2015 CASING REFERENCE TABLES

VAM Premium connections. Photo Thiago Fernandes, courtesy of Vallourec Oil & Gas France.

Special Supplement to
World Oil®
Published in January 2015

These tables are organized by connection manufacturer, and listings show page numbers for cut-away diagrams (not to scale) for visual cross-reference with tabular data. Critical tubular and connection areas can be used with minimum yield or ultimate strengths in designs, and to calculate casing connection tensile capacity. Individual manufacturers' representatives should be consulted before making final decisions.

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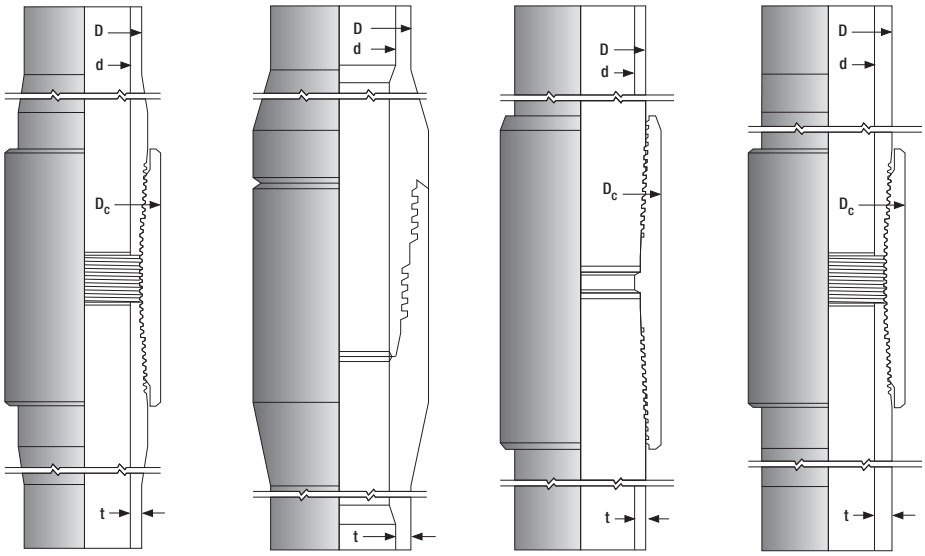
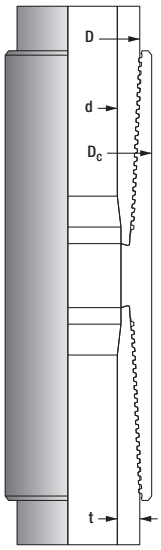
Contents

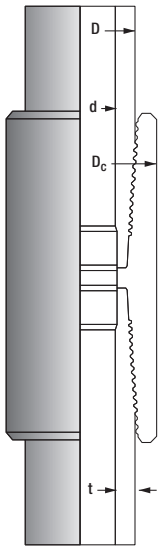
Dimension nomenclature

D = Casing nominal OD of tube, in.
w = Casing weight, lb/ft
d = ID (drift), in.
t = Casing wall thickness, in.
Dc = Connection OD, in.
At = Casing wall critical cross-sectional area, sq in.
Ac = Connection critical cross-sectional area, sq in.

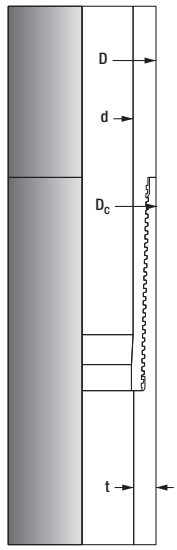




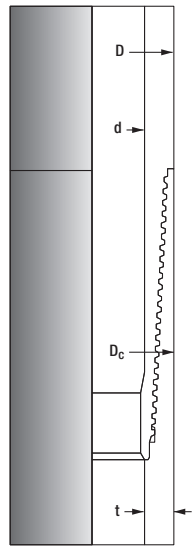
HSC Corp. HSC Casing is a non-upset, threaded and coupled premium connection with a tapered thread and metal-to-metal seal. The seal is maximized by storing the torqued energy across the 15° shoulder. With HSC coupling, joint performance exceeds the tensile strength of the pipe body.



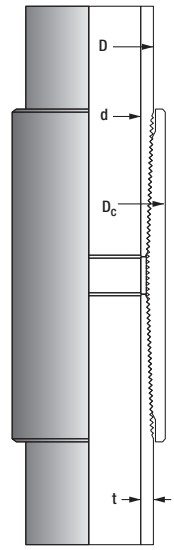
Hunting Big "0" Seal-Lock (SLBIGO) is a threaded and coupled, non-upset connection for large-diameter pipe. Features include 3-pitch hooked thread design with gas-tight, metal-to-metal seal and internal torque shoulder. Thread geometry and form allow for easy stabbing, quick make-up and multiple make-and-break. No welding or additional inspection is needed because it is threaded on plain-end pipe.



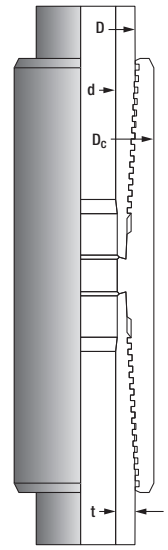
Hunting FJ-150 includes an ID/OD flush connection, which makes it ideal for high-grade steels and chrome. The 90° load flank and large-radius stab flank allow low hoop stresses and reduced running times. Axial metal-to-metal nose seal is created by an internal shoulder, while the external shoulder creates an external torque shoulder. Large torque shoulders allow for high torque capabilities.



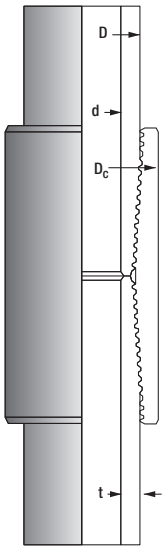
Hunting Seal-Lock Flush (SLF) is a premium connection with metal-to-metal seal, hooked thread form and external torque shoulder for liner applications. It offers excellent clearance and pipe body burst. Hooked thread form and geometry provide easy make-up and eliminate radial separation between mating pin and box.



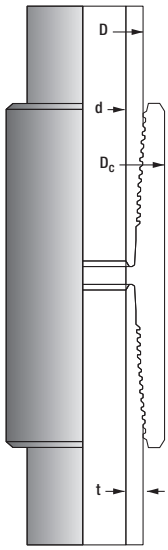
Hunting TKC Convertible (TKC CLTC) includes a converter ring press fit into J-area after mill end make-up, which provides a smooth bore for turbulent-free flow, positive torque stop for field end make-up, and metal-to-metal seal when used according to pin end specifications. Manufactured to ⅛ of API tolerances to ensure ideal match with API 8 round pins. Ability to withstand bending and torsional loads downhole makes it ideal for horizontal and deviated wells.



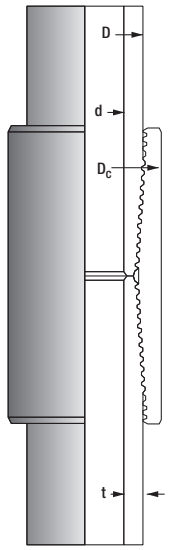
Hunting Seal-Lock Apex (SLAPEX) is a new threaded and coupled, non-upset premium connection designed to provide internal and external pressure integrity under extreme loads. It utilizes a patented sealing thread form and a metal-to-metal seal to provide performance ratings that equal or exceed pipe body ratings in tension, internal and external pressure. A negative load-flank thread and advanced connection geometry result in smooth, trouble-free running.



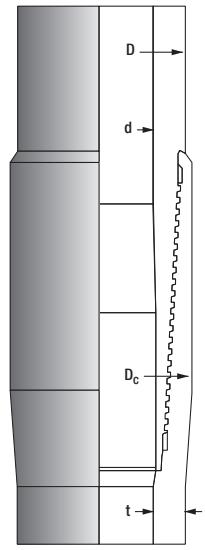
Hunting Seal-Lock Boss (SLBOSS) is a casing connection that is cost-competitive with API Buttress. It uses a patented sealing and unique pin-to-pin torque shoulder for enhanced compressive loading. Rugged thread form and geometry result in deep stabbing and quick make-up without cross-threading.



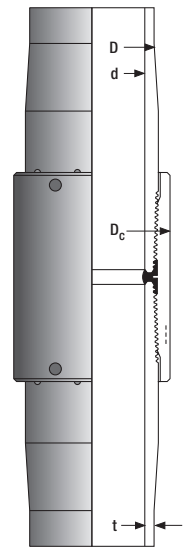
Hunting Seal-Lock HC (SLHC) threaded and coupled connection is for light to mid-weight tubulars. Features include gas-tight, metal-to-metal seal, torque shoulder and hooked thread form. Geometry allows multiple make and breaks and virtually eliminates cross-threading. Stresses are minimized to provide superior performance in H_2S and CO_2.



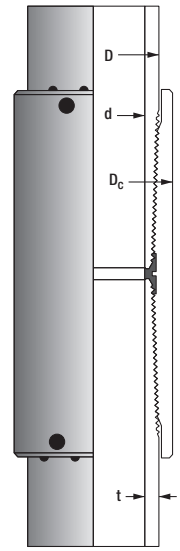
Hunting Seal-Lock HT (SLHT) is a threaded and coupled casing connection featuring a tapered run-out hooked thread form and unique pin-to-pin shoulder to provide excellent torsional, bending and tensile performance in horizontal and directional wells. The close-tolerance thread form provides pipe body pressure capability under the most extreme well conditions.



Hunting Seal-Lock Semi Flush (SLSF) bi-directional metal-to-metal sealing delivers full-body API rating internally and significantly enhanced external performance. Internal and external shoulders permit visual make-up indication and increased torque rating for downhole rotation applications. Angles and areas of the stab flanks and torque shoulders are optimized to create enhanced compressive ratings.



Hunting TKC MMS for internally plastic-coated casing. Teflon center ring allows for turbulent-free flow. When used with pin end finish specifications, a gas-tight seal is provided, along with 100% holiday-free connection. Precise make-up is achieved by a proprietary coupling and pin gauging system. It is manufactured to ⅛ of API tolerances to ensure ideal match with API 8 round pins.



Hunting TKC LTC has high-temperature, elastomeric internal and external seals to block pressure from thread area, which allows threads to serve primarily as tensile joining members. Elastomeric seals can withstand repeated make and break cycles. It is manufactured to ⅛ of API tolerances to ensure best possible match with API 8 round pins. With resistance to bending and torsional loads downhole, it is ideal for horizontal and deviated wells.

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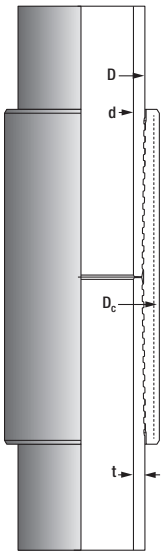
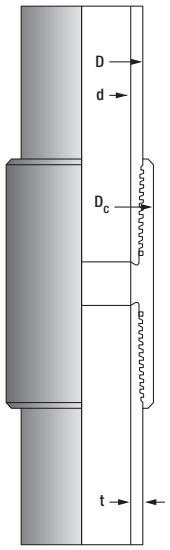
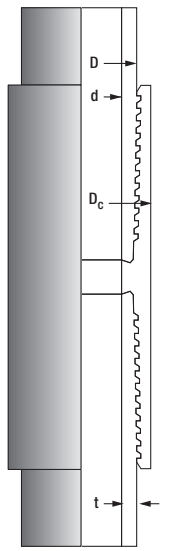


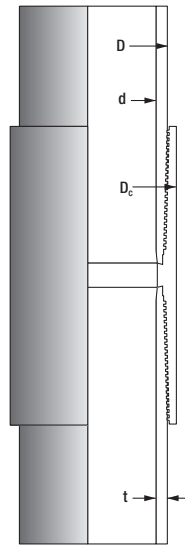
Hunting TKC 4040 RTC is specially designed as a low-stress, multi-cycle fracture string. This non-upset threaded and coupled connection uses the established Hunting TKC 4040 thread form and mating pin ends to create a positive torque stop.



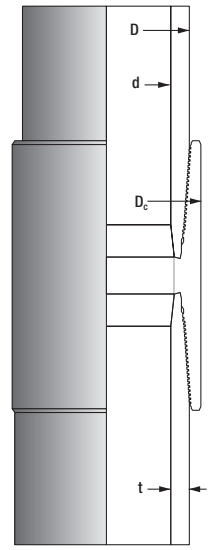
JFE FOX is a premium threaded and coupled connection providing full pipe body performance for internal and external pressures and tension. The coupling OD is matched to the casing wall thickness to optimize clearance. Special clearance couplings are also available. The thread utilizes a unique change in thread pitch to provide more even load distribution along the threads and the contour metal to metal seal provides full gas tight sealing. Casing size range is 5 in. to 13⅜ in.



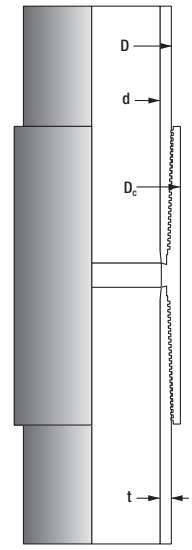
JFE Steel JFEBEAR is a premium threaded and coupled connection providing full pipe body performance for internal and external pressures and tension. The coupling OD is matched to the casing wall thickness to optimize clearance. Special clearance couplings are also available. The thread form is enhanced for ease of stabbing and running and the contour metal to metal seal provides full gas tight sealing. Casing size range is 5 in. to 9⅝ in.



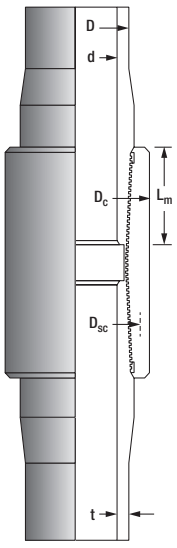
JFE Steel JFELION is a premium threaded and coupled connection providing full pipe body performance for internal and external pressures, tension and compression. The coupling OD is matched to the casing wall thickness to optimize clearance. Special clearance couplings are available. The thread form is enhanced for ease of stabbing and running and the radial metal to metal seal provides full gas tight sealing. Casing size range is 5½ in. to 14 in.



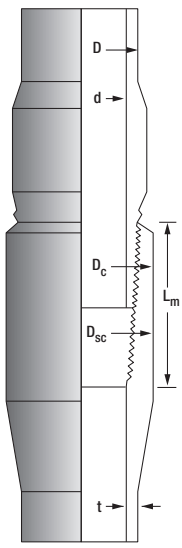
JFE Steel JFELION HW is a premium threaded and coupled connection specifically designed for heavy wall casing, providing full pipe body ratings for internal and external pressures, tension and compression. The thread form and taper are designed for ease of stabbing and running while the metal to metal seal provides gas tight sealing. Size range is 6⅝ in. to 12¼ in. and wall thickness up to 1.500 in. Special clearance coupling options are available.



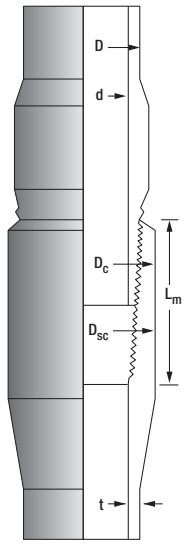
JFE Steel JFETIGER is a premium threaded and coupled connection providing full pipe body performance for internal and external pressures, tension, and 95% compression. The coupling OD is matched to the casing wall thickness to optimize clearance. Special clearance couplings are available. The thread form is enhanced for ease of stabbing and running and the radial metal to metal seal provides full gas tight sealing. Standard size range is 7 in. to 9⅞ in.



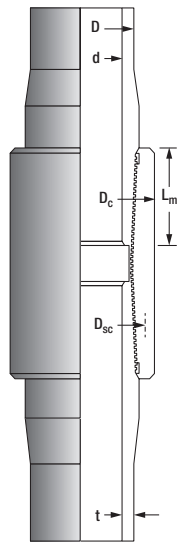
NOV Fiber Glass Systems, Star Aliphatic Amine Casing (Threaded and Coupled) features premium Advanced Composite Threads (ACT) designed in accordance with API 8rd EUE long form specifications. ACT threads are molded for a smooth, corrosion-resistant thread surface, which provides superior breakout performance. ACT threads use graphite as an added lubricant to avoid damage and wear. The casing is designed and manufactured to resist creep and increase maximum tensile strength. Laminate can handle internal pressures up to 3,500 psi at 200°F.



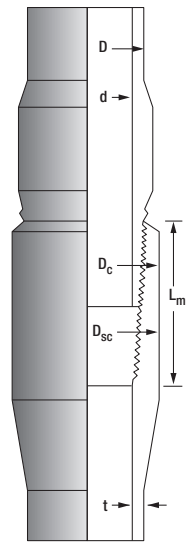
NOV Fiber Glass Systems, Star Aliphatic Amine Casing (Integral Joint) features premium Advanced Composite Threads (ACT) designed in accordance with API 8rd EUE long form specifications. ACT threads are molded for a smooth, corrosion-resistant thread surface, which provides superior breakout performance. ACT threads use graphite as an added lubricant to avoid damage and wear. The casing is designed and manufactured to resist creep and increase maximum tensile strength. Laminate can handle internal pressures up to 3,500 psi at 200°F.



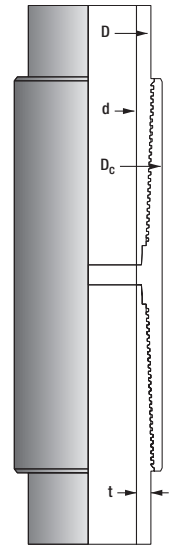
NOV Fiber Glass Systems, Star Anhydride Casing (Integral Joint) features premium Advanced Composite Threads (ACT) designed in accordance with API 8rd EUE long form specifications. ACT threads are molded for a smooth, corrosion-resistant thread surface, which provides superior breakout performance. ACT threads use graphite as an added lubricant to avoid damage and wear. The casing is designed and manufactured to resist creep and increase maximum tensile strength. Laminate can handle internal pressures up to 2,500 psi at 150°F.



NOV Fiber Glass Systems, Star Aromatic Amine Casing (Threaded and Coupled) features premium Advanced Composite Threads (ACT) designed in accordance with API 8rd EUE long form specifications. ACT threads are molded for a smooth, corrosion-resistant thread surface, which provides superior breakout performance. ACT threads use graphite as an added lubricant to avoid damage and wear. The casing is designed and manufactured to resist creep and increase maximum tensile strength. Laminate can handle internal pressures up to 2,500 psi at 212°F.



NOV Fiber Glass Systems, Centron Downhole Casing (Integral Joint) features premium 4-thread-per-inch connectors with coarse, shallow-angle thread forms that are rugged and more resistant to stab damage and cross-threading. Mechanical O-ring seals prevent fluid penetration into the thread seal area and keep dope from entering the formation in injection applications, minimizing the need for acidizing. Threads are LTC and are available in non-galling female composite, assuring easy make-up and superior breakout performance. This casing can be run with common oilfield tools. Laminate can handle internal pressures up to 2,500 psi at 212°F.



NS Connection Technology NS-CC is a field-proven, high- performance threaded and coupled connection. It combines the rugged buttress thread form with a patented two-step pin nose and high-pressure, gas-tight metal-to-metal seal. It provides a joint strength greater than pipe-body yield strength on API tubing while maintaining low hoop stress in the coupling, which is ideal for H2S environments. The recess-free bore allows for less turbulent flow. Excellent anti-gall performance for carbon and high chrome materials is demonstrated in API 5C5 testing and in the field. NS-CC has full interchange ability in a size range.

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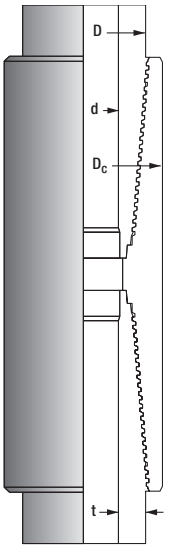
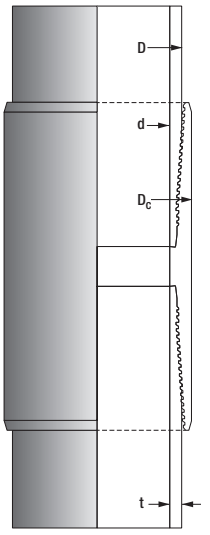
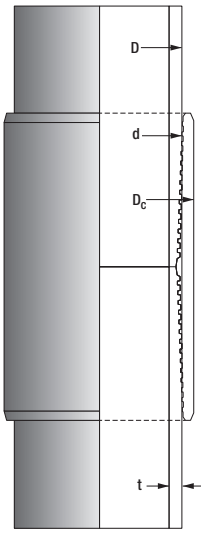


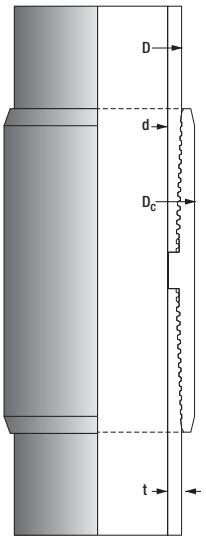
NS Connection Technology NS-HC is a field-proven, high-performance threaded and coupled connection. It combines the rugged buttress thread form with a patented two-step pin nose and high-pressure, gas-tight metal-to-metal seal. It provides a joint strength greater than pipe-body yield strength on API tubing while maintaining low hoop stress in the coupling, which is ideal for H2S environments. The recess-free bore allows for less turbulent flow. Excellent anti-gall performance for carbon and high chrome materials is demonstrated in API 5C5 testing and in the field. NS-HC has full interchange ability in a size range.



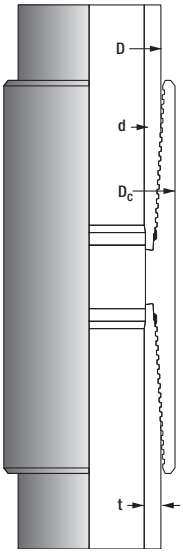
Tejas Tubular TTNY features a rugged straight to taper Connection Design. This is a double lead connection—for every revolution the connection makes up on two threads for faster make-up. The straight section is designed for deep stabbing, while the tapered section provides negative load flank threads, capable of providing sealing to 100% Internal Pressure while preventing jump-out. The primary metal-to-metal radial seal and the secondary axial metal seal, tested with combined loads of tension and compression to 95% VME, providing 100% internal pressure with gas, at ambient and elevated temperature to 365°F.



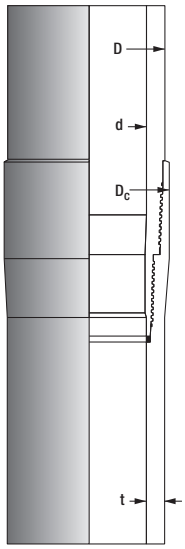
Tejas Tubular TTXS Xtreme Series Connection is a non-upset threaded and coupled casing connection, with a size range from 4 ½ in. to 7 in. Pin ends shoulder inside the coupling to provide a torque stop, resulting in a more cost effective production string or liner. The flush ID connection provides increased flowrates without turbulence or erosion and no restrictions during the running of downhole tools. 100% in tensile, compression and internal pressure. Interchangeable with an API Buttress connection. Tested to 20% per 100 ft in bending with combined loads provides an additional option for long laterals.



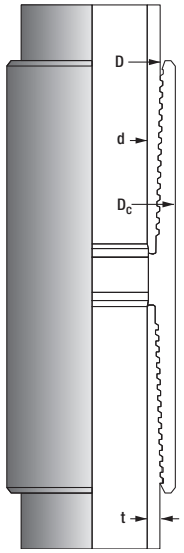
Tejas Tubular TTRS1 Reduced Stress Connection is designed to reduce stress levels experienced during multiple hydraulic fracturing stages and rotation of casing in horizontal wells. The rugged torque shoulder provides 100% compression efficiency and a higher torsional rating for drilling, not found in API Buttress connections. The axial metal contact of the pin nose to the torque shoulder provides 100% in internal pressure while bending is applied to 20% per 100 ft. The high operational torque provides for rotation of the string through high bend rates in horizontal wells. The torque shoulder provides an internal flush ID.



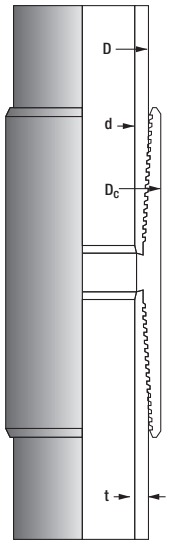
TenarisHydril Blue is a high-performance threaded and coupled premium connection, successfully tested under ISO 13679 CAL IV and the forthcoming revision of the API RP 5C5 testing protocol. Specially designed for use in today's increasingly complex and environmentally sensitive oil and gas drilling and production activities and extensively field-proven in demanding applications such us HP/HT and deepwater environments. TenarisHydril Blue Dopeless connections exhibit the largest dope-free running record worldwide.



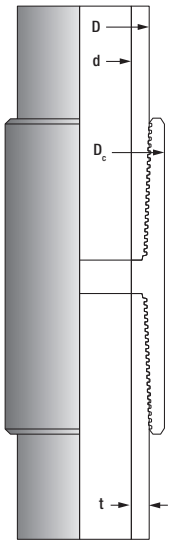
The Blue Near Flush connection is a semi-flush premium connection designed to combine high tension capacity, compression efficiency and sealability for use in applications of deepwater, HP/HT and deep wells where tight clearances are required. It offers best-in-class performance and the operational and environmental benefits of the renowned Dopeless technology.



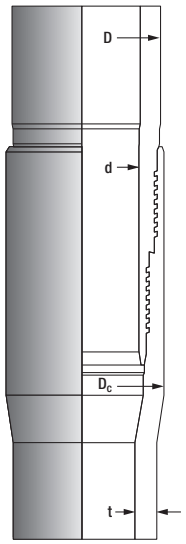
TenarisHydril Blue Thermal Liner is the connection specifically designed and tested to offer best-in-class performance for the horizontal slotted section of SAGD wells and other slotted liner applications. Its optimized design maintains excellent mechanical integrity under combined torque, compression, cyclical loading conditions, and provides enhanced running performance. Available with Dopeless technology.



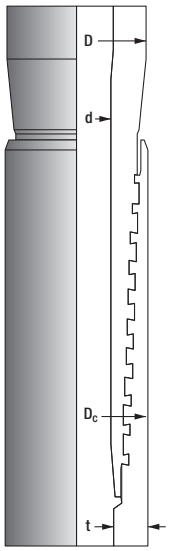
TenarisHydril ER is a field-proven, robust connection widely used as surface and intermediate casing in a variety of applications where metal-to-metal seal is not needed. Among the most important features are the easy stabbing and fast make-up with minimum cross-threading risk even in large ODs. Available with Dopeless technology.



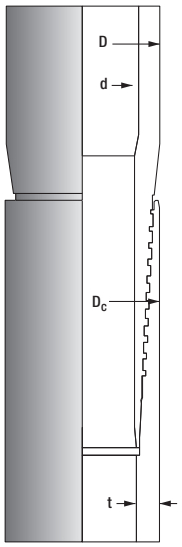
TenarisXP Buttress connection is recommended for shale and casing while drilling applications. It is API-compatible, with a special shouldered coupling design that offers extra torque and compression resistance, as well as greater make-up stability than standard buttress connections.



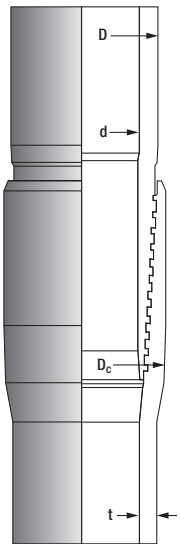
TenarisHydril MACII is a field proven integral connection for heavy wall pipes.



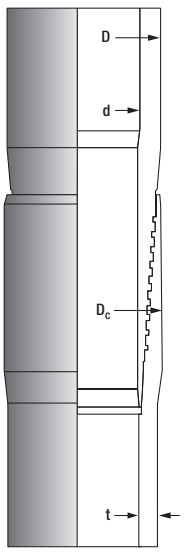
TenarisHydril Wedge 511 is an integral TenarisHydril Wedge connection for maximum clearance. With a completely flush profile, this connection is used in applications such as horizontal and extended reach well, casing while drilling or HP/HT and deep wells, where its high compression and torque capacity are needed. It is available with Dopeless technology, which reduces environmental impact and enhances operational performance by avoiding dope applied to connections during running and storage.



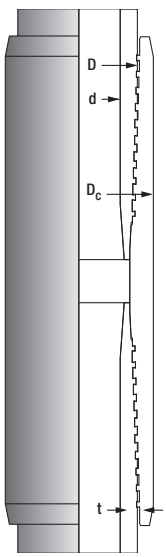
TenarisHydril Wedge 513 is an integral TenarisHydril Wedge connection for maximum clearance and a metal-to-metal seal. With a completely flush profile, this connection is used in applications such as horizontal and extended reach well, casing while drilling or HP/HT and deep wells, where its high compression and torque capacity are needed. It is available with Dopeless technology, which reduces environmental impact and enhances operational performance by avoiding dope applied to connections during running and storage.



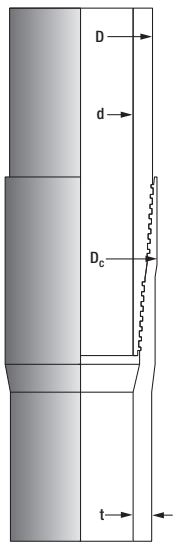
TenarisHydril Wedge 521 is a field-proven, integral TenarisHydril Wedge connection featuring exceptional compression ratings, torque capacity and running reliability, often used in deep water and deep well applications for large diameter, tight clearance intermediate strings. It also provides high torque with high clearance for applications such as production liners in horizontal and extended reach wells. It is available with Dopeless technology, which reduces environmental impact and enhances operational performance by avoiding dope applied to connections during running and storage.



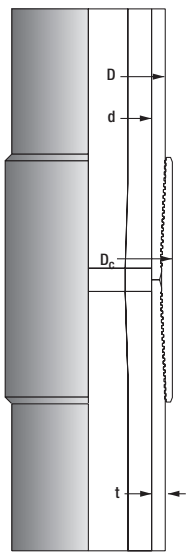
TenarisHydril Wedge 523 is a field-proven, integral TenarisHydril Wedge connection with metal-to-metal seal, featuring exceptional compression ratings, torque capacity and running reliability. Widely used in demanding applications as HP/HT, deep wells and horizontal and extended reach wells. It is available with Dopeless technology, which reduces environmental impact and enhances operational performance by avoiding dope applied to connections during running and storage.



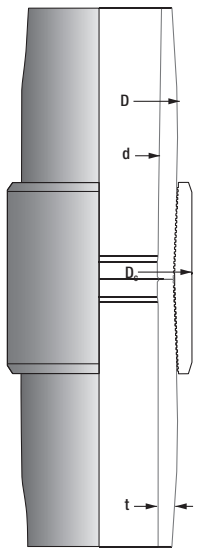
TenarisHydril Wedge 563 is field proven, high performance TenarisHydril Wedge connection featuring exceptional torque and running reliability. This threaded-and-coupled connection combines the structural characteristics of the dovetail Wedge thread with the sealing reliability of a metal seal. It is available with Dopeless technology, which reduces environmental impact and enhances operational performance by avoiding dope applied to connections during running and storage.



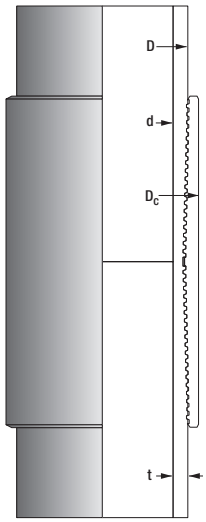
TenarisHydril Wedge 625 is an integral TenarisHydril Wedge connection providing best-in-class tension/compression ratings together with exceptional torque capacity and running reliability. It is used in shales and horizontal and extended reach applications. It is available with Dopeless technology, which reduces environmental impact and enhances operational performance by avoiding dope applied to connections during running and storage.



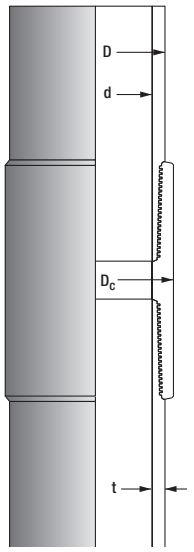
TMK UP ULTRA DQX is a high performance semi -premium connection with tension and compression strength equal to pipe body Tested to the ISO 13679 CAL II. Designed with ULTRA FullContact thread, it provides excellent bending capacity and improved sealability. Its torque energized shoulder is designed for high torque resistance while maintaining integrity during hydraulic fracturing.



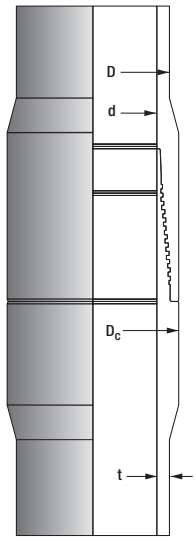
TMK UP ULTRA DQX HT boasts the same advantages as the DQX in fatigue life and minimized hoop stress, as well as tension and compression strength equal to the pipe body. Its enhanced torque energized shoulder delivers an increased torque resistance over standard DQX.



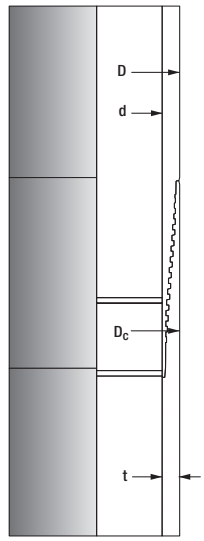
TMK BPN is an API buttress compatible semi-premium connection featuring a pin nose torque shoulder designed for high torque applications. It is specifically designed for customers seeking better-than-API performance along with the convenience of API buttress compatibility



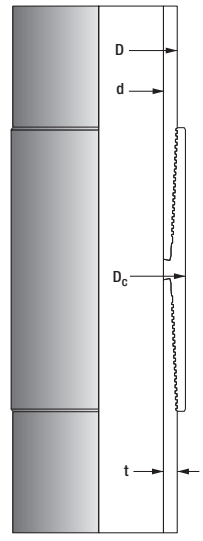
TMK UP CWB is a threaded and coupled semi-premium connection with improved modified buttress threads and designed to withstand high torque requirements.



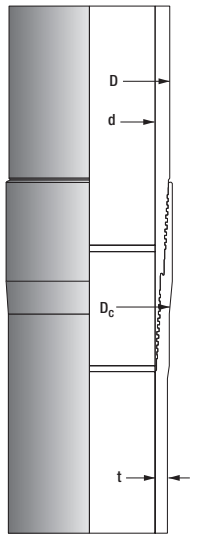
TMK UP ULTRA FX is a special clearance tubing connection featuring an extended API upset and the FullContact threadform. Rated at 100% in tension and compression, this connection is ideal for WAG and CO2 injection wells, workstrings and production tubing where clearance and performance are key.



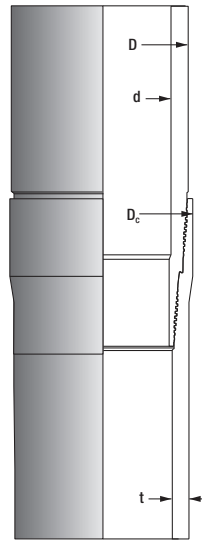
TMK UP ULTRA FJ premium connection is features an internal and external gas tight metal-to-metal seals and the FullContact, and is one of the strongest true flush-joint connection on the market today



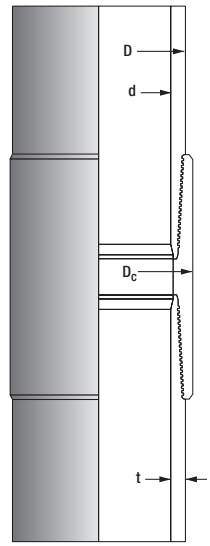
TMK UP ULTRA QX is a threaded and coupled premium connection featuring the FullContact™ threadform. It is designed to maintain gas tight pressure integrity while enduring the stresses of high torque and severe bending which has been validated by the severe CAL IV test.



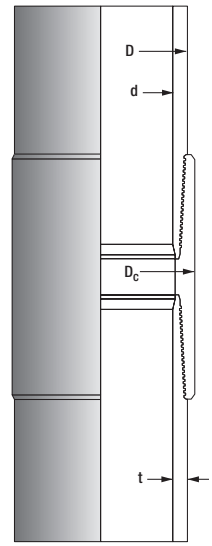
TMK UP ULTRA SF slim-line premium connection is the strongest semi-flush connection with the highest tensile efficiency of any semi-flush casing connection. The connection is ideal for extended reach wells as its unique metal to metal center shoulder seal that can resist rotation up to 100% of yield. Widely accepted in the industry as one of the best, the SF's performance has been validated by CAL IV testing protocol.



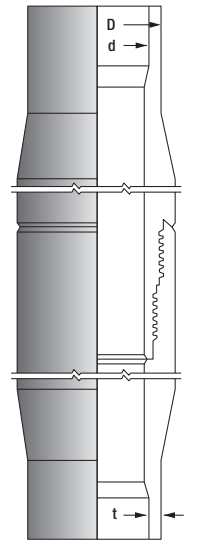
TMK UP ULTRA SF-II is the next generations of semi-flush connection designed and tested to withstand the severities of horizontal, extended reach and HT/HP wells. Designed to withstand high pressure and high torque the SF-II is ideal for the most demanding well conditions.



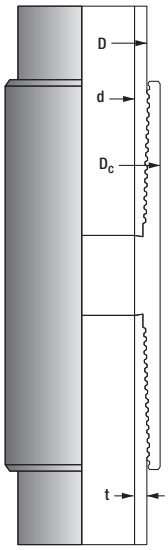
TMK UP PF is a premium connection with high tension and compression efficiency. Designed with a metal to metal seal, it ensures high integrity in harsh conditions under significant bending, compressive, tensile loads.



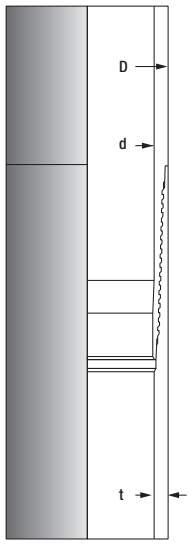
TMK UP PF ET is designed to withstand high compression and high torque requirements while maintaining a gas-tight seal under the most demanding well conditions.



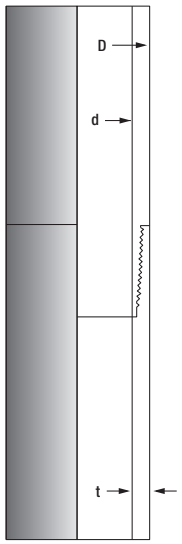
TPS Technitube Röhrenwerke TPS-Multiseal-TS-4 is a high-performance, premium, two-step integral joint connection for high-pressure service. Available with medium and heavyweight tubing. Thread profile with multiple metal-to-metal seals and torque shoulders utilizes four threads per inch. Increased upset length guarantees 90% reparability by recutting in case of thread damage.



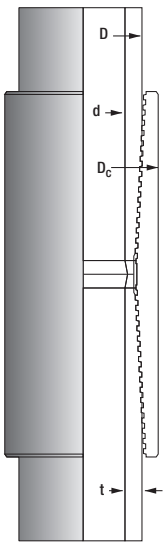
TPS Technitube Röhrenweke Techniseal is a high-performance, non-upset tubing and casing coupling with buttress-type threads, high-compression, tapered, metal-to-metal seal and reverse-angle shoulder. Full pipe strength is provided for tension, compression, bending and internal and external pressures. It will withstand repeated make/break and is fast running, and flush ID minimizes corrosion/erosion. It is also recommended for high-strength and special alloy materials.



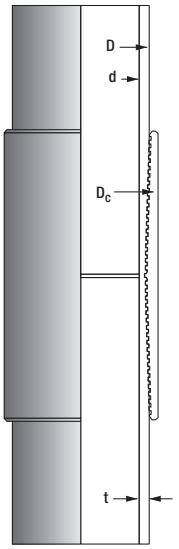
Vallourec USA—Atlas Bradford HD-L connection is a flush OD connection with superior pressure resistance and structural integrity. Connection design features 5° internal and external (sizes <14 in.) metal-to-metal pressure seals rated to the API pipe body pressure rating, a robust hooked thread form that resists cross-threading and jump-out, and excellent resistance to cyclical combined loading including bending. Now available in sizes 23/8 in. through 20 in.



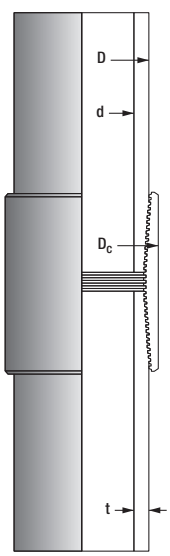
Vallourec USA—Atlas Bradford ST-L is a flush OD premium tubing connection featuring negative-angle load flanks and twin lead threads for superior strength. Radial metal-to-metal seals and optional seal ring provide protection against internal and external pressures. Trapped 15° external torque shoulder withstands high make-up torque. Designed for easy stabbing and fast make-up.



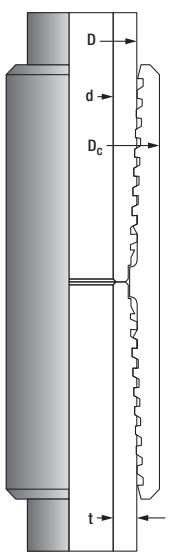
Vallourec USA—Atlas Bradford ATS-E is a semi-premium threaded and coupled connection with a patented thread sealing design. With robust, hooked 3-pitch thread form for 133/8–20-in. (4-pitch for 7–117/8-in.) make-up is fast and dependable. Abutting pin noses offer enhanced torsional capabilities and ensure proper connection make-up at the rig, as well as compressive loading resistance. The couplings incorporate API Buttress coupling stock dimensions. Performance ratings were tested and verified using the ISO 13679 connection qualification standard. The ATS-E offers tensile, burst and collapse ratings equal to pipe body ratings.



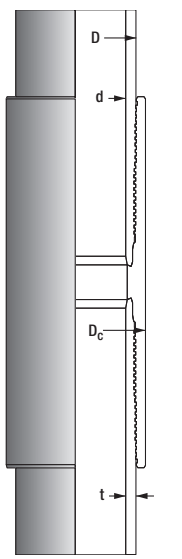
Vallourec USA—Atlas Bradford DWC/C, DWC/C-HT, DWC/C PLUS are semi-premium threaded and coupled connections designed specifically for drilling with casing applications. Connector design features a patented fatigue resistance groove in the coupling to increase fatigue life, along with a pin-to-pin torque shoulder system that greatly increases the amount of torque that can be applied. It also features an API Buttress run-out thread form, optional resilient Teflon seal ring, and uses API Buttress coupling stock. Widely accepted in the U.S. shale plays, DWC/C is now available with further options, among those a High Torque (HT) option that provides torque capability above 30,000 ft-lb.



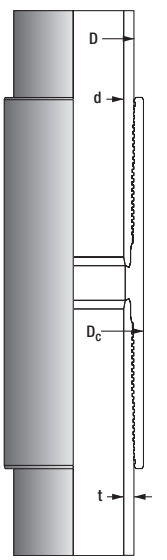
VAM Connection BIG OMEGA is a threaded and coupled connection for large-OD surface and intermediate casing and conductor pipe. Three threads per inch and steep 1:7:5 thread taper produce quick running times while virtually eliminating cross-threading. Problems associated with welding on connectors are eliminated because coupling is threaded directly onto pipe.



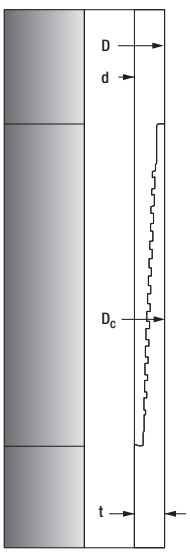
VAM Connection DINO VAM is a cost-effective, threaded and coupled connection for surface and intermediate casing applications. Increased running reliability and reduced rig costs result from its deep stabbing, non-cross-threading and fast make-up. Sealing and structural strength are provided by a coarse 3-TPI tapered, hooded thread design. The connection is immune to jump-in/jump-out.



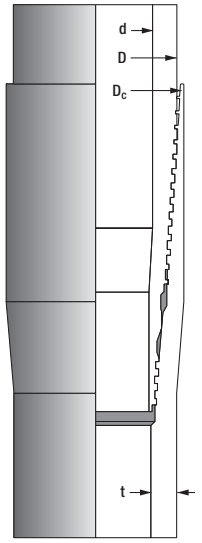
VAM Connection VAM 21 is the latest generation of threaded and coupled premium connection introducing an innovative design. Confidence thanks to ISO 13679 CAL-IV compliance within the full pipe body envelope extends the opportunities for well designs.



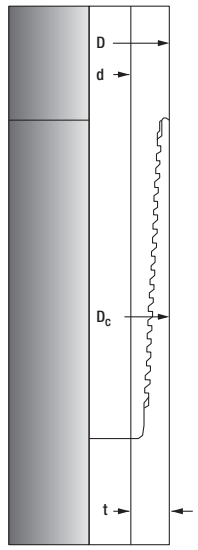
VAM Connection VAM 21 HT has the same design and performance as the VAM® 21TM, except for an enhanced torque shoulder. This design is ideal for applications where high torque is anticipated, such as rotation during cementing operations or tight running in deviated and horizontal wells."



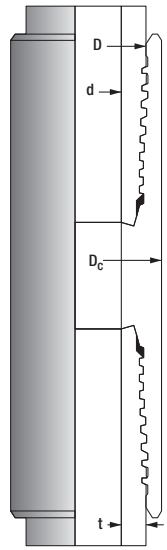
VAM Connection VAM BOLT is a true flush OD connection for large OD surface casing applications requiring tight clearance, for instance offshore HPHT. Its features include dovetail profile threads to prevent jump-out and a double tapered metal-to-metal seal providing superior external and internal pressure tightness. The double-start thread design and tapered profile allows an easy stabbing and fast running.



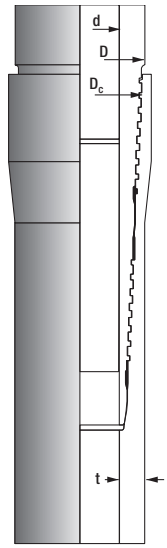
VAM Connection VAM EDGE SF has a torque capability over 25,000 ft-lb for the most popular sizes, expanding the opportunities for drilling in shale plays, and giving access to longer lateral sections. The connection has been tested and validated to the specific shale drilling requirements, which includes a qualification against the most recent ISO13679 testing protocol.



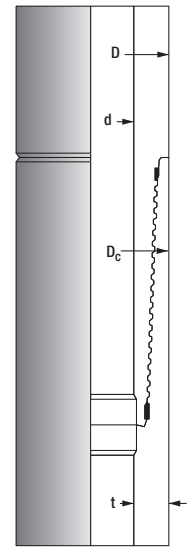
VAM Connection VAM FJL is an integral flush joint that provides maximum running clearance and optimum strength (65% efficiency under tension) on medium wall. It features reverse-angle load flank for load transmission and jump-out prevention. Ideal for moderate-depth liners and tieback strings.



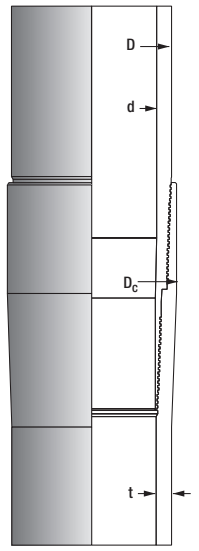
VAM Connection VAM HW ST is a threaded and coupled connection designed for HPHT applications. It is available on heavy wall pipes. A metal-to-metal seal system provides pressure integrity under high internal and external pressure. Tensile efficiency equals 100%. Hooked thread with –3° reverse angle prevents jump-out under tension or bending. The connection also is available with special clearance 70–80% to meet with special HPHT designs.



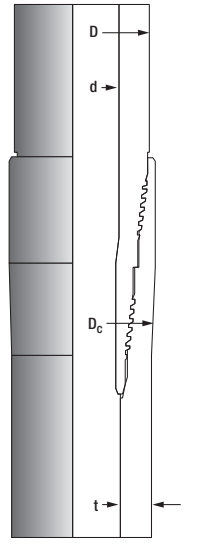
VAM Connection VAM HTF (High Torque Flush) is a true flush OD and ID integral connection providing maximum clearance along with superior torque strength. It is recommended for challenging applications such as drilling with casing and liner rotation to achieve better cementation in highly deviated and critical HPHT wells. The VAM HTF features external and internal metal-to-metal seals, working independently of each other, to achieve 100% sealability against annular and wellbore pressures.



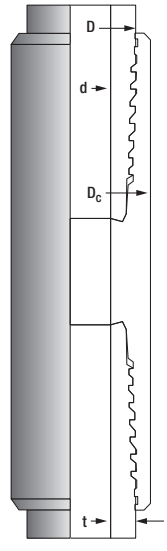
VAM Connection VAM MUST is a heavy wall connection for extreme external pressures, as found in squeezing clay and salt domes.



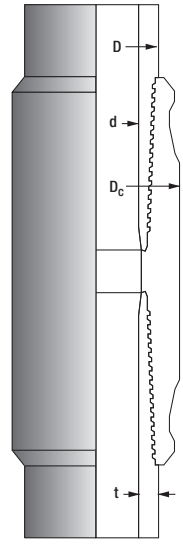
VAM Connection VAM SG brings VAM premium sealing performance to a semi-flush connection with extremely high tension performance and increased torque capacity, validated to the specific shale drilling requirements, while remaining highly competitive in the shale play economics.



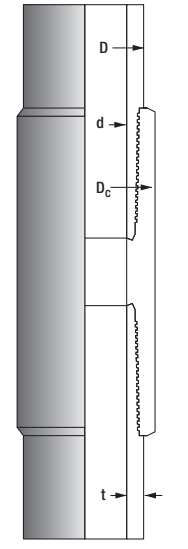
VAM Connection VAM SLIJ II is an improved, second-generation version of the former VAM® SLIJTM connection. It is an integral casing joint machined on plain-end non-upset pipe. The design combines a near-flush OD with high tensile efficiencies and stronger structural integrity. The connection is ideal for production and intermediate casing, liner and tieback applications in all types of wells. It has a unique combination of internal and external metal-to-metal seals to prevent pressures from entering the connection.



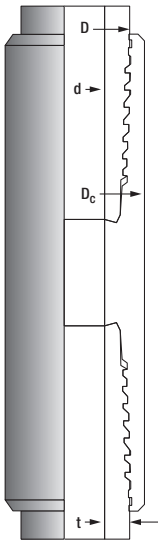
VAM Connection VAM TOP provides tubing performance in casing sizes. New steep taper, metal-to-metal seal design ensures gas-tight pressure integrity for large-OD tubing and production casing strings, even under severe mechanical and thermal combine loads. It is suitable for all types of materials (carbon and corrosion-resistant alloy) and ideal for horizontal or deviated wells.



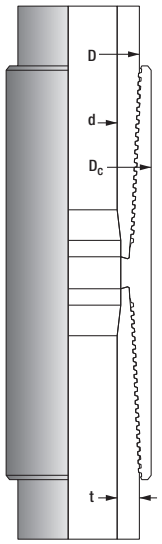
VAM Connection VAM TOP FE (Fatigue Enhanced) threaded and coupled riser for offshore high-pressure drilling and production applications. Excellent fatigue performance combined with the proven design characteristics of VAM TOP, including the high-pressure metal-to-metal seal integrity. Fatigue improved thread and swoosh coupling design- result in SAF of 2.5 or better over product line. The threaded and coupled design allows high collapse and/or sour service in high strength grades ideal for inner riser design.



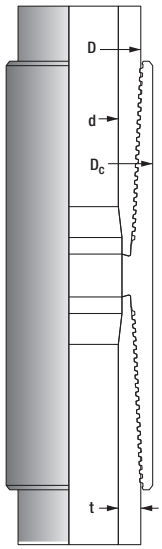
VAM Connection VAM TOP HC (High Compression) is a threaded and coupled connection based on the main features of the VAM TOP connection. This connection has been designed for various high-compression applications where it may be necessary to apply extreme compressive loads to the string (elevated temperature inducing compression, compaction, subsidence).



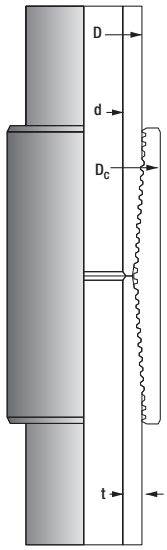
VAM Connection VAM TOP HT has the same design and performance as the VAM® TOPTM, except for an enhanced torque shoulder. This design is ideal for applications where high torque is anticipated, such as rotation during cementing operations or tight running in deviated and horizontal wells.



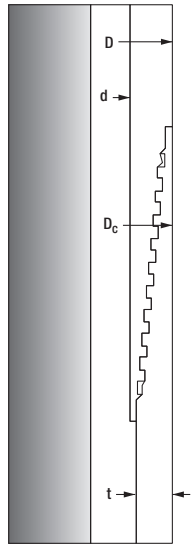
voestalpine Tubulars VAGT is a threaded and coupled connection with a metal to metal seal, proven by millions of feet in service. The high contact pressure in the seal area ensures 100% gas tightness. Its internal shoulder reinforces the contact pressure in the seal area and acts as positive make-up stop. The thread design ensures high stress performance and allows easy make-up under severe conditions. Its smooth internal profile minimizes turbulence and provides good conditions for internal plastic coating.



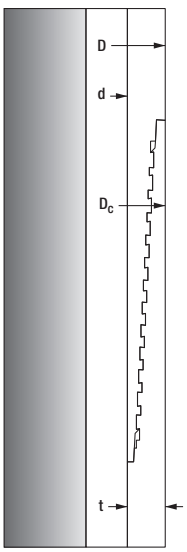
voestalpine Tubulars VAsuperior is a threaded and coupled gas tight connection with a metal to metal seal. It is designed to meet ISO 13679, CAL IV. Its internal flush profile minimizes turbulences. The high contact pressure in the seal area is reinforced by the internal shoulder. The distance of the seal area from the pin face provides improved protection against transport, handling and—most of all—installation damages. The thread design allows easy and fast make-up in the most severe conditions.



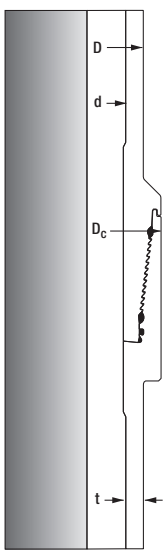
voestalpine Tubulars VAroughneck is a joint development between voestalpine Tubulars and RAG, an Austrian oil company, especially for well applications where rotation of the casing is required (during installation or cementing). It combines the strengths of API Buttress (e.g. minimal risk of jump-out failures under bending loads) with the following advantages: The make-up is controlled by pin-to-pin contact and the connection provides double torque capability compared to API Buttress. Therefore this connection is suitable for tough field applications.



XL Systems–National Oilwell Varco XLC-S integral wedge thread connection was developed for structural applications where tension and compression strength, bending strength and fatigue performance dominate the string design criteria. XLC-S includes an external metal-to-metal seawater exclusion seal making this connection ideal for the outermost string of an offshore well. XLC-S is available in 20-in. and larger diameters. Typical applications include platform conductors or drive pipe, jackup exploratory wells conductors, subsea well conductors or jet strings, and tieback strings.



XL Systems–National Oilwell Varco XLF is an integral connection with the threads machined directly into the pipe wall, producing the ideal connection geometry of a flush ID and flush OD profile. XLF uses wedge thread technology with a dovetail thread shape. Internal metal-to-metal seal makes XLF a choice when pressure integrity is the primary design driver. XLF is available in 20-in. and larger diameters. Typical applications include intermediate and surface casing strings, downhole liner strings, casing for deep wells with tight annular clearances, and tieback strings.



XL Systems–National Oilwell Varco Viper is a high strength weld-on casing and conductor connector designed for the most demanding onshore and offshore applications. The self-aligning design incorporates an elastomeric O-ring as the primary seal and a secondary metal-to-metal seawater exclusion seal. Viper connectors are manufactured in 16 to 38-in. diameters. Performance exceeds pipe body ratings for internal pressure, external pressure, tension, compression and bending in most sizes.

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HSC Corp.—HSC Casing

Diagram p. C-110

Type: Coupled **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
5.000	13.0	4.383	0.253	5.586	3.773	5.498	–	–	302	–	415	–	472	–
5.000	15.0	4.283	0.296	5.586	4.374	5.498	–	–	350	–	481	–	547	–
5.000	18.0	4.151	0.362	5.586	5.275	5.498	–	–	422	–	580	–	659	–
5.000	21.4	4.001	0.437	5.586	6.265	5.498	–	–	501	–	658	–	783	–
5.000	23.2	3.919	0.478	5.586	6.790	5.498	–	–	543	–	747	–	849	–
5.500	15.5	4.825	0.275	6.075	4.514	5.975	–	–	361	–	497	–	564	–
5.500	17.0	4.767	0.304	6.075	4.963	5.975	–	–	397	–	546	–	620	–
5.500	20.0	4.653	0.361	6.075	5.828	5.975	–	–	466	–	641	–	729	–
5.500	23.0	4.545	0.415	6.075	6.629	5.975	–	–	530	–	729	–	829	–
5.500	26.0	4.423	0.476	6.075	7.513	5.975	–	–	601	–	826	–	939	–
6.625	20.0	5.924	0.288	7.413	5.733	9.667	–	–	459	–	631	–	717	–
6.625	24.0	5.796	0.352	7.413	6.939	9.667	–	–	555	–	763	–	867	–
6.625	28.0	5.666	0.417	7.413	8.133	9.667	–	–	651	–	895	–	1,017	–
6.625	32.0	5.550	0.475	7.413	9.177	9.667	–	–	734	–	1,009	–	1,147	–
7.000	23.0	6.241	0.317	7.681	6.656	9.066	–	–	532	–	732	–	832	–
7.000	26.0	6.151	0.362	7.681	7.548	9.066	–	–	604	–	830	–	944	–
7.000	29.0	6.059	0.408	7.681	8.451	9.066	–	–	676	–	930	–	1,056	–
7.000	32.0	5.969	0.453	7.681	9.317	9.066	–	–	745	–	1,025	–	1,165	–
7.000	35.0	5.879	0.498	7.681	10.173	9.066	–	–	814	–	1,119	–	1,272	–
7.000	38.0	5.795	0.540	7.681	10.958	9.066	–	–	877	–	1,205	–	1,370	–
7.625	26.4	6.844	0.328	8.528	7.519	12.899	–	–	602	–	827	–	940	–
7.625	29.7	6.750	0.375	8.528	8.540	12.899	–	–	683	–	939	–	1,068	–
7.625	33.7	6.640	0.430	8.528	9.720	12.899	–	–	778	–	1,069	–	1,215	–
7.625	39.0	6.500	0.500	8.528	11.192	12.899	–	–	895	–	1,231	–	1,399	–
7.625	42.8	6.376	0.562	8.528	12.470	12.899	–	–	998	–	1,372	–	1,559	–
8.625	28.0	7.892	0.304	9.650	7.942	16.399	–	–	635	–	874	–	993	–
8.625	32.0	7.796	0.352	9.650	9.148	16.399	–	–	732	–	1,006	–	1,144	–
8.625	36.0	7.700	0.400	9.650	10.338	16.399	–	–	827	–	1,137	–	1,292	–
8.625	40.0	7.600	0.450	9.650	11.555	16.399	–	–	924	–	1,271	–	1,444	–
8.625	44.0	7.500	0.500	9.650	12.760	16.399	–	–	1,021	–	1,404	–	1,595	–
8.625	49.0	7.386	0.557	9.650	14.117	16.399	–	–	1,129	–	1,553	–	1,765	–
9.625	36.0	8.765	0.352	10.650	10.255	18.206	–	–	820	–	1,128	–	1,282	–
9.625	40.0	8.679	0.395	10.650	11.454	18.206	–	–	916	–	1,260	–	1,432	–
9.625	43.5	8.599	0.435	10.650	12.560	18.206	–	–	1,005	–	1,382	–	1,570	–
9.625	47.0	8.525	0.472	10.650	13.572	18.206	–	–	1,086	–	1,493	–	1,697	–
9.625	53.5	8.379	0.545	10.650	15.546	18.206	–	–	1,244	–	1,710	–	1,943	–
9.625	58.4	8.278	0.595	10.650	16.879	18.206	–	–	1,350	–	1,857	–	2,110	–
9.625	59.4	8.251	0.609	10.650	17.250	18.206	–	–	1,380	–	1,898	–	2,156	–
10.750	40.5	9.893	0.350	11.772	11.436	20.186	–	–	915	–	1,258	–	1,430	–
10.750	45.5	9.793	0.400	11.772	13.006	20.186	–	–	1,040	–	1,431	–	1,626	–
10.750	51.0	9.693	0.450	11.772	14.561	20.186	–	–	1,165	–	1,602	–	1,820	–
10.750	55.5	9.603	0.495	11.772	15.948	20.186	–	–	1,276	–	1,754	–	1,994	–
10.750	60.7	9.503	0.545	11.772	17.473	20.186	–	–	1,398	–	1,922	–	2,184	–
10.750	65.7	9.403	0.595	11.772	18.983	20.186	–	–	1,519	–	2,088	–	2,373	–
11.750	47.0	10.844	0.375	12.772	13.401	21.988	–	–	1,072	–	1,474	–	1,675	–
11.750	54.0	10.723	0.435	12.772	15.463	21.988	–	–	1,237	–	1,701	–	1,933	–
11.750	60.0	10.615	0.489	12.772	17.299	21.988	–	–	1,384	–	1,903	–	2,162	–
11.750	65.0	10.525	0.534	12.772	18.815	21.988	–	–	1,505	–	2,070	–	2,352	–
13.375	54.5	12.458	0.380	14.298	15.514	24.879	–	–	1,241	–	1,707	–	1,939	–
13.375	61.0	12.358	0.430	14.298	17.487	24.879	–	–	1,399	–	1,924	–	2,186	–
13.375	68.0	12.258	0.480	14.298	19.445	24.879	–	–	1,556	–	2,139	–	2,431	–
13.375	72.0	12.190	0.514	14.298	20.767	24.879	–	–	1,661	–	2,284	–	2,596	–
13.375	77.0	12.118	0.550	14.298	22.160	24.879	–	–	1,773	–	2,438	–	2,770	–
13.375	80.7	12.058	0.580	14.298	23.313	24.879	–	–	1,865	–	2,565	–	2,914	–
13.375	85.0	12.002	0.608	14.298	24.386	24.879	–	–	1,951	–	2,682	–	3,048	–
13.375	86.0	11.968	0.625	14.298	25.034	24.879	–	–	2,003	–	2,754	–	3,129	–

Hunting—SEAL-LOCK BIG O (SLBIGO)

Diagram p. C-110

Type: Coupled **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
13.625	88.2	12.219	0.625	15.000	25.525	25.525	100.0	76.9	2,425	89,700	3,191	120,700	3,446	136,200
13.625	94.7	12.099	0.685	15.000	27.847	27.847	100.0	70.5	2,645	90,300	3,481	121,300	3,759	136,800
13.625	104.5	11.949	0.760	15.000	30.717	30.716	100.0	63.9	2,918	91,000	3,840	122,000	4,147	137,500
14.000	82.5	12.688	0.562	15.000	23.726	23.726	100.0	74.4	2,254	77,100	2,966	103,800	3,203	117,200
14.000	94.8	12.500	0.656	15.000	27.500	27.500	100.0	64.1	2,613	78,000	3,438	104,700	3,713	118,100
14.000	99.3	12.436	0.688	15.125	28.773	28.773	100.0	61.3	2,733	78,500	3,597	105,300	3,884	118,600
14.000	111.0	12.254	0.779	15.125	32.356	31.947	98.7	54.5	3,035	79,300	3,993	106,000	4,313	119,400
14.000	123.0	12.250	0.872	15.125	35.964	31.947	88.8	49.1	3,035	79,900	3,993	106,600	4,313	120,000
16.000	75.0	14.936	0.438	17.000	21.414	21.414	100.0	92.6	2,034	96,600	2,677	131,900	2,891	149,500
16.000	84.0	14.822	0.495	17.000	24.112	24.112	100.0	93.4	2,291	97,000	3,014	132,200	3,255	149,900
16.000	94.5	14.688	0.562	17.000	27.257	27.257	100.0	82.7	2,589	97,300	3,407	132,600	3,680	150,200
16.000	109.0	14.500	0.656	17.000	31.622	31.622	100.0	61.6	3,004	76,200	3,953	102,800	4,269	116,200
16.000	118.0	14.382	0.715	17.000	34.334	32.954	96.0	56.8	3,131	76,500	4,119	103,200	4,449	116,500
16.000	128.0	14.250	0.781	17.000	37.341	32.954	88.3	52.2	3,131	76,900	4,119	103,600	4,449	116,900
18.625	87.5	17.567	0.435	19.625	24.858	24.858	100.0	92.6	2,362	127,000	3,107	173,600	3,356	196,900
18.625	93.7	17.501	0.468	19.625	26.696	26.696	100.0	93.1	2,536	127,200	3,337	173,800	3,604	197,100
18.625	96.5	17.467	0.485	19.625	27.639	27.639	100.0	93.4	2,626	127,300	3,455	173,900	3,731	197,200
18.625	109.4	17.311	0.563	19.625	31.947	31.947	100.0	80.8	3,035	127,800	3,993	174,400	4,313	197,700
18.625	112.0	17.279	0.579	19.625	32.825	32.825	100.0	78.6	3,118	127,900	4,103	174,500	4,431	197,800
18.625	136.0	17.051	0.693	19.625	39.040	38.242	98.0	57.0	3,633	98,400	4,780	133,300	5,163	150,700
20.000	94.0	18.936	0.438	21.000	26.918	26.918	100.0	92.7	2,557	148,600	3,365	203,300	3,634	230,700
20.000	106.5	18.812	0.500	21.000	30.631	30.631	100.0	93.6	2,910	149,100	3,829	203,800	4,135	231,100
20.000	117.0	18.686	0.563	21.000	34.379	34.379	100.0	81.3	3,266	149,500	4,297	204,100	4,641	231,500
20.000	133.0	18.542	0.635	21.000	38.631	38.631	100.0	62.5	3,670	115,100	4,829	156,200	5,215	176,700
20.000	147.0	18.394	0.709	21.000	42.969	41.043	95.5	56.2	3,899	115,600	5,130	156,700	5,541	177,200
20.000	169.0	18.188	0.812	21.000	48.948	41.043	83.8	49.3	3,899	116,300	5,130	157,400	5,541	177,900

Hunting—FJ-150

Diagram p. C-110

Type: Flush **Seal: Metal-to-metal, threaded**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
5.000	13.0	4.369	0.253	5.000	3.773	1.872	49.6	51.7	178	4,200	234	5,800	253	6,600
5.000	15.0	4.283	0.296	5.000	4.374	2.189	50.0	58.7	208	6,300	274	8,700	296	9,800
5.000	18.0	4.151	0.362	5.000	5.275	2.785	52.8	59.3	265	8,200	348	11,300	376	12,800
5.000	20.3	4.059	0.408	5.000	5.886	3.087	52.5	63.9	293	10,300	386	14,200	417	16,100
5.000	23.2	3.919	0.478	5.000	6.791	4.567	67.3	69.1	434	13,400	571	18,500	617	21,000
5.500	14.0	4.887	0.244	5.500	4.029	2.014	50.0	50.0	191	4,200	252	5,800	272	6,600
5.500	15.5	4.825	0.275	5.500	4.514	2.255	50.0	55.6	214	5,900	282	8,100	304	9,200
5.500	17.0	4.767	0.304	5.500	4.962	2.480	50.0	59.8	236	7,400	310	10,200	335	11,600
5.500	20.0	4.653	0.361	5.500	5.828	3.014	51.7	62.7	286	9,700	377	13,300	407	15,200
5.500	23.0	4.545	0.415	5.500	6.630	3.514	53.0	67.5	334	12,500	439	17,100	474	19,500
6.625	20.0	5.924	0.288	6.625	5.734	2.867	50.0	57.6	272	8,000	358	11,000	387	12,500
6.625	24.0	5.796	0.352	6.625	6.937	3.468	50.0	65.3	329	12,100	434	16,600	468	18,900
6.625	28.0	5.666	0.417	6.625	8.133	4.310	53.0	64.7	409	14,500	539	20,000	582	22,700
6.625	32.0	5.550	0.475	6.625	9.177	4.831	52.6	69.0	459	18,100	604	24,900	652	28,300
7.000	20.0	6.331	0.272	7.000	5.749	2.896	50.4	55.1	275	7,300	362	10,100	391	11,500
7.000	23.0	6.241	0.317	7.000	6.656	3.328	50.0	61.5	316	10,400	416	14,300	449	16,300
7.000	26.0	6.151	0.362	7.000	7.549	3.985	52.8	59.3	379	11,700	498	16,100	538	18,300
7.000	29.0	6.059	0.408	7.000	8.449	4.426	52.4	63.9	420	14,800	553	20,400	598	23,200
7.000	32.0	5.969	0.453	7.000	9.317	3.982	42.7	65.3	378	17,100	498	23,500	538	26,700
7.625	24.2	6.900	0.300	7.625	6.904	3.595	52.1	45.1	342	9,200	449	12,600	485	14,300
7.625	26.4	6.844	0.328	7.625	7.519	4.046	53.8	46.0	384	10,300	506	14,200	546	16,100
7.625	29.7	6.750	0.375	7.625	8.541	4.555	53.3	52.8	433	13,800	569	19,000	615	21,600
7.625	33.7	6.640	0.430	7.625	9.720	5.135	52.8	57.0	488	17,300	642	23,700	693	27,000
7.625	39.0	6.500	0.500	7.625	11.192	5.868	52.4	63.0	557	22,300	734	30,700	792	34,800
8.625	24.0	7.972	0.264	8.625	6.934	3.467	50.0	53.8	329	8,400	433	11,600	468	13,200
8.625	28.0	7.892	0.304	8.625	7.947	4.137	52.1	55.7	393	10,800	517	14,800	558	16,900
8.625	32.0	7.796	0.352	8.625	9.149	4.899	53.6	58.2	465	13,800	612	19,000	661	21,500
8.625	36.0	7.700	0.400	8.625	10.336	5.491	53.1	63.2	522	17,800	686	24,500	741	27,800
8.625	40.0	7.600	0.450	8.625	11.557	6.261	54.2	64.5	595	20,900	783	28,700	845	32,700
9.625	36.0	8.765	0.352	9.625	10.254	5.491	53.6	58.2	522	15,500	686	21,200	741	24,100
9.625	40.0	8.679	0.395	9.625	11.454	6.271	54.8	67.4	596	18,300	784	25,200	847	28,600
9.625	43.5	8.599	0.435	9.625	12.559	6.821	54.3	63.3	648	22,100	853	30,300	921	34,500
9.625	47.0	8.525	0.472	9.625	13.572	7.506	55.3	63.5	713	24,300	938	33,400	1,013	38,000
9.625	53.5	8.379	0.545	9.625	15.547	8.487	54.6	68.4	806	31,000	1,061	42,700	1,146	48,500
9.625	58.4	8.279	0.595	9.625	16.879	9.150	54.2	71.0	869	35,600	1,144	48,900	1,235	55,600

Hunting—SEAL-LOCK FLUSH (SLF)

Diagram p. C-110

Type: Flush **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
5.000	15.0	4.283	0.296	5.000	4.374	2.714	62.0	34.8	258	4,400	339	6,000	366	6,800
5.000	18.0	4.151	0.362	5.000	5.275	3.454	65.5	32.2	328	4,400	432	6,000	466	6,700
5.000	21.4	4.001	0.437	5.000	6.264	4.053	64.7	32.3	385	5,700	507	7,700	547	8,700
5.000	23.2	3.919	0.478	5.000	6.791	4.512	66.4	28.1	429	5,200	564	7,100	609	8,000
5.000	24.1	3.875	0.500	5.000	7.069	4.869	68.9	27.8	463	5,500	609	7,400	657	8,400
5.500	15.5	4.825	0.275	5.500	4.514	2.709	60.0	36.6	257	5,200	339	7,100	366	8,100
5.500	17.0	4.767	0.304	5.500	4.962	3.249	65.5	31.7	309	4,900	406	6,600	439	7,500
5.500	20.0	4.653	0.361	5.500	5.828	3.775	64.8	32.2	359	5,400	472	7,300	510	8,300
5.500	23.0	4.545	0.415	5.500	6.630	4.338	65.4	30.7	412	5,900	542	8,100	586	9,100
5.500	26.0	4.423	0.476	5.500	7.513	4.962	66.0	28.2	471	6,300	620	8,600	670	9,800
6.625	28.0	5.666	0.417	6.625	8.133	5.141	63.2	30.8	488	8,900	643	12,100	694	13,800
7.000	23.0	6.241	0.317	7.000	6.656	3.165	47.6	34.7	301	8,300	396	11,300	427	12,800
7.000	26.0	6.151	0.362	7.000	7.549	4.676	61.9	33.4	444	9,300	585	12,700	631	14,400
7.000	29.0	6.059	0.408	7.000	8.449	5.485	64.9	31.4	521	9,900	686	13,600	740	15,400
7.000	32.0	5.969	0.453	7.000	9.317	6.315	67.8	28.5	600	9,900	789	13,600	853	15,400
7.000	35.0	5.879	0.498	7.000	10.172	6.913	68.0	28.9	657	12,100	864	16,400	933	18,500
7.000	38.0	5.795	0.540	7.000	10.959	7.510	68.5	27.0	713	11,800	939	15,500	1,014	17,400
7.000	41.0	5.695	0.590	7.000	11.881	8.294	69.8	27.0	788	13,100	1,037	17,400	1,120	19,600
7.000	42.7	5.625	0.625	7.000	12.517	8.765	70.0	27.2	833	14,300	1,096	18,000	1,183	21,400
7.000	49.5	5.415	0.730	7.000	14.379	9.917	69.0	28.6	942	18,800	1,240	25,000	1,339	28,100
7.625	26.4	6.844	0.328	7.625	7.519	4.585	61.0	34.7	436	10,500	573	14,200	619	–
7.625	29.7	6.750	0.375	7.625	8.541	5.456	63.9	31.3	518	11,000	682	14,800	737	16,700
7.625	33.7	6.640	0.430	7.625	9.720	6.312	64.9	32.1	600	13,900	789	18,800	852	21,200
7.625	39.0	6.500	0.500	7.625	11.192	7.607	68.0	27.2	723	13,700	951	18,400	1,027	20,700
7.625	42.8	6.376	0.562	7.625	12.470	8.476	68.0	29.0	805	16,000	1,060	21,400	1,144	24,100
7.625	45.3	6.310	0.595	7.625	13.141	8.931	68.0	29.2	848	17,500	1,116	23,400	1,206	26,300
7.750	46.1	6.435	0.595	7.750	13.374	9.094	68.0	29.2	864	17,400	1,137	24,000	1,228	27,100
8.625	40.0	7.600	0.450	8.625	11.557	7.442	64.4	32.0	707	18,800	930	25,500	1,005	28,800
8.625	44.0	7.500	0.500	8.625	12.763	8.675	68.0	29.2	824	19,300	1,084	26,000	1,171	29,400
9.625	36.0	8.765	0.352	9.625	10.254	5.646	55.0	34.6	536	18,500	706	25,200	762	28,500
9.625	40.0	8.679	0.395	9.625	11.454	7.209	62.9	33.8	685	21,400	901	28,900	973	32,700
9.625	43.5	8.599	0.435	9.625	12.559	7.792	62.0	32.7	740	21,100	974	28,400	1,052	32,000
9.625	47.0	8.525	0.472	9.625	13.572	8.815	64.9	31.8	837	22,700	1,102	30,700	1,190	34,600
9.625	53.5	8.379	0.545	9.625	15.546	10.058	64.7	27.9	956	23,300	1,257	31,400	1,358	35,400
9.625	58.4	8.279	0.595	9.625	16.879	11.315	67.0	26.4	1,075	24,400	1,414	32,800	1,528	36,900
9.625	70.3	8.001	0.734	9.625	20.502	14.233	69.4	28.3	1,352	–	1,779	48,600	1,921	54,700
9.875	62.8	8.469	0.625	9.625	18.162	12.078	66.5	27.2	1,147	–	1,510	39,200	1,631	44,200
10.750	45.5	9.794	0.400	10.750	13.006	8.422	64.8	31.8	800	24,600	1,053	33,400	1,137	37,800
10.750	51.0	9.694	0.450	10.750	14.561	9.320	64.0	32.4	885	27,200	1,165	36,900	1,258	41,700
10.750	60.7	9.504	0.545	10.750	17.473	11.577	66.3	30.8	1,100	33,600	1,447	45,400	1,563	51,300
10.750	65.7	9.404	0.595	10.750	18.982	12.881	67.9	22.9	1,224	24,600	1,610	32,900	1,739	37,100
11.750	47.0	10.844	0.375	11.750	13.401	7.898	58.9	37.2	750	30,300	987	41,200	1,066	46,600
11.750	54.0	10.724	0.435	11.750	15.463	9.279	60.0	32.7	882	31,500	1,160	42,600	1,253	48,200
11.750	60.0	10.616	0.489	11.750	17.300	11.241	65.0	32.0	1,068	36,500	1,405	49,400	1,518	55,800
11.750	65.0	10.526	0.534	11.750	18.816	11.700	62.2	26.7	1,112	31,300	1,463	42,300	1,580	47,800
11.875	71.8	10.625	0.582	11.875	20.648	14.035	68.0	30.0	1,333	45,000	1,754	60,200	1,895	67,900
13.375	68.0	12.259	0.480	13.375	19.445	12.639	65.0	32.1	1,201	46,400	1,580	62,900	1,706	71,100
13.375	72.0	12.191	0.514	13.375	20.768	13.504	65.0	27.3	1,283	40,400	1,688	54,400	1,823	61,400
13.625	88.2	12.219	0.625	13.625	25.526	17.360	68.0	29.9	1,649	64,600	2,170	86,900	2,344	98,100
16.000	84.0	14.822	0.495	16.000	24.112	14.478	60.0	35.2	1,375	53,000	1,810	72,000	1,955	81,500
16.000	95.0	14.000	0.566	16.000	27.444	16.353	59.6	35.5	1,554	67,400	2,044	91,500	2,208	103,600
16.000	97.0	14.680	0.575	16.000	27.864	16.751	60.1	35.0	1,591	67,400	2,094	91,500	2,261	103,600
16.000	109.0	14.500	0.656	16.000	31.622	18.583	58.8	37.0	1,765	89,600	2,323	121,400	2,509	138,100
17.875	94.0	16.750	0.500	17.875	27.293	16.247	59.5	35.4	1,543	67,400	2,031	91,800	2,193	104,000

Continued

Hunting—SEAL-LOCK FLUSH (SLF) (cont.)

Diagram p. C-110

Type: Flush **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
17.875	121.0	16.387	0.650	17.875	35.174	22.027	62.6	33.1	2,093	67,800	2,753	127,400	2,974	144,200
18.000	93.5	16.812	0.500	17.875	27.293	16.326	59.4	35.1	1,551	66,700	2,041	90,800	2,204	102,800
18.000	127.3	16.436	0.688	17.875	37.418	20.749	55.5	40.5	1,971	138,200	2,594	188,400	2,801	213,500
18.625	87.5	17.567	0.435	18.625	24.858	14.232	57.3	34.6	1,352	53,400	1,779	72,700	1,921	82,400
18.625	94.5	17.517	0.460	18.625	26.251	14.232	54.2	32.8	1,352	535,000	1,779	72,800	1,921	82,500
18.625	97.7	17.465	0.486	18.625	27.695	16.184	58.4	35.8	1,537	71,200	2,023	97,000	2,185	109,900
18.625	98.5	17.437	0.500	18.625	28.471	16.903	59.4	34.9	1,606	71,300	2,113	97,100	2,282	110,000
20.000	94.0	18.936	0.438	20.000	26.918	15.297	56.8	34.4	1,453	62,800	1,912	84,300	2,065	95,400
20.000	106.5	18.812	0.500	20.000	30.631	18.171	59.3	34.9	1,726	82,000	2,271	111,800	2,453	126,600
20.000	133.0	18.542	0.635	20.000	38.631	21.030	54.0	31.6	1,998	104,300	2,629	142,100	2,839	161,000
20.000	169.0	18.188	0.812	20.000	48.948	28.835	58.9	34.5	2,739	171,000	3,604	233,100	3,893	264,200

Hunting—TKC CONVERTIBLE (TKC CLTC)

Diagram p. C-110

Type: Coupled **Seal: Metal-to-metal, threaded**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
5.000	13.0	4.369	0.253	5.563	3.773	2.670	70.8	34.1	241	3,400	317	4,700	342	5,300
5.000	15.0	4.283	0.296	5.563	4.374	3.271	74.8	43.4	295	5,600	388	7,700	420	8,700
5.000	18.0	4.151	0.362	5.563	5.275	4.171	79.1	53.4	376	8,800	495	12,000	535	13,700
5.000	21.4	4.001	0.437	5.563	6.264	5.161	82.4	61.1	466	12,200	613	16,800	662	19,100
5.000	23.2	3.919	0.478	5.563	6.791	5.687	83.8	64.3	513	14,000	675	19,300	729	21,900
5.000	24.1	3.875	0.500	5.563	7.069	5.965	84.4	65.8	538	15,000	708	20,600	765	23,400
5.500	15.5	4.825	0.275	6.050	4.514	3.299	73.1	38.7	298	5,300	392	7,300	423	8,200
5.500	17.0	4.767	0.304	6.050	4.962	3.747	75.5	44.4	338	7,000	445	9,700	481	11,000
5.500	20.0	4.653	0.361	6.050	5.828	4.613	79.2	53.0	416	10,400	548	14,300	592	16,300
5.500	23.0	4.545	0.415	6.050	6.630	5.414	81.7	59.0	489	13,500	643	18,600	694	21,100
6.625	20.0	5.924	0.288	7.390	5.734	4.267	74.4	36.5	369	7,800	500	10,800	547	12,200
6.625	24.0	5.796	0.352	7.390	6.937	5.470	78.9	47.8	473	13,500	641	18,600	702	21,100
6.625	28.0	5.666	0.417	7.390	8.133	6.666	82.0	55.7	576	19,100	781	26,300	855	29,800
6.625	32.0	5.550	0.475	7.390	9.177	7.710	84.0	60.9	666	23,900	904	32,900	989	37,400
7.000	23.0	6.241	0.317	7.656	6.656	5.105	76.7	41.0	435	11,300	590	15,500	655	17,600
7.000	26.0	6.151	0.362	7.656	7.549	5.998	79.5	48.2	511	15,700	693	21,600	769	24,600
7.000	29.0	6.059	0.408	7.656	8.449	6.899	81.6	53.8	587	20,200	797	27,700	885	31,500
7.000	32.0	5.969	0.453	7.656	9.317	7.766	83.4	58.3	661	24,400	897	33,600	996	38,200
7.000	35.0	5.879	0.498	7.656	10.172	8.622	84.8	61.9	734	28,600	996	39,300	1,106	44,700
7.000	38.0	5.795	0.540	7.656	10.959	9.408	85.9	64.8	801	32,400	1,087	44,600	1,207	50,600
7.625	26.4	6.844	0.328	8.500	7.519	–	77.5	41.8	482	14,300	654	19,700	733	22,300
7.625	29.7	6.750	0.375	8.500	8.541	–	80.2	48.9	567	19,800	769	27,300	861	31,000
7.625	33.7	6.640	0.430	8.500	9.720	–	82.6	55.3	664	26,200	901	36,000	1,009	40,900
7.625	39.0	6.500	0.500	8.500	11.192	–	84.9	61.3	786	34,000	1,066	46,800	1,194	53,100
7.625	42.8	6.376	0.562	8.500	12.470	–	86.4	65.4	891	40,800	1,210	56,000	1,355	63,700
7.625	45.3	6.310	0.595	8.500	13.141	–	87.1	67.3	947	44,300	1,285	60,900	1,439	69,200
7.625	47.1	6.250	0.625	8.500	13.745	–	87.7	68.8	997	47,400	1,353	65,200	1,515	74,100
8.625	32.0	7.796	0.352	9.625	9.149	–	79.1	42.4	583	20,300	791	27,900	887	31,700
8.625	36.0	7.700	0.400	9.625	10.336	–	81.5	49.1	678	27,500	921	37,800	1,032	43,000
8.625	40.0	7.600	0.450	9.625	11.557	–	83.4	54.6	776	34,900	1,055	48,000	1,182	54,600
8.625	44.0	7.500	0.500	9.625	12.763	–	85.0	59.0	874	42,200	1,186	58,100	1,330	66,000
8.625	49.0	7.386	0.557	9.625	14.118	–	86.4	63.1	983	50,400	1,335	69,200	1,496	78,700
9.625	36.0	8.765	0.352	10.625	10.254	–	79.2	40.2	634	23,900	861	32,800	966	37,300
9.625	40.0	8.679	0.395	10.625	11.454	–	81.3	46.5	727	32,100	988	44,100	1,108	50,100
9.625	43.5	8.599	0.435	10.625	12.559	–	83.0	51.3	813	39,600	1,105	54,400	1,240	61,800
9.625	47.0	8.525	0.472	10.625	13.572	–	84.2	55.1	893	46,400	1,213	63,900	1,361	72,600
9.625	53.5	8.379	0.545	10.625	15.547	–	86.2	60.9	1,047	59,700	1,422	82,200	1,595	93,400
9.625	58.4	8.279	0.595	10.625	16.879	–	87.3	64.1	1,151	62,500	1,564	85,900	1,754	97,600
20.000	94.0	18.936	0.438	21.000	26.918	–	59.2	48.4	1,285	167,000	1,753	229,600	1,976	261,000
20.000	106.5	18.812	0.500	21.000	30.631	–	60.6	54.7	1,498	219,800	2,043	302,200	2,302	343,400
20.000	133.0	18.542	0.635	21.000	38.631	–	62.8	64.2	1,955	333,000	2,668	457,900	3,006	520,300

*Maximum delta torque. Torque applied after pin nose contact.

Hunting—SEAL-LOCK APEX (SLAPEX)

Diagram p. C-110

Type: Coupled **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
5.000	15.0	4.283	0.296	5.750	4.374	4.374	100.0	65.0	416	8,600	547	11,600	590	13,200
5.000	18.0	4.151	0.362	5.750	5.275	5.275	100.0	62.0	501	9,900	659	13,300	712	15,100
5.000	20.3	4.059	0.408	5.750	5.886	5.886	100.0	64.1	559	12,300	736	16,600	795	18,800
5.000	21.4	4.001	0.437	5.750	6.264	6.264	100.0	65.1	595	13,800	783	18,600	846	21,000
5.000	23.2	3.919	0.478	5.750	6.791	6.791	100.0	66.1	645	15,600	849	21,200	917	23,900
5.000	24.1	3.875	0.500	5.750	7.069	6.936	98.0	66.4	659	16,600	867	22,500	936	25,400
5.500	15.5	4.825	0.275	6.050	4.514	4.514	100.0	62.5	429	8,800	564	11,900	609	13,400
5.500	17.0	4.767	0.304	6.050	4.962	4.962	100.0	66.3	471	11,200	620	15,100	670	17,100
5.500	20.0	4.653	0.361	6.050	5.828	5.677	97.4	65.1	539	15,700	710	21,300	766	24,100
5.500	23.0	4.545	0.415	6.250	6.630	6.630	100.0	48.0	630	10,100	829	13,500	895	15,200
5.500	26.0	4.423	0.476	6.250	7.513	7.513	100.0	50.6	714	13,300	939	17,800	1,014	20,100
5.500	26.8	4.375	0.500	6.250	7.854	7.854	100.0	51.7	746	14,700	982	19,700	1,060	22,300
5.500	28.4	4.315	0.530	6.250	8.275	8.275	100.0	53.2	786	16,400	1,034	22,100	1,117	24,900
5.500	29.7	4.251	0.562	6.250	8.718	8.395	96.3	54.9	798	18,400	1,049	24,700	1,133	27,900
6.625	28.0	5.666	0.417	7.500	8.133	8.133	100.0	43.9	773	12,000	1,017	16,400	1,098	18,500
6.625	32.0	5.550	0.475	7.500	9.177	9.177	100.0	45.5	872	13,000	1,147	17,600	1,239	19,900
6.625	33.0	5.500	0.500	7.500	9.621	9.621	100.0	45.8	914	14,300	1,203	19,300	1,299	21,800
6.625	34.5	5.450	0.525	7.500	10.061	10.061	100.0	47.4	956	16,100	1,258	21,800	1,358	24,600
6.625	36.7	5.376	0.562	7.500	10.705	10.705	100.0	49.4	1,017	18,700	1,338	25,300	1,445	28,600
6.625	40.2	5.250	0.625	7.500	11.781	11.781	100.0	48.7	1,119	21,100	1,473	28,500	1,590	32,200
6.625	43.7	5.126	0.687	7.500	12.816	11.833	92.3	49.8	1,124	24,400	1,479	33,000	1,597	37,300
6.625	47.1	5.000	0.750	7.500	13.843	11.833	85.5	50.8	1,124	27,600	1,479	37,300	1,597	42,200
7.000	23.0	6.250	0.317	7.656	6.656	6.656	100.0	67.6	632	16,100	832	21,900	899	24,800
7.000	26.0	6.151	0.362	7.656	7.549	7.549	100.0	63.7	717	16,600	944	22,500	1,019	25,400
7.000	29.0	6.125	0.408	7.656	8.449	8.449	100.0	65.9	803	20,600	1,056	28,000	1,141	31,800

Continued

Hunting—SEAL-LOCK APEX (SLAPEX) (cont.)

Diagram p. C-110

Type: Coupled **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
7.000	32.0	6.000	0.453	8.000	9.317	9.317	100.0	58.2	885	17,700	1,165	23,900	1,258	27,000
7.000	35.0	5.879	0.498	8.000	10.173	10.173	100.0	55.0	966	16,300	1,272	21,900	1,373	24,700
7.000	38.0	5.795	0.540	8.000	10.959	10.959	100.0	56.1	1,041	19,300	1,370	26,000	1,479	29,400
7.000	41.0	5.695	0.590	8.000	11.881	11.881	100.0	57.1	1,129	22,800	1,485	30,700	1,604	34,700
7.000	42.7	5.625	0.625	8.000	12.517	12.517	100.0	57.6	1,189	25,200	1,565	33,900	1,690	38,300
7.000	44.0	5.595	0.640	8.000	12.788	12.788	100.0	57.8	1,215	26,100	1,599	35,100	1,726	39,700
7.000	46.4	5.501	0.687	8.000	13.625	13.625	100.0	58.2	1,294	29,000	1,703	39,100	1,839	44,200
7.000	49.5	5.415	0.730	8.000	14.379	14.045	97.7	58.5	1,334	31,600	1,756	42,600	1,896	48,100
7.000	50.1	5.375	0.750	8.000	14.726	14.045	95.4	58.6	1,334	32,700	1,756	44,100	1,896	49,800
7.625	26.4	6.844	0.328	8.500	7.519	7.519	100.0	57.6	714	14,500	940	19,600	1,015	22,100
7.625	29.7	6.750	0.375	8.500	8.541	8.541	100.0	59.7	811	19,100	1,068	25,900	1,153	29,200
7.625	33.7	6.640	0.430	8.500	9.720	9.720	100.0	64.9	923	26,200	1,215	35,500	1,312	40,200
7.625	39.0	6.500	0.500	8.750	11.192	11.192	100.0	62.1	1,063	27,400	1,399	37,000	1,511	41,800
7.625	42.8	6.376	0.562	8.750	12.470	12.470	100.0	56.0	1,185	25,000	1,559	33,600	1,683	37,800
7.625	45.3	6.310	0.595	8.750	13.141	13.141	100.0	56.3	1,248	27,600	1,643	37,000	1,774	41,700
7.625	47.1	6.250	0.625	8.750	13.745	13.745	100.0	58.9	1,306	31,500	1,718	42,400	1,856	47,800
7.625	51.2	6.126	0.687	8.750	14.974	14.974	100.0	60.1	1,423	36,800	1,872	49,600	2,021	56,000
7.625	52.8	6.076	0.712	8.750	15.463	15.463	100.0	60.3	1,469	38,800	1,933	52,200	2,088	58,900
7.625	55.3	6.000	0.750	8.750	16.199	16.199	100.0	61.8	1,539	42,700	2,025	57,600	2,187	65,000
7.625	59.2	5.876	0.812	8.750	17.380	16.960	97.6	60.7	1,611	45,900	2,120	61,900	2,290	69,900
7.750	46.1	6.500	0.595	8.600	13.375	13.375	100.0	60.1	1,271	30,900	1,672	41,800	1,806	47,200
8.625	40.0	7.625	0.450	9.625	11.557	11.557	100.0	58.3	1,098	27,000	1,445	36,700	1,560	41,500
8.625	44.0	7.500	0.500	9.625	12.763	12.763	100.0	59.9	1,212	35,100	1,595	47,700	1,723	53,900
8.625	49.0	7.386	0.557	9.625	14.118	14.118	100.0	58.4	1,341	33,500	1,765	45,300	1,906	51,200
8.625	52.0	7.310	0.595	9.625	15.010	15.010	100.0	59.0	1,426	37,500	1,876	50,800	2,026	57,400
8.625	54.0	7.250	0.625	9.625	15.708	15.708	100.0	59.2	1,492	40,600	1,964	55,000	2,121	62,200
8.625	58.0	7.126	0.687	9.625	17.132	17.132	100.0	59.6	1,628	46,700	2,142	63,200	2,313	71,400
8.625	63.5	7.000	0.750	9.625	18.555	17.180	92.6	59.8	1,632	52,500	2,148	71,000	2,319	80,300
9.625	40.0	8.750	0.395	10.625	11.454	11.454	100.0	78.3	1,088	48,900	1,432	66,600	1,546	75,500
9.625	43.5	8.599	0.435	10.625	12.559	12.559	100.0	85.1	1,193	61,500	1,570	84,000	1,695	95,200
9.625	47.0	8.525	0.472	10.625	13.572	13.572	100.0	60.9	1,289	38,400	1,697	52,200	1,832	59,100
9.625	53.5	8.500	0.545	10.625	15.547	15.547	100.0	57.5	1,477	39,400	1,943	53,400	2,099	60,400
9.625	58.4	8.375	0.595	10.625	16.879	16.879	100.0	56.6	1,604	44,000	2,110	59,700	2,279	67,600
9.625	64.9	8.125	0.672	10.625	18.901	18.901	100.0	53.4	1,796	48,300	2,363	65,500	2,552	74,100
9.625	70.3	8.001	0.734	10.625	20.502	19.097	93.1	51.9	1,814	52,400	2,387	71,000	2,578	80,300
9.625	71.6	7.969	0.750	10.625	20.911	19.097	91.3	54.1	1,814	57,300	2,387	77,700	2,578	87,900
9.750	59.2	8.500	0.595	10.625	17.113	17.113	100.0	57.0	1,626	45,600	2,139	61,900	2,310	70,100
9.875	62.8	8.500	0.625	10.625	18.162	17.463	96.1	63.0	1,659	58,400	2,183	79,500	2,358	90,000
10.750	51.0	9.694	0.450	11.750	14.561	14.561	100.0	58.3	1,383	42,800	1,820	58,200	1,966	65,900
10.750	55.5	9.625	0.495	11.750	15.947	15.947	100.0	64.6	1,515	54,400	1,993	74,100	2,153	83,900
10.750	60.7	9.504	0.545	11.750	17.473	17.473	100.0	58.9	1,660	51,600	2,184	70,100	2,359	79,300
10.750	65.7	9.500	0.595	11.750	18.982	18.982	100.0	61.1	1,803	62,500	2,373	84,900	2,563	96,100
10.750	71.1	9.294	0.650	11.750	20.625	20.625	100.0	59.9	1,959	68,900	2,578	93,700	2,784	106,000
10.750	75.9	9.194	0.700	11.750	22.101	21.286	96.3	61.1	2,022	78,300	2,661	106,400	2,874	120,500
10.750	80.8	9.094	0.750	11.750	23.562	21.286	90.3	62.1	2,022	87,500	2,661	119,000	2,874	134,800
10.750	91.2	8.876	0.859	11.800	26.692	26.692	100.0	38.3	2,536	54,500	3,337	73,100	3,603	82,500
10.750	97.1	8.750	0.922	11.800	28.467	28.467	100.0	40.2	2,704	55,000	3,558	73,600	3,843	83,000
10.750	102.9	8.626	0.984	11.800	30.190	30.190	100.0	41.4	2,868	63,500	3,774	85,200	4,076	96,100
10.750	109.0	8.500	1.050	11.800	31.997	31.997	100.0	44.5	3,040	77,100	4,000	103,800	4,320	117,100
11.750	60.0	10.625	0.489	12.750	17.300	17.300	100.0	59.3	1,644	63,500	2,163	86,500	2,336	98,000
11.750	65.0	10.625	0.534	12.750	18.816	18.816	100.0	62.7	1,788	77,300	2,352	105,400	2,540	119,400
11.750	71.0	10.430	0.582	12.750	20.420	20.420	100.0	62.5	1,940	74,800	2,553	101,900	2,757	115,400
11.750	75.4	10.344	0.625	12.750	21.844	21.844	100.0	62.2	2,075	82,600	2,731	112,400	2,949	127,400
11.750	78.8	10.282	0.656	12.750	22.863	22.863	100.0	62.9	2,172	88,200	2,858	120,100	3,087	136,100
11.750	82.6	10.212	0.691	12.750	24.007	23.205	96.7	62.3	2,204	95,000	2,901	129,400	3,133	146,600
11.750	87.2	10.126	0.734	12.750	25.402	23.205	91.4	62.9	2,204	104,100	2,901	141,900	3,133	160,800
11.875	71.8	10.625	0.582	12.750	20.648	20.648	100.0	60.3	1,962	72,400	2,581	98,500	2,787	111,600
13.375	68.0	12.259	0.480	14.375	19.445	19.445	100.0	60.2	1,847	79,400	2,431	108,300	2,625	122,800
13.375	72.0	12.250	0.514	14.375	20.768	20.768	100.0	58.7	1,973	72,700	2,596	99,000	2,804	112,100
13.375	77.0	12.119	0.550	14.375	22.160	22.160	100.0	57.2	2,105	77,900	2,770	106,100	2,992	120,100
13.375	80.7	12.059	0.580	14.375	23.314	23.314	100.0	59.4	2,215	90,100	2,914	122,700	3,147	139,000
13.375	86.0	11.969	0.625	14.375	25.035	25.035	100.0	60.4	2,378	103,100	3,129	140,600	3,380	159,300
13.375	91.0	11.899	0.660	14.375	26.364	26.364	100.0	62.8	2,505	118,100	3,296	161,000	3,559	182,500
13.375	92.5	11.875	0.672	14.375	26.818	26.365	98.3	61.7	2,505	118,200	3,296	161,100	3,559	182,600
13.625	88.2	12.250	0.625	14.375	25.525	21.172	82.9	62.3	2,011	111,800	2,647	152,700	2,858	173,100

Hunting—SEAL-LOCK BOSS (SLBOSS)

Diagram p. C-110

Type: Coupled, non-upset **Seal: Threaded**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
7.625	29.7	6.750	0.375	8.500	8.541	8.541	100.0	62.6	811	24,000	1,068	32,600	1,153	36,900
7.625	33.7	6.640	0.430	8.500	9.720	9.720	100.0	64.5	923	30,900	1,215	42,000	1,312	47,500
7.625	39.0	6.500	0.500	8.500	11.192	11.192	100.0	66.9	1,063	40,000	1,399	54,300	1,511	61,500
7.625	42.8	6.376	0.562	8.500	12.470	12.470	100.0	70.6	1,185	49,400	1,559	67,100	1,683	76,000
8.625	28.0	7.892	0.304	9.625	7.947	7.947	100.0	59.6	755	19,100	993	26,000	1,073	29,500
8.625	36.0	7.700	0.400	9.625	10.336	10.336	100.0	64.6	982	35,300	1,292	48,300	1,395	54,700
8.625	44.0	7.500	0.500	9.625	12.763	12.763	100.0	69.2	1,212	53,300	1,595	72,900	1,723	82,700
8.625	49.0	7.386	0.557	9.625	14.118	14.026	99.3	72.4	1,332	64,800	1,753	88,500	1,894	100,300
9.625	40.0	8.679	0.395	10.625	11.454	11.454	100.0	55.5	1,088	34,000	1,432	46,400	1,546	52,600
9.625	43.5	8.599	0.435	10.625	12.559	12.559	100.0	56.7	1,193	41,500	1,570	56,600	1,695	64,100
9.625	47.0	8.525	0.472	10.625	13.572	13.572	100.0	57.6	1,289	48,000	1,697	65,400	1,832	74,100
9.625	53.5	8.500	0.545	10.625	15.546	15.546	100.0	63.2	1,477	66,800	1,943	91,100	2,099	103,200
9.625	59.4	8.251	0.609	10.625	17.250	17.250	99.6	67.0	1,639	82,900	2,156	113,100	2,329	128,200
9.750	59.2	8.500	0.595	10.625	17.113	17.113	100.0	55.4	1,626	63,900	2,139	87,000	2,310	98,600
9.875	62.8	8.500	0.625	10.625	18.162	17.797	98.0	47.3	1,691	56,500	2,225	76,500	2,403	86,500
10.750	45.5	9.875	0.400	11.750	13.006	13.006	100.0	56.1	1,236	44,400	1,626	60,600	1,756	68,700
10.750	51.0	9.694	0.450	11.750	14.561	14.561	100.0	58.2	1,383	57,000	1,820	77,800	1,966	88,200
10.750	55.5	9.625	0.495	11.750	15.947	15.947	100.0	59.5	1,515	67,900	1,993	92,600	2,153	104,900
10.750	60.7	9.504	0.545	11.750	17.473	17.473	100.0	63.2	1,660	84,200	2,184	114,800	2,359	130,100
10.750	65.7	9.500	0.595	11.750	18.982	18.982	100.0	66.3	1,803	100,100	2,373	136,600	2,563	154,900
10.750	73.2	9.250	0.672	11.750	21.276	19.841	91.2	70.1	1,885	124,200	2,480	169,500	2,679	192,200
10.750	79.2	9.126	0.734	11.750	23.096	19.841	84.0	72.6	1,885	143,100	2,480	195,400	2,679	221,600
10.750	80.8	9.094	0.750	11.750	23.562	19.841	82.4	73.2	1,885	147,900	2,480	202,600	2,679	229,100
11.750	47.0	10.844	0.375	12.750	13.401	13.401	100.0	53.2	1,273	43,200	1,675	59,000	1,809	66,900

Continued

Hunting—SEAL-LOCK BOSS (SLBOSS) (cont.)

Diagram p. C-110

Type: Coupled, non-upset **Seal: Threaded**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
11.750	54.0	10.724	0.435	12.750	15.463	15.463	100.0	56.3	1,469	62,600	1,933	85,500	2,088	96,900
11.750	60.0	10.625	0.489	12.750	17.300	17.300	100.0	59.0	1,643	79,300	2,162	108,200	2,335	122,600
11.750	65.0	10.625	0.534	12.750	18.816	18.816	100.0	62.5	1,788	97,000	2,352	132,400	2,540	150,000
11.750	71.0	10.430	0.582	12.750	20.420	20.420	100.0	65.6	1,940	115,600	2,552	157,800	2,757	178,900
11.875	71.8	10.625	0.582	12.750	20.648	20.648	100.0	54.5	1,962	91,600	2,581	124,900	2,788	141,600
13.375	61.0	12.359	0.430	14.375	17.487	17.487	100.0	55.2	1,661	54,000	2,186	74,000	2,361	83,900
13.375	68.0	12.259	0.480	14.375	19.445	19.445	100.0	57.3	1,847	67,100	2,431	91,900	2,625	104,200
13.375	72.0	12.250	0.514	14.375	20.768	20.768	100.0	59.3	1,973	77,500	2,596	106,000	2,804	120,300
13.375	77.0	12.119	0.550	14.375	22.160	22.160	100.0	60.5	2,105	86,900	2,770	118,900	2,992	135,000
13.375	85.0	12.003	0.608	14.375	24.386	24.025	98.5	62.6	2,282	102,900	3,003	140,900	3,243	159,900
13.375	86.0	11.969	0.625	14.375	25.035	24.025	96.0	64.1	2,282	103,000	3,003	141,000	3,243	160,000
13.625	88.2	12.250	0.625	14.375	25.525	23.559	92.3	44.8	2,238	71,200	2,945	96,900	3,180	109,700
14.000	82.5	12.720	0.562	15.000	23.726	23.726	100.0	58.6	2,254	95,000	2,966	129,700	3,203	147,000
14.000	94.8	12.500	0.656	15.000	27.500	25.726	93.5	64.5	2,444	129,800	3,216	177,300	3,473	201,000
14.000	99.0	12.468	0.688	15.000	28.773	25.726	89.4	66.2	2,444	141,400	3,216	193,100	3,473	219,000
14.000	114.0	12.244	0.800	15.000	33.175	25.726	77.5	70.9	2,444	181,400	3,216	248,000	3,473	281,300
16.000	65.0	15.062	0.375	17.000	18.408	18.408	100.0	54.4	1,749	61,600	2,301	84,300	2,485	95,600
16.000	75.0	14.936	0.438	17.000	21.414	21.414	100.0	53.9	2,034	78,200	2,677	106,800	2,891	121,100
16.000	84.0	14.822	0.495	17.000	24.112	24.112	100.0	54.3	2,291	94,900	3,014	129,500	3,255	146,800
16.000	95.0	14.680	0.566	17.000	27.444	27.444	100.0	59.8	2,607	130,400	3,430	178,100	3,705	201,900
16.000	104.0	14.562	0.625	17.000	30.189	29.118	96.5	63.7	2,766	159,600	3,640	217,900	3,931	247,100
16.000	109.0	14.500	0.656	17.000	31.622	29.118	92.1	65.5	2,766	174,700	3,640	238,600	3,931	270,600
16.000	128.0	14.250	0.781	17.000	37.341	29.118	78.0	70.8	2,766	234,600	3,640	320,600	3,931	363,700
18.625	87.5	17.567	0.435	19.625	24.858	24.858	100.0	50.4	2,362	95,000	3,107	129,600	3,356	147,000
18.625	96.5	17.465	0.486	19.625	27.695	27.695	100.0	52.8	2,631	122,000	3,462	166,500	3,739	188,800
18.625	99.0	17.437	0.500	19.625	28.471	28.471	100.0	54.4	2,705	131,700	3,559	179,800	3,844	203,800
18.625	105.0	17.375	0.531	19.625	30.184	30.184	100.0	57.0	2,867	153,100	3,773	209,000	4,075	237,000
18.625	112.0	17.279	0.579	19.625	32.825	32.825	100.0	60.5	3,118	186,000	4,103	253,900	4,431	287,900
18.625	138.0	16.997	0.720	19.625	40.500	34.232	84.5	68.2	3,252	272,500	4,279	372,300	4,621	422,200
20.000	94.0	18.936	0.438	21.000	26.918	26.918	100.0	50.2	2,557	110,300	3,365	150,600	3,634	170,800
20.000	106.5	18.812	0.500	21.000	30.631	30.631	100.0	52.0	2,910	143,100	3,829	195,200	4,135	221,200
20.000	131.0	18.562	0.625	21.000	38.043	37.367	98.2	61.6	3,550	242,300	4,671	330,800	5,045	375,000
20.000	133.0	18.542	0.635	21.000	38.631	37.367	96.7	62.2	3,550	250,100	4,671	341,400	5,045	387,100
20.000	147.0	18.394	0.709	21.000	42.969	37.367	87.0	66.1	3,550	307,600	4,671	420,100	5,045	476,400
20.000	169.0	18.188	0.812	21.000	48.948	37.367	76.3	70.4	3,550	386,300	4,671	527,900	5,045	598,700

Hunting—SEAL-LOCK HC (SLHC)

Diagram p. C-110

Type: Coupled **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
5.000	13.0	4.369	0.253	5.563	3.773	3.773	100.0	71.9	358	6,900	472	9,200	509	10,400
5.000	15.0	4.283	0.296	5.563	4.374	4.287	98.0	62.0	407	7,000	536	9,400	579	10,600
5.000	18.0	4.151	0.362	5.563	5.275	4.287	81.3	51.4	407	7,200	536	9,500	579	10,700
5.500	15.5	4.825	0.275	6.050	4.514	4.514	100.0	69.7	429	9,000	564	12,100	609	13,700
5.500	17.0	4.767	0.304	6.050	4.962	4.962	100.0	63.4	471	9,100	620	12,200	670	13,800
5.500	20.0	4.653	0.361	6.050	5.828	5.513	94.6	67.3	524	12,100	689	16,300	744	18,300
5.500	23.0	4.545	0.415	6.050	6.630	5.513	83.2	59.2	524	12,300	689	16,400	744	18,500
6.625	20.0	5.924	0.288	7.390	5.734	6.937	100.0	65.0	659	9,800	867	13,200	936	15,000
6.625	24.0	5.796	0.352	7.390	6.937	6.937	100.0	53.7	659	10,000	867	13,500	936	15,200
6.625	28.0	5.666	0.417	7.390	8.133	8.123	99.9	67.2	772	16,100	1,015	21,800	1,097	24,700
6.625	32.0	5.550	0.475	7.390	9.177	8.123	88.5	59.5	772	16,300	1,015	22,000	1,097	24,800
7.000	23.0	6.250	0.317	7.656	6.655	6.655	100.0	65.3	632	12,800	832	17,200	898	19,400
7.000	26.0	6.151	0.362	7.656	7.549	7.549	100.0	57.6	717	13,000	944	17,400	1,019	19,600
7.000	29.0	6.125	0.408	7.656	8.449	8.449	100.0	64.4	803	17,100	1,056	23,000	1,141	26,000
7.000	32.0	6.000	0.453	7.656	9.317	9.313	99.9	58.4	885	17,300	1,164	23,200	1,257	26,100
7.000	35.0	5.879	0.498	7.656	10.172	9.313	91.5	53.5	885	17,400	1,164	23,300	1,257	26,300
7.000	38.0	5.795	0.540	7.656	10.959	9.313	85.0	49.7	885	17,500	1,164	23,400	1,257	26,400
7.000	41.0	5.695	0.590	7.656	11.881	9.313	78.4	45.8	885	17,600	1,164	23,500	1,257	26,500
7.625	26.4	6.844	0.328	8.500	7.519	7.519	100.0	63.1	714	13,300	940	17,800	1,015	20,100
7.625	29.7	6.750	0.375	8.500	8.541	8.541	100.0	55.6	811	13,500	1,068	18,000	1,153	20,300
7.625	33.7	6.640	0.430	8.500	9.720	9.720	100.0	48.8	923	13,700	1,215	18,300	1,312	20,500
7.625	39.0	6.500	0.500	8.500	11.192	11.192	100.0	42.4	1,063	14,000	1,399	18,500	1,511	20,800
7.625	45.3	6.310	0.595	8.500	13.141	11.212	85.3	36.1	1,065	14,300	1,402	18,800	1,514	21,100
7.750	46.1	6.500	0.595	8.600	13.374	13.374	100.0	35.5	1,271	14,500	1,672	19,000	1,805	21,200
8.625	32.0	7.875	0.352	9.625	9.149	9.149	100.0	58.8	869	17,100	1,144	22,900	1,235	25,900
8.625	36.0	7.700	0.400	9.625	10.336	10.336	100.0	52.0	982	17,400	1,292	23,200	1,395	26,100
8.625	40.0	7.625	0.450	9.625	11.557	11.557	100.0	46.5	1,098	17,700	1,445	23,500	1,560	26,400
8.625	44.0	7.500	0.500	9.625	12.763	12.763	100.0	42.1	1,212	17,900	1,595	23,700	1,723	26,700
8.625	49.0	7.386	0.557	9.625	14.118	14.118	100.0	38.1	1,341	18,200	1,765	24,000	1,906	26,900
9.625	36.0	8.765	0.352	10.625	10.254	10.254	100.0	58.9	974	21,800	1,282	29,100	1,384	32,800
9.625	40.0	8.750	0.395	10.625	11.454	11.454	100.0	52.8	1,088	22,100	1,432	29,500	1,546	33,200
9.625	43.5	8.625	0.435	10.625	12.559	12.559	100.0	48.1	1,193	22,400	1,570	29,800	1,695	33,500
9.625	47.0	8.625	0.472	10.625	13.572	13.572	100.0	44.5	1,289	22,600	1,697	30,000	1,832	33,700
9.625	53.5	8.500	0.545	10.625	15.546	15.546	100.0	38.9	1,477	23,000	1,943	30,400	2,099	34,100
9.750	59.2	8.500	0.595	10.625	17.113	17.113	100.0	35.3	1,626	23,500	2,139	30,900	2,310	34,600
9.875	62.8	8.500	0.625	10.625	18.162	18.162	100.0	33.3	1,725	23,800	2,270	31,200	2,452	34,900
10.750	40.5	9.894	0.350	11.750	11.435	11.435	100.0	58.9	1,086	27,100	1,429	36,400	1,544	41,000
10.750	45.5	9.875	0.400	11.750	13.006	13.006	100.0	51.8	1,236	27,600	1,626	36,800	1,756	41,400
10.750	51.0	9.694	0.450	11.750	14.561	14.561	100.0	46.2	1,383	28,000	1,820	37,200	1,966	41,800
10.750	55.5	9.625	0.495	11.750	15.947	15.947	100.0	42.2	1,515	28,300	1,993	37,600	2,153	42,200
10.750	60.7	9.504	0.545	11.750	17.473	17.473	100.0	38.5	1,660	28,700	2,184	37,900	2,359	42,500
10.750	65.7	9.500	0.595	11.750	18.982	18.982	100.0	35.5	1,803	29,000	2,373	38,200	2,563	42,800
11.750	47.0	10.844	0.375	12.750	13.401	13.401	100.0	67.4	1,273	37,000	1,675	49,800	1,809	56,200
11.750	54.0	10.724	0.435	12.750	15.463	15.463	100.0	58.4	1,469	37,600	1,933	50,300	2,088	56,700
11.750	60.0	10.625	0.489	12.750	17.300	17.300	100.0	52.2	1,644	38,000	2,163	50,800	2,336	57,200
11.750	65.0	10.625	0.534	12.750	18.816	18.816	100.0	48.0	1,788	38,300	2,352	51,100	2,540	57,500
11.750	66.7	10.500	0.547	12.750	19.252	19.252	100.0	47.0	1,829	38,400	2,407	51,200	2,599	57,600
11.750	71.0	10.430	0.582	12.750	20.420	20.420	100.0	44.3	1,940	38,600	2,553	51,400	2,757	57,800
11.750	73.6	10.376	0.609	12.750	21.315	21.315	100.0	42.4	2,025	38,800	2,664	51,600	2,878	58,000
11.750	80.5	10.250	0.672	12.750	23.387	23.243	99.4	38.7	2,208	39,200	2,905	51,900	3,138	58,300
11.750	87.2	10.126	0.734	12.750	25.402	23.243	91.5	35.6	2,208	39,500	2,905	52,300	3,138	58,700
11.875	71.8	10.625	0.582	12.750	20.648	20.648	100.0	43.8	1,962	38,900	2,581	51,700	2,787	58,100
13.375	54.5	12.459	0.380	14.375	15.513	15.513	100.0	68.0	1,474	49,000	1,939	66,300	2,094	74,900
13.375	61.0	12.359	0.430	14.375	17.487	17.487	100.0	60.3	1,661	49,500	2,186	66,700	2,361	75,400

Continued

Hunting—SEAL-LOCK HC (SLHC) (cont.)

Diagram p. C-110

Type: Coupled **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
13.375	68.0	12.259	0.480	14.375	19.445	19.445	100.0	54.2	1,847	49,900	2,431	67,100	2,625	75,800
13.375	72.0	12.250	0.514	14.375	20.768	20.768	100.0	50.8	1,973	50,100	2,596	67,400	2,804	76,000
13.375	77.0	12.119	0.550	14.375	22.160	22.160	100.0	47.6	2,105	50,400	2,770	67,600	2,992	76,300
13.375	85.0	12.003	0.608	14.375	24.386	24.386	100.0	43.3	2,317	50,700	3,048	68,000	3,292	76,600
13.625	88.2	12.250	0.625	14.375	25.525	25.525	100.0	41.3	2,425	51,400	3,191	68,700	3,446	77,300

Hunting—SEAL-LOCK HT (SLHT)

Diagram p. C-110

Type: Coupled **Seal: Threaded**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
5.000	15.0	4.283	0.296	5.563	4.374	4.374	100.0	54.4	437	8,700	547	11,500	590	12,900
5.000	18.0	4.151	0.362	5.563	5.275	5.275	100.0	62.3	501	12,600	659	16,700	712	18,800
5.000	21.4	4.001	0.437	5.563	6.264	5.510	88.0	65.9	523	16,000	689	21,400	744	24,100
5.000	23.2	3.919	0.478	5.563	6.791	5.510	81.1	68.7	523	18,200	689	24,400	744	27,500
5.500	15.5	4.825	0.275	6.050	4.514	4.514	100.0	50.2	429	8,700	524	11,400	609	12,800
5.500	17.0	4.767	0.304	6.050	4.962	4.962	100.0	54.8	471	10,800	620	14,300	670	16,100
5.500	20.0	4.653	0.361	6.050	5.828	5.828	100.0	58.4	554	14,000	729	18,700	787	21,100
5.500	23.0	4.545	0.415	6.050	6.630	5.915	89.2	63.7	562	17,700	739	23,700	799	26,800
6.625	20.0	5.924	0.288	7.390	5.734	5.734	100.0	52.5	545	13,800	717	18,500	774	20,800
6.625	24.0	5.796	0.352	7.390	6.937	6.937	100.0	60.9	659	20,600	867	27,700	936	31,300
6.625	28.0	5.666	0.417	7.390	8.133	8.133	100.0	63.9	773	26,000	1,017	35,100	1,098	39,700
7.000	23.0	6.241	0.317	7.656	6.656	6.656	100.0	54.4	632	18,600	832	24,700	898	27,800
7.000	26.0	6.151	0.362	7.656	7.549	7.549	100.0	59.9	717	23,900	944	32,000	1,019	36,100
7.000	29.0	6.059	0.408	7.656	8.449	8.449	100.0	61.3	803	27,900	1,056	37,400	1,141	42,100
7.000	32.0	5.969	0.453	7.656	9.317	8.763	94.1	62.5	833	31,700	1,095	42,600	1,183	48,000
7.000	35.0	5.879	0.498	7.656	10.172	8.763	86.1	65.7	833	36,800	1,095	49,500	1,183	55,800
7.000	38.0	5.795	0.540	7.656	10.959	8.763	80.0	68.3	833	41,400	1,095	55,700	1,183	62,900

Hunting—SEAL-LOCK SEMI FLUSH (SLSF)

Diagram p. C-110

Type: Flush **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
5.000	15.0	0.296	4.283	5.212	4.374	3.106	71.0	69.1	295	4,300	388	5,700	419	6,500
5.000	18.0	0.362	4.151	5.214	5.275	3.848	73.0	63.7	366	5,300	481	7,100	519	8,000
5.000	20.3	0.408	4.059	5.251	5.886	4.459	75.8	57.1	424	5,400	557	7,200	602	8,100
5.000	20.8	0.422	4.031	5.263	6.069	4.643	76.5	55.4	441	5,400	580	7,200	627	8,100
5.000	21.4	0.437	4.001	5.275	6.264	4.721	75.4	53.6	448	5,400	590	7,200	637	8,100
5.000	23.2	0.478	3.919	5.209	6.791	5.093	75.0	53.0	484	6,600	637	8,700	688	9,800
5.000	24.1	0.500	3.875	5.226	7.079	5.369	75.8	50.9	510	6,700	671	8,800	725	9,900
5.500	17.0	0.304	4.767	5.718	4.962	3.573	72.0	66.5	339	5,100	447	6,800	482	7,700
5.500	20.0	0.361	4.653	5.766	5.828	4.439	76.2	56.6	422	5,100	555	6,800	599	7,700
5.500	23.0	0.415	4.545	5.723	6.630	4.975	75.0	57.1	473	6,800	622	9,200	672	10,300
5.500	23.8	0.437	4.501	5.741	6.951	5.296	76.2	54.5	503	6,800	662	9,200	715	10,300
5.500	26.0	0.476	4.423	5.713	7.513	5.634	75.0	53.4	535	7,900	704	10,500	761	11,800
5.500	26.8	0.500	4.375	5.732	7.854	5.975	76.1	51.1	568	8,000	747	10,600	807	11,900
6.625	24.0	0.352	5.796	6.842	6.937	5.065	73.0	62.7	481	8,900	633	11,900	684	13,400
6.625	28.0	0.417	5.666	6.898	8.133	6.265	77.0	53.5	595	9,000	783	12,000	846	13,500
6.625	32.0	0.475	5.550	6.841	9.177	6.886	75.0	53.7	654	11,800	861	15,700	930	17,600
6.625	33.0	0.500	5.500	6.862	9.621	7.324	76.0	51.2	696	11,900	916	15,800	989	17,700
7.000	23.0	0.317	6.250	7.205	6.656	4.421	66.4	70.0	420	9,800	553	13,200	597	15,000
7.000	26.0	0.362	6.151	7.245	7.549	5.308	70.3	61.8	504	9,900	664	13,300	717	15,100
7.000	29.0	0.408	6.125	7.219	8.449	6.250	74.0	59.2	594	11,500	781	15,500	844	17,500
7.000	32.0	0.453	6.000	7.257	9.317	7.117	76.4	53.7	676	11,600	890	15,600	961	17,600
7.000	35.0	0.498	5.879	7.215	10.172	7.632	75.0	52.5	725	13,600	954	18,100	1,030	20,400
7.000	38.0	0.540	5.795	7.250	10.959	8.419	76.8	48.7	800	13,700	1,052	18,200	1,137	20,500
7.625	29.7	0.375	6.750	7.835	8.541	6.154	72.1	64.2	585	13,500	769	18,300	831	20,700
7.625	33.7	0.430	6.640	7.883	9.720	7.332	75.4	56.4	697	13,600	917	18,400	990	20,800
7.625	39.0	0.500	6.500	7.844	11.192	8.396	75.0	52.5	798	15,900	1,050	21,300	1,133	24,000
7.625	42.8	0.562	6.376	7.896	12.470	9.673	77.6	47.1	919	16,100	1,209	21,500	1,306	24,200
7.625	45.3	0.595	6.310	7.833	13.141	9.860	75.0	48.5	937	18,800	1,233	25,100	1,331	28,300
7.625	47.1	0.625	6.250	7.858	13.744	10.459	76.1	46.4	994	19,000	1,307	25,300	1,412	28,500
7.625	51.2	0.687	6.126	7.950	14.974	11.694	78.1	42.6	1,111	19,300	1,462	25,600	1,579	28,800
7.625	52.8	0.712	6.076	7.822	15.463	11.596	75.0	45.0	1,102	21,900	1,450	29,200	1,565	32,800
7.625	55.3	0.750	6.076	7.898	16.199	12.329	76.1	42.9	1,171	22,100	1,541	29,400	1,664	33,000
7.625	59.1	0.800	5.900	7.811	16.199	12.329	75.0	43.2	1,222	24,300	1,608	32,300	1,737	36,400
7.625	59.2	0.812	5.876	7.820	17.380	13.090	75.0	43.2	1,244	24,400	1,636	32,400	1,767	36,500
7.750	46.1	0.595	6.500	7.959	13.374	10.027	75.0	48.6	953	19,500	1,253	26,000	1,354	29,300
7.750	56.1	0.750	6.125	7.941	16.493	12.375	75.0	44.1	1,176	24,100	1,547	32,000	1,671	35,900
8.063	54.0	0.684	6.570	8.201	15.856	11.097	70.0	51.6	1,054	27,700	1,387	37,100	1,498	41,900
8.625	32.0	0.352	7.796	8.840	9.149	6.590	72.0	64.2	626	15,300	824	20,800	890	23,500
8.625	36.0	0.400	7.700	8.883	10.336	7.777	75.2	56.8	739	15,400	972	20,900	1,050	23,600
8.625	40.0	0.450	7.625	8.850	11.557	8.667	75.0	55.4	823	18,600	1,083	25,100	1,170	28,400
8.625	44.0	0.500	7.500	8.894	12.763	9.873	77.4	50.1	938	18,700	1,234	25,200	1,333	28,500
8.625	49.1	0.562	7.376	8.849	14.236	10.819	76.0	48.7	1,028	22,300	1,352	29,800	1,461	33,600
8.625	52.0	0.595	7.310	8.877	15.010	11.589	77.2	46.2	1,101	22,500	1,449	30,000	1,565	33,800
8.625	54.0	0.625	7.250	8.902	15.708	12.284	78.2	44.2	1,167	22,600	1,536	30,100	1,658	33,900
9.625	36.0	0.352	8.765	9.841	10.254	7.381	72.0	63.9	701	16,900	923	22,900	996	26,000
9.625	40.0	0.395	8.750	9.880	11.454	8.580	74.9	57.2	815	17,000	1,073	23,000	1,158	26,100
9.625	43.5	0.435	8.599	9.847	12.559	9.296	74.0	57.6	883	20,500	1,162	27,800	1,255	31,400
9.625	47.0	0.472	8.525	9.880	13.572	10.312	76.0	53.3	980	20,600	1,289	27,900	1,392	31,500
9.625	53.5	0.545	8.500	9.847	15.547	11.654	75.0	50.8	1,107	24,100	1,457	32,600	1,573	36,900
9.625	58.4	0.595	8.375	9.839	16.879	12.664	75.0	48.8	1,203	26,800	1,583	35,900	1,710	40,500
9.625	59.4	0.609	8.251	9.851	17.250	13.034	75.6	47.8	1,238	26,800	1,629	35,900	1,760	40,500
9.625	70.3	0.734	8.001	9.850	20.502	15.379	75.0	44.8	1,460	32,700	1,922	43,600	2,076	49,000
9.625	71.6	0.750	7.969	9.866	20.911	15.789	75.5	43.9	1,500	32,800	1,974	43,700	2,132	49,100
9.750	59.2	0.595	8.500	9.964	17.113	12.842	75.0	48.8	1,220	27,400	1,605	36,800	1,734	41,500
9.875	62.8	0.625	8.500	10.135	18.162	13.625	75.0	47.8	1,294	29,200	1,703	39,500	1,839	44,500
9.875	66.6	0.678	8.363	10.240	19.590	14.478	73.9	44.3	1,375	29,500	1,810	40,200	1,955	45,300
10.125	79.2	0.795	8.500	10.249	23.302	16.304	70.0	53.5	1,549	48,600	2,038	65,600	2,201	74,200

Continued

Hunting—SEAL-LOCK SEMI FLUSH (SLSF) (cont.)

Diagram p. C-110

Type: Flush **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
10.375	87.9	0.864	8.500	10.455	25.816	17.554	68.0	51.0	1,668	53,900	2,194	72,600	2,370	82,000
10.750	45.5	0.400	9.875	10.960	13.006	9.362	72.0	62.5	889	25,300	1,170	34,400	1,264	39,000
10.750	51.0	0.450	9.694	10.969	14.561	10.769	74.0	56.7	1,023	26,700	1,346	36,200	1,454	40,900
10.750	55.5	0.495	9.625	11.009	15.947	12.155	76.2	51.8	1,155	26,800	1,519	36,300	1,641	41,000
10.750	60.7	0.545	9.504	10.972	17.473	13.102	75.0	50.9	1,245	30,600	1,638	41,300	1,769	46,700
10.750	62.8	0.578	9.438	11.004	18.471	14.100	76.8	48.1	1,340	30,700	1,763	41,400	1,904	46,800
10.750	65.7	0.595	9.500	11.016	18.982	14.612	77.0	46.8	1,388	30,800	1,827	41,500	1,973	46,900
10.750	79.2	0.734	9.126	10.920	23.096	16.858	75.9	47.1	1,602	42,900	2,107	57,700	2,276	65,100
10.750	83.8	0.787	9.020	10.940	24.633	18.395	74.6	44.2	1,748	43,500	2,299	58,300	2,483	65,700
10.750	85.3	0.797	9.000	10.949	24.921	18.683	75.0	43.6	1,775	43,600	2,335	58,400	2,522	65,800
11.750	54.0	0.435	10.724	11.975	15.463	11.440	74.0	57.7	1,087	30,600	1,430	41,600	1,544	47,100
11.750	60.0	0.489	10.616	12.024	17.300	13.277	76.8	51.6	1,261	30,700	1,660	41,700	1,792	47,200
11.750	65.0	0.534	10.625	11.974	18.616	14.106	75.8	52.0	1,340	35,600	1,763	48,300	1,904	54,700
11.750	71.0	0.582	10.430	12.017	20.420	15.706	76.9	47.4	1,492	35,800	1,963	48,500	2,120	54,900
11.750	74.6	0.618	10.358	11.967	21.613	16.218	75.0	51.1	1,541	41,000	2,027	55,400	2,189	62,500
11.750	75.4	0.625	10.344	11.973	21.844	16.445	75.3	50.5	1,562	41,000	2,056	55,400	2,220	62,500
11.750	93.2	0.797	10.000	11.950	27.425	19.189	70.0	49.4	1,823	61,400	2,399	82,600	2,591	93,200
11.750	119.8	1.047	9.500	11.753	35.205	23.241	66.0	38.5	2,208	87,300	2,905	117,400	3,138	132,400
11.875	71.8	0.582	10.625	12.096	20.648	15.487	75.0	49.5	1,471	39,300	1,936	53,200	2,091	60,200
13.375	61.0	0.430	12.359	13.608	17.487	13.110	75.0	55.3	1,245	36,300	1,639	49,400	1,770	55,900
13.375	68.0	0.480	12.259	13.654	19.445	15.068	77.5	49.8	1,431	36,400	1,884	49,500	2,034	56,000
13.375	72.0	0.514	12.250	13.602	20.768	15.585	75.0	52.2	1,481	44,700	1,948	60,700	2,104	68,700
13.375	77.0	0.550	12.119	13.635	22.160	16.973	76.6	49.0	1,612	44,800	2,122	60,800	2,291	68,800
13.375	80.7	0.580	12.059	13.597	23.314	17.493	75.0	49.5	1,662	49,900	2,187	67,700	2,362	76,600
13.375	85.0	0.608	12.003	13.622	24.386	18.564	76.1	47.3	1,764	50,100	2,321	67,900	2,506	76,800
13.375	86.0	0.625	11.969	13.637	25.035	19.204	76.7	46.1	1,824	50,200	2,401	68,000	2,593	76,900
13.625	88.2	0.625	12.250	13.844	25.526	19.134	75.0	48.0	1,818	55,500	2,392	75,200	2,583	85,100
13.625	118.2	0.868	11.733	14.275	34.787	28.395	81.6	35.3	2,698	57,800	3,549	77,500	3,833	87,400
13.750	58.2	0.400	12.794	13.937	16.776	11.404	68.0	67.4	1,083	46,900	1,426	64,000	1,540	72,600
13.750	98.6	0.708	12.250	14.120	29.009	21.756	75.0	47.4	2,067	66,300	2,720	89,900	2,937	101,600
14.000	72.1	0.500	12.844	14.170	21.206	14.421	68.0	61.1	1,370	59,100	1,803	80,700	1,947	91,500
14.000	82.5	0.562	12.720	14.211	23.726	17.328	73.0	52.6	1,645	56,400	2,165	76,800	2,338	87,000
14.000	104.2	0.734	12.376	14.215	30.591	22.947	75.0	45.1	2,180	68,700	2,868	92,600	3,098	104,600
14.000	112.6	0.797	12.250	14.250	33.058	25.413	76.9	41.7	2,414	69,200	3,177	93,100	3,431	105,100
14.000	112.9	0.800	12.250	14.350	33.175	25.525	76.9	41.6	2,425	69,400	3,191	93,300	3,446	105,300
14.000	116.2	0.825	12.194	14.400	34.147	26.504	77.6	40.4	2,518	69,600	3,313	93,500	3,578	105,500
14.000	120.3	0.855	12.134	14.450	35.308	27.665	78.4	39.0	2,628	69,900	3,458	93,800	3,735	105,800
14.063	118.0	0.825	12.250	14.250	34.310	25.278	73.7	45.7	2,401	82,100	3,160	110,900	3,413	125,300
14.063	122.0	0.850	12.250	14.350	35.283	26.251	74.4	44.4	2,494	82,500	3,281	111,300	3,544	125,700
16.000	84.0	0.495	14.822	16.257	24.112	16.396	68.0	36.7	1,558	77,800	2,050	106,000	2,214	120,000
16.000	95.0	0.566	14.868	16.200	27.444	17.064	62.0	35.7	1,621	84,500	2,133	115,200	2,304	130,500
16.000	97.0	0.575	14.850	16.200	27.864	17.484	63.0	35.6	1,661	87,200	2,186	119,000	2,360	134,800
16.000	99.0	0.601	14.798	16.250	29.075	18.696	64.0	35.0	1,776	90,100	2,767	122,700	2,524	139,000
16.000	109.0	0.656	14.688	16.250	31.622	22.136	70.0	34.4	2,103	95,000	2,767	129,000	2,988	146,000
16.040	109.6	0.667	14.706	16.250	32.213	20.530	64.0	34.4	1,950	96,200	2,566	131,000	2,772	148,400
16.100	103.4	0.625	14.850	16.300	30.385	20.148	66.0	38.7	1,914	101,600	2,519	138,500	2,720	156,900
17.875	92.8	0.500	16.875	16.687	27.293	18.002	66.0	39.1	1,710	103,500	2,250	141,300	2,430	160,200
17.875	106.2	0.575	16.725	16.537	31.251	21.870	70.0	34.4	2,078	105,000	2,734	143,000	2,952	162,100
18.000	93.5	0.500	17.000	16.812	27.489	18.133	66.0	39.1	1,723	104,900	2,267	143,300	2,448	162,400
18.000	116.1	0.625	16.750	16.562	34.116	23.208	68.0	36.7	2,205	121,600	2,901	165,700	3,133	187,800
18.625	96.9	0.500	17.625	17.500	28.471	18.787	66.0	39.0	1,785	112,100	2,348	153,200	2,536	173,800
18.625	120.3	0.625	17.375	17.187	35.343	24.024	68.0	36.8	2,282	130,300	3,003	177,800	3,243	201,500

Hunting—TKC MMS

Diagram p. C-110

Type: Coupled **Seal: Resilient, threaded**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
5.000	13.0	4.369	0.253	5.563	3.773	2.670	70.8	42.5	241	3,765	317	5,100	342	5,700
5.000	15.0	4.283	0.296	5.563	4.374	3.271	74.8	36.6	295	4,620	388	6,255	420	6,975
5.000	18.0	4.151	0.362	5.563	5.275	4.171	79.1	30.4	376	5,895	495	7,965	535	8,895
5.000	21.4	4.001	0.437	5.563	6.264	5.161	82.4	25.6	466	7,290	613	9,870	662	11,010
5.000	23.2	3.919	0.478	5.563	6.791	5.687	83.8	23.6	513	8,025	675	10,875	729	12,135
5.000	24.1	3.875	0.500	5.563	7.069	5.965	84.4	22.7	538	8,415	708	11,400	765	12,735
5.500	15.5	4.825	0.275	6.050	4.514	3.299	73.1	39.2	298	4,515	392	6,105	423	6,825
5.500	17.0	4.767	0.304	6.050	4.962	3.747	75.5	35.7	338	5,115	445	6,930	481	7,755
5.500	20.0	4.653	0.361	6.050	5.828	4.613	79.2	30.4	416	6,300	548	8,535	592	9,540
5.500	23.0	4.545	0.415	6.050	6.630	5.414	81.7	26.7	489	7,395	643	10,020	694	11,205
6.625	20.0	5.924	0.288	7.390	5.734	4.267	74.4	37.3	369	5,535	500	7,500	547	8,385
6.625	24.0	5.796	0.352	7.390	6.937	5.470	78.9	30.8	473	7,095	641	9,615	702	10,755
6.625	28.0	5.666	0.417	7.390	8.133	6.666	82.0	26.3	576	8,640	781	11,715	855	13,110
6.625	32.0	5.550	0.475	7.390	9.177	7.710	84.0	23.3	666	9,990	904	13,560	989	15,165
7.000	23.0	6.241	0.317	7.656	6.656	5.105	76.7	34.0	435	6,525	590	8,850	655	9,900
7.000	26.0	6.151	0.362	7.656	7.549	5.998	79.5	29.9	511	7,665	693	10,395	769	11,640
7.000	29.0	6.059	0.408	7.656	8.449	6.899	81.6	26.8	587	8,805	797	11,955	885	13,380
7.000	32.0	5.969	0.453	7.656	9.317	7.766	83.4	24.3	661	9,915	897	13,455	996	15,060
7.000	35.0	5.879	0.498	7.656	10.172	8.622	84.8	22.2	734	11,010	996	14,940	1,106	16,725
7.000	38.0	5.795	0.540	7.656	10.959	9.408	85.9	20.6	801	12,015	1,087	16,305	1,207	18,240
7.625	26.4	6.844	0.328	8.500	7.519	N/A	77.5	32.8	482	7,230	654	9,810	733	10,995
7.625	29.7	6.750	0.375	8.500	8.541	N/A	80.2	28.9	567	8,505	769	11,535	861	12,915
7.625	33.7	6.640	0.430	8.500	9.720	N/A	82.6	25.4	664	9,960	901	13,515	1,009	15,135
7.625	39.0	6.500	0.500	8.500	11.192	N/A	84.9	22.1	786	11,790	1,066	15,990	1,194	17,910
7.625	42.8	6.376	0.562	8.500	12.470	N/A	86.4	19.8	891	13,365	1,210	18,150	1,355	20,325
7.625	45.3	6.310	0.595	8.500	13.141	N/A	87.1	18.8	947	14,205	1,285	19,275	1,439	21,585
7.625	47.1	6.250	0.625	8.500	13.745	N/A	87.7	18.0	997	14,955	1,353	20,295	1,515	22,725
8.625	32.0	7.796	0.352	9.625	9.149	N/A	79.1	30.6	583	8,745	791	11,865	887	13,305
8.625	36.0	7.700	0.400	9.625	10.336	N/A	81.5	27.1	678	10,170	921	13,815	1,032	15,480
8.625	40.0	7.600	0.450	9.625	11.557	N/A	83.4	24.2	776	11,640	1,055	15,825	1,182	17,730
8.625	44.0	7.500	0.500	9.625	12.763	N/A	85.0	21.9	874	13,110	1,186	17,790	1,330	19,950
8.625	49.0	7.386	0.557	9.625	14.118	N/A	86.4	19.8	983	14,745	1,335	20,025	1,496	22,440
9.625	36.0	8.765	0.352	10.625	10.254	N/A	79.2	30.2	634	9,510	861	12,915	966	14,490
9.625	40.0	8.679	0.395	10.625	11.454	N/A	81.3	27.0	727	10,905	988	14,820	1,108	16,620
9.625	43.5	8.599	0.435	10.625	12.559	N/A	83.0	24.6	813	12,195	1,105	16,575	1,240	18,600
9.625	47.0	8.525	0.472	10.625	13.572	N/A	84.2	22.8	893	13,395	1,213	18,195	1,361	20,415
9.625	53.5	8.379	0.545	10.625	15.547	N/A	86.2	19.9	1,047	15,705	1,422	21,330	1,595	23,925
9.625	58.4	8.279	0.595	10.625	16.879	N/A	87.3	18.3	1,151	17,265	1,564	23,460	1,754	26,310

Note: N/A = Jumpout Limited

Hunting—TKC LTC

Diagram p. C-110

Type: Coupled **Seal: Metal-to-metal, threaded**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
5.000	13.0	4.369	0.253	5.563	3.773	2.670	70.8	34.1	241	3,400	317	4,700	342	5,300
5.000	15.0	4.283	0.296	5.563	4.374	3.271	74.8	43.4	295	5,600	388	7,700	420	8,700
5.000	18.0	4.151	0.362	5.563	5.275	4.171	79.1	53.4	376	8,800	495	12,000	535	13,700
5.000	21.4	4.001	0.437	5.563	6.264	5.161	82.4	61.1	466	12,200	613	16,800	662	19,100
5.000	23.2	3.919	0.478	5.563	6.791	5.687	83.8	64.3	513	14,000	675	19,300	729	21,900
5.000	24.1	3.875	0.500	5.563	7.069	5.793	82.0	65.8	538	15,000	708	20,600	765	23,400
5.500	15.5	4.825	0.275	6.050	4.514	3.299	73.1	38.7	298	5,300	392	7,300	423	8,200
5.500	17.0	4.767	0.304	6.050	4.962	3.747	75.5	44.4	338	7,000	445	9,700	481	11,000
5.500	20.0	4.653	0.361	6.050	5.828	4.613	79.2	53.0	416	10,400	548	14,300	592	16,300
5.500	23.0	4.545	0.415	6.050	6.630	5.414	81.7	58.9	489	13,500	643	18,600	694	21,100
6.625	20.0	5.924	0.288	7.390	5.734	4.267	74.4	36.5	369	7,800	500	10,800	547	12,200
6.625	24.0	5.796	0.352	7.390	6.937	5.470	78.9	47.8	473	13,500	641	18,600	702	21,100
6.625	28.0	5.666	0.417	7.390	8.133	6.666	82.0	55.7	576	19,100	781	26,300	855	29,800
6.625	32.0	5.550	0.475	7.390	9.177	7.710	84.0	60.9	666	23,900	904	32,900	989	37,400
7.000	23.0	6.241	0.317	7.656	6.656	5.105	76.7	41.0	435	11,300	590	15,500	655	17,600
7.000	26.0	6.151	0.362	7.656	7.549	5.998	79.5	48.2	511	15,700	693	21,600	769	24,600
7.000	29.0	6.059	0.408	7.656	8.449	6.899	81.6	53.8	587	20,200	797	27,700	885	31,500
7.000	32.0	5.969	0.453	7.656	9.317	7.766	83.4	58.3	661	24,400	897	33,600	996	38,200
7.000	35.0	5.879	0.498	7.656	10.172	8.622	84.8	61.9	734	28,600	996	39,300	1,106	44,700
7.000	38.0	5.795	0.540	7.656	10.959	9.408	85.9	64.8	801	32,400	1,087	44,600	1,207	50,600
7.625	26.4	6.844	0.328	8.500	7.519	–	77.5	41.8	482	14,300	654	19,700	733	22,300
7.625	29.7	6.750	0.375	8.500	8.541	–	80.2	48.9	567	19,800	769	27,300	861	31,000
7.625	33.7	6.640	0.430	8.500	9.720	–	82.6	55.2	664	26,200	901	36,000	1,009	40,900
7.625	39.0	6.500	0.500	8.500	11.192	–	84.9	61.3	786	34,000	1,066	46,800	1,194	53,100
7.625	42.8	6.376	0.562	8.500	12.470	–	86.4	65.4	891	40,800	1,210	56,000	1,355	63,700
7.625	45.3	6.310	0.595	8.500	13.141	–	87.1	67.3	947	44,300	1,285	60,900	1,439	69,200
7.625	47.1	6.250	0.625	8.500	13.745	–	87.7	68.8	997	47,400	1,353	65,200	1,515	74,100
8.625	32.0	7.796	0.352	9.625	9.149	–	79.1	42.3	583	20,300	791	27,900	887	31,700
8.625	36.0	7.700	0.400	9.625	10.336	–	81.5	49.1	678	27,500	921	37,800	1,032	43,000
8.625	40.0	7.600	0.450	9.625	11.557	–	83.4	54.6	776	34,900	1,055	48,000	1,182	54,600
8.625	44.0	7.500	0.500	9.625	12.763	–	85.0	59.0	874	42,200	1,186	58,100	1,330	66,000
8.625	49.0	7.386	0.557	9.625	14.118	–	86.4	63.1	983	50,400	1,335	69,200	1,496	78,700
9.625	36.0	8.765	0.352	10.625	10.254	–	79.2	40.2	634	23,900	861	32,800	966	37,300
9.625	40.0	8.679	0.395	10.625	11.454	–	81.3	46.5	727	32,100	988	44,100	1,108	50,100
9.625	43.5	8.599	0.435	10.625	12.559	–	83.0	51.3	813	39,600	1,105	54,400	1,240	61,800
9.625	47.0	8.525	0.472	10.625	13.572	–	84.2	55.1	893	46,400	1,213	63,900	1,361	72,600
9.625	53.5	8.379	0.545	10.625	15.547	–	86.2	60.9	1,047	59,700	1,422	82,200	1,595	93,400
9.625	58.4	8.279	0.595	10.625	16.879	–	87.3	64.1	1,151	62,500	1,564	85,900	1,754	97,600
20.000	94.0	18.936	0.438	21.000	26.918	–	59.2	48.4	1,285	167,000	1,753	229,600	1,976	261,000
20.000	106.5	18.812	0.500	21.000	30.631	–	60.6	54.7	1,498	219,800	2,043	302,200	2,302	343,400
20.000	133.0	18.542	0.635	21.000	38.631	–	62.8	64.2	1,955	333,000	2,668	457,900	3,006	520,300

*Maximum delta torque. Torque applied after pin nose contact.

Hunting—TKC 4040 RTC

Diagram p. C-112

Type: Coupled **Seal: Metal-to-metal, threaded**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
5.000	18.0	4.151	0.362	5.563	5.275	4.882	92.6	76.7	391	16,700	537	22,900	610	26,000
5.000	23.2	3.919	0.478	5.563	6.791	4.882	71.9	83.7	391	22,800	537	31,400	610	35,700
5.500	15.5	4.825	0.275	6.050	4.514	4.342	96.2	63.3	347	10,150	478	14,000	543	15,900
5.500	17.0	4.767	0.304	6.050	4.962	4.790	96.5	66.1	383	13,000	527	17,900	599	20,300
5.500	20.0	4.653	0.361	6.050	5.828	5.334	91.5	70.4	427	16,500	587	22,700	667	25,800
5.500	23.0	4.545	0.415	6.050	6.630	5.334	80.5	73.4	427	19,800	587	27,200	799	30,900
7.000	23.0	6.241	0.317	7.656	6.655	6.436	96.7	61.9	515	17,200	708	23,700	805	26,900
7.000	26.0	6.151	0.362	7.656	7.549	7.33	97.1	67.7	586	20,800	806	28,600	916	32,500
7.000	29.0	6.059	0.408	7.656	8.449	8.230	97.4	72.0	658	24,500	905	33,600	1,029	38,200

JFE Steel/Hunting—Fox

Diagram p. C-112

Type: Coupled **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
5.000	13.0	4.369	0.253	5.563	3.773	5.487	100.0	*	302	*	415	*	472	*
5.000	15.0	4.283	0.296	5.563	4.374	5.487	100.0	*	350	*	481	*	547	*
5.000	18.0	4.151	0.362	5.563	5.275	5.487	100.0	*	422	*	580	*	659	*
5.000	21.4	4.001	0.437	5.563	6.264	5.487	87.6	*	439	*	604	*	686	*
5.000	23.2	3.919	0.478	5.563	6.791	5.487	80.8	*	439	*	604	*	686	*
5.000	24.1	3.875	0.500	5.563	7.069	5.487	77.6	*	439	*	604	*	686	*
5.500	15.5	4.825	0.275	6.050	4.514	5.888	100.0	*	361	*	497	*	564	*
5.500	17.0	4.767	0.304	6.050	4.962	5.888	100.0	*	397	*	546	*	620	*
5.500	20.0	4.653	0.361	6.050	5.828	5.888	100.0	*	466	*	641	*	729	*
5.500	23.0	4.545	0.415	6.050	6.630	5.888	88.8	*	471	*	648	*	736	*
5.500	26.8	4.375	0.500	6.050	7.854	5.888	75.0	*	471	*	648	*	736	*
6.625	20.0	5.924	0.288	7.390	5.734	9.627	100.0	*	459	*	631	*	717	*
6.625	24.0	5.796	0.352	7.390	6.937	9.627	100.0	*	555	*	763	*	867	*
6.625	28.0	5.666	0.417	7.390	8.133	9.627	100.0	*	651	*	895	*	1,017	*
6.625	32.0	5.550	0.475	7.390	9.177	9.627	100.0	*	734	*	1,009	*	1,147	*
7.000	20.0	6.331	0.272	7.656	5.749	8.967	100.0	*	460	*	632	*	719	*
7.000	23.0	6.250	0.317	7.656	6.655	8.967	100.0	*	532	*	732	*	832	*
7.000	26.0	6.151	0.362	7.656	7.549	8.967	100.0	*	604	*	830	*	944	*
7.000	29.0	6.059	0.408	7.656	8.449	8.967	100.0	*	676	*	929	*	1,056	*
7.000	32.0	6.000	0.453	7.656	9.317	8.967	96.2	*	717	*	986	*	1,121	*
7.000	35.0	5.879	0.498	7.656	10.172	8.967	88.2	*	717	*	986	*	1,121	*
7.000	38.0	5.795	0.540	7.656	10.959	8.967	81.8	*	717	*	986	*	1,121	*
7.625	26.4	6.844	0.328	8.500	7.519	12.766	100.0	*	602	*	827	*	940	*
7.625	29.7	6.750	0.375	8.500	8.541	12.766	100.0	*	683	*	940	*	1,068	*
7.625	33.7	6.640	0.430	8.500	9.720	12.766	100.0	*	778	*	1,069	*	1,215	*
7.625	39.0	6.500	0.500	8.500	11.192	12.766	100.0	*	895	*	1,231	*	1,399	*
7.625	42.8	6.376	0.562	8.500	12.470	12.766	100.0	*	998	*	1,372	*	1,559	*
7.625	45.3	6.310	0.595	8.500	13.141	12.766	97.1	*	1,021	*	1,404	*	1,596	*

Continued

JFE Steel/Hunting—Fox (cont.)

Diagram p. C-112

Type: Coupled **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
8.625	32.0	7.875	0.352	9.625	9.149	16.241	100.0	*	732	*	1,006	*	1,144	*
8.625	36.0	7.700	0.400	9.625	10.336	16.241	100.0	*	827	*	1,137	*	1,292	*
8.625	40.0	7.625	0.450	9.625	11.557	16.241	100.0	*	925	*	1,271	*	1,445	*
8.625	44.0	7.500	0.500	9.625	12.763	16.241	100.0	*	1,021	*	1,404	*	1,595	*
8.625	49.0	7.386	0.557	9.625	14.118	16.241	100.0	*	1,129	*	1,553	*	1,765	*
9.625	36.0	8.765	0.352	10.625	10.254	18.035	100.0	*	820	*	1,128	*	1,282	*
9.625	40.0	8.750	0.395	10.625	11.454	18.035	100.0	*	916	*	1,260	*	1,432	*
9.625	43.5	8.599	0.435	10.625	12.559	18.035	100.0	*	1,005	*	1,381	*	1,570	*
9.625	47.0	8.525	0.472	10.625	13.572	18.035	100.0	*	1,086	*	1,493	*	1,697	*
9.625	53.5	8.500	0.545	10.625	15.546	18.035	100.0	*	1,244	*	1,710	*	1,943	*
9.625	58.4	8.375	0.595	10.625	16.879	18.035	100.0	*	1,350	*	1,857	*	2,110	*
10.750	40.5	9.894	0.350	11.750	11.435	20.053	100.0	*	915	*	1,258	*	1,429	*
10.750	45.5	9.794	0.400	11.750	13.006	20.053	100.0	*	1,040	*	1,431	*	1,626	*
10.750	51.0	9.694	0.450	11.750	14.561	20.053	100.0	*	1,165	*	1,602	*	1,820	*
10.750	55.5	9.604	0.495	11.750	15.947	20.053	100.0	*	1,276	*	1,754	*	1,993	*
10.750	60.7	9.504	0.545	11.750	17.473	20.053	100.0	*	1,398	*	1,922	*	2,184	*
10.750	65.7	9.404	0.595	11.750	18.982	20.053	100.0	*	1,519	*	2,088	*	2,373	*
10.750	73.2	9.250	0.672	11.750	21.276	20.053	94.3	*	1,604	*	2,206	*	2,507	*
11.750	47.0	10.844	0.375	12.750	13.401	21.847	100.0	*	1,072	*	1,474	*	1,675	*
11.750	54.0	10.724	0.435	12.750	15.463	21.847	100.0	*	1,237	*	1,701	*	1,933	*
11.750	60.0	10.625	0.489	12.750	17.300	21.847	100.0	*	1,384	*	1,903	*	2,163	*
11.750	65.0	10.625	0.534	12.750	18.816	21.847	100.0	*	1,505	*	2,070	*	2,352	*
13.375	54.5	12.459	0.380	14.375	15.514	24.762	100.0	*	1,241	*	1,707	*	1,939	*
13.375	61.0	12.359	0.430	14.375	17.487	24.762	100.0	*	1,399	*	1,924	*	2,186	*
13.375	68.0	12.259	0.480	14.375	19.445	24.762	100.0	*	1,556	*	2,139	*	2,431	*
13.375	72.0	12.250	0.514	14.375	20.768	24.762	100.0	*	1,661	*	2,284	*	2,596	*

*Please contact JFE Steel/Hunting Oilfield for Compression Efficiency and Yield Torque.

JFE Steel—JFE Bear

Diagram p. C-112

Type: Coupled **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
5.000	13.0	4.369	0.253	5.563	3.773	5.487	100.0	*	302	*	415	*	472	*
5.000	15.0	4.283	0.296	5.563	4.374	5.487	100.0	*	350	*	481	*	547	*
5.000	18.0	4.151	0.362	5.639	5.275	6.155	100.0	*	422	*	580	*	659	*
5.000	21.4	4.001	0.437	5.707	6.264	6.761	100.0	*	501	*	689	*	783	*
5.000	23.2	3.919	0.478	5.750	6.791	7.148	100.0	*	543	*	747	*	849	*
5.000	24.1	3.875	0.500	5.750	7.069	7.148	100.0	*	566	*	778	*	884	*
5.500	15.5	4.825	0.275	6.050	4.514	5.888	100.0	*	361	*	497	*	564	*
5.500	17.0	4.767	0.304	6.050	4.962	5.888	100.0	*	397	*	546	*	620	*
5.500	20.0	4.653	0.361	6.104	5.828	6.403	100.0	*	466	*	641	*	729	*
5.500	23.0	4.545	0.415	6.135	6.630	6.701	100.0	*	530	*	729	*	829	*
5.500	26.8	4.375	0.500	6.262	7.854	7.938	100.0	*	628	*	864	*	982	*
6.625	20.0	5.924	0.288	7.161	5.734	7.010	100.0	*	459	*	631	*	717	*
6.625	24.0	5.796	0.352	7.277	6.937	8.326	100.0	*	555	*	763	*	867	*
6.625	28.0	5.666	0.417	7.346	8.133	9.118	100.0	*	651	*	895	*	1,017	*
6.625	32.0	5.550	0.475	7.390	9.177	9.627	100.0	*	734	*	1,009	*	1,147	*
7.000	23.0	6.241	0.317	7.693	6.656	9.413	100.0	*	532	*	732	*	832	*
7.000	26.0	6.151	0.362	7.693	7.549	9.413	100.0	*	604	*	830	*	944	*
7.000	29.0	6.059	0.408	7.693	8.449	9.413	100.0	*	676	*	929	*	1,056	*
7.000	32.0	5.969	0.453	7.693	9.317	9.413	100.0	*	745	*	1,025	*	1,165	*
7.000	35.0	5.879	0.498	7.829	10.172	11.071	100.0	*	814	*	1,119	*	1,272	*
7.000	38.0	5.795	0.540	7.829	10.959	11.071	100.0	*	877	*	1,205	*	1,370	*
7.000	42.7	5.625	0.625	8.045	12.517	13.764	100.0	*	1,001	*	1,377	*	1,565	*
7.000	46.4	5.501	0.687	8.045	13.625	13.764	100.0	*	1,090	*	1,499	*	1,703	*
7.625	29.7	6.750	0.375	8.277	8.541	9.828	100.0	*	683	*	940	*	1,068	*
7.625	33.7	6.640	0.430	8.277	9.720	9.828	100.0	*	778	*	1,069	*	1,215	*
7.625	39.0	6.500	0.500	8.500	11.192	12.766	100.0	*	895	*	1,231	*	1,399	*
7.625	42.8	6.376	0.562	8.500	12.470	12.766	100.0	*	998	*	1,372	*	1,559	*
7.625	45.3	6.310	0.595	8.538	13.141	13.275	100.0	*	1,051	*	1,446	*	1,643	*
8.625	32.0	7.796	0.352	9.318	9.149	11.674	100.0	*	732	*	1,006	*	1,144	*
8.625	36.0	7.700	0.400	9.318	10.336	11.674	100.0	*	827	*	1,137	*	1,292	*
8.625	40.0	7.600	0.450	9.318	11.557	11.674	100.0	*	925	*	1,271	*	1,445	*
8.625	44.0	7.500	0.500	9.625	12.763	16.242	100.0	*	1,021	*	1,404	*	1,595	*
8.625	49.0	7.386	0.557	9.625	14.118	16.242	100.0	*	1,129	*	1,553	*	1,765	*
9.625	36.0	8.765	0.352	10.485	10.254	15.714	100.0	*	820	*	1,128	*	1,282	*
9.625	40.0	8.679	0.395	10.485	11.454	15.714	100.0	*	916	*	1,260	*	1,432	*
9.625	43.5	8.599	0.435	10.485	12.559	15.714	100.0	*	1,005	*	1,381	*	1,570	*
9.625	47.0	8.525	0.472	10.485	13.572	15.714	100.0	*	1,086	*	1,493	*	1,697	*
9.625	53.5	8.379	0.545	10.485	15.547	15.714	100.0	*	1,244	*	1,710	*	1,943	*
9.625	58.4	8.279	0.595	10.625	16.879	18.035	100.0	*	1,350	*	1,857	*	2,110	*
9.625	59.4	8.251	0.609	10.625	17.250	18.035	100.0	*	1,380	*	1,898	*	2,156	*

*Please contact JFE Steel for Compression Efficiency and Yield Torque.

JFE Steel—JFE LION

Diagram p. C-112

Type: Coupled **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
7.000	23.0	0.317	6.241	7.589	6.655	7.321	100	100	532		732		832	
7.000	26.0	0.362	6.151	7.671	7.549	8.304	100	100	604		830		944	
7.000	29.0	0.408	6.059	7.752	8.449	9.294	100	100	676		929		1,056	
7.000	32.0	0.453	6.000	7.811	9.317	10.249	100	100	745		1,025		1,165	
7.000	35.0	0.498	5.879	7.887	10.172	11.190	100	100	814		1,119		1,272	
7.000	38.0	0.540	5.795	7.944	10.959	12.055	100	100	877		1,206		1,370	
8.625	57.4	0.656	7.250	9.753	16.423	18.066	100	100	1,314		1,807		2,053	
9.625	43.5	0.435	8.625	10.433	12.559	13.815	100	100	1,005		1,381		1,570	
9.625	47.0	0.472	8.625	10.501	13.572	14.930	100	100	1,086		1,493		1,697	
9.625	53.5	0.545	8.500	10.599	15.546	17.101	100	100	1,244		1,710		1,943	
10.750	60.7	0.545	9.504	11.726	17.473	19.220	100	100	1,398		1,922		2,184	

Continued

JFE Steel—JFE LION (cont.)

Diagram p. C-112

Type: Coupled Seal: Metal-to-metal

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
10.750	65.7	0.595	9.500	11.816	18.982	20.880	100	100	1,519		2,088		2,373	
10.750	73.2	0.672	9.250	11.951	21.276	23.404	100	100	1,702		2,340		2,660	
13.375	68.0	0.480	12.259	14.258	19.445	21.390	100	100	1,556		2,139		2,431	
13.375	72.0	0.514	12.250	14.324	20.768	22.844	100	100	1,661		2,284		2,596	
13.375	77.0	0.550	12.119	14.392	22.160	24.376	100	100	1,773		2,438		2,770	
13.625	88.2	0.625	12.250	14.767	25.525	28.078	100	100	2,042		2,808		3,191	

*Please contact JFE Steel for Compression Efficiency and Yield Torque.

JFE Steel—JFE LION HW

Diagram p. C-112

Type: Coupled Seal: Metal-to-metal

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
6.625	57.5	0.950	4.600	7.892	16.937	-	100	100	1,355		1,863		2,117	
6.625	60.0	1.000	4.500	7.957	17.671	-	100	100	1,414		1,944		2,209	
7.000	61.4	0.950	4.975	8.254	18.056	-	100	100	1,445		1,986		2,257	
7.000	74.2	1.200	4.475	8.360	21.865	-	100	100	1,749		2,405		2,733	
7.625	74.6	1.064	5.372	9.054	21.931	-	100	100	1,754		2,412		2,741	
8.625	91.8	1.150	6.200	10.204	27.006	-	100	100	2,160		2,971		3,376	
9.000	110.4	1.350	6.175	10.602	32.445		100	100	2,596		3,569		4,056	
12.250	131.0	1.125	9.894	13.882	39.319	-	100	100	3,146		4,325		4,915	

JFE Steel—JFE TIGER

Diagram p. C-112

Type: Coupled Seal: Metal-to-metal

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
7.000	23.0	0.317	6.250	7.713	6.655	9.654	100	95	532		732		832	
7.000	26.0	0.362	6.151	7.776	7.549	10.421	100	95	604		830		944	
7.000	29.0	0.408	6.059	7.544	8.449	7.629	100	95	676		929		1,056	
7.000	32.0	0.453	6.000	7.829	9.317	11.070	100	95	745		1,025		1,165	
7.000	35.0	0.498	5.879	7.896	10.172	11.898	100	95	814		1,119		1,272	
7.000	38.0	0.540	5.875	7.944	10.959	12.495	100	95	877		1,206		1,370	
7.625	29.7	0.375	6.750	8.343	8.541	10.693	100	95	683		940		1,068	
7.625	33.7	0.430	6.640	8.417	9.720	11.667	100	95	778		1,069		1,215	
7.625	39.0	0.500	6.500	8.500	11.192	12.770	100	95	895		1,231		1,399	
7.625	42.8	0.562	6.376	8.572	12.470	13.735	100	95	998		1,372		1,559	
7.625	45.3	0.595	6.310	8.626	13.141	14.465	100	95	1,051		1,445		1,643	
7.625	47.1	0.625	6.250	8.675	13.744	15.130	100	95	1,100		1,512		1,718	
8.625	40.0	0.450	7.625	9.562	11.557	15.338	100	95	925		1,271		1,445	
8.625	44.0	0.500	7.500	9.562	12.763	15.338	100	95	1,021		1,404		1,595	
8.625	49.0	0.557	7.386	9.670	14.118	16.969	100	95	1,129		1,553		1,765	
8.625	52.0	0.595	7.310	9.740	15.010	18.036	100	95	1,201		1,651		1,876	
8.625	54.0	0.625	7.250	9.794	15.708	18.865	100	95	1,257		1,728		1,963	
8.625	57.4	0.656	7.188	9.850	16.423	19.729	100	95	1,314		1,807		2,053	
8.625	58.7	0.687	7.126	9.905	17.132	20.582	100	95	1,371		1,885		2,142	
8.625	59.2	0.700	7.100	9.928	17.428	20.940	100	95	1,394		1,917		2,178	
9.625	40.0	0.395	8.750	10.485	11.454	15.740	100	95	916		1,260		1,432	
9.625	43.5	0.435	8.625	10.485	12.559	15.740	100	95	1,005		1,381		1,570	
9.625	47.0	0.472	8.625	10.520	13.572	16.317	100	95	1,086		1,493		1,697	
9.625	53.5	0.545	8.500	10.625	15.546	18.061	100	95	1,244		1,710		1,943	
9.625	58.4	0.595	8.375	10.657	16.879	18.596	100	95	1,350		1,857		2,110	
9.625	59.4	0.609	8.251	10.681	17.250	18.998	100	95	1,380		1,897		2,156	
9.875	62.8	0.625	8.500	11.063	18.162	21.852	100	95	1,453		1,998		2,270	
9.875	65.3	0.650	8.419	11.063	18.838	21.852	100	95	1,507		2,072		2,355	
9.875	66.4	0.661	8.397	11.063	19.134	21.852	100	95	1,531		2,105		2,392	
9.875	66.9	0.668	8.383	11.063	19.322	21.852	100	95	1,546		2,125		2,415	
9.875	67.5	0.678	8.363	11.063	19.590	21.852	100	95	1,567		2,155		2,449	
9.875	68.0	0.694	8.331	11.063	20.017	21.852	100	95	1,601		2,202		2,502	
9.875	68.9	0.700	8.319	11.063	20.177	21.852	100	95	1,614		2,219		2,522	

NOV Fiber Glass Systems—Star Aliphatic Amine Casing

Diagram p. C-112

Type: Threaded and Coupled Seal: Threaded and Lubricated

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
5.160	3.3	0.210	4.620	6.250	3.266	–	27,000	400	–	–	–	–	–	–
5.230	3.7	0.245	4.620	6.250	3.837	–	38,000	1,200	–	–	–	–	–	–
5.310	4.3	0.285	4.620	6.450	4.499	–	37,000	1,000	–	–	–	–	–	–
5.410	4.9	0.335	4.620	6.600	5.341	–	48,000	1,800	–	–	–	–	–	–
5.470	5.3	0.365	4.620	6.600	5.854	–	47,000	1,900	–	–	–	–	–	–
5.470	5.4	0.365	4.620	6.750	5.854	–	47,000	1,900	–	–	–	–	–	–
5.480	5.4	0.370	4.620	6.750	5.940	–	53,000	2,000	–	–	–	–	–	–
5.480	5.5	0.370	4.620	7.000	5.940	–	53,000	2,000	–	–	–	–	–	–
4.830	6.8	0.490	3.730	7.600	6.681	–	66,000	3,200	–	–	–	–	–	–
5.040	8.2	0.595	3.730	7.900	8.309	–	78,000	3,600	–	–	–	–	–	–
6.500	4.8	0.285	5.810	7.550	5.565	–	43,000	400	–	–	–	–	–	–
6.570	5.4	0.320	5.810	7.550	6.283	–	55,000	1,000	–	–	–	–	–	–
6.020	4.3	0.260	5.380	7.550	4.705	–	45,000	1,000	–	–	–	–	–	–
6.070	4.8	0.285	5.380	7.700	5.180	–	41,000	600	–	–	–	–	–	–
6.200	5.7	0.350	5.380	7.900	6.432	–	60,000	1,800	–	–	–	–	–	–
6.220	6.0	0.360	5.380	7.900	6.628	–	53,000	1,100	–	–	–	–	–	–
6.370	7.2	0.435	5.380	8.250	8.111	–	64,000	1,900	–	–	–	–	–	–
6.380	7.3	0.440	5.380	8.250	8.211	–	70,000	2,200	–	–	–	–	–	–
6.510	8.4	0.505	5.380	8.250	9.527	–	70,000	2,500	–	–	–	–	–	–
6.650	6.4	0.360	5.810	8.400	7.114	–	56,000	900	–	–	–	–	–	–
6.720	7.0	0.395	5.810	8.400	7.849	–	75,000	1,800	–	–	–	–	–	–
6.790	7.6	0.430	5.810	8.750	8.592	–	68,000	1,600	–	–	–	–	–	–

Continued

NOV Fiber Glass Systems—Star Aliphatic Amine Casing (cont.)

Diagram p. C-112

Type: Threaded and Coupled Seal: Threaded and Lubricated

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
6.930	9.2	0.500	5.810	8.750	10.100	–	90,000	2,200	–	–	–	–	–	–
6.940	8.9	0.505	5.770	8.750	10.209	–	81,000	1,600	–	–	–	–	–	–
8.460	8.2	0.360	7.620	9.500	9.161	–	73,000	400	–	–	–	–	–	–
8.490	8.5	0.375	7.620	9.700	9.560	–	90,000	1,000	–	–	–	–	–	–
8.610	10.0	0.435	7.620	10.000	11.172	–	90,000	700	–	–	–	–	–	–
8.760	12.8	0.510	7.580	11.500	13.218	–	105,000	1,200	–	–	–	–	–	–
8.780	13.2	0.520	7.620	11.500	13.494	–	125,000	1,800	–	–	–	–	–	–
8.910	14.6	0.585	7.580	11.900	15.300	–	122,000	1,700	–	–	–	–	–	–
9.050	16.4	0.655	7.580	11.900	17.275	–	125,000	2,400	–	–	–	–	–	–
9.080	16.1	0.670	7.620	11.900	17.702	–	160,000	2,200	–	–	–	–	–	–

NOV Fiber Glass Systems—Star Aliphatic Amine Casing

Diagram p. C-112

Type: Integral Joint Seal: Threaded and Lubricated

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
6.500	4.8	0.285	5.810	7.300	5.565	–	43,000	400	–	–	–	–	–	–
6.570	5.4	0.320	5.810	7.550	6.283	–	55,000	1,000	–	–	–	–	–	–
6.020	4.3	0.260	5.380	7.450	4.705	–	45,000	1,000	–	–	–	–	–	–
6.070	4.8	0.285	5.380	7.560	5.180	–	41,000	600	–	–	–	–	–	–
6.200	5.7	0.350	5.380	7.650	6.432	–	60,000	1,800	–	–	–	–	–	–
6.220	6.0	0.360	5.380	7.770	6.628	–	53,000	1,100	–	–	–	–	–	–
6.370	7.2	0.435	5.380	7.790	8.111	–	64,000	1,900	–	–	–	–	–	–
6.380	7.3	0.440	5.380	8.000	8.211	–	70,000	2,200	–	–	–	–	–	–
6.510	8.4	0.505	5.380	7.950	9.527	–	70,000	2,500	–	–	–	–	–	–
6.650	6.4	0.360	5.810	8.240	7.114	–	56,000	900	–	–	–	–	–	–
6.720	7.0	0.395	5.810	8.400	7.849	–	75,000	1,800	–	–	–	–	–	–
6.790	7.6	0.430	5.810	8.320	8.592	–	68,000	1,600	–	–	–	–	–	–
6.930	9.2	0.500	5.810	8.700	10.100	–	90,000	2,200	–	–	–	–	–	–
6.940	8.9	0.505	5.770	8.530	10.209	–	81,000	1,600	–	–	–	–	–	–
8.460	8.2	0.360	7.620	9.500	9.161	–	73,000	400	–	–	–	–	–	–
8.490	8.5	0.375	7.620	9.600	9.560	–	90,000	1,000	–	–	–	–	–	–
8.610	10.0	0.435	7.620	9.860	11.172	–	90,000	700	–	–	–	–	–	–
8.760	12.8	0.510	7.580	11.120	13.218	–	105,000	1,200	–	–	–	–	–	–
8.780	13.2	0.520	7.620	11.400	13.494	–	125,000	1,800	–	–	–	–	–	–
8.910	14.6	0.585	7.580	11.380	15.300	–	122,000	1,700	–	–	–	–	–	–
9.050	16.4	0.655	7.580	11.670	17.275	–	125,000	2,400	–	–	–	–	–	–
9.080	16.1	0.670	7.620	11.750	17.702	–	160,000	2,200	–	–	–	–	–	–

NOV Fiber Glass Systems—Star Anhydride Casing

Diagram p. C-112

Type: Integral Joint Seal: Threaded and Lubricated

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
5.440	5.6	0.350	4.620	6.590	5.597	–	52,000	1,700	–	–	–	–	–	–
6.160	6.1	0.330	5.380	7.640	6.044	–	54,000	800	–	–	–	–	–	–
6.310	7.6	0.405	5.380	7.830	7.513	–	70,000	1,700	–	–	–	–	–	–
6.460	8.6	0.480	5.380	8.030	9.018	–	70,000	2,250	–	–	–	–	–	–
8.410	10.7	0.455	7.380	9.920	11.371	–	98,000	800	–	–	–	–	–	–
8.520	12.0	0.510	7.380	10.080	12.834	–	107,000	1,100	–	–	–	–	–	–

NOV Fiber Glass Systems—Star Aromatic Amine Casing

Diagram p. C-112

Type: Threaded and Coupled Seal: Threaded and Lubricated

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
5.410	5.0	0.335	4.620	6.460	5.341	–	39,000	1,200	–	–	–	–	–	–
6.280	6.9	0.390	5.380	7.690	7.217	–	53,000	1,200	–	–	–	–	–	–
6.450	8.4	0.475	5.380	7.900	8.916	–	67,000	2,000	–	–	–	–	–	–
8.560	12.5	0.530	7.380	9.990	13.370	–	101,000	1,300	–	–	–	–	–	–
9.260	17.5	0.680	7.740	11.470	18.329	–	125,000	2,000	–	–	–	–	–	–

NOV Fiber Glass Systems—Centron Downhole Casing

Diagram p. C-112

Type: Integral Joint Seal: Threaded and Lubricated

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
4.280	1.6	0.150	3.965	5.400	1.946	–	9,000	190	–	–	–	–	–	–
4.380	2.2	0.200	3.965	5.500	2.626	–	12,000	430	–	–	–	–	–	–
4.480	2.8	0.250	3.965	5.600	3.322	–	15,000	820	–	–	–	–	–	–
4.580	3.4	0.300	3.965	5.700	4.034	–	18,000	1,360	–	–	–	–	–	–
4.680	4.0	0.350	3.965	5.800	4.761	–	21,000	2,090	–	–	–	–	–	–
4.780	4.7	0.400	3.965	5.900	5.504	–	25,000	3,010	–	–	–	–	–	–
4.630	1.8	0.150	4.310	5.250	2.111	–	9,500	150	–	–	–	–	–	–
4.730	2.4	0.200	4.310	5.500	2.846	–	13,000	340	–	–	–	–	–	–
4.830	3.0	0.250	4.310	5.600	3.597	–	16,000	640	–	–	–	–	–	–
5.150	2.0	0.150	4.835	6.300	2.356	–	10,000	110	–	–	–	–	–	–
5.250	2.7	0.200	4.835	6.400	3.173	–	14,000	250	–	–	–	–	–	–
5.350	3.4	0.250	4.835	6.500	4.006	–	18,000	470	–	–	–	–	–	–
5.450	4.1	0.300	4.835	6.600	4.854	–	22,000	780	–	–	–	–	–	–
5.550	4.8	0.350	4.835	6.700	5.718	–	26,000	1,210	–	–	–	–	–	–
5.650	5.6	0.400	4.835	6.800	6.597	–	30,000	1,750	–	–	–	–	–	–
6.500	3.3	0.200	6.085	8.100	3.958	–	18,000	130	–	–	–	–	–	–
6.600	4.2	0.250	6.085	8.200	4.987	–	22,000	240	–	–	–	–	–	–
6.700	5.1	0.300	6.085	8.350	6.032	–	27,000	410	–	–	–	–	–	–
6.800	6.0	0.350	6.085	8.500	7.092	–	32,000	630	–	–	–	–	–	–

Continued

NOV Fiber Glass Systems—Centron Downhole Casing (cont.)

Diagram p. C-112

Type: Integral Joint Seal: Threaded and Lubricated

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
6.900	6.9	0.400	6.085	8.650	8.168	–	37,000	920	–	–	–	–	–	–
7.000	7.8	0.450	6.085	8.800	9.260	–	42,000	1,280	–	–	–	–	–	–
7.100	8.8	0.500	6.085	8.950	10.367	–	48,000	1,720	–	–	–	–	–	–
6.800	3.5	0.200	6.380	8.100	4.147	–	19,000	110	–	–	–	–	–	–
6.900	4.4	0.250	6.380	8.200	5.223	–	24,000	210	–	–	–	–	–	–
7.000	5.3	0.300	6.380	8.350	6.315	–	29,000	350	–	–	–	–	–	–
7.100	6.3	0.350	6.380	8.400	7.422	–	34,000	550	–	–	–	–	–	–
7.200	7.2	0.400	6.380	8.450	8.545	–	39,000	800	–	–	–	–	–	–
7.300	8.2	0.450	6.380	8.550	9.684	–	44,000	1,120	–	–	–	–	–	–
7.400	9.2	0.500	6.380	8.650	10.838	–	50,000	1,500	–	–	–	–	–	–
8.250	5.3	0.250	7.735	10.400	6.283	–	28,000	120	–	–	–	–	–	–
8.350	6.4	0.300	7.735	10.600	7.587	–	34,000	200	–	–	–	–	–	–
8.450	7.5	0.350	7.735	10.800	8.906	–	40,000	320	–	–	–	–	–	–
8.550	8.7	0.400	7.735	11.000	10.242	–	46,000	470	–	–	–	–	–	–
8.650	9.8	0.450	7.735	11.200	11.592	–	52,000	650	–	–	–	–	–	–
8.750	11.0	0.500	7.735	11.400	12.959	–	58,000	880	–	–	–	–	–	–
8.920	6.1	0.250	8.410	10.100	6.809	–	30,000	90	–	–	–	–	–	–
9.020	7.5	0.300	8.410	10.250	8.218	–	37,000	160	–	–	–	–	–	–
9.120	8.7	0.350	8.410	10.400	9.643	–	44,000	250	–	–	–	–	–	–
9.220	10.0	0.400	8.410	10.550	11.084	–	50,000	370	–	–	–	–	–	–
9.320	11.3	0.450	8.410	10.700	12.540	–	57,000	520	–	–	–	–	–	–
9.420	12.6	0.500	8.410	10.900	14.012	–	64,000	700	–	–	–	–	–	–
10.320	7.8	0.300	9.705	12.200	9.444	–	35,000	110	–	–	–	–	–	–
10.420	9.5	0.350	9.705	12.300	11.073	–	41,000	170	–	–	–	–	–	–
10.520	11.0	0.400	9.705	12.500	12.717	–	48,000	240	–	–	–	–	–	–
10.620	12.5	0.450	9.705	12.700	14.377	–	55,000	340	–	–	–	–	–	–
10.720	14.0	0.500	9.705	12.900	16.054	–	61,000	460	–	–	–	–	–	–

NS Connection Technology—NS-CC

Diagram p. C-112

Type: Coupled Seal: Metal-to-metal

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
5.000	15.0	4.408	0.296	5.563	4.374	–	100.0	100.0	379	12,000	503	12,000	548	12,000
5.000	18.0	4.276	0.362	5.563	5.275	–	100.0	100.0	457	15,300	606	15,300	661	15,300
5.000	21.4	4.126	0.437	5.665	6.264	–	100.0	100.0	543	16,200	720	16,200	785	16,200
5.000	23.2	4.044	0.478	5.720	6.791	–	100.0	100.0	589	16,200	780	16,200	851	16,200
5.000	24.1	4.000	0.500	5.750	7.069	–	100.0	100.0	613	16,200	812	16,200	886	16,200
5.500	17.0	4.892	0.304	6.054	4.962	–	100.0	100.0	428	12,900	568	12,900	620	12,900
5.500	20.0	4.778	0.361	6.054	5.828	–	100.0	100.0	503	17,700	667	17,700	728	17,700
5.500	23.0	4.670	0.415	6.135	6.630	–	100.0	100.0	572	17,700	759	17,700	828	17,700
5.500	26.0	4.548	0.476	6.221	7.513	–	100.0	100.0	648	18,900	860	18,900	938	18,900
5.500	28.4	4.440	0.530	6.300	8.275	–	100.0	100.0	714	18,900	947	18,900	1,033	18,900
6.626	24.0	5.921	0.352	7.390	6.938	–	100.0	100.0	592	17,700	787	17,700	860	17,700
6.626	28.0	5.791	0.417	7.390	8.134	–	100.0	100.0	694	20,100	922	20,100	1,009	20,100
6.626	32.0	5.676	0.475	7.390	9.179	–	100.0	100.0	783	20,100	1,041	20,100	1,138	20,100
7.000	23.0	6.366	0.317	7.656	6.655	–	100.0	100.0	565	15,300	752	15,300	823	15,300
7.000	26.0	6.276	0.362	7.656	7.549	–	100.0	100.0	641	20,100	853	20,100	934	20,100
7.000	29.0	6.184	0.408	7.656	8.449	–	100.0	100.0	718	22,800	955	22,800	1,045	22,800
7.000	32.0	6.094	0.453	7.680	9.317	–	100.0	100.0	791	22,800	1,053	22,800	1,152	22,800
7.000	35.0	6.004	0.498	7.756	10.172	–	100.0	100.0	864	24,000	1,150	24,000	1,258	24,000
7.000	38.0	5.920	0.540	7.815	10.959	–	100.0	100.0	931	24,000	1,239	24,000	1,356	24,000
7.000	41.0	5.820	0.590	7.885	11.881	–	100.0	100.0	1,009	24,900	1,343	24,900	1,470	24,900
7.000	42.7	5.750	0.625	7.935	12.517	–	100.0	100.0	1,063	24,900	1,415	24,900	1,548	24,900
7.000	44.0	5.720	0.640	7.955	12.788	–	100.0	100.0	1,086	26,100	1,445	26,100	1,582	26,100
7.625	26.4	6.969	0.328	8.500	7.519	–	100.0	100.0	635	21,000	845	21,000	926	21,000
7.625	29.7	6.875	0.375	8.500	8.541	–	100.0	100.0	721	21,000	960	21,000	1,052	21,000
7.625	33.7	6.765	0.430	8.500	9.720	–	100.0	100.0	820	24,000	1,093	24,000	1,197	24,000
7.625	39.0	6.625	0.500	8.500	11.192	–	100.0	100.0	945	24,000	1,258	24,000	1,379	24,000
7.625	42.8	6.501	0.562	8.500	12.470	–	100.0	100.0	1,053	26,100	1,402	26,100	1,536	26,100
7.625	45.3	6.435	0.595	8.510	13.141	–	100.0	100.0	1,109	27,000	1,477	27,000	1,619	27,000
7.625	47.1	6.375	0.625	8.555	13.744	–	100.0	100.0	1,160	27,000	1,543	27,000	1,691	27,000
8.625	36.0	7.825	0.400	9.625	10.336	–	100.0	100.0	864	24,000	1,152	24,000	1,265	24,000
8.625	40.0	7.725	0.450	9.625	11.557	–	100.0	100.0	966	26,100	1,288	26,100	1,415	26,100
8.625	44.0	7.625	0.500	9.625	12.763	–	100.0	100.0	1,066	26,100	1,423	26,100	1,562	26,100
8.625	49.0	7.511	0.557	9.625	14.118	–	100.0	100.0	1,180	28,500	1,574	28,500	1,728	28,500
8.625	52.0	7.435	0.595	9.625	15.010	–	100.0	100.0	1,254	30,900	1,673	30,900	1,837	30,900
9.625	40.0	8.835	0.395	10.625	11.454	–	100.0	100.0	947	24,900	1,266	24,900	1,393	24,900
9.625	43.5	8.755	0.435	10.625	12.559	–	100.0	100.0	1,038	28,500	1,388	28,500	1,527	28,500
9.625	47.0	8.681	0.472	10.625	13.572	–	100.0	100.0	1,122	29,700	1,500	29,700	1,650	29,700
9.625	53.5	8.535	0.545	10.625	15.546	–	100.0	100.0	1,285	32,400	1,718	32,400	1,890	32,400
9.625	58.4	8.435	0.595	10.625	16.879	–	100.0	100.0	1,396	35,100	1,865	35,100	2,052	35,100
9.625	59.4	8.407	0.609	10.625	17.250	–	100.0	100.0	1,426	35,100	1,906	35,100	2,098	35,100
9.875	62.8	8.625	0.625	10.875	18.162	–	100.0	100.0	1,498	35,100	2,003	35,100	2,205	35,100
9.875	66.8	8.519	0.678	10.875	19.590	–	100.0	100.0	1,616	38,100	2,160	38,100	2,378	38,100
9.875	68.8	8.475	0.700	10.875	20.177	–	100.0	100.0	1,664	38,100	2,225	38,100	2,420	38,100
10.750	45.5	9.950	0.400	11.750	13.006	–	100.0	100.0	1,063	28,500	1,423	28,500	1,570	28,500
10.750	51.0	9.850	0.450	11.750	14.561	–	100.0	100.0	1,190	32,400	1,594	32,400	1,758	32,400
10.750	55.5	9.760	0.495	11.750	15.947	–	100.0	100.0	1,303	33,600	1,745	33,600	1,925	33,600
10.750	60.7	9.660	0.545	11.750	17.473	–	100.0	100.0	1,428	35,100	1,912	35,100	2,109	35,100
10.750	65.7	9.560	0.595	11.750	18.982	–	100.0	100.0	1,551	38,100	2,077	38,100	2,291	38,100
10.750	75.9	9.350	0.700	11.750	22.101	–	100.0	100.0	1,806	40,200	2,419	40,200	2,625	40,200
11.750	47.0	11.000	0.375	12.750	13.401	–	100.0	100.0	1,084	32,400	1,454	32,400	1,607	32,400
11.750	54.0	10.880	0.435	12.750	15.463	–	100.0	100.0	1,250	36,300	1,677	36,300	1,854	36,300
11.750	60.0	10.772	0.489	12.750	17.300	–	100.0	100.0	1,399	39,000	1,877	39,000	2,074	39,000
12.063	78.1	10.781	0.641	13.092	23.001	–	100.0	100.0	1,854	48,900	2,488	48,900	2,752	48,900
13.375	54.5	12.615	0.380	14.375	15.513	–	100.0	100.0	1,233	38,100	1,659	38,100	1,840	38,100
13.375	61.0	12.515	0.430	14.375	17.487	–	100.0	100.0	1,389	40,200	1,870	40,200	2,074	40,200
13.375	68.0	12.415	0.480	14.375	19.445	–	100.0	100.0	1,545	42,300	2,079	42,300	2,306	42,300
13.375	72.0	12.347	0.514	14.375	20.768	–	100.0	100.0	1,650	44,400	2,221	44,400	2,463	44,400
14.000	82.5	12.876	0.562	15.000	23.726	–	100.0	100.0	1,872	48,900	2,523	48,900	2,802	48,900

NS Connection Technology—NS-HC

Diagram p. C-114

Type: Coupled Seal: Metal-to-metal

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
5.500	30.9	4.330	0.585	6.054	9.033	–	100	100	815	20,700	1,073	23,850	1,159	23,850
5.500	31.4	4.308	0.596	6.054	9.182	–	100	100	829	20,700	1,091	23,850	1,179	23,850
5.500	32.0	4.276	0.612	6.054	9.398	–	100	100	850	20,700	1,118	23,850	1,208	23,850
6.625	41.4	5.346	0.640	7.390	12.034	–	100	100	1,092	29,250	1,436	31,500	1,551	31,500
6.625	43.7	5.251	0.687	7.390	12.816	–	100	100	1,166	31,500	1,534	33,600	1,657	33,600
6.625	46.7	5.154	0.736	7.390	13.617	–	100	100	1,242	34,650	1,634	36,750	1,765	36,750
7.000	44.9	5.685	0.657	7.700	13.092	–	100	100	1,189	31,500	1,565	34,650	1,690	34,650
7.000	46.0	5.660	0.670	7.700	13.324	–	100	100	1,211	31,500	1,594	35,850	1,721	35,850
7.000	46.4	5.626	0.687	7.700	13.625	–	100	100	1,240	32,550	1,631	36,750	1,762	36,750
7.000	49.5	5.540	0.730	7.700	14.379	–	100	100	1,311	36,750	1,726	43,350	1,864	43,350
7.000	50.1	5.500	0.750	7.700	14.726	–	100	100	1,344	39,150	1,769	46,650	1,910	46,650
7.000	51.8	5.447	0.776	7.700	15.173	–	100	100	1,383	40,050	1,820	47,850	1,965	47,850
7.625	51.2	6.251	0.687	8.500	14.974	–	100	100	1,363	39,150	1,793	45,450	1,937	45,450
7.625	52.8	6.201	0.712	8.500	15.463	–	100	100	1,410	43,350	1,855	49,950	2,003	49,950
7.625	55.3	6.125	0.750	8.500	16.199	–	100	100	1,479	49,950	1,947	57,600	2,102	57,600
7.625	59.2	6.001	0.812	8.500	17.380	–	100	100	1,592	55,200	2,094	66,150	2,262	66,150
7.625	63.2	5.875	0.875	8.500	18.555	–	100	100	1,703	55,200	2,241	66,150	2,420	66,150
7.625	64.2	5.856	0.885	8.500	18.739	–	100	100	1,721	55,200	2,264	66,150	2,445	66,150
8.625	58.7	7.251	0.687	9.625	17.132	–	100	100	1,560	46,650	2,053	53,100	2,217	53,100
8.625	63.5	7.125	0.750	9.625	18.555	–	100	100	1,695	53,100	2,231	59,700	2,409	59,700
8.625	68.1	7.001	0.812	9.625	19.931	–	100	100	1,826	61,800	2,403	67,200	2,595	67,200
8.625	72.7	6.875	0.875	9.625	21.304	–	100	100	1,957	61,800	2,574	67,200	2,780	67,200
8.625	77.1	6.751	0.937	9.625	22.631	–	100	100	2,083	61,800	2,740	67,200	2,960	67,200
9.625	66.1	8.269	0.678	10.625	19.057	–	100	100	1,735	53,100	2,283	59,700	2,466	59,700
9.625	70.3	8.157	0.734	10.625	20.502	–	100	100	1,873	57,600	2,464	63,900	2,661	63,900
9.625	71.8	8.125	0.750	10.625	20.911	–	100	100	1,911	59,700	2,515	68,400	2,716	68,400
9.625	75.6	8.031	0.797	10.625	22.104	–	100	100	2,025	68,400	2,664	70,500	2,877	70,500
9.625	80.8	7.907	0.859	10.625	23.656	–	100	100	2,172	68,400	2,858	70,500	3,087	70,500
9.625	84.0	7.844	0.891	10.625	24.448	–	100	100	2,247	68,400	2,957	70,500	3,194	70,500
10.750	79.2	9.282	0.734	11.825	23.096	–	100	100	2,110	66,150	2,777	68,400	2,999	68,400
10.750	80.8	9.250	0.750	11.825	23.562	–	100	100	2,154	66,150	2,835	68,400	3,062	68,400
10.750	85.3	9.156	0.797	11.825	24.921	–	100	100	2,284	66,150	3,005	68,400	3,245	68,400
10.750	91.2	9.032	0.859	11.825	26.692	–	100	100	2,452	66,150	3,226	68,400	3,484	68,400
10.750	97.1	8.906	0.922	11.825	28.467	–	100	100	2,620	66,150	3,448	68,400	3,724	68,400
10.750	103.0	8.782	0.984	11.825	30.190	–	100	100	2,784	66,150	3,663	68,400	3,956	68,400
10.750	108.7	8.656	1.047	11.825	31.916	–	100	100	2,842	66,150	3,739	68,400	4,038	68,400

Tejas—TTNY

Diagram p. C-114

Type: Coupled, non-upset Seal: Metal-to-metal

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
4.500	11.6	0.250	3.875	5.000	3.338	3.338	100.0	100.0	267	4,000	367	5,500	417	6,200
4.500	13.5	0.290	3.795	5.000	3.837	3.837	100.0	100.0	307	5,500	422	7,500	480	8,500
4.500	15.1	0.337	3.701	5.090	4.407	4.407	100.0	100.0	353	7,800	485	10,000	551	11,400
5.500	20.0	0.361	4.653	6.050	5.828	5.828	100.0	100.0	466	13,100	641	18,000	729	20,500
5.500	23.0	0.415	4.545	6.100	6.630	6.630	100.0	100.0	530	15,300	729	21,000	829	23,900
5.500	26.0	0.476	4.423	6.150	7.513	7.513	100.0	100.0	601	18,200	826	25,000	939	28,400
7.000	26.0	0.362	6.151	7.875	7.549	7.549	100.0	100.0	604	15,300	830	21,100	944	24,000
7.000	29.0	0.408	6.184	7.875	8.449	8.449	100.0	100.0	676	18,800	929	25,800	1,056	29,300
7.000	32.0	0.453	5.969	7.875	9.317	9.317	100.0	100.0	745	22,100	1,025	30,400	1,165	34,500

Tejas—TTRS1

Diagram p. C-114

Type: Coupled, non-upset Seal: Thread

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
4.500	11.6	0.250	3.875	5.000	3.338	3.338	100.0	100.0	267	6,000	367	8,300	417	9,400
4.500	13.5	0.290	3.795	5.000	3.837	3.837	100.0	100.0	307	8,000	422	11,000	480	12,500
4.500	15.1	0.337	3.701	5.090	4.407	4.407	100.0	100.0	353	10,500	485	14,500	551	16,500
5.000	21.4	0.437	4.001	5.675	6.260	6.260	100.0	100.0	501	17,500	689	24,000	783	27,300
5.500	17.0	0.304	4.767	6.050	4.962	4.962	100.0	100.0	397	12,500	546	17,000	620	19,300
5.500	20.0	0.361	4.653	6.050	5.828	5.828	100.0	100.0	466	18,000	641	23,000	729	26,100
5.500	23.0	0.415	4.545	6.150	6.630	6.630	100.0	100.0	530	21,500	729	29,500	829	33,500
5.500	26.0	0.476	4.423	6.250	7.513	7.513	100.0	100.0	601	25,000	826	35,000	939	39,800
6.625	28.0	0.417	5.791	7.400	8.133	8.133	100.0	100.0	651	26,300	895	36,200	1,017	41,100
6.625	32.0	0.475	5.675	7.400	9.177	9.177	100.0	100.0	734	30,800	1,009	42,300	1,147	48,100
7.000	26.0	0.362	6.151	7.875	7.549	7.549	100.0	100.0	604	22,000	830	30,000	944	34,100
7.000	29.0	0.408	6.184	7.875	8.449	8.449	100.0	100.0	676	25,500	929	35,000	1,056	39,800
7.000	32.0	0.453	5.969	7.875	9.317	9.317	100.0	100.0	745	29,000	1,025	40,000	1,165	45,500

Tejas—TTXS

Diagram p. C-114

Type: Coupled, non-upset Seal: Thread

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
4.500	11.6	0.250	3.875	5.000	3.338	3.338	100.0	100.0	267	5,500	367	7,600	417	8,600
4.500	13.5	0.290	3.795	5.000	3.837	3.837	100.0	100.0	307	7,400	422	10,000	480	11,400
5.000	21.4	0.437	4.001	5.675	6.260	6.260	100.0	100.0	501	16,000	689	22,000	783	25,000
5.500	17.0	0.304	4.767	6.050	4.962	4.962	100.0	100.0	397	11,500	546	15,600	620	17,700
5.500	20.0	0.361	4.653	6.050	5.828	5.828	100.0	100.0	466	16,500	641	21,000	729	26,100
6.625	28.0	0.417	5.791	7.400	8.133	8.133	100.0	100.0	651	22,700	895	31,200	1,017	35,500
6.625	32.0	0.475	5.675	7.400	9.177	9.177	100.0	100.0	734	27,100	1,009	37,300	1,147	42,400
7.000	23.0	0.317	6.366	7.875	6.655	6.655	100.0	100.0	532	18,000	732	24,700	832	28,100
7.000	26.0	0.362	6.151	7.875	7.549	7.549	100.0	100.0	604	20,000	830	27,600	944	31,400
7.000	29.0	0.408	6.184	7.875	8.449	8.449	100.0	100.0	676	21,800	929	30,000	1,056	34,100
7.000	32.0	0.453	5.969	7.875	9.317	9.317	100.0	100.0	745	25,500	1,025	35,000	1,165	40,000

TenarisHydril—Blue

Diagram p. C-114

Type: Threaded & coupled **Seal: Metal-to-metal**

											L-80		P-110		Q-125	
D	w	d	t	Dc	Dsc	At	Ac	Lm	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
5.000	13.00	4.421	0.253	5.512	5.315	3.773	3.773	4.579	100.0	100.0	302	9,500	415	11,540	472	12,560
5.000	15.00	4.350	0.296	5.512	5.354	4.374	4.374	4.579	100.0	100.0	350	11,650	481	14,130	547	15,370
5.000	18.00	4.264	0.362	5.630	5.445	5.275	5.275	4.579	100.0	100.0	422	14,600	580	17,600	659	19,100
5.000	20.30	4.209	0.408	5.650	5.508	5.886	5.885	4.579	100.0	100.0	471	16,450	647	19,770	736	21,430
5.000	20.80	4.193	0.422	5.673	5.524	6.069	6.070	4.579	100.0	100.0	486	17,020	668	20,430	759	22,130
5.000	21.40	4.185	0.437	5.693	5.543	6.264	6.265	4.579	100.0	100.0	501	17,360	689	20,810	783	22,540
5.000	23.20	4.134	0.478	5.756	5.594	6.791	6.791	4.579	100.0	100.0	543	19,200	747	22,940	849	24,810
5.000	24.10	4.091	0.500	5.787	5.622	7.069	7.068	4.579	100.0	100.0	565	20,670	778	24,660	884	26,650
5.000	26.70	3.969	0.562	5.874	5.693	7.836	7.835	4.579	100.0	100.0	627	24,970	862	29,600	979	31,920
5.500	15.50	4.911	0.275	6.063	5.831	4.514	4.514	4.677	100.0	100.0	361	12,120	497	14,770	564	16,100
5.500	17.00	4.860	0.304	6.063	5.874	4.962	4.963	4.677	100.0	100.0	397	13,990	546	17,060	620	18,600
5.500	20.00	4.789	0.361	6.102	5.953	5.828	5.828	4.677	100.0	100.0	466	16,810	641	20,430	729	22,250
5.500	23.00	4.695	0.415	6.181	6.024	6.630	6.629	4.677	100.0	100.0	530	20,560	729	24,900	829	27,080
5.500	26.00	4.616	0.476	6.307	6.102	7.513	7.513	4.677	100.0	100.0	601	24,010	826	28,930	939	31,400
5.500	26.80	4.589	0.500	6.307	6.134	7.854	7.854	4.677	100.0	100.0	628	25,150	864	30,270	982	32,840
5.500	28.40	4.530	0.530	6.350	6.169	8.275	8.275	4.677	100.0	100.0	662	27,600	910	33,150	1,034	35,930
5.500	29.70	4.506	0.562	6.382	6.209	8.718	8.719	4.677	100.0	100.0	697	28,740	959	34,460	1,090	37,320
5.500	32.60	4.427	0.625	6.469	6.283	9.572	9.571	4.677	100.0	100.0	766	32,330	1,053	38,590	1,197	41,720
6.625	20.00	5.973	0.288	7.283	7.020	5.734	5.733	4.480	100.0	100.0	459	16,360	631	20,280	717	22,240
6.625	23.20	5.894	0.330	7.283	7.051	6.526	6.526	4.480	100.0	100.0	522	20,220	718	25,070	816	27,490
6.625	24.00	5.855	0.352	7.283	7.063	6.937	6.936	4.480	100.0	100.0	555	22,170	763	27,480	867	30,130
6.625	28.00	5.749	0.417	7.390	7.157	8.133	8.133	4.480	100.0	100.0	651	27,780	895	34,290	1,017	37,550
6.625	32.00	5.678	0.475	7.409	7.236	9.177	9.178	4.480	100.0	100.0	734	31,570	1,010	38,870	1,147	42,520
6.625	35.00	5.619	0.525	7.492	7.299	10.061	10.061	4.480	100.0	100.0	805	34,940	1,107	42,880	1,258	46,850
6.625	36.70	5.623	0.562	7.539	7.346	10.705	10.704	4.480	100.0	100.0	856	35,090	1,178	42,980	1,338	46,930
7.000	23.00	6.287	0.317	7.677	7.409	6.655	6.656	4.480	100.0	100.0	532	20,040	732	24,950	832	27,400
7.000	24.75	6.228	0.343	7.677	7.413	7.173	7.173	4.480	100.0	100.0	574	23,200	789	28,880	897	31,720
7.000	26.00	6.189	0.362	7.677	7.441	7.549	7.549	4.480	100.0	100.0	604	25,330	830	31,520	944	34,620
7.000	29.00	6.118	0.408	7.677	7.508	8.449	8.449	4.480	100.0	100.0	676	29,290	929	36,380	1,056	39,930
7.000	32.00	6.063	0.453	7.732	7.567	9.317	9.317	4.480	100.0	100.0	745	32,580	1,025	40,370	1,165	44,260
7.000	35.00	6.012	0.498	7.807	7.630	10.172	10.173	4.480	100.0	100.0	814	35,750	1,119	44,170	1,272	48,380
7.000	38.00	5.969	0.540	7.870	7.685	10.959	10.959	4.480	100.0	100.0	877	38,490	1,206	47,440	1,370	51,910
7.000	41.00	5.890	0.590	7.949	7.748	11.881	11.881	4.480	100.0	100.0	950	43,270	1,307	53,160	1,485	58,110
7.625	29.70	6.801	0.375	8.425	8.075	8.541	8.541	4.551	100.0	100.0	683	29,790	940	37,130	1,068	40,800
7.625	33.70	6.699	0.430	8.465	8.154	9.720	9.720	4.551	100.0	100.0	778	36,550	1,069	45,460	1,215	49,920
7.625	35.80	6.659	0.465	8.465	8.201	10.460	10.459	4.551	100.0	100.0	837	39,270	1,151	48,770	1,307	53,520
7.625	39.00	6.604	0.500	8.496	8.252	11.192	11.193	4.551	100.0	100.0	895	43,050	1,231	53,370	1,399	58,530
7.625	42.80	6.553	0.562	8.539	8.335	12.470	12.470	4.551	100.0	100.0	998	46,850	1,372	57,920	1,559	63,450
7.625	45.30	6.561	0.595	8.591	8.378	13.141	13.141	4.551	100.0	100.0	1,051	46,720	1,445	57,680	1,643	63,160
7.750	46.10	6.691	0.595	8.740	8.488	13.374	13.375	4.968	100.0	100.0	1,070	46,510	1,471	57,360	1,672	62,790
7.750	47.60	6.632	0.625	8.740	8.528	13.990	13.990	4.968	100.0	100.0	1,119	50,570	1,539	62,310	1,749	68,180
7.750	48.60	6.600	0.640	8.772	8.547	14.296	14.296	4.968	100.0	100.0	1,144	52,750	1,573	64,960	1,787	71,060
7.750	51.80	6.506	0.687	8.843	8.606	15.244	15.244	4.968	100.0	100.0	1,220	59,590	1,677	73,180	1,905	79,970
7.750	56.10	6.380	0.750	8.937	8.685	16.493	16.494	4.968	100.0	100.0	1,319	68,950	1,814	84,330	2,062	92,020
8.625	36.00	7.787	0.400	9.488	9.126	10.336	10.335	5.065	100.0	100.0	827	38,180	1,137	47,710	1,292	52,470
8.625	40.00	7.709	0.450	9.488	9.181	11.557	11.557	5.065	100.0	100.0	925	44,190	1,271	55,300	1,445	60,850
8.625	44.00	7.650	0.500	9.488	9.252	12.763	12.763	5.065	100.0	100.0	1,021	48,780	1,404	61,050	1,595	67,190
8.625	49.00	7.535	0.557	9.626	9.331	14.118	14.117	5.065	100.0	100.0	1,129	58,360	1,553	72,860	1,765	80,110
8.625	52.00	7.496	0.595	9.626	9.382	15.010	15.010	5.065	100.0	100.0	1,201	61,530	1,651	76,780	1,876	84,400
8.625	54.00	7.437	0.625	9.638	9.421	15.708	15.708	5.065	100.0	100.0	1,257	66,350	1,728	82,720	1,964	90,900
8.625	58.70	7.390	0.687	9.736	9.504	17.132	17.132	5.065	100.0	100.0	1,371	70,680	1,885	87,930	2,142	96,550
9.625	36.00	8.829	0.352	10.626	10.079	10.254	10.255	5.065	100.0	100.0	820	42,890	1,128	53,910	1,282	59,420
9.625	40.00	8.781	0.395	10.626	10.122	11.454	11.455	5.065	100.0	100.0	916	47,960	1,260	60,200	1,432	66,330
9.625	43.50	8.711	0.435	10.626	10.165	12.559	12.560	5.065	100.0	100.0	1,005	55,160	1,381	69,220	1,570	76,240
9.625	47.00	8.659	0.472	10.626	10.217	13.572	13.572	5.065	100.0	100.0	1,086	60,500	1,493	75,840	1,697	83,520
9.625	53.50	8.545	0.545	10.626	10.323	15.546	15.547	5.065	100.0	100.0	1,244	72,310	1,710	90,490	1,943	99,580
9.625	58.40	8.494	0.595	10.626	10.394	16.879	16.880	5.065	100.0	100.0	1,350	77,830	1,857	97,260	2,110	106,970
9.625	59.40	8.553	0.609	10.626	10.409	17.250	17.250	5.065	100.0	100.0	1,380	72,270	1,897	90,260	2,156	99,250
9.625	61.10	8.514	0.625	10.654	10.433	17.671	17.672	5.065	100.0	100.0	1,414	76,360	1,944	95,310	2,209	104,780
9.625	64.90	8.435	0.672	10.728	10.496	18.901	18.901	5.065	100.0	100.0	1,512	84,840	2,079	105,700	2,363	116,130
9.625	70.30	8.356	0.734	10.827	10.579	20.502	20.502	5.065	100.0	100.0	1,640	93,690	2,255	116,430	2,563	127,800
9.875	62.80	8.691	0.625	10.984	10.654	18.162	18.163	5.065	100.0	100.0	1,453	85,690	1,998	107,240	2,270	118,010
9.875	66.90	8.646	0.668	10.984	10.717	19.322	19.322	5.065	100.0	100.0	1,546	90,710	2,125	113,390	2,415	124,720
9.875	68.80	8.593	0.700	10.984	10.756	20.177	20.176	5.065	100.0	100.0	1,614	96,590	2,219	120,610	2,522	132,630
9.875	70.40	8.608	0.707	10.984	10.768	20.363	20.362	5.065	100.0	100.0	1,629	95,050	2,240	118,680	2,545	130,500
9.875	72.10	8.573	0.725	11.031	10.791	20.841	20.840	5.065	100.0	100.0	1,667	99,100	2,292	123,620	2,605	135,880
10.250	82.00	8.870	0.800	11.579	–	23.750	23.750	5.065	100.0	80.0	1,900	121,950	2,613	151,350	2,969	166,050
10.750	40.50	9.963	0.350	11.575	11.217	11.435	11.436	5.065	100.0	100.0	915	51,820	1,258	65,610	1,429	72,510
10.750	45.50	9.885	0.400	11.575	11.256	13.006	13.006	5.065	100.0	100.0	1,040	61,660	1,431	78,040	1,626	86,220
10.750	51.00	9.806	0.450	11.654	11.327	14.561	14.561	5.065	100.0	100.0	1,165	71,830	1,602	90,750	1,820	100,210
10.750	55.50	9.751	0.495	11.693	11.394	15.947	15.948	5.065	100.0	100.0	1,276	79,080	1,754	99,770	1,993	110,110
10.750	60.70	9.692	0.545	11.748	11.469	17.473	17.473	5.065	100.0	100.0	1,398	86,970	1,922	109,520	2,184	120,800
10.750	65.70	9.633	0.595	11.890	11.539	18.982	18.983	5.065	100.0	100.0	1,519	81,200	2,088	101,890	2,373	112,230
10.750	71.10	9.570	0.650	11.913	11.614	20.625	20.624	5.065	100.0	100.0	1,650	104,100	2,269	130,590	2,578	143,840
10.750	73.20	9.558	0.672	11.929	11.646	21.276	21.277	5.065	100.0	100.0	1,702	105,980	2,340	132,830	2,660	146,260
10.750	76.60	9.503	0.700	11.929	11.685	22.101	22.101	5.065	100.0	100.0	1,768	112,510	2,431	140,920	2,763	155,120
10.750	79.20	9.452	0.734	11.984	11.728	23.096	23.097	5.065	100.0	100.0	1,848	119,460	2,541	149,420	2,887	164,410
11.750	54.00	10.950	0.435	12.752	12.319	15.463	15.463	5.065	100.0	100.0	1,237	66,660	1,701	84,160	1,933	92,920
11.750	60.00	10.831	0.489	12.752	12.398	17.300	17.300	5.065	100.0	100.0	1,384	83,740	1,903	105,890	2,162	116,970
11.750	65.00	10.753	0.534	12.752	12.465	18.816	18.815	5.065	100.0	100.0	1,505	95,380	2,070	120,590	2,352	133,190
11.750	71.00	10.670	0.582	12.752	12.531	20.420	20.420	5.065	100.0	100.0	1,634	107,690	2,246	136,060	2,552	150,250
11.875	58.80	10.973	0.470	12.854	12.472	16.840	16.841	5.361	100.0	100.0	1,347	80,250	1,852	101,520	2,105	112,150
11.875	71.80	10.879	0.582	12.854	12.638	20.648	20.648	5.361	100.0	100.0	1,652	95,320	2,271	120,340	2,581	132,860
13.375	54.50	12.520	0.380	14.173	13.858	15.513	15.514	5.719	100.0	100.0	1,241	86,430	1,706	109,940	1,939	121,700
13.375	61.00	12.442	0.430	14.173	13.898	17.487	17.487	5.719	100.0	100.0	1,399	101,470	1,924	129,040	2,186	142,830
13.375	68.00	12.371	0.480	14.252	13.976	19.445	19.445	5.719	100.0	100.0	1,556	115,610	2,139	146,810	2,431	162,410
13.375	72.00	12.312	0.514	14.252	14.028	20.768	20.767	5.719	100.0	100.0	1,661	126,890	2,284	161,070	2,596	178,170
13.375	77.00	12.261	0.550	14.299	14.079	22.160	22.160	5.719	100.0	100.0	1,773	137,140	2,438	173,900	2,770	192,280
13.375	80.70	12.221	0.580	14.354	14.122	23.314	23.314	5.719	100.0	100.0	1,865	145,240	2,565	183,960	2,914	203,320
13.375	85.00	12.182	0.608	14.402	14.165	24.386	24.386	5.719	100.0	100.0	1,951	153,270	2,682	193,950	3,048	214,300
13.375	86.00	12.174	0.625	14.433	14.189	25.035	25.034	5.719	100.0	100.0	2,003	155,270	2,754	196,340	3,129	216,880

Continued

TenarisHydril—Blue (cont.)

Diagram p. C-114

Type: Threaded & coupled **Seal: Metal-to-metal**

											L-80		P-110		Q-125	
D	w	d	t	Dc	Dsc	At	Ac	Lm	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
13.375	98.00	12.150	0.719	14.598	14.323	28.587	28.587	5.719	100.0	100.0	2,287	162,610	3,145	204,860	3,573	225,980
13.500	81.40	12.400	0.580	14.488	14.283	23.542	23.541	5.719	100.0	100.0	1,883	136,320	2,590	172,110	2,943	190,000
13.625	79.10	12.478	0.555	14.665	14.323	22.789	22.788	5.719	100.0	100.0	1,823	143,070	2,507	181,780	2,849	201,140
13.625	88.20	12.422	0.625	14.665	14.421	25.525	25.525	5.719	100.0	100.0	2,042	154,980	2,808	196,600	3,191	217,410

*Yield torque values refer to a structural limit of the connection.
**d refers to Connection ID.

TenarisHydril—Blue Near Flush

Diagram p. C-114

Type: Integral swaged, non-upset **Seal: Metal-to-metal**

											L-80		P-110		Q-125	
D	w	d	t	Dc	Dsc	At	Ac	Lm	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
5.000	18.00	4.217	0.362	5.146	–	5.275	3.743	4.839	71.0	50.0	300		412		468	
5.500	23.00	4.618	0.415	5.650	–	6.630	4.707	4.685	71.0	40.0	376		518		589	
7.000	26.00	6.228	0.362	7.169	–	7.549	5.530	5.339	73.3	40.0	443		608		692	
7.000	29.00	6.130	0.408	7.169	–	8.449	5.913	4.980	70.0	40.0	473		650		739	
7.000	32.00	6.083	0.453	7.193	–	9.317	6.710	5.980	72.0	50.0	536		738		839	
7.000	35.00	5.953	0.498	7.209	–	10.172	7.629	5.732	75.0	50.0	611		839		954	
7.000	38.00	5.874	0.540	7.201	–	10.959	8.331	5.980	76.0	50.0	667		917		1,041	
7.000	41.00	5.768	0.590	7.224	–	11.881	9.269	5.732	78.0	50.0	741		1,019		1,158	
7.625	29.70	6.823	0.375	7.791	–	8.541	6.067	5.339	71.0	40.0	485		667		758	
7.625	33.70	6.713	0.430	7.803	–	9.720	7.192	5.480	74.0	50.0	576		791		899	
7.625	39.00	6.571	0.500	7.827	–	11.192	8.506	5.480	76.0	50.0	680		936		1,063	
7.625	42.80	6.453	0.562	7.850	–	12.470	9.849	6.232	79.0	50.0	788		1,084		1,232	
7.625	45.30	6.390	0.595	7.854	–	13.141	10.249	6.232	78.0	50.0	820		1,127		1,282	
7.625	47.10	6.327	0.625	7.866	–	13.744	10.724	6.232	78.0	50.0	858		1,179		1,340	
7.750	46.10	6.560	0.595	7.992	–	13.374	9.895	5.858	74.0	50.0	792		1,089		1,237	
7.750	48.60	6.445	0.640	8.004	–	14.296	11.296	6.480	79.0	50.0	904		1,243		1,412	
8.625	36.00	7.780	0.400	8.799	–	10.336	7.752	5.539	75.0	50.0	620		853		969	
8.625	40.00	7.705	0.450	8.815	–	11.557	8.553	5.480	74.0	50.0	685		941		1,069	
8.625	44.00	7.583	0.500	8.831	–	12.763	9.827	5.732	77.0	50.0	786		1,081		1,228	
8.625	49.00	7.465	0.557	8.850	–	14.118	10.873	5.732	77.0	50.0	869		1,196		1,359	
8.625	52.00	7.386	0.595	8.882	–	15.010	11.856	6.232	79.0	50.0	949		1,304		1,482	
9.625	40.00	8.764	0.395	9.799	–	11.454	8.130	5.189	71.0	45.0	650		895		1,017	
9.625	43.50	8.709	0.435	9.819	–	12.559	9.043	4.980	72.0	40.0	724		994		1,130	
9.625	47.00	8.606	0.472	9.827	–	13.572	10.317	5.732	76.0	50.0	825		1,135		1,290	
9.625	53.50	8.535	0.545	9.878	–	15.546	11.969	5.890	77.0	50.0	958		1,317		1,496	
9.625	58.40	8.435	0.595	9.870	–	16.879	12.995	5.980	77.0	50.0	1,040		1,430		1,625	
9.625	64.90	8.209	0.672	9.909	–	18.901	14.744	6.480	78.0	50.0	1,179		1,622		1,843	
9.875	62.80	8.579	0.625	10.110	–	18.162	13.989	5.980	77.0	50.0	1,119		1,538		1,748	
9.875	65.30	8.504	0.650	10.134	–	18.838	14.882	6.480	79.0	50.0	1,191		1,637		1,860	
9.875	68.80	8.402	0.700	10.154	–	20.177	15.537	6.232	77.0	50.0	1,243		1,709		1,942	
10.000	68.80	8.579	0.700	10.110	–	20.452	14.300	5.980	65.0	50.0	1,063		1,463		1,661	
10.750	51.00	9.783	0.450	10.941	–	14.561	10.776	5.732	74.0	50.0	862		1,185		1,347	
10.750	55.50	9.713	0.495	10.941	–	15.947	11.958	6.232	75.0	50.0	957		1,316		1,495	
10.750	60.70	9.579	0.545	10.980	–	17.473	13.451	5.453	77.0	50.0	1,076		1,480		1,682	
10.750	65.70	9.560	0.595	10.996	–	18.982	14.804	6.232	78.0	50.0	1,185		1,629		1,851	
11.750	54.00	10.807	0.435	11.965	–	15.463	11.752	5.480	76.0	50.0	940		1,293		1,469	
11.750	60.00	10.709	0.489	11.988	–	17.300	13.147	5.980	76.0	50.0	1,052		1,446		1,643	
11.750	65.00	10.682	0.534	12.004	–	18.816	13.733	5.232	70.0	40.0	1,054		1,449		1,646	
11.750	71.00	10.516	0.582	12.024	–	20.420	15.720	5.732	77.0	50.0	1,258		1,729		1,965	
11.875	71.80	10.711	0.582	12.122	–	20.648	15.277	5.732	74.0	50.0	1,222		1,681		1,910	
13.375	61.00	12.449	0.430	13.579	–	17.487	12.938	5.339	74.0	50.0	1,035		1,424		1,618	
13.375	68.00	12.343	0.480	13.606	–	19.445	14.582	5.480	75.0	50.0	1,167		1,604		1,823	
13.375	72.00	12.323	0.514	13.646	–	20.768	16.202	6.354	78.0	50.0	1,296		1,782		2,025	
13.375	77.00	12.209	0.550	13.618	–	22.160	17.286	5.980	78.0	50.0	1,383		1,902		2,161	
13.375	80.70	12.150	0.580	13.626	–	23.314	17.949	5.732	77.0	50.0	1,436		1,975		2,244	
13.375	86.00	12.059	0.625	13.626	–	25.035	18.781	5.480	75.0	50.0	1,502		2,066		2,347	
13.625	88.20	12.343	0.625	13.886	–	25.525	19.150	5.732	75.0	50.0	1,532		2,106		2,393	

** d refers to Connection ID.

TenarisHydril—Blue Thermal Liner

Diagram p. C-114

Type: Threaded & coupled **Seal: None**

											L-80		P-110		Q-125	
D	w	d	t	Dc	Dsc	At	Ac	Lm	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
4.500	10.50	4.016	0.224	4.921	–	3.009	3.009	4.016	100.0	100.0	241	6,290	331	7,610	376	8,270
4.500	11.60	4.000	0.250	4.921	–	3.338	3.339	4.016	100.0	100.0	267	6,710	367	8,110	417	8,820
4.500	12.60	3.921	0.271	4.921	–	3.600	3.601	4.016	100.0	100.0	288	7,420	396	9,040	450	9,850
4.500	13.50	3.921	0.290	4.961	–	3.836	3.836	4.016	100.0	100.0	307	7,660	422	10,400	479	10,100
4.500	15.10	3.854	0.337	5.079	–	4.407	4.408	4.016	100.0	100.0	353	9,300	485	10,710	551	12,270
4.500	17.00	3.827	0.380	5.079	–	4.918	4.918	4.016	100.0	100.0	393	9,940	541	12,070	615	13,130
4.500	23.70	3.717	0.560	5.299	–	6.932	6.932	4.016	100.0	100.0	555	13,200	762	15,890	866	17,230
5.500	15.50	4.878	0.275	6.051	5.843	4.514	4.514	4.252	100.0	100.0	361	13,620	497	17,270	564	19,090
5.500	17.00	4.827	0.304	6.051	5.886	4.962	4.963	4.252	100.0	100.0	397	14,930	546	18,990	620	21,020
5.500	20.00	4.772	0.361	6.051	5.972	5.828	5.828	4.252	100.0	100.0	466	16,480	641	20,970	729	23,210
5.500	23.00	4.705	0.415	6.146	6.047	6.630	6.629	4.252	100.0	100.0	530	18,550	729	23,550	829	26,050
5.500	26.00	4.681	0.476	6.260	6.130	7.513	7.513	4.252	100.0	100.0	601	19,860	826	25,030	939	27,620
5.500	26.80	4.650	0.500	6.260	6.165	7.854	7.854	4.252	100.0	100.0	628	20,630	864	26,040	982	28,750
6.625	20.00	5.992	0.288	7.346	6.965	5.734	5.733	4.252	100.0	100.0	459	17,870	631	22,530	717	24,860
6.625	24.00	5.870	0.352	7.346	7.063	6.937	6.936	4.252	100.0	100.0	555	22,460	763	28,560	867	31,610
6.625	28.00	5.760	0.417	7.346	7.157	8.133	8.133	4.252	100.0	100.0	651	26,450	895	33,820	1,017	37,500
6.625	32.00	5.646	0.475	7.346	7.244	9.177	9.178	4.252	100.0	100.0	734	30,300	1,010	38,930	1,147	43,250
7.000	20.00	6.382	0.272	7.657	7.382	5.749	5.749	4.409	100.0	100.0	460	18,360	632	23,120	719	24,700
7.000	23.00	6.291	0.317	7.657	7.382	6.655	6.656	4.409	100.0	100.0	532	22,180	732	28,160	832	31,150
7.000	26.00	6.209	0.362	7.657	7.453	7.549	7.549	4.409	100.0	100.0	604	25,670	830	32,730	944	36,270
7.000	29.00	6.150	0.408	7.657	7.520	8.449	8.449	4.409	100.0	100.0	676	27,480	929	35,060	1,056	38,848

Continued

TenarisHydril—Blue Thermal Liner (cont.)

Diagram p. C-114

Type: Threaded & coupled **Seal: None**

											L-80		P-110		Q-125	
D	w	d	t	Dc	Dsc	At	Ac	Lm	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
7.000	32.00	6.039	0.453	7.717	7.583	9.317	9.317	4.409	100.0	100.0	745	32,480	1,025	41,700	1,165	46,310
7.000	35.00	5.965	0.498	7.756	7.650	10.172	10.173	4.409	100.0	100.0	814	35,530	1,119	45,670	1,272	50,740
8.625	24.00	8.004	0.264	9.252	9.075	6.934	6.935	4.634	100.0	100.0	555	24,310	763	31,000	867	34,340
8.625	28.00	7.968	0.304	9.252	9.075	7.947	7.947	4.634	100.0	100.0	636	26,420	874	33,880	993	37,610
8.625	32.00	7.921	0.352	9.252	9.075	9.149	9.148	4.634	100.0	100.0	732	28,900	1,006	37,270	1,144	41,450
8.625	36.00	7.825	0.400	9.370	9.144	10.336	10.335	4.634	100.0	100.0	827	36,630	1,137	47,580	1,292	53,060
8.625	40.00	7.725	0.450	9.370	9.219	11.557	11.557	4.634	100.0	100.0	925	39,380	1,271	51,330	1,445	57,310
9.625	36.00	8.892	0.352	10.240	10.110	10.254	10.255	5.135	100.0	100.0	820	44,380	1,128	54,850	1,282	60,080
9.625	40.00	8.835	0.395	10.240	10.110	11.454	11.455	5.135	100.0	100.0	916	47,090	1,260	58,570	1,432	64,310
9.625	43.50	8.755	0.435	10.386	10.171	12.559	12.560	5.135	100.0	100.0	1,005	52,340	1,381	64,770	1,570	70,980
9.625	47.00	8.681	0.472	10.386	10.226	13.572	13.572	5.135	100.0	100.0	1,086	57,990	1,493	72,540	1,697	79,810
9.625	53.50	8.535	0.545	10.591	10.335	15.546	15.547	5.135	100.0	100.0	1,244	66,570	1,710	82,950	1,943	91,140
10.750	45.50	9.950	0.400	11.463	11.238	13.006	13.006	5.386	100.0	100.0	1,040	59,130	1,431	73,730	1,626	81,030
10.750	51.00	9.850	0.450	11.463	11.317	14.561	14.561	5.386	100.0	100.0	1,165	63,080	1,602	79,170	1,820	87,210
10.750	55.50	9.760	0.495	11.632	11.384	15.947	15.948	5.386	100.0	100.0	1,276	70,000	1,754	87,390	1,993	96,080
10.750	60.70	9.660	0.545	11.632	11.459	17.473	17.473	5.386	100.0	100.0	1,398	78,710	1,922	99,370	2,184	109,690

"*Yield torque values refer to a structural limit of the connection.
**d refers to Connection ID.

TenarisHydril—ER

Diagram p. C-114

Type: Threaded & coupled **Seal: None**

											L-80		P-110		Q-125	
D	w	d	t	Dc	Dsc	At	Ac	Lm	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
7.000	23.00	6.398	0.317	7.657	7.375	6.656	6.656	4.409	100.0	100.0	532	–	732	–	832	–
7.000	26.00	6.339	0.362	7.657	7.375	7.549	7.549	4.409	100.0	100.0	604	–	830	–	944	–
7.000	29.00	6.272	0.408	7.657	7.375	8.449	8.449	4.409	100.0	100.0	676	–	929	–	1,056	–
7.000	32.00	6.232	0.453	7.657	7.375	9.317	9.317	4.409	100.0	100.0	745	–	1,025	–	1,165	–
7.000	35.00	6.193	0.498	7.657	7.375	10.173	9.517	4.409	93.6	100.0	762	–	1,047	–	1,191	–
7.000	38.00	6.161	0.540	7.657	7.375	10.959	9.517	4.409	86.8	100.0	761	–	1,047	–	1,189	–
7.000	41.00	6.122	0.590	7.657	7.375	11.881	9.517	4.409	80.1	100.0	761	–	1,047	–	1,189	–
7.000	44.00	6.083	0.640	7.657	7.375	12.788	9.517	4.409	74.4	100.0	761	–	1,047	–	1,189	–
7.000	46.00	6.083	0.670	7.657	7.375	13.324	9.517	4.409	71.4	100.0	761	–	1,047	–	1,189	–
8.625	24.00	8.051	0.264	9.626	9.125	6.935	6.935	4.724	100.0	100.0	555	–	763	–	867	–
8.625	28.00	8.008	0.304	9.626	9.125	7.947	7.947	4.724	100.0	100.0	636	–	874	–	993	–
8.625	32.00	7.980	0.352	9.626	9.125	9.148	9.148	4.724	100.0	100.0	732	–	1,006	–	1,144	–
8.625	36.00	7.882	0.400	9.626	9.125	10.335	10.335	4.724	100.0	100.0	827	–	1,137	–	1,292	–
8.625	40.00	7.846	0.450	9.626	9.125	11.557	11.557	4.724	100.0	100.0	925	–	1,271	–	1,445	–
8.625	44.00	7.807	0.500	9.626	9.125	12.763	12.763	4.724	100.0	100.0	1,021	–	1,404	–	1,595	–
8.625	49.00	7.764	0.557	9.626	9.125	14.117	14.117	4.724	100.0	100.0	1,129	–	1,553	–	1,765	–
8.625	52.00	7.717	0.595	9.626	9.125	15.010	15.010	4.724	100.0	100.0	1,201	–	1,651	–	1,876	–
8.625	54.00	7.717	0.625	9.626	9.125	15.708	15.708	4.724	100.0	100.0	1,257	–	1,728	–	1,964	–
8.625	58.70	7.646	0.687	9.626	9.125	17.132	17.095	4.724	99.8	100.0	1,368	–	1,881	–	2,138	–
9.625	36.00	8.972	0.352	10.626	10.125	10.255	10.255	4.724	100.0	100.0	820	–	1,128	–	1,282	–
9.625	40.00	8.890	0.395	10.626	10.125	11.455	11.455	4.724	100.0	100.0	916	–	1,260	–	1,432	–
9.625	43.50	8.839	0.435	10.626	10.125	12.560	12.560	4.724	100.0	100.0	1,005	–	1,381	–	1,570	–
9.625	47.00	8.807	0.472	10.626	10.125	13.572	13.572	4.724	100.0	100.0	1,086	–	1,493	–	1,697	–
9.625	53.50	8.748	0.545	10.626	10.125	15.547	15.547	4.724	100.0	100.0	1,244	–	1,710	–	1,943	–
9.625	58.40	8.705	0.595	10.626	10.125	16.880	16.880	4.724	100.0	100.0	1,350	–	1,857	–	2,110	–
9.625	59.40	8.705	0.609	10.626	10.125	17.250	17.250	4.724	100.0	100.0	1,380	–	1,897	–	2,156	–
9.625	61.10	8.689	0.625	10.626	10.125	17.672	17.672	4.724	100.0	100.0	1,414	–	1,944	–	2,209	–
9.625	64.90	8.654	0.672	10.626	10.125	18.901	18.901	4.724	100.0	100.0	1,512	–	2,079	–	2,363	–
9.875	62.80	9.055	0.625	10.827	–	18.163	18.163	4.724	100.0	100.0	1,453	–	1,998	–	2,270	–
10.750	45.50	9.980	0.400	11.748	11.250	13.006	13.006	4.724	100.0	100.0	1,040	–	1,431	–	1,626	–
10.750	51.00	9.980	0.450	11.748	11.250	14.561	14.561	4.724	100.0	100.0	1,165	–	1,602	–	1,820	–
10.750	55.50	9.980	0.495	11.748	11.250	15.948	15.948	4.724	100.0	100.0	1,276	–	1,754	–	1,993	–
10.750	60.70	9.764	0.545	11.748	11.250	17.473	17.473	4.724	100.0	100.0	1,398	–	1,922	–	2,184	–
10.750	65.70	9.764	0.595	11.748	11.250	18.983	18.983	4.724	100.0	100.0	1,519	–	2,088	–	2,373	–
11.875	71.80	10.866	0.582	12.756	–	20.648	20.648	4.724	100.0	100.0	1,652	–	2,271	–	2,581	–
13.375	54.50	12.689	0.380	14.374	–	15.514	15.514	4.724	100.0	100.0	1,241	–	1,706	–	1,939	–
13.375	61.00	12.559	0.430	14.374	–	17.487	17.487	4.724	100.0	100.0	1,399	–	1,924	–	2,186	–
13.375	68.00	12.559	0.480	14.374	–	19.445	19.445	4.724	100.0	100.0	1,556	–	2,139	–	2,431	–
13.375	72.00	12.559	0.514	14.374	–	20.767	20.767	4.724	100.0	100.0	1,661	–	2,284	–	2,596	–
13.500	80.40	12.559	0.576	14.500	–	23.386	23.386	4.724	100.0	100.0	1,871	–	2,573	–	2,923	–
13.625	88.20	12.598	0.625	14.626	–	25.525	25.525	4.724	100.0	100.0	2,042	–	2,808	–	3,191	–
13.625	105.00	12.402	0.760	14.626	–	30.716	26.569	4.724	86.5	100.0	2,125	–	2,923	–	3,322	–
14.000	82.50	12.996	0.562	15.000	–	23.726	23.726	4.724	100.0	100.0	1,898	–	2,610	–	2,966	–
14.000	94.80	12.874	0.656	15.000	–	27.500	27.500	4.724	100.0	100.0	2,200	–	3,025	–	3,438	–
14.000	99.30	12.874	0.688	15.000	–	28.773	28.773	4.724	100.0	100.0	2,302	–	3,165	–	3,597	–
14.000	110.00	12.795	0.772	15.000	–	32.082	30.597	4.724	95.4	100.0	2,449	–	3,367	–	3,826	–
14.000	111.00	12.795	0.779	15.000	–	32.356	30.597	4.724	94.6	100.0	2,448	–	3,367	–	3,826	–
14.000	114.00	12.756	0.800	15.000	–	33.175	30.597	4.724	92.2	100.0	2,447	–	3,364	–	3,824	–
15.000	109.00	13.602	0.715	16.000	–	32.088	32.088	5.512	100.0	100.0	2,567	–	3,530	–	4,011	–
16.000	65.00	15.252	0.375	17.000	–	18.408	18.408	4.232	100.0	100.0	1,473	–	2,025	–	2,301	–
16.000	75.00	15.118	0.438	17.000	–	21.413	21.413	4.232	100.0	100.0	1,713	–	2,355	–	2,677	–
16.000	84.00	15.020	0.495	17.000	16.406	24.112	24.112	4.724	100.0	100.0	1,929	–	2,652	–	3,014	–
16.000	94.50	14.961	0.562	17.000	16.556	27.257	27.257	4.724	100.0	100.0	2,181	–	2,998	–	3,407	–
16.000	109.00	14.902	0.656	17.000	–	31.622	31.622	4.724	100.0	100.0	2,530	–	3,478	–	3,953	–
16.000	118.00	14.744	0.715	17.000	–	34.334	34.334	5.512	100.0	100.0	2,747	–	3,777	–	4,292	–
16.000	128.00	14.705	0.781	17.000	–	37.341	37.281	5.512	100.0	100.0	2,987	–	4,108	–	4,668	–
18.625	87.50	17.803	0.435	20.000	19.685	24.859	24.859	4.232	100.0	100.0	1,989	–	2,734	–	3,107	–
18.625	94.50	17.764	0.468	20.000	–	26.696	26.696	4.232	100.0	100.0	2,136	–	2,937	–	3,337	–
18.625	96.50	17.764	0.485	20.000	–	27.640	27.640	4.232	100.0	100.0	2,211	–	3,040	–	3,455	–
18.625	99.00	17.657	0.500	20.000	–	28.470	28.470	4.724	100.0	100.0	2,278	–	3,132	–	3,559	–
18.625	114.00	17.579	0.579	20.000	–	32.826	32.826	4.724	100.0	100.0	2,626	–	3,611	–	4,103	–
18.625	115.00	17.579	0.594	20.000	–	33.647	33.647	4.724	100.0	100.0	2,692	–	3,701	–	4,206	–
18.625	124.00	17.559	0.625	20.000	–	35.343	35.343	4.724	100.0	100.0	2,827	–	3,888	–	4,418	–
18.625	126.00	17.559	0.636	20.000	–	35.943	35.943	4.724	100.0	100.0	2,875	–	3,954	–	4,493	–
18.625	136.00	17.559	0.693	20.000	–	39.040	39.040	4.724	100.0	100.0	3,123	–	4,294	–	4,880	–
18.625	139.00	17.323	0.720	20.000	–	40.500	40.500	5.512	100.0	100.0	3,240	–	4,455	–	5,063	–
20.000	94.00	19.177	0.438	21.000	–	26.917	26.917	4.232	100.0	100.0	2,153	–	2,961	–	3,365	–
20.000	106.50	19.012	0.500	21.000	–	30.631	30.631	4.724	100.0	100.0	2,450	–	3,369	–	3,829	–
20.000	118.50	18.965	0.563	21.000	–	34.379	34.379	4.724	100.0	100.0	2,750	–	3,782	–	4,297	–
20.000	131.50	18.917	0.625	21.000	–	38.043	38.043	4.724	100.0	100.0	3,043	–	4,185	–	4,755	–

Continued

TenarisHydril—ER (cont.)

Diagram p. C-114

Type: Threaded & coupled **Seal: None**

											L-80		P-110		Q-125	
D	w	d	t	Dc	Dsc	At	Ac	Lm	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
20.000	133.00	18.917	0.635	21.000	–	38.631	38.631	4.724	100.0	100.0	3,091	–	4,249	–	4,829	–
20.000	147.00	18.858	0.709	21.000	–	42.969	42.969	4.724	100.0	100.0	3,437	–	4,727	–	5,371	–
20.000	156.00	18.827	0.750	21.000	–	45.356	43.419	4.724	95.7	100.0	3,473	–	4,774	–	5,426	–
20.000	169.00	18.787	0.812	21.000	–	48.948	43.416	4.724	88.7	100.0	3,473	–	4,776	–	5,428	–
20.000	209.00	18.701	1.000	21.000	–	59.691	43.417	4.724	72.7	100.0	3,471	–	4,773	–	5,424	–
22.000	146.50	20.906	0.625	23.130	–	41.969	41.969	5.512	100.0	100.0	3,358	–	4,617	–	5,246	–
22.000	180.00	20.689	0.781	23.130	–	52.063	52.063	5.512	100.0	100.0	4,165	–	5,727	–	6,508	–
22.000	226.00	20.394	1.000	23.130	–	65.973	55.735	5.512	84.5	100.0	4,460	–	6,132	–	6,969	–
22.000	257.40	20.118	1.125	23.504	23.217	73.779	73.779	6.654	100.0	100.0	5,902	–	8,116	–	9,222	–
24.000	125.50	23.118	0.500	25.000	–	36.913	36.913	4.232	100.0	100.0	2,953	–	4,061	–	4,614	–
24.000	159.20	22.906	0.625	25.000	–	45.897	45.897	4.724	100.0	100.0	3,672	–	5,049	–	5,737	–
24.000	162.00	22.906	0.635	25.000	–	46.612	46.612	4.724	100.0	100.0	3,729	–	5,127	–	5,826	–
24.000	174.00	22.866	0.688	25.000	–	50.388	50.388	4.724	100.0	100.0	4,031	–	5,543	–	6,298	–
24.000	189.00	22.815	0.750	25.000	–	54.782	51.964	4.724	94.9	100.0	4,159	–	5,719	–	6,499	–
24.500	133.00	23.638	0.500	25.591	–	37.699	37.699	4.232	100.0	100.0	3,016	–	4,147	–	4,712	–
24.500	140.00	23.488	0.531	25.591	–	39.985	39.985	4.724	100.0	100.0	3,199	–	4,398	–	4,998	–
24.500	162.00	23.417	0.625	25.591	–	46.878	46.878	4.724	100.0	100.0	3,750	–	5,157	–	5,860	–
24.500	165.00	23.417	0.635	25.591	–	47.608	47.608	4.724	100.0	100.0	3,809	–	5,237	–	5,951	–
24.500	182.00	23.417	0.709	25.591	–	52.992	52.992	4.724	100.0	100.0	4,239	–	5,829	–	6,624	–

* Yield torque values refers to a structural limit of the connection.

TenarisXP Buttress

Diagram p. C-115

Type: Threaded & coupled **Seal: None**

											L-80		P-110		Q-125	
D	w	d	t	Dc	Dsc	At	Ac	Lm	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
4.500	10.50	4.040	0.224	5.000	–	3.009	3.009	4.016	100.0	100.0	241	–	331	–	376	–
4.500	11.60	3.988	0.250	5.000	–	3.338	3.338	4.016	100.0	100.0	267	–	367	7,800	417	8,300
4.500	13.50	3.908	0.290	5.000	–	3.836	3.836	4.016	100.0	100.0	307	10,100	422	11,500	479	12,200
4.500	15.10	3.814	0.337	5.100	–	4.407	4.407	4.016	100.0	100.0	353	10,800	485	12,600	551	13,500
5.000	13.00	4.482	0.253	5.563	–	3.773	3.773	4.141	100.0	100.0	302	–	415	–	472	–
5.000	15.00	4.396	0.296	5.563	–	4.374	4.374	4.141	100.0	100.0	350	–	481	–	547	–
5.000	18.00	4.264	0.362	5.720	–	5.275	5.275	4.141	100.0	100.0	422	–	580	–	659	–
5.000	21.40	4.114	0.437	5.720	–	6.264	6.264	4.141	100.0	100.0	501	–	689	–	783	–
5.000	23.20	4.032	0.478	5.820	–	6.791	6.791	4.141	100.0	100.0	543	–	747	–	849	–
5.000	24.10	3.988	0.500	5.820	–	7.069	7.069	4.141	100.0	100.0	565	–	778	–	884	–
5.500	15.50	4.938	0.275	6.050	–	4.514	4.514	4.204	100.0	100.0	361	–	497	12,500	564	13,400
5.500	17.00	4.880	0.304	6.050	–	4.962	4.962	4.204	100.0	100.0	397	11,750	546	12,900	620	14,000
5.500	20.00	4.766	0.361	6.100	–	5.828	5.828	4.204	100.0	100.0	466	19,000	641	23,900	729	25,250
5.500	23.00	4.658	0.415	6.200	–	6.630	6.630	4.204	100.0	100.0	530	20,800	729	26,900	829	28,400
5.500	26.00	4.536	0.476	6.300	–	7.513	7.513	4.204	100.0	100.0	601	24,500	826	29,000	939	31,300
6.625	20.00	6.037	0.288	7.390	–	5.734	5.734	4.391	100.0	100.0	459	–	631	–	717	–
6.625	24.00	5.909	0.352	7.390	–	6.937	6.937	4.391	100.0	100.0	555	–	763	–	867	–
6.625	28.00	5.779	0.417	7.390	–	8.133	8.133	4.391	100.0	100.0	651	–	895	–	1,017	–
6.625	32.00	5.663	0.475	7.420	–	9.177	9.177	4.391	100.0	100.0	734	–	1,010	–	1,147	–
7.000	23.00	6.354	0.317	7.656	–	6.655	6.655	4.579	100.0	100.0	532	20,900	732	24,500	832	26,300
7.000	26.00	6.264	0.362	7.656	–	7.549	7.549	4.579	100.0	100.0	604	23,400	830	28,100	944	30,400
7.000	29.00	6.172	0.408	7.750	–	8.449	8.449	4.579	100.0	100.0	676	26,300	929	32,000	1,056	34,900
7.000	32.00	6.082	0.453	7.750	–	9.317	9.317	4.579	100.0	100.0	745	28,300	1,025	35,000	1,165	38,400
7.000	35.00	5.992	0.498	7.890	–	10.172	10.172	4.579	100.0	100.0	814	29,000	1,119	36,700	1,272	40,500
7.000	38.00	5.908	0.540	7.890	–	10.959	10.959	4.579	100.0	100.0	877	31,000	1,206	39,600	1,370	43,900
7.625	26.20	6.957	0.328	8.500	–	7.519	7.519	4.766	100.0	100.0	602	–	827	–	940	–
7.625	29.70	6.863	0.375	8.500	–	8.541	8.541	4.766	100.0	100.0	683	–	940	–	1,068	–
7.625	33.70	6.753	0.430	8.500	–	9.720	9.720	4.766	100.0	100.0	778	–	1,069	–	1,215	–
7.625	39.00	6.613	0.500	8.500	–	11.192	11.192	4.766	100.0	100.0	895	–	1,231	–	1,399	–
7.625	42.80	6.489	0.562	8.650	–	12.470	12.470	4.766	100.0	100.0	998	–	1,372	–	1,559	–
7.625	45.30	6.423	0.595	8.650	–	13.141	13.141	4.766	100.0	100.0	1,051	–	1,445	–	1,643	–
7.625	47.10	6.363	0.625	8.650	–	13.744	13.744	4.766	100.0	100.0	1,100	–	1,512	–	1,718	–
8.625	32.00	7.909	0.352	9.625	–	9.149	9.149	4.891	100.0	100.0	732	–	1,006	–	1,144	–
8.625	36.00	7.813	0.400	9.625	–	10.336	10.336	4.891	100.0	100.0	827	–	1,137	–	1,292	–
8.625	40.00	7.713	0.450	9.625	–	11.557	11.557	4.891	100.0	100.0	925	–	1,271	–	1,445	–
8.625	44.00	7.613	0.500	9.625	–	12.763	12.763	4.891	100.0	100.0	1,021	–	1,404	–	1,595	–
8.625	49.00	7.499	0.557	9.625	–	14.118	14.118	4.891	100.0	100.0	1,129	–	1,553	–	1,765	–
9.625	36.00	8.909	0.352	10.625	–	10.254	10.254	4.891	100.0	100.0	820	–	1,128	–	1,282	–
9.625	40.00	8.823	0.395	10.625	–	11.454	11.454	4.891	100.0	100.0	916	–	1,260	–	1,432	–
9.625	43.50	8.743	0.435	10.625	–	12.559	12.559	4.891	100.0	100.0	1,005	–	1,381	–	1,570	–
9.625	47.00	8.669	0.472	10.625	–	13.572	13.572	4.891	100.0	100.0	1,086	–	1,493	–	1,697	–
9.625	53.50	8.523	0.545	10.625	–	15.546	15.546	4.891	100.0	100.0	1,244	–	1,710	–	1,943	–
9.625	58.40	8.423	0.595	10.625	–	16.879	16.879	4.891	100.0	100.0	1,350	–	1,857	–	2,110	–
10.750	40.50	10.038	0.350	11.750	–	11.435	11.435	4.891	100.0	100.0	915	–	1,258	–	1,429	–
10.750	45.50	9.938	0.400	11.750	–	13.006	13.006	4.891	100.0	100.0	1,040	–	1,431	–	1,626	–
10.750	51.00	9.838	0.450	11.750	–	14.561	14.561	4.891	100.0	100.0	1,165	–	1,602	–	1,820	–
11.750	47.00	10.988	0.375	12.750	–	13.401	13.401	4.891	100.0	100.0	1,072	–	1,474	–	1,675	–
11.750	54.00	10.868	0.435	12.750	–	15.463	15.463	4.891	100.0	100.0	1,237	–	1,701	–	1,933	–
11.750	60.00	10.760	0.489	12.750	–	17.300	17.300	4.891	100.0	100.0	1,384	–	1,903	–	2,162	–
13.375	54.50	12.603	0.380	14.375	–	15.513	15.513	4.891	100.0	100.0	1,241	–	1,706	–	1,939	–
13.375	61.00	12.503	0.430	14.375	–	17.487	17.487	4.891	100.0	100.0	1,399	–	1,924	–	2,186	–
13.375	68.00	12.403	0.480	14.375	–	19.445	19.445	4.891	100.0	100.0	1,556	–	2,139	–	2,431	–
13.375	72.00	12.335	0.514	14.375	–	20.768	20.768	4.891	100.0	100.0	1,661	–	2,284	–	2,596	–
16.000	75.00	15.112	0.438	17.000	–	21.414	21.414	4.891	100.0	100.0	1,713	–	2,355	–	2,677	–
16.000	84.00	14.998	0.495	17.000	–	24.112	24.112	4.891	100.0	100.0	1,929	–	2,652	–	3,014	–

* Yield torque values refers to a structural limit of the connection.

TenarisHydril—MACII

Diagram p. C-115

Type: Integral swaged, non-upset Seal: Metal-to-metal

											L-80		P-110		Q-125	
D	w	d	t	Dc	Dsc	At	Ac	Lm	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
5.500	28.40	4.360	0.530	5.716	–	8.275	6.205	4.940	75.0	37.5	497	–	683	–	776	–
5.500	29.70	4.296	0.562	5.743	–	8.718	6.781	4.940	77.8	38.9	542	–	746	–	848	–
5.500	32.60	4.170	0.625	5.770	–	9.572	7.490	4.940	78.2	39.1	599	–	823	–	936	–
5.500	35.30	4.046	0.687	5.767	–	10.388	7.951	5.750	76.5	38.3	636	–	874	–	993	–
5.500	36.40	4.010	0.705	5.766	–	10.620	7.958	5.750	74.9	37.5	637	–	875	–	995	–
5.500	38.00	3.920	0.750	5.764	–	11.192	8.418	5.810	75.2	37.6	673	–	926	–	1,052	–
5.500	40.50	3.796	0.812	5.761	–	11.959	8.851	6.440	74.0	37.0	708	–	973	–	1,106	–
6.625	36.70	5.421	0.562	6.921	–	10.705	8.250	5.000	77.1	38.5	660	–	908	–	1,032	–
6.625	40.20	5.295	0.625	6.887	–	11.781	9.020	5.750	76.6	38.3	722	–	993	–	1,128	–
6.625	43.70	5.171	0.687	6.951	–	12.816	9.860	5.750	76.9	38.5	788	–	1,084	–	1,232	–
6.625	47.10	5.045	0.750	6.948	–	13.843	10.807	5.810	78.1	39.0	865	–	1,189	–	1,351	–
6.625	50.40	4.921	0.812	6.945	–	14.829	11.367	6.440	76.7	38.3	910	–	1,251	–	1,422	–
6.625	53.70	4.795	0.875	6.942	–	15.806	11.931	6.440	75.5	37.7	954	–	1,313	–	1,492	–
6.625	65.80	4.295	1.125	6.933	–	19.439	14.078	7.380	72.4	36.2	1,126	–	1,548	–	1,759	–
7.000	41.00	5.740	0.590	7.259	–	11.881	9.195	5.000	77.4	38.7	735	–	1,012	–	1,149	–
7.000	42.70	5.670	0.625	7.300	–	12.517	9.807	5.000	78.3	39.2	784	–	1,078	–	1,225	–
7.000	44.00	5.640	0.640	7.270	–	12.788	9.679	5.750	75.7	37.8	774	–	1,065	–	1,210	–
7.000	45.40	5.580	0.670	7.298	–	13.324	10.368	5.750	77.8	38.9	829	–	1,141	–	1,295	–
7.000	46.40	5.546	0.687	7.311	–	13.625	10.664	5.750	78.3	39.1	853	–	1,174	–	1,333	–
7.000	49.50	5.460	0.730	7.344	–	14.379	11.349	5.810	78.9	39.5	907	–	1,248	–	1,418	–
7.000	50.10	5.420	0.750	7.343	–	14.726	11.349	5.810	77.1	38.5	908	–	1,249	–	1,419	–
7.000	53.60	5.296	0.812	7.340	–	15.785	12.235	6.440	77.5	38.8	979	–	1,345	–	1,529	–
7.000	57.10	5.170	0.875	7.337	–	16.837	12.838	6.440	76.2	38.1	1,026	–	1,411	–	1,604	–
7.000	60.50	5.046	0.937	7.334	–	17.847	13.423	7.380	75.2	37.6	1,074	–	1,476	–	1,678	–
7.000	63.90	4.920	1.000	7.331	–	18.850	14.063	7.380	74.6	37.3	1,125	–	1,546	–	1,758	–
7.625	45.30	6.400	0.595	7.885	–	13.141	9.710	5.000	73.9	36.9	777	–	1,068	–	1,214	–
7.625	47.10	6.295	0.625	7.921	–	13.744	10.743	5.000	78.2	39.1	860	–	1,182	–	1,343	–
7.625	51.20	6.171	0.687	8.004	–	14.974	11.650	5.810	77.8	38.9	932	–	1,281	–	1,456	–
7.625	52.80	6.121	0.712	8.003	–	15.463	11.796	5.810	76.3	38.1	944	–	1,298	–	1,475	–
7.625	55.30	6.045	0.750	8.001	–	16.199	12.847	5.810	79.3	39.7	1,028	–	1,413	–	1,606	–
7.625	59.20	5.921	0.812	7.998	–	17.380	13.723	6.440	79.0	39.5	1,098	–	1,510	–	1,716	–
7.625	63.20	5.795	0.875	7.994	–	18.555	14.407	6.440	77.6	38.8	1,152	–	1,584	–	1,800	–
7.625	66.90	5.671	0.937	7.991	–	19.687	15.051	7.380	76.5	38.2	1,205	–	1,657	–	1,883	–
7.625	70.70	5.545	1.000	7.989	–	20.813	15.736	7.380	75.6	37.8	1,259	–	1,730	–	1,967	–
7.750	46.10	6.530	0.595	8.025	–	13.374	10.046	5.750	75.1	37.6	804	–	1,105	–	1,256	–
7.750	48.60	6.405	0.640	8.084	–	14.296	10.934	5.750	76.5	38.2	875	–	1,203	–	1,367	–
8.000	70.80	6.046	0.937	8.386	–	20.791	15.804	7.380	76.0	38.0	1,264	–	1,738	–	1,975	–
8.063	74.20	6.045	0.980	8.450	–	21.807	16.570	7.380	76.0	38.0	1,326	–	1,823	–	2,072	–
8.625	54.00	7.295	0.625	8.884	–	15.708	11.869	5.810	75.6	37.8	950	–	1,306	–	1,485	–
8.625	58.70	7.171	0.687	8.970	–	17.132	13.249	5.810	77.3	38.7	1,060	–	1,457	–	1,656	–
8.625	63.50	7.045	0.750	9.054	–	18.555	14.439	5.810	77.8	38.9	1,155	–	1,588	–	1,804	–
8.625	68.10	6.921	0.812	9.051	–	19.931	15.784	6.500	79.2	39.6	1,262	–	1,736	–	1,973	–
8.625	72.70	6.795	0.875	9.047	–	21.304	16.905	7.380	79.4	39.7	1,353	–	1,860	–	2,114	–
8.625	77.10	6.671	0.937	9.044	–	22.631	17.766	7.380	78.5	39.3	1,421	–	1,954	–	2,221	–
8.625	81.50	6.545	1.000	9.041	–	23.955	18.562	7.380	77.5	38.7	1,485	–	2,042	–	2,320	–
8.625	83.20	6.525	1.025	9.075	–	24.473	18.767	7.380	76.7	38.3	1,502	–	2,065	–	2,346	–
9.625	58.40	8.400	0.595	9.843	–	16.879	11.793	5.810	69.9	34.9	944	–	1,298	–	1,475	–
9.625	59.40	8.327	0.609	9.873	–	17.250	13.033	5.810	75.6	37.8	1,043	–	1,434	–	1,630	–
9.625	61.10	8.295	0.625	9.889	–	17.671	13.440	5.810	76.1	38.0	1,076	–	1,479	–	1,681	–
9.625	64.90	8.201	0.672	9.965	–	18.901	14.620	5.810	77.3	38.7	1,169	–	1,607	–	1,827	–
9.625	70.30	8.077	0.734	10.047	–	20.502	16.017	6.500	78.1	39.1	1,281	–	1,761	–	2,002	–
9.625	71.60	8.045	0.750	10.060	–	20.911	16.410	6.500	78.5	39.2	1,313	–	1,806	–	2,052	–
9.625	75.60	7.951	0.797	10.099	–	22.104	17.558	6.500	79.4	39.7	1,404	–	1,930	–	2,194	–
9.625	80.80	7.827	0.859	10.102	–	23.656	18.779	7.380	79.4	39.7	1,502	–	2,066	–	2,348	–
9.625	86.00	7.701	0.922	10.098	–	25.209	20.213	7.380	80.2	40.1	1,618	–	2,224	–	2,527	–
9.625	91.00	7.577	0.984	10.095	–	26.712	21.093	7.440	79.0	39.5	1,688	–	2,321	–	2,638	–
9.875	62.80	8.565	0.625	10.147	–	18.162	13.655	5.810	75.2	37.6	1,093	–	1,502	–	1,707	–
10.750	73.20	9.326	0.672	11.041	–	21.276	16.264	5.810	76.4	38.2	1,300	–	1,788	–	2,032	–
10.750	75.90	9.270	0.700	11.076	–	22.101	17.066	5.810	77.2	38.6	1,365	–	1,877	–	2,133	–
10.750	79.20	9.202	0.734	11.131	–	23.096	18.021	5.810	78.0	39.0	1,441	–	1,982	–	2,252	–
10.750	80.80	9.170	0.750	11.157	–	23.562	18.366	5.810	77.9	39.0	1,468	–	2,019	–	2,294	–
10.750	85.30	9.076	0.797	11.139	–	24.921	19.474	7.440	78.1	39.1	1,557	–	2,141	–	2,433	–
10.750	91.20	8.952	0.859	11.223	–	26.692	21.184	7.440	79.4	39.7	1,695	–	2,331	–	2,650	–
10.750	97.10	8.826	0.922	11.283	–	28.467	22.257	7.440	78.2	39.1	1,781	–	2,448	–	2,782	–
10.750	102.90	8.702	0.984	11.280	–	30.190	24.257	7.500	80.3	40.2	1,939	–	2,667	–	3,031	–
10.750	104.30	8.670	1.000	11.232	–	30.631	23.140	7.440	75.5	37.8	1,850	–	2,544	–	2,891	–
10.750	108.70	8.576	1.047	11.276	–	31.916	25.602	7.440	80.2	40.1	2,048	–	2,816	–	3,199	–
11.750	87.50	10.202	0.734	12.097	–	25.402	19.647	6.560	77.3	38.7	1,571	–	2,160	–	2,454	–
11.750	94.00	10.076	0.797	12.185	–	27.425	21.580	6.560	78.7	39.3	1,727	–	2,374	–	2,698	–
11.750	100.50	9.952	0.859	12.267	–	29.391	23.313	7.440	79.3	39.7	1,864	–	2,564	–	2,913	–
11.750	107.10	9.826	0.922	12.320	–	31.364	25.209	7.440	80.4	40.2	2,017	–	2,774	–	3,152	–
11.750	111.50	9.780	0.945	12.336	–	32.078	25.536	7.440	79.6	39.8	2,043	–	2,809	–	3,192	–
11.750	113.50	9.702	0.984	12.332	–	33.281	26.713	7.440	80.3	40.1	2,138	–	2,940	–	3,340	–
11.750	119.90	9.576	1.047	12.330	–	35.205	28.590	7.440	81.2	40.6	2,287	–	3,145	–	3,574	–
12.750	94.20	11.202	0.734	13.091	–	27.708	21.370	6.560	77.1	38.6	1,709	–	2,350	–	2,671	–
12.750	101.70	11.076	0.797	13.185	–	29.929	23.510	6.560	78.6	39.3	1,882	–	2,588	–	2,940	–
12.750	109.10	10.952	0.859	13.285	–	32.089	25.584	6.560	79.7	39.9	2,046	–	2,813	–	3,197	–
12.750	116.50	10.826	0.922	13.311	–	34.260	27.153	7.500	79.3	39.6	2,174	–	2,989	–	3,396	–
12.750	123.70	10.702	0.984	13.387	–	36.373	29.182	7.500	80.2	40.1	2,334	–	3,209	–	3,647	–
12.750	130.90	10.576	1.047	13.384	–	38.494	29.689	7.500	77.1	38.6	2,375	–	3,264	–	3,710	–
12.750	137.90	10.452	1.109	13.379	–	40.558	33.085	7.440	81.6	40.8	2,648	–	3,640	–	4,137	–
13.375	92.50	11.951	0.672	13.680	–	26.818	20.267	6.560	75.6	37.8	1,622	–	2,230	–	2,534	–
13.375	100.30	11.827	0.734	13.759	–	29.149	22.510	6.560	77.2	38.6	1,800	–	2,475	–	2,813	–
13.375	108.10	11.701	0.797	13.756	–	31.493	24.425	7.440	77.6	38.8	1,955	–	2,688	–	3,055	–
13.375	115.70	11.577	0.859	13.848	–	33.776	26.622	7.440	78.8	39.4	2,129	–	2,927	–	3,327	–
13.375	123.40	11.451	0.922	13.936	–	36.071	28.522	7.500	79.1	39.5	2,283	–	3,139	–	3,567	–
13.375	130.80	11.327	0.984	13.991	–	38.305	30.668	7.500	80.1	40.0	2,454	–	3,375	–	3,835	–
13.375	138.30	11.201	1.047	14.033	–	40.550	32.662	7.500	80.5	40.3	2,611	–	3,590	–	4,081	–
13.375	145.60	11.077	1.109	14.037	–	42.735	33.936	7.500	79.4	39.7	2,715	–	3,733	–	4,242	–
14.000	99.60	12.520	0.700	14.306	–	29.248	22.109	6.560	75.6	37.8	1,769	–	2,432	–	2,764	–
14.000	104.20	12.452	0.734	14.354	–	30.590	23.397	6.560	76.5	38.2	1,872	–	2,574	–	2,925	–

Continued

TenarisHydril—MACII (cont.)

Diagram p. C-115

Type: Integral swaged, non-upset **Seal: Metal-to-metal**

											L-80		P-110		Q-125	
D	w	d	t	Dc	Dsc	At	Ac	Lm	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
14.000	112.60	12.326	0.797	14.458	–	33.058	25.750	6.560	77.9	38.9	2,060	–	2,832	–	3,219	–
16.000	109.00	14.608	0.656	16.706	–	31.622	20.891	7.560	66.1	33.0	1,672	–	2,299	–	2,613	–
16.000	118.00	14.490	0.715	16.706	–	34.334	25.312	7.560	73.7	36.9	2,025	–	2,784	–	3,163	–
16.000	128.60	14.358	0.781	16.706	–	37.341	28.192	7.560	75.5	37.7	2,255	–	3,102	–	3,524	–
16.000	137.90	14.234	0.843	16.706	–	40.141	30.876	7.560	76.9	38.5	2,469	–	3,396	–	3,859	–
16.000	147.30	14.108	0.906	16.706	–	42.962	33.579	7.560	78.2	39.1	2,688	–	3,696	–	4,199	–

* d refers to connection ID.

TenarisHydril—Wedge 511

Diagram p. C-115

Type: Integral, flush **Seal: None**

											L-80		P-110		Q-125	
D	w	d	t	Dc	Dsc	At	Ac	Lm	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
5.000	15.00	4.317	0.296	5.000	–	4.374	2.654	2.673	60.7	74.9	212	12,800	292	17,700	332	20,000
5.000	18.00	4.185	0.362	5.000	–	5.275	3.311	3.615	62.8	74.5	265	18,300	364	25,000	414	29,000
5.500	15.50	4.860	0.275	5.500	–	4.514	2.727	2.673	60.4	75.5	218	15,800	300	22,000	341	25,000
5.500	17.00	4.802	0.304	5.500	–	4.962	3.021	2.673	60.9	74.6	242	15,700	332	22,000	377	25,000
5.500	20.00	4.688	0.361	5.500	–	5.828	3.636	3.237	62.4	74.0	291	20,000	400	28,000	455	32,000
5.500	32.60	4.160	0.625	5.500	–	9.572	6.297	4.784	65.8	75.3	504	30,000	693	42,000	787	47,000
5.750	18.00	5.036	0.312	5.750	–	5.330	3.196	2.673	60.0	73.3	255	17,200	351	24,000	399	27,000
5.750	21.80	4.910	0.375	5.750	–	6.332	3.885	3.704	61.4	74.4	311	29,000	428	40,000	486	45,000
5.750	24.20	4.820	0.420	5.750	–	7.033	4.202	3.704	59.8	71.4	336	28,000	462	39,000	525	44,000
6.000	20.00	5.263	0.324	6.000	–	5.777	3.515	3.035	60.8	73.5	281	22,000	387	30,000	439	34,000
6.000	23.00	5.151	0.380	6.000	–	6.709	4.026	3.098	60.0	73.1	322	25,000	443	34,000	504	39,000
6.625	24.00	5.832	0.352	6.625	–	6.937	4.393	3.615	63.3	75.0	351	34,000	483	46,000	549	52,000
6.625	28.00	5.702	0.417	6.625	–	8.133	4.871	3.704	59.9	71.5	390	38,000	536	53,000	609	60,000
7.000	23.00	6.286	0.317	7.000	–	6.655	4.045	3.035	60.8	73.7	323	30,000	445	41,000	506	47,000
7.000	26.00	6.187	0.362	7.000	–	7.549	4.595	3.704	60.9	74.2	368	44,000	505	60,000	575	68,000
7.000	29.00	6.161	0.408	7.000	–	8.449	4.488	3.690	53.1	65.3	359	43,000	493	59,000	561	67,000
7.625	26.40	6.881	0.328	7.625	–	7.519	4.633	3.035	61.6	74.0	371	36,000	510	49,000	579	56,000
7.625	29.70	6.787	0.375	7.625	–	8.541	5.218	3.704	61.1	73.8	417	52,000	574	72,000	652	82,000
7.625	33.70	6.677	0.430	7.625	–	9.720	5.841	4.138	60.1	73.1	468	59,000	642	81,000	730	92,000
7.625	51.20	6.163	0.687	7.625	–	14.974	9.411	5.597	62.8	74.4	753	83,000	1,035	114,000	1,176	129,000
8.000	31.00	7.168	0.375	8.000	–	8.983	5.525	3.704	61.5	74.1	442	58,000	608	80,000	691	91,000
8.125	32.50	7.293	0.375	8.125	–	9.130	5.581	3.704	61.1	73.7	446	60,000	614	82,000	697	94,000
8.125	35.50	7.203	0.420	8.125	–	10.167	6.199	3.690	61.0	72.5	496	59,000	682	81,000	775	92,000
8.125	39.50	7.103	0.470	8.125	–	11.303	6.741	4.138	59.6	71.4	539	67,000	741	92,000	843	105,000
8.625	32.00	7.918	0.352	8.625	–	9.149	5.242	3.237	57.3	68.8	419	53,000	576	73,000	655	82,000
8.625	36.00	7.743	0.400	8.625	–	10.336	6.348	3.690	61.4	73.6	508	67,000	698	93,000	793	105,000
8.625	40.00	7.668	0.450	8.625	–	11.557	6.777	4.138	58.6	70.9	542	77,000	745	105,000	847	120,000
9.000	40.00	8.069	0.425	9.000	–	11.449	7.120	3.690	62.2	73.5	570	73,000	783	101,000	890	115,000
9.625	40.00	8.794	0.395	9.625	–	11.454	6.824	3.704	59.6	71.4	546	86,000	751	118,000	853	134,000
9.625	43.50	8.669	0.435	9.625	–	12.559	7.849	3.690	62.5	73.6	628	84,000	863	116,000	981	132,000
9.625	47.00	8.569	0.472	9.625	–	13.572	8.306	4.138	61.2	72.8	665	95,000	914	131,000	1,039	149,000
10.750	45.50	9.922	0.400	10.750	–	13.006	7.671	3.704	59.0	70.6	613	108,000	844	148,000	959	168,000
10.750	51.00	9.741	0.450	10.750	–	14.561	9.159	4.138	62.9	74.9	733	121,000	1,008	167,000	1,145	189,000
10.750	55.00	9.672	0.495	10.750	–	15.947	9.629	4.138	60.4	71.3	770	120,000	1,059	165,000	1,203	188,000
10.750	60.70	9.551	0.545	10.750	–	17.473	11.258	4.965	64.4	75.6	901	144,000	1,238	197,000	1,407	224,000
10.750	65.70	9.547	0.595	10.750	–	18.982	11.318	4.965	59.6	69.9	906	144,000	1,245	197,000	1,415	224,000
11.500	51.00	10.650	0.425	11.500	–	14.787	7.899	3.704	53.4	64.3	632	123,000	869	169,000	987	192,000
11.750	60.00	10.674	0.489	11.750	–	17.300	10.499	4.647	60.7	74.0	840	172,000	1,155	237,000	1,312	269,000
11.750	65.00	10.674	0.534	11.750	–	18.816	10.499	4.647	55.8	68.0	840	172,000	1,155	237,000	1,312	269,000
11.875	58.80	10.926	0.470	11.875	–	16.840	9.356	4.138	55.6	66.7	748	149,000	1,029	205,000	1,169	233,000
11.875	71.80	10.675	0.582	11.875	–	20.648	12.658	4.965	61.3	71.5	1,013	177,000	1,392	243,000	1,582	277,000
16.000	84.00	14.881	0.495	16.000	–	24.112	15.812	4.223	65.6	76.9	1,265	268,000	1,739	369,000	1,976	419,000
16.000	95.00	14.807	0.566	16.000	–	27.444	17.416	4.965	63.5	73.6	1,394	330,000	1,916	454,000	2,177	516,000
16.000	96.00	14.807	0.575	16.000	–	27.864	17.416	4.965	62.5	72.5	1,393	330,000	1,916	454,000	2,177	516,000
16.000	102.90	14.621	0.625	16.000	–	30.189	19.186	5.597	63.6	75.1	1,535	401,000	2,111	551,000	2,399	626,000
16.000	109.00	14.559	0.656	16.000	–	31.622	20.608	5.597	65.2	76.2	1,649	401,000	2,267	551,000	2,576	626,000
18.000	105.00	16.751	0.562	18.000	–	30.788	17.864	4.647	58.0	69.0	1,429	410,000	1,965	564,000	2,233	641,000
18.000	117.00	16.625	0.625	18.000	–	34.116	21.195	5.597	62.1	73.6	1,695	512,000	2,332	703,000	2,649	799,000
18.000	119.00	16.595	0.640	18.000	–	34.904	21.979	5.597	63.0	74.2	1,758	512,000	2,417	703,000	2,747	799,000
18.000	126.00	16.563	0.677	18.000	–	36.844	22.813	5.597	61.9	72.6	1,825	512,000	2,509	703,000	2,851	799,000
18.000	128.00	16.563	0.688	18.000	–	37.418	22.813	5.597	61.0	71.5	1,825	512,000	2,509	703,000	2,851	799,000
18.000	162.00	16.125	0.875	18.000	–	47.075	30.884	5.876	65.6	73.8	2,471	454,000	3,397	624,000	3,860	709,000
18.625	123.40	17.254	0.625	18.625	–	35.343	22.801	5.597	64.5	75.7	1,824	550,000	2,508	757,000	2,850	860,000
18.625	136.00	17.118	0.693	18.625	–	39.040	25.283	5.597	64.8	74.9	2,023	548,000	2,781	753,000	3,160	856,000
18.625	139.00	17.064	0.720	18.625	–	40.500	25.563	5.597	63.1	75.5	2,045	548,000	2,812	753,000	3,196	856,000

* d refers to connection ID.
** Yield torque values refers to a structural limit of the connection.

TenarisHydril—Wedge 513

Diagram p. C-115

Type: Integral, flush **Seal: Metal-to-metal**

											L-80		P-110		Q-125	
D	w	d	t	Dc	Dsc	At	Ac	Lm	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
5.000	15.00	4.327	0.296	5.000	–	4.374	2.629	3.750	60.1	72.4	210	20,000	289	26,000	329	29,000
5.000	18.00	4.194	0.362	5.000	–	5.275	3.360	4.320	63.7	73.7	269	23,000	369	29,000	420	33,000
5.000	20.30	4.103	0.408	5.000	–	5.886	3.567	4.390	60.6	71.2	285	26,000	392	33,000	446	37,000
5.000	21.40	4.045	0.437	5.000	–	6.264	3.915	4.390	62.5	72.8	313	26,000	431	34,000	489	38,000
5.000	23.20	3.963	0.478	5.000	–	6.791	4.251	4.020	62.6	71.7	340	22,000	468	27,000	531	30,000
5.000	24.10	3.919	0.500	5.000	–	7.069	4.369	4.020	61.8	70.7	349	22,000	481	28,000	546	31,000
5.000	26.70	3.795	0.562	5.000	–	7.836	5.031	4.660	64.2	72.1	403	28,000	553	35,000	629	39,000
5.500	17.00	4.813	0.304	5.500	–	4.962	3.116	3.780	62.8	74.4	249	24,000	343	31,000	389	35,000
5.500	20.00	4.698	0.361	5.500	–	5.828	3.718	4.350	63.8	73.9	297	27,000	409	35,000	465	39,000
5.500	23.00	4.590	0.415	5.500	–	6.630	4.210	4.420	63.5	74.1	337	31,000	463	41,000	526	45,000
5.500	26.00	4.468	0.476	5.500	–	7.513	4.771	4.050	63.5	72.8	382	26,000	525	33,000	596	37,000
7.000	26.00	6.199	0.362	7.000	–	7.549	4.711	4.360	62.4	72.3	377	42,000	518	56,000	589	63,000

Continued

TenarisHydril—Wedge 513 (cont.)

Diagram p. C-115

Type: Integral, flush Seal: Metal-to-metal

											L-80		P-110		Q-125	
D	w	d	t	Dc	Dsc	At	Ac	Lm	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
7.000	29.00	6.093	0.408	7.000	–	8.449	5.196	4.070	61.5	75.8	416	35,000	571	46,000	649	52,000
7.000	32.00	6.034	0.453	7.000	–	9.317	5.935	4.700	63.7	76.7	475	46,000	653	60,000	742	68,000
7.000	35.00	5.913	0.498	7.000	–	10.172	6.286	4.650	61.8	73.6	503	46,000	692	61,000	786	68,000
7.000	38.00	5.829	0.540	7.000	–	10.959	6.893	5.460	62.9	75.4	552	59,000	759	77,000	862	86,000
7.625	29.70	6.800	0.375	7.625	–	8.541	5.125	4.420	60.0	75.2	410	53,000	564	70,000	641	79,000
7.625	33.70	6.675	0.430	7.625	–	9.720	5.813	4.060	59.8	73.4	465	42,000	639	55,000	727	62,000
7.625	39.00	6.535	0.500	7.625	–	11.192	6.939	4.690	62.0	73.8	555	54,000	763	72,000	867	80,000
7.625	42.80	6.411	0.562	7.625	–	12.470	8.168	5.510	65.5	77.4	654	69,000	899	91,000	1,021	101,000
7.625	45.30	6.345	0.595	7.625	–	13.141	8.161	5.510	62.1	73.4	653	70,000	897	91,000	1,020	102,000
7.625	47.10	6.285	0.625	7.625	–	13.744	8.164	5.510	59.4	70.2	653	70,000	898	92,000	1,020	103,000
7.750	46.10	6.535	0.595	7.750	–	13.374	8.131	5.490	60.8	72.2	651	72,000	894	94,000	1,017	106,000
8.625	40.00	7.665	0.450	8.625	–	11.557	7.154	4.730	61.9	75.2	573	68,000	787	91,000	894	103,000
9.375	39.00	8.540	0.400	9.375	–	11.278	6.643	4.470	58.9	73.2	531	77,000	731	104,000	830	118,000
9.625	47.00	8.566	0.472	9.625	–	13.572	8.374	4.750	61.7	74.3	670	85,000	921	113,000	1,047	127,000
9.625	53.50	8.541	0.545	9.625	–	15.546	9.405	5.560	60.5	72.9	753	108,000	1,035	144,000	1,176	162,000
9.625	58.40	8.320	0.595	9.625	–	16.879	10.617	5.560	62.9	74.3	849	108,000	1,168	144,000	1,327	161,000
9.875	62.80	8.541	0.625	9.875	–	18.162	11.369	5.560	62.6	73.4	910	113,000	1,251	151,000	1,421	170,000
9.875	65.10	8.541	0.650	9.875	–	18.838	11.378	5.560	60.4	70.8	910	113,000	1,251	151,000	1,422	170,000
10.000	68.42	8.541	0.688	10.000	–	20.127	12.821	5.560	63.7	73.5	1,026	115,000	1,410	152,000	1,603	171,000
10.000	68.80	8.541	0.700	10.000	–	20.452	12.823	5.560	62.7	72.3	1,026	115,000	1,411	152,000	1,603	171,000
10.125	79.29	8.541	0.795	10.125	–	23.302	14.144	6.420	60.7	72.1	1,131	144,000	1,556	190,000	1,768	214,000
10.750	55.50	9.665	0.495	10.750	–	15.947	9.712	4.750	60.9	73.2	777	105,000	1,068	141,000	1,214	159,000
10.750	60.70	9.546	0.545	10.750	–	17.473	11.602	5.540	66.4	79.0	928	135,000	1,276	181,000	1,450	203,000
10.750	65.70	9.542	0.595	10.750	–	18.982	11.598	5.540	61.1	72.7	928	136,000	1,276	181,000	1,450	203,000
11.750	60.00	10.666	0.489	11.750	–	17.300	11.366	4.790	65.7	78.1	909	125,000	1,250	168,000	1,420	189,000
11.750	65.00	10.666	0.534	11.750	–	18.816	11.365	4.790	60.4	71.8	909	125,000	1,250	168,000	1,421	189,000
11.875	71.80	10.665	0.582	11.875	–	20.648	12.760	5.870	61.8	74.5	1,021	174,000	1,403	235,000	1,595	266,000
12.750	88.00	11.291	0.672	12.750	–	25.498	15.987	5.690	62.7	73.0	1,279	186,000	1,759	249,000	1,998	281,000
13.375	68.00	12.303	0.480	13.375	–	19.445	12.348	4.940	63.5	75.9	988	162,000	1,358	218,000	1,544	246,000
13.375	72.00	12.294	0.514	13.375	–	20.768	12.897	4.940	62.1	73.7	1,031	162,000	1,418	218,000	1,612	246,000
13.625	88.20	12.295	0.625	13.625	–	25.525	15.341	6.440	60.1	74.5	1,227	288,000	1,688	388,000	1,918	438,000
14.000	99.60	12.456	0.700	14.000	–	29.248	18.543	6.580	63.4	76.5	1,484	272,000	2,040	366,000	2,318	412,000
14.000	104.20	12.388	0.734	14.000	–	30.590	18.538	6.580	60.6	73.1	1,483	273,000	2,039	366,000	2,317	413,000
14.000	112.60	12.293	0.797	14.000	–	33.058	20.694	6.620	62.6	74.1	1,656	271,000	2,276	363,000	2,587	409,000
14.000	113.00	12.293	0.800	14.000	–	33.175	21.332	6.620	64.3	75.8	1,707	271,000	2,346	363,000	2,667	409,000
14.000	115.00	12.293	0.812	14.000	–	33.642	21.329	6.620	63.4	74.7	1,706	271,000	2,346	363,000	2,666	409,000
14.000	116.00	12.293	0.820	14.000	–	33.953	21.322	6.620	62.8	74.0	1,706	271,000	2,346	363,000	2,665	409,000
16.000	95.00	14.793	0.566	16.000	–	27.444	17.454	6.020	63.6	76.7	1,397	319,000	1,920	433,000	2,181	489,000
16.000	96.00	14.793	0.575	16.000	–	27.864	17.443	6.020	62.6	75.5	1,395	319,000	1,919	433,000	2,180	489,000
16.000	102.90	14.605	0.625	16.000	–	30.189	18.959	5.860	62.8	73.9	1,517	293,000	2,086	395,000	2,370	446,000
16.000	109.00	14.643	0.656	16.000	–	31.622	19.795	5.860	62.6	73.2	1,584	292,000	2,177	395,000	2,475	446,000

* d refers to connection ID.
** Yield torque values refers to a structural limit of the connection.

TenarisHydril—Wedge 521

Diagram p. C-115

Type: Integral swaged, non-upset Seal: None

											L-80		P-110		Q-125	
D	w	d	t	Dc	Dsc	At	Ac	Lm	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
5.000	13.00	4.444	0.253	5.185	–	3.773	2.431	3.620	64.4	84.3	195	18,900	267	26,000	304	30,000
5.000	15.00	4.358	0.296	5.255	–	4.374	3.014	3.620	68.9	86.8	241	18,900	331	26,000	377	30,000
5.000	18.00	4.226	0.362	5.359	–	5.275	3.891	3.620	73.8	88.7	311	18,900	428	26,000	486	30,000
5.500	14.00	4.947	0.244	5.660	–	4.029	2.552	3.620	63.3	83.5	204	23,000	281	32,000	319	36,000
5.500	15.50	4.900	0.275	5.713	–	4.514	3.022	3.620	67.0	85.7	242	23,000	333	32,000	378	36,000
5.500	17.00	4.842	0.304	5.761	–	4.962	3.453	3.620	69.6	87.0	276	23,000	380	32,000	431	36,000
5.500	20.00	4.728	0.361	5.852	–	5.828	4.300	3.620	73.8	88.7	344	23,000	473	32,000	538	36,000
5.500	23.00	4.620	0.415	5.936	–	6.630	5.069	3.620	76.5	89.6	405	23,000	557	32,000	634	36,000
6.625	20.00	5.999	0.288	6.818	–	5.734	3.755	3.700	65.5	86.0	301	40,000	413	55,000	470	62,000
6.625	24.00	5.871	0.352	6.925	–	6.937	4.924	3.700	71.0	88.3	394	40,000	542	55,000	615	62,000
6.625	28.00	5.741	0.417	7.029	–	8.133	6.079	3.700	74.7	89.5	487	40,000	669	55,000	760	62,000
6.625	32.00	5.625	0.475	7.120	–	9.177	7.097	3.700	77.3	90.4	568	40,000	781	55,000	887	62,000
7.000	20.00	6.381	0.272	7.148	–	5.749	3.629	3.700	63.1	84.4	290	44,000	399	61,000	454	69,000
7.000	23.00	6.291	0.317	7.225	–	6.655	4.507	3.700	67.7	86.8	360	44,000	496	61,000	563	69,000
7.000	26.00	6.201	0.362	7.300	–	7.549	5.373	3.700	71.2	88.0	430	44,000	591	61,000	672	69,000
7.000	29.00	6.165	0.408	7.375	–	8.449	6.248	3.700	73.9	89.0	500	44,000	687	61,000	781	69,000
7.000	32.00	6.050	0.453	7.447	–	9.317	7.086	3.700	76.0	89.7	567	44,000	779	61,000	886	69,000
7.625	26.40	6.894	0.328	7.868	–	7.519	5.088	3.700	67.7	85.8	407	53,000	560	73,000	636	83,000
7.625	29.70	6.800	0.375	7.947	–	8.541	6.080	3.700	71.2	87.5	486	53,000	669	73,000	760	83,000
7.625	33.70	6.690	0.430	8.037	–	9.720	7.220	3.700	74.3	88.6	578	53,000	794	73,000	902	83,000
7.625	39.00	6.550	0.500	8.148	–	11.192	8.650	3.700	77.3	89.7	692	53,000	951	73,000	1,081	83,000
7.625	51.20	6.176	0.687	8.080	–	14.974	11.672	4.970	77.9	89.3	934	71,000	1,284	98,000	1,459	111,000
7.625	52.80	6.126	0.712	8.080	–	15.463	11.672	4.970	75.5	88.8	934	71,000	1,284	98,000	1,459	111,000
8.625	32.00	7.924	0.352	8.889	–	9.149	6.234	3.700	68.1	83.9	499	68,000	685	93,000	779	106,000
8.625	36.00	7.750	0.400	8.970	–	10.336	7.384	3.700	71.4	86.7	591	68,000	812	93,000	923	106,000
8.625	40.00	7.674	0.450	9.053	–	11.557	8.572	3.700	74.2	87.8	686	68,000	943	93,000	1,072	106,000
8.625	44.00	7.550	0.500	9.134	–	12.763	9.744	3.700	76.4	88.7	780	68,000	1,072	93,000	1,218	106,000
9.625	36.00	8.846	0.352	9.883	–	10.254	6.841	3.700	66.7	83.7	547	85,000	752	117,000	855	133,000
9.625	40.00	8.799	0.395	9.957	–	11.454	8.012	3.700	70.0	85.4	641	85,000	881	117,000	1,002	133,000
9.625	43.50	8.680	0.435	10.025	–	12.559	9.083	3.700	72.3	86.4	727	85,000	999	117,000	1,135	133,000
9.625	47.00	8.606	0.472	10.087	–	13.572	10.052	3.700	74.1	87.1	804	85,000	1,106	117,000	1,257	133,000
9.625	53.50	8.535	0.545	10.206	–	15.546	11.976	3.700	77.0	88.4	958	85,000	1,317	117,000	1,497	133,000
10.750	40.50	9.975	0.350	10.863	–	11.435	7.231	4.140	63.2	78.1	579	120,000	795	166,000	904	188,000
10.750	45.50	9.926	0.400	10.950	–	13.006	8.651	4.140	66.5	78.9	692	120,000	952	166,000	1,082	188,000
10.750	51.00	9.775	0.450	11.037	–	14.561	10.247	4.140	70.4	82.1	820	120,000	1,127	166,000	1,281	188,000
10.750	55.50	9.685	0.495	11.010	–	15.947	11.463	4.970	71.9	84.5	917	145,000	1,261	199,000	1,433	226,000
10.750	60.70	9.585	0.545	11.094	–	17.473	12.937	4.970	74.0	85.6	1,035	145,000	1,423	199,000	1,617	226,000
10.750	65.70	9.551	0.595	11.177	–	18.982	14.370	4.970	75.7	85.3	1,150	145,000	1,581	199,000	1,796	226,000
11.750	47.00	10.925	0.375	11.892	–	13.401	8.577	4.140	64.0	78.3	686	145,000	943	199,000	1,072	226,000
11.750	54.00	10.805	0.435	11.998	–	15.463	10.586	4.140	68.5	80.7	847	145,000	1,165	199,000	1,323	226,000
11.750	60.00	10.687	0.489	11.928	–	17.300	12.205	4.970	70.6	82.5	976	173,000	1,343	238,000	1,525	270,000
11.750	65.00	10.676	0.534	11.965	–	18.816	13.198	4.970	70.1	80.8	1,056	173,000	1,452	238,000	1,650	270,000
11.750	71.00	10.501	0.582	12.125	–	20.420	15.235	4.970	74.6	84.7	1,219	173,000	1,676	238,000	1,904	270,000
11.750	73.60	10.447	0.609	12.170	–	21.315	16.103	4.970	75.5	85.2	1,288	173,000	1,772	238,000	2,013	270,000
11.750	80.50	10.321	0.672	12.274	–	23.387	18.097	4.970	77.4	86.2	1,448	173,000	1,991	238,000	2,262	270,000
11.875	71.80	10.676	0.582	12.269	–	20.648	15.353	4.970	74.4	85.8	1,228	178,000	1,689	244,000	1,919	278,000

Continued

TenarisHydril—Wedge 521 (cont.)

Diagram p. C-115

Type: Integral swaged, non-upset **Seal: None**

											L-80		P-110		Q-125	
D	w	d	t	Dc	Dsc	At	Ac	Lm	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
13.375	54.50	12.540	0.380	13.531	–	15.513	9.461	4.650	61.0	81.9	757	226,000	1,040	311,000	1,183	354,000
13.375	61.00	12.440	0.430	13.620	–	17.487	11.362	4.650	65.0	83.8	909	226,000	1,250	311,000	1,420	354,000
13.375	68.00	12.340	0.480	13.707	–	19.445	13.254	4.650	68.2	85.1	1,061	226,000	1,458	311,000	1,657	354,000
13.375	72.00	12.317	0.514	13.766	–	20.768	14.537	4.650	70.0	85.8	1,163	226,000	1,599	311,000	1,817	354,000
13.375	77.00	12.200	0.550	13.686	–	22.160	15.587	5.600	70.3	85.7	1,247	280,000	1,715	385,000	1,948	438,000
13.375	80.70	12.140	0.580	13.738	–	23.314	16.693	5.600	71.6	86.2	1,335	280,000	1,837	385,000	2,086	438,000
13.375	85.00	12.084	0.608	13.785	–	24.386	17.740	5.600	72.7	86.6	1,419	280,000	1,951	385,000	2,217	438,000
13.375	86.00	12.050	0.625	13.814	–	25.035	18.361	5.600	73.3	86.9	1,469	280,000	2,020	385,000	2,295	438,000
13.500	81.40	12.315	0.580	13.940	–	23.542	16.793	5.600	71.3	87.3	1,343	291,000	1,848	400,000	2,099	455,000
13.625	88.20	12.305	0.625	13.940	–	25.525	18.708	5.600	73.3	86.9	1,497	291,000	2,058	400,000	2,339	455,000
15.000	77.50	13.875	0.500	15.149	–	22.777	15.041	4.650	66.0	78.0	1,203	279,000	1,654	384,000	1,880	436,000
16.000	65.00	15.122	0.375	16.125	–	18.408	11.137	4.650	60.5	77.6	891	324,000	1,225	446,000	1,392	507,000
16.000	75.00	15.049	0.438	16.155	–	21.414	14.058	4.650	65.6	80.3	1,125	324,000	1,546	446,000	1,757	507,000
16.000	84.00	14.935	0.495	16.257	–	24.112	16.644	4.650	69.0	82.2	1,332	324,000	1,831	446,000	2,080	507,000
16.000	84.80	14.925	0.500	16.266	–	24.347	16.873	4.650	69.3	82.2	1,350	324,000	1,856	446,000	2,109	507,000
16.000	94.50	14.809	0.562	16.412	–	27.257	19.707	4.650	72.3	83.8	1,577	324,000	2,168	446,000	2,463	507,000
16.000	95.00	14.809	0.566	16.397	–	27.444	19.886	4.650	72.5	83.9	1,591	324,000	2,188	446,000	2,485	507,000
16.000	96.00	14.809	0.575	16.397	–	27.864	20.296	4.650	72.8	84.1	1,624	324,000	2,233	446,000	2,537	507,000
16.000	109.00	14.613	0.656	16.465	–	31.622	23.487	5.600	74.3	88.4	1,879	324,000	2,583	446,000	2,936	507,000
16.000	118.00	14.495	0.715	16.566	–	34.334	26.116	5.600	76.1	89.1	2,090	407,000	2,873	559,000	3,265	635,000
16.125	95.60	14.864	0.566	16.427	–	27.666	19.645	4.650	71.0	81.5	1,571	407,000	2,161	559,000	2,455	635,000
17.000	77.50	16.067	0.438	17.197	–	22.790	14.950	4.650	65.6	80.7	1,196	366,000	1,645	504,000	1,869	572,000
17.000	88.10	15.925	0.500	17.308	–	25.918	17.967	4.650	69.3	82.6	1,437	366,000	1,976	504,000	2,246	572,000
17.000	111.60	15.675	0.625	17.527	–	32.152	24.004	4.650	74.7	85.3	1,920	366,000	2,641	504,000	3,000	572,000
17.000	151.00	15.175	0.875	17.673	–	44.326	34.664	5.880	78.2	86.0	2,773	407,000	3,813	560,000	4,333	636,000
17.875	93.50	16.843	0.500	18.000	–	27.293	17.254	4.650	63.2	79.3	1,380	403,000	1,898	555,000	2,157	630,000
17.875	105.00	16.628	0.562	18.000	–	30.567	19.942	5.600	65.2	77.4	1,595	500,000	2,193	688,000	2,493	782,000
17.875	121.00	16.565	0.650	18.020	–	35.174	22.815	5.600	64.9	75.5	1,825	500,000	2,510	688,000	2,852	782,000
18.000	94.00	16.883	0.500	18.060	–	27.489	17.699	4.650	64.4	75.4	1,416	403,000	1,947	555,000	2,212	630,000
18.000	105.00	16.759	0.562	18.135	–	30.788	20.978	4.650	68.1	78.0	1,678	403,000	2,308	555,000	2,623	630,000
18.625	87.50	17.638	0.435	18.854	–	24.858	16.223	4.650	65.3	83.1	1,298	442,000	1,784	608,000	2,028	691,000
18.625	94.50	17.588	0.460	18.899	–	26.251	17.580	4.650	67.0	84.0	1,406	442,000	1,934	608,000	2,197	691,000
18.625	97.70	17.571	0.486	18.946	–	27.695	18.969	4.650	68.5	85.0	1,518	442,000	2,086	608,000	2,371	691,000
18.625	100.00	17.571	0.500	18.971	–	28.471	19.709	4.650	69.2	85.4	1,577	442,000	2,168	608,000	2,464	691,000
18.625	101.00	17.571	0.510	18.989	–	29.024	20.243	4.650	69.7	85.7	1,619	442,000	2,227	608,000	2,530	691,000
18.625	109.35	17.387	0.563	18.948	–	31.947	22.588	5.600	70.7	86.9	1,807	551,000	2,485	757,000	2,823	861,000
18.625	112.00	17.355	0.579	18.976	–	32.825	23.445	5.600	71.4	87.3	1,876	551,000	2,579	757,000	2,930	861,000

* d refers to connection ID.
** Yield torque values refers to a structural limit of the connection.

TenarisHydril—Wedge 523

Diagram p. C-115

Type: Integral swaged, non-upset **Seal: Metal-to-metal**

											L-80		P-110		Q-125	
D	w	d	t	Dc	Dsc	At	Ac	Lm	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
7.000	29.00	6.093	0.408	7.129	–	8.449	6.041	4.070	71.5	81.9	483	40,000	664	53,000	755	59,000
7.000	32.00	6.034	0.453	7.153	–	9.317	6.811	4.700	73.1	82.6	545	51,000	749	67,000	852	75,000
7.000	35.00	5.913	0.498	7.168	–	10.172	7.558	4.650	74.3	83.1	605	52,000	831	68,000	945	76,000
7.000	38.00	5.829	0.540	7.182	–	10.959	8.143	5.460	74.3	86.4	652	66,000	896	86,000	1,018	96,000
7.625	29.70	6.800	0.375	7.752	–	8.541	6.021	4.420	70.5	81.7	482	58,000	663	78,000	753	87,000
7.625	33.70	6.675	0.430	7.775	–	9.720	7.057	4.060	72.6	82.4	565	48,000	776	63,000	882	70,000
7.625	39.00	6.535	0.500	7.787	–	11.192	8.327	4.690	74.4	82.9	666	61,000	916	80,000	1,041	89,000
7.625	42.80	6.411	0.562	7.787	–	12.470	9.078	5.510	72.8	81.8	727	76,000	999	100,000	1,135	112,000
7.625	45.30	6.345	0.595	7.811	–	13.141	9.737	5.510	74.1	82.6	779	77,000	1,071	101,000	1,217	113,000
7.625	47.10	6.285	0.625	7.811	–	13.744	9.854	5.510	71.7	79.9	789	78,000	1,084	102,000	1,232	113,000
7.750	46.10	6.535	0.595	7.937	–	13.374	9.616	5.490	71.9	80.5	769	79,000	1,058	104,000	1,202	117,000
8.625	40.00	7.665	0.450	8.773	–	11.557	8.229	4.730	71.2	80.6	659	76,000	905	102,000	1,029	114,000
9.625	47.00	8.566	0.472	9.784	–	13.572	9.948	4.750	73.3	82.0	796	94,000	1,094	126,000	1,244	141,000
9.625	53.50	8.541	0.545	9.834	–	15.546	11.457	5.560	73.7	82.8	917	119,000	1,260	159,000	1,432	179,000
9.625	58.40	8.320	0.595	9.830	–	16.879	12.828	5.560	76.0	84.3	1,026	119,000	1,411	158,000	1,604	178,000
9.875	62.80	8.541	0.625	10.087	–	18.162	13.458	5.560	74.1	82.1	1,077	125,000	1,481	166,000	1,682	187,000
9.875	65.10	8.541	0.650	10.087	–	18.838	13.450	5.560	71.4	79.2	1,076	125,000	1,479	166,000	1,681	187,000
10.000	68.42	8.541	0.688	10.150	–	20.127	13.465	5.560	66.9	74.1	1,077	126,000	1,481	167,000	1,683	188,000
10.000	68.80	8.541	0.700	10.175	–	20.452	13.478	5.560	65.9	72.9	1,078	126,000	1,483	167,000	1,684	188,000
10.125	79.29	8.541	0.795	10.340	–	23.302	16.311	6.420	70.0	79.2	1,305	161,000	1,794	213,000	2,039	239,000
10.750	55.50	9.665	0.495	10.922	–	15.947	11.211	4.750	70.3	78.8	897	117,000	1,233	156,000	1,401	176,000
10.750	60.70	9.546	0.545	10.931	–	17.473	12.371	5.540	70.8	83.4	990	149,000	1,361	198,000	1,546	223,000
10.750	65.70	9.542	0.595	10.966	–	18.982	13.800	5.540	72.7	80.7	1,104	149,000	1,518	199,000	1,725	224,000
11.750	60.00	10.666	0.489	11.928	–	17.300	12.283	4.790	71.0	83.2	983	138,000	1,351	186,000	1,535	209,000
11.750	65.00	10.666	0.534	11.965	–	18.816	13.435	4.790	71.4	79.0	1,075	138,000	1,478	186,000	1,679	210,000
11.875	71.80	10.665	0.582	12.072	–	20.648	14.660	5.870	71.0	80.9	1,173	192,000	1,612	259,000	1,833	293,000
12.750	88.00	11.291	0.672	13.000	–	25.498	19.022	5.690	74.6	82.2	1,522	205,000	2,093	275,000	2,378	310,000
13.375	68.00	12.303	0.480	13.564	–	19.445	13.456	4.940	69.2	81.9	1,077	179,000	1,480	241,000	1,682	272,000
13.375	72.00	12.294	0.514	13.602	–	20.768	14.849	4.940	71.5	82.3	1,188	179,000	1,633	241,000	1,856	272,000
13.625	88.20	12.295	0.625	13.875	–	25.525	18.250	6.440	71.5	83.4	1,460	317,000	2,008	427,000	2,282	481,000
14.000	99.60	12.456	0.700	14.234	–	29.248	20.912	6.580	71.5	84.6	1,673	305,000	2,300	409,000	2,614	461,000
14.000	104.20	12.388	0.734	14.241	–	30.590	22.117	6.580	72.3	82.1	1,769	306,000	2,433	410,000	2,765	462,000
14.000	112.60	12.293	0.797	14.253	–	33.058	24.430	6.620	73.9	82.9	1,955	303,000	2,687	406,000	3,054	457,000
14.000	113.00	12.293	0.800	14.253	–	33.175	24.483	6.620	73.8	82.7	1,959	303,000	2,693	406,000	3,060	457,000
14.000	115.00	12.293	0.812	14.253	–	33.642	24.424	6.620	72.6	81.4	1,954	303,000	2,687	406,000	3,053	457,000
14.000	116.00	12.293	0.820	14.253	–	33.953	24.480	6.620	72.1	80.8	1,958	303,000	2,693	406,000	3,060	457,000
16.000	95.00	14.793	0.566	16.224	–	27.444	19.375	6.020	70.6	82.5	1,550	350,000	2,131	474,000	2,422	537,000
16.000	96.00	14.793	0.575	16.226	–	27.864	19.839	6.020	71.2	81.4	1,587	350,000	2,182	475,000	2,480	537,000
16.000	102.90	14.605	0.625	16.235	–	30.189	22.310	5.860	73.9	82.6	1,785	321,000	2,454	433,000	2,789	490,000
16.000	109.00	14.643	0.656	16.241	–	31.622	22.831	5.860	72.2	79.5	1,827	320,000	2,511	433,000	2,854	489,000

* d refers to connection ID.
** Yield torque values refers to a structural limit of the connection.

TenarisHydril—Wedge 563

Diagram p. C-115

Type: Threaded and coupled **Seal: Metal-to-metal**

											L-80		P-110		Q-125	
D	w	d	t	Dc	Dsc	At	Ac	Lm	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
5.000	13.00	4.444	0.253	5.563	–	3.773	–	3.990	95.8	100.0	289	17,900	398	25,000	452	28,000
5.000	15.00	4.358	0.296	5.563	–	4.374	–	3.990	100.0	100.0	350	17,900	481	25,000	547	28,000
5.000	18.00	4.276	0.362	5.563	–	5.275	–	3.990	100.0	100.0	422	17,900	580	25,000	659	28,000
5.000	21.40	4.076	0.437	5.750	–	6.264	–	5.360	95.9	100.0	480	28,000	661	39,000	751	44,000
5.000	23.20	4.044	0.478	5.750	–	6.791	–	5.360	100.0	100.0	543	28,000	747	39,000	849	44,000
5.000	24.10	4.000	0.500	5.750	–	7.069	–	5.360	100.0	100.0	565	28,000	778	39,000	884	44,000
5.000	26.70	3.876	0.562	5.750	–	7.836	–	5.360	100.0	100.0	627	28,000	862	39,000	979	44,000
5.500	14.00	4.962	0.244	6.050	–	4.029	–	3.990	95.4	100.0	307	22,000	423	30,000	481	34,000
5.500	15.50	4.900	0.275	6.050	–	4.514	–	3.990	100.0	100.0	361	22,000	497	30,000	564	34,000
5.500	17.00	4.842	0.304	6.050	–	4.962	–	3.990	100.0	100.0	397	22,000	546	30,000	620	34,000
5.500	20.00	4.778	0.361	6.050	–	5.828	–	3.990	100.0	100.0	466	22,000	641	30,000	729	34,000
5.500	23.00	4.670	0.415	6.050	–	6.630	–	3.990	100.0	100.0	530	22,000	729	30,000	829	34,000
5.500	26.00	4.498	0.476	6.125	–	7.513	–	4.300	100.0	100.0	601	27,000	826	37,000	939	42,000
5.500	26.80	4.450	0.500	6.125	–	7.854	–	4.300	100.0	100.0	628	27,000	864	37,000	982	42,000
5.500	28.40	4.390	0.530	6.125	–	8.275	–	4.300	100.0	100.0	662	27,000	910	37,000	1,034	42,000
5.500	29.70	4.326	0.562	6.250	–	8.718	–	5.060	100.0	100.0	697	34,000	959	47,000	1,090	54,000
5.500	32.60	4.250	0.625	6.250	–	9.572	–	5.060	100.0	100.0	766	34,000	1,053	47,000	1,197	54,000
6.625	20.00	5.999	0.288	7.390	–	5.734	–	4.050	95.7	100.0	439	36,000	604	49,000	686	56,000
6.625	24.00	5.871	0.352	7.390	–	6.937	–	4.050	100.0	100.0	555	36,000	763	49,000	867	56,000
6.625	28.00	5.791	0.417	7.390	–	8.133	–	4.050	100.0	100.0	651	36,000	895	49,000	1,017	56,000
6.625	32.00	5.675	0.475	7.390	–	9.177	–	4.050	100.0	100.0	734	36,000	1,010	49,000	1,147	56,000
7.000	20.00	6.406	0.272	7.656	–	5.749	–	4.050	95.0	100.0	437	39,000	600	53,000	683	61,000
7.000	23.00	6.316	0.317	7.656	–	6.655	–	4.050	100.0	100.0	532	39,000	732	53,000	832	61,000
7.000	26.00	6.226	0.362	7.656	–	7.549	–	4.050	100.0	100.0	604	39,000	830	53,000	944	61,000
7.000	29.00	6.184	0.408	7.656	–	8.449	–	4.050	100.0	100.0	676	39,000	929	53,000	1,056	61,000
7.000	32.00	6.094	0.453	7.656	–	9.317	–	4.050	100.0	100.0	745	39,000	1,025	53,000	1,165	61,000
7.000	35.00	5.954	0.498	7.750	–	10.172	–	5.060	100.0	100.0	814	54,000	1,119	75,000	1,272	85,000
7.000	38.00	5.870	0.540	7.750	–	10.959	–	5.060	100.0	100.0	877	54,000	1,206	75,000	1,370	85,000
7.000	41.00	5.820	0.590	7.750	–	11.881	–	5.060	100.0	100.0	950	54,000	1,307	75,000	1,485	85,000
7.000	42.70	5.750	0.625	7.750	–	12.517	–	5.060	100.0	100.0	1,001	54,000	1,377	75,000	1,565	85,000
7.625	26.40	6.919	0.328	8.500	–	7.519	–	4.050	100.0	100.0	602	45,000	827	62,000	940	71,000
7.625	29.70	6.875	0.375	8.500	–	8.541	–	4.050	100.0	100.0	683	45,000	940	62,000	1,068	71,000
7.625	33.70	6.765	0.430	8.500	–	9.720	–	4.050	100.0	100.0	778	45,000	1,069	62,000	1,215	71,000
7.625	39.00	6.575	0.500	8.500	–	11.192	–	5.060	100.0	100.0	895	62,000	1,231	85,000	1,399	96,000
7.625	42.80	6.501	0.562	8.500	–	12.470	–	5.060	100.0	100.0	998	62,000	1,372	85,000	1,559	96,000
7.625	45.30	6.435	0.595	8.500	–	13.141	–	5.060	100.0	100.0	1,051	62,000	1,445	85,000	1,643	96,000
7.625	47.10	6.375	0.625	8.500	–	13.744	–	5.060	100.0	100.0	1,100	62,000	1,512	85,000	1,718	96,000
7.625	51.20	6.251	0.687	8.500	–	14.974	–	6.170	95.7	100.0	1,146	81,000	1,576	112,000	1,792	127,000
7.625	52.80	6.201	0.712	8.500	–	15.463	–	6.170	100.0	100.0	1,237	81,000	1,701	112,000	1,933	127,000
7.625	55.30	6.125	0.750	8.500	–	16.199	–	6.170	100.0	100.0	1,296	81,000	1,782	112,000	2,025	127,000
7.750	46.10	6.560	0.595	8.500	–	13.374	–	5.190	100.0	100.0	1,070	71,000	1,471	98,000	1,672	111,000
7.750	48.60	6.470	0.640	8.500	–	14.296	–	5.190	100.0	100.0	1,144	71,000	1,573	98,000	1,787	111,000
8.625	32.00	7.933	0.352	9.625	–	9.149	–	4.050	100.0	100.0	732	60,000	1,006	82,000	1,144	94,000
8.625	36.00	7.825	0.400	9.625	–	10.336	–	4.050	100.0	100.0	827	60,000	1,137	82,000	1,292	94,000
8.625	40.00	7.725	0.450	9.625	–	11.557	–	4.050	100.0	100.0	925	60,000	1,271	82,000	1,445	94,000
8.625	44.00	7.575	0.500	9.625	–	12.763	–	5.060	100.0	100.0	1,021	80,000	1,404	111,000	1,595	126,000
8.625	49.00	7.511	0.557	9.625	–	14.118	–	5.060	100.0	100.0	1,129	80,000	1,553	111,000	1,765	126,000
8.625	52.00	7.435	0.595	9.625	–	15.010	–	5.060	100.0	100.0	1,201	80,000	1,651	111,000	1,876	126,000
8.625	54.00	7.375	0.625	9.625	–	15.708	–	5.060	100.0	100.0	1,257	80,000	1,728	111,000	1,964	126,000
8.625	59.60	7.225	0.700	9.625	–	17.428	–	6.180	100.0	100.0	1,394	105,000	1,917	145,000	2,179	165,000
8.625	61.10	7.187	0.719	9.625	–	17.858	–	6.180	100.0	100.0	1,429	105,000	1,964	145,000	2,232	165,000
8.625	63.50	7.125	0.750	9.625	–	18.555	–	6.180	100.0	100.0	1,484	105,000	2,041	145,000	2,319	165,000
8.625	68.10	7.001	0.812	9.625	–	19.931	–	6.180	100.0	100.0	1,594	105,000	2,192	145,000	2,491	165,000
9.625	36.00	8.871	0.352	10.625	–	10.254	–	4.050	100.0	100.0	820	75,000	1,128	103,000	1,282	117,000
9.625	40.00	8.835	0.395	10.625	–	11.454	–	4.050	100.0	100.0	916	75,000	1,260	103,000	1,432	117,000
9.625	43.50	8.755	0.435	10.625	–	12.559	–	4.050	100.0	100.0	1,005	75,000	1,381	103,000	1,570	117,000
9.625	47.00	8.681	0.472	10.625	–	13.572	–	4.050	100.0	100.0	1,086	75,000	1,493	103,000	1,697	117,000
9.625	53.50	8.535	0.545	10.625	–	15.546	–	4.050	100.0	100.0	1,244	75,000	1,710	103,000	1,943	117,000
9.625	58.40	8.435	0.595	10.625	–	16.879	–	5.060	100.0	100.0	1,350	103,000	1,857	141,000	2,110	161,000
9.625	59.40	8.407	0.609	10.625	–	17.250	–	5.060	100.0	100.0	1,380	103,000	1,897	141,000	2,156	161,000
9.625	61.10	8.375	0.625	10.625	–	17.671	–	5.060	100.0	100.0	1,414	103,000	1,944	141,000	2,209	161,000
9.875	62.80	8.625	0.625	10.625	–	18.162	–	5.060	100.0	100.0	1,453	109,000	1,998	149,000	2,270	170,000
9.875	65.10	8.575	0.650	10.625	–	18.838	–	5.060	95.4	100.0	1,438	109,000	1,977	149,000	2,247	170,000
10.750	40.50	10.000	0.350	11.750	–	11.435	–	4.470	100.0	100.0	915	103,000	1,258	142,000	1,429	161,000
10.750	45.50	9.950	0.400	11.750	–	13.006	–	4.570	100.0	100.0	1,040	103,000	1,431	142,000	1,626	161,000
10.750	51.00	9.850	0.450	11.750	–	14.561	–	4.570	100.0	100.0	1,165	103,000	1,602	142,000	1,820	161,000
10.750	55.50	9.710	0.495	11.750	–	15.947	–	5.370	100.0	100.0	1,276	145,000	1,754	199,000	1,993	226,000
10.750	60.70	9.660	0.545	11.750	–	17.473	–	5.370	100.0	100.0	1,398	145,000	1,922	199,000	2,184	226,000
10.750	65.70	9.560	0.595	11.750	–	18.982	–	5.370	100.0	100.0	1,519	145,000	2,088	199,000	2,373	226,000
10.750	73.20	9.406	0.672	11.750	–	21.276	–	5.370	100.0	100.0	1,702	145,000	2,340	199,000	2,660	226,000
10.750	79.20	9.282	0.734	11.750	–	23.096	–	5.940	100.0	100.0	1,848	180,000	2,541	248,000	2,887	282,000
11.750	47.00	11.000	0.375	12.750	–	13.401	–	4.450	100.0	100.0	1,072	123,000	1,474	169,000	1,675	192,000
11.750	54.00	10.880	0.435	12.750	–	15.463	–	4.450	100.0	100.0	1,237	123,000	1,701	169,000	1,933	192,000
11.750	60.00	10.722	0.489	12.750	–	17.300	–	5.360	100.0	100.0	1,384	161,000	1,903	221,000	2,162	251,000
11.750	65.00	10.682	0.534	12.750	–	18.816	–	5.360	100.0	100.0	1,505	161,000	2,070	221,000	2,352	251,000
11.750	71.00	10.586	0.582	12.750	–	20.420	–	5.360	100.0	100.0	1,634	161,000	2,246	221,000	2,552	251,000
11.750	75.00	10.514	0.618	12.750	–	21.613	–	5.360	100.0	100.0	1,729	161,000	2,377	221,000	2,702	251,000
11.750	79.00	10.438	0.656	12.750	–	22.863	–	5.360	100.0	100.0	1,829	161,000	2,515	221,000	2,858	251,000
11.875	71.80	10.711	0.582	12.750	–	20.648	–	5.220	100.0	100.0	1,652	164,000	2,271	226,000	2,581	257,000
13.375	54.50	12.540	0.380	14.375	–	15.513	–	5.170	100.0	100.0	1,241	188,000	1,706	258,000	1,939	293,000
13.375	61.00	12.440	0.430	14.375	–	17.487	–	5.170	100.0	100.0	1,399	188,000	1,924	258,000	2,186	293,000
13.375	68.00	12.415	0.480	14.375	–	19.445	–	5.170	100.0	100.0	1,556	188,000	2,139	258,000	2,431	293,000
13.375	72.00	12.347	0.514	14.375	–	20.768	–	5.170	100.0	100.0	1,661	188,000	2,284	258,000	2,596	293,000
13.375	77.00	12.200	0.550	14.375	–	22.160	–	6.060	100.0	100.0	1,773	250,000	2,438	344,000	2,770	390,000
13.375	80.70	12.140	0.580	14.375	–	23.314	–	6.060	100.0	100.0	1,865	250,000	2,565	344,000	2,914	390,000
13.375	85.00	12.159	0.608	14.375	–	24.386	–	6.060	100.0	100.0	1,951	250,000	2,682	344,000	3,048	390,000
13.375	86.00	12.125	0.625	14.375	–	25.035	–	6.060	100.0	100.0	2,003	250,000	2,754	344,000	3,129	390,000
13.500	81.40	12.340	0.580	14.375	–	23.542	–	5.170	95.1	100.0	1,791	243,000	2,463	334,000	2,799	379,000
13.625	88.20	12.375	0.625	14.625	–	25.525	–	6.060	100.0	100.0	2,042	259,000	2,808	357,000	3,191	405,000

* d refers to connection ID.

** Yield torque values refers to a structural limit of the connection.

TenarisHydril—Wedge 625

Diagram p. C-115

Type: Integral swaged, non-upset **Seal: Metal-to-metal**

											L-80		P-110		Q-125	
D	w	d	t	Dc	Dsc	At	Ac	Lm	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
4.500	13.50	3.849	0.290	4.714	–	3.836	3.491	4.830	91.0	94.5	279	15,000	384	18,000	436	19,000
4.500	15.10	3.755	0.337	4.724	–	4.407	3.971	5.230	90.1	94.8	318	18,000	437	21,000	496	23,000
5.000	18.00	4.206	0.362	5.242	–	5.275	4.827	5.310	91.5	94.6	386	21,000	531	25,000	603	27,000
5.000	23.20	3.974	0.478	5.276	–	6.791	6.166	5.930	90.8	95.0	493	28,000	678	34,000	771	36,000
5.500	20.00	4.709	0.361	5.739	–	5.828	5.350	5.290	91.8	94.5	428	25,000	588	30,000	669	32,000
5.500	23.00	4.601	0.415	5.766	–	6.630	6.053	5.600	91.3	94.5	484	29,000	666	34,000	757	37,000
5.500	26.00	4.479	0.476	5.788	–	7.513	6.762	5.940	90.0	95.5	541	33,000	743	39,000	845	43,000

* d refers to connection ID.
** Yield torque values refers to a structural limit of the connection.

TMK—ULTRA DQX

Diagram p. C-115

Type: Threaded & coupled **Seal: Thread and Lubricant**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
4.500	10.50	0.224	3.927	5.000	3.009	3.009	100%	100%	241	5,800	331	7,200	376	7,900
4.500	11.60	0.250	3.875	5.000	3.338	3.338	100%	100%	267	6,800	367	8,600	417	9,500
4.500	12.60	0.271	3.833	5.000	3.600	3.600	100%	100%	288	7,700	396	9,800	450	10,800
4.500	13.50	0.290	3.795	5.000	3.836	3.836	100%	100%	307	8,400	422	10,800	479	12,000
4.500	15.10	0.337	3.701	5.000	4.407	4.407	100%	100%	353	10,200	485	13,200	551	14,800
5.000	15.00	0.296	4.283	5.563	4.374	4.374	100%	100%	350	10,400	481	13,200	547	14,700
5.000	18.00	0.362	4.151	5.563	5.275	5.275	100%	100%	422	13,500	580	17,500	659	19,500
5.000	21.40	0.437	4.001	5.563	6.264	5.841	93%	100%	467	16,900	643	22,100	730	24,800
5.000	23.20	0.478	3.919	5.563	6.791	5.841	86%	100%	467	18,600	643	24,600	730	27,500
5.000	24.10	0.500	3.875	5.563	7.069	5.841	84%	100%	473	19,600	651	25,800	739	29,000
5.500	15.50	0.275	4.825	6.050	4.514	4.514	100%	100%	361	10,800	497	13,800	564	15,200
5.500	17.00	0.304	4.767	6.050	4.962	4.962	100%	100%	397	12,500	546	16,100	620	17,900
5.500	20.00	0.361	4.653	6.050	5.828	5.828	100%	100%	466	15,800	641	20,600	729	23,100
5.500	23.00	0.415	4.545	6.050	6.630	6.297	95%	100%	504	18,800	693	24,800	787	27,800
6.625	20.00	0.288	5.924	7.390	5.734	5.734	100%	100%	459	16,400	631	21,000	717	23,200
6.625	23.20	0.330	5.840	7.390	6.526	6.526	100%	100%	522	20,000	718	26,000	816	29,000
6.625	24.00	0.352	5.796	7.390	6.937	6.937	100%	100%	555	21,900	763	28,600	867	31,900
6.625	24.60	0.362	5.776	7.390	7.123	7.123	100%	100%	570	22,800	784	29,700	890	33,200
6.625	28.00	0.417	5.666	7.390	8.133	8.133	100%	100%	651	27,400	895	36,100	1,017	40,400
6.625	29.00	0.432	5.636	7.390	8.405	8.405	100%	100%	672	28,600	925	37,800	1,051	42,300
6.625	32.00	0.475	5.550	7.390	9.177	9.177	100%	100%	734	32,100	1,010	42,500	1,147	47,800
7.000	23.00	0.317	6.241	7.656	6.655	6.655	100%	100%	532	19,900	732	25,800	832	28,700
7.000	26.00	0.362	6.151	7.656	7.549	7.549	100%	100%	604	24,200	830	31,700	944	35,500
7.000	29.00	0.408	6.059	7.656	8.449	8.449	100%	100%	676	28,600	929	37,700	1,056	42,300
7.000	32.00	0.453	5.969	7.656	9.317	9.317	100%	100%	745	32,700	1,025	43,400	1,165	48,800
7.000	35.00	0.498	5.879	7.656	10.172	9.501	93%	100%	760	36,800	1,045	49,000	1,188	55,100
7.000	38.00	0.540	5.795	7.656	10.959	9.501	87%	100%	760	40,500	1,045	54,100	1,188	60,900
7.625	26.40	0.328	6.844	8.500	7.519	7.519	100%	100%	602	23,000	827	29,500	940	32,700
7.625	29.70	0.375	6.750	8.500	8.541	8.541	100%	100%	683	28,400	940	36,900	1,068	41,200
7.625	33.70	0.430	6.640	8.500	9.720	9.720	100%	100%	778	34,700	1,069	45,500	1,215	50,900
7.625	35.80	0.465	6.570	8.500	10.460	10.460	100%	100%	837	38,600	1,151	50,900	1,308	57,000
7.625	39.00	0.500	6.500	8.500	11.192	11.192	100%	100%	895	42,400	1,231	56,100	1,399	63,000
7.625	42.80	0.562	6.376	8.500	12.470	12.470	100%	100%	998	49,000	1,372	65,300	1,559	73,400
7.625	45.30	0.595	6.310	8.500	13.141	13.141	100%	100%	1,051	52,500	1,446	70,000	1,643	78,800
7.625	47.10	0.625	6.250	8.500	13.744	13.385	97%	100%	1,071	55,600	1,472	74,300	1,673	83,600
8.625	32.00	0.352	7.796	9.625	9.149	9.149	100%	100%	732	32,400	1,006	42,100	1,144	46,900
8.625	36.00	0.400	7.700	9.625	10.336	10.336	100%	100%	827	39,500	1,137	51,900	1,292	58,100
8.625	40.00	0.450	7.600	9.625	11.557	11.557	100%	100%	925	46,800	1,271	61,900	1,445	69,500
8.625	44.00	0.500	7.500	9.625	12.763	12.763	100%	100%	1,021	54,000	1,404	71,800	1,595	80,700
8.625	49.00	0.557	7.386	9.625	14.118	14.118	100%	100%	1,129	62,000	1,553	82,800	1,765	93,200
9.625	36.00	0.352	8.765	10.625	10.254	10.254	100%	100%	820	39,100	1,128	51,200	1,282	57,300
9.625	40.00	0.395	8.679	10.625	11.454	11.454	100%	100%	916	47,100	1,260	62,300	1,432	69,900
9.625	43.50	0.435	8.599	10.625	12.559	12.559	100%	100%	1,005	54,500	1,382	72,500	1,570	81,400
9.625	47.00	0.472	8.525	10.625	13.572	13.572	100%	100%	1,086	61,300	1,493	81,700	1,697	92,000
9.625	53.50	0.545	8.379	10.625	15.546	15.546	100%	100%	1,244	74,400	1,710	99,700	1,943	112,400
9.625	58.40	0.595	8.279	10.625	16.879	16.879	100%	100%	1,350	83,100	1,857	111,800	2,110	126,100
10.750	40.50	0.350	9.894	11.750	11.435	11.435	100%	100%	915	46,600	1,258	61,500	1,429	69,000
10.750	45.50	0.400	9.794	11.750	13.006	13.006	100%	100%	1,041	58,400	1,431	77,800	1,626	87,400
10.750	51.00	0.450	9.694	11.750	14.561	14.561	100%	100%	1,165	70,100	1,602	93,800	1,820	105,600
10.750	55.50	0.495	9.604	11.750	15.947	15.947	100%	100%	1,276	80,400	1,754	107,900	1,993	121,700
10.750	60.70	0.545	9.504	11.750	17.473	17.473	100%	100%	1,398	91,700	1,922	123,500	2,184	139,400
10.750	65.70	0.595	9.404	11.750	18.982	18.982	100%	100%	1,519	102,800	2,088	138,800	2,373	156,800
11.750	47.00	0.375	10.844	12.750	13.401	13.401	100%	100%	1,072	62,600	1,474	83,600	1,675	94,100
11.750	54.00	0.435	10.724	12.750	15.463	15.463	100%	100%	1,237	79,500	1,701	106,800	1,933	120,500
11.750	60.00	0.489	10.616	12.750	17.300	17.300	100%	100%	1,384	94,500	1,903	127,500	2,162	143,900
13.375	54.50	0.380	12.459	14.375	15.513	15.513	100%	100%	1,241	81,000	1,707	108,700	1,939	122,600
13.375	61.00	0.430	12.359	14.375	17.487	17.487	100%	100%	1,399	99,400	1,924	134,100	2,186	151,400
13.375	68.00	0.480	12.259	14.375	19.445	19.445	100%	100%	1,556	117,700	2,139	159,200	2,431	179,900
13.375	72.00	0.514	12.191	14.375	20.768	20.768	100%	100%	1,661	130,000	2,284	176,100	2,596	199,100

TMK—ULTRA DQX HT

Diagram p. C-115

Type: Threaded & coupled **Seal: Thread and Lubricant**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
4.500	10.50	0.224	3.927	5.000	3.009	5.000	100%	100%	240,727	7,000	331,000	8,800	376,137	9,800
4.500	11.60	0.250	3.875	5.000	3.338	5.000	100%	100%	267,035	8,100	367,174	10,400	417,243	11,500
4.500	12.60	0.271	3.833	5.000	3.600	5.000	100%	100%	288,036	9,000	396,050	11,600	450,056	12,900
4.500	13.50	0.290	3.795	5.000	3.836	5.000	100%	100%	306,846	9,800	421,913	12,700	479,446	14,200
4.500	15.10	0.337	3.701	5.000	4.407	5.000	100%	100%	352,595	11,700	484,818	15,400	550,930	17,200
5.000	15.00	0.296	4.283	5.563	4.374	5.563	100%	100%	349,944	12,100	481,173	15,600	546,788	17,300
5.000	18.00	0.362	4.151	5.563	5.275	5.563	100%	100%	421,968	15,500	580,206	20,200	659,324	22,600
5.000	21.40	0.437	4.001	5.563	6.264	5.563	93%	100%	467,255	19,100	642,475	25,200	730,086	28,300
5.000	23.20	0.478	3.919	5.563	6.791	5.563	86%	100%	467,255	21,000	642,475	27,800	730,086	31,200
5.000	24.10	0.500	3.875	5.563	7.069	5.563	84%	100%	467,255	22,000	642,475	29,200	730,086	32,800
5.500	15.50	0.275	4.825	6.050	4.514	6.050	100%	100%	361,126	12,800	496,548	16,500	564,259	18,300
5.500	17.00	0.304	4.767	6.050	4.962	6.050	100%	100%	396,993	14,600	545,865	19,000	620,301	21,300
5.500	20.00	0.361	4.653	6.050	5.828	6.050	100%	100%	466,257	18,200	641,104	24,000	728,527	26,800
5.500	23.00	0.415	4.545	6.050	6.630	6.050	95%	100%	503,750	21,500	692,657	28,500	787,110	31,900

TMK—UP BPN

Diagram p. C-116

Type: Threaded & coupled **Seal: Thread and Lubricant**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
10.750	51.00	0.450	9.694	11.750	14.561	14.561	100%	100%	1,165	84,700	1,602	112,300	1,820	126,100
10.750	55.50	0.495	9.625	11.750	15.947	15.947	100%	100%	1,276	96,300	1,754	128,000	1,993	143,900
10.750	60.70	0.545	9.504	11.750	17.473	17.473	100%	100%	1,398	108,900	1,922	145,200	2,184	163,300
10.750	65.70	0.595	9.404	11.750	18.982	18.982	100%	100%	1,519	121,400	2,088	162,000	2,373	182,300
11.750	47.00	0.375	10.844	12.750	13.401	13.401	100%	100%	1,072	*	1,474	*	1,675	*
11.750	54.00	0.435	10.724	12.750	15.463	15.463	100%	100%	1,237	*	1,701	*	1,933	*
11.750	60.00	0.489	10.625	12.750	17.300	17.300	100%	100%	1,384	*	1,903	*	2,162	*
13.375	54.50	0.380	12.459	14.375	15.513	15.513	100%	100%	1,241	*	1,706	*	1,939	*
13.375	61.00	0.430	12.359	14.375	17.487	17.487	100%	100%	1,399	*	1,924	*	2,186	*
13.375	68.00	0.480	12.259	14.375	19.445	19.445	100%	100%	1,556	*	2,139	*	2,431	*
13.375	72.00	0.514	12.25	14.375	20.768	20.768	100%	100%	1,661	*	2,285	*	2,596	*

*Contact TMK IPSCO for yield torque.

TMK—TMK CWB

Diagram p. C-116

Type: Threaded and coupled **Seal: Thread and lubricant**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
9.625	36.00	8.765	0.352	10.625	10.254	10.254	100%	80%	820	37,230	1,128	44,710	1,282	48,400
9.625	40.00	8.679	0.395	10.625	11.454	11.454	100%	80%	916	44,200	1,260	53,040	1,432	57,460
9.625	43.50	8.599	0.435	10.625	12.559	12.559	100%	80%	1,005	48,280	1,381	57,970	1,570	62,760
9.625	47.00	8.525	0.472	10.625	13.572	13.572	100%	80%	1,086	55,250	1,493	66,470	1,697	71,830
9.625	53.50	8.379	0.545	10.625	15.546	15.546	100%	80%	1,244	69,530	1,710	83,300	1,943	90,390
9.625	58.40	8.279	0.595	10.625	16.879	16.879	100%	80%	1,350	72,420	1,857	86,870	2,110	94,150
9.625	59.40	8.251	0.609	10.625	17.250	17.250	100%	80%	1,380	74,120	1,897	89,080	2,156	96,360
9.625	64.90	8.125	0.672	10.625	18.901	18.331	97%	80%	1,466	84,660	2,016	101,490	2,291	110,060
13.375	54.50	12.459	0.380	14.375	15.513	15.513	100%	80%	1,241	72,420	1,706	86,020	1,939	94,150
13.375	61.00	12.359	0.430	14.375	17.487	17.487	100%	80%	1,399	88,230	1,924	104,040	2,186	114,700
13.375	68.00	12.259	0.480	14.375	19.445	19.445	100%	80%	1,556	100,470	2,139	120,190	2,431	130,610
13.375	72.00	12.190	0.514	14.375	20.768	20.768	100%	80%	1,661	122,740	2,284	131,070	2,596	159,560

TMK—ULTRA FX

Diagram p. C-116

Type: Integral, Upset **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
2.063	3.25	0.156	1.657	2.200	0.939	0.939	100.0%	100.0%	75	1,898	103	2,034	117	2,169
2.063	4.50	0.225	1.519	2.203	1.306	1.306	100.0%	100.0%	104	2,440	144	2,712	163	2,847
2.375	4.70	0.190	1.901	2.539	1.311	1.311	100.0%	100.0%	105	2,576	144	2,983	164	3,254
2.375	5.95	0.254	1.773	2.543	1.702	1.702	100.0%	100.0%	136	3,390	187	3,796	213	4,067
2.875	6.50	0.217	2.347	3.071	1.822	1.822	100.0%	100.0%	146	4,067	200	4,881	228	5,288
2.875	7.90	0.276	2.198	3.075	2.266	2.266	100.0%	100.0%	181	4,745	249	5,694	283	6,101
2.875	8.70	0.308	2.229	3.079	2.498	2.498	100.0%	100.0%	200	5,423	275	6,372	312	6,779
3.500	9.30	0.254	2.867	3.726	2.604	2.604	100.0%	100.0%	208	6,779	286	8,135	326	8,948
3.500	10.30	0.289	2.797	3.728	2.931	2.931	100.0%	100.0%	234	7,186	322	8,542	366	9,355
3.500	12.70	0.375	2.625	3.728	3.702	3.702	100.0%	100.0%	296	8,677	407	10,169	463	10,982
4.000	11.00	0.262	3.351	4.230	3.093	3.093	100.0%	100.0%	247	8,270	340	10,169	387	11,118
4.000	11.60	0.286	3.303	4.234	3.355	3.355	100.0%	100.0%	268	8,406	369	10,304	419	11,253
4.000	13.20	0.330	3.215	4.236	3.826	3.826	100.0%	100.0%	306	9,219	421	11,253	478	12,202
4.000	16.10	0.415	3.045	4.238	4.700	4.700	100.0%	100.0%	376	11,253	517	13,287	588	14,236
4.500	11.60	0.250	3.875	4.723	3.356	3.356	100.0%	100.0%	268	9,219	369	11,389	419	12,338
4.500	12.75	0.271	3.833	4.735	3.62	3.62	100.0%	100.0%	290	9,355	398	11,660	452	12,880
4.500	13.50	0.290	3.795	4.743	3.856	3.856	100.0%	100.0%	308	10,304	424	12,745	482	13,965
4.500	15.10	0.337	3.701	4.733	4.431	4.431	100.0%	100.0%	355	10,711	487	13,016	554	14,100
4.500	17.00	0.380	3.615	4.753	4.945	4.945	100.0%	100.0%	396	12,609	544	15,456	618	16,812
4.500	18.90	0.430	3.515	4.763	5.528	5.528	100.0%	100.0%	442	14,778	608	17,625	691	19,117
5.000	15.00	0.296	4.283	5.246	4.398	4.398	100.0%	100.0%	352	8,900	484	11,200	550	12,400
5.000	18.00	0.362	4.151	5.257	5.303	5.303	100.0%	100.0%	424	10,500	583	13,000	663	14,300
5.000	20.30	0.408	4.059	5.259	5.918	5.918	100.0%	100.0%	473	11,400	651	14,000	740	15,300
5.000	20.80	0.422	4.031	5.259	6.102	6.102	100.0%	100.0%	488	11,700	671	14,300	763	15,500
5.000	21.40	0.437	4.001	5.259	6.299	6.299	100.0%	100.0%	504	12,800	693	15,300	787	16,600
5.000	23.20	0.478	3.919	5.265	6.828	6.828	100.0%	100.0%	546	14,100	751	16,800	854	18,100
5.000	24.10	0.500	3.875	5.269	7.108	7.108	100.0%	100.0%	569	11,700	782	13,600	888	14,600
5.500	15.50	0.275	4.825	5.746	4.538	4.538	100.0%	100.0%	363	9,800	499	12,400	567	13,700
5.500	17.00	0.304	4.767	5.746	4.989	4.989	100.0%	100.0%	399	10,100	549	12,800	624	14,100
5.500	20.00	0.361	4.653	5.768	5.859	5.859	100.0%	100.0%	469	12,300	645	15,400	732	17,000
5.500	23.00	0.415	4.545	5.774	6.665	6.665	100.0%	100.0%	533	13,800	733	17,100	833	18,700

TMK—UP ULTRA FJ

Diagram p. C-116

Type: Integral, flush **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
2.375	4.60	0.190	1.901	2.375	1.304	0.852	65.3%	65.3%	68	1,200	93	1,600	106	1,700
2.375	5.80	0.254	1.773	2.375	1.692	1.141	67.4%	67.4%	91	1,900	125	2,400	142	2,600
2.875	6.40	0.217	2.347	2.875	1.812	1.152	63.6%	63.6%	92	2,200	127	2,800	144	3,100
2.875	7.80	0.276	2.229	2.875	2.254	1.487	66.0%	66.0%	119	2,700	163	3,500	185	3,900
2.875	8.60	0.308	2.165	2.875	2.484	1.749	70.4%	70.4%	139	2,900	192	3,700	218	4,100
3.500	9.20	0.254	2.867	3.500	2.590	1.606	62.0%	62.0%	128	3,800	176	5,000	200	5,500
3.500	10.20	0.289	2.797	3.500	2.915	1.864	64.0%	64.0%	149	4,400	205	5,600	233	6,200
3.500	12.70	0.375	2.625	3.500	3.682	2.483	67.5%	66.4%	198	5,400	273	6,900	310	7,700
3.500	15.50	0.476	2.423	3.500	4.522	3.355	74.2%	63.4%	268	5,700	369	7,300	419	8,000
4.000	9.50	0.226	3.423	4.000	2.680	1.711	63.9%	63.9%	137	4,000	188	5,300	213	6,000
4.000	10.80	0.262	3.351	4.000	3.077	1.927	62.6%	62.6%	154	4,900	212	6,400	240	7,100
4.000	11.60	0.286	3.303	4.000	3.337	2.174	65.1%	65.1%	173	4,900	239	6,400	272	7,200
4.000	13.20	0.330	3.215	4.000	3.805	2.592	68.1%	68.1%	207	5,500	285	7,100	324	7,900
4.000	14.80	0.380	3.115	4.000	4.322	3.049	70.6%	69.9%	243	6,100	335	7,900	381	8,800
4.000	16.10	0.415	3.045	4.000	4.674	3.409	72.9%	72.9%	272	6,200	375	8,000	426	8,900

Continued

TMK—UP ULTRA FJ (cont.)

Diagram p. C-116

Type: Integral, flush Seal: Metal-to-metal

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
4.500	9.50	0.205	3.965	4.500	2.766	1.754	63.4%	63.4%	140	4,000	193	5,300	219	5,900
4.500	10.50	0.224	3.927	4.500	3.009	1.910	63.5%	63.5%	152	4,800	210	6,400	239	7,300
4.500	11.60	0.250	3.875	4.500	3.338	2.066	61.9%	61.9%	165	5,600	227	7,300	258	8,200
4.500	12.60	0.271	3.833	4.500	3.600	2.224	61.8%	61.8%	178	6,300	245	8,200	278	9,100
4.500	13.50	0.290	3.795	4.500	3.836	2.420	63.1%	63.1%	193	6,600	266	8,700	302	9,700
4.500	15.10	0.337	3.701	4.500	4.407	3.025	68.6%	67.4%	242	6,700	332	8,800	377	9,800
4.500	16.60	0.375	3.625	4.500	4.860	3.429	70.6%	70.0%	274	7,100	377	9,200	428	10,300
4.500	18.80	0.430	3.515	4.500	5.498	3.928	71.4%	71.4%	314	8,500	431	10,900	491	12,100
5.000	13.00	0.253	4.369	5.000	3.773	2.234	59.2%	59.2%	178	7,200	246	9,500	279	10,600
5.000	15.00	0.296	4.283	5.000	4.374	2.791	63.8%	63.8%	223	7,900	307	10,400	348	11,700
5.000	18.00	0.362	4.151	5.000	5.275	3.635	68.9%	67.8%	290	8,700	400	11,400	454	12,800
5.000	20.30	0.408	4.059	5.000	5.886	4.187	71.1%	71.0%	334	9,300	460	12,200	523	13,600
5.000	20.80	0.422	4.031	5.000	6.069	4.381	72.2%	72.2%	350	9,400	481	12,200	547	13,600
5.000	21.40	0.437	4.001	5.000	6.264	4.588	73.2%	73.2%	367	9,500	505	12,200	573	13,600
5.000	23.20	0.478	3.919	5.000	6.791	5.130	75.5%	64.5%	410	10,000	564	13,000	641	14,400
5.000	24.10	0.500	3.875	5.000	7.069	5.331	75.4%	64.4%	426	10,400	586	13,500	666	15,000
5.500	15.50	0.275	4.825	5.500	4.514	2.709	60.0%	60.0%	217	9,500	298	12,600	338	14,200
5.500	17.00	0.304	4.767	5.500	4.962	3.044	61.3%	61.3%	243	10,500	334	13,900	380	15,600
5.500	20.00	0.361	4.653	5.500	5.828	3.685	63.2%	63.2%	295	12,400	405	16,500	460	18,500
5.500	23.00	0.415	4.545	5.500	6.630	4.406	66.5%	65.6%	352	13,400	484	17,500	550	19,600
5.500	26.00	0.476	4.423	5.500	7.513	5.333	71.0%	71.0%	427	13,500	586	17,700	667	19,900
5.500	26.80	0.500	4.375	5.500	7.854	5.666	72.1%	62.1%	453	13,700	623	18,000	708	20,200
5.500	29.70	0.562	4.251	5.500	8.718	6.515	74.7%	64.5%	521	14,400	717	18,800	814	21,000
6.625	16.19	0.238	6.025	6.625	4.766	2.907	61.0%	61.0%	232	9,900	320	13,300	363	15,000
6.625	24.00	0.352	5.796	6.625	6.937	4.365	62.9%	62.9%	349	16,700	480	22,200	546	25,000
7.000	20.00	0.272	6.331	7.000	5.749	3.418	59.5%	59.5%	273	14,200	376	18,900	427	21,300
7.000	23.00	0.317	6.250	7.000	6.655	3.924	59.0%	59.0%	314	17,500	432	23,200	490	26,000
7.000	26.00	0.362	6.151	7.000	7.549	4.769	63.2%	63.2%	381	18,400	524	24,500	596	27,600
7.000	29.00	0.408	6.125	7.000	8.449	5.459	64.6%	63.5%	436	20,400	600	27,200	682	30,600
7.000	32.00	0.453	6.000	7.000	9.317	6.509	69.9%	69.9%	520	20,100	715	26,800	813	30,100
7.000	35.00	0.498	5.879	7.000	10.172	7.245	71.2%	61.3%	579	21,000	796	27,700	905	31,000
7.000	38.00	0.540	5.795	7.000	10.959	7.934	72.4%	62.5%	634	22,200	872	29,300	991	32,800
7.625	26.40	0.328	6.844	7.625	7.519	4.344	57.8%	57.8%	347	22,200	478	29,500	543	33,200
7.625	29.70	0.375	6.750	7.625	8.541	5.316	62.2%	62.2%	425	23,500	584	31,500	664	35,500
7.625	33.70	0.430	6.640	7.625	9.720	6.390	65.7%	65.1%	511	24,700	703	33,000	798	37,200
7.625	39.00	0.500	6.500	7.625	11.192	7.854	70.2%	60.6%	628	25,700	864	34,100	981	38,300
7.625	42.80	0.562	6.376	7.625	12.470	9.092	72.9%	63.0%	727	27,100	1,000	35,700	1,136	40,000
7.625	45.30	0.595	6.310	7.625	13.141	9.712	73.9%	63.9%	777	27,900	1,068	36,700	1,213	41,100
7.625	47.10	0.625	6.250	7.625	13.744	10.173	74.0%	64.1%	813	29,700	1,118	38,900	1,272	43,500
7.625	51.20	0.687	6.126	7.625	14.974	11.439	76.4%	66.4%	914	31,800	1,258	41,400	1,429	46,300
7.625	55.30	0.750	6.000	7.625	16.199	12.479	77.0%	67.1%	998	34,300	1,372	44,400	1,559	49,500
7.750	46.10	0.595	6.500	7.750	13.374	9.712	72.6%	62.6%	776	29,700	1,068	39,200	1,213	43,900
8.625	24.00	0.264	7.972	8.625	6.934	4.138	59.7%	59.7%	331	19,500	455	26,300	517	29,800
8.625	32.00	0.352	7.875	8.625	9.149	5.575	60.9%	60.9%	445	27,600	613	37,200	697	42,000
8.625	44.00	0.500	7.500	8.625	12.763	8.765	68.7%	68.7%	701	33,800	964	45,000	1,095	50,600
8.625	49.00	0.557	7.386	8.625	14.118	9.872	69.9%	60.6%	789	36,600	1,085	48,500	1,233	54,400
8.625	54.00	0.625	7.250	8.625	15.708	11.276	71.8%	62.5%	902	40,400	1,240	53,200	1,409	59,600
8.625	60.65	0.719	7.062	8.625	17.858	13.353	74.8%	65.2%	1,068	43,200	1,469	56,500	1,669	63,200
9.625	36.00	0.352	8.765	9.625	10.254	6.348	61.9%	61.9%	508	32,300	698	43,400	793	49,000
9.625	40.00	0.395	8.750	9.625	11.454	7.125	62.2%	62.2%	570	35,100	783	46,900	890	52,800
9.625	43.50	0.435	8.599	9.625	12.559	8.343	66.4%	65.9%	667	36,400	917	48,500	1,042	54,500
9.625	47.00	0.472	8.525	9.625	13.572	9.159	67.5%	67.5%	732	37,900	1,007	50,300	1,145	56,500
9.625	53.50	0.545	8.500	9.625	15.546	10.970	70.6%	61.0%	877	42,400	1,207	56,700	1,371	63,900
9.625	58.40	0.595	8.375	9.625	16.879	12.184	72.2%	62.6%	974	44,600	1,340	59,600	1,522	67,000
9.875	62.80	0.625	8.500	9.875	18.162	13.476	74.2%	64.2%	1,077	45,400	1,482	60,400	1,684	68,000
10.750	40.50	0.350	9.894	10.750	11.435	6.348	55.5%	55.5%	507	44,100	698	58,900	793	66,400
10.750	45.50	0.400	9.875	10.750	13.006	7.707	59.3%	59.3%	616	49,900	847	66,700	963	75,000
10.750	51.00	0.450	9.694	10.750	14.561	9.309	63.9%	63.9%	744	51,500	1,024	68,800	1,164	77,400
10.750	55.50	0.495	9.625	10.750	15.947	10.413	65.3%	65.0%	833	54,200	1,145	72,500	1,301	81,600
10.750	60.70	0.545	9.504	10.750	17.473	11.949	68.4%	59.3%	955	55,100	1,314	73,800	1,494	83,200
10.750	65.70	0.595	9.500	10.750	18.982	13.156	69.3%	60.4%	1,052	59,300	1,447	78,900	1,644	88,700
10.750	85.30	0.797	9.000	10.750	24.921	18.353	73.6%	66.3%	1,468	76,700	2,019	102,700	2,294	115,600
11.750	47.00	0.375	10.844	11.750	13.401	7.734	57.7%	57.7%	619	53,000	851	71,100	967	80,200
11.750	54.00	0.435	10.724	11.750	15.463	9.699	62.7%	62.7%	776	56,100	1,066	75,000	1,212	84,400
11.750	60.00	0.489	10.625	11.750	17.300	11.413	66.0%	65.5%	912	59,200	1,255	78,900	1,426	88,800
11.750	65.00	0.534	10.625	11.750	18.816	12.727	67.6%	58.3%	1,018	62,200	1,399	82,900	1,591	93,300
11.875	71.80	0.582	10.625	11.875	20.648	13.772	66.7%	57.5%	1,101	69,400	1,515	92,600	1,721	104,300
13.375	54.50	0.380	12.459	13.375	15.513	9.430	60.8%	60.8%	754	53,000	1,037	71,600	1,179	80,800
13.375	61.00	0.430	12.359	13.375	17.487	10.593	60.6%	58.6%	847	64,600	1,165	87,200	1,324	98,500
13.375	68.00	0.480	12.259	13.375	19.445	12.105	62.3%	60.9%	968	71,800	1,331	96,700	1,513	109,100
13.375	72.00	0.514	12.250	13.375	20.768	13.043	62.8%	61.9%	1,043	77,400	1,434	104,100	1,630	117,400
13.625	88.20	0.625	12.250	13.625	25.525	17.944	70.3%	60.9%	1,436	79,200	1,973	106,400	2,243	120,000
16.000	75.00	0.438	14.937	16.000	21.414	12.710	59.4%	57.6%	1,017	100,400	1,398	136,100	1,588	154,000
16.000	84.00	0.495	14.822	16.000	24.112	15.104	62.6%	52.5%	1,208	87,800	1,661	118,400	1,887	133,700
16.000	96.00	0.575	14.663	16.000	27.864	17.509	62.8%	53.3%	1,401	109,200	1,926	147,200	2,188	166,200

TMK—ULTRA QX

Diagram p. C-116

Type: Threaded & coupled Seal: Metal-to-metal

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
4.500	10.50	0.224	3.927	4.872	3.009	3.009	100%	100%	241	3,400	331	4,700	376	5,400
4.500	11.60	0.250	3.875	4.907	3.338	3.338	100%	100%	267	4,100	367	5,600	417	6,300
4.500	12.60	0.271	3.833	4.934	3.600	3.600	100%	100%	288	5,000	396	6,900	450	7,800
4.500	13.50	0.290	3.795	4.958	3.836	3.836	100%	100%	307	5,600	422	7,700	479	8,800
4.500	15.10	0.337	3.701	5.016	4.407	4.407	100%	100%	353	7,100	485	9,800	551	11,100
4.500	18.80	0.430	3.515	5.127	5.498	5.498	100%	100%	440	9,600	605	13,200	687	15,000
5.000	15.00	0.296	4.283	5.472	4.374	4.374	100%	100%	350	5,400	481	7,500	547	8,500
5.000	18.00	0.362	4.151	5.554	5.275	5.275	100%	100%	422	7,700	580	10,600	659	12,100
5.000	20.30	0.408	4.059	5.612	5.886	5.886	100%	100%	471	9,300	647	12,800	736	14,500
5.000	20.80	0.422	4.031	5.627	6.069	6.069	100%	100%	486	9,700	668	13,400	759	15,200
5.000	21.40	0.437	4.001	5.645	6.264	6.264	100%	100%	501	10,200	689	14,100	783	16,000
5.000	23.20	0.478	3.919	5.693	6.791	6.791	100%	100%	543	11,500	747	15,900	849	18,000
5.000	24.10	0.500	3.875	5.717	7.069	7.069	100%	100%	565	12,200	778	16,800	884	19,100

Continued

TMK—ULTRA QX (cont.)

Diagram p. C-116

Type: Threaded & coupled Seal: Metal-to-metal

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
5.500	15.50	0.275	4.825	5.947	4.514	4.514	100%	100%	361	7,000	497	9,200	564	10,400
5.500	17.00	0.304	4.767	5.986	4.962	4.962	100%	100%	397	8,500	546	11,300	620	12,700
5.500	20.00	0.361	4.653	6.060	5.828	5.828	100%	100%	466	11,500	641	15,300	729	17,100
5.500	23.00	0.415	4.545	6.127	6.630	6.630	100%	100%	530	14,400	729	19,000	829	21,300
5.500	26.00	0.476	4.423	6.200	7.513	7.513	100%	100%	601	17,400	826	23,000	939	25,800
5.500	26.80	0.500	4.375	6.227	7.854	7.854	100%	100%	628	18,700	864	24,500	982	27,500
5.500	29.70	0.562	4.251	6.299	8.718	8.718	100%	100%	697	21,800	959	28,500	1,090	31,900
6.625	20.00	0.288	5.924	7.098	5.734	5.734	100%	100%	459	8,200	631	10,300	717	11,400
6.625	23.20	0.330	5.840	7.153	6.526	6.526	100%	100%	522	10,500	718	13,400	816	14,800
6.625	24.00	0.352	5.796	7.183	6.937	6.937	100%	100%	555	11,800	763	15,000	867	16,600
6.625	24.60	0.362	5.776	7.196	7.123	7.123	100%	100%	570	12,400	783	15,700	890	17,400
6.625	28.00	0.417	5.666	7.269	8.133	8.133	100%	100%	651	15,600	895	19,800	1,017	21,900
6.625	29.00	0.432	5.636	7.286	8.405	8.405	100%	100%	672	16,400	925	20,800	1,051	23,000
6.625	32.00	0.475	5.550	7.341	9.177	9.177	100%	100%	734	18,900	1,010	23,900	1,147	26,500
6.625	33.00	0.500	5.500	7.371	9.621	9.621	100%	100%	770	20,300	1,058	25,800	1,203	28,500
6.625	34.50	0.525	5.450	7.402	10.061	10.061	100%	100%	805	22,300	1,107	28,000	1,258	30,900
7.000	23.00	0.317	6.250	7.515	6.655	5.749	100%	100%	532	10,600	732	13,600	832	15,000
7.000	26.00	0.362	6.151	7.575	7.549	6.655	100%	100%	604	13,400	830	17,200	944	19,100
7.000	29.00	0.408	6.125	7.636	8.449	7.549	100%	100%	676	16,700	929	21,100	1,056	23,300
7.000	32.00	0.453	6.000	7.693	9.317	8.449	100%	100%	745	19,600	1,025	24,800	1,165	27,400
7.000	35.00	0.498	5.879	7.750	10.172	9.317	100%	100%	814	22,400	1,119	28,400	1,272	31,400
7.000	38.00	0.540	5.795	7.801	10.959	10.172	100%	100%	877	25,200	1,206	31,800	1,370	35,100
7.000	41.00	0.590	5.695	7.861	11.881	10.959	100%	100%	950	28,400	1,307	35,800	1,485	39,600
7.625	26.40	0.328	6.844	8.168	7.519	11.881	100%	100%	602	10,100	827	12,700	940	14,000
7.625	29.70	0.375	6.750	8.232	8.541	7.519	100%	100%	683	13,600	940	17,200	1,068	19,000
7.625	33.70	0.430	6.640	8.307	9.720	8.541	100%	100%	778	17,600	1,069	22,300	1,215	24,600
7.625	35.80	0.465	6.570	8.350	10.460	9.720	100%	100%	837	20,100	1,151	25,500	1,307	28,200
7.625	39.00	0.500	6.500	8.396	11.192	10.460	100%	100%	895	22,700	1,231	28,800	1,399	31,800
7.625	42.80	0.562	6.376	8.473	12.470	11.192	100%	100%	998	27,200	1,372	34,500	1,559	38,100
7.625	45.30	0.595	6.310	8.513	13.141	12.470	100%	100%	1,051	29,600	1,445	37,500	1,643	41,500
7.625	47.10	0.625	6.250	8.549	13.744	13.141	100%	100%	1,100	31,800	1,512	40,200	1,718	44,500
7.750	46.10	0.595	6.500	8.640	13.374	13.744	100%	100%	1,070	31,000	1,471	39,100	1,672	43,100
7.750	48.00	0.625	6.375	8.676	13.990	13.374	100%	100%	1,119	33,300	1,539	41,900	1,749	46,200
7.750	49.00	0.640	6.345	8.695	14.296	13.990	100%	100%	1,144	34,400	1,573	43,300	1,787	47,800
8.625	28.00	0.304	7.892	9.139	7.947	14.296	100%	100%	636	10,000	874	12,600	993	14,000
8.625	32.00	0.352	7.875	9.206	9.149	7.947	100%	100%	732	14,300	1,006	18,200	1,144	20,100
8.625	36.00	0.400	7.700	9.274	10.336	9.149	100%	100%	827	18,800	1,137	23,900	1,292	26,400
8.625	40.00	0.450	7.625	9.340	11.557	10.336	100%	100%	925	23,300	1,271	29,700	1,445	32,900
8.625	44.00	0.500	7.500	9.407	12.763	11.557	100%	100%	1,021	27,800	1,404	35,500	1,595	39,400
8.625	49.00	0.557	7.386	9.479	14.118	12.763	100%	100%	1,129	33,000	1,553	42,200	1,765	46,700
9.625	36.00	0.352	8.765	10.212	10.254	14.118	100%	100%	820	16,500	1,128	21,100	1,282	23,400
9.625	40.00	0.395	8.750	10.272	11.454	10.254	100%	100%	916	21,200	1,260	27,000	1,432	29,900
9.625	43.50	0.435	8.599	10.327	12.559	11.454	100%	100%	1,005	25,500	1,381	32,600	1,570	36,200
9.625	47.00	0.472	8.525	10.377	13.572	12.559	100%	100%	1,086	29,600	1,493	37,800	1,697	42,000
9.625	53.50	0.545	8.500	10.473	15.546	13.572	100%	100%	1,244	37,500	1,710	48,000	1,943	53,200
9.625	58.40	0.595	8.375	10.537	16.879	15.546	100%	100%	1,350	42,800	1,857	54,800	2,110	60,800
9.875	62.80	0.625	8.500	10.828	18.162	16.879	100%	100%	1,453	48,000	1,998	61,200	2,270	67,800
10.750	40.50	0.350	9.894	11.337	11.435	18.162	100%	100%	915	17,700	1,258	22,600	1,429	25,100
10.750	45.50	0.400	9.875	11.409	13.006	11.435	100%	100%	1,040	24,300	1,431	31,200	1,626	34,700
10.750	51.00	0.450	9.694	11.477	14.561	13.006	100%	100%	1,165	30,900	1,602	39,600	1,820	43,900
10.750	55.50	0.495	9.625	11.539	15.947	14.561	100%	100%	1,276	36,900	1,754	47,400	1,993	52,600
10.750	60.70	0.545	9.504	11.606	17.473	15.947	100%	100%	1,398	43,600	1,922	56,000	2,184	62,200
10.750	65.70	0.595	9.500	11.672	18.982	17.473	100%	100%	1,519	50,100	2,088	64,400	2,373	71,600
11.750	42.00	0.333	11.000	12.315	11.944	18.982	100%	100%	956	19,300	1,314	24,400	1,493	26,900
11.750	47.00	0.375	10.844	12.377	13.401	11.944	100%	100%	1,072	26,400	1,474	33,600	1,675	37,300
11.750	54.00	0.435	10.724	12.462	15.463	13.401	100%	100%	1,237	36,600	1,701	47,000	1,933	52,200
11.750	60.00	0.489	10.625	12.536	17.300	15.463	100%	100%	1,384	45,600	1,903	58,700	2,162	65,200
11.750	65.00	0.534	10.625	12.598	18.816	17.300	100%	100%	1,505	53,700	2,070	68,800	2,352	76,300
11.750	71.00	0.582	10.430	12.664	20.420	18.816	100%	100%	1,634	62,000	2,246	79,500	2,552	88,200
11.750	74.60	0.618	10.358	12.710	21.613	20.420	100%	100%	1,729	68,000	2,377	87,200	2,702	96,800
11.875	71.80	0.582	10.625	12.788	20.648	21.613	100%	100%	1,652	62,900	2,271	80,800	2,581	89,700
13.375	54.50	0.380	12.459	14.013	15.513	20.648	100%	100%	1,241	33,100	1,706	42,500	1,939	47,200
13.375	61.00	0.430	12.359	14.085	17.487	15.513	100%	100%	1,399	43,800	1,924	56,100	2,186	62,300
13.375	68.00	0.480	12.259	14.157	19.445	17.487	100%	100%	1,556	54,600	2,139	70,300	2,431	78,200
13.375	72.00	0.514	12.250	14.204	20.768	19.445	100%	100%	1,661	62,100	2,284	80,000	2,596	89,000
13.375	77.00	0.550	12.119	14.253	22.160	20.768	100%	100%	1,773	69,700	2,438	90,000	2,770	100,100
13.375	80.70	0.580	12.059	14.294	23.314	22.160	100%	100%	1,865	76,200	2,565	98,400	2,914	109,500
13.375	91.00	0.660	11.899	14.405	26.364	23.314	100%	100%	2,109	93,400	2,900	120,700	3,295	134,400
13.625	88.20	0.625	12.250	14.609	25.525	26.364	100%	100%	2,042	88,400	2,808	114,500	3,191	127,500
16.000	75.00	0.438	14.937	16.662	21.414	25.525	100%	100%	1,713	45,300	2,355	56,700	2,677	62,400
16.000	84.00	0.495	14.82	16.770	24.112	24.112	100%	100%	1,929	68,900	2,652	87,900	3,014	97,400
16.000	94.50	0.575	14.750	16.936	27.864	27.864	100%	100%	2,229	101,600	3,065	131,100	3,483	145,800

TMK—UP ULTRA SF

Diagram p. C-116

Type: Intergral, upset Seal: Metal-to-metal

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
3.500	12.70	0.375	2.625	3.638	2.750	3.334	90.3%	90.3%	266	5,300	365	6,800	416	7,500
3.500	15.50	0.476	2.423	3.669	2.548	4.126	91.0%	91.0%	329	7,200	452	9,000	514	9,800
3.500	17.00	0.530	2.315	3.657	2.440	4.490	90.6%	90.6%	358	7,800	492	9,500	560	10,300
4.000	11.60	0.286	3.303	4.154	3.428	3.035	90.5%	90.5%	241	6,500	332	8,600	377	9,600
4.000	13.20	0.330	3.215	4.152	3.340	3.435	90.1%	90.1%	274	6,500	376	8,500	428	9,500
4.000	14.68	0.380	3.115	4.148	3.240	3.937	90.9%	90.9%	313	6,800	432	8,800	491	9,700
4.500	13.50	0.290	3.795	4.655	3.920	3.492	90.3%	90.3%	276	8,100	380	10,700	433	11,900
4.500	15.10	0.337	3.701	4.645	3.826	4.037	91.4%	91.4%	322	7,900	442	10,400	503	11,700
4.500	16.60	0.375	3.625	4.650	3.750	4.426	90.8%	90.8%	352	8,300	485	10,800	551	12,100
4.500	17.00	0.380	3.615	4.656	3.740	4.526	91.8%	91.8%	361	8,200	497	10,700	564	12,000
4.500	18.80	0.430	3.515	4.659	3.640	4.801	87.1%	87.1%	382	10,100	526	13,200	598	14,800
5.000	15.00	0.296	4.283	5.160	4.408	3.904	89.0%	89.0%	311	9,800	428	13,000	486	14,600
5.000	18.00	0.362	4.151	5.160	4.276	4.826	91.3%	91.3%	384	10,000	529	13,100	601	14,700
5.000	20.30	0.408	4.059	5.180	4.184	5.223	88.5%	88.5%	416	12,300	573	16,300	651	18,300
5.000	20.80	0.422	4.031	5.178	4.156	5.399	88.7%	88.7%	430	12,400	592	16,400	673	18,300
5.000	21.40	0.437	4.001	5.177	4.126	5.588	89.0%	89.0%	446	12,300	613	16,200	697	18,200

Continued

TMK—UP ULTRA SF (cont.)

Diagram p. C-116

Type: Intergral, upset Seal: Metal-to-metal

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
5.000	23.20	0.478	3.919	5.171	4.044	6.162	90.5%	90.5%	492	12,600	675	16,400	768	18,300
5.500	24.10	0.500	3.875	5.168	4.000	6.342	89.5%	89.5%	506	12,600	695	16,500	790	18,400
5.500	17.00	0.304	4.767	5.663	3.876	4.559	91.6%	91.6%	363	11,400	499	15,200	568	17,100
5.500	20.00	0.361	4.653	5.646	3.750	5.289	90.5%	90.5%	422	11,400	580	15,100	659	17,000
5.500	23.00	0.415	4.545	5.696	4.892	6.110	91.9%	91.9%	487	14,400	670	19,100	761	21,400
5.500	26.00	0.476	4.423	5.688	4.778	6.957	92.4%	92.4%	555	14,600	763	19,200	867	21,500
5.500	26.80	0.500	4.375	5.670	4.670	7.041	89.4%	89.4%	562	14,700	772	19,200	877	21,500
6.625	29.70	0.562	4.251	5.692	4.548	7.419	84.9%	82.3%	592	19,200	814	25,300	924	28,300
6.625	24.00	0.352	5.796	6.789	4.500	6.277	90.3%	90.3%	500	16,500	689	22,100	783	24,800
6.625	28.00	0.417	5.666	6.833	4.376	7.406	90.8%	90.8%	590	21,000	812	27,900	923	31,400
7.000	32.00	0.475	5.550	6.835	6.049	8.474	92.1%	92.1%	676	21,500	929	28,400	1,057	31,800
7.000	23.00	0.317	6.250	7.176	5.921	6.038	90.5%	90.5%	481	18,500	662	24,800	752	27,900
7.000	26.00	0.362	6.151	7.157	5.901	6.896	91.1%	91.1%	549	18,400	756	24,600	859	27,700
7.000	29.00	0.408	6.059	7.210	5.791	7.690	90.8%	90.8%	613	23,200	843	31,000	959	34,900
7.000	32.00	0.453	6.000	7.212	5.675	8.501	91.0%	91.0%	678	23,700	932	31,400	1,059	35,300
7.000	35.00	0.498	5.879	7.194	5.625	9.258	90.8%	90.8%	738	23,800	1,015	31,400	1,154	35,300
7.000	38.00	0.540	5.795	7.240	5.575	9.682	88.1%	88.1%	772	31,300	1,062	41,600	1,206	46,700
7.000	41.00	0.590	5.695	7.243	5.501	10.634	89.3%	89.3%	848	32,000	1,166	42,100	1,326	47,200
7.625	42.70	0.625	5.625	7.243	6.366	11.292	90.0%	90.0%	901	32,300	1,238	42,300	1,407	47,400
7.625	26.40	0.328	6.844	7.792	6.276	6.683	88.7%	88.7%	533	21,900	733	29,400	832	33,100
7.625	29.70	0.375	6.750	7.786	6.184	7.615	88.9%	88.9%	607	22,000	835	29,400	949	33,100
7.625	33.70	0.430	6.640	7.821	6.094	8.845	90.8%	90.8%	705	27,500	970	36,800	1,102	41,400
7.625	39.00	0.500	6.500	7.902	6.004	10.195	90.9%	90.9%	813	36,900	1,119	49,300	1,270	55,600
7.625	42.80	0.562	6.376	7.896	5.920	11.399	91.2%	91.2%	909	37,500	1,250	49,700	1,421	55,900
7.625	45.30	0.595	6.310	7.891	5.820	12.025	91.3%	91.3%	959	37,800	1,319	49,900	1,499	56,000
8.625	47.10	0.625	6.250	7.886	5.750	12.583	91.3%	91.3%	1,004	38,000	1,380	50,000	1,569	56,100
8.625	46.10	0.595	6.500	7.988	5.540	11.710	87.3%	87.3%	934	38,600	1,285	51,200	1,459	57,600
9.625	32.00	0.352	7.875	8.796	6.969	7.838	85.5%	85.5%	625	28,200	860	37,800	977	42,600
9.625	44.00	0.500	7.500	8.917	6.875	11.652	91.1%	91.1%	930	47,500	1,278	63,600	1,453	71,600
9.625	39.00	0.400	-0.125	9.592	6.765	35.764	90.7%	90.7%	818	44,300	1,125	52,600	1,278	56,700
9.625	36.00	0.352	8.765	9.808	6.625	9.314	90.6%	90.6%	743	25,500	1,021	34,500	1,161	38,900
9.625	40.00	0.395	8.750	9.807	6.501	10.212	88.9%	88.9%	815	26,100	1,120	35,000	1,273	39,400
10.750	43.50	0.435	8.625	9.837	6.435	11.215	89.1%	89.1%	894	32,700	1,230	43,900	1,398	49,500
10.750	47.00	0.472	8.525	9.830	6.375	12.200	89.7%	88.7%	973	32,800	1,338	43,900	1,521	49,500
10.750	53.50	0.545	8.500	9.910	6.560	13.800	88.5%	88.5%	1,101	44,200	1,514	59,200	1,720	66,700
10.750	62.80	0.625	8.500	10.161	7.921	16.746	92.0%	92.0%	1,335	46,800	1,837	62,400	2,088	70,100
10.750	40.50	0.350	9.894	10.932	7.825	10.162	88.6%	88.6%	810	32,300	1,114	43,500	1,267	49,100
10.750	45.50	0.400	9.875	10.925	7.725	11.276	86.5%	86.5%	899	32,200	1,237	43,400	1,405	49,000
11.750	51.00	0.450	9.694	10.969	7.625	13.086	89.6%	89.6%	1,043	40,800	1,435	54,800	1,632	61,800
11.750	55.50	0.495	9.625	10.966	7.511	14.354	89.8%	89.8%	1,145	40,900	1,575	54,900	1,789	61,900
13.375	60.70	0.545	9.504	11.046	7.435	15.990	91.3%	91.3%	1,275	54,900	1,754	73,700	1,994	83,100
13.375	65.70	0.595	9.500	11.035	7.375	16.946	89.0%	89.0%	1,352	55,300	1,859	74,000	2,112	83,400
13.375	60.00	0.489	10.625	11.965	8.575	15.505	89.4%	86.7%	1,236	48,500	1,700	65,300	1,933	73,700
13.625	65.00	0.534	10.625	12.038	8.921	16.493	87.4%	87.4%	1,316	65,400	1,809	88,100	2,056	99,500
11.875	71.80	0.582	10.625	12.163	8.835	18.468	89.2%	89.2%	1,473	66,800	2,026	89,800	2,303	101,300
13.375	61.00	0.430	12.359	13.620	8.755	15.949	91.0%	91.0%	1,272	58,700	1,749	79,400	1,988	89,800
13.375	68.00	0.480	12.259	13.606	8.681	17.738	91.0%	90.0%	1,415	58,500	1,945	79,100	2,211	89,400
13.375	72.00	0.514	12.250	13.672	8.535	18.398	88.4%	87.7%	1,468	78,300	2,018	106,200	2,293	120,200
13.625	88.20	0.625	12.250	13.932	8.435	23.225	90.8%	90.8%	1,853	83,100	2,548	111,700	2,895	125,900
9.875	62.80	0.625	8.500	10.161	8.625	16.704	91.6%	92.9%	1,336	63,100	1,837	83,300	2,088	93,400
9.875	64.10	0.650	8.500	10.128	8.575	16.670	88.1%	89.3%	1,334	63,200	1,833	83,300	2,084	93,400
10.750	40.50	0.350	9.894	10.932	10.050	10.137	88.3%	89.8%	811	44,700	1,114	59,600	1,266	67,000
10.750	45.50	0.400	9.875	10.925	9.950	11.248	86.1%	87.5%	899	44,800	1,237	59,600	1,406	67,000
10.750	51.00	0.450	9.694	10.970	9.850	13.054	89.3%	90.7%	1,044	56,200	1,436	74,700	1,631	83,900
10.750	55.50	0.495	9.604	10.967	9.760	14.400	89.9%	90.0%	1,151	56,400	1,584	74,800	1,800	83,900
10.750	60.70	0.545	9.504	11.046	9.660	15.950	90.9%	92.2%	1,276	74,100	1,754	98,600	1,993	110,800
10.750	65.70	0.595	9.500	11.036	9.560	16.903	88.7%	89.9%	1,352	74,800	1,859	99,200	2,113	111,300
10.750	85.30	0.797	9.000	11.017	9.156	22.869	91.4%	92.5%	1,829	79,300	2,515	102,600	2,858	114,300
10.750	97.10	0.922	8.750	10.993	8.906	26.065	91.2%	92.2%	2,085	81,700	2,867	104,400	3,258	115,700
11.750	47.00	0.375	10.844	11.932	11.000	11.896	88.4%	89.9%	951	53,300	1,308	71,100	1,486	80,000
11.750	54.00	0.435	10.724	11.974	10.880	13.813	89.0%	90.4%	1,104	66,400	1,519	88,700	1,726	99,800
11.750	60.00	0.489	10.625	11.965	10.772	15.466	89.1%	86.3%	1,237	66,500	1,701	88,600	1,932	99,700
11.750	65.00	0.534	10.625	12.038	10.682	16.452	87.1%	87.5%	1,316	87,900	1,809	117,600	2,056	132,400
11.750	71.00	0.582	10.430	12.038	10.586	18.505	90.3%	91.5%	1,480	88,400	2,036	117,800	2,313	132,500
11.875	71.80	0.582	10.625	12.163	10.711	18.422	88.9%	90.1%	1,473	90,000	2,026	120,000	2,303	135,000
13.375	54.50	0.380	12.459	13.646	12.615	14.357	92.2%	93.7%	1,148	85,400	1,579	114,600	1,794	129,200
13.375	61.00	0.430	12.359	13.620	12.515	15.909	90.6%	92.0%	1,272	85,400	1,750	114,500	1,988	129,000
13.375	68.00	0.480	12.259	13.606	12.415	17.694	90.6%	89.7%	1,415	84,700	1,946	113,700	2,212	128,100
13.375	72.00	0.514	12.250	13.672	12.347	18.353	88.0%	87.4%	1,467	111,600	2,018	150,400	2,294	169,900
13.625	88.20	0.625	12.250	13.932	12.375	23.167	90.4%	91.6%	1,853	119,700	2,548	159,400	2,896	179,200
16.000	97.00	0.575	14.750	16.298	14.850	24.591	87.9%	85.7%	1,967	162,100	2,704	217,900	3,073	245,800

TMK—UP ULTRA SF II

Diagram p. C-116

Type: Intergral, upset Seal: Metal-to-metal

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
3.500	12.70	0.375	2.625	3.638	2.750	3.265	86.1%	78.2%	253	6,000	348	6,900	396	7,400
3.500	15.50	0.476	2.423	3.653	2.548	4.015	87.1%	76.6%	314	7,700	433	8,800	492	9,300
3.500	17.00	0.530	2.315	3.639	2.440	4.380	87.7%	78.1%	346	8,400	476	9,400	542	10,000
4.000	11.60	0.286	3.303	4.157	3.428	2.856	83.1%	83.1%	221	6,200	305	7,500	346	8,200
4.000	13.20	0.330	3.215	4.180	3.340	3.299	84.2%	84.2%	256	7,700	352	9,300	400	10,000
4.000	14.80	0.380	3.115	4.163	3.240	3.779	85.7%	76.0%	296	7,700	407	9,200	463	9,900
4.500	13.50	0.290	3.795	4.655	3.920	3.270	82.8%	82.8%	253	8,600	348	10,700	396	11,800
4.500	15.10	0.337	3.701	4.679	3.826	3.810	83.9%	83.9%	295	10,700	406	13,200	462	14,500
4.500	16.60	0.375	3.625	4.669	3.750	4.267	85.3%	74.9%	331	10,400	455	12,900	517	14,200
4.500	17.00	0.380	3.615	4.668	3.740	4.323	85.3%	75.2%	335	10,500	462	13,000	524	14,200
4.500	18.80	0.430	3.515	4.689	3.640	4.799	85.6%	71.9%	376	11,900	517	14,700	588	16,200
5.000	15.00	0.296	4.283	5.156	4.408	3.737	82.5%	82.5%	288	10,400	397	13,100	451	14,400
5.000	18.00	0.362	4.151	5.209	4.276	4.589	84.1%	84.1%	354	14,700	488	18,300	554	20,100
5.000	20.30	0.408	4.059	5.199	4.184	5.203	85.4%	73.6%	401	14,600	553	18,200	628	20,000
5.000	20.80	0.422	4.031	5.197	4.156	5.377	85.6%	74.3%	415	14,900	571	18,400	649	20,200
5.000	21.40	0.437	4.001	5.217	4.126	5.509	85.8%	73.9%	430	16,500	591	20,500	672	22,500

Continued

TMK—UP ULTRA SF II (cont.)

Diagram p. C-116

Type: Intergral, upset Seal: Metal-to-metal

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
5.000	23.20	0.478	3.919	5.216	4.044	5.976	85.9%	71.9%	466	16,900	641	20,800	728	22,800
5.000	24.10	0.500	3.875	5.213	4.000	6.240	86.1%	72.6%	487	17,300	669	21,200	760	23,200
5.500	17.00	0.304	4.767	5.666	4.892	4.231	82.4%	82.4%	326	13,100	449	16,500	511	18,200
5.500	20.00	0.361	4.653	5.688	4.778	5.049	83.7%	83.7%	390	16,400	537	20,400	609	22,500
5.500	23.00	0.415	4.545	5.726	4.670	5.817	85.2%	71.9%	451	19,500	621	24,800	705	27,400
5.500	26.00	0.476	4.423	5.730	4.548	6.618	85.5%	70.8%	514	20,900	706	26,100	803	28,700
5.500	26.80	0.500	4.375	5.754	4.500	6.840	85.8%	70.5%	539	24,100	741	30,100	842	33,100
5.500	29.70	0.562	4.251	5.744	4.376	7.651	86.5%	72.7%	603	25,200	829	31,100	942	34,100
6.625	24.00	0.352	5.796	6.801	5.921	6.168	83.9%	70.5%	465	17,200	640	22,000	727	24,400
6.625	28.00	0.417	5.666	6.839	5.791	7.149	84.9%	71.5%	552	23,700	759	30,100	863	33,400
6.625	32.00	0.475	5.550	6.862	5.675	8.054	85.2%	69.6%	625	27,100	860	34,300	977	37,900
7.000	23.00	0.317	6.250	7.178	6.366	5.720	82.2%	81.7%	438	18,900	602	24,300	683	26,900
7.000	26.00	0.362	6.151	7.199	6.276	6.536	83.3%	83.3%	502	23,200	691	29,500	785	32,700
7.000	29.00	0.408	6.125	7.238	6.184	7.254	82.6%	70.1%	557	25,800	767	33,100	872	36,700
7.000	32.00	0.453	6.000	7.244	6.094	8.178	85.2%	71.7%	635	29,800	873	37,900	992	42,000
7.000	35.00	0.498	5.879	7.272	6.004	8.939	85.7%	72.2%	697	35,400	958	44,900	1,090	49,600
7.000	38.00	0.540	5.795	7.270	5.920	9.632	85.7%	70.3%	751	35,900	1,033	45,300	1,174	50,000
7.000	41.00	0.590	5.695	7.328	5.820	10.397	86.2%	70.9%	819	39,400	1,126	49,300	1,280	54,200
7.000	42.70	0.625	5.625	7.322	5.750	10.990	86.5%	71.9%	866	40,400	1,190	50,200	1,353	55,100
7.625	26.40	0.328	6.844	7.800	6.969	6.456	82.2%	81.8%	494	22,400	680	28,800	772	31,900
7.625	29.70	0.375	6.750	7.819	6.875	7.354	83.2%	83.2%	568	27,400	781	35,000	888	38,800
7.625	33.70	0.430	6.640	7.838	6.765	8.514	84.6%	70.8%	658	30,600	905	39,200	1,027	43,500
7.625	39.00	0.500	6.500	7.897	6.625	9.806	85.5%	71.5%	765	41,400	1,052	52,700	1,195	58,400
7.625	42.80	0.562	6.376	7.892	6.501	10.954	85.7%	70.3%	854	42,500	1,175	53,700	1,335	59,300
7.625	45.30	0.595	6.310	7.953	6.435	11.470	86.0%	70.3%	904	46,000	1,243	57,900	1,412	63,800
7.625	47.10	0.625	6.250	7.948	6.375	12.032	86.2%	71.2%	948	47,000	1,303	58,800	1,482	64,700
7.750	46.10	0.595	6.500	8.127	6.560	11.897	85.9%	71.5%	919	48,000	1,264	60,300	1,436	66,500
8.625	32.00	0.352	7.875	8.845	7.921	7.860	82.2%	82.2%	601	24,300	827	30,700	940	34,000
8.625	44.00	0.500	7.500	8.882	7.625	11.289	84.6%	68.1%	864	38,400	1,188	48,300	1,350	53,300
9.375	39.00	0.400	8.450	9.582	8.575	9.876	83.4%	68.4%	752	29,100	1,034	36,400	1,175	40,100
9.625	36.00	0.352	8.765	9.802	8.921	8.799	81.7%	81.1%	670	25,500	921	32,100	1,047	35,300
9.625	40.00	0.395	8.750	9.845	8.835	9.938	82.6%	82.6%	757	31,200	1,040	39,000	1,183	42,900
9.625	43.50	0.435	8.599	9.851	8.755	11.057	83.8%	68.5%	842	35,000	1,158	43,800	1,316	48,300
9.625	47.00	0.472	8.525	9.874	8.681	11.964	84.4%	69.4%	915	40,500	1,259	50,500	1,431	55,500
9.625	53.50	0.545	8.500	9.965	8.535	13.706	84.8%	70.1%	1,054	48,900	1,450	60,700	1,647	66,500
9.875	62.80	0.625	8.500	10.248	8.625	16.206	85.0%	71.3%	1,234	57,600	1,697	70,700	1,929	77,200
10.750	40.50	0.350	9.894	10.936	10.050	9.835	81.1%	79.5%	742	31,500	1,020	40,300	1,159	44,700
10.750	45.50	0.400	9.875	10.953	9.950	11.416	82.8%	68.5%	861	31,800	1,184	40,600	1,346	45,000
10.750	51.00	0.450	9.694	10.954	9.850	12.906	83.6%	70.5%	973	38,800	1,339	49,300	1,522	54,500
10.750	55.50	0.495	9.625	10.995	9.760	14.062	83.2%	69.4%	1,061	44,700	1,459	56,700	1,658	62,800
10.750	60.70	0.545	9.504	11.017	9.660	15.529	83.8%	70.5%	1,171	51,900	1,611	65,500	1,831	72,300
10.750	65.70	0.595	9.404	11.058	9.560	16.983	84.4%	71.1%	1,281	61,600	1,762	77,400	2,002	85,400
11.750	60.00	0.489	10.625	12.014	10.772	15.364	83.8%	68.9%	1,159	59,900	1,594	76,800	1,811	85,300
11.750	65.00	0.534	10.625	12.055	10.682	16.628	83.4%	70.7%	1,255	60,300	1,725	77,300	1,961	85,800
11.875	71.80	0.582	10.625	12.197	10.711	18.364	83.9%	70.0%	1,385	73,000	1,905	93,200	2,166	103,400
13.375	61.00	0.430	12.359	13.580	12.515	15.254	82.3%	67.6%	1,150	57,000	1,582	74,400	1,798	83,000
13.375	68.00	0.480	12.259	13.639	12.415	17.126	83.1%	67.5%	1,292	75,000	1,776	97,500	2,019	108,800
13.375	72.00	0.514	12.250	13.648	12.347	18.392	83.5%	69.5%	1,388	75,800	1,908	98,200	2,168	109,400
13.625	88.20	0.625	12.250	13.936	12.375	22.683	83.8%	70.8%	1,712	94,400	2,353	121,700	2,674	135,300

TMK—UP TMK PF

Diagram p. C-116

Type: Threaded and Coupled Seal: Metal-to-metal

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
2.375	4.6	0.19	1.901	2.88	1.305	1.305	100%	80%	72	1,900	143	2,600	163	2,800
2.375	5.8	0.25	1.773	2.88	1.692	1.692	100%	80%	135	2,400	186	3,200	212	3,400
2.375	6.6	0.29	1.691	2.88	1.927	1.927	100%	80%	154	2,600	212	3,400	241	3,700
2.375	7.35	0.34	1.609	2.88	2.151	2.151	95%	80%	163	2,800	224	3,700	254	3,900
2.875	6.40	0.22	2.347	3.50	1.811	1.811	100%	80%	145	3,000	199	4,100	226	4,300
2.875	7.80	0.28	2.229	3.50	2.253	2.253	100%	80%	180	3,600	248	4,700	282	5,000
2.875	8.60	0.31	2.165	3.50	2.483	2.483	100%	80%	199	3,900	273	5,000	310	5,400
2.875	9.35	0.34	2.101	3.50	2.709	2.709	100%	80%	217	4,200	298	5,500	339	5,900
2.875	10.50	0.39	1.997	3.50	3.058	3.058	100%	80%	245	4,600	336	6,100	382	6,500
2.875	11.50	0.44	1.901	3.50	3.367	3.19	95%	80%	255	5,000	351	6,600	399	7,000
3.50	7.7	0.22	2.943	4.25	2.23	2.23	100%	80%	179	5,000	245	6,600	279	7,000
3.50	9.2	0.25	2.867	4.25	2.59	2.59	100%	80%	207	5,500	285	7,300	324	7,700
3.50	10.2	0.29	2.797	4.25	2.915	2.915	100%	80%	233	5,900	321	7,800	364	8,400
3.50	12.7	0.37	2.625	4.25	3.68	3.68	100%	80%	295	7,000	405	9,200	460	9,700
3.50	14.3	0.43	2.515	4.25	4.147	4.147	100%	80%	332	7,500	456	9,800	518	10,500
3.50	15.5	0.48	2.423	4.25	4.522	4.522	100%	80%	362	8,100	497	10,600	565	11,200
3.50	17	0.53	2.315	4.25	4.945	4.74	96%	80%	380	8,700	521	11,400	593	12,300
4.00	9.5	0.23	3.423	4.75	2.679	2.679	100%	80%	215	6,400	295	8,400	335	8,900
4.00	10.7	0.26	3.351	4.75	3.075	3.075	100%	80%	246	7,100	338	9,400	384	10,000
4.00	13.2	0.33	3.215	4.75	3.804	3.804	100%	80%	305	8,500	418	11,100	476	11,900
4.00	16.1	0.41	3.045	4.75	4.674	4.674	100%	80%	374	10,200	514	13,400	584	14,400
4.50	12.6	0.27	3.833	5.20	3.599	3.599	100%	60%	288	7,100	396	8,900	450	9,800
4.50	13.50	0.290	3.794	5.201	3.838	3.838	100%	60%	307	7,600	422	9,500	480	10,500
4.50	15.10	0.340	3.701	5.201	4.408	4.408	100%	60%	353	8,400	485	10,300	551	11,500
4.50	17.00	0.380	3.615	5.201	4.918	4.918	100%	60%	394	9,500	541	11,800	615	13,000
4.50	18.90	0.430	3.515	5.201	5.497	5.497	100%	60%	440	10,700	604	13,200	687	14,800
4.50	21.50	0.500	3.375	5.201	6.283	5.859	93%	60%	469	12,500	644	15,400	733	17,100
5.000	15.00	0.296	4.283	5.563	4.374	4.374	100%	60%	350	9,700	481	11,800	547	12,900
5.000	18.00	0.362	4.152	5.563	5.275	5.275	100%	60%	422	11,900	580	14,400	659	15,900
5.000	21.40	0.437	4.001	5.563	6.264	5.387	86%	60%	502	13,700	689	17,200	783	19,300
5.000	23.20	0.478	3.919	5.563	6.791	5.432	80%	60%	544	1,500	747	18,800	849	21,000
5.000	24.10	0.500	3.875	5.563	7.069	5.443	76%	60%	566	15,700	777	19,700	884	22,100
5.500	15.50	0.275	4.826	6.050	4.514	4.514	100%	60%	361	10,100	496	12,600	564	14,000
5.500	17.00	0.304	4.767	6.050	4.962	4.962	100%	60%	397	11,200	545	14,000	620	15,400
5.500	20.00	0.361	4.653	6.050	5.828	5.828	98%	60%	459	12,200	631	16,200	717	17,900
5.500	23.00	0.415	4.545	6.050	6.630	5.834	86%	60%	531	14,000	729	18,500	717	20,600
6.625	20.00	0.288	5.924	7.390	5.734	5.734	100%	60%	459	16,300	631	20,900	717	23,000
6.625	21.25	0.310	5.870	7.390	6.244	6.244	100%	60%	500	19,400	686	25,000	781	27,500
6.625	24.00	0.352	5.797	7.390	6.937	6.937	100%	60%	555	19,900	763	25,500	867	28,000

Continued

TMK—UP TMK PF (cont.)

Diagram p. C-116

Type: Threaded and Coupled **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
6.625	28.00	0.417	5.667	7.390	8.133	8.133	100%	60%	651	23,600	894	30,200	1,017	33,100
6.625	32.00	0.475	5.551	7.390	9.177	9.177	100%	60%	735	26,800	1009	34,300	1,147	37,700
7.000	23.00	0.317	6.241	7.656	6.655	6.655	100%	60%	533	18,200	732	22,400	832	25,000
7.000	26.00	0.362	6.152	7.656	7.549	7.549	100%	60%	604	20,700	830	21,600	943	28,400
7.000	29.00	0.408	6.060	7.656	8.449	8.449	100%	60%	676	23,400	929	28,700	1,056	32,100
7.000	32.00	0.453	5.969	7.656	9.320	9.320	96%	60%	746	26,200	1025	32,100	1,165	35,800
7.000	35.00	0.498	5.879	7.656	10.173	10.173	87%	60%	815	28,900	1118	35,400	1,272	39,300
7.000	38.00	0.540	5.794	7.875	10.962	10.962	100%	60%	878	32,600	1205	41,000	1,371	45,500
7.000	42.70	0.630	5.624	7.875	12.521	11.402	91%	60%	913	38,500	1254	48,500	1,426	53,800
7.000	46.40	0.690	5.501	7.875	13.625	11.402	84%	60%	1,091	42,700	1498	53,800	1,704	59,800
7.625	26.40	0.328	6.845	8.500	7.519	7.519	100%	60%	602	23,700	827	28,900	940	31,400
7.625	29.70	0.375	6.751	8.500	8.541	8.541	100%	60%	684	29,300	939	37,600	1,067	40,500
7.625	33.70	0.430	6.641	8.500	9.720	9.720	100%	60%	778	33,600	1068	43,200	1,215	46,600
7.625	39.00	0.500	6.502	8.500	11.192	11.192	100%	60%	896	39,000	1231	50,100	1,399	54,100
7.625	42.80	0.562	6.377	8.500	12.470	12.470	100%	60%	998	43,900	1371	56,300	1,559	60,700
7.625	45.30	0.595	6.311	8.500	13.141	12.747	97%	60%	1,002	50,000	1376	66,300	1,565	66,300
8.625	32.00	0.352	7.797	9.625	9.149	9.149	100%	60%	732	30,200	1006	40,500	1,144	42,900
8.625	36.00	0.400	7.700	9.625	10.336	10.336	100%	60%	828	34,300	1136	44,600	1,292	48,900
8.625	40.00	0.450	7.600	9.625	11.557	11.557	100%	60%	925	38,600	1271	50,300	1,445	55,000
8.625	44.00	0.500	7.500	9.625	12.763	12.763	100%	60%	1,022	43,000	1403	56,000	1,596	61,300
8.625	49.00	0.557	7.386	9.625	14.118	14.118	100%	60%	1,131	47,900	1552	60,600	1,765	67,100
9.625	36.00	0.352	8.765	10.625	10.254	10.254	100%	60%	821	31,700	1127	37,700	1,282	41,300
9.625	40.00	0.395	8.679	10.625	11.454	11.454	100%	60%	917	36,700	1259	44,900	1,432	49,200
9.625	43.50	0.435	8.599	10.625	12.559	12.559	100%	60%	1,006	41,500	1381	52,500	1,570	57,300
9.625	47.00	0.472	8.525	10.625	13.572	13.572	100%	60%	1,087	47,900	1492	64,100	1,697	67,100
9.625	53.50	0.545	8.379	10.625	15.546	15.546	100%	60%	1,245	55,400	1709	74,300	1,943	77,600
9.625	58.40	0.595	8.279	10.625	16.879	16.879	100%	60%	1,351	60,300	1855	80,800	2,110	84,400
10.750	40.50	0.350	9.894	11.750	11.435	11.435	100%	60%	916	38,300	1257	47,300	1,430	54,500
10.750	45.50	0.400	9.794	11.750	13.006	13.006	100%	60%	1,041	47,300	1430	60,900	1,626	68,400
10.750	51.00	0.450	9.694	11.750	14.561	14.561	100%	60%	1,166	53,200	1601	68,400	1,821	77,000
10.750	55.50	0.495	9.604	11.750	15.947	15.947	100%	60%	1,277	58,500	1753	75,200	1,993	84,800
10.750	60.70	0.545	9.504	11.750	17.473	17.473	100%	60%	1,399	64,600	1921	82,900	2,184	101,900
10.750	65.70	0.595	9.404	11.750	18.982	18.982	100%	60%	1,520	70,500	2087	90,500	2,373	115,000
10.750	73.20	0.672	9.250	11.750	21.276	20.212	95%	60%	1,588	85,500	2180	113,500	2,480	125,300
11.750	65.00	0.530	10.526	12.750	18.811	18.811	100%	60%	1,506	68,200	2068	89,500	2,352	95,500
12.750	49.46	0.374	11.840	13.819	14.541	14.541	100%	60%	1,167	45,560	1605	52,360	1,823	59,228
12.750	56.99	0.433	11.724	13.819	16.755	16.755	101%	60%	1,347	53,380	1852	61,370	2,104	69,394
12.750	63.97	0.488	11.616	13.819	18.799	18.799	100%	60%	1,507	60,690	2072	69,700	2,355	78,897
12.750	71.84	0.551	11.504	13.819	21.117	21.117	99%	60%	1,671	69,190	2298	79,390	2,612	89,947
13.375	54.50	0.380	12.459	14.375	15.513	15.513	100%	60%	1,242	60,100	1705	73,000	1,939	78,400
13.375	61.00	0.430	12.360	14.375	17.487	17.487	100%	60%	1,400	69,400	1922	86,800	2,186	95,100
13.375	68.00	0.480	12.260	14.375	19.445	19.445	100%	60%	1,557	77,400	2138	97,000	2,431	106,000
13.375	72.00	0.514	12.191	14.375	20.768	20.768	100%	60%	1,663	84,600	2284	109,100	2,597	121,200

TMK—UP PF-ET

Diagram p. C-116

Type: Threaded and Coupled **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
4.500	13.5	0.29	3.794	5	3.838	3.838	100%	80%	365	9,500	480	11,900	518	13,200
4.500	15.1	0.34	3.701	5	4.408	4.252	97%	80%	404	10,500	532	13,000	574	14,400
5.000	15	0.3	4.283	5.563	4.375	4.375	100%	80%	416	12,200	547	14,700	591	16,200
5.000	18	0.36	4.151	5.563	5.272	5.272	100%	80%	501	14,800	659	18,100	712	19,900
5.000	21.4	0.044	4.001	5.563	6.285	5.31	85%	80%	505	17,100	664	21,500	717	24,100
5.000	23.2	0.48	3.919	5.563	6.79	5.31	78%	80%	505	18,800	664	23,600	717	26,400
5.000	24.1	0.5	3.875	5.563	7.069	5.31	75%	80%	505	19,700	664	24,700	717	27,700
5.500	15.5	0.27	4.825	6.05	4.511	4.511	100%	80%	429	12,600	564	15,900	609	17,500
5.500	17	0.3	4.767	6.05	43,961.00	4.961	100%	80%	471	14,000	620	17,500	670	19,300
5.500	20	0.36	4.653	6.05	5.829	5.737	98%	80%	545	15,300	717	20,300	775	22,500
5.500	23	0.41	4.545	6.05	6.629	5.737	87%	80%	545	17,500	717	23,300	775	25,800
6.625	20	0.29	5.924	7.39	5.737	5.737	100%	80%	545	20,500	717	26,200	775	28,700
6.625	21.25	0.31	5.87	7.39	6.244	6.244	100%	80%	593	22,200	781	28,400	843	31,400
6.625	24	0.35	5.796	7.39	6.937	6.937	100%	80%	659	24,900	867	31,800	937	35,100
6.625	28	0.42	5.666	7.39	8.132	8.132	100%	80%	773	29,500	1,017	37,700	1,098	41,400
6.625	32	0.47	5.55	7.39	9.174	9.174	100%	80%	872	33,600	1,147	42,900	1,239	47,200
7.000	20	0.27	6.331	7.875	5.75	5.75	100%	80%	546	19,600	719	24,000	776	26,900
7.000	23	0.32	6.241	7.875	6.654	6.654	100%	80%	632	22,800	832	28,000	899	31,400
7.000	26	0.36	6.151	7.875	7.545	7.454	100%	80%	717	25,900	943	31,200	1,019	35,500
7.000	29	0.41	6.059	7.875	8.447	8.447	100%	80%	803	29,300	1,056	35,900	1,141	40,200
7.000	32	0.45	5.969	7.875	9.32	9.32	100%	80%	885	32,800	1,165	40,200	1,259	44,800
7.000	35	0.5	5.879	7.875	10.173	10.173	100%	80%	966	36,100	1,272	44,200	1,374	49,200
7.625	24	0.3	6.9	8.5	6.904	6.904	100%	60%	656	27,100	863	33,000	932	35,800
7.625	26.4	0.33	6.844	8.5	7.518	7.518	100%	60%	714	29,600	940	36,100	1,015	39,200
7.625	29.7	0.37	6.75	8.5	8.537	8.537	100%	60%	811	36,700	1,067	47,000	1,153	50,700
7.625	33.7	0.43	6.64	8.5	9.718	9.718	100%	60%	923	42,000	1,215	53,900	1,312	58,200
7.625	39	0.5	6.5	8.5	11.192	11.192	100%	60%	1,063	48,800	1,399	62,600	1,511	67,700
7.625	42.8	0.56	6.376	8.5	12.467	12.467	100%	60%	1,184	55,000	1,559	70,500	1,683	75,900
7.625	45.3	0.59	6.31	8.5	13.139	12.519	95%	60%	1,189	62,500	1,565	83,700	1,691	89,800
8.625	28	0.3	7.892	9.625	7.946	7.946	100%	60%	755	32,600	993	43,800	1,073	46,300
8.625	32	0.35	7.796	9.625	9.148	9.148	100%	60%	869	37,700	1,144	50,700	1,235	53,600
8.625	36	0.4	7.7	9.625	10.336	10.336	100%	60%	982	42,900	1,292	55,900	1,369	61,200
8.625	40	0.45	7.6	9.625	11.557	11.557	100%	60%	1,098	48,300	1,445	62,800	1,561	66,300
8.625	44	0.5	7.5	9.625	12.763	12.763	100%	60%	1,213	53,800	1,596	66,300	1,723	66,300
8.625	49	0.56	7.386	9.625	14.12	14.12	100%	60%	1,341	59,800	1,765	66,300	1,907	66,300
9.625	36	0.35	8.765	10.625	10.254	10.254	100%	60%	974	39,900	1282	50,300	1,385	55,800
9.625	40	0.39	8.679	10.625	11.451	11.451	100%	60%	1,088	44,600	1432	56,200	1,546	57,000
9.625	43	0.44	8.599	10.625	12.56	12.56	100%	60%	1,193	49,000	1570	64,100	1,696	62,400
9.625	47	0.47	8.525	10.625	13.574	13.574	100%	60%	1,290	53,100	1697	69,600	1,833	68,500
9.625	53.5	0.54	8.379	10.625	15.544	15.544	100%	60%	1,477	61,200	1943	80,100	2,099	74,400
9.625	58.4	0.59	8.279	10.625	16.887	16.887	100%	60%	1,603	66,700	2110	87,400	2,279	85,600
9.625	59.4	0.61	8.251	10.625	17.252	17.252	100%	60%	1,639	68,200	2157	89,500	2,330	93,400
9.625	64.9	0.67	8.125	10.625	18.903	17.841	94%	60%	1,695	75,200	2231	98,500	2,409	95,600
9.625	70.3	0.73	8.001	10.625	20.499	17.841	87%	60%	1,695	82,000	2231	107,600	2,409	105,300
9.625	75.6	0.8	7.875	10.625	22.101	17.841	81%	60%	1,695	89,000	2231	116,600	2,409	114,900

TPS Technitube Röhrenwerke—TPS-Multiseal-TS 4

Diagram p. C-116

Type: Integral **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
5.000	18.0	4.276	0.362	5.515	5.275	> At	> Pipe body	–	422	–	580	–	–	–
5.000	20.3	4.184	0.408	5.585	5.886	> At	> Pipe body	–	471	–	647	–	–	–
5.000	23.2	4.044	0.478	5.700	6.791	> At	> Pipe body	–	543	–	747	–	–	–
5.000	27.0	3.880	0.560	5.835	7.811	> At	> Pipe body	–	625	–	859	–	–	–
5.500	17.0	4.892	0.304	5.920	4.962	> At	> Pipe body	–	397	–	546	–	–	–
5.500	20.0	4.778	0.361	6.005	5.828	> At	> Pipe body	–	466	–	641	–	–	–
5.500	23.0	4.670	0.415	6.090	6.630	> At	> Pipe body	–	530	–	729	–	–	–
5.500	26.0	4.548	0.476	6.185	7.513	> At	> Pipe body	–	601	–	826	–	–	–
5.500	28.4	4.440	0.530	6.275	8.275	> At	> Pipe body	–	662	–	910	–	–	–
6.625	28.0	5.791	0.417	7.210	8.133	> At	> Pipe body	–	651	–	895	–	–	–
6.625	32.0	5.675	0.475	7.300	9.177	> At	> Pipe body	–	688	–	1,009	–	–	–
6.625	35.0	5.575	0.525	7.380	10.061	> At	> Pipe body	–	805	–	1,107	–	–	–
7.000	29.0	6.184	0.408	7.570	8.449	> At	> Pipe body	–	676	–	929	–	–	–
7.000	32.0	6.094	0.453	7.640	9.317	> At	> Pipe body	–	745	–	1,025	–	–	–
7.000	35.0	6.004	0.498	7.710	10.172	> At	> Pipe body	–	814	–	1,119	–	–	–
7.000	38.0	5.920	0.540	7.775	10.959	> At	> Pipe body	–	877	–	1,205	–	–	–

TPS Technitube Röhrenwerke—Techniseal

Diagram p. C-117

Type: Coupled **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
5.000	13.0	4.494	0.253	5.587	3.773	5.498	= Pipe body	–	302	–	415	–	–	–
5.000	15.0	4.408	0.296	5.587	4.374	5.498	= Pipe body	–	350	–	481	–	–	–
5.000	18.0	4.276	0.362	5.587	5.275	5.498	= Pipe body	–	422	–	580	–	–	–
5.000	20.3	4.184	0.408	5.587	5.886	5.498	= Pipe body	–	440	–	605	–	–	–
5.000	20.8	4.156	0.422	5.587	6.069	5.498	= Pipe body	–	440	–	605	–	–	–
5.000	21.4	4.125	0.437	5.587	6.264	5.498	= Pipe body	–	440	–	605	–	–	–
5.000	24.1	4.000	0.500	5.587	7.069	5.498	= Pipe body	–	440	–	605	–	–	–
5.500	15.5	4.950	0.275	6.075	4.514	5.975	= Pipe body	–	361	–	564	–	–	–
5.500	17.0	4.892	0.304	6.075	4.962	5.975	= Pipe body	–	397	–	546	–	–	–
5.500	20.0	4.778	0.361	6.075	5.828	5.975	= Pipe body	–	466	–	641	–	–	–
5.500	23.0	4.670	0.415	6.075	6.630	5.975	= Pipe body	–	478	–	657	–	–	–
5.500	26.0	4.548	0.476	6.075	7.513	5.975	= Pipe body	–	478	–	657	–	–	–
6.625	20.0	6.049	0.288	7.413	5.734	9.667	= Pipe body	–	459	–	631	–	–	–
6.625	23.2	5.965	0.330	7.413	6.526	9.667	= Pipe body	–	522	–	718	–	–	–
6.625	24.0	5.921	0.352	7.413	6.937	9.667	= Pipe body	–	555	–	763	–	–	–
6.625	28.0	5.791	0.417	7.413	8.133	9.667	= Pipe body	–	651	–	894	–	–	–
6.625	32.0	5.675	0.475	7.413	9.177	9.667	= Pipe body	–	734	–	1,009	–	–	–
6.625	35.0	5.575	0.525	7.413	10.061	9.667	= Pipe body	–	774	–	1,064	–	–	–
7.000	23.0	6.366	0.317	7.681	6.655	9.066	= Pipe body	–	532	–	732	–	–	–
7.000	26.0	6.276	0.362	7.681	7.549	9.066	= Pipe body	–	604	–	830	–	–	–
7.000	29.0	6.184	0.408	7.681	8.449	9.066	= Pipe body	–	676	–	929	–	–	–
7.000	32.0	6.094	0.453	7.681	9.317	9.066	= Pipe body	–	725	–	997	–	–	–
7.000	35.0	6.004	0.498	7.681	10.172	9.066	= Pipe body	–	725	–	997	–	–	–
7.000	38.0	5.920	0.540	7.681	10.959	9.066	= Pipe body	–	725	–	997	–	–	–
7.000	41.0	5.820	0.590	7.681	11.881	9.066	= Pipe body	–	725	–	997	–	–	–
7.000	44.0	5.720	0.640	7.681	12.788	14.792	= Pipe body	–	725	–	997	–	–	–
7.000	46.0	5.660	0.670	7.683	13.324	14.792	= Pipe body	–	727	–	1,000	–	–	–
7.625	26.4	6.969	0.328	8.528	7.519	12.899	= Pipe body	–	601	–	827	–	–	–
7.625	29.7	6.875	0.375	8.528	8.541	12.899	= Pipe body	–	683	–	939	–	–	–
7.625	33.7	6.765	0.430	8.528	9.720	12.899	= Pipe body	–	777	–	1,069	–	–	–
7.625	35.8	6.693	0.466	8.528	10.481	12.899	= Pipe body	–	836	–	1,150	–	–	–
7.625	39.0	6.625	0.500	8.528	11.192	12.899	= Pipe body	–	895	–	1,231	–	–	–
7.625	42.8	6.501	0.562	8.528	12.470	12.899	= Pipe body	–	997	–	1,371	–	–	–
7.625	45.3	6.435	0.595	8.528	13.141	12.899	= Pipe body	–	1,032	–	1,419	–	–	–
8.625	28.0	8.017	0.304	9.650	7.947	16.399	= Pipe body	–	636	–	874	–	–	–
8.625	32.0	7.921	0.352	9.650	9.149	16.399	= Pipe body	–	732	–	1,006	–	–	–
8.625	36.0	7.825	0.400	9.650	10.336	16.399	= Pipe body	–	827	–	1,137	–	–	–
8.625	40.0	7.725	0.450	9.650	11.557	16.399	= Pipe body	–	925	–	1,271	–	–	–
8.625	44.0	7.625	0.500	9.650	12.763	16.399	= Pipe body	–	1,021	–	1,404	–	–	–
8.625	49.0	7.511	0.557	9.650	14.118	16.399	= Pipe body	–	1,130	–	1,553	–	–	–
8.625	52.0	7.435	0.595	9.650	15.010	16.399	= Pipe body	–	1,201	–	1,651	–	–	–

*Regular T&C.

Vallourec USA-Atlas Bradford—HD-L

Diagram p. C-117

Type: Integral flush joint **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
5.000	15.0	4.283	0.296	5.000	4.374	2.013	46.0	46.0	161	3,400	221	4,200	252	4,600
5.000	18.0	4.151	0.362	5.000	5.275	2.736	51.9	51.9	219	3,400	301	4,200	342	4,600
5.000	20.3	4.059	0.408	5.000	5.886	3.317	56.4	56.4	265	3,400	365	4,200	415	4,600
5.000	20.8	4.031	0.422	5.000	6.069	3.500	57.7	57.7	280	3,400	385	4,200	438	4,600
5.000	21.4	4.001	0.437	5.000	6.264	3.695	59.0	59.0	296	3,400	406	4,200	462	4,600
5.000	22.4	3.951	0.462	5.000	6.587	3.987	60.5	60.5	319	3,400	439	4,200	498	4,600
5.000	23.2	3.919	0.478	5.000	6.791	4.191	61.7	61.7	335	3,400	461	4,200	524	4,600
5.000	24.1	3.875	0.500	5.000	7.069	4.469	63.2	63.2	358	3,400	492	4,200	559	4,600
5.500	15.5	4.825	0.275	5.500	4.514	2.444	54.1	54.1	196	2,400	269	3,200	306	3,500
5.500	17.0	4.767	0.304	5.500	4.962	2.325	46.9	46.9	186	3,900	256	4,900	291	5,400
5.500	20.0	4.653	0.361	5.500	5.828	2.995	51.4	51.4	240	3,900	329	4,900	374	5,400
5.500	23.0	4.545	0.415	5.500	6.630	3.762	56.7	56.7	301	3,900	414	4,900	470	5,400
5.500	26.0	4.423	0.476	5.500	7.513	4.612	61.4	61.4	369	3,900	507	4,900	577	5,400
5.500	26.8	4.400	0.500	5.500	7.854	4.953	63.1	63.1	396	3,900	545	4,900	619	5,400
5.500	28.4	4.315	0.530	5.500	8.275	5.374	64.9	64.9	430	3,900	591	4,900	672	5,400
5.500	29.7	4.251	0.562	5.500	8.718	5.784	66.3	66.3	463	3,900	636	4,900	723	5,400
5.500	32.6	4.125	0.625	5.500	9.572	6.637	69.3	69.3	531	3,900	730	4,900	830	5,400
5.500	35.3	4.001	0.687	5.500	10.388	7.453	71.7	71.7	596	3,900	820	4,900	932	5,400
6.625	24.0	5.796	0.352	6.625	6.937	3.655	52.7	52.7	292	5,800	402	7,400	457	8,100
6.625	28.0	5.666	0.417	6.625	8.133	4.571	56.2	56.2	366	5,800	503	7,400	571	8,100
6.625	32.0	5.550	0.475	6.625	9.177	5.616	61.2	61.2	449	5,800	618	7,400	702	8,100

Continued

Vallourec USA-Atlas Bradford—HD-L (cont.)

Diagram p. C-117

Type: Integral flush joint **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
6.625	35.0	5.450	0.525	6.625	10.061	6.458	64.2	64.2	517	5,800	710	7,400	807	8,100
7.000	23.0	6.250	0.317	7.000	6.655	3.152	47.4	47.4	252	6,300	347	8,000	394	8,900
7.000	26.0	6.151	0.362	7.000	7.549	3.793	50.2	50.2	303	6,300	417	8,000	474	8,900
7.000	29.0	6.059	0.408	7.000	8.449	4.693	55.5	55.5	375	6,300	516	8,000	587	8,900
7.000	32.0	6.000	0.453	7.000	9.317	5.517	59.2	59.2	441	6,300	607	8,000	690	8,900
7.000	35.0	5.879	0.498	7.000	10.172	6.329	62.2	62.2	506	6,300	696	8,000	791	8,900
7.000	38.0	5.795	0.540	7.000	10.959	7.116	64.9	64.9	569	6,300	783	8,000	890	8,900
7.000	42.7	5.625	0.625	7.000	12.517	8.630	68.9	69.0	690	6,300	949	8,000	1,079	8,900
7.000	46.0	5.535	0.670	7.000	13.324	9.437	70.8	70.8	755	6,300	1,038	8,000	1,180	8,900
7.625	26.4	6.844	0.328	7.625	7.519	3.638	48.4	48.4	291	7,600	400	9,800	455	10,800
7.625	29.7	6.750	0.375	7.625	8.541	4.384	51.3	51.3	351	7,600	482	9,800	548	10,800
7.625	33.7	6.640	0.430	7.625	9.720	5.562	57.2	57.2	445	7,600	612	9,800	695	10,800
7.625	39.0	6.500	0.500	7.625	11.192	6.939	62.0	62.0	555	7,600	763	9,800	867	10,800
7.625	42.8	6.376	0.562	7.625	12.470	8.217	65.9	65.9	657	7,600	904	9,800	1,027	10,800
7.625	45.3	6.310	0.595	7.625	13.141	8.888	67.6	67.6	711	7,600	978	9,800	1,111	10,800
7.625	47.1	6.250	0.625	7.625	13.744	9.444	68.7	68.7	756	7,600	1,039	9,800	1,181	10,800
7.625	52.8	6.076	0.712	7.625	15.463	11.163	72.2	72.2	893	7,600	1,228	9,800	1,395	10,800
7.625	55.3	6.000	0.750	7.625	16.199	11.722	72.4	72.4	938	7,600	1,289	9,800	1,465	10,800
7.625	59.0	5.900	0.800	7.625	17.153	11.496	67.0	67.0	920	14,100	1,265	18,520	1,437	20,700
7.625	59.2	5.876	0.812	7.625	17.380	11.722	67.4	67.4	938	14,100	1,289	18,500	1,465	20,700
7.750	46.1	6.500	0.595	7.750	13.374	9.039	67.6	67.6	723	7,700	994	9,900	1,130	11,000
7.750	48.6	6.345	0.640	7.750	14.296	9.911	69.3	69.3	793	7,700	1,090	9,900	1,239	11,000
8.625	32.0	7.796	0.352	8.625	9.149	4.643	50.7	50.8	371	9,900	511	12,700	580	14,100
8.625	36.0	7.700	0.400	8.625	10.336	5.516	53.4	53.4	441	9,900	607	12,700	690	14,100
8.625	40.0	7.625	0.450	8.625	11.557	6.737	58.3	58.3	539	9,900	741	12,700	842	14,100
8.625	44.0	7.500	0.500	8.625	12.763	7.889	61.8	61.8	631	9,900	868	12,700	986	14,100
8.625	49.0	7.386	0.557	8.625	14.118	9.190	65.1	65.1	735	9,900	1,011	12,700	1,149	14,100
8.625	63.5	7.000	0.750	8.625	18.555	13.573	73.2	73.1	1,086	9,900	1,493	12,700	1,697	14,100
9.625	40.0	8.679	0.395	9.625	11.454	5.947	51.9	51.9	476	12,200	654	15,700	743	17,500
9.625	43.5	8.599	0.435	9.625	12.559	7.052	56.2	56.2	564	12,200	776	15,700	882	17,500
9.625	47.0	8.525	0.472	9.625	13.572	8.005	59.0	59.0	640	12,200	881	15,700	1,001	17,500
9.625	53.5	8.500	0.545	9.625	15.546	9.918	63.8	63.8	793	12,200	1,091	15,700	1,240	17,500
9.625	58.4	8.279	0.595	9.625	16.879	11.251	66.7	66.7	900	12,200	1,238	15,700	1,406	17,500
9.625	64.9	8.125	0.672	9.625	18.901	13.213	69.9	69.9	1,057	12,200	1,453	15,700	1,652	17,500
9.625	70.3	8.001	0.734	9.625	20.502	14.814	72.3	72.3	1,185	12,200	1,630	15,700	1,852	17,500
9.875	62.8	8.500	0.625	9.875	18.162	12.355	68.0	68.0	988	13,300	1,359	17,000	1,544	18,900
10.750	45.5	9.875	0.400	10.750	13.006	7.090	54.5	54.5	567	15,600	780	20,200	886	22,500
10.750	51.0	9.694	0.450	10.750	14.561	8.251	56.7	56.7	660	15,600	908	20,200	1,031	22,500
10.750	55.5	9.625	0.495	10.750	15.947	9.569	60.0	60.0	766	15,600	1,053	20,200	1,196	22,500
10.750	60.7	9.504	0.545	10.750	17.473	11.095	63.5	63.5	888	15,600	1,220	20,200	1,387	22,500
10.750	65.7	9.500	0.595	10.750	18.982	12.537	66.0	66.0	1,003	15,600	1,379	20,200	1,567	22,500
11.750	54.0	10.724	0.435	11.750	15.463	8.413	54.4	54.4	673	18,900	925	24,600	1,052	27,500
11.750	60.0	10.625	0.489	11.750	17.300	10.249	59.2	59.2	820	18,900	1,127	24,600	1,281	27,500
11.750	65.0	10.625	0.534	11.750	18.816	11.613	61.7	61.7	929	18,900	1,277	24,600	1,452	27,500
11.750	71.0	10.430	0.582	11.750	20.420	13.265	65.0	65.0	1,061	18,900	1,459	24,600	1,658	27,500
11.750	73.6	10.376	0.609	11.750	21.315	14.116	66.2	66.2	1,129	18,900	1,553	24,600	1,765	27,500
11.750	75.0	10.358	0.618	11.750	21.613	14.414	66.7	66.7	1,153	18,900	1,586	24,600	1,802	27,500
11.875	71.8	10.625	0.582	11.875	20.648	13.378	64.8	64.8	1,070	19,600	1,472	25,400	1,672	28,300
13.375	68.0	12.259	0.480	13.375	19.445	11.139	57.3	57.3	891	25,500	1,225	33,200	1,392	37,000
13.375	72.0	12.250	0.514	13.375	20.768	12.427	59.8	59.8	994	25,500	1,367	33,200	1,553	37,000
13.375	77.0	12.119	0.550	13.375	22.160	13.417	60.5	60.5	1,073	25,500	1,476	33,200	1,677	37,000
13.375	80.7	12.059	0.580	13.375	23.314	14.598	62.6	62.6	1,168	25,500	1,606	33,200	1,825	37,000
13.375	85.0	12.003	0.608	13.375	24.386	15.699	64.4	64.4	1,256	25,500	1,727	33,200	1,962	37,000
13.375	86.0	11.969	0.625	13.375	25.035	16.283	65.0	65.0	1,303	25,500	1,791	33,200	2,035	37,000
13.625	88.2	12.250	0.625	13.625	25.525	16.522	64.7	64.7	1,322	26,900	1,817	34,900	2,065	38,900
14.000	82.5	12.688	0.562	14.000	23.726	13.676	57.6	57.6	1,094	28,500	1,504	38,000	1,710	42,700
14.000	94.8	12.500	0.656	14.000	27.500	16.922	61.5	61.5	1,354	28,400	1,861	37,900	2,115	42,700
14.000	99.0	12.436	0.688	14.000	28.773	18.248	63.4	63.4	1,460	28,400	2,007	37,900	2,281	42,600
14.000	110.0	12.268	0.772	14.000	32.082	21.695	67.6	67.6	1,736	28,300	2,386	37,700	2,712	42,500
14.000	114.0	12.250	0.800	14.000	33.175	21.726	65.5	65.5	1,738	46,000	2,390	62,000	2,716	70,100
16.000	84.0	14.822	0.495	16.000	24.112	12.819	53.2	53.2	1,026	37,200	1,410	49,700	1,602	56,000
16.000	84.8	14.812	0.500	16.000	24.347	12.819	52.7	52.7	1,026	37,200	1,410	49,700	1,602	56,000
16.000	92.8	14.688	0.562	16.000	27.257	15.529	57.0	57.0	1,242	36,900	1,708	49,400	1,941	55,600
16.000	95.0	14.750	0.566	16.000	27.444	15.529	56.6	56.6	1,242	36,500	1,708	49,000	1,941	55,200
16.000	97.0	14.750	0.575	16.000	27.864	15.529	55.7	55.7	1,242	36,500	1,708	49,000	1,941	55,200
16.000	104.0	14.562	0.625	16.000	30.189	18.169	60.2	60.2	1,454	36,900	1,999	49,400	2,271	55,600
16.000	109.0	14.600	0.656	16.000	31.622	17.929	56.7	56.7	1,434	36,900	1,972	49,300	2,241	55,600
16.000	118.0	14.382	0.715	16.000	34.334	22.059	64.2	64.2	1,765	36,900	2,426	49,300	2,757	55,500
16.000	128.0	14.250	0.781	16.000	37.341	25.178	67.4	67.4	2,014	36,700	2,770	49,100	3,147	55,300
16.000	147.0	14.000	0.906	16.000	42.962	31.010	72.2	72.2	2,481	36,500	3,411	48,800	3,876	55,000
17.875	93.5	16.687	0.500	17.875	27.293	14.338	52.5	52.5	1,147	46,200	1,577	61,800	1,792	69,700
18.000	94.0	16.812	0.500	18.000	27.489	14.421	52.5	52.5	1,154	46,900	1,586	62,800	1,803	70,700
18.000	–	16.500	0.656	18.000	35.744	21.999	61.5	61.5	1,760	46,500	2,420	62,300	2,750	70,200
18.000	128.0	16.436	0.688	18.000	37.418	23.980	64.1	64.1	1,918	46,900	2,638	62,700	2,998	70,600
18.625	87.5	17.567	0.435	18.625	24.858	11.978	48.2	48.2	958	49,700	1,318	66,600	1,497	75,100
18.625	97.7	17.465	0.486	18.625	27.695	14.205	51.3	51.3	1,136	49,600	1,563	66,600	1,776	75,100
18.625	99.0	17.437	0.500	18.625	28.471	14.945	52.5	52.5	1,196	49,600	1,644	66,600	1,868	75,100
18.625	105.0	17.375	0.531	18.625	30.184	16.365	54.2	54.2	1,309	49,800	1,800	66,800	2,046	75,300
18.625	109.4	17.311	0.563	18.625	31.947	17.945	56.2	56.2	1,436	49,800	1,974	66,700	2,243	75,200
18.625	112.0	17.279	0.579	18.625	32.825	18.390	56.0	56.0	1,471	49,800	2,023	66,700	2,299	75,200
18.625	136.0	17.051	0.693	18.625	39.040	24.305	62.3	62.3	1,944	49,700	2,674	66,600	3,038	75,000
18.625	138.0	16.997	0.720	18.625	40.500	25.811	63.7	63.7	2,065	49,600	2,839	66,500	3,226	74,900
20.000	106.5	18.812	0.500	20.000	30.631	15.710	51.3	51.3	1,257	57,200	1,728	76,800	1,964	86,600
20.000	133.0	18.542	0.635	20.000	38.631	23.034	59.6	59.6	1,843	57,700	2,534	77,300	2,879	87,000
20.000	147.0	18.394	0.709	20.000	42.969	26.962	62.7	62.7	2,157	56,400	2,966	75,900	3,370	85,700
20.000	169.0	18.188	0.812	20.000	48.948	33.545	68.5	68.5	2,684	57,500	3,690	77,000	4,193	86,700

Vallourec USA-Atlas Bradford—ST-L

Diagram p. C-117

Type: Integral flush joint **Seal: Metal-to-metal, resilient optional**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
5.000	13.0	4.369	0.253	5.000	3.773	2.054	54.4	32.7	164	2,200	226	2,440	257	2,770
5.000	15.0	4.283	0.296	5.000	4.374	2.494	57.0	34.2	200	2,700	274	3,160	312	3,600
5.000	18.0	4.151	0.362	5.000	5.275	3.103	58.8	35.3	248	3,500	341	4,170	388	4,730
5.000	20.3	4.059	0.408	5.000	5.886	3.892	66.1	39.7	311	4,200	428	4,200	487	4,200
5.000	20.8	4.031	0.422	5.000	6.069	3.729	61.4	36.9	298	4,200	410	4,780	466	5,430
5.000	21.4	4.001	0.437	5.000	6.264	4.184	66.8	40.1	335	4,500	460	4,500	523	4,560
5.000	23.6	3.919	0.478	5.000	6.791	4.588	67.6	40.5	367	4,900	505	4,900	574	5,160
5.000	24.2	3.875	0.500	5.000	7.069	4.071	57.6	34.6	326	5,860	448	8,060	509	9,160
5.500	14.0	4.887	0.244	5.500	4.029	2.154	53.5	32.1	172	2,200	237	2,700	269	3,070
5.500	15.5	4.825	0.275	5.500	4.514	2.226	49.3	29.6	178	2,800	245	3,700	278	4,200
5.500	17.0	4.767	0.304	5.500	4.962	2.786	56.1	33.7	223	3,200	306	4,100	348	4,660
5.500	20.0	4.653	0.361	5.500	5.828	3.438	59.0	35.4	275	3,700	378	4,810	430	5,460
5.500	23.0	4.545	0.415	5.500	6.630	4.237	63.9	38.3	339	4,700	466	5,120	530	5,820
5.500	26.0	4.423	0.476	5.500	7.513	5.037	67.0	40.2	403	5,400	554	5,400	630	5,860
5.500	26.7	4.375	0.500	5.500	7.854	4.979	63.4	38.0	398	5,400	548	5,400	622	5,860
5.500	28.4	4.315	0.530	5.500	8.275	4.805	58.1	34.8	384	7,590	529	10,440	601	11,860
5.500	29.7	4.251	0.562	5.500	8.718	5.095	58.4	35.1	408	8,110	560	11,150	637	12,670
5.500	32.3	4.151	0.612	5.500	9.398	5.397	57.4	35.3	432	8,650	594	11,890	675	13,510
5.500	32.6	4.125	0.625	5.500	9.572	5.650	59.0	35.4	452	9,110	622	12,520	706	14,230
6.625	20.0	5.924	0.288	6.625	5.734	3.267	57.0	34.2	261	3,670	359	5,050	408	5,740
6.625	24.0	5.796	0.352	6.625	6.937	4.150	59.8	35.9	332	5,060	457	6,960	519	7,900
6.625	28.0	5.666	0.417	6.625	8.133	5.437	66.9	40.1	435	5,900	598	6,370	680	7,240
6.625	28.6	5.636	0.432	6.625	8.405	5.468	65.1	39.0	437	5,800	601	7,800	684	8,870
6.625	32.0	5.550	0.475	6.625	9.177	6.250	68.1	40.9	500	6,600	688	7,720	781	8,770
6.625	36.7	5.376	0.562	6.625	10.705	6.329	59.1	35.5	506	11,790	696	16,210	791	18,420
7.000	17.0	6.413	0.231	7.000	4.912	2.574	52.4	31.5	206	2,800	283	3,630	322	4,120
7.000	20.0	6.331	0.272	7.000	5.749	3.203	55.7	33.4	256	3,650	352	5,020	400	5,710
7.000	23.0	6.241	0.317	7.000	6.655	3.871	58.2	34.9	310	4,750	426	6,530	484	7,420
7.000	26.0	6.151	0.362	7.000	7.549	4.729	62.6	37.6	378	5,400	520	6,540	591	7,430
7.000	29.0	6.059	0.408	7.000	8.449	5.403	63.9	38.4	432	6,100	594	8,070	675	9,170
7.000	32.0	5.969	0.453	7.000	9.317	6.245	67.0	40.2	500	6,800	687	7,880	781	8,950
7.000	35.0	5.879	0.498	7.000	10.172	6.911	67.9	40.8	553	7,400	760	9,050	864	10,280
7.000	38.0	5.795	0.540	7.000	10.959	7.520	68.6	41.2	602	8,100	827	10,130	940	11,510
7.000	41.0	5.695	0.590	7.000	11.881	8.051	67.8	40.7	644	9,520	886	13,090	1,006	14,870
7.000	44.0	5.595	0.640	7.000	12.788	8.312	65.0	39.0	665	12,280	914	16,890	1,039	19,190
7.000	46.0	5.535	0.670	7.000	13.324	8.609	64.6	38.8	689	13,250	947	18,220	1,076	20,710
7.000	49.5	5.415	0.730	7.000	14.379	9.810	68.2	40.7	785	12,480	1,079	17,160	1,226	19,500
7.625	24.0	6.900	0.300	7.625	6.904	3.964	57.4	34.5	317	5,040	436	6,930	496	7,870
7.625	26.4	6.844	0.328	7.625	7.519	4.373	58.2	34.9	350	5,870	481	8,080	547	9,180
7.625	29.7	6.750	0.375	7.625	8.541	5.550	65.0	39.0	444	6,000	611	6,930	694	7,870
7.625	33.7	6.640	0.430	7.625	9.720	6.489	66.8	40.1	519	7,000	714	8,660	811	9,840
7.625	35.8	6.570	0.465	7.625	10.460	7.031	67.2	40.3	562	7,500	773	10,220	879	11,610
7.625	39.0	6.500	0.500	7.625	11.192	7.135	63.8	38.3	571	10,510	785	14,450	892	16,420
7.625	42.8	6.376	0.562	7.625	12.470	8.668	69.5	41.7	693	9,240	953	12,710	1,084	14,450
7.625	45.3	6.310	0.595	7.625	13.141	9.191	69.9	37.6	735	9,980	1,011	13,720	1,149	15,590
7.625	47.1	6.250	0.625	7.625	13.744	9.653	70.2	42.1	772	10,640	1,062	14,620	1,207	16,620
7.625	51.2	6.126	0.687	7.625	14.974	9.051	60.4	36.3	724	19,570	996	26,910	1,131	30,580
7.625	52.8	6.076	0.712	7.625	15.463	9.218	59.6	35.8	737	19,980	1,014	27,480	1,152	31,220
7.625	55.3	6.000	0.750	7.625	16.199	11.447	70.7	42.4	916	13,340	1,259	18,340	1,431	20,840
7.625	59.2	5.876	0.812	7.625	17.380	10.489	60.4	36.2	839	23,440	1,154	32,230	1,311	36,630
7.750	46.1	6.435	0.595	7.750	13.374	9.303	69.6	41.7	744	10,340	1,023	14,220	1,163	16,160
8.625	24.0	7.972	0.264	8.625	6.934	3.788	54.6	32.8	303	4,860	417	6,680	474	7,590
8.625	28.0	7.892	0.304	8.625	7.947	4.536	57.1	34.2	363	6,360	499	8,750	567	9,940
8.625	32.0	7.796	0.352	8.625	9.149	5.423	59.3	35.6	434	8,150	597	11,210	678	12,730
8.625	36.0	7.700	0.400	8.625	10.336	6.819	66.0	39.6	546	7,300	750	9,530	852	10,830
8.625	40.0	7.600	0.450	8.625	11.557	7.778	67.3	40.4	622	8,400	856	11,560	972	13,130
8.625	44.0	7.500	0.500	8.625	12.763	7.423	58.2	34.9	594	17,220	817	23,680	928	26,910
8.625	49.0	7.386	0.557	8.625	14.118	8.338	59.1	35.4	667	19,640	917	27,010	1,042	30,690
9.375	34.0	8.556	0.347	9.375	9.842	5.794	58.9	35.3	464	9,210	637	12,670	724	14,400
9.375	39.0	8.500	0.400	9.375	11.278	6.837	60.6	36.4	547	11,630	752	15,990	855	18,170
9.625	36.0	8.765	0.352	9.625	10.254	6.147	59.9	36.0	492	9,700	676	13,340	768	15,160
9.625	40.0	8.679	0.395	9.625	11.454	6.867	60.0	36.0	549	12,740	755	17,520	858	19,910
9.625	43.5	8.599	0.435	9.625	12.559	8.418	66.6	39.9	673	10,320	926	14,180	1,052	16,120
9.625	47.0	8.525	0.472	9.625	13.572	8.961	66.0	39.6	717	10,200	986	11,340	1,120	12,880
9.625	53.5	8.500	0.545	9.625	15.546	9.780	62.9	37.7	782	11,500	1,076	15,760	1,223	17,910
9.625	58.4	8.279	0.595	9.625	16.879	10.970	65.0	39.0	878	20,920	1,207	28,760	1,371	32,680
9.625	71.6	7.969	0.750	9.625	20.911	12.534	59.9	36.0	1,003	35,720	1,379	49,120	1,567	55,810
9.875	62.8	8.500	0.625	9.875	18.162	12.769	70.3	42.2	1,022	18,140	1,405	24,950	1,596	28,350
9.875	65.1	8.500	0.650	9.875	18.838	13.186	70.0	42.0	1,055	18,840	1,450	25,910	1,648	29,440
10.750	40.5	9.894	0.350	10.750	11.435	6.855	59.9	36.0	548	11,360	754	15,610	857	17,740
10.750	45.5	9.794	0.400	10.750	13.006	7.796	59.9	36.0	624	15,820	858	21,750	975	24,710
10.750	51.0	9.694	0.450	10.750	14.561	9.831	67.5	40.5	786	13,600	1,081	18,700	1,229	21,250
10.750	55.5	9.604	0.495	10.750	15.947	9.559	59.9	36.0	765	24,100	1,051	33,130	1,195	37,650
10.750	60.7	9.504	0.545	10.750	17.473	12.175	69.7	41.8	974	17,060	1,339	23,460	1,522	26,660
10.750	65.7	9.404	0.595	10.750	18.982	11.378	59.9	36.0	910	32,530	1,252	44,740	1,422	50,840
11.750	47.0	10.844	0.375	11.750	13.401	8.041	60.0	36.0	643	14,970	885	20,590	1,005	23,400
11.750	54.0	10.724	0.435	11.750	15.463	9.268	59.9	36.0	741	21,440	1,019	29,480	1,159	33,500
11.750	60.0	10.616	0.489	11.750	17.300	10.369	59.9	36.0	830	27,670	1,141	38,040	1,296	43,230
11.750	65.0	10.625	0.534	11.750	18.816	11.067	58.8	35.3	885	33,710	1,217	46,350	1,383	52,680
11.750	71.0	10.430	0.582	11.750	20.420	12.240	59.9	36.0	979	37,200	1,346	51,150	1,530	58,120
11.750	74.6	10.358	0.618	11.750	21.613	12.954	59.9	36.0	1,036	40,810	1,425	56,110	1,619	63,760
11.875	71.8	10.625	0.582	11.875	20.648	12.376	59.9	36.0	990	37,970	1,361	52,210	1,547	59,330
13.375	54.5	12.459	0.380	13.375	15.513	9.298	59.9	36.0	744	18,650	1,023	25,650	1,162	29,150
13.375	61.0	12.359	0.430	13.375	17.487	10.481	59.9	36.0	838	26,390	1,153	36,280	1,310	41,230
13.375	68.0	12.259	0.480	13.375	19.445	11.655	59.9	36.0	932	33,290	1,282	45,770	1,457	52,010
13.375	72.0	12.191	0.514	13.375	20.768	14.339	69.0	41.4	1,147	25,810	1,577	35,490	1,792	40,330
13.375	77.0	12.119	0.550	13.375	22.160	13.281	59.9	36.0	1,062	42,790	1,461	58,840	1,660	66,860
13.375	85.0	12.003	0.608	13.375	24.386	14.616	59.9	36.0	1,169	50,530	1,608	69,480	1,827	78,950
13.625	88.2	12.250	0.625	13.625	25.525	18.048	70.7	42.4	1,444	35,010	1,985	48,140	2,256	54,700

*Contact Atlas Bradford Technical Services for make-up and yield torque data.

Vallourec USA-Atlas Bradford—ATS-E

Diagram p. C-117

Type: Threaded & coupled **Seal: Threaded**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
7.000	26.0	6.151	0.362	7.656	7.549	7.549	100.0	50.0	604	11,800	830	14,200	944	15,500
7.000	29.0	6.125	0.408	7.656	8.449	8.449	100.0	50.0	676	16,300	929	20,200	1,056	22,100
7.000	32.0	6.000	0.453	7.656	9.317	9.317	100.0	50.0	745	20,500	1,025	25,700	1,165	28,300
7.000	35.0	5.879	0.498	7.656	10.172	10.172	100.0	50.0	814	24,500	1,119	31,100	1,272	34,300
7.625	29.7	6.750	0.375	8.500	8.541	8.541	100.0	50.0	683	15,200	940	18,500	1,068	20,200
7.625	33.7	6.640	0.430	8.500	9.720	9.720	100.0	50.0	778	21,600	1,069	27,000	1,215	29,700
7.625	35.8	6.570	0.465	8.500	10.460	10.460	100.0	50.0	837	25,600	1,151	32,200	1,307	35,500
7.625	39.0	6.560	0.500	8.500	11.192	11.192	100.0	50.0	895	29,400	1,231	37,300	1,399	41,200
8.625	32.0	7.875	0.352	9.625	9.149	9.149	100.0	50.0	732	14,700	1,006	17,600	1,144	19,100
8.625	36.0	7.700	0.400	9.625	10.336	10.336	100.0	50.0	827	22,100	1,137	27,400	1,292	30,100
8.625	40.0	7.625	0.450	9.625	11.557	11.557	100.0	50.0	925	29,500	1,271	37,300	1,445	41,200
8.625	44.0	7.500	0.500	9.625	12.763	12.763	100.0	50.0	1,021	36,700	1,404	46,800	1,595	51,900
9.625	40.0	8.750	0.395	10.625	11.454	11.454	100.0	50.0	916	25,000	1,260	31,100	1,432	34,200
9.625	43.5	8.625	0.435	10.625	12.559	12.559	100.0	50.0	1,005	32,500	1,381	41,100	1,570	45,400
9.625	47.0	8.625	0.472	10.625	13.572	13.572	100.0	50.0	1,086	39,300	1,493	50,100	1,697	55,500
9.625	53.5	8.500	0.545	10.625	15.546	15.546	100.0	50.0	1,244	52,200	1,710	67,300	1,943	74,900
9.625	58.4	8.375	0.595	10.625	16.879	16.879	100.0	50.0	1,350	60,700	1,857	78,700	2,110	87,700
9.875	62.8	8.500	0.625	10.625	18.162	18.162	100.0	50.0	1,453	50,800	1,998	63,100	2,270	69,300
10.750	40.5	9.894	0.350	11.750	11.435	11.435	100.0	50.0	915	18,300	1,258	22,000	1,429	23,900
10.750	45.5	9.875	0.400	11.750	13.006	13.006	100.0	50.0	1,040	30,300	1,431	38,000	1,626	41,900
10.750	51.0	9.694	0.450	11.750	14.561	14.561	100.0	50.0	1,165	42,000	1,602	53,600	1,820	59,400
10.750	55.5	9.625	0.495	11.750	15.947	15.947	100.0	50.0	1,276	52,300	1,754	67,300	1,993	74,800
10.750	60.7	9.504	0.545	11.750	17.473	17.473	100.0	50.0	1,398	63,400	1,922	82,100	2,184	91,500
10.750	65.7	9.500	0.595	11.750	18.982	18.982	100.0	50.0	1,519	74,100	2,088	96,600	2,373	107,800
11.750	47.0	10.844	0.375	12.750	13.401	13.401	100.0	50.0	1,072	27,100	1,474	33,500	1,675	36,700
11.750	54.0	10.724	0.435	12.750	15.463	15.463	100.0	50.0	1,237	44,100	1,701	56,200	1,933	62,300
11.750	60.0	10.625	0.489	12.750	17.300	17.300	100.0	50.0	1,384	58,900	1,903	76,100	2,162	84,700
11.750	65.0	10.625	0.534	12.750	18.816	18.816	100.0	50.0	1,505	71,000	2,070	92,300	2,352	102,900
11.750	71.0	10.430	0.582	12.750	20.420	20.420	100.0	50.0	1,634	83,600	2,246	109,100	2,552	121,900
13.375	54.5	12.459	0.380	14.375	15.513	15.513	100.0	50.0	1,241	34,700	1,706	43,500	1,939	47,900
13.375	61.0	12.359	0.430	14.375	17.487	17.487	100.0	50.0	1,399	52,800	1,924	67,900	2,186	75,500
13.375	68.0	12.259	0.480	14.375	19.445	19.445	100.0	50.0	1,556	70,600	2,139	91,800	2,431	102,500
13.375	72.0	12.250	0.514	14.375	20.768	20.768	100.0	50.0	1,661	82,400	2,284	107,800	2,596	120,500
16.000	75.0	14.936	0.438	17.000	21.414	21.414	100.0	50.0	1,713	58,300	2,355	72,300	2,677	79,200
16.000	84.0	14.822	0.495	17.000	24.112	24.112	100.0	50.0	1,929	88,600	2,652	112,800	3,014	124,900
16.000	84.8	14.812	0.500	17.000	24.347	24.347	100.0	50.0	1,948	91,300	2,678	116,400	3,043	128,900
16.000	97.0	14.750	0.575	17.000	27.864	27.864	100.0	50.0	2,229	129,900	3,065	168,300	3,483	187,500
16.000	109.0	14.500	0.656	17.000	31.622	31.622	100.0	50.0	2,530	170,400	3,478	222,800	3,953	249,100
18.625	87.5	17.567	0.435	20.000	24.858	24.858	100.0	50.0	1,989	61,400	2,734	76,500	3,107	84,000
18.625	94.5	17.501	0.468	20.000	26.696	26.696	100.0	50.0	2,136	85,200	2,937	108,500	3,337	120,100
18.625	97.7	17.465	0.486	20.000	27.695	27.695	100.0	50.0	2,216	98,100	3,046	125,800	3,462	139,700
18.625	106.0	17.375	0.531	20.000	30.184	30.184	100.0	50.0	2,415	130,000	3,320	168,800	3,773	188,200
18.625	109.0	17.315	0.561	20.000	31.837	31.837	100.0	50.0	2,547	151,000	3,502	197,100	3,980	220,200
18.625	112.0	17.279	0.579	20.000	32.825	32.825	100.0	50.0	2,626	163,400	3,611	214,000	4,103	239,200
18.625	115.0	17.249	0.594	20.000	33.648	33.648	100.0	50.0	2,692	173,800	3,701	227,900	4,206	255,000
18.625	129.0	17.125	0.656	20.000	37.032	37.032	100.0	50.0	2,963	216,100	4,074	285,100	4,629	319,600
18.625	138.6	17.001	0.718	20.000	40.392	40.392	100.0	50.0	3,231	257,600	4,443	341,300	5,049	383,100
18.625	139.0	16.997	0.720	20.000	40.500	40.500	100.0	50.0	3,240	258,900	4,455	343,000	5,063	385,100
20.000	94.0	18.936	0.438	21.000	26.918	26.918	100.0	50.0	2,153	65,100	2,961	81,300	3,365	89,500
20.000	106.5	18.812	0.500	21.000	30.631	30.631	100.0	50.0	2,450	115,900	3,369	150,100	3,829	167,200
20.000	119.0	18.688	0.562	21.000	34.319	34.319	100.0	50.0	2,746	165,900	3,775	217,700	4,290	243,600
20.000	131.0	18.562	0.625	21.000	38.043	38.043	100.0	50.0	3,043	215,600	4,185	285,200	4,755	319,900
20.000	133.0	18.542	0.635	21.000	38.631	38.631	100.0	50.0	3,091	223,400	4,249	295,800	4,829	331,900
20.000	143.0	18.436	0.688	21.000	41.741	41.741	100.0	50.0	3,339	264,500	4,592	351,500	5,218	395,000
20.000	149.0	18.376	0.718	21.000	43.494	42.435	97.6	48.8	3,395	287,500	4,668	382,700	5,304	430,300
20.000	156.0	18.312	0.750	21.000	45.357	42.435	93.6	46.8	3,395	311,800	4,668	415,700	5,304	467,700
20.000	163.0	18.250	0.781	21.000	47.155	42.435	90.0	45.0	3,395	335,100	4,668	447,500	5,304	503,700
20.000	169.0	18.188	0.812	21.000	48.948	42.435	86.7	43.3	3,395	358,300	4,668	479,000	5,304	539,300

Vallourec USA-Atlas Bradford—DWC/C

Diagram p. C-117

Type: Threaded & coupled **Seal: Thread**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
4.500	10.5	3.927	0.224	5.000	3.009	3.009	100.0	100.0	241	5,300	331	6,500	376	7,000
4.500	11.6	3.875	0.250	5.000	3.338	3.338	100.0	100.0	267	6,400	367	7,900	417	8,600
4.500	12.6	3.833	0.271	5.000	3.600	3.600	100.0	100.0	288	7,200	396	9,000	450	9,800
4.500	13.5	3.795	0.290	5.000	3.836	3.836	100.0	100.0	307	7,900	422	9,900	479	10,900
4.500	15.1	3.701	0.337	5.000	4.407	4.348	98.7	98.7	348	9,700	478	12,200	544	13,500
5.000	15.0	4.283	0.296	5.563	4.374	4.374	100.0	100.0	350	10,400	481	12,900	547	14,200
5.000	18.0	4.151	0.362	5.563	5.275	5.275	100.0	100.0	422	13,500	580	17,000	659	18,800
5.000	20.3	4.059	0.408	5.563	5.886	5.466	92.9	92.9	437	15,500	601	19,700	683	21,800
5.000	20.8	4.031	0.422	5.563	6.069	5.466	90.1	90.1	437	16,100	601	20,400	683	22,600
5.000	21.4	4.001	0.437	5.563	6.264	5.466	87.3	87.3	437	16,700	601	21,300	683	23,600
5.000	23.2	3.919	0.478	5.563	6.791	5.466	80.5	80.5	437	18,300	601	23,500	683	26,000
5.000	24.1	3.875	0.500	5.563	7.069	5.466	77.3	77.3	437	19,200	601	24,600	683	27,300
5.500	15.5	4.825	0.275	6.050	4.514	4.514	100.0	100.0	361	10,600	497	13,300	564	14,600
5.500	17.0	4.767	0.304	6.050	4.962	4.962	100.0	100.0	397	12,300	546	15,500	620	17,100
5.500	20.0	4.653	0.361	6.050	5.828	5.828	100.0	100.0	466	15,500	641	19,800	729	21,900
5.500	23.0	4.545	0.415	6.050	6.630	5.898	89.0	89.0	472	18,400	649	23,600	737	26,200
5.500	26.0	4.423	0.476	6.050	7.513	5.898	78.5	78.5	472	21,400	649	27,700	737	30,800
5.500	26.8	4.375	0.500	6.050	7.854	5.898	75.1	75.1	472	22,500	649	29,200	737	32,600
6.625	20.0	5.924	0.288	7.390	5.734	5.734	100.0	50.0	459	15,400	631	19,500	717	21,600
6.625	23.2	5.840	0.330	7.390	6.526	6.526	100.0	50.0	522	19,000	718	24,400	816	27,000
6.625	24.0	5.796	0.352	7.390	6.937	6.937	100.0	50.0	555	20,900	763	26,800	867	29,800
6.625	28.0	5.666	0.417	7.390	8.133	8.133	100.0	50.0	651	26,100	895	33,900	1,017	37,700
6.625	29.0	5.636	0.432	7.390	8.405	8.405	100.0	50.0	672	27,300	925	35,400	1,051	39,500
6.625	32.0	5.550	0.475	7.390	9.177	9.177	100.0	50.0	734	30,600	1,010	39,800	1,147	44,500
6.625	35.0	5.450	0.525	7.390	10.061	9.637	95.8	47.9	771	34,200	1,060	44,700	1,205	50,000
7.000	23.0	6.250	0.317	7.875	6.655	6.655	100.0	50.0	532	19,100	732	24,300	832	26,900
7.000	26.0	6.151	0.362	7.875	7.549	7.549	100.0	50.0	604	23,800	830	30,600	944	34,000
7.000	29.0	6.125	0.408	7.875	8.449	8.449	100.0	50.0	676	25,000	929	32,200	1,056	35,800
7.000	32.0	6.000	0.453	7.875	9.317	9.317	100.0	50.0	745	30,600	1,025	39,800	1,165	44,300
7.000	35.0	5.879	0.498	7.875	10.172	10.172	100.0	50.0	814	35,800	1,119	46,700	1,272	52,200
7.000	38.0	5.795	0.540	7.875	10.959	10.959	100.0	50.0	877	39,300	1,206	51,400	1,370	57,400

Continued

Vallourec USA-Atlas Bradford—DWC/C (cont.)

Diagram p. C-117

Type: Threaded & coupled **Seal: Thread**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
7.000	41.0	5.695	0.590	7.875	11.881	11.635	97.9	49.0	931	43,200	1,280	56,700	1,454	63,400
7.625	26.4	6.844	0.328	8.500	7.519	7.519	100.0	50.0	602	23,200	827	29,800	940	33,100
7.625	29.7	6.750	0.375	8.500	8.541	8.541	100.0	50.0	683	28,500	940	36,900	1,068	41,100
7.625	33.7	6.640	0.430	8.500	9.720	9.720	100.0	50.0	778	34,400	1,069	44,900	1,215	50,100
7.625	35.8	6.570	0.465	8.500	10.460	10.460	100.0	50.0	837	38,100	1,151	49,800	1,307	55,600
7.625	39.0	6.500	0.500	8.500	11.192	11.192	100.0	50.0	895	41,600	1,231	54,600	1,399	61,100
7.625	42.8	6.376	0.562	8.500	12.470	12.470	100.0	50.0	998	47,700	1,372	62,800	1,559	70,400
7.625	47.1	6.250	0.625	8.500	13.744	12.759	92.8	46.4	1,021	53,700	1,403	70,800	1,595	79,400
8.625	28.0	7.892	0.304	9.625	7.947	7.947	100.0	50.0	636	24,700	874	31,900	993	35,500
8.625	32.0	7.875	0.352	9.625	9.149	9.149	100.0	50.0	732	26,000	1,006	33,600	1,144	37,400
8.625	36.0	7.700	0.400	9.625	10.336	10.336	100.0	50.0	827	38,700	1,137	50,600	1,292	56,600
8.625	40.0	7.625	0.450	9.625	11.557	11.557	100.0	50.0	925	43,900	1,271	57,600	1,445	64,500
8.625	44.0	7.500	0.500	9.625	12.763	12.763	100.0	50.0	1,021	52,300	1,404	69,000	1,595	77,300
8.625	49.0	7.386	0.557	9.625	14.118	14.118	100.0	50.0	1,129	59,700	1,553	79,000	1,765	88,600
8.625	57.4	7.188	0.656	9.625	16.423	16.337	99.5	49.7	1,307	71,900	1,797	95,500	2,042	107,300
9.625	36.0	8.765	0.352	10.625	10.254	10.254	100.0	50.0	820	38,400	1,128	50,500	1,282	56,500
9.625	40.0	8.750	0.395	10.625	11.454	11.454	100.0	50.0	916	39,800	1,260	52,300	1,432	58,600
9.625	43.5	8.625	0.435	10.625	12.559	12.559	100.0	50.0	1,005	50,800	1,381	67,300	1,570	75,500
9.625	47.0	8.525	0.472	10.625	13.572	13.572	100.0	50.0	1,086	59,400	1,493	78,900	1,697	88,600
9.625	53.5	8.500	0.545	10.625	15.546	15.546	100.0	50.0	1,244	61,500	1,710	81,700	1,943	91,800
9.625	58.4	8.375	0.595	10.625	16.879	16.879	100.0	50.0	1,350	71,800	1,857	95,700	2,110	107,600
10.750	40.5	9.894	0.350	11.750	11.435	11.435	100.0	50.0	915	46,400	1,258	61,400	1,429	68,900
10.750	45.5	9.875	0.400	11.750	13.006	13.006	100.0	50.0	1,040	48,500	1,431	64,300	1,626	72,200
10.750	51.0	9.694	0.450	11.750	14.561	14.561	100.0	50.0	1,165	68,400	1,602	91,300	1,820	102,800
10.750	55.5	9.625	0.495	11.750	15.947	15.947	100.0	50.0	1,276	75,800	1,754	101,300	1,993	114,100
10.750	60.7	9.504	0.545	11.750	17.473	17.473	100.0	50.0	1,398	88,400	1,922	118,500	2,184	133,500
10.750	65.7	9.500	0.595	11.750	18.982	18.982	100.0	50.0	1,519	88,800	2,088	119,000	2,373	134,100
11.750	47.0	10.844	0.375	12.750	13.401	13.401	100.0	50.0	1,072	61,300	1,474	81,800	1,675	92,000
11.750	54.0	10.724	0.435	12.750	15.463	15.463	100.0	50.0	1,237	77,100	1,701	103,300	1,933	116,400
11.750	60.0	10.625	0.489	12.750	17.300	17.300	100.0	50.0	1,384	89,800	1,903	120,700	2,162	136,100
11.750	65.0	10.625	0.534	12.750	18.816	18.816	100.0	50.0	1,505	89,800	2,070	120,700	2,352	136,100
11.750	71.0	10.430	0.582	12.750	20.420	20.420	100.0	50.0	1,634	114,200	2,246	153,800	2,552	173,700
11.750	74.6	10.358	0.618	12.750	21.613	21.613	100.0	50.0	1,729	122,900	2,377	165,700	2,702	187,200
13.375	54.5	12.459	0.380	14.375	15.513	15.513	100.0	50.0	1,241	79,900	1,706	107,400	1,939	121,200
13.375	61.0	12.359	0.430	14.375	17.487	17.487	100.0	50.0	1,399	97,100	1,924	130,900	2,186	147,800
13.375	68.0	12.259	0.480	14.375	19.445	19.445	100.0	50.0	1,556	114,000	2,139	153,900	2,431	173,900
13.375	72.0	12.250	0.514	14.375	20.768	20.768	100.0	50.0	1,661	115,500	2,284	156,000	2,596	176,200
13.375	77.0	12.119	0.550	14.375	22.160	22.160	100.0	50.0	1,773	137,200	2,438	185,500	2,770	209,700
13.375	80.7	12.059	0.580	14.375	23.314	23.314	100.0	50.0	1,865	146,900	2,565	198,800	2,914	224,800
13.375	91.0	11.899	0.660	14.375	26.364	24.911	94.5	47.2	1,993	172,300	2,740	233,600	3,114	264,200

Vallourec USA-Atlas Bradford—DWC/C-HT

Diagram p. C-117

Type: Threaded and Coupled **Seal: Thread**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Field & accessories max, ft-lb	Joint strength, kips	Field & accessories max, ft-lb	Joint strength, kips	Field & accessories max, ft-lb
4.500	10.5	3.927	0.224	5.000	3.009	3.009	100.0	100.0	241	6,400	331	7,800	376	8,500
4.500	11.6	3.875	0.250	5.000	3.338	3.338	100.0	100.0	267	7,600	367	9,400	417	10,300
4.500	12.6	3.833	0.271	5.000	3.600	3.600	100.0	100.0	288	8,400	396	10,500	450	11,500
4.500	13.5	3.795	0.290	5.000	3.836	3.836	100.0	100.0	307	9,100	422	11,400	479	12,600
4.500	15.1	3.701	0.337	5.000	4.407	4.348	98.7	98.7	348	11,100	478	14,000	544	15,500
5.000	15.0	4.283	0.296	5.563	4.374	4.374	100.0	100.0	350	12,500	481	15,500	547	17,000
5.000	18.0	4.151	0.362	5.563	5.275	5.275	100.0	100.0	422	16,000	580	20,100	659	22,200
5.000	20.3	4.059	0.408	5.563	5.886	5.466	92.9	92.9	437	17,800	601	22,600	683	25,000
5.000	20.8	4.031	0.422	5.563	6.069	5.466	90.1	90.1	437	18,200	601	23,200	683	25,700
5.000	21.4	4.001	0.437	5.563	6.264	5.466	87.3	87.3	437	18,700	601	23,900	683	26,500
5.000	23.2	3.919	0.478	5.563	6.791	5.466	80.5	80.5	437	19,900	601	25,400	683	28,200
5.000	24.1	3.875	0.500	5.563	7.069	5.466	77.3	77.3	437	20,400	601	26,200	683	29,100
5.500	15.5	4.825	0.275	6.050	4.514	4.514	100.0	100.0	361	12,800	497	15,900	564	17,500
5.500	17.0	4.767	0.304	6.050	4.962	4.962	100.0	100.0	397	14,800	546	18,700	620	20,600
5.500	20.0	4.653	0.361	6.050	5.828	5.828	100.0	100.0	466	18,600	641	23,800	729	26,300
5.500	23.0	4.545	0.415	6.050	6.630	5.898	89.0	89.0	472	21,600	649	27,800	737	30,800
5.500	26.0	4.423	0.476	6.050	7.513	5.898	78.5	78.5	472	24,100	649	31,200	737	34,700
5.500	26.8	4.375	0.500	6.050	7.854	5.898	75.1	75.1	472	25,000	649	32,400	737	36,100

Vallourec USA-Atlas Bradford—DWC/C PLUS

Diagram p. C-117

Type: Threaded and Coupled **Seal: Thread**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Field & accessories max, ft-lb	Joint strength, kips	Field & accessories max, ft-lb	Joint strength, kips	Field & accessories max, ft-lb
4.500	10.5	3.927	0.224	5.250	3.009	3.009	100.0	100.0	241	5,700	331	6,900	376	7,400
4.500	11.6	3.875	0.250	5.250	3.338	3.338	100.0	100.0	267	6,800	367	8,300	417	9,100
4.500	12.6	3.833	0.271	5.250	3.600	3.600	100.0	100.0	288	7,700	396	9,400	450	10,300
4.500	13.5	3.795	0.290	5.250	3.836	3.836	100.0	100.0	307	8,500	422	10,500	479	11,400
4.500	15.1	3.701	0.337	5.250	4.407	4.407	100.0	100.0	353	10,300	485	12,800	551	14,100
5.500	15.5	4.825	0.275	6.300	4.514	4.514	100.0	100.0	361	11,200	497	13,900	564	15,200
5.500	17.0	4.767	0.304	6.300	4.962	4.962	100.0	100.0	397	13,000	546	16,200	620	17,800
5.500	20.0	4.653	0.361	6.300	5.828	5.828	100.0	100.0	466	16,300	641	20,600	729	22,700
5.500	23.0	4.545	0.415	6.300	6.630	6.630	100.0	100.0	530	19,300	729	24,500	829	27,200
5.500	26.0	4.423	0.476	6.300	7.513	7.513	100.0	100.0	601	22,400	826	28,700	939	31,900
5.500	26.8	4.375	0.500	6.300	7.854	7.854	100.0	100.0	628	23,600	864	30,300	982	33,600

VAM Connections—BIG OMEGA

Diagram p. C-117

Type: Threaded & Couples **Seal: Thread**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
13.625	88.2	12.250	0.625	14.625	25.525	25.525	100%	–	2,023	–	2,723	–	–	–
14.000	82.5	12.663	0.562	15.000	23.726	23.726	100%	–	1,872	–	2,523	–	–	–
14.000	94.8	12.465	0.656	15.000	27.500	27.500	100%	–	2,170	–	2,924	–	–	–
14.000	99.3	12.395	0.688	15.000	28.773	28.773	100%	–	2,271	–	3,060	–	–	–
14.000	110.0	12.250	0.772	15.000	32.082	32.082	100%	–	2,532	–	3,411	–	–	–
16.000	75.0	14.936	0.438	17.000	21.414	21.414	100%	–	–	–	–	–	–	–
16.000	84.0	14.822	0.495	17.000	24.112	24.112	100%	–	1,861	–	–	–	–	–
16.000	94.5	14.750	0.562	17.000	27.257	27.257	100%	–	2,104	–	2,846	–	–	–
16.000	109.0	14.500	0.656	17.000	31.622	31.622	100%	–	2,441	–	3,302	–	–	–
16.000	118.0	14.341	0.715	17.000	34.334	34.334	100%	–	2,650	–	3,585	–	–	–
16.000	128.0	14.229	0.781	17.000	37.341	37.341	100%	–	2,883	–	3,900	–	–	–
16.000	147.0	14.000	0.906	17.000	42.962	38.093	89%	–	3,316	–	4,486	–	–	–
18.625	87.5	17.567	0.435	20.000	24.858	24.858	100%	–	–	–	–	–	–	–
18.625	96.5	17.500	0.485	20.000	27.639	27.639	100%	–	2,071	–	–	–	–	–
18.625	114.0	17.233	0.579	20.000	32.825	32.825	100%	–	2,460	–	3,346	–	–	–
18.625	136.0	17.003	0.693	20.000	39.040	39.040	100%	–	2,925	–	3,979	–	–	–
18.625	139.0	17.000	0.720	20.000	40.500	40.500	100%	–	3,035	–	4,128	–	–	–
20.000	94.0	18.937	0.438	21.000	26.918	26.918	100%	–	–	–	–	–	–	–
20.000	106.5	18.813	0.500	21.000	30.631	30.631	100%	–	2,259	–	–	–	–	–
20.000	118.5	18.687	0.563	21.000	34.379	34.379	100%	–	2,535	–	3,459	–	–	–
20.000	133.0	18.543	0.635	21.000	38.631	38.631	100%	–	2,849	–	3,887	–	–	–
20.000	147.0	14.348	0.709	21.000	42.969	42.969	100%	–	3,169	–	4,323	–	–	–
20.000	169.0	18.138	0.812	21.000	48.948	48.948	100%	–	3,609	–	4,923	–	–	–
24.000	162.0	22.433	0.635	25.000	46.611	46.611	100%	–	–	–	–	–	–	–
24.000	174.0	22.327	0.688	25.000	50.387	50.387	100%	–	–	–	5,006	–	–	–
24.000	189.0	22.203	0.750	25.000	54.782	54.782	100%	–	–	–	5,441	–	–	–
24.000	203.0	22.079	0.812	25.000	59.152	59.152	100%	–	–	–	5,873	–	–	–
24.500	140.0	23.141	0.531	25.500	39.985	39.985	100%	–	–	–	–	–	–	–
24.500	165.0	23.000	0.635	25.500	47.609	47.609	100%	–	–	–	–	–	–	–
24.500	182.0	22.785	0.709	25.500	52.992	52.992	100%	–	–	–	5,373	–	–	–
24.500	207.0	22.579	0.812	25.500	60.427	60.427	100%	–	–	–	6,125	–	–	–
26.000	207.0	24.203	0.750	27.500	59.494	59.494	100%	–	–	–	–	–	–	–
26.000	223.0	24.079	0.812	27.500	64.254	64.254	100%	–	–	–	–	–	–	–
26.000	237.0	24.000	0.866	27.500	68.380	68.380	100%	–	–	–	7,357	–	–	–
26.000	270.0	23.703	1.000	27.500	78.540	78.540	100%	–	–	–	8,450	–	–	–

VAM Connections—DINO VAM

Diagram p. C-117

Type: Threaded & Coupled **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Field & accessories max, ft-lb	Joint strength, kips	Field & accessories max, ft-lb	Joint strength, kips	Field & accessories max, ft-lb
7.000	20.00	6.331	0.272	7.657	5.751	5.751	100.0	50.0	460	5,790	633	6,440	719	5,860
7.000	23.00	6.241	0.317	7.657	6.654	6.654	100.0	50.0	532	6,870	732	6,870	832	7,450
7.000	26.00	6.151	0.362	7.657	7.545	7.545	100.0	50.0	604	7,810	830	7,810	943	7,880
7.000	29.00	6.059	0.408	7.657	8.448	8.448	100.0	50.0	676	8,320	929	8,680	1,056	8,680
9.625	36.0	8.765	0.352	10.626	10.254	10.254	100.0	50.0	820	7,570	1,128	9,550	1,282	10,800
9.625	40.0	8.679	0.395	10.626	11.454	11.454	100.0	50.0	916	10,400	1,260	13,750	1,432	15,400
9.625	43.5	8.599	0.435	10.626	12.559	12.559	100.0	50.0	1,005	13,300	1,381	17,500	1,570	19,950
9.625	47.0	8.525	0.472	10.626	13.572	13.572	100.0	50.0	1,086	15,800	1,493	21,200	1,697	23,700
9.625	53.5	8.379	0.545	10.626	15.546	15.546	100.0	50.0	1,244	20,800	1,710	24,950	1,943	24,950
9.625	58.4	8.279	0.595	10.626	16.879	16.879	100.0	50.0	1,350	24,150	1,857	24,950	2,110	24,950
9.625	59.4	8.251	0.609	10.626	17.250	17.250	100.0	50.0	1,380	19,150	1,898	24,950	2,156	24,950
9.625	61.1	8.219	0.625	10.626	17.671	17.671	100.0	50.0	1,414	19,950	1,944	24,950	2,209	24,950
9.625	64.9	8.125	0.672	10.626	18.901	18.901	100.0	50.0	1,512	22,900	2,079	24,950	2,363	24,950
9.625	70.3	8.001	0.734	10.626	20.502	20.502	100.0	50.0	1,632	24,950	2,244	24,950	2,550	24,950
9.625	71.8	7.969	0.750	10.626	20.911	20.401	98.0	49.0	1,632	24,950	2,244	24,950	2,550	24,950
9.750	59.2	8.404	0.595	10.626	17.113	17.113	100.0	50.0	1,369	19,950	1,882	24,950	2,139	24,950
9.750	60.2	8.376	0.609	10.626	17.489	17.489	100.0	50.0	1,399	20,800	1,924	24,950	2,186	24,950
9.875	62.8	8.469	0.625	10.870	18.162	18.162	100.0	50.0	1,453	21,200	1,998	24,950	2,270	24,950
9.875	66.4	8.397	0.661	10.870	19.134	19.134	100.0	50.0	1,531	23,700	2,105	24,950	2,392	24,950
9.875	67.5	8.363	0.678	10.870	19.590	19.590	100.0	50.0	1,567	24,950	2,155	24,950	2,449	24,950
9.875	68.9	8.319	0.700	10.870	20.177	20.177	100.0	50.0	1,614	24,950	2,219	24,950	2,522	24,950
9.875	70.5	8.279	0.720	10.870	20.708	20.708	100.0	50.0	1,652	24,950	2,272	24,950	2,582	24,950
10.750	40.5	9.894	0.350	11.752	11.435	11.435	100.0	50.0	915	8,230	1,258	10,400	1,429	11,650
10.750	45.5	9.794	0.400	11.752	13.006	13.006	100.0	50.0	1,040	12,500	1,431	16,200	1,626	18,300
10.750	51.0	9.694	0.450	11.752	14.561	14.561	100.0	50.0	1,165	16,600	1,602	22,000	1,820	24,950
10.750	55.5	9.604	0.495	11.752	15.947	15.947	100.0	50.0	1,276	20,350	1,754	24,950	1,993	24,950
10.750	60.7	9.504	0.545	11.752	17.473	17.473	100.0	50.0	1,398	24,550	1,922	24,950	2,184	24,950
10.750	65.7	9.404	0.595	11.752	18.982	18.982	100.0	50.0	1,519	24,950	2,088	24,950	2,373	24,950
10.750	66.15	9.372	0.611	11.752	19.462	19.462	100.0	50.0	1,557	22,000	2,141	24,950	2,433	24,950
10.750	73.2	9.250	0.672	11.752	21.276	21.276	100.0	50.0	1,702	24,950	2,340	24,950	2,660	24,950
10.750	76.1	9.176	0.709	11.752	22.365	22.365	100.0	50.0	1,789	24,950	2,460	24,950	2,796	24,950
10.750	79.2	9.126	0.734	11.752	23.096	23.096	100.0	50.0	1,848	24,950	2,541	24,950	2,887	24,950
11.750	47.0	10.844	0.375	12.752	13.401	13.401	100.0	50.0	1,615	14,150	2,221	19,150	2,524	21,200
11.750	54.0	10.724	0.435	12.752	15.463	15.463	100.0	50.0	1,072	20,350	1,474	24,950	1,675	24,950
11.750	60.0	10.616	0.489	12.752	17.300	17.300	100.0	50.0	1,237	17,500	1,701	22,900	1,933	24,950
11.750	65.0	10.526	0.534	12.752	18.816	18.816	100.0	50.0	1,384	22,000	1,903	24,950	2,163	24,950
11.750	71.0	10.430	0.582	12.752	20.420	20.420	100.0	50.0	1,505	24,950	2,070	24,950	2,352	24,950
11.875	71.8	10.555	0.582	12.677	20.648	20.648	100.0	50.0	1,634	24,950	2,246	24,950	2,553	24,950
13.375	54.5	12.459	0.380	14.374	15.513	15.513	100.0	50.0	1,241	17,500	1,706	22,900	1,939	24,950
13.375	61.0	12.359	0.430	14.374	17.487	17.487	100.0	50.0	1,399	24,150	1,924	24,950	2,186	24,950
13.375	68.0	12.259	0.480	14.374	19.445	19.445	100.0	50.0	1,556	24,950	2,139	24,950	2,431	24,950
13.375	72.0	12.191	0.514	14.374	20.768	20.768	100.0	50.0	1,661	24,950	2,284	24,950	2,596	24,950
13.375	77.0	12.119	0.550	14.374	22.160	22.160	100.0	50.0	1,773	24,950	2,438	24,950	2,770	24,950
13.375	80.7	12.059	0.580	14.374	23.314	23.314	100.0	50.0	1,865	24,950	2,565	24,950	2,914	24,950
13.375	85.0	12.003	0.608	14.374	24.386	24.386	100.0	50.0	1,951	24,950	2,682	24,950	3,048	24,950
13.375	86.0	11.969	0.625	14.374	25.035	25.035	100.0	50.0	2,003	24,950	2,754	24,950	3,129	24,950
13.625	78.9	12.328	0.555	14.488	22.790	22.790	100.0	50.0	2,036	–	2,800	–	3,182	–
13.625	88.2	12.188	0.625	14.488	25.525	25.525	100.0	50.0	2,036	24,950	2,800	24,950	3,182	24,950
14.000	82.5	12.689	0.562	15.043	23.726	23.726	100.0	50.0	1,898	24,550	2,610	24,950	2,966	24,950
14.000	86.0	12.613	0.600	15.043	25.258	25.258	100.0	50.0	2,021	24,950	2,778	24,950	3,157	24,950
14.000	93.0	12.513	0.650	15.043	27.261	27.261	100.0	50.0	2,181	24,950	2,999	24,950	3,408	24,950
14.000	94.8	12.501	0.656	15.043	27.500	27.500	100.0	50.0	2,200	24,950	3,025	24,950	3,438	24,950
14.000	99.0	12.437	0.688	15.043	28.773	28.773	100.0	50.0	2,302	24,950	3,165	24,950	3,597	24,950

Continued

VAM Connections—DINO VAM (cont.)

Diagram p. C-117

Type: Threaded & Coupled **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Field & accessories max, ft-lb	Joint strength, kips	Field & accessories max, ft-lb	Joint strength, kips	Field & accessories max, ft-lb
14.000	106.0	12.313	0.750	15.043	31.220	31.220	100.0	50.0	2,340	24,950	3,217	24,950	3,656	24,950
14.000	108.2	12.313	0.750	15.043	31.220	31.220	100.0	50.0	2,498	–	3,434	–	3,903	–
14.000	114.0	12.213	0.800	15.043	33.175	33.175	100.0	50.0	2,648	24,950	3,640	24,950	4,137	24,950
16.000	65.0	15.063	0.375	17.000	18.408	18.408	100.0	50.0	1,473	19,550	2,025	24,950	2,301	24,950
16.000	75.0	14.937	0.438	17.000	21.414	21.414	100.0	50.0	1,713	24,950	2,356	24,950	2,677	24,950
16.000	84.0	14.823	0.495	17.000	24.112	24.112	100.0	50.0	1,929	24,950	2,652	24,950	3,014	24,950
16.000	84.8	14.813	0.500	17.000	24.347	24.347	100.0	50.0	1,948	24,950	2,678	24,950	3,043	24,950
16.000	94.5	14.689	0.562	17.000	27.257	27.257	100.0	50.0	2,181	24,950	2,998	24,950	3,407	24,950
16.000	97.0	14.663	0.575	17.000	27.894	27.894	100.0	50.0	2,229	24,950	3,065	24,950	3,483	24,950
16.000	104.0	14.563	0.625	17.000	30.189	30.189	100.0	50.0	2,415	24,950	3,321	24,950	3,774	24,950
16.000	109.0	14.501	0.656	17.000	31.622	31.622	100.0	50.0	2,530	24,950	3,478	24,950	3,953	24,950
16.000	128.0	14.251	0.781	17.000	37.341	37.341	100.0	50.0	2,987	24,950	4,108	24,950	4,668	24,950

VAM Connection—VAM 21

Diagram p. C-117

Type: Threaded & Coupled

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield ft-lb	Joint strength, kips	Yield ft-lb	Joint strength, kips	Yield ft-lb
4.500	11.6	3.880 S	0.250	4.934	3.339	3.405	100%	100%	272	6,300	375	8,400	426	9,500
4.500	12.6	3.880 S	0.271	4.969	3.601	3.672	100%	100%	294	6,400	404	8,500	459	9,600
4.500	13.5	3.845 S	0.290	4.999	3.836	3.914	100%	100%	313	7,300	431	9,700	489	10,900
4.500	15.1	3.750 S	0.337	5.073	4.408	4.497	100%	100%	360	9,700	495	12,900	562	14,500
5.000	18.0	4.151	0.362	5.604	5.275	5.275	100%	100%	422	10,200	580	11,800	659	13,300
5.000	21.4	4.001	0.437	5.699	6.264	6.264	100%	100%	501	11,900	689	14,500	783	16,400
5.000	23.2	4.000 S	0.478	5.758	6.791	6.791	100%	100%	543	13,200	747	15,700	849	17,800
5.500	17.0	4.767	0.304	6.018	4.961	4.961	100%	100%	397	8,450	546	10,000	620	11,400
5.500	20.0	4.700 S	0.361	6.110	5.829	5.829	100%	100%	466	10,950	641	13,400	729	15,000
5.500	23.0	4.600 S	0.415	6.195	6.629	6.629	100%	100%	530	13,450	729	16,700	829	18,800
5.500	26.0	4.500 S	0.476	6.268	7.513	7.513	100%	100%	601	15,450	826	18,000	939	20,400
5.500	26.8	4.375	0.500	6.303	7.854	7.854	100%	100%	628	16,300	864	18,900	982	21,300
6.000	18.6	5.267	0.304	6.510	5.441	5.554	100%	100%	444	9,100	611	11,000	694	12,500
6.000	30.9	4.837	0.519	6.833	8.937	9.116	100%	100%	729	19,700	1,003	24,500	1,140	27,700
6.625	23.2	5.875 S	0.330	7.173	6.526	6.526	100%	100%	522	10,800	718	12,800	816	14,500
6.625	24.0	5.796	0.352	7.211	6.937	6.937	100%	100%	555	11,900	763	14,100	867	15,900
6.625	28.0	5.666	0.417	7.317	8.133	8.133	100%	100%	651	16,700	895	21,300	1,017	24,100
6.625	32.0	5.500	0.475	7.409	9.177	9.177	100%	100%	734	22,000	1,010	28,000	1,147	31,700
6.625	36.7	5.376	0.562	7.522	10.705	10.705	100%	100%	856	24,600	1,178	31,400	1,338	35,600
7.000	23.0	6.250 A	0.317	7.516	6.655	6.655	100%	100%	532	11,550	732	14,200	832	16,000
7.000	26.0	6.151	0.362	7.593	7.549	7.549	100%	100%	604	12,900	830	14,800	944	16,700
7.000	29.0	6.125 S	0.408	7.669	8.449	8.449	100%	100%	676	15,300	929	17,800	1,056	20,100
7.000	32.0	6.000 A	0.453	7.742	9.317	9.317	100%	100%	745	19,300	1,025	24,300	1,165	27,600
7.000	35.0	6.000 S	0.498	7.813	10.172	10.172	100%	100%	814	23,650	1,119	31,300	1,272	35,600
7.000	38.0	5.875 S	0.540	7.854	10.959	10.959	100%	100%	877	26,050	1,206	33,500	1,370	38,000
7.000	41.0	5.695	0.590	7.931	11.881	11.881	100%	100%	950	28,550	1,307	36,400	1,485	41,300
7.000	42.7	5.625	0.625	7.982	12.517	12.517	100%	100%	1,001	30,250	1,377	38,400	1,565	43,600
7.625	29.7	6.750	0.375	8.278	8.541	8.541	100%	100%	683	14,850	940	18,100	1,068	20,500
7.625	33.7	6.750 S	0.430	8.370	9.720	9.720	100%	100%	778	19,500	1,069	24,700	1,215	27,900
7.625	35.8	6.570	0.465	8.427	10.460	10.460	100%	100%	837	22,700	1,151	28,800	1,307	32,500
7.625	39.0	6.500	0.500	8.482	11.192	11.192	100%	100%	895	27,300	1,231	34,700	1,399	39,200
7.625	47.1	6.250	0.625	8.652	13.744	14.018	100%	100%	1121	37800	1542	48500	1752	54,900
8.625	44.0	7.500	0.500	9.483	12.763	13.018	100%	100%	1041	30200	1432	38300	1627	43200
8.750	57.5	7.295 S	0.665	9.819	16.890	17.228	100%	100%	1378	45400	1895	58300	2154	65,900
9.625	40.0	8.750 A	0.395	10.319	11.454	11.454	100%	100%	916	26,300	1,260	29,300	1,432	31,100
9.625	43.5	8.625 S	0.435	10.357	12.559	12.559	100%	100%	1,005	29,850	1,381	32,800	1,570	34,650
9.625	47.0	8.625 S	0.472	10.419	13.572	13.572	100%	100%	1,086	34,700	1,493	38,450	1,697	40,800
9.625	53.5	8.525 S	0.545	10.541	15.546	15.546	100%	100%	1,244	51,450	1,710	57,500	1,943	61,150
9.625	58.4	8.425 S	0.595	10.610	16.879	16.879	100%	100%	1,350	63,050	1,857	71,500	2,110	76,300
9.875	62.8	8.500 S	0.625	10.941	18.162	18.162	100%	100%	1,453	74,450	1,998	85,100	2,270	91,050
9.875	65.3	8.500 S	0.650	10.980	18.838	18.838	100%	100%	1,507	81,450	2,072	93,150	2,355	99,750
9.875	66.4	8.500 S	0.661	10.998	19.134	19.134	100%	100%	1,531	86,350	2,105	98,850	2,392	105,950
9.875	66.9	8.500 S	0.668	11.010	19.322	19.322	100%	100%	1,546	86,400	2,125	98,950	2,415	106,000
9.875	68.9	8.500 S	0.700	11.045	20.177	20.177	100%	100%	1,614	70,750	2,219	77,950	2,522	82,600
10.000	73.9	8.500 S	0.732	11.213	21.313	21.313	100%	100%	1,705	78,550	2,344	86,650	2,664	91,800
10.750	45.5	9.875 A	0.400	11.482	13.006	13.006	100%	100%	1,040	31,500	1,431	35,200	1,626	37,450
10.750	51.0	9.694	0.450	11.547	14.561	14.561	100%	100%	1,165	35,300	1,602	39,150	1,820	41,550
10.750	55.5	9.625 A	0.495	11.626	15.947	15.947	100%	100%	1,276	48,150	1,754	53,850	1,993	57,300
10.750	60.7	9.504	0.545	11.711	17.473	17.473	100%	100%	1,398	62,400	1,922	70,100	2,184	74,700
10.750	65.7	9.550 S	0.595	11.778	18.982	18.982	100%	100%	1,519	73,250	2,088	83,700	2,373	89,400
10.750	73.2	9.330 S	0.672	11.876	21.275	22.979	100%	100%	1,838	112,700	2,528	127,000	2,872	135,500
11.750	54.0	10.724	0.435	12.539	15.463	15.463	100%	100%	1,237	44,700	1,701	50,300	1,933	53,600
11.750	60.0	10.625 A	0.489	12.622	17.300	17.300	100%	100%	1,384	52,350	1,903	58,550	2,162	62,300
11.750	65.0	10.625 A	0.534	12.701	18.816	18.816	100%	100%	1,505	67,950	2,070	76,300	2,352	81,300
11.750	71.0	10.500 S	0.582	12.770	20.420	20.420	100%	100%	1,634	78,750	2,246	90,100	2,552	96,350
11.875	67.8	10.625 S	0.550	12.846	19.568	19.568	100%	100%	1,565	74,250	2,153	83,600	2,446	89,150
11.875	71.8	10.625 S	0.582	12.894	20.648	20.648	100%	100%	1,652	79,750	2,271	91,200	2,581	97,600
13.375	61.0	12.359	0.430	14.150	17.487	17.487	100%	100%	1,399	45,700	1,924	51,300	2,186	54,650
13.375	68.0	12.259	0.480	14.224	19.442	19.442	100%	100%	1,556	53,350	2,139	59,500	2,431	63,250
13.375	72.0	12.250 A	0.514	14.285	20.768	20.768	100%	100%	1,661	68,300	2,284	76,600	2,596	81,550
13.375	77.0	12.250 S	0.550	14.319	22.160	22.160	100%	100%	1,773	74,300	2,438	84,700	2,770	90,650
13.625	88.2	12.250 S	0.625	14.699	25.533	25.533	100%	100%	2,042	108,550	2,808	120,700	3,191	128,250
14.000	82.5	12.750 S	0.562	15.022	23.726	23.726	100%	100%	1,898	62,100	2,610	68,750	2,966	72,700
14.000	86.0	12.613	0.600	15.094	25.259	25.259	100%	100%	2,021	80,550	2,778	89,950	3,157	95,350
14.000	93.0	12.513	0.650	15.096	27.261	27.261	100%	100%	2,181	67,200	2,999	73,050	3,408	77,000
14.000	96.9	12.473	0.670	15.134	28.058	28.058	100%	100%	2,245	77,200	3,086	84,400	3,507	89,150
14.000	100.0	12.413	0.700	15.189	29.248	29.248	100%	100%	2,340	91,500	3,217	100,700	3,656	106,600
14.000	106.0	12.313	0.750	15.281	31.220	31.220	100%	100%	2,498	115,450	3,434	128,000	3,902	135,850
14.000	114.0	12.250 S	0.800	15.372	33.175	33.175	100%	100%	2,654	140,050	3,649	156,050	4,147	165,850

*MTS = Maximum Torque with Sealability. A: Alternate Drift S: Special Drift

VAM Connection—VAM 21 HT

Diagram p. C-117

Type: Threaded & Coupled **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	MTS* ft-lb	Joint strength, kips	MTS* ft-lb	Joint strength, kips	MTS* ft-lb
5.000	18.0	4.151	0.362	5.604	5.275	5.275	100%	100%	422	11,700	580	14,800	659	16,800
5.000	21.4	4.001	0.437	5.699	6.264	6.264	100%	100%	501	13,400	689	20,900	783	23,600
5.000	23.2	3.919	0.478	5.758	6.791	6.791	100%	100%	543	15,300	747	24,000	849	27,100
5.500	17.0	4.767	0.304	6.018	4.961	4.961	100%	100%	397	10,100	546	13,600	620	15,400
5.500	20.0	4.653	0.361	6.110	5.829	5.829	100%	100%	466	13,600	641	18,400	729	20,800
5.500	23.0	4.545	0.415	6.195	6.629	6.629	100%	100%	530	17,000	729	22,900	829	26,000
5.500	26.0	4.423	0.476	6.268	7.513	7.513	100%	100%	601	18,200	826	24,000	939	27,100
5.500	26.8	4.375	0.500	6.303	7.854	7.854	100%	100%	628	19,500	864	25,700	982	29,100
6.625	23.2	5.840	0.330	7.173	6.526	6.526	100%	100%	522	14,200	718	22,500	816	25,500
6.625	24.0	5.796	0.352	7.211	6.937	6.937	100%	100%	555	16,100	763	25,400	867	28,800
6.625	28.0	5.666	0.417	7.317	8.133	8.133	100%	100%	651	21,500	895	34,000	1,017	38,600
6.625	32.0	5.500	0.475	7.409	9.177	9.177	100%	100%	734	26,500	1,010	41,800	1,147	47,400
6.625	36.7	5.376	0.562	7.522	10.705	10.705	100%	100%	856	28,700	1,178	39,200	1,338	44,500
7.000	23.0	6.250 A	0.317	7.516	6.655	6.655	100%	100%	532	15,000	732	20,000	832	22,700
7.000	26.0	6.151	0.362	7.593	7.549	7.549	100%	100%	604	19,400	830	26,000	944	29,500
7.000	29.0	6.059	0.408	7.669	8.449	8.449	100%	100%	676	24,000	929	32,200	1,056	36,600
7.000	32.0	6.000 A	0.453	7.742	9.317	9.317	100%	100%	745	28,700	1,025	38,400	1,165	43,600
7.000	35.0	5.879	0.498	7.813	10.172	10.172	100%	100%	814	33,200	1,119	44,400	1,272	50,400
7.000	38.0	5.795	0.540	7.854	10.959	10.959	100%	100%	877	32,500	1,206	44,300	1,370	50,300
7.000	41.0	5.695	0.590	7.931	11.881	11.881	100%	100%	950	37,100	1,307	50,600	1,485	57,500
7.000	42.7	5.625	0.625	7.982	12.517	12.517	100%	100%	1,001	40,200	1,377	54,900	1,565	62,300
7.625	29.7	6.750	0.375	8.278	8.541	8.541	100%	100%	683	17,700	940	27,100	1,068	30,700
7.625	33.7	6.640	0.430	8.370	9.720	9.720	100%	100%	778	22,700	1,069	29,100	1,215	33,100
7.625	35.8	6.570	0.465	8.427	10.460	10.460	100%	100%	837	26,000	1,151	33,400	1,307	37,800
7.625	39.0	6.500	0.500	8.482	11.192	11.192	100%	100%	895	29,300	1,231	37,500	1,399	42,500
9.625	40.0	8.750 A	0.395	10.319	11.454	11.454	100%	100%	916	39,000	1,260	53,000	1,432	60,200
9.625	43.5	8.599	0.435	10.356	12.559	12.559	100%	100%	1,005	45,300	1,381	61,500	1,570	69,900
9.625	47.0	8.525	0.472	10.419	13.572	13.572	100%	100%	1,086	52,900	1,493	71,700	1,697	81,400
9.625	53.5	8.500 A	0.545	10.541	15.546	15.546	100%	100%	1,244	56,500	1,710	76,300	1,943	86,500
9.625	58.4	8.375 A	0.595	10.610	16.879	16.879	100%	100%	1,350	65,000	1,857	88,900	2,110	101,200

*MTS = Maximum Torque with Sealability. A: Alternate Drift S: Special Drift

VAM Connection — VAM BOLT

Diagram p. C-117

Type: Integral Flush **Seal: Metal-to-Metal**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Max torque, ft-lb	Joint strength, kips	Max torque, ft-lb	Joint strength, kips	Max torque, ft-lb
11.750	65.00	10.625	0.534	11.750	18.816	10.349	55%	55%	828	21,700	1,138	25,400	–	–
11.875	71.80	10.625	0.582	11.875	20.648	12.803	62%	62%	–	–	–	–	1,600	26,900
14.000	115.00	12.250	0.812	14.000	33.642	21.866	65%	65%	–	–	2,405	49,200	2,733	53,200
16.000	84.00	14.823	0.495	16.000	24.112	13.040	54%	54%	1,043	29,400	1,434	36,100	1,630	39,700
16.000	97.00	14.750	0.575	16.000	27.864	16.373	59%	59%	1,310	30,200	1,801	36,900	2,047	40,300
16.000	109.00	14.600	0.656	16.000	31.622	20.147	64%	64%	1,612	32,600	2,216	39,300	2,518	42,600
17.875	93.50	16.688	0.500	17.875	27.293	14.193	52%	52%	1,135	41,600	1,561	52,100	–	–
17.875	105.00	16.564	0.562	17.875	30.567	15.591	51%	51%	1,247	52,400	–	–	–	–
17.938	93.80	16.750	0.500	17.938	27.391	14.234	52%	52%	1,139	38,400	–	–	–	–
18.000	94.00	16.813	0.500	18.000	27.489	14.697	53%	53%	1,176	39,100	–	–	–	–
18.000	105.00	16.689	0.562	18.000	30.788	17.487	57%	57%	1,399	40,300	1,924	50,100	–	–
18.000	117.00	16.563	0.625	18.000	34.116	20.603	60%	60%	1,648	42,800	–	–	–	–
18.000	119.00	16.533	0.640	18.000	34.904	21.350	61%	61%	1,708	44,100	–	–	–	–
18.000	127.00	16.437	0.688	18.000	37.418	23.582	63%	63%	1,887	46,200	–	–	–	–

VAM Connection — VAM EDGE SF

Diagram p. C-118

Type: Integral Flush **Seal: Metal-to-Metal**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Max torque, ft-lb	Joint strength, kips	Max torque, ft-lb	Joint strength, kips	Max torque, ft-lb
5.000	21.40	4.001	0.437	5.252	6.264	5.199	83%	58%	–	–	572	22,750	650	25,500
5.000	23.20	3.919	0.478	5.252	6.791	5.668	83%	58%	–	–	623	23,000	709	25,750
5.500	23.00	4.545	0.415	5.765	6.630	5.427	82%	57%	–	–	597	27,000	678	30,250
5.500	26.00	4.423	0.476	5.765	7.513	6.253	83%	58%	–	–	688	29,000	782	32,500

VAM Connections—VAM FJL

Diagram p. C-118

Type: Integral Flush **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Max torque, ft-lb	Joint strength, kips	Max torque, ft-lb	Joint strength, kips	Max torque, ft-lb
5.000	13.0	4.369	0.253	5.000	3.773	2.082	55.0	22.0	167	1,990	229	2,620	260	2,940
5.000	15.0	4.283	0.296	5.000	4.374	2.410	55.0	22.0	193	2,140	265	2,780	301	3,020
5.000	18.0	4.151	0.362	5.000	5.275	3.205	61.0	24.4	256	3,490	353	3,980	401	4,370
5.000	20.3	4.059	0.408	5.000	5.886	3.818	65.0	26.0	305	3,890	420	4,370	477	4,620
5.000	20.8	4.031	0.422	5.000	6.069	3.999	66.0	26.4	320	4,210	440	4,530	500	4,690
5.000	21.4	4.001	0.437	5.000	6.264	4.083	65.0	26.0	327	4,300	449	4,770	510	4,920
5.000	23.2	3.919	0.478	5.000	6.791	4.574	67.0	26.8	366	4,370	503	5,170	572	5,650
5.000	24.1	3.875	0.500	5.000	7.069	4.574	65.0	26.0	366	4,450	503	5,410	572	5,800
5.500	15.5	4.825	0.275	5.500	4.514	2.488	55.0	22.0	199	2,940	274	3,810	311	4,210
5.500	17.0	4.767	0.304	5.500	4.962	2.739	55.0	22.0	219	3,100	301	3,890	342	4,370
5.500	20.0	4.653	0.361	5.500	5.828	3.418	59.0	23.6	273	3,890	376	4,920	427	5,480
5.500	23.0	4.545	0.415	5.500	6.630	4.219	64.0	25.6	338	4,690	464	5,330	527	5,800
5.500	26.0	4.423	0.476	5.500	7.513	5.031	67.0	26.8	402	5,090	553	5,730	629	6,200
5.500	28.4	4.315	0.530	5.500	8.275	5.391	65.0	26.0	431	5,410	593	6,440	674	6,600
5.500	29.7	4.251	0.562	5.500	8.718	5.690	65.0	26.0	455	6,200	626	6,910	711	7,160
5.500	32.0	4.151	0.612	5.500	9.398	6.135	65.0	26.0	491	7,230	675	7,950	767	8,750
6.625	23.2	5.840	0.330	6.625	6.526	3.581	55.0	22.0	286	5,170	394	6,760	448	7,550
6.625	24.0	5.796	0.352	6.625	6.937	3.991	58.0	23.2	319	5,330	439	6,910	499	7,720
6.625	28.0	5.666	0.417	6.625	8.133	5.186	64.0	25.6	415	5,730	570	7,310	648	7,950
6.625	32.0	5.550	0.475	6.625	9.177	6.037	66.0	26.4	483	6,120	664	7,720	755	8,340
6.625	35.0	5.450	0.525	6.625	10.061	6.777	67.0	26.8	542	6,520	745	7,950	847	8,750

Continued

VAM Connections—VAM FJL (cont.)

Diagram p. C-118

Type: Integral Flush **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Max torque, ft-lb	Joint strength, kips	Max torque, ft-lb	Joint strength, kips	Max torque, ft-lb
7.000	23.0	6.241	0.317	7.000	6.655	3.402	51.0	20.4	272	6,440	374	8,340	425	9,130
7.000	26.0	6.151	0.362	7.000	7.549	4.297	57.0	22.8	344	6,680	473	8,750	537	9,570
7.000	29.0	6.059	0.408	7.000	8.449	5.199	62.0	24.8	416	7,000	572	8,750	650	9,950
7.000	32.0	5.969	0.453	7.000	9.317	6.064	65.0	26.0	485	7,400	667	9,130	758	10,340
7.000	35.0	5.879	0.498	7.000	10.172	6.642	65.0	26.0	531	7,790	731	9,570	830	11,500
7.000	38.0	5.795	0.540	7.000	10.959	7.152	65.0	26.0	572	8,340	787	9,950	894	11,850
7.000	41.0	5.695	0.590	7.000	11.881	7.735	65.0	26.0	619	8,750	851	10,720	967	12,300
7.625	26.4	6.844	0.328	7.625	7.519	3.894	52.0	20.8	312	7,790	428	10,340	487	11,500
7.625	29.7	6.750	0.375	7.625	8.541	4.912	58.0	23.2	393	7,950	540	10,340	614	11,500
7.625	33.7	6.640	0.430	7.625	9.720	6.093	63.0	25.2	487	8,340	670	10,720	762	11,850
7.625	35.8	6.570	0.465	7.625	10.460	6.818	65.0	26.0	545	8,750	750	11,150	852	12,300
7.625	39.0	6.500	0.500	7.625	11.192	7.296	65.0	26.0	584	9,130	803	11,500	912	12,650
7.625	42.8	6.376	0.562	7.625	12.470	8.113	65.0	26.0	649	9,570	892	11,850	1,014	13,050
7.625	45.3	6.310	0.595	7.625	13.141	8.666	66.0	26.4	693	9,570	953	12,300	1,083	13,850
7.625	47.1	6.250	0.625	7.625	13.744	9.060	66.0	26.4	725	11,500	997	15,050	1,133	16,700
8.125	32.5	7.250	0.375	8.125	9.130	5.766	57.0	25.2	461	8,360	634	10,780	721	11,850
8.625	32.0	7.796	0.352	8.625	9.149	4.983	54.0	21.6	399	9,950	548	13,050	623	14,700
8.625	36.0	7.700	0.400	8.625	10.336	6.167	60.0	24.0	493	10,340	678	13,500	771	15,050
8.625	40.0	7.600	0.450	8.625	11.557	7.389	64.0	25.6	591	10,720	813	13,500	924	15,050
8.625	44.0	7.500	0.500	8.625	12.763	8.344	65.0	26.0	668	11,150	918	14,300	1,043	15,850
8.625	49.0	7.386	0.557	8.625	14.118	9.765	69.0	27.6	781	11,850	1,074	14,700	1,221	15,850
8.625	52.0	7.310	0.595	8.625	15.010	9.765	65.0	26.0	781	12,300	1,074	15,500	1,221	16,700
9.375	39.0	8.450	0.400	9.375	11.278	6.498	58.0	23.2	520	11,150	715	14,700	812	16,300
9.375	40.0	8.410	0.420	9.375	11.816	6.911	58.0	23.2	553	11,150	760	14,300	864	16,300
9.625	36.0	8.765	0.352	9.625	10.254	5.485	53.0	21.2	439	12,300	603	16,700	686	17,400
9.625	40.0	8.679	0.395	9.625	11.454	6.682	58.0	23.2	535	12,650	735	16,700	835	17,400
9.625	43.5	8.599	0.435	9.625	12.559	7.786	62.0	24.8	623	13,050	856	16,700	973	17,400
9.625	47.0	8.525	0.472	9.625	13.572	8.799	65.0	26.0	704	13,500	968	17,400	1,100	17,400
9.625	53.5	8.379	0.545	9.625	15.546	10.125	65.0	26.0	810	14,300	1,114	17,400	1,266	17,400
9.625	58.4	8.279	0.595	9.625	16.879	11.496	68.0	27.2	920	14,700	1,265	17,400	1,437	17,400
9.625	59.4	8.251	0.609	9.625	17.250	11.496	67.0	26.8	920	14,700	1,265	17,400	1,437	17,400
9.625	61.1	8.219	0.625	9.625	17.671	11.496	65.0	26.0	920	15,050	1,265	17,400	1,437	17,400
9.875	62.8	8.469	0.625	9.875	18.162	12.369	68.0	27.2	990	15,850	1,361	17,400	1,546	17,400
9.875	65.3	8.419	0.650	9.875	18.838	12.369	66.0	26.4	990	16,700	1,361	17,400	1,546	17,400
9.875	66.4	8.397	0.661	9.875	19.134	12.369	65.0	26.0	990	16,700	1,361	17,400	1,546	17,400
9.875	67.5	8.363	0.678	9.875	19.590	13.039	67.0	26.8	1,043	17,400	1,434	17,400	1,630	17,400
10.750	40.5	9.894	0.350	10.750	11.435	5.983	52.0	20.8	479	15,850	658	17,400	748	17,400
10.750	45.5	9.794	0.400	10.750	13.006	7.555	58.0	23.2	604	15,850	831	17,400	944	17,400
10.750	51.0	9.694	0.450	10.750	14.561	9.109	63.0	25.2	729	15,850	1,002	17,400	1,139	17,400
10.750	55.5	9.604	0.495	10.750	15.947	10.401	65.0	26.0	832	16,700	1,144	17,400	1,300	17,400
10.750	60.7	9.504	0.545	10.750	17.473	11.461	66.0	26.4	917	17,400	1,261	17,400	1,433	17,400
10.750	65.7	9.404	0.595	10.750	18.982	12.451	66.0	26.4	996	17,400	1,370	17,400	1,556	17,400
11.750	47.0	10.844	0.375	11.750	13.401	7.488	56.0	22.4	599	17,400	824	17,400	936	17,400
11.750	54.0	10.724	0.435	11.750	15.463	9.233	60.0	24.0	739	17,400	1,016	17,400	1,154	17,400
11.750	60.0	10.616	0.489	11.750	17.300	10.985	63.0	25.2	879	17,400	1,208	17,400	1,373	17,400
11.750	65.0	10.526	0.534	11.750	18.816	12.152	65.0	26.0	972	17,400	1,337	17,400	1,519	17,400
11.875	71.8	10.555	0.582	11.875	20.648	13.510	65.0	26.0	1,081	17,400	1,486	17,400	1,689	17,400

VAM Connection—VAM HP

Diagram p. C-118

Type: Threaded & Coupled **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Max torque, ft-lb	Joint strength, kips	Max torque, ft-lb	Joint strength, kips	Max torque, ft-lb
7.625	51.20	6.126	0.687	8.094	14.975	11.675	78%	60%	934	–	1,284	33,000	1,459	–
7.625	55.30	6.000	0.750	8.120	16.199	12.436	77%	60%	995	–	1,368	33,000	1,554	–
7.625	59.20	5.876	0.812	8.141	17.380	13.207	76%	60%	1,057	–	1,453	–	1,651	–
10.5 *	96.00	8.500	0.940	11.191	28.308	22.646	80%	60%	1,812	–	2,491	–	2,831	59,400
10.75	71.10	9.294	0.650	11.437	20.624	18.555	90%	60%	1,484	–	2,041	47,300	2,319	47,300
10.75	73.20	9.250	0.672	11.470	21.275	19.156	90%	60%	1,533	–	2,107	47,300	2,395	47,300
10.75	79.20	9.126	0.734	11.344	23.097	19.308	84%	60%	1,545	–	2,124	49,400	2,414	–
10.75	85.30	9.000	0.797	11.470	24.921	21.674	87%	60%	1,734	–	2,384	50,600	2,709	50,600
10.75	100.40	8.674	0.960	11.470	29.526	23.510	80%	60%	1,881	–	2,586	55,000	2,939	55,000
10.75	110.20	8.494	1.050	11.491	31.997	25.598	80%	60%	2,048	–	2,816	59,400	3,200	59,400
10.875	72	9.407	0.656	11.621	21.060	21.061	100%	60%	1,685	–	2,317	50,600	2,633	50,600

* Pipe oversized needed

VAM Connections—VAM HW ST

Diagram p. C-118

Type: Threaded & Coupled **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Max torque, ft-lb	Joint strength, kips	Max torque, ft-lb	Joint strength, kips	Max torque, ft-lb
5.000	28.2	3.675	0.600	5.791	8.294	8.294	100.0	40.0	664	–	912	12,500	1,037	13,600
5.000	30.2	3.575	0.650	5.839	8.883	8.883	100.0	40.0	711	–	977	14,300	1,110	15,600
5.000	32.2	3.475	0.700	5.882	9.456	9.456	100.0	40.0	756	–	1,040	16,200	1,182	17,600
5.000	34.0	3.375	0.750	5.925	10.014	10.014	100.0	40.0	801	–	1,102	18,000	1,252	19,600
5.000	35.9	3.275	0.800	5.969	10.556	10.556	100.0	40.0	844	–	1,161	19,800	1,320	21,600
5.000	37.7	3.175	0.850	6.004	11.082	11.082	100.0	40.0	887	–	1,219	21,700	1,385	23,500
5.000	39.4	3.075	0.900	6.043	11.592	11.592	100.0	40.0	927	–	1,275	23,400	1,449	25,400
5.000	40.1	2.975	0.950	6.079	12.087	12.087	100.0	40.0	967	–	1,330	25,200	1,511	27,300
5.500	31.4	4.175	0.600	6.276	9.236	9.236	100.0	40.0	739	–	1,016	13,300	1,155	14,500
5.500	32.6	4.125	0.625	6.307	9.572	9.572	100.0	40.0	766	–	1,053	14,600	1,197	16,000
5.500	33.7	4.075	0.650	6.343	9.904	9.904	100.0	40.0	792	13,100	1,089	16,000	1,238	17,500
5.500	35.3	4.001	0.687	6.394	10.388	10.388	100.0	40.0	831	14,600	1,143	18,000	1,299	19,700
5.500	35.9	3.975	0.700	6.406	10.556	10.556	100.0	40.0	844	15,100	1,161	18,500	1,320	20,200
5.500	38.0	3.875	0.750	6.449	11.192	11.192	100.0	40.0	895	16,800	1,231	20,600	1,399	22,600
5.500	40.2	3.775	0.800	6.492	11.812	11.812	100.0	40.0	945	18,600	1,299	22,800	1,477	24,900
5.500	40.5	3.751	0.812	6.504	11.959	11.959	100.0	40.0	957	19,100	1,315	23,300	1,495	25,400
5.500	42.2	3.675	0.850	6.535	12.417	12.417	100.0	40.0	993	–	1,366	24,900	1,552	25,400
5.500	43.2	3.625	0.875	6.555	12.714	12.714	100.0	40.0	1,017	–	1,399	25,400	1,589	25,400
5.500	44.2	3.575	0.900	6.575	13.006	13.006	100.0	40.0	1,040	–	1,431	25,400	1,626	25,400
5.500	45.2	3.525	0.925	6.594	13.295	13.295	100.0	40.0	1,064	–	1,462	27,800	1,662	30,300

Continued

VAM Connections—VAM HW ST (cont.)

Diagram p. C-118

Type: Threaded & Coupled **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Max torque, ft-lb	Joint strength, kips	Max torque, ft-lb	Joint strength, kips	Max torque, ft-lb
5.500	46.2	3.475	0.950	6.614	13.580	13.580	100.0	40.0	1,086	–	1,494	27,800	1,698	30,300
6.625	41.5	5.200	0.650	7.516	12.201	12.201	100.0	40.0	976	17,300	1,342	21,800	1,525	24,100
6.625	44.3	5.100	0.700	7.567	13.030	13.030	100.0	40.0	1,042	19,700	1,433	24,800	1,629	25,400
6.625	47.1	5.000	0.750	7.618	13.843	13.843	100.0	40.0	1,107	22,000	1,523	25,400	1,730	25,400
6.625	49.8	4.900	0.800	7.665	14.640	14.640	100.0	40.0	1,171	24,300	1,610	25,400	1,830	25,400
6.625	52.4	4.800	0.850	7.681	15.421	15.421	100.0	40.0	1,234	25,400	1,696	25,400	1,928	25,400
6.625	55.0	4.700	0.900	7.744	16.187	16.187	100.0	40.0	1,295	27,800	1,781	30,300	2,023	30,300
6.625	57.6	4.600	0.950	7.807	16.937	16.937	100.0	40.0	1,355	30,300	1,863	30,300	2,117	30,300
6.625	60.1	4.500	1.000	7.728	17.671	17.671	100.0	40.0	1,414	25,400	1,944	30,300	2,209	30,300
6.625	62.5	4.400	1.050	7.764	18.390	18.390	100.0	40.0	1,471	27,400	2,023	30,300	2,299	30,300
6.625	64.9	4.300	1.100	7.799	19.093	19.093	100.0	40.0	1,527	29,400	2,100	33,000	2,387	33,000
6.625	66.1	4.250	1.125	7.815	19.439	19.439	100.0	40.0	1,555	30,400	2,138	33,000	2,430	33,000
6.625	67.2	4.200	1.150	7.831	19.780	19.780	100.0	40.0	1,582	31,400	2,176	35,800	2,473	35,800
6.625	69.5	4.100	1.200	7.862	20.452	20.452	100.0	40.0	1,636	33,300	2,250	35,800	2,557	35,800
7.000	44.1	5.575	0.650	7.850	12.967	12.967	100.0	40.0	1,037	17,200	1,426	21,600	1,621	23,800
7.000	46.0	5.535	0.670	7.870	13.324	13.324	100.0	40.0	1,066	18,300	1,466	22,700	1,666	24,600
7.000	46.4	5.501	0.687	7.890	13.625	13.625	100.0	40.0	1,090	19,100	1,499	23,900	1,703	25,400
7.000	47.1	5.475	0.700	7.902	13.854	13.854	100.0	40.0	1,108	19,700	1,524	24,600	1,732	25,400
7.000	49.5	5.415	0.730	7.929	14.379	14.379	100.0	40.0	1,150	21,200	1,582	25,400	1,797	25,400
7.000	50.1	5.375	0.750	7.949	14.726	14.726	100.0	40.0	1,178	22,200	1,620	25,400	1,841	25,400
7.000	53.0	5.275	0.800	7.996	15.582	15.582	100.0	40.0	1,247	24,800	1,714	25,400	1,948	25,400
7.000	53.6	5.251	0.812	8.008	15.785	15.785	100.0	40.0	1,263	25,300	1,736	25,400	1,973	25,400
7.000	55.8	5.175	0.850	8.043	16.423	16.423	100.0	40.0	1,314	25,400	1,807	25,400	2,053	25,400
7.000	57.2	5.125	0.875	8.063	16.837	16.837	100.0	40.0	1,347	27,800	1,852	30,300	2,105	30,300
7.000	58.6	5.075	0.900	8.087	17.247	17.247	100.0	40.0	1,380	27,800	1,897	30,300	2,156	30,300
7.000	60.7	5.001	0.937	8.118	17.847	17.847	100.0	40.0	1,428	30,300	1,963	30,300	2,231	30,300
7.000	61.4	4.975	0.950	8.130	18.056	18.056	100.0	40.0	1,444	30,300	1,986	33,000	2,257	33,000
7.000	64.1	4.875	1.000	8.091	18.850	18.850	100.0	40.0	1,508	26,800	2,074	30,300	2,356	30,300
7.000	66.7	4.775	1.050	8.126	19.627	19.627	100.0	40.0	1,570	29,000	2,159	30,300	2,453	30,300
7.000	67.4	4.751	1.062	8.134	19.811	19.811	100.0	40.0	1,585	29,600	2,179	30,300	2,476	30,300
7.000	69.3	4.675	1.100	8.161	20.389	20.389	100.0	40.0	1,631	31,100	2,243	33,000	2,549	33,000
7.000	71.9	4.575	1.150	8.193	21.135	21.135	100.0	40.0	1,691	33,300	2,325	35,800	2,642	35,800
7.000	73.1	4.525	1.175	8.213	21.502	21.502	100.0	40.0	1,720	34,300	2,365	38,200	2,688	38,200
7.000	74.3	4.475	1.200	8.228	21.865	21.865	100.0	40.0	1,749	35,300	2,405	38,200	2,733	38,200
7.000	76.8	4.375	1.250	8.256	22.580	22.580	100.0	40.0	1,806	37,500	2,484	42,100	2,823	42,100
7.625	48.4	6.200	0.650	8.488	14.243	14.243	100.0	40.0	1,139	19,300	1,567	24,400	1,780	25,400
7.625	51.2	6.126	0.687	8.528	14.974	14.974	100.0	40.0	1,198	21,500	1,647	25,400	1,872	25,400
7.625	52.1	6.100	0.700	8.539	15.229	15.229	100.0	40.0	1,218	22,100	1,675	25,400	1,904	25,400
7.625	52.8	6.076	0.712	8.551	15.463	15.463	100.0	40.0	1,237	22,250	1,701	25,400	1,933	25,400
7.625	55.3	6.000	0.750	8.591	16.199	16.199	100.0	40.0	1,296	25,000	1,782	25,400	2,025	25,400
7.625	58.3	5.900	0.800	8.638	17.153	17.153	100.0	40.0	1,372	25,400	1,887	25,400	2,144	25,400
7.625	59.2	5.876	0.812	8.650	17.380	17.380	100.0	40.0	1,390	25,400	1,912	25,400	2,173	25,400
7.625	61.5	5.800	0.850	8.685	18.092	18.092	100.0	40.0	1,447	25,400	1,990	25,400	2,262	25,400
7.625	64.6	5.700	0.900	8.732	19.014	19.014	100.0	40.0	1,521	30,300	2,092	30,300	2,377	30,300
7.625	65.0	5.690	0.905	8.736	19.106	19.106	100.0	40.0	1,528	30,300	2,102	30,300	2,388	30,300
7.625	67.7	5.600	0.950	8.780	19.922	19.922	100.0	40.0	1,594	33,000	2,191	33,000	2,490	33,000
7.625	70.8	5.500	1.000	8.740	20.813	20.813	100.0	40.0	1,665	27,800	2,289	30,300	2,602	30,300
7.625	73.7	5.400	1.050	8.780	21.689	21.689	100.0	40.0	1,735	30,300	2,386	30,300	2,711	30,300
7.625	76.7	5.300	1.100	8.815	22.549	22.549	100.0	40.0	1,804	33,000	2,480	33,000	2,819	33,000
7.625	79.5	5.200	1.150	8.850	23.393	23.393	100.0	40.0	1,871	35,800	2,573	35,800	2,924	35,800
7.625	82.3	5.100	1.200	8.886	24.222	24.222	100.0	40.0	1,938	38,200	2,664	38,200	3,028	38,200
7.625	85.1	5.000	1.250	8.921	25.035	25.035	100.0	40.0	2,003	42,100	2,754	42,100	3,129	42,100
8.625	59.3	7.100	0.700	9.567	17.428	17.428	100.0	40.0	1,394	25,400	1,917	25,400	2,179	25,400
8.625	63.5	7.000	0.750	9.618	18.555	18.555	100.0	40.0	1,484	25,400	2,041	25,400	2,319	25,400
8.625	66.9	6.900	0.800	9.669	19.666	19.666	100.0	40.0	1,573	25,400	2,163	25,400	2,458	25,400
8.625	70.6	6.800	0.850	9.720	20.762	20.762	100.0	40.0	1,661	30,300	2,284	30,300	2,595	30,300
8.625	72.7	6.750	0.875	9.744	21.304	21.304	100.0	40.0	1,704	30,300	2,343	30,300	2,663	30,300
8.625	74.3	6.700	0.900	9.768	21.842	21.842	100.0	40.0	1,747	30,300	2,403	30,300	2,730	30,300
8.625	77.9	6.600	0.950	9.815	22.906	22.906	100.0	40.0	1,832	33,000	2,520	33,000	2,863	33,000
8.625	81.4	6.500	1.000	9.776	23.955	23.955	100.0	40.0	1,916	30,300	2,635	30,300	2,994	30,300
8.625	83.2	6.450	1.025	9.795	24.473	-36.003	100.0	40.0	1,958	33,000	2,692	33,000	3,059	33,000
8.625	85.0	6.400	1.050	9.815	24.987	24.987	100.0	40.0	1,999	33,000	2,749	33,000	3,123	33,000
8.625	88.4	6.300	1.100	9.854	26.005	26.005	100.0	40.0	2,080	35,800	2,861	35,800	3,251	35,800
8.625	90.1	6.250	1.125	9.874	26.507	26.507	100.0	40.0	2,121	35,800	2,916	35,800	3,313	35,800
8.625	91.8	6.200	1.150	9.894	27.006	27.006	100.0	40.0	2,160	38,200	2,971	38,200	3,376	38,200
8.625	95.2	6.100	1.200	9.933	27.992	27.992	100.0	40.0	2,239	42,100	3,079	42,100	3,499	42,100
8.625	98.5	6.000	1.250	9.969	28.962	28.962	100.0	40.0	2,317	44,600	3,186	44,600	3,620	44,600
9.625	64.9	8.125	0.672	10.551	18.901	18.901	100.0	40.0	1,512	25,400	2,079	25,400	2,363	25,400
9.625	66.7	8.069	0.700	10.579	19.627	19.627	100.0	40.0	1,570	25,400	2,159	25,400	2,453	25,400
9.625	70.3	8.001	0.734	10.618	20.502	20.502	100.0	40.0	1,640	25,400	2,255	25,400	2,563	25,400
9.625	71.8	7.969	0.750	10.634	20.911	20.911	100.0	40.0	1,673	25,400	2,300	25,400	2,614	25,400
9.625	75.6	7.875	0.797	10.685	22.104	22.104	100.0	40.0	1,768	25,400	2,431	25,400	2,763	25,400
9.625	75.9	7.869	0.800	10.689	22.180	22.180	100.0	40.0	1,774	25,400	2,440	25,400	2,773	25,400
9.625	79.7	7.769	0.850	10.740	23.432	23.432	100.0	40.0	1,875	30,300	2,578	30,300	2,929	30,300
9.625	83.9	7.669	0.900	10.791	24.669	24.669	100.0	40.0	1,974	30,300	2,714	30,300	3,084	30,300
9.625	88.0	7.569	0.950	10.843	25.890	25.890	100.0	40.0	2,071	30,300	2,848	30,300	3,236	30,300
9.625	92.1	7.469	1.000	10.803	27.096	27.096	100.0	40.0	2,168	30,300	2,981	30,300	3,387	30,300
9.625	96.2	7.369	1.050	10.846	28.286	28.286	100.0	40.0	2,263	33,000	3,111	33,000	3,536	33,000
9.625	100.2	7.269	1.100	10.886	29.460	29.460	100.0	40.0	2,357	35,800	3,241	35,800	3,683	35,800
9.625	104.1	7.169	1.150	10.929	30.619	30.619	100.0	40.0	2,450	39,800	3,368	39,800	3,827	39,800
9.625	108.0	7.069	1.200	10.969	31.762	31.762	100.0	40.0	2,541	42,100	3,494	42,100	3,970	42,100
9.625	111.8	6.969	1.250	11.008	32.889	32.889	100.0	40.0	2,631	44,600	3,618	44,600	4,111	44,600
10.000	68.7	8.468	0.688	10.949	20.127	20.127	100.0	40.0	1,610	25,400	2,214	25,400	2,516	25,400
10.000	69.2	8.444	0.700	10.961	20.452	20.452	100.0	40.0	1,636	25,400	2,250	25,400	2,557	25,400
10.000	71.8	8.380	0.732	10.996	21.313	21.313	100.0	40.0	1,705	25,400	2,344	25,400	2,664	25,400
10.000	74.1	8.344	0.750	11.016	21.795	21.795	100.0	40.0	1,744	25,400	2,397	25,400	2,724	25,400
10.000	78.6	8.244	0.800	11.071	23.122	23.122	100.0	40.0	1,850	25,400	2,543	25,400	2,890	25,400
10.000	83.1	8.144	0.850	11.122	24.434	24.434	100.0	40.0	1,955	30,300	2,688	30,300	3,054	30,300
10.000	87.5	8.044	0.900	11.173	25.730	25.730	100.0	40.0	2,058	33,000	2,830	33,000	3,216	33,000
10.000	91.8	7.944	0.950	11.224	27.010	27.010	100.0	40.0	2,161	35,800	2,971	35,800	3,376	35,800
10.000	96.1	7.844	1.000	11.185	28.274	28.274	100.0	40.0	2,262	33,000	3,110	33,000	3,534	33,000
10.000	100.4	7.744	1.050	11.228	29.523	29.523	100.0	40.0	2,362	35,800	3,248	35,800	3,690	35,800
10.000	104.6	7.644	1.100	11.272	30.756	30.756	100.0	40.0	2,460	38,200	3,383	38,200	3,845	38,200
10.000	108.7	7.544	1.150	11.315	31.974	31.974	100.0	40.0	2,558	39,800	3,517	39,800	3,997	39,800
10.000	112.8	7.444	1.200	11.358	33.175	33.175	100.0	40.0	2,654	44,600	3,649	44,600	4,147	44,600
10.000	116.8	7.344	1.250	11.398	34.361	34.361	100.0	40.0	2,749	44,600	3,780	44,600	4,295	44,600
10.750	65.7	9.404	0.595	11.579	18.982	18.982	100.0	40.0	1,519	22,300	2,088	25,400	2,373	25,400

Continued

VAM Connections—VAM HW ST (cont.)

Diagram p. C-118

Type: Threaded & Coupled **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Max torque, ft-lb	Joint strength, kips	Max torque, ft-lb	Joint strength, kips	Max torque, ft-lb
10.750	71.1	9.294	0.650	11.642	20.625	20.625	100.0	40.0	1,650	25,400	2,269	25,400	2,578	25,400
10.750	73.2	9.250	0.672	11.665	21.276	21.276	100.0	40.0	1,702	25,400	2,340	25,400	2,660	25,400
10.750	75.9	9.194	0.700	11.697	22.101	22.101	100.0	40.0	1,768	25,400	2,431	25,400	2,763	25,400
10.750	79.2	9.126	0.734	11.732	23.096	23.096	100.0	40.0	1,848	25,400	2,541	25,400	2,887	25,400
10.750	80.8	9.094	0.750	11.752	23.562	23.562	100.0	40.0	1,885	25,400	2,592	25,400	2,945	25,400
10.750	85.3	9.000	0.797	11.803	24.921	24.921	100.0	40.0	1,994	25,400	2,741	25,400	3,115	25,400
10.750	85.0	8.994	0.800	11.803	25.007	25.007	100.0	40.0	2,001	30,300	2,751	30,300	3,126	30,300
10.750	90.3	8.894	0.850	11.858	26.437	26.437	100.0	40.0	2,115	30,300	2,908	30,300	3,305	30,300
10.750	91.2	8.876	0.859	11.866	26.692	26.692	100.0	40.0	2,135	30,300	2,936	30,300	3,337	30,300
10.750	94.7	8.794	0.900	11.909	27.850	27.850	100.0	40.0	2,228	33,000	3,064	33,000	3,481	33,000
10.750	99.7	8.694	0.950	11.961	29.248	29.248	100.0	40.0	2,340	35,800	3,217	35,800	3,656	35,800
10.750	100.4	8.674	0.960	11.969	29.526	29.526	100.0	40.0	2,362	38,200	3,248	38,200	3,691	38,200
10.750	102.6	8.716	0.984	11.996	30.190	30.190	100.0	40.0	2,415	38,200	3,321	38,200	3,774	38,200
10.750	104.1	8.594	1.000	11.898	30.631	30.631	100.0	40.0	2,450	33,000	3,369	33,000	3,829	33,000
10.750	108.8	8.494	1.050	11.941	31.997	31.997	100.0	40.0	2,560	35,800	3,520	35,800	4,000	35,800
10.750	114.8	8.394	1.100	11.984	33.348	33.348	100.0	40.0	2,668	38,200	3,668	38,200	4,169	38,200
10.750	117.9	8.294	1.150	12.024	34.683	34.683	100.0	40.0	2,775	42,100	3,815	42,100	4,335	42,100
10.750	122.4	8.194	1.200	12.067	36.003	36.003	100.0	40.0	2,880	44,600	3,960	44,600	4,500	44,600
10.750	126.8	8.094	1.250	12.106	37.306	37.306	100.0	40.0	2,984	44,600	4,104	44,600	4,663	44,600
11.750	77.1	10.294	0.650	12.650	22.667	22.667	100.0	40.0	1,813	25,400	2,493	25,400	2,833	25,400
11.750	82.6	10.194	0.700	12.705	24.300	24.300	100.0	40.0	1,944	25,400	2,673	25,400	3,038	25,400
11.750	88.1	10.094	0.750	12.764	25.918	25.918	100.0	40.0	2,073	25,400	2,851	25,400	3,240	25,400
11.750	93.6	9.994	0.800	12.819	27.520	27.520	100.0	40.0	2,202	30,300	3,027	30,300	3,440	30,300
11.750	99.0	9.894	0.850	12.874	29.107	29.107	100.0	40.0	2,329	30,300	3,202	30,300	3,638	30,300
11.750	100.0	9.874	0.860	12.882	29.422	29.422	100.0	40.0	2,354	33,000	3,236	33,000	3,678	33,000
11.750	104.3	9.794	0.900	12.925	30.678	30.678	100.0	40.0	2,454	33,000	3,375	33,000	3,835	33,000
11.750	109.6	9.694	0.950	12.976	32.323	32.323	100.0	40.0	2,579	38,200	3,546	38,200	4,029	38,200
12.750	119.7	10.626	0.984	14.098	36.373	36.373	100.0	40.0	2,910	42,100	4,001	42,100	4,547	42,100
13.375	88.3	11.919	0.650	14.287	25.985	25.985	100.0	40.0	2,079	25,400	2,858	25,400	3,248	25,400
13.375	94.8	11.819	0.700	14.346	27.874	27.874	100.0	40.0	2,230	25,400	3,066	25,400	3,484	25,400
13.375	101.1	11.719	0.750	14.402	29.747	29.747	100.0	40.0	2,380	25,400	3,272	25,400	3,718	25,400
13.375	107.4	11.619	0.800	14.461	31.604	31.604	100.0	40.0	2,528	30,300	3,476	30,300	3,951	30,300
13.375	113.7	11.519	0.850	14.516	33.446	33.446	100.0	40.0	2,676	30,300	3,679	30,300	4,181	30,300
13.375	119.9	11.419	0.900	14.571	35.272	35.272	100.0	40.0	2,822	35,800	3,880	35,800	4,409	35,800
13.375	122.0	11.385	0.917	14.591	35.890	35.890	100.0	40.0	2,871	35,800	3,948	35,800	4,486	35,800
13.375	126.1	11.319	0.950	14.626	37.083	37.083	100.0	40.0	2,967	38,200	4,079	38,200	4,635	38,200
14.000	86.0	12.613	0.600	14.854	25.258	25.258	100.0	40.0	2,021	25,400	2,778	25,400	3,157	25,400
14.000	93.0	12.513	0.650	14.913	27.261	27.261	100.0	40.0	2,181	25,400	2,999	25,400	3,408	25,400
14.000	100.0	12.413	0.700	14.972	29.248	29.248	100.0	40.0	2,340	25,400	3,217	25,400	3,656	25,400
14.000	106.0	12.313	0.750	15.031	31.220	31.220	100.0	40.0	2,498	25,400	3,434	25,400	3,903	25,400
14.000	114.0	12.213	0.800	15.091	33.175	33.175	100.0	40.0	2,654	30,300	3,649	30,300	4,147	30,300
14.000	120.0	12.113	0.850	15.146	35.115	35.115	100.0	40.0	2,809	33,000	3,863	33,000	4,389	33,000
14.000	125.9	12.013	0.900	15.205	37.039	37.039	100.0	40.0	2,963	35,800	4,074	35,800	4,630	35,800
14.000	132.4	11.913	0.950	15.260	38.948	38.948	100.0	40.0	3,116	39,800	4,284	39,800	4,869	39,800

VAM Connections—VAM HTF

Diagram p. C-118

Type: Integral Flush **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Max torque, ft-lb	Joint strength, kips	Max torque, ft-lb	Joint strength, kips	Max torque, ft-lb
4.500	13.5	3.920	0.290	4.545	3.836	2.252	59	35	180	14,000	248	18,500	281	21,000
4.500	15.1	3.826	0.337	4.545	4.408	2.682	61	36	214	15,500	295	20,500	335	23,000
4.500	16.6	3.750	0.375	4.545	4.859	3.004	62	37	240	19,000	330	25,500	375	28,500
4.500	17.0	3.740	0.380	4.545	4.918	3.024	62	37	242	18,000	333	24,000	378	27,000
4.500	18.9	3.640	0.430	4.545	5.498	3.432	62	37	274	21,500	377	28,000	429	31,500
4.500	21.5	3.500	0.500	4.545	6.284	3.940	63	38	315	26,000	433	34,000	492	38,000
5.000	15.0	4.408	0.296	5.050	4.374	2.483	57	34	199	18,000	273	24,500	311	27,500
5.000	18.0	4.276	0.362	5.050	5.275	3.258	62	37	261	21,000	359	28,000	407	32,000
5.000	21.4	4.126	0.437	5.050	6.265	3.931	63	38	314	26,500	432	35,000	491	39,500
5.000	23.2	4.044	0.478	5.050	6.791	4.204	62	37	336	30,500	462	40,500	525	45,500
5.000	24.1	4.000	0.500	5.050	7.068	4.410	62	37	353	30,500	485	40,500	551	45,000
5.000	26.7	3.876	0.562	5.050	7.835	4.870	62	37	390	33,000	536	43,500	609	49,000
5.500	17.0	4.892	0.304	5.555	4.963	2.895	58	35	231	18,500	318	24,500	362	28,000
5.500	20.0	4.778	0.361	5.555	5.828	3.367	58	35	269	23,500	371	31,500	421	35,500
5.500	23.0	4.670	0.415	5.555	6.629	4.038	61	37	323	27,500	444	37,000	505	41,500
5.500	26.0	4.548	0.476	5.555	7.513	4.724	63	38	378	37,500	520	50,000	591	56,500
7.000	23.0	6.366	0.317	7.070	6.656	3.813	57	34	305	31,000	420	42,000	477	47,500
7.000	26.0	6.276	0.362	7.070	7.549	4.475	59	36	358	40,500	492	55,000	560	62,000
7.000	29.0	6.184	0.408	7.070	8.449	4.952	59	35	396	47,500	545	64,000	619	72,500
7.000	32.0	6.094	0.453	7.070	9.317	5.676	61	37	454	57,500	624	78,000	709	88,000
7.000	35.0	6.004	0.498	7.070	10.173	6.271	62	37	501	60,000	689	81,000	783	91,500
7.000	38.0	5.920	0.540	7.070	10.959	6.803	62	37	544	64,000	749	86,000	851	97,000
7.625	26.4	6.969	0.328	7.701	7.519	4.244	56	34	339	42,500	466	57,500	530	65,000
7.625	29.7	6.875	0.375	7.701	8.541	4.971	58	35	398	45,000	547	61,000	621	69,000
7.625	33.7	6.765	0.430	7.701	9.720	5.833	60	36	467	57,500	642	78,000	729	88,000
7.625	39.0	6.625	0.500	7.701	11.193	7.039	63	38	563	66,500	774	90,000	880	101,500
7.625	42.8	6.501	0.562	7.701	12.470	7.747	62	37	620	81,000	852	109,000	968	123,500
7.625	45.3	6.435	0.595	7.701	13.141	8.176	62	37	654	88,000	899	118,000	1,022	133,500
7.750	46.1	6.560	0.595	7.828	13.375	7.786	58	35	623	82,500	856	111,500	973	126,000
9.625	40.0	8.835	0.395	9.721	11.455	6.374	56	33	509	72,000	701	98,000	796	110,500
9.625	43.5	8.755	0.435	9.721	12.560	7.590	60	36	607	87,000	834	118,500	948	134,000
9.625	47.0	8.681	0.472	9.721	13.572	8.475	62	37	678	101,500	932	138,000	1,059	156,000
9.625	53.5	8.535	0.545	9.721	15.547	9.074	58	35	726	120,500	999	163,500	1,135	185,500
9.875	62.8	8.625	0.625	9.974	18.163	12.036	66	40	963	147,000	1325	199,000	1,505	225,500

VAM Connections—VAM MUST

Diagram p. C-118

Type: Integral Flush **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Max torque, ft-lb	Joint strength, kips	Max torque, ft-lb	Joint strength, kips	Max torque, ft-lb
5.500	32.0	4.151	0.612	5.500	9.398	4.703	50.0	50.0	376	9,900	517	12,800	588	14,300
7.625	55.3	6.000	0.750	7.625	16.339	9.153	56.0	56.0	732	18,300	1,007	24,300	1,144	25,450
7.625	59.2	5.876	0.812	7.625	17.380	10.029	58.0	58.0	802	20,250	1,103	25,450	1,254	27,900
10.750	109.0	8.528	1.033	10.750	31.534	17.723	56.0	56.0	1,418	38,500	1,950	38,500	2,215	38,500

VAM Connections—VAM SG

Diagram p. C-118

Type: Integral Semi-Flush **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Max torque, ft-lb	Joint strength, kips	Max torque, ft-lb	Joint strength, kips	Max torque, ft-lb
4.500	15.1	3.701	0.337	4.6788	4.408	4.014	90	63	377	8,100	436	8,900	496	9,900
5.000	21.4	4.001	0.437	5.2520	6.265	5.672	90	63	536	11,500	620	12,600	705	14,000
5.000	23.2	3.919	0.478	5.2764	6.791	6.198	91	64	587	12,900	680	14,100	772	15,500
5.500	20.0	4.653	0.361	5.6970	5.828	5.263	87	61	482	10,400	558	11,300	634	12,500
5.500	23.0	4.545	0.415	5.7205	6.630	6.020	90	63	567	12,000	656	13,100	746	14,500
5.500	26.0	4.423	0.476	5.7205	7.513	6.810	90	63	642	13,500	744	14,800	845	16,200

VAM Connections—VAM SLIJ II

Diagram p. C-118

Type: Integral Semi-Flush **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Max torque, ft-lb	Joint strength, kips	Max torque, ft-lb	Joint strength, kips	Max torque, ft-lb
5.000	18.0	4.151	0.362	5.098	5.275	3.777	72.0	50.4	302	5,400	415	5,900	472	6,300
5.000	20.3	4.059	0.408	5.136	5.886	4.421	75.0	52.5	354	6,300	486	7,200	553	7,500
5.000	20.8	4.031	0.422	5.146	6.069	4.619	76.0	53.2	370	6,700	508	7,600	577	8,000
5.000	21.4	4.001	0.437	5.158	6.264	4.831	77.0	53.9	386	7,000	531	7,900	604	8,500
5.000	23.2	3.919	0.478	5.190	6.791	5.242	77.0	53.9	419	7,800	577	8,800	655	9,400
5.000	24.1	3.875	0.500	5.193	7.069	5.468	77.0	53.9	437	8,100	601	9,400	684	9,900
5.000	26.7	3.751	0.562	5.203	7.836	6.081	78.0	54.6	486	9,200	669	10,600	760	11,200
5.000	29.2	3.625	0.625	5.214	8.590	6.687	78.0	54.6	535	10,500	736	11,900	836	12,700
5.500	20.0	4.653	0.361	5.594	5.828	4.125	70.0	49.7	330	6,500	454	7,200	516	7,500
5.500	23.0	4.545	0.415	5.635	6.630	4.958	75.0	52.5	397	7,900	545	8,900	620	9,500
5.500	23.8	4.501	0.437	5.653	6.951	5.301	76.0	53.2	424	8,500	583	9,700	663	10,200
5.500	26.0	4.423	0.476	5.678	7.513	5.833	78.0	54.6	467	9,600	642	10,900	729	11,600
5.500	26.8	4.375	0.500	5.706	7.854	6.135	78.0	54.6	491	10,100	675	11,400	767	12,100
5.500	28.4	4.315	0.530	5.719	8.275	6.507	79.0	55.3	521	10,800	716	12,300	813	13,100
5.500	29.7	4.251	0.562	5.733	8.718	6.907	79.0	55.3	553	11,600	760	13,200	863	14,100
5.500	32.0	4.151	0.612	5.742	9.398	7.452	79.0	55.3	596	12,800	820	14,500	932	15,400
5.500	32.6	4.125	0.625	5.748	9.572	7.621	80.0	56.0	610	13,100	838	15,000	953	15,800
6.625	28.0	5.666	0.417	6.751	8.133	5.969	73.0	51.1	478	10,600	657	12,000	746	12,700
6.625	32.0	5.550	0.475	6.795	9.177	7.066	77.0	53.9	565	12,800	777	14,600	883	15,500
6.625	33.0	5.500	0.500	6.822	9.621	7.398	77.0	53.9	592	13,400	814	15,400	925	16,400
6.625	34.5	5.450	0.525	6.841	10.061	7.855	78.0	54.6	628	14,400	1,042	16,500	982	17,600
6.625	36.7	5.376	0.562	6.869	10.705	8.517	80.0	56.0	681	15,700	937	18,200	1,065	19,400
6.625	40.2	5.250	0.625	6.920	11.781	9.464	80.0	56.0	757	18,000	1,041	20,900	1,183	22,200
6.625	43.7	5.126	0.687	6.948	12.816	10.410	81.0	56.7	833	20,200	1,145	23,400	1,301	25,000
6.875	32.7	5.794	0.478	7.061	9.606	7.252	75.0	52.5	580	13,100	798	14,900	907	15,800
7.000	26.0	6.151	0.362	7.084	7.549	5.199	69.0	48.3	416	10,700	572	11,700	650	12,100
7.000	29.0	6.059	0.408	7.119	8.449	6.135	73.0	51.1	491	12,800	675	14,000	767	14,600
7.000	32.0	5.969	0.453	7.162	9.317	6.916	74.0	51.8	553	14,500	761	16,400	865	17,300
7.000	35.0	5.879	0.498	7.198	10.172	7.814	77.0	53.9	625	16,600	860	18,900	977	20,000
7.000	38.0	5.795	0.540	7.231	10.959	8.654	79.0	55.3	692	18,700	952	21,200	1,082	22,400
7.000	41.0	5.695	0.590	7.264	11.881	9.508	80.0	56.0	761	20,900	1,046	24,000	1,189	25,400
7.000	42.7	5.625	0.625	7.299	12.517	10.086	81.0	56.7	807	22,700	1,109	25,900	1,261	27,800
7.000	44.0	5.595	0.640	7.309	12.788	10.337	81.0	56.7	827	23,300	1,137	25,900	1,292	27,800
7.000	45.4	5.535	0.670	7.318	13.324	10.822	81.0	56.7	866	24,600	1,187	27,800	1,353	29,800
7.000	46.4	5.501	0.687	7.323	13.625	11.028	81.0	56.7	882	25,400	1,213	29,800	1,379	31,800
7.000	49.5	5.415	0.730	7.333	14.379	11.636	81.0	56.7	931	27,800	1,280	31,800	1,455	33,800
7.625	29.7	6.750	0.375	7.711	8.541	5.912	69.0	48.3	473	12,500	650	13,900	739	14,500
7.625	33.7	6.640	0.430	7.754	9.720	7.119	73.0	51.1	570	15,400	783	17,100	890	17,900
7.625	39.0	6.500	0.500	7.818	11.192	8.523	76.0	53.2	682	18,800	938	21,300	1,065	22,700
7.625	42.8	6.376	0.562	7.866	12.470	9.858	79.0	55.3	789	21,100	1,084	25,400	1,232	27,800
7.625	45.3	6.310	0.595	7.889	13.141	10.528	80.0	56.0	842	24,000	1,158	27,800	1,316	29,800
7.625	47.1	6.250	0.625	7.920	13.744	11.010	80.0	56.0	881	25,900	1,211	29,800	1,376	31,800
7.625	51.2	6.126	0.687	7.962	14.974	12.192	81.0	56.7	975	29,800	1,341	33,800	1,524	35,800
7.625	52.1	6.100	0.700	7.967	15.229	12.422	82.0	57.4	994	29,800	1,366	33,800	1,553	35,800
7.625	52.8	6.076	0.712	7.976	15.463	12.674	82.0	57.4	1,014	29,800	1,394	33,800	1,584	35,800
7.625	55.3	6.000	0.750	7.989	16.199	13.342	82.0	57.4	1,067	21,800	1,468	35,800	1,668	37,800
7.625	59.2	5.876	0.812	7.991	17.380	14.124	81.0	56.7	1,130	25,800	1,554	39,800	1,766	41,800
7.750	46.1	6.435	0.595	8.019	13.374	10.538	79.0	55.3	843	23,800	1,159	27,800	1,317	29,800
7.750	46.9	6.395	0.615	8.036	13.785	10.962	80.0	56.0	877	25,100	1,206	29,800	1,370	31,800
7.750	47.6	6.375	0.625	8.045	13.990	11.188	80.0	56.0	895	25,900	1,231	29,800	1,399	31,800
7.750	48.6	6.345	0.640	8.056	14.296	11.513	81.0	56.7	921	25,900	1,266	29,800	1,439	31,800
8.625	36.0	7.700	0.400	8.721	10.336	7.234	70.0	49.0	579	14,100	796	16,000	904	16,800
8.625	40.0	7.600	0.450	8.767	11.557	8.308	72.0	50.4	665	16,600	917	19,100	1,039	20,400
8.625	44.0	7.500	0.500	8.809	12.763	9.576	75.0	52.5	766	19,300	1,053	22,400	1,197	24,100
8.625	49.0	7.386	0.557	8.855	14.118	10.988	78.0	54.6	879	22,300	1,209	25,900	1,374	27,800
8.625	49.1	7.376	0.562	8.857	14.236	11.101	78.0	54.6	888	22,700	1,221	25,900	1,388	27,800
8.625	52.0	7.310	0.595	8.880	15.010	11.802	79.0	55.3	944	24,500	1,298	27,800	1,475	29,800
8.625	54.0	7.250	0.625	8.913	15.708	12.400	79.0	55.3	992	25,900	1,364	29,800	1,550	31,800
8.625	58.7	7.126	0.687	8.955	17.132	13.811	81.0	56.7	1,105	29,800	1,519	33,800	1,726	35,800
8.625	63.5	7.000	0.750	8.982	18.555	15.061	81.0	56.7	1,205	33,800	1,657	37,800	1,883	39,800
9.625	43.5	8.599	0.435	9.748	12.559	8.719	69.0	48.3	698	16,400	959	18,900	1,090	20,100
9.625	47.0	8.525	0.472	9.777	13.572	9.756	72.0	50.4	780	18,500	1,073	21,500	1,220	22,900
9.625	53.5	8.379	0.545	9.855	15.546	11.591	75.0	52.5	927	22,300	1,275	25,900	1,449	27,800
9.625	58.4	8.279	0.595	9.882	16.879	12.961	77.0	53.9	1,037	25,300	1,426	29,800	1,620	31,800
9.625	59.4	8.251	0.609	9.894	17.250	13.352	77.0	53.9	1,068	25,900	1,469	29,800	1,669	31,800
9.625	61.1	8.219	0.625	9.905	17.671	13.755	78.0	54.6	1,100	27,800	1,513	31,800	1,719	33,800
9.625	64.9	8.125	0.672	9.941	18.901	14.982	79.0	55.3	1,199	29,800	1,648	33,800	1,873	35,800
9.625	70.3	8.001	0.734	9.977	20.502	16.489	80.0	56.0	1,319	33,800	1,814	37,800	2,061	39,800
9.625	71.8	7.969	0.750	9.985	20.911	16.924	81.0	56.7	1,354	35,800	1,862	39,800	2,116	41,800
9.625	75.6	7.875	0.797	10.013	22.104	18.081	82.0	57.4	1,446	37,800	1,989	41,800	2,260	43,800
9.625	80.8	7.751	0.859	9.961	23.656	18.922	80.0	56.0	1,514	41,800	2,081	45,800	2,365	47,800
9.750	59.2	8.404	0.595	10.006	17.113	13.108	77.0	53.9	1,049	25,300	1,442	29,800	1,639	31,800
9.875	62.8	8.469	0.625	10.151	18.162	14.096	78.0	54.6	1,128	27,800	1,551	31,800	1,762	33,800
9.875	65.3	8.419	0.650	10.174	18.838	14.816	79.0	55.3	1,185	29,800	1,630	33,800	1,852	35,800
9.875	66.9	8.383	0.668	10.188	19.322	15.309	79.0	55.3	1,225	29,800	1,684	33,800	1,914	35,800
9.875	67.5	8.363	0.678	10.181	19.590	14.948	76.0	53.2	1,196	29,800	1,644	33,800	1,869	35,800
9.875	68.9	8.319	0.700	10.207	20.177	16.044	80.0	56.0	1,284	33,800	1,765	37,800	2,006	39,800
10.000	67.2	8.500	0.672	10.312	19.693	15.610	79.0	55.3	1,249	29,800	1,717	33,800	1,951	35,800
10.000	68.7	8.468	0.688	10.325	20.127	16.074	80.0	56.0	1,286	31,800	1,768	35,800	2,009	37,800
10.750	51.0	9.694	0.450	10.878	14.561	10.166	70.0	49.0	813	18,000	1,118	21,700	1,271	23,400
10.750	55.5	9.604	0.495	10.913	15.947	11.574	73.0	51.1	926	20,700	1,273	25,000	1,447	27,800
10.750	60.7	9.504	0.545	10.962	17.473	12.908	74.0	51.8	1,033	23,800	1,420	27,800	1,614	29,800
10.750	65.7	9.404	0.595	11.002	18.982	14.458	76.0	53.2	1,157	25,900	1,590	29,800	1,807	31,800

Continued

VAM Connections—VAM SLIJ II (cont.)

Diagram p. C-118

Type: Integral Semi-Flush **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Max torque, ft-lb	Joint strength, kips	Max torque, ft-lb	Joint strength, kips	Max torque, ft-lb
10.750	71.1	9.294	0.650	11.045	20.625	16.160	78.0	54.6	1,293	29,800	1,778	33,800	2,020	35,800
10.750	73.2	9.250	0.672	11.063	21.276	16.842	79.0	55.3	1,347	31,800	1,853	35,800	2,105	37,800
10.750	75.9	9.194	0.700	11.081	22.101	17.524	79.0	55.3	1,402	33,800	1,928	37,800	2,191	39,800
10.750	79.2	9.126	0.734	11.102	23.096	18.355	79.0	55.3	1,468	35,800	2,019	39,800	2,294	41,800
10.750	80.8	9.094	0.750	11.114	23.562	18.814	80.0	56.0	1,505	35,800	2,070	39,800	2,352	41,800
10.750	85.3	9.000	0.797	11.144	24.921	20.181	81.0	56.7	1,614	39,800	2,220	43,800	2,523	45,800
10.750	97.1	8.750	0.922	11.187	28.467	23.278	82.0	57.4	1,862	47,700	2,561	51,700	2,910	53,700
10.875	72.0	9.407	0.656	11.165	21.060	16.196	77.0	53.9	1,296	29,800	1,782	33,800	2,024	35,800
11.750	54.0	10.724	0.435	11.858	15.463	10.458	68.0	47.6	837	18,000	1,150	21,700	1,307	23,500
11.750	60.0	10.616	0.489	11.900	17.300	12.318	71.0	49.7	985	21,300	1,355	25,900	1,540	27,800
11.750	65.0	10.526	0.534	11.943	18.816	13.597	72.0	50.4	1,088	23,700	1,496	27,800	1,700	29,800
11.750	71.0	10.430	0.582	11.981	20.420	15.229	75.0	52.5	1,218	27,800	1,675	31,800	1,904	33,800
11.750	74.6	10.358	0.618	12.006	21.613	16.458	76.0	53.2	1,317	29,800	1,810	33,800	2,057	35,800
11.750	75.4	10.344	0.625	12.011	21.844	16.694	76.0	53.2	1,336	29,800	1,836	33,800	2,087	35,800
11.750	78.8	10.282	0.656	12.035	22.863	17.730	78.0	54.6	1,418	31,800	1,950	35,800	2,216	37,800
11.750	80.5	10.250	0.672	12.048	23.387	18.275	78.0	54.6	1,462	33,800	2,010	37,800	2,284	39,800
11.750	82.6	10.212	0.691	12.063	24.007	18.915	79.0	55.3	1,513	35,800	2,081	39,800	2,364	41,800
11.750	87.4	10.126	0.734	12.097	25.402	20.364	80.0	56.0	1,629	37,800	2,240	41,800	2,546	43,800
11.875	71.8	10.555	0.582	12.096	20.648	15.319	74.0	51.8	1,226	27,800	1,685	31,800	1,915	33,800
12.063	78.08	10.627	0.640	12.328	22.967	17.512	76.0	53.2	1,401	31,800	1,926	35,800	2,189	37,800
12.125	87.7	10.529	0.720	12.451	25.798	20.321	79.0	55.3	1,626	35,800	2,235	39,800	2,540	41,800
12.750	86.7	11.250	1.672	13.013	25.798	20.321	79.0	55.3	1,626	33,800	2,235	37,800	2,540	39,800
13.375	68.0	12.259	0.480	13.513	19.445	13.170	68.0	47.6	1,054	22,100	1,449	27,800	1,646	29,800
13.375	72.0	12.191	0.514	13.542	20.768	14.522	70.0	49.0	1,162	23,500	1,597	27,800	1,815	29,800
13.375	77.0	12.119	0.550	13.573	22.160	15.936	72.0	50.4	1,275	25,900	1,753	29,800	1,992	31,800
13.375	80.7	12.059	0.580	13.590	23.314	17.073	73.0	51.1	1,366	27,800	1,878	31,800	2,134	33,800
13.375	85.0	12.003	0.608	13.611	24.386	18.138	74.0	51.8	1,451	29,800	1,995	33,800	2,267	35,800
13.375	86.0	11.969	0.625	13.625	25.035	18.809	75.0	52.5	1,505	31,800	2,069	35,800	2,351	37,800
13.375	92.0	11.875	0.672	13.661	26.818	20.615	77.0	53.9	1,649	35,800	2,268	39,800	2,577	41,800
13.375	98.0	11.781	0.719	13.698	28.587	22.418	78.0	54.6	1,793	37,800	2,466	41,800	2,802	43,800
13.625	88.2	12.188	0.625	13.875	25.525	19.141	75.0	52.5	1,531	31,800	2,106	35,800	2,393	37,800
13.750		12.250	0.707	14.040	28.970	21.488	74.2	51.9	1,719	41,800	2,364	45,800	2,686	47,700
13.875	105.9	12.259	0.755	14.218	31.119	24.175	77.7	54.4	1,934	37,800	2,659	41,800	3,022	43,800
14.000	82.5	12.689	0.562	14.199	23.726	17.030	72.0	50.4	1,362	31,800	1,873	35,800	2,129	37,800
14.000	93.0	12.513	0.650	14.263	27.261	20.421	75.0	52.5	1,634	39,800	2,246	43,800	2,553	45,800
14.000	100.0	12.413	0.700	14.301	29.249	22.401	77.0	53.9	1,792	43,800	2,464	47,700	2,800	49,700
14.000	104.2	12.345	0.734	14.322	30.589	23.436	77.0	53.9	1,875	45,800	2,578	49,700	2,930	51,700
14.000	106.0	12.313	0.750	14.332	31.220	24.056	77.0	53.9	1,924	47,700	2,646	51,700	3,007	53,700
14.000	112.6	12.219	0.797	14.368	33.058	26.012	79.0	55.3	2,081	53,700	2,861	54,900	3,252	54,900
14.000	115.0	12.189	0.812	14.381	33.642	26.668	79.0	55.3	2,133	54,900	2,933	54,900	3,334	54,900
14.000		12.250	0.820	14.240	33.953	25.670	75.6	52.9	2,054	49,700	2,824	53,700	3,209	54,900
16.000	84.0	14.823	0.495	16.250	24.112	15.977	66.3	46.4	1,278	37,800	1,757	41,800	1,997	43,800
16.000	97.0	14.750	0.575	16.250	27.864	19.715	70.8	49.6	1,577	43,800	2,169	47,700	2,464	49,700
16.000	104.0	14.563	0.625	16.250	30.189	22.041	73.0	51.1	1,763	49,700	2,424	53,700	2,755	54,900
16.000	109.0	14.600	0.656	16.250	31.622	23.372	73.9	51.7	1,870	51,700	2,571	54,900	2,922	54,900
16.000	118.0	14.383	0.715	16.250	34.334	26.193	76.3	53.4	2,095	54,900	2,881	54,900	3,274	54,900

VAM Connections—VAM TOP

Diagram p. C-118

Type: Threaded & Coupled **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Max torque, ft-lb	Joint strength, kips	Max torque, ft-lb	Joint strength, kips	Max torque, ft-lb
5.000	13.0	4.369	0.253	5.400	3.773	3.773	100.0	60.0	302	4,530	415	5,560	472	6,360
5.000	15.0	4.283	0.296	5.470	4.374	4.374	100.0	60.0	350	5,560	481	7,160	547	7,950
5.000	18.0	4.151	0.362	5.577	5.275	5.275	100.0	60.0	422	6,360	580	7,550	659	8,340
5.000	20.3	4.059	0.408	5.648	5.886	5.886	100.0	60.0	471	7,950	647	9,950	736	10,720
5.000	20.8	4.031	0.422	5.669	6.069	6.069	100.0	60.0	486	8,750	668	10,720	759	11,500
5.000	21.4	4.001	0.437	5.691	6.264	6.264	100.0	60.0	501	9,130	689	11,150	783	11,850
5.000	23.2	3.919	0.478	5.750	6.791	6.791	100.0	60.0	543	10,720	747	13,050	849	14,700
5.000	24.1	3.875	0.500	5.781	7.069	7.069	100.0	60.0	566	12,100	778	14,900	884	16,300
5.500	14.0	4.887	0.244	5.876	4.029	4.029	100.0	60.0	322	4,920	–	6,200	504	6,910
5.500	15.5	4.825	0.275	5.929	4.514	4.514	100.0	60.0	361	5,560	497	7,160	564	7,950
5.500	17.0	4.767	0.304	5.978	4.962	4.962	100.0	60.0	397	5,960	546	7,550	620	8,340
5.500	20.0	4.653	0.361	6.071	5.828	5.828	100.0	60.0	466	7,160	641	8,340	729	9,130
5.500	23.0	4.545	0.415	6.156	6.630	6.630	100.0	60.0	530	9,130	729	11,500	829	12,300
5.500	26.0	4.423	0.476	6.248	7.513	7.513	100.0	60.0	601	11,850	826	15,050	939	16,700
5.500	26.8	4.375	0.500	6.283	7.854	7.854	100.0	60.0	628	13,400	864	16,700	982	18,400
5.500	28.4	4.315	0.530	6.327	8.275	8.275	100.0	60.0	662	14,800	910	18,450	1,034	20,400
5.500	29.7	4.251	0.562	6.372	8.718	8.718	100.0	60.0	697	16,300	959	20,450	1,090	22,600
5.750	18.1	5.017	0.304	6.264	5.201	5.201	100.0	60.0	416	7,630	–	9,570	650	10,340
5.750	19.7	4.955	0.335	6.317	5.699	5.699	100.0	60.0	456	7,860	627	9,980	712	11,050
5.750	21.8	4.875	0.375	6.382	6.332	6.332	100.0	60.0	507	9,320	696	11,820	791	13,140
6.625	20.0	5.924	0.288	7.081	5.734	5.734	100.0	60.0	459	6,760	631	8,750	717	9,570
6.625	23.2	5.840	0.330	7.154	6.526	6.526	100.0	60.0	522	7,160	718	9,130	816	9,950
6.625	24.0	5.796	0.352	7.191	6.937	6.937	100.0	60.0	555	7,550	763	9,570	867	10,340
6.625	28.0	5.666	0.417	7.297	8.133	8.133	100.0	60.0	651	10,340	895	12,300	1,017	13,500
6.625	32.0	5.550	0.475	7.390	9.177	9.177	100.0	60.0	734	13,050	1,009	15,850	1,147	17,400
6.625	36.7	5.376	0.562	7.524	10.705	10.705	100.0	60.0	856	17,400	–	21,450	1,338	23,800
7.000	23.0	6.241	0.317	7.488	6.655	6.655	100.0	60.0	532	8,340	732	10,340	832	11,150
7.000	26.0	6.151	0.362	7.565	7.549	7.549	100.0	60.0	604	9,130	830	11,150	944	11,850
7.000	29.0	6.059	0.408	7.644	8.449	8.449	100.0	60.0	676	10,340	929	12,650	1,056	13,500
7.000	32.0	5.969	0.453	7.717	9.317	9.317	100.0	60.0	745	12,300	1,025	15,050	1,165	16,200
7.000	35.0	5.879	0.498	7.787	10.172	10.172	100.0	60.0	814	14,700	1,119	18,250	1,272	19,900
7.000	38.0	5.795	0.540	7.852	10.959	10.959	100.0	60.0	877	17,050	1,205	20,600	1,370	23,100
7.000	41.0	5.695	0.590	7.929	11.881	11.881	100.0	60.0	950	19,900	1,307	23,800	1,485	25,450
7.000	42.7	5.625	0.625	7.980	12.517	12.517	100.0	60.0	1,001	22,250	–	25,450	1,565	25,450
7.625	26.4	6.844	0.328	8.132	7.519	7.519	100.0	60.0	602	9,950	827	12,650	940	13,850
7.625	29.7	6.750	0.375	8.213	8.541	8.541	100.0	60.0	683	10,340	940	13,500	1,068	14,300
7.625	33.7	6.640	0.430	8.305	9.720	9.720	100.0	60.0	778	11,150	1,069	14,300	1,215	15,050
7.625	35.8	6.570	0.465	8.362	10.460	10.460	100.0	60.0	837	13,500	1,151	16,700	1,308	18,250
7.625	39.0	6.500	0.500	8.419	11.192	11.192	100.0	60.0	895	15,850	1,231	19,900	1,399	22,250
7.625	42.8	6.376	0.562	8.518	12.470	12.470	100.0	60.0	998	20,600	1,372	25,450	1,559	25,450
7.625	45.3	6.310	0.595	8.569	13.141	13.141	100.0	60.0	1,051	23,100	1,446	25,450	1,643	25,450
7.625	47.1	6.250	0.625	8.614	13.744	13.744	100.0	60.0	1,100	24,600	1,512	25,450	1,718	25,450

Continued

VAM Connections—VAM TOP (cont.)

Diagram p. C-118

Type: Threaded & Coupled **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Max torque, ft-lb	Joint strength, kips	Max torque, ft-lb	Joint strength, kips	Max torque, ft-lb
7.750	46.1	6.435	0.595	8.693	13.374	13.374	100.0	60.0	1,070	22,250	1,471	25,450	1,672	25,450
8.625	36.0	7.700	0.400	9.266	10.336	10.336	100.0	60.0	827	9,950	1,137	11,850	1,292	12,650
8.625	40.0	7.600	0.450	9.350	11.557	11.557	100.0	60.0	925	13,500	1,271	16,700	1,445	18,250
8.625	44.0	7.500	0.500	9.433	12.763	12.763	100.0	60.0	1,021	18,250	1,404	22,250	1,595	23,800
8.625	49.0	7.386	0.557	9.526	14.118	14.118	100.0	60.0	1,129	23,100	1,553	25,450	1,765	25,450
8.625	52.0	7.310	0.595	9.587	15.010	15.010	100.0	60.0	1,201	25,450	1,651	25,450	1,876	25,450
9.625	36.0	8.765	0.352	10.188	10.253	10.466	100.0	60.0	815	10,340	1,121	12,650	1,274	13,500
9.625	40.0	8.679	0.395	10.264	11.454	11.454	100.0	60.0	916	10,340	1,260	12,650	1,432	13,500
9.625	43.5	8.599	0.435	10.333	12.559	12.559	100.0	60.0	1,005	14,300	1,381	17,400	1,570	19,050
9.625	47.0	8.525	0.472	10.396	13.572	13.572	100.0	60.0	1,086	17,400	1,493	22,250	1,697	23,800
9.625	53.5	8.379	0.545	10.520	15.546	15.546	100.0	60.0	1,244	25,450	1,710	25,450	1,943	25,450
9.625	58.4	8.279	0.595	10.600	16.879	16.879	100.0	60.0	1,350	25,450	1,857	25,450	2,110	25,450
9.875	62.8	8.469	0.625	10.907	18.162	18.162	100.0	60.0	1,453	25,450	1,998	25,450	2,270	25,450
9.875	65.3	8.419	0.650	10.949	18.838	18.838	100.0	60.0	1,507	25,450	–	25,450	2,355	25,450
9.875	66.4	8.397	0.661	10.965	19.134	19.134	100.0	60.0	1,531	25,450	2,105	25,450	2,392	25,450
9.875	66.9	8.383	0.668	10.978	19.322	19.322	100.0	60.0	1,546	25,450	2,125	25,450	2,415	25,450
9.875	67.5	8.363	0.678	10.992	19.590	19.590	100.0	60.0	1,567	27,800	2,155	27,800	2,449	27,800
9.875	68.0	8.331	0.694	11.018	20.017	20.017	100.0	60.0	1,601	30,200	–	30,200	2,502	30,200
9.875	68.9	8.319	0.700	11.028	20.177	20.177	100.0	60.0	1,614	30,200	2,219	30,200	2,522	30,200
9.875	70.5	8.279	0.720	11.059	20.708	20.708	100.0	60.0	1,657	33,000	2,278	33,000	2,589	33,000
9.875	72.0	8.269	0.725	11.067	20.841	20.841	100.0	60.0	1,667	33,000	2,293	33,000	2,605	33,000
10.000	67.2	8.500	0.672	11.116	19.693	19.693	100.0	60.0	1,575	33,000	–	33,000	2,462	33,000
10.000	68.7	8.468	0.688	11.142	20.127	20.127	100.0	60.0	1,610	33,000	–	33,000	2,516	33,000
10.000	71.8	8.400	0.722	11.195	21.045	21.045	100.0	60.0	1,684	33,000	–	33,000	2,631	33,000
10.750	45.5	9.794	0.400	11.400	13.006	13.006	100.0	60.0	1,040	11,850	1,431	14,300	1,626	15,850
10.750	51.0	9.694	0.450	11.488	14.561	14.561	100.0	60.0	1,165	17,400	1,602	21,400	1,820	23,800
10.750	55.5	9.604	0.495	11.565	15.947	15.947	100.0	60.0	1,276	22,250	1,754	25,450	1,993	25,450
10.750	60.7	9.504	0.545	11.652	17.473	17.473	100.0	60.0	1,398	25,450	1,922	25,450	2,184	25,450
10.750	65.7	9.404	0.595	11.734	18.982	18.982	100.0	60.0	1,519	25,450	2,088	25,450	2,373	25,450
10.750	71.1	9.294	0.650	11.825	20.625	20.625	100.0	60.0	1,650	25,450	–	25,450	2,578	25,450
10.750	73.2	9.250	0.672	11.724	21.276	19.172	90.0	60.0	1,702	33,000	2,340	33,000	2,660	33,000
10.875	72.0	9.407	0.656	11.951	21.060	21.060	100.0	60.0	1,685	35,800	2,317	35,800	2,633	35,800
11.750	54.0	10.724	0.435	12.463	15.463	15.463	100.0	60.0	1,237	16,700	1,701	20,600	1,933	23,100
11.750	60.0	10.616	0.489	12.557	17.300	17.300	100.0	60.0	1,384	23,800	1,903	25,450	2,163	25,450
11.750	65.0	10.526	0.534	12.636	18.816	18.816	100.0	60.0	1,505	25,450	2,070	25,450	2,352	25,450
11.750	71.0	10.430	0.582	12.719	20.420	20.420	100.0	60.0	1,634	25,450	2,246	25,450	2,553	25,450
11.875	67.8	10.619	0.550	12.787	19.568	19.568	100.0	60.0	1,565	25,450	–	25,450	2,446	25,450
11.875	71.8	10.555	0.582	12.844	20.648	20.648	100.0	60.0	1,652	25,450	2,271	25,450	2,581	25,450
13.375	61.0	12.359	0.430	14.085	17.487	17.487	100.0	60.0	1,399	18,250	1,924	23,100	2,186	25,450
13.375	68.0	12.259	0.480	14.175	19.445	19.445	100.0	60.0	1,556	25,450	2,139	25,450	2,431	25,450
13.375	72.0	12.191	0.514	14.236	20.768	20.768	100.0	60.0	1,661	25,450	2,284	25,450	2,596	25,450
13.375	77.0	12.119	0.550	14.299	22.160	22.160	100.0	60.0	1,773	25,450	2,438	25,450	2,770	25,450
13.375	80.7	12.059	0.580	14.350	23.314	23.314	100.0	60.0	1,865	25,450	2,565	25,450	2,914	25,450
13.375	85.0	12.003	0.608	14.400	24.386	24.386	100.0	60.0	1,951	25,450	2,682	25,450	3,048	25,450
13.375	86.0	11.969	0.625	14.429	25.035	25.035	100.0	60.0	2,003	25,450	2,754	25,450	3,129	25,450
13.375	92.0	11.875	0.672	14.510	26.818	26.818	100.0	60.0	2,145	55,000	2,950	55,000	3,352	55,000
13.625	88.2	12.188	0.625	14.681	25.525	25.525	100.0	60.0	2,042	33,000	2,808	33,000	3,191	33,000
13.625	118.2	11.738	0.850	15.051	34.114	34.114	100.0	60.0	2,729	33,000	–	33,000	4,264	33,000
14.000	82.2	12.693	0.560	14.878	23.645	24.130	100.0	60.0	1,190	31,350	1,637	33,000	1,860	33,000
14.000	82.5	12.689	0.562	14.882	23.726	24.223	100.0	60.0	1,191	31,850	1,637	33,000	1,860	33,000
14.000	86.0	12.613	0.600	14.943	25.258	25.258	100.0	60.0	2,021	33,000	2,778	33,000	3,157	33,000
14.000	93.0	12.513	0.650	15.030	27.261	27.261	100.0	60.0	2,181	33,000	2,999	33,000	3,408	33,000
14.000	100.0	12.413	0.700	15.114	29.248	29.248	100.0	60.0	2,340	36,300	3,217	36,300	3,656	36,300
14.000	106.0	12.313	0.750	15.199	31.220	31.220	100.0	60.0	2,498	39,600	3,434	39,600	3,903	39,600
14.000	114.0	12.213	0.800	15.281	33.175	33.175	100.0	60.0	2,654	48,500	3,649	48,500	4,147	48,500
14.000	120.0	12.113	0.850	15.364	35.115	35.115	100.0	60.0	2,809	50,600	3,863	50,600	4,389	50,600
15.000	92.5	13.653	0.580	15.994	26.275	26.275	100.0	60.0	2,102	36,600	–	36,600	3,284	36,600
15.000	107.0	13.463	0.675	16.162	30.377	31.025	100.0	60.0	2,430	44,600	3,341	44,600	3,797	44,600
16.000	84.0	14.823	0.495	16.863	24.112	24.597	100.0	60.0	1,929	36,600	2,652	36,600	3,014	36,600
16.000	95.0	14.681	0.566	16.993	27.444	28.050	100.0	60.0	2,196	55,000	3,019	55,000	3,431	55,000
16.000	97.0	14.663	0.575	17.006	27.864	28.419	100.0	60.0	2,229	55,000	3,065	55,000	3,483	55,000
16.000	104.0	14.563	0.625	17.095	30.189	30.791	100.0	60.0	2,415	55,000	3,321	55,000	3,774	55,000

VAM Connections—VAM TOP FE

Diagram p. C-118

Type: Threaded & Coupled **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Max torque, ft-lb	Joint strength, kips	Max torque, ft-lb	Joint strength, kips	Max torque, ft-lb
6.625	36.7	5.376	0.562	7.702	10.705	10.705	100.0	60.0	856	20,860	1,178	25,340	1,338	27,640
7.000	23.0	6.241	0.317	7.601	6.655	6.655	100.0	60.0	532	11,220	732	13,400	832	14,520
7.000	26.0	6.151	0.362	7.691	7.549	7.549	100.0	60.0	604	11,960	830	14,150	944	15,270
7.000	29.0	6.059	0.408	7.782	8.449	8.449	100.0	60.0	676	12,520	929	14,710	1,056	15,830
7.000	32.0	5.969	0.453	7.868	9.317	9.317	100.0	60.0	745	15,620	1,025	18,590	1,165	20,120
7.000	35.0	5.879	0.498	7.952	10.172	10.172	100.0	60.0	814	18,410	1,119	22,140	1,272	24,070
7.000	38.0	5.795	0.540	8.029	10.959	10.959	100.0	60.0	877	21,000	1,205	25,430	1,370	27,710
7.000	41.0	5.695	0.590	8.117	11.881	11.881	100.0	60.0	950	24,060	1,307	29,350	1,485	32,050
7.000	42.7	5.625	0.625	8.178	12.517	12.517	100.0	60.0	1,001	26,460	1,377	32,330	1,565	35,340
7.625	26.4	6.844	0.328	8.248	7.519	7.519	100.0	60.0	602	13,550	827	16,560	940	18,100
7.625	29.7	6.750	0.375	8.344	8.541	8.541	100.0	60.0	683	14,360	940	17,360	1,068	18,910
7.625	33.7	6.640	0.430	8.452	9.720	9.720	100.0	60.0	778	15,270	1,069	18,280	1,215	19,820
7.625	35.8	6.570	0.465	8.520	10.460	10.460	100.0	60.0	837	17,780	1,151	21,490	1,308	23,410
7.625	39.0	6.500	0.500	8.587	11.192	11.192	100.0	60.0	895	20,260	1,231	24,700	1,399	26,980
7.625	42.8	6.376	0.562	8.701	12.470	12.470	100.0	60.0	998	24,570	1,372	30,270	1,559	33,190
7.625	45.3	6.310	0.595	8.761	13.141	13.141	100.0	60.0	1,051	26,940	1,446	33,320	1,643	36,590
7.625	47.1	6.250	0.625	8.815	13.744	13.744	100.0	60.0	1,100	29,230	1,512	36,220	1,718	39,810
7.750	46.1	6.435	0.595	8.886	13.374	13.374	100.0	60.0	1,070	27,450	1,471	33,900	1,672	37,200
8.000	32.0	7.125	0.375	8.719	8.983	8.983	100.0	60.0	719	18,360	988	22,660	1,123	24,860
8.625	36.0	7.700	0.400	9.406	10.336	10.336	100.0	60.0	827	14,620	1,137	16,790	1,292	17,910
8.625	40.0	7.600	0.450	9.506	11.557	11.557	100.0	60.0	925	19,260	1,271	22,740	1,445	24,530
8.625	44.0	7.500	0.500	9.604	12.763	12.763	100.0	60.0	1,021	23,910	1,404	28,720	1,595	31,190
8.625	49.0	7.386	0.557	9.713	14.118	14.118	100.0	60.0	1,129	29,170	1,553	35,460	1,765	38,690
8.625	52.0	7.310	0.595	9.784	15.010	15.010	100.0	60.0	1,201	32,590	1,651	39,860	1,876	43,590
9.625	40.0	8.679	0.395	10.404	11.454	11.454	100.0	60.0	916	14,100	1,260	16,210	1,432	17,290
9.625	43.5	8.599	0.435	10.486	12.559	12.559	100.0	60.0	1,005	18,470	1,381	21,880	1,570	23,630
9.625	47.0	8.525	0.472	10.561	13.572	13.572	100.0	60.0	1,086	22,530	1,493	27,150	1,697	29,510

Continued

VAM Connections—VAM TOP FE (cont.)

Diagram p. C-118

Type: Threaded & Coupled **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Max torque, ft-lb	Joint strength, kips	Max torque, ft-lb	Joint strength, kips	Max torque, ft-lb
9.625	53.5	8.379	0.545	10.705	15.546	15.546	100.0	60.0	1,244	30,560	1,710	37,580	1,943	41,200
9.625	58.4	8.279	0.595	10.801	16.879	16.879	100.0	60.0	1,350	35,960	1,857	44,620	2,110	49,050
9.875	62.8	8.469	0.625	11.118	18.162	18.162	100.0	60.0	1,453	41,610	1,998	52,310	2,270	57,770
9.875	65.3	8.419	0.650	11.165	18.838	18.838	100.0	60.0	1,507	44,450	2,072	56,010	2,355	61,940
9.875	66.4	8.397	0.661	11.186	19.134	19.134	100.0	60.0	1,531	45,690	2,105	57,640	2,392	63,760
9.875	66.9	8.383	0.668	11.199	19.322	19.322	100.0	60.0	1,546	46,440	2,125	58,610	2,415	64,850
9.875	67.5	8.363	0.678	11.217	19.590	19.590	100.0	60.0	1,567	47,550	2,155	60,060	2,449	66,470
9.875	68.0	8.331	0.694	11.247	20.017	20.017	100.0	60.0	1,601	49,390	2,202	62,470	2,502	69,180
9.875	68.9	8.319	0.700	11.258	20.177	20.177	100.0	60.0	1,614	50,000	2,219	63,270	2,522	70,070
9.875	70.5	8.279	0.720	11.294	20.708	20.708	100.0	60.0	1,657	52,320	2,278	66,300	2,589	73,480
9.875	72.0	8.269	0.725	11.304	20.841	20.841	100.0	60.0	1,667	52,830	2,293	66,970	2,605	74,230
10.750	45.5	9.794	0.400	11.544	13.006	13.006	100.0	60.0	1,040	16,640	1,431	19,670	1,626	21,230
10.750	51.0	9.694	0.450	11.648	14.561	14.561	100.0	60.0	1,165	23,230	1,602	28,300	1,820	30,910
10.750	55.5	9.604	0.495	11.740	15.947	15.947	100.0	60.0	1,276	29,160	1,754	36,080	1,993	39,640
10.750	60.7	9.504	0.545	11.840	17.473	17.473	100.0	60.0	1,398	35,730	1,922	44,680	2,184	49,300
10.750	65.7	9.404	0.595	11.939	18.982	18.982	100.0	60.0	1,519	42,370	2,088	53,440	2,373	59,130
10.750	71.1	9.294	0.650	12.045	20.625	20.625	100.0	60.0	1,650	49,730	2,269	63,130	2,578	70,020
10.750	73.2	9.250	0.672	12.091	21.275	26.020	100.0	60.0	1,702	52,640	2,340	66,950	2,659	74,300
11.750	54.0	10.724	0.435	12.618	15.463	15.463	100.0	60.0	1,237	22,100	1,701	26,770	1,933	29,170
11.750	60.0	10.616	0.489	12.731	17.300	17.300	100.0	60.0	1,384	30,330	1,903	37,630	2,163	41,370
11.750	65.0	10.526	0.534	12.823	18.816	18.816	100.0	60.0	1,505	37,280	2,070	46,810	2,352	51,700
11.750	71.0	10.430	0.582	12.920	20.420	20.420	100.0	60.0	1,634	44,730	2,246	56,650	2,553	62,800
11.875	67.8	10.619	0.550	12.982	19.568	19.568	100.0	60.0	1,565	39,710	2,152	50,050	2,446	55,370
11.875	71.8	10.555	0.582	13.046	20.648	20.648	100.0	60.0	1,652	44,700	2,271	56,660	2,581	62,820
13.375	61.0	12.359	0.430	14.241	17.487	17.487	100.0	60.0	1,399	26,280	1,924	32,580	2,186	35,820
13.375	68.0	12.259	0.480	14.348	19.445	19.445	100.0	60.0	1,556	36,010	2,139	45,540	2,431	50,460
13.375	72.0	12.191	0.514	14.420	20.768	20.768	100.0	60.0	1,661	42,650	2,284	54,400	2,596	60,420
13.375	77.0	12.119	0.550	14.494	22.160	22.160	100.0	60.0	1,773	49,730	2,438	63,860	2,770	71,080
13.375	80.7	12.059	0.580	14.556	23.314	23.314	100.0	60.0	1,865	55,780	2,565	71,930	2,914	75,000
13.375	85.0	12.003	0.608	14.613	24.386	24.386	100.0	60.0	1,951	61,180	2,682	75,000	3,048	75,000
13.375	86.0	11.969	0.625	14.648	25.035	25.035	100.0	60.0	2,003	64,650	2,754	75,000	3,129	75,000
13.625	88.2	12.188	0.625	14.900	25.525	25.525	100.0	60.0	2,042	65,010	2,808	75,000	3,191	75,000
14.000	106.0	12.400	0.750	15.464	31.220	31.220	100.0	60.0	2,498	75,000	3,434	75,000	3,903	75,000

VAM Connections—VAM TOP HC

Diagram p. C-118

Type: Coupled **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Max torque, ft-lb	Joint strength, kips	Max torque, ft-lb	Joint strength, kips	Max torque, ft-lb
5.000	15.0	4.283	0.296	5.470	4.374	4.374	100.0	100.0	350	6,050	481	7,400	547	7,950
5.000	18.0	4.151	0.362	5.577	5.275	5.275	100.0	100.0	422	8,750	580	10,720	659	11,500
5.000	20.3	4.059	0.408	5.648	5.886	5.886	100.0	100.0	471	10,340	647	13,050	736	14,300
5.000	20.8	4.031	0.422	5.669	6.069	6.069	100.0	100.0	486	11,150	668	13,500	759	15,050
5.000	21.4	4.001	0.437	5.691	6.264	6.264	100.0	100.0	501	11,500	689	14,300	783	15,850
5.000	23.2	3.919	0.478	5.750	6.791	6.791	100.0	100.0	543	13,050	747	16,250	849	17,400
5.000	24.1	3.875	0.500	5.781	7.069	7.069	100.0	100.0	566	14,300	778	17,400	884	19,050
5.500	15.5	4.825	0.275	5.929	4.514	4.514	100.0	100.0	361	5,960	497	7,560	564	8,340
5.500	17.0	4.767	0.304	5.978	4.962	4.962	100.0	100.0	397	7,230	546	9,130	620	9,950
5.500	20.0	4.653	0.361	6.071	5.828	5.828	100.0	100.0	466	9,570	641	11,850	729	13,050
5.500	23.0	4.545	0.415	6.156	6.630	6.630	100.0	100.0	530	11,850	729	15,050	829	16,700
5.500	26.0	4.423	0.476	6.248	7.513	7.513	100.0	100.0	601	14,700	826	18,250	939	19,050
5.500	26.8	4.375	0.500	6.283	7.854	7.854	100.0	100.0	628	15,850	864	19,900	982	22,250
5.500	28.4	4.315	0.530	6.327	8.275	8.275	100.0	100.0	662	17,050	910	21,450	1,034	23,800
5.500	29.7	4.251	0.562	6.372	8.718	8.718	100.0	100.0	697	18,250	959	23,100	1,090	25,450
6.625	23.2	5.840	0.330	7.154	6.526	6.526	100.0	100.0	522	11,150	718	13,850	816	15,500
6.625	24.0	5.796	0.352	7.191	6.937	6.937	100.0	100.0	555	12,300	763	15,850	867	17,400
6.625	28.0	5.666	0.417	7.297	8.133	8.133	100.0	100.0	651	15,850	895	17,850	1,017	19,400
6.625	32.0	5.550	0.475	7.390	9.177	9.177	100.0	100.0	734	17,400	1,009	21,800	1,147	24,250
7.000	26.0	6.151	0.362	7.565	7.549	7.549	100.0	100.0	604	13,050	830	16,700	944	18,250
7.000	29.0	6.059	0.408	7.644	8.449	8.449	100.0	100.0	676	16,250	929	19,400	1,056	19,900
7.000	32.0	5.969	0.453	7.717	9.317	9.317	100.0	100.0	745	17,050	1,025	21,450	1,165	23,800
7.000	35.0	5.879	0.498	7.787	10.172	10.172	100.0	100.0	814	19,900	1,119	25,000	1,272	25,450
7.000	38.0	5.795	0.540	7.852	10.959	10.959	100.0	100.0	877	22,600	1,205	25,450	1,370	25,450
7.000	41.0	5.695	0.590	7.929	11.881	11.881	100.0	100.0	950	25,450	1,307	25,450	1,485	25,450
7.625	29.7	6.750	0.375	8.213	8.541	8.541	100.0	100.0	683	15,850	940	20,250	1,068	22,600
7.625	33.7	6.640	0.430	8.305	9.720	9.720	100.0	100.0	776	20,250	1,067	25,450	1,213	25,450
7.625	35.8	6.570	0.465	8.362	10.460	10.460	100.0	100.0	837	22,600	1,151	25,450	1,308	25,450
7.625	39.0	6.500	0.500	8.419	11.192	11.192	100.0	100.0	895	25,000	1,231	25,450	1,399	25,450
7.625	42.8	6.376	0.562	8.518	12.470	12.470	100.0	100.0	998	25,450	1,372	25,450	1,559	25,450
7.625	45.3	6.310	0.595	8.569	13.141	13.141	100.0	100.0	1,051	25,450	1,446	25,450	1,643	25,450
7.625	47.1	6.250	0.625	8.614	13.744	13.744	100.0	100.0	1,100	25,450	1,512	25,450	1,718	25,450
7.750	46.1	6.435	0.595	8.693	13.374	13.374	100.0	100.0	1,070	25,450	1,471	25,450	1,672	25,450

VAM Connections—VAM TOP HT

Diagram p. C-119

Type: Threaded & Coupled **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Max torque, ft-lb	Joint strength, kips	Max torque, ft-lb	Joint strength, kips	Max torque, ft-lb
5.000	15.0	4.283	0.296	5.470	4.374	4.374	100.0	80.0	350	7,090	481	9,400	547	9,400
5.000	18.0	4.151	0.362	5.577	5.275	5.275	100.0	80.0	422	10,150	580	13,750	659	13,750
5.000	20.3	4.059	0.408	5.648	5.886	5.886	100.0	80.0	471	11,050	647	14,150	736	15,950
5.000	20.8	4.031	0.422	5.669	6.069	6.069	100.0	80.0	486	11,650	668	14,950	759	16,850
5.000	21.4	4.001	0.437	5.691	6.264	6.264	100.0	80.0	501	11,850	689	15,750	783	17,750
5.000	23.2	3.919	0.478	5.750	6.791	6.791	100.0	80.0	543	13,050	747	17,650	849	19,850
5.500	17.0	4.767	0.304	5.978	4.962	4.962	100.0	80.0	397	8,700	546	11,950	620	11,950
5.500	20.0	4.653	0.361	6.071	5.828	5.828	100.0	80.0	466	11,950	641	15,900	729	15,900
5.500	23.0	4.545	0.415	6.156	6.630	6.630	100.0	80.0	530	15,200	729	17,900	829	20,000
5.500	26.0	4.423	0.476	6.248	7.513	7.513	100.0	80.0	601	15,650	826	23,100	939	23,100
5.500	29.7	4.251	0.562	6.373	8.718	8.718	100.0	80.0	697	19,100	959	25,700	1,090	25,700
6.625	23.2	5.840	0.330	7.154	6.526	6.526	100.0	80.0	522	14,800	718	20,250	816	20,250
6.625	24.0	5.796	0.352	7.191	6.937	6.937	100.0	80.0	555	16,650	763	22,800	867	22,800
6.625	28.0	5.666	0.417	7.297	8.133	8.133	100.0	80.0	651	21,700	895	29,600	1,017	29,600

Continued

VAM Connections—VAM TOP HT (cont.)

Diagram p. C-119

Type: Threaded & Coupled **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	d	t	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Max torque, ft-lb	Joint strength, kips	Max torque, ft-lb	Joint strength, kips	Max torque, ft-lb
6.625	32.0	5.550	0.475	7.390	9.177	9.177	100.0	80.0	734	27,000	1,009	37,150	1,147	37,150
6.625	36.7	5.376	0.562	7.524	10.705	10.705	100.0	80.0	856	28,800	1,178	37,700	1,338	42,700
7.000	26.0	6.151	0.362	7.565	7.549	7.549	100.0	80.0	604	17,350	830	24,000	944	24,000
7.000	29.0	6.059	0.408	7.644	8.449	8.449	100.0	80.0	676	22,050	929	30,100	1,056	30,100
7.000	32.0	5.969	0.453	7.717	9.317	9.317	100.0	80.0	745	25,450	1,025	34,700	1,165	34,700
7.000	35.0	5.879	0.498	7.787	10.172	10.172	100.0	80.0	814	30,600	1,119	41,800	1,272	41,800
7.000	38.0	5.795	0.540	7.852	10.959	10.959	100.0	80.0	877	30,600	1,205	41,800	1,370	47,300
7.000	41.0	5.695	0.590	7.929	11.881	11.881	100.0	80.0	950	33,350	1,307	44,050	1,485	53,750
7.625	29.7	6.750	0.375	8.213	8.541	8.541	100.0	80.0	683	17,600	940	24,000	1,068	27,300
7.625	33.7	6.640	0.430	8.305	9.720	9.720	100.0	80.0	778	22,700	1,069	30,900	1,215	35,100
7.625	35.8	6.570	0.465	8.362	10.460	10.460	100.0	80.0	837	24,400	1,151	33,200	1,308	37,700
7.625	39.0	6.500	0.500	8.419	11.192	11.192	100.0	80.0	895	26,000	1,231	35,300	1,399	40,100
7.625	42.8	6.376	0.562	8.518	12.470	12.470	100.0	80.0	998	30,500	1,372	41,300	1,559	46,800
7.625	45.3	6.310	0.595	8.569	13.141	13.141	100.0	80.0	1,051	32,300	1,446	44,000	1,643	49,800
7.625	47.1	6.250	0.625	8.614	13.744	13.744	100.0	80.0	1,100	33,300	1,512	45,700	1,718	51,700

voestalpine Tubulars — VAGT

Diagram p. C-119

Type: Threaded & Coupled **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	t	d	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
4.500	10.50	0.224	3.927	4.862	3.009	3.646	100	50	241	*	331	*	376	*
4.500	11.60	0.250	3.875	4.862	3.338	3.646	100	50	267	*	367	*	417	*
4.500	13.50	0.290	3.974	4.961	3.838	4.406	100	50	307	*	422	*	479	*
5.000	13.00	0.253	4.369	5.563	3.775	5.560	100	50	302	*	415	*	472	*
5.000	15.00	0.296	4.283	5.563	4.375	5.560	100	50	350	*	481	*	547	*
5.000	18.00	0.362	4.151	5.563	5.272	5.560	100	50	422	*	580	*	659	*
5.000	21.40	0.437	4.000	5.563	6.270	5.560	88.6	50	445	*	611	*	695	*
5.000	23.20	0.478	3.919	5.563	6.790	5.560	81.8	50	445	*	611	*	695	*
5.000	24.10	0.500	3.875	5.563	7.069	5.560	78.6	50	445	*	611	*	695	*
5.500	15.50	0.275	4.825	6.051	4.511	6.020	100	50	361	*	496	*	564	*
5.500	17.00	0.304	4.767	6.051	4.961	6.020	100	50	397	*	545	*	620	*
5.500	20.00	0.361	4.653	6.051	5.829	6.020	100	50	467	*	641	*	729	*
5.500	23.00	0.415	4.545	6.051	6.629	6.020	90.8	50	481	*	662	*	752	*
5.500	26.00	0.476	4.423	6.051	7.513	6.020	80.1	50	481	*	662	*	752	*
5.750	16.40	0.276	5.074	6.535	4.740	8.690	100	50	379	*	521	*	593	*
5.750	17.90	0.303	5.019	6.535	5.187	8.690	100	50	415	*	570	*	649	*
5.750	19.70	0.335	4.956	6.535	5.693	8.690	100	50	456	*	626	*	712	*
5.750	20.40	0.354	4.914	6.535	6.006	8.690	100	50	480	*	660	*	750	*
6.625	20.00	0.288	5.924	7.390	5.738	9.771	100	50	459	*	631	*	717	*
6.625	24.00	0.352	5.797	7.390	6.937	9.771	100	50	555	*	763	*	867	*
6.625	28.00	0.417	5.667	7.390	8.133	9.771	100	50	651	*	894	*	1,017	*
6.625	32.00	0.475	5.551	7.390	9.175	9.771	100	50	735	*	1,009	*	1,147	*
7.000	23.00	0.317	6.241	7.657	6.654	9.137	100	50	533	*	732	*	832	*
7.000	26.00	0.362	6.151	7.657	7.545	9.137	100	50	604	*	830	*	943	*
7.000	29.00	0.408	6.059	7.657	8.447	9.137	100	50	676	*	929	*	1,056	*
7.000	32.00	0.453	5.969	7.657	9.320	9.137	98	50	731	*	1,005	*	1,141	*
7.000	35.00	0.498	5.879	7.657	10.173	9.137	89.8	50	731	*	1,005	*	1,141	*
7.000	38.00	0.540	5.974	7.657	10.959	9.137	83.3	50	731	*	1,005	*	1,141	*

* Yield torque values available on request.

Description:

VAGT is a threaded and coupled connection with a metal to metal seal, proven by millions of feet in service.The high contact pressure in the seal area ensures 100% gas tightness.Its internal shoulder reinforces the contact pressure in the seal area and acts as positive make-up stop.The thread design ensures high stress performance and allows easy make-up under severe conditions.Its smooth internal profile minimizes turbulence and provides good conditions for internal plastic coating.

voestalpine Tubulars — VAsuperior

Diagram p. C-119

Type: Threaded & Coupled **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	t	d	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
5.000	13.00	0.253	4.369	5.563	3.775	5.463	100	100	302	*	415	*	472	*
5.000	15.00	0.296	4.283	5.563	4.375	5.463	100	100	350	*	481	*	547	*
5.000	18.00	0.362	4.151	5.563	5.272	5.463	100	100	422	*	580	*	659	*
5.000	21.40	0.437	4.000	5.748	6.270	7.107	100	100	502	*	689	*	784	*
5.000	23.20	0.478	3.919	5.748	6.790	7.107	100	100	543	*	746	*	848	*
5.000	24.10	0.500	3.875	5.748	7.069	7.107	100	100	565	*	776	*	883	*
5.500	15.50	0.275	4.825	6.051	4.511	5.916	100	100	361	*	496	*	564	*
5.500	17.00	0.304	4.767	6.051	4.961	5.916	100	100	397	*	545	*	620	*
5.500	20.00	0.361	4.653	6.051	5.829	5.916	100	100	467	*	641	*	729	*
5.500	23.00	0.415	4.545	6.260	6.629	7.934	100	100	531	*	729	*	829	*
5.500	26.00	0.476	4.423	6.260	7.513	7.934	100	100	601	*	825	*	938	*
5.750	16.40	0.276	5.074	6.260	4.740	5.809	100	100	379	*	521	*	593	*
5.750	17.90	0.303	5.019	6.260	5.187	5.809	100	100	415	*	570	*	649	*
5.750	19.70	0.335	4.956	6.299	5.693	6.197	100	100	456	*	626	*	712	*
5.750	20.40	0.354	4.916	6.299	6.006	6.197	100	100	480	*	660	*	750	*
6.625	20.00	0.288	5.924	7.157	5.738	6.992	100	100	459	*	631	*	717	*
6.625	24.00	0.352	5.797	7.390	6.937	9.646	100	100	555	*	763	*	867	*
6.625	28.00	0.417	5.667	7.390	8.133	9.646	100	100	651	*	894	*	1,017	*
6.625	32.00	0.475	5.551	7.390	9.175	9.646	100	100	735	*	1,009	*	1,147	*
7.000	23.00	0.317	6.241	7.657	6.654	9.001	100	100	533	*	732	*	832	*
7.000	26.00	0.362	6.151	7.657	7.545	9.001	100	100	604	*	830	*	943	*
7.000	29.00	0.408	6.059	7.657	8.447	9.001	100	100	676	*	929	*	1,056	*
7.000	32.00	0.453	5.969	7.795	9.320	10.673	100	100	746	*	1,025	*	1,165	*
7.000	35.00	0.498	5.879	7.795	10.173	10.673	100	100	814	*	1,118	*	1,272	*

* Yield torque values available on request.

Description:

VAsuperior is a threaded and coupled gas tight connection with a metal to metal seal. It is designed to meet ISO 13679, CAL IV. Its internal flush profile minimizes turbulences. The high contact pressure in the seal area is reinforced by the internal shoulder.The distance of the seal area from the pin face provides improved protection against transport, handling and - most of all - installation damages.The thread design allows easy and fast make-up in the most severe conditions.

voestalpine Tubulars — VAroughneck

Diagram p. C-119

Type: Threaded & Coupled

									L-80		P-110		Q-125	
D	w	t	d	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
4.500	10.50	0.224	3.927	5.000	3.009	4.451	100	100	241	5,750	331	7,250	376	7,600
4.500	11.60	0.250	3.875	5.000	3.338	4.451	100	100	267	6,800	367	8,550	417	9,050
4.500	12.60	0.271	3.833	5.000	3.600	4.451	100	100	288	7,300	396	9,150	450	9,750
4.500	13.50	0.290	3.795	5.000	3.838	4.451	100	100	307	8,100	422	10,200	480	10,850
4.500	15.10	0.337	3.701	5.201	4.407	6.027	100	100	353	10,250	484	13,000	551	13,700
5.000	15.00	0.296	4.283	5.563	4.373	5.532	100	100	350	10,050	481	12,900	547	13,850
5.000	18.00	0.362	4.151	5.563	5.269	5.532	100	100	422	13,000	580	16,800	659	18,050
5.000	21.40	0.437	4.001	5.748	6.261	7.175	100	100	502	16,900	689	22,000	784	23,600
5.000	23.20	0.478	3.919	5.748	6.787	7.175	100	100	544	18,900	747	24,550	849	26,400
5.000	24.10	0.500	3.875	5.748	7.065	7.175	100	100	566	19,900	777	25,950	884	27,900
5.500	17.00	0.304	4.767	6.050	4.961	5.983	100	100	397	13,000	545	16,350	620	17,400
5.500	20.00	0.361	4.653	6.050	5.829	5.983	100	100	467	16,250	641	20,600	728	22,000
5.500	23.00	0.415	4.545	6.260	6.629	7.999	100	100	531	19,550	729	24,800	828	26,400
5.500	26.00	0.476	4.423	6.260	7.513	7.999	100	100	601	23,000	826	29,300	938	31,250
6.625	20.00	0.288	5.924	7.390	5.738	9.713	100	100	459	15,500	631	19,700	712	21,100
6.625	24.00	0.352	5.796	7.390	6.937	9.713	100	100	556	21,250	763	26,900	860	28,900
6.625	28.00	0.417	5.666	7.390	8.133	9.713	100	100	651	25,750	894	33,400	1,008	35,850
6.625	32.00	0.475	5.555	7.390	9.175	9.713	100	100	735	30,450	1,009	39,600	1,138	42,550
7.000	23.00	0.317	6.241	7.874	6.654	11.822	100	100	533	19,300	732	25,100	823	26,900
7.000	26.00	0.362	6.151	7.874	7.545	11.822	100	100	604	23,250	830	30,250	933	32,450
7.000	29.00	0.408	6.059	7.874	8.447	11.822	100	100	676	27,800	929	36,200	1,045	38,950
7.000	32.00	0.453	5.969	7.874	9.320	11.822	100	100	746	32,300	1,025	42,100	1,153	45,300
7.000	35.00	0.498	5.879	7.874	10.173	11.822	100	100	814	36,650	1,118	47,850	1,258	51,550

Description:

VAroughneck is a joint development between voestalpine Tubulars and RAG, an Austrian oil company, especially for well applications where rotation of the casing is required (during installation or cementing). It combines the strengths of API Buttress (e.g. minimal risk of jump-out failures under bending loads) with the following advantages: The make-up is controlled by pin-to-pin contact and the connection provides double torque capability compared to API Buttress. Therefore this connection is suitable for tough field applications.

XL Systems–National Oilwell Varco—XLC-S

Diagram p. C-119

Type: Integral, flush **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	t	d	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
26.000	202.3	24.500	0.750	26.000	59.494	39.427	66.0	66.0	3,154	233,000	4,337	320,000	4,928	364,000
26.000	267.0	24.000	1.000	26.000	78.540	55.097	70.0	70.0	4,408	319,000	6,061	439,000	6,887	498,000
26.000	330.4	23.500	1.250	26.000	97.193	75.519	78.0	78.0	6,042	429,000	8,307	590,000	9,440	670,000
26.000	392.5	23.000	1.500	26.000	115.454	91.118	79.0	79.0	7,289	508,000	10,023	698,000	11,390	793,000
30.000	234.3	28.500	0.750	30.000	68.919	45.610	66.0	66.0	3,649	313,000	5,017	430,000	5,701	489,000
30.000	309.7	28.000	1.000	30.000	91.106	63.805	70.0	70.0	5,104	431,000	7,019	592,000	7,976	673,000
30.000	383.8	27.500	1.250	30.000	112.901	87.583	78.0	78.0	7,007	581,000	9,634	799,000	10,948	908,000
30.000	456.6	27.000	1.500	30.000	134.303	105.796	79.0	79.0	8,464	691,000	11,638	950,000	13,225	1,079,000
30.000	528.0	26.500	1.750	30.000	155.312	124.079	80.0	80.0	9,926	797,000	13,649	1,095,000	15,510	1,245,000
30.000	598.1	26.000	2.000	30.000	175.929	141.912	81.0	81.0	11,353	896,000	15,610	1,232,000	17,739	1,400,000
32.000	250.3	30.500	0.750	32.000	73.631	48.701	66.0	66.0	3,896	358,000	5,357	492,000	6,088	559,000
32.000	331.1	30.000	1.000	32.000	97.389	68.159	70.0	70.0	5,453	493,000	7,497	677,000	8,520	770,000
32.000	410.5	29.500	1.250	32.000	120.755	93.615	78.0	78.0	7,489	666,000	10,298	916,000	11,702	1,041,000
32.000	488.6	29.000	1.500	32.000	143.728	113.135	79.0	79.0	9,051	793,000	12,445	1,090,000	14,142	1,238,000
32.000	565.4	28.500	1.750	32.000	166.308	132.750	80.0	80.0	10,620	916,000	14,603	1,259,000	16,594	1,431,000
32.000	640.8	28.000	2.000	32.000	188.496	151.902	81.0	81.0	12,152	1,032,000	16,709	1,419,000	18,988	1,612,000
34.000	266.3	32.500	0.750	34.000	78.343	51.792	66.0	66.0	4,143	405,000	5,697	557,000	6,474	633,000
34.000	352.4	32.000	1.000	34.000	103.673	72.514	70.0	70.0	5,801	559,000	7,977	768,000	9,064	873,000
34.000	437.2	31.500	1.250	34.000	128.609	99.646	77.0	77.0	7,972	757,000	10,961	1,041,000	12,456	1,183,000
34.000	520.7	31.000	1.500	34.000	153.153	120.473	79.0	79.0	9,638	902,000	13,252	1,240,000	15,059	1,409,000
34.000	602.8	30.500	1.750	34.000	177.304	141.421	80.0	80.0	11,314	1,043,000	15,556	1,434,000	17,678	1,630,000
34.000	683.5	30.000	2.000	34.000	201.062	161.893	81.0	81.0	12,951	1,177,000	17,808	1,618,000	20,237	1,839,000
36.000	282.4	34.500	0.750	36.000	83.056	54.884	66.0	66.0	4,391	456,000	6,037	627,000	6,861	712,000
36.000	373.8	34.000	1.000	36.000	109.956	76.868	70.0	70.0	6,149	629,000	8,455	865,000	9,609	983,000
36.000	463.9	33.500	1.250	36.000	136.463	105.678	77.0	77.0	8,454	853,000	11,625	1,173,000	13,210	1,333,000
36.000	552.7	33.000	1.500	36.000	162.577	127.812	79.0	79.0	10,225	1,018,000	14,059	1,400,000	15,977	1,590,000
36.000	640.1	32.500	1.750	36.000	188.299	150.092	80.0	80.0	12,007	1,179,000	16,510	1,621,000	18,762	1,842,000
36.000	726.2	32.000	2.000	36.000	213.628	171.883	80.0	80.0	13,751	1,332,000	18,907	1,831,000	21,485	2,081,000
38.000	298.4	36.500	0.750	38.000	87.768	57.975	66.0	66.0	4,638	509,000	6,377	700,000	7,247	796,000
38.000	395.2	36.000	1.000	38.000	116.239	81.222	70.0	70.0	6,498	704,000	8,934	968,000	10,153	1,100,000
38.000	490.6	35.500	1.250	38.000	144.317	111.710	77.0	77.0	8,937	956,000	12,288	1,314,000	13,964	1,493,000
38.000	584.7	35.000	1.500	38.000	172.002	135.151	79.0	79.0	10,812	1,141,000	14,867	1,569,000	16,894	1,783,000
38.000	677.5	34.500	1.750	38.000	199.295	158.763	80.0	80.0	12,701	1,323,000	17,464	1,819,000	19,845	2,067,000
38.000	769.0	34.000	2.000	38.000	226.195	181.873	80.0	80.0	14,550	1,496,000	20,006	2,057,000	22,734	2,337,000
40.000	314.4	38.500	0.750	40.000	92.481	61.066	66.0	66.0	4,885	566,000	6,717	778,000	7,633	884,000
40.000	416.5	38.000	1.000	40.000	122.522	85.576	70.0	70.0	6,846	783,000	9,413	1,076,000	10,697	1,223,000
40.000	517.3	37.500	1.250	40.000	152.171	117.742	77.0	77.0	9,419	1,064,000	12,952	1,463,000	14,718	1,662,000
40.000	616.8	37.000	1.500	40.000	181.427	142.490	79.0	79.0	11,399	1,271,000	15,674	1,748,000	17,811	1,987,000
40.000	714.9	36.500	1.750	40.000	210.290	167.433	80.0	80.0	13,395	1,475,000	18,418	2,029,000	20,929	2,305,000
40.000	811.7	36.000	2.000	40.000	238.761	191.863	80.0	80.0	15,349	1,670,000	21,105	2,296,000	23,983	2,609,000
40.000	907.1	35.500	2.250	40.000	266.839	221.510	83.0	83.0	17,721	1,904,000	24,366	2,618,000	27,689	2,975,000
42.000	330.4	40.500	0.750	42.000	97.193	64.158	66.0	66.0	5,133	625,000	7,057	860,000	8,020	977,000
42.000	437.9	40.000	1.000	42.000	128.805	89.931	70.0	70.0	7,194	866,000	9,892	1,191,000	11,241	1,353,000
42.000	544.0	39.500	1.250	42.000	160.025	123.774	77.0	77.0	9,902	1,178,000	13,615	1,619,000	15,472	1,840,000
42.000	648.8	39.000	1.500	42.000	190.852	149.828	79.0	79.0	11,986	1,409,000	16,481	1,937,000	18,729	2,201,000
42.000	752.3	38.500	1.750	42.000	221.286	176.104	80.0	80.0	14,088	1,636,000	19,371	2,250,000	22,013	2,557,000
42.000	854.4	38.000	2.000	42.000	251.327	201.854	80.0	80.0	16,148	1,853,000	22,204	2,548,000	25,232	2,896,000
42.000	955.2	37.500	2.250	42.000	280.976	223.360	79.0	79.0	17,869	2,027,000	24,570	2,787,000	27,920	3,167,000
44.000	346.4	42.500	0.750	44.000	101.905	67.249	66.0	66.0	5,380	688,000	7,397	945,000	8,406	1,074,000
44.000	459.2	42.000	1.000	44.000	135.088	94.285	70.0	70.0	7,543	953,000	10,371	1,310,000	11,786	1,489,000
44.000	570.7	41.500	1.250	44.000	167.879	129.806	77.0	77.0	10,384	1,297,000	14,279	1,784,000	16,226	2,027,000
44.000	680.9	41.000	1.500	44.000	200.277	157.167	78.0	78.0	12,573	1,553,000	17,288	2,135,000	19,646	2,427,000
44.000	789.7	40.500	1.750	44.000	232.282	184.775	80.0	80.0	14,782	1,805,000	20,325	2,482,000	23,097	2,821,000
44.000	897.1	40.000	2.000	44.000	263.894	211.844	80.0	80.0	16,948	2,046,000	23,303	2,814,000	26,481	3,198,000
44.000	1003.3	39.500	2.250	44.000	295.113	245.210	83.0	83.0	19,617	2,342,000	26,973	3,221,000	30,651	3,660,000
46.000	362.5	44.500	0.750	46.000	106.618	70.340	66.0	66.0	5,627	753,000	7,737	1,035,000	8,793	1,176,000
46.000	480.6	44.000	1.000	46.000	141.372	98.639	70.0	70.0	7,891	1,044,000	10,850	1,436,000	12,330	1,632,000
46.000	597.4	43.500	1.250	46.000	175.733	135.838	77.0	77.0	10,867	1,423,000	14,942	1,956,000	16,980	2,223,000
46.000	712.9	43.000	1.500	46.000	209.701	164.506	78.0	78.0	13,160	1,705,000	18,096	2,344,000	20,563	2,663,000
46.000	827.0	42.500	1.750	46.000	243.277	193.446	80.0	80.0	15,476	1,983,000	21,279	2,726,000	24,181	3,098,000
46.000	939.8	42.000	2.000	46.000	276.460	221.834	80.0	80.0	17,747	2,249,000	24,402	3,093,000	27,729	3,514,000

Continued

XL Systems–National Oilwell Varco—XLC-S (cont.)

Diagram p. C-119

Type: Integral, flush **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	t	d	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
46.000	1051.3	41.500	2.250	46.000	309.251	257.130	83.0	83.0	20,570	2,579,000	28,284	3,546,000	32,141	4,030,000
46.000	1161.5	41.000	2.500	46.000	341.648	291.593	85.0	85.0	23,327	2,893,000	32,075	3,978,000	36,449	4,521,000
48.000	378.5	46.500	0.750	48.000	111.330	73.432	66.0	66.0	5,875	821,000	8,078	1,129,000	9,179	1,283,000
48.000	502.0	46.000	1.000	48.000	147.655	102.994	70.0	70.0	8,240	1,140,000	11,329	1,568,000	12,874	1,781,000
48.000	624.1	45.500	1.250	48.000	183.587	141.870	77.0	77.0	11,350	1,554,000	15,606	2,137,000	17,734	2,428,000
48.000	744.9	45.000	1.500	48.000	219.126	171.845	78.0	78.0	13,748	1,863,000	18,903	2,562,000	21,481	2,911,000
48.000	864.4	44.500	1.750	48.000	254.273	202.117	79.0	79.0	16,169	2,169,000	22,233	2,982,000	25,265	3,388,000
48.000	982.6	44.000	2.000	48.000	289.027	231.825	80.0	80.0	18,546	2,462,000	25,501	3,385,000	28,978	3,846,000
48.000	1099.4	43.500	2.250	48.000	323.388	268.779	83.0	83.0	21,502	2,825,000	29,566	3,884,000	33,597	4,413,000
48.000	1214.9	43.000	2.500	48.000	357.356	304.882	85.0	85.0	24,391	3,171,000	33,537	4,360,000	38,110	4,955,000

XL Systems–National Oilwell Varco—XLF

Diagram p. C-119

Type: Integral, flush **Seal: Metal-to-metal**

									L-80		P-110		Q-125	
D	w	t	d	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
20.000	104.1	19.000	0.500	20.000	30.631	15.879	52.0	52.0	1,270	73,000	1,747	100,000	1,985	113,000
20.000	129.3	18.750	0.625	20.000	38.043	20.082	53.0	53.0	1,607	91,000	2,209	125,000	2,510	142,000
20.000	131.3	18.730	0.635	20.000	38.631	20.082	52.0	52.0	1,607	91,000	2,209	125,000	2,510	142,000
20.000	154.2	18.500	0.750	20.000	45.357	25.076	55.0	55.0	2,006	112,000	2,758	154,000	3,135	175,000
20.000	166.4	18.376	0.812	20.000	48.948	25.076	51.0	51.0	2,006	111,000	2,758	153,000	3,135	174,000
20.000	202.9	18.000	1.000	20.000	59.690	38.455	64.0	64.0	3,076	167,000	4,230	230,000	4,807	261,000
20.000	250.3	17.500	1.250	20.000	73.631	50.994	69.0	69.0	4,080	216,000	5,609	298,000	6,374	338,000
22.000	114.8	21.000	0.500	22.000	33.772	17.488	52.0	52.0	1,399	88,000	1,924	122,000	2,186	138,000
22.000	142.7	20.750	0.625	22.000	41.970	22.124	53.0	53.0	1,770	111,000	2,434	152,000	2,766	173,000
22.000	170.2	20.500	0.750	22.000	50.069	27.636	55.0	55.0	2,211	137,000	3,040	188,000	3,455	213,000
22.000	224.3	20.000	1.000	22.000	65.973	42.426	64.0	64.0	3,394	205,000	4,667	282,000	5,303	320,000
22.000	277.0	19.500	1.250	22.000	81.485	56.319	69.0	69.0	4,506	266,000	6,195	366,000	7,040	416,000
24.000	125.5	23.000	0.500	24.000	36.914	19.096	52.0	52.0	1,528	106,000	2,101	145,000	2,387	165,000
24.000	156.0	22.750	0.625	24.000	45.897	24.165	53.0	53.0	1,933	132,000	2,658	182,000	3,021	207,000
24.000	186.2	22.500	0.750	24.000	54.782	30.196	55.0	55.0	2,416	164,000	3,322	225,000	3,775	256,000
24.000	245.6	22.000	1.000	24.000	72.257	46.397	64.0	64.0	3,712	246,000	5,104	339,000	5,800	385,000
24.000	303.7	21.500	1.250	24.000	89.339	61.644	69.0	69.0	4,932	321,000	6,781	441,000	7,706	501,000
24.000	360.5	21.000	1.500	24.000	106.029	70.174	66.0	66.0	5,614	357,000	7,719	491,000	8,772	559,000
26.000	136.2	25.000	0.500	26.000	40.055	20.705	52.0	52.0	1,656	125,000	2,278	171,000	2,588	195,000
26.000	169.4	24.750	0.625	26.000	49.824	26.207	53.0	53.0	2,097	156,000	2,883	215,000	3,276	244,000
26.000	202.3	24.500	0.750	26.000	59.494	32.756	55.0	55.0	2,620	193,000	3,603	266,000	4,095	302,000
26.000	267.0	24.000	1.000	26.000	78.540	50.368	64.0	64.0	4,029	292,000	5,540	401,000	6,296	456,000
26.000	330.4	23.500	1.250	26.000	97.193	66.969	69.0	69.0	5,358	380,000	7,367	523,000	8,371	594,000
26.000	392.5	23.000	1.500	26.000	115.454	76.268	66.0	66.0	6,101	425,000	8,389	584,000	9,534	664,000
28.000	146.9	27.000	0.500	28.000	43.197	22.313	52.0	52.0	1,785	145,000	2,454	199,000	2,789	226,000
28.000	182.7	26.750	0.625	28.000	53.751	28.248	53.0	53.0	2,260	182,000	3,107	250,000	3,531	284,000
28.000	218.3	26.500	0.750	28.000	64.206	35.315	55.0	55.0	2,825	225,000	3,885	310,000	4,414	352,000
28.000	288.4	26.000	1.000	28.000	84.823	54.339	64.0	64.0	4,347	341,000	5,977	468,000	6,792	532,000
28.000	357.1	25.500	1.250	28.000	105.047	72.294	69.0	69.0	5,784	445,000	7,952	612,000	9,037	696,000
28.000	424.5	25.000	1.500	28.000	124.878	82.362	66.0	66.0	6,589	498,000	9,060	685,000	10,295	778,000
30.000	196.1	28.750	0.625	30.000	57.678	30.290	53.0	53.0	2,423	210,000	3,332	288,000	3,786	327,000
30.000	234.3	28.500	0.750	30.000	68.919	37.875	55.0	55.0	3,030	260,000	4,166	357,000	4,734	406,000
30.000	309.7	28.000	1.000	30.000	91.106	58.310	64.0	64.0	4,665	393,000	6,414	541,000	7,289	615,000
30.000	383.8	27.500	1.250	30.000	112.901	77.619	69.0	69.0	6,210	515,000	8,538	708,000	9,702	805,000
30.000	456.6	27.000	1.500	30.000	134.303	88.456	66.0	66.0	7,076	577,000	9,730	794,000	11,057	902,000
30.000	528.0	26.500	1.750	30.000	155.312	110.584	71.0	71.0	8,847	710,000	12,164	976,000	13,823	1,109,000
30.000	598.1	26.000	2.000	30.000	175.929	130.267	74.0	74.0	10,421	823,000	14,329	1,131,000	16,283	1,285,000

XL Systems–National Oilwell Varco—Viper

Diagram p. C-119

Type: Weld-on pin and box **Seal: Internal elastomeric and external metal-to-metal**

									L-80		P-110		Q-125	
D	w	t	d	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
16.000	72.9	14.624	0.438	17.500	21.414	31.038	144.9	99.8	2,483	171,451	–	–	–	–
16.000	77.7	14.564	0.468	17.500	22.836	31.038	135.9	93.6	2,483	171,451	–	–	–	–
16.000	82.8	14.500	0.500	17.500	24.347	31.038	127.5	87.8	2,483	171,451	–	–	–	–
16.000	102.7	14.250	0.625	17.500	30.189	39.675	131.4	98.9	3,174	232,802	–	–	–	–
16.000	112.6	14.124	0.688	17.500	33.096	45.250	136.7	93.7	3,620	234,007	–	–	–	–
16.000	122.3	14.000	0.750	17.500	35.932	45.250	125.9	86.3	3,620	234,007	–	–	–	–
18.625	85.2	17.249	0.438	20.350	25.026	36.150	144.5	95.1	2,892	223,035	–	–	–	–
18.625	90.8	17.189	0.468	20.350	26.696	36.150	135.4	89.2	2,892	223,035	–	–	–	–
18.625	96.9	17.125	0.500	20.350	28.471	36.150	127.0	83.6	2,892	223,035	–	–	–	–
18.625	120.3	16.875	0.625	20.350	35.343	45.938	130.0	82.3	3,675	271,069	–	–	–	–
18.625	131.9	16.749	0.688	20.350	38.769	53.625	138.3	91.5	4,290	310,389	–	–	–	–
18.625	143.3	16.625	0.750	20.350	42.117	53.625	127.3	84.2	4,290	310,389	–	–	–	–
20.000	91.6	18.530	0.438	21.620	26.918	49.825	185.1	120.9	3,986	306,595	–	–	–	–
20.000	104.2	18.500	0.500	21.620	30.631	49.825	162.7	106.3	3,986	306,595	–	–	–	–
20.000	129.4	18.250	0.625	21.620	38.043	49.825	131.0	85.6	3,986	306,595	–	–	–	–
20.000	154.3	18.000	0.750	21.620	45.357	63.925	140.9	91.2	5,114	386,308	–	–	–	–
20.000	166.6	17.876	0.812	21.620	48.948	63.925	130.6	84.5	5,114	386,308	–	–	–	–
20.000	203.1	17.500	1.000	21.620	59.690	54.125	90.7	59.3	4,330	452,924	–	–	–	–
20.000	227.0	16.900	1.125	21.620	66.710	80.888	121.3	105.4	6,471	575,810	–	–	–	–
20.000	250.5	16.900	1.250	21.620	73.631	80.888	109.9	95.5	6,471	575,810	–	–	–	–
20.000	296.6	16.500	1.500	21.620	87.179	80.888	92.8	80.6	6,471	575,810	–	–	–	–
22.000	101.0	20.530	0.438	23.800	29.670	55.638	187.5	145.9	4,451	479,151	–	–	–	–
22.000	114.9	20.500	0.500	23.800	33.772	55.638	164.7	128.2	4,451	479,151	–	–	–	–
22.000	142.8	20.250	0.625	23.800	41.970	55.638	132.6	103.2	4,451	479,151	–	–	–	–
22.000	170.4	20.000	0.750	23.800	50.069	67.225	134.3	106.6	5,378	576,414	–	–	–	–
22.000	183.9	19.876	0.812	23.800	54.050	67.225	124.4	98.7	5,378	576,414	–	–	–	–
22.000	224.5	19.500	1.000	23.800	65.973	76.925	116.6	96.8	6,154	658,016	–	–	–	–
22.000	251.0	18.900	1.125	23.800	73.778	86.663	117.5	115.4	6,933	809,562	–	–	–	–
22.000	277.3	18.900	1.250	23.800	81.485	86.663	106.4	104.5	6,933	809,562	–	–	–	–
22.000	328.7	18.500	1.500	23.800	96.604	86.663	89.7	88.1	6,933	809,562	–	–	–	–
24.000	125.6	22.150	0.500	25.800	36.914	68.513	185.6	168.6	5,481	732,375	–	–	–	–
24.000	156.2	22.150	0.625	25.800	45.897	68.513	149.3	135.6	5,481	732,375	–	–	–	–
24.000	186.4	22.000	0.750	25.800	54.782	68.513	125.1	113.6	5,481	732,375	–	–	–	–

Continued

XL Systems–National Oilwell Varco—Viper (cont.)

Diagram p. C-119

Type: Weld-on pin and box **Seal: Internal elastomeric and external metal-to-metal**

									L-80		P-110		Q-125	
D	w	t	d	Dc	At	Ac	Tensile efficiency, %	Compression efficiency, %	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb	Joint strength, kips	Yield torque, ft-lb
24.000	201.3	21.876	0.812	25.800	59.152	82.913	140.2	116.9	6,633	789,503	–	–	–	–
24.000	245.9	21.500	1.000	25.800	72.257	82.913	114.7	95.7	6,633	789,503	–	–	–	–
24.000	275.1	20.900	1.125	25.800	80.847	93.938	116.2	114.2	7,515	975,484	–	–	–	–
24.000	304.0	20.900	1.250	25.800	89.339	93.938	105.1	103.4	7,515	975,484	–	–	–	–
24.000	360.8	20.500	1.500	25.800	106.029	93.938	88.6	87.1	7,515	975,484	–	–	–	–
26.000	136.3	24.150	0.500	27.800	40.055	73.738	184.1	168.5	5,899	864,301	–	–	–	–
26.000	169.5	24.150	0.625	27.800	49.824	73.738	148.0	135.5	5,899	864,301	–	–	–	–
26.000	202.4	24.000	0.750	27.800	59.494	73.738	123.9	113.5	5,899	864,301	–	–	–	–
26.000	218.6	23.876	0.812	27.800	64.254	90.188	140.4	116.3	7,215	932,958	–	–	–	–
26.000	267.3	23.500	1.000	27.800	78.540	90.188	114.8	95.2	7,215	932,958	–	–	–	–
26.000	299.2	22.900	1.125	27.800	87.916	101.838	115.8	113.0	8,147	1,156,863	–	–	–	–
26.000	330.7	22.900	1.250	27.800	97.193	101.838	104.8	102.2	8,147	1,156,863	–	–	–	–
26.000	392.9	22.500	1.500	27.800	115.454	101.838	88.2	86.1	8,147	1,156,863	–	–	–	–
28.000	147.0	26.150	0.500	29.800	43.197	79.975	185.1	164.4	6,398	1,007,147	–	–	–	–
28.000	182.9	26.150	0.625	29.800	53.751	79.975	148.8	132.1	6,398	1,007,147	–	–	–	–
28.000	218.5	26.000	0.750	29.800	64.206	79.975	124.6	110.6	6,398	1,007,147	–	–	–	–
28.000	236.0	25.876	0.812	29.800	69.356	96.638	139.3	114.8	7,731	1,088,382	–	–	–	–
28.000	288.6	25.500	1.000	29.800	84.823	96.638	113.9	93.9	7,731	1,088,382	–	–	–	–
28.000	323.2	24.900	1.125	29.800	94.984	109.538	115.3	112.8	8,763	1,353,703	–	–	–	–
28.000	357.4	24.900	1.250	29.800	105.047	109.538	104.3	102.0	8,763	1,353,703	–	–	–	–
28.000	424.9	24.500	1.500	29.800	124.878	109.538	87.7	85.8	8,763	1,353,703	–	–	–	–
30.000	157.7	27.650	0.500	32.000	46.338	106.988	230.9	235.8	8,559	1,601,052	–	–	–	–
30.000	196.3	27.650	0.625	32.000	57.678	106.988	185.5	189.4	8,559	1,601,052	–	–	–	–
30.000	234.5	27.650	0.750	32.000	68.919	106.988	155.2	158.5	8,559	1,601,052	–	–	–	–
30.000	310.0	27.500	1.000	32.000	91.106	106.988	117.4	119.9	8,559	1,601,052	–	–	–	–
30.000	347.3	26.780	1.125	32.000	102.053	133.125	130.4	137.9	10,650	1,889,490	–	–	–	–
30.000	384.2	26.780	1.250	32.000	112.901	133.125	117.9	124.6	10,650	1,889,490	–	–	–	–
30.000	457.0	26.500	1.500	32.000	134.303	133.125	99.1	104.8	10,650	1,889,490	–	–	–	–
30.000	528.5	25.900	1.750	32.000	155.312	150.663	97.0	110.8	12,053	2,165,271	–	–	–	–
30.000	598.6	25.500	2.000	32.000	175.929	150.663	85.6	97.8	12,053	2,165,271	–	–	–	–
32.000	168.4	29.650	0.500	34.000	49.480	113.913	230.2	231.6	9,113	1,829,649	–	–	–	–
32.000	209.6	29.650	0.625	34.000	61.605	113.913	184.9	186.0	9,113	1,829,649	–	–	–	–
32.000	250.5	29.650	0.750	34.000	73.631	113.913	154.7	155.7	9,113	1,829,649	–	–	–	–
32.000	331.4	29.500	1.000	34.000	97.389	113.913	117.0	117.7	9,113	1,829,649	–	–	–	–
32.000	371.3	28.780	1.125	34.000	109.121	142.350	130.5	134.4	11,388	2,163,167	–	–	–	–
32.000	410.9	28.780	1.250	34.000	120.755	142.350	117.9	121.5	11,388	2,163,167	–	–	–	–
32.000	489.1	28.500	1.500	34.000	143.728	142.350	99.0	102.0	11,388	2,163,167	–	–	–	–
32.000	565.9	27.900	1.750	34.000	166.308	160.700	96.6	109.5	12,856	2,485,833	–	–	–	–
32.000	641.4	27.500	2.000	34.000	188.496	160.700	85.3	96.7	12,856	2,485,833	–	–	–	–
34.000	179.1	31.650	0.500	36.000	52.622	120.713	229.4	230.2	9,657	2,073,497	–	–	–	–
34.000	223.0	31.650	0.625	36.000	65.532	120.713	184.2	184.8	9,657	2,073,497	–	–	–	–
34.000	266.6	31.650	0.750	36.000	78.343	120.713	154.1	154.6	9,657	2,073,497	–	–	–	–
34.000	352.8	31.500	1.000	36.000	103.673	120.713	116.4	116.8	9,657	2,073,497	–	–	–	–
34.000	395.4	30.780	1.125	36.000	116.190	150.700	129.7	133.3	12,056	2,458,775	–	–	–	–
34.000	437.6	30.780	1.250	36.000	128.609	150.700	117.2	120.4	12,056	2,458,775	–	–	–	–
34.000	521.1	30.500	1.500	36.000	153.153	150.700	98.4	101.1	12,056	2,458,775	–	–	–	–
34.000	603.3	29.900	1.750	36.000	177.304	169.638	95.7	109.1	13,571	2,828,530	–	–	–	–
34.000	684.2	29.500	2.000	36.000	201.062	169.638	84.4	96.2	13,571	2,828,530	–	–	–	–
36.000	282.6	31.220	0.750	36.880	83.056	173.300	208.7	270.8	13,864	2,830,291	–	–	–	–
36.000	374.2	31.220	1.000	36.880	109.956	173.300	157.6	204.6	13,864	2,830,291	–	–	–	–
36.000	419.4	31.220	1.125	36.880	123.258	173.300	140.6	182.5	13,864	2,830,291	–	–	–	–
36.000	464.3	31.220	1.250	36.880	136.463	173.300	127.0	164.8	13,864	2,830,291	–	–	–	–
36.000	553.2	31.220	1.500	36.880	162.577	173.300	106.6	138.3	13,864	2,830,291	–	–	–	–
36.000	640.7	31.220	1.750	36.880	188.299	189.500	100.6	92.7	15,160	2,261,941	–	–	–	–
36.000	726.9	31.220	2.000	36.880	213.628	189.500	88.7	81.7	15,160	2,261,941	–	–	–	–
36.000	811.8	30.150	2.250	36.880	238.565	219.300	91.9	96.5	17,544	2,884,661	–	–	–	–
36.000	895.3	30.150	2.500	36.880	263.108	219.300	83.3	87.5	17,544	2,884,661	–	–	–	–
38.000	298.7	33.220	0.750	38.880	87.768	182.750	208.2	272.7	14,620	3,189,264	–	–	–	–
38.000	395.5	33.220	1.000	38.880	116.239	182.750	157.2	205.9	14,620	3,189,264	–	–	–	–
38.000	443.5	33.220	1.125	38.880	130.327	182.750	140.2	183.7	14,620	3,189,264	–	–	–	–
38.000	491.1	33.220	1.250	38.880	144.317	182.750	126.6	165.9	14,620	3,189,264	–	–	–	–
38.000	585.3	33.220	1.500	38.880	172.002	182.750	106.2	139.2	14,620	3,189,264	–	–	–	–
38.000	678.1	33.220	1.750	38.880	199.295	201.638	101.2	91.7	16,131	2,548,581	–	–	–	–
38.000	769.7	33.220	2.000	38.880	226.195	201.638	89.1	80.8	16,131	2,548,581	–	–	–	–
38.000	859.9	32.150	2.250	38.880	252.702	231.113	91.5	96.3	18,489	3,257,936	–	–	–	–
38.000	948.7	32.150	2.500	38.880	278.816	231.113	82.9	87.3	18,489	3,257,936	–	–	–	–

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