Rynglok®
Hydraulic Tube Fitting System

Eaton's Rynglok tube fitting system is the system of choice for aerospace hydraulic tubing for military, commercial and general aviation.



Powering Business Worldwide

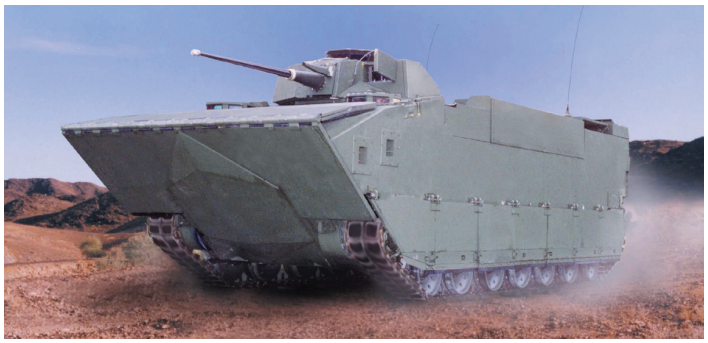
Rynglok Fitting Design Features

- Designed for operating systems up to 5,000 psi
- All metal 6Al-4V titanium alloy construction
- Zero leakage with no elastomeric seal or composite materials
- Accommodates tube float up to 0.400 inches
- Fitting joint unaffected by long term exposure to high temperature aerospace fluids
- Available in titanium for high-pressure operating systems (up to 5,000 psi) and aluminum for low pressure (up to 1,500 psi) applications
- Similar technology available in Rynglok Repair System, adopted worldwide by both commercial airlines and military for aircraft service
- Provides excellent high current lightening strike capabilities
- Fittings available in size from 0.250 inch OD (-04) up to 1.50 inch OD (-24) tube
- Exceeds flexure requirements of MIL-F-85421 and MIL-F-85720
- Provides torsional strength comparable to that of aerospace tube
- Exceeds burst and impulse capability of aerospace tube
- Passes 15 minute fire test with Type IIIb low flow rates and vibration (per AS1055B)
- Exceeds tension strength requirements of Boeing BPS-F-142
- Selected for high performance applications in both military and commercial vehicles, including the Boeing F/A-18 E/F, Bombardier Lear 45 business jet, Bell Boeing MV-22 and General Dynamics AAAV



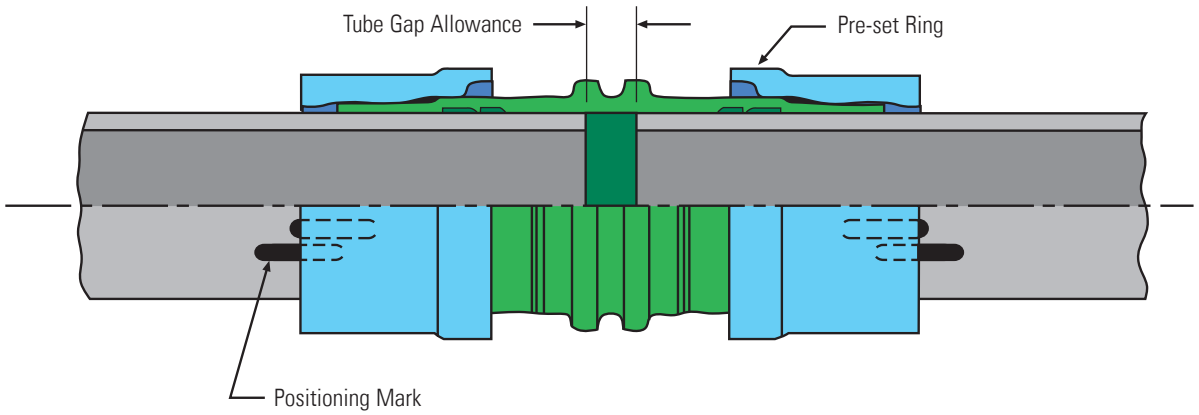




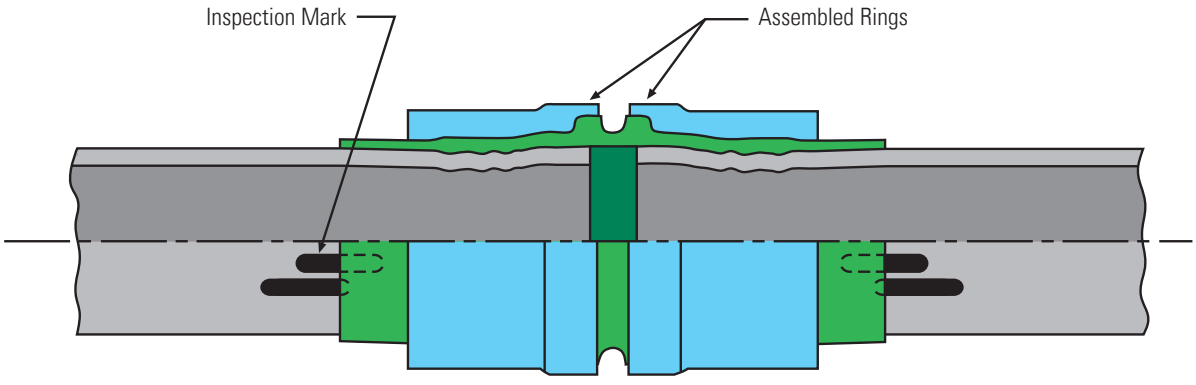


Simple • Repeatable • Reliable

Before Assembly

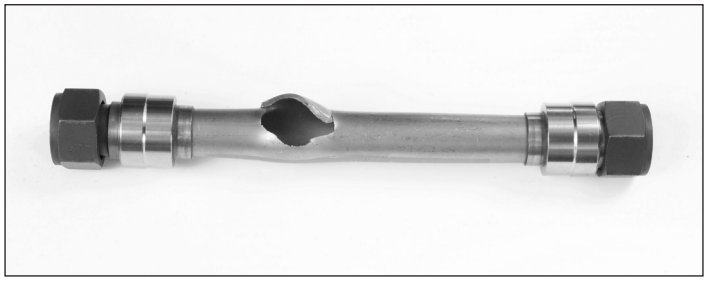


After Assembly



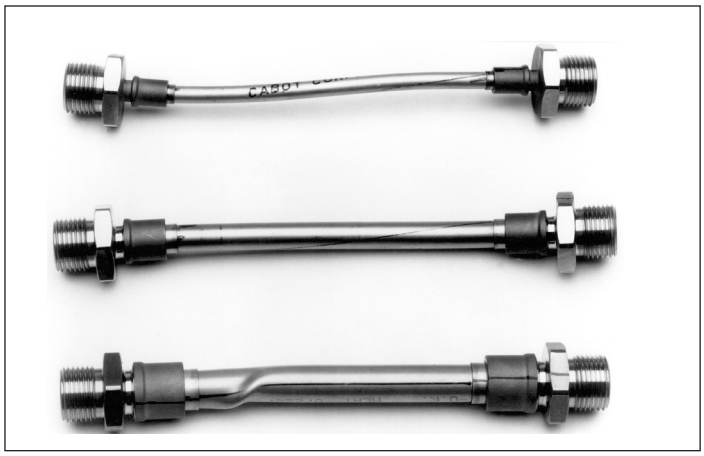
Rynglok Performance Verification Testing

The superior capability of Rynglok tube joints has been successfully demonstrated in over 6000 tests for sealing integrity, flexure fatigue, pressure impulse, burst strength, tensile strength, resistance to torsion, fire and lightning strike conductivity.



Even after undergoing torsion, fire, stress corrosion, impulse, flexure, and thermal shock testing, the Rynglok tube joints exceed the burst strength of the tubing.

Rynglok fitting strength often exceeds the torsional strength of the tubing.



Lightning Strike

Spark-free Connection

Rynglok's design makes it possible to exceed lightning strike requirements by conducting high surface currents "spark free".

The continuous metal contact ensures very low electrical resistance which prevents sparking in critical applications such as aircraft fuel tanks.



Proven Performance

High Pressure Fittings

- All metal 6Al-4V titanium alloy construction with no composite materials
- Fitting capable of use on all sizes of standard tube wall
- Proven to exceed tube capabilities on standard hydraulic tube
- Light weight, compact size
- Zero leakage with no elastomeric seal
- Assembly process not controlled under time constraints or temperature limits
- Fitting joint unaffected by long term exposure to high temperature aerospace fluids
- Available in titanium for high pressure operating systems (up to 5,000 psi) and aluminum for low pressure (up to 1,500 psi) applications
- Similar technology available in Rynglok Repair System, used worldwide by both commercial airlines and military for aircraft service



Low Pressure Fittings

Rynglok Technology for Systems below 1,500 psi

- All metal 6061-T6 construction with no elastomeric seals
- Chemical Conversion Coated per MIL-C-5541 for improved corrosion resistance and electrical conductivity
- Available in sizes 0.250" (-04) up to 1.500" (-24)



Rynglok Installation Tools

- Assembly tools available to reduce total assembly time and fatigue
- Air/Oil Hydraulic Intensifiers use pneumatic air source to assist in supplying hydraulic pressure
- Intensifiers available with foot actuated pedal or handheld remote
- Tube cutters and deburring tools available for complete tube preparation







Tool Kits

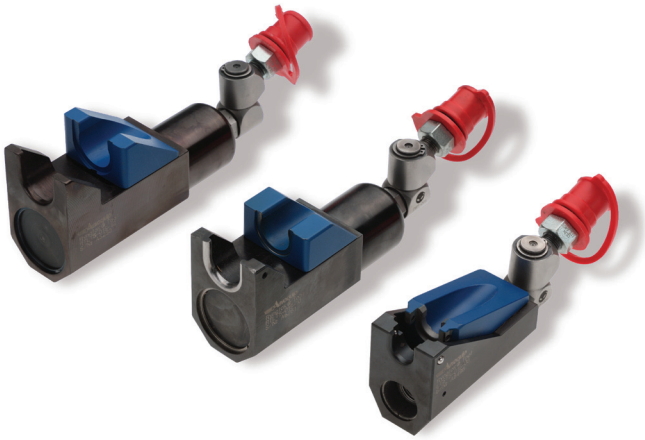
- Assembly Tools are supplied in a hard shell storage case and are configured with tool sizes needed for each specific program
- Rynglok tools require only 180 degree access to complete fitting installation
- Small tool envelope accommodates OEM installation and aftermarket repair in compact aircraft systems installation
- Minimal Operator Training required
- Tools constructed of safe, low-stressed ductile material



RTLT5 Assembly Tools

- Allows easy installation in limited area
- Quick five step process allows fitting attachment in less than 60 seconds
- Require only 180 degree access to fitting to complete swage
- Smaller in size, lighter in weight than competitive swaging systems
- Swivel quick connect hose fitting for improved maneuverability
- Simplified process easy to learn and reduces training time



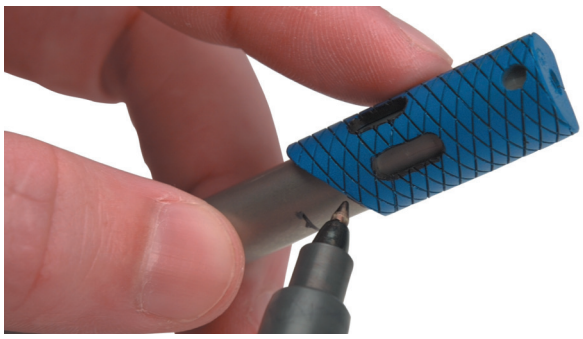


Rynglok Fitting System Installation Sequence

SIMPLE AND EASY

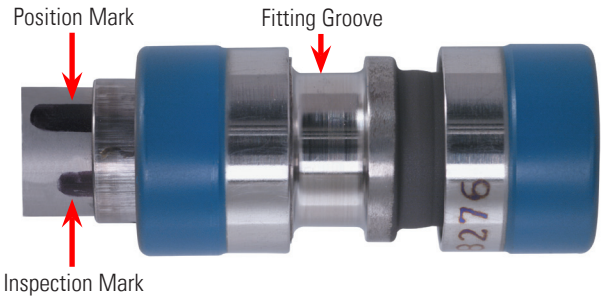
1. Mark the Tube

Position the marking gauge on the end of the cut tube. Use a suitable marking pen to make the position and inspection marks. Electro etching of the position and inspection marks is an acceptable method of marking and is common for production tubing.



2. Position the Fitting

Place the fitting on the tube within the limits of the positioning mark.



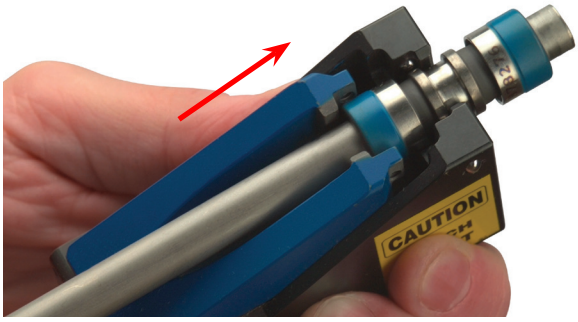
3. Position the Tool

When using the tool in the forward mode as shown, position the tool onto the fitting with the tube side of the ring nested into the moveable jaw. If positioned properly, the front end of the tool will be in the fitting groove. Make sure that the fitting is bottomed into the tool.



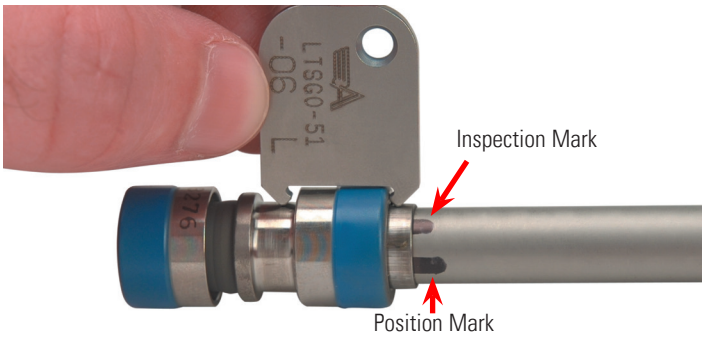
4. Swaging the Fitting

To swage the fitting, apply pressure. Upon completion of swaging, release the pressure, the moveable jaw will return to the original position.



5. Inspect the Installation

Visually inspect the ring to assure it is fully advanced onto the fitting using the inspection gauge. Be sure to verify that the edge of the fitting is within the limits of the inspection mark.



The above steps are repeated for each operation of the Rynglok fitting installation sequence.

For a more detailed outline of the Rynglok installation sequence see our installation bulletin.

Rynglok Fitting Part Number System and How to Order

Basic Part Number Designation

R5 X 0 XX T

- T = Titanium fitting material (6Al-4V)
  D = Aluminum fitting material (6061T6)
- Configuration number (see tube fitting configuration sheet)
- 0 = Standard production fitting
- Connection Type:
  0 = Permanent, all Rynglok fitting ends
  1 = ArcSeal® (separable) male or female
  2 = Flareless (separable) male or female
  3 = Flared (separable) male or female
- R5 = Rynglok titanium high pressure fitting
  RA = Rynglok aluminum low pressure fitting
  L5 = Lightweight Rynglok titanium high pressure fitting, optimized for size and weight in -04, -06, -08 sizes only.

Example: R51003T10

Rynglok fitting, female ArcSeal® (separable) to Rynglok fitting in the 90° elbow configuration.

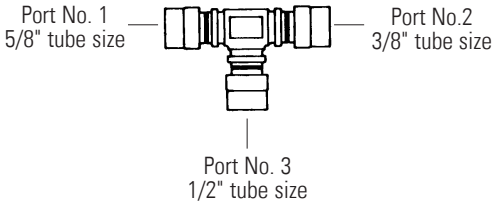
How to Order

R5XXXXT ( ) ( ) ( )

- Port No. 3 (side port)[1,2]
- Port No. 2 (right port)[1,2]
- Port No. 1 (left port)[1], largest Rynglok fitting end on the run, if all ends are Rynglok or any separable end
- Basic part number

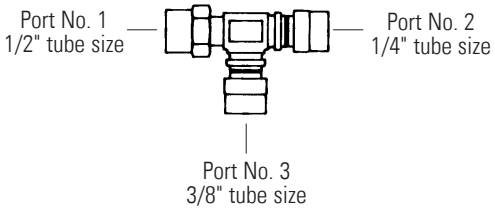
Example: RA0054D100608

Rynglok fitting, reducing tee, all legs permanent.



Example: L51054T080406

Lightweight Rynglok reducing tee, with female ArcSeal® separable.



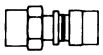
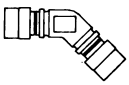
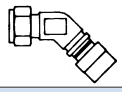
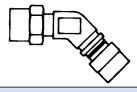
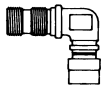
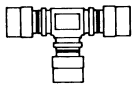
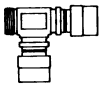
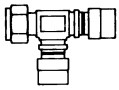
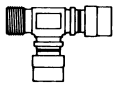
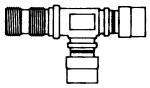
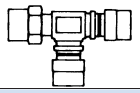
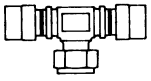
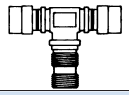
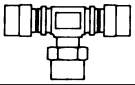
[1] Tube size is specified in 1/16" increments, (i.e., 08=8/16ths or 1/2")

[2] Port 2 and 3 only required for reducer fittings

NOTE: Port numbering system is in accordance with AIR 1590.

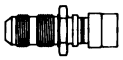
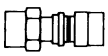
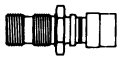
For additional information contact Eaton, Aerospace Group, Fluid & Electrical Distribution Division, 300 S. East Ave., Jackson, Michigan 49203
Ph: (517) 787-8121 Fax: (517) 789-2947.

High Pressure Rynglok Tube Fitting Configuration

		Permanent to Arcseal®			Permanent to "MS" Flareless		
	Permanent to Permanent	**Male** MIL-F-85421/1 or MIL-F-85720/1	**Male** MIL-F-85421/2 or MIL-F-85720/1 Bulkhead	**Female** Mates with MIL-F-85421 & MIL-F-85720	**Male** MS33514	**Male** NAS 1760 MS33515	**Female** Modified
Union							
Non-Reducer	R50001T( )	R51021T( )	R51041T( )	R51001T( )	R52021T( )	R52041T( )	R52001T( )
Reducer	R50051T( )( )	R51071T( )( )	R51091T( )( )	R51051T( )( )	R52071T( )( )	R52091T( )( )	R52051T( )( )
45° Elbow							
Non-Reducer	R50002T( )	R51022T( )	R51042T( )	R51002T( )	R52022T( )	R52042T( )	R52002T( )
Reducer	R50052T( )( )	R51072T( )( )	R51092T( )( )	R51052T( )( )	R52072T( )( )	R52092T( )( )	R52052T( )( )
90° Elbow							
Non-Reducer	R50003T( )	R51023T( )	R51043T( )	R51003T( )	R52023T( )	R52043T( )	R52003T( )
Reducer	R50053T( )( )	R51073T( )( )	R51093T( )( )	R51053T( )( )	R52073T( )( )	R52093T( )( )	R52053T( )( )
Tee (Separable on Run)							
Non-Reducer	R50004T( )	R51024T( )	R51044T( )	R51004T( )	R52024T( )	R52044T( )	R52004T( )
Reducer	R50054T( )( )( )	R51074T( )( )( )	R51094T( )( )( )	R51054T( )( )( )	R52074T( )( )( )	R52094T( )( )( )	R52054T( )( )( )
Tee (Separable on Side)							
Non-Reducer		R51026T( )	R51046T( )	R51006T( )	R52026T( )	R52046T( )	R52006T( )
Reducer		R51076T( )( )( )	R51096T( )( )( )	R51056T( )( )( )	R52076T( )( )( )	R52096T( )( )( )	R52056T( )( )( )

For sizes -04, -06, or -08 the R5 prefix will be replaced by L5 in the Part Number.

Low Pressure Rynglok Tube Fitting Configuration

		Permanent to "AN" Flared			Permanent to "MS" Flareless		
	Permanent to Permanent	**Male** AS4395 (MS33656)	**Male** AS4396 (MS33657)	**Female** AS1708	**Male** MS33514	**Male** MS33515	**Female** NAS 1760 Modified
Union							
Non-Reducer	RA0001D( )	RA3021D( )	RA3041D( )	RA3001D( )	RA2021D( )	RA2041D( )	RA2001D( )
Reducer	RA0051D( )( )	RA3071D( )( )	RA3091D( )( )	RA3051D( )( )	RA2071D( )( )	RA2091D( )( )	RA2051D( )( )
45° Elbow							
Non-Reducer	RA0002D( )	RA3022D( )	RA3042D( )	RA3002D( )	RA2022D( )	RA2042D( )	RA2002D( )
Reducer	RA0052D( )( )	RA3072D( )( )	RA3092D( )( )	RA3052D( )( )	RA2072D( )( )	RA2092D( )( )	RA2052D( )( )
90° Elbow							
Non-Reducer	RA0003D( )	RA3023D( )	RA3043D( )	RA3003D( )	RA2023D( )	RA2043D( )	RA2003D( )
Reducer	RA0053D( )( )	RA3073D( )( )	RA3093D( )( )	RA3053D( )( )	RA2073D( )( )	RA2093D( )( )	RA2053D( )( )
Tee (Separable on Run)							
Non-Reducer	RA0004D( )	RA3024D( )	RA3044D( )	RA3004D( )	RA2024D( )	RA2044D( )	RA2004D( )
Reducer	RA0054D( )( )( )	RA3074D( )( )( )	RA3094D( )( )( )	RA3054D( )( )( )	RA2074D( )( )( )	RA2094D( )( )( )	RA2054D( )( )( )
Tee (Separable on Side)							
Non-Reducer		RA3026D( )	RA3046D( )	RA3006D( )	RA2026D( )	RA2046D( )	RA2006D( )
Reducer		RA3076D( )( )( )	RA3096D( )( )( )	RA3056D( )( )( )	RA2076D( )( )( )	RA2096D( )( )( )	RA2056D( )( )( )

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