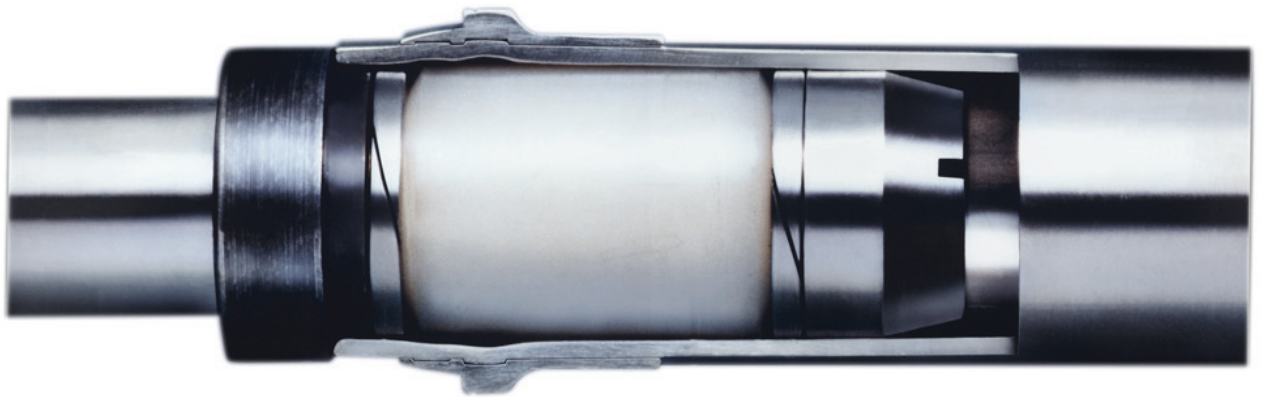




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Eaton internal elastomeric swage fittings were developed to provide a simple, yet reliable method to attach separable end fittings to rigid tubes for the demanding aerospace environment. These fittings provide a lightweight and cost effective alternative to welding, brazing, or other mechanically attached methods.

## Advantages of Internal Swaging

Internal swaging is a mechanical method for the attachment of fittings to tubing. This is accomplished by forming tubing outward into grooves within the fitting. The following advantages can be realized from this technique.

### Advantages

- No special tube end preparation (cleaning or sizing)
- Very rapid fabrication (seconds per connection)
- No X-ray inspection required
- No flushing or ball-check test required
- Reduces scrap rate
- Improved fatigue performance vs. braze
- No heat-affected zones or heat-induced distortion
- No stress-relieving required

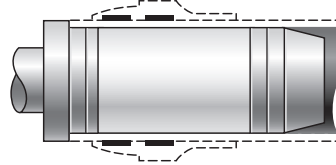
These advantages can result in significant installed cost savings. The use of Eaton internal swage fittings is ideally compatible with

CAD/CAM systems for tube assembly production. Mechanical attachment at room temperature is a plus in situations where flammability is a concern.

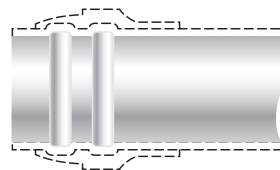
### Fitting Features

- Fittings are made of high-strength alloys (15-5 CRES, 7075 Aluminum, 6AL-4V Titanium)
- Flared fitting with machined metal sealing surface eliminates tube flare cracking
- Flared fitting uses a 2-angle face which results in a line-contact seal allowing up to 4° angular misalignment
- Various Flareless styles are available which are compatible with all flareless systems in use today
- Lipseal fittings provide excellent sealing due to a flexible beam surface plus maximum fitting interface clearance
- Available in sizes from 1/4" (6.35mm) through 1-1/2" (38 mm).

## Internal Swaging Technique



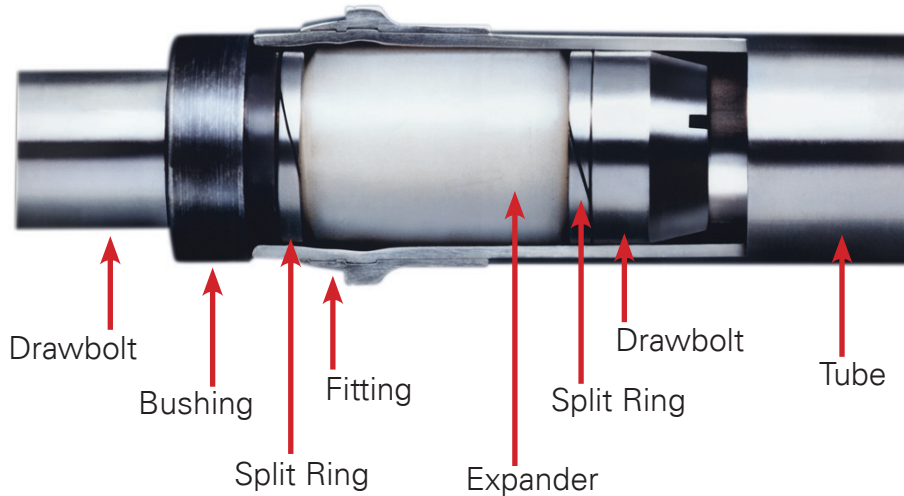
Before swaging, with drawbolt/expander assembly inserted



After swaging, with tube formed into fitting grooves

# Internal Elastomeric Swaging Equipment

## Elastomeric Drawbolt Assembly



## Elastomeric Swaging Equipment

### MODEL 5420A – Dual-Head Automated Power Swage Machine

The Model 5420A is designed for high volume elastomeric power swaging of aircraft fittings to aluminum, steel or titanium tubing. It features two heads for high productivity, a capacity range of .25" (6.35mm) O.D. through 1.50" (38mm) O.D., and a cycle time as fast as 10 seconds per swage. Each head on Model 5420A has a separate set of controls which allows one operator to use one head independently of the other, or two operators to use both heads simultaneously. The unit's motor also provides sufficient pressure so that both heads can operate off the same relief valve and hydraulic pump. All internal components are housed in a rugged welded steel body.



Model 5420A

### MODEL 6520 – Semi-Automatic Power Swage Machine

The Model 6520 is designed for high production runs of tube assemblies in tubing sizes of .25" (6.35mm) O.D. through .75" (19mm) O.D. this semi-automatic swage machine uses a hydraulically actuated drawbolt with an elastomeric expander to hydrostatically form the tube outward into machined grooves within the fitting, which is captured by metal jaws during swaging. This power swage machine can elastomerically swage fittings to tubing in 15 to 20 seconds, for high volume tube assembly production. CRES, aluminum and CP titanium can be swaged in all industry-standard wall thickness. Power swaging machines are housed in steel carts complete with tool storage.

### MODEL 6530 – Semi-Automatic Power Swage Machine

The Model 6530 is designed for high production runs of tube assemblies in tubing sizes of .750" (19mm) O.D. through 1.50" (38mm) O.D. This semi-automatic swage machine uses a hydraulically actuated drawbolt with an elastomeric expander to hydrostatically form the tube outward into machined grooves within the fitting, which is captured by metal jaws during swaging. This power swage machine can elastomerically swage fittings to tubing in 15 to 20 seconds, for high volume tube assembly production. CRES, aluminum and CP titanium can be swaged in all industry-standard wall thickness. Power swaging machines are housed in steel carts complete with tool storage.

# Internal Elastomeric Swage Tools - Model 5175

## TOOLING

| 5175           | Eaton Part Number | Length          |
|----------------|-------------------|-----------------|
| Pump Assembly  | 5798              |                 |
| Swaging Head   | 5806              |                 |
| Hose Assembly* | 5804-1            | 40 in (1016mm)  |
|                | 5804-2            | 76 in (1930mm)  |
|                | 5804-3            | 124 in (3149mm) |
|                | 5804-4            | 148 in (3759mm) |
| Retaining Ring | 5728              |                 |

For use in fastening fittings to .250 O.D. thru .500 O.D. tubing.

Internal tooling requirements for this unit are listed in applicable swaging supplements and/or the operation manual.

\*5175 comes with only one hose. Length specified by customer.

5798 Hand Pump & Hose



5806 Small Swage Head with 5728 Adapter Ring



Swage Kit Available



### Swage Tooling - For Use With 35235 Sleeve

| Tube Size | Assembly          |              | Replacement Components |                |             |                     | Jaw Sets & Anvil's |             |             |
|-----------|-------------------|--------------|------------------------|----------------|-------------|---------------------|--------------------|-------------|-------------|
|           | Drawbolt Assembly | Drawbolt P/N | Expander P/N           | Split Ring P/N | Bushing P/N | Anti-Extrusion Ring | Anvil P/N          | Jaw Set P/N | Adapter P/N |
| -04       | 6742-04XXXL       | 5642-1XXX    | 5945-04XXX             | 5937-04XXX     | 6150-04XXX  | None Required       | 5284-2             | 5598        | 5329 & 5930 |
| -05       | 6743-05XXXL       | 5643-1XXX    | 5945-05XXX             | 5937-05XXX     | 6150-05XXX  | None Required       | 5285-2             | 5599        | 5329 & 5930 |
| -06       | 6744-06XXXL       | 5902-1XXX    | 5945-06XXX             | 5937-06XXX     | 5264-06XXX  | 5942-06             | 5286-2             | 5600        | 5930        |
| -08       | 6745-08XXXL       | 5645-1XXX    | 5945-08XXX             | 5937-08XXX     | 5264-08XXX  | 5942-08             | 5288-2             | 5601        | 5930        |

XXX designates Tube Wall thickness (i.e. 6744-06028L)

### Swage Tooling - For Use With 35056 Union

| Tube Size | Assembly          |              | Replacement Components |                |             |                     | Jaw Sets & Anvil's |             |             |
|-----------|-------------------|--------------|------------------------|----------------|-------------|---------------------|--------------------|-------------|-------------|
|           | Drawbolt Assembly | Drawbolt P/N | Expander P/N           | Split Ring P/N | Bushing P/N | Anti-Extrusion Ring | Anvil P/N          | Jaw Set P/N | Adapter P/N |
| -04       | 6751-04XXXL       | 5642-1XXX    | 5945-04XXX             | 5937-04XXX     | 5264-04XXX  | None Required       | 5876-04            | 5877        | 5329 & 5930 |
| -05       | -                 | -            | -                      | -              | -           | None Required       | -                  | -           | -           |
| -06       | 6753-06XXXL       | 5902-1XXX    | 5945-06XXX             | 5937-06XXX     | 5264-06XXX  | 5942-06             | 5876-06            | 5879        | 5930        |
| -08       | 6754-08XXXL       | 5645-1XXX    | 5945-08XXX             | 5937-08XXX     | 5264-08XXX  | 5942-08             | 5876-08            | 6053        | 5930        |

XXX designates Tube Wall thickness (i.e. 6753-06028L)

### Swage Tooling - For Use With 35066 Union

| Tube Size | Assembly          |              | Replacement Components |                |             |                     | Jaw Sets & Anvil's |             |             |
|-----------|-------------------|--------------|------------------------|----------------|-------------|---------------------|--------------------|-------------|-------------|
|           | Drawbolt Assembly | Drawbolt P/N | Expander P/N           | Split Ring P/N | Bushing P/N | Anti-Extrusion Ring | Anvil P/N          | Jaw Set P/N | Adapter P/N |
| -04       | 6751-04XXXL       | 5642-1XXX    | 5945-04XXX             | 5937-04XXX     | 5264-04XXX  | None Required       | 5876-04            | 5995        | 5329 & 5930 |
| -05       | 6752-05XXXL       | 5643-1XXX    | 5945-05XXX             | 5937-05XXX     | 5264-05XXX  | None Required       | 5876-05            | 5996        | 5329 & 5930 |
| -06       | 6753-06XXXL       | 5902-1XXX    | 5945-06XXX             | 5937-06XXX     | 5264-06XXX  | 5942-06             | 5876-06            | 5997        | 5930        |
| -08       | 6754-08XXXL       | 5645-1XXX    | 5945-08XXX             | 5937-08XXX     | 5264-08XXX  | 5942-08             | 5876-08            | 5998        | 5930        |

XXX designates Tube Wall thickness (i.e. 6753-06028L)

# Internal Elastomeric Swage Tools - Model 5720

## TOOLING

| 5720           | Eaton Part Number | Length          |
|----------------|-------------------|-----------------|
| Head           | 5724              |                 |
| Pump Assembly  | 5800              |                 |
| Hose Assembly* | 5804-1            | 40 in (1016mm)  |
|                | 5804-2            | 76 in (1930mm)  |
|                | 5804-3            | 124 in (3149mm) |
|                | 5804-4            | 148 in (3759mm) |

For use in fastening sleeves and other fittings to .625 O.D. thru 1.500 O.D. tubing by swaging the tube into grooves in the fitting.

Maximum operating pressure = 6,000 psi

For internal tooling requirements for this unit see the applicable swaging supplements listed in your swage machine operation manual.

\*5720 comes with only one hose. Length specified by customer.

5724 Large Swage Head



5720 Hand Pump



## Swage Tooling

### For Use With 35235 Sleeve (Long)

| Tube Size | Assembly    | Replacement Components |              |                |             |                     | Jaw Sets & Anvil's |             |             |
|-----------|-------------|------------------------|--------------|----------------|-------------|---------------------|--------------------|-------------|-------------|
|           |             | Drawbolt P/N           | Expander P/N | Split Ring P/N | Bushing P/N | Anti-Extrusion Ring | Anvil P/N          | Jaw Set P/N | Adapter P/N |
| -10       | 6746-10XXXL | 5642-1XXX              | 5945-10XXX   | 5937-10XXX     | 5264-10XXX  | 5942-10             | 5310-2             | 5602        | 5307 & 5990 |
| -12       | 6747-12XXXL | 5647-1XXX              | 5945-12XXX   | 5937-12XXX     | 6150-12XXX  | 5942-12             | 5311-2             | 5603        | 5307 & 5990 |
| -16       | 6748-16XXXL | 5986-1XXX              | 5945-16XXX   | 5937-16XXX     | 6150-16XXX  | 5942-16             | 5312-2             | 5604        | 5990        |
| -20       | 6749-20XXXL | 5649-1XXX              | 5945-20XXX   | 5937-20XXX     | 6150-20XXX  | 5942-20             | 5313-2             | 5605        | 5990        |
| -24       | 6750-24XXXL | 5650-1XXX              | 5945-24XXX   | 5937-24XXX     | 6150-24XXX  | 5942-24             | 5314-2             | 5606        | 5990        |

XXX designates Tube Wall thickness (i.e. 6746-10049L)

## Swage Tooling

### For Use With 35056 Union (Long)

| Tube Size | Assembly    | Replacement Components |              |                |             |                     | Jaw Sets & Anvil's |             |             |
|-----------|-------------|------------------------|--------------|----------------|-------------|---------------------|--------------------|-------------|-------------|
|           |             | Drawbolt P/N           | Expander P/N | Split Ring P/N | Bushing P/N | Anti-Extrusion Ring | Anvil P/N          | Jaw Set P/N | Adapter P/N |
| -10       | 6755-10XXXL | 5646-1XXX              | 5945-10XXX   | 5937-10XXX     | 5264-10XXX  | 5942-10             | 8030-10            | 6055        | 5307 & 5990 |
| -12       | 6756-12XXXL | 5647-1XXX              | 5945-12XXX   | 5937-12XXX     | 5264-12XXX  | 5942-12             | 8030-12            | 6056        | 5307 & 5990 |
| -16       | 6757-16XXXL | 5986-1XXX              | 5945-16XXX   | 5937-16XXX     | 5264-16XXX  | 5942-16             | 8030-16            | 6057        | 5990        |
| -20       | 6758-20XXXL | 5649-1XXX              | 5945-20XXX   | 5937-20XXX     | 5264-20XXX  | 5942-20             | 8030-20            | 6058        | 5990        |
| -24       | 6759-24XXXL | 5650-1XXX              | 5945-24XXX   | 5937-24XXX     | 5264-24XXX  | 5942-24             | 8030-24            | 6059        | 5990        |

XXX designates Tube Wall thickness (i.e. 6755-10049L)

## Swage Tooling 35066 Union (Long)

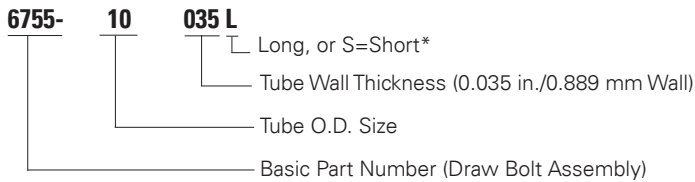
| Tube Size | Assembly          | Replacement Components |              |                |             |                     | Jaw Sets & Anvil's |             |             |
|-----------|-------------------|------------------------|--------------|----------------|-------------|---------------------|--------------------|-------------|-------------|
|           | Drawbolt Assembly | Drawbolt P/N           | Expander P/N | Split Ring P/N | Bushing P/N | Anti-Extrusion Ring | Anvil P/N          | Jaw Set P/N | Adapter P/N |
| -10       | 6755-10XXXL       | 5646-1XXX              | 5945-10XXX   | 5937-10XXX     | 5264-10XXX  | 5942-10             | 8030-10            | 8031-10-1   | 5307 & 5990 |
| -12       | 6756-12XXXL       | 5647-1XXX              | 5945-12XXX   | 5937-12XXX     | 5264-12XXX  | 5942-12             | 8030-12            | 8031-12-1   | 5307 & 5990 |
| -16       | 6757-16XXXL       | 5986-1XXX              | 5945-16XXX   | 5937-16XXX     | 5264-16XXX  | 5942-16             | 8030-16            | 8031-16-1   | 5990        |
| -20       | 6758-20XXXL       | 5649-1XXX              | 5945-20XXX   | 5937-20XXX     | 5264-20XXX  | 5942-20             | 8030-20            | 8031-20-1   | 5990        |
| -24       | 6759-24XXXL       | 5650-1XXX              | 5945-24XXX   | 5937-24XXX     | 5264-24XXX  | 5942-24             | 8030-24            | 8031-24-1   | 5990        |

Ref. Airbus NSA855034

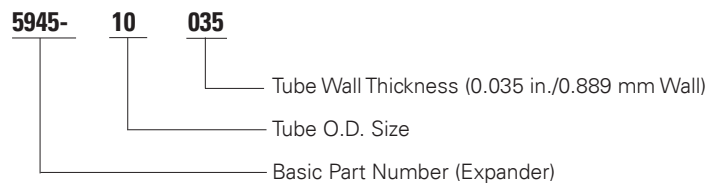
**XXX designates Tube Wall thickness (i.e. 675510049L)**

## HOW TO ORDER

Part Number Example - Draw Bolt Assembly



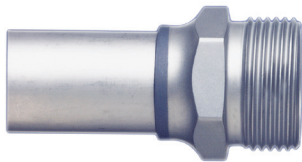
Part Number Example - Component



\* Short to be used in special circumstances where fitting is too close to bend in tube

## FITTING REFERENCES

### Union 35056, 35066



#### OEM Cross Reference

| Eaton Part Number | Airbus Part Number | Boeing Part Number |
|-------------------|--------------------|--------------------|
| 35066( )XX        | NSA855010          | —                  |
| 35056( )XX        | —                  | BACU24AB           |

### Sleeve 35235



| Eaton Part Number | Airbus Part Number | Boeing Part Number |
|-------------------|--------------------|--------------------|
| 35235( )XX        | NSA855034          | BACS13BX           |

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