

iH2O Pre-Insulated Pipe Product Statement

iH2O insulated pipe is produced in Darwin, Northern Territory by ISO9001:2015 Quality Assured company Australian Piping Solutions (APS). iH2O is a pre-insulated carrier pipe, produced to Australian standards, for both cold and hot water mechanical applications such as chilled water industrial grade air-conditioning systems. Locally owned and established, APS has been servicing the local and Australian market with piping solutions to the mining, mechanical, civil, plumbing and construction industries for 15 years.

APS manufactures, supplies and installs a range of mechanical piping products, including iH2O pre-insulated chilled water piping in a range of different piping materials, including HDPE, copper and steel and finished with a range of cladding including HDPE, galvanised steel and Colourbond. APS also supplies and lays HDPE pipelines and custom fabricates pipe fittings and spooling. Through APS, Australian industry has access to readily available, very high quality pre-insulated pipe for mechanical applications, such as chilled water air-conditioning system solutions. Not only is it of high quality, it is readily available with stocks being held at the iH2O factory in Berrimah, Darwin NT.

The iH2O pipe comes in varying combinations of both cladding and service pipe options, including but not limited to:

Clad Options: galvanised steel, Colourbond steel, stainless steel, aluminium and HDPE

Service Pipe Options: copper, stainless steel, carbon steel, HDPE and PVC

The iH2O pipe is pre-insulated using a high grade environmentally friendly foaming system supplied by Australian Urethane Systems called **DPE1783R**. This foaming system has a blended blowing agent of predominately EcoMate and M1, with a **ZERO Ozone Depleting Potential**, is **VOC Exempt** and has a **very low Global Warming Potential** of approximately 250. EcoMate's properties are non-GWP, non-ODP and have good mechanical and thermal properties without compromising quality standards.

Being an Australian made product iH2O only uses Australian manufactured and sourced components and products which are made to Australian Standards. These components include copper supplied by Australian copper tube manufacturer Kembla, galvanised steel supplied by Australian supplier Vulcan Steel and an environmentally friendly foaming system produced to Australian standards, supplied by Australian Urethane Systems.

Australian Piping Solution's iH2O is a quality brand of Australian manufactured product and is the next frontier to quality, readily available pre-insulated pipe, field cladding and installation services

Sample Photos of iH2O pipework in different combinations manufactured & Installed

Copper pipe with White Colour Bond Spiral Cladding and Injected Polyurethane insulation



Carbon Steel pipework with Galvanised Spiral Cladding and Polyurethane insulation



Sample Photo of APS Typical Plantroom Chilled Water, Condenser Water Construction & Configuration

Example 1:



Example 2:



Example 3:



Pipework Combination's, Technical information and R values of



R-Value Input Parameters

Service Pipe:

Type B Copper @ k= 320 W/m²K

Insulation:

DPE1783R PU @ k= 0.024 W/m²K

Casing:

Z150 Galv Steel @ k= 50 W/m²K

$$R_{total} = R_{CU} + R_{PU} + R_{galv}$$

note R_{CU} & R_{galv} omitted from calculation

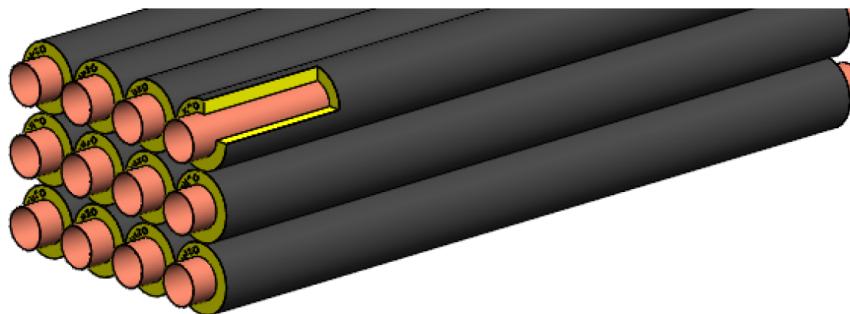
$$R_{total} = R_{CU} + R_{PU} + R_{galv}$$

$$R_{PU} = (r_{2PU} \times \ln(r_{2PU}/r_{1PU})) / k_{PU}$$

Z150 Galv steel @ K= 30 w/m K					Casing (Z150 Galvanized steel--Spiral Wound) --- sizes are external (mm)																				
Pipe Diameter (mm)	Equivalent Imperial	Class		NB	102		127		152		178		203		229		254		305		330		400		
		Bar	thk		PU_Thk	R-Val	PU_Thk	R-Val	PU_Thk	R-Val	PU_Thk	R-Val	PU_Thk	R-Val	PU_Thk	R-Val	PU_Thk	R-Val	PU_Thk	R-Val	PU_Thk	R-Val	PU_Thk	R-Val	
12.7	¹ / ₂ "	52.9	0.91	10.9	44.65	4.39	57.15	6.04																	
19.1	³ / ₄ "	39.7	1.02	17.1	41.45	3.53	53.95	4.97																	
25.4	1"	35	1.02	23.4	38.30	2.93	50.80	4.22																	
31.8	1 ¹ / ₄ "	27.8	1.22	29.4	35.10	2.46	47.60	3.63																	
38.1	1 ¹ / ₂ "	23	1.22	35.7	31.95	2.08	44.45	3.16	56.95	4.35															
50.8	2"	17.1	1.22	48.4			38.10	2.40	50.60	3.44														63.60	4.61
63.5	2 ¹ / ₂ "	13.7	1.22	61.1					44.25	2.74														57.25	3.79
76.2	3"	15.2	1.63	72.9					37.90	2.17														50.90	3.12
101.6	4"	12	1.63	98.3							38.20	2.06	50.70	2.90	63.70	3.85									
127	5"	9.6	1.63	123.7									38.00	1.97	51.00	2.79									
152.4	6"	10	2.03	148.3									25.30	1.20	38.30	1.93								50.80	2.68
203.2	8"	7.2	2.03	199.1																				25.40	1.17
228.6	9"	8.1	2.64	223.3															38.20	1.82	50.70	2.50	73.00	3.75	
254	10"	7.3	2.64	248.7																38.00	1.78				

YELLOW BLOCKS DENOTE STANDARD STOCK ITEMS

Copper Pipework with HDPE Cladding & Injected Polyurethane Insulation



R-Value Input Parameters

Service Pipe:

Type B Copper @ $k = 320 \text{ W/m}^2\text{K}$

Insulation:

DPE1783R PU @ $k = 0.024 \text{ W/m}^2\text{K}$

Casing:

PE100 S1 Poly Pipe @ $k = 0.43 \text{ W/m}^2\text{K}$

$$R_{\text{total}} = R_{\text{CU}} + R_{\text{PU}} + R_{\text{HDclad}}$$

note: R_{CU} omitted from calculation

~~$$R_{\text{CU}} = (r_{2\text{CU}} \times \ln(r_{2\text{CU}}/r_{1\text{CU}})) / k_{\text{CU}}$$~~

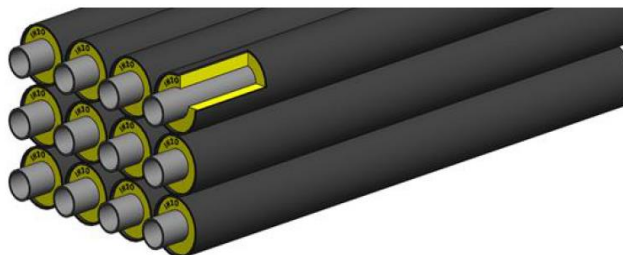
$$R_{\text{PU}} = (r_{2\text{PU}} \times \ln(r_{2\text{PU}}/r_{1\text{PU}})) / k_{\text{PU}}$$

$$R_{\text{HDclad}} = (r_{2\text{HDclad}} \times \ln(r_{2\text{HDclad}}/r_{1\text{HDclad}})) / k_{\text{HD}}$$

Service Pipe Diameter (mm)	Equivalent Imperial	Class		NB	Casing (PE100 S1 HDPE) --- sizes are OD/ID																	
					OD	ID	OD	ID	OD	ID	OD	ID	OD	ID	OD	ID	OD	ID	OD	ID	OD	ID
					110	103	160	150	200	188	225	211	250	234.8	280	263	315	296	355	333	400	376
PU_Thk	R-Val	PU_Thk	R-Val	PU_Thk	R-Val	PU_Thk	R-Val	PU_Thk	R-Val	PU_Thk	R-Val	PU_Thk	R-Val	PU_Thk	R-Val	PU_Thk	R-Val	PU_Thk	R-Val	PU_Thk	R-Val	
12.7	1/2"	52.9	0.91	10.9	45.32	4.48																
19.1	3/4"	39.7	1.02	17.1	42.12	3.61																
25.4	1"	35	1.02	23.4	38.97	3.00																
31.8	1 1/4"	27.8	1.22	29.4	35.77	2.52	59.25	4.83														
38.1	1 1/2"	23	1.22	35.7			56.10	4.27														
50.8	2"	17.1	1.22	48.4			49.75	3.38														
63.5	2 1/2"	13.7	1.22	61.1			43.40	2.69	62.19	4.23												
76.2	3"	15.2	1.63	72.9					55.84	3.52												
101.6	4"	12	1.63	98.3					43.14	2.40	54.88	3.22										
127	5"	9.6	1.63	123.7							42.18	2.24	53.92	3.00	68.02	3.98						
152.4	6"	10	2.03	148.3									41.22	2.12	55.32	2.99	71.75	4.08				
203.2	8"	7.2	2.03	199.1													46.35	2.32	65.14	3.44		
228.6	9"	8.1	2.64	223.3															52.44	2.63	73.58	
254	10"	7.3	2.64	248.7																	60.88	

YELLOW BLOCKS DENOTE STANDARD ITEMS

HDPE Pipework/ HDPE Outer Cladding & Injected Polyurethane Insulation



R-Value Input Parameters

Service Pipe:

PE100 S1 Poly Pipe @ $k = 0.43 \text{ W/m}^2\text{K}$

Insulation:

DPE1783R PU @ $k = 0.024 \text{ W/m}^2\text{K}$

Casing:

PE100 S1 Poly Pipe @ $k = 0.43 \text{ W/m}^2\text{K}$

$$R_{\text{total}} = R_{\text{HD}} + R_{\text{PU}} + R_{\text{HDclad}}$$

$$R_{\text{HD}} = (r_{2\text{HD}} \times \ln(r_{2\text{HD}}/r_{1\text{HD}})) / k_{\text{HD}}$$

$$R_{\text{PU}} = (r_{2\text{PU}} \times \ln(r_{2\text{PU}}/r_{1\text{PU}})) / k_{\text{PU}}$$

$$R_{\text{HDclad}} = (r_{2\text{HDclad}} \times \ln(r_{2\text{HDclad}}/r_{1\text{HDclad}})) / k_{\text{HD}}$$

Service Pipe Diameter (mm)	Equivalent Imperial	Class		NB	Casing (PE100 S1 HDPE) --- sizes are OD/ID																											
					OD	ID	OD	ID	OD	ID	OD	ID	OD	ID	OD	ID	OD	ID	OD	ID	OD	ID	OD	ID	OD	ID	OD	ID	OD	ID		
					110	103	160	150	200	188	225	211	250	235	280	263	315	296	355	333	400	376	450	423	500	470						
					PU_Thk	R-Val	PU_Thk	R-Val	PU_Thk	R-Val	PU_Thk	R-Val	PU_Thk	R-Val	PU_Thk	R-Val	PU_Thk	R-Val	PU_Thk	R-Val	PU_Thk	R-Val	PU_Thk	R-Val	PU_Thk	R-Val	PU_Thk	R-Val	PU_Thk	R-Val	PU_Thk	R-Val
20	3/8"	12.5	13.6	17.1	41.67	3.52																										
25	3/4"	12.5	13.6	21.3	39.17	3.04																										
32	1"	12.5	13.6	27.3	35.67	2.52																										
40	1 1/4"	12.5	13.6	34.1	31.67	2.04	55.15	4.13																								
50	1 1/2"	12.5	13.6	42.6	26.67	1.57	50.15	3.44																								
63	2"	12.5	13.6	53.7			43.65	2.72	62.44	4.27																						
75	2 1/2"	10	17	66.2			37.65	2.18	56.44	3.59																						
90	3"	10	17	79.4			30.15	1.62	48.94	2.88	60.68	3.76																				
110	4"	10	17	97.1					38.94	2.11	50.68	2.88																				
125	4-5"	10	17	110.3					31.44	1.61	43.18	2.33																				
140	5"	10	17	123.5							35.68	1.84	47.42	2.55																		
160	6"	10	17	141.2									37.42	1.90	51.52	2.75																
180	6"	10	17	158.8											41.52	2.11	57.95	3.09														
200	6-8"	10	17	176.5													47.95	2.45														
225	8"	10	17	198.5													35.45	1.73	54.24	2.77												
250	9"	10	17	220.6															41.74	2.05	62.88	3.24										
280	10"	10	17	247.1															26.74	1.27	47.88	2.36	71.36	3.67								
315	10-12"	10	17	277.9																	30.38	1.45	53.86	2.65	77.35	3.96						
355	12"	10	17	313.2																			33.86	1.61	57.35	2.80						

YELLOW BLOCKS DENOTE STANDARD ITEMS

GRACO Electric Foam injector for site insulation of Bends Joins and Elbows



Reactor E-10

Electric Foam and Polyurea Proportioner

For smaller polyurethane foam or polyurea projects or touch-ups - applies up to 12 lb (5.4 kg) per minute

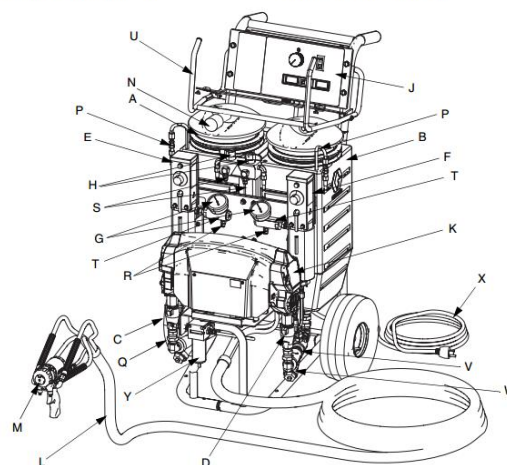
Reactor E-10	
Maximum Fluid Working Pressure	140 bar, 14 MPa
Maximum Fluid Temperature	71°C
Maximum Ambient Temperature	43°C
Maximum Output at 340 cycles/min	5.4 kg/min
Output per Cycle (A and B)	0.0133 liter
Overpressure Relief	Recirc/Spray valves automatically relieve excessive fluid pressure back to supply tanks
Weight (approximately, depending on model)	72 kg
Wetted Parts	Aluminum, stainless steel, carbon steel, brass, carbide, chrome, chemically resistant o-rings, PTFE, ultra-high molecular weight polyethylene
Electrical Requirements	
Model AP9570, CS9570:	120 Vac, 1 phase, 50/60 Hz, 3500 W; requires two separate, dedicated 15 A circuits
Model AP9571, CS9571:	240 Vac, 1 phase, 50/60 Hz, 3800 W; requires two separate, dedicated 10 A circuits
Model AP9572, CS9572:	240 Vac, 1 phase, 50/60 Hz, 3800 W; requires a single dedicated 16 A circuit
Model 249806:	120 Vac, 1 phase, 50/60 Hz, 1800 W; requires a single dedicated 15 A circuit
Model 249808:	240 Vac, 1 phase, 50/60 Hz, 1800 W; requires a single dedicated 8 A circuit
Generator Size (for Reactor E-10 only)	
Heated:	5000 W minimum
Nonheated:	2500 W minimum
Heater Power	
120V models:	850 W each; 1700 W total
240V models:	1000 W each; 2000 W total
Sounds Pressure	
Fast Circulation Mode:	78.7 dB(A)
At 2000 psi (14 MPa, 140 bar), 0.72 gpm (2.7 lpm):	84.5 dB(A)
Sound Power, measured per ISO 9416-2	
Fast Circulation Mode:	88.6 dB(A)
At 2000 psi (14 MPa, 140 bar, 0.72 gpm (2.7 lpm):	94.4 dB(A)
Tank Capacity (nominal)	26.5 liters
Fluid Outlets	
Component A (ISO):	-5 JIC male
Component B (RES):	-6 JIC male
Fluid Circulation Ports	
Component A (ISO):	-5 JIC male
Component B (RES):	-6 JIC male
Air Inlet	1/4 in quick-disconnect industrial type pin fitting
Air Outlet	1/4 npsm(m)
Gun Compressed Air Requirements	
Fusion Gun (purge air and operating air):	0.112 m³/min
2K Ultra-Lite Gun with disposable mixer kit, with air spray valve fully open:	0.392 m³/min
2K Ultra-Lite Gun with joint fill kit:	0.056 m³/min
Hose Markings	
A Side	Red
B Side	Blue



Component Identification

Key for Fig. 1

- | | |
|---|---|
| A Supply Tank A | M Fusion Air Purge Spray Gun |
| B Supply Tank B | N Desiccant Dryer (mounts on supply tank A) |
| C Pump A | P Recirculation Tubes |
| D Pump B | Q Air Line Inlet (quick-disconnect fitting) |
| E Heater A | R Outlet Hose Connections |
| F Heater B | S Return Hose Connections |
| G Fluid Pressure Gauges | T Fluid Temperature Sensors |
| H Recirc/Spray and Overpressure Relief Valves | U Hose Rack and Control Shield |
| J Control Panel: see Fig. 3, page 14 | V Fluid Inlet Ball Valves (1 on each side) |
| K Electric Motor and Drive Housings | W Fluid Inlet Strainers (1 on each side) |
| L Insulated Hose Bundle (includes circulation return hoses) | X Power Cord |
| | Y Air Filter/Moisture Separator |



AUSTHANE DPE1783R Rigid Low Density Polyurethane Injection Foam System

Product Description

AUSTHANE DPE 1783R is formulated as a rigid low density flame retarded void filling / injection foam system. The product is designed to provide excellent flow and stability in void filling operations where the in-situ density of the foam is controlled to be a minimum of 35 kg/m³. The product is formulated to give very good flow in narrow void filling applications.

It is recommended that it be processed through plural component PU injection machines at a Mix Ratio of 100 : 100 parts by Volume [Graco® Reactor Machines or SAIP™ LP Units or equivalent]. It can be 'hand-mixed' in small volume applications. Refer to Guide to 'Hand-mixing of AUSTHANE Rigid Foam Systems-October 2010.

If required refer to AUS Technical staff for information on processing equipment.

DPE1783R Polyol is formulated using a mixed 'blowing agent' formulation, primarily **ecomate®** - a Zero ODP¹, Zero GWP², and VOC³ exempt Blowing Agent.

Recommended Product Applications

- In tank insulation as the injected insulation system between tank wall and external metal cladding
- in pipe-in-pipe annulus filling as the injected insulation system [see note under Guide to Use | Processing Recommendations]
- it is recommended to be used as a 'buoyancy' foam in large 'metal skinned' buoys, and in wave skis, canoes and similar marine craft , at an in-situ density > 35 kg/m³.
- in commercial refrigeration cabinets requiring an injection foam system with very good flow characteristics
- in thermal insulation in cold and hot applications, for contact surface temperatures ranging from - 30°C to + 85°C.

System Specifications

Mix Ratio by Volume

100 Parts by Volume to 100 Parts by Volume
DPE1783R POLYOL AUSTHANE AUSMDI ISO

Mix Ratio by Weight

100 Parts by Weight to 110 Parts by Weight
DPE1783R POLYOL AUSTHANE AUSMDI ISO

Laboratory Reactivity Profile / Free Rise Density @ 20°C

[Laboratory QA Foam Cup Test based on 210 gm of System]

Mix Time	15	seconds
Cream Time	28 - 30	seconds
Gel Time	200 - 210	seconds
Tack Free Time	240 - 250	seconds
Free Rise CORE Density	27 - 27	kg/m ³

Liquid Properties of DPE1783R System Components @ 25°C

	DPE1783R Polyol	AUSMDI Isocyanate
Appearance	Clear Amber Liquid	Dark Brown liquid
Viscosity	400 ± 50 cPs	200 ± 50 cPs
Specific Gravity [gm/ml]	1.09	1.24

Product Physical | Technical Data

Closed Cell Content	@ 36.6 kg/m ³	> 96 %	
Compressive Stress at 10% deformation			
Foam Test Density	Parallel to Rise	Perpendicular to Rise	
36.6 kg / m ³	> 240 kPa	> 140 kPa	
Dimensional Stability of DPE1783R System at 36.1 kg/m ³ (based on AS 2489.6)			
Dimensional Change	7 days exposure at - 20°C	7 days exposure at 100°C	
Length	Nil	Nil	
Width	Nil	Nil	
Thickness	Nil	Nil	
Thermal Conductivity	0.0242 W/ m.K	Test Method based on AS 2464.5.	
[Aged Sample - Density: 37.0 kg/m ³]	R value @ 100 mm 4.13 m ² .k/W	Mean Temperature of Test: 17.52°C	
Aged k factor			
The Aged k factor of PU foam is affected by the exposure conditions and application of the foam, the actual temperature range of exposure over time and the density of the in-situ foam. Specific technical guidance should be obtained in regard to this aspect of polyurethane foam. In applications where impermeable facings are in place or are applied to both faces of the AUSTHANE DPE1783R product, e.g. metal sheeting, metal foils, fibreglass lay-up construction and is adhered firmly over the whole surface of both sides of the foam, the foam will retain its Initial k factor of typically 0.024 W / m.K.			
Foam Thickness	50 mm	75 mm	100 mm
R value - m ² .k/W	2.07	3.10	4.11

Guide to Use | Processing Recommendations

- AUSTHANE DPE1783R System is designed to be used in applications where the injected / in-situ foam density achieved is a minimum of 35 kg/m³ density.

- when using a SAIP SE30 or similar equipment, the recommended processing conditions are:

Polyol Temperature	23 - 27°C
Hose Temperature Setting	23 - 27°C

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