

# AUSPEX PIPELINE MANUAL

AUSTRALIAN OWNED





# ADVANTAGES OF THE AUSPEX PIPE

1. The pipe does not have to be expanded or reverted to make the joint.

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2. Tighter manual bending.

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3. Light weight.

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4. Corrosion resistant.

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5. Dampens water hammer noise.

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6. Pipe bores of AUSPEX 16mm & 20mm comply with Table 1.3 (minimum bore of pipes) in A.S.3500 1.2.

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7. No corrosion or scale build up.

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8. Quiet water flow.  
(see acoustic tables on page 9)

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AUSPEX PIPE is a Cross-Linked Polyethylene (PE-X) Pipe manufactured in accordance with A.S.2492- Cross-linked Polyethylene (PE-X) Pipe for Hot and Cold Water Applications. The pipe is intended for use by licensed plumbing tradesmen, who are experienced in working to accepted plumbing practices.

Installations should be carried out in accordance with accepted plumbing practices and instructions provided in this manual where practical. However, the installer should also be aware of local authority codes and by-laws relevant to plumbing, which take precedence over these guidelines in any area where they vary.

The requirements of the National Plumbing Codes (A.S/NZS. 3500 1.1/2 and 3500. 4.1/2 ) should also be adhered to.

The PE-X pipe has significantly better temperature/pressure than most other plastic materials.

## PRESSURE DERATING OF PIPES ACCORDING TO PIPE MATERIAL TEMPERATURE

	Temperature				
	20°C	40°C	60°C	80°C	95°C
	<b>Working pressure, kPa</b>				
<b>PN 16</b>	1600	1480	1280	1050	800
	<b>Working pressure, P.S.I.</b>				
<b>PN 16</b>	232	214	186	161	152

If the above tables are likely to be exceeded, refer to table 4.2. in A.S/NZS 3500 4.2 for valve installation requirements. Eg. Cold water expansion valves and/or pressure limiting valves. Contact Auspex if necessary.

## **FIRE AND EXCESSIVE HEAT**

Keep PE-X a minimum of 500 mm from sources of high heat such as heating appliances, flues from heating appliances etc.

Keep PE-X 1500mm from slow combustion type stoves and flues used to heat hot water or cooking (wet back type).

Leave 300mm minimum space between PE-X pipe and recessed electric light fittings.

PE-X should not be positioned within 150mm of gas or central heating vents or flues.

## **UNCONTROLLED HEAT SOURCES**

PE-X pipe can take higher temperatures than most other approved plastics materials, however in the case of uncontrolled heat sources, ie. slow combustion stoves, room heaters, water heating coils, wet back boilers, solar or the like, PE-X pipe should not be used. The primary flow and returns on these types of heaters should not be installed in PE-X pipe.

Secondary flow and returns must be controlled so that the temperature/pressure requirements are not exceeded. (See derating table as detailed on opposite page.)

In the interest of safe temperature and to protect the user, tempering valves should be installed in accordance with A.S/NZS.3500 4.2.

Where PE-X pipe is installed and penetrates fire resistant construction, the fire resistant integrity of the construction must be retained. Refer to building codes.

## **DIRECT SUNLIGHT EXPOSURE**

The limitations clauses in the National Plumbing Codes requires that as with most plastic materials PE-X shall not be used where subject to direct sunlight. This requirement is detailed in A.S.3500 1.2 and 4.2. The pipe has been especially manufactured in black to comply with A.S.2492 so that light transmitted through the pipe wall does not exceed 0.1%.

# GENERAL INSTALLATION REQUIREMENTS

The pipe is manufactured in 16mm, 20mm sizes and supplied in 50 metre and/or 5 metre straight lengths. 25mm pipe is available in 25 metre and/or 5 metre straight lengths. The pipe is manufactured in accordance with A.S. 2492, which is far more exacting than other approved plastics materials. Because the pipe is flexible and available in coils you can often use less fittings on a job.

## MINIMUM COLD BENDING RADII.

Ten times the outside diameter of the pipe used.

diameter	radii
16mm	160mm
20mm	200mm
25mm	250mm

Bending of the pipe for change of direction is preferable to elbows, however fittings will be required where sharp bends are necessary. Tighter bends can be achieved by using a bend support.

### **DO NOT USE PIPES THAT HAVE:**

Kinks, cuts, deep scratches, squashed ends, imperfections or have been in contact with grease or tar substances. Any of the above should be cut out and replaced, as these conditions may affect the integrity of the system.

# CLIPPING

A.S.3500 recommend the following spacings:

diameter	horizontal	vertical
16mm	600mm	1200mm
20mm	700mm	1400mm
25mm	750mm	1500mm

The above is a guide only. Good plumbing practice requires that clipping be installed so that stress is not imposed on the joint. When bending close to a joint, clips should be placed near the fitting in a manner not to stress the joint.

# EXPANSION AND CONTRACTION

The pipe can handle thermal expansion because of its flexibility. It should freely move through the clips, studs, plates or walls. Synthetic clips are recommended.

Care should be taken in regard to contraction. Where pipes are installed between fixed points, allow 10mm slack per metre for contraction to overcome undue pressure on the joints if contraction occurs.

## The formula for calculating expansion rates is as follows:

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$$\Delta I = a \times L \times \Delta T$$

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$\Delta I$  = linear expansion in mm

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**a** = coefficient of linear expansion is 0.15 mm/mK

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**L** = length of pipe in metres

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$\Delta T$  = temperature difference

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The approximate expansion rate of PE-X is 7.5mm per metre in a change of temperature of 50°C.

## PIPE FLOW TESTS

### Flow Chart Worked Example

- Q:** How much head loss (pressure drop) occurs in an Auspex 16 mm PE-X pipe carrying hot water at 70°C with a required flow rate of 0.1 Litres/Second ?
- A:** Place a ruler on the 0.1 Litres/Second mark on the bottom of the chart and measure up to cross the sloping line for the 16mm pipe. From this point draw a horizontal line to the line left hand side of the chart. This gives a head loss of 0.8 KPa/metre of pipe length. Multiply this value by the length of the total pipe to give the total head loss in the pipeline in KPa. The velocity of flow in the pipe is approximately 0.9 metres/second.

### Flow Chart Temperature Corrections

The AUSPEX flow charts are calculated for water at 70°C temperature. Where the water is at a different temperature the values from the chart need to be adjusted. Multiply the head loss by the appropriate factor in the table.

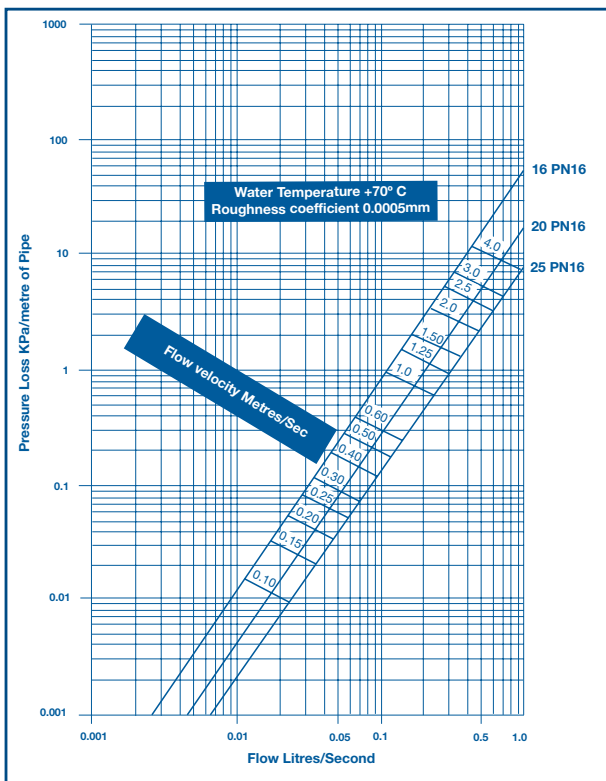
### Dimensions

AUSPEX pipes are made to A.S.2492 dimensions for PN16 pressure ratings. Tighter manufacturing specifications ensure that bore sizes on all pipes are always at the maximum allowable.

### Thermal Conductivity

Temperature loss from PE-X is very low compared to metallic products. For more specific calculations, the formula for thermal conductivity is:

$1.1 \times 10^{-3} \text{ cal/sec/cm/}^{\circ}\text{C}$   
or 0.46 W/mK (Watts per metre Kelvin)



Size	Mean OD	Min Wall	Max Mean ID
16	16.0	2.0	12.3
20	20.0	2.3	15.7
25	25.0	2.8	19.7

Water °C	20	30	40	50	60	80	90
Factor	1.20	1.14	1.10	1.05	1.02	0.98	0.95

# ACOUSTIC TESTS

## Results Summary

The noise emitted by the pipes through the wall was mainly evident in the mid to high frequencies of the A-weighted spectrum.

Noise emitted at frequencies below 250Hz was affected by the level of background noise in the room.

The change in radiated noise level was greater with the change in water flow compared with the change in water pressure.

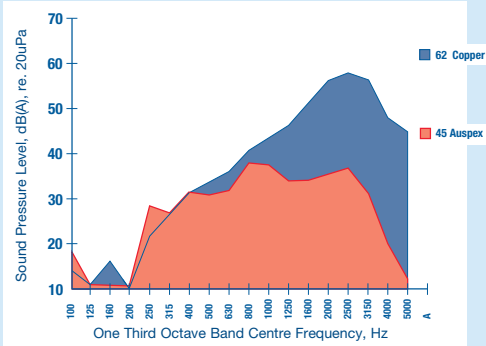
In all cases the overall noise level emitted by the Auspex pipe was less than for the copper pipe. For the same flow conditions the differences in overall noise level between the pipes was between 14 and 17dB(A).

## Conclusion

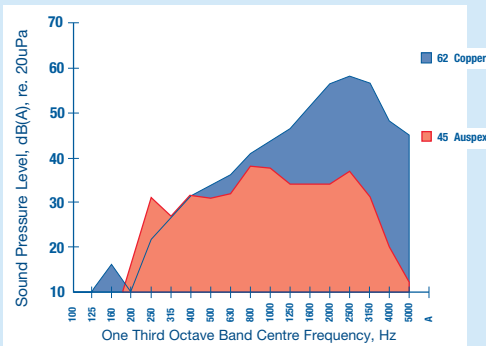
Measurements of noise emitted from nominal 15mm bore pipes attached to the other side of a concrete block wall with water flowing through them and a noise source in the pipe showed that the Auspex cross-linked polyethylene pipe was between 14 and 17dB(A) quieter than the standard copper pipe.

Waterflow L/min	Water Pressure kPa	Measured Noise Level <small>dB(A)</small>		Difference <small>dB(A)</small>
		Auspex	Copper	Copper - Auspex
15	300	38	55	17
15	600	40	54	14
20	600	45	62	17
20	700	45	62	17

Measured noise level of water flow through nominal 15mm bore Auspex and copper pipe, 20L/min., 600kPa with DIN 52218 noise source.



Measured noise level of water flow through nominal 15mm bore Auspex and copper pipe, 20L/min., 700kPa with DIN 52218 noise source.



## TIMBER FRAMES

Drill holes through studs, plates etc. large enough so that the pipe can move freely through the holes to allow for expansion and contraction and pressure surges.

To avoid noises where pipes pass through studs, plates etc. that have large holes, consideration should be given to the use of a non aggressive compound, grommet or sleeve in the annular space in the stud or plate. Ensure that pipe is protected when bending against frames etc.

## STEEL FRAMES

Ensure that where a pipe passes through a steel frame, a suitable sleeve or grommet is used to protect the pipe against raw edges so it is still able to move through the protective medium.

## PIPES IN CHASES DUCTS OR CONDUITS

(refer A.S.3500 1.2: clause 5.5.2.2. for full detail)

1. Pipes in chases shall be continuously wrapped with an impermeable flexible material.
2. AUSPEX SUPPLY PRE-COVERED 5 METRE LENGTHS SUITABLE FOR THIS PURPOSE.
3. Ducts shall be fitted with removable covers.
4. Conduits embedded in walls or floors shall comply with the requirements of the Australian or New Zealand Building Codes as applicable.

## UNDER CONCRETE SLABS

Refer A.S.3500.1.2: clause 5.5.2.3. and A.S.3500 4.2. clause 3.5.3 for full details.

# NON POTABLE WATER PIPE

(Not for human consumption )

The pipe is manufactured in accordance with A.S.2492 however it is coloured in a special lilac colour specified and branded in accordance with the authorities requirements for the distribution of water not suitable for human consumption. This water is generally used for watering gardens and supply to cisterns.

## PRECAUTIONS

### Chemicals

Always check with the manufacturer before using PE-X pipe other than for potable water.

Always check with the manufacturer if the pipework is to be installed in a known contaminated area, in contaminated soils or may be subject to chemical spills.

### Electrical

It is of the utmost importance that if a metallic pipe is being replaced or installed in part or in its entirety by a plastic pipe or other non-metallic fittings or couplings, the requirements of A.S.3500 must be followed. No work should be carried out until the earth requirements have been checked by an electrical contractor and modified if necessary.

### Limitations of PE-X pipe as in AS3500 parts 1&4

- A Less than class 16.
- B Used as part of a water meter assembly or vertical riser.
- C Used beyond the inlet stop valve and within 1 metre of the outlet of the water heater.
- D Used where subject to direct sunlight.
- E Used in concealed locations unless the provisions of A.S.3500 are observed.
- F Used in areas subject to contamination by petroleum products.

Note: classes and temperature ratings for different working pressures are given in A.S.2492

## PRODUCT LIST

### Black Pipe

**AP401650**

16mm Auspex x 50 metre coils

**AP401605**

16mm Auspex x 5m straight lengths

**AP412050**

20mm Auspex x 50 metre coils

**AP412005**

20mm Auspex x 5m straight lengths

**AP422525**

25mm Auspex x 25 metre coil

**AP4016100**

16mm Auspex x 100 metre coil **NEW**

**AP4120100**

20mm Auspex x 100 metre coil **NEW**



### Black Pipe (pre-lagged)

For rendering, not heat retention.

**AP401605LAG**

16mm Auspex x 5m  
pre-lagged length

**AP412005LAG**

20mm Auspex x 5m  
pre-lagged length



### Corrugated Slewing

Available on request.

**AP401625COR**

16mm Auspex x 25m coil

**AP412025COR**

20mm Auspex x 25m coil



## Lilac Pipe\*

### **AP401650LIL**

16mm Auspex x 50 metre coil

### **AP401605LIL**

16mm Auspex x 5 metre length

### **AP412050LIL**

20mm Auspex x 50 metre coil

### **AP412005LIL**

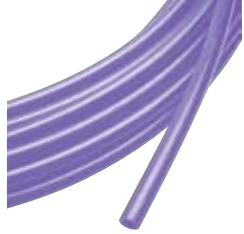
20mm Auspex x 5 metre length

### **AP422525LIL**

25mm Auspex x 25 metre coil

### **AP422505LIL**

25mm Auspex x 5 metre length



\*Lilac pipe for recycled water. Marked in accordance with Australian Standards.

## Green Pipe

For rainwater applications.

### **AP401615G**

16mm x 50 metre coil

### **AP412050G**

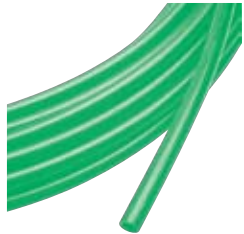
20mm x 50 metre coil

### **AP401605G**

16mm x 5 metre length

### **AP412005G**

20mm x 5 metre length





## **AUSPEX**

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