

Alba-RIG™

RAPID INTEGRITY GASKETS



For the best Leak Test results,
fit Alba Rapid Integrity Gaskets



Alba-RIG™

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About Alba Gaskets

Alba Gaskets are based in Aberdeen, Scotland and have been producing gaskets for the global energy sector since 2007. We specialise in the design and production of the patented Alba-RIG™ Rapid Integrity Gasket product range. The Alba-RIG™ is designed to verify the integrity and performance of our clients' bolted joint assemblies with a firm focus on reducing fugitive emissions. The Alba-RIG™ was initially designed to withstand the harsh environments of the North Sea Oil and gas sector however it is now widely utilised by many international energy end users and contractors and is supported by our regional sales offices in Brazil, UAE and Malaysia.

The Alba-RIG™ is manufactured to the highest standard and tightest tolerances. Our specialist facility provides the quickest lead times for urgent requirements as well as having the capacity to take on large scale projects.

experienced and trusted gasket specialists working in the sector. We provide an unrivaled level of service to our clients and are proud to support end users in over 40 countries.

With a firm focus on technical proficiency and customer service the Alba Team includes some of the most



**TRUSTED PARTNER TO
OVER 400 CLIENTS**



**PRODUCTS SUCCESSFULLY
INSTALLED ON OVER
100 NORTH SEA
PRODUCTION ASSETS**



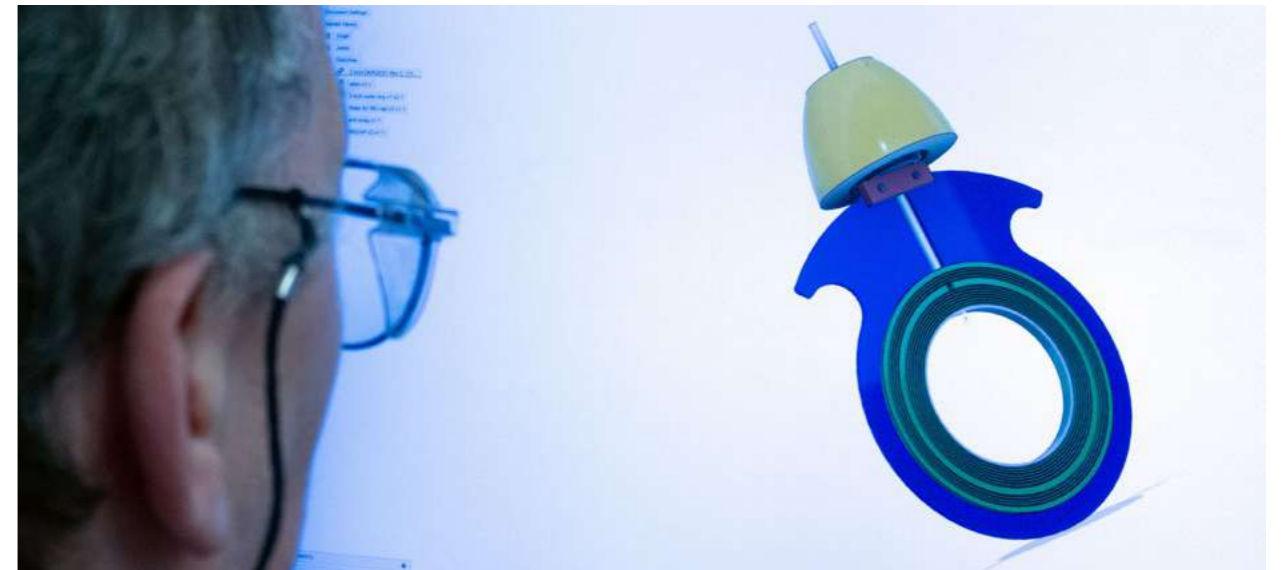
**PRODUCTS INSTALLED
IN OVER 40 COUNTRIES**



**TECHNICAL TEAM
HAS OVER 80 YEARS
COMBINED EXPERIENCE**



All Alba-RIG™ products are produced on modern CNC equipment



Alba design and develop product using Fusion 360 and AutoCAD software



Gaskets are cut on modern waterjet equipment

Rapid Integrity Leak Testing

Rapid Integrity leak testing safely and efficiently tests flange connections prior to operational start up, providing peace of mind and maximising production time.

A joint integrity leak test is conducted via a test port in the Rapid Integrity Gasket (Alba-RIG™) allowing users to confirm joint integrity has been achieved before the flange and pipe are subjected to internal pressures and without the need to pressurise whole systems.

The test is run using portable equipment, typically hydraulic or nitrogen test pumps connected to the test port in the gasket. It is quick and easy to pressurise the space between the primary and secondary seals on the gasket and check for leaks on any type of flange assembly.

There are significant benefits to utilising this form of testing which include:

- Provides an opportunity to conduct a leak test on individual joints from the outside of the flange
- Validates gasket installation through a small volume of test media (nitrogen or hydraulic)
- Saves time and costs with rapid verification of joint integrity prior to start up
- Can eliminate the need to conduct a full system pressure test
- Lowers the costs of leak test campaigns e.g. less resource, less time, less equipment and test media

Many clients utilise Rapid Integrity testing as part of their joint integrity/leak testing philosophy and this type of testing has been successfully used in the energy sector since the late 1990s.



Alba-RIG™ test on ESVs – North Sea 2020



Alba-RIG™ FAT test for US based Subsea client – 2021



Typical set up of Alba-RIG™ leak test using nitrogen bottle



“ Rapid Integrity leak testing has saved significant time and money during various shutdown work scopes and campaigns. ”

North Sea Technical Authority, 2023

Alba-RIG™ for Raised Face and Flat Face Flanges

Alba-RIG™ gaskets are widely used in ANSI Raised face and Flat faced flanged connections.

In this type of flange connection, we offer our Alba-RIG™ Dual Kamprofile version (Alba-RIG™ DKP). This product utilises bespoke geometry high integrity Kamprofile sealing technology and our patented design is manufactured to the highest international standards.

Our gaskets are manufactured from sheet material cut by a waterjet and fully machined on a CNC lathe. During production, a fully annealed high-quality tube is prepared, and laser welded to the gasket. The tube end is prepared, the outer ring and base installed per the application and a standard tube fitting is installed. The unit undergoes visual inspection, 100% leak and pressure testing before being shipped to the client.

The sealing mechanism of the product incorporates a combination of high purity Graphite and E-PTFE seals which significantly out-performs conventional gaskets such as spiral wounds and non-asbestos gaskets. During the rapid integrity test media is pumped into the annular space between the two seals and held for 15 minutes at pressure to verify a correct installation and that a leak tight connection has been achieved.

SPECIFICATION

Size range: ½" to 72"

Thickness: 6.5mm Uncompressed
6.5mm Compressed

Materials: 316, Carbon Steel, 31803, 32750

Pressure ranges: Din PN 20-420, JIS5K to 63K

Fugitive Emissions Class (MESG SPE 85/300 – 3.3.2): AH

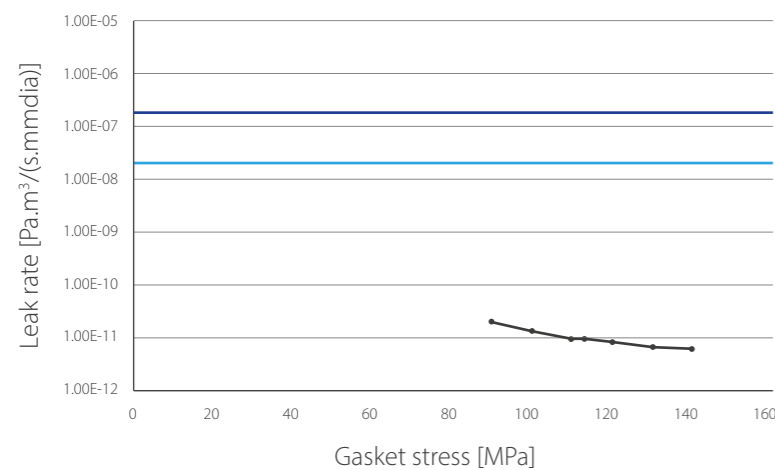
Leakage Rate: 1.36E-11 Pa*m³/(s*mmdia)



Alba-RIG™ DKP test North Sea 2020

Alba-RIG™ Gasket AMTEC Shell Tests

Shell specification is for fugitive emission leakage test: MESG SPE 85/300 3.3.2



KEY

- Tightness Class BH
- Tightness Class AH
- Leak rate [Pa.m³/(s.mmdia)]

Tightness Class AH
1 bubble = 4 weeks
1cc leak = 3.2 years

Dual Kamprofile Geometry
1 bubble = 80 years
1cc = 3200 years



ALBA-RIG™ – RAISED FACE AND FLAT FACE FLANGES

1. Anti snag protective cap
2. Lloyds and DNV Type approved test port
3. Dual ferrule fitting with metal to metal seals producing no torque from fitting to tubing
4. Test port support shoulders for impact protection
5. Robust test port fused with laser welding technology
6. Alignment ring for safe, fast and precise installation
7. Inert and fire safe 6mm thick dual Kamprofile technology for corrosion and emissions control

Alba-RIG™ for Ring Type Joint Flanges

Alba-RIG™ gaskets are commonly used in API and ASME Ring Type Joint flanges across the energy sector.

The Alba-RIG™ is available in Octagonal, Oval, RX and BX cross sections and in a comprehensive list of materials. The product is rated up to 10,000 PSI allowing users to individually leak test any type of RTJ flange assembly.

All products are manufactured to the standards set by the American Petroleum Institute, and the American Society of Mechanical Engineers. We use fully traceable materials, from mill cert to final supply and have in place strict quality assurance procedures that exceed API 6A PSL 4. Each Ring Type Joint is low stress stamped for identification and traceability. Soft iron and low carbon steel rings are protected with electroplated zinc in accordance with specifications.

During production a certified standard RTJ is drilled to a proprietary configuration optimising metal to metal fusion. A fully annealed high-quality tube is prepared, and laser welded to the RTJ. In-process inspection is conducted. The tube end is prepared, the outer ring and base installed per the application and a standard tube fitting is installed. The unit undergoes visual inspection, 100% leak and pressure testing before being shipped to the client.

BX cross sections are manufactured with an extra 5mm height for the test port to clear the flanges. The extra height has minimal effect on tension, load or stress and can be calculated by all bolting specialists.

SPECIFICATION

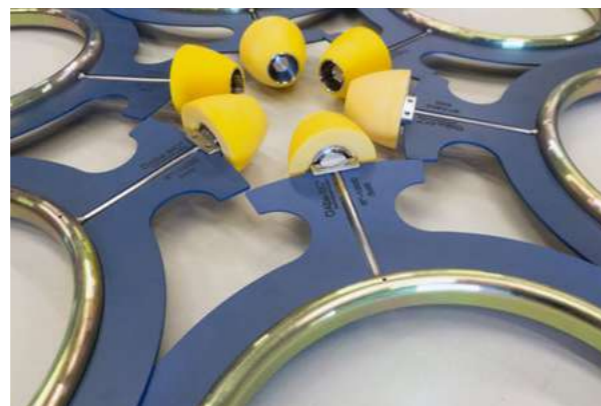
Size range: ½" to 60"

Materials: Carbon Steel, Soft Iron, 316, 31803, 32750, 625, 825

Pressure ranges: ASME B16.20 to 2500lbs, API6A 2K to 10K

ALBA-RIG™ RTJ HARDNESS TABLE

Material	Designation	Maximum Hardness Brinell
Soft Iron	D	90
316 Stainless steel	S	135
Inconel 625	INC 625	180-200
Alloy 825	INC 825	150-160
UNS 31803	31803	230
UNS 32750	32750	250



ALBA-RIG™ – RING TYPE JOINT & RAISED FACED FLANGES

1. Anti snag protective cap
2. Lloyds and DNV Type approved test port
3. Dual ferrule fitting with metal to metal seals producing no torque from fitting to tubing
4. Test port support shoulders for impact protection
5. Robust test port fused with laser welding technology
6. Alignment ring for safe, fast and precise installation
7. R,RX and BX versions according to ASME B16.5/API 6A/17D metallic RTJs available in:
Soft Iron, 316, duplex, super duplex, Alloy 825, Inconel 625, F44

Alba-RIG™ Subsea

The Alba-RIG™ Subsea product line has been designed to withstand the harsh environments of the subsea sector and to provide divers and dive contractors a safe, robust and fast method to leak test flanges underwater.

Manufactured to the same strict parameters as the RTJ version our Subsea design incorporates a number of diver friendly features including:

- Laser welded test port – ensuring a highly precise and controlled port weld with no chance of impingement on the flange
- Reinforced 1/4" test port located outside the flange ensuring easy access for diver and no risk of damage
- Highly visible yellow anti snag test port caps – to avoid diver equipment being snagged on the product and providing long lasting robust protection after installation
- Built-in alignment ring designed to centralise gasket (no need to buy additional skillet). This allows the diver to complete installation without having to insert their fingers between flanges, mitigating risk of injury
- Lift point handles for ease of transportation from vessel to seabed
- Test port diver tool with belt clip – to ensure test port caps are not dropped

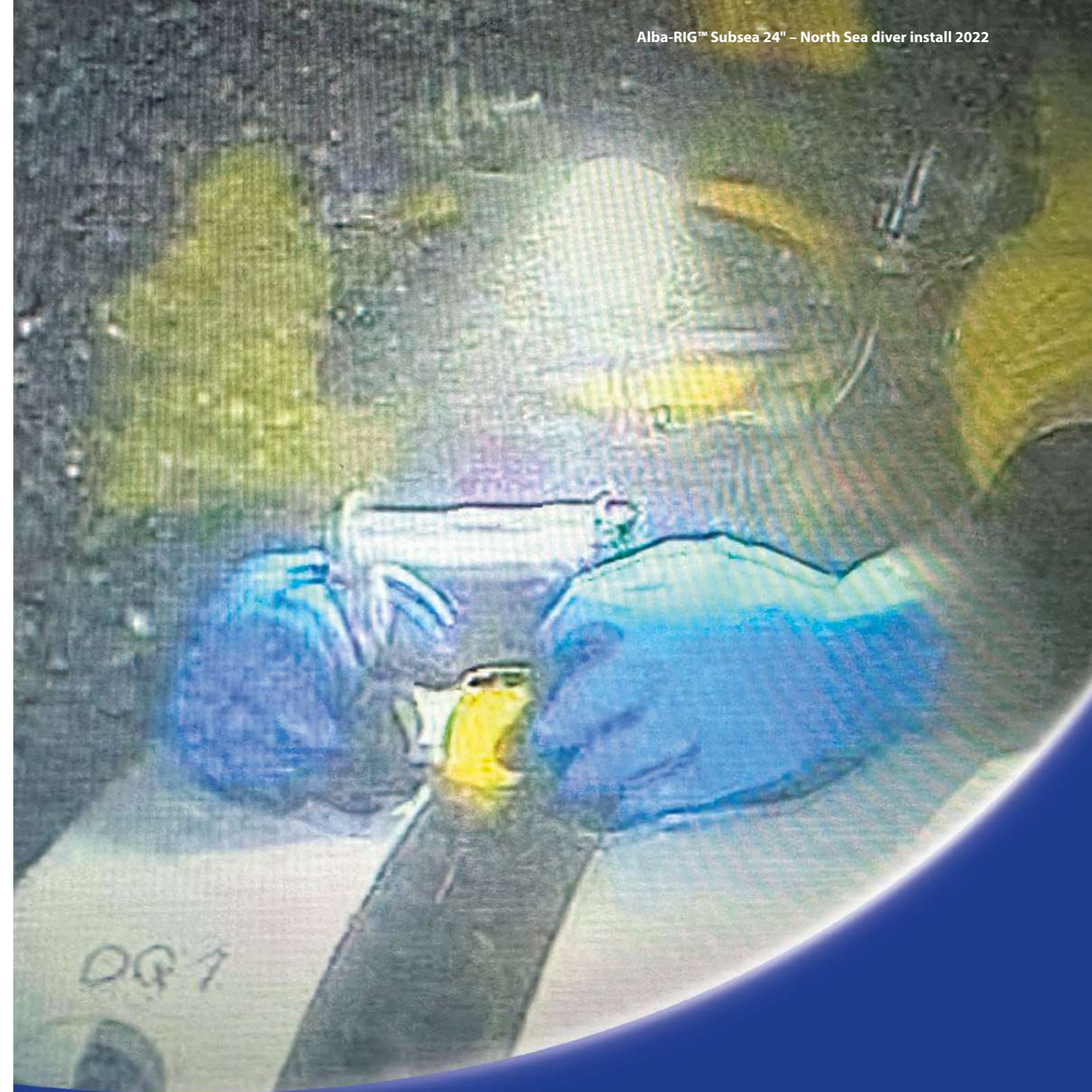
The Alba-RIG™ Subsea is the only product on the market that has been designed specifically for subsea leak testing and has been successfully installed on many global subsea projects.

SPECIFICATION

Size range: ½" to 60"

Materials: Carbon Steel, Soft Iron, 316, 31803, 32750, 625, 825

Pressure ranges: ASME B16.20 to 2500lbs, API6A 2K to 10K



Alba-RIG™ Subsea Gaskets are robust and user friendly and have been designed with diver safety in mind

Alba-RIG™ Seal Rings

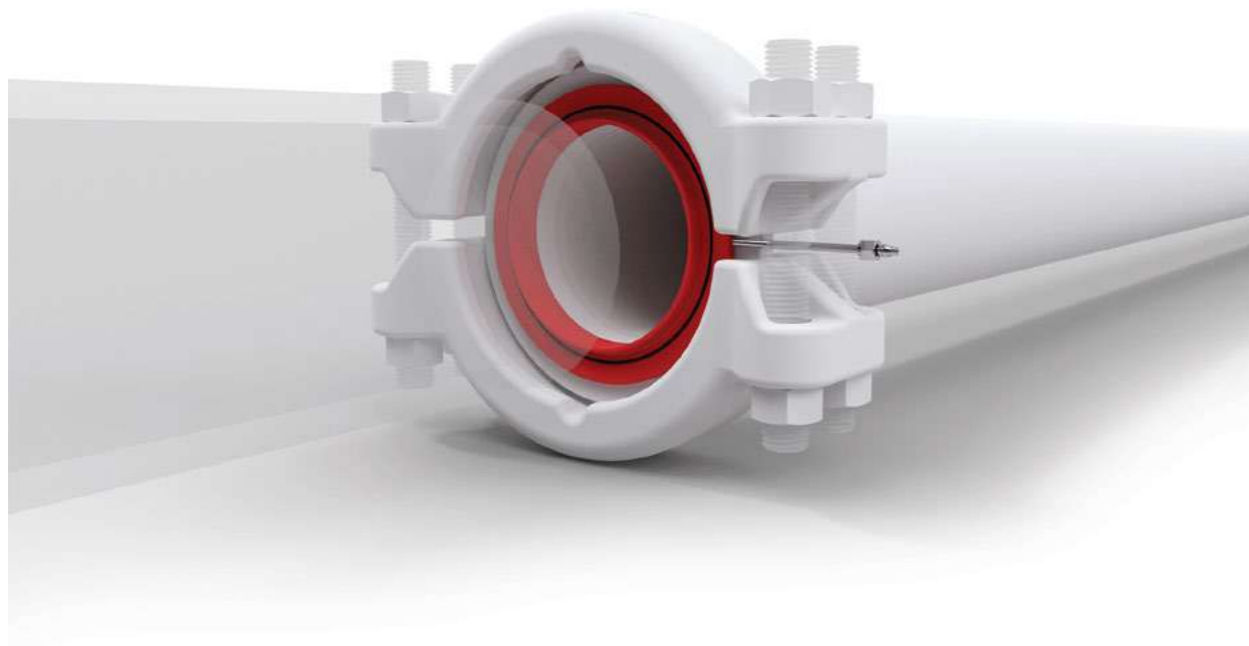
Alba-RIG™ SR (Seal Ring) systems are designed to leak test hubbed connections.

Two O-ring grooves are machined into the web of the ring and the cavity between the O-ring and the seal lips is pressurized through a small diameter pipe exiting between the hubs and in-between two clamp ears. Before assembly, the O-ring contact surfaces on the hubs must be properly cleaned and may need polishing for the O-ring to function properly. Before pre-loading the bolts, the clamp should be rotated to the most convenient orientation for performing the test.

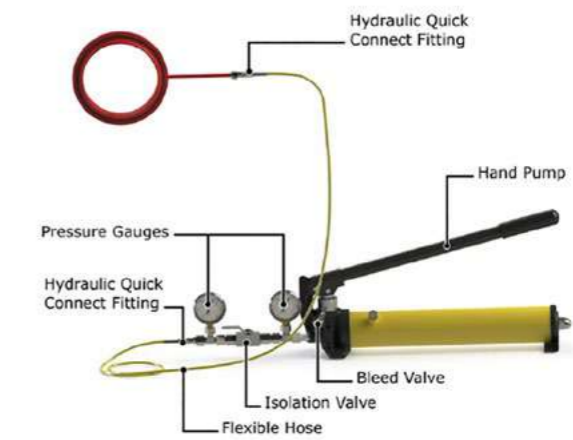
Since the seal is pressurized from the reverse side, the contact pressure between seal and the hubs in the test, will always be lower than during operation since the internal pressure in operation provides a strong pressure energized effect. The reverse integrity test pressure can therefore be low, and the test is typically 10bar for 10 minutes.

Higher test pressure can be used, but this does not provide any better confirmation of the seal functionality for internal pressure. Using too high pressure will push the seal off the seat and create a leakage. A condition which has no relevance to the actual use. A reverse integrity test pressure higher than 150bar should not be applied, except in the case of testing to verify external pressure capacity.

It is only in the case of using the clamp connector subsea that a higher external pressure than 150bar needs to be applied. The actual external pressure capacity is depending on seal ring material strength and the seal ring.



Typical set up for a back seal test (RIT)



Applications

All types of ASME and API flanges.

Most common uses:

- **Large sections of piping** where the user can use the Alba-RIG™ to verify the individual flange connection, avoiding to have to fill up the entire pipe in order to verify the leak.
- **Witness joint testing** – avoid time consuming witness joint testing, with the Alba-RIG™ the integrity is verified much quicker, saving time and cost and allowing a quicker and safer start up.
- **Flanged equipment replacement** (for example valves, manifolds etc) where the user would save time and costs by simply verifying the integrity of the flange connections, avoiding large pressure/leak tests.
- **Riser connections** – these are very critical connections between the risers and the FPSO/rig, and the flanged components have usually been tested separately prior to connection. With the Alba-RIG™ this critical flange connection can be verified prior to start-up, avoiding a new large and time consuming leak test.
- **Drop out spools (DOS)** – Following installation of the spool, the joint must undergo a strength/leak test, a 48-hour activity. The same scenario exists at the other end, so if both topside and pipeline undergo a single hydrotest, both ends and the pipeline must be completed, thus 3 separate construction packages are reliant on each being finished. An Alba-RIG™ at the DOS means each can complete their scope including hydrotesting and the last remaining on site can install the DOS at each end and test the joints only.
- **Flares** – These will often not be possible to section off with blind flanges, an Alba-RIG™ can be used to verify the integrity of the last flange connection before a flare.
- **Pig Launchers** – When installing pig launchers the flange connection integrity can be verified quickly prior to launching the pig.



Industries Served:

- Oil and Gas – Onshore, Offshore, Subsea, FPSO
- Oil and Gas – Midstream, Downstream, Refineries, Gas plants, LNG,
- Chemical and Pharmaceutical
- Fertiliser plants
- Gas Transmission
- Power Generation

Other applications and benefits:

- High volume piping systems that are routed over large distances with minimal flanged connections
- Piping circuits with unknown joint integrity of a single flange (typically connected to skid modules)
- Equipment nozzles where the flange joint can be tested without the need to test through equipment
- Flanges of in line instruments, control valves, meters that have been reinstated after hydrotest and flushing (avoid re-pressurizing upstream and downstream sections)
- Flanges used solely for the creation of sub-systems to meet construction and/or pre-commissioning schedules
- Decouples inter-dependent packages providing a cleaner interface resolution
- Package contractors can be de-mobbed on completion of their scope or moved to their next activity
- Cost saving of test media provision and disposal
- Reduced leak testing set up and execution (time and manhour reduction)
- Reduction in hazards associated with testing that produces high volumes of stored energy
- Reduction in exclusion zones in working areas where the tests are to be completed, especially in lines that route through multiple process areas and Piperack's
- Mechanical equipment, eg PSV removal and return
- Lethal, toxic or other severe service pressurized systems



Alba-RIG™ on flare line test – North Sea 2020



Alba-RIG™ test North Sea 2023



Alba-RIG™ test North Sea 2020

Design and Construction

EXCEPTIONAL SEALING PERFORMANCE

The Alba-RIG™ design provides users with an exceptionally high performing seal for long term operational use. When installed, our clients flange assemblies achieve values of low fugitive emissions, high levels of corrosion protection and chemical compatibility, ensuring that the greatest levels of joint integrity are achieved with no compromise of performance or safety. Alba-RIG™ designs have been validated through an independent third-party laboratory, results demonstrating tightness levels exceeding emissions class AH by a factor of 3 (10^{-8} vs 10^{-11}), virtually approaching the limit of Helium particles (10^{-12}).

LASER WELDING - RAPID AND ROBUST

After extensive research in collaboration with Strathclyde University we identified Laser Welding as the most robust method to weld our test port to the gasket body. Laser welding offers many advantages over other welding methods including better fusion between metals, less voids and micro cracks and a smaller heat affected zone. Laser welding also ensures a tighter control on weld height and width ensuring no pinch points on installation.

For our test port, we selected standard dual ferrule tube fittings. They eliminate rotational force associated with screw on fittings that strains the weld area and deforms or damages the test port tube. They are certified by DNV, Lloyds, ABS, have undergone extensive testing and have a reliable service history over multiple decades.

SAFETY AND PROTECTION

Unique to the Alba-RIG™ product is an integral outer ring with support shoulders that protects the test port from damage by transferring any load or impact onto the flange rather than the gasket or port. In addition, the support shoulder serves to align the gasket, so no hands need to be placed between the flanges during the installation meaning the product is an easy and safe gasket.

Once testing is complete our metal-to-metal test port plug is designed so no rotational force is exerted on the tube or weld and provides a fire safe seal. The test port protective cap is installed to prevent any accidental damage.

HIGHEST LEVELS OF INTEGRITY

All aspects of the Alba-RIG™ product line have been designed with our clients in mind to ensure the most user friendly and reliable installation. Thousands of products have been successfully installed and tested and clients who use our products are assured of the highest levels of joint Integrity.



When flange face spacing is tight, the ability to control the weld geometry through laser welding is key

Case Study: North Sea Operator



AT A GLANCE

BENEFITS

- Alba-RIG™ manufactured and supplied same day
- Client given a quick efficient test method
- Peace of mind that joint integrity is achieved after install
- Quicker start up time – saving the operator 1 day production est £400,000 saving

Alba-RIG™ allows Operator to avoid losing a day's production

OBJECTIVE

To achieve a quick and effective leak test

A major North Sea Operator called us with a big problem. They were coming out of shutdown and a 8" main isolation valve had failed delaying the start up of their 2nd stage compressor.

A replacement valve was available to install but they needed a quick and effective method to leak test the installation and start production again. Further delays would cost a day's production.

SOLUTION

Alba manufactured and tested 4 x 8" Alba Rapid Integrity Gaskets and delivered them to the Heliport in less than 4 hours. The urgency was so high that a helicopter was booked specifically to ship the gaskets at a cost of over £30,000 to deliver them to the platform. The gaskets were installed successfully and the platform started up on time, ensuring a day's production was not lost, saving around £400,000.

" We wanted to pass on thanks to Alba for manufacturing these gaskets on such a quick turnaround.

We managed to install and test successfully allowing us to start up our compressor again, a great result for us."

NORTH SEA OPERATOR
MECHANICAL ENGINEER



Case Study: FPSO Client



AT A GLANCE

BENEFITS

- Alba-RIG™ stock was available on site during refurbishment to allow rapid leak testing on any flange
- Additional requirements supplied on fast track basis
- Client given a quick efficient test method
- Peace of mind that joint integrity was achieved after install
- Delayed PSVs could be tested quickly
- Problematic assemblies were identified prior to operation start up
- HP/LP flare tests were simplified reducing time and cost

Alba-RIG™ (Rapid Integrity Gaskets) cut testing time of FPSO refurbishment project

CLIENT DETAILS

A UK/Dutch operator undertook a major modification project to upgrade their FPSO to enable export of gas via the SEGAL pipeline to the St Fergus terminal in Aberdeenshire.

During the modification project the FPSO was based at a yard in Haugesund, Norway for several months of refurbishment work. To assist in the leak testing phase the client specified and purchased a significant range of Alba Rapid integrity Gaskets.

These ranged in sizes from 1” to 8” and up to 2500lbs pressure class for use in both raised face and RTJ flanges.

CLIENT FEEDBACK

The Alba-RIG™s were purchased to enable us to speed up and reduce the complexity of leak tests on our HP and LP flare headers and in areas where overhauled valves and PSV were being installed. The product did the job well and Alba were also able to make and ship additional gaskets in 24 hours when additional requirements were identified

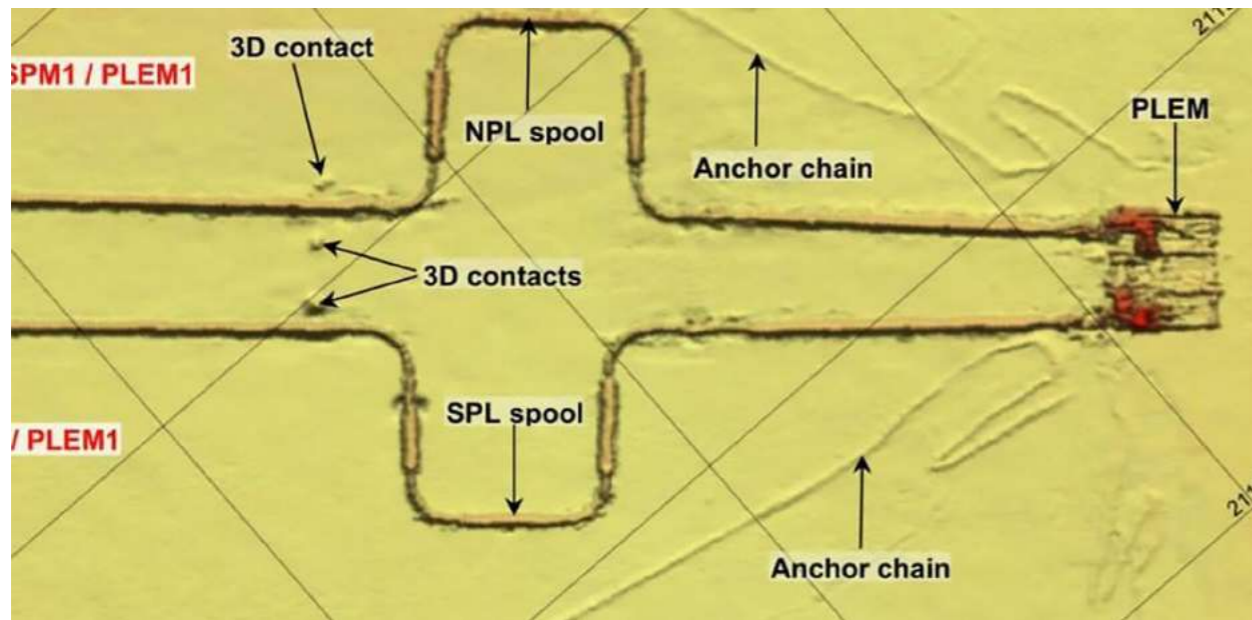
“Great product. Has saved significant time and money during various shutdown work scopes and campaigns.”

NORTH SEA OPERATOR



Case Study: DCN Diving

Project: CALM Buoy Installation



AT A GLANCE

CHALLENGES

- ▣ 42" Flanges
- ▣ Non Standard Gaskets
- ▣ Diver Install
- ▣ High cost of testing
- ▣ Short Lead time requirement

BENEFITS

- ▣ Quick and efficient subsea test method
- ▣ Peace of mind that joint integrity is achieved after each dive
- ▣ Reduces testing costs and dive time

Alba-RIG™ (Rapid Integrity Gaskets) provides the answer to Subsea testing challenge

OBJECTIVE

DCN Diving supported a project to install expansions tie-in spools on a 42" subsea pipeline in the Arabian Sea.

This included the installation and testing of 42" non standard gaskets in misalignment flanges. DCN Diving asked Alba to design and supply robust, diver friendly reverse integrity gaskets within a short project timeline.

SOLUTION

Alba Gaskets designed and supplied 8 x 42" Alba-RIG™ (Rapid Integrity Gaskets) offering DCN Diving a quick and effective method to install, test and validate joint integrity on each flange.

The products were designed with a diver friendly handle with lift bag point ensuring a safe and precise installation. After each installation DCN Diving were able to leak test each flange through our rapid integrity gasket test port confirming joint integrity had been achieved before a full system hydro test. All products were installed successfully and the project was a success and completed on time.

" We used the Alba-RIG™ for testing and everything passed with no issues, hydrotest is now completed and job done"

DCN DIVING
GENERAL MANAGER



Test Equipment and Adapters

Our products are designed to be easy to use and we offer a range of accessories which can be used to aid installation.

These include a range of test kits test port fittings and adapter details as follows:



STANDARD TEST KIT

Test kits available in 400 Bar and 700 Bar versions, comes with a 3-metre test hose, equipped with quick connects and a quick connect adapter.



SUBSEA TEST KIT

Test kits available in 400 Bar and 700 Bar versions, comes with a 3-metre test hose, equipped with quick connects and a quick connect adapter. Gauges are liquid filled subsea versions.



PREMIUM TEST KITS

In addition to our standard test kits, we offer specialised versions with Pressure Regulating Valves, Digital data logging gauges, auxiliary ports, etc. Contact our engineering team to discuss.



NITROGEN TEST KIT

Test kits come with Nitrogen bottle, Regulator and purge valve, along with 3-metre test hose and quick connect adapter.

TEST HOSE ADAPTERS



QC400: Quick Connect 400 Bar.

Designed to be used with commercially available test kits or with Alba Test Kits.



QC700: Quick Connect 700 Bar.

Designed to be used with commercially available test kits or with Alba Test Kits.



Adapter 0: 1/8" Male NPT.

When using a test hose with a 1/8" Female NPT end.



Adapter 1: 1/8" Female NPT.

When using a test hose with a 1/8" Male NPT end.



Adapter 2: 1/4" Male NPT.

When using a test hose with a 1/4" Female NPT end.



Adapter 3: 1/4" Female NPT.

When using a test hose with a 1/4" Male NPT end.



Adapter 4: 1/8" Male BSP.

When using a test hose with a 1/8" Female BSP end.



Adapter 5: 1/8" Female BSP.

When using a test hose with a 1/8" Male BSP end.



Adapter 6: 1/4" Male BSP.

When using a test hose with a 1/4" Female BSP end.



Adapter 7: 1/4" Female BSP.

When using a test hose with a 1/4" Male BSP end.



Adapter 8: 1/4" Male JIC.

When using a test hose with a 1/4" Female JIC end.



Adapter 9: 1/4" Female JIC.

When using a test hose with a 1/4" Male JIC end.

Installation Guidelines

PURPOSE

The purpose of this document is to describe the procedure for personnel carrying out installation and reverse integrity/back seal gasket testing on flanged connections top side.

Please contact our engineering team for Subsea specific instructions.

NOTES

Alba Rapid Integrity Gaskets must be fitted by trained personnel.

Alba Rapid Integrity Gaskets are designed for gas or hydraulic pressure testing.

Over pressure protection (Regulator or Pressure Relief Valve) is recommended while conducting testing. Regulator/PRV not provided by Alba Gaskets. Setting should be 3 to 5% above desired test pressure.

Once Rapid Integrity Gaskets are in service, Alba Gaskets recommends periodic visual inspection (Yearly) on each Rapid Integrity Gasket to ensure the test port and gasket have no damage, no leak and there is no concern regarding joint integrity. Further tests, including leak detection or retesting of Rapid Integrity Gasket can be done as/when required as long as the pipeline is not under operation/pressure.

PRE-INSTALLATION

Alba Gaskets recognizes PCC-1 (Guidelines for Pressure Boundary Bolted Flange Joint Assembly) and EN 159-4 (Flanges and their joints).

Qualification of personnel competency in the assembly of the bolted connection of critical service pressurized systems) as industry guidelines and generally accepted good practices that can be used in conjunction with existing codes.

The flange sealing areas must meet PCC-1 guidelines in terms of allowable imperfections and the flange assembly must be parallel and aligned within specifications.

Bolt holes must be checked to ensure that there are no rough or burred edges which will obstruct a clean joint being made. Before installing the gasket, it should be inspected to ensure that it is in good condition. Check to ensure proper OD, ID, thickness and pressure rating of the gasket are compatible with all operating parameters to which it will be subjected. All bolting should be inspected prior to use to ensure thread detail is not damaged. Never use damaged bolting. All threads of bolting must be coated in Molykote 1000 or equivalent thread lubricant.

INSTALLATION

The Rapid Integrity Gasket comes ready to install, with the test fitting fully assembled, hand tight, so no air pressure buildup occurs during the fitting process.

RF Dual Kamprofile Gaskets are 6.5mm thick (uncompressed) and 6mm thick (compressed when installed).

R style RTJ Gaskets are the same height as a standard RTJ.

BX style RTJ Gaskets are 5mm extra height to accommodate the test port.

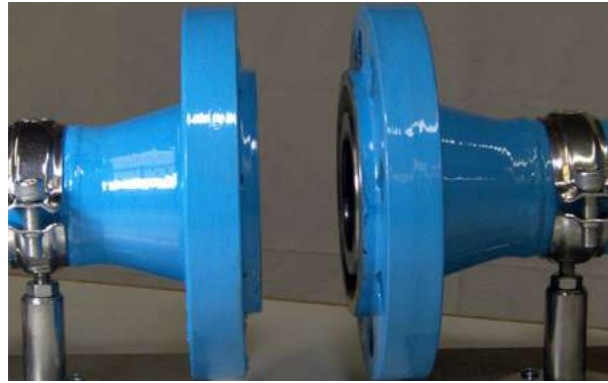
It is important to spread the flanges apart far enough to allow the gaskets to be inserted without force.

For DKP Alba-RIG™ it is recommended to split the flanges at least 10mm.

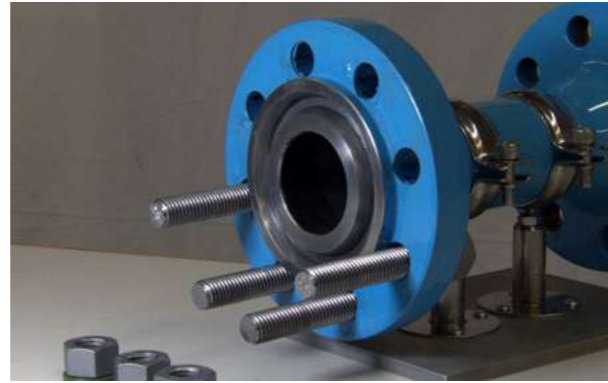
For RTJ and BX rings, it is recommended to split the flange at least 5mm more than the RTJ height dimension. Forcing a gasket between flanges during installation will result in damage to the gasket and the flanges and will most likely make it difficult to achieve a leak tight joint.



Installation Guidelines



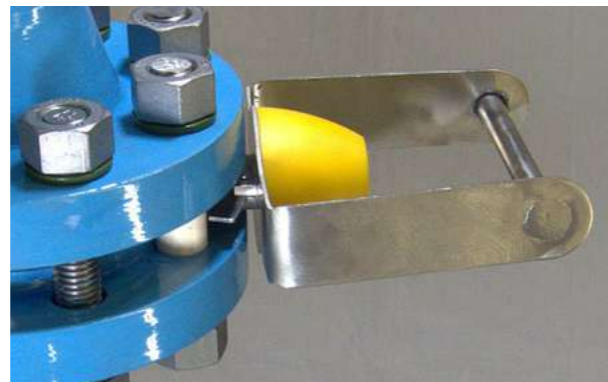
STEP 1
Make sure there is sufficient space between the flange faces to install the gasket. It is critical for protection of the Dual Kamprofile or RTJ sealing surfaces. We recommend at least 10mm more than the RTJ height dimension or the DKP thickness.



STEP 2
For visualization purposes, only 1 flange is pictured. During an actual installation, both flanges would be in place as illustrated in STEP 1. Install the lower bolts to support and align the gasket during insertion.



STEP 3
Slide the gasket between the flanges. Hold the gasket by the yellow cap or use a handle if the gasket is heavy. Make sure the gasket slides smoothly between the flanges. If there is any resistance, double check flange spacing and adjust. Forcing the gasket between the flanges will cause damage and potentially cause leaks



STEP 4
The gasket can be clocked to the desired position. Illustration shows test port at 3 O'clock. Subsea installations often place test port between 4 and 8 O'clock. Once in place, bolt sleeves can be installed on 2 bolts and bolts are inserted in the outer ring shoulders, which will further align and support the gasket.



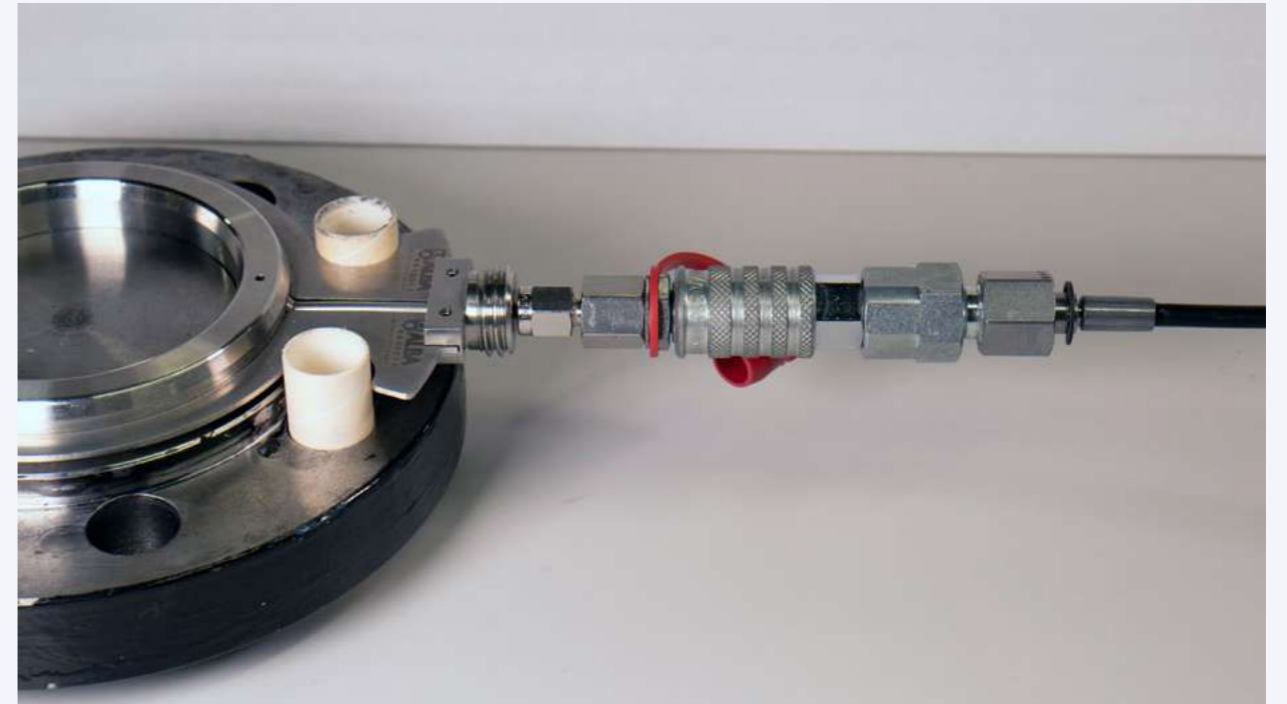
STEP 5
The remaining bolts and nuts can be lubricated and installed. The flange assembly is ready for bolt fastening via a torque wrench or tensioning equipment.



STEP 6
Place an 11 mm wrench on the cap, place another 11 mm wrench on the nut. Rotate the nut clockwise to loosen. Remove cap and place to the side.

ILLUSTRATION

View of connected gasket in a flange with placement of isolation sleeves, quick connect and test hose attached.



Testing Guidelines

TESTING PRECAUTIONS

1. As Alba Rapid Integrity Gaskets are used in multiple applications and as the company has no control over the method of their use, the company excludes all conditions or warranties, expressed or implied by statute or otherwise. Any technical cooperation is given for customer assistance only and without liability on the part of the company
2. Follow safe work practices and wear suitable PPE (minimum recommendations include safety glasses or shield, work gloves and heavy clothing)
3. Risk assessments should be conducted prior to testing
4. Procedures developed by accredited joint integrity specialists should be followed. The following information is provided by Alba Gaskets as a guideline
5. Only operators trained in using hydraulic and gas equipment should conduct pressure tests
6. Keep hands, work area and tools clean
7. Only use open ended spanners/wrenches, not adjustable/shifting spanners or pliers
8. Gasket is ready for test
9. Contact Alba Gaskets Technical team should you have any questions or require more specific information before conducting tests

PREPARE FOR TESTING

1. Connect the quick connect test adapter to the gasket test port as illustrated in step 7 above making sure test port tubing is firmly seated on the shoulder of the adapter body
2. Don't force tubing into fitting if it does not fit easily. Check tubing for burs or defects
3. Thread the nut until hand tight
4. Using a 11 mm open ended spanner (7/16" also works) on the nut and the proper spanner on the fitting, tighten the nut until an increase in resistance is encountered, then tighten slightly more, about 1/8 to 1/4 of a turn while keeping the fitting body steady
 - a. **Don't turn fitting body**, turn nut while holding body with back-up wrench
 - b. **Don't over tighten**. It will not improve seal integrity and may cause material fatigue and remake difficult
5. Connect test hose quick connect to test pump
6. Complete test hose purge to bleed as much air out of the system as possible
7. Connect test hose quick connect to Gasket test port

HYDRAULIC TESTING

1. Set Pressure Relief Valve 3%-5% above desired test pressure
2. Start pumping to 25% of test pressure, wait approximately 3 minutes for air in line to compress and equalize. It is normal for pressure to drop during this phase
3. Check for leaks around all connections
4. Gradually increase pressure and hold inspecting for leaks or large pressure drops (repeat steps 2 and 3 increasing pressure at a safe rate based on your company's directives)
5. Pump to final test pressure and close valve to isolate system pressure. When using long hoses, it can take some time to stabilize pressure and this step might be repeated.
6. Once test pressure is stable, hold for a minimum of 10 minutes (or per your internal procedures) Industry practices vary and it is the user's responsibility to determine criteria
7. If no pressure drop occurs, successful gasket installation is confirmed
8. If there is a pressure drop, leakage has occurred and gasket installation must be checked, repeated
9. Open test valve and make sure pump pressure valve is open. Pressure should drop to zero on gauge
10. Remove the test fitting from the Alba RIG™ using the appropriate spanners
11. Install test port cap making sure tubing is firmly seated on the shoulder of the cap body and thread the nut until hand tight
 - a. Don't force tubing into fitting if it does not fit easily. Check tubing for burs or defects

12. Using a 11 mm open ended spanner (7/16" also works) on the nut and the proper spanner on the fitting, tighten the nut until an increase in resistance is encountered, then tighten slightly more, about 1/8 to 1/4 of a turn while keeping the fitting body steady
 - a. **Don't turn fitting body**, turn nut while holding body with back-up wrench
 - b. **Don't over tighten**. It will not improve seal integrity and may cause material fatigue and remake difficult
13. A reliable leak tight connection is now complete

Recommended maximum hydraulic test pressures

Pressure Class Hydrostatic test pressure	
150	455 psi
300	1125 psi
600	2250 psi
900	3375 psi
1500	5625 psi
2500	9375 psi
API 2K	4000 psi (<13-5/8) 3000 psi (16-3/4 +)
API 3K	6000 psi (<13-5/8) 4500 psi (16-3/4 +)
API 5K	7500 psi
API 10K	10000 psi
API 15K	10000 psi

GAS (NITROGEN) TESTING

1. Purge water from cylinder by quickly opening and closing cylinder valve
 - a. Don't point cylinder connection towards any parts of your body or any hot surfaces or flames
2. Install pressure regulator to nitrogen cylinder making sure system valve is in closed position
3. Open cylinder valve slowly
4. Set regulator to desired test pressure
5. Open regulator control valve until pressure reaches 25% of final test pressure
6. Wait approximately 3 minutes for air in line to compress and equalize. It is normal for pressure to drop during this phase
7. Gradually increase pressure and hold inspecting for leaks or large pressure drops (repeat steps 5 and 6 increasing pressure at a safe rate based on your company's directives)
8. Open regulator control valve until pressure equalizes and reaches final test pressure, close cylinder valve to isolate system pressure
9. Hold for a minimum of 10 minutes (or per your internal procedures) Industry practices vary and it is the user's responsibility to determine criteria
10. If no pressure drop occurs, successful gasket installation is confirmed
11. If there is a pressure drop, leakage has occurred and gasket installation must be checked, repeated
12. Close cylinder pressure valve
13. Open pressure regulator valve (counter clockwise)
14. Open test purge valve
 - a. Don't point purge valve outlet towards any parts of your body or any hot surfaces or flames
15. Remove the test fitting from the Alba RIG using the appropriate spanners

16. Install test port cap making sure tubing is firmly seated on the shoulder of the cap body and thread the nut until hand tight
 - a. Don't force tubing into fitting if it does not fit easily. Check tubing for burs or defects
17. Using a 11mm open ended spanner (7/16" also works) on the nut and the proper spanner on the fitting, tighten the nut until an increase in resistance is encountered, then tighten slightly more, about 1/8 to 1/4 of a turn while keeping the fitting body steady
 - a. **Don't turn fitting body**, turn nut while holding body with back-up wrench
 - b. **Don't over tighten**. It will not improve seal integrity and may cause material fatigue and remake difficult (See Figure 1).

18. A reliable leak tight connection is now complete
Recommended maximum Nitrogen test pressures: 200 Bar/2900 Psi

POST-INSTALLATION

Alba Gaskets recognizes PCC-1 (Guidelines for Pressure Boundary Bolted Flange Joint Assembly) and EN 1591-4 (Flanges and their joints. Qualification of personnel competency in the assembly of the bolted connection of critical service pressurized systems) as industry guidelines and generally accepted good practices that can be used in conjunction with existing codes. It is recommended that a post installation validation of applied bolt load is performed. Gasket embedment and creep relaxation occurs, especially with ring type joints (RTJ), therefore re-checking torque/tension at least 4 hours past the initial tightening is highly recommended.

In some instances, such as low or high temperatures or known difficult joints such as BX rings, a 24 to 48 hour period post installation is recommended.

RF/FF ALBA-RIG™ TORQUE CHART 0.11

(Contact factory for different lubricants/coefficient of friction)

ANSI 150# Flanges				
Size (inches)	Quantity Bolts	Bolt Diameter	Suggested Torque (Ft. Lbs)	Suggested Torque (N-m)
½	4	0.50	27	37
¾	4	0.50	27	37
1	4	0.50	31	42
1 ¼	4	0.50	40	54
1 ½	4	0.50	49	67
2	4	0.63	87	118
2 ½	4	0.63	96	130
3	4	0.63	114	154
3 ½	8	0.63	87	118
4	8	0.63	78	106
5	8	0.75	121	164
6	8	0.75	156	211
8	8	0.75	187	253
10	12	0.88	218	296
12	12	0.88	263	357
14	12	1.00	324	439
16	16	1.00	288	390
18	16	1.13	417	565
20	20	1.13	422	572
24	20	1.25	589	799

Hydro Test Pressure: 450 psi

ANSI 600# Flanges				
Size (inches)	Quantity Bolts	Bolt Diameter	Suggested Torque (Ft. Lbs)	Suggested Torque (N-m)
½	4	0.50	35	47
¾	4	0.63	69	94
1	4	0.63	69	94
1 ¼	4	0.63	78	106
1 ½	4	0.75	135	184
2	8	0.63	87	118
2 ½	8	0.75	121	164
3	8	0.75	136	185
3 ½	8	0.88	169	229
4	8	0.88	242	328
5	8	1.00	360	488
6	12	1.00	324	439
8	12	1.13	527	715
10	16	1.25	663	899
12	20	1.25	663	899
14	20	1.38	895	1,214
16	20	1.50	1,175	1,594
18	20	1.63	1,510	2,047
20	24	1.63	1,510	2,047
24	24	1.88	2,358	3,197

Hydro Test Pressure: 2250 psi

ANSI 300# Flanges				
Size (inches)	Quantity Bolts	Bolt Diameter	Suggested Torque (Ft. Lbs)	Suggested Torque (N-m)
½	4	0.50	35	47
¾	4	0.63	69	94
1	4	0.63	69	94
1 ¼	4	0.63	69	94
1 ½	4	0.75	106	144
2	8	0.63	69	94
2 ½	8	0.75	106	144
3	8	0.75	127	172
3 ½	8	0.75	121	164
4	8	0.75	135	184
5	8	0.75	151	205
6	12	0.75	135	184
8	12	0.88	218	296
10	16	1.00	324	439
12	16	1.13	474	643
14	20	1.13	474	643
16	20	1.25	589	799
18	24	1.25	589	799
20	24	1.25	589	799
24	24	1.50	1,046	1,418

Hydro Test Pressure: 1125 psi

ANSI 900# Flanges				
Size (inches)	Quantity Bolts	Bolt Diameter	Suggested Torque (Ft. Lbs)	Suggested Torque (N-m)
½	4	0.75	121	164
¾	4	0.75	121	164
1	4	0.88	194	263
1 ¼	4	0.88	194	263
1 ½	4	1.00	324	439
2	8	0.88	194	263
2 ½	8	1.00	288	390
3	8	0.88	242	328
4	8	1.13	467	634
5	8	1.25	663	899
6	12	1.13	527	715
8	12	1.38	895	1,214
10	16	1.38	995	1,349
12	20	1.38	995	1,349
14	20	1.50	1,307	1,772
16	20	1.63	1,677	2,274
18	20	1.88	2,620	3,552
20	20	2.00	3,199	4,337
24	20	2.50	5,194	7,042

Hydro Test Pressure: 3375 psi

RF/FF ALBA-RIG™ TORQUE CHART

ANSI 1500# Flanges				
Size (inches)	Quantity Bolts	Bolt Diameter	Suggested Torque (Ft. Lbs)	Suggested Torque (N-m)
½	4	0.75	121	164
¾	4	0.75	136	184
1	4	0.88	218	296
1 ¼	4	0.88	242	328
1 ½	4	1.00	360	488
2	8	0.88	242	328
2 ½	8	1.00	324	439
3	8	1.13	527	715
4	8	1.13	736	998
5	8	1.50	1,307	1,772
6	12	1.38	995	1,349
8	12	1.50	1,677	2,274
10	12	1.88	2,620	3,553
12	16	2.00	2,935	3,979
14	16	2.25	3,755	5,091
16	16	2.50	3,896	5,282
18	16	2.75	5,220	7,077
20	16	3.00	6,814	9,239
24	16	3.50	9,096	12,333

Hydro Test Pressure: 5625 psi

ANSI 2500# Flanges				
Size (inches)	Quantity Bolts	Bolt Diameter	Suggested Torque (Ft. Lbs)	Suggested Torque (N-m)
½	4	0.75	121	164
¾	4	0.75	151	205
1	4	0.88	242	328
1 ¼	4	1.00	396	537
1 ½	4	1.13	580	786
2	8	1.00	396	537
2 ½	8	1.13	527	715
3	8	1.25	810	1,098
4	8	1.50	1,197	1,623
5	8	1.75	1,723	2,336
6	12	2.00	2,609	3,537
8	12	2.00	2,609	3,537
10	12	2.50	4,220	5,722
12	16	2.75	5,655	7,667

Hydro Test Pressure: 9375 psi

ALWAYS WEAR PERSONAL PROTECTIVE EQUIPMENT



RING TYPE JOINT TORQUE CHART

ANSI 150# Flanges				
Size (inches)	Quantity Bolts	Bolt Diameter	Suggested Torque (Ft. Lbs)	Suggested Torque (N-m)
½	4	0.50	27	37
¾	4	0.50	27	37
1	4	0.50	31	42
1 ¼	4	0.50	35	47
1 ½	4	0.50	44	60
2	4	0.63	87	118
2 ½	4	0.63	87	118
3	4	0.63	87	118
3 ½	8	0.63	87	118
4	8	0.63	78	106
5	8	0.75	121	164
6	8	0.75	136	184
8	8	0.75	151	205
10	12	0.88	218	296
12	12	0.88	218	296
14	12	1.00	324	439
16	16	1.00	288	390
18	16	1.13	422	572
20	20	1.13	422	572
24	20	1.25	589	799

Hydro Test Pressure: 450 psi

ANSI 300# Flanges				
Size (inches)	Quantity Bolts	Bolt Diameter	Suggested Torque (Ft. Lbs)	Suggested Torque (N-m)
½	4	0.50	35	47
¾	4	0.63	69	94
1	4	0.63	69	94
1 ¼	4	0.63	69	94
1 ½	4	0.75	106	144
2	8	0.63	69	94
2 ½	8	0.75	106	144
3	8	0.75	127	172
3 ½	8	0.75	121	164
4	8	0.75	136	184
5	8	0.75	151	205
6	12	0.75	136	184
8	12	0.88	218	296
10	16	1.00	324	439
12	16	1.13	474	643
14	20	1.13	474	643
16	20	1.25	589	799
18	24	1.25	589	799
20	24	1.25	589	799
24	24	1.50	1,046	1,418

Hydro Test Pressure: 1125 psi

ANSI 600# Flanges				
Size (inches)	Quantity Bolts	Bolt Diameter	Suggested Torque (Ft. Lbs)	Suggested Torque (N-m)
½	4	0.50	35	47
¾	4	0.63	69	94
1	4	0.63	69	94
1 ¼	4	0.63	78	106
1 ½	4	0.75	136	184
2	8	0.63	87	118
2 ½	8	0.75	121	164
3	8	0.75	136	184
3 ½	8	0.88	169	229
4	8	0.88	242	328
5	8	1.00	360	488
6	12	1.00	324	439
8	12	1.13	527	715
10	16	1.25	663	899
12	20	1.25	663	899
14	20	1.38	895	1,213
16	20	1.50	1,176	1,594
18	20	1.63	1,510	2,047
20	24	1.63	1,510	2,047
24	24	1.88	2,358	3,197

Hydro Test Pressure: 2250 psi

ANSI 900# Flanges				
Size (inches)	Quantity Bolts	Bolt Diameter	Suggested Torque (Ft. Lbs)	Suggested Torque (N-m)
½	4	0.75	121	164
¾	4	0.75	121	164
1	4	0.88	194	263
1 ¼	4	0.88	194	263
1 ½	4	1.00	324	439
2	8	0.88	194	263
2 ½	8	1.00	288	390
3	8	0.88	242	328
4	8	1.13	474	643
5	8	1.25	663	899
6	12	1.13	527	715
8	12	1.38	895	1,213
10	16	1.38	995	1,349
12	20	1.38	995	1,349
14	20	1.50	1,307	1,772
16	20	1.63	1,677	2,274
18	20	1.88	2,620	3,552
20	20	2.00	3,198	4,336
24	20	2.50	5,711	7,743

Hydro Test Pressure: 3375 psi

RING TYPE JOINT TORQUE CHART

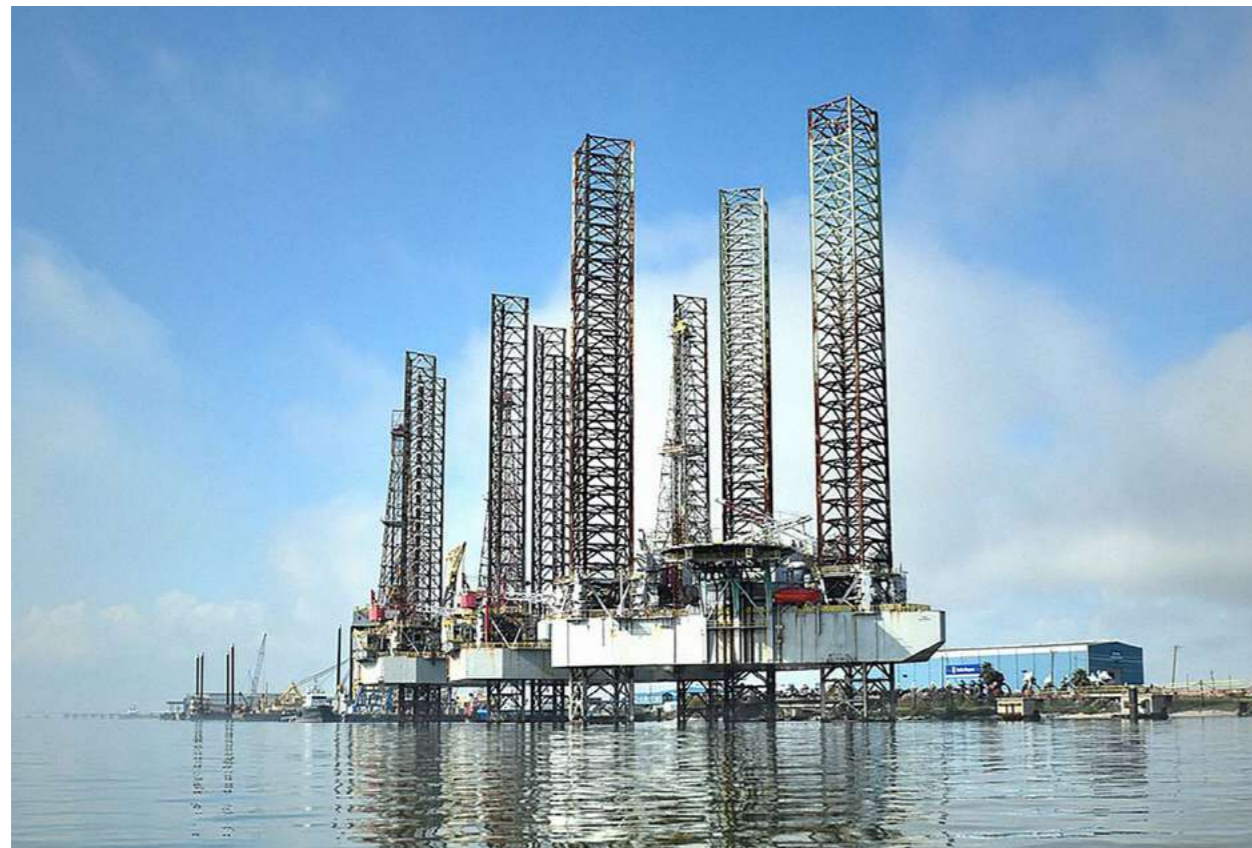
ANSI 1500# Flanges				
Size (inches)	Quantity Bolts	Bolt Diameter	Suggested Torque (Ft. Lbs)	Suggested Torque (N-m)
½	4	0.75	121	164
¾	4	0.75	136	184
1	4	0.88	218	296
1 ¼	4	0.88	242	328
1 ½	4	1.00	360	488
2	8	0.88	242	328
2 ½	8	1.00	324	439
3	8	1.13	527	715
4	8	1.13	736	998
5	8	1.50	1,307	1,772
6	12	1.38	995	1,349
8	12	1.50	1,677	2,274
10	12	1.88	2,620	3,552
12	16	2.00	3,198	4,336
14	16	2.25	4,133	5,604
16	16	2.50	5,711	7,743
18	16	2.75	7,664	10,391
20	16	3.00	9,985	13,538
24	16	3.50	15,999	21,692

Hydro Test Pressure: 5625 psi

ANSI 2500# Flanges				
Size (inches)	Quantity Bolts	Bolt Diameter	Suggested Torque (Ft. Lbs)	Suggested Torque (N-m)
½	4	0.75	136	184
¾	4	0.75	151	205
1	4	0.88	242	328
1 ¼	4	1.00	396	537
1 ½	4	1.13	580	786
2	8	1.00	396	537
2 ½	8	1.13	527	715
3	8	1.25	810	1,098
4	8	1.50	1,438	1,950
5	8	1.75	2,111	2,862
6	12	2.00	3,198	4,336
8	12	2.00	3,198	4,336
10	12	2.50	6,346	8,604
12	16	2.75	8,516	11,546

Hydro Test Pressure: 9375 psi

ALWAYS WEAR PERSONAL PROTECTIVE EQUIPMENT





01224 249414 | sales@albagaskets.co.uk
albagaskets.com

