INTEGRITY-PRO

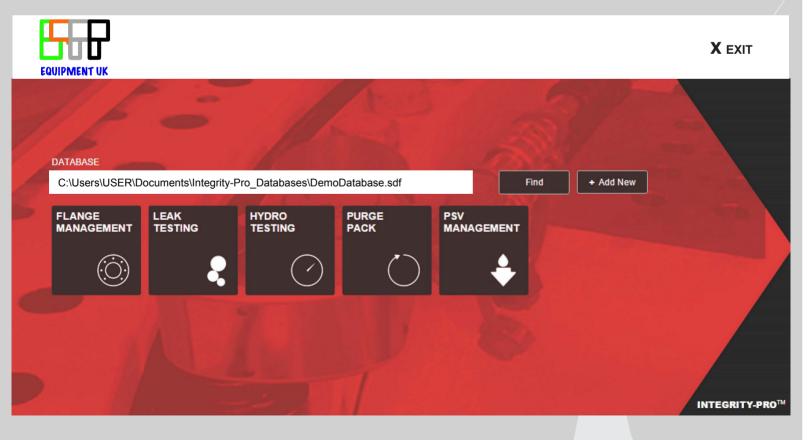
Flange Management Joint Integrity Software

INTEGRITY-PRO Joint Monitoring software is a bespoke database system specifically developed to plan, monitor, control and provide traceability of flanged joints and connections. The database calculation engine uses the Baseline Standard ASME Section VIII Division 1 to define the initial bolt load/stress (using gasket factors) to seat the gasket. This Baseline Standard is compliant with PD5500 (formerly BS5500) that uses ASME code to define gasket factors, and is compared with tabled values in the SHELL ES090 Specification. INTEGRITY-PRO runs on the standard Windows operating system and can be used as stand alone or networked. It has been adopted by major plant operators as an essential management system due to it's simplicity and comprehensive covering of the plant and related maintenance.

Offering data gathered from years of industry experience, Integrity-Pro can provide bolt tightening data including bolting patterns, torque and tensioning figures, procedures, techniques and recommended controlled bolting equipment. Based on the information entered, the Integrity-Pro software will analyze all of the data and produce a complete calculation sheet along with the required torque or tension figures to ensure an accurate and correctly bolted joint is achieved.

Integrity-Pro can also create a specific tightening procedure for each bolted joint, which can include specific information such as any special remarks all of which can be easily entered into the software by the user. It also includes basic information for standard flanges, wafer check valves, spade and spacers, and swivel flange assemblies.

Integrity-Projoint integrity database management system is used to support bolted joint inspection and maintenance and/or leak testing activities raising safety levels across the industry in which it applies.



INTEGRITY-PRO

Flange Management Joint Integrity Software

FUNCTIONALITY

Full traceability and control of all activities associated with the joint/connection including:

- · Joint disassembly/breakout
- · Machining/re-facing
- · Joint assembly
- Bolt tightening
- Testing
 (Hydrostatic, Pneumatic, Nitrogen or Helium)
- Leak history and incidents

Interacts seamlessly with "Tool-Pro Controlled Bolting" software to provide bolting calculations and data for :

- BS1560/ANSI B16.5 standard flanges
- MSS SP44 standard flanges
- API 6A and 17D standard flanges
- Clamp type connectors(Techlok, Grayloc, Galperti and Destec)
- Non-standard joints, i.e. pressure vessels, heat exchangers, compact flanges, etc..

- Project control and review by visual status display of each joint.
- Performs as a central source for documentation and records associated with each activity or task.
- Provides joint tightening procedures and methods.
- Generates tooling lists.
- Provides and maintains historical data for each joint.
- Search engine to find and display specific flanges/records.
- Embedded equipment database providing access to service records, tool calibration, etc..
- Embedded personnel database providing access to individual training, competence, qualifications, etc..
- Completed joint databases can be viewed and interrogated by a freeware viewer which can be freely distributed throughout the organization.

			Integrity-Pro				Integrity-Pro
			Edit Flange				Edit Flange
Use Metric Size A/F Qty Bolt Material*	No V 2 1/4 V 3 1/2 28 A193-B7 V		Stainless ▼ Stainless ▼ SIONER	Use Metric Size A/F Qty Bolt Material*	No Y 2 1/4 Y 3 1/2 28 [A193-B7 Y		Stainless
Advanced 🛛		🖌 🖊 an	y Brand	Advanced ¥			any Brand
Calculation Opt	ions	Additional Infor	mation	Calculation Op	tions	Ad ⊿tional Info	
Tightening Method	Aquajack Tensioner BS3 Tensioner BT Standard 1500 bar BT Subsea	Client Project Ref		Tightening Method	○ Tension	Client Project Ref	
Advanced 🖈	BT Subsea BT TSR Tensioner BT Xtra	SAP Order Order		Advanced 🛠		SAP Order	
Use User Stress	HF SBT Tensioner HF Sub Sea Tensioner HF Topside Tensioner	Custom 3		Use User Stress		Order Custom 3	
	HT Topsde Tensioner HTF Tensioner LEVERLOK Tensioner MRT Tensioner PS Tensioner SRT Tensioner SSI Tensioner	Custom 4 Custom 5 Work Instructions Comments			Atlas Copco ATW EnerPac HiForce Hydratight Hytorc Norwolf	Custom 4 Custom 5 Work Instructions Comments	
Tension Details	SSIII Tensioner	Tension Output	ts	Torque Details	RAD SPX	Torque Output	S
Procedure* Supplier*	SVR Tensioner System 15 Tensioner • SRT Tensioner •	Residual Stress Residual Load	45000 lbf/in² (310 N/mm²) 155250 lbf (691 kN)	Lubricant*	Torc-Tech TorcTool TorcUP	Residual Stress Torque	s 45000 lbf/in² (310 N/mm²) 4133 lbf.ft (5604 Nm)
Model*	SRT5 T	% of Yield (Residual)	42.9	Supplier*	Wren ATW	Bolt Load	155250 lbf (691 kN)
Max WP	21750 psi 🔻	Pressure A	15447 psi (1065.1 bar)	Model*	SATWH T	Pump Pressure	5451 psi (375.9 bar)
НРА	15.5 in ² •	Pressure B	12358 psi (852 bar)	Drive Type	Hex Drive 🔻	Min To Seal	35475 lbf/in² (245 N/mm²)
Grip Length	12.630 in v	Min To Seal	35475 lbf/in ² (245 N/mm ²)	Pump Pressure	e 5451 psi (375.9 bar)	Yield Stress	105000 lbf/in² (724 N/mm²)
Min Bolt Length Add Torque	[19.880 in ▼	Pass 1N	1: 15447 psi (1065.1 bar) 2: 14417 psi (994 bar) 3: 13388 psi (923 bar)	Min Bolt Length	[17.630] in V	Allowable Stress	89250 lbf/in² (616 N/mm²)

- 1. Key Feature Rapid Flange Entry
- Import data from Excel (Data Migration) or Copy existing Flanges.
- Allows for Pre-Engineering project work to commence, saved as a .sdf file.

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Fi						Edit Flange		
C) · 🔶 🖾 🤅	◗♀▤						i i
	Flange Register 🗙	Workpac	Identification		Function / Loc	ation	Flange Dimensions	
0	🥸 🃎 💊 🍃		Joint ID*	Flange 01-D	System	01 - Produced Gas 🔻	Imperial (inch) Bolts: 28 Clearance: 4.25	
	Flange Joint ID ▽+■	Pro Workpa	Advanced 🛠		Sub-System	01-01	0.25	
	001	Default Proj	Customer ID	007	Line No	Line 1 V	42.25	
H	002	Default Proj	Temporary Tag		Module	Module 1		
t	003	Default Proj	Workpack*	Default Project Workpack	Area	Area A	A 38.00 2.13	
T	004	Default Proj	Installation*	Kaombo FSPO	Sub-Area	Loc 1	31.00	
	005	Default Proj	Description	ECITB MJI 10, 18 & 19 Course Rayong	Advanced 🖈		Δ	
	005	Default Proj	Status*	New T	Criticality	Medium		
	006	Default Proj					A 29.00	
+	007	Default Proj Default Proj	Joint Specificati	on	Pipe Specificat	ion	Γ Γ Γ Γ Γ Γ Γ	
4	009	Default Proj	Type*	ANSI 16.5/16.47 Series A	Pipe Spec	ASME		
1	Flange01-D	Default Proj	Model*	Standard 🔻	Advanced 🖈		<u>'</u>	
┥	Flange01-C	CHRIS-01-E	Class*	600 (PN 100) •	Working			
+	Flange01-A	CHRIS 01-4	Size*	28 (DN 700)	Pressure	1480.00 psi 🔻	<u> </u>	
	Flange 01-B	CHRIS 01-4	Advanced 🛠		Test Pressure	2220.00 psi 🔻		
			Material	Carbon Steel	Operating Temperature	deg F 🔻	<u> </u>	
							Metric Imperial	
			Bolt Specification	n	Gasket Specifi	cation	Messages	
			Use Metric	No	Type*	Ring Type Joint 🔻	Please contact Technical Support. You are reaching the	
			Size	2 •	Material*	Stainless Steels and Nickel-base Alloys	recommended rating for this tool. Please consider using bigger model.	
			A/F	3 1/8	Description	316 SS INNER RING,316 SS OUTER RING B	bigger model.	
		Contraction (Contraction)	Qty	28]			
	1000		Bolt Material*	А193-В7 •]			
•			Advanced ¥					
0.	Flanges 14 No. I	Filtered 14						
1				P3 w3 X3 🔿	د :		▲ 🏴 🛍	10:08 AM

2. Key Feature - Completion & Work Instruction Certificate

- Once all drawings are in the system and all specifications are added, Work Instructions can be generated to support the field work.
- Also can create completion certificates as part of any documentation handover.

Clie	ent			Work	pac	(Number				Ta	a No	
PRO	FAB					12345					007	
Project I	Number			Project Name			Location			Client	Tag No	
JN 1	176			Ichthys		Bat	am, Indones	sia		TG_0	07_ab	
				Woi	kpa	ck Details						
Line No		L-80-790	FW	347-JF-002		C2SA Prop	ane Tank	C2SA-790	_FW3	347-1G/	\3-K-N	
				J	oint	Details						
Joint Type		ANSI Stan	dard			Gasket Type		SWG				
Joint Size		20				Gasket Mate	rial	Stainless				
Joint Class/Rat	ing	300				Bolt Qty		24				
Flange Materia		ANSI B16.5				Nut A/F		2				
Bolt Material		A320-L7				Grip Length		5.13 in				
Bolt Size/Lengt	h	1 1/4" / 8	.46 i	n		Bolt Coating		Black Oxide				
Lubricant Nam	e	MOLYKOT	E 10	00		Co-efficient	Of Friction (µ)	0.11				
Residual Bolt S	tress	40000 lbf/	în^2			Bolt Load		37760 lbf				
				Recomm	nend	ed Equipme	ent					
		Tens	ion					Torque				
Tool Recomme	nded					Tool Recomm	mended	3ATWS				
Tool Cover		100% / 50%	6/2	5%		Torque (Stag	ges/Pass)	30%		60%	100%	
1st Pass Pressu	ire					Torque Value	e	177 lbf.ft	353	lbf.ft	ft 589 lbf.ft	
2nd Pass Press	ure					Pump Pressu	ire	547 psi	109	4 psi	psi 1824 psi	
Check Pass												
							fied Values?					
				Equipment Inform	atior	۱				Note: Decord co	rial numbers f	
Tool Used		3ATWS	3ATWS			Serial No		W6005	/6005 equipment used on		t used on	
Pump Type	RWP55				3chur 140				k pass only			
		Flange (Cheo	ks				Comment	ts			
Flange Face	Clean		X	Aligned	X	Passed 3 00)psi integrity te	stina				
Bolts		t Length	X	Correct Material	X		spor encouncy te	Jung				
Gasket	Correc	t Size	X	Correct Material	X							
Assembled By		Johnny Pras	toyo	,	Co	mpany	PT Advent Pra	ikarsa	Date	06/	02/2016	
Tightened By		John Smith			Co	mpany	PT Advent Pra	akarsa	Date		02/2016	
				PT ADVENT			PROFAB			K	ΉI	
Print Name		IOL		MITH – ECITB TECHNICI CERT NO. 1988325	AN	Firm	an Wahyu Ja	atmiko	P	Mr Yam	a Kitahara	
Signature				J. Smith			F.Jatmi	ko	4	Ŷ. 9	Kitahara	
Date		9 th FE	EBRI	JAURY 2016		10 th FEBR	UAURY 2016		12 th	FEBRUA	URY 2016	

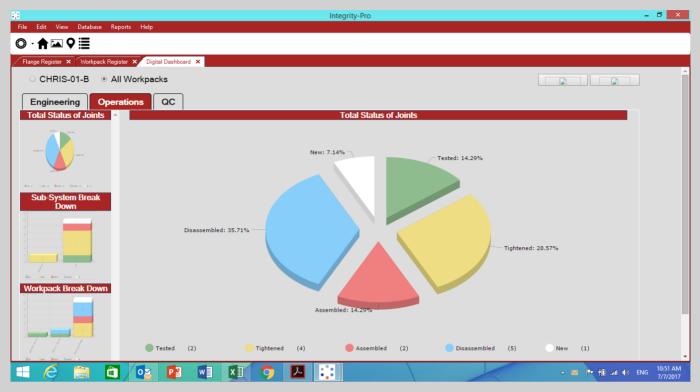
		ent					Number		Tag No	
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P	roject		er			Loca			ent Tag No	
	JN 1	176					uth Korea	T	G_007_ab	
						orkpa	k Details			
System				_	V347-1GA3-K-N		Sub-System	N/A		
Line No		L-80	-790_	FW	347-JF-002			_		
(mil) Elec				-	U.b. a fallowed a		uction w for hydrocarbon / hy	densities with t	ter interet	
					applied. For over 2'	' bolt	shall be used for bolts dia., bolt tensioning sh Details			1" to 2" bo
Joint Type		ANSI	Stand	lard			Gasket Type	SWG		
Joint Size		20					Gasket Material	Stainless		
Joint Class/Rati	ing	300					Bolt Qty	24		
Flange Material		ANSI	B16.5				Nut A/F	2		
Bolt Material		A320)-L7				Grip Length	5.13 in		
Bolt Size/Lengt	h	1 1/4	4"/8.	46	n		Bolt Coating	Black Oxide		
Lubricant Name	•	MOL	укот	10	00		Co-efficient Of Friction (µ)	0.11		
Residual Bolt S	tress	4000	0 lbf/	in^2			Bolt Load	37760 lbf		
					Recom	mend	ed Equipment			
			Tensi	on				Torque		
Tool Recomme	nded						Tool Recommended	HTL-DS3		
Tool Cover		100%	50%	6 / 2	5%		Torque (Stages/Pass)	30%	60% 353 lbf.ft	100%
1st Pass Pressu 2nd Pass Press							Torque Value Pump Pressure	547 psi	353 lbt.ft 1094 psi	589 lbf.ft 1824 psi
Check Pass	u.e	-					rump Pressure	547 psi	1094 hil	1024 psi
CHICK Papp	_	-	_		Equipment Inforr	natio	l n		Note:	_
Tool Used		-	BATW		aquipmentermon		Serial No	W6005	Record se	rial numbers nent used on
Pump Type			APP5				Serial No	123456	final/chec	k pass only
	_	Fla	nge C	he	ks	_		Comments		
Flange Face	Clean			х	Aligned	X	All send in send on 177			
Flange Face				-		_	All good in good condition			
Bolts	Correc	t Lengt	h	х	Correct Material	X				

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3. Key Feature - Digital Dashboard

• Dashboard for Engineering, QC and Operations.



4. Key Feature - Drawing Overlay & Mark-up

- Drawing overlay feature allows Flange Management tags and visual status to be layered on top of leak test mark-up route.
- Mark-up drawings allow detailing information on valves within the test envelope.

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File Edit View Database Reports Help			
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Flange Register × Workpack Register × Drawing Register 3	× L-HUD-N-HL-1124-001-HB981-N (View) ×		
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5. Key Feature – ATEX ECOM tablet

- Intrinsically safe Zone 1/21 & DIV. 1 ATEX ECOM tablet running INTEGRITY-PRO (Flange Management) FM JIT software.
- The ECOM tablet can directly scan the Flange Tag Bar Code, thereby locating the Flange Joint ID immediately in the Flange Register where the Flange status can be updated in real time.



FLANGE REGISTER



DRAWING OVERLAY MARK-UP



FLANGE TAG BAR CODE SCANNING



ADD FLANGE ACTIVITIES

← =			T-001 / OGS-371-001-0	37-J01	
De	tails for T-	001/00	GS-371-001-	037-J01	
Ad	Id activity				
Tag:		T-001	Customer tag:	035-371-001-037-J01	
T)pe:		Standard	System:	300 - Utility Systems	
Rating:		900	Sub system:	371 - Instrument Air Syster	TTS
Size:		12"	Line No:	AJ-371-9613	
Bolt size	6:	138	Tighten method:	Torque	
Bolt mat	terial:	D7	Residual stress:	50000 bf/inch ²	
Gasket:			Tool type:	RSC 4	
Gasket	materiat	Stainless	Torque:	985 fbft	
	A Home	(* 10		Drawings	Accession

Data upload to local server/cloud hosted DB



ADD WORK INSTRUCTION