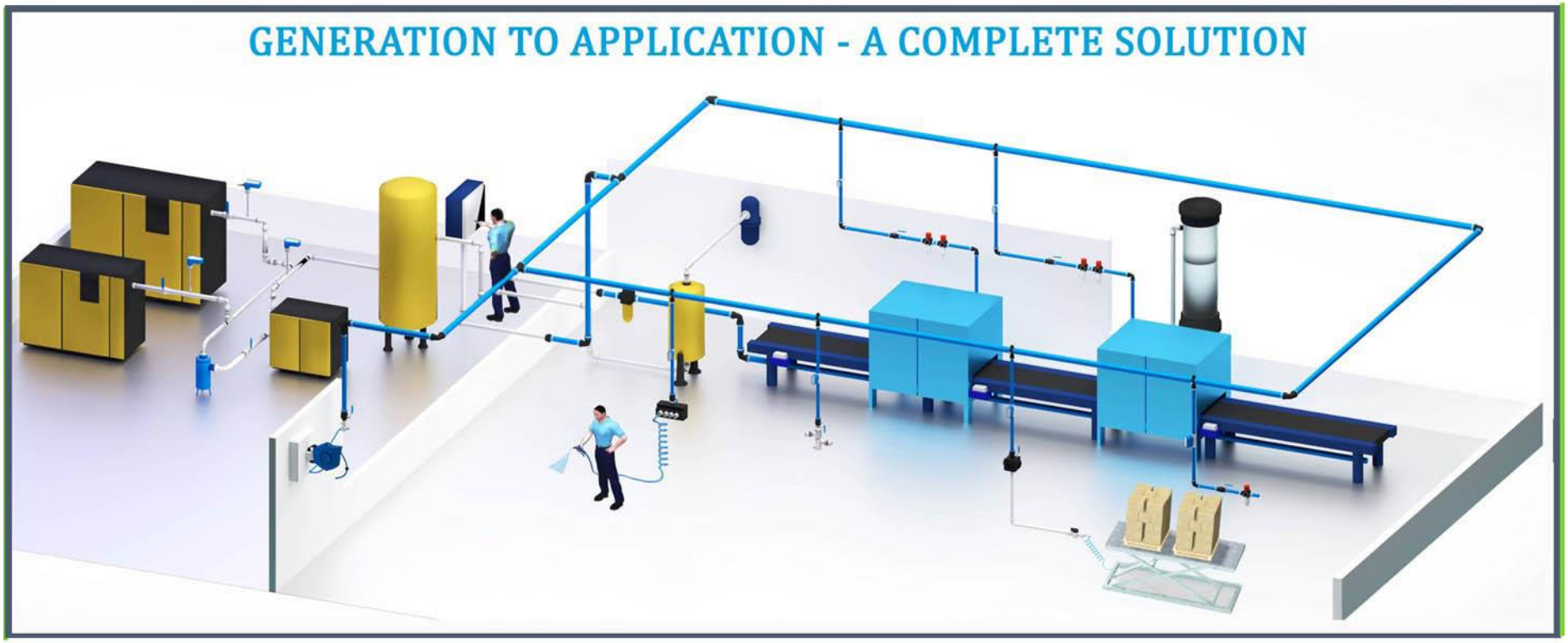
PNEUMSYS
ADVANCE ENERGY SOLUTIONS



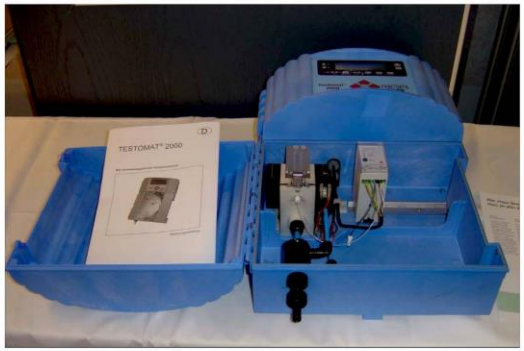
WELD FREE PIPING SYSTEM

PNEUMSYS
ADVANCE ENERGY SOLUTIONS

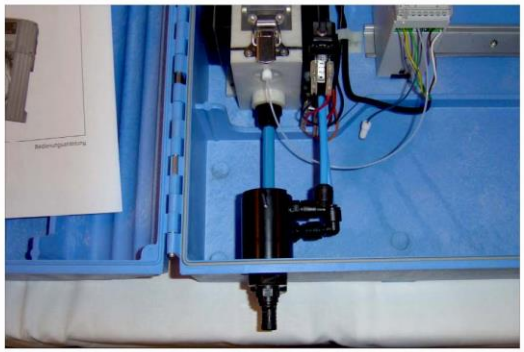
- **PNEUMSYS ADVANCE ENERGY SOLUTIONS (PAES)** is a 40 years experience turnkey project execution company with our activities encompassing complete applications from Air Piping, Flow Meters and Pneumatics accessories. Owing to our extensive experience in having executed 2000+ projects in the Indian Industry, Middle East & Asian region, PAES has gathered extensive experience & expertise in providing the best quality products and services.

- We deals in Aluminium Push-fit piping system (EQO Fluids), SS Crimping piping system (Pegler's), Flowmeters (VP flowmeter & ATD)and other pneumatics accessories (JG , CEJN)

Laboratory Equipment



Water Analysis Equipment



ALUMINIUM PUSH-IN PIPING SYSTEMS

- ✓ Aluminum piping for compressed air uses Push Fit technology
- ✓ Takes less time and no special tools required.
- ✓ Used for pressures up to 70 bar and the air system remains corrosion free and leakage free for years.
- ✓ Since welding is not required, it allows smooth flow of fluid inside the fluid. Can be re-open and again reassemble

Project Installations

TYPES OF DROPS IN ALUMINIUM PIPING

Clamp Saddle Branch
Assembling Instructions

Flexible bend Drop

Right Angle Drop

Straight Drop

TYPES OF SUPPORTS

Metal Support Bracket

Girder Clamp

Suspended Support

Tie Rod

FLOW CALCULATOR

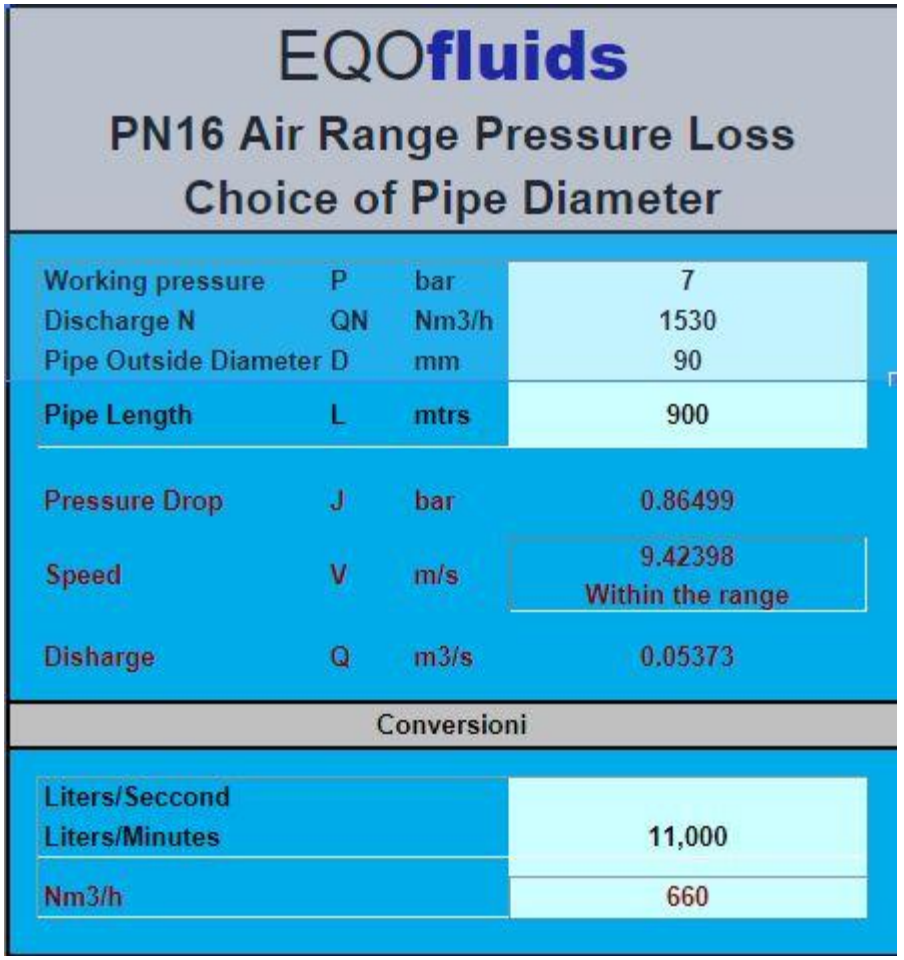
❖ Flow Calculator is used to determine the pipe size, pressure drop, Speed , discharge etc

Inputs are :-

- ✓ Working Pressure
- ✓ Discharge
- ✓ Pipe Diameter
- ✓ and Pipe Length.

Outputs are:-

- ✓ Pressure Drop
- ✓ Speed
- ✓ Discharge



EQOFLUIDS PNEUMSYS PIPE DETAILS

	EXTRUSION PIPE CHART		
SIZES OD	ID	THICKNESS	Wt./ mtr
20mm OD	17.6mm	1.2mm	0.191 Kg
25mm OD	22.4mm	1.3mm	0.261 Kg
32mm OD	29.4mm	1.3mm	0.338 Kg
40mm OD	36.8mm	1.6mm	0.521 Kg
50mm OD	46.8mm	1.6mm	0.656 Kg
63mm OD	59mm	2mm	1.03 Kg
90mm OD	84mm	03mm	2.21 Kg
110mm OD	104mm	3mm	2.72 Kg
160mm OD	151.4mm	4.3mm	5.67 Kg

INFORMATION & BENEFITS OF ALUMINIUM PIPING

- ✓ COMPLETELY ALUMINIUM PIPE & FITTINGS.
- ✓ 2 RANGES LOW PRESSURE 16 BAR & HIGH PRESSURE 70 BAR
- ✓ SIZES FROM 20MM TO 250MM
- ✓ APPLICATION – LOW PRESSURE AIR, HIGH PRESSURE AIR, LOW PRESSURE NITROGEN, HIGH PRESSURE NITROGEN, VACUUM.
- ✓ 3 PIECE FITTING
- ✓ SS 304 SOLID MACHINED GRAB RING
- ✓ NITRILE O RING
- ✓ PIPE IS ALUMINIUM ALLOY 6061-T6
- ✓ NO SPECIAL TOOLS ARE REQUIRED.
- ✓ LISTE OF TOOLS REQUIRED (ONLY SPANNER, DRILL MACHINE, FILE, HOLE CUTTER. WHICH IS NORMAL AVAILABLE IN ALL THE INDUSTRIES. APART FORM THIS NO TOOLS ARE REQUIRED.

CLIENTS QUESTIONNARIES

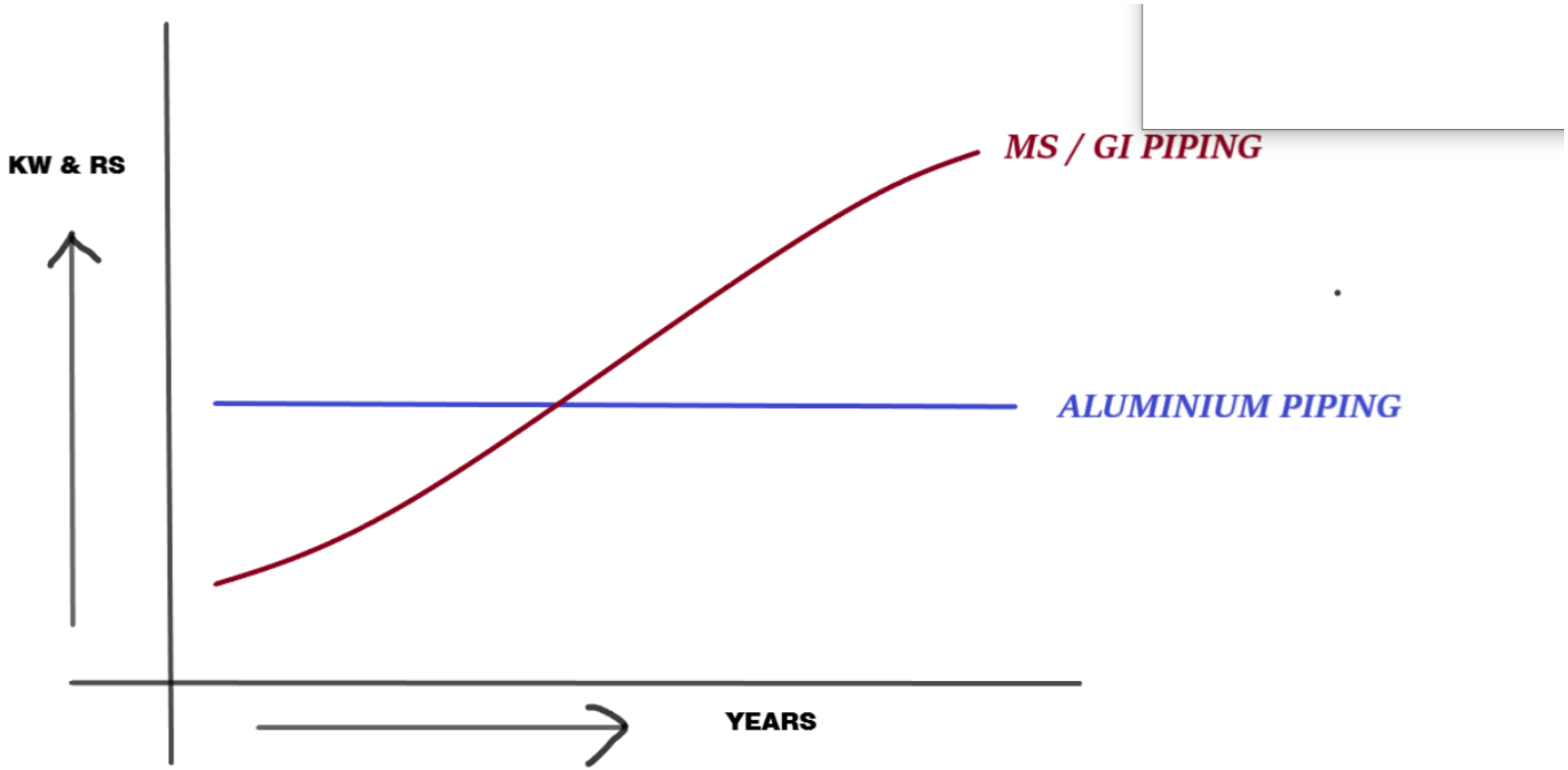
❑ Why should I go with Aluminium Piping?

- ✓ LEAKAGE FREE SYSTEM
- ✓ LESS AND EASY MAINTAINANCE
- ✓ CORROSION FREE SYSTEM
- ✓ LONG LIFE
- ✓ 10 YEARS WARRANTY
- ✓ FRICTIONAL LOSSES IS NEGLIGIBLE.
- ✓ AESTHETIC LOOK
- ✓ INSTALLATION TIME REDUCES

HOW COSTLY IS ALUMINIUM PIPING AS COMPARED WITH CONVENTIONAL MS / GI PIPING?

- ✓ INITIAL COST IS HIGHER 1.3 TO 1.5 TIMES AND SOME TIMES PROJECT VALUE IS SAME. ITS DEPEND UPON THE SIZE AND LAYOUT.
- ✓ AS PER MY KNOWLEGDE NO COMPANY WILL SHUT DOWN OR CLOSED THERE PLANT AFTER 3 TO 4 YEARS.
- ✓ CONSIDERING LONG PERIOD OF TIME ITS VERY CHEAP.
- ✓ CORROSION IN MS / GI PIPING STARTS AFTER 3 YEARS & IT GOES ON INCREASING EVERY YEAR AT 3% TO 7%
- ✓ SURFACE ROUGHNESS IN MS/GI PIPING IS 0.0015MM AND ALUMINIUM PIPING IS 0.0015 MICRON. THUS SURFACE ROUGHNESS OF ALUMINIUM IS 1000 TIMES LESS THAN MS/GI
- ✓ INTERNAL SURFACE AREA GETS REDUCED
- ✓ DUE TO CORRISSION AND RUSTING

GRAPH SHOWING THE ROI FOR MS&GI V/S ALUMINIUM PIPING



HOW TO DO THE SIZING OF ALUMINIUM PIPING AS COMPARED TO GI/MS PIPING

CASE STUDY @ 600 CFM @ 7 BAR CONSIDERING LENGTH OF 105 MTRS (This case we have considered in the offer along with internal piping offer):–

- USING 100 NB GI PIPE = **0.034 PRESSURE DROP**
- USING OD 90 MM & ID 84MM ALUMINIUM PIPING = **0.0534 PRESSURE DROP.**

Standard Working Condition				
1	Atmospheric Pressure	=	101300.00	N/m²
2	Air Density at atmospheric pressure and 20°C	=	1.29	kg/m3
3	Kinematic viscosity v	=	0.00001461	m2/s
4	Average Roughness k	=	0.0002300	m

Pressure Drop Calculation in Aluminium Pipe Input Condition			
1	Working Pressure	700000.00	N/m²
2	Discharge	600.00	Cfm
3	Discharge	0.2683	m3/s
4	Outside Diameter	0.9000	m
5	Inside Diameter	0.0840	m
6	Length of Pipe	105.00	m

Result			
1	Air density at working	8.935	kg/m3
2	Area of Pipe	0.0055	m2
3	Discharge	0.034	m3/s
4	Speed	6.12	m/s
5	Frictional Coefficient	0.0255	
6	**Pressure Drop**	**0.0534**	**Bar**

Standard Working Condition				
1	Atmospheric Pressure	=	101300	N/m²
2	Air Density at atmospheric pressure and 20°C	=	1.29	kg/m3
3	Kinematic viscosity v	=	0.00001461	m2/s
4	Average Roughness k	=	0.0015000	m

Pressure Drop Calculation in GI Pipe Input Condition			
1	Working Pressure	700000.00	N/m²
2	Discharge	600.00	Cfm
3	Discharge	0.2683	m3/s
4	Outside Diameter	0.1143	m
5	Inside Diameter	0.1023	m
6	Length of Pipe	105.00	m

Result			
1	Air density at working	8.935	kg/m3
2	Area of Pipe	0.008	m2
3	Discharge	0.034	m3/s
4	Speed	4.13	m/s
5	Frictional Coefficient	0.0433	
6	**Pressure Drop**	**0.034**	**Bar**

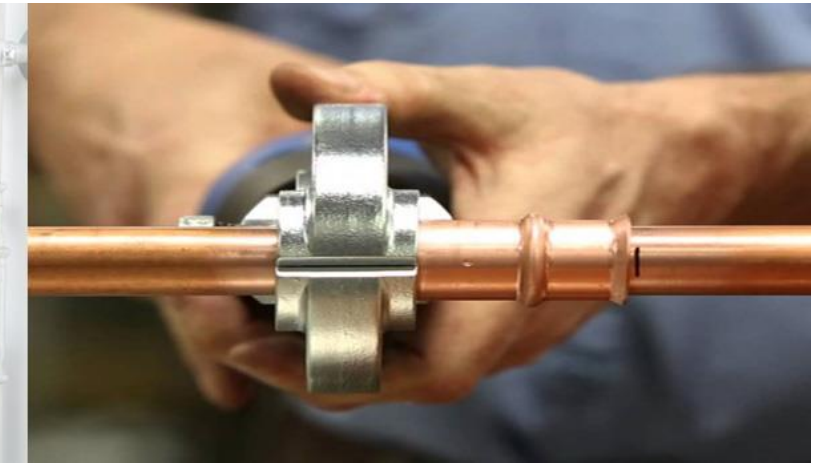
COMPARISON BETWEEN ALUMINIUM AND OTHER CONVENTIONAL PIPE

Aluminium Piping	GI & MS Piping
Light Weight and Modular. Hence Requires no heavy support and No skilled labors	Heavy and requires heavy supports. Also skilled labours (welders, fitters) are required.
Less Production down time as the system is modular (push to connect).	Production down time is more for additional work as there is a lot of welding work required.
The ID pipe is specially treated and hence does not react with water to form scaling and in turn gives laminar flow and no friction losses.	After a period of time the ID id pipe get corroded due to water and in turn gives turbulent flow which increase friction losses.
Leakage free for 10 years warranty.	The Joining of pipe is by welding. If not done properly will results in small leakages which will add to compressor working and maintenance

HOW COSTLY IS ALUMINIUM PIPING AS COMPARED WITH PLASTIC PIPING?

- ✓ PLASTIC PIPING IS CHEAPER AS COMPARED WITH ALUMINIUM PIPING.
- ✓ NO OTHER BENEFITS.
- ✓ PLASTIC PIPING REQUIRES FUSION WELDING
- ✓ DUE TO WHICH OBSTRACLE ARE CREATED IN THE INTERNAL SURFACE OF PIPING.
- ✓ THIS RESULTS IN PRESSURE DROP AS AIR STRIKES IN THE STEP CREATED BY FUSION WELDING
- ✓ PLASTIC PIPING IS BRITTLE AND IN HOT CLIMATIC CONDITION, CHANCES OF BURSTING, LEAKAGES MAY DEVELOPED
- ✓ PLASTICS PIPES HAVE CERTAIN DEFINATE LIFE
- ✓ HOGGING & SAGGING PROBLEM.
- ✓ PLASTIC PIPES ARE NOT RECOMMENDED FOR COMPRESSED AIR AS PER CAGI REPORTS
- ✓ ONLY SUITABLE FOR CHILLER PLANT PIPING AND OTHER WATER APPLICATION WHERE TEMPERATURE & PRESSURE IS VERY LOW.

PRESS-FIT PIPING SOLUTION



Press-Fit offers a comprehensive and flexible range for all modern building services, providing easy, fast, cost effective and reliable joints.

Advantages :-

- ✓ It offers all the benefits of a heat free, press-fit system, saving time and money with every joint.
- ✓ No complicated clamping techniques.

Safety:

- ✓ No naked flames Perfectly clean internal bore - less finishing or cleaning required.
- ✓ No carbon deposits, internal solder runs or flux residue hence reduced risk of corrosion.
- ✓ They are made of different materials such as

  > Stainless steel (SS 304)

  > Stainless steel (SS 316)

  > Copper

Advantages of The XPRESS Fittings are as below:-

- ✓ Major savings in installation time and cost compared with traditional jointing methods
- ✓ A completely heat-free joint system that requires no additional solders, adhesives, compounds, gas, hot works permits or costly insurance
- ✓ Clean, rapid, heat-free jointing
- ✓ No complicated clamping techniques
- ✓ No long preparation procedures or waiting for the adhesive to dry
- ✓ Safety: no naked flames Perfectly clean internal bore - less finishing or cleaning required
- ✓ No localized annealing from high-temperature working
- ✓ No carbon deposits, internal solder runs or flux residue hence reduced risk of corrosion
- ✓ The system does not need to be ‘dry’ for effective jointing

Xpress Fittings O-Ring Compatibility Chart

Xpress fittings use the same O Ring technology to provide the best and widest range of heat free jointing. It is important to check compatibility between the O Ring and the fluid and the fluid in the system. The table below is a guide for the Contractor, installer and Specifier, and shows the compatibility of three O Ring materials with common fluid types and some gases.

EPDM - Ethylene Propylene Diene Monomer - This is the standard, BLACK O Ring that is used in Xpress COPPER ranges. This material is also used for the Leak before Press O Rings used in Xpress CARBON and Xpress STAINLESS STEEL

HNBR - *Hydrogenated Nitrile Rubber* - This is the YELLOW O Ring that is only used in Xpress GAS

FPM - *Fluorocarbon Rubber* - This is the GREEN O Ring that is only used in Xpress Solar

Designation	Black EPDM Tectite/XPress	Yellow HNBR Gas	Green FPM Solar
Fluids Resistance			
Acid			
Acetic 10%	✓✓✓	✓	✓
Formic	✓✓✓	X	✓
Hydrochloric 20%	✓✓✓	✓	✓✓
Nitric 30%	✓✓✓	X	✓✓
Phosphoric 20%	✓✓✓	✓	✓✓✓
Sulphuric 30%	✓✓	X	✓✓
Alkalis			
Barium hydroxide	✓✓✓	✓✓	✓✓✓
Calcium hydroxide	✓✓✓	✓✓	✓✓✓
Sodium hydroxide	✓✓✓	✓✓	✓✓
Alcohols			
Butyl alcohol (Butanol)	✓✓	✓✓✓	✓✓✓
Ethyl alcohol (Ethanol)	✓✓✓	✓✓	✓
Methyl alcohol (Methanol)	✓✓✓	✓✓✓	X
Amines			
Ethylene diamine	✓✓✓	✓✓	X
Ammonia – cold gas	✓✓✓	✓✓✓	X
Ammonia – hot gas	✓✓	X	X
Chlorides			
Ammonium chloride	✓✓✓	✓✓✓	✓✓✓
Calcium chloride solution	✓✓✓	✓✓✓	✓✓✓
Magnesium chloride	✓✓✓	✓✓✓	✓✓✓
Zinc chloride	✓✓✓	✓✓✓	✓✓✓
Gases			
Butane	X	✓✓✓	✓✓✓
Carbon dioxide (dry)	✓✓	✓✓✓	✓✓✓
Chloride (wet)	✓	X	✓✓✓
Freon 12	✓✓	✓✓✓	✓✓
Freon 21	X	X	X
Freon 22	✓✓✓	X	X
Freon 134a	✓✓✓	•	X
Natural gas	X	✓✓✓	✓✓✓
Methane	X	✓✓✓	✓✓✓
Propane	X	✓✓✓	✓✓✓
Oils and Fuels			
ASTM No 1 oil	X	✓✓✓	✓✓✓
ASTM No 2 oil	X	✓✓✓	✓✓✓
ASTM No 3 oil	X	✓✓✓	✓✓✓
ASTM fuel A	X	✓✓✓	✓✓✓
ASTM fuel B	X	✓✓	✓✓✓
ASTM fuel C	X	✓	✓✓✓
Diesel oil	X	✓✓✓	✓✓✓
Diesel oil + RME (10%)	X	X	✓✓✓
Mineral oil (low aromatic)	X	✓✓✓	✓✓✓

These tables refer to room temperature tests. For other conditions and additional media advices please refer to Pegler Yorkshire for advice.

Designation	Black EPDM Tectite/XPress	Yellow HNBR Gas	Green FPM Solar
Maximum service temperature °C	180	100	230
Low service temperature °C	- 50	-20	-20
Water/Steam Resistance			
Water/Steam resistance <40°C	✓✓✓	✓✓✓	✓✓✓
Water/Steam resistance <80°C	✓✓✓	✓✓	✓✓✓
Water/Steam resistance <150°C	✓✓	X	*✓✓
Water/Steam resistance >150°C	✓	X	*✓✓

Designation	Black EPDM Tectite/XPress	Yellow HNBR Gas	Green FPM Solar
Oils and Fuels cont			
Hydraulic oils (petroleum base)	X	✓✓✓	✓✓✓
Lubricating oils	X	✓✓✓	✓✓✓
Paraffin	X	✓✓✓	✓✓✓
Petrol	X	✓✓✓	✓✓✓
Silicone oil/grease	✓✓✓	✓✓✓	✓✓✓
Transformer oils	X	✓✓✓	✓✓✓
Vegetable oils	✓	✓✓✓	✓✓✓
Solvents			
Acetone	✓✓✓	X	X
Benzene	X	X	✓✓✓
Carbon tetrachloride	X	✓	✓✓✓
Dimethyl formamide	✓✓	✓	X
Ethyl acetate	✓✓	X	X
Methyl ethyl ketone	✓✓✓	X	X
Tetrachloroethylene	X	X	✓✓✓
Toluene	X	X	✓✓✓
Turpentine	X	✓✓✓	✓✓✓
Xylene	X	X	✓✓
Miscellaneous			
Ethylene glycol	✓✓✓	✓✓✓	✓✓✓
Detergents	✓✓✓	✓✓✓	✓✓✓
Dioctyl phthalate	✓✓	X	X
Formaldehyde	✓✓✓	✓	X
Hydrogen peroxide (90%)	✓✓	X	✓✓
Phosphate esters	✓✓✓	X	✓
Potassium nitrate	✓✓✓	✓✓✓	✓✓✓

Key to Media Table	
✓✓✓	**Excellent** – Recommended
✓✓	**Good** – Minor to Moderate effects
✓	**Fair** – Moderate to severe effects
X	**Poor** – Not recommended
•	Insufficient data available
* Conditions Apply	Temperature or other limitation affecting polymer choice

Contact

Thank you

PNEUMSYS®
ADVANCE ENERGY SOLUTIONS

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