

LOCTITE[®]
BONDERITE[®]
TECHNOMELT[®]
TEROSON[®]
AQUENCE[®]

Adhesives, Sealants, Functional Coatings, Equipment and Services

HVAC Solutions



Henkel

Henkel.

Improving your designs, understanding your challenges.

PROVEN SOLUTIONS FOR ALL YOUR NEEDS – TODAY AND TOMORROW

HVAC manufacturers face daily challenges – reducing costs, improving efficiency, and continuing to innovate, to name just a few. While there are many adhesive suppliers to choose from, they're not all created equal. You need a supplier with a broad product portfolio, a global footprint, and the engineering and application know-how to solve your challenges.

Henkel, **the leading solution provider for adhesives, sealants and functional coatings worldwide**, offers much more than quality adhesives. With our history and experience in the HVAC industry, our experts can help you find ways to optimize your manufacturing processes and drive down costs. We can help you create equipment that is **stronger, quieter and more reliable**. And we're continually developing innovations to help you succeed in the future.

Let us show you the value Henkel offers.



INNOVATION

More than 30%
of our sales come from products
launched in the past five years.



GLOBAL SUPPLY CHAIN

and chemical management services
to maintain a **reliable supply**
of products to our customers.



CUSTOMIZED SOLUTIONS

We will create the formula that
meets your **exact** requirements.



GLOBAL SUPPORT

no matter where in the
world you're **located**.



**BROAD
PRODUCT
PORTFOLIO**

to provide the optimum
solution for your challenges.

WHY HENKEL?

Henkel will work with you to optimize
your manufacturing process, identify
improvements, and solve
your toughest challenges.

**We're your partner
every step of the way.**



**COMPLETE
EQUIPMENT LINE**

that can be **easily
integrated** into your
manufacturing process.



**COMPREHENSIVE
TESTING**

and teardown analysis to
back up our product and
process solutions.



**ENGINEERING
SERVICES**

10 R&D centers
around the world staffed by 3,000 design,
application and manufacturing reliability
professionals.








WORLDWIDE RESEARCH AND DEVELOPMENT



ENGINEERING SOLUTIONS

Henkel's global network of engineering and R&D centers is staffed by 3,000 design and application professionals. We offer complete engineering services from application and design support to process optimization and a full array of analytical and testing services.



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HENKEL: YOUR TOTAL SOLUTIONS PROVIDER

SOLUTIONS

for every step of your process

Henkel offers a **broad array** of adhesives, sealants and functional coatings for every step of your manufacturing process, from forming and stamping to final assembly. But Henkel is more than just a supplier – our **partnership** with customers sets us apart. We have the expertise and ability to work with you from the R&D stage through the entire manufacturing process.

In addition to the product solutions shown below, we can also support your needs with our **testing capabilities, acoustics labs, analytical services, technical seminars, value calculators,** and much more. Our **global capabilities** enable us to service your manufacturing and design centers in all regions with our dedicated Henkel technical and account experts. It's part of our mission to be your total solutions provider.

METAL FORMING

METAL

MACHINING, FORMING AND STAMPING

- Metalworking fluids

WELDING AND PREASSEMBLY

- Panel stiffening
- Seam sealing
- Structural bonding
- Anti-weld spatter

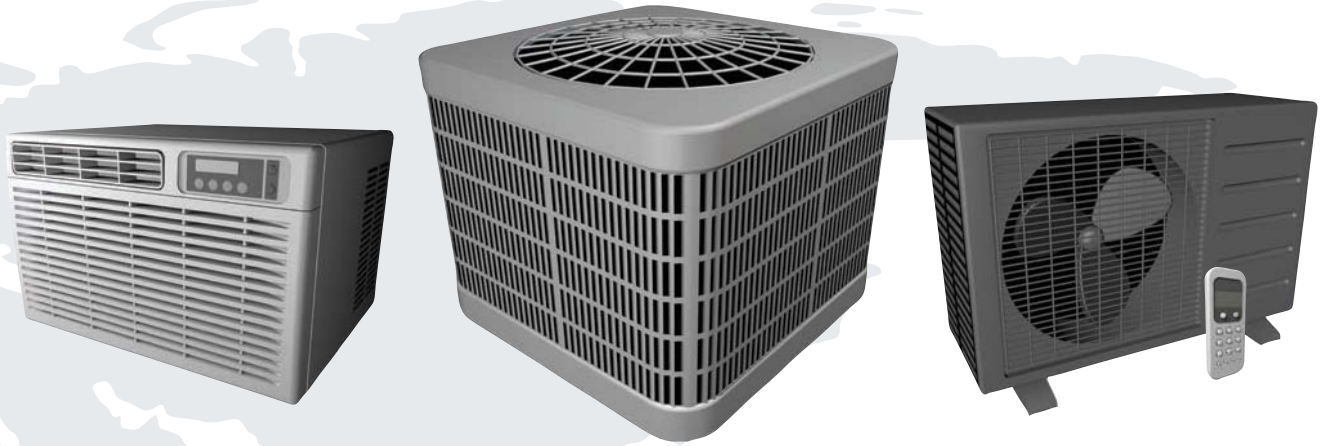
FUNCTIONAL COATINGS

METAL PRETREATMENT

- Cleaning
- Conditioning
- Conversion coating

PRIMER AND TOP COAT PAINTING

- Powder coating
- E-coating
- Autodeposition coating
- Seam sealing
- Structural/elastic bonding



ASSEMBLY

STRUCTURAL BONDING

- Cabinet assembly
- Seam sealing

GENERAL BONDING

- Overlay bonding
- Control panel bonding
- Machinery adhesives

NOISE AND THERMAL CONTROL

- Insulation bonding
- Vibration damping
- Sound absorption

INSPECTION + TEST

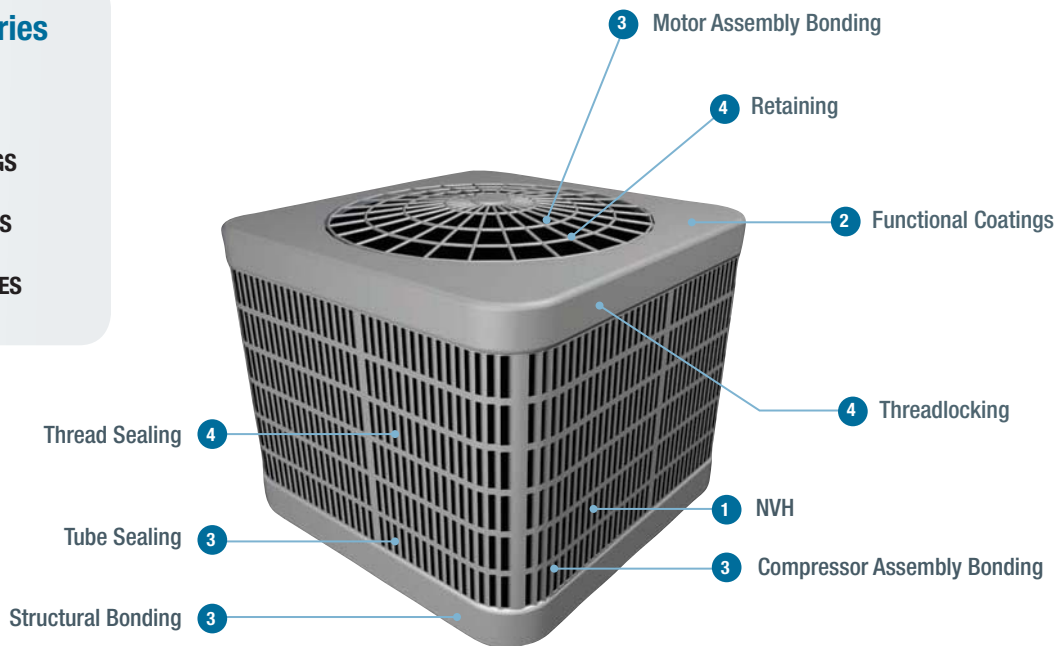
PACKAGING

- Carton closing
- Packaging adhesives
- Labeling

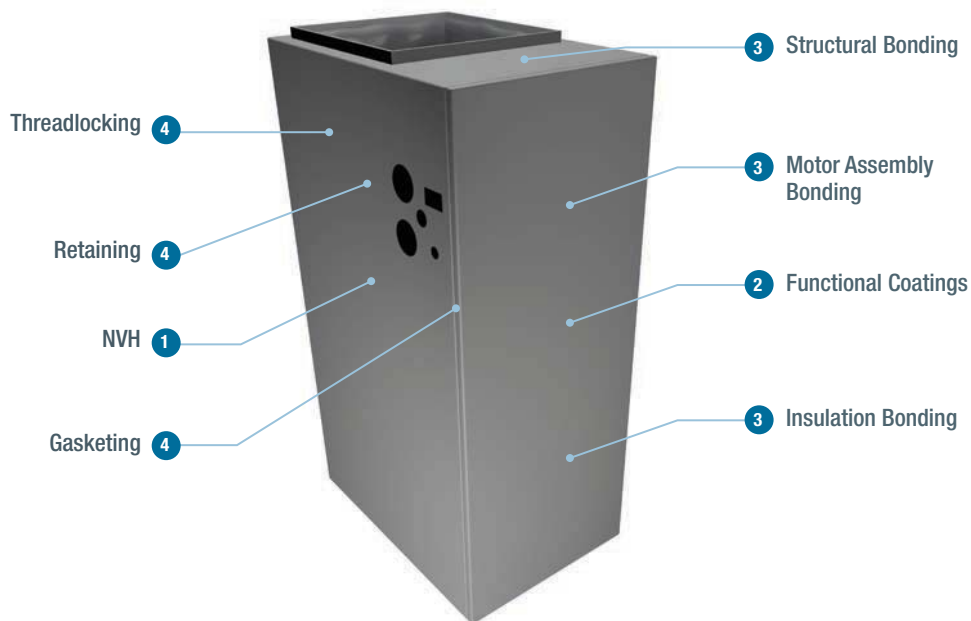
HVAC APPLICATIONS

Application Categories

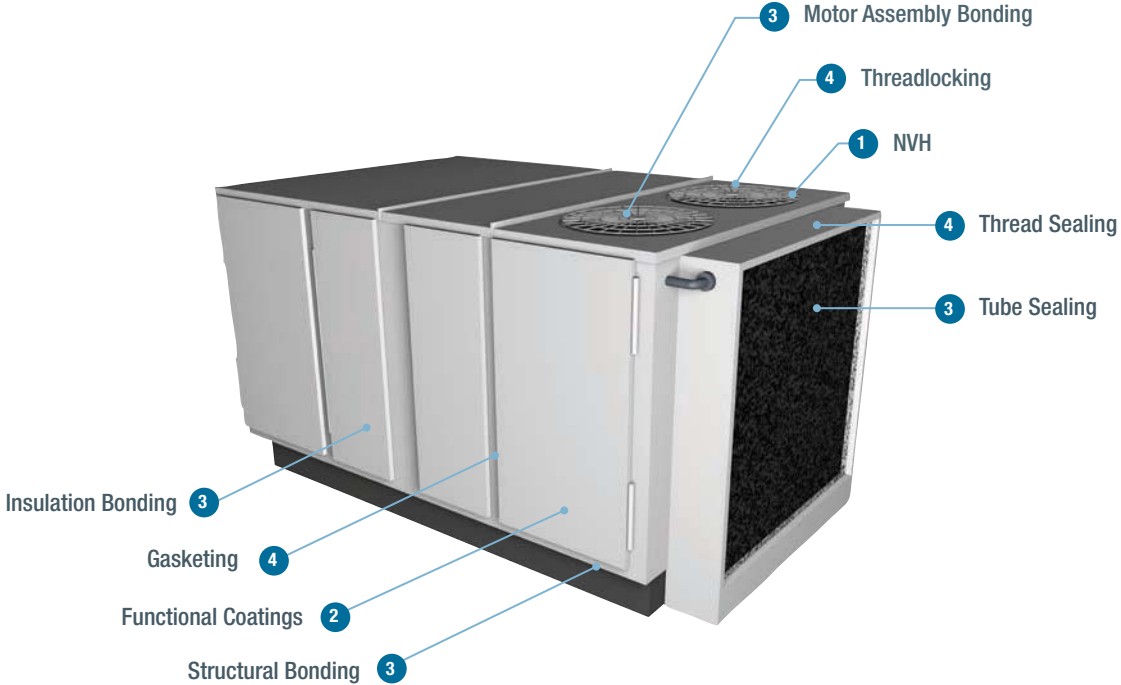
- 1 NVH
- 2 FUNCTIONAL COATINGS
- 3 ASSEMBLY SOLUTIONS
- 4 MACHINERY ADHESIVES



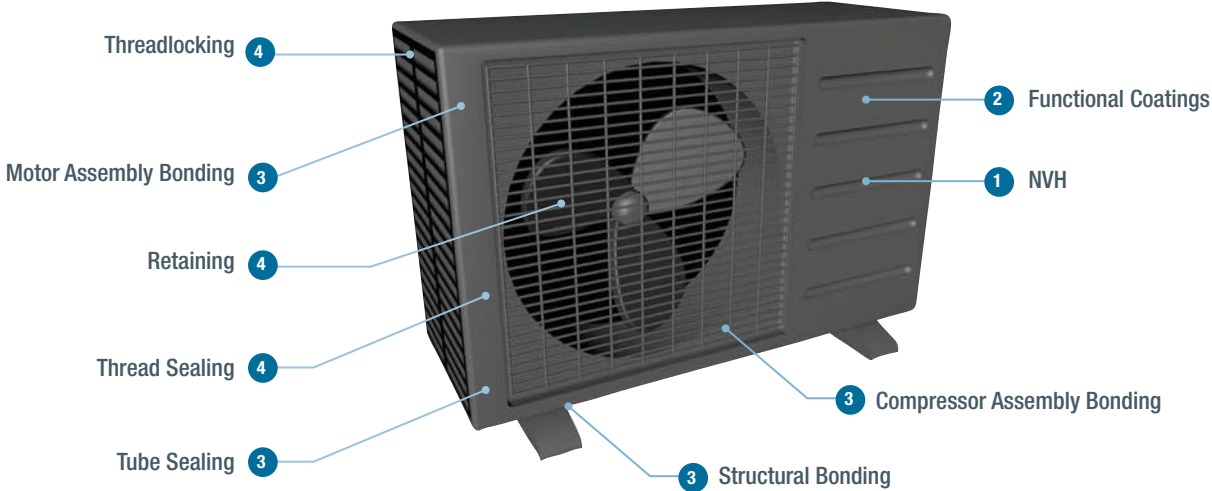
CENTRAL A/C CONDENSER UNIT



CENTRAL A/C AIR HANDLER UNIT



INDUSTRIAL HVAC

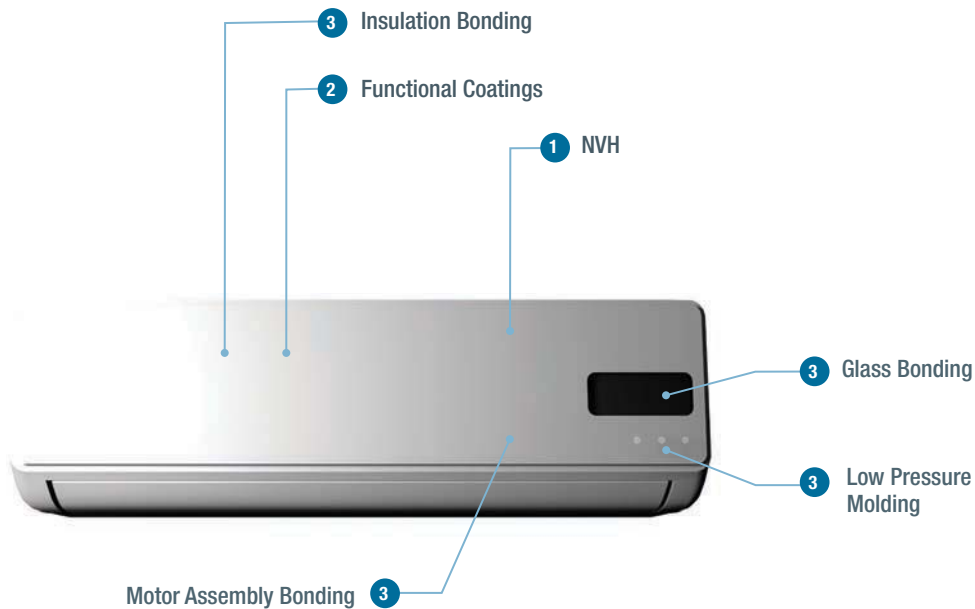


DUCTLESS CONDENSER UNIT

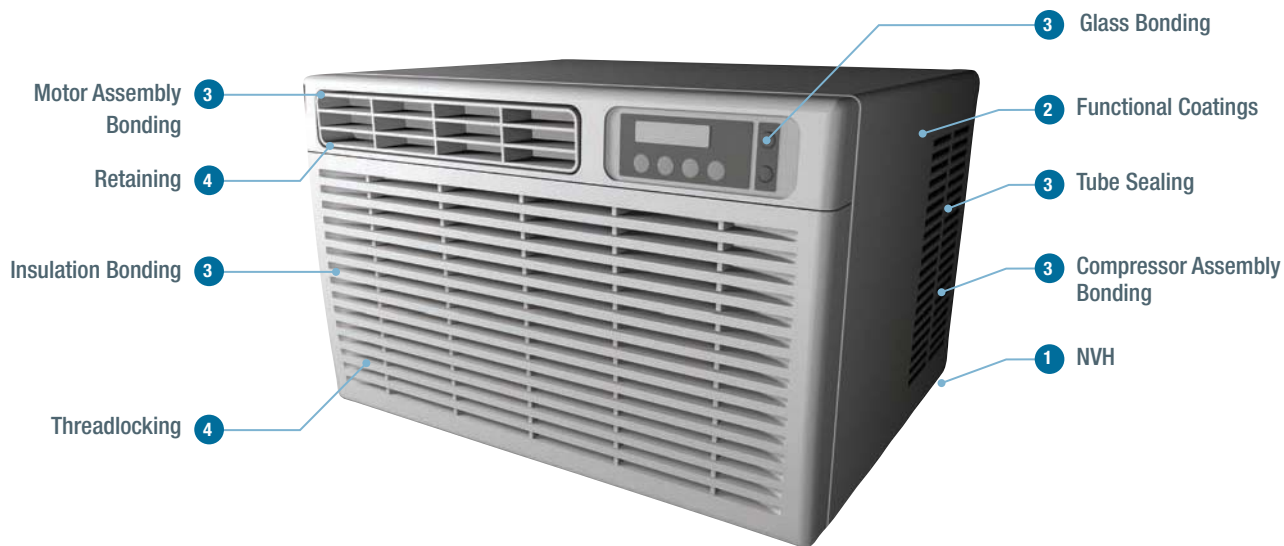
HVAC APPLICATIONS

Application Categories

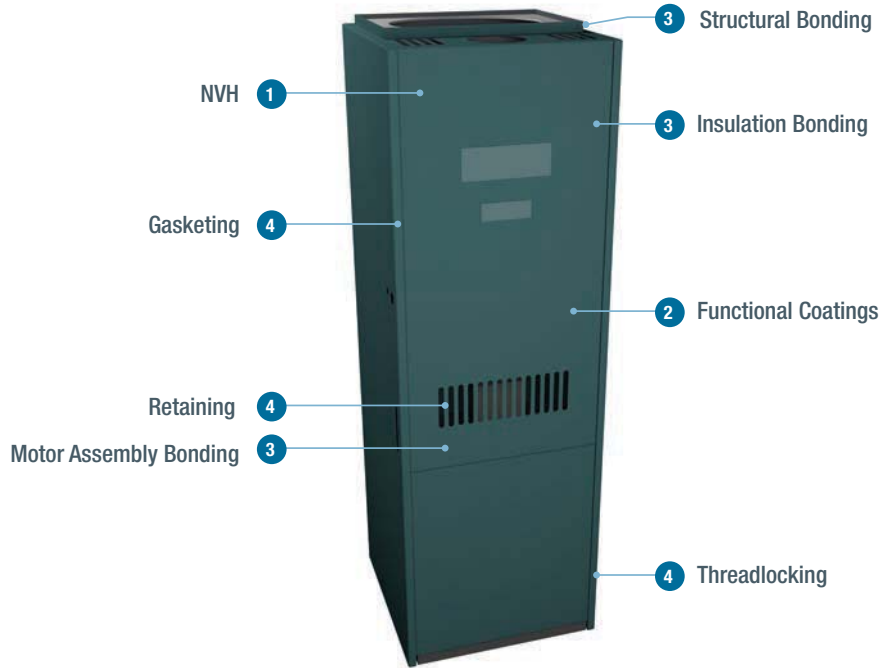
- 1 NVH
- 2 FUNCTIONAL COATINGS
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- 4 MACHINERY ADHESIVES



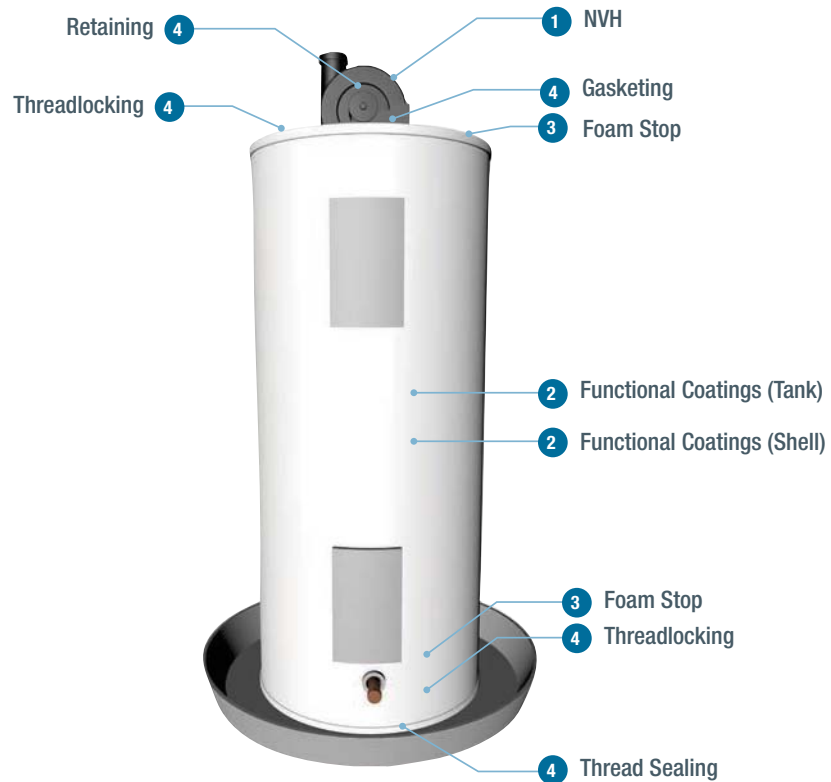
DUCTLESS AIR HANDLER



WINDOW A/C



FURNACE



WATER HEATER





NOISE, VIBRATION, HARSHNESS AND METAL REINFORCEMENT SOLUTIONS

Create Stronger and Quieter Systems


Henkel's solutions to reduce noise, vibration and harshness (NVH) were originally designed for automotive vehicle cabins and are now used in HVAC manufacturing. Our TEROSON® brand NVH solutions and LOCTITE® brand adhesives and sealants help enhance material properties and minimize audible noises.

NOISE, VIBRATION, HARSHNESS AND METAL REINFORCEMENT SOLUTIONS

Henkel is a leading source worldwide for NVH (noise, vibration and harshness) solutions. We provide advanced NVH technologies and comprehensive design and engineering support to our customers. Henkel has been an NVH partner with leading manufacturers for more than 20 years, and our expertise also helps HVAC manufacturers create dimensionally stronger and quieter products. Our TEROSON® brand NVH solutions and LOCTITE® brand adhesives and sealants help enhance material properties and minimize audible noises.

NVH Product Portfolio and Technologies

- Henkel offers a full portfolio of NVH solutions in five categories – **reinforcement, damping, sealing, absorption and barrier** – detailed in Figure 1.
- We provide effective solutions to **airborne noise and structure-borne noise**, as well as **vibration and leakage**.
- We help our customers achieve **high performance sealing and save on process cost** through automation.

APPLICATION	<p>REINFORCEMENT</p> 
NEED	<p>Increase stiffness, shift resonant frequency</p>
SOLUTION	<p>Expandable Foams Reinforcing with Stiffening Pads Structural Adhesives Structural Tapes</p>

- Structural vibration reduction
- Allows metal design with thinner panels
- Reduction in mass

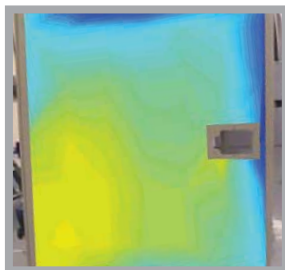
Vibration Response Test (Figure 2)

> BEFORE

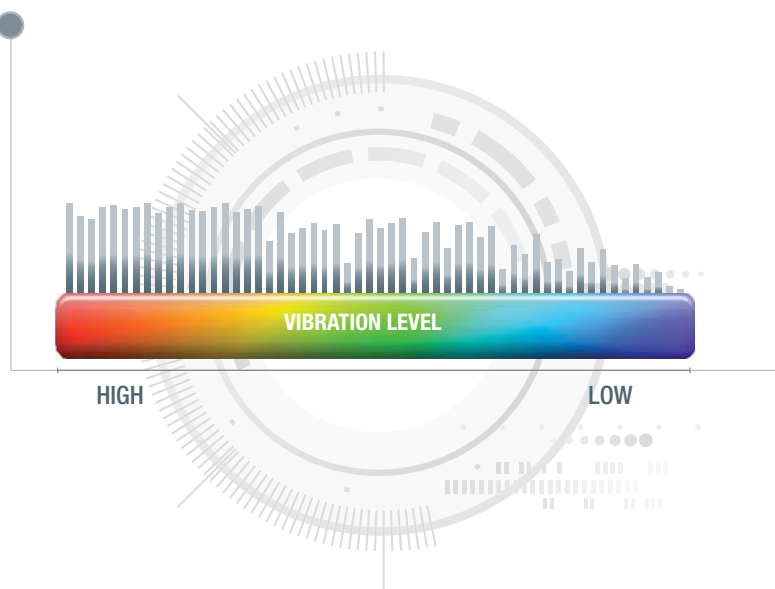


Vibration response test for side panel. Red/yellow indicates high levels of vibration.

> AFTER

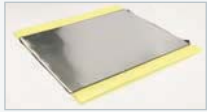


Test results for side panel using Henkel expandable material with optimized application. Blue/green indicates low levels of vibration.



NOISE, VIBRATION AND HARSHNESS SOLUTIONS (FIGURE 1)

DAMPING



Dissipate vibration of panel structure

Liquid Applied Sound Deadener
High Damping Foam
Constrained Layer Pads

- High loss factor performance
- Structural vibration reduction
- Improves NVH performance
- Converts vibration into thermal energy
- Reduction in sound pressure levels
- Easy to apply on various substrates

SEALING



Isolate noise sources

Gap Filling Sealants
Semi-Structural Sealant and Expandable Foams

- Less welding
- Less corrosion
- Process cost savings through automation
- Blocks noise pathway

ABSORPTION



Reduce airborne noise

Acoustic Barrier/Absorber

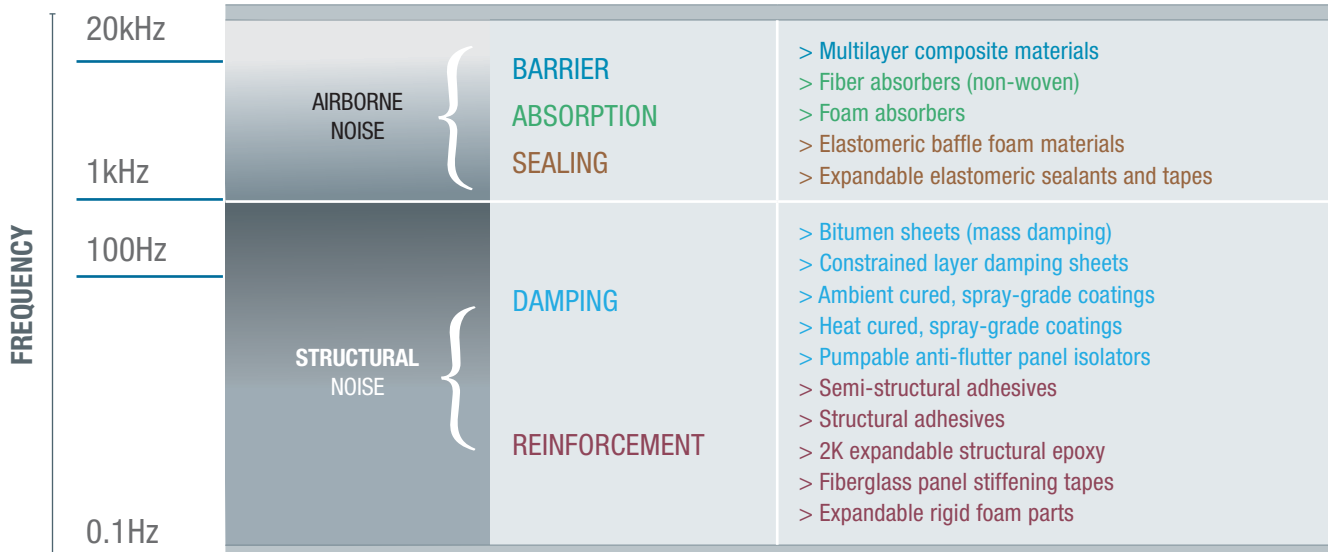
- High Sound Transmission Loss (STL) performance
- High absorption performance
- Tunable performance

BARRIER



Block sound transmission

NVH Technology Overview



NOISE, VIBRATION, HARSHNESS AND METAL REINFORCEMENT SOLUTIONS

TEROSON® Liquid Applied Sound Deadener (LASD)

TEROSON® Liquid Applied Sound Deadener (LASD) significantly reduces structural noise by absorbing and dissipating vibrational energy. LASD is applied directly to the unit, reducing unwanted noise and vibration.

LASD offers a sustainable and cost-effective solution by providing mass reduction, improved Noise Vibration Harshness (NVH) performance and reduced complexity.

► BENEFITS

- Targeted robotically applied LASD spray ensures optimal damping application and performance.
- Automation reduces total material usage.

Service and Support

Henkel supports its LASD technology with experienced acoustic/materials engineering, laboratory, and field service personnel. LASD application systems can be easily added into existing processes.

TEROSON® Fiber Absorbers

TEROSON® sound-deadening fiber absorbers are an effective solution for reducing noise. The fiber blocks the passage of the airborne noise in hollow cavities and prevents noise, vibration and harshness.

► BENEFITS:

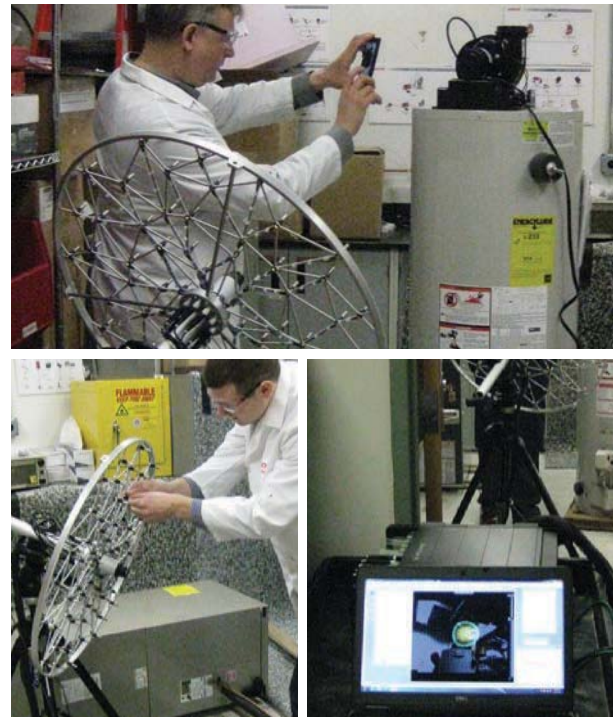
- Blocks the passage of airborne noise in hollow cavities
- Prevents noise, vibration and harshness (NVH)
- Flame retardant



Acoustics Labs and Engineering Services

Henkel's technical support team offers engineering, design, prototyping, application evaluation and testing services to help customers solve NVH problems and improve machine design.

- **Acoustics Labs** with state-of-the-art instrumentation and validation equipment for testing and analysis of noise and vibration reduction variables.
- **Lab Locations** in each of our major regional hubs – Germany, United States, China and India.
- **NVH Engineering:** Our comprehensive services include analysis, application solution design and application solution validation.
- **NVH Testing:** Our world-class testing resources include acoustic material testing and machine/component testing.
- **NVH Simulation:** We use a broad range of modeling tools for structural, acoustic, thermal and aerodynamic simulation.



Our services include:

NVH Analysis	Acoustic Material Testing	Other NVH Testing	
<ul style="list-style-type: none"> • Noise source • Transmission path • Contribution • Frequency response 	<ul style="list-style-type: none"> • Damping test (Oberst, impedance, free method) • Sound absorption • Transmission loss 	<ul style="list-style-type: none"> • Semi-anechoic room test • Reverberant room test • Vibration test by laser meter • Acoustic camera (holography) 	<ul style="list-style-type: none"> • Sound pressure level • Sound intensity/power • Field test • Modal test

NVH Simulation Capabilities:

SIMULATION TYPES	FEA	BEM	SEA
Strength	✓	×	×
Stiffness	✓	×	×
Modal	✓	×	×
Vibration	✓	×	×
Noise	✓	✓	✓
Thermal	✓	×	×

- **FEA** Finite element analysis for structural and low frequency
- **BEM** Boundary element analysis for mid and high frequency
- **SEA** Statistical energy analysis for mid and high frequency





BONDING SOLUTIONS

Faster and Lower-Cost Assembly

The design and manufacture of HVAC units presents numerous challenges in assembly, mounting, fastening, and sealing. Henkel's solutions enable manufacturers to reduce or replace traditional mechanical fastening methods and improve the long-term durability of the assembled unit. Henkel adhesives and sealants have been specified by the world's major HVAC manufacturers for more than 40 years.

LARGE AREA BONDING

Bonding Insulation Panels

Connection of Insulation Panels involves bonding the insulating material to the painted steel cabinet shell. Using hot melt or water-based adhesives with high initial tack achieves a strong, immediate bond between the components.

► BENEFITS:

- High initial tack for fast processing
- High strength and thermally resistant
- UL rating for flame and smoke index

HOT MELT					
PRODUCT NO.	VISCOSITY (mPas)	DISPENSE TEMP. (°C/°F)	SOFTENING POINT (°C/°F)	COLOR	DESCRIPTION
SYNTHETIC RUBBER					
TECHNOMELT® PS 1530™	11,000	160/320	92/198	Light Yellow	Spray or roll coat
TECHNOMELT® PS 1573™	17,000	160/320	92/198	Light Yellow	Spray or roll coat
TECHNOMELT® PS 8707™	4,000	180/356	110/230	Light Yellow	Spray or roll coat
TECHNOMELT® PS 703™	6,000	180/356	100/212	Light Yellow	Spray or roll coat
TECHNOMELT® PS 1573E™	8,200	180/356	95/203	Light Yellow	Slot nozzle or roll coat
TECHNOMELT® PS 977EX™	7,300	180/356	94/201	Amber	Slot nozzle or roll coat
POLYOLEFIN					
TECHNOMELT® AS 3210™	8,000	177/351	135/275	Off-white	UL 723 Class 1 for flame and smoke spread, UL 2395, UL 727
EVA					
TECHNOMELT® AS 491C™	2,200	150/302	132/270	Light Yellow	UL 723

WATER-BASED					
PRODUCT NO.	VISCOSITY (mPas)	SOLIDS (%)	COLOR	DESCRIPTION	
AQUENCE® AV 452A™	300	65	Off-white	UL 2395, UL 727, 0 flame spread 0 smoke index	
AQUENCE® AV 514A™	300	65	Blue	UL 2395, UL 727, 0 flame spread 0 smoke index	
AQUENCE® AV 0885™	22,500	66	Off-white	Bonding of porous substrates	
SOLVENT-BASED					
LOCTITE® S 563R™	125	18	Red	Contact adhesive	
LOCTITE® S 6097™	700	26	Amber	Contact adhesive	

LEARN MORE:

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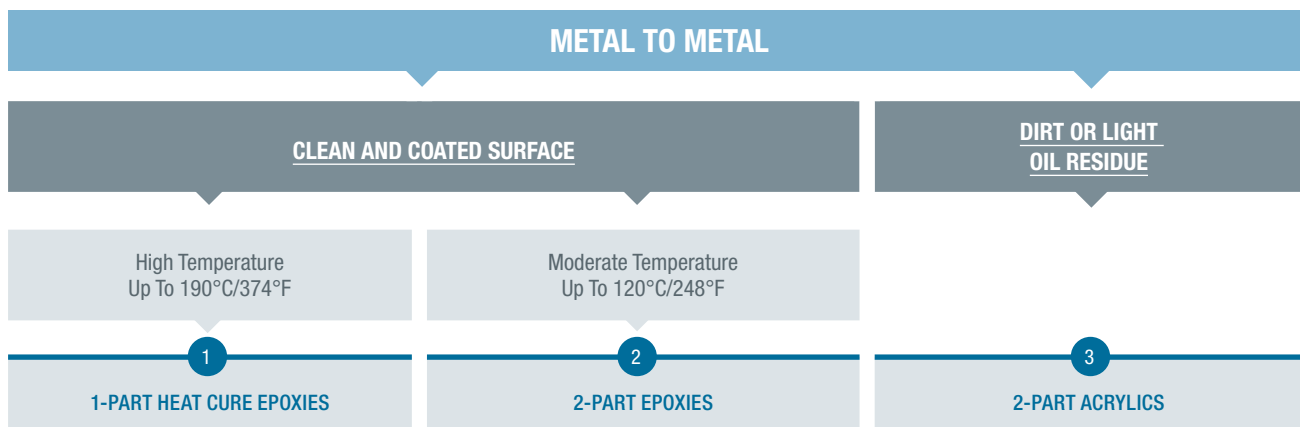
STRUCTURAL BONDING

Metal Bonding

Henkel structural adhesives for metal bonding provide tough, long-lasting bonds to metal surfaces such as steel, galvanized steel, aluminum and stainless steel. These adhesives reduce or replace the need for threaded fasteners, welds or rivets, resulting in a higher quality and lighter-weight assembly. Henkel structural adhesives withstand higher temperatures, provide excellent chemical resistance, and survive aggressive pretreatment and high performance paint processes.

► BENEFITS:

- High strength coupled with high impact and peel resistance
- Resistance to high temperatures and aggressive chemicals
- Bond gap control to prevent adhesive squeeze-out
- A variety of open times to meet processing line needs
- Cost benefits by replacing or reducing welds, rivets and screws



Anti-Weld Spatter

For applications where welding is required, Henkel's Anti-Weld Spatter coatings can help manufacturers increase productivity and lower costs. These innovative coatings protect welding equipment and parts by preventing metal spatter from adhering to the contact tip, nozzle and surrounding parts. Products can be applied manually or robotically and are suitable for MIG and MAG welding.

► BENEFITS:

- Minimizes downtime
- Extends torch nozzle and tip life
- Decreases cleaning time and frequency
- Silicone-free, no paint issues
- Improves quality of weld seams
- High temperature resistance (1,100°C/2,012°F)

LEARN MORE:

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1

1-PART HEAT CURE EPOXIES

PRODUCT NO.	VISCOSITY (mPas)	HEAT CURE	SERVICE TEMPERATURE	COLOR
LOCTITE® EA 3985™	50,000	Heat cure 30 minutes at 150°C/302°F	149°C/300°F	Black
TEROSON® EP 5089™	100,000	Heat cure 40 minutes at 160°C/320°F	178°C/352°F	Purple

2

2-PART EPOXIES

PRODUCT NO.	MIX RATIO (VOLUME)	MIX RATIO (WEIGHT)	MIXED VISCOSITY (mPas)	WORK LIFE (MINS.)	GLASS TRANSITION TEMPERATURE (°C/°F)	COLOR	DESCRIPTION
LOCTITE® EA E-00NS™	1:1	100:92	100,000	3	20/68	Yellow Translucent	Fast fixture, non-sag
LOCTITE® EA E-04SS™	1:1	100:98	–	3	–	Light Grey	Color matched for stainless steel
LOCTITE® EA E-05MR™	1:1	100:100	25,000	5	39/102	Water White Clear	Moisture resistant
LOCTITE® EA E-05CL™	1:1	100:105	2,500	3	10/50	Clear	Fast fixture
LOCTITE® EA E-20NS™	2:1	100:52	60,000	20	87/189	Tan	Low sag
LOCTITE® EA E-20HP™	2:1	100:55	30,000	20	60/140	Off White	Toughened, high performance
LOCTITE® EA E-30CL™	2:1	100:46	10,000	30	70/158	Clear	Chemically resistant
LOCTITE® EA E-30UT™	2:1	100:46	65,000	30	45/133	Dark Purple	Ultra-tough
LOCTITE® EA E-40FL™	1:1	100:85	70,000	40	30/86	Opaque Grey	Flexible
LOCTITE® EA E-40HT™	2:1	100:43	430,000	40	57/135	Off-white	Service temperature to 150°C/302°F
LOCTITE® EA E-60HP™	2:1	100:50	45,000	60	70/158	Off-white	Toughened, high performance
LOCTITE® EA E-60NC™	1:1	100:91	8,000	60	55/131	Black	Noncorrosive potting
LOCTITE® EA E-120HP™	2:1	100:46	30,000	120	90/194	Amber	Chemically resistant
LOCTITE® EA 9460™	1:1	100:97	200,000	50	68/154	Grey	Non-sag
LOCTITE® EA 3430™	1:1	100:100	23,000	5	58/136	Ultra Clear	Transparent
LOCTITE® EA 3450™	1:1	100:106	33,000	5	37/99	Metallic Grey	Metal bonder

3

2-PART ACRYLICS

PRODUCT NO.	MIX RATIO (VOLUME)	MIX RATIO (WEIGHT)	MIXED VISCOSITY (mPas)	WORK LIFE (MINS.)	GLASS TRANSITION TEMPERATURE (°C/°F)	COLOR	DESCRIPTION
LOCTITE® AA H3151™	1:1	100:100	70,000	45	–	Light Yellow	High peel strength
LOCTITE® AA H3300™	1:1	100:100	110,000	5	–	Yellow	Plastic bonder, fast work time
LOCTITE® AA H4500™	10:1	100:10	45,000	15	107/225	Grey	Metal bonder
LOCTITE® AA H4800™	10:1	100:10	50,000	30	–	Light Yellow	Plastic bonder, impact resistant
LOCTITE® AA H8000™	10:1	100:12	190,000	30	71/160	Green	Aluminum metal bonder, long work time
LOCTITE® AA H8510™	10:1	100:10	45,000	30	85/185	Grey	Metal bonder, long work time
LOCTITE® AA H8600™	2:1	100:50	86,000	25	–	Blue	Galvanized steel metal bonder
LOCTITE® AA H8700™	2:1	100:56	40,000	40	88/190	Blue	Paint bake compatible

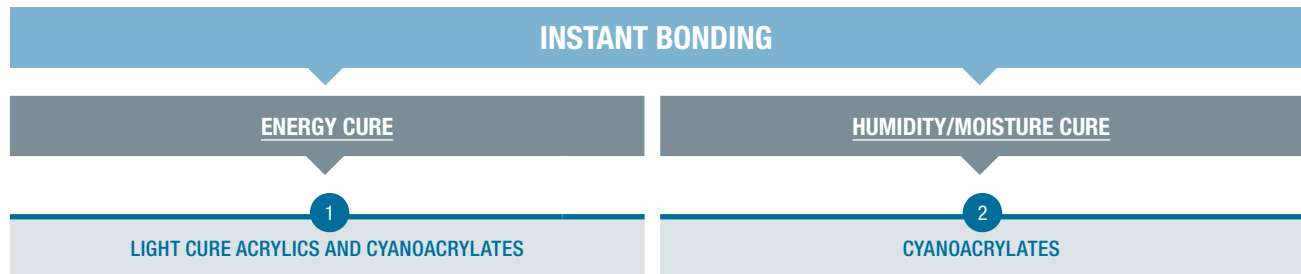
STRUCTURAL BONDING

Instant Bonding

Henkel cyanoacrylate adhesives cure rapidly at room temperature without heat or light and are easy to use. Products include speciality grades where thermal and impact resistance, flexibility and gap filling are needed. Light curing adhesives provide repositioning time during assembly followed by bond-on-demand capability when exposed to light.

► BENEFITS:

- Single component
- Fast fixturing and cure for high volume production lines
- Cure-on-demand capability



1 LIGHT CURE ACRYLICS					
PRODUCT NO.	VISCOSITY (mPas)	ELONGATION	SHORE HARDNESS	COLOR	DESCRIPTION
UV CURE ACRYLIC					
LOCTITE® 349™	9,500	300	D70	Clear/Straw	Typically used on glass and metal.
LOCTITE® 3108™	5,000	330	A72	Translucent/Colorless	Typically used on thermoplastics, thermosets, and glass.
UV / ACTIVATOR CURE ACRYLIC					
LOCTITE® 352™	19,500	290	D60	Clear/Light Amber	Typically used on glass and metal.
UV / VISIBLE CURE ACRYLIC					
LOCTITE® 3311™	300	265	D64	Clear/Pale Straw	Typically used on glass, metal, thermoplastics, polycarbonate, and PVC.
LOCTITE® 3321™	5,000	250	D53	Clear/Pale Straw	Typically used on glass, metal, thermoplastics, polycarbonate, and PVC.
LOCTITE® 3525™	15,000	260	D60	Clear/Pale Straw/Fluorescent	Typically used on glass, metal, and thermosets.
LOCTITE® 3972™	4,500	88	D68	Transparent/ To Hazy Fluorescent	Typically used on metal, thermoplastics, PVC, and polyurethane.
LOCTITE® 3979™	56,500	227	D56	Translucent/Straw/Fluorescent	Gel

LEARN MORE:

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1

LIGHT CURE CYANOACRYLATES

PRODUCT NO.	VISCOSITY (mPas)	FIXTURE TIME (SEC.)	TEMP. RESISTANCE (°C/°F)	COLOR	DESCRIPTION
LOCTITE® 4310™	150	5	116/241	Transparent Light Green/ Fluorescent	Toughened
LOCTITE® 4311™	900	5	93/199	Transparent Light Green/ Fluorescent	Toughened

2

CYANOACRYLATES

PRODUCT NO.	VISCOSITY (mPas)	FIXTURE TIME (SEC.)	TEMP RESISTANCE (°C/°F)	COLOR	DESCRIPTION
TOUGHENED					
LOCTITE® 380™	300	90	80/176	Black	Excellent peel, impact and shear strength
LOCTITE® 411™	5,000	30	90/194	Clear	Designed for impact and peel strength in gap filling applications
LOCTITE® 435™	200	30	121/250	Clear	Surface insensitive for metal, rubber and plastics
LOCTITE® 480™	200	90	80/176	Black	Rubber toughened, increased flexibility and peel strength, enhanced shock resistance
SURFACE INSENSITIVE					
LOCTITE® 401™	110	5	121/250	Clear	Bonds a wide range of materials including metals, plastics, and elastomers
LOCTITE® 406™	20	10	121/250	Clear	For plastics and elastomeric materials requiring very fast fixturing
LOCTITE® 431™	1,000	15	121/250	Clear	Bonds a wide range of materials including metals, plastics, and elastomers
LOCTITE® 454™	Gel	15	121/250	Clear	No-run viscosity for large gaps and vertical surfaces.
THERMALLY RESISTANT					
LOCTITE® 407™	35	20	110/230	Clear	High temperature, low viscosity for plastics, rubbers, and metals
LOCTITE® 4204™	4,000	75	121/250	Clear	Excellent hot strength and heat aging properties
LOCTITE® 4205™	Gel	90	121/250	Clear	For porous surfaces and vertical or overhead applications
ETHYL					
LOCTITE® 495™	45	5	121/250	Clear	Bonds rubber, metal, and plastic parts with gaps to 0.004 inch
METHYL					
LOCTITE® 496™	125	30	90/194	Clear	General purpose adhesive; suited to bonding metal substrates
ETHYL BUTYL					
LOCTITE® 4850™	375	15	50/122	Clear	Flexible and bendable; designed for difficult to bond materials
LOCTITE® 4851™	375	15	50/122	Clear	Flexible and bendable; designed for difficult to bond materials
CA/EPOXY HYBRID					
LOCTITE® HY 4090™	18,000	90	90/194	Off-white to Light Yellow	1:1 Mix ratio, 2 part system

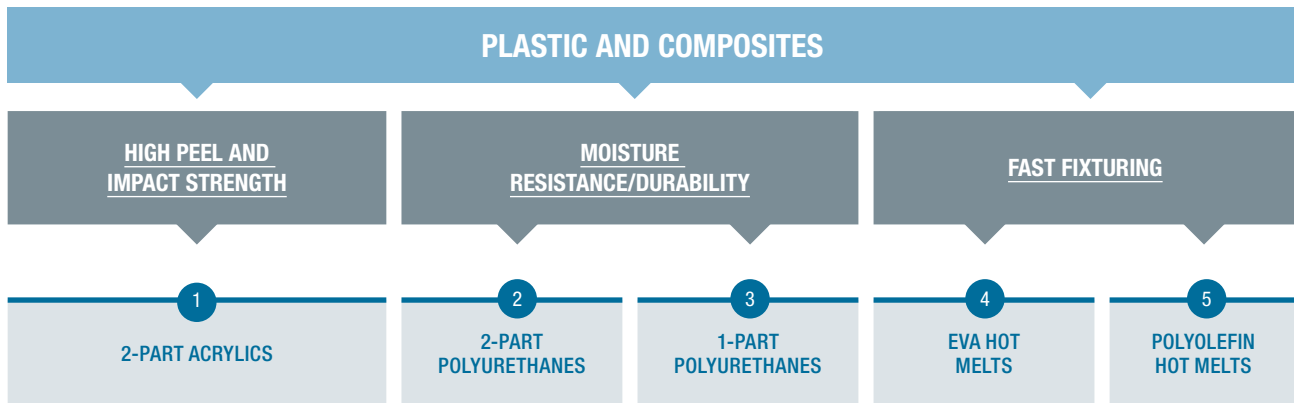
STRUCTURAL BONDING

Plastic and Composite Bonding

Henkel structural adhesives for plastic and composite surfaces bond a variety of materials, including fiber-reinforced plastic, gel coat, thermoset plastics, polycarbonate, ABS, PVC, polyethylene and polypropylene. They have been specially formulated to provide UV resistance, impact resistance, and peel resistance.

► BENEFITS

- Non-sag
- High temperature resistance
- Flexible bond strengths
- Toughened bond strengths
- Fast fixture time



1

2-PART ACRYLICS							
PRODUCT NO.	MIX RATIO (VOLUME)	MIX RATIO (WEIGHT)	MIXED VISCOSITY (mPas)	WORK LIFE (MINS.)	GLASS TRANSITION TEMPERATURE (°C/°F)	COLOR	DESCRIPTION
LOCTITE® AA H3151™	1:1	100:100	70,000	45	–	Light Yellow	High peel strength
LOCTITE® AA H3300™	1:1	100:100	110,000	5	–	Yellow	Plastic bonder, fast work time
LOCTITE® AA H4500™	10:1	100:10	45,000	15	107/225	Grey	Metal bonder
LOCTITE® AA H4800™	10:1	100:10	50,000	30	–	Light Yellow	Plastic bonder, impact resistant
LOCTITE® AA H8000™	10:1	100:12	190,000	30	71/160	Green	Aluminum metal bonder, long work time
LOCTITE® AA H8510™	10:1	100:10	45,000	30	85/185	Grey	Metal bonder, long work time
LOCTITE® AA H8600™	2:1	100:50	86,000	25	–	Blue	Galvanized steel metal bonder
LOCTITE® AA H8700™	2:1	100:56	40,000	40	88/190	Blue	Paint bake compatible

LEARN MORE:

This catalog lists the most common products used in each application. Many additional products are available. Not all products are available in all countries. Contact your Henkel representative for assistance.

2

2-PART POLYURETHANES

PRODUCT NO.	MIX RATIO (VOLUME)	MIX RATIO (WEIGHT)	MIXED VISCOSITY (mPas)	WORK LIFE (MINS.)	COLOR	DESCRIPTION
LOCTITE® UK U-05FL™	1:2	100:200	100,000	5	Off-white	Metal bonder, flexible
LOCTITE® UK U-09FL™	1:1	100:91	5,000	10	Ultra Clear	Plastic bonder, flexible
LOCTITE® UK 3497™	1:1	100:102	24,000	3	White	21 CFR 175.105
LOCTITE® UK 1351™ B25 / UK 5452™	2:1	100:40	450,000	50	Green	Composite bonder, toughened
LOCTITE® UK 1366™ B10 / UK 5452™	4:1	100:22	450,000	30	Green	Metal bonder, flexible
LOCTITE® UK 8445™ B1 / UK 5400™	4:1	100:22	6,500	1	Beige	Used in top lid bonding
LOCTITE® UK 8119™ B1 / UK 5400™	3:1	100:25	3,000	45	Beige	Used in top lid bonding
LOCTITE® UK 8103™ B10 / UK 5400™	3.7:1	100:20	9,000	10	Beige	Used to manually repair PUR foam defects

3

1-PART POLYURETHANES

PRODUCT NO.	SKIN OVER TIME (MINS.)	FIXTURE TIME (MINS.)	COLOR	DESCRIPTION
LOCTITE® 3370™	25	90	Black, Grey, White	Typically used on glass and metals.

4

EVA HOT MELTS

PRODUCT NO.	VISCOSITY AT DISPENSE TEMP. (mPas)	DISPENSE TEMP. (°C/°F)	SOFTENING POINT (°C/°F)	OPEN TIME (SECONDS)	COLOR	DESCRIPTION
TECHNOMELT® AS 236™	8,500	177/351	82/180	25	Clear	21 CFR 175.105
TECHNOMELT® AS 1942™	5,000	177/351	92/198	30	Tan	21 CFR 175.105
TECHNOMELT® CoolMelt	7,200	121/250	98/208	15	White	Typically used on EPS, plastic foam, polyethylene, and plastics.
TECHNOMELT® AS 8448™	1,100	177/351	110/230	15	Tan	Typically used in packaging. 21 CFR 175.105
TECHNOMELT® AS 3267™	5,000	170/338	118/244	–	Light Yellow	General assembly applications
TECHNOMELT® AS 9268™	15,000	170/338	86/187	50	White Transparent	General assembly applications
TECHNOMELT® AS 9268Y™	4,500	160/320	90/194	25	Yellow	General assembly applications
TECHNOMELT® AS 9270™	14,000	170/338	86/187	50	Translucent White	21 CFR 175.105

5

POLYOLEFIN HOT MELTS

PRODUCT NO.	VISCOSITY AT DISPENSE TEMP. (mPas)	DISPENSE TEMP. (°C/°F)	SOFTENING POINT (°C/°F)	COLOR	DESCRIPTION
TECHNOMELT® DM 200E™	12,000	130/266	85/185	Yellow	Slot die applied

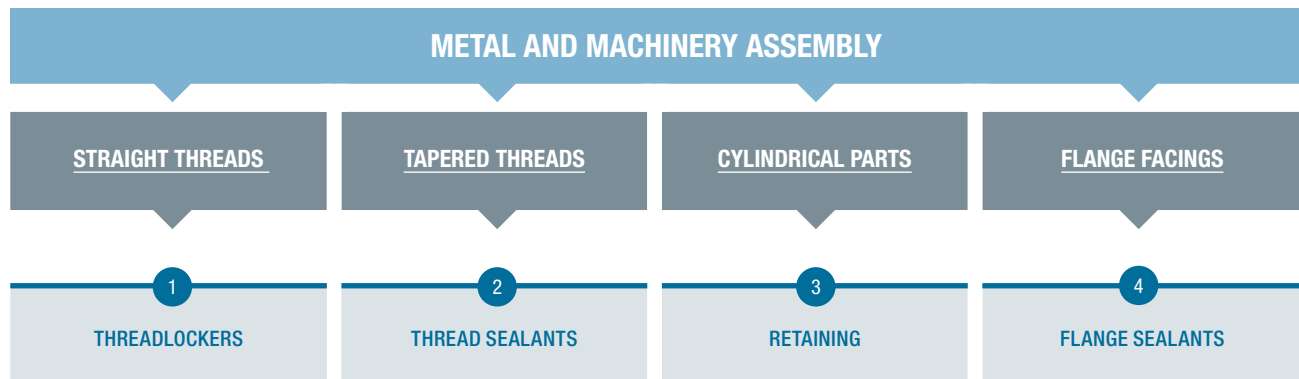
METAL AND MACHINERY ASSEMBLY

Increase Reliability

Henkel's wide range of LOCTITE® machinery adhesives replace mechanical locking and sealing methods and help manufacturers increase reliability and improve performance. Henkel can replace many traditional fasteners with versatile, reliable alternatives that have made previously difficult or cost-prohibitive designs possible.

► BENEFITS

- Prevent loosening from shock and vibration
- Strengthen assemblies
- Can be used on various sizes of fasteners – reduce inventory costs
- Long open time
- Single component – clean and easy to apply
- Seal and protect from leaks and corrosion



1 THREADLOCKING				
PRODUCT NO.	VISCOSITY (mPas)	FIXTURE TIME (MINS.)	COLOR	DESCRIPTION
REMOVABLE STRENGTH				
LOCTITE® 243™	1,300	10	Blue	NSF 61
PERMANENT STRENGTH				
LOCTITE® 263™	400	10	Red	High temperature performance and oil tolerant
LOCTITE® 270™	400	10	Green	NSF P1
WICKING GRADE				
LOCTITE® 290™	25	20	Green	NSF 61
LOCTITE® 294™	30	20	Green	Service temperatures up to 232°C/450°F

LEARN MORE:

This catalog lists the most common products used in each application. Many additional products are available. Not all products are available in all countries. Contact your Henkel representative for assistance.

2

THREAD SEALING				
PRODUCT NO.	TYPICAL USE	VISCOSITY (mPas)	COLOR	DESCRIPTION
LOCTITE® 542™	Small thread gaps	600	Brown	Medium strength
LOCTITE® 554™	Refrigerant sealant	2,500	Red	High strength
LOCTITE® 565™	Controlled strength	300,000	White	General-purpose sealant
LOCTITE® 567™	Stainless steel and inactive metals	540,000	White	Ideal for stainless steel and all other metal fittings
LOCTITE® 5770™	High temperature	paste	White	Service temperatures to 277°C/531°F

3

RETAINING						
PRODUCT NO.	TYPICAL USE	VISCOSITY (mPas)	GAP FILL (IN.)	FIXTURE TIME (MINS.)	COLOR	DESCRIPTION
LOCTITE® 603™	Close fit	125	0.005	10	Green	Prevents fretting and corrosion
LOCTITE® 620™	High temperature	8,500	0.008	60	Green	Service temperatures -54°C/-65°F to 232°C/450°F
LOCTITE® 638™	Primerless, oil tolerant, slip fit	2,500	0.01	4	Green	Cures on metals without an activator
LOCTITE® 641™	Removable strength	525	0.008	20	Yellow	Controlled-strength retaining
LOCTITE® 648™	Primerless, oil tolerant, close fit	500	0.006	3	Green	Cures on metals without an activator
LOCTITE® 680™	Primerless, oil tolerant, slip fit	1,250	0.015	4	Green	Best resistance to dynamic, axial and radial loads

4

FLANGE SEALANTS					
PRODUCT NO.	TYPICAL USE	VISCOSITY (mPas)	GAP FILL (IN.)	COLOR	DESCRIPTION
LOCTITE® 510™	High temperature	188,000	0.01	Red	Service temperatures -54°C/-65°F to 204°C/399°F
LOCTITE® 515™	Flexible	275,000	0.01	Purple	UL 1356
LOCTITE® 518™	Aluminum and all metals	800,000	0.01	Red	NSF 61
LOCTITE® 5188™	Highly flexible	14,000	0.005	Red	Use on rigid metal flanged connections

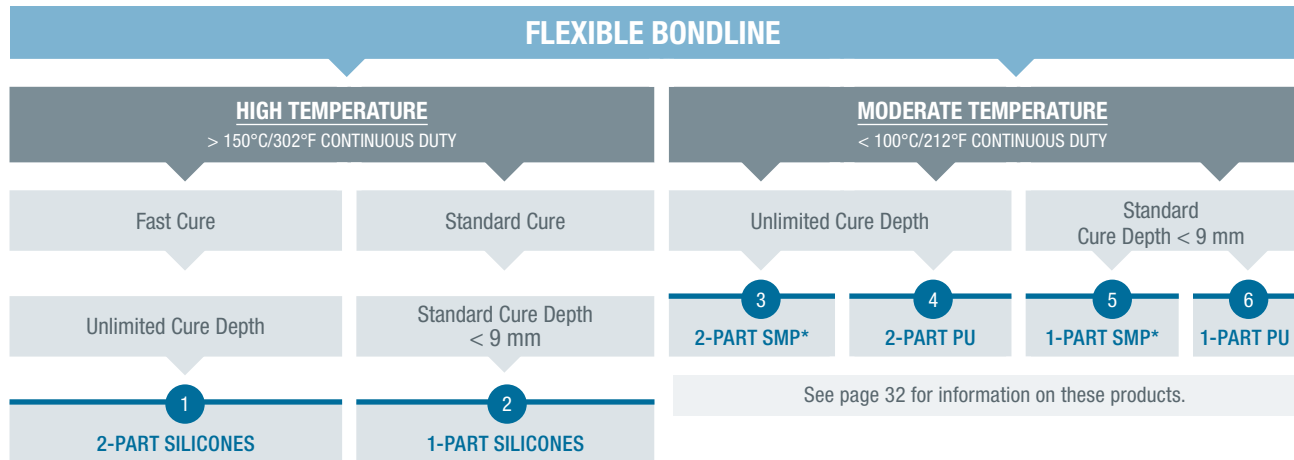
GLASS BONDING

Dependable Bonding

The use of glass and tempered glass is becoming more popular in the manufacture of HVAC equipment. Glass provides a smooth, durable, easy-to-clean surface that provides structural properties. Glass also withstands temperature extremes and thermal cycling with minimal distortion. Connections between the glass and metals and plastics are easily achieved with adhesives. The goal is to provide a long-term, reliable bond and seal between the components. Several types of adhesives meet these challenges.

► BENEFITS:

- Silicones seal against moisture and solvents and withstand high temperatures.
- Silane modified polymers (SMPs) provide strong, resilient bonds to many substrates without a primer.
- Polyurethanes bond a wide variety of materials, including most metals, plastics and composites.
- Light cure acrylics are excellent for bonding glass, metals and plastics for thin or transparent bondlines.



* Silane Modified Polymers

SURFACE TREATMENT		
PRODUCT NO.	TYPE	NOTES
TEROSON® SB 450™	Cleaner & adhesion promoter	Used on plastics and coated metal surfaces to promote the adhesion of silane modified polymers and silicones.

LEARN MORE:

This catalog lists the most common products used in each application. Many additional products are available. Not all products are available in all countries. Contact your Henkel representative for assistance.

1

2-PART SILICONES – HIGH TEMPERATURE, FLEXIBLE BOND LINES

PRODUCT NO.	MIX RATIO (VOLUME)	MIX RATIO (WEIGHT)	WORK LIFE (MINS.)	SKIN OVER TIME (MINS.)	FIXTURE TIME (MINS.)	COLOR	DESCRIPTION
LOCTITE® SI 5600™	2:1	100:66	1	2	5	Black, Grey, Almond	UL 746C, 180°C/356°F
LOCTITE® SI 5604™	4:1	100:33	2	4	10	Black, Grey, Almond	UL 746C, 180°C/356°F
LOCTITE® SI 5607™	2:1	100:67	6	30	20	Grey	Extended working life
LOCTITE® SI 5610™	2:1	100:67	2	3	5	Black	Service temperature up to 180°C/356°F
LOCTITE® SI 5612™	4:1	100:34	6	22	30	Red	Service temperature up to 220°C/428°F
LOCTITE® SI 5615™	2:1	100:66	5	12	12	Black	Service temperature up to 180°C/356°F
LOCTITE® SI 5616™	2:1	100:66	5	21	13	White	Service temperature up to 180°C/356°F
LOCTITE® SI 5618™	10:1	100:7	4	10	14	Black	Fast work life

2

1-PART SILICONES – HIGH TEMPERATURE, FLEXIBLE BOND LINES

PRODUCT NO.	CURE TYPE	SKIN OVER TIME (MIN.)	ELONGATION %	SHORE HARDNESS	TEMP. RESISTANCE (°C/°F)	COLOR	DESCRIPTION
LOCTITE® SI 593™	Acetoxy	60	>300	A18	200/392	Black	UL94 HB; UL746C, 180°C/356°F
LOCTITE® SI 595™	Acetoxy	30	>275	A14	200/392	Clear	NSF 51, UL 94HB
LOCTITE® SI 587™	Neutral Cure Oxime	30	>350	A32	260/500	Blue	Neutral cure oxime. Service temperature up to 260°C/500°F
LOCTITE® SI 596™	Acetoxy	60	>300	A18	315/599	Red	Service temperature to 315°C/599°F
LOCTITE® SI 598™	Neutral Cure Oxime	25	>325	A32	300/572	Black	Neutral cure oxime. Service temperature -54°C/-65°F to 260°C/500°F
LOCTITE® SI 5011™ CL	Neutral Cure Oxime	20	>300	A20	260/500	Clear	Neutral cure oxime
LOCTITE® SI 5039™	UV Cure/ Acetoxy	20	>150	A40	177/351	Light Yellow Translucent	Dual cure RTV & UV / visible light
LOCTITE® SI 5248™	UV Cure / Neutral Cure Alkoxy	11	> 135	A25	250/482	Light Straw Translucent	Dual cure RTV & UV light
LOCTITE® SI 5331™	Acetoxy	5	–	–	150/302	White	NSF P1. Typically used as a thread sealant on plastic pipe threads
LOCTITE® SI 5368™	Acetoxy	5	435	A26	250/482	Black	Service temperature up to 250°C/482°F
LOCTITE® SI 5398™	Acetoxy	8	200	A35	350/662	Red	Service temperature up to 350°C/662°F
LOCTITE® SI 5900™	Neutral Cure Oxime	15	>400	A38	260/500	Black	NSF P1. Neutral cure oxime
LOCTITE® SI 5905™	Neutral Cure Oxime	20	>250	A39	260/500	Black, White	Neutral cure oxime
LOCTITE® SI 5920™	Neutral Cure Oxime	20	>350	A30	350/662	Copper	Neutral cure oxime. Service temperature up to 350°C/662°F

GLASS BONDING

FLEXIBLE BONDLINE

HIGH TEMPERATURE

> 150°C/302°F CONTINUOUS DUTY

Fast Cure

Standard Cure

Unlimited Cure Depth

Standard Cure Depth
< 9 mm

1

2-PART SILICONES

2

1-PART SILICONES

MODERATE TEMPERATURE

< 100°C/212°F CONTINUOUS DUTY

Unlimited Cure Depth

Standard
Cure Depth < 9 mm

3

2-PART SMP*

4

2-PART PU

5

1-PART SMP*

6

1-PART PU

See page 31 for information on these products.

* Silane Modified Polymers

3

2-PART SILANE MODIFIED POLYMERS – MODERATE TEMPERATURE, FLEXIBLE BONDLINES

PRODUCT NO.	MIX RATIO (VOLUME)	MIX RATIO (WEIGHT)	WORK LIFE (MINS.)	SKIN OVER TIME (MINS.)	FIXTURE TIME (MINS.)	COLOR	DESCRIPTION
TEROSON® MS 650™	10:1	10:1	2	5	10	Black	Service temperature -40°C/-40°F to 90°C/194°F
TEROSON® MS 5590™	1:1	1:1	8	30	60	Black	Service temperature -40°C/-40°F to 100°C/212°F
TEROSON® MS 9399™	1:1	1:1	8	20	90	Black, Grey, White	Service temperature -40°C/-40°F to 100°C/212°F

4

2-PART POLYURETHANES – RIGID BONDLINE, BOND AND SEAL

PRODUCT NO.	MIX RATIO (VOLUME)	MIX RATIO (WEIGHT)	MIXED VISCOSITY (mPas)	WORK LIFE (MINS.)	COLOR	DESCRIPTION
LOCTITE® UK U-05FL™	1:2	100:200	100,000	5	Off-white	Metal bonder, flexible
LOCTITE® UK U-09FL™	1:1	100:91	5,000	10	Ultra Clear	Plastic bonder, flexible
LOCTITE® UK 3497™	1:1	100:102	24,000	3	White	21 CFR 175.105
LOCTITE® UK 1351™ B25 / UK 5452™	2:1	100:40	450,000	50	Green	Composite bonder, toughened
LOCTITE® UK 1366™ B10 / UK 5452™	4:1	100:22	450,000	30	Green	Metal bonder, flexible
LOCTITE® UK 8445™ B1 / UK 5400™	4:1	100:22	6,500	1	Beige	Used in top lid bonding
LOCTITE® UK 8119™ B1 / UK 5400™	3:1	100:25	3,000	45	Beige	Used in top lid bonding
LOCTITE® UK 8103™ B10 / UK 5400™	3.7:1	100:20	9,000	10	Beige	Used to manually repair PUR foam defects

LEARN MORE:

This catalog lists the most common products used in each application. Many additional products are available. Not all products are available in all countries. Contact your Henkel representative for assistance.

5

1-PART SILANE MODIFIED POLYMERS – MODERATE TEMPERATURE, FLEXIBLE BONDLINES

PRODUCT NO.	SKIN OVER TIME (MINS.)	ELONGATION %	HARDNESS (SHORE A)	COLOR	DESCRIPTION
TEROSON® MS 930™	20	250	A30	Black, Grey, White	Service temperature -50°C/-58°F to 80°C/176°F
TEROSON® MS 935™	10	230	A50	Black, Grey, White	Service temperature -40°C/-40°F to 100°C/212°F
TEROSON® MS 939™	6	250	A55	Black, Grey, White	Service temperature -40°C/-40°F to 100°C/212°F
TEROSON® MS 660™	4	230	A40	Transparent	Service temperature -30°C/-22°F to 80°C/176°F
TEROSON® MS 9360™	6	200	A60	Black	Service temperature -40°C/-40°F to 100°C/212°F
TEROSON® MS 9120™	8	250	A50	Black, Grey, White	Service temperature -30°C/-22°F to 100°C/212°F

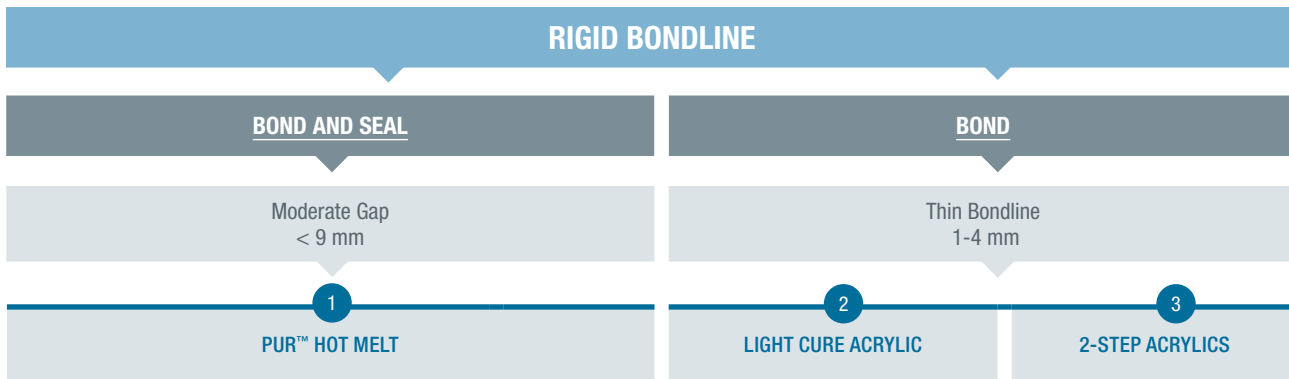
6

1-PART POLYURETHANES – MODERATE TEMPERATURE, FLEXIBLE BONDLINES

PRODUCT NO.	SKIN OVER TIME (MINS.)	FIXTURE TIME (MINS.)	COLOR	DESCRIPTION
LOCTITE® 3370™	25	90	Black, Grey, White	Typically used on glass and metals



GLASS BONDING



1

POLYURETHANE HOT MELTS – RIGID BONDLINE, BOND AND SEAL			
PRODUCT NO.	VISCOSITY AT DISPENSE TEMP. (mPas)	DISPENSE TEMP. (°C/°F)	HEAT RESISTANCE
TECHNOMELT® PUR™ 4661™	8,500	130/266	150°C/302°F
TECHNOMELT® PUR™ 4663™	10,000	130/266	150°C/302°F
TECHNOMELT® PUR™ 3460™	10,000	130/266	150°C/302°F
TECHNOMELT® PUR™ 3533 - 22™	10,000	130/266	–
TECHNOMELT® PUR™ 310™	7,500	120/248	150°C/302°F
TECHNOMELT® PUR™ 3631™	12,000	121/250	150°C/302°F

LEARN MORE:

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2

LIGHT CURE ACRYLICS – THIN BONDLINE / TRANSPARENT BONDLINE

PRODUCT NO.	VISCOSITY (mPas)	ELONGATION	HARDNESS (SHORE)	DESCRIPTION
UV / VISIBLE CURE				
LOCTITE® AA 3525™	15,000	260	D60	Typically used on glass, metal and thermosets.
LOCTITE® AA 3974™	2,400	100	A77	Typically used on thermoplastics, thermosets and glass.
LOCTITE® AA 3494™	6,000	190	D65	Typically used on glass and metals.
UV CURE				
LOCTITE® AA 3108™	5,100	330	A72	Typically used on thermoplastics, thermosets and glass.
LOCTITE® AA 302™	100	160	D68	Typically used on glass, metals and plastics.

3

2-STEP ACRYLICS – RIGID BONDLINE, SMALL GAP

PRODUCT NO.	VISCOSITY (mPas)	FIXTURE TIME (MINS.)	COLOR	DESCRIPTION
LOCTITE® AA 326™	17,000	1	Light Amber	Fast fixture
LOCTITE® AA 330™	67,500	5	Pale Yellow	NSF Category P1
LOCTITE® AA 331™	20,000	1	Cream	Fast fixture, service temperature to 176°C/349°F
LOCTITE® AA 332™	100,000	3	Amber	Service temperature to 204°C/399°F
LOCTITE® AA 392™	6,500	1	Amber	Fast fixture, dual cure activator/heat
LOCTITE® AA 3920™	10,000	0.5	Amber	Dual cure activator/UV
ACTIVATOR				
LOCTITE® SF 7387™	2		Transparent Yellow	Activator for 2-step acrylics 330, 331, 332, 392
LOCTITE® SF 7649™	2		Transparent Green	NSF 61, NSF Category P1. Activator for 2-step acrylic 326

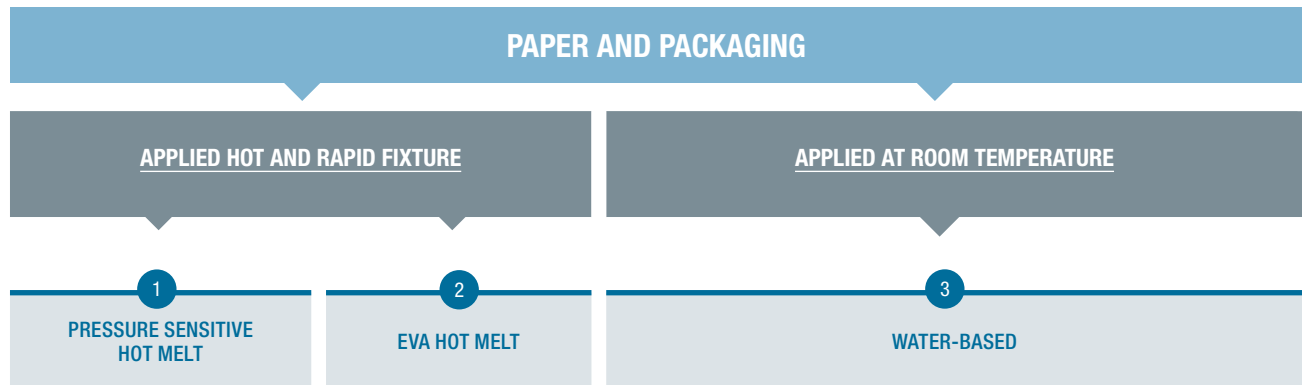
PAPER AND PACKAGING

Case and Carton Sealing

As a major supplier of packaging adhesives globally, Henkel provides a broad range of hot melt adhesives for case and carton sealing for every condition, substrate, process and budget. Henkel adhesives reduce or eliminate assembly line frustrations including throwing, stringing, downtime and rejects.

► BENEFITS

- **Functional:** Containers that provide protection during storage and transport
- **Economic:** A cost-effective component of the overall package
- **Sustainable:** Less adhesive consumption means fewer natural resources are consumed
- **Reliable:** Consistent performance, case after case



1					
PRESSURE SENSITIVE HOT MELTS					
PRODUCT NO.	VISCOSITY AT DISPENSE TEMP. (mPas)	DISPENSE TEMP. (°C/°F)	SOFTENING POINT (°C/°F)	COLOR	DESCRIPTION
TECHNOMELT® PS 8668™	36,000	177/351	140/284	Amber	Typically used in packaging. 21 CFR 175.105
TECHNOMELT® PS 8707™	4,000	180/356	110/230	Light Yellow	Transparent adhesive film
TECHNOMELT® PS 8845™	19,000	180/356	108/226	Yellow Amber	Slot die applied
TECHNOMELT® GA 003A™	8,400	150/302	97/207	Translucent	Typically used in labeling. 21 CFR 175.105

LEARN MORE:

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2

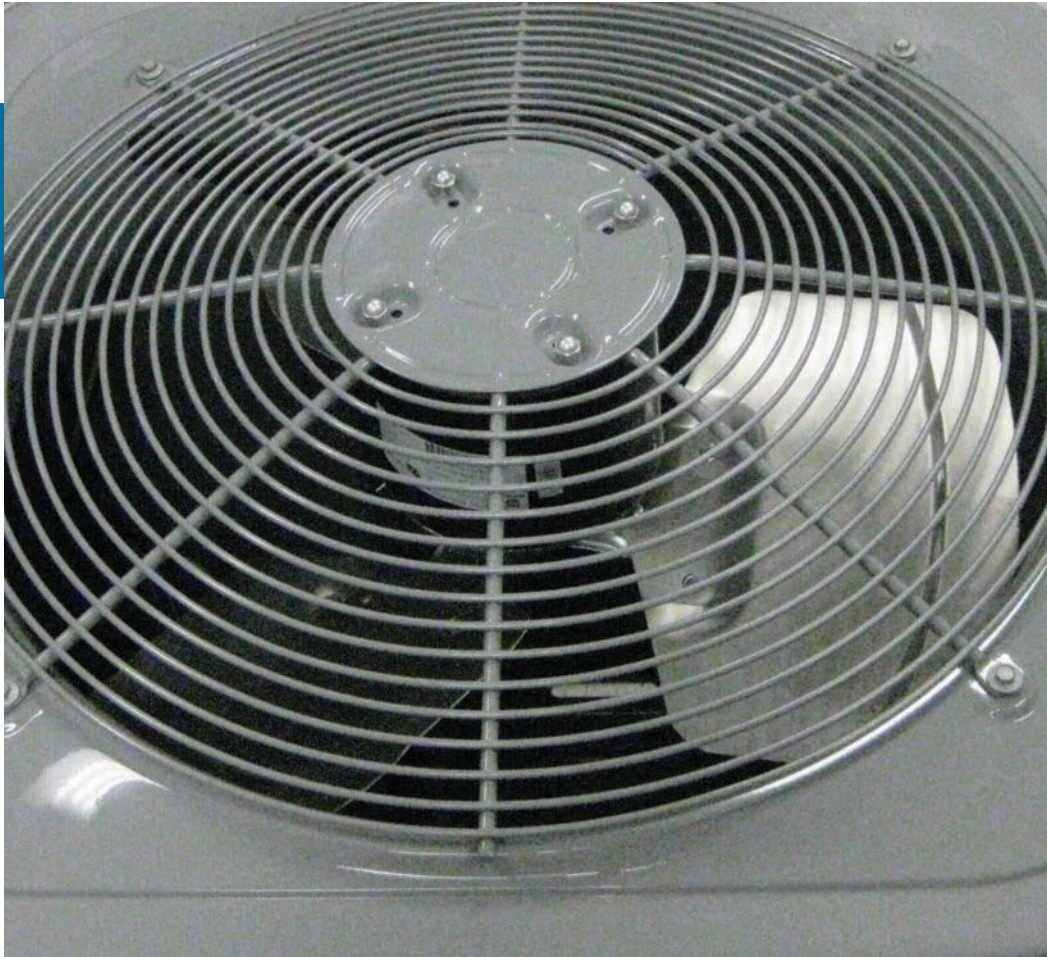
EVA HOT MELTS

PRODUCT NO.	VISCOSITY AT DISPENSE TEMP. (mPas)	DISPENSE TEMP. (°C/°F)	SOFTENING POINT (°C/°F)	OPEN TIME (SECONDS)	COLOR	DESCRIPTION
TECHNOMELT® AS 236™	8,500	177/351	82/180	25	Clear	21 CFR 175.105
TECHNOMELT® AS 1942™	5,000	177/351	92/198	30	Tan	21 CFR 175.105
TECHNOMELT® CoolMelt	7,200	121/250	98/208	15	White	Typically used on EPS, plastic foam, polyethylene, and plastics.
TECHNOMELT® AS 8448™	1,100	177/351	110/230	15	Tan	Typically used in packaging. 21 CFR 175.105
TECHNOMELT® AS 3267™	5,000	170/338	118/244	–	Light Yellow	General assembly applications
TECHNOMELT® AS 9268™	15,000	170/338	86/187	50	White Transparent	General assembly applications
TECHNOMELT® AS 9268Y™	4,500	160/320	90/194	25	Yellow	General assembly applications
TECHNOMELT® AS 9270™	14,000	170/338	86/187	50	Translucent White	21 CFR 175.105

3

WATER-BASED

PRODUCT NO.	VISCOSITY (mPas)	SOLIDS (%)	COLOR	DESCRIPTION
AQUEUCE® WL 0294™	8,500	44	Light Yellow	High performance, high tack wood assembly adhesive. UV indicator.
AQUEUCE® WL 3053™	1,500	54	White	General-purpose assembly and laminating. 21 CFR 175.105





FUNCTIONAL COATINGS

Solutions for Metal Pretreatment

Henkel offers a full range of solutions for the pretreatment of HVAC components to clean metal, promote paint adhesion, and improve corrosion resistance. Our solutions include conversion coatings for high-visibility surfaces, corrosion protection for high moisture areas, and cleaners for the removal of oils and greases.

FUNCTIONAL COATINGS AND METAL PRETREATMENT SOLUTIONS

THE HENKEL PORTFOLIO

CLEANERS

- ▶ Maintenance
- ▶ Process
- ▶ Industrial
- ▶ Speciality
- ▶ Pickles
- ▶ Strippers
- ▶ Alkaline
- ▶ Neutral
- ▶ Conditioners

BONDERITE® cleaners help to increase efficiency, lower operating costs, and simplify your daily processes.

METAL PRETREATMENT AND CONVERSION COATINGS

- ▶ Iron phosphate, zinc phosphate, manganese phosphate
- ▶ New generation coatings (nanoceramics)
- ▶ Light metal finishing (chrome, non-chrome technologies, anodizing)

BONDERITE® metal pretreatments and conversion coatings set a high standard for corrosion protection and paint adhesion. These high-performance, sustainable products can help improve your process reliability and are available in multiple options for dip or spray applications.



Henkel Process Services

Process selection

Henkel's experts consult with customers to match their individual requirements to the right Henkel process.

Analytic and process validation

Henkel analyzes the complete production process for customers, reducing production cycle times and rejection rates.

Start-up of application and lab testing

Henkel tests applications of your process in our labs and ensures that Henkel products can be smoothly integrated into your plant.

COATINGS

- ▶ Electroceramic coating
- ▶ Autophoretic coating
- ▶ Water-based primer

BONDERITE® coating processes deliver anti-corrosion, friction reduction, and improved heat resistance benefits while offering a number of environmental benefits.

Key Henkel Processes

Henkel's focus on innovation has led to the development of new, more efficient surface treatment processes that offer environmental benefits and reduced energy and CO₂.

- **Henkel Nanoceramic Process:**
Our **BONDERITE® Nanotechnology** conversion coating provides a phosphate-free alternative to traditional iron phosphate.
- **Henkel Autodeposition Process:**
Our **BONDERITE® M-PP** autodeposition process combines metal pretreatment and finishing in one process, increasing efficiency along with energy and cost savings.

Read more about these innovative processes on the following page.



Equipment

All our product solutions are supported by a full range of dispensing equipment that can be easily integrated into your existing manufacturing processes.

See page 48 for more information.

Process optimization

Henkel works with customers to design simpler and more efficient production processes, with a focus on meeting environmental and safety criteria.

Customer training

Henkel offers comprehensive training to help our customers understand our products in detail and learn correct application methods.

FUNCTIONAL COATINGS AND METAL PRETREATMENT SOLUTIONS

Henkel Nanotechnology Solutions

MORE SAVINGS, FEWER STEPS

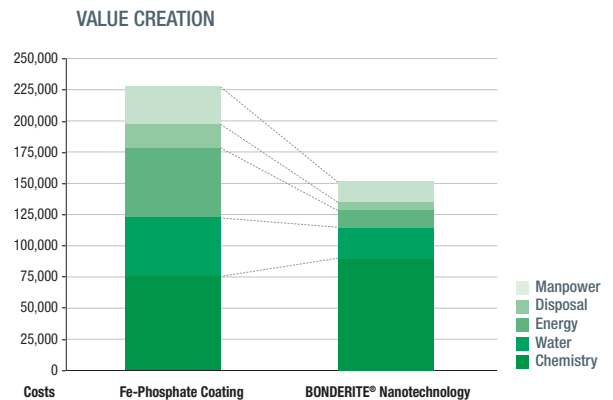
BONDERITE® Nanotechnology

The BONDERITE® Nanotechnology conversion coating is a single-part zirconium-based nanotechnology, which provides a phosphate-free alternative to traditional iron phosphate. It runs at low temperatures and is completely phosphate- and regulated heavy metal-free to reduce energy consumption and waste removal. BONDERITE® Nanotechnology is suitable for dip and spray applications.

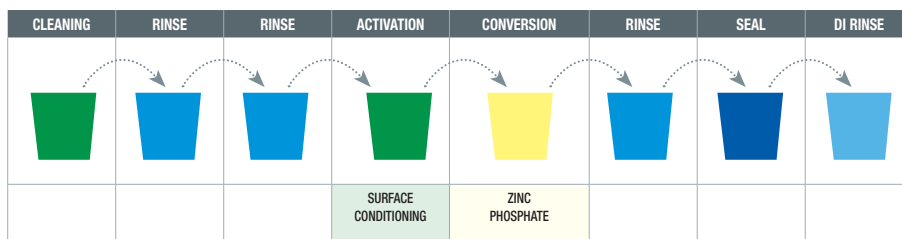
► BENEFITS

The Henkel Nanoceramic process offers significant savings in manpower, disposal, energy, and water cost savings compared to traditional processes:

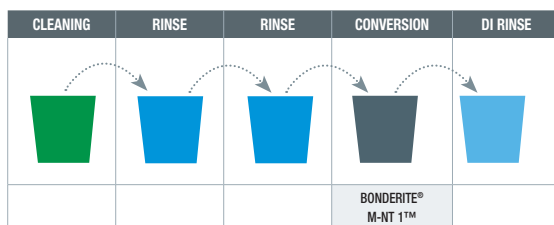
- **Lower energy and water use:** BONDERITE® Nanotechnology operates at ambient temperatures, reducing energy use and associated CO₂
- **Reduced hazardous waste:** Free of nickel, phosphates, VOCs and regulated chemicals
- **Marginal sludge formation:** Significant savings in hazardous waste generation
- **Fewer process steps:** Activation and passivation are no longer required; contact times are simultaneously reduced



► TRADITIONAL MULTI-STEP PROCESS



► HENKEL NANO CERAMIC PROCESS



Henkel Autodeposition Solutions

ENHANCED CORROSION PROTECTION FOR DEMANDING APPLICATIONS

BONDERITE® M-PP

The BONDERITE® Autodeposition process delivers a highly corrosion-resistant, thin organic coating, while increasing process efficiency over traditional finishing methods. It combines metal pretreatment and finishing in one process, providing a lasting finish – both inside and outside of parts.

► BENEFITS

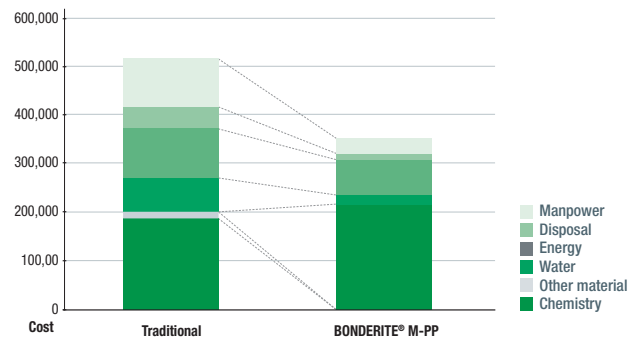
Henkel's Autodeposition process provides substantial savings compared to traditional e-coating methods:

- **Requires significantly less** manpower and equipment, less cycle time, energy, part rework, and handling
- **Reduced energy:** BONDERITE® M-PP and powder coating topcoats are “co-cured” in a single oven, significantly reducing energy requirements and the production footprint
- **Environmental benefits:** No toxic heavy metals, very low Volatile Organic Compounds (VOCs)

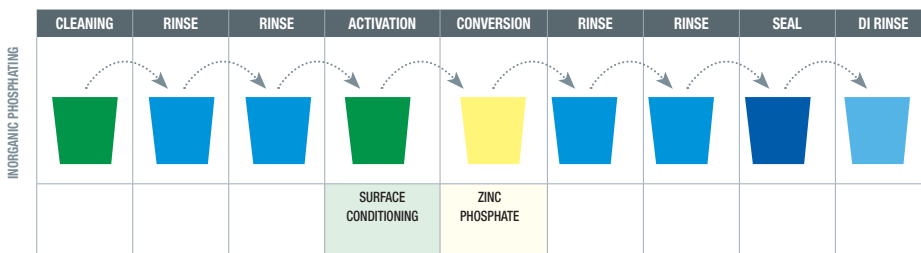
► PROCESS ADVANTAGES

- Unlimited throwing (wetting) power with uniform coverage
- Coats fully assembled parts
- Inside and outside part protection
- No electrical contacts required

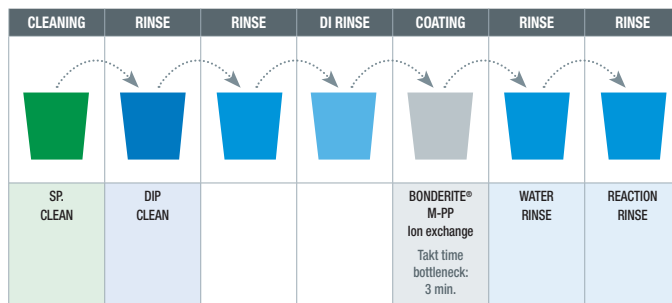
VALUE CREATION



► TRADITIONAL MULTI-STEP PROCESS



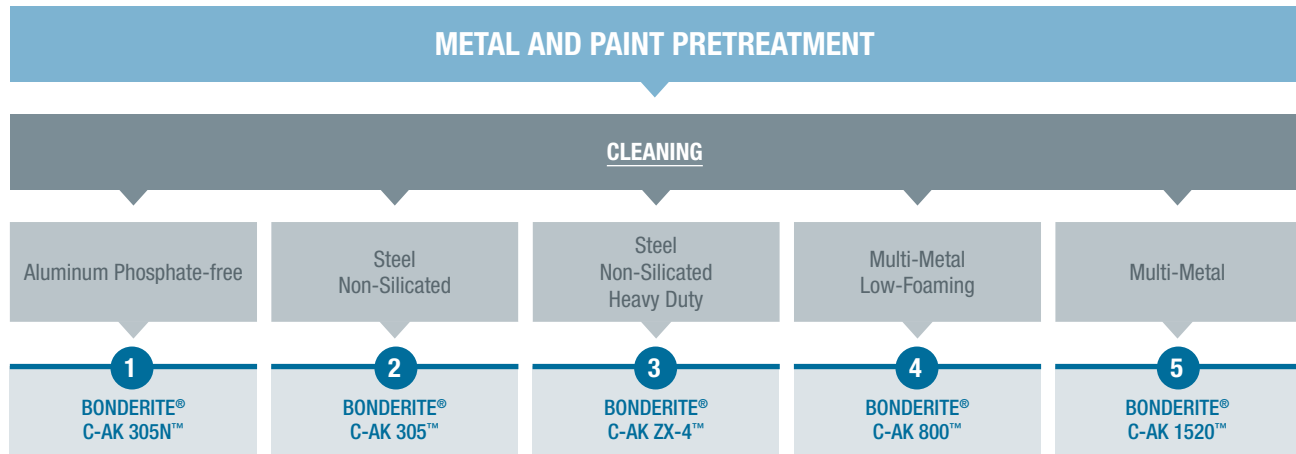
► HENKEL AUTODEPOSITION PROCESS



PRODUCT LINE SUPPORT

Henkel's BONDERITE® team is made up of chemists, engineers, application specialists and pilot plant facilities that can assist you in the evaluation, design and installation of autodeposition coating processes. For more information, please contact your Henkel representative for assistance.

FUNCTIONAL COATINGS AND METAL PRETREATMENT SOLUTIONS

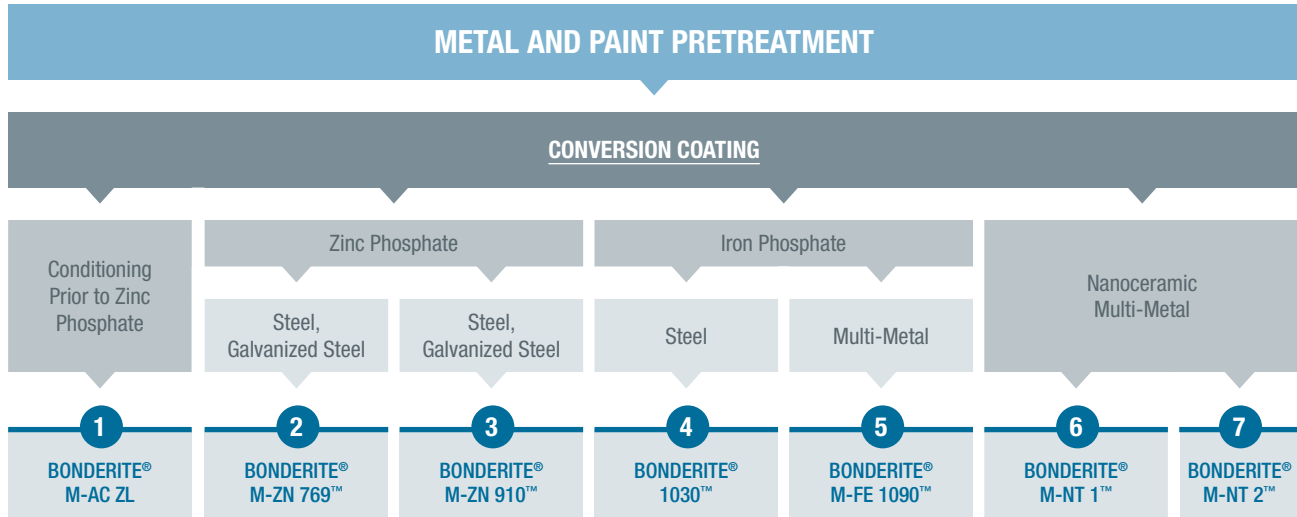


CLEANING – TYPICAL PROPERTIES

	PRODUCT NO.	APPLICATION TEMP.	CONCENTRATION BY VOLUME	CONTACT TIME	APPLICATION	ACID/ALKALINE
1	BONDERITE® C-AK 305N™	37°C–60°C 99°F–140°F	2–5%	30–120 sec.	Spray	Alkaline
2	BONDERITE® C-AK 305™	49°C–60°C 120°F–140°F	2–5%	30–120 sec.	Spray	Alkaline
3	BONDERITE® C-AK ZX-4™	49°C–60°C 120°F–140°F	2–5%	45–180 sec.	Spray	Alkaline
4	BONDERITE® C-AK 800™	49°C–60°C 120°F–140°F	2–5%	45–180 sec.	Spray	Alkaline
5	BONDERITE® C-AK 1520™	43°C–60°C 109°F–140°F	1–3%	60–180 sec.	Spray, immersion	Alkaline

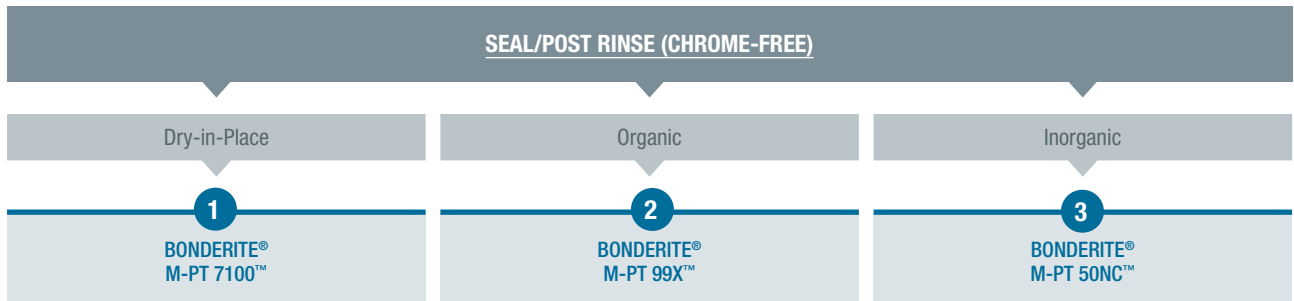
LEARN MORE:

This catalog lists the most common products used in each application. Many additional products are available. Not all products are available in all countries. Contact your Henkel representative for assistance.

**CONVERSION COATING – TYPICAL PROPERTIES**

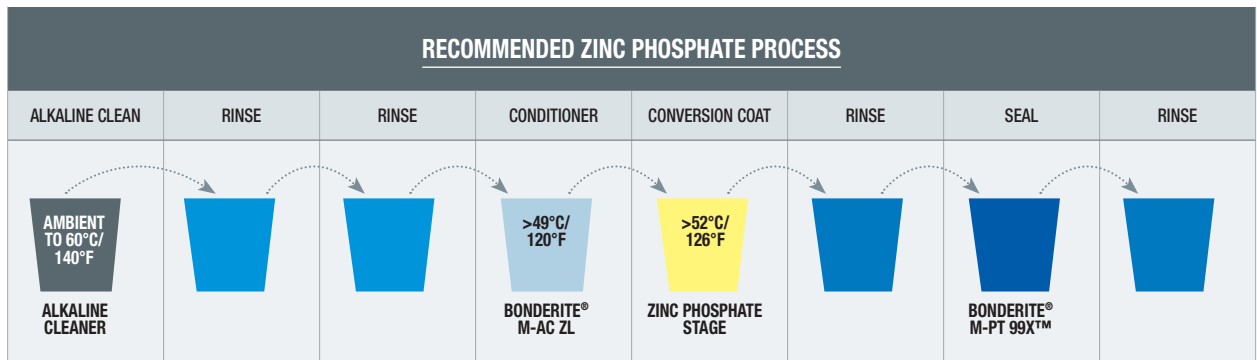
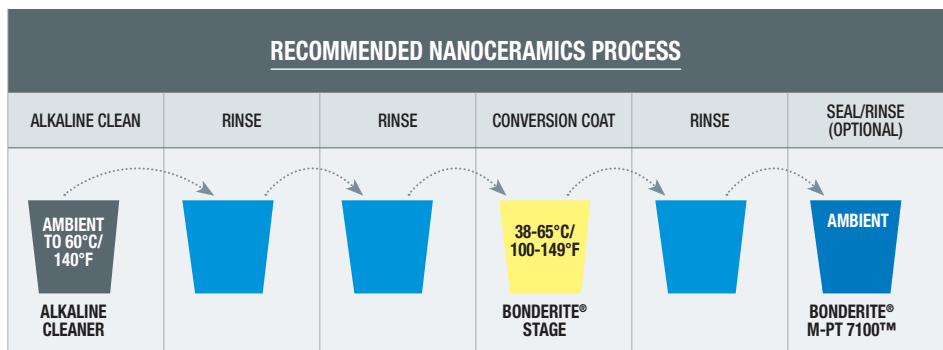
PRODUCT NO.	APPLICATION TEMP.	CONCENTRATION BY VOLUME	CONTACT TIME	APPLICATION	ACID/ALKALINE
CONDITIONING					
1	>49°C >120°F	0.25–1.0%	20–60 sec.	Spray, immersion	Alkaline
ZINC PHOSPHATE					
2	>52°C >126°F	1.5–3.0%	40–90 sec.	Spray, immersion	Acid
3	>52°C >126°F	2.50%	60–180 sec.	Spray	Acid
IRON PHOSPHATE					
4	38°C–49°C 100°F–120°F	3–4%	45–90 sec.	Spray	Acid
5	43°C–60°C 109°F–115°F	2–6%	30 sec. –5 min.	Spray, immersion	Acid
NANOCERAMIC MULTI-METAL					
6	Ambient	3–5%	20–120 sec.	Spray, immersion	Acid
7	Ambient	3–5%	20–120 sec.	Spray, immersion	Alkaline

FUNCTIONAL COATINGS AND METAL PRETREATMENT SOLUTIONS



SEAL/POST RINSE – TYPICAL PROPERTIES

	PRODUCT NO.	APPLICATION TEMP.	CONCENTRATION BY VOLUME	CONTACT TIME	APPLICATION	ACID/ALKALINE
1	BONDERITE® M-PT 7100™	Ambient	5-10%	5-15 sec.	Spray	Acid
2	BONDERITE® M-PT 99X™	Ambient	3%	20-120 sec.	Spray, immersion	Acid
3	BONDERITE® M-PT 50NC™	21°C–30°C 70°F–100°F	10%	15-60 sec.	Spray, immersion	Acid



LEARN MORE:

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AUTODEPOSITION PROCESS (PRETREATMENT AND FINISHING COMBINED)

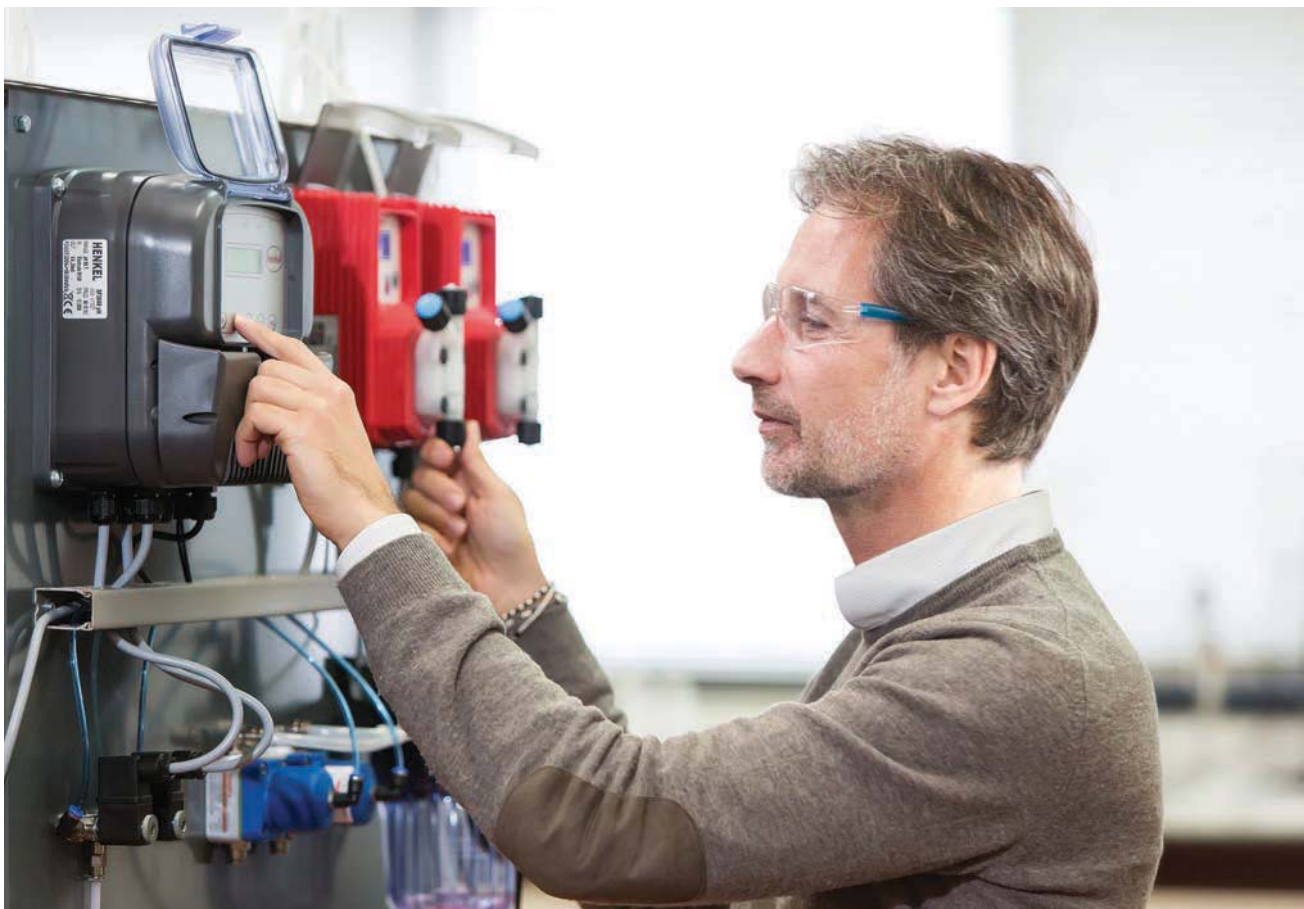
7-STAGE



AUTODEPOSITION PROCESS (PRETREATMENT AND FINISHING COMBINED) – TYPICAL PROPERTIES

	PRODUCT NO.	APPLICATION TEMP.	CONCENTRATION BY VOLUME	CONTACT TIME	APPLICATION	ACID/ALKALINE
1	BONDERITE® M-PP 866™	20-22°C 68-71°F	11-12%	90-120 sec.	Immersion	Acid
2	BONDERITE® M-PP 930™	20-22°C 68-71°F	11-12%	90-120 sec.	Immersion	Acid
3	BONDERITE® M-PP 935G™	20-22°C 68-71°F	10%	90-120 sec.	Immersion	Acid
4	BONDERITE® M-PP 966™	20-22°C 68-71°F	12%	60-180 sec.	Immersion	Acid

FUNCTIONAL COATINGS AND METAL PRETREATMENT SOLUTIONS



Functional Coating Equipment Solutions

Over the past 30 years, Henkel has designed, built and integrated advanced equipment solutions to optimize the application of metal pretreatment products, providing trusted, high quality services to our customers. We offer a complete line of application equipment, process controls, pretreatment support equipment and other specialty systems that can be easily integrated into your existing manufacturing processes.



Henkel's equipment systems include:

- **Process Control Systems:** Our LINEGUARD® control systems streamline process steps, increase efficiencies, and improve overall quality. We can demonstrate washer chemical savings of 10-25%, water usage savings of 5-30%, and quality improvements (reduced paint line rejections) of up to 10% after LINEGUARD® system installations.
 - Solid state
 - Programmable logic controller (PLC)
 - PC based logic controller
- **Pretreatment Support Equipment:** The right support equipment can maximize process efficiencies, recycle processing solutions for longer bath life, reduce fresh water requirements, and minimize waste loading.
 - Chemical metering pumps
 - Air diaphragm pumps
 - Level controls
 - Spray nozzles
 - Coalescing oil separators
 - Ion exchange
- **Test Equipment and Data Management Systems:** Essential for good manufacturing quality control, our test equipment and data management systems are developed in close collaboration with our customers and fully supported by our team of equipment engineers.
- **Equipment field service support**
- **Customized equipment solutions and systems**




BONDERITE® equipment package

BONDERITE® equipment supports the complete bath management process. Baths can be analyzed precisely, and adjusted efficiently or even automatically. Remote access and monitoring is also available.

► BENEFITS:

- Linear and constant bath management
- Improved coating quality
- Increased safety
- Process cost reduction
- Documented and recorded process parameters
- Monitoring of process costs and chemicals










EQUIPMENT & ENGINEERING SOLUTIONS






Dependable Equipment, High-Quality Services





Henkel provides a complete line of rugged and dependable dispensing systems for both one- and two-component adhesives and sealants. Our engineering services range from design and product development to simulated testing of the manufacturing process and dispensing trials. In a design-through-assembly partnership, no one adds value like Henkel.

EQUIPMENT SOLUTIONS








LOCTITE® PRODUCT		IDH NUMBER	USED TO DISPENSE	PACKAGE TYPES & SIZES	VISCOSITY RANGE	APPLICATION	CONSUMABLES – DISPENSE ACCESSORIES
VOLUMETRIC DISPENSING	BOTTLE DISPENSING						
		50 ml Hand Pump 250 ml Hand Pump	608966 88631	Retaining Compounds, Threadlockers	50 ml bottle 250 ml bottle	Low to Medium	Manual
VOLUMETRIC DISPENSING	TUBE DISPENSING						
		50 ml-F Tube Squeeze Dispenser	1083845	Thread Sealants, Gasketing Compounds	50 ml tubes	Low to High	Manual

LOCTITE® PRODUCT		IDH NUMBER	PRESSURE REGULATION	USED TO DISPENSE	PACKAGE TYPES & SIZES	VISCOSITY RANGE	LOW LEVEL SENSING	CONSUMABLES – DISPENSE ACCESSORIES	
PRESSURE TIME DISPENSING	BOTTLE DISPENSING								
		Integrated Semi-Automatic Dispenser	1390322	0 to 15 psi Viscosity >3,000 cP	Gel Adhesives, Instant Adhesives, Light Cure/Acrylics, Retaining Compounds, Threadlockers	250 ml bottle 1 lb. bottle 1 liter bottle 2 kg bottle 200 g squeeze tube	Low to Medium	Yes	Dispense Tips and Accessories
		1390321	0 to 100 psi Viscosity 0 to 3,000 cP	Medium to High			Yes		
		LOCTITE® BOND-A-MATIC® 3000 Dispenser	209685	0 to 15 psi	Gel Adhesives, Instant Adhesives, Light Cure Acrylics, Retaining Compounds, Threadlockers	250 ml bottle 1 lb. bottle 1 liter bottle 2 kg bottle 200 g squeeze tube	Low	No	
LOCTITE® BOND-A-MATIC® 3000 Dispenser		218323	0 to 100 psi	Medium to High			No		
	LOCTITE® Rotospray™ 9000 Applicator	The LOCTITE® Rotospray™ 9000 Applicator is a pneumatically powered applicator used for applying 360-degree beads of fluid on the inside diameter of any surface or threaded hole. Common materials applied are retaining compounds, threadlockers, activators/primers and oils. Common applications are engine cup plug sealing, bearing retaining and motor magnet bonding.							

LOCTITE® PRODUCT		IDH NUMBER	PRESSURE REGULATION	USED TO DISPENSE	PACKAGE TYPE & SIZES	VISCOSITY RANGE	LOW LEVEL SENSING	CONSUMABLES – DISPENSE ACCESSORIES	
SAUSAGE/CARTRIDGE DISPENSING	ONE-PART DISPENSING – PNEUMATIC								
		HD10 300 ml Pneumatic Cartridge Dispenser	1714379	0 to 60 psi	Gel Cyanoacrylates, Anaerobic Gasketing, Light Cure/Acrylics, Silicones	300 ml cartridges 250 ml tubes	Medium to High	No	
		Soft Press HandHeld Pneumatic Applicator	250052	0 to 125 psi	Adhesive Packaged in Soft Packs	Soft Pack	Low to High	N/A	582416 – Soft Press Pneumatic Applicator Nozzle (1)
		TEROSON® Multipress Telescopic Dispenser	142241	0 to 145 psi	Sprayable SMP Adhesives	300 ml cartridges	Low to High	N/A	547882 –Pneumatic Spray Applicator Nozzle Kit (12)
		TEROSON® Powerline II 300 ml Dispenser	960304	0 to 100 psi	MS Polymer Polyurethane	300/310 ml cartridges	Medium to Very High	N/A	Cartridge Accessories
	LOCTITE® PUMP-A- BEAD™ II Dispenser	209687	60 to 100 psi	LOCTITE® brand Flange Sealants	850 ml cartridges	Medium to High			

LOCTITE® PRODUCT		IDH NUMBER	USED TO DISPENSE	PACKAGE TYPE & SIZES	MIX RATIOS	VISCOSITY RANGE	TYPE	
DUAL CARTRIDGE DISPENSING	TWO-PART DISPENSING							
		50 ml Dual Cartridge Manual Applicators	720228	Two-Component Epoxies, Urethanes, Methacrylates	50 ml dual cartridge	1:1, 2:1, 4:1	Low to High	Manual
			1034026		S-50 dual cartridge	10:1		
		200 ml/400 ml Dual Cartridge Manual Applicators	218483	Two-Component Epoxies, Urethanes, Methacrylates	200 ml dual cartridge	1:1, 2:1	High to Paste	Manual
			218312		400 ml dual cartridge	1:1, 2:1		
			478600		490 ml dual cartridge	10:1		
		200 ml/400 ml Dual Cartridge Pneumatic Applicators	218315	Two-Component Epoxies, Urethanes, Methacrylates	200 ml dual cartridge	1:1, 2:1	High to Paste	Pneumatic
			218311		400 ml dual cartridge	1:1, 2:1		
			470572		490 ml dual cartridge	10:1		
		LOCTITE® DuraPump™ Programmable Meter Mix System	1041635	Two-Part Epoxies, Two-Part Polyurethanes, Two-Part Acrylics, Two-Part Silicones	Any, excluding dual cartridges	Custom	SHOT SIZE RANGE	
							0.2 ml up to 26 ml depending on ratio selected	

ADDITIONAL EQUIPMENT OFFERINGS

ROBOTIC SYSTEMS		Henkel offers a full line of bench top Gantry and Scara robots for all of your automation needs. These systems integrate directly with all of our LOCTITE® brand dispensing and curing equipment and allow manufacturers to reliably dispense difficult patterns onto complex surfaces with ease and efficiency.
DISPENSE VALVES, RESERVOIRS AND CONTROLLERS		Henkel features a robust line of precision dispense systems, valves, reservoirs and controllers specifically designed to meet various manufacturing needs for any handheld, bench top, stationary work cell or fully automated production process.
MIX NOZZLES		Henkel offers a comprehensive line of LOCTITE® precision mix nozzles, gasket rollers, dispense tips and syringe barrel components for all of your single-component or two-part adhesive dispensing needs.
DISPENSE TIPS, ROLLERS AND NEEDLES		
CUSTOM EQUIPMENT		Henkel specializes in high-quality customized equipment solutions for difficult applications. Our custom high-flow meter mix systems provide simple, accurate and reliable metering equipment. These systems are easy to use and ruggedly designed to keep maintenance to a minimum.
		Our customized high viscosity paste pump systems are specifically designed to dispense paste products packaged in 5-gallon open-top pails up to 55-gallon drums. Pump ratios can be tailored for pumping medium to high viscosity paste products.
		The LOCTITE® UV curing conveyor is a benchtop, ultraviolet curing conveyor that produces high-intensity ultraviolet energy in the UVA, UVB and UVC spectral region. This system can be integrated into an automatic or semiautomatic production line for cure-on-demand assembly.

For specific information on the equipment offered in the categories above or to see the full LOCTITE® equipment product line, please contact your local Henkel representative.

ENGINEERING EXPERTISE

Engineered for your applications

Henkel offers complete engineering services for projects demanding expertise and support beyond the limits of our standard technical services. Our engineers and scientists can provide the following value-added services:

- On-site engineering assistance
- Joint product development programs
- Prototype testing, fixture preparation and consultation
- Contract lab services and testing
- Custom formulations

Services:

Custom test fixtures and protocols: Henkel can perform an array of rigorous strength tests to determine whether the customer's application and the adhesive criteria can hold up. Custom test fixtures and protocols can be developed to meet specific end-use requirements.

Prototyping capability: Our prototyping capability can provide valuable data regarding the feasibility of full-scale manufacturing.

Durability and longevity testing: Our engineers can create environmental conditions that simulate and even exceed the most severe conditions. With heat aging, salt fog, humidity, and thermal cycling chambers, our engineers can provide manufacturers with confidence in the durability and longevity of an assembly in the field.

Additional Capabilities:

- Process Consultations
- Device Teardowns
- Custom Equipment
- Line Surveys
- Material Properties Testing
- Surface Analysis
- Process Optimization
- Equipment Support



Laboratory Evaluations:

- Adhesive bond strengths
- Threadlocking and thread sealing
- Gasketing and sealing
- Porosity sealing
- Bulk material properties
- Fluid immersion
- Accelerated aging
- Environmental exposure testing
- Robotic programming/dispensing

Robotics Lab

The robotics lab dispensing capabilities enable Henkel to utilize production-intent equipment for evaluation purposes. Various functions include:

- Full component assembly
- Potting and gasketing
- Conducting dispense studies for process optimization

► BENEFITS

- Simulates full manufacturing capabilities using production-intent equipment
- Full-scale UV and heat-cure equipment for small to large parts
- Dispense stations are able to be customized for small-scale testing to larger developmental validation test requirements
- Opportunity to dispense and test Henkel products on actual parts

Physical Testing Lab

Capabilities include:

- Evaluating bulk material properties of adhesives

► BENEFITS

- Ability to conduct mechanical testing according to standard test methods and OEM specifications
- Capable of low load to high capacity forces
- Variety of fixtures available for testing various substrates and conditions



For complete product testing and engineering support, partner with Henkel to identify and validate the best adhesive solutions for your application.

HENKEL CONSULTING EXPERTISE



In addition to offering a **broad product portfolio** in the adhesives industry, Henkel provides an array of services to help our HVAC customers **optimize** their manufacturing process, improve efficiency and **reduce** overall costs. The following services are available worldwide:



MANUFACTURING EXCELLENCE

Henkel has decades of success optimizing manufacturing processes. We can analyze your complete manufacturing process and provide tailor-made recommendations on how to reduce production cycle times and rejection rates, thereby lowering your overall costs and increasing your productivity.



LAB TESTING

Henkel's testing capabilities can provide complete data on our product recommendations. Whether you want to analyze a single component of your production process or review the complete system, our labs can provide all the data you need.



CUSTOMER TRAINING

Henkel offers a wide selection of customized training programs to help customers learn the details of our product technologies and how to apply them effectively. We can also train you to use our custom- designed equipment efficiently. Our Technology Days provide additional training and demonstrations of our newest innovations.



VALUE CALCULATORS

Using our Value Calculators, our adhesives specialists can accurately analyze the total costs of your adhesive processes and determine your savings potential. Simply arrange an appointment with our specialists, and they will visit your production facilities to conduct an in-depth analysis.



ANALYTICAL SERVICES

Henkel provides comprehensive analysis of all steps in your manufacturing process using our own industry experts. We will identify problem points on the production line and recommend improvements to the manufacturing process. These services can also include equipment tear-downs, surface analysis, and testing.

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