4130 Alloy Steel (LTCS-333) Process Fittings

NACE MR0175 / ISO 15156 Compliant
A333 (LTCS) Qualified
1/8 in. / 3.2 mm Corrosion Allowance

THE mechanical “weld equivalent” pipe connection

Suitable for use in: sour service
low-temperature service
high-temperature service

ASME B31 QUALIFICATION • Lloyds Type Approval
No hot work • Safe, permanent and tamper free • Quick and easy to install
Significantly reduces installation costs • Eliminates PWHT and HAZ issues
4130 Alloy Steel (LTCS-333) Process Fittings

- Applications may include but are not limited to:
  - Plant, instrument, utility, air
  - Fuel (diesel), fuel gas, natural gas
  - Lube, seal and hydraulic oil
  - Closed drains (hazardous and nonhazardous)
  - Open drains (hazardous and nonhazardous)
  - Butane and propane
  - Process vapor
  - LP flare
  - HP flare
  - Flare (sour)
  - Process fluids (sour)
  - Atmospheric vents
  - Steam
  - Gases (N₂, O₂, H₂, He, etc.)
  - Inert gas
  - Hydrocarbons and LPG
  - Hydrocarbon solvents
  - Distillates and aromatics
  - Condensate
  - Methanol
  - Sulfuric acid (95 to 98 % concentration)
  - Heat transfer fluids
  - Cooling, utility, and fire water
  - Crude and HP storage LPG connection lines

- System Parameters
  - Typical class: 150, 300, 600, 900, and 1500
  - Temperature: –50 to 800 °F (–46 to 426 °C)

- A NACE-compliant fitting material (AISI/SAE 4130 (UNS G41300) 4130 alloy steel tested to NACE TMO-177 Method A
- Qualified for use on A333 (LTCS) Piping (Charpy impact tested to –50 °F (–46 °C). 85 % minimum shear)
- Designed for piping systems having a corrosion allowance of 1/8 in. or 3.2 mm

- ASME B31 Qualification Testing
  - Qualified for use on A333 Gr 6, A106, API 5L and A53 Grades B
  - Schedule 40, 80, and 160 (A. Up to 2 1/2 in.)

- Fitting Material Specification
  - AISI/SAE 4130 (UNS G41300) 4130 alloy steel in accordance with Lokring material specifications LMS 97-22 and LMS 09-02
  - Fittings have blue zinc chromate plating in accordance with ASTM B633

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Elastic Strain Preload (ESP®) Technology

During installation, the axial movement of the Lokring™ driver over the fitting body swages the body onto the pipe surface, compressing the pipe wall first elastically and then plastically. The pipe wall resists this swaging action, generating high unit compressive loads at the contact points between narrow sealing lands inside the fitting body and the pipe surface.

These contact stresses are sufficiently high to plastically yield the pipe surface under the multiple sealing lands, forming a 360° circumferential, permanent, metal-to-metal seal between the pipe and fitting body. The driver, which experiences a small increase in diameter (elastic strain) during installation, exerts an elastic, radial preload on the metallic seals for the life of the connection.

### Technical Specifications

- **Flange (FLNG600)-Class 600**
- **Coupling (-CPL-)**

### Ordering Information

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<th>Pipe Size</th>
<th>Fitting Size</th>
<th>Standard Installation Tool</th>
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<th>Body Insert</th>
<th>Jaw Insert</th>
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Weld-free ASME B16.5 equivalent flanges also available in classes 150, 300, and 1500.
Weld-free elbows and tees under development. Caps available up to 1 inch NPS.
Actual Test Description

- 4130 alloy steel material 1 1/2- and 2-inch Lokring couplings on A333/A106 pipe
- Internal exposure testing of the assemblies using NACE TM0177 solution A for a duration of 30 days
- Solution A is 5 % NaCl acidified with 0.5 % glacial acetic acid
- Tests conducted at 1 atm of H₂S at room temperature (76 °F / 24 °C) to assess sulfide stress cracking (SSC)
- The solution and test specimens were initially deaerated with N₂ followed by continuous purging of H₂S for the duration
- pH was initially 2.7 and was replenished when pH reached 3.8

Key Observations and Conclusions

- No evidence of sulfide stress cracking (SSC) or stress corrosion was observed in any sample
- Deemed suitable for sour service applications within the H₂S partial pressure temperature limitations listed in NACE MR0175 / ISO 15156 and NACE MR0103
- Any temperature is allowed with a restrictive partial pressure of H₂S of 15 psia (1 bar)

The above was extracted from a customer test report. Available for viewing on request.

Crevice Corrosion Testing

This was conducted to see the impact of corrosion within the small cavity, or crevice, in the Lokring fitting design with the intent to evaluate the corrosion specific to a Lokring fitting and compared to a socket weld.

It was based on the principles of ASTM G78 Standard Guide for Crevice Corrosion Testing of Iron-Base and Nickel-Base Stainless Alloys in Seawater and Other Chloride-Containing Aqueous Environments for an accelerated 30-day test.

The test solution and exposure conditions as outlined in ASTM G78 utilized test solution A: 5.0 wt % sodium chloride and 0.5 wt % glacial acetic acid dissolved in distilled or deionized water (e.g., 50.0 g of NaCl and 5.0 g of CH₃COOH dissolved in 945 g of distilled or deionized water).

As a result of this testing, Lokring is now pleased to endorse Lokring 4130 alloy steel fittings for applications that customers feel may result in crevice corrosion. We would however suggest that you work closely with your Lokring representative to ensure all parties are comfortable with the overall system conditions and parameters. This report is available on request.