

Internal Roller Swage Tube Fittings
Three Groove

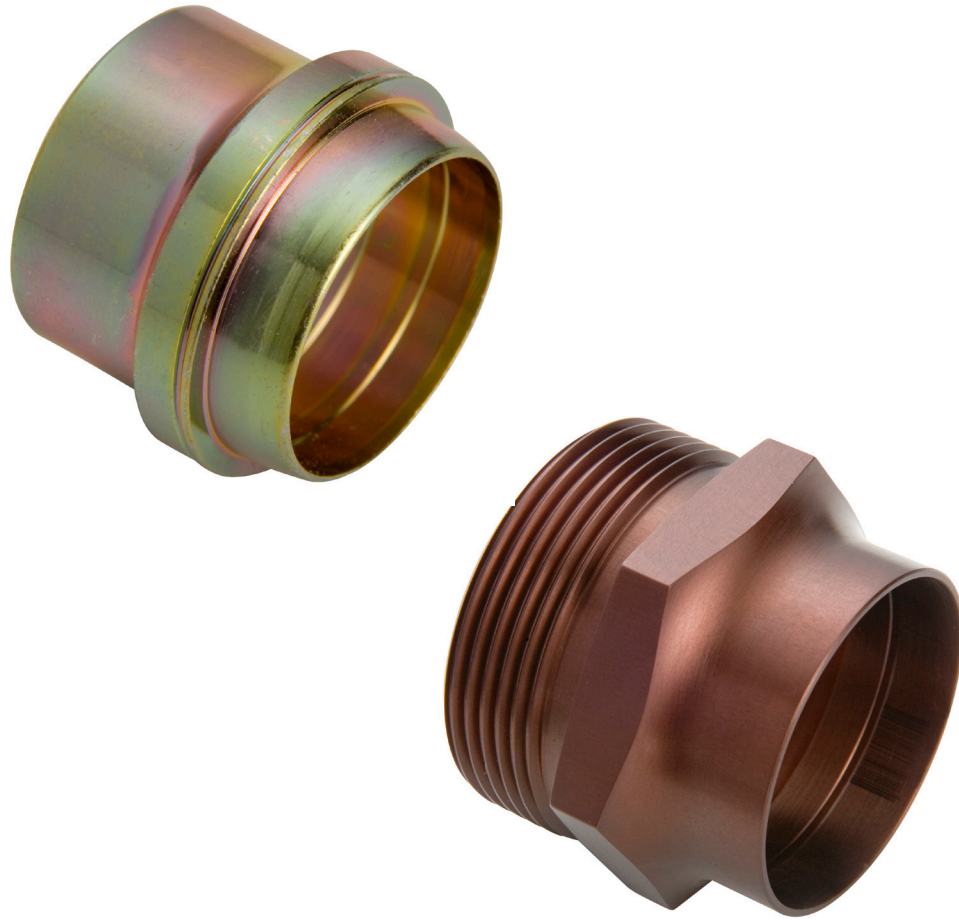


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Universal Three-Groove Fittings

Internal Swage Sleeve & Union

Feature Highlights...

- High performance and light weight at nominal cost
- Interchangeable with MS21922 sleeve and MS21902 union
- Attaches virtually to any tubing material, hardness and thickness with minimum tube end preparation
- Fast and simple attachment method by using Eaton's roller swager machine and tooling
- Extensively tested, approved and utilized by major aerospace manufacturers

Eaton's Three-Groove Sleeve and Union fittings are attached by internally swaging (i.e. expanding) the tubing into annular grooves within the fitting by means of the roller expander.

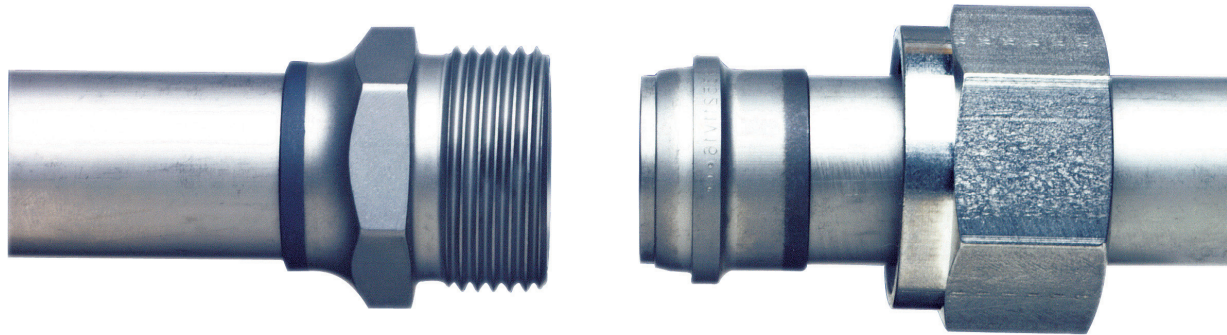
This is a proven technique which has been utilized by the industry for over 25 years.

The main swaging element of internally swaged system is the roller expander supported with any of Eaton's automatic (model 6777, 8777), semi-automatic (model 4777) swaging machines.

The system provides a positive, reliable metal-to-metal seal that surpasses the performance requirements of industry and government specifications.

Qualifications/Approvals

- Fully qualified for 3000 psi operating pressure per AS18280, ISO 7169, AS 4459
- Fully qualified for 4000 psi operating pressure per MIL-F-85421



Tube/Fitting Compatibility Chart - Recommended Wall Thickness

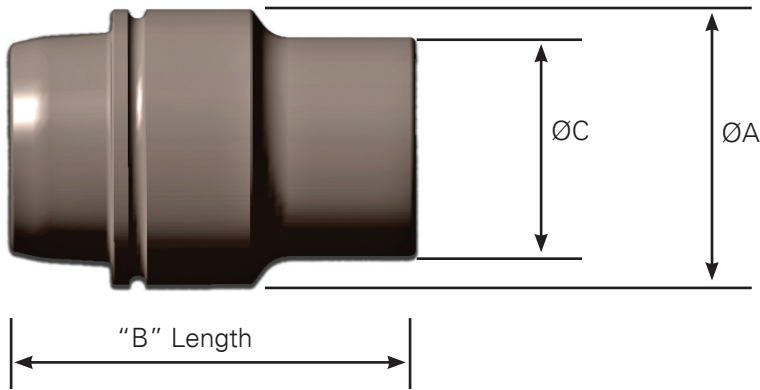
Dimensions: inches/mm

Fitting Material	Tube Material	Max. Rated Pressure (psig/kPa)	Tube Diameter					
			.250/6.35	.375/9.52	.500/12.7	.625/15.8	.750/19.0	1.000/25.4
6Al-4V TI	3Al-2.5V TI	4000/27,560	.020/.508	.028/.711	.035/.889	.044/1.11	.052/1.32	.070/1.776
Al-4V TI	3Al-2.5V TI	4000/27,560	—	.020/.508	.020/.508	.023/.581	.027/.685	.036/.914
15-5 PH	3Al-2.5V TI	3000/20,670	.016/.406	.019/.482	.026/.660	.032/.812	.039/.990	.051/1.29
15-5 PH	21-6-9 CRES	3000/20,670	.016/.406	.020/.508	.026/.660	.033/.838	.039/.990	.052/1.32
15-5 PH	304 1/8 CRES	3000/20,670	.020/.508	.028/.711	.035/.889	.042/1.06	.058/1.47	.065/1.65
15-5 PH	6061-T6 AL	1000/6,890	.035/.889	.035/.889	.035/.889	.035/.889	.049/1.24	—

NOTE: For all other sizes and wall thickness refer to appropriate technical documents. *Applicable Tubing Specifications:*

3Al-2.5V TI:	AMS 4944, AMS 4945
21-6-9 CRES:	AMS 5561
304 1/8 HD CRES:	MIL-T-6845
6061-T6 AL:	MIL-T-7081

Internal Roller Swage Three-Groove Sleeve



Dimensions: inches/mm

Part Number	Tube Size +.001/.025 -.002/.050	ØA Max	B Max	ØC Max	Weight (lb/kg)	
					CRES	Ti
35381 () 04	.250/6.35	.371/9.42	.554/14.0	.296/7.5	.005/.0022	.003/.0013
35381 () 05	.312/7.92	.434/11.0	.637/16.1	.362/9.1	.006/.0027	.003/.0013
35381 () 06	.375/9.52	.490/12.4	.672/17.0	.421/10.6	.007/.0031	.004/.0018
35381 () 08	.500/12.7	.670/17.0	.774/19.6	.548/13.9	.014/.0063	.008/.0036
35381 () 10	.625/15.8	.786/19.9	.824/20.9	.684/17.3	.019/.0086	.011/.0049
35381 () 12	.750/19.0	.960/24.3	.749/19.0	.819/20.8	.025/.0113	.014/.0063
35381 () 16	1.000/25.4	1.210/30.7	.800/20.3	1.067/27.1	.029/.0131	.017/.0077

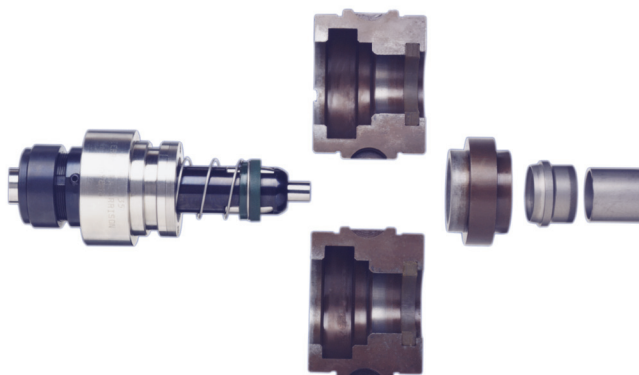
-20 and -25 sizes are available. Contact Eaton for further information.

04=Tube size ()=Material Code: "T" for 6AL-4V Titanium; "V" for 15-5PH CRES

35381=Basic part number (Replaces 35211 series fitting)

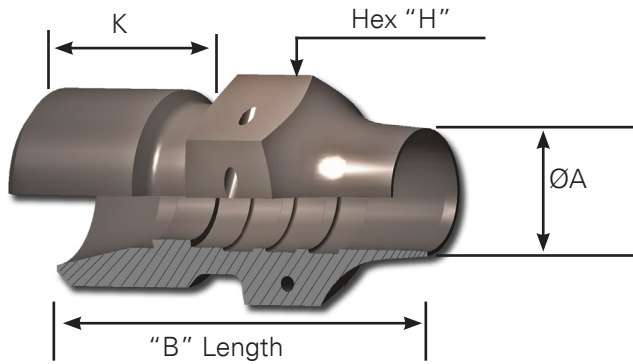
External Tooling for Sleeves

The external tooling for sleeves consists of one jaw set P/N 6884-size which has two halves and retainer.



Size	Jaw	Retainer
-04	6884-04	6885-104
-05	6884-05	6885-105
-06	6884-06	6885-106
-08	6884-08	6885-108
-10	6884-10	6885-110
-12	6884-12	6885-112
-16	6884-16	6885-116
-20	6884-20	6885-120
-24	6884-24	6885-124

Internal Roller Swage Three-Groove Union



Dimensions: inches/mm

Part Number	Tube Size	ØA	B	H FLATS	K	(T) Thread Class 3A Per AS8879	Approximate Weight (lbs/kg) CRES
35382B () 04	0.250/6.3	0.31/7.8	0.97/24.6	0.44/11.1	0.48/12.1	.4375 - 20 UNJF	0.019/.0086
35382B () 05	0.312/7.9	0.38/9.6	1.05/26.6	0.50/12.7	0.48/12.1	.5000 - 20 UNJF	0.033/.0149
35382B () 06	0.375/9.5	0.45/11.4	1.09/27.6	0.57/14.4	0.52/13.2	.5625 - 18 UNJF	0.034/.0154
35382B () 08	0.500/12.7	0.58/14.7	1.27/32.2	0.75/19.0	0.56/14.2	.7500 - 16 UNJF	0.056/.0254
35382B () 10	0.625/15.8	0.73/18.5	1.42/36.0	0.88/22.3	0.63/16.0	.8750 - 14 UNJF	0.089/.0403
35382B () 12	0.750/19.0	0.86/21.8	1.35/34.2	1.06/26.9	0.66/16.0	1.0625 - 12 UNJ	0.122/.0553
35382B () 16	1.000/25.4	1.11/28.1	1.37/34.7	1.31/33.2	0.69/17.5	1.3125 - 12 UNJ	0.282/.1279

-20 and -24 sizes available. Contact Eaton for further information.

35382B = Basic Part Number. Replaces 35212B series fitting.

External Tooling for Unions

The external tooling for union consists of only one jaw set P/N 6886-size which has two halves.

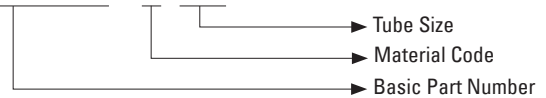
Size	Jaw Part Number
-04	6886-04
-05	6886-05
-06	6886-06
-08	6886-08
-10	6886-10
-12	6886-12
-16	6886-16
-20	6886-20
-24	6886-24

Internal tooling requirements for fittings are listed in applicable Technical Information Bulletin (TIB) and/or the operation manual.

How To Order

Part Number Example

3 5 3 8 2 B V 0 4

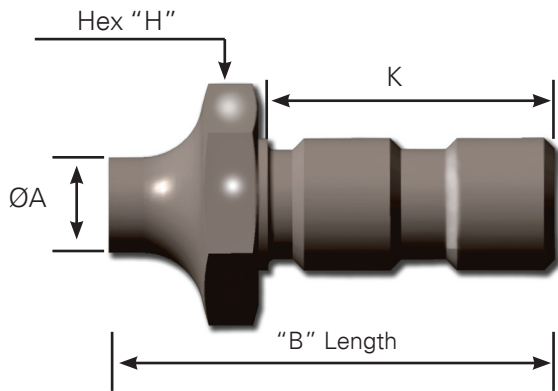


Material Call-out

V	15 - 5PH CRES per AMS 5659	Passivate per AMS-2700, Type II
GV*	7075 - T73 Al. Aly. per QQ-A-225/g	Anodize per AMS-A-8625, Type II, Color Brown
GVC*	7075-T73 Al. Aly. per QQ-A-225/g	Chemical Film Coat per AMS-C-5541
VN	15-5PH CRES per AMS5659	Cadmium plate per AMS-QQ-P-416, Type II, Class 3
T	6AL-4V Titanium Alloy per AMS 4965	Fluoride Phosphate Coat per AMS 2486

* Unions only

Internal Roller Swage Three-Groove Bulkhead Union



Dimensions: inches/mm

Dash Number	Tube Size	ØA Max	B	H Max	K	(T) Thread Class 3A Per AS8879	Approximate Weight (lbs/kg)	
							CRES	TI
-04	0.250/6.3	0.31/7.8	1.46/37.0	0.69/17.5	0.97/24.6	.4375 - 20 UNJF	0.050/.0226	0.029/.0131
-05	0.312/7.9	0.38/9.6	1.54/39.1	0.75/19.0	0.97/24.6	.5000 - 20 UNJF	0.057/.0258	0.033/.0149
-06	0.375/9.5	0.45/11.4	1.59/40.3	1.82/46.2	1.02/25.9	.5625 - 18 UNJF	0.069/.0312	0.039/.0176
-08	0.500/12.7	0.58/14.7	1.86/47.2	1.00/25.4	1.16/29.4	.7500 - 16 UNJF	0.117/.0530	0.067/.0303
-10	0.625/15.8	0.73/18.5	2.09/53.0	1.13/28.7	1.30/33.0	.8750 - 14 UNJF	0.160/.0725	0.093/.0421
-12	0.750/19.0	0.86/21.8	2.10/53.3	1.38/35.0	1.41/35.8	1.0625 - 12 UNJ	0.245/.1111	0.142/.0644
-16	1.000/25.4	1.11/28.1	2.09/53.0	1.63/41.4	1.41/35.8	1.3125 - 12 UNJ	0.415/.1882	0.238/.107

External Tooling for 35230 Bulkhead Union

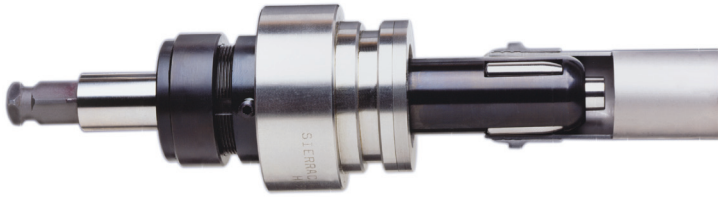
The external tooling for 35230 Bulkhead Union consists of only one jaw set P/N 7349-size which has two halves.

Size	Jaw Part Number
-04	7349-04
-05	N/A
-06	7349-06
-08	7349-08
-10	7349-10
-12	7349-12
-16	7349-16
-20	7349-20
-24	7349-24

Internal tooling requirements for fittings are listed in applicable Technical Information Bulletin (TIB) and/or the operation manual.

Internal Roller Swage Tools & Equipment

Roller Assembly Tooling



Available Machines

Model 4777

- Compact, ideal for light production use or field repair
- Easy to operate
- Swages sizes 1/4" to 1-1/2" (6mm to 38 mm) O.D. tubing

Model 6777

- Automated single-head swage machine
- Touch-screen control with variable motor speed
- Swages sizes 1/4" to 3/4" (6mm to 19 mm) O.D. tubing

Model 8777

- Capabilities of 6777 with second swage head for larger sizes
- Swages sizes 1/4" to 3-1/2" (6 mm to 89 mm) O.D. tubing

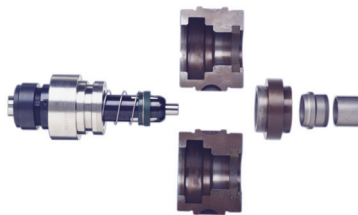


Roller Swage Sleeves and Unions 4 Easy Assembly Steps

1) Install proper expander and jaws on swager machine.



2) Insert tubing onto fitting end and place assembly inside jaw half



Jaws for Sleeves (2 halves)

3) Select recommended torque value, close jaws and activate start button.



4) Inspect by using an internal 5919 ID Mueller gauge



6777 Swager Machine

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