When you need a better connection™

Carbon Steel • Stainless Steel • Copper Nickel • Brass
Fittings for Pipe and Tubing Applications
Advantages of Lokring Fittings

1. Permanent Connection — No Maintenance and No Repair
2. No Hot Work — Potential Reduction of OSHA Incidents
3. Secure Tamper-Proof Fittings — No Threads, Ferrule-Free, No Wrenches
4. No Purge or Flushing — Zero Contamination Compared to Welding
5. ANSI/ASME B31.1 & B31.3 Qualified
6. Visual Inspection — Non-Destructive (X-Ray) Testing is Unnecessary
7. Reliable Weld Equivalent Connection
8. The Only Mechanically Attached Fitting to Meet API 607 Fire Test
9. Increased Job Scheduling — Ten Times Faster than Welding
10. Increased Productivity — Fast and Easy to Install

WHEN and WHERE Should LOKRING Fittings Be Used?

- In confined spaces
- Underwater
- On jobs where flammable or explosive conditions may exist
- On jobs where plant downtime is costly and problematic
- On jobs that require working with medical gas systems
- For quick and easy repair/rework
- To free up ASME-certified welders for large bore pipe or pressure vessel welding

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 degree 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 pre-load on the metallic seals for the life of the connection.

LOKRING Meets the Strictest Air Resource Board Qualification (California)

No other connector (flanged or threaded) is capable of passing helium leak testing anywhere close to the level of a LOKRING fitting. LOKRING was independently tested to 2X10⁻¹¹ atmosphere cc/sec Helium leak rate.

In fact, the fitting meets all the criteria of a welded connection, except that no heat is required to make the connection.

The quality of a LOKRING connection has now been recognized by the California Air Resources Board (CARB). CARB, through their equipment and process pre-certification program has granted LOKRING pre-certification status through executive order G-096-029-R03.

The California Air Resources Board through their evaluation program has given LOKRING equivalent to WELDED status.

NOTE: Please contact LOKRING Customer Services for a copy of our preliminary Position Paper Relating to Fugitive Emissions.
Common Applications

**Pulp and Paper**
- Hydraulic and Lubrication Oil
- Water: Potable, Hot Shower, Filtered
- Mill and Warm Mill Water
- Steam and Condensate
- Clean and Waste Solvents
- Instrument Air & Control Applications
- Steam Trap Stations

**Shipbuilding and Repair**
- Fire Hazardous Services
- Lubrication & Hydraulic Oil
- Utility Services
- Steam and Condensate
- Instrument & Control Applications
- NAVSEA, Coast Guard, ABS Approval

**Metal Industries**
- Lubricating and Hydraulic Oil
- Breathing Air
- Utility Services
- Instrument Air & Control Applications
- Steam and Condensate
- Coolant and Water

**Power and Generation**
- Steam — Boiler Drain (Non Code)
- CO₂, H₂, N₂, Gases
- Closed Cooling Water
- Condensate — Demineralization Water
- Fuel & Lube Oil
- Heater Vents — Water Systems
- Instrument, Plant and Utility Air

**Offshore Production/Refineries**
- Utilities, Water, Steam
- Instrument Air
- Condensate & Drain Lines
- Hydrogen Vent/Flare Headers
- Propane, Nitrogen Systems
- Gas Dehydration & Refrigeration
- Clean & Waste Solvents
- Lube Oil

**Chemical Processing Industries**
- Distillates & Aromatics • Breathing Air
- Clean and Waste Solvents
- Sealing/Cooling Air • Steam/Condensate
- Hydrocarbons and LPG’s
- Polymers and Catalysts • Flare Headers
- VOC (Volatile Organic Compounds)
- Instrument and Control Applications
- Heat Transfer Liquids (i.e. Dowtherm™)

**Medical Gas and Vacuum**
- Approved NFPA 99
  (Para. 5.1.10.7(4)) 2005
- N₂, O₂, Nitrous Oxide Lines
- Vacuum Lines
- Cooling, Utility and Fire Water

**Automotive**
- Solvent and Water Based Paints
- Tank Farm Services
- Utility Services
- Process Industry Applications

**Railroad**
- Air Brake Systems
- Auxiliary Support Systems

Contact your LOKRING Customer Service for specific project application data.
Technical Approvals/Qualifications

Lloyd’s Register #98-60070(E1)
CRN #0A0481
TSSA-QA 00899
Hartford Boiler CSA-B51-95
API-607 Rev 4 Fire Test
ASTM-F1387 NAVSEA
ANSI/ASME B31.1, B31.3
Association of American Railroads
U.S. Coast Guard
NFPA 30
California Air Resources Board
American Bureau of Shipping
NFPA 99

ASME B31 Qualifications and Testing

Both stainless and carbon steel LOKRING fittings are qualified to the requirements of the ASME B31.1 and B-31.3 pressure piping codes for pressure and fatigue design and materials of construction.

Extensive mechanical and environmental testing has demonstrated the mechanical and sealing integrity of the LOKRING connection in a wide range of applications and environmental conditions.

Pressure-Torsion Testing:

Flexural Testing:

Fire Testing:

Figure 1: ASME testing
The 1/2” NPS stainless steel test fitting was subjected to torsional loading high enough to twist the pipe in a spiral without leakage of the joint.
Afterwards, during hydraulic testing, the pipe ruptured at 22,000 psi (1497 bar).

Figure 2: Fatigue testing
The 2” NPS carbon steel coupling above has been deflected to 3x the yield strength of the matching pipe without leaking.
The performance of this fitting in severe bending, fatigue, and vibration loads is comparable or superior to a socket weld fitting.

Figure 3: Fire Testing
The metal-to-metal LOKRING seal remains intact when subjected to extreme thermal loads, including fire (above). Stainless and carbon steel LOKRING fittings are qualified to the API-607 Rev 4, fire test standards. Stainless steel fittings and CuNi 90/10 and 70/30 are also qualified to F1387 (U.S. Navy) fire test standards. Both are widely used on volatile and flammable services.
Easy Installation

1. Cut and prep pipe/tube.
2. Inspect, gauge and mark pipe/tube ends.
3. Select and assemble LOKTOOL™.
4. Actuate tool to install fitting.
5. Remove LOKRING tool head. Inspect completed job.

Twice the Productivity of Welded Pipe

A fitter/helper team can routinely field erect, fit-up, and install 50 to 60 LOKRING fittings in a single shift. This productivity more than doubles the rate at which welded piping systems are typically shop fabricated and field erected.

The increased productivity for a typical job equals $300.00 savings for every $1000.00 of the project’s cost. This combination of greater productivity and lower man-hour rates translates to approximately 250% more fittings per hour using LOKRING.

Without the Welding Overhead

By eliminating welding in the unit, many overhead costs relating to safety, personnel, equipment and supplies, inspection, rework, and monitoring can be eliminated or substantially reduced.

Some examples are:
- Obtain fire permit for hot work
- Erect scaffolding and provide ventilation
- “Sniff” area, gas free and weather protect
- Blank flanges and nozzles
- Establish fire watch
- Build fire box or tarp
- Drain, flush and dry lines
- Place equipment, electric cables, and purge line
- Cranes, welders, grinders and small tools
- Weld consumables (purge gas and filler rod)
- Workers’ compensation, insurance and benefits
- Weld X-ray or other NDT
- Rework of damaged or misaligned spools
- System soak, flush, or passivation
- HAZMAT disposal
- Maintain and monitor flanges for leakage

In addition, ASME-certified welders are freed up for large bore pipe or pressure vessel welding.
Carbon Steel Pipe Fittings
Qualified matching pipe:
Seamless carbon steel to ASTM A106/A53S
ERW carbon steel to ASTM A53E/A587

Stainless Steel Pipe Fittings
Qualified matching pipe:
Stainless steel to ASTM A312
Type 304/304L/316/316L
Carbon steel pipe to ASTM A106/A53S

Copper Nickel Fittings
Qualified matching pipe:
Copper nickel 90/10 class 200
per MIL-T-16420 250PSI
Copper per MIL-T-24107
to 200 PSI, .065 wall
Copper nickel 70/30 class 200
and 700 per MIL-T-16420

Pressure - Temperature Rating

<table>
<thead>
<tr>
<th>Pipe NPS</th>
<th>Pipe Sch.</th>
<th>Design Pressure * PSI (Bar)</th>
<th>Design Temperature** Degrees in °F (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4”</td>
<td>40/80/160</td>
<td>8,810 (607)</td>
<td>-20 to 650 (-29 to 343)</td>
</tr>
<tr>
<td>3/8”</td>
<td>40/80/160</td>
<td>7,470 (515)</td>
<td>-20 to 650 (-29 to 343)</td>
</tr>
<tr>
<td>1/2”</td>
<td>40/80/160</td>
<td>7,000 (482)</td>
<td>-20 to 650 (-29 to 343)</td>
</tr>
<tr>
<td>3/4”</td>
<td>40/80/160</td>
<td>5,870 (404)</td>
<td>-20 to 650 (-29 to 343)</td>
</tr>
<tr>
<td>1”</td>
<td>40/80/160</td>
<td>5,300 (365)</td>
<td>-20 to 650 (-29 to 343)</td>
</tr>
<tr>
<td>1-1/4”</td>
<td>40/80</td>
<td>4,460 (307)</td>
<td>-20 to 650 (-29 to 343)</td>
</tr>
<tr>
<td>1-1/2”</td>
<td>40/80</td>
<td>3,900 (269)</td>
<td>-20 to 650 (-29 to 343)</td>
</tr>
<tr>
<td>2”</td>
<td>40/80</td>
<td>3,230 (222)</td>
<td>-20 to 650 (-29 to 343)</td>
</tr>
<tr>
<td>3”</td>
<td>40/80</td>
<td>2,470 (170)</td>
<td>-20 to 650 (-29 to 343)</td>
</tr>
</tbody>
</table>

* On Schedule 80 matching pipe to ANSI B31.3 at ambient temperature. See Specification FS40 for details.
** Do not use carbon steel fittings in “sour” services. LOKRING stainless steel fittings may be a suitable alternative. Contact your local distributor for details.

Pressure - Temperature Rating

<table>
<thead>
<tr>
<th>Pipe NPS</th>
<th>Pipe Sch.</th>
<th>Design Pressure * PSI (Bar)</th>
<th>Design Temperature** Degrees in °F (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4”</td>
<td>10/40/80</td>
<td>6,300 (434)</td>
<td>-60 to 800 (-50 to 425)</td>
</tr>
<tr>
<td>3/8”</td>
<td>10/40/80</td>
<td>4,900 (338)</td>
<td>-60 to 800 (-50 to 425)</td>
</tr>
<tr>
<td>1/2”</td>
<td>10/40/80</td>
<td>5,060 (348)</td>
<td>-60 to 800 (-50 to 425)</td>
</tr>
<tr>
<td>3/4”</td>
<td>10/40/80</td>
<td>4,470 (308)</td>
<td>-60 to 800 (-50 to 425)</td>
</tr>
<tr>
<td>1”</td>
<td>10/40/80</td>
<td>3,920 (270)</td>
<td>-60 to 800 (-50 to 425)</td>
</tr>
<tr>
<td>1-1/4”</td>
<td>10/40/80</td>
<td>2,640 (182)</td>
<td>-60 to 800 (-50 to 425)</td>
</tr>
<tr>
<td>1-1/2”</td>
<td>10/40/80</td>
<td>2,600 (179)</td>
<td>-60 to 800 (-50 to 425)</td>
</tr>
<tr>
<td>2”</td>
<td>10/40/80</td>
<td>1,840 (126)</td>
<td>-60 to 800 (-50 to 425)</td>
</tr>
<tr>
<td>3”</td>
<td>10/40/80</td>
<td>2,100 (144)</td>
<td>-60 to 800 (-50 to 425)</td>
</tr>
</tbody>
</table>

* On Schedule 40 matching pipe to ANSI B31.3 at ambient temperature. See Specification FS40 for details.

Pressure - Temperature Rating

<table>
<thead>
<tr>
<th>Pipe NPS</th>
<th>O.D.*</th>
<th>Design Pressure 90/10 Class 200 PSI (Bar)</th>
<th>Design Pressure 70/30 Class 700 PSI</th>
<th>Design Temperature Degrees F (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>—</td>
<td>0.250”</td>
<td>*</td>
<td>*</td>
<td>-60 to 425 (-51 to 218)</td>
</tr>
<tr>
<td>—</td>
<td>0.500”</td>
<td>—</td>
<td>700 (48)</td>
<td>-60 to 425 (-51 to 218)</td>
</tr>
<tr>
<td>1/4”</td>
<td>0.540”</td>
<td>250 (17)</td>
<td>700 (48)</td>
<td>-60 to 425 (-51 to 218)</td>
</tr>
<tr>
<td>3/8”</td>
<td>0.675”</td>
<td>250 (17)</td>
<td>700 (48)</td>
<td>-60 to 425 (-51 to 218)</td>
</tr>
<tr>
<td>1/2”</td>
<td>0.840”</td>
<td>250 (17)</td>
<td>700 (48)</td>
<td>-60 to 425 (-51 to 218)</td>
</tr>
<tr>
<td>3/4”</td>
<td>1.050”</td>
<td>250 (17)</td>
<td>700 (48)</td>
<td>-60 to 425 (-51 to 218)</td>
</tr>
<tr>
<td>1”</td>
<td>1.315”</td>
<td>250 (17)</td>
<td>700 (48)</td>
<td>-60 to 425 (-51 to 218)</td>
</tr>
<tr>
<td>1-1/4”</td>
<td>1.660”</td>
<td>250 (17)</td>
<td>700 (48)</td>
<td>-60 to 425 (-51 to 218)</td>
</tr>
<tr>
<td>1-1/2”</td>
<td>1.900”</td>
<td>250 (17)</td>
<td>700 (48)</td>
<td>-60 to 425 (-51 to 218)</td>
</tr>
<tr>
<td>2”</td>
<td>2.375”</td>
<td>250 (17)</td>
<td>700 (48)</td>
<td>-60 to 425 (-51 to 218)</td>
</tr>
</tbody>
</table>

* 1/4” O.D. CN-3300 - rating is 3300 PSI
Qualified matching tube:
ASTM B88 drawn types K,L,M
ASTM B819 types K,L

<table>
<thead>
<tr>
<th>Tube O.D.</th>
<th>Nominal Wall min. / max.</th>
<th>Pressure Test B31.3* min wall / max wall PSI (BAR)</th>
<th>Design Temperature Degrees F° (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4&quot;</td>
<td>0.035/0.065&quot;</td>
<td>5100 / 9050 (352 / 624)</td>
<td>-60 to 800 (-50 to 425)</td>
</tr>
<tr>
<td>3/8&quot;</td>
<td>0.035/0.065&quot;</td>
<td>3300 / 5660 (228 / 390)</td>
<td>-60 to 800 (-50 to 425)</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>0.035/0.065&quot;</td>
<td>2600 / 4270 (179 / 294)</td>
<td>-60 to 800 (-50 to 425)</td>
</tr>
<tr>
<td>5/8&quot;</td>
<td>0.035/0.065&quot;</td>
<td>2100 / 3750 (145 / 259)</td>
<td>-60 to 800 (-50 to 425)</td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>0.035/0.065&quot;</td>
<td>1700 / 3300 (117 / 228)</td>
<td>-60 to 800 (-50 to 425)</td>
</tr>
<tr>
<td>7/8&quot;</td>
<td>0.065&quot;</td>
<td>2800 (193)</td>
<td>-60 to 800 (-50 to 425)</td>
</tr>
<tr>
<td>1&quot;</td>
<td>0.065/0.083&quot;</td>
<td>2400 / 3100 (165 / 214)</td>
<td>-60 to 800 (-50 to 425)</td>
</tr>
<tr>
<td>1-1/4&quot;</td>
<td>0.065/0.109&quot;</td>
<td>1900 / 3300 (131 / 228)</td>
<td>-60 to 800 (-50 to 425)</td>
</tr>
<tr>
<td>1-1/2&quot;</td>
<td>0.065/0.120&quot;</td>
<td>1600 / 3000 (110 / 207)</td>
<td>-60 to 800 (-50 to 425)</td>
</tr>
<tr>
<td>2&quot;</td>
<td>0.065/0.083&quot;</td>
<td>1100 / 1500 (76 / 103)</td>
<td>-60 to 800 (-50 to 425)</td>
</tr>
<tr>
<td>2-1/2&quot;</td>
<td>0.065/0.083&quot;</td>
<td>900 / 1200 (62 / 83)</td>
<td>-60 to 800 (-50 to 425)</td>
</tr>
</tbody>
</table>

*At ambient temperature - See specification FS40-T for details.

Stainless Steel Tube Fittings

Qualified matching tube:
Seamless steel to ASTM A269 or A213
Many fitting shapes available — Unions, Male Elbows, Union Tees, etc.

Brass Tube Fittings

Qualified matching tube:
ASTM B88 drawn types K,L,M
ASTM B819 types K,L

Exceeds Required Temperature of 1000° F
Pressure rating should be derated at elevated temperature. Fittings meet 1000°F integrity test. See specification FS-BR for details.

Specials

Universal Steam Trap Adapters
LOKRING offers adapters with LOKRING ends.

3-PC Ball Valve
Available in stainless steel, carbon steel and copper nickel.

Many standard and special fitting configurations other than those shown above are available.
Selection Tool Kits

Tool kits are material specific and are available for Brass, Copper, Copper Nickel, Carbon and Stainless Steel pipe/tubing in sizes ranging from 1/4” OD through 3” NPS.

A tool kit consists of the appropriate tool head with replaceable insert(s) for multiple sizes (except non-replaceable inserts for 3” NPS), marking gauge(s) and a sturdy carrying case.

Installation instructions and kit inventory sheets accompany the tool kit.

The hydraulic tool requires a hose and pump (hand, electric or air hydraulic) to complete the installation kit.

To order Fittings or Tool Kits refer to our website www.lokring.com or contact your local distributor.

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38376 Apollo Parkway,
Willoughby, Ohio 44094
Phone: 440-942-0880
Toll Free: 800-876-2323
Fax: 440-942-1186

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960 Gateway Drive
Burlington, Ontario L7L 5K7
Phone: 905-639-4050
Toll Free: 888-667-6484
Fax: 905-639-6163

www.lokring.com

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