PETROMETALIC

Solutions de régulation des fluides

# High Pressure Equipment

## 8 - Tooling

HiP

Petrometalic SA
32, rue de l'Ermitage
78000 VERSAILLES
www.petrometalic.com
packers@petrometalic.com

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**PETROMETALIC Siège social**
32 rue de l'Ermitage
78000 Versailles Cedex
Tél : 33 (0)1 39 23 96 70
Fax : 33 (0)1 39 23 96 71
PDG : M. Philippe Mazurel
direction@petrometalic.com

**PETROMETALIC Cambrai**
11 rue de Ecluses de Selles BP 287
59400 Cambrai cedex
Tél : 33 (0) 3 27 72 06 60
Fax : 33 (0) 3 27 72 06 61
DAF : Geneviève Leroy
daf@petrometalic.com

**CONTACTS :**

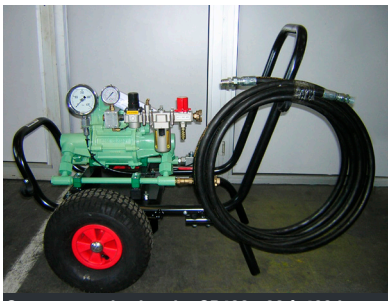
Mme Elisabeth BONNEVILLE
Commercial France / Export
Tél. +33 3 27 72 06 24
Fax +33 3 27 72 06 31
packers@petrometalic.com

Mr Didier RENUT
Responsable Commercial
Tél. +33 3 27 72 06 20
Fax +33 3 27 72 06 31
packers@petrometalic.com

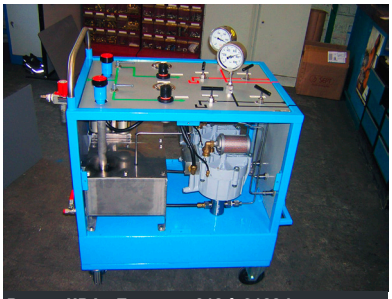
## OBTURATEURS BIMBAR / PACKERS

Petrometalic développe et exporte dans le monde entier depuis 1975 le tuyau dilatable BIMBAR, d'abord pour l'abattage hydraulique du charbon, ensuite pour la consolidation des sols et les applications géotechniques.

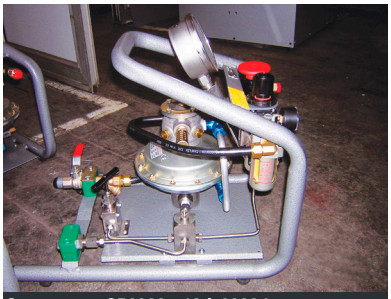
plus d'information sur les obturateurs sur Petrometalic.com



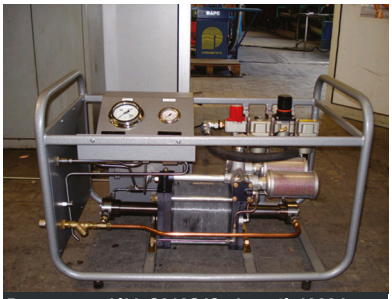
Surpresseur de chantier SP400 - 90 à 490 bar



Pompe HP Le Touquet - 210 à 2100 bar



Surpresseur SP2300 - 10 à 2330 bar



Pompe gros débit S218GJC - jusqu'à 1380 bar

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Surpresseurs nus ou équipés en centrale jusqu'à 3000 bars.

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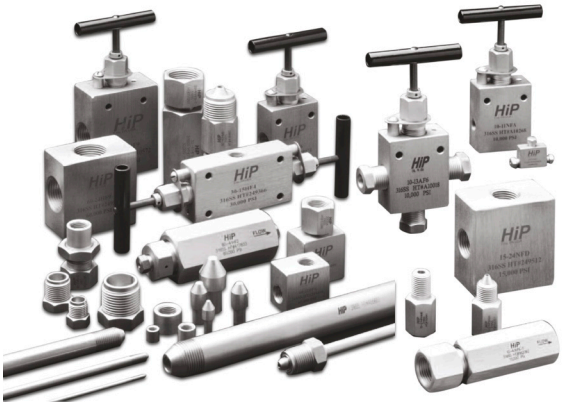
catalogue surpresseurs et pompes téléchargeables sur Petrometalic.com



## RACCORDS ET TUBES TRÈS HAUTE PRESSION

Une gamme HP et THP couvrant tous les composants consultables et téléchargeables dans nos catalogues.

catalogues THP téléchargeables sur Petrometalic.com

### SERVICE COMMERCIAL

email : **packers@petrometalic.com**
tel. : +33 3 27 72 06 24 (Cambrai)
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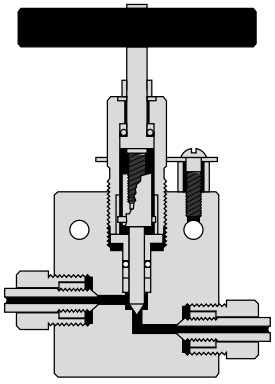
### NOS ENGAGEMENTS

- ✔ un stock de 1.1M€
- ✔ 50 ans d'expérience
- ✔ conseil de qualité

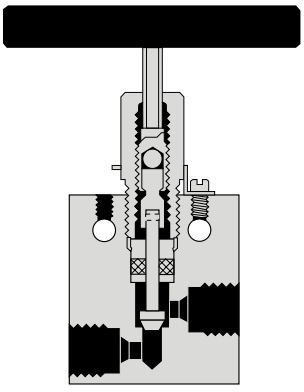
# Valve Design

## General

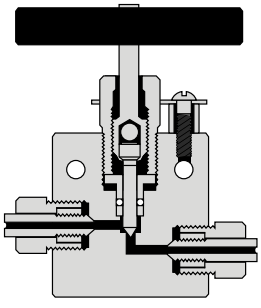
- Valve bodies through 100,000 psi are high tensile Type 316 stainless steel, 150,000 psi valve bodies are 17-4 PH stainless steel.
- Stem assemblies have non-rotating tips to prevent galling with valve seats.
- Packing is located below the stem threads to prevent contact with media (liquid or gas).
- Packing glands are equipped with locking devices or lock nuts.
- Six valve patterns (see chart on page 1.3).
- Tubing connections are: 1/16", 1/8", 1/4", 3/8", 9/16", 3/4", and 1". Pipe connections include: 1/8", 1/4", 3/8", 1/2", 3/4", and 1" NPT.
- Remote control air operators are available for most valves.



Positive Guide Stem



Pinned Stem



Rolled Style Stem

**Positive Guide Stem:** High Pressure Equipment Company's patented “Positive Guide” stem assembly virtually eliminates lower stem rotation — one of the most common causes of premature stem failure. The lower section stem is manufactured from hardened 17-4 PH stainless steel for exceptional wear and corrosion resistance and can be easily serviced with no special tooling required. The one-piece upper section stem eliminates the need for continual adjustment and minimizes “loose handle” backlash.

The Positive Guide Stem is standard for all AF4, AF6, HF4, HF6, and HF9 valves, and 60,000 psi HF2 valves.

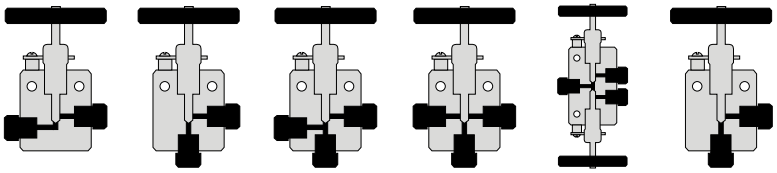
**Rolled Style Stem:** This simple two-piece design is also non-rotating and is ideal for smaller valves and for valves made from exotic materials. The standard lower section stem is manufactured from hardened 17-4 PH stainless steel. It is affixed to a one-piece upper stem requiring no periodic adjustment. The two stem components are free to rotate independently of each other, thereby minimizing rotation of the lower stem against the valve seat.

The Rolled Style Stem is standard for all AF1, AF2, NFA, NFB, LF4, LF6 valves, 30,000 psi HF2, XF4, and XF6 valves, as well as most valves requiring stems made from exotic materials. It is optional for any valve normally supplied with a Positive Guide Stem.

**Pinned Stem Design:** This variation on the Rolled Style Stem is a three-piece design in which the lower stem is pinned into a freely-rotating stem guide. It has all of the advantages of the rolled style stem, with the additional benefit of a replaceable lower section stem.

The Pinned Stem Design is standard for all NFC, NFD, NFF, NFH, LF9, LF12, LF16, and HF16 valves.

# Quick Selector Guide to Standard Valves



| | | Tubing Size O.D. | Tubing Size I.D. | Two Way Straight | Two Way Angle | Three Way Two Press | Three Way One Press | Three Way Two Stem | Replaceable Seat |
|---|---|---|---|---|---|---|---|---|---|
| ***Taper Seal Valves*** | 10,000 psi | 1/4" | 1/8" | 10-11AF4 | 10-12AF4 | 10-13AF4 | 10-14AF4 | 10-15AF4 | NA |
| | | 3/8" | 1/4" | 10-11AF6 | 10-12AF6 | 10-13AF6 | 10-14AF6 | 10-15AF6 | NA |
| | 15,000 psi | 1/16" | .030" | 15-11AF1 | 15-12AF1 | 15-13AF1 | 15-14AF1 | 15-15AF1 | NA |
| | | 1/8" | 1/16" | 15-11AF2 | 15-12AF2 | 15-13AF2 | 15-14AF2 | 15-15AF2 | NA |
| ***Medium Pressure Valves*** | 20,000 psi | 1/4" | 7/64" | 20-11LF4 | 20-12LF4 | 20-13LF4 | 20-14LF4 | 20-15LF4 | 20-12LF4R |
| | | 3/8" | 13/64" | 20-11LF6 | 20-12LF6 | 20-13LF6 | 20-14LF6 | 20-15LF6 | 20-12LF6R |
| | | 9/16" | 5/16" | 20-11LF9 | 20-12LF9 | 20-13LF9 | 20-14LF9 | 20-15LF9 | 20-12LF9R |
| | | 3/4" | 33/64" | 20-11LF12 | 20-12LF12 | 20-13LF12 | 20-14LF12 | 20-15LF12 | 20-12LF12R |
| | | 1" | 11/16" | 20-11LF16 | 20-12LF16 | 20-13LF16 | 20-14LF16 | 20-15LF16 | 20-12LF16R |
| ***High Pressure Valves*** | 30,000 psi | 1/8" | .040" | 30-11HF2 | 30-12HF2 | 30-13HF2 | 30-14HF2 | 30-15HF2 | 30-12HF2R |
| | | 1/4" | .083" | 30-11HF4 | 30-12HF4 | 30-13HF4 | 30-14HF4 | 30-15HF4 | 30-12HF4R |
| | | 3/8" | 1/8" | 30-11HF6 | 30-12HF6 | 30-13HF6 | 30-14HF6 | 30-15HF6 | 30-12HF6R |
| | | 9/16" | 3/16" | 30-11HF9 | 30-12HF9 | 30-13HF9 | 30-14HF9 | 30-15HF9 | 30-12HF9R |
| | | 1" | .437" | 30-11HF16 | 30-12HF16 | 30-13HF16 | 30-14HF16 | 30-15HF16 | 30-12HF16R |
| | 60,000 psi | 1/8" | .020" | 60-11HF2 | 60-12HF2 | 60-13HF2 | 60-14HF2 | 60-15HF2 | 60-12HF2R |
| | | 1/4" | 1/16" | 60-11HF4 | 60-12HF4 | 60-13HF4 | 60-14HF4 | 60-15HF4 | 60-12HF4R |
| | | 3/8" | 1/8" | 60-11HF6 | 60-12HF6 | 60-13HF6 | 60-14HF6 | 60-15HF6 | 60-12HF6R |
| | | 9/16" | 3/16" | 60-11HF9 | 60-12HF9 | 60-13HF9 | 60-14HF9 | 60-15HF9 | 60-12HF9R |
| ***Ultra High Pressure Valves*** | 100,000 psi | 1/4" | 1/16" | 100-11XF4 | 100-12XF4 | 100-13XF4 | 100-14XF4 | NA | 100-12XF4R |
| | 150,000 psi | 3/8" | 1/16" | 150-11XF6 | 150-12XF6 | 150-13XF6 | 150-14XF6 | NA | 150-12XF6R |

# High Pressure Equipment

## Catalog Numbering System

| PRESSURE | | TYPE | CONNECTION | CONNECTION | | OPTIONS / ACCESSORIES |
|---|---|---|---|---|---|---|
| 30 | - | 11 | HF9 | *(IF DIFFERENT FROM FIRST CONNECTION)* | ⊿ 7 | |

### Pressure Series

**10** =10,000 psi
**15** = 15,000 psi
**20** = 20,000 psi
**30** = 30,000 psi
**40** = 40,000 psi
**60** = 60,000 psi
**100** = 100,000 psi
**150** = 150,000 psi

Catalog part numbers for some components (NPT fittings, special alloy parts) have been maintained for historical consideration.

The referred pressure series may not reflect the actual pressure rating. Please refer to applicable catalog page for pressure rating, or consult the factory.

### Type of Components

**2** = Gland, Collar or Sleeve
**3** = Anti-Vibration Assembly
**7** = Plug
**11** = 2-Way Straight Valve
**12** = 2-Way Angle Valve
**13** = 3-Way Valve with Two Pressure Connections
**14** = 3-Way Valve with One Pressure Connections
**15** = 3-Way, 2-Stem Valve
**16** = Ball Valve (Floating)
**21** = Coupling or Adapter
**22** = Elbow
**23** = Tee
**24** = Cross
**41** = Check Valve
**51** = Line Filter
**61** = Safety Head (Straight)
**63** = Safety Head (Tee Type)
**71** = 2-Way Ball Valve *
**72** = 3-Way Ball Valve 180° *
**73** = 3-Way Ball Valve Diverter *
**74** = 2-Way Ball Valve *
**75** = 3-Way Ball Valve 180° *
**76** = 3-Way Ball Valve Diverter *
**77** = 3-Way Mini Ball Valve $^1/_4$ NPT
**80** = 2-Way Ball Valve *
**81** = 3-Way Ball Valve 180° *
**82** = 3-Way Ball Valve Diverter *

* (Trunion)

### Connection(s) Size and Type

| Female | Male | |
|---|---|---|
| AF1 | AM1 | $^1/_{16}$" Taper Seal |
| AF2 | AM2 | $^1/_8$" Taper Seal |
| AF4 | AM4 | $^1/_4$" Taper Seal |
| AF6 | AM6 | $^3/_8$" Taper Seal |
| LF4 | LM4 | $^1/_4$" Medium Pressure |
| LF6 | LM6 | $^3/_8$" Medium Pressure |
| LF9 | LM9 | $^9/_{16}$" Medium Pressure |
| LF12 | LM12 | $^3/_4$" Medium Pressure |
| LF16 | LM16 | 1" Medium Pressure |
| HF2 | HM2 | $^1/_8$" High Pressure |
| HF4 | HM4 | $^1/_4$" High Pressure |
| HF6 | HM6 | $^3/_8$" High Pressure |
| HF9 | HM9 | $^9/_{16}$" High Pressure |
| HF16 | HM16 | 1" High Pressure |
| XF4 | XM4 | $^1/_4$" Ultra High Pressure |
| XF6 | XM6 | $^3/_8$" Ultra High Pressure |
| NFA | NMA | $^1/_8$" NPT Pipe |
| NFB | NMB | $^1/_4$" NPT Pipe |
| NFC | NMC | $^3/_8$" NPT Pipe |
| NFD | NMD | $^1/_2$" NPT Pipe |
| NFF | NMF | $^3/_4$" NPT Pipe |
| NFH | NMH | 1" NPT Pipe |
| — | HA9 | $^9/_{16}$" Hose |
| — | HA12 | $^3/_4$" Hose |
| — | HA16 | 1" Hose |
| — | HA21 | $1^5/_{16}$" Hose |

### Options

**-V** = Micro Control Metering Assembly (See page 6.5)
**-HT** = High Temperature Stem Extension (Up to 1,000° F) (See page 6.4)
**-SGS** = Sour Gas ($H_2S$) Service
**-N/O** = Normally Open
**-N/C** = Normally Closed
**-K** = With Antivibration Collars and Glands
**-REG** = Regulating Tip
**-TSR8** = Ball Valve Actuator
**-TDA8** = Ball Valve Actuator Double Acting
**-W/O** = Without Collars and Glands
**-LT** = Low Temperature Stem Extension (to -320°F)
**-MPO-NO** = Medium Duty Piston Operator Normally Open
**-MPO-NC** = Medium Duty Piston Operator Normally Closed
**-HPO-NO** = Heavy Duty Piston Operator Normally Open
**-HPO-NC** = Heavy Duty Piston Operator Normally Closed
**-EHPO-NO** = Extra Heavy Piston Operator Normally Open
**-EHPO-NC** = Extra Heavy Piston Operator Normally Closed

## How to Order Valves and Fittings

**Simply indicate catalog number and specify option or special requirement.**

**Examples:**

**30-11HF4** = 30,000 psi Straight Valve for $^1/_4$" O.D. tubing
**60-23HF4** = 60,000 psi Tee for $^1/_4$" O.D. tubing
**15-21AF2** = 15,000 psi Straight Coupling for $^1/_8$" O.D. tubing, Taper Seal connections
**15-21AF2NMB** = 15,000 psi Adapter with one end $^1/_8$" O.D. Female Taper Seal and opposite end Male $^1/_4$" NPT Pipe
**30-11HF6-HT** = 30,000 psi Straight Valve for $^3/_8$" O.D. tubing with High Temperature Extension
**"HIPCO" 10-12NFB (N/C)** = 10,000 psi Angle Valve for $^1/_4$" NPT Pipe with "Hipco" Air Operator, Normally Closed
**"HIPPO" 15-11A4F (N/C)** = 10,000 psi Angle Valve for $^1/_4$" Taper Seal with "Hippo" Piston Operator, Normally Closed
**60-21HF4 (Hastelloy C-276)** = 60,000 psi Straight Coupling for $^1/_4$" O.D. tubing, made from Hastelloy C-276 material

## *Warranty*

*High Pressure Equipment Company warrants the products which it manufactures to be free from defects in material and workmanship which would impair their intended usefulness. This warranty is for a period of one year after the date of shipment. Warranty is limited to the repair or replacement of any item manufactured by High Pressure Equipment Company. High Pressure Equipment Company shall not be liable for any direct or indirect consequential damage arising from a failure or malfunction of the equipment. This warranty further excludes damage, failure or malfunction which is caused by corrosion or erosion common to the material supplied.*

*Terms: Net 30 for qualified accounts*

*FOB: Erie, PA - USA*

# High Pressure Equipment

## Tooling

To ensure safe and leak-free operation of your pressure system, High Pressure Equipment Company provides complete installation instructions for the make-up of a coned and threaded connection. In addition to outlining the correct procedures, we offer coning and threading tools and female tubing connection tools.

### Index

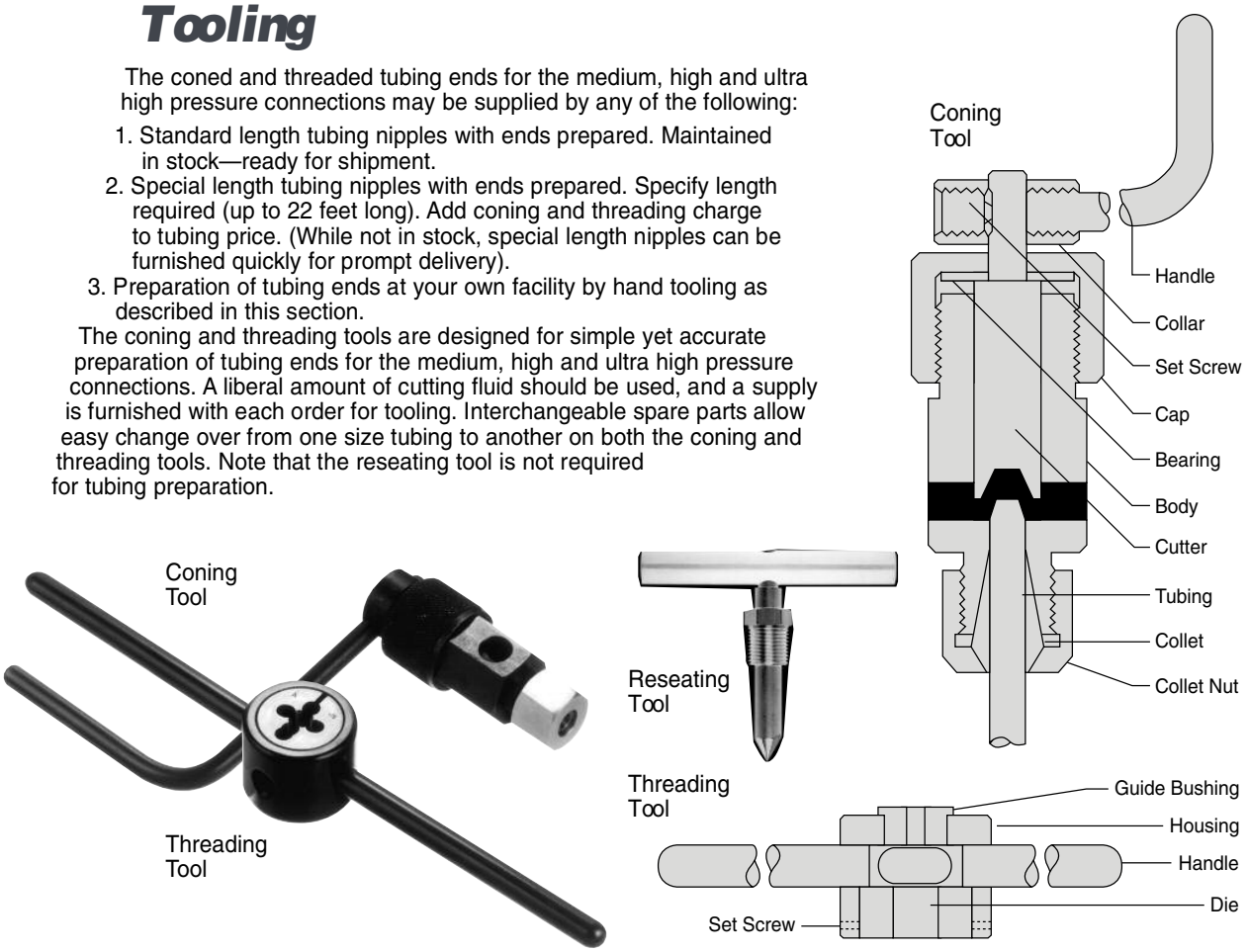
# High Pressure Equipment

## Tooling

The coned and threaded tubing ends for the medium, high and ultra high pressure connections may be supplied by any of the following:

1. Standard length tubing nipples with ends prepared. Maintained in stock—ready for shipment.
2. Special length tubing nipples with ends prepared. Specify length required (up to 22 feet long). Add coning and threading charge to tubing price. (While not in stock, special length nipples can be furnished quickly for prompt delivery).
3. Preparation of tubing ends at your own facility by hand tooling as described in this section.

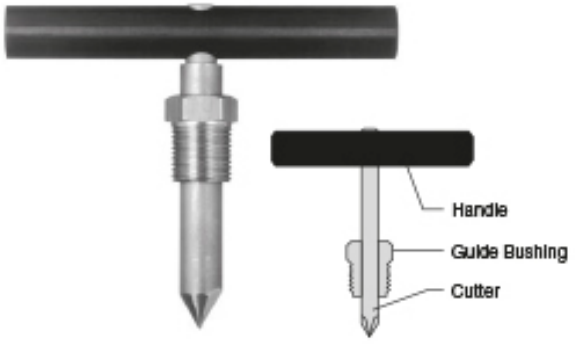
The coning and threading tools are designed for simple yet accurate preparation of tubing ends for the medium, high and ultra high pressure connections. A liberal amount of cutting fluid should be used, and a supply is furnished with each order for tooling. Interchangeable spare parts allow easy change over from one size tubing to another on both the coning and threading tools. Note that the reseating tool is not required for tubing preparation.




## Reseating Tools

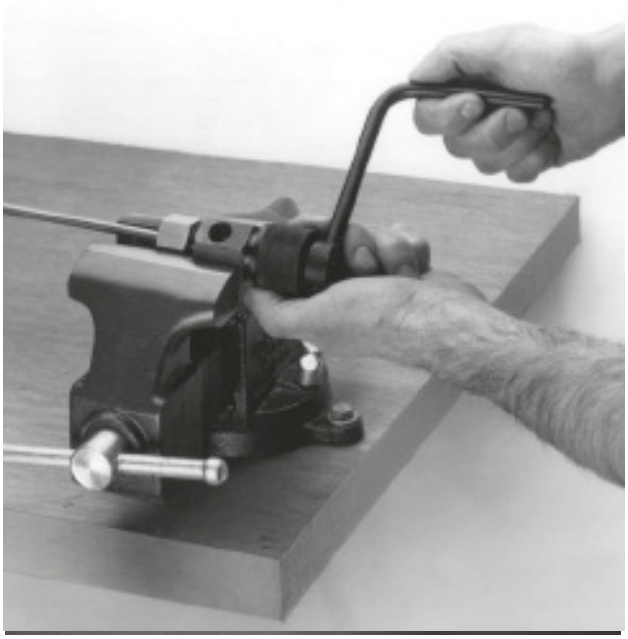
The reseating tools are available for repairing old or damaged tubing connection seats in valves or fittings. This tool is not required for tubing preparation.

| Catalog No. | For Tubing Connection |
|---|---|
| RTLF4L | F4 |
| RTLF6 | LF6 |
| RTLF9L | F9 |
| RTHF2H | F2 |
| RTHF4H | F4 |
| RTHF6 | HF6 |
| RTHF9H | F9 |
| RTXF4X | F4 |
| RTXF6 | XF6 |



# Coning Tools

The coning tool is designed for preparing a “cone” on the ends of Medium, High and Ultra High Pressure tubing. Included angle of the cone is approximately 57 to 59 degrees. The cutter and collet are interchangeable on all of the assemblies (except 2-HF9 and 2-LF9) to permit changing from one size tubing to another.

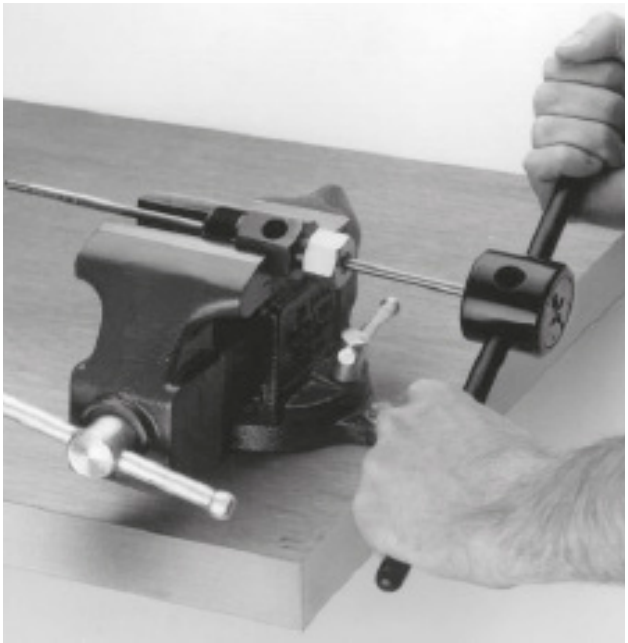


| Catalog No. | Tubing Size | Spare Cutter | Spare Collet |
|---|---|---|---|
| 2-LF4 | (1/4" O.D. x .109" I.D. (20.000 psi) | 2-LF4L | 2-LF4P |
| 2-LF6 | (3/8" O.D. x .203 I.D. (20,000 psi) | 2-LF6L | 2-LF6P |
| 2-LF9 | (9/16" O.D. x .312 I.D. (20,000 psi) | 2-LF9L* | 2-LF9P |
| 2-HF2 | (1/8" O.D. x .020 I.D. (60,000 psi)<br>(1/8" O.D. x .040 I.D. (30,000 psi) | 2-HF2L | 2-HF2P |
| 2-HF4 | (1/4" O.D. x .083 I.D. (60,000 psi) | 2-HF4L | 2-HF4P |
| 2-HF6 | (3/8" O.D. x 1/8" I.D. (60,000 psi) | 2-HF6L | 2-HF6P |
| 2-HF9 | (9/16" O.D. x 3/16" I.D. x (60,000 psi) | 2-HF9L* | 2-HF9P |
| 2-XF4 | (1/4" O.D. x 1/16" I.D. (100,000 psi) | 2-XF4L | 2-XF4P |
| 2-XF6 | (3/8" O.D. x 1/16" I.D. (150,000 psi) | 2-XF6L | 2-XF6P |

* Not interchangeable

# Threading Tools

The threading tool is designed for preparing a left-hand thread onto Medium, High and Ultra High Pressure tubing ends. The threaded die and guide bushings are interchangeable on all of the assemblies (except 2-MHF2) to permit changing from one size tubing to another.



| Catalog No. | Tubing Size | Spare Threading DieG | Spare uide Bushing |
|---|---|---|---|
| 2-MLF4 | 1/4" O.D. | 1/4"- 28LH | 2-MLF4P |
| 2-MLF6 | 3/8" O.D. | 3/8"- 24LH | 2-MLF6P |
| 2-MLF9 | 9/16" O.D. | 9/16"- 18LH | 2-MLF9P |
| 2-MHF2 | 1/8" O.D. | 1/8"- 40LH* | 2-MHF2P* |
| 2-MHF4 | 1/4" O.D. | 1/4"- 28LH | 2-MHF4P |
| 2-MHF6 | 3/8" O.D. | 3/8"- 24LH | 2-MHF6P |
| 2-MHF9 | 9/16" O.D. | 9/16"- 18LH | 2-MHF9P |
| 2-MXF4 | 1/4" O.D. | 1/4"- 28LH | 2-MXF4P |
| 2-MXF6 | 3/8" O.D. | 3/8"- 24LH | 2-MXF6P |

* Not interchangeable

# High Pressure Equipment

# Coning and Threading Instructions

## Coning Tubing Ends

The coning tool is designed for preparing a "cone" having an included angle of approximately 57 to 59 degrees on the ends of tubing. Operation is as follows:

1. Secure coning tool body in suitable vise. You may wish to angle the tool in the vise in order to facilitate access to the collet nut and knurled cap.
2. Cut off tubing to desired length and deburr ends.
3. Rotate knurled cap clockwise into tool as far as it will go.
4. "Back off" knurled cap by rotating counterclockwise a number of complete rotations as indicated in the chart below. (A mark on the knurled cap may be useful).

| Tubing Size | "Back Off Turns" |
|---|---|
| 1/8" O.D. | 3 turns |
| 1/4" O.D. | 4 1/2 turns |
| 3/8" O.D. | 4 1/2 turns |
| 9/16" O.D. | 8 turns |

5. Insert tubing thru collet nut and collet until tubing stops up against inside cutter.
6. Tighten collet nut to secure tubing into position.
7. Turn knurled cap counterclockwise to remove cap and cutter from tool.
8. Apply a very liberal amount of "Sulflo" (sulphur based cutting compound) to the end of the cutter.
9. Screw cap and cutter back into the body until the cutter contacts the end of the tubing.
10. Rotate handle of cutting tool clockwise fairly rapidly with one hand while slowly rotating the knurled cap clockwise with the other hand in order to continuously feed the cutter into the tubing. Do not overly force the cutter against the tubing as it will bind. (You will quickly develop the proper feel). You will need to rotate the knurled cap a complete number of turns as per the chart below in order to complete the cone on the end of the tubing.

| Tubing Size | "Back Off Turns" |
|---|---|
| 1/8" O.D. | 2 1/2 turns |
| 1/4" O.D. | 3 1/2 turns |
| 3/8" O.D. | 4 turns |
| 9/16" O.D. | 7 1/2 turns |

11. After coning the tubing end, loosen the collet nut and remove tubing from the tool. Remove the knurled cap and cutter from the tool in order to clean off the Sulflo compound and steel chips in preparation for the next tube.

**NOTES:**

A. Steps 3 and 4 (on left) are primarily a help in properly positioning the tubing in the tool. As you gain experience with the tool, you will be able to judge the proper position by sight in order to eliminate these steps.

B. The 1/4" O.D. and 3/8" O.D. tubing sizes are relatively easy to cone. The 1/8" O.D. size is "delicate" (be especially careful not to force the cutter). The 9/16" O.D. size requires the most amount of firmness in the cutting.

C. As with other tools, it is not uncommon for a collet to "stick" even after the collet nut has been released. Should this occur, simply tap the side of the collet nut firmly with the wrench to release the collet.

## Threading the Tubing

The threading tool is designed to put a left hand thread onto the end of the tubing. Operation is as follows:

1. The coning tool (with the knurled cap and cutter removed) provides an ideal way to hold the tubing for the threading operation (see photo).
2. After securing the tubing, apply a liberal amount of Sulflo to the end of the tubing.
3. Place the threading tool (guide bushing side first) onto the tubing.
4. Place the palm of your hand firmly against the center of the threading tool and rotate your wrist counterclockwise. This will help "start" the die onto the tube. After you feel the die start onto the tubing, continue to rotate the threading tool using the handles.
5. Remove the threading tool and clean off Sulflo and chips.

**NOTE:**

The tubing collar should easily screw onto the tubing. If it feels too tight or loose, the die should be adjusted accordingly. Simply remove the die from the holder by loosening the outer set screw. The small adjustment screw located on the side of the die can be turned to precisely set the die.

# PETROMETALIC

**Siège social**
32 rue de l'Ermitage
78000 VERSAILLES
Tel : +33 1 39 23 96 70
Fax : +33 1 39 23 96 71

**Petrometalic Cambrai**
Rue des Ecluses de Selles
BP 287
59400 Cambrai Cedex
Tél : +33 3 27 72 06 60
Fax : +33 3 27 72 06 61

www.petrometalic.com

negoceversailles@petrometalic.com
negocecambrai@petrometalic.com