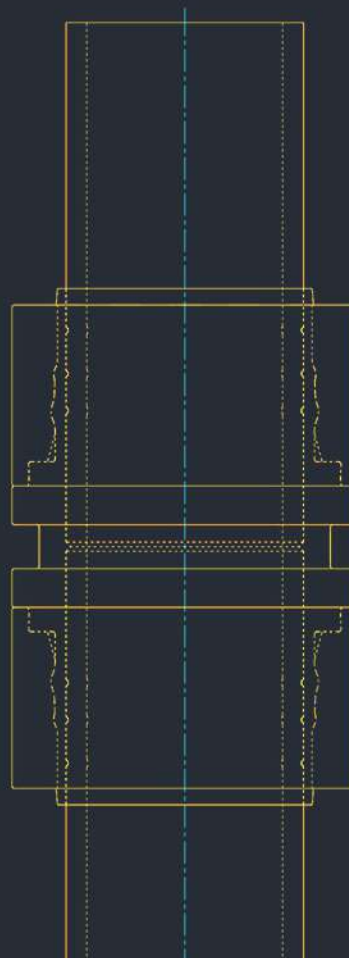


# LINX | AS

## TECHNICAL MANUAL

**Connecting**



**Pipes**

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# INTRODUCTION

LiNX|AS fitting system is a simple unit, therefore, it is effortless to assemble with no complex parts and makes installation easy and foolproof.

Necessary requirements for a reliable piping system are cautious selection, handling and installation of the pipe with a matching LiNX|AS fitting.

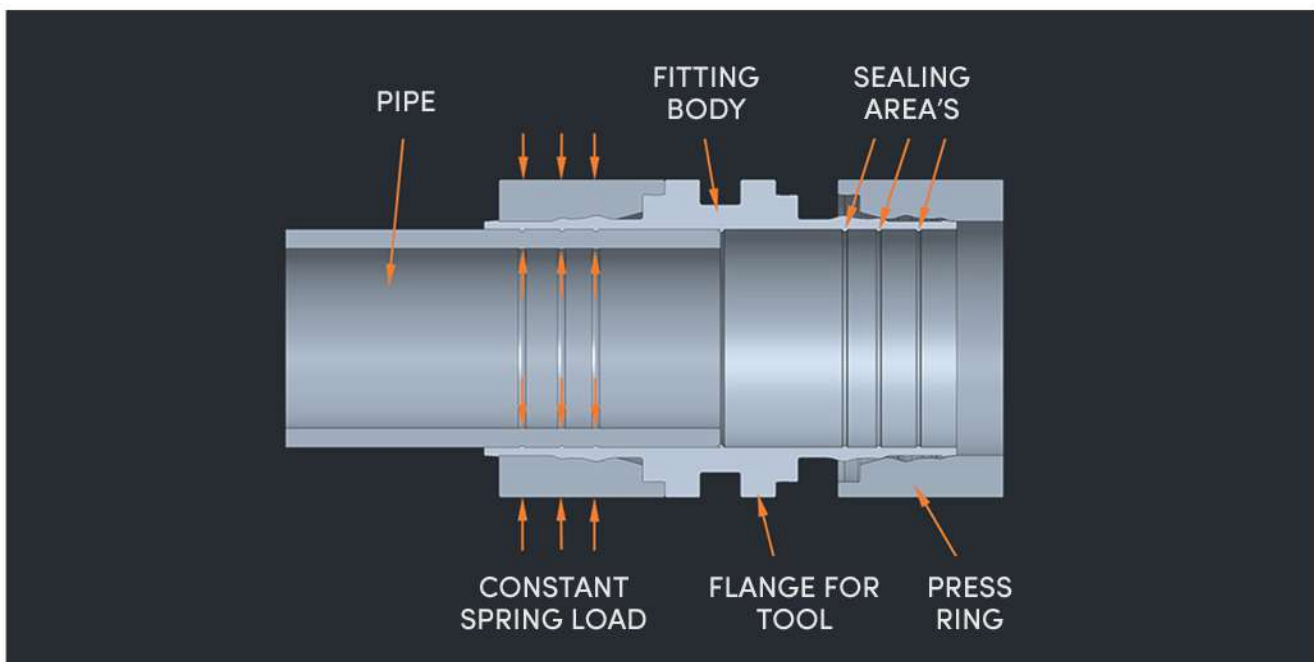
LiNX|AS fittings are ideally suited for fast-track and cost-effective fabrication of tubes/ pipes systems up to 2" size and is alternative to field welding or flanging.

By using straight fittings an entire piping system can be mechanically assembled without any heat.

This increases safety and cost. System design and system safety are the ultimate responsibility of the end user.

Ensure proper product selection to satisfy the System function, material compatibility, product ratings. All information in these instructions has been compiled with regard to accuracy.

## LiNX|AS Fittings: Principal Elements





# PROJECT DESIGN AND SPECIFICATION WITH LiNX | AS

---

LiNX |AS fittings have been developed in compliance with the B31.3 Process piping code. LiNX|AS uses circumferential compression pressure to mechanically attach fittings which permanently connect the pipe and provide pure metal-to-metal sealing. The ASME B31.3 code for process piping provides requirements for safe design of various pressure piping system applications.

LiNX|AS fittings have been tested according to the provisions of ASTM F1387 to confirm their performance capability and type approval certification has been issued by Lloyds Register.

Design engineers wishing to take advantage of the benefits of using LiNX|AS technology will need to consider a number of aspects in relation to any particular project:

- **Piping**
  - Standard
  - Materials
  - Pressure Performance Requirements
  
- **Potential Applications**
  - Industry Sector
  - Application Type
  
- **Practicalities**
  - Fitting Dimensions
  - Installation Space Requirements
  - Installation Quality Assessment

## Pipe Standards

---

LiNX|AS fittings are available for pipes manufactured to the following standards:

- ANSI
- ANSI/DIN
- DIN Imperial
- DIN Metric (ISO)
- Universal
- Japan/Korea

## Materials Compatibility

---

### LiNX|AS Low Alloy Steel fittings

Grade 4140 Normalized, quenched and tempered alloy steel fittings are manufactured from bars and Forgings and is designed for use with the following Carbon and Low alloy steel pipes/ tubes and their equivalents.

- ASTM A106 Grade A, B and C Seamless. Temp.  $-33^{\circ}$  C to  $426^{\circ}$  C
- ASTM A335 Grade P11 and P22 Seamless. Temp.  $-29^{\circ}$  C to  $426^{\circ}$  C

### LiNX|AS Stainless, Duplex & Super Duplex Stainless Steel Fittings

ASTM A479 316 Stainless steel & A479-S31803 (2205) Duplex stainless steel, A479-S32750 (2507) Super duplex stainless steel are made from barstock and mechanical tubing conforming to LiNX|AS material specifications. These fittings are designed to use the following Pipe/Tube materials.

- ASTM A312 TP304 Seamless. Temp.  $-254^{\circ}$  C to  $426^{\circ}$  C
- ASTM A312 TP304L Seamless. Temp.  $-254^{\circ}$  C to  $426^{\circ}$  C
- ASTM A312 TP316 Seamless. Temp.  $-254^{\circ}$  C to  $426^{\circ}$  C
- ASTM A312 TP316L Seamless. Temp.  $-254^{\circ}$  C to  $426^{\circ}$  C

## Compatibility Summary

| Pipe Material →   | A106 | A335 P11 | A335 P22 | S152 | S355J2 | TP304 | TP304L | TP316 | TP316L |
|-------------------|------|----------|----------|------|--------|-------|--------|-------|--------|
| LiNX AS Fitting ↓ |      |          |          |      |        |       |        |       |        |
| 4140 Alloy Steel  | ✓    | ✓        | ✓        | ✓    | ✓      |       |        |       |        |
| 316L              |      |          |          |      |        | ✓     | ✓      | ✓     | ✓      |
| 304L (Combi)      |      |          |          |      |        | ✓     | ✓      | ✓     | ✓      |
| 2205              |      |          |          |      |        | ✓     | ✓      | ✓     | ✓      |
| 2507              |      |          |          |      |        | ✓     | ✓      | ✓     | ✓      |

## Typical Applications

Straight Pipe Fitting system has numerous industrial applications worldwide including but not limited to

- Ship building and Repair
- Water Industries
- Petroleum – Oil & Gas
- Chemical
- Pharmaceutical
- Food/Beverage
- Marine
- Offshore and Sub Sea
- Land based Drilling Rigs
- Mobile Equipment
- Fire Suppression
- Mining
- Pulp and Paper
- Nuclear/Power Generation
- Any Piping System Connections

## Limitations

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Additional Factors that may limit the effectiveness of a LiNX|AS joint include

- Pipe hardness above the recommended limit
- Pipe wall thickness above or below recommended limits
- Physical condition of the pipe(s)
- Pipe Dimension Tolerance

## Certification

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## ASME B31.3 Code calculations

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ASME B31.3, Para. No.:304.1.2, 3a.

$$\text{Pressure Design Thickness } t = \frac{PD}{2(SEW + PY)}$$

$$\text{Design Pressure } P = \frac{2SEWt}{D-2Yt}$$

### Note

As per ASME B31.3 Para 304.1.2 the maximum internal pressure are calculated for the pipe/tube based on the pipe size, material and wall thickness. For fittings we have taken around 80% of the maximum internal pressure calculated above based on the proof test we have carried out successfully for the fittings. Hence, around 80% of Design Pressure.

### Where

P = Design Pressure in kg/mm<sup>2</sup>

S = Pipe Allowable Stress value from B31.3 Table A-1 in ksi.

The allowable stress ' S ' taken from B31.3 Para. No 302.3.2, (d) point no 1 & 2 or the following two values :

S<sub>y</sub> = Two-thirds of yield strength at room temperature

S<sub>t</sub> = One-third of tensile strength at room temperature

E = Quality factor = 1 From B31.3 Table A-1A and Table A-1B for Carbon Steel and Low and Intermediate Alloy Steel

t = Thickness of pipe from ASME B16.25 Table 1 with considering of mill tolerance 12.5% from B31.3 para S301.2, in mm.

D = Outer Dia. of pipe from ASME B16.25 Table 1, in mm.

Y = Coefficient from ASME B31.3 Table 304.1.1 for Ferritic Steels

W = Weld joint length reduction factor = 1 (Not Applicable)

d = Fitting ID (Pipe OD with tolerance value) in mm.

# PERFORMANCE SPECIFICATIONS

## Pressure Temperature Ranges

Table 1: Low Alloy Steel Product Max. Design pressure - temp rating for SCH. 40 or 40S (BAR)

| SIZE   | Min. temp. to 150° F (65° C) | 650° F (343° C) | 700° F (371° C) | 800° F (426° C) |
|--------|------------------------------|-----------------|-----------------|-----------------|
| 1/2"   | 280                          | 274             | 272             | 244             |
| 3/4"   | 224                          | 220             | 217             | 195             |
| 1"     | 210                          | 206             | 204             | 183             |
| 1 1/2" | 154                          | 151             | 149             | 134             |
| 2"     | 130                          | 127             | 126             | 113             |

Table 2: Stainless Steel product Max. Design pressure - temp rating for SCH. 40 or 40S (BAR)

| SIZE   | Min. temp. to 300° F (148° C) | 400° F (204° C) | 500° F (260° C) | 600° F (315° C) | 700° F (371° C) | 800° F (426° C) |
|--------|-------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| 1/2"   | 231                           | 222             | 199             | 169             | 136             | 109             |
| 3/4"   | 189                           | 181             | 163             | 138             | 112             | 89              |
| 1"     | 175                           | 168             | 151             | 128             | 103             | 82              |
| 1 1/2" | 130                           | 125             | 112             | 95              | 77              | 61              |
| 2"     | 100                           | 96              | 86              | 73              | 59              | 47              |

Table 3: Low Alloy Steel Product Max. Design pressure - temp rating for SCH. 80 or 80S (BAR)

| SIZE   | Min, temp. to 300° F (148° C) | 650° F (204° C) | 700° F (371° C) | 800° F (426° C) |
|--------|-------------------------------|-----------------|-----------------|-----------------|
| 1/2"   | 350                           | 343             | 340             | 305             |
| 3/4"   | 290                           | 284             | 281             | 252             |
| 1"     | 265                           | 260             | 257             | 231             |
| 1 1/2" | 200                           | 196             | 194             | 174             |
| 2"     | 171                           | 168             | 166             | 149             |

Table 4: Stainless Steel product Max. Design pressure - temp rating for SCH. 80 or 80S (BAR)

| SIZE   | Min. temp. to 300° F (148° C) | 400° F (204° C) | 500° F (260° C) | 600° F (315° C) | 700° F (371° C) | 800° F (426° C) |
|--------|-------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| 1/2"   | 326                           | 313             | 280             | 238             | 192             | 153             |
| 3/4"   | 266                           | 255             | 229             | 194             | 157             | 125             |
| 1"     | 245                           | 235             | 211             | 179             | 145             | 115             |
| 1 1/2" | 182                           | 175             | 157             | 133             | 107             | 86              |
| 2"     | 150                           | 144             | 129             | 110             | 89              | 71              |

Table 5: Duplex, Super Duplex stainless steel  
Design pressure temp. rating for 0.8 (or) 1.2mm thickness (Bar)

| SIZE           | Min. temp. to 300° F (148° C) | 400° F (204° C) | 500° F (260° C) | 600° F (315° C) | 700° F (371° C) | 800° F (426° C) |
|----------------|-------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| 1/4" &<br>3/8" | 200                           | 192             | 172             | 146             | 118             | 94              |
|                | 300                           | 288             | 258             | 219             | 177             | 141             |

## Design Pressure Ranges

### A29-4140 Low Alloy Steel

| Sl. No | Size   | Schedule |      | Outside Ø Pipe from standard ASME B16.25 | Sch-40 Rated Pressure in Bar | Sch-80 Rated Pressure in Bar |
|--------|--------|----------|------|--|------------------------------|------------------------------|
|        | Inch   | 40       | 80   | D (mm)                                   | ASME B31.3                   | ASME B31.3                   |
| 1      | 1/2"   | 2.42     | 3.26 | 21.3                                     | 280                          | 350                          |
| 2      | 3/4"   | 2.51     | 3.42 | 26.7                                     | 224                          | 290                          |
| 3      | 1"     | 2.96     | 3.98 | 33.4                                     | 210                          | 265                          |
| 4      | 1 1/2" | 3.22     | 4.45 | 48.3                                     | 154                          | 200                          |
| 5      | 2"     | 3.42     | 4.85 | 60.3                                     | 130                          | 171                          |

### 316L Stainless Steel

| Sl. No | Size   | Schedule |      | Outside Ø Pipe from standard ASME B16.25 | Sch-40 Rated Pressure in Bar | Sch-80 Rated Pressure in Bar |
|--------|--------|----------|------|--|------------------------------|------------------------------|
|        | Inch   | 40       | 80   | D (mm)                                   | ASME B31.3                   | ASME B31.3                   |
| 1      | 1/2"   | 2.42     | 3.26 | 21.3                                     | 231                          | 326                          |
| 2      | 3/4"   | 2.51     | 3.42 | 26.7                                     | 189                          | 266                          |
| 3      | 1"     | 2.96     | 3.98 | 33.4                                     | 175                          | 245                          |
| 4      | 1 1/2" | 3.22     | 4.45 | 48.3                                     | 130                          | 182                          |
| 5      | 2"     | 3.42     | 4.85 | 60.3                                     | 100                          | 150                          |



## Ultimate Burst Pressures

| <b>Size (inch)</b> | <b>Material</b> | <b>Schedule 40<br/>Burst Pressure<br/>(Bar)</b> | <b>Schedule 80<br/>Burst Pressure<br/>(Bar)</b> |
|--------------------|-----------------|---|---|
| 1/2"               | Carbon Steel    | 1120  | 1400  |
|                    | Alloy Steel     | 1120  | 1400  |
|                    | Stainless Steel | 924   | 1304  |
| 3/4"               | Carbon Steel    | 896   | 1160  |
|                    | Alloy Steel     | 896   | 1160  |
|                    | Stainless Steel | 756   | 1064  |
| 1"                 | Carbon Steel    | 840   | 1060  |
|                    | Alloy Steel     | 840   | 1060  |
|                    | Stainless Steel | 700   | 980   |
| 1 1/2 "            | Carbon Steel    | 616   | 800   |
|                    | Alloy Steel     | 616   | 800   |
|                    | Stainless Steel | 520   | 728   |
| 2"                 | Carbon Steel    | 520   | 684   |
|                    | Alloy Steel     | 520   | 684   |
|                    | Stainless Steel | 400   | 600   |

## 2205 Duplex Stainless Steel &amp; 2507 Super Duplex Stainless Steel

| Sl.No | Size Inch | Thickness (mm) | Outside Ø Pipe (mm) | Rated Pressure in Bar |
|-------|-----------|----------------|---------------------|-----------------------|
| 1     | 1/4"      | 0.8/1.2        | 6.35                | 200                   |
|       |           |                |                     | 300                   |
| 2     | 3/8"      | 0.8/1.2        | 9.525               | 200                   |
|       |           |                |                     | 300                   |
| 3     | 1/2"      | SCH 10         | 21.3                | 172                   |
|       |           | SCH 40         |                     | 230                   |
| 4     | 3/4"      | SCH 10         | 26.7                | 135                   |
|       |           | SCH 40         |                     | 187                   |
| 5     | 1"        | SCH 10         | 33.4                | 142                   |
|       |           | SCH 40         |                     | 176                   |
| 6     | 1 1/2"    | SCH 10         | 48.3                | 96                    |
|       |           | SCH 40         |                     | 130                   |
| 7     | 2"        | SCH 10         | 60.3                | 76                    |
|       |           | SCH 40         |                     | 109                   |

| Size (Inch) | Material   | Thickness  | Burst Pressure (Bar) |
|-------------|--|------------|----------------------|
| 1/4"        | Duplex<br>Stainless Steel &<br>Super Duplex<br>Stainless Steel | 0.8/1.2 mm | 800                  |
|             |  |            | 1200                 |
| 3/8"        |  | 0.8/1.2 mm | 800                  |
|             |  |            | 1200                 |
| 1/2"        |  | SCH 10     | 688                  |
|             |  | SCH 40     | 920                  |
| 3/4"        |  | SCH 10     | 540                  |
|             |  | SCH 40     | 748                  |
| 1"          |  | SCH 10     | 568                  |
|             |  | SCH 40     | 704                  |
| 1 1/2"      | SCH 10   | 384        |                      |
|             | SCH 40   | 520        |                      |
| 2"          | SCH 10   | 304        |                      |
|             | SCH 40   | 436        |                      |

# INSTALLATION

---

Installation of pipes using the LiNX|AS fitting to form joints is a simple process

## New Assemblies

---

When fabricating new assemblies LiNX|AS provides an opportunity to part assemble sections and subassemblies off site and fit these on site using the LiNX|AS cold-press joint formation method. This can increase production time and minimise interruptions of operations on existing sites.

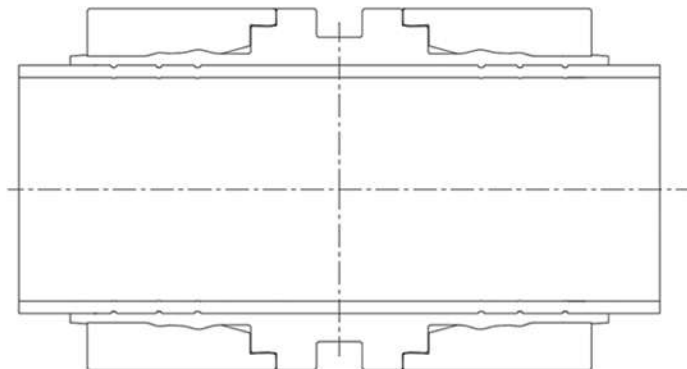
The standard straight fitting is normally used in the creation of new assemblies as the central stop allows for rapid joint formation and reduced alignment checks.

## Repairs

---

### Repair Fitting Drawing

Repairs are typically performed in-situ. The cold work joint formation process of LiNX|AS fittings makes them ideally suited for situations where there is risk of fire or explosion.



For most repair work, a damaged section or sub-assembly is cut out and a fresh replacement is installed. This will typically use two of the LiNX|AS repair fittings. These differ from the standard straight fitting in that the central stop is not present. Two pairs of markings are made on the pipe using the LiNX|AS gauge.

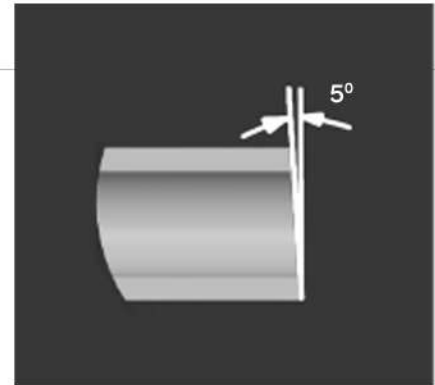
The Installation process involves sliding the Repair Fitting down the existing pipe and then moving the new section into place. The Repair Fitting is slid back up into position where the new and old pipe meet. The joint is then formed in the normal way.

# Installation Process

## Pre-Installation

### Pipe Inspection

The LiNX|AS measurement gauge enables the pipe fitter to quickly confirm pipe dimensions and roundness as part of the installation process.



### Pipe Preparation

- Use square tool to confirm cut angle is within tolerance
- Ensure the interior and exterior of the pipe are clean and free from burr
- Use provide gauge to inspect the pipe

### Tool Preparation

- Install the correct inserts and prepare the tool
  - o Ensure there is no grit or dirt in any of the moving parts
  - o Connect the tool to the hydraulic power source

## Installation

- Apply pressure and clamp the fitting with the pipe

## Inspection

- Check the trailing edge should be projecting beneath the end of the Press ring
- Check to see if the INSPECT mark is partly enclosed
- All most full of INSTALL mark is visible
- Check the drive rings butts up against the fitting body flange





## Pipe Quality & Condition

---

The LiNX|AS fitting performance relies upon the metal-to-metal seals between the joint and the pipe. The presence of surface or pipe defects or distortions can result in a lack of total sealing around the circumference of the pipe.

This in turn can cause pathways at which leakage can occur. When considering the quality of the pipe, it is important to consider Distance A, as shown in Diagram 1.

This is the portion of pipe which interacts with the LiNX|AS joint, and can therefore influence the quality of the joint finish. This distance can be obtained from the Measuring Guide for the fittings being used.

Each pipe/tube end must be inspected prior to insertion in a LiNX|AS fitting. The following points should act as a guide during the inspection in order to qualify a pipe/tube as being of sufficient quality to be used with a LiNX|AS fitting.

## Handling of the Pipe/Tube

---

The tube/pipe end should be protected in order to reduce scratches/damage or distortion of the pipe.

1. Tubing/pipe should never be dragged out of a tubing rack or along a rough surface or floor – this can cause damage/distortion of the pipe.
2. Never clamp the pipe end (distance A) to be inserted into a LiNX|AS fitting in a vice/pipe wrench – this can cause distortion

## Cutting the Pipe/Tube

1. The Pipe/tube ends must be cut square. There is a tolerance of  $\pm 5^\circ$  off-square.
2. Care should be taken when using pipe cutters which can distort the shape of the pipe (such as wheeled cutters which clamp onto the pipe).
3. Saws/tube cutters should be sharp.

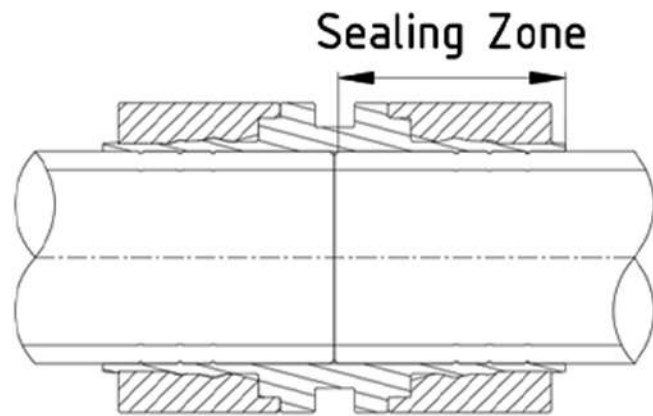


Diagram 1

4. Before cutting, ensure that the distance between any bends/ fittings and the cut end is sufficient in order to provide access for the press tool.

Diagram 1 showing the pipe length used in a LiNX|AS joint

## Deburring the Pipe

It is important to deburr the end of the pipe to ensure that liquid runs through the pipe smoothly (no cavitation), that the LiNX|AS fitting can seal tightly and uniformly, and to protect the LiNX|AS fitting from being damaged/scratched when the pipe is inserted.

1. Use a deburring tool to deburr both the inside and the outside of the pipe/tube ends.



## Sanding the Pipe/Tube ends

It is best practise to sand the ends of the pipe (distance A in Diagram 1) in order to remove any mill scale, corrosion, surface contamination, paint etc.

1. 120 grit sandpaper is recommended
2. Always sand around the pipe circumference, rather than parallel to the pipe length, as shown in Diagram 2. This will minimize the possibility of flat spots being created on the pipe/tube.



Diagram 2  
showing correct  
sanding direction

## Pipe/Tube surface defects

Scratches, pitting and coating drips are common defects seen on pipes.

### Longitudinal Scratches

If there are deep longitudinal scratches in the pipe/tube under the sealing rings, the LiNX|AS fitting will not be able to seal completely with the pipe/tube, which will lead to points of leakage.

A simple test to check for deep scratches is to run your fingernail around the outside pipe circumference.

If your nail catches in any scratches, they are considered to be deep enough to impact on the joint and further surface preparation must be carried out to remove these scratches.



Diagram 3  
showing a longitudinal  
scratch



## Corrosion/Pitting

If the pipe/tube suffers from severe surface corrosion/pitting (particularly important when carrying out repair joint fitting to a carbon steel pipe in the field), care should be taken to remove these surface defects by sanding. If the pitting is so severe as to not be able to be removed, the LiNX|AS joint may be compromised.

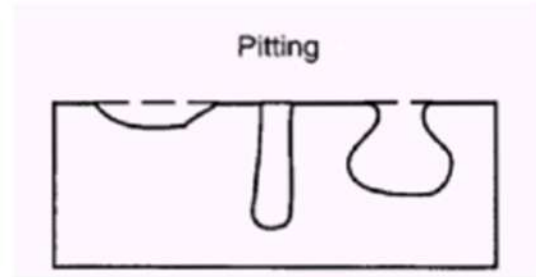


Diagram 4  
showing surface pitting

## Uneven Zinc Coating

If the pipe/tube being used has been zinc coated, check for signs of any zinc drips, pooling or uneven application. This must be removed by sanding before use.



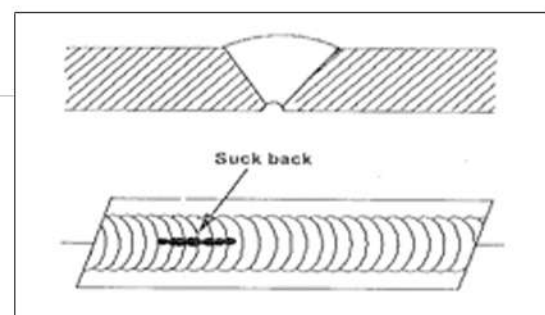
Diagram 5  
showing Zinc coating drips

## Seam welded pipe (Electric Resistance Welded)

As noted above, any surface defects on a pipe/tube can form pathways under the LiNX|AS seal, which in turn can cause leakage/loss of pressure. If using seam welded pipe, special care must be taken to inspect the seam in order to ensure that there are no surface defects which could cause leakage. The following items are examples of poor-quality weld seams that could affect the quality of a LiNX|AS joint.

### 1. Suck Back - A

Suck back along the weld seam, creating a longitudinal scratch & associated leak path under the LiNX|AS seal

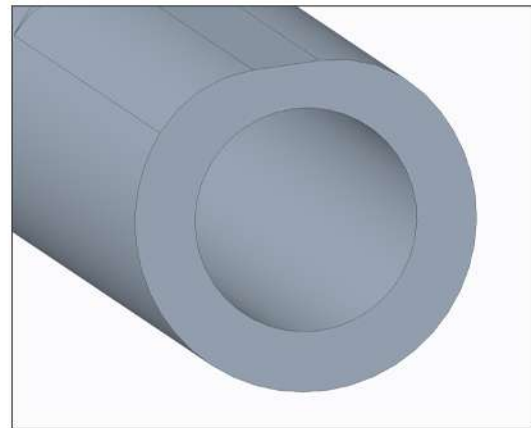




## 2. Flat Spot - B

---

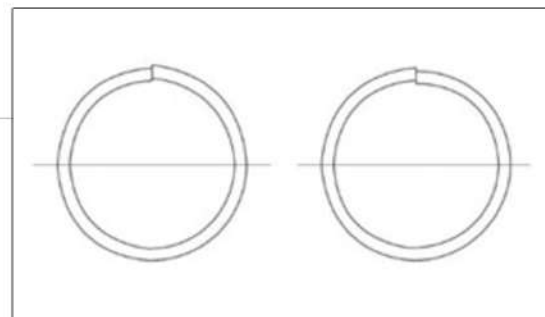
Excessive weld removal at the manufacturer can lead to flat spots along the weld which could result in the LiNX|AS joint being unable to seal the pipe sufficiently at this point.



## 3. Misalignment - C

---

If the two sides of the pipe are misaligned, a step down will result.



## 4. Weld bead - D

---

Insufficient weld bead removal at the manufacturer will cause high points which could create leak pathways either side of the weld seam.

## Surface Defect Remedies

---

If the Pipe/tube being used displays any of the above surface defects it should be remedied as follows:

1. Cut back the pipe further until "good" pipe/tube is reached
2. Sand the surface using 60grit, finishing with 120grit sandpaper. As noted earlier, do not sand parallel with the length of the pipe. Care should be taken not to alter the shape of the pipe/tube (out of round), or reduce the pipe/tube wall thickness to less than the minimum tolerance, or reduce the outer diameter to less than the specified outer diameter for the fitting (see Measurement Guide for tolerances).

# REFERENCE

## Materials Hardness

| Fitting Material  | Hardness ( BHN ) |
|-------------------|------------------|
| A29-4140          | 230-270          |
| 304L              | 200              |
| 316L              | 217              |
| Duplex 2205       | 293              |
| Super Duplex 2507 | 300              |

## Pipe Hardness

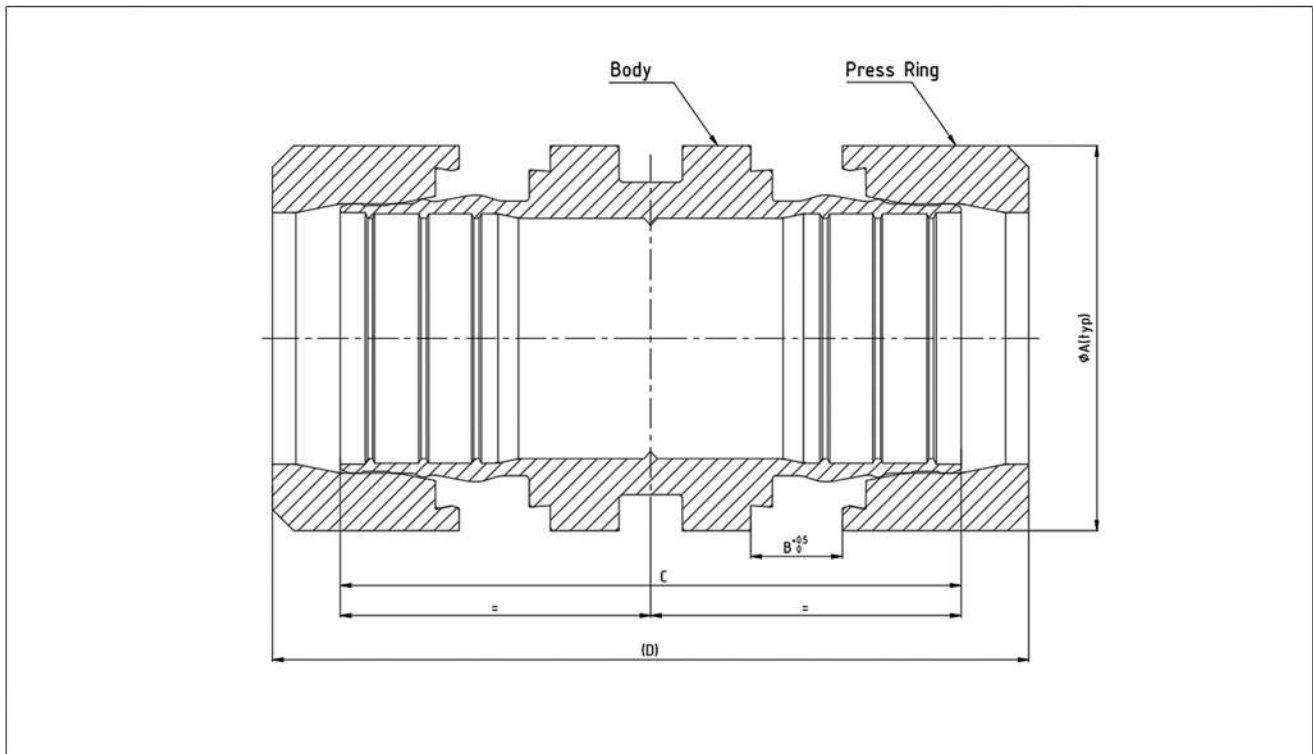
| Pipe Material   | Typical Hardness Range (BHN) | Maximum Allowable Hardness ( BHN ) |
|-----------------|------------------------------|------------------------------------|
| Carbon Steel    | 150-170                      | 170max                             |
| Alloy Steel     | 160-180                      | 180max                             |
| Stainless Steel | 160-180                      | 180max                             |

For a secure joint to be formed using the LiNX|AS process the fitting hardness must always be higher than the surface of the pipe.

## Dimensional Tolerance for Pipe

| Size ( Inches ) | Pipe OD (mm) | Tolerance |
|-----------------|--------------|-----------|
| 1/4"            | Ø6.35        | ±0.25     |
| 3/8"            | Ø9.525       | ±0.25     |
| 1/2"            | Ø21.3        | ±0.4      |
| 3/4"            | Ø26.7        | ±0.4      |
| 1"              | Ø33.4        | ±0.4      |
| 1-1/2"          | Ø48.3        | ±0.4      |
| 2"              | Ø60.3        | ±0.8      |

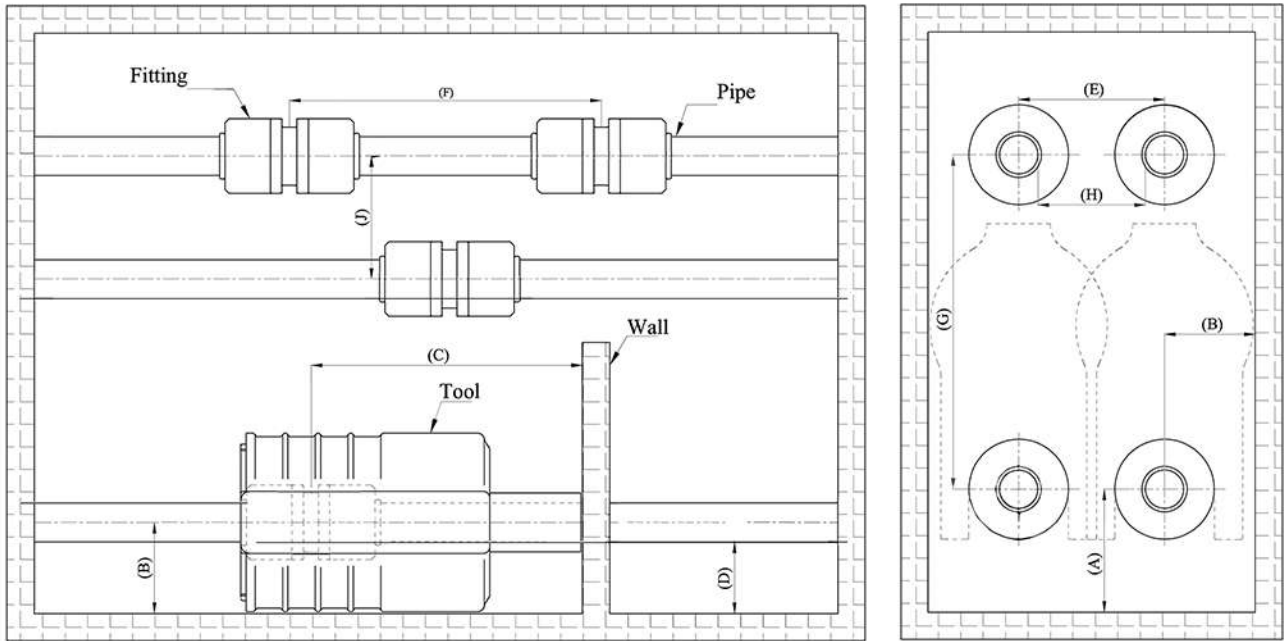
## Fitting Exterior Dimensions & Weight



| Sl. No | Size<br>inch | A<br>mm | B<br>mm | C<br>mm | D<br>mm | Material        | Weight<br>kg | Pipe<br>Outside<br>Diameter<br>Ø mm |
|--------|--------------|---------|---------|---------|---------|-----------------|--------------|-------------------------------------|
| 1      | 1/4"         | 19.07   | 6.32    | 48.99   | 57.85   | 2205/2507       | 0.116        | 6.35                                |
| 2      | 3/8"         | 26.00   | 7.6     | 57.99   | 68.1    | 2205/2507       | 0.174        | 9.525                               |
| 3      | 1/2"         | 41.00   | 11.7    | 76.83   | 94.3    | Gr.4140/Gr.316L | 0.23         | 21.3                                |
| 4      | 3/4"         | 46.8    | 11.50   | 79.75   | 96.9    | Gr.4140/Gr.316L | 0.3          | 26.7                                |
| 5      | 1"           | 53.96   | 12.85   | 87.06   | 106.23  | Gr.4140/Gr.316L | 0.76         | 33.4                                |
| 6      | 1 1/2"       | 71.11   | 16.40   | 106.00  | 133.15  | Gr.4140/Gr.316L | 1.55         | 48.3                                |
| 7      | 2"           | 85.40   | 18.40   | 113.58  | 144.18  | Gr.4140         | 2.25         | 60.3                                |
| 8      | 2"           | 85.40   | 18.40   | 123.58  | 154.18  | Gr.316L         | 2.48         | 60.3                                |



# Space Requirements around Tooling



| Press Tool | Size (Inch)  | Between Wall to Pipe A min. (mm) | Between Wall to Pipe B min. (mm) | Between Wall to Fitting Center C min. (mm) | Pipe Outer to Wall D min. (mm) | Between Pipes E min. (mm) |
|------------|--------------|----------------------------------|----------------------------------|--|--------------------------------|---------------------------|
| C009       | 1/4" to 3/8" | 45                               | 33.5                             | 133  | 37                             | 56                        |
| L100       | 1/2" to 1"   | 67.5                             | 50                               | 149  | 56.5                           | 80.5                      |
| P200       | 1 1/2" & 2"  | 100                              | 62                               | 160.5                                      | 70                             | 115                       |

| Press Tool | Size (Inch)  | Between Fittings F min. (mm) | Between Pipes G min. (mm) | Between Pipes H min. (mm)         | Between Pipes J min. (mm) | Tool Weight (Kg) |
|------------|--------------|------------------------------|---------------------------|-----------------------------------|---------------------------|------------------|
| C009       | 1/4" to 3/8" | 111                          | 127                       | 50 / 46.5<br>(1/4") (3/8")        | 45                        | 5.25             |
| L100       | 1/2" to 1"   | 142                          | 183.5                     | 59 / 54 / 47<br>(1/2")(3/4") (1") | 67.5                      | 10.5             |
| P200       | 1 1/2" & 2"  | 184                          | 228                       | 67 / 55<br>(1 1/2")(2")           | 100                       | 14.5             |

## Fitting types

We will offer the following different shapes of Fittings



### STRAIGHT FITTING

A fitting or adapter is used in pipe systems to connect straight sections of pipe or tube.



### REPAIR FITTING

Repair fittings are used for damage places in the pipe/tube



### REDUCER

A Reducer, meaning they reduce flow by joining a larger pipe to smaller size.



### SOCKET WELD ADAPTER

In this fittings, one end is connected to the pipe by using our method and the another end directly welded to the run pipe or Valves.



### BLIND END

In this type of Fittings are used to stop the flow in the pipe linings.



### FEMALE ADAPTER

An adapter could be fitted on the end of a plain pipe to allow a Female threaded connection at the other side of the adapter.



### MALE ADAPTER

An adapter could be fitted on the end of a plain pipe to allow a Male threaded connection at the other side of the adapter.



### MALE NPT ADAPTER

An adapter could be fitted on the end of a plain pipe to allow a Male NPT threaded connection at the other side of the adapter.



### FEMALE NPT ADAPTER

An adapter could be fitted on the end of a plain pipe to allow a Female NPT threaded connection at the other side of the adapter.



### FLANGE ADAPTER

In this fittings, one end is connected to the pipe by using our method and the another end directly connected to the run pipe or Valves by Bolt & Nuts



### TEE ADAPTER

In this fittings, Three end is connected to the pipe by using our method.



### CROSS ADAPTER

In this fittings, all ends are connected to the pipe by using our method.

## Tool Care, Maintenance & Servicing

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The LiNX|AS Press Tool, Inserts and Measurement Gauge are designed to give many cycles of untroubled service

Operate tool several times without fitting to assure functionality and retraction of tool and no air is locked in the system.

Ensure that the LiNX|AS fittings are fully located in the Press Tool system before Clamping process. Fittings that are not fully located can damage fitting and/or tool.

Do not use Press Tool components with damage or excessive wear.

Press Tool system components (hoses, pumps) are fully rated for 700 Bar operating pressure. Do not substitute components without prior approval of LiNX|AS.

Daily cleaning process required on Press tool before use.  
Lubrication required to avoid wear in moving parts on press tool.

## Tool Specification - Weights, Pressure Ratings & Fitting Sizes

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LiNX press tool is designed to install different size of LiNX fittings with respective inserts. LiNX press tool provides the required hydraulic pressure on the sliding jaw of the tool to press and insert the Press ring on the fitting body creating a metal-to-metal sealing. Pay attention to pipe size and insert compatibility of the tool model while selecting the tool.

The press tool table and Specifications of press tools & inserts table will provide the necessary information to help you selecting the press tool model and inserts.

### Tool accessories required for installation

- Tool accessories with Tooling
- Tool Inserts
- Hydraulic hand pump / Energy pack at 700 bar
- 10 ft Hydraulic Hose
- Pipe Measurement Gauge



## Press Tool Models

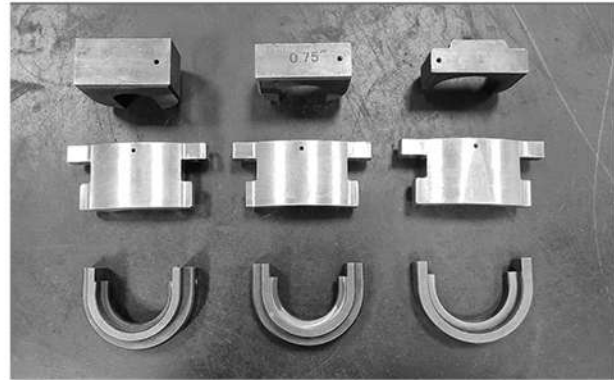
| Model Name | Model ID | Tool Weight (KG) | Tool Kit Weight (KG) |
|------------|----------|------------------|----------------------|
| Cheetah    | C009     | 2.75             | 7                    |
| Leopard    | L100     | 9.75             | 19                   |
| Panther    | P200     | 14.5             | 29                   |

## Press Tool Size Ranges

| Model ID | Pipe Size |       |      |       |        |       |
|----------|-----------|-------|------|-------|--------|-------|
|          | <1/2"     | 1/2"  | 3/4" | 1"    | 1-1/2" | 2"    |
| Imperial | <1/2"     | 1/2"  | 3/4" | 1"    | 1-1/2" | 2"    |
| Metric   | <20 mm    | 20 mm | <>   | 35 mm | <>     | 60 mm |
| C009     | ✓         |       |      |       |        |       |
| L100     |           | ✓     | ✓    | ✓     |        |       |
| P200     |           |       |      |       | ✓      | ✓     |

## Tool Inserts

Inserts provide the proper support and alignment of press ring and fitting body to ensure perfect installation. Each size fitting has its compatible insert model that can be used on particular press tool model. Refer the press tool table and Specifications of press tools & inserts table for more information on compatibility.



## Specifications of press tools & inserts

| d=pipe<br>Ø mm | Press Tool |      | Insert |        |
|----------------|------------|------|--------|--------|
|                | Model      | Code | Model  | Code   |
| Ø 6.35         | C009       | 009  | T06    | 009006 |
| Ø 9.525        | C009       | 009  | T09    | 009009 |
| Ø 21.3         | L100       | 010  | T21    | 010021 |
| Ø 26.7         | L100       | 010  | T26    | 010026 |
| Ø 33.4         | L100       | 010  | T33    | 010033 |
| Ø 48.3         | P200       | 020  | T48    | 020048 |
| Ø 60.3         | P200       | 020  | T60    | 020060 |

## Pipe Measurement Gauge

Pipe Gauge is the tool provide with for inspecting the squareness of the cut, gauge the outside diameter of the pipe and for drawing marks that allows the installer to inspect the proper completion of the installation process. It is always recommended to use pipe gauge before installation as instructed to achieve proper installation. The Pipe which answers the No Go gauges are not recommended for installation.



### Specifications of pipe measurement gauge

| d=pipe Ø mm       | Pipe Gauge Model | Code |
|-------------------|------------------|------|
| Ø 21.3            | PG210            | 0210 |
| Ø 26.7            | PG260            | 0260 |
| Ø 33.4            | PG330            | 0330 |
| Ø 48.3            | PG480            | 0480 |
| Ø 60.3            | PG600            | 0600 |
| Ø 60.3(316L PIPE) | PG60A            | 060A |

## Power Sources

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Use a standard Hydraulic hand pump, Pneumatic pump, Electric pump at 700 bar.

### Hydraulic Hand Pump

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Hand pump with hardened and ground piston with low friction and high-performance seal give the pump long service life. Special air breather prevents airborne impurities from entering the cylinder, thereby enhancing the service life of the pump. Pressure regulating knob is provided for controlling the required pressure during clamping.



### Electric Pump

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High pressure cordless battery powered hydraulic pumps are ideal for jobs that require a combination of portability, speed, and safety. These cordless pumps are perfect for remote locations without access to power, but also indoors where trip hazards, ergonomics or size is a concern. The Lithium-Ion battery provides superior run time, even under extreme job site conditions.





# Type Approval Certificate

Issued by Lloyds Register – 2021



Page 1 of 2  
 Certificate No: LR21242333TA-01  
 Issue Date: 02/07/2021  
 Expiry Date: 22/06/2026

## Type Approval Certificate

This is to certify that the undernoted product(s) has/have been tested with satisfactory results in accordance with the relevant requirements of the Lloyd's Register Type Approval System.

|                            |  |
|----------------------------|--|
| <b>Manufacturer</b>        | <b>LYNX AS FZC</b>   |
| <b>Address</b>             | BUSINESS CENTRE, AL SHMOOKH BUILDING, UAQ Free Trade Zone,<br>UMM AL Quwain, UAE   |
| <b>Place of Production</b> | Aruna Industrial Products Pvt.Ltd<br>3/1, Melur Main Road, Ulaganeri Village, Madurai, 625107, India   |
| <b>Type</b>                | Pipe Fittings  |
| <b>Description</b>         | Ferrous and Non Ferrous Metallic Pipe Joints (Compression Couplings- Swage Type)   |
| <b>Trade Name</b>          | LlNX   AS Pipe Fittings  |
| <b>Application</b>         | For marine, offshore and industrial piping installations classed or intended for Classification with Lloyd's Register.<br><u>Restrictions:</u><br>I. High pressure fuel supply line of the injection pumps on diesel engines.<br>II. Use in superheated steam, acetylene, oxygen, cargo & venting lines on chemical and gas tankers. |
| <b>Specified Standard</b>  | Lloyd's Register's Rules and Regulations for the Classification of Ships, 2020.<br>Lloyd's Register's Type Approval System Test Specification No. 2 ( December -2020)<br>ASTMF1387   |

71 Fenchurch Street, London, EC3M 4BS, United Kingdom

**Mohamed Mohamed Rila**

Senior Specialist to Lloyd's Register EMEA  
 A member of the Lloyd's Register group





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## Type Approval Certificate

### Ratings

Diameter : 1/2 to 2 inches  
Wall Thickness: SCH 40 & SCH 80  
Max. Design pressure: 47 to 392 bar  
Temperature range : -55° to 426° C  
For detail Pressure- temperature ratings, please see the manufacturer's product catalogue and Design Appraisal Document.

### Other Conditions

1. Pipe fittings are to be selected, installed and tested in accordance with the manufacturer's recommendations and Lloyd's Register's Rules and Regulations for the Classification of Ships, Part 5, Chapter 12, Section 2.12, Table 12.2.7.
2. The materials are to be suitable for intended medium and environment service.
3. The couplings are to be marked with the following information:
  - Manufacturer's name or trademark.
  - Material identification
  - Pressure rating
  - Temperature range
  - Size

This certificate is not valid for equipment, the design, ratings or operating parameters of which have been varied from the specimen tested. The manufacturer should notify Lloyd's Register EMEA of any modification or changes to the equipment in order to obtain a valid Certificate.

**Previous Version:** LR21242333TA

The Design Appraisal No. Document LR21242333TA-01 and its supplementary Type Approval Terms and Conditions form part of this Certificate.



# TROUBLESHOOTING

| Issue                                | Possible Cause  | Solution   |
|--------------------------------------|---|--|
| Fitting not fully Closed             | <ul style="list-style-type: none"><li>• Insufficient tool stroke length.</li><li>• Insufficient hydraulic power.</li><li>• Use of incorrect tool insert</li></ul> | Ensure correct tool, insert and clamping pressure  |
| Joint is leaking                     |   | Remove & replace joint   |
| Tool is leaking hydraulic fluid      |   | Check here & adapter connection  |
| Installation marks in wrong position |   | Remove and replace joint, ensure pipe is properly inserted before pressing joint fitting |

# Contact us

## Regional Offices

NORDIC

EUROPE

AMERICAS

MENA

ASIA PACIFIC

## Registered Office

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