

A.R. Thomson Group

FLUID CONTAINMENT AND CONTROL SPECIALISTS **SINCE 1967**



Total Sealing Integrity

GASKETS ■ SEALS ■ VALVES ■ FITTINGS

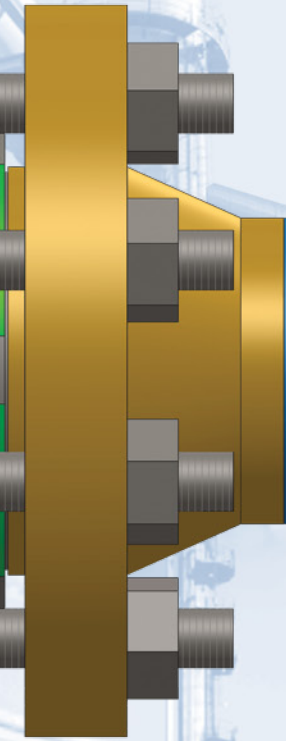
Quality

Traceability

Reliability

Efficiency

Environment



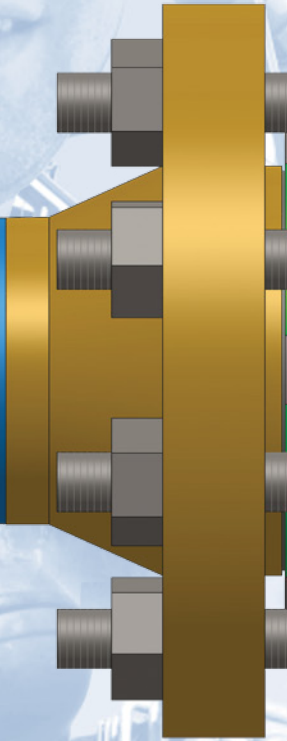
Inspection

Training

Safety

Asset Management

Performance



Our Mission Statement

To be a valued provider of cost effective solutions for fluid containment and control through consultation, training and a policy of continuous improvement in quality, technology and work processes. To have our customers place a high value on our service and view us as an important ally in their business.

About our Gasket, Stud and Nut Divisions

A.R. Thomson Group manufactures a wide variety of gaskets using the most advanced methods including forming, machining, CNC laser cutting, stamping and winding. We are also able to produce custom metal/composite and “form-in-place” gaskets for heat exchangers, pressure vessels, heaters, pumps, valves and large diameter flanges. These include solid steel, double jacketed, camprofile and spiral wound gaskets of various alloys and filler materials.

As an industry leader in manufacturing and supply of gaskets and industrial sealing products, A.R. Thomson Group has expanded its offering to include a full line of studs, nuts and bolting products. All of our industrial studs and nuts complement the bolted joint assembly and are manufactured in accordance to the latest editions of ASTM and ASME.



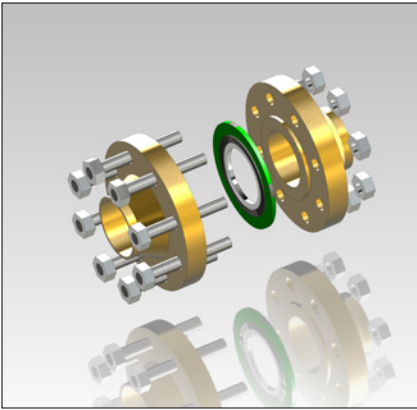
Quality

A.R. Thomson Group is committed to reliability, repeatability, traceability and to providing quality products and services to our customers through a policy of “continuous improvement.” This is demonstrated by our commitment to new product development, the integration of new technologies into our manufacturing processes, the development and implementation of training programs for our employees and our competitiveness in the global marketplace.



Governing Bodies

- ABSA** | Alberta Boilers Safety Association
- AML** | Accepted Manufacturers List (CANFLEX® Gaskets)
- API** | American Petroleum Institute
- ASME** | American Society of Mechanical Engineers
- ASTM** | American Society for Testing and Materials
- EOH&S** | Environmental/Occupational Health & Safety (COR)
- ISO** | International Organization for Standardization



The integrity of a bolted joint assembly depends on following installation procedures:

1. Select materials suitable for the application (gasket, media, temperature, pressure, etc).
2. Clean and inspect all joint components (flange faces, gasket, studs and nuts).
3. Correct gasket placement (centered between the mating flanges).
4. Lubricate the studs and nuts (approved lubricants).
5. Install and tighten bolts (5 passes, star pattern).

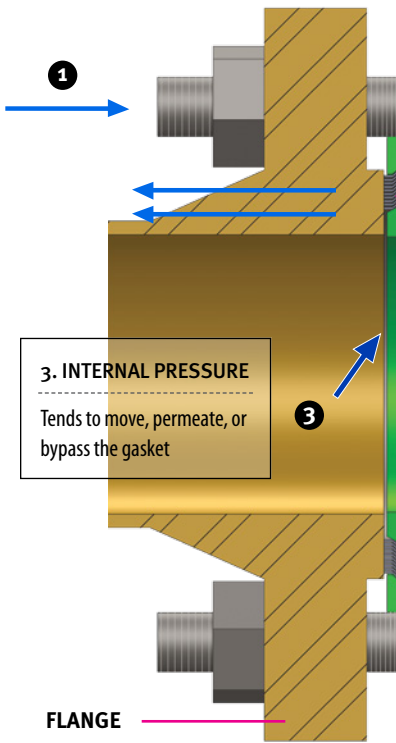
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The Bolted Joint Assembly

Studs/Nuts and Gaskets are the critical components to positive sealing of a 'bolted joint connection/assembly'.

| | |
|-------------------|---|
| FLANGE | Connects piping, valves, pumps and other related components together |
| STUDS/NUTS | Provide the compressive force required to bring the flanges together and compress the gasket |
| GASKET | Maintains a static seal between the adjacent flanges; prevents the passage of media across the flanged connection |

1. GASKET LOAD
The function of bolting or another device which applies force upon the flange faces to compress the gasket



3. INTERNAL PRESSURE
Tends to move, permeate, or bypass the gasket

4. ATMOSPHERIC PRESSURE

Material Selection Guide

The following must be considered when selecting the appropriate materials for any bolted joint assembly:

| GASKET | STUD & NUT |
|---|---|
| <ul style="list-style-type: none"> ▪ Compatibility with the service media | <ul style="list-style-type: none"> ▪ Must have sufficient yield strength for desired load |
| <ul style="list-style-type: none"> ▪ Compatibility with the operating temperature and pressure | <ul style="list-style-type: none"> ▪ Bolts must be of uniform materials to ensure consistent mechanical and thermal properties |
| <ul style="list-style-type: none"> ▪ Flange design (raised face, flat face, etc.) | <ul style="list-style-type: none"> ▪ Ensure that the studs & nuts are free of corrosion |
| <p>⚠ Do not reuse gaskets</p> | <p>⚠ It is not recommended to re-use studs and nuts</p> |

Flange Insulation

- Increases the effectiveness of cathodic protection systems
- Alleviates the galvanic corrosion of dissimilar metal flanges
- Decreases/eliminates flow induced flange face erosion
- Specialized products available to mate mismatched flange arrangements (RT) to RF)

Please consult an A.R. Thomson Group application specialist for assistance in determining the correct materials for your service.

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Sealing Integrity

The Importance of Lubrication

Lubrication is essential when torque is used to create a positive seal in any bolted joint assembly. The following must be considered when selecting a lubricant for your specific application requirements:

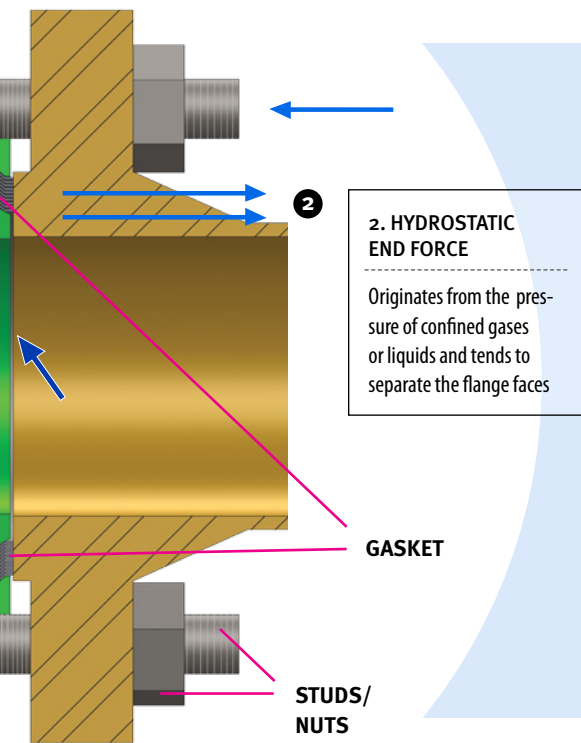
- LUBRICITY** Higher quality lubricants will generate less friction.
- COMPATIBILITY** The selected lubricant must be compatible with the specified studs and nuts.
- TEMPERATURE** Ensure that the lubricant will function within the required process service temperatures.

Coated Studs & Nuts

- Used to enhance the performance of studs & nuts in a bolted joint assembly
- Custom coatings help reduce corrosion and prevent seizing and galling
- Available in a wide variety of materials and coatings (Xylan®, Teflon®, Cadmium, Zinc) to suit your specific service requirements

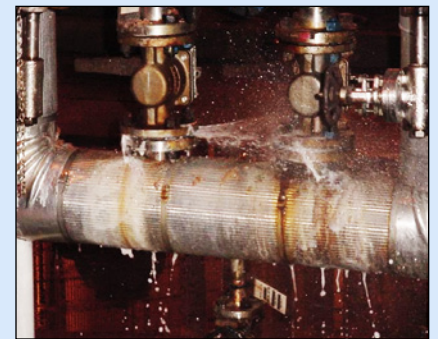
Hardened Steel Washers

- Helps maintain the integrity of the flange and enhances load distribution



Common Reasons for Joint Failure

- **Failure due to the studs & nuts** most common; insufficient load
- **Failure due to the gasket** incorrect material, damaged during installation, reused, etc.
- **Failure due to the flange** uncommon; surface damage, warping, corrosion etc.



⚠ Flange assemblies often leak due to reasons other than gasket failure

Flexible Graphite

Not all Flexible Graphite is the same...

Flexible Graphite is well-known for its extreme temperature resistance, but there are limitations. When oxygen is present, Flexible Graphite is subject to "Oxidation". This condition results in volume loss and potential failure.

- OXIDATION INHIBITOR** Is a non-metallic, anti-corrosion additive that prevents oxidation at elevated temperatures increasing the maximum temperature capability of the Graphite.
- CARBON CONTENT** Oxidation resistance is not necessarily indicated by carbon content. Flexible Graphite with higher carbon content does not resist oxidation any more than those with lower contents.
- FLEXIBLE GRAPHITE IMPURITIES** Excess sulphur, leachable chloride, and ash will compromise Flexible Graphite performance and may lead to premature corrosion and failure. Reputable manufacturers will publish these content levels in their specifications.

Flexible Graphite from A.R. Thomson Group

A.R. Thomson Group holds a strict Flexible Graphite specification that includes oxidation inhibitors, low sulphur/leachable chlorides/ash content, and high carbon content. We have an incoming "analyzer" inspection protocol and third party testing for all Flexible Graphite. We believe that quality Flexible Graphite is a critical component of **Total Sealing Integrity**.

ARTG FLEXIBLE GRAPHITE SEALING PROPERTIES

| | |
|--|--|
| Excellent thermal stability | High thermal conductivity |
| No aging or embrittlement | Low gas permeability |
| Easily conformable to surface irregularities | Low modulus of elasticity, highly flexible |
| Good chemical resistance | Non-toxic, presents no health hazards |

Please contact your local A.R. Thomson Group technical representative for additional Flexible Graphite information.



As Total Sealing Integrity and Asset Management specialists:

- We create and promote **best bolting practices** for our customers through consultation and safety training.
- We emphasize and develop practices toward achieving **bolted joint reliability**.
- We provide **gasket selection** criteria specific to our customers unique applications.
- We regularly manage and update our customers' **equipment database**.
- We provide site **surveys, inspection and audits** of our customer's equipment through our technical services group.

Our services include:



Positive Material Identification

- Added value of complete material traceability
- Specification grade, superior graphite quality
- Internal PMI testing



A.R. Thomson Group Technical Services

- Site Surveys
- Equipment Inspections
- Equipment Audits
- Hose Testing
- Leak Detection



Satellite Warehouse Program

- A transportable warehouse for gaskets, studs and nuts, and other fluid containment products
- Used to enhance service and supply during major projects or plant turnarounds
- Managed by a dedicated A.R. Thomson Group representative



Education and Training Services

A.R. Thomson Group offers several on-site education, training and safety courses. Some examples include:

- Best Bolting Practices
- Gasket Safety Training
- Criteria for Gasket Selection
- Gasket Installation
- Why Does that Gasket Leak?
- Pre-turnaround Contractor Training
- Plant Engineering, Maintenance and Procurement Training
- Tool Box Training Sessions

CORPORATE PROFILE

The A.R. Thomson Group was established in 1967 as a regional manufacturer/ distributor of gaskets and other fluid containment products. With the rapid growth of oil and gas production, petrochemical, oil refining and pulp and paper industries, our manufacturing facilities expanded to meet increased demand for these products. We currently design and manufacture a wide variety of products using the latest technology. Some examples include:

- ALL VARIETIES OF INDUSTRIAL METALLIC AND NON-METALLIC GASKETS
- PRE-FORMED PACKING SETS FOR VALVES, PUMPS AND MIXERS
- FLEXIBLE METAL HOSE AND EXPANSION JOINTS
- SEAL SPECIALTIES FOR THE OIL AND GAS INDUSTRY

A.R. Thomson Group has also increased the product scope for its Fluid Control Division. This includes a complete line of process and specialty valves along with fittings, pumps and accessories for process as well as product transfer piping systems.

Further to our industrial product offering, ARTG has developed an Energy Efficiency and Environmental program which identifies and minimizes system inefficiencies. The various elements of the program can significantly reduce operating costs and environmental impact. As part of this program ARTG has developed a technical services team which provides:

- ON-SITE TRAINING
- EQUIPMENT SURVEYS AND AUDITS
- APPLICATION ENGINEERING
- MAINTENANCE AND REPAIR OPTIMIZATION PROGRAMS

Since 1967, we have developed our expertise and know-how to become the leader in solving fluid containment and control problems. No matter what your control or containment needs, we can help.

BRITISH COLUMBIA

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NOVA SCOTIA

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*Denotes manufacturing location