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LOKRING Specifications FS-BR for Series BR Brass Fittings

Scope of Specifications: The Lokring "BR-" Series Brass Fittings are a mechanically attached fitting which utilizes a patented elastic strain preload technology to create a permanent, nonseparable metal to metal seal on copper tubing. Pressure-temperature ratings of qualified fittings, and matching tube sizes are detailed in Tables 1 and 2 of this specification. Fitting configurations and dimensions are detailed in LOKRING product catalogs. Installation tool envelope dimensions, and minimum fit-up dimensions are provided in LOKRING Installation Procedure LP-110. For installation procedures, and selection of installation tooling, see Installation Procedure LP-110.

Fitting Material Specification: Fitting bodies and swage rings are manufactured to type 360 Brass per ASTM B16. Physical and mechanical properties of the material conform to ASTM B16 and to LOKRING material specifications LMS 05-34. Lokring shapes such as elbows and tees are 377 Brass in compliance with ASTM B283 and to LOKRING material specifications LMS 08-01

Fitting Applications:

Fittings are designed and qualified for:

- Use in medical gas applications as an axially swaged, elastic strain preload fitting providing a metal to metal seal per NFPA 99-2005 Section 5.1.10.7(4).
- Use on copper tubing in the as drawn condition made to the following ASTM specifications:
  - ASTM B819- Standard Specification for Seamless Copper Tube for Medical Gas Systems, wall thicknesses of types K and L and in the as drawn condition.
  - ASTM B88- Standard Specification for Seamless Copper Water Tube for wall thicknesses of types K, L and M in the as drawn conditions.
- Use on copper tube sizes 3/8" through 2" nominal for types K, L and M tubing wall thicknesses. See Table 1.
- Design temperatures between -452 to +400 Deg. F (-269 to +204 Deg. C).

Note: Lokring “BR-“ Series Brass Fittings are NOT to be installed on copper tubing that is in the annealed condition or on copper tubing that has been softened. The joint seal integrity may be compromised if a Lokring fitting is installed on annealed or soft copper tubing. However, Lokring fittings may be use in systems where brazing is performed as long as the Lokring fitting is installed a minimum distance of 6 inches (152mm) away from a brazed joint. Refer to Installation Procedure LP-110 for further information. If tube hardness measurements are able to be acquired then the following guideline can be used:

	Temper Designation		Rockwell Hardness		
Per ASTM	Standard	Condition	Scale	Value	Acceptable for ensuring a leaktight seal with Lokring?
B 88	O60	annealed	F	50 max	No
B 88	O50	annealed	F	55 max	No
B 819	H58	drawn	30 T	30 min	Yes

Table 1- Lokring Brass Tube Fitting- Qualified tube sizes and wall thicknesses:

Size Designation	Tube O.D. nominal, in.	Tube O.D. actual, in.	Wall Thickness, in.		
			K	L	M
T06	3/8	0.500	0.049	0.035	0.025
T08	1/2	0.625	0.049	0.040	0.028
T10	5/8	0.750	0.049	0.042	N/A
T12	3/4	0.875	0.065	0.045	0.032
T16	1	1.125	0.065	0.050	0.035
T20	1 1/4	1.375	0.065	0.055	0.042
T24	1 1/2	1.625	0.072	0.060	0.049
T32	2	2.125	0.083	0.070	0.058

Notes:

- Dimensions are referenced from ASTM B819 and ASTM B88.
- Type M tube not applicable for Medical Gas systems.
- Medical Gas systems (tube type K and L) require tube to be in the as drawn condition only.

Table 2- Lokring Brass Tube Fitting- Pressure Ratings

Size Designation	Tube O.D. nominal, in.	Tube O.D. actual, in.	Pressure Rating, psi (bar)		
			K	L	M
T06	3/8	0.500	1946 (134.2)	1341(92.5)	982 (67.7)
T08	1/2	0.625	1534 (105.8)	1242 (85.6)	850 (58.6)
T10	5/8	0.750	1266 (87.3)	1086 (74.9)	-
T12	3/4	0.875	1466 (101.1)	1002 (69.1)	701 (48.3)
T16	1	1.125	1126 (77.6)	850 (58.6)	580 (40.0)
T20	1 1/4	1.375	914 (63.0)	755 (52.1)	582 (40.1)
T24	1 1/2	1.625	850 (58.6)	702 (48.4)	569 (39.2)
T32	2	2.125	747 (51.5)	625 (43.1)	514 (35.4)

Notes:

- Pressure ratings are limited to the allowable working pressures per ASTM B88 for copper tube (drawn condition) and not on the capability of the Lokring fitting.
- If in any part of the system annealed tubing or brazing is used the actual system pressure rating may be less.
- Pressure ratings are applicable for system operating temperatures between -452 to +250 Deg. F (-269 to +121 Deg. C). For temperatures above +250 Deg. F (121 Deg. C) the de-rating factor (See Table 3 for Pressure-temperature de-rating factors) must be used, to a maximum pressure of 400 Deg. F (204 Deg C). Interpolating between de-rating factors is permitted.

Table 3- Lokring Brass Tube Fitting- Pressure-Temperature de-rating Factors.

System operating Temperature Degrees F (C)	Pressure-Temperature De-rating Factor
-452 to 100 (-269 to 38)	1.00
100 (38)	1.00
150 (66)	1.00
200 (93)	1.00
250 (121)	1.00
300 (149)	0.96
350 (177)	0.94
400 (204)	0.91

Notes:

- Pressure-temperature ratings in Table 2 and 3 assumes no corrosion allowance and negligible bending moments on the fitting. Please consult factory for more detailed design guidance.
- System operating temperature range established in B31 for copper and copper alloy pipes and tubes.

Lokring Brass Tube Fitting- Thermal expansion, Flexural Fatigue.

The fitting design has been qualified to the flexural fatigue requirements outlined in B31 and ASTM F-1387. Test specimen consisting of a LOKRING coupling and two equal length tube tangents on either side of the coupling were tested where a uniform bending moment was applied to the assembly, inducing a bending stress in the assembly equal to or greater than the tube minimum yield strength of 13,500 psi (93.1 MPa). One complete bending cycle consists of bending the assembly to one side of the neutral axis to the specified value and then back again through the neutral axis to the specified value on the opposite side and then back to the neutral axis. All assemblies exceeded 80,000 complete bending cycles without leakage, and many greatly exceeded this value. Consult factory for other details.

Applicable industry codes and practices should be considered when using the information in this document. When selecting Lokring fittings for use in any application, total system design must be considered to ensure safe, trouble free performance. Material compatibility, adequate corrosion allowances, pressure and temperature ratings, proper installation, operation and maintenance are the responsibility of the system designer and user.

