

40105-07

Gaskets and Packing

- An introduction to
 - Gaskets
 - Packing
 - O-rings

I.0.0 Introduction

- Gaskets
 - **Seals two flat mating surfaces.**
 - Rigid (non-moving) joints only.
- Packing
 - Packed into a cavity (packing gland).
 - Rigid, rotating, or sliding joints.
- O-rings
 - Fits into a groove on one surface and compresses against the other surface.
 - Rigid or rotating joints.

SECTION I : GASKETS

- Types of Gaskets
- Gaskets Materials

1.0.0 Introduction to Gaskets



1.1.0 Compatibility

- Every sealant must be compatible with the fluid it is sealing.
- If not, the seal will break down.
 - Chemically or physically.
- Then the joint will leak.

2.0.0 Types of Gaskets

- Ring
- Full Face
- Spiral Wound
- Jacketed
- Envelope
- Split Ring
- Strip
- Ring-Type Joint
- Graphite-Impregnated

2.1.0 Ring Gasket

- Flat, usually donut shaped.
- Used for pipe flanges.
- Fits inside the flange bolt circle.
- Normally withstands up to 200 psi.

2.1.0 Ring Gasket



2.2.0 Full Face Gasket

- Flat, usually donut shaped.
- Covers the entire flange face.
- **Has bolt holes to match the flange.**

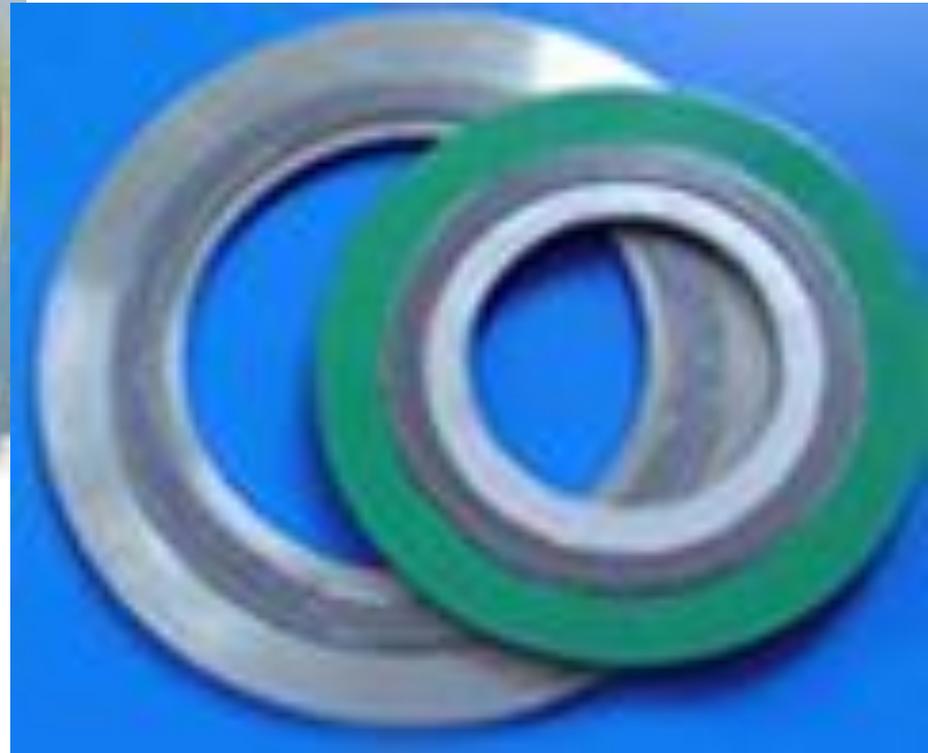
2.2.0 Full Face Gasket



2.3.0 Spiral Wound Gasket

- Flat, usually donut shaped.
- Normally made of Stainless Steel with a Graphite insert.
- Crushable, with a high Resilience.
- Resilience = the ability to expand and contract with changes in pressure, temperature, and pipe movement.

2.3.0 Spiral Wound Gasket



2.4.0 Jacketed Gasket

- Metal exterior, normally Stainless Steel.
- Internal filler material.
 - Older filler was mainly asbestos.
 - Remove only if you are certified.
- Jacket prevents filler material from contaminating the system fluid.

2.4.0 Jacketed Gasket



2.5.0 Envelope Gasket

- **Teflon exterior.**
 - **TFE – tetrafluoroethylene.**
- Internal filler material.
- Same basic principles as the Jacketed Gasket, but has limited temperature range.
- Superior sealing capacity.
 - Used mainly on imperfect flange fit-ups.

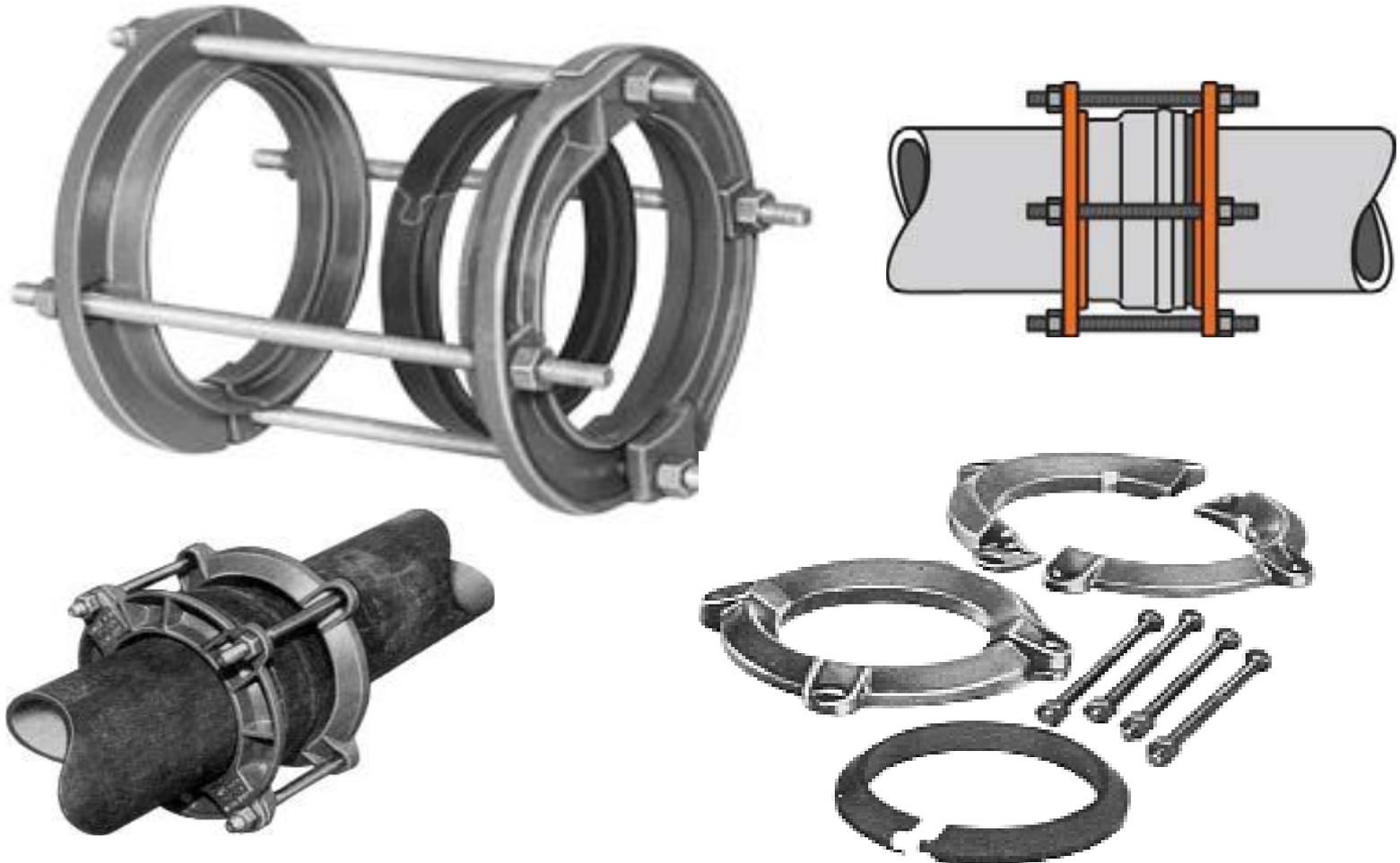
2.5.0 Envelope Gasket



2.6.0 Split Ring Gasket

- Donut shaped.
 - With many different configurations.
- Two half-ring pieces.
- To fit into joint where flange or pipe cannot be completely separated.

2.6.0 Split Ring Gasket



2.7.0 Strip Gasket

- A long strip of flat or round material.
- Purchased as bulk wound on a roll.
- Is cut to length needed for the joint.
- Usually Teflon or mixed with Teflon.
- Medium pressure, low temperature.
- **Used for temporary repairs.**
 - **NOT for permanent installations.**

2.7.0 Strip Gasket



2.8.0 (RTJ) Ring Type Joint Gasket

- Flat, usually donut shaped.
- Usually metal.
- Used with flanges that have concentric grooves cut into each face.
- Gasket is compressed into the grooves.
- Used in high pressure applications of 2,000 psi or higher.
- Have been used in 50,000 psi applications.

2.8.0 (RTJ) Ring Type Joint Gasket



2.9.0 Graphite-Impregnated Gasket

- Flat, usually donut shaped.
- Fiberglass impregnated with particles of graphite.
- Used mainly in high temperature applications.
- The graphite makes them reactive to oxidation.

2.9.0 Graphite-Impregnated Gasket



REVIEW

2.0.0 Types of Gaskets

- Ring
- Full Face
- Spiral Wound
- Jacketed
- Envelope
- Split Ring
- Strip
- Ring-Type Joint
- Graphite-Impregnated

3.0.0 Gasket Materials

- Natural rubber
- EDPM
- Neoprene
- Nitrile
- Silicone
- Viton
- Gylon or Amerilon
- Fiberglass / Graphite
- Soft metal

3.1.0 Natural Rubber

- Seldom used today.
- Low solvent and oil resistance.
- Excellent sealant for water.
- Excellent resilience.
- Maximum temperature rating of 175 F.

3.2.0 EPDM

- Low solvent and oil resistance.
- Good sealant for water and most chemicals.
- Good ozone resistance.
- Very good sealant for oxygen-rich environments.
- Excellent flame resistance.
- Maximum temperature rating of 350 F.

3.3.0 Neoprene

- **Used only for non-critical sealing applications.**
- Not a recommended sealant for water.
- Poor chemical resistance.
- Fair solvent and oil resistance.
- Maximum temperature rating of 250 F.

3.4.0 Nitrile

- **Used for medium-pressure solvent and oil sealing applications.**
- Poor ozone resistance.
- Poor flame resistance.
- Cannot be used with acetone or methyl ethyl ketone (MEK).
- Good chemical resistance.
- Excellent sealant for water and alcohol.
- Maximum temperature rating of 250 F.

3.5.0 Silicone

- A rubber-like material that is widely used.
- Has many different grades.
- Poor to excellent resilience depending on the grade of silicone.
- Not a recommended sealant for solvent and oil.
- Fair to good chemical resistance.
- Fair to good flame resistance.
- Excellent ozone resistance.
- Maximum temperature rating of 550 F.

3.6.0 Viton

- A hard fluoroelastomer material.
- Excellent solvent and oil resistance.
- Excellent chemical resistance.
- **The most commonly used sealant for chemicals.**
- Excellent solvent and oil resistance.
- Excellent ozone resistance.
- Relatively inexpensive material.
- Maximum temperature rating of 400 F.

3.7.0 Gylon or Amerilon

- Proprietary combinations of Kevlar and PTFE.
- Used heavily in chemical and paper industries.
- **Gylon 3510 has one of the best sealability factors in the industry.**
- Excellent tear resistance.
- Excellent low temperature resistance.
- Excellent chemical resistance.
 - These gaskets are chemically inert.
- High resilience – 45% recovery.
- Maximum temperature rating of 500 F.

3.8.0 Fiberglass / Graphite

- Fiberglass impregnated with graphite particles.
- Low oxidation resistance.
- Excellent high temperature resistance.

3.9.0 Soft Metal

- Usually annealed copper or aluminum.
- Metal chosen for non-reactivity to the environment.
- High wear resistance.
- High pressure resistance.
- Uses heavily in oil and gas pipelines.
- Used heavily in high pressure industrial systems.

3.9.0 Soft Metal



Review

3.0.0 Gasket Materials

- Natural rubber
- EDPM
- Neoprene
- Nitrile
- Silicone
- Viton
- Gylon or Amerilon
- Fiberglass / Graphite
- Soft metal

3.10.0 Gasket Color Codes

- Most manufacturers color code their gaskets.
- Color codes can represent different types, materials, or sizes.
- All manufacturers have different color coding schemes.