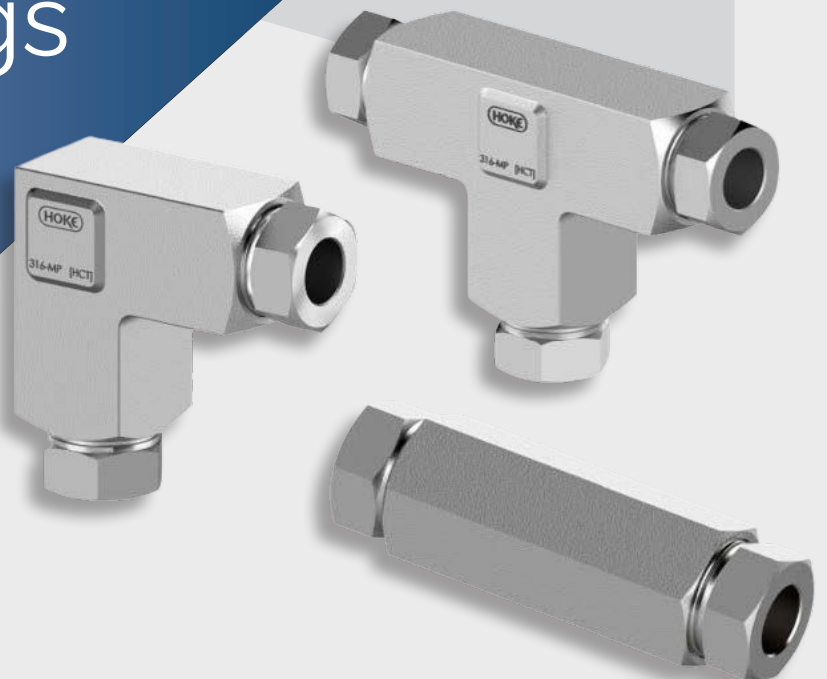




GYROLOK[®]MP

GYROLOK[®]MP

Medium Pressure
Tube Fittings



CRANE[®]

www.hoke.com
www.cranecpe.com



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For Your Safety

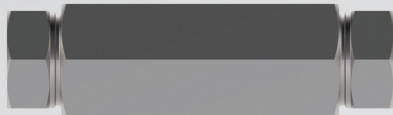
It is solely the responsibility of the system designer and user to select products suitable for their specific application requirements and to ensure proper installation, operation, and maintenance of these products. When selecting products, the total system design must be considered to ensure safe, trouble-free performance. Material compatibility, product ratings and application details should be considered in the selection. Improper selection or use of products described herein can cause personal injury or property damage. Contact your authorized HOKE[®] sales and service representative for information about additional sizes and special alloys.

SAFETY WARNING:

HOKE[®] products are designed for installation only by professional suitably qualified licensed system installers experienced in the applications and environments for which the products are intended. These products are intended for integration into a system. Where these products are to be used with flammable or hazardous media, precautions must be taken by the system designer and installer to ensure the safety of persons and property. Flammable or hazardous media pose risks associated with fire or explosion, as well as burning, poisoning or other injury or death to persons and/or destruction of property. The system designer and installer must provide for the capture and control of such substances from any vents in the product(s). The system installer must not permit any leakage or uncontrolled escape of hazardous or flammable substances. The system operator must be trained to follow appropriate precautions and must inspect and maintain the system and its components including the product(s) and at regular intervals in accordance with time scales recommended by the supplier to prevent unacceptable wear or failure.



GYROLOK® MP OVERVIEW



100 Years of Product Excellence

Samuel W. HOKE began manufacturing small gas flow control valves for jewelers' torches in 1925. At the same time, he also laid the foundation for a top international fluid control products company, HOKE® Incorporated. In the early 1940's, S.W. HOKE produced the forerunners of today's HOKE® valves, masterfully crafted with the highest quality materials. In the early 1960's, HOKE® Incorporated (HOKE®) took the industry by storm, introducing the GYROLOK® Tube Fitting. To this day, no other manufacturer has been able to improve upon its unique design. Over the years, HOKE® built a first-class reputation for designing and manufacturing state-of-the-art products. In striving for maximum quality and value, HOKE® set the industry standards for product safety, operability, durability and reliability. CRANE continues this product excellence for all global customers.

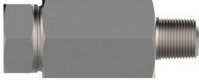
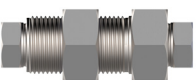
Training and Engineering Support

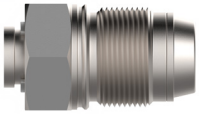
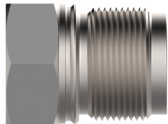
CRANE offers extensive training designed to ensure that your craftspeople thoroughly understand how a GYROLOK® fitting functions. By teaching proper tubing preparation and installation procedures, maximum performance is assured. CRANE will take the time to assist our customers in finding the GYROLOK® fitting that is right for their specific needs. Ask your HOKE® distributor for details regarding HOKE's valve and fitting installation workshop and additional support materials.

GYROLOK® MP

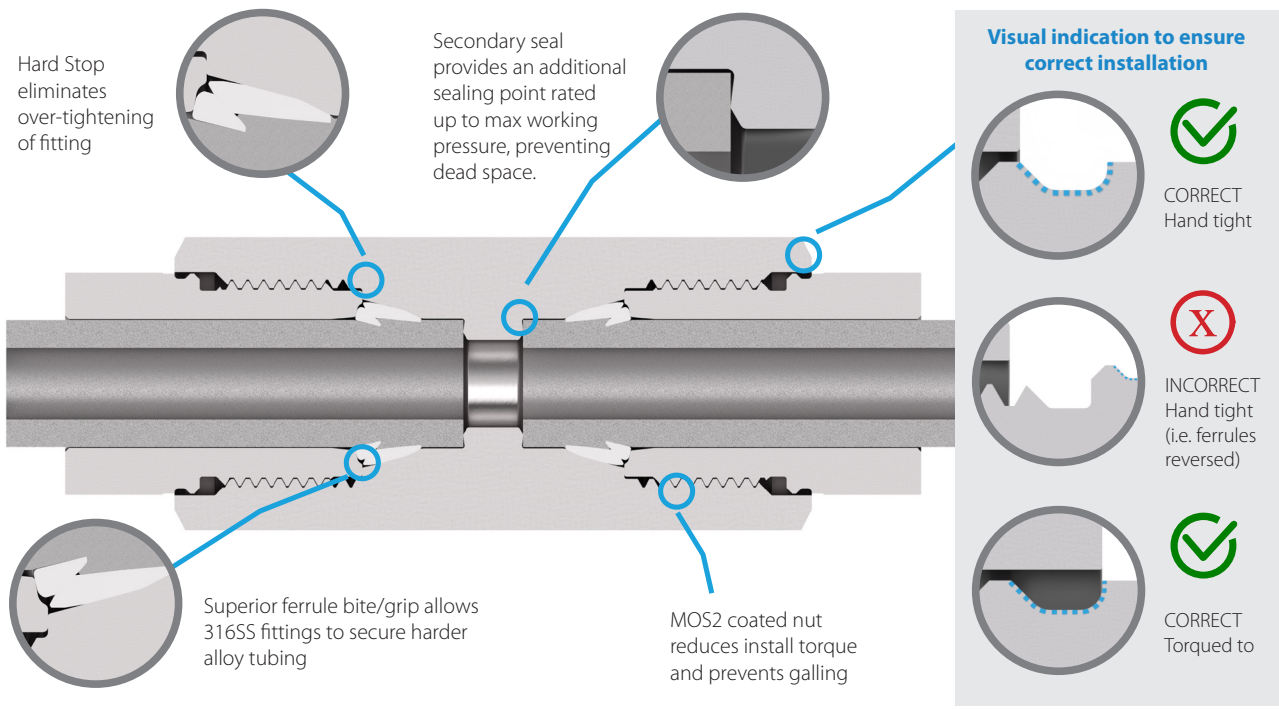
The GYROLOK® MP redefines reliability in medium-pressure fittings, delivering performance up to 15,000 PSI. Engineered with a secondary seal for enhanced protection, a visual make-up indicator for installation assurance, and an advanced ferrule bite for superior grip, it ensures unmatched safety and confidence. Designed for broad compatibility, including exotic alloys, GYROLOK® MP sets a new benchmark for durability and precision in demanding applications.

GYROLOK®MP FITTING LOCATOR

Component Image	Component Description	Page Location
	Male Connector - CM	8
	Female Connector - CF	12
	Cone and Thread Adapter - CTSA	13
	Union - U	11
	Reducing Union - RU	11
	Bulkhead Union - U	11
	Elbow Union - LU	9
	Male Elbow - LM	14
	Tee Union - TTT	10
	Reducing Branch Tee - TTTB	15

Component Image	Component Description	Page Location
	Reducing Run Tee - TTBR	13
	Male Branch - TTM	15
	Male Run Tee - TMT	12
	Cross - C	14
	Plug - P	9
	Cap - CP	10
	Front Ferrule - FF	16
	Rear Ferrule - FR	16
	Male Nut - MN	16

GYROLOK®MP FEATURES & BENEFITS

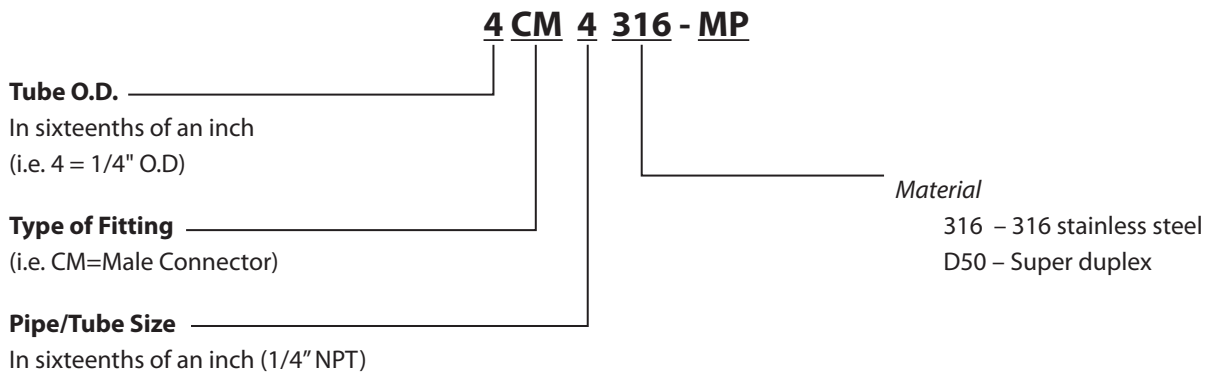


Features	Explanation	Benefits
Visual Indicator	A machined groove on the nut confirms proper ferrule presence and alignment at hand tight conditions. It also confirms proper tightening after makeup without the need for a separate gauge.	Prevents leaks by ensuring proper assembly, reducing rework and potential safety hazards.
Hard Stop	A 90° stop prevents over-tightening of the fitting.	Eliminates risk of over-tightening, protecting components from damage and reducing maintenance costs.
Secondary Seal	With proper tube preparation, a sealing point pierces the tube upon fitting make-up to provide an additional sealing point and to eliminate dead space.	Enhances sealing integrity, reduces potential for system contamination and improves system reliability.
MOS2 Coated Nut	Special coating lowers installation torque and prevents galling.	Reduces installation torque and allows for multiple remakes.
Hardened Ferrules	Proprietary hardening process on both ferrules allows for superior tube bite.	Validated by burst testing to 60,000 psi (4x rated working pressure), demonstrating robust sealing performance of 316 SS ferrules on exotic alloy tubing.

General Information

How to Order

The GYROLOK[®] MP numbering system is a completely descriptive system that's easy to understand. Each part number describes completely assembled fittings.

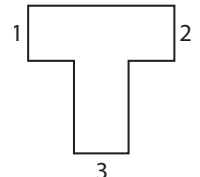


1. The first number (4) identifies the tube O.D. size. For example, 4 = 4/16" for fractional fittings.
2. The letter group, (CM) identifies the type of fitting (Male Connector). See fitting locator, pages 2 and 3.
3. The third group, a number (4), is only necessary if the second tube connection size is different from the first tube O.D. size. For pipe sizes, a number is always required. If the fitting involves an NPT connection, this number specifies the size, in sixteenths of an inch.
4. Material is identified in the fourth group.

Examples:

4CM4316-MP = 1/4" Gyrolok MP connection x 1/4" male NPT connector in 316 stainless steel.

8RU6316-MP = 1/2" Gyrolok MP connection x 3/8" Gyrolok MP connection reducing union in 316 stainless steel



5. Tee part numbering: TEES are described by first the run (1 and 2) and next the branch (3), for example:
TTM describes a tee that has tube connections at 1 and 2 and a male pipe thread at position 3.
TFT describes a tee that has tube connections at 1 and 3 and a female pipe thread at position 2.

316 Stainless Steel

Size	Rated Working Pressure
1/4"	15,000 psi
3/8"	15,000 psi
1/2"	15,000 psi
9/16"	15,000 psi
3/4"	15,000 psi
1"	12,500 psi

Note: The rated working pressure shall be limited to the maximum allowable working pressure of the tubing when the tubing rating is lower than the fitting rating

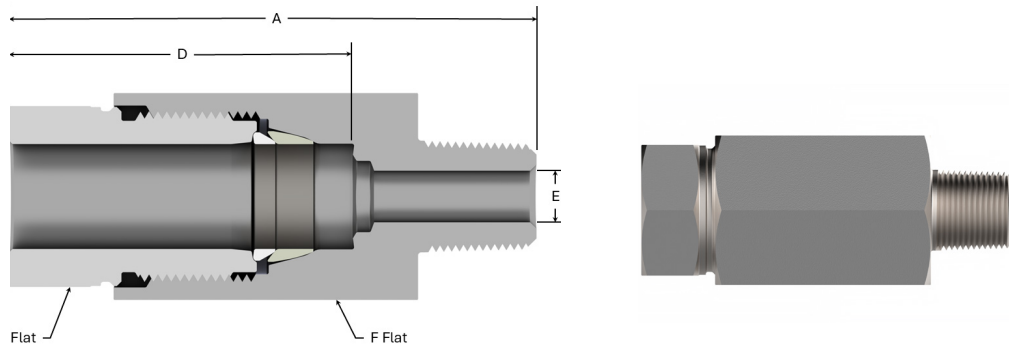
Super Duplex

Size	Rated Working Pressure
1/4"	15,000 psi
3/8"	15,000 psi
1/2"	15,000 psi
9/16"	15,000 psi
3/4"	15,000 psi
1"	15,000 psi

Note: The rated working pressure shall be limited to the maximum allowable working pressure of the tubing when the tubing rating is lower than the fitting rating

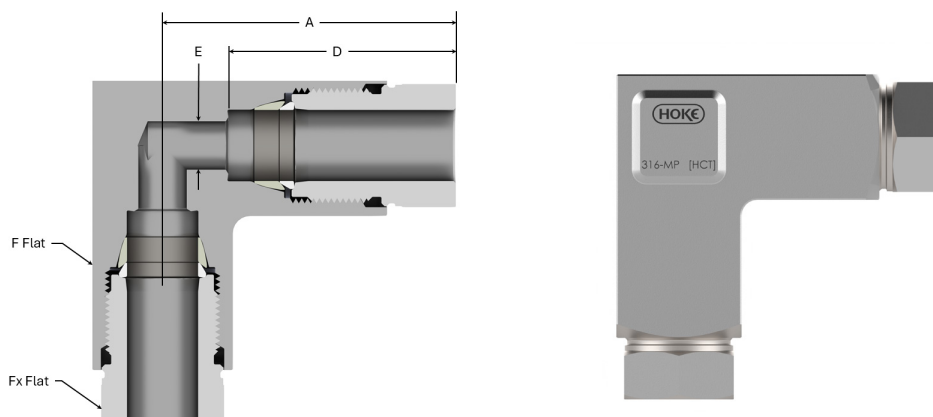
NPT SIZE*in.	WORKING PRESSURE, [psig]
1/8, 1/4, 3/8, 1/2, 3/4 (Male & Female)	15000
1 (Male)	12500
1 (Female)	9800

*No allowance is made for corrosion, erosion, bending, or elevated temperature.



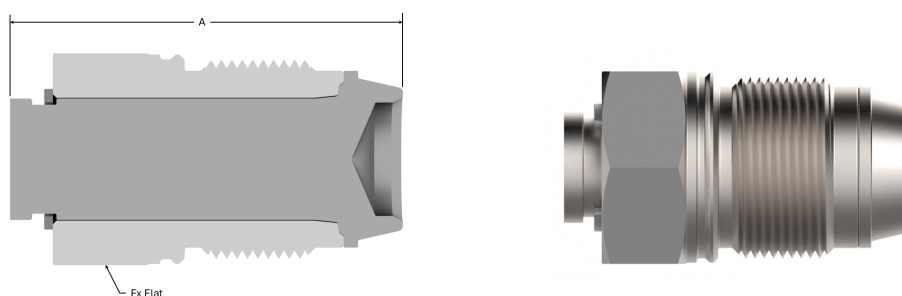
CM (MALE CONNECTOR)

Tube OD (in)	NPT Size	Ordering Number	Dimensions (in)				
			A	D	E	F	Fx
1/4	1/8	4CM2[]-MP	1.75	1.22	0.18	5/8	9/16
	1/4	4CM4[]-MP	1.93	1.22	0.18	5/8	9/16
	3/8	4CM6[]-MP	1.93	1.22	0.18	3/4	9/16
	1/2	4CM8[]-MP	2.12	1.22	0.18	1	9/16
3/8	1/4	6CM4[]-MP	2.20	1.41	0.24	3/4	11/16
	3/8	6CM6[]-MP	2.20	1.41	0.24	3/4	11/16
	1/2	6CM8[]-MP	2.39	1.41	0.24	1	11/16
1/2	1/4	8CM4[]-MP	2.49	1.62	0.25	1	7/8
	3/8	8CM6[]-MP	2.49	1.62	0.33	1	7/8
	1/2	8CM8[]-MP	2.54	1.62	0.35	1	7/8
	3/4	8CM12[]-MP	2.54	1.62	0.35	1 1/2	7/8
9/16	1/4	9CM4[]-MP	2.66	1.75	0.25	1 1/8	1
	1/2	9CM8[]-MP	2.85	1.75	0.39	1 1/8	1
3/4	1/2	12CM8[]-MP	3.28	2.26	0.41	1 1/2	1 1/4
	3/4	12CM12[]-MP	3.21	2.26	0.55	1 1/2	1 1/4
	1	12CM16[]-MP	3.66	2.26	0.55	1 1/2	1 1/4
1	1/2	16CM8[]-MP	3.98	2.87	0.41	1 3/4	1 1/2
	3/4	16CM12[]-MP	4.22	2.87	0.55	1 3/4	1 1/2
	1	16CM16[]-MP	4.41	2.87	0.73	1 3/4	1 1/2



LU (ELBOW UNION)

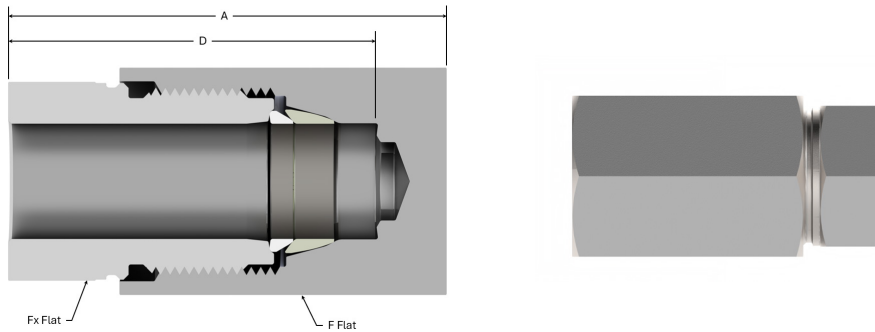
Tube OD (in)	Ordering Number	Dimensions (in)				
		A	D	E	F	Fx
1/4	4LU□-MP	1.40	1.22	0.18	11/16	9/16
3/8	6LU6□-MP	1.72	1.41	0.24	3/4	11/16
1/2	8LU□-MP	2.09	1.62	0.35	1	7/8
9/16	9LU□-MP	2.30	1.76	0.39	1 1/8	1
3/4	12LU8□-MP	2.98	2.27	0.55	1 1/2	1 1/4
1	16LU□-MP	3.86	2.87	0.73	1 3/4	1 1/2



P (PLUG)

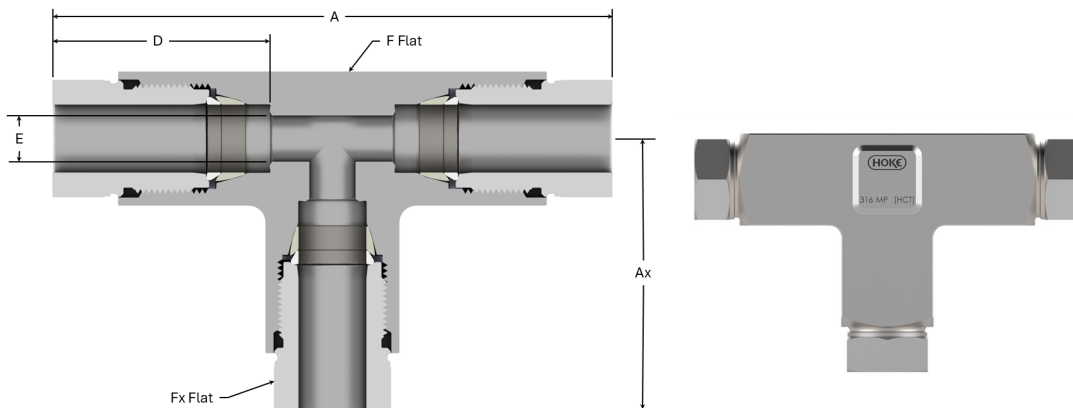
Tube OD (in)	Ordering Number	Dimensions (in)	
		A	Fx
1/4	4P□-MP	1.17	9/16
3/8	6P□-MP	1.40	11/16
1/2	8P□-MP	1.58	7/8
9/16	9P□-MP	1.73	1
3/4	12P□-MP	2.23	1 1/4
1	16P□-MP	2.69	1 1/2

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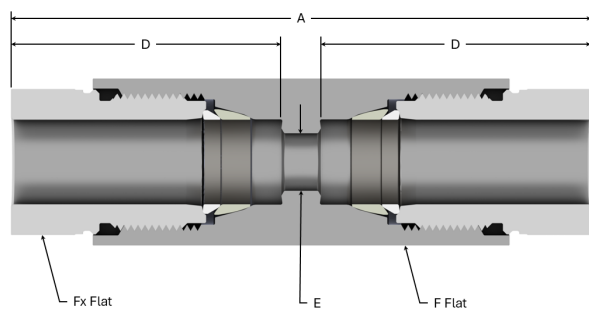
CP (CAP)

Tube OD (in)	Ordering Number	Dimensions (in)			
		A	D	F	Fx
1/4	4CP[]-MP	1.37	1.22	5/8	9/16
3/8	6CP[]-MP	1.64	1.41	3/4	11/16
1/2	8CP[]-MP	1.93	1.62	1	7/8
9/16	9CP[]-MP	2.10	1.75	1 1/8	1
3/4	12CP[]-MP	2.72	2.26	1 1/2	1 1/4
1	16CP[]-MP	3.47	2.87	1 3/4	1 1/2



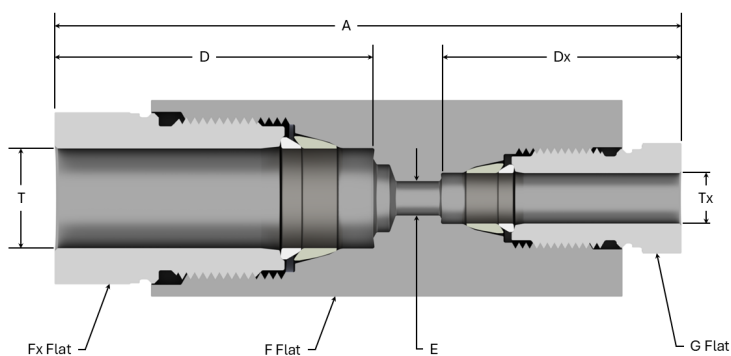
TTT (TEE UNION)

Tube OD (in)	Ordering Number	Dimensions (in)					
		A	Ax	D	E	F	Fx
1/4	4TTT[]-MP	2.79	1.39	1.22	0.17	11/16	9/16
3/8	6TTT[]-MP	3.43	1.71	1.41	0.24	3/4	11/16
1/2	8TTT[]-MP	4.15	2.09	1.60	0.34	1	7/8
9/16	9TTT[]-MP	4.59	2.29	1.75	0.38	1 1/8	1
3/4	12TTT[]-MP	5.96	2.98	2.26	0.54	1 1/2	1 1/4
1	16TTT[]-MP	7.71	3.85	2.87	0.73	1 3/4	1 1/2



U (UNION)

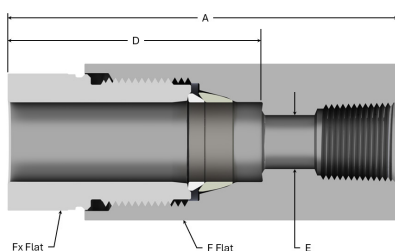
Tube OD (in)	Ordering Number	Dimensions (in)				
		A	D	E	F	Fx
1/4	4U[]-MP	2.60	1.22	0.18	5/8	9/16
3/8	6U[]-MP	3.14	1.41	0.24	3/4	11/16
1/2	8U[]-MP	3.45	1.61	0.35	1	7/8
9/16	9U[]-MP	3.99	1.76	0.39	1 1/8	1
3/4	12U[]-MP	5.17	2.27	0.55	1 1/2	1 1/4
1	16U[]-MP	6.43	2.87	0.73	1 3/4	1 1/2



RU (REDUCING UNION)

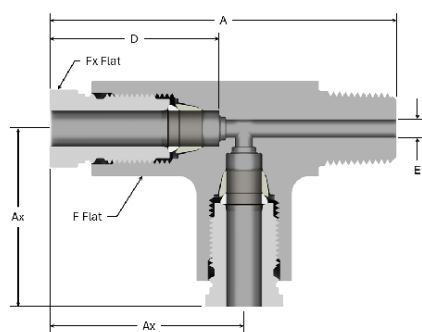
Tube OD (in)		Ordering Number	Dimensions (in)						
T	Tx		A	D	Dy	E	F	Fx	Fy
3/8	1/4	6RU4[]-MP	2.90	1.41	1.22	0.18	3/4	11/16	9/16
1/2	1/4	8RU4[]-MP	3.19	1.62	1.22	0.18	1	7/8	9/16
1/2	3/8	8RU6[]-MP	3.39	1.62	1.41	0.24	1	7/8	11/16
9/16	4/16	9RU4[]-MP	3.46	1.76	1.22	0.18	1 1/8	1	9/16
9/16	3/8	9RU6[]-MP	3.66	1.76	1.41	0.24	1 1/8	1	11/16
9/16	1	9RU8[]-MP	3.86	1.76	1.62	0.35	1 1/8	1	7/8
3/4	1/2	12RU8[]-MP	4.48	2.27	1.62	0.35	1 1/2	1 1/4	7/8
1	3/4	16RU12[]-MP	6.24	2.87	2.27	0.55	1 3/4	1 1/2	1 1/4

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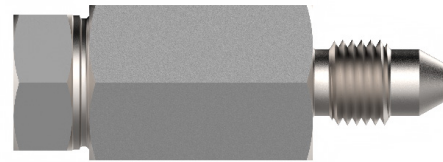
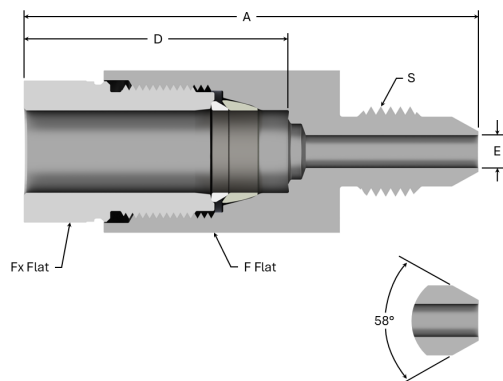
CF (FEMALE CONNECTOR)

Tube OD (in)	Female NPT Size	Ordering Number	Dimensions (in)				
			A	D	E	F	Fx
1/4	1/4	4CF4[]-MP	1.95	1.22	0.18	1	9/16
3/8	1/4	6CF4[]-MP	2.20	1.41	0.24	1	11/16
	3/8	6CF6[]-MP	2.30	1.41	0.24	1 1/8	11/16
1/2	1/4	8CF4[]-MP	2.49	1.62	0.35	1	7/8
	3/8	8CF6[]-MP	2.54	1.62	0.35	1 1/8	7/8
	1/2	8CF8[]-MP	2.79	1.62	0.35	1 3/8	7/8
9/16	1/4	9CF4[]-MP	2.57	1.76	0.39	1 1/8	1
	3/8	9CF6[]-MP	2.77	1.76	0.39	1 1/8	1
3/4	1/2	12CF8[]-MP	3.38	2.27	0.55	1 1/2	1 1/4
	3/4	12CF12[]-MP	3.58	2.27	0.55	1 3/4	1 1/4
1	1/2	16CF8[]-MP	4.30	2.87	0.69	1 3/4	1 1/2
	3/4	16CF12[]-MP	4.40	2.87	0.73	1 3/4	1 1/2
	1	16CF16[]-MP	4.60	2.87	0.73	1 3/4	1 1/2



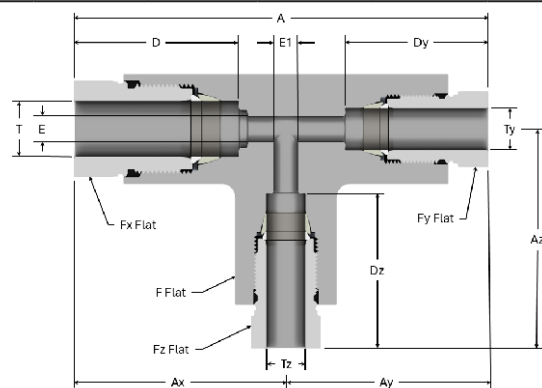
TMT (MALE RUN TEE)

Tube OD (in)	NPT Size	Ordering Number	Dimensions (in)					
			A	Ax	D	E	F	Fx
1/4	1/4	4TMT4[]-MP	2.50	1.40	1.22	0.18	11/16	9/16
	3/8	4TMT6[]-MP	2.94	1.48	1.22	0.18	3/4	9/16
3/8	1/4	6TMT4[]-MP	3.04	1.72	1.41	0.24	3/4	11/16
	3/8	6TMT6[]-MP	3.04	1.72	1.41	0.24	3/4	11/16



CTSA (CONE AND THREAD ADAPTER)

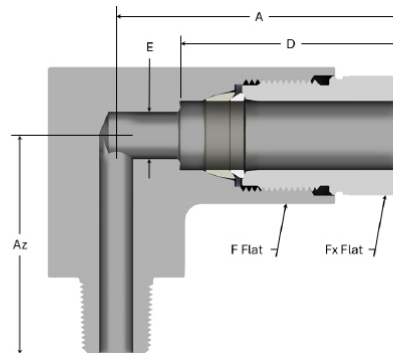
Tube OD (in)	Cone & Thread Tube	Ordering Number	Dimensions (in)					
			A	D	E	F	Fx	S (Thread Size)
1/4	1/4	4CTSA4[]-MP	2.10	1.22	0.11	5/8	9/16	7/16-20 UN
3/8	1/4	6CTSA4[]-MP	2.40	1.41	0.13	3/4	11/16	7/16-20 UN
	3/8	6CTSA6[]-MP	2.45	1.41	0.20	3/4	11/16	9/16-18 UN
1/2	3/8	8CTSA6[]-MP	2.79	1.62	0.20	1	7/8	9/16-18 UN
	9/16	8CTSA9[]-MP	2.79	1.62	0.31	1	7/8	13/16-16 UN
9/16	1/4	9CTSA4[]-MP	2.97	1.76	0.11	1 1/8	1	7/16-20 UN
	3/8	9CTSA6[]-MP	2.97	1.76	0.20	1 1/8	1	9/16-18 UN
	9/16	9CTSA9[]-MP	3.07	1.76	0.31	1 1/8	1	13/16-16 UN
3/4	9/16	12CTSA9[]-MP	3.63	2.27	0.31	1 1/2	1 1/4	13/16-16 UN
	3/4	12CTSA12[]-MP	3.88	2.27	0.44	1 1/2	1 1/4	3/4-14 NPSM
1	3/4	16CTSA12[]-MP	4.80	2.87	0.44	1 3/4	1 1/2	3/4-14 NPSM
	1	16CTSA16[]-MP	5.00	2.87	0.56	1 3/4	1 1/2	1 3/8-12 UN



TTTBR (REDUCING RUN TEE)

Tube OD (in)			Ordering Number	Dimensions (in)												
T	Ty	Tz		A	Ax	Ay	Az	D	Dy	Dz	E	E1	F	Fx	Fy	Fz
3/8	1/4	1/4	6TTT4BR4[]-MP	3.34	1.72	1.62	1.62	1.41	1.22	1.22	0.18	0.18	3/4	11/16	9/16	9/16
1/2	3/8	3/8	8TTT6BR6[]-MP	4.09	2.09	2.00	2.00	1.62	1.41	1.41	0.24	0.24	1	7/8	11/16	11/16
9/16	3/8	1/4	9TTT6BR4[]-MP	4.42	2.30	2.13	2.03	1.76	1.41	1.22	0.24	0.18	1 1/8	1	11/16	9/16
	3/8	3/8	9TTT6BR6[]-MP	4.42	2.30	2.13	2.13	1.76	1.41	1.41	0.24	0.24	1 1/8	1	11/16	11/16

GYROLOK®MP



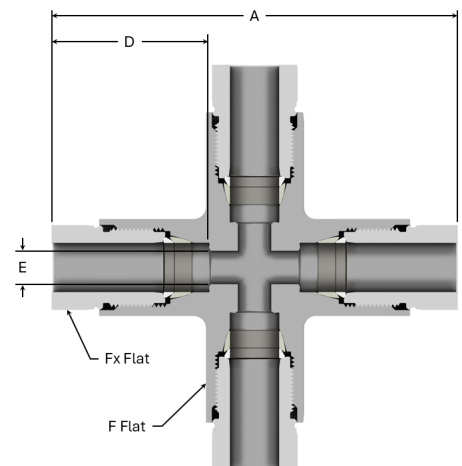
LM (MALE ELBOW)

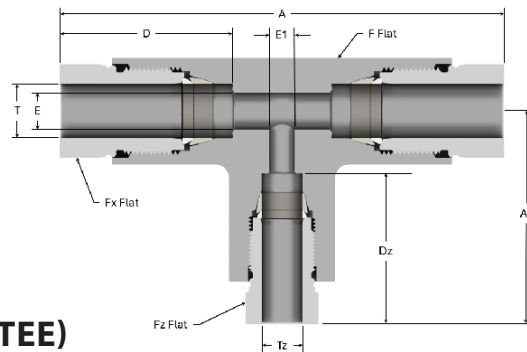
Tube OD (in)	Male NPT Size	Ordering Number	Dimensions (in)					
			A	Az	D	E	F	Fx
1/4	1/4	4LM4[]-MP	1.40	1.10	1.22	0.18	11/16	9/16
	3/8	4LM6[]-MP	1.62	1.32	1.22	0.18	3/4	9/16
	1/2	4LM8[]-MP	1.90	1.32	1.22	0.18	1	9/16
3/8	1/4	6LM4[]-MP	1.72	1.32	1.41	0.24	3/4	11/16
	3/8	6LM6[]-MP	1.72	1.32	1.41	0.24	3/4	11/16
	1/2	6LM8[]-MP	2.00	1.60	1.41	0.24	1	11/16
1/2	1/4	8LM4[]-MP	2.04	1.60	1.62	0.25	1	7/8
	3/8	8LM6[]-MP	2.09	1.60	1.62	0.33	1	7/8
	1/2	8LM8[]-MP	2.09	1.60	1.62	0.35	1	7/8
9/16	1/2	9LM8[]-MP	2.30	1.73	1.76	0.39	1 1/8	1
3/4	1/2	12LM8[]-MP	2.98	2.30	2.27	0.41	1 1/2	1 1/4
	3/4	12LM12[]-MP	2.98	2.30	2.27	0.55	1 1/2	1 1/4
1	3/4	16LM12[]-MP	3.82	3.02	2.87	0.55	1 3/4	1 1/2
	1	16LM16[]-MP	3.82	3.02	2.87	0.73	1 3/4	1 1/2



CROSS (C)

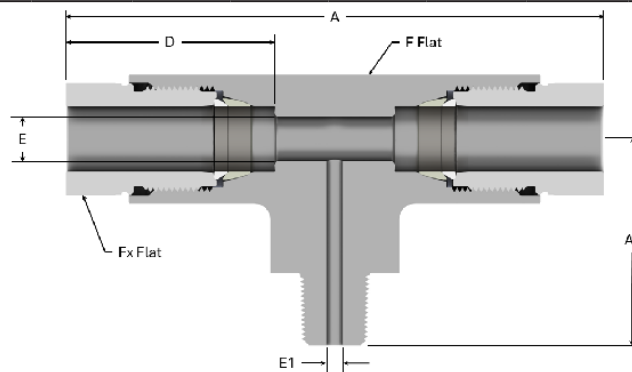
Tube OD (in)	Ordering Number	Dimensions (in)				
		A	D	E	F	Fx
1/4	4C[]-MP	2.80	1.22	0.18	11/16	9/16
3/8	6C[]-MP	3.44	1.41	0.24	3/4	11/16
1/2	8C[]-MP	4.18	1.62	0.35	1	7/8
9/16	9C[]-MP	4.59	1.76	0.39	1 1/8	1
3/4	12C[]-MP	5.99	2.27	0.55	1 1/2	1 1/4
1	16C[]-MP	7.72	2.87	0.73	1 3/4	1 1/2





TTTB (REDUCING BRANCH TEE)

Tube OD (in)		Ordering Number	Dimensions (in)								
T	Tz		A	Az	D	Dz	E	E1	F	Fx	Fz
1/4	3/8	4TTTB6[]-MP	3.24	1.72	1.22	1.41	0.18	0.18	3/4	9/16	11/16
3/8	1/4	6TTTB4[]-MP	3.44	1.62	1.41	1.22	0.24	0.18	3/4	11/16	9/16
	1/2	6TTTB8[]-MP	4.00	2.09	1.41	1.62	0.24	0.24	1	11/16	7/8
	9/16	6TTTB9[]-MP	4.26	2.30	1.41	1.76	0.24	0.24	1 1/8	11/16	1
1/2	3/8	8TTTB6[]-MP	4.18	2.00	1.62	1.41	0.35	0.24	1	7/8	11/16
9/16	1/4	9TTTB4[]-MP	4.59	2.03	1.76	1.22	0.39	0.18	1 1/8	1	9/16
	3/8	9TTTB6[]-MP	4.59	2.13	1.76	1.41	0.39	0.24	1 1/8	1	11/16
3/4	1/2	12TTTB8[]-MP	5.97	2.79	2.27	1.62	0.55	0.35	1 1/2	1 1/4	7/8
	9/16	12TTTB9[]-MP	5.97	2.87	2.27	1.76	0.55	0.39	1 1/2	1 1/4	1
1	9/16	16TTTB9[]-MP	7.72	3.59	2.87	1.76	0.73	0.39	1 3/4	1 1/2	1
	3/4	16TTTB12[]-MP	7.72	3.70	2.87	2.27	0.73	0.55	1 3/4	1 1/2	1 1/4



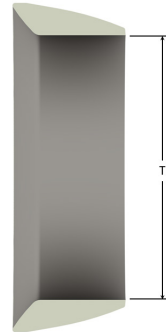
TTM (MALE BRANCH)

Tube OD (in)	Male NPT Size	Ordering Number	Dimensions (in)						
			A	Az	D	E	E1	F	Fx
1/4	1/4	4TTM4[]-MP	2.80	1.10	1.22	0.18	0.18	11/16	9/16
3/8	1/4	6TTM4[]-MP	3.44	1.32	1.22	0.24	0.13	3/4	11/16
	3/8	6TTM6[]-MP	3.44	1.32	1.22	0.24	0.21	3/4	11/16
1/2	1/4	8TTM4[]-MP	4.18	1.52	1.62	0.35	0.13	1	7/8
	3/8	8TTM6[]-MP	4.18	1.60	1.62	0.35	0.21	1	7/8
	1/2	8TTM8[]-MP	4.18	1.60	1.62	0.35	0.33	1	7/8
3/4	1/2	12TTM8[]-MP	5.97	2.30	2.27	0.55	0.33	1 1/2	1 1/4
	3/4	12TTM12[]-MP	5.97	2.30	2.27	0.55	0.33	1 1/2	1 1/4

GYROLOK®MP

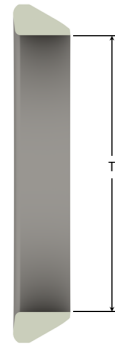
FF (FRONT FERRULE)

ORDERING PART No.	Dimensions (in)
	T
4FF[]-MP	1/4
6FF[]-MP	3/8
8FF[]-MP	1/2
9FF[]-MP	9/16
12FF[]-MP	3/4
16FF[]-MP	1



FR (REAR FERRULE)

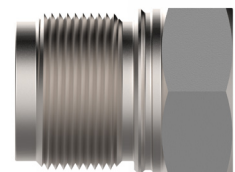
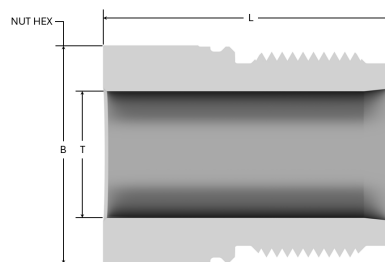
ORDERING PART No.	Dimensions (in)
	T
4FR[]-MP	1/4
6FR[]-MP	3/8
8FR[]-MP	1/2
9FR[]-MP	9/16
12FR[]-MP	3/4
16FR[]-MP	1



**Size 16 FR is coated in MOS2*

MN (MALE NUT)

ORDERING PART No.	Tube OD	Dimensions (in)	
		B	L
4MN[]-MP	0.26	9/16	0.86
6MN[]-MP	0.38	11/16	1.00
8MN[]-MP	0.51	7/8	1.17
9MN[]-MP	0.57	1	1.28
12MN[]-MP	0.76	1 1/4	1.64
16MN[]-MP	1.01	1 1/2	2.10



GYROLOK[®]MP TUBING DATA CHARTS & NPT RATINGS

316 Stainless Steel Annealed Seamless Tubing

ASTM A-269 UNS S30400 & S31600 or Equivalent, Maximum Recommended Hardness HRB 90

Maximum Working Pressure (psi) for Fractional Sizes

- Allowable Stress = 20,000 psi between –20° F and 100° F
- Allowable working pressure is based on calculations in ASME B31.3 using a maximum allowable stress (S) of 20,000 psi (137.9 MPa). Values shown below are for seamless annealed tubing only.

TUBE OD (in)	NOMINAL OD (in)	NOMINAL WALL THICKNESS (in)	WORKING PRESSURE (psig)
1/4	0.250	0.095	15000
3/8	0.375	0.134	15000
1/2	0.500	0.188	15000
3/4	0.750	0.250	13900
1	1.000	0.250	10500

316 Stainless Steel 1/8th Hard Cone and Thread

Minimum Recommended Hardness HRB 95

Maximum Working Pressure (psi) for Fractional Sizes

- Allowable Stress = 35,000 psi between –20° F and 100° F
- Allowable working pressure is based on calculations in ASME B31.3 using a maximum allowable stress (S) of 35,000 psi (241 MPa).

TUBE OD (in)	NOMINAL OD (in)	NOMINAL ID (in)	WORKING PRESSURE (psig)
1/4	0.246	0.109	15000
3/8	0.368	0.203	15000
1/2	0.500	0.282	15000
9/16	0.555	0.312	15000
3/4	0.743	0.438	15000
1	0.993	0.562	12500

6MO HW Annealed

ASTM A-269, A-213 UNS S31254 or Equivalent, Maximum Recommended Hardness HRB 96

Maximum Working Pressure (psi) for Fractional Sizes

- Allowable Stress = 27,100 psi between –20° F and 100° F
- Allowable working pressure is based on calculations in ASME B31.3 using a maximum allowable stress (S) of 27,100 psi (186.9 MPa). Values shown below are for seamless annealed tubing only.

TUBE OD (in)	NOMINAL OD (in)	NOMINAL WALL THICKNESS	WORKING PRESSURE (psig)
3/4	0.750	0.188	14000
1	1.000	0.188	10500

2507 Super Duplex Stainless Steel

ASTM A789 UNS S32750 or Equivalent, Maximum Recommended Hardness HRC 32

Maximum Working Pressure (psi) for Fractional Sizes

- Allowable Stress = 38,700 psi between –20° F and 100° F
- Allowable working pressure is based on calculations in ASME B31.3 using a maximum allowable stress (S) of 38,700 psi (267 MPa).

TUBE OD (in)	NOMINAL OD (in)	NOMINAL WALL THICKNESS (in)	WORKING PRESSURE (psig)
1/4	0.250	0.049	15000
3/8	0.375	0.083	15000
1/2	0.500	0.095	15000
3/4	0.750	0.120	12500
3/4	0.750	0.134	15000
1	1.000	0.188	15000



GYROLOK®MP TEMPERATURE DERATING TABLE

Maximum Allowable Pressure Derating Factors, Elevated Temperatures

NOTE: Multiply value in Tubing Data Chart by value in Chart Below

Temperature °F	Temperature °C	316 Stainless Steel	Alloy 6MO	Super Duplex
100°	38°	—	—	—
200°	93°	—	—	0.99
300°	148°	—	—	0.94
400°	204°	0.97	0.95	0.91
500°	260°	0.90	0.86	0.88
600°	315°	0.85	0.82	0.88
650°	343°	0.84	0.81	—
700°	371°	0.82	0.80	—
750°	398°	0.81	0.80	—
800°	426°	0.80	0.79	—
850°	454°	0.79	0.79	—
900°	482°	0.78	—	—
950°	510°	0.77	—	—
1000°	538°	0.77	—	—
1050°	566°	0.73	—	—
1100°	593°	0.62	—	—
1150°	621°	0.49	—	—
1200°	649°	0.37	—	—
1250°	677°	0.28	—	—

Example	
Alloy	316 Stainless Steel
Temperature	500° F
Tube Size	1/4" x 0.095"
MAWP from Chart	15,000 PSI
New MAWP	MAWP*Derate Factor
New MAWP	15,000*0.9
New MAWP	13,500 PSI

GYROLOK[®]MP TUBE PREPARATION

Care and Handling of Tubing

Proper control of tubing variables is not only a function of how the tubing is manufactured. Improper care and handling of the tubing can cause correctly manufactured tubing to become unsuitable for use with a tube fitting.

1. Notify Supplier of Need for Careful Handling of Tubing

Not only should tubing be ordered to applicable specifications but appropriate precautions must be taken to protect key tubing characteristics through each handling and preparation phase.

2. Protect Tubing Surface from Damage

A smooth, unscratched tubing surface is essential for achieving a proper seal with a tube fitting. Do not drag straight tubing from storage racks.

3. Properly cut tubing

Tubing must be cut squarely to maximize the functionality of the fitting. There are multiple ways to cut tubing.

3.1. Tube saw (Hoke recommended)

As mentioned above, tube must be cut squarely to get the most out of the fitting. This is most easily accomplished with a rotary saw which uses a diamond cutting wheel with coolant applied to ensure the tubing doesn't overheat.



- a. Ensure the saw has been properly maintained and is ready for use.
- b. Support tube on either side of the saw to ensure a square cut.
- c. Cut tube with saw.

3.2. Hacksaw

A hacksaw should be used as a secondary cutting method.

- a. When cutting tubing with a hacksaw use guideblocks to ensure a square cut and prevent the tubing from flattening out.



4. Deburr Tubing

Cutting tubing, with either tube saw, tube cutter or hacksaw, will leave burrs on the tubing. It is important to deburr both the tubing's inside and outside diameters prior to installation. Excessive burring of the tubing outside diameter can damage the fitting during assembly or prevent proper fitting performance. Burrs on the inside diameter of the tubing can break off, enter the fluid stream, and possibly damage critical system components. After deburring, clean all metal chips from the tubing.

GYROLOK®MP TUBE PREPARATION

Free Length of Tubing for Proper Fitting Installation

GYROLOK® MP fittings are designed to be removed and reinstalled over the life of your system. In order to ensure the fittings can be properly installed and removed, the end user must plan for a certain length of tubing which is free from other components, bends, other fittings, etc. Table 1 below shows the full free length of tube required as well as the free length past the nut once the fitting is properly made up.

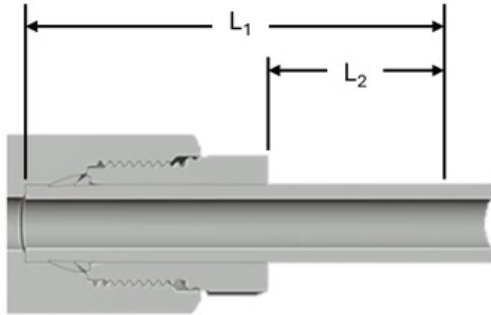


Table 1: Required free tube length

Tube OD (in)	Total required free tube length (in) [L1]	Required tube free length past installed nut (in) [L2]
1/4	1.86	0.68
3/8	2.08	0.72
1/2	2.36	0.80
9/16	2.54	0.84
3/4	3.29	1.11
1	4.23	1.45

GYROLOK®MP HAND TIGHTENING INSTRUCTIONS

Tightening to hand-tight

As a result of the patented makeup indicator groove, the installer of the GYROLOK® MP fitting has a built in gauge to ensure proper orientation and presence of the ferrules. Please refer to the instructions below to get the fitting into a proper hand-tight condition.

1. Fully insert correctly cut, deburred tube into the GMT as far as possible.
2. Mark the tubing as shown with an Ultra-Fine Point, Chloride-Free pen. Take care to position the mark perpendicular to the GMT, or insufficient ferrule set could occur
3. Insert cut end of tube into the fitting. Ensure the tube firmly rests on the bottom of the fitting.
4. Tighten nut to a hand-tight condition. Ensure the ferrules are properly loaded by referring to Table 2 below.
5. Move on to manual or HPST makeup instructions

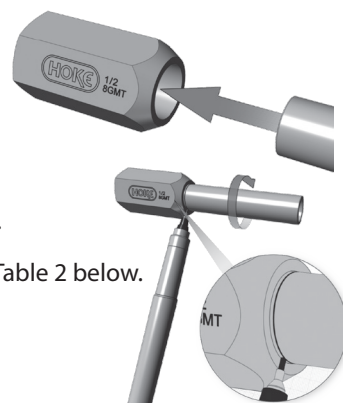


Table 2: Required free tube length

Condition	Side view of body/nut (i.e. what user is seeing)	Cross section view of body/nut (i.e. what might be going on inside)	Description of what to check
1. Ferrules properly loaded (groove is visible)			No check needed, proceed
2. Ferrule(s) misoriented (groove and chamfer are fully visible)			Check for ferrule reversal/mis-orientation
3. Ferrule missing (groove is not visible)			Check for presence of both ferrules
4. Ferrules missing (groove is not visible)			Check for presence of both ferrules

GYROLOK®MP MAKEUP INSTRUCTIONS

Fitting Installation

GYROLOK® MP fittings are designed to be installed with a torque wrench after they are hand tight. A hydraulic preset tool may be required or optional depending on the fitting size and installation environment.

- 1/4" - 9/16" size: Fitting makeups can be done manually.
- 1/2" - 9/16" size: Manual makeup or post-hydraulic preset makeup.
- 3/4" - 1" size: Fitting makeups must be done with a hydraulic preset tool (HPST).

Manual makeup instructions:

1. Follow hand-tight guidance in prior section and confirm ferrules are properly loaded in fitting.
2. Secure the hex end of the fitting.
3. Using a crows foot attached to a torque wrench, torque the nut to the torque specified in Table 3.

Table 1: Torque table for manual makeup of Gyrolok MP fittings

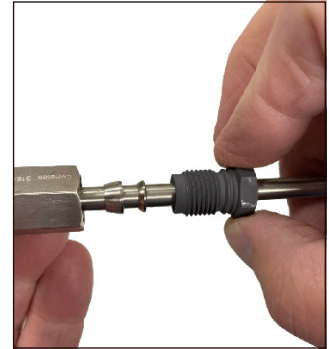
Fitting size (in)	Torque (lb-ft)	Note
1/4	25	
3/8	45	
1/2	120	Manual makeup or post-hydraulic preset makeup
9/16	170	Manual makeup or post-hydraulic preset makeup
3/4	270	Post-hydraulic preset makeup only
1	350	Post-hydraulic preset makeup only

4. Once torque is achieved, verify makeup indicator groove is not visible. Confirm that the GMT witness line is now visible.*

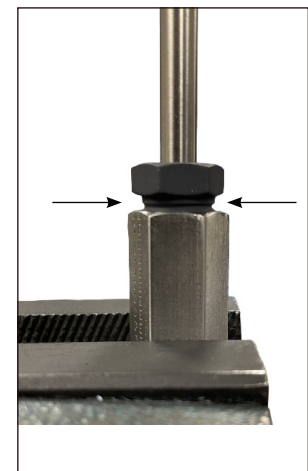
*Note that production tolerance variation may result in a makeup indicator groove that is slightly visible after makeup. An indicator groove may be as much as 10% visible after proper makeup. The application of the proper torque shall take precedence in this situation.

5. Fitting makeup is now complete.

1.



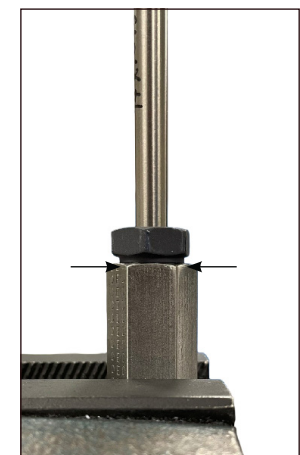
2.



3.



4.



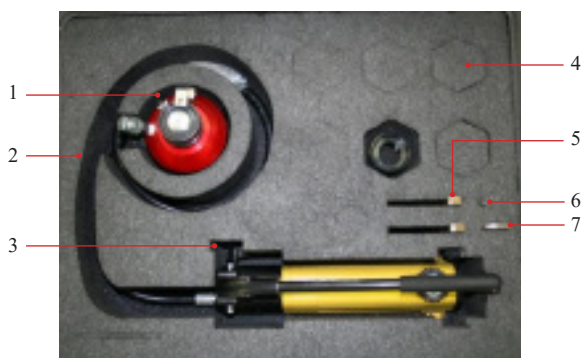
GYROLOK[®]MP OPERATION INSTRUCTIONS

HYDRAULIC PRESET TOOL (HPST) MAKEUP INSTRUCTIONS FOR GYROLOK[®] FITTINGS

Hydraulic Pre-Setting Tool (HPST) Operations Manual For Model Number 3HPST

3HPST pre-setting tool was designed to initially set ferrules onto tubing prior to final make-up.

Pre-setting assures correct and consistent make-ups. Final manual make-up torque is reduced approximately by 30% of what would have been required without pre-setting.



1. PRE-SETTING HEAD	5. WRENCHES
2. HAND PUMP HOSE	6. DIE FIXING BOLT
3. HAND PUMP	7. 5mm HEX WRENCH
4. DIE & JIG LOCATION	

HPST Setup

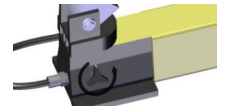
1. Connect hand pump to Pre-Setting head

The hand pump is supplied with a hose connected. Therefore the free end of the hose needs to be connected to the Pre-Setting head.

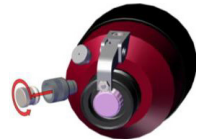
1.1. Remove the hand pump and Pre-Setting head from the case and place them in a suitable location.



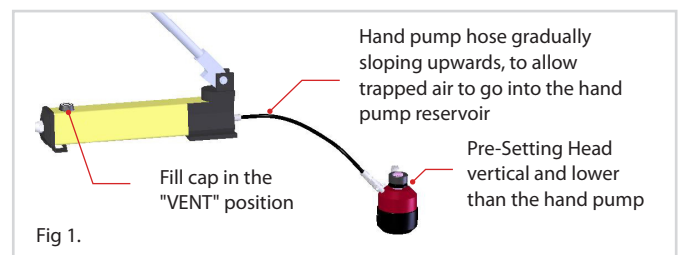
1.2. Open the release valve on hand pump by turning the handle counter-clockwise.



1.3. Remove the protective plug from the inlet connector on the Pre-Setting head, turn counter-clockwise. Keep the plug in a safe place, such as in the black case.



1.4. Connect the free end of the hand pump hose to the inlet connector on the Pre-Setting head tightening the male and female couplers together.

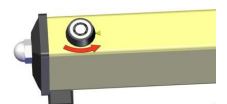


2. System Bleeding (Air Removal)

Perform the System Bleeding process prior to using the tool and whenever any part of the hydraulic system has been disconnected.

2.1. Position the hand pump at a higher elevation than the Pre-Setting head; this will help in chasing any trapped air out of the hydraulic system. (See FIG 1, above)

2.2. Vent hand pump reservoir, by turning the fill cap a 1/4 of a turn to the "VENT" position and ensure the hand pump release valve is closed. Turn release valve handle clockwise. Ensure the vent end of the Hand Pump reservoir is the highest point in the system.



GYROLOK®MP OPERATION INSTRUCTIONS

2.3. Operate the hand pump (pump the handle) until the piston in the Pre-Setting head is fully extended. This is achieved when the pump handle is hard to push. Do not try to pump the handle any further.

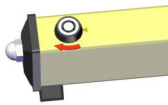
2.4. Open the release valve on the hand pump to retract the Pre-Setting head piston. This action will force any trapped air to move up into the hand pump reservoir.



2.5. Repeat the above step as necessary.

2.6. Add oil to the hand pump reservoir, if necessary. Reference hand pump manufacturer's manual for instructions

2.7. Return fill cap to the operating position ("CLOSE").



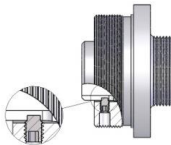
3. Die and Jig Installation

Always keep the Die and Jig as a matched pair and stored in the black case when not in use.

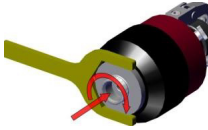
Table 4: HPST Die/Jig sets

Type	Gyrolok	Die/Jig Set	Applicable Sizes	Die/Jig Set P/N
Imperial	-MP	Die/Jig Set, Size 8 Gyrolok MP	Size 8 (1/2")	2FDJS-8-MP
Imperial	-MP	Die/Jig Set, Size 9 Gyrolok MP	Size 9 (9/16")	2FDJS-9-MP
Imperial	-MP	Die/Jig Set, Size 12 Gyrolok MP	Size 12 (3/4")	2FDJS-12-MP
Imperial	-MP	Die/Jig Set, Size 16 Gyrolok MP	Size 16 (1")	2FDJS-16-MP

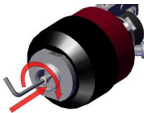
3.1. Select the corresponding Die and Jig set to the desired tube size you wish to pre-set, from Table 4. Make sure the Die and Jig is a matched pair. Use a 3/32 Allen Wrench to loosen the set screw located on the large end of the jig (See adjacent figure). This ensures that the Die moves freely prior to installing the Die and Jig assembly into the Pre-Setting head unit.



3.2. Maintaining the Jig key in the Die slot, install the Jig and Die by screwing the Jig into the Pre-Setting head and tighten completely, turning clockwise. Do not over-tighten. Use ONLY open-end wrenches provided.



3.3. Screw the Die-Fixing bolt to secure the Die onto the Pre-Setting head's piston, use the 5mm hex wrench, provided.



4. Indicator Nut Installation

4.1. Select the corresponding Indicator Nut for the fitting size you wish to pre-set.

Table 5: Indicator Nut Selection

Type	Gyrolok	Indicator Nut	Applicable Sizes	Indicator P/N
Imperial	-MP	Control Nut, Blue	Size 8 and 9	122697
Imperial	-MP	Control Nut, Orange	Size 12 and Size 16 (316SS fitting only)	122696
Imperial	-MP	Control Nut, Red	Size 16 (Super duplex fitting only)	122718

4.2. With the Indicator Arm in the release position, screw the Indicator Nut on to the threaded piston shaft.



5. Tube Preparation

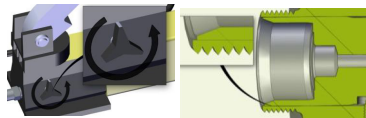
5.1. Ensure tube is cut according to Gyrolok MP tube cutting specifications.

6. Ferrule Pre-Setting Procedure

6.1. With the Pre-Setting head in the desired location, ensure the Indicator Arm is in the released position and the required Die and Jig set installed.



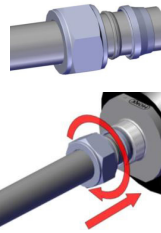
6.2. Open the release valve on the hand pump (turn counter-clockwise). Ensure the end of the Die is back from the end of the threaded portion of the Jig.



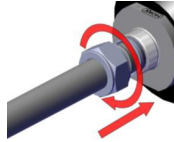
6.3. Place the Nut, Rear and Front Ferrule on to the desired prepared tubing.

GYROLOK®MP OPERATION INSTRUCTIONS

6.4. Insert the assembly into the Die and screw the nut (finger-tight) onto the jig. Tubing that is oval or oversize will not fit, do not force such tubing.



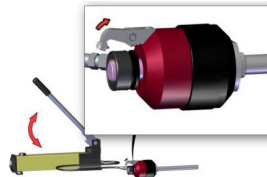
6.5. Close the hand pump release valve (turn clockwise).



6.6. Set the indicator arm in the operating position by, rotating the Indicator Nut counter-clockwise until it just captures the indicator pin on the indicator arm. Make sure the Indicator Arm can still move. Move the arm in a short movement and at the same time turn the Indicator Nut just until the arm will not move. Use the lock nut to hold the Indicator Nut in position, if desired.



6.7. Continue pumping until the indicator arm releases. STOP pumping immediately after the arm releases. Over pumping may cause the tube to swell and stick. Pre-Setting is now complete.



6.8. Open the release valve on the hand pump. Unscrew the nut and withdraw the pre-set assembly from the Pre-Setting head.

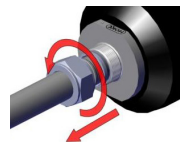


6.9. At this point the fitting make-up is not complete. The completion can take place in the final location (fitting).

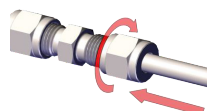


7. Finalizing the Fitting Make-up

7.1. Take the pre-set assembly and install in the desired fitting. Finger-tighten the nut.



7.2. With the fitting properly supported, use a torque wrench to torque the nut to the prescribed torque in Table 3. The fitting makeup is complete.



8. Resting Indicator Arm

8.1. Make sure the hand pump release valve is in the open position. Turn the valve handle counter-clockwise.



8.2. Rotate the lock nut and Indicator Nut until the pin on the Indicator Arm is able to touch the face of the Indicator Nut.

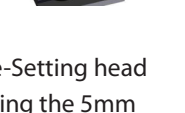


8.3. Leave the Indicator Nut in this position and close the release valve on the hand pump. The unit is now ready for the next pre-setting operation.



9. Dismantle & Store Unit

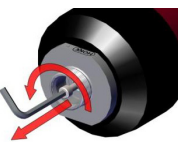
9.1. Open the Hand pump release valve.



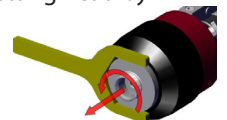
9.2. Remove the Die and Jig from the Pre-Setting head by first unscrewing the Die-Fixing bolt, using the 5mm Hex wrench provided.



9.3. Remove the Die-Fixing bolt and store in a safe place. Unscrew the Jig along with the Die, turning it counter-clockwise, using the wrench provided.



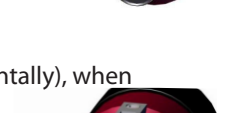
9.4. Disconnect the hand pump hose from the female coupler on the Pre-Setting head by loosening the coupler collar.



9.5. Plug the uncoupled end of Pre-Setting head with the protective plug removed and stored earlier.



9.6. Store clean components and accessories in the black case.



9.7. Lay the black case down (horizontally), when possible, during storage.





GYROLOK®MP PLUG INSTALLATION/REMAKE INSTRUCTIONS

Plug Installation

Gyrolok MP plugs come preinstalled into a unique nut. Note that the nut that comes with the plug is identical to the standard nuts, with the exception of the makeup indicator groove. The groove is not present on plugs. This is due to the nut having less displacement with a plug versus with ferrules and hence the groove would not function the same.

- 1. Secure the hex end of the fitting. Ensure there are no debris on the fitting.
Note: If reusing a plug, lubricate both sides of the tip, both where it contacts the nut and where it will contact the body with Krytox FS5 fluorolube, or equivalent. Plugs come lubricated from the factory. Proper lubrication will avoid galling.
- 2. Using a torque wrench, torque the nut to the torque specified in Table 6.

Table 6: Torque table for Gyrolok MP fitting plugs

Fitting size (in)	Torque (lb-ft)
1/4	25
3/8	45
1/2	120
9/16	170
3/4	270
1	350

- 3. Plug installation is now complete.

Remake Instructions

Gyrolok MP fittings can be remake multiple times without compromising their sealing capability.

- 1. Secure the hex end of the fitting.
- 2. Using a wrench, loosen the nut and separate the nut/ ferrule/tube from the fitting.
- 3. Follow makeup instructions if installing new components.
- 4. If reusing existing fittings, please follow Table 7 below to retorque the fitting.

Table 7: Torque table for remake of Gyrolok MP fittings

Fitting size (in)	Torque (ft-lb)
1/4	25
3/8	45
1/2	120
9/16	170
3/4	270
1	350

- 5. Fitting remake is now complete.



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