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LOCTITE®
Product Training
2014

Henkel Excellence is our Passion

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Anaerobic adhesives are the highest performance, easiest to use, lowest cost solution when assembling tight fitting metal parts.

Anaerobic adhesives are:

- One Part
- Solvent Free
- Room temperature cure
- Won’t dry out
- Cured resin forms a thermoset plastic that won’t melt
- Cure in the absence of air and the presence of an active metal **(confined between two metal parts)**
- Cure at Room temperature **(68° to 72°F)**
- Offer superior chemical and thermal resistance
- Long shelf/room temperature storage

When should I use a Primer?

- When both surfaces considered inactive
- When you have large Gap
- If applying to cold parts

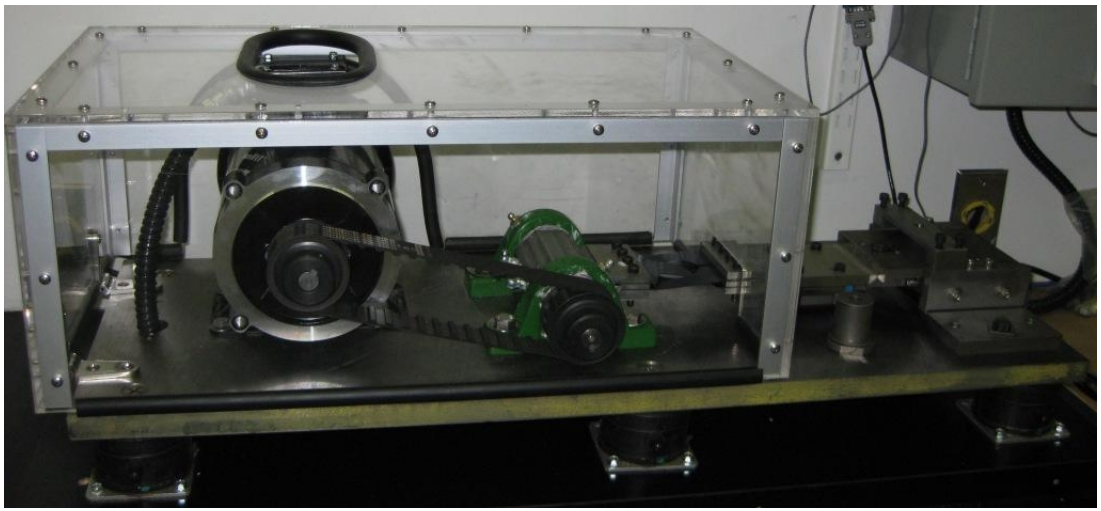
ACTIVE METALS			
Iron	Plain Steel	Kovar®	Commercial Aluminum (with copper content e.g., 6061)
Brass	Copper	Monel®	
Bronze	Maganese	Nickel	
INACTIVE METALS			
Plated Parts	Pure Aluminum	Plastics	Natural or Chemical Black Oxide
Magnetite Steel	Titanium	Cadmium	
Stainless Steel	Magnesium	Inconel®	Anodized Aluminum (Alodine, Irridite)
Galvanized Steel	Gold and Silver	Zinc	

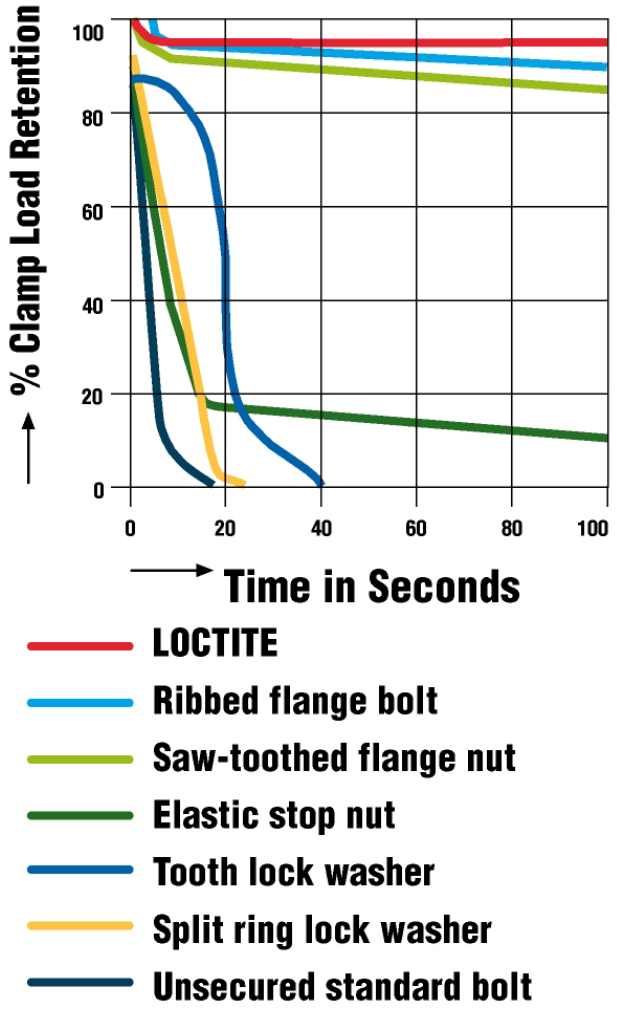
Primer

- **7649 Primer N**
  - Cleans parts/ speeds cure
  - Use it with any threadlocker
  - Spray or Liquid
- **7088 Stick Primer**
  - Convenient
  - Portable

#1 Cause of Catastrophic Failure? Loosening of Threaded Fasteners!

Transverse Shock Tester - JUNKERS





Why Do Fasteners Fail?

What can cause threaded fasteners to loosen?

- Vibration
- Impact
- Bending
- Thermal cycling
- Transverse shock
- Part fatigue
- Part deformation

Parts tolerance

Vibration and loosening

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Threadlocking

THREADLOCKING – Locking of Threaded Fasteners

- Prevents loosening from shock and vibration
- Single component – clean and easy to apply
- Can be used on various sizes of fasteners – reduces inventory costs

VDR ORDER NUMBER	MFG CATALOG NUMBER	PRODUCT DESCRIPTION	PACKAGE SIZE
1186840	1186840	LOCTITE® 2046™ Threadlocker	12 ml syringe
1134607	1134607	LOCTITE® 2047™ Threadlocker	50 ml
483618 645093 231424	37388 39186 22041	LOCTITE® 220™ Threadlocker	10 ml 50 ml 250 ml
135333 135334 135335	22221 22231 22241	LOCTITE® 222MS™ Threadlocker	10 ml 50 ml 250 ml
555339	38653	LOCTITE® 222™ Threadlocker	6 ml
1526121	1526121	LOCTITE® 2400NA™ Blue Threadlocker	50 ml
230718 487229 492140 135355	24205 37418 37477 24231	LOCTITE® 242® Threadlocker	0.5 ml ampule 6 ml 36 ml 50 ml
1134601	1134601	LOCTITE® 2422™ Threadlocker	30 g
1330799 1329837 1330906 1329467 1329505	1330799 1329837 1330906 1329467 1329505	LOCTITE® 243™ Threadlocker	6 ml 10 ml 36 ml 50 ml 250 ml
1138282	1138282	LOCTITE® 2620™ Threadlocker	30 g
487231 492141 135374	37420 37478 26231	LOCTITE® 262™ Threadlocker	6 ml 36 ml 50 ml

VDR ORDER NUMBER	MFG CATALOG NUMBER	PRODUCT DESCRIPTION	PACKAGE SIZE
1330583 1330585 1330335	1330583 1330585 1330335	LOCTITE® 263™ Threadlocker	10 ml 50 ml 250 ml
1526123	1526123	LOCTITE® 2700NA™ Red Threadlocker	50 ml
232532 487232 492142	27105 37421 37479	LOCTITE® 271™ Threadlocker	0.5 ml ampule 6 ml 36 ml
492143 88442	37480 27240	LOCTITE® 272™ Threadlocker	36 ml 50 ml
555353 88448	38656 27731	LOCTITE® 277™ Threadlocker	36 ml 50 ml
487234 233731 492144 135392 135393	37423 29021 37481 29031 29041	LOCTITE® 290™ Threadlocker	6 ml 10 ml 36 ml 50 ml 250 ml
135461	42540	LOCTITE® 425™ Assure™ Instant Adhesive	20 g
506166 504466	37643 37614	LOCTITE® Blue Threadlocker Stick	9 g 19 g
1372603	1372603	LOCTITE® QuickTape® 249™	260" roll
511537 511535	37701 37700	LOCTITE® Red Threadlocker Stick	9 g 19 g

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Attempts at Reliability

Mechanical Methods of Fastening and Locking

Cost based on 2008 pricing of quantities of 100 pieces (3/8 x 16)

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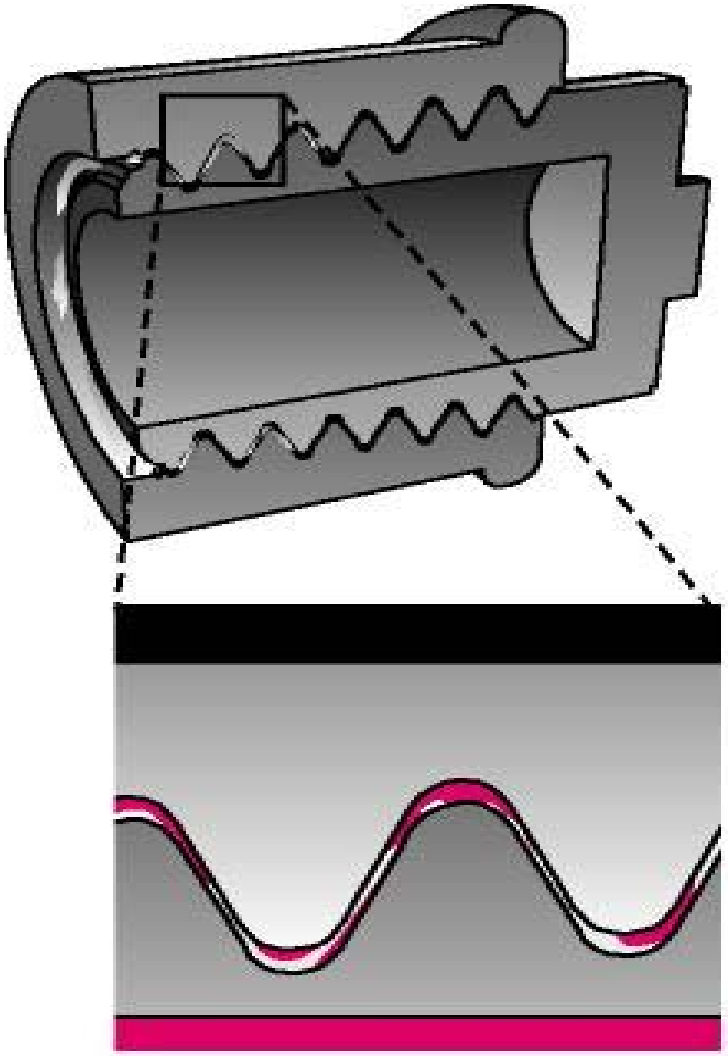
Types of Threadlockers

- **High Strength – Primerless, removable with heat, for fastners ¾” – 1-1/2”**
- **Medium Strength – Primerless, removable with hand tools, for fasteners ¼” to 3/4”**
- **Low Strength - Removable, low strength, small fastener carburetors, relay locks, headlamps throttle body assembly, choke assembly and fuel injection set screws, body panel mounting fasteners.**
- **Wicking Grade - Wicking, high strength, seals weld porosity – great for bolts on alternators, air conditioning belts, distributor clamps, carburetor adjustments screws and hairline cracks**

Why do Pipe Threads Leak?

- Less than 100% metal-to-metal contact
- Damaged threads
- Temperature cycling
- Vibration & shock
- Improper Assembly
- Excessive Pressure
- Incorrect materials
- Inefficient sealant
- Piping support/ design



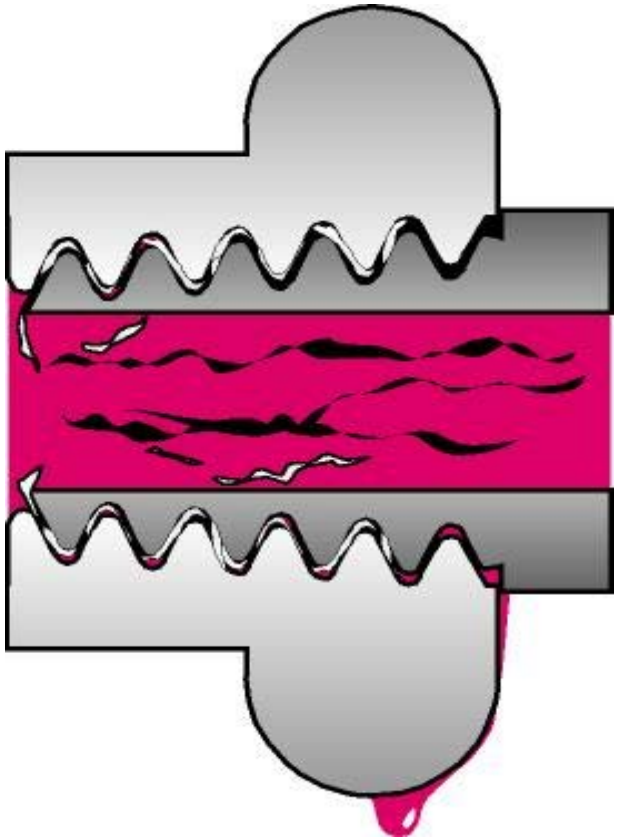
Oil Leaks and Air Leaks

- What does one drop of hydraulic fluid every TEN seconds mean?
  - 40 Gallons of fluid a year
  - What about other costs? Hazardous waste disposal & slips

What are the costs of air leakage?			
Diameter of Opening (inch)	**Cubic Feet of Air Loss/Month at 100 psi**	**Cost @ $0.05 per KW Hour = Loss per year in dollar of**	**Cost @ $0.05 per KW Hour = Loss per year in dollar of**
1/32	69,850	$148.00	$295.00
1/16	278,700	$592.00	$1,183.00
1/8	1,114,800	$2,371.00	$4,741.00

Shortcomings of Teflon Tape

- Tape Cold Flows & can push into system
- Tape Shreds & Contaminates on Reassembly
- Tape is a Lubricant (can cause over tightening)
- Tape requires Precise Application
  (direction & number of wraps)



Pipe Dope

- Pipe dope contains up to 50% solvents and dries and cracks
- Dope forms a semi solid that’s hard to loosen and clean
- Dope can be messy to apply

Characteristics of Anerobic Thread Sealants

- Cure from a liquid/ paste to a solid thermoset plastic
- Seal and lock threads simultaneously
- Lubricate for proper assembly
- Uncured sealant dissipates in fluid, eliminating contamination and fowling
- Prevent thread rusting for predictable disassembly
- Provide instant low pressure seals
- Universal (works on all types of fittings)

Retaining

Retaining Defined

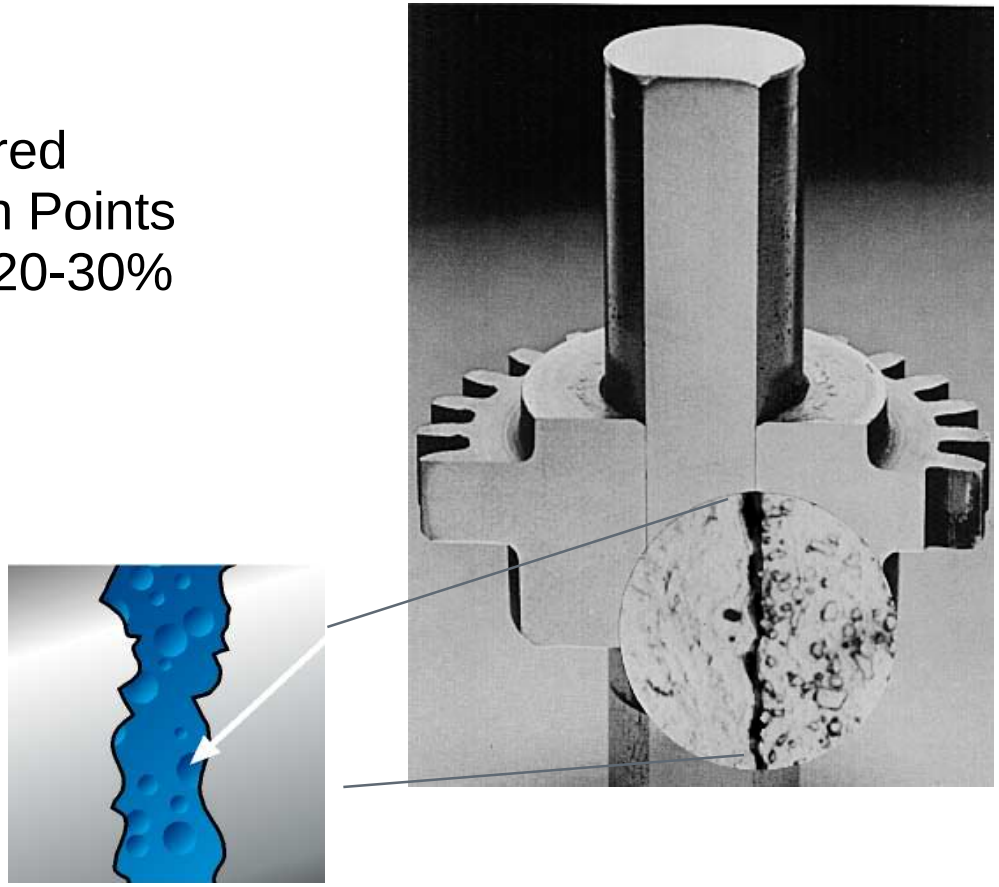
- Retaining refers to any method of holding together cylindrically fitted assemblies
- Retaining methods include Keyed, splines, setscrews and interference fits

Typical Chronic Failures in Cylindrical Applications

- Backlash/Wear
- Spun Bearings
- Key Wallow
- Misalignment

Shortcomings of Press Fits

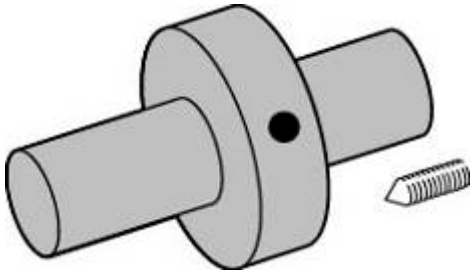
- High Stress
- Fretting Possible
- Assembly equipment required
- Contact occurs only at High Points
  - Generally only between 20-30%



Shortcomings of other Mechanical Assemblies

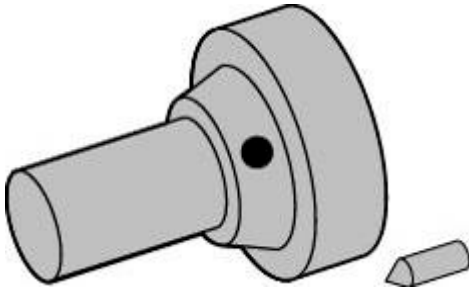
Set Screws

- Low metal-to-metal contact
- Low-torque transmission
- Extra machining



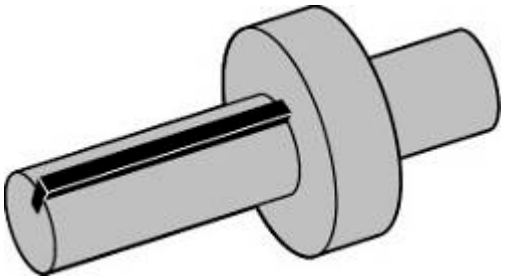
Pins

- High-stress concentration
- Prone to backlash
- Costly machining

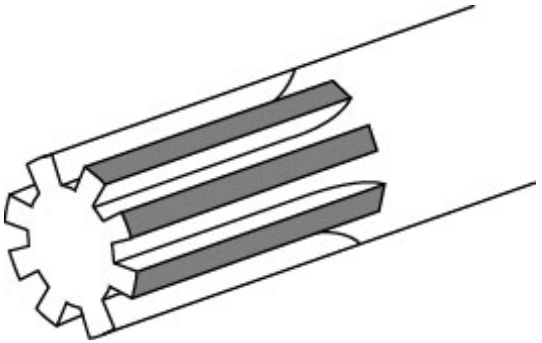


Short Comings of other Mechanical Assemblies

Keys
- Costly to produce
- Prone to backlash and chattering
- Accurate machining required



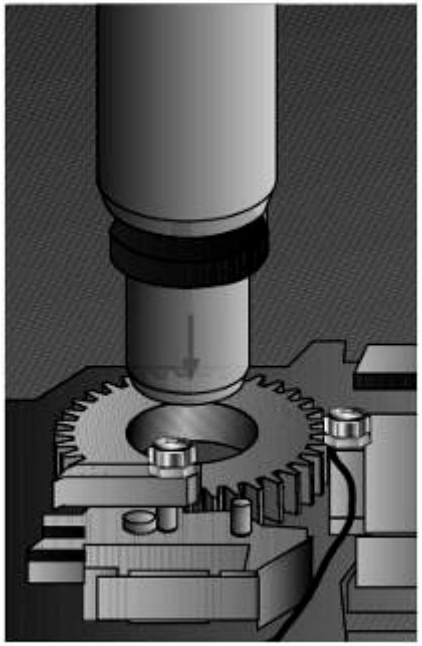
Splines
- Costly machining
- Special design
- Prone to wear

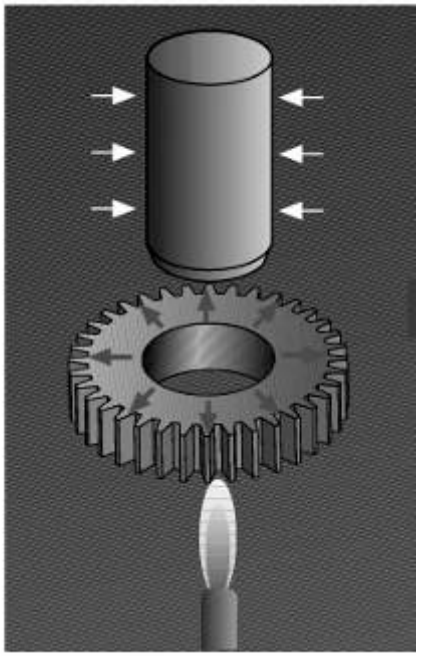


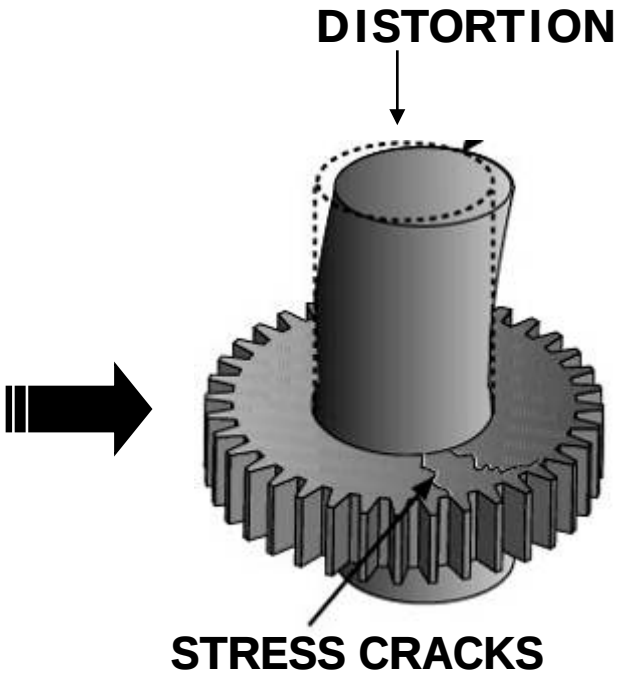
Stress and Distortion

Force & Heat generated or applied in the assembly process can:

- Cause Stress & Distortion

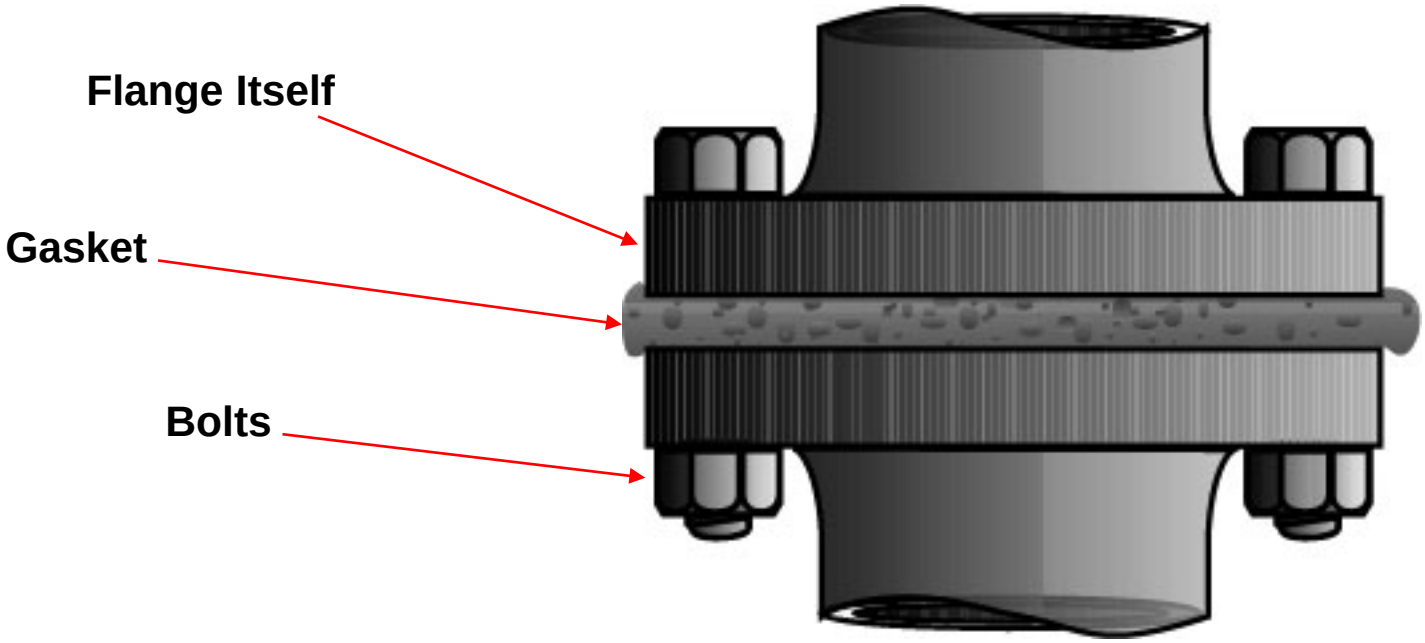




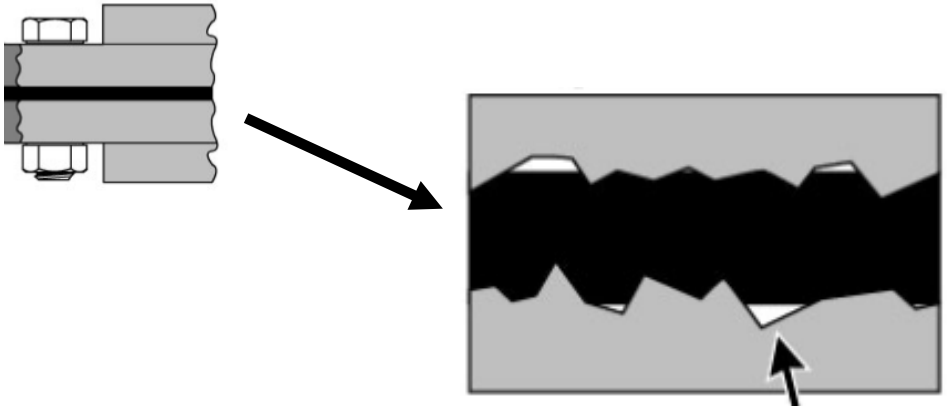


Gasketing

Parts of a Flange System



The Perfect Flange



Why must we use a gasket?

Surface Imperfections leave gaps which are potential leak paths

What would be a "perfect" flange or surface?

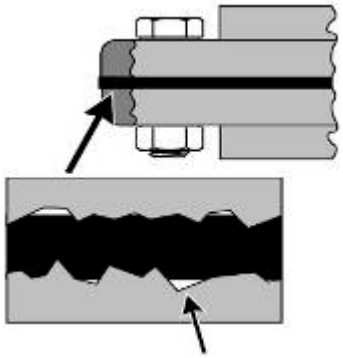
A perfectly machined surface which is very costly is highly impractical for general industry and is only perfect once (Perfect Flange)

Functions of a Gasket

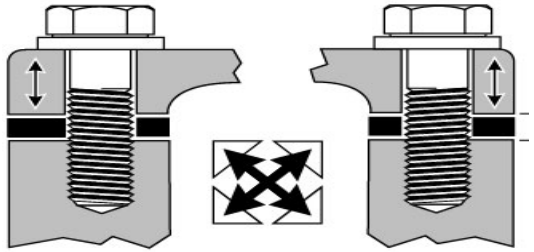
- Create a seal
- Maintain a seal
- Remain impervious to fluid flow
- Compatible with environment

Why do Gaskets Fail?

Surface Roughness

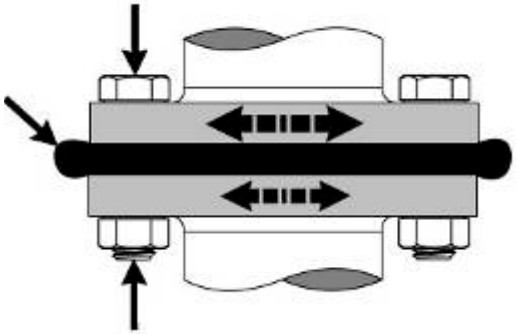


Compression Set



PRESSURE SURGES FELT BY FLANGES HAVE A POUNDING EFFECT ON GASKETS GRADUALLY REDUCING THEIR THICKNESS

Temperature Effects



Fluid Attack

Brittle / Crack with Age

Pressure Extrusion

Require Dressings

Anaerobic Gasketing

- Flange Sealants
  - 515 Gasket Eliminator
    - Flexible gasket for rigid flanges
    - ***Applications*** – water pumps, thermostat housings, transmission pans and case covers, transaxle casings, o-ring replacement
    - General gasketing
    - Gaps of <.015”
    - OEM certified
  - Package
    - 50 ml tube – item # 38655

Anaerobic Gasketing

- Flange Sealants
  - 518 Gasket Eliminator
    - Flexible gasket for flexible metals
    - ***Applications*** – water pumps, thermostat housings, transmission pans and case covers, transaxle casings, o-ring replacement
    - Resists low on-line test pressures
    - Gaps up to .050”
    - 300F rating
    - OEM certified
  - Packages
    - 50 ml tube – item # 37394
    - 300 ml cartridge – item # 37530

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Silicone Gasketing

- Ready Gasket
  - Single component – moisture cure
  - Gasket maker
  - ***Applications*** – cut gasket replacement
  - Resists – ATF, oil, antifreeze
  - Temp. range -75F to 500F
  - OEM certified
  - Packages
    - 7 oz. pressurized can – item # 37510
    - 5 oz. cartridge – item # 37512
    - 190 ml power can aerosol – item # 40480

Silicone Gasketing

- RTV 587 Blue
  - Single component – moisture cure
  - Gasket maker
  - ***Applications*** – plant maintenance
  - Increased oil resistance
  - Non-corrosive
  - Sensor safe
  - Temp. range -75F to 500F
  - ***Certifications***
    - UL listed
    - NSF P1, CFIA, ABS
  - Packages
    - 80 ml tube – item # 37465
    - 190 ml power can aerosol – item # 40462

Silicone Gasketing

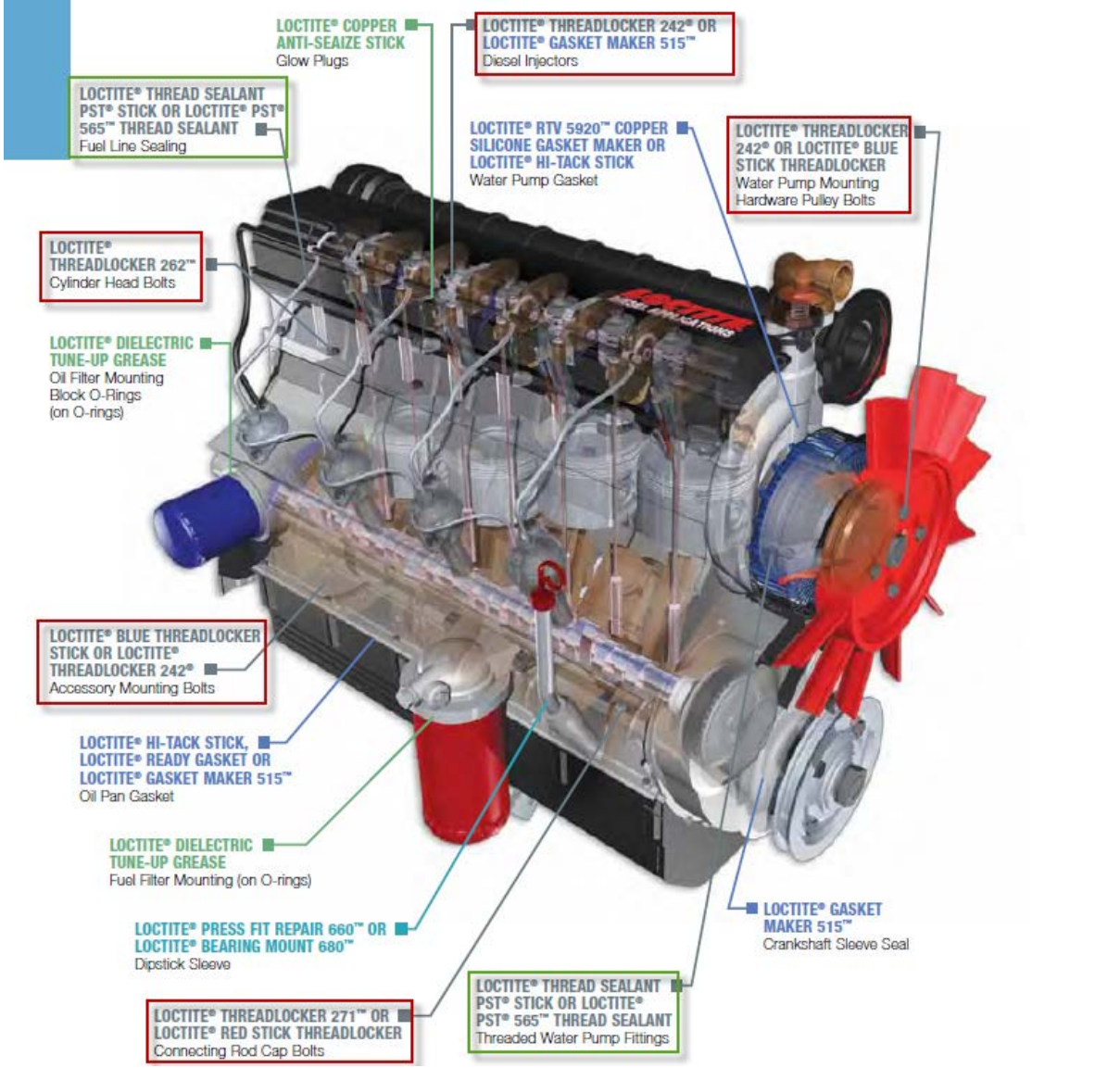
- RTV 598 Black
  - Single component – moisture cure
  - Gasket maker
  - ***Applications*** – valve covers, oil pans, timing covers, transmission pans
  - Non-corrosive
  - Sensor safe
  - Excellent oil resistance
  - Temp. range -75F to 625F
    - OEM specified
  - ***Certifications***
    - CFIA, ABS
  - Packages
    - 0.37 & 80 ml tube – item # 37472, 37467
    - 190 ml power can aerosol – item # 40463
    - 8.75 oz. pressurized can – item # 37519
    - 300 ml cartridge – item # 37516

Silicone Gasketing

- RTV 5699 Silicone
  - Single component – moisture cure
  - Gasket maker
  - ***Applications*** – valve covers, oil pans, timing covers, water pumps, thermostat housings, intake manifold end seals
  - Non-corrosive
  - Outstanding oil resistance
  - Temp. range -75F to 625F
    - OEM specified
  - ***Certifications***
    - CFIA
  - Packages
    - 80 ml tube – item # 37464
    - 190 ml power can aerosol – item # 40405

diesel engine

Poster Ava. – LT#4675



heavy-duty differential/axle