

HYDRAULIC HOSE & FITTINGS

PRODUCT & TECHNICAL GUIDE

Hose types · collars and ferrules · thread identification · part numbers · hose assembly



OVERVIEW

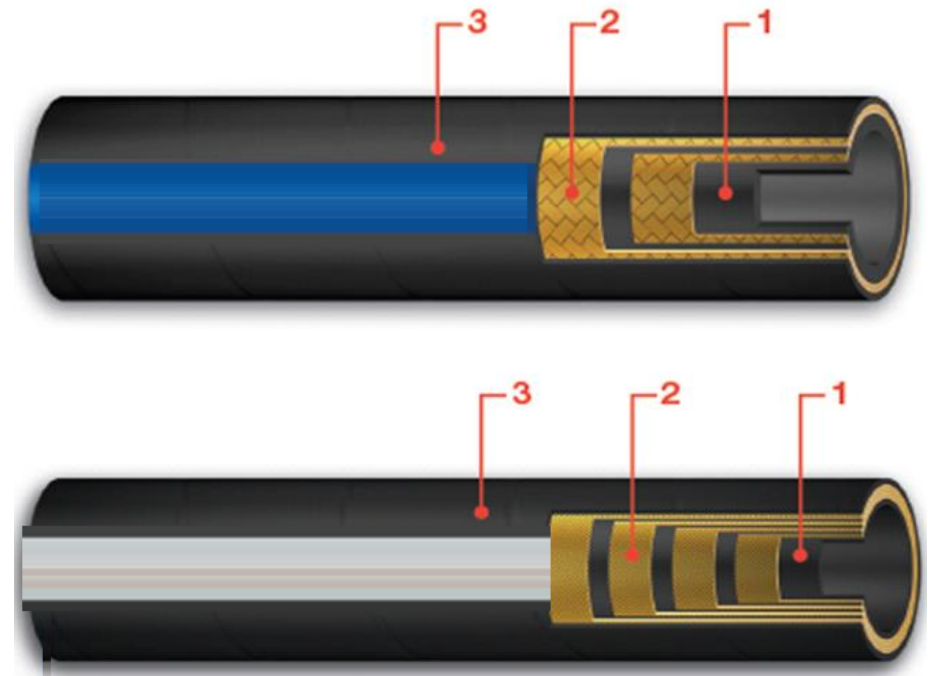
WHAT THIS GUIDE COVERS



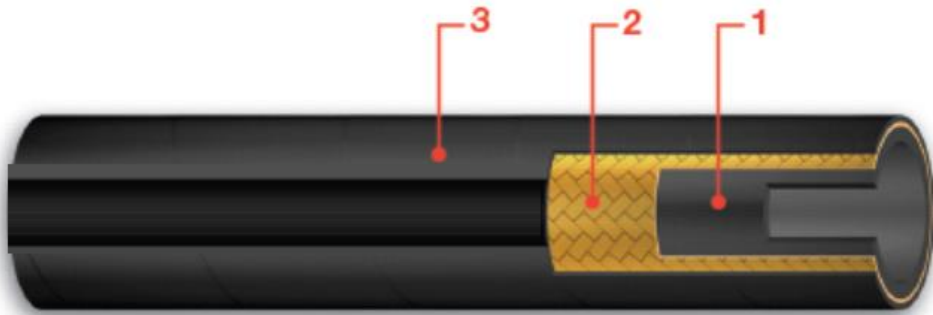
- Different Hoses
- Collars / Ferrules
- Thread Identification
- Understanding the Part Number
- Hose Assemblies

TYPES OF HYDRAULIC HOSES

- Braided Hydraulic Hose
- Spiral Hydraulic Hose
- R7 and R8 Orange Hose
- High Pressure Hose (10 000 PSI / 700 bar)
- Convoluted and Smooth Bore Teflon Hose

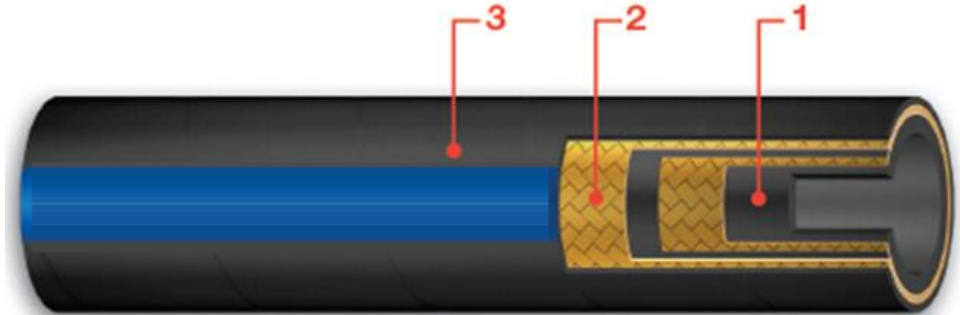


BRAIDED HOSE CONSTRUCTION



1 WIRE HOSE CONSTRUCTION

1. Synthetic rubber tube
2. One high tensile steel wire braid
3. Synthetic rubber cover (MSHA approved)

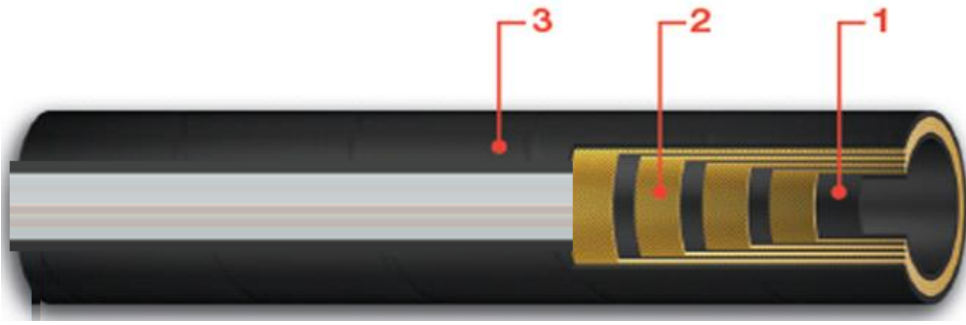


2 WIRE HOSE CONSTRUCTION

1. Synthetic rubber tube
2. Two high tensile steel wire braids
3. Synthetic rubber cover (MSHA approved)

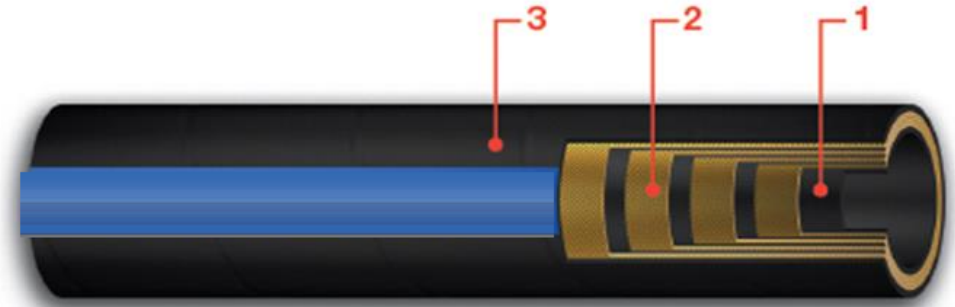
APPLICATION: standard hydraulic systems that do not operate at high pressures.

MULTI-SPIRAL HOSE CONSTRUCTION



4SP HOSE CONSTRUCTION

1. Synthetic rubber tube
2. Four high tensile steel wire spirals
3. Synthetic rubber cover (MSHA approved)



4SH HOSE CONSTRUCTION

1. Synthetic rubber tube
2. Four high tensile steel wire spirals
3. Synthetic rubber cover (MSHA approved)

APPLICATION: high pressure hydraulic systems with extreme high pressure peaks.

The lay line gives all the specs and information of the hose in question, such as:

1. Manufacturer's name
2. Date of manufacturing – indicated by quarter, plus year, e.g. 3Q08
3. Working pressure – indicated in PSI, BAR or MPa
4. Technical specs – SAE or DIN spec
5. Batch number – allows for traceability
6. MSHA (Mine Safety and Health Administration) approved
7. Lay lines also give a good visual indication of any twist on an installed hose

SAE SPECIFICATIONS

- SAE100R1A & SAE100R1AT
- SAE100R2A & SAE100R2AT
- SAE100R12 & SAE100R13

All the above are typical SAE spec.

SAE hose is typically American spec, e.g. Parker.

DIN SPECIFICATIONS

- 1SN & 1ST
- 2SN & 2ST
- 4SP & 4SH

All the above are typical DIN spec.

DIN hose is typically European spec.

ADVANTAGES

1. Small ID/OD ratio = space saving
2. 1/3 lighter than the equivalent sized rubber hose
3. Hose is non conductive
4. UV resistant
5. Available in different colours (orange & black)
– assists in traceability
6. Many thermoplastic hoses come standard with a pin pricked cover – ideal for gas applications

DISADVANTAGES

1. Specific collars and lower pressure rating compared to equivalent sized rubber hose

1. R7-04, -06 & -08 specifically for forklift and furnace applications
2. Twin hose available in a 1 cord nylon version for the above mentioned sizes

APPLICATIONS: material handling equipment and general hydraulics requiring non conductive hose.

1. PH351-04 is specifically designed for Enerpac, Powerteam and Simplex jacking equipment
2. 700 BAR / 10 000 psi working pressure with a burst pressure of 40 000 psi – safety factor of 4:1
3. 3506 – fittings and collars are essential for these hose assemblies
4. Spring guards and screw type quick couplers are also available

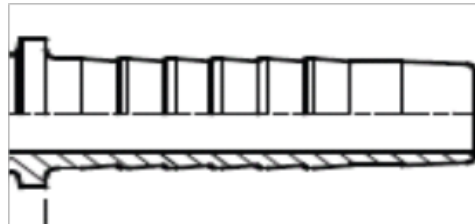
1. Two types of PTFE hose are available – **PTFESW1004-16** (smooth bore) & **AFX8006-16** (convoluted bore)
2. Can handle temperatures of up to 260 °C for smooth bore, and 200 °C for convoluted bore
3. Is able to withstand most aggressive chemicals
4. Convoluted bore is used where flexibility is critical

APPLICATIONS

- Compressors
- Heat applications
- Steam
- Chemical lines
- Food industry
- Paper industry
- Gas applications

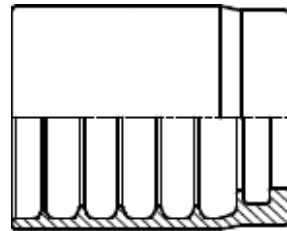
COLLARS / FERRULES

D22, D56 & D77



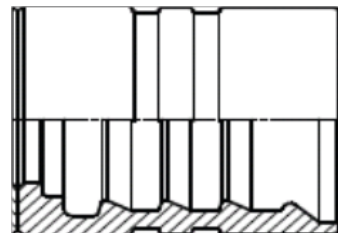
B – Insert

Sizes: 04 – 32



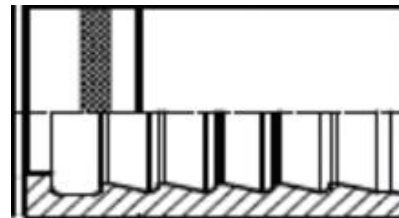
D220000

Non-skive – R1AT/1SN: 04–32 ·
R2AT/2SN: 04–32



D560000

Ext. skive – 4SP: 04–16 · 4SH: 12–16 ·
4ST: 08–16 · R12: 06–32 · R2A/2ST: 04–
16

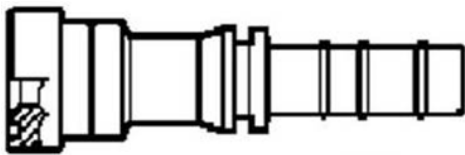


D770000

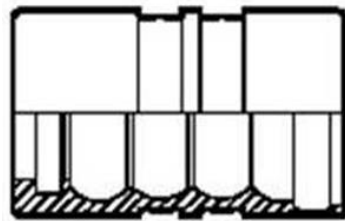
Non-skive – R7: 04–16

COLLARS / FERRULES

D19 & D660022

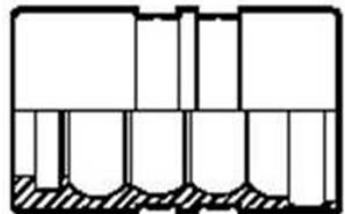


P – Insert
Sizes: 12 – 32



D190000

Ext. skive – 4SH: 12–32



D660022

Ext. skive – R13: 20–32 · R15: 20–32

DASH SIZES

These dash sizes apply to hose IDs, BSP, NPT & ORFS thread sizes & flanges.

Dash	Sixteenths	Inches
-02	2/16	1/8"
-04	4/16	1/4"
-06	6/16	3/8"
-08	8/16	1/2"
-10	10/16	5/8"
-12	12/16	3/4"
-16	16/16	1"
-20	20/16	1¼"
-24	24/16	1½"
-32	32/16	2"

- BSP
- JIC
- Metric
- NPT
- ORFS
- SAE Flange

TYPES OF BSP FITTINGS

1. BSP Female
2. BSP Female Flat Face
3. BSP Male Parallel
4. BSP Male Taper

BSP stands for British Standard Pipe. BSPP is the parallel thread, BSPT the tapered thread.

TYPES OF JIC FITTINGS

1. JIC Female

2. JIC Male

- JIC stands for Joint Industries Council.
- JIC is an American thread.

TYPES OF METRIC FITTINGS

1. Metric Male

2. Metric Female

- Metric is a German thread.
- Metric is a finer thread, therefore it is able to withstand higher pressures.
- Metric has an L series and an S series (L = Low pressure, S = High pressure).

TYPES OF NPT FITTINGS

1. NPT Male Fixed

- NPT stands for National Pipe Taper.
- NPT is also an American thread, sometimes called a Pipe Thread.

TYPES OF ORFS FITTINGS

1. ORFS Male

2. ORFS Female

- ORFS stands for O-ring Face Seal (the O-ring is on the male).
- ORFS is also an American thread.

TYPES OF SAE FLANGE FITTINGS

1. 3000 psi = Code 61
2. 6000 psi = Code 62
3. 9000 psi = Super CAT

SAE Flange is also American. SAE stands for Society of Automotive Engineers.

BREAKDOWN OF PART NUMBERS

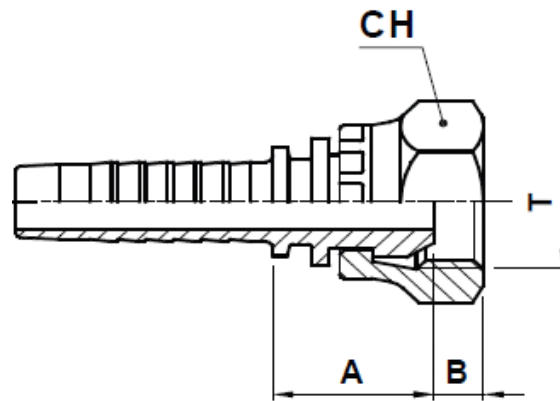
BSP BREAKDOWN



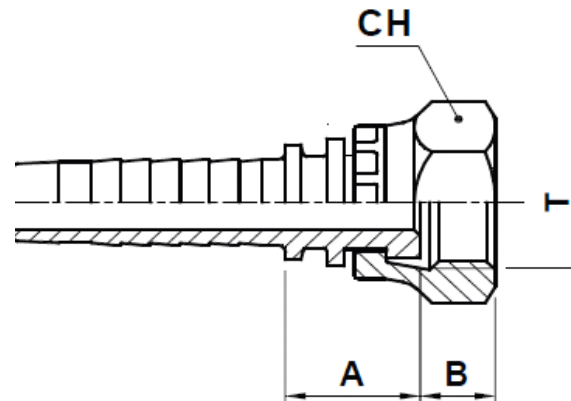
BSPF	BSP Female
BSPFF	BSP Flat Face
BSPPM	BSP Parallel Male
BSPTM	BSP Taper Male
BSPFCF90	BSP Compact Female 90°

- If you have a fitting with a 45° or 90° angle, your part number will look as follows: **BSPF450404** or **BSPF900404**
- If you have a straight fitting, simply remove the 45 or 90.

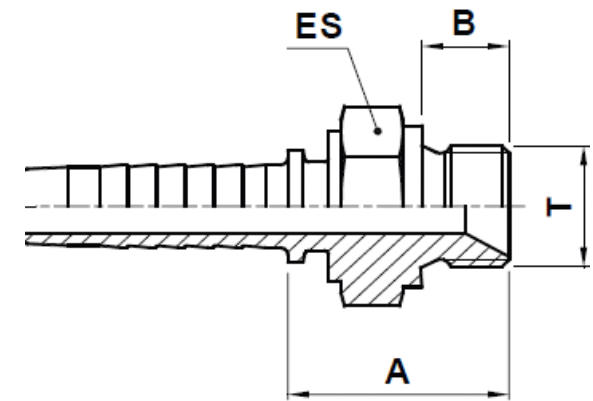
DIFFERENT TYPES OF BSP HOSE FITTINGS



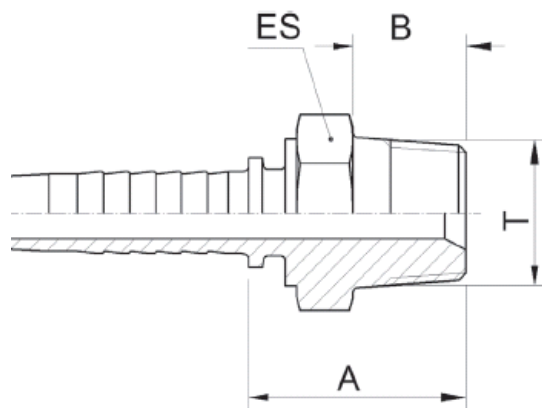
BSPF



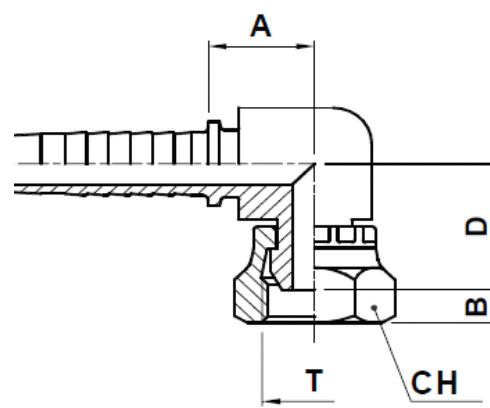
BSPFF



BSPPM



BSPTM



BSPCF90

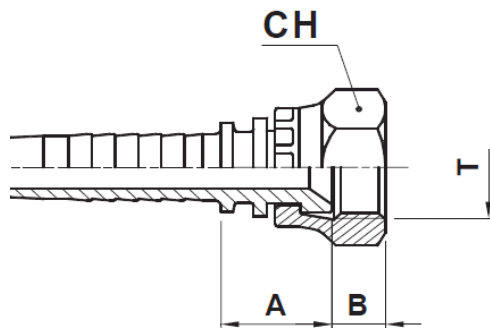
DIFFERENT TYPES OF JIC HOSE FITTINGS

JICF JIC Female

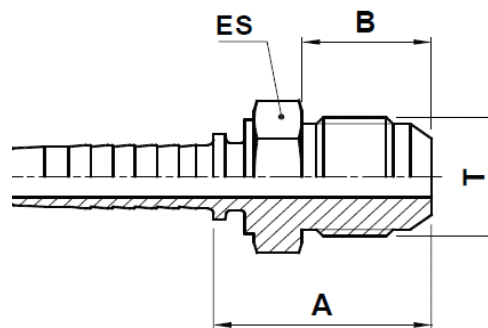
JICM JIC Male

JICF900808LONG JIC Female Long Drop

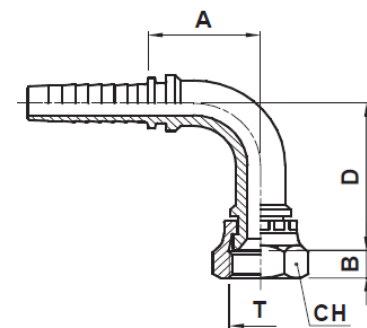
- If you have a 45° or 90° fitting, your part number will look as follows: **JICF450808** or **JICF900808**
- If you have a straight hosetail, simply remove the 45 or 90.



JICF



JICM



JICF900404LONG

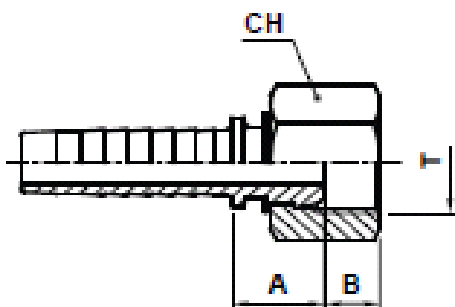
DIFFERENT TYPES OF METRIC HOSE FITTINGS

METF Straight Metric Female

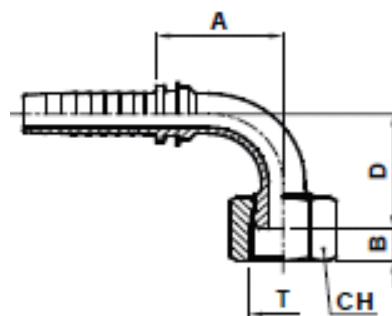
METM Metric Male

METSP Metric Stand Pipe

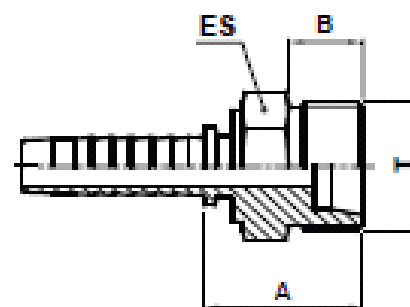
- If you have a 45° or 90° hosetail, your part number will look as follows: **METF4512L06** or **METF9012L06**
- For a straight hosetail, simply remove the 45 or 90 from the part number.



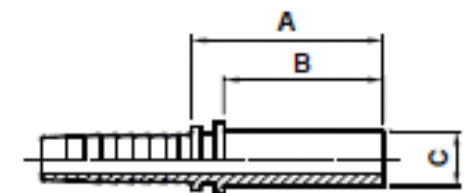
METF



METF90



METM

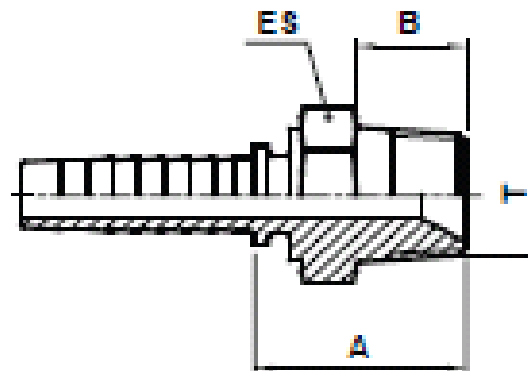


METSP

TYPES OF NPT HOSE FITTINGS

NPTM NPT Male

- Available as NPT male hosetails only.
- 45° and 90° NPT hosetails are not stocked.

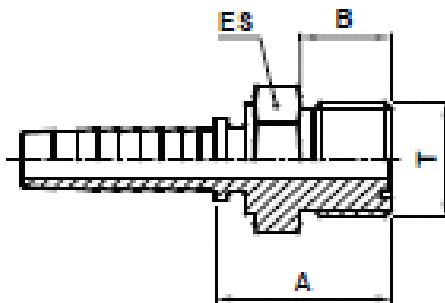


NPTM

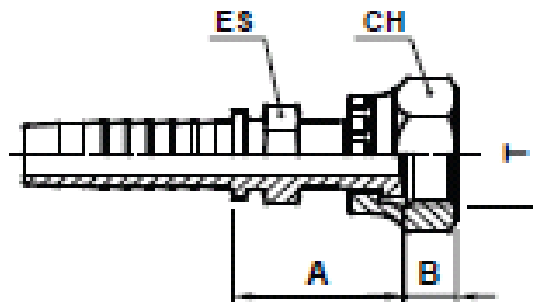
DIFFERENT TYPES OF ORFS HOSE FITTINGS

ORFSF	ORFS Female
ORFSM	ORFS Male
ORFSF90LONG	ORFS Long Drop

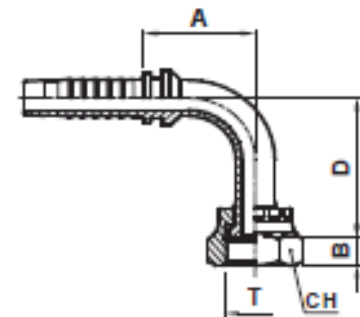
- Typically used in the agriculture industry.
- Used on John Deere tractors and some European earth moving machines.



ORFSF



ORFSM



ORFSF900404LONG

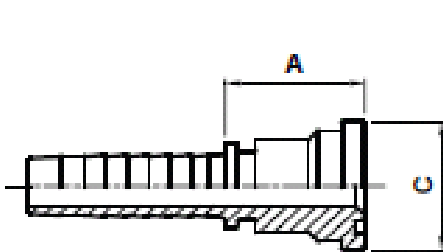
TYPES OF SAE FLANGE HOSE FITTINGS

FL3 3000 psi

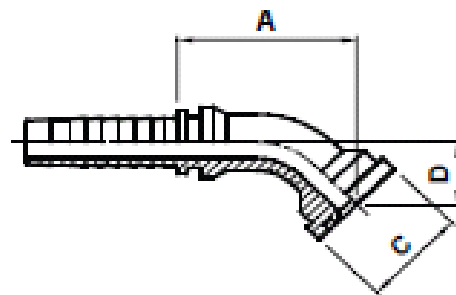
FL6 6000 psi

AY1CP 9000 psi

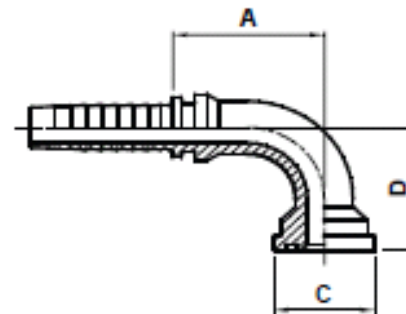
- For a 45° or 90° hosetail, your part number will look as follows: **FL3450404** or **FL6900404**
- For a 45° or 90° Super CAT, simply replace the 1 in the part number with either a 4 or a 9 (4 = 45°, 9 = 90°).



FL3 / FL6



FL345 / FL645



FL390 / FL690



AY1CP

HOSE ASSEMBLIES

1. SELECTING THE CORRECT HOSE

- Check the lay line for hose information/specs
- Ask questions – working pressure; type of fluid/medium being used in the system; operating and ambient temperature

2. CUTTING

- Ensure length is correct – use a tape measure
- Always ensure that you cut the hose as square as possible
- Always be sure of cut length (CT) or overall length (OAL)
- Cut length = collar to collar
- Overall length = total length of hose including the fittings

3. SKIVING

- Always refer to the swage chart for skive lengths, i.e. external or internal (if applicable)
- Never damage the reinforcement, i.e. braiding or spiraling
- Not more than 1 mm tolerance on skive length allowed
- Correct skive lengths provide a weather seal

4. ASSEMBLING

- Select the correct series fitting and collar for the selected hose. Refer to the swaging chart if you are not sure
- Ensure that the collar fits squarely onto the hose, then push the insert/fitting all the way into the hose. Ensure that the insert's shoulder fits into the collar's recess. Do not use excessive force. Use some lubricant if necessary. **Do NOT use any oil if the assembly is to be used in a gas application.**
- Make sure of the offset between two angle fittings before you crimp the assembly

5. SWAGING / CRIMPING

- Select the correct dies for the job
- Refer to the swage chart for correct swage dimensions
- Rather “under swage” and adjust down
- Use a vernier or go/no-go mandrel to ensure correct swage dimensions
- Measure opposite die tracks – NOT across crimping folds
- Ensure that the hose assembly is cleaned and plugged

6. PACKAGING

- Always make sure that the assembly is blown clean on the inside
- Hose assembly ends should always be plugged or packed in a plastic sheath to avoid contamination

Age	Recommendations
Up to 3 years	Use without further testing
3 – 5 years	Use only after testing EACH assembly to a pressure test of 1.5 times the designed working pressure, and representative samples to burst pressure
5 – 8 years	Test up to PROOF pressure, i.e. 2 times the designed working pressure. Subject representative samples to a burst test
Over 8 years	SCRAP

WARRANTY: warranty on hoses is dependent on correct application, correct crimping, site conditions and age of hoses.

FACTORS AFFECTING HOSE LIFE SPAN



1. Rated working pressure
2. Pressure surges – spikes and valleys, also known as impulses
3. Minimum burst pressure
4. Temperature range
5. Environment
6. Medium compatibility
7. Minimum bend radius/routing
8. Correct fittings for angles used
9. Length of hose – IMPORTANT
10. Storage

INSTALLATION OF A HOSE ASSEMBLY



1. Ensure that the hose is cleaned before installation
2. Handle with care – do not drag over sharp and abrasive surfaces. Do not kink or flatten the hose. Do not drive over the hose
3. Upon installation, remove dust caps from the hose ends
4. Ensure that jointing surfaces are all free from foreign matter – dirt causes leakage
5. Ensure correct routing to prevent shaving of the outer cover & mechanical damage
6. Hand tighten union nuts at both ends
7. Do not twist the lay line of the hose – even on final tightening
8. Never use long handled spanners, excessive force or any other method of applying force



TALK TO HYDRAULIC SQUAD

Need a hose, fittings or a hose assembly? Tell us the working pressure, the fluid and the temperature, and we'll help you choose the right one.

Telephone +27 87 822 1376

Email sales@hydraulicsquad.co.za

Web www.hydraulicsquad.co.za

Address Unit 2B, 22 Mulder Street, Bronkhorstspuit,
1020, Gauteng