LOCTITE®
BONDERITE®
TEROSON®

Adhesives, Sealants, Functional Coatings, Equipment and Services

Agricultural & Construction Equipment Solutions

Henkel Excellence is our Passion

Henkel.

Improving your designs, understanding your challenges

PROVEN SOLUTIONS FOR ALL YOUR NEEDS –
TODAY AND TOMORROW

Manufacturers of agricultural and construction equipment face daily challenges – reducing costs, improving efficiency, and increasing innovation, 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. You also need a partner who can help you maintain your high quality while developing advanced new products.

Henkel, the leading solutions provider for adhesives, sealants and functional coatings worldwide, offers much more than quality adhesives. With our history and experience in the industry, our experts can help you find ways to optimize your manufacturing processes and drive down costs. We can help you reduce weight, increase durability and enhance the reliability of your equipment. And we're continually developing innovations to help you succeed in the future.

Let us show you the value Henkel offers.

BROAD PRODUCT PORTFOLIO

to provide the optimum solution for your challenges.

CUSTOMER PARTNERSHIP

to help make your designs more reliable and durable, and to help improve your processes.

GLOBAL SUPPLY CHAIN

to maintain a reliable supply of products to our customers.

COMPREHENSIVE TESTING

10 R&D centers around the world for testing and analysis, staffed by 3,000 design and application professionals.

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.

CUSTOMIZED SOLUTIONS

We can customize our products to fit your exact requirements.

EQUIPMENT SOLUTIONS

that can be easily integrated into your manufacturing process.

INNOVATION

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

GLOBAL SUPPORT

no matter where in the world you're located.

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, as well as a full array of analytical and testing services.

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.

BODY SHOP

METAL

MACHINING, FORMING AND STAMPING

- Metalworking fluids

WELDING AND PREASSEMBLY

- Panel stiffening
- Seam sealing
- Structural bonding
- Anti-flutter assembly
- Anti-weld spatter
- Machinery adhesives

PAINT SHOP

METAL PRETREATMENT (FUNCTIONAL COATINGS)

- Cleaning
- Conditioning
- Conversion coating
- Rust prevention

PRIMER AND TOP COAT PAINTING

- Autodeposition coating
- Seam sealing
- Structural/elastic bonding

MACHINERY ADHESIVES

TRIM SHOP

POWERTRAIN

SUB-ASSEMBLIES AND INTERIOR

TRIM SHOP/ FINAL ASSEMBLY

- Vibration damping
- Sound absorption
- Structural/elastic bonding
- Window glazing
- Machinery adhesives

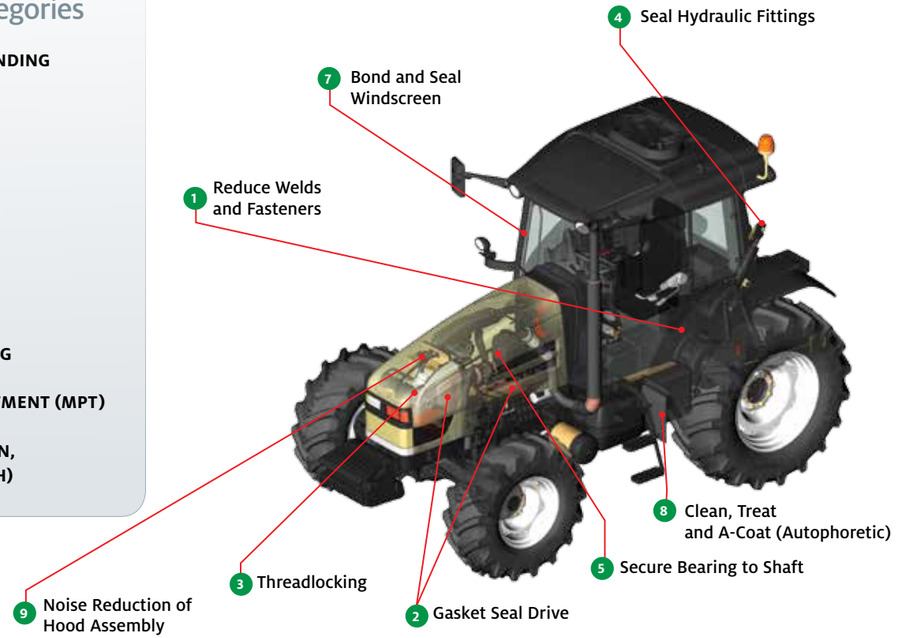
INSPECTION + TEST

ENGINEERING SERVICES • TESTING • ACOUSTICS LABS • ANALYTICAL SERVICES • TECHNICAL SEMINARS • TRAINING • GLOBAL SUPPORT

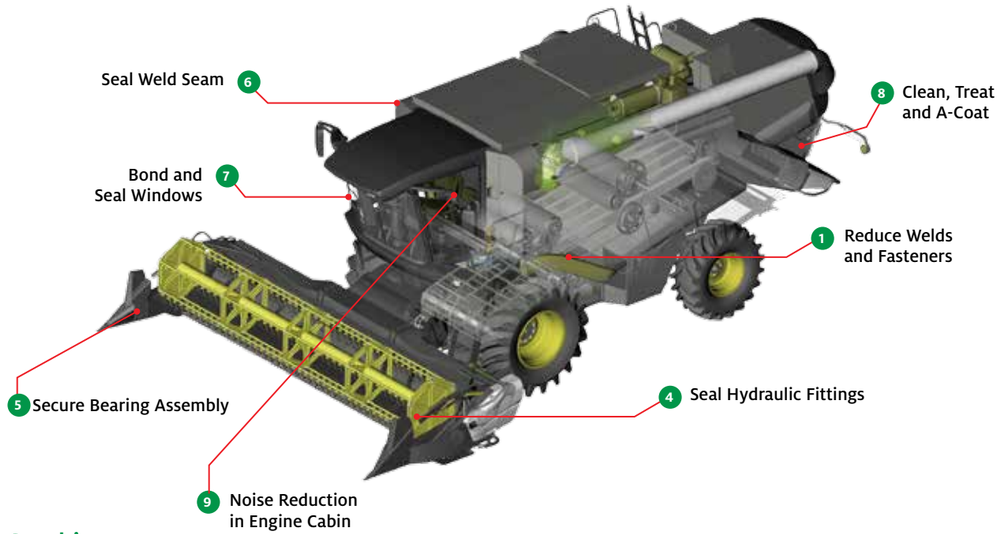
VEHICLE APPLICATIONS

Application Categories

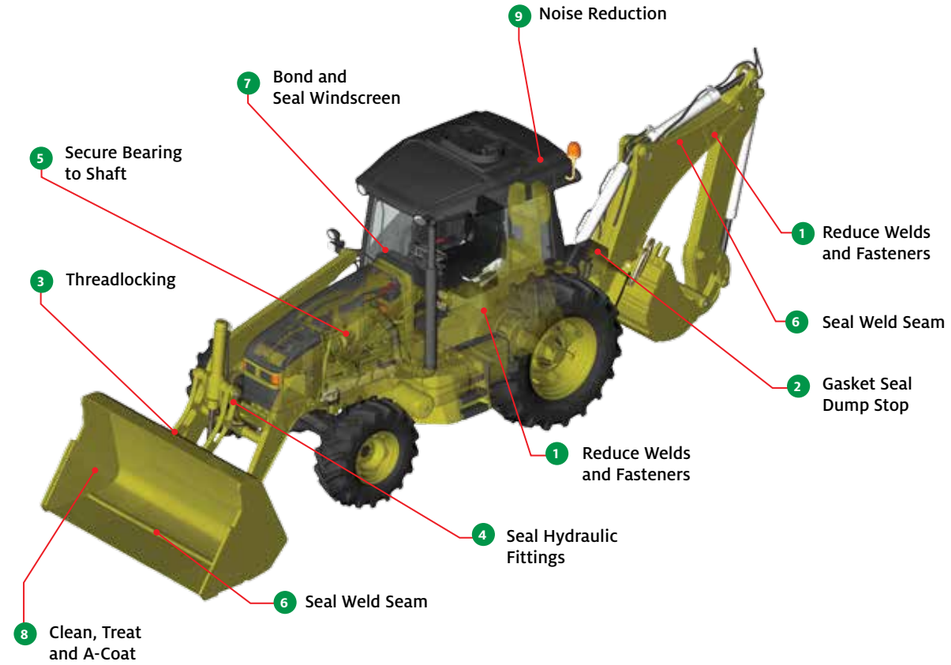
1. STRUCTURAL BONDING
2. GASKETING
3. THREADLOCKING
4. THREAD SEALING
5. RETAINING
6. SEAM SEALING
7. WINDOW GLAZING
8. METAL PRETREATMENT (MPT)
9. NOISE, VIBRATION, HARSHNESS (NVH)



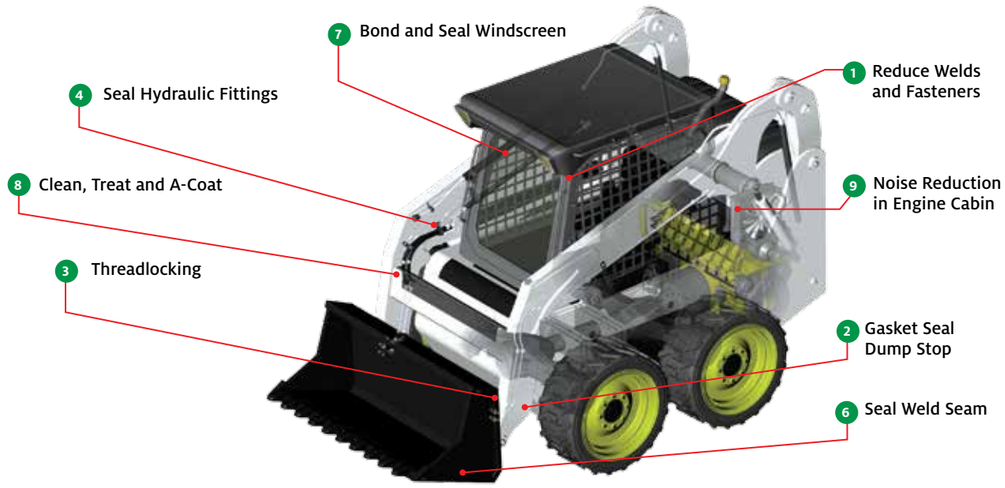
Tractors



Combines



Backhoes

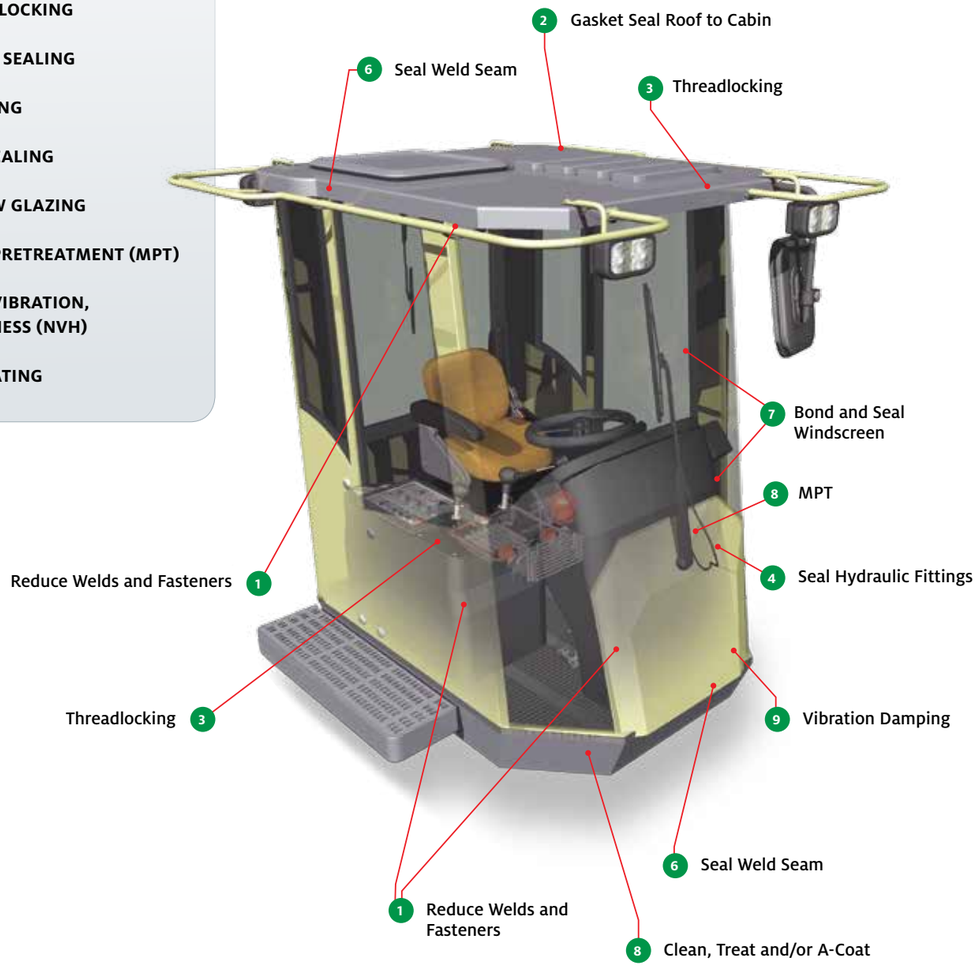


Skid Steers

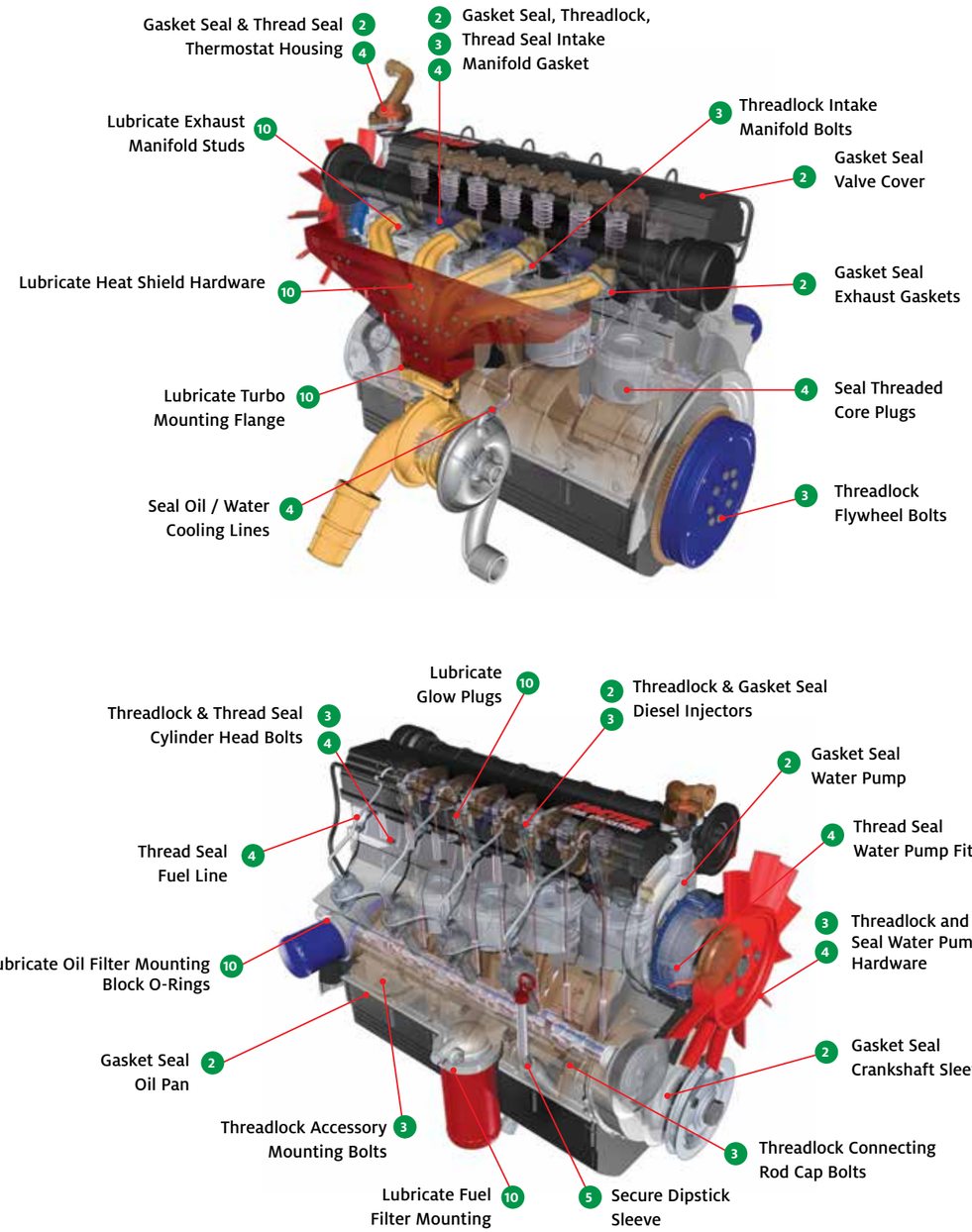
CABIN AND ENGINE APPLICATIONS

Application Categories

1. STRUCTURAL BONDING
2. GASKETING
3. THREADLOCKING
4. THREAD SEALING
5. RETAINING
6. SEAM SEALING
7. WINDOW GLAZING
8. METAL PRETREATMENT (MPT)
9. NOISE, VIBRATION, HARSHNESS (NVH)
10. LUBRICATING



Cabin Assemblies

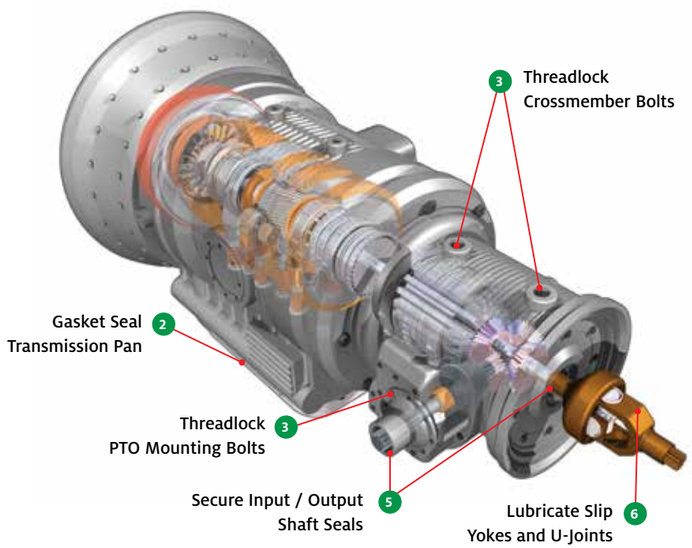


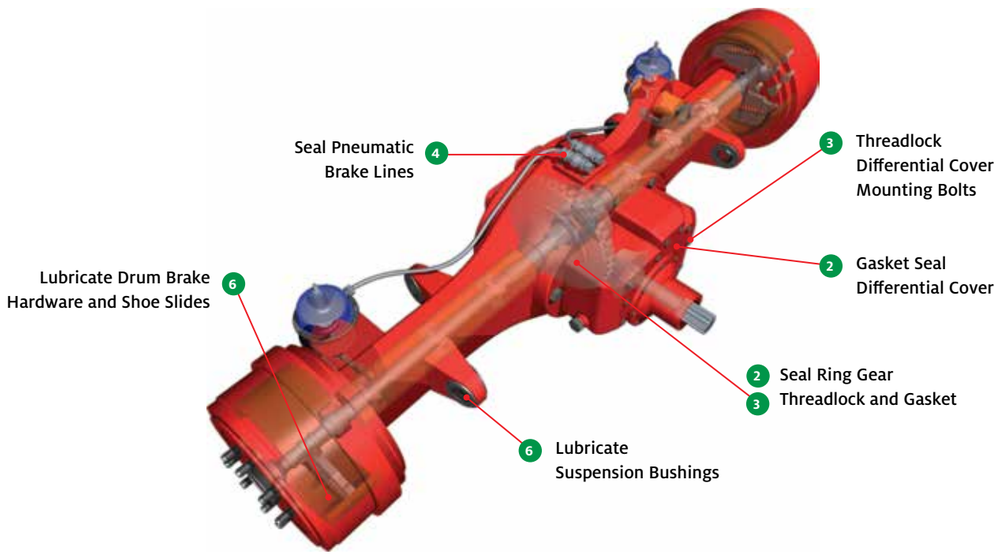
Engine Assemblies

SUBCOMPONENT APPLICATIONS

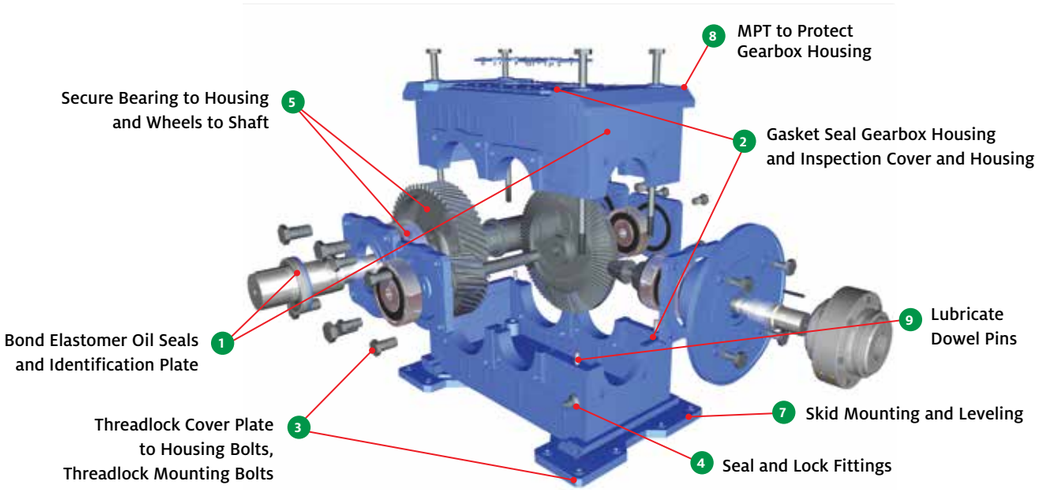
Application Categories

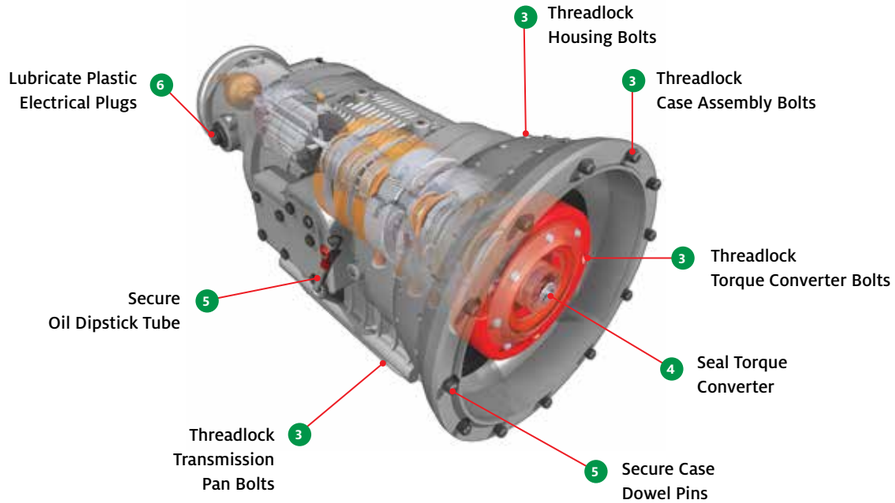
1. GENERAL BONDING
2. GASKETING
3. THREADLOCKING
4. THREAD SEALING
5. RETAINING
6. LUBRICATING
7. GROUTING
8. METAL PRETREATMENT (MPT)
9. ANTI-SEIZE





Axle/Differential Assemblies





Transmission Assemblies

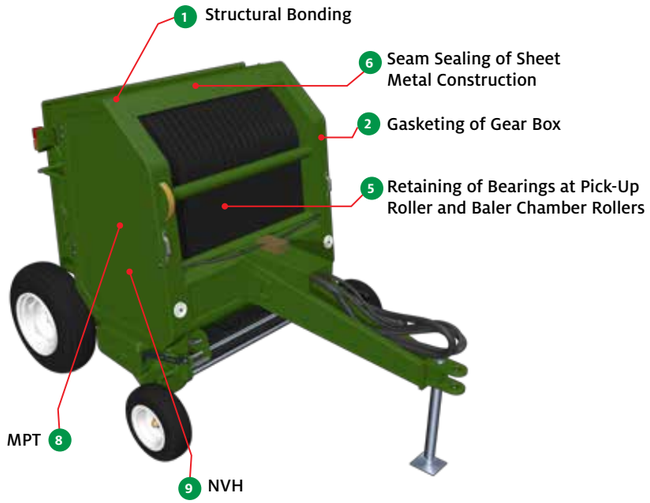
Gearbox Assemblies

ATTACHMENT APPLICATIONS

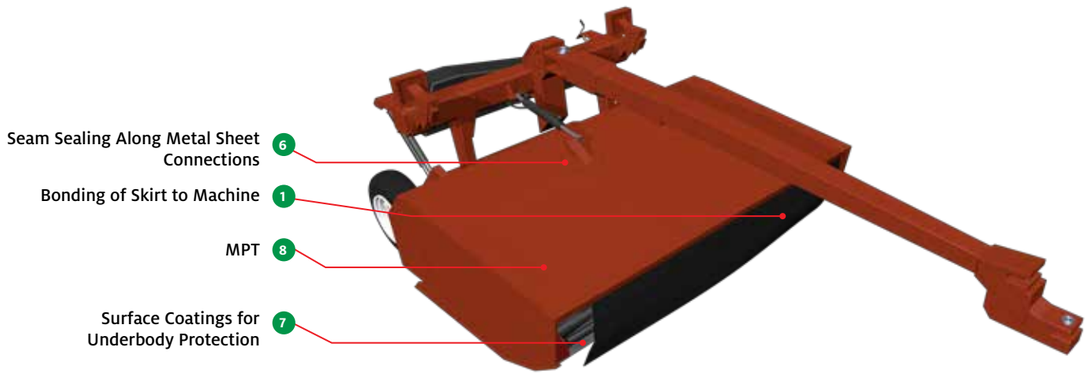
Application Categories

1. STRUCTURAL BONDING
2. GASKETING
3. THREADLOCKING
4. THREAD SEALING
5. RETAINING
6. SEAM SEALING
7. SURFACE COATINGS
8. METAL PRETREATMENT (MPT)
9. NOISE, VIBRATION, HARSHNESS (NVH)

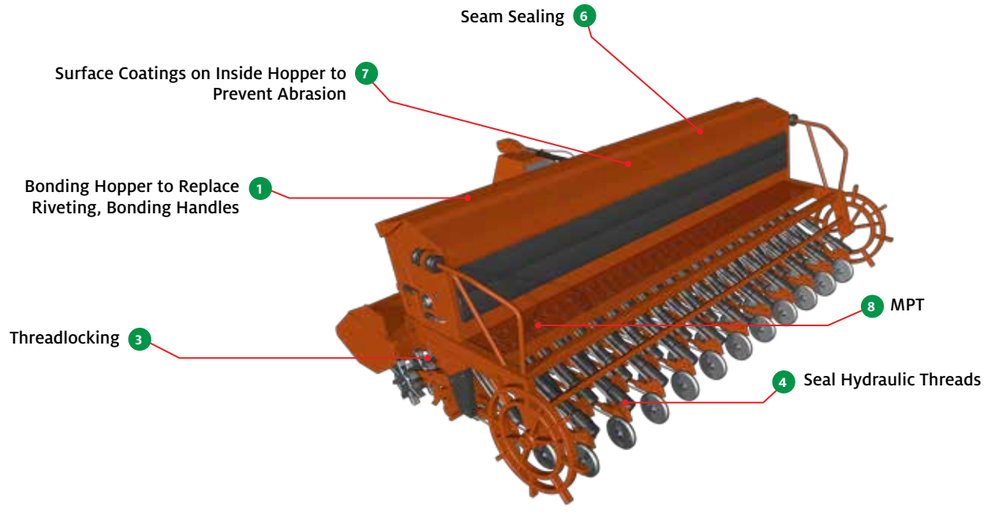
Balers



Mowers



Seed Drills



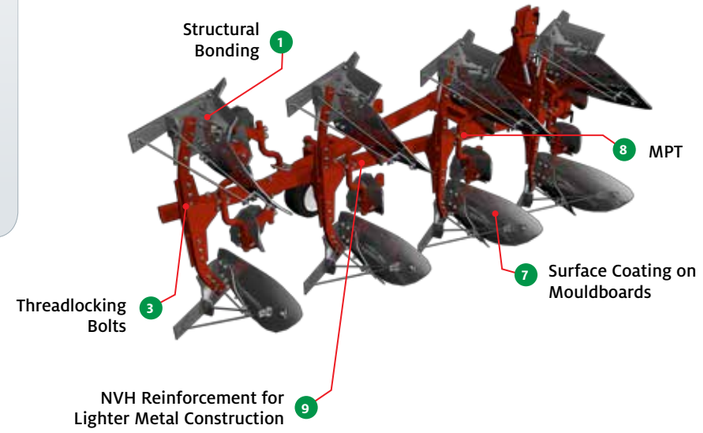
Harrows

ATTACHMENT APPLICATIONS

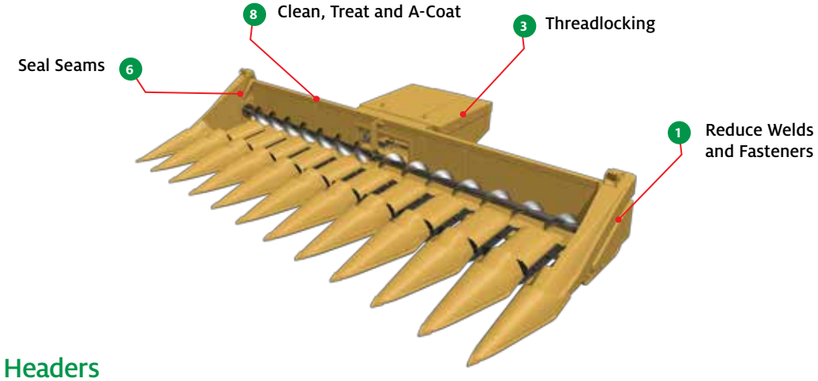
Application Categories

1. STRUCTURAL BONDING
2. GASKETING
3. THREADLOCKING
4. THREAD SEALING
5. RETAINING
6. SEAM SEALING
7. SURFACE COATING
8. METAL PRETREATMENT (MPT)
9. NOISE, VIBRATION, HARSHNESS (NVH)

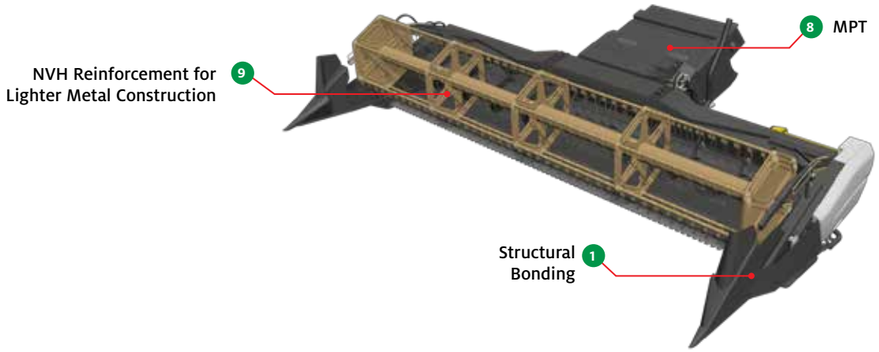
Plows



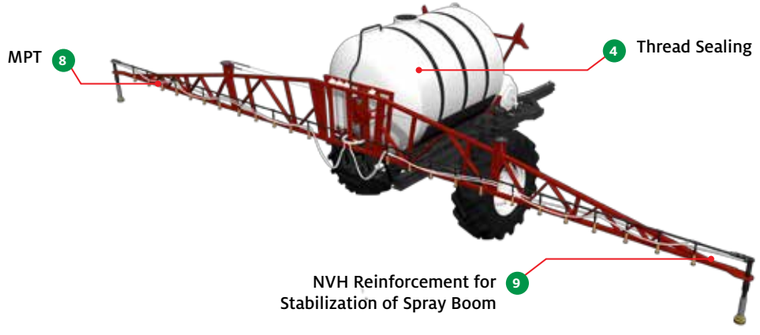
Corn Headers



Grain Headers



Sprayers



NOISE, VIBRATION, HARSHNESS AND METAL REINFORCEMENT SOLUTIONS

Create Stronger and Quieter Equipment

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

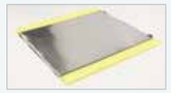
NOISE, VIBRATION, HARSHNESS AND METAL REINFORCEMENT SOLUTIONS

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 the top automotive manufacturers for more than 20 years, and our expertise also helps agricultural and construction equipment 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

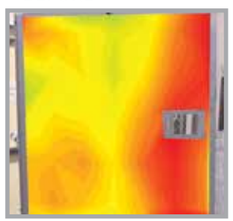
- Henkel offers a full portfolio of NVH solutions in five categories – **reinforcement, damping, sealing, absorption and barrier** – detailed in Figure 1.
- Our portfolio covers **15 core technologies** through the frequency range of 0.1 Hz up to 20 kHz. In addition, our capabilities allow us to provide solutions outside our core technologies.
- 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.

NOISE, VIBRATION AND HARSHNESS SOLUTIONS (FIGURE 1)

	REINFORCEMENT	DAMPING	SEALING	ABSORPTION	BARRIER
APPLICATION					
NEED	**Increase stiffness, shift resonant frequency**	**Attenuate vibration of panel structure**	**Isolate noise sources**	**Reduce reverberant noise**	**Block sound transmission**
SOLUTION	Reinforce With Stiffening Pads	Liquid Applied Sound Deadener Water-Based Damping High Damping Foam Constrained Layer Pads	Semi-Structural Adhesive/Sealant	Acoustic Barrier/Absorber	
	• Structural vibration reduction • Allows metal design with thinner panels • Reduction in mass	• 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	• Less welding • Less corrosion • Process cost savings through automation	• High Sound Transmission Loss (STL) performance • High absorption performance • Tunable performance • Complexity reduction	

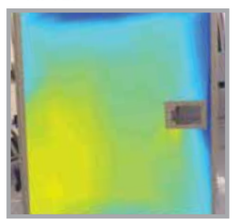
Vibration Response Test (Figure 2)

> BEFORE

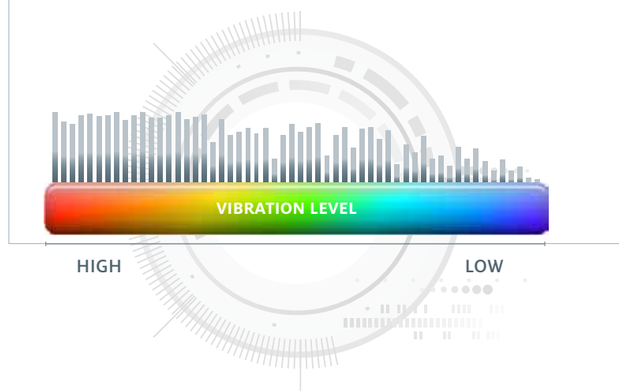


Vibration response test for side panel. Red/ yellow indicates high levels of vibration.

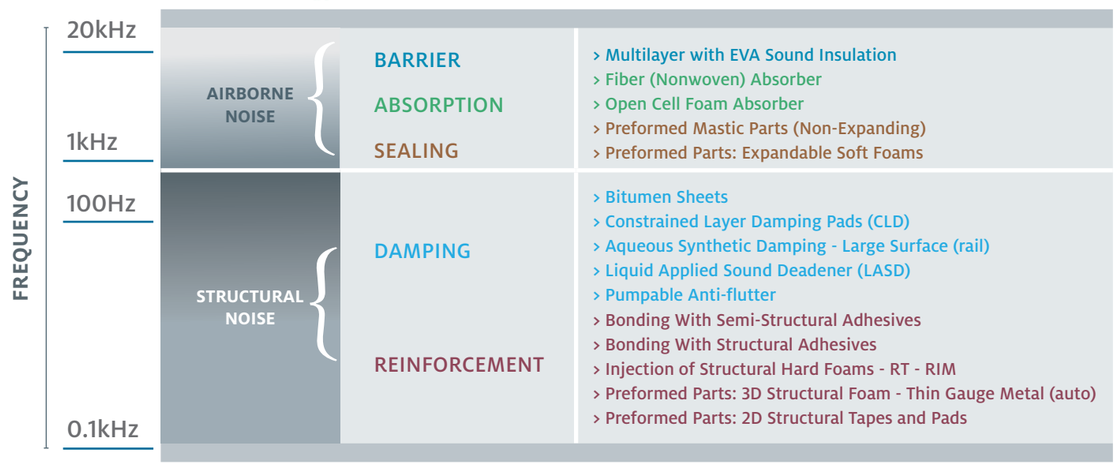
> AFTER



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



NVH Technology Overview



NOISE, VIBRATION, HARSHNESS AND METAL REINFORCEMENT SOLUTIONS

TEROSON® Liquid Applied Sound Deadener (LASD)

TEROSON® Liquid Applied Sound Deadener (LASD) significantly reduces the structural noise generated by the vehicle's powertrain and wheels by absorbing and dissipating vibrational energy. LASD is applied directly to the vehicle body, reducing noise and vibration.

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

▶ BENEFITS

- Robotically applied LASD assures consistent application, providing reliable NVH performance.
- Renewable raw materials reduce the use of chemicals of concern and improve automotive interior air quality.

Service and Support

Henkel supports its LASD technology with experienced acoustics/materials engineering, laboratory and field service personnel. LASD application systems can be easily added into existing body or paint shop manufacturing processes.

TEROSON® Foam Absorbers

TEROSON® foam absorbers are an effective solution to reduce exterior noise and cabin noise. The foam absorbers can be used inside the engine cover and cabin. They absorb noise inside the engine room or cabin and reduce reverberant noise in the cavity.

▶ BENEFITS

- Absorbs engine noise
- Attenuates reverberant noise in cavities
- Good adhesion to panels
- 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 to test and analyze 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	
• Noise source • Transmission path • Contribution • Frequency response	• Damping test (Oberst, impedance, free method) • Sound absorption • Transmission loss	• Semi anechoic room test • Reverberant room test • Vibration test by laser meter • Acoustic camera (holography)	• 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

FUNCTIONAL COATINGS

Solutions for Metal Pretreatment

Henkel offers a full range of metal pretreatment solutions to reduce process steps, improve efficiency, and increase cost savings. Our solutions will help you achieve enhanced paint adhesion and corrosion protection with less energy and water consumption, less wastewater, and more environmentally conscious formulas.

FUNCTIONAL COATINGS AND METAL PRETREATMENT SOLUTIONS

THE HENKEL PORTFOLIO

CLEANERS

- Maintenance
- Process
- Industrial
- Specialty
- Pickles
- Strippers
- Alkaline
- Neutral
- Conditioners

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

COATINGS

- Electro-ceramic coating
- Autophoretic coating (A-Coat)
- Rust prevention
- Break-in lubricant coating

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

Henkel Process Services

Process selection	Analytic and process validation	Start-up of application and lab testing	Process optimization	Customer training
Henkel's experts consult with customers to match their individual requirements to the right Henkel process.	Henkel analyzes the complete production process for customers, reducing production cycle times and rejection rates.	Henkel tests applications of your process in our labs and ensures that Henkel products can be smoothly integrated into your plant.	Henkel works with customers to design simpler and more efficient production processes, with a focus on meeting environmental and safety criteria.	Henkel offers comprehensive training to help our customers understand our products in detail and learn correct application methods.

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 CO_2.

- **Henkel Nanoceramic Process: Our BONDERITE® M-NT 1™** 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 33 for more information.

FUNCTIONAL COATINGS AND METAL PRETREATMENT SOLUTIONS

Henkel Nanotechnology Solutions

MORE SAVINGS, FEWER STEPS

BONDERITE® M-NT 1™

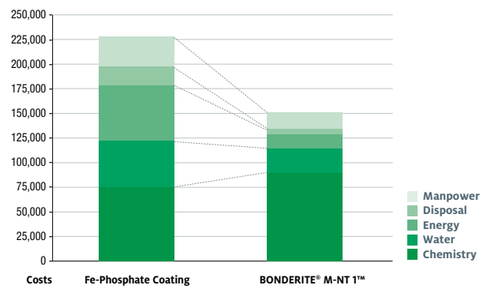
The BONDERITE® M-NT 1™ conversion coating is single-part zirconium-based nanotechnology, which provides a phosphate-free alternative to traditional iron phosphate. It runs at low temperatures and is completely phosphate- and regulated heavy metal-free, to reduce energy consumption and waste removal. BONDERITE® M-NT 1™ is suitable for dip and spray applications.

▶ BENEFITS

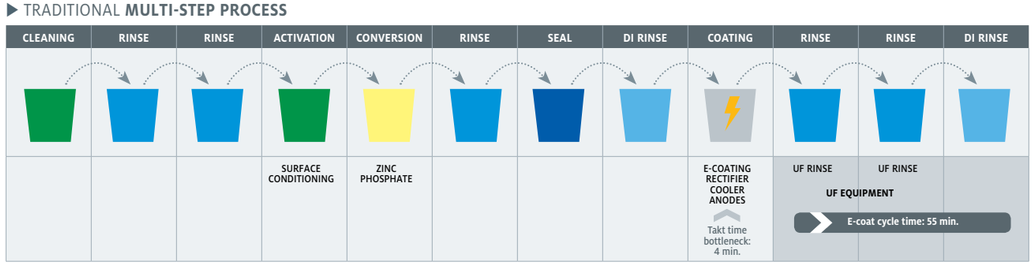
The Henkel Nanoceramic process offers significant savings in manpower, disposal, energy, and water costs compared to traditional processes:

- **Lower energy and water use:** BONDERITE® M-NT 1™ operates at ambient temperatures, reducing energy use and associated CO_2
- **Reduced hazardous waste:** Free of nickel, phosphates, Volatile Organic Compounds (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

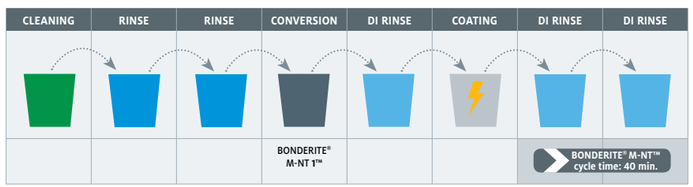
VALUE CREATION



▶ TRADITIONAL **MULTI-STEP PROCESS**



▶ HENKEL **NANOCERAMIC 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

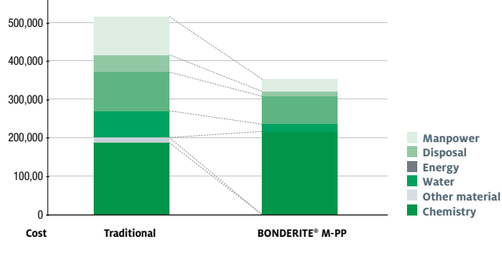
Henkel's Autodeposition process provides substantial savings compared to traditional e-coating methods:

- **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 VOCs

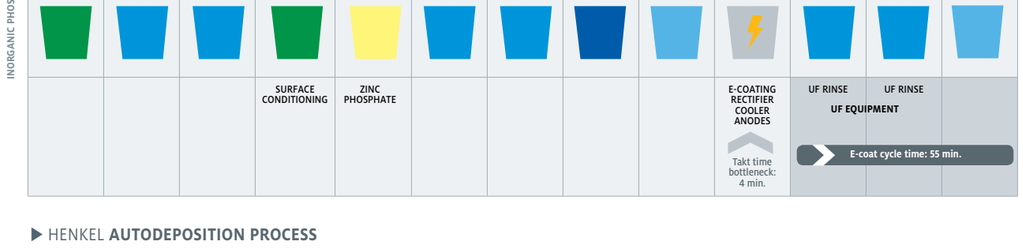
▶ PROCESS ADVANTAGES

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

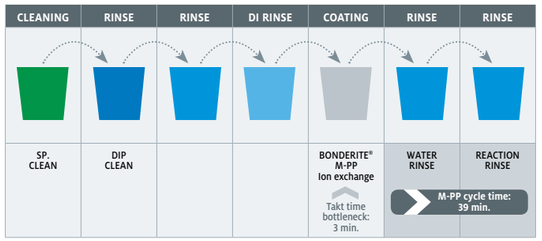
VALUE CREATION



▶ 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

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.

STEP 1 ▶ Pick a cleaner
STEP 2 ▶ Pick a conversion coating
STEP 3 ▶ Seal it

METAL AND PAINT PRETREATMENT

Cleaning

YOUR APPLICATION	Phosphate-free	Steel	Aluminum	Pickle	Multi-Metal
SOLUTION	BONDERITE® C-AK 305N™	BONDERITE® C-AK 305™	BONDERITE® C-AK 412™	BONDERITE® C-IC 182B™	BONDERITE® C-AK 1520™
Application Temperature	37°C-60°C (99°F-140°F)	37°C-60°C (99°F-140°F)	54°C-82°C (129°F-180°F)	82°C (180°F)	43°C-60°C (109°F-140°F)
Concentration by Volume	1-3%	2-4%	1-5%	5-30%	1-3%
Contact Time	5-25 sec.	5-25 sec.	1-15 min.	1-15 min.	30-80 sec.
Application	Spray	Spray	Spray, Immersion	Spray, Immersion	Spray, Immersion
Acid/Alkaline	Alkaline	Alkaline	Alkaline	Acid	Alkaline

METAL AND PAINT PRETREATMENT

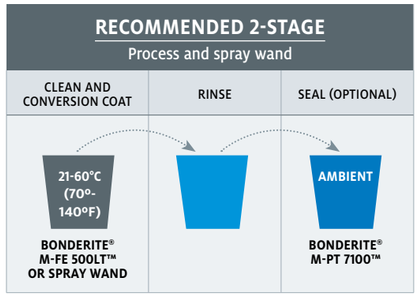
Conversion Coating

	1-STAGE	2-STAGE		4-STAGE		5-STAGE
	Spray Wand	Spray Wand	Cleaner/Coater	Iron Phosphate		Nanoceramic
			Steel	Multi-Metal	Steel	Multi-Metal	
	BONDERITE® M-FE 101™	BONDERITE® M-FE 200™	BONDERITE® M-FE 500LT™	BONDERITE® M-FE 700™	BONDERITE® M-FE 1030™	BONDERITE® M-FE 1090™	BONDERITE® M-NT 1™
Application Temperature	49°C-88°C (120°F-190°F)	54°C-88°C (129°F-190°F)	21°C-60°C (70°F-140°F)	43°C-65°C (109°F-149°F)	38°C-49°C (100°F-120°F)	43°C-46°C (109°F-115°F)	Ambient
Concentration by Volume	1-3%	1-6%	2-4%	4-8%	3-4%	2-6%	3-5%
Contact Time	30-180 sec.	30-180 sec.	1-2 min.	1-5 min.	45-90 sec.	30 sec.-5 min.	20-120 sec.
Application	Spray	Spray	Spray	Spray, Immersion	Spray	Spray, Immersion	Spray, Immersion
Acid/Alkaline	Acid	Acid	Acid	Acid	Acid	Acid	Acid

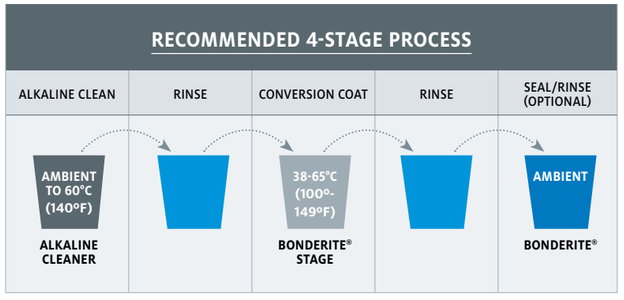
SEAL / POST RINSE (CHROME-FREE)

	Dry-in-Place	Organic	Inorganic
	BONDERITE® M-PT 7100™	BONDERITE® M-PT 99X™	BONDERITE® M-PT 50NC™
Application Temperature	Ambient	Ambient	21°C-38°C (70°F-100°F)
Concentration by Volume	5-10%	3%	10%
Contact Time	5-15 sec.	20-120 sec.	15-60 sec.
Application	Spray	Spray, Immersion	Spray, Immersion
Acid/Alkaline	Acid	Acid	Acid

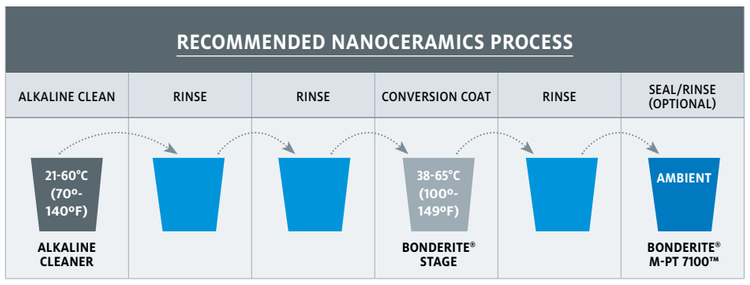
RECOMMENDED 2-STAGE
Process and spray wand



RECOMMENDED 4-STAGE PROCESS



RECOMMENDED NANOCERAMICS PROCESS



FUNCTIONAL COATINGS AND METAL PRETREATMENT SOLUTIONS

Additional Coating Solutions

Rust Preventatives

Henkel offers a comprehensive line of BONDERITE® neutral cleaners and rust preventatives to protect metal surfaces. Neutral cleaners are typically used after machining to remove machining fluids and metal fines while providing short-term rust protection.

▶ ADVANTAGES

- Use in single stage washers
- Use with automatic gauging equipment
- Good separation of removed oils
- No scale buildup in washer
- Good before heat treating

Our BONDERITE® rust preventatives provide protection on ferrous and non-ferrous alloys and can be applied by spraying or dipping. The product range includes a variety of staying power:

- **In process:** Applied inline and lasts a few days to a few weeks.
- **Short term:** Applied toward the end of the operation and lasts up to two months with ideal storage conditions
- **Extended:** Applied at or near the end of the process and lasts six months or longer.

Remanufacturing

Henkel offers products and engineering services that can make you more competitive in the demanding business of engine and transmission remanufacturing. Our R&D scientists and engineers have developed a wide range of products for every step of the remanufacturing cycle, including market-leading solutions for cleaning, remachining and reassembly.

Henkel products are designed to improve finished goods reliability, reduce operating costs, and return engines and transmissions back into service faster than ever before. Whether you need a consultation regarding our products' performance or a complete turnkey process design, Henkel can provide cost-effective solutions that will meet or exceed your requirements.

Anti-Weld Spatter

Henkel's innovative Anti-Weld Spatter 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

Increased Productivity

- Easy to apply and/or automate
- Minimizes downtime
- Reliable continuous production

Lower Costs

- Extends torch nozzle and tip life
- Decreases cleaning time and frequency

Higher Quality

- Silicone-free, no paint issues
- Improves quality of weld seams
- High temperature resistance (1100°C/2012°F)

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.

- **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

ASSEMBLY SOLUTIONS

Faster and Lower-Cost Assembly

From structural bonding to seam sealing and window glazing, we provide a complete range of technologies that allow you to reduce or replace traditional mechanical fastening and sealing methods in a variety of assembly applications.

ASSEMBLY SOLUTIONS – **SEAM SEALING**

Fill Gaps and Leak Paths

SEAL IN/OUT HEAT, LIQUIDS, SOLIDS AND GASES;
IMPROVE AESTHETICS

Designed to prevent leakage, our robust seam sealants work effectively on metals, plastics and composites, and can be applied during any phase of vehicle or component assembly. Our current seam sealant technologies include products that are paintable and resistant to the high heat of paint cure processes.

- Products engineered to adhere to bare oily metals in the body shop
- Painted components in the paint and trim shop
- Products designed to endure high temperature e-coat/powder coat lines
- Room temperature cure applications exposed to direct sun, elements and weather

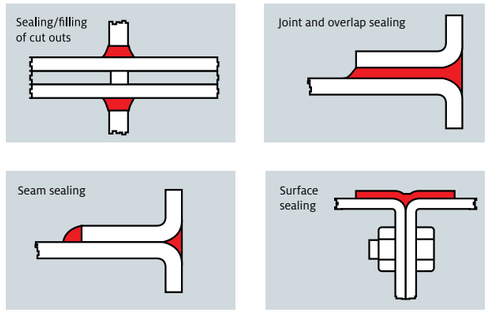
Why use a seam sealant?

- Seal in/out heat, liquids, solids and gases (moisture, dirt and exhaust)
- Prevent corrosion between metal joints
- Improve aesthetics by eliminating rust bleed and creating a seamless appearance
- Reduce airborne and structural-borne noise
- Simplify designs and assembly process
- Enhance paint quality
- Reduce the need for welding

Where to use a seam sealant:

- Over and between welded/fastened joints:
  - Cabin assemblies
  - Door and panel assemblies
  - Engine and radiator covers
  - Lower and upper frame assemblies
  - Boom and shovel assemblies

No matter what your needs are, we have a seam sealant that will adapt to your assembly and paint process.



Room temperature curing seam sealants include:

- Rigid epoxy and acrylic-based weld sealants
- Flexible silyl modified polymers (SMP) and polyurethane (PU) based elastomeric adhesives

Heat curing seam sealants include:

- Paintable weld-through compatible formulations
- Low and high temperature curing formulations

ASSEMBLY PROCESS	CONSIDERATIONS	SOLUTIONS
BODY SHOP	• Adhesion to bare “oily” metal • Resistant to washout from MPT • Thermal compatibility with paint bake (up to 220°C/428°F) • Paint adhesion and no read-through	• Reactive PVC and rubber based adhesives • Epoxies • Acrylics • Some Silyl Modified Polymers*
PAINT SHOP Post Metal Pretreatment Pre E-Coat/Primer	• Adhesion to treated metal • Thermal compatibility with paint bake (up to 220°C/428°F) • Paint adhesion and no read-through • Minimal to no outgassing (paint)	• Reactive PVC and rubber based adhesives • Epoxies • Acrylics • Silyl Modified Polymers*
PAINT SHOP Post E-Coat/Primer Pre Powder/Top Coat	• Adhesion to e-coated/ primed metal • Thermal compatibility with paint bake (up to 220°C/428°F) • Paint adhesion and no read-through • Minimal to no outgassing (paint)	• Reactive PVC and rubber based adhesives • Epoxies • Acrylics • Silyl Modified Polymers* • Polyurethanes*
TRIM SHOP	• Adhesion to painted metal or composite • UV and environmental resistance • Ambient cure mechanism • Excellent smoothability and appearance	• Silyl Modified Polymers • Silicones

*liquid paint process only

ASSEMBLY SOLUTIONS – **SEAM SEALING**

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.

YOUR APPLICATION CRITERIA

WHERE WILL THE SEAM SEALANT BE APPLIED?

BODY SHOP

Will the joint be visible?

No

Pumpable

SOLUTION	TEROSON® PV 1297™
Chemistry	PVC plastisol
Cure Type	Heat Cure
Color	Black
Expansion	50-100%
Visible Joints	No
Oil Tolerance	Highly Recommended
Cure Schedule	Min.: 25 min. @ 160°C (320°F) Max: 60 min. @ 200°C (392°F)
Application Temperature	Ambient
Shore Hardness	51A
Peak Metal Temp. Resistance	200°C (392°F)
Description	High expansion, PVC plastisol sealant for use on large non-visible gaps.

Tape

SOLUTION	TEROSON® RB 10102™
Chemistry	Rubber
Cure Type	Heat Cure
Color	Black
Expansion	60-120%
Visible Joints	No
Oil Tolerance	Highly Recommended
Cure Schedule	Min.: 10 min. @ 165°C (329°F) Max: 60 min. @ 205°C (401°F)
Application Temperature	Ambient
Shore Hardness	N/A
Peak Metal Temp. Resistance	205°C (401°F)
Description	Expandable heat curing, rubber based, weldable sealer tape for use on oily, non-visible joints.

Yes

What cure method is desired?

Moisture

Sprayable Sealant

SOLUTION	TEROSON® MS 9320SF™
Chemistry	SMP
Cure Type	Moisture
Color	Black, Grey, Ocher
Expansion	N/A
Visible Joints	Yes
Oil Tolerance	Recommended
Cure Schedule	Skin Over Time: 15 min. Cure rate: 4.5 mm/day
Application Temperature	Ambient
Shore Hardness	30A
Peak Metal Temp. Resistance	150°C (302°F)
Description	Sprayable or brushable modified silane sealant with excellent smoothability and paintability. Good adhesion to lightly oiled metal.

Static Mix

Fast Cure

SOLUTION	LOCTITE® EA E-04SS™
Chemistry	Epoxy
Cure Type	Static Mix
Color	Grey
Expansion	N/A
Visible Joints	Yes
Oil Tolerance	Recommended
Cure Schedule	Fixture Time: 6 min. 90% cured after 24 hrs.
Application Temperature	Ambient
Shore Hardness	70D
Peak Metal Temp. Resistance	220°C (428°F)
Description	Fast 5-minute epoxy with excellent sag and washout resistance. Primarily used on thick substrates with large gaps.

Long Open Time

SOLUTION	LOCTITE® EA 9460™
Chemistry	Epoxy
Cure Type	Static Mix
Color	Grey
Expansion	N/A
Visible Joints	Yes
Oil Tolerance	Recommended
Cure Schedule	Fixture Time: 3 hrs. 90% cured after 24 hrs.
Application Temperature	Ambient
Shore Hardness	75D
Peak Metal Temp. Resistance	210°C (410°F)
Description	Robust extended open-time epoxy with excellent sag and washout resistance. Primarily used on thick substrates with large gaps.

Heat Cure

High Temp. Resistance

SOLUTION	LOCTITE® 5016™
Chemistry	Epoxy/Acrylic
Cure Type	Heat Cure
Color	White
Expansion	N/A
Visible Joints	Yes
Oil Tolerance	Recommended
Cure Schedule	Min.: 30 min. @ 140°C (284°F) Max: 30 min. @ 220°C (428°F)
Application Temperature	Ambient
Shore Hardness	65A
Peak Metal Temp. Resistance	230°C (446°F)
Description	Smoothable epoxy/acrylic hybrid sealant with exceptional heat resistance for high temp. e-coat and powder bake processes.

PAINT SHOP

What cure method is desired?

Heat Cure

What thermal resistance is required?

180°C to 220°C (356°F to 428°F)

Powder Paint Sealant

SOLUTION	TEROSON® AL 6302R™
Chemistry	PVC/Polyacrylate
Cure Type	Heat Cure
Color	White
Expansion	N/A
Visible Joints	Yes
Oil Tolerance	Not Recommended
Cure Schedule	Min.: 10 min. @ 150°C (302°F) Max: 60 min. @ 220°C (428°F)
Application Temperature	Ambient
Shore Hardness	55A
Peak Metal Temp. Resistance	220°C (428°F)
Description	Heat cure PVC/ polyacrylate hybrid sealant with exceptional heat resistance for high temp. powder bake processes. Primarily used on primed metal.

140°C to 180°C (284°F to 356°F)

Epoxy/PU Paint Sealant

SOLUTION	TEROSON® PV 3046™
Chemistry	PVC plastisol
Cure Type	Heat Cure
Color	Ivory
Expansion	N/A
Visible Joints	Yes
Oil Tolerance	Not Recommended
Cure Schedule	Min.: 10 min. @ 140°C (284°F) Max: 20 min. @ 200°C (392°F)
Application Temperature	Ambient
Shore Hardness	70A
Peak Metal Temp. Resistance	180°C (356°F)
Description	Solvent-free PVC heat cure sealant for general use on primed metal.

95°C to 140°C (203°F to 284°F)

Low Temp. Paint Bake

SOLUTION	TEROSON® PU 1104 AA25™
Chemistry	PU
Cure Type	Heat Cure
Color	Grey
Expansion	N/A
Visible Joints	Yes
Oil Tolerance	Not Recommended
Cure Schedule	Min.: 10 min. @ 85°C (185°F) Max: 60 min. @ 140°C (284°F)
Application Temperature	Ambient
Shore Hardness	58A
Peak Metal Temp. Resistance	140°C (284°F)
Description	Solvent free elastic adhesive based on an encapsulated polyisocyanate. Cures at low paint bake temperatures (85°C/185°F). Ideal for cure on-demand applications with low temp. paint bake processes.

Moisture

What type of top coat paint is used?

Liquid Top Coat

General Purpose

SOLUTION	LOCTITE® UR 3370™
Chemistry	PU
Cure Type	Moisture
Color	Black, White, Grey
Expansion	N/A
Visible Joints	Yes
Oil Tolerance	Not Recommended
Cure Schedule	Skin Over Time: 30 min. 80% cure after 24 hrs.
Application Temperature	Ambient
Shore Hardness	55A
Peak Metal Temp. Resistance	170°C (338°F)
Description	General purpose moisture cure urethane for sealing joints on primed metal.

Powder Paint

High Temp. Resistance

SOLUTION	TEROSON® MS 9380HT™
Chemistry	SMP
Cure Type	Moisture
Color	Grey
Expansion	N/A
Visible Joints	Yes
Oil Tolerance	Not Recommended
Cure Schedule	Skin Over Time: 7 min. Cure rate: 3mm/day
Application Temperature	Ambient
Shore Hardness	65A
Peak Metal Temp. Resistance	200°C (392°F)
Description	Moisture cure modified silane for use on primed metal prior to powder paint processes.

TRIM SHOP

Does the sealant need to be clear?

No

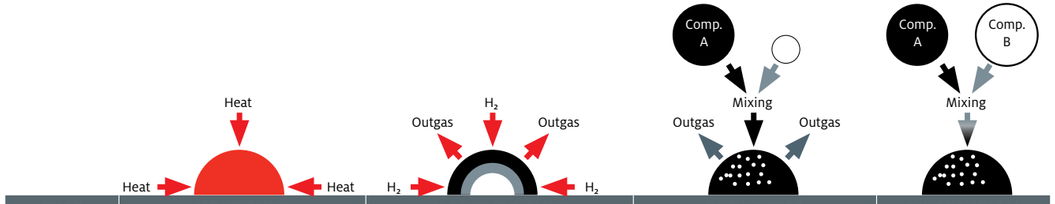
Fast Skin Time

SOLUTION	TEROSON® MS 930™
Chemistry	SMP
Cure Type	Moisture
Color	White, Grey, Black
Expansion	N/A
Visible Joints	Yes
Oil Tolerance	Not Recommended
Cure Schedule	Skin Over Time: 25 min. Cure rate: 4 mm/day
Application Temperature	Ambient
Shore Hardness	30A
Peak Metal Temp. Resistance	150°C (302°F)
Description	Moisture cure modified silane with primerless adhesion to most substrates and excellent UV and moisture resistance.

Yes

Clear

SOLUTION	TEROSON® MS 5510™
Chemistry	SMP
Cure Type	Moisture
Color	Clear
Expansion	N/A
Visible Joints	Yes
Oil Tolerance	Not Recommended
Cure Schedule	Skin Over Time: 20 min. Cure rate: 2 mm/day
Application Temperature	Ambient
Shore Hardness	44A
Peak Metal Temp. Resistance	150°C (302°F)
Description	Ultra clear silyl modified polymer with excellent primerless adhesion to most substrates and UV resistance. Ideal for applications where paint color matching is important.



TYPE	HEAT CURE	MOISTURE CURE	1K BOOSTED	2K REACTION
Comp.	1K	1K	1,2	2k
Method	Cure on-demand	Humidity	Controlled Cure	Controlled Cure
Cure Cond.	Heat (oven)	Ambient	Ambient	Ambient
Cure Dir.	Outside in	Outside in	Homogenous	Homogenous
Mixing	No mixing	No mixing	Mixing	Mixing
Cure Time	<1 hr.	3-4 mm/day	<1 hr.	<24 hrs.
Fixture Time	N/A	<1 hr.	<20 min.	<1 hr.

ASSEMBLY SOLUTIONS – **WINDOW GLAZING**

Bonding and Sealing Windows

PUMPABLE HIGH STRENGTH ELASTOMERS FOR BONDING AND SEALING VEHICLE WINDSCREENS

Primarily designed to bond windscreens to vehicle cabins, our wide range of window glazing adhesives simplify and improve the assembly process while improving torsional stiffness and vehicle safety.

Based on the substrates and desired drive-away time, Henkel offers a variety of engineered products and primers that provide exceptional performance. These include products formulated to provide primerless adhesion and instant fixturing to products, with controlled and uniform curing.

Why use a window glazing product?

- Seal in/out heat, liquids, solids and gases (e.g. moisture, dirt and exhaust)
- Improve safety, aesthetics and drag
- Airtight seal results in improved noise, vibration, and harshness (NVH) enhancements
- Higher strength for increased glass retention
- More automated assembly process reduces labor costs

Where to use a window glazing product:

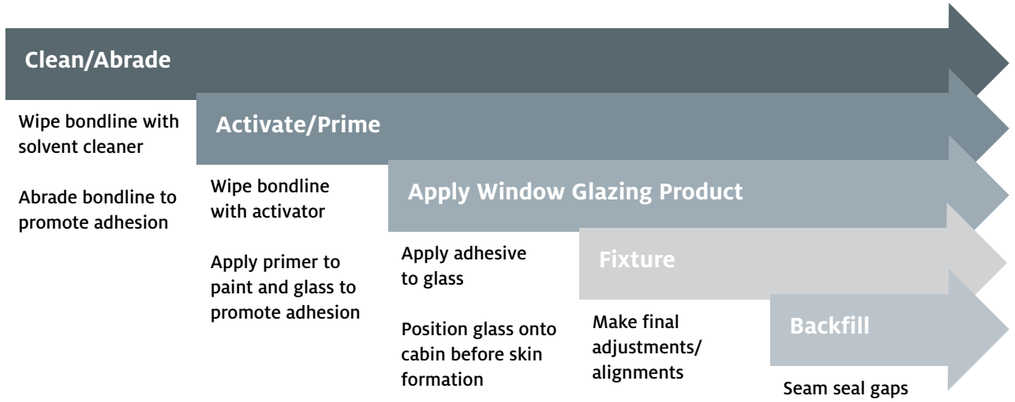
- In the Trim Shop on cabin assemblies
  - Bonding and sealing windscreens
  - Sealing between panes of glass
  - Stationary windows and sunroofs
  - Backfilling large gaps and voids
  - Bonding headliner and upholstery

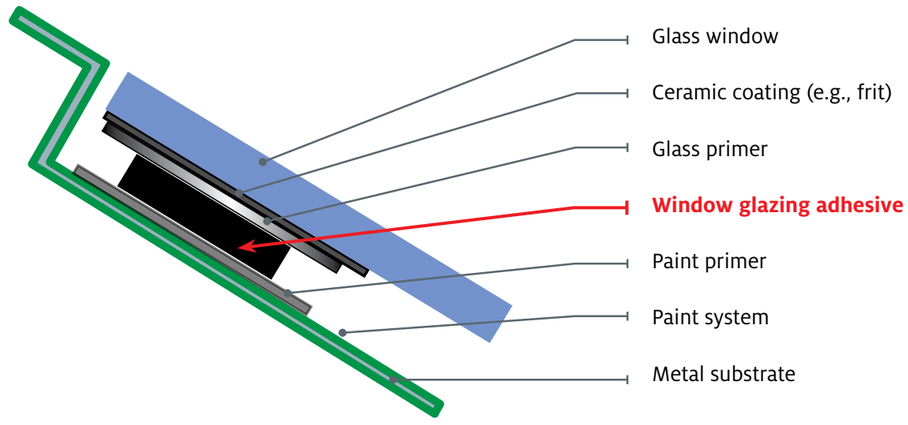
Types of window glazing products:

Moisture curing window glazing products include:	**Controlled curing window glazing** products include:	**Primerless window glazing** products include:
• High modulus single-component PU based adhesives • Low modulus single-component SMP based adhesives	• Boosted single-component PU and SMP based adhesives • Dual-component SMP based elastomeric adhesives	• Single-component moisture cure or boosted PU and SMP based adhesives • Dual-component SMP based elastomeric adhesives • Dual-component SMP based adhesives

Typical Windscreen Installation Process

HOW TO USE WINDOW GLAZING PRODUCTS





CROSS SECTION OF TRADITIONAL WINDOW GLAZING APPLICATION

ASSEMBLY SOLUTIONS – **WINDOW GLAZING**

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.

YOUR APPLICATION CRITERIA

SELECT YOUR STEP IN THE GLAZING PROCESS

CLEAN/ACTIVATE

Do you need an active cleaner?

- **No**
  - General Purpose
  - Silicone Removal
- **Yes**
  - PU Activator
  - SMP Activator

PRIME

What substrate are you trying to prime?

- Glass/Frit → Glass/Frit Primer
- Paint/Metal → All-In-One Primer

GLAZE

What type of glazing compound is preferred?

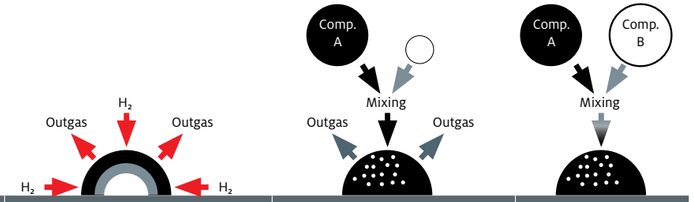
- **Standard Primer System**
  - Cold Applied
  - High Sag Resistance
- **Primerless System**
  - Cold Applied
  - High Position Tack
  - Low Modulus
- **Controlled Cure**
  - Static Mix
  - PU Booster

GLASS BONDING/SEALING

Is your process paint sensitive?

- No → Clear RTV
- Yes → Paintable

SOLUTION	TEROSON® PU 8550™	TEROSON® VR20™	TEROSON® PU 8560™	TEROSON® SB 450™	TEROSON® PU 8517H™	TEROSON® PU 8519P™	TEROSON® PU 8597™	TEROSON® PU 8599™	TEROSON® PU 9095™	TEROSON® PU 9095HV™	TEROSON® MS 939™	TEROSON® MS 9399™	TEROSON® PU 8590 BB-15™	LOCTITE® SI 595™	TEROSON® MS 5510™
Chemistry	Isopropanol	Benzene	Silane/Benzene	Silane/ Isopropanol	PU	PU	PU	PU	PU	PU	SMP	SMP	Glycerol Booster	Silicone	SMP
Cure Type/Ratio	Solvent	Solvent	Solvent	Solvent	Solvent	Solvent	Moisture	Moisture	Moisture	Moisture	Moisture	Static Mix (1:1)	Static Mix (1-5%)	Moisture	Moisture
Color	Clear	Clear	Clear	Clear	Black	Black	Black	Black	Black	Black	Black	Black	Beige	Clear	Clear
Dry/Skin Time	2 min.	2 min.	30 sec.	10 sec.	15 min.	2 min.	25 min.	20 min.	30 min.	30 min.	10 min.	30 min.	5-20 min.	45 min.	20 min.
Elongation	N/A	N/A	N/A	N/A	N/A	N/A	350%	250%	400%	400%	250%	150%	N/A	275%	140%
Tensile Strength (MPa)	N/A	N/A	N/A	N/A	N/A	N/A	9.0	8.0	8.0	8.0	3.0	2.0	N/A	0.9	1.7
Application Temperature	Ambient	Ambient	Ambient	Ambient	15°C to 25°C (59°F to 77°F)	0°C to 30°C (32°F to 86°F)	5°C to 35°C (41°F to 95°F)	60°C to 70°C (140°F to 158°F)	5°C to 50°C (41°F to 122°F)	60°C to 70°C (140°F to 158°F)	5°C to 40°C (41°F to 104°F)	15°C to 40°C (59°F to 104°F)	5°C to 70°C (41°F to 158°F)	Ambient	Ambient
Shore Hardness	N/A	N/A	N/A	N/A	N/A	N/A	70A	70A	60A	60A	55A	60A	N/A	14A	44A
Description	General purpose glass, ceramic frit and painted metal cleaner based on isopropanol.	Universal window glazing cleaner based on white spirits specially formulated to remove silicone residue from windscreens.	Solvent based activated cleaner containing silanes for added adhesion promotion.	Isopropanol based activated cleaner formulated specially for use with silyl modified polymers.	Black primer formulated specially for enhancing UV resistance and promoting adhesion on glass and ceramic frit.	Fast black primer formulated for promoting adhesion on all glazing surfaces including paint, glass and ceramic frit.	Robust black primer glazing compound for general use in room-temperature-applied applications.	Ultra high viscosity black primer glazing compound with excellent sag resistance. Requires preheating to dispense.	Pumpable glazing compound for bonding windows without the use of black primer. Primarily used in handheld manual applications.	High position tack warm melt glazing compound for bonding windows without the use of black primer or fixturing. Requires preheating to dispense.	Flexible modified silane adhesive used in applications with large differences in thermal expansion and plastic windows.	Primerless two-component modified silane adhesive used primarily on small glass or plastic windows where fast, consistent cure speed is required.	Urethane glazing booster added to glazing compounds to enhance cure speed and promote uniform controlled curing.	Clear, robust acetoxy silicone for sealing between glass windows for better operator visibility.	Clear, silicone-free glass silyl modified polymer for sealing between glass windows.



TYPE	MOISTURE CURE	1K BOOSTED	2K REACTION
Comp.	1K	1,2	2k
Method	Humidity	Controlled Cure	Controlled Cure
Cure Cond.	Ambient	Ambient	Ambient
Cure Dir.	Outside in	Homogenous	Homogenous
Mixing	No mixing	Mixing	Mixing
Cure Time	3-4 mm/day	<1 hr.	<24 hrs.
Skin Over Time	<1 hr.	<20 min.	<1 hr.

ASSEMBLY SOLUTIONS – **STRUCTURAL BONDING**

Weld and Fastener Reduction

FOR USE BETWEEN FLEXIBLE SHEET METALS, RIGID CASTINGS/EXTRUSIONS, AND/OR COMPOSITE/PLASTIC MATERIALS

Structural and elastic bonding adhesives have been used in the automotive and aerospace industry for decades. The benefits of design versatility, even stress distribution, and robust long-term performance compared to traditional assembly methods are now being applied to the agricultural and construction equipment industries.

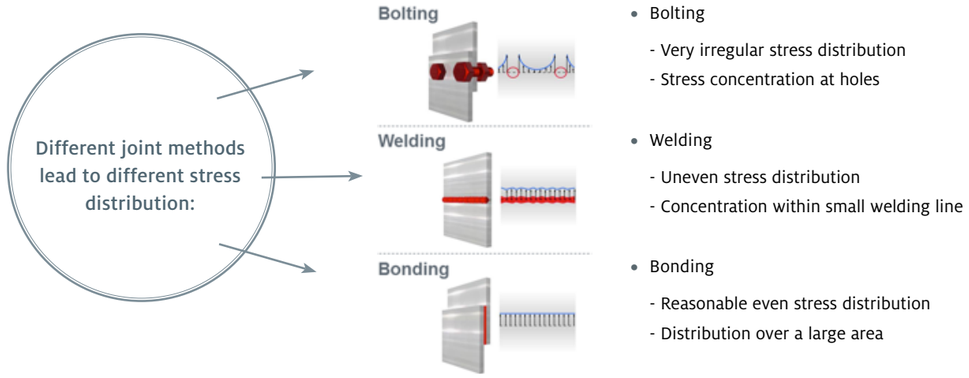
Primarily designed to replace welds, rivets and other mechanical fasteners in the body, paint or trim shops, our wide range of high strength structural and elastic bonders simplify and improve the design and assembly processes while improving aesthetics, performance and processing costs.

Why use a structural adhesive?

- High strength
- Seal, bond and protect in one step
- Reduce NVH (anti-flutter)
- Prevent corrosion
- Improve aesthetics
- Simplify designs
- Improve part performance
- Join dissimilar substrates
- Use lower-cost materials
- Distribute stress evenly
- Reduce assembly time
- Reduce need for skilled labor/welders

Where to use a structural adhesive:

- Skin to frame assembly
- Door and panel stiffener attachment
- Bracket attachment
- Plastic and composite components
- Aluminum and stainless components
- Lower and upper frame assembly
- Boom and shovel assembly



- Bolting
  - Very irregular stress distribution
  - Stress concentration at holes
- Welding
  - Uneven stress distribution
  - Concentration within small welding line
- Bonding
  - Reasonable even stress distribution
  - Distribution over a large area

Structural Adhesive Solutions

TECHNOLOGY	PRIMARY USES	ADVANTAGES	CONSIDERATIONS
Epoxies	For metal in body shops where high cohesive, cleavage and adhesive strength is required.	• High shear & impact strength on metal • Oily surface adhesion (heat cure) • Excellent moisture resistance • Excellent heat resistance (up to 1 hr. @ 220°C/428°F) • Weld-through compatible	• Slow fixture/cure times (2k) • Requires mixing and/or fixturing during cure • Poor elongation and damping • Below average oil tolerance as 2k • Poor adhesion to plastics
Two-Part (2k) Acrylics	For a wide range of substrates including oily metal in body and trim shops where high cohesive, cleavage and adhesive strength is required.	• Excellent adhesion on plastic & metal • High peel & impact resistance • Excellent oily surface adhesion • Good corrosion resistance • High heat resistance (30 min. @ 200°C/428°F)	• Requires mixing and/or fixturing • Refrigerated storage • Strong odor (MMA) Modified Methacrylate Acrylics • Not weld-through capable (flammable) • May create read-through on thin metals
Two-Step Acrylics	For a wide range of substrates in body and paint shops where rapid on-demand fixturing is needed.	• No mixing, cure on-demand • Good corrosion resistance • High strength on wide range of substrates • Light oily surface adhesion • High heat resistance (30 min. @ 200°C/428°F)	• Activator may contain solvents • Resin has moderate odor • Low cure through depth, ~1mm • Fillets remain uncured • Not weld-through capable
Polyurethanes (PU)	For plastic and treated/ painted sheet metal parts where fatigue resistance and elastic bonding is needed.	• Excellent flexibility • Great for noise & vibration reduction • Great adhesion on plastics & painted metal • Great on dissimilar materials • Excellent paintability after cure up to 7 days	• Limited temp. resistance (1 hr. @ 140°C/284°F) • Poor adhesion to bare and oily metal • Poor corrosion resistance • Contains isocyanates • Moisture sensitive before cure
Silyl Modified Polymers (SMPs)	For plastic and treated/ painted sheet metal where fatigue resistance, weather resistance and elastic bonding is needed	• Primerless adhesion to most substrates • Excellent anti-flutter material • Great UV stability • No solvent, isocyanates or silicone • Good paintability after cure up to 3 days	• Poor adhesion on oily metal • Max temp. resistance (1 hr. @ 177°C/351°F) • Low cohesive strength • Slow fixture and cure speed • Moisture sensitive
Reactive Rubbers	For sheet metal in body and paint shop applications as a flexible anti-flutter material.	• Wide range of expansions (0 to >1000%) • Good adhesion on oily metal • Weld-through capable • Excellent washout resistance • Good heat resistance (up to 1 hr. @ 200°C/428°F)	• Limited to hidden/non-visible joints • Limited shelf life (3 to 6 months) • Limited availability • Pumpables require preheating to dispense

ASSEMBLY SOLUTIONS – **STRUCTURAL BONDING**

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.

YOUR APPLICATION CRITERIA

WHAT TYPE OF BONDING IS REQUIRED?

Structural Metal Bonding

Are the substrates oily or cleaned/coated?

Oily Metal | **Cleaned or Coated Metal**

What cure method is desired?

Two-Step | **Static Mix** | **Heat Cure**

SOLUTION	Fast Cure	High Strength	High Impact Resistance	High Performance	High Position Tack	Fast Cure	High Impact Strength	General Purpose
	LOCTITE® AA 334™/SF 7387™	LOCTITE® AA H8000™	LOCTITE® AA H8510™	TEROSON® EP 5089™	TEROSON® RB 5197™	LOCTITE® EA E-05MR™	LOCTITE® EA E-30UT™	LOCTITE® EA E-60HP™
Chemistry	Acrylic	MMA	MMA	Epoxy	Rubber Based	Epoxy	Epoxy	Epoxy
Cure Mechanism	Two-Step	Two-Part	Two-Part	Heat	Heat	Two-Part	Two-Part	Two-Part
Color	Yellow	Green	Grey	Purple	Black	Clear	Purple	Off-White
Viscosity (Pa-S)	85,000	190,000	45,000	100,000	180,000	25,000	65,000	45,000
Fixture/Cure Time	2 min./ 24 hrs.	30 min./ 24 hrs.	30 min./ 24 hrs.	10 min. @ 155°C (311°F)	15 min. @ 175°C (347°F)	15 min./ 24 hrs.	3 hrs./ 24 hrs.	4 hrs./ 24 hrs.
Tensile Strength (MPa)	N/A	14.8	16.2	> 30.0	12.0	49.9	36.8	35.2
Elongation	N/A	13%	41%	9%	10%	5%	3%	9%
Hardness	70D	70D	70D	68D	N/A	78D	80D	80D
Shear Strength (Steel) (MPa)	17.8	22.9	19.9	31.1	15.0	23.3	29.0	29.8
Description	General purpose, high temp. two-step acrylic for use in lightly oiled metal bonding applications that require fast cure on-demand fixturing and tough, durable strength.	Robust, static mix acrylic designed for structurally bonding oily metal in weld and rivet reduction applications. Excellent weather resistance.	Oily metal bonder for high impact and peel stress applications. Contains 30 mil spacer beads to prevent excessive squeeze-out of adhesive due to over-clamping.	Toughened heat cure epoxy offering high shear strength, thermal resistance and extremely good peel and impact resistance. Weld-through capable.	High strength, rubber-based oily metal bonder formulated with high position tack and excellent wash-off resistance. Ideal for panel stiffener bonding applications. Weld-through capable.	Ultra clear, fast fixturing epoxy that provides excellent moisture resistance and exceptional toughness.	Ultra tough, high impact resistant epoxy designed for structurally bonding a variety of substrates in high impact applications.	High strength epoxy with an extended 60-minute work life for large assemblies.

ASSEMBLY SOLUTIONS – **STRUCTURAL BONDING**

LEARN MORE:

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YOUR APPLICATION CRITERIA

WHAT TYPE OF BONDING IS REQUIRED?

General Purpose Elastic Bonding

What cure method is desired?

Moisture Cure

Static Mix

Heat Cure

Composite/Plastic Bonding

Instant Bonding

SOLUTION	General Purpose TEROSON® MS 939™	High Position Tack TEROSON® PU 9095™ HV	Fast Cure TEROSON® MS 9399™	General Purpose LOCTITE® UK U-05FL™	Cure on-demand TEROSON® PU 1103 AA25™	Flexible Substrates LOCTITE® UK 1366 B10™	Rigid Substrates LOCTITE® UK 1351 B25™	Fast Cure LOCTITE® AA H3300™	Large Gaps LOCTITE® 4090™	Toughened LOCTITE® 411™
Chemistry	MS Polymer	Polyurethane	MS Polymer	Polyurethane	Polyurethane	Polyurethane	Polyurethane	MMA	Cyanoacrylate	Cyanoacrylate
Cure Mechanism	Moisture	Moisture	Two-Part	Two-Part	Heat	Two-Part	Two-Part	Two-Part	Two-Part	Moisture
Color	Black	Black	Black	Off-White	Crème	Green	Green	Yellow	Off-White	Clear
Viscosity (Pa-S)	Paste	Paste	Paste	100,000	95,000	34,000	29,000	110,000	17,000	6,000
Fixture/Cure Time	10 min./ 72 hrs.	30 min./ 72 hrs.	2 hrs./ 72 hrs.	2.5 hrs./ 24 hrs.	10 min. @ 85°C (185°F)	35 min./ 72 hrs.	75 min./ 72 hrs.	5 min./ 24 hrs.	3 min./ 24 hrs.	35 sec./ 24 hrs.
Tensile Strength (MPa)	3.0	8.0	3.0	9.0	5.0	10.0	26.0	29.0	7.0	7.0
Elongation	250%	400%	150%	74%	200%	58%	1%	30%	4%	N/A
Hardness	55A	55A	60A	45D	74A	55D	84D	80D	67D	N/A
Shear Strength (Steel) (MPa)	1.5	2.3	3.0	7.0	4.0	10.3 (PVC)	8.8 (PVC)	14.6 (PVC)	17.0	29.0
Description	A robust, isocyanate-free, heavy bodied modified silane adhesive that exhibits primerless adhesion to most substrates.	High tensile strength, high position tack urethane adhesive that is free of PVC and solvents. Ideal for panel and floor bonding applications.	Non-sag, two-component modified silane adhesive. Mixed adhesive provides primerless adhesion to a wide variety of substrates.	High performance static mix urethane adhesive for general-purpose metal bonding. Highly flexible, impact and moisture resistant with high peel and shear strength on many substrates.	Solvent-free elastic adhesive based on an encapsulated polyisocyanate. Cures at low paint bake temperatures. Ideal for cure on-demand applications with low temp. paint bake processes.	Highly flexible structural bonder with good adhesion to plastics and composites. Excellent environmental resistance and impact strength.	Highly toughened GL approved two-part urethane for composites bonding. Non-sag with excellent fatigue and environmental resistance.	Non-sag, fast fixturing structural adhesive for bonding a variety of plastics and composites.	Two-component epoxy/cyanoacrylate hybrid with ultra fast fixturing, great gap filling and thermal resistance. Ideal for high strength general-purpose bonding applications including rubbers, metals and plastics.	High viscosity, high strength, surface insensitive rubber-toughened cyanoacrylate that bonds instantly to most substrates including rubbers, metals and plastics.

MACHINERY ADHESIVES

Seal, Bond and Protect Flanged, Threaded and Cylindrical Assemblies

Henkel's wide range of LOCTITE® threadlocking, thread sealing, gasketing and retaining products help manufacturers increase reliability and reduce downtime. Our innovative, reliably engineered adhesives replace mechanical locking and sealing methods, prevent loosening from vibration, strengthen the assembly, and protect against leaks and corrosion.

MACHINERY ADHESIVES – **THREADLOCKING**

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.

Threadlocking

LOCTITE® threadlockers dramatically increase the reliability of threaded assemblies. Available as liquid and semi-solid adhesives, LOCTITE® threadlockers are applied to the threads of a fastener and cure to a hard thermoset plastic when applied between metal surfaces. They cure in the absence of air and completely fill the gaps between mating threads to lock and seal threads and joints.

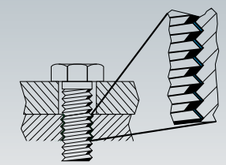
Benefits

- Bonds metal fasteners to prevent loosening from shock and vibration
- Fills air void to seal and protects threads from rust and corrosion
- Single component – clean and easy to apply or automate
- Can be used on various sizes of fasteners – reduced inventory costs
- Long open time – cures in absence of oxygen and presence of active metal

INACTIVE METALS	
Plated Parts	Galvanized Steel
Anodized Aluminum	Zinc
Titanium	Aluminum
Stainless Steel	Black Oxide

Helpful Hints:

- Use LOCTITE® SF 7649™ Primer for faster fixture times and on inactive metals
- Typical bolt assemblies only have 15% contact with 85% air void



YOUR APPLICATION CRITERIA

ARE THE PARTS ALREADY ASSEMBLED?

Yes

Wicking Grade

SOLUTION → **LOCTITE® 290™**

Color	Green
Viscosity (Pa-S)	25/55
Fixture/Cure Time	20 min./24 hrs.
Breakaway/Prevail Torque (N-m)	10/29
Temperature Resistance	-54° to 149°C (-65° to 300°F)
Oil Resistance (1,000h @ 121°C/250°F)	Recommended
Water/glycol resistance (1,000h @ 87°C/189°F)	Highly Recommended
Gasoline Resistance (1,000h @ 22°C/72°F)	Highly Recommended
Description	Recommended for locking pre-assembled fasteners. Mil Spec (S-46163A) Type III, Grade R. NSF/ANSI 61 Certified.

No

Are your bolts larger than 7/8"?

Yes

High Lubricity

SOLUTION → **LOCTITE® 2047™**

Color	Black
Viscosity (Pa-S)	2,000/12,000
Fixture/Cure Time	90 min./24 hrs.
Breakaway/Prevail Torque (N-m)	42/9
Temperature Resistance	-54° to 149°C (-65° to 300°F)
Oil Resistance (1,000h @ 121°C/250°F)	Highly Recommended
Water/glycol resistance (1,000h @ 87°C/189°F)	Highly Recommended
Gasoline Resistance (1,000h @ 22°C/72°F)	Highly Recommended
Description	This product is specially formulated with lubricant additives to aid in the assembly of large nuts and bolts.

No

What temperature resistance do you need?

182°C/360°F

Medium Strength/ Primerless

SOLUTION → **LOCTITE® 243™**

Color	Blue
Viscosity (Pa-S)	1,300/3,000
Fixture/Cure Time	10 min./24 hrs.
Breakaway/Prevail Torque (N-m)	26/5
Temperature Resistance	-54° to 182°C (-65° to 360°F)
Oil Resistance (1,000h @ 121°C/250°F)	Highly Recommended
Water/glycol resistance (1,000h @ 87°C/189°F)	Highly Recommended
Gasoline Resistance (1,000h @ 22°C/72°F)	Highly Recommended
Description	General purpose removable strength liquid threadlocker. Reliably seals, locks and protects metal fasteners up to 3/4". NSF/ANSI 61 Certified. CFIA Approved.

Medium Strength Health and Safety Grade

SOLUTION → **LOCTITE® 2400NA™**

Color	Blue
Viscosity (Pa-S)	3,070
Fixture/Cure Time	10 min./24 hrs.
Breakaway/Prevail Torque (N-m)	20/2
Temperature Resistance	-54° to 182°C (-65° to 360°F)
Oil Resistance (1,000h @ 121°C/250°F)	Highly Recommended
Water/glycol resistance (1,000h @ 87°C/189°F)	Highly Recommended
Gasoline Resistance (1,000h @ 22°C/72°F)	Highly Recommended
Description	Removable strength threadlocker formulated to have a 'white' health and safety label. Tested and deemed a non-skin allergen/irritant.

High Strength/ Primerless

SOLUTION → **LOCTITE® 263™**

Color	Red
Viscosity (Pa-S)	400/600
Fixture/Cure Time	10 min./24 hrs.
Breakaway/Prevail Torque (N-m)	33/33
Temperature Resistance	-54° to 182°C (-65° to 360°F)
Oil Resistance (1,000h @ 121°C/250°F)	Highly Recommended
Water/glycol resistance (1,000h @ 87°C/189°F)	Highly Recommended
Gasoline Resistance (1,000h @ 22°C/72°F)	Highly Recommended
Description	General purpose permanent strength liquid threadlocker. Reliably seals, locks and protects metal fasteners up to 1". CFIA Approved.

High Strength Health and Safety Grade

SOLUTION → **LOCTITE® 2700NA™**

Color	Green
Viscosity (Pa-S)	350/550
Fixture/Cure Time	5 min./3 hrs.
Breakaway/Prevail Torque (N-m)	20/19
Temperature Resistance	-54° to 182°C (-65° to 360°F)
Oil Resistance (1,000h @ 121°C/250°F)	Highly Recommended
Water/glycol resistance (1,000h @ 87°C/189°F)	Highly Recommended
Gasoline Resistance (1,000h @ 22°C/72°F)	Highly Recommended
Description	Permanent strength threadlocker formulated to have a 'white' health and safety label. Tested and deemed a non-skin allergen/irritant.

232°C/450°F

Medium Strength

SOLUTION → **LOCTITE® 246™**

Color	Blue
Viscosity (Pa-S)	2,600
Fixture/Cure Time	5 min./24 hrs.
Breakaway/Prevail Torque (N-m)	19/5
Temperature Resistance	-54° to 232°C (-65° to 450°F)
Oil Resistance (1,000h @ 121°C/250°F)	Highly Recommended
Water/glycol resistance (1,000h @ 87°C/189°F)	Highly Recommended
Gasoline Resistance (1,000h @ 22°C/72°F)	Highly Recommended
Description	Removable strength liquid threadlocker for high temp. applications. (Note: Also available in High Strength Red, LOCTITE® 272™)

343°C/650°F

Medium Strength

SOLUTION → **LOCTITE® 2422™**

Color	Blue
Viscosity (Pa-S)	Paste
Fixture/Cure Time	30 min./24 hrs.
Breakaway/Prevail Torque (N-m)	12/1
Temperature Resistance	-54° to 343°C (-65° to 650°F)
Oil Resistance (1,000h @ 121°C/250°F)	Highly Recommended
Water/glycol resistance (1,000h @ 87°C/189°F)	Highly Recommended
Gasoline Resistance (1,000h @ 22°C/72°F)	Highly Recommended
Description	Removable strength liquid threadlocker for ultra high temp. applications (e.g. 343°C/650°F). (Note: Also available in High Strength Red, LOCTITE® 2620™)

MACHINERY ADHESIVES – **THREAD SEALING**

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.

Thread Sealing

LOCTITE® anaerobic thread sealants prevent leakage of gases and liquids and are available in liquid form or as sealing cord. Designed for low pressure and high pressure applications, they fill the space between threaded parts and provide an instant, low pressure seal. When fully cured, they seal to the burst strength of most pipe systems.

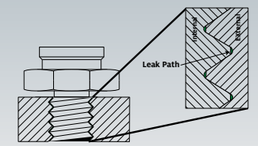
Benefits

- Bonds metal fasteners to prevent loosening from shock and vibration
- Fills air void to seal and protect threads from rust and corrosion
- Single component – clean and easy to apply or automate
- Can be used on various sizes of fasteners – reduces inventory costs
- Long open time – cures in absence of oxygen and presence of active metal

INACTIVE METALS	
Plated Parts	Galvanized Steel
Anodized Aluminum	Zinc
Titanium	Aluminum
Stainless Steel	Black Oxide

Helpful Hints:

- Use LOCTITE® SF 7649™ Primer for faster fixture times and/or on inactive metals.
- Even highly machined pneumatic fittings have leak paths.



YOUR APPLICATION CRITERIA

ARE THE PARTS METAL OR PLASTIC?

METAL

Are you working with hydraulic fittings?

No

What is your preferred application technique?

Liquid Paste

Health and Safety Grade

SOLUTION: LOCTITE® 5400™

Color	White
Viscosity (Pa-S)	14,000
Fixture/Cure Time	30 min./ 72 hrs.
Pressure Resistance (MPa) (hydraulic)	69.0
Temperature Resistance	-54° to 149°C (-65° to 300°F)
Oil Resistance (1,000h @ 125°C/257°F)	Highly Recommended
Gasoline Resistance (1,000h @ 22°C/72°F)	Highly Recommended
Water/Glycol Resistance (1,000h @ 87°C/189°F)	Highly Recommended
Description	Thread sealant formulated to have a 'white' health and safety label. Tested and deemed a non-skin allergen/irritant.

General Purpose

SOLUTION: LOCTITE® 567™

Color	White
Viscosity (Pa-S)	540,000
Fixture/Cure Time	6 hrs./ 72 hrs.
Pressure Resistance (MPa) (hydraulic)	69.0
Temperature Resistance	-54° to 149°C (-65° to 300°F)
Oil Resistance (1,000h @ 125°C/257°F)	Highly Recommended
Gasoline Resistance (1,000h @ 22°C/72°F)	Highly Recommended
Water/Glycol Resistance (1,000h @ 87°C/189°F)	Highly Recommended
Description	General purpose thread sealant specially formulated with anti-galling properties for stainless steel substrates. ABS Approved.

Coarse Threads

SOLUTION: LOCTITE® 577™

Color	Yellow
Viscosity (Pa-S)	55,000
Fixture/Cure Time	30 min./ 24 hrs.
Pressure Resistance (MPa) (hydraulic)	69.0
Temperature Resistance	-54° to 149°C (-65° to 300°F)
Oil Resistance (1,000h @ 125°C/257°F)	Highly Recommended
Gasoline Resistance (1,000h @ 22°C/72°F)	Highly Recommended
Water/Glycol Resistance (1,000h @ 87°C/189°F)	Highly Recommended
Description	Primerless thread sealant formulated to have higher strength for coarse threads and anti-galling properties for use on stainless steel substrates.

Semi-Solid Stick

General Purpose

SOLUTION: LOCTITE® 561™

Color	White
Viscosity (Pa-S)	Semi-Solid
Fixture/Cure Time	5 min. / 24 hrs.
Pressure Resistance (MPa) (hydraulic)	69.0
Temperature Resistance	-54° to 149°C (-65° to 300°F)
Oil Resistance (1,000h @ 125°C/257°F)	Highly Recommended
Gasoline Resistance (1,000h @ 22°C/72°F)	Highly Recommended
Water/Glycol Resistance (1,000h @ 87°C/189°F)	Highly Recommended
Description	Semi-solid thread sealant stick convenient for overhead applications and on-the-go usage. NSF/ANSI 61 Certified.

Yes (non-fouling)

What size are your fittings?

1/2" or greater

High Viscosity

SOLUTION: LOCTITE® 5452™

Color	Purple
Viscosity (Pa-S)	30,000
Fixture/Cure Time	5 min. / 24 hrs.
Pressure Resistance (MPa) (hydraulic)	69.0
Temperature Resistance	-54° to 149°C (-65° to 300°F)
Oil Resistance (1,000h @ 125°C/257°F)	Highly Recommended
Gasoline Resistance (1,000h @ 22°C/72°F)	Highly Recommended
Water/Glycol Resistance (1,000h @ 87°C/189°F)	Highly Recommended
Description	Non-fouling thread sealant formulated for use on larger fine-threaded fittings as used in hydraulic and pneumatic installations.

3/8" or less

Low Viscosity

SOLUTION: LOCTITE® 545™

Color	Purple
Viscosity (Pa-S)	14,000
Fixture/Cure Time	4 hrs. / 24 hrs.
Pressure Resistance (MPa) (hydraulic)	69.0
Temperature Resistance	-54° to 149°C (-65° to 300°F)
Oil Resistance (1,000h @ 125°C/257°F)	Highly Recommended
Gasoline Resistance (1,000h @ 22°C/72°F)	Highly Recommended
Water/Glycol Resistance (1,000h @ 87°C/189°F)	Highly Recommended
Description	Non-fouling thread sealant formulated for use on smaller fine-threaded fittings as used in hydraulic and pneumatic installations. ABS Approved. CFIA Listed.

PLASTIC

Coated Multi-Filament Thread

Universal Sealant

SOLUTION: LOCTITE® 55™ Pipe Cord

Color	White
Viscosity (Pa-S)	Solid Thread
Fixture/Cure Time	Non-reactive
Pressure Resistance (MPa) (hydraulic)	69.0
Temperature Resistance	-54° to 149°C (-65° to 300°F)
Oil Resistance (1,000h @ 125°C/257°F)	Highly Recommended
Gasoline Resistance (1,000h @ 22°C/72°F)	Highly Recommended
Water/Glycol Resistance (1,000h @ 87°C/189°F)	Highly Recommended
Description	General purpose, non-reactive thread sealant that is wound from the dispensing package onto the threads of a pipe.

MACHINERY ADHESIVES – **GASKETING**

LEARN MORE:

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Gasketing

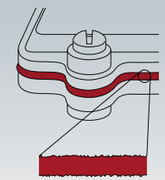
LOCTITE® gasketing products are self-forming gaskets that provide a perfect seal between components, with maximum face-to-face contact, eliminating flange face corrosion. They form a low-pressure seal immediately on assembly and fully cure in 24 hours, providing a joint that will not shrink, crack or relax. They are available as anaerobic products for rigid flanges and silicone products for flexible flanges.

Benefits

- Fills all voids – relaxes the tolerances and preparation of flange surfaces
- Can be used on various flange configurations – reduces inventory costs
- Eliminates shimming and compression setting – no need for re-torquing
- Seals liquids and gases, and protects flanges from corrosion
- Unitizes flange assemblies for added reliability and durability

Helpful Hints:

- For frequently serviced parts, consider using a cure-in-place light cure silicone gasketing product such as LOCTITE® SI 5039™.
- Even machined flanges have surface irregularities that can create leak paths.



YOUR APPLICATION CRITERIA

ARE YOUR SUBSTRATES RIGID METAL (CASTED OR MACHINED) OR FLEXIBLE (PLASTIC OR STAMPED)?

Casted or Machined Metal (< 0.25 mm gap)

What temperature resistance do you need?

204°C/400°F

149°C/300°F

SOLUTION	High Temp.	Health and Safety Grade	Flexible	Oil Tolerant	Fast Cure
	LOCTITE® 510™	LOCTITE® 5800™	LOCTITE® 5188™	LOCTITE® 5128™	LOCTITE® 518™
Color	Red	Red	Red	Red	Red
Viscosity (Pa-S)	350,000	21,000	20,000	50,000	2,275,000
Shear Strength (MPa)	5.0	21.0	2.0	10.0	7.0
Temperature Resistance	-54° to 204°C (-65° to 400°F)	-54° to 149°C (-65° to 300°F)	-54° to 149°C (-65° to 300°F)	-54° to 149°C (-65° to 300°F)	-54° to 149°C (-65° to 300°F)
Functional Cure Time	4 hrs.	2 hrs.	24 hrs.	4 hrs.	4 hrs.
Oil Resistance (1,000h @ 125°C/257°F)	Highly Recommended	Highly Recommended	Highly Recommended	Highly Recommended	Highly Recommended
Gasoline Resistance (1,000h @ 22°C/72°F)	Recommended	Highly Recommended	Recommended	Recommended	Recommended
Water/Glycol Resistance (1,000h @ 87°C/189°F)	Highly Recommended	Recommended	Recommended	Highly Recommended	Highly Recommended
Description	Rigid, general purpose, form-in-place anaerobic flange sealant formulated for use in high temp. rigid metal gasketing applications.	Rigid anaerobic, form-in-place gasketing compound formulated to have a 'white' health and safety label. Tested and deemed a non-skin allergen/irritant.	Flexible, general purpose, form-in-place anaerobic flange sealant designed for use on metal substrates (especially aluminum).	High strength, flexible, general purpose, form-in-place anaerobic flange sealant for use on metal substrates with slight oil contamination that are subjected to high stress at 80°C/176°F continuously.	Rigid, general purpose, form-in-place anaerobic flange sealant for use on rigid metal flanges where fast cure time is needed. NSF/ANSI 61 Certified. CFIA Approved.

Plastic or Stamped Metal (> 0.25 mm gap)

Are the flanges intended to be serviceable regularly?

No – Form in Place

Yes – Cure in Place

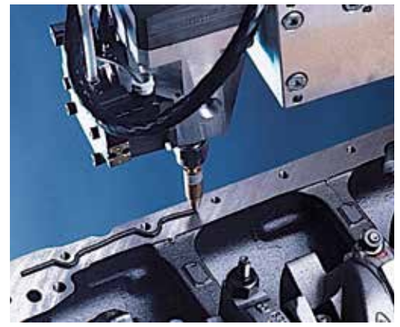
What temperature resistance do you need?

232°C/450°F

260°C/500°F

371°C/700°F

	Rapid Cure	Oil Tolerant	High Temp.	Light Curable
	LOCTITE® SI 5600™	LOCTITE® SI 5900™	LOCTITE® SI 5920™	LOCTITE® SI 5033™
Color	Black	Black	Copper	Translucent White
Viscosity (Pa-S)	65,000	35 g/min.	275 g/min.	135 g/min.
Shear Strength (MPa)	2.0	1.0	0.65	1.0
Temperature Resistance	-54° to 232°C (-65° to 450°F)	-54° to 260°C (-65° to 500°F)	-54° to 371°C (-65° to 700°F)	-54° to 176°C (-65° to 349°F)
Functional Cure Time	5 min.	20 min.	1 hr.	30 sec. (light cure)
Oil Resistance (1,000h @ 125°C/257°F)	Highly Recommended	Highly Recommended	Highly Recommended	Recommended
Gasoline Resistance (1,000h @ 22°C/72°F)	Not Recommended	Not Recommended	Not Recommended	Not Recommended
Water/Glycol Resistance (1,000h @ 87°C/189°F)	Highly Recommended	Highly Recommended	Not Recommended	Recommended
Description	Flexible, fast cure, form-in-place 2k silicone for use in gasketing applications with flexible parts or large gap tolerance. (Also available in slower cure times.)	Flexible, general purpose, form-in-place, moisture cure, oxime silicone for use in gasketing applications with flexible parts or large gap tolerance. CFIA Approved.	Flexible, form-in-place, moisture cure, oxime silicone for use in high temp. gasketing applications.	Flexible, cure-in-place moisture/light cure, acetoxy silicone gasket for use in high line speed applications for flanges that may require frequent servicing.



MACHINERY ADHESIVES – **RETAINING**

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.

Retaining

LOCTITE® anaerobic retaining compounds secure bearings, bushings and cylindrical parts into housings or onto shafts. They achieve maximum load transmission capability and uniform stress distribution and eliminate fretting corrosion. Applied as a liquid, they form a 100% contact between mating metal surfaces, eliminating the need for expensive replacement parts, time consuming machining or the use of mechanical methods.

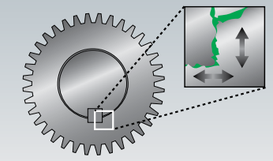
Benefits

- High shear strength – augments or replaces press fits
- 100% contact – evens distribution of load and stress
- Eliminates fretting and backlash in keys and splines
- Fills air voids to seal and protect from corrosion
- Relaxes part tolerances

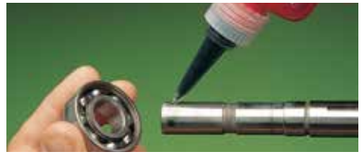
INACTIVE METALS	
Plated Parts	Galvanized Steel
Anodized Aluminum	Zinc
Titanium	Aluminum
Stainless Steel	Black Oxide

Helpful Hints:

- Use LOCTITE® SF 7649™ Primer for faster fixture times and on inactive metals.
- Even machined surfaces have only 20% to 40% contact.



YOUR APPLICATION CRITERIA



DO YOU HAVE LARGE PARTS THAT REQUIRE EXTRA ASSEMBLY TIME?

No

What temperature resistance is required?

180°C/356°F

Health and Safety Grade

General Purpose/ Stainless Steel

Slip Fit/High Strength

232°C/450°F

Slip Fit/High Temp.

Yes

What temperature resistance is required?

149°C/300°F

Heavy Press Fits

204°C/400°F

Slow Cure for Large Parts and Active Metals

SOLUTION	LOCTITE® 6300™	LOCTITE® 648™	LOCTITE® 638™	LOCTITE® 620™	LOCTITE® 232™	LOCTITE® 640™
Color	Green	Green	Green	Green	Brown	Green
Viscosity (Pa-S)	350	500	2,500	8,500	5,000	600
Shear Strength (Steel) (MPa)	15.0	27.0	31.0	26.0	9.0	22.0
Clearance	Up to 0.25mm	Up to 0.15mm	Up to 0.25mm	Up to 0.2mm	Up to 0.38mm	Up to 0.1mm
Temperature Resistance	-54° to 180°C (-65° to 356°F)	-54° to 180°C (-65° to 356°F)	-54° to 180°C (-65° to 356°F)	-54° to 232°C (-65° to 450°F)	-54° to 149°C (-65° to 300°F)	-54° to 204°C (-65° to 400°F)
Fixture/Cure Time	60 min. / 24 hrs.	3 min. / 24 hrs.	4 min. / 24 hrs.	60 min. / 24 hrs.	60 min. / 24 hrs.	60 min. / 24 hrs.
Oil Resistance (1,000 hrs. @ 250°C/482°F)	Highly Recommended	Highly Recommended	Highly Recommended	Highly Recommended	Highly Recommended	Highly Recommended
Gasoline Resistance (1,000 hrs. @ 22°C/72°F)	Highly Recommended	Highly Recommended	Highly Recommended	Highly Recommended	Highly Recommended	Highly Recommended
Water/Glycol Resistance (1,000 hrs. @ 87°C/189°F)	Highly Recommended	Highly Recommended	Highly Recommended	Highly Recommended	Highly Recommended	Highly Recommended
Description	High strength retaining compound formulated to have a 'white' health and safety label. Tested and deemed a non-skin allergen/irritant.	General purpose, high strength, retaining compound for bonding cylindrical metal parts (especially stainless steel) with a clearance or interference fit. NSF/ANSI 61 Certified.	General purpose, high strength, retaining compound for bonding cylindrical metal parts with slip fits or larger gaps. NSF/ANSI 61 Certified.	High strength, retaining compound for bonding cylindrical metal parts in high temp. applications. ABS Approved.	Slow curing, low strength retaining compound for bonding very large and/or heavy interference fitting metal parts.	Slow cure, high strength retaining compound for bonding very large and/or heavy interference fitting metal parts (especially brass) in high temp. applications.

EQUIPMENT AND ENGINEERING SOLUTIONS

Dependable Equipment, High-Quality Services

Henkel provides a complete line of rugged and dependable application and cure equipment for all of our products as well as supporting services. 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.

ADHESIVE AND SEALANT EQUIPMENT SOLUTIONS

LOCTITE® and TEROSON® Standard Equipment

From simple handheld devices to fully automated systems and a broad range of accessories, Henkel offers a complete line of off-the-shelf and custom-built dispensing equipment that can be integrated easily into your manufacturing process.

VOLUMETRIC DISPENSING

LOCTITE® PRODUCT		IDH NUMBER	USED TO DISPENSE	PACKAGE TYPES & SIZES	VISCOSITY RANGE	APPLICATION	CONSUMABLES – DISPENSE ACCESSORIES
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	Dispense Tips and Accessories
TUBE DISPENSING							
	50 ML-F TUBE SQUEEZE DISPENSER	1083845	Thread Sealants, Gasketing Compounds	50 ml tubes	Low to High	Manual	N/A

PRESSURE TIME DISPENSING

LOCTITE® PRODUCT		IDH NUMBER	PRESSURE REGULATION	USED TO DISPENSE	PACKAGE TYPES & SIZES	VISCOSITY RANGE	LOW LEVEL SENSING	CONSUMABLES – DISPENSE ACCESSORIES
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.						

SAUSAGE/CARTRIDGE DISPENSING

LOCTITE® PRODUCT		IDH NUMBER	PRESSURE REGULATION	USED TO DISPENSE	PACKAGE TYPE & SIZES	VISCOSITY RANGE	LOW LEVEL SENSING	CONSUMABLES – DISPENSE ACCESSORIES
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		

DUAL CARTRIDGE DISPENSING

LOCTITE® PRODUCT		IDH NUMBER	USED TO DISPENSE	PACKAGE TYPE & SIZES	MIX RATIOS	VISCOSITY RANGE	TYPE
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.

ADHESIVE AND SEALANT ENGINEERING SERVICES

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
- Customer teardowns
- Custom equipment
- Customer 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 engine assembly (formed-in-place, cured-in-place, and injection gasketing)
- Electrical/electronic potting and gasketing
- Headlamp/lighting assembly
- 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 product 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.

TOTAL SOLUTIONS AND SUPPORT

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

PROCESS OPTIMIZATION

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 cost 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 analyses 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 teardowns, surface analysis, and testing.

Product Solutions

Product Solutions

Equipment Solutions

NOTES

Call Henkel for other innovative processing solutions to speed up your production line.

1-800-562-8483

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TECHNOMELT®
TEROSON®
AQUENCE®

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