

UPVC, CPVC PIPES & FITTINGS  
**ASTM STANDARD**



**FOR P.V.C. PIPES & FITTINGS** ®





Ten silos for material distribution before mixing.



Production area with fifteen extruder machines.



Sophisticated quality control procedures.



Storage area for pipes and fittings.



View of Arabian Gulf Manufacturers Ltd. The new plant inaugurated in 1991, covering an area of 100,000 sq. m. : one of the most modern & largest plant in the Kingdom.

**AGM**



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مواسير ايه جي ام  
FOR R.V.C. PIPES & FITTINGS

AGM Pipes  
FOR R.V.C. PIPES & FITTINGS



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AGM



ARABIAN GULF MANUFACTURERS LTD., was established in 1965 as one of the first major plastic producers in the Kingdom of Saudi Arabia. Today, they lead throughout the kingdom's market, offering a wide range of plastic products including injection moulded fittings, extruded profiles and thermoformed products. Subsequent technological research and development on production technique "know-how" resulted in the company achieving kingdom-wide recognition as a market leader in this field.

**AGM**, was the first to initiate marketing orientated technique to meet increasing industrial demand by gearing production to market requirements for development of its range of UPVC & CPVC Pipes and Fittings.

**AGM** UPVC & CPVC Pipes and Fittings are now well accepted and widely used in all types of industrial process pipework, water and gas reticulation and distribution systems , as well as irrigation installation, together with electrical supply conduit and flexible corrugated pipe.



<b>SCHEDULE 40</b>	<b>SCHEDULE 80 (UPVC)</b>
ASTM D-1784 - for rigid UPVC compound ASTM D-1785 - for UPVC pipes ( size & pressure ) ASTM D- 2466 -for UPVC fittings	ASTM D-1784 - for rigid UPVC compound ASTM D-1785- for UPVC pipes (size & pressure) ASTM D-2464 - for threaded UPVC fittings ASTM D-2467 - for socket UPVC fittings
<b>SCHEDULE 40 DWV</b>	<b>SCHEDULE 80 (CPVC)</b>
ASTM D-2665 - for UPVC pipes ASTM D-3033 - for UPVC fittings ASTM D-3034 - for UPVC fittings ASTM D-3311 - for UPVC fittings	ASTM 1784 - for rigid CPVC compound ASTM F-441 - for CPVC pipes (size & pressure) ASTM F - 437 - for threaded CPVC fittings ASTM F-439 -for socket CPVC fittings
<b>UPVC PIPES SDR SERIES</b>	
ASTM D-2241	

### ASTM D-1785

Saudi AGM UPVC Pipes and Fittings for water supply are manufactured to inch dimensions from 1/2 inch to 8 inches.

Our AGM UPVC pipes are produced to ASTM D-1785. These pipes are normally available in standard lengths of 6 meters. Other lengths can be manufactured and available with a plain end and socket with coupling. Pipes are made with white and grey colour, other colours can also be made.

Saudi AGM CPVC pipes for HOT WATER SUPPLY are manufactured in inch dimensions from 1/2 inch to 2 inch.

Our AGM CPVC Pipes, schedule 80 are manufactured according to ASTM F-441 specifications.

These pipes are normally available in standard lengths of 6 meters. Other lengths can be made available in plain spigot pipes produced in light grey colour.

### CHLORINATED POLY VINYL CHLORIDE (CPVC)

This is a Thermoplastic piping material which can be used for higher temperature applications. it is a special Polymer with a higher glass transition point, which means advantages over regular UPVC Pipes & Fittings.

CPVC retains its mechanical strength at higher temperatures.

CPVC = 93°C Max.

UPVC = 59°C Max.



**AMERICAN NATIONAL  
STANDARD**

All products manufactured by "AGM for Pipes and Fittings" have to pass through our stringent Quality Control procedures.

AGM pipes & Fittings are manufactured as per AMERICAN SOCIETY FOR TESTING AND MATERIALS ( ASTM ) STANDARD.

**AGM PVC Pipes and Fittings  
bear the trademark:**



**AGM PVC Pipes and Fittings  
are produced in conformity with  
the appropriate specifications**

- UPVC pipes for water supply
- UPVC pipes for irrigation
- UPVC pipes for waste and ventilation
- UPVC pipes for drainage and sewer systems
- CPVC pipes for hot water
- UPVC and CPVC fittings for all the above items.



**AGM**, high performance extruders with advanced process control and monitoring system permit increased rate of production over the entire diameter ranges, adhering to the highest quality.

**AGM**, high technology moulding machines with advanced automated tooling, permit high volume production of Fittings with exceptionally high consistency in terms of dimensional accuracy, mechanical strength and surface finish.

At **AGM**, sophisticated quality control procedures and advanced manufacturing techniques work hand-in-hand to assure the highest quality and dimensional consistency in thermoplastic piping products.





This is our long term commitment to the customers. From the receipt of the bulk resins to the final stages of production, **AGM** maintains stringent quality control programme by qualified technical personnel using sophisticated procedures, with latest quipment. Both on-line Q.C. checks and in-lab tests are conducted.

**AGM** subjects its full line of pipes and fittings to hydrostatic pressure test as per the design data, to check the suitability of the product to the application.

**AGM** laboratory is well facilitated to confirm that the products manufactured are to standard specifications.

AGM high performance extruders with advanced process control and monitoring system permit increased rate of production over the entire diameter ranges, adhering to the highest quality.

**AGM** high technology moulding machines with advanced automated tooling, permit high volume production of fittings with exceptionally high consistency in terms of dimensional accuracy, mechanical strength and surface finish.

At **AGM**, Sophisticated quality control procedures and advanced manufacturing techniques work hand-in-hand to assure the highest quality and dimensional consistency in thermoplastic piping products.



<b>MATERIAL :</b>	
Unplasticized Polyvinyl Chloride (UPVC)	
<b>GENERAL PROPERTIES :</b>	
a) Specific Gravity b) Water absorption c) Flammability	1.42 gm/ cm <sup>3</sup> 4 gm/ cm <sup>2</sup> will not support combustion
<b>THERMAL PROPERTIES :</b>	
a) Softening point b) Specific Heat c) Thermal conductivity d) Coefficient of Linear expansion e) Elongation at break	80°C 0.25 cal/ °C 0.13 cal/ cm-h-°C 6.7 x 10 <sup>-5</sup> °C 10-50 %
<b>MECHANICAL PROPERTIES :</b>	
a) Ultimate tensile strength b) Compressive strength c) Flexural strength d) Impact strength e) Modulus of elasticity	475-525 kgf/ cm <sup>2</sup> 670 kgf/ cm <sup>2</sup> 950 kgf/ cm <sup>2</sup> 4-4.5 joules 3.2 x 10 <sup>4</sup> kgf/ cm
<b>ELECTRICAL PROPERTIES :</b>	
a) Volume resistivity b) Surface resistivity c) Power factor (at 10 cycles)  UPVC is a non conductor of electricity and also non subject to galvanic or electrolytic attack. Electrical equipments should not be earthened to (UPVC) pipes.	10 <sup>14</sup> ohm/ cm 10 <sup>12</sup> ohm/ cm 3.0
<b>COLOUR :</b>	
Grey and White (Other colours available on request)	

<b>MATERIAL :</b>	
Chlorinated Polyvinyl Chloride (CPVC)	
<b>GENERAL PROPERTIES :</b>	
a) Specific Gravity b) Water absorption c) Flammability	1.52 gm/cm <sup>3</sup> 7 gm/cm <sup>2</sup> will not support combustion
<b>THERMAL PROPERTIES :</b>	
a) Softening point b) Coefficient of Linear expansion	93°C 8.3 x 10 <sup>-6</sup> °C
<b>MECHANICAL PROPERTIES :</b>	
a) Ultimate tensile strength b) Flexural strength c) Impact strength	575 kgf/ cm <sup>2</sup> 1018 kgf/ cm <sup>2</sup> 11 joules
<b>ELECTRICAL PROPERTIES :</b>	
a) Volume resistivity b) Surface resistivity c) Power factor (at 10 cycles)	10 <sup>14</sup> ohm/ cm 10 <sup>12</sup> ohm/ cm 3.0
CPVC is a non conductor of electricity and also non subject to galvanic or electrolytic attack. Electrical equipments should not be earthened to (CPVC) pipes.	
<b>COLOUR :</b>	
Light Grey	



## **FLEXIBILITY**

PVC pipes are regarded as being flexible when properly installed in a trench using suitable bedding and backfill. They seldom fracture when subjected to unforeseen excess loading, merely taking on a small deformation which is of temporary nature.

## **LIGHT WEIGHT**

PVC pipes are lighter in weight than traditional cast iron pipes. This gives savings in manpower handling and installation cost.

## **STRENGTH**

PVC pipes, having a higher impact strength than its iron or clay counterpart, cuts breakages due to mishandling, etc.

## **NON-TOXIC**

Will not impair the taste or smell of water.

## **CORROSION RESISTANCE**

PVC pipes do not undergo physical deterioration due to corrosive subsoil. They can also handle a wide range of industrial effluents.

## **INSTALLATION**

Requiring no special tools or skilled personnel, PVC pipes are easier to install than the traditional ones.

ARABIAN GULF MANUFACTURERS LTD., has technical service department, staffed by qualified engineers, who provide a free technical advisory service to consultants, civil engineers, contractors, etc., including advise on the properties of UPVC and CPVC, the suitability of the material for specific application, the design of pipelines and the installation of PVC pipes. This service also provides site demonstrations and training of operators, unfamiliar with the handling and joining of PVC pipes and fittings.

Direct substitution of UPVC and CPVC pipes for traditional pipes, without an informed appraisal of the most efficient methods of using them, can never show the their full economies. The many advantages and economies possible are best achieved only where UPVC and CPVC are used correctly.

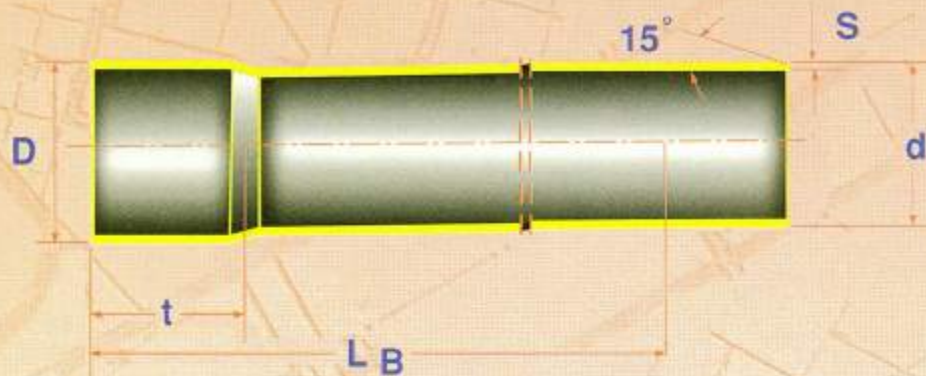


Nominal Pipe Size inches	Ave Outside Dia (d) mm	Wall Thickness (S)		Nominal weight kg/m	Water Pressure Rating at 73°F(23°C) Psi
		MIN mm	MAX mm		
1/2	21.34	2.77	3.28	0.24	600
3/4	26.67	2.87	3.38	0.33	480
1	33.40	3.38	3.89	0.48	450
1 1/4	42.16	3.56	4.07	0.65	370
1 1/2	48.26	3.68	4.19	0.77	330
2	60.32	3.91	4.42	1.04	280
2 1/2	73.12	5.16	5.77	1.62	300
3	88.90	5.49	6.15	2.14	260
4	114.30	6.02	6.73	3.05	220
6	168.28	7.11	7.97	5.30	180
8	219.08	8.18	9.17	8.11	160

1 BAR = 14.5 PSI

Pressure ratings apply only to unthreaded pipes at 23 Centigrade. Threading of schedule 40 pipes is not recommended. The standard lengths (L) 6 meters.





Nominal Pipe Size inches	Ave Outside Dia (d) mm	Wall Thickness (S)		t mm	D mm	Nominal weight kg/m	Water Rating at Pressure 73°F(23°C) Psi
		MIN mm	MAX mm				
1/2	21.34	2.77	3.28	26	27.85	0.24	600
3/4	26.67	2.87	3.38	32	32.95	0.33	480
1	33.40	3.38	3.89	38	40.70	0.48	450
1 1/4	42.16	3.56	4.07	42	49.75	0.65	370
1 1/2	48.26	3.68	4.19	50	56.15	0.77	330
2	60.32	3.91	4.42	76	68.65	1.04	280
2 1/2	73.02	5.16	5.77	80	84.05	1.62	300
3	88.90	5.49	6.15	90	100.55	2.14	260
4	114.30	6.02	6.73	100	127.05	3.05	220
6	168.28	7.11	7.97	134	183.40	5.37	180
8	219.08	8.18	9.17	158	236.45	8.11	160

1 BAR = 14.5 PSI

Pressure ratings apply only to unthreaded pipes at 23°Centigrade. Threading of schedule 40 pipes is not recommended. The standard lengths (L) 6 meters.

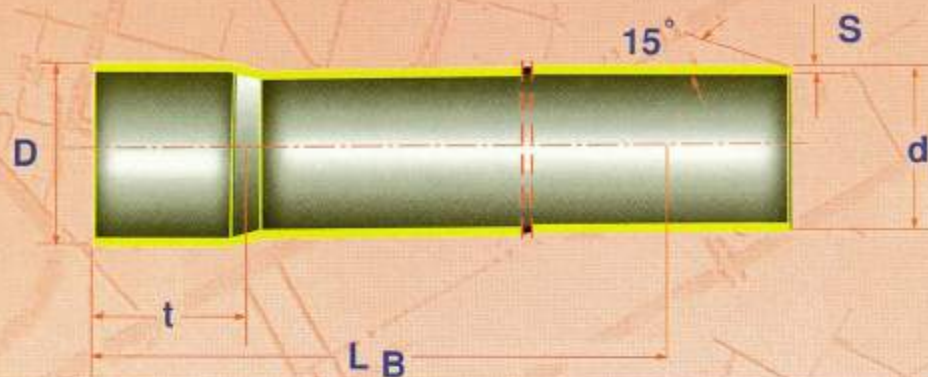




Nominal Pipe Size inches	Ave Outside Dia (d) mm	Wall Thickness mm (s)	Nominal weight kg/m	Water Rating at Pressure 73°F(23°C) Psi
1/2 SDR 13.5	21.34	1.60	0.153	315
1/2 SDR 13.5	21.34	2.10	0.202	315
3/4 SDR 21	26.67	1.50	0.180	200
3/4 SDR 13.5	26.67	2.40	0.287	315
1 SDR 26	33.40	1.50	0.227	160
1 SDR 17	33.40	2.40	0.362	250
1-1/4 SDR 32.5	42.16	1.50	0.285	125
1-1/4 SDR 21	42.16	2.40	0.458	200
1-1/2 SDR 32.5	48.26	1.50	0.325	125
1-1/2 SDR 21	48.26	2.40	0.520	200
1-1/2 SDR 17	48.26	2.80	0.602	250
2 SDR 26	60.32	2.50	0.680	160
2 SDR 21	60.32	2.80	0.752	200
3 SDR 41	88.90	2.50	1.00	100
3 SDR 32.5	88.90	2.70	1.08	125
3 SDR 26	88.90	3.50	1.40	160
4 SDR 41	114.30	3.20	1.658	100
4 SDR 32.5	114.30	3.50	1.80	125
4 SDR 32.5	114.30	4.0	2.055	125
4 SDR 26	114.30	4.50	2.312	160
4 SDR 26	114.30	5.0	2.567	160
6 SDR 64	168.28	3.20	2.420	63
6 SDR 41	168.28	4.0	3.025	100
6 SDR 41	168.28	4.50	3.403	100
6 SDR 32.5	168.28	5.20	3.930	125
8 SDR 41	219.08	6.0	5.903	100
8 SDR 32.5	219.08	7.0	6.887	125

1 BAR = 14.5 PSI  
The standard lengths (L) 6 meters.



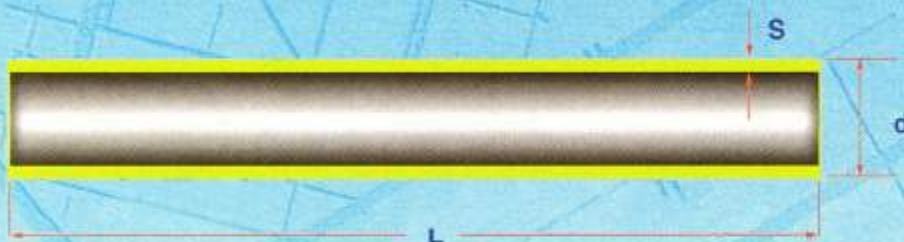


Nominal Size inches	Ave Outside Dia (d) mm	Wall Thickness mm (S)	t mm	D mm	Nominal weight kg/m	Water Rating at Pressure 73°F(23°C) Psi
1/2 SDR 13.5	21.34	1.60	26	24.6	0.153	315
1/2 SDR 13.5	21.34	2.10	26	25.6	0.202	315
3/4 SDR 21	26.67	1.50	32	29.7	0.180	200
3/4 SDR 13.5	26.67	2.40	32	31.5	0.287	315
1 SDR 26	33.40	1.50	38	36.5	0.227	160
1 SDR 17	33.40	2.40	38	38.2	0.362	250
1-1/4 SDR 32.5	42.16	1.50	42	45.2	0.285	125
1-1/4 SDR 21	42.16	2.40	42	47	0.458	200
1-1/2 SDR 32.5	48.26	1.50	50	51.3	0.325	125
1-1/2 SDR 21	48.26	2.40	50	53.1	0.520	200
1-1/2 SDR 17	48.26	2.80	50	53.9	0.602	250
2 SDR 26	60.32	2.50	58	65.4	0.680	160
2 SDR 21	60.32	2.80	58	66	0.752	200
3 SDR 41	88.90	2.50	82	94	1.00	100
3 SDR 32.5	88.90	2.70	82	94.5	1.08	125
3 SDR 26	88.90	3.50	82	96	1.40	160
4 SDR 41	114.30	3.20	94	120.8	1.658	100
4 SDR 32.5	114.30	3.50	94	121.5	1.80	125
4 SDR 32.5	114.30	4.0	94	122.5	2.055	125
4 SDR 26	114.30	4.50	94	123.5	2.312	160
4 SDR 26	114.30	5.0	94	124.5	2.567	160
6 SDR 64	168.28	3.20	124	174.7	2.420	63
6 SDR 41	168.28	4.0	124	176.5	3.025	100
6 SDR 41	168.28	4.50	124	177.3	3.403	100
6 SDR 32.5	168.28	5.20	124	178.7	3.930	125
8 SDR 41	219.08	6.0	148	231.10	5.903	100
8 SDR 32.5	219.08	7.0	148	233.10	6.887	125

1 BAR = 14.5 PSI

The standard lengths (L) 6 meters.





Nominal Pipe Size inches	Ave Outside Dia (d) mm	Wall Thickness (S)		Nominal weight kg/m	Water Pressure Rating at 73°F(23°C) Psi
		MIN mm	MAX mm		
1/2	21.34	3.73	4.24	0.31	850
3/4	26.67	3.91	4.42	0.41	690
1	33.40	4.55	5.08	0.60	630
1 1/4	42.16	4.85	5.43	0.84	520
1 1/2	48.26	5.08	5.69	1.03	470
2	60.32	5.54	6.20	1.41	400
2 1/2	73.02	7.01	7.85	2.15	420
3	88.90	7.62	8.53	2.88	370
4	114.30	8.56	9.58	4.22	320
6	168.28	10.97	12.29	8.05	280
8	219.08	12.70	14.22	12.23	250

1 BAR = 14.5 PSI

Pressure ratings apply to water services at 23° Centigrade. For more severe service an additional correction factor may be required. Threading of schedule 80 PVC pipe above 4" nominal size is not recommended.

The standard length is 6 meters.





Nominal Pipe Size inches	Ave Outside Dia (d) mm	Wall Thickness (S) mm	Nominal weight kg/m	Water Pressure Rating at 73°F(23°C) Psi
1/2	21.30	3.73	0.323	850
3/4	26.70	3.91	0.453	690
1	33.40	4.55	0.637	630
1 1/4	42.20	4.85	0.918	520
1 1/2	48.30	5.08	1.060	470
2	60.30	5.54	1.510	400

The standard length (L) is 6 meters.

### CHLORINATED POLY VINYL CHLORIDE (CPVC)

This is thermoplastic piping material which can be used for higher temperature applications. It is a special Polymer with a higher glass transition point, which means advantages over regular UPVC Pipes & Fittings.

CPVC retains its mechanical strength at higher temperatures.

CPVC = 93°C Max

UPVC = 59°C Max.

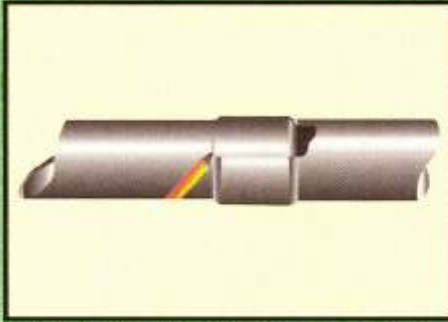




1. In the case of a pipe cut on site, cut the spigot end square.



2. Pipe edge can be chamfered.



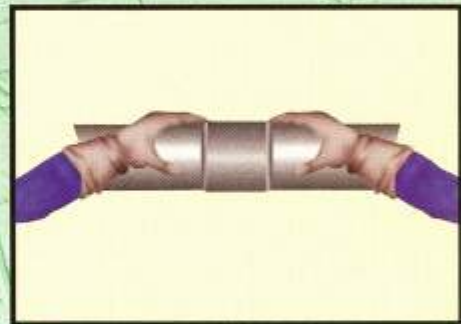
3. Mark depth of entry of the pipe into the socket and alignment mark.



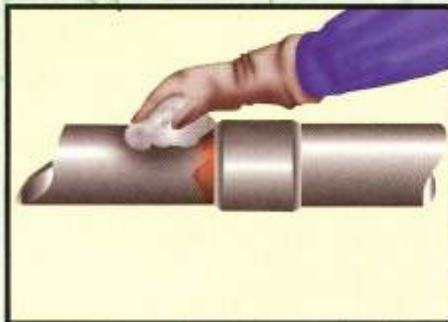
4. Clean the spigot and socket by using a clean dry cloth and AGM cleaner.



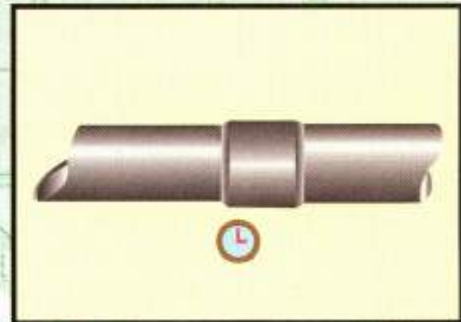
5. Apply one even coat of AGM cement to both of the surfaces to be joined, stroking the cement along and not around the surfaces. Do not apply excessive cement.



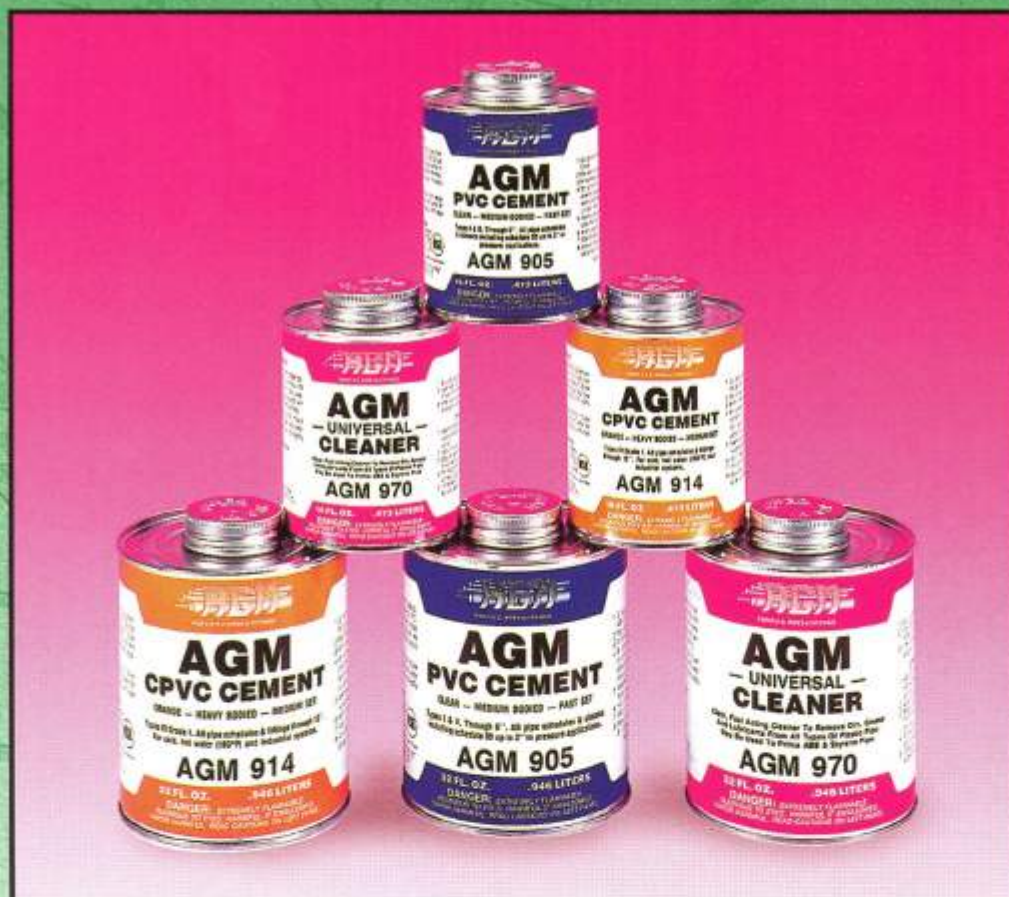
6. Immediately push the spigot fully home and hold for not less than 10 secs.



7. Remove surplus cement.



8. After completion allow 8 hours before applying working pressure or 24 hours before applying test pressure. If it is necessary to reduce these times please consult our Technical department.



PACKING OF AGM LUBRICANT , CLEANER AND SOLVENT CEMENT ( KG / CAN )

DESC.	1/8 KG	1/4 KG	1/2 KG	1 KG
LUBRICANT AGM 919	—	—	—	✓
CLEANER AGM 970	—	✓	✓	✓
CLEAR CEMENT SCH 40 AGM 905	✓	✓	✓	✓
GREY CEMENT SCH 80 AGM 917	✓	✓	✓	✓
ORANGE CEMENT CPVC AGM 914	✓	✓	✓	✓



# CHEMICAL RESISTANCE

Agent	Concentration %	Temp. °C	
Acetaldehyde, aqueous	40	40	o
Acetaldehyde, concentrated	100	20	-
Acetaldehyde + acetic acid	90/10	20	o
Acetic acid, aqueous	upto 25	40	+
	upto 25	60	o
	25-60	60	+
	80	40	o
Acetic acid, crude	95	40	o
Acetic anhydride	100	20	-
	100	40	-
	100	60	-
Acetic ester	100	20	-
Acetone, aqueous	traces	20	-
Acetone	100	20	-
	100	60	-
Acronal dispersions	commercial	20	+
Acronal solutions	commercial	20	-
Acrylic acid ethyl ester	100	20	-
Adipic acid, aqueous	saturated	20	+
	saturated	60	o
Aktivin, aqueous	1	20	+
Allyl alcohol	96	20	o
	96	60	-
Aluminium chloride, aqueous	diluted	40	+
	diluted	60	o
	saturated	60	+
Aluminium sulphate, aqueous	diluted	40	+
	diluted	60	o
	saturated	60	+
Alums, aqueous	diluted	40	+
	diluted	60	o
	saturated	60	+
Ammonia, gaseous	100	60	+
Ammonia, liquid	100	20	o
Ammonia water	warm sat.	40	+
	warm sat.	60	o
Ammonium chloride, aqueous	diluted	40	+
	diluted	60	o
	saturated	60	+
Ammonium fluoride, aqueous	upto 20	20	+
	upto 20	60	o
Ammonium nitrate, aqueous	diluted	40	+
	diluted	60	o
	saturated	60	+
Ammonium sulphate, aqueous	diluted	40	+
	diluted	60	o
	saturated	60	+
Ammonium sulphide, aqueous	diluted	40	+
	diluted	60	o
	saturated	60	+
Aniline, aqueous	saturated	20	-
	saturated	60	-
Aniline, pure	100	20	-
	100	60	-
Aniline chlorine hydrate, aqu.	saturated	20	o
	saturated	60	-
Anone	100	20	-
Anthraquinone sulphonic acid	suspension	30	+
Antiformin, aqueous	2	20	+
Antimony chloride, aqueous	90	20	+
Arsenic acid, aqueous	diluted	40	+
	diluted	60	o
	80	40	+
	80	60	o
Asfluid I. dry (film)	-	20	o
Asfluid I. liquid	-	20	-
Beef suet emulsion, sulphonated	commercial	20	+
Beer	commercial	20	+
Benzaldehyde, aqueous	0.1	60	-

Agent	Concentration %	Temp. °C	
Benzene	100	20	-
Benzine	100	60	+
Benzine-benzene mixture	80/20	20	-
Benzoic acid, aqueous	any	40	+
	any	60	o
Benzoic acid soda, aqueous	upto 10	40	+
	upto 10	60	o
	36	60	o
	warm sat.	50	+
Bisulphite lye, containing SO <sub>2</sub>			
Bleaching lye, 12.5% active chlorine	usual	40	+
	usual	60	o
Borax, aqueous	diluted	40	+
	diluted	60	o
	saturated	60	o
Boric acid, aqueous	diluted	40	+
	diluted	60	o
	saturated	60	o
Brandy, various kinds	commercial	20	+
Bromine, liquid	100	20	-
Bromine, vapours	low	20	o
Butadiene	100	60	+
Butandiol	upto 100	20	o
Butandiol, aqueous	upto 10	20	+
	upto 10	40	o
	upto 10	60	-
Butane, gaseous	50	20	+
Butanol	upto 100	40	+
	upto 100	60	o
	upto 100	40	o
Butindiol	100	20	-
Butyl acetate	100	-20	+
Butylene, liquid	100	20	o
Butyl phenol	100	20	o
Butyric acid, aqueous	20	20	+
	concentr.	20	-
Calcium chloride, aqueous	diluted	40	+
	diluted	60	o
	saturated	60	+
Calcium nitrate, aqueous	50	40	+
Caramel	commercial	60	+
Carbon bisulphide	100	20	o
Carbonic acid, aqueous at an over pressure of 7 bar	saturated	20	+
Carbonic acid, dry	100	60	+
Carbonic acid, moist	any	40	+
	any	60	o
Carbon tetrachloride, techn.	100	20	o
Caustic lye, aqueous	upto 40	40	+
	upto 40	60	o
	50/60	60	+
	diluted	20	+
Chloramine, aqueous	1	40	+
Chloric acid, aqueous	1	60	o
	10	40	+
	10	60	o
	20	40	+
	20	60	o
Chlorine, gaseous, dry	100	20	o
Chlorine, gaseous, moist	0.5	20	+
	1	20	o
	5	20	o
Chlorine water	saturated	20	o
Chloroacetic acid (mono)	100	40	+
	100	60	o
Chloroacetic acid (mono) aqu.	85	20	o
Chloromethyl	100	20	-
Chlorosulphonic acid	100	20	o

+ = resistant    o = limited resistant    - = not resistant

# CHEMICAL RESISTANCE

Agent	Concentration %	Temp. °C	
Chromic acid, aqueous	upto 50	40	+
	upto 50	60	o
Chromic acid/ sulphuric acid/ water	50/15/35	40	+
	50/15/35	60	o
Chromic alum, aqueous	diluted	40	+
	diluted	60	o
	saturated	60	+
Cider	commercial	20	+
Citric acid, aqueous	upto 10	40	+
	upto 10	60	o
	saturated	60	+
Clophene	commercial	20	o
	commercial	60	-
Coconut oil alcohol	100	20	+
	100	60	+
Copper fluoride, aqueous	2	50	+
Copper sulphate, aqueous	diluted	40	+
	diluted	60	o
	saturated	60	+
Cresol, aqueous	upto 90	45	o
Crotonaldehyde	100	20	-
Cuprous chloride, aqueous	saturated	20	+
Cyclanone	commercial	20	+
	commercial	60	+
Cyclohexanol	100	20	-
Cyclohexanone	100	20	-
Densodrin W	commercial	60	+
Dextrin, aqueous	saturated	20	+
	18	60	o
Diglycolic acid, aqueous	30	60	o
	saturated	20	+
Dimethylamine, liquid	100	-30	o
Dutch glue	ind.stand.	60	+
Ethyl alcohol, aqueous	any	20	+
	96	60	o
Ethyl alcohol, denaturated (with 2% toluene)	96	20	+
Ethyl alcohol (fermentation mash)	ind.stand.	40	+
	ind.stand.	60	o
	ind.stand.	20	+
Ethyl alcohol + acetic acid (fermentation mash)	100	20	-
Ethylene chloride	100	-20	-
Ethylene oxide, liquid	100	20	-
Ethyl acetate	100	60	-
	100	20	-
Ethyl ether	100	20	-
Fatty acids	100	60	+
Fermentation yeast wort	ind.stand.	40	+
	ind.stand.	60	o
Ferric chloride, aqueous	upto 10	40	+
	upto 10	60	o
	saturated	60	+
Ferric potassium cyanide and ferrous potass. cyanide, aqu	diluted	40	+
	diluted	60	o
	saturated	60	+
Formaldehyde, aqueous	diluted	40	+
	diluted	60	o
	40	60	+
Formic acid	100	20	+
	100	60	-
Formic acid, aqueous	upto 50	40	+
	50	60	o
Freon 12	100	20	+
Fruit pulp	ind.stand.	20	+
Fruit tree carbolineum aqueous	usual	20	+
Gas water	usual	40	o
Glacial acetic acid	100	20	o
	100	40	-

Agent	Concentration %	Temp. °C	
Glucose, aqueous	saturated	20	+
	saturated	60	o
Glycerine, aqueous	any	60	+
Glycocol, aqueous	10	40	+
Glycol, aqueous	commercial	60	+
Glycolic acid	37	20	+
Hexantriol	commercial	60	+
Hydrobromic acid, aqueous	upto 10	40	+
	upto 10	60	o
	48	60	+
Hydrochloric acid, aqueous	upto 30	40	+
	upto 30	60	o
	over 30	20	+
	over 30	60	+
Hydrofluoric acid, aqueous	upto 40	20	+
	40	60	o
	60	20	o
	70	20	o
Hydrofluosilicic acid, aqueous	upto 32	60	+
Hydrogen	100	60	+
Hydrogen peroxide, aqueous	upto 30	20	+
	upto 20	50	+
Hydrogen phosphide	100	20	+
Hydrogen sulphide, aqueous	warm sat.	40	+
	warm sat.	60	o
Hydrogen sulphide, dry	100	60	+
Hydrosulfite, aqueous	upto 10	40	+
	upto 10	60	o
Hydroxylamine sulphate, aqu.	upto 12	35	+
Lactic acid, aqueous	upto 10	40	+
	upto 10	60	o
	90	60	-
Lead acetate, aqueous	warm sat.	50	+
	diluted	40	+
	diluted	60	+
	saturated	60	+
Lead tetraethyl	100	20	+
Liquors	commercial	20	+
Magnesium chloride, aqueous	diluted	40	+
	diluted	60	o
	saturated	60	+
Magnesium sulphate, aqueous	diluted	40	+
	diluted	60	o
	saturated	60	+
Maleic acid, aqueous	saturated	40	+
	saturated	60	o
	35	40	+
Malic acid, aqueous	1	20	+
Manuring salts, aqueous	upto 10	40	+
	upto 10	60	o
	saturated	60	+
Mersol D	ind.stand.	40	+
Methyl alcohol	100	40	+
	100	60	o
Methylamine, aqueous	32	20	o
Methylene chloride	100	20	-
Methyl sulphuric acid, aqu.	upto 50	20	+
	upto 50	40	o
	100	40	+
	100	60	o
Milk	commercial	20	+
Mixed acid (sulphuric acid/ nitric acid/water)	48/49/3	20	+
	48/49/3	40	o
	50/50/0	20	o
	50/50/0	40	-
	10/20/70	50	+
	10/87/3	20	o
	50/31/19	30	+



# CHEMICAL RESISTANCE

Agent	Concentration %	Temp. °C	
Molasses	ind.stand.	20	+
	ind.stand.	60	o
Molasses wort	ind.stand.	60	+
Mowilith D	commercial	20	+
Nekal, BK, aqueous	diluted	40	+
	diluted	60	o
Nickel sulphate, aqueous	diluted	40	+
	diluted	60	o
	saturated	60	+
Nicotine, aqueous	usual	20	+
Nicotine preparations, aqu.	usual	20	+
Nitric acid, aqueous	upto 30	50	+
	30/50	50	+
	98	20	-
Nitrous fumes	concentr.	20	o
	concentr.	60	-
Oils and fats	commercial	60	+
Oleic acid	commercial	60	+
Oleum	10	20	-
Oleum fumes	lower	20	+
	higher	20	o
Oxalic acid, aqueous	diluted	40	+
	diluted	60	+
	saturated	60	+
Oxygen	any	60	+
Ozone	100	20	+
	10	30	+
Palm nut fatty acids	100	60	+
Paraffin emulsion	commercial	20	+
	commercial	40	+
Perchloric acid, aqueous	upto 10	40	+
	upto 10	60	o
	saturated	60	+
Phenol, aqueous	upto 90	45	o
	1	20	+
Phenylhydrazine	100	20	-
	100	60	-
Phenylhydrazine-chloro-hydrate, aqueous	saturated	20	o
	saturated	60	-
Phosgene, gaseous	100	20	+
	100	60	o
Phosgene, liquid	100	20	-
Phosphoric acid, aqueous	upto 30	10	+
	upto 30	60	o
	40	60	+
	80	20	+
	80	60	+
Phosphorus pentoxide	100	20	+
Phosphorus trichloride	100	20	-
Photo developers	commercial	40	+
Photo emulsions	any	40	+
Photo fixing baths	commercial	40	+
Picric acid, aqueous	1	20	+
Potash, aqueous	saturated	40	+
Potassium bichromate, aqu.	40	20	+
Potassium borate, aqueous	1	40	+
	1	60	o
Potassium bromate, aqu.	upto 10	40	+
	upto 10	60	o
Potassium bromide, aqueous	diluted	40	+
	diluted	60	o
	saturated	60	+
Potassium chloride, aqueous	diluted	40	+
	diluted	60	o
	saturated	60	+
Potassium chromate, aqueous	40	20	+
Potassium cyanide, aqueous	upto 10	40	+

Agent	Concentration %	Temp. °C	
	upto 10	60	o
	saturated	60	+
Potassium lye, aqueous	upto 40	40	+
	upto 40	60	o
	50/60	60	+
Potassium nitrate, aqueous	diluted	40	+
	diluted	60	o
	saturated	60	+
Potassium perchlorate, aqu.	1	40	+
	1	60	o
Potassium permanganate, aqu.	upto 6	20	+
	upto 6	40	+
	upto 6	60	+
	upto 18	40	+
Potassium persulphate, aqu.	diluted	40	+
	diluted	60	o
	saturated	40	+
	saturated	60	o
Propane, gaseous	100	20	+
Propane, liquid	100	20	+
Propargyl alcohol, aqueous	7	60	+
Roaster gases, dry	any	60	+
Sea water	-	40	+
	-	60	o
Silicic acid, aqueous	any	60	+
Silver nitrate, aqueous	upto 8	40	+
	upto 8	60	o
Soap solution, aqueous	concentr.	20	+
	concentr.	60	o
Soda, aqueous	diluted	40	+
	diluted	60	o
	saturated	60	+
Sodium bisulphite, aqueous	diluted	40	+
	diluted	60	o
	saturated	60	+
Sodium chlorate, aqueous	upto 10	40	+
	upto 10	60	o
	saturated	60	+
Sodium chloride, aqueous	diluted	60	+
	saturated	60	+
Sodium chlorite, aqueous	diluted	20	o
	diluted	60	-
Sodium hypochlorite, aqu.	diluted	20	+
Sodium sulphide, aqueous	diluted	40	+
	diluted	60	o
	saturated	60	+
Sperm oil alcohol	commercial	20	+
Spin bath acids, containing CS2	0.01	52	+
	0.02	52	o
	0.07	52	-
Stannous chloride, aqueous	diluted	40	+
	diluted	60	o
	saturated	60	o
Starch, aqueous	any	40	+
	any	60	+
Starch syrup	ind.stand.	60	+
Stearic acid	100	60	+
Sulphur dioxide, aqueous at an overpressure of 7 bar	saturated	20	+
Sulphur dioxide, dry	any	60	+
Sulphur dioxide, liquid	100	-10	o
	100	20	o
	100	60	-
Sulphur dioxide, moist and aqu.	any	40	+
	50	50	+
	any	60	o
Sulphuric acid, aqueous	upto 40	40	+
	upto 40	60	o
	70	20	+

# CHEMICAL RESISTANCE

Agent	Concentration %	Temp. °C	
	70	60	+
	80/90	40	+
	96	20	+
Tallow	96	60	o
	100	20	+
	100	60	+
Tanigan extra A, aqueous	any	20	+
Tanigan extra B, aqueous	any	20	+
Tanigan extra D, aqueous	saturated	40	o
	saturated	60	-
Tanigan F, aqueous	saturated	60	+
Tanigan U, aqueous	saturated	40	+
	saturated	60	o
Tanning extracts, from cellulose	usual	20	+
Tanning extracts, vegetable	usual	20	+
Tartaric acid, aqueous	upto 10	40	+
	upto 10	60	o
	saturated	60	+
Thionyl chloride	100	20	-
Toluol	100	20	-
Trichloroethylene	100	20	-
Triethanolamine	100	20	-
Trilone	commercial	60	o
Trimethylolpropane, aqueous	upto 10	40	+
	upto 10	60	o
	commercial	40	o
	commercial	60	o
Urea, aqueous	upto 10	40	+
	upto 10	60	o
	33	60	+

Agent	Concentration %	Temp. °C	
Urine	normal	40	+
	normal	60	+
Vinegar (wine vinegar)	commercial	50	+
	commercial	60	o
Vinyl acetate	100	20	-
Waste gases, cont. carbonic acid	any	60	+
Waste gases, cont. hydrochloric acid	any	60	+
Waste gases, cont. hydrogen fluoride	traces	60	+
Waste gases, nitrous	traces	60	+
	higher	60	-
Waste gases, cont. oleum	lower	20	+
	higher	20	-
Waste gases, cont. SO <sub>2</sub>	lower	60	+
	50	50	+
Waste gases, cont. sulphuric acid, moist water	any	60	+
	100	40	+
	100	60	+
Wax alcohol	100	60	+
Wines, red and white	commercial	20	+
Xylene	100	20	-
Zinc chloride, aqueous	diluted	40	+
	diluted	60	o
	saturated	60	+
Zinc sulphate, aqueous	diluted	40	+
	diluted	60	o
	saturated	60	+





British Standards Institution

ENDORSEMENT No. 1

LICENCE No. 2402 BRITISH STANDARD No. 4246 Part 1: 1989

GRANTED TO FIP FORMATURA INIEZIONE POLIMERI SPA

IS ENDORSED AS FOLLOWS

1. To include the following fittings:-

(These items on the Licence Schedule have been brought forward to this Endorsement.)

DESCRIPTION	CLASS	NOMINAL SIZE (INCHES)								
GLV 90° Elbow	D		1 1/2	2	2 1/2	3	4	5	6	8
	E	1/8	1	1	1 1/2	2	3	4		
HLV 45° Elbow	D		1 1/2	2	2 1/2	3	4			
	E	1/8	1	1 1/2	2	3	4			
MVL Socket	D		1 1/2	2	2 1/2	3	4	5	6	8
	E	1/8	1	1 1/2	2	3	4			
TVL 90° Tee	D		1 1/2	2	2 1/2	3	4	5	6	8
	E	1/8	1	1 1/2	2	3	4			
CLV End Cap	D		1 1/2	2	2 1/2	3	4			
	E	1/8	1	1 1/2	2	3	4			
DLV Reducing Bush	D									4x5 4x6
	E	1/8	1x1	1x1 1/2	1x2	2x1	2x2			

2. All previous Endorsements are hereby cancelled.

DIRECTOR  
28 July 1989

## INSTITUT FÜR BAUTECHNIK

Anstalt des öffentlichen Rechts

1009 Berlin, am 30. Dez. 1981  
Abgabestelle 02-11  
Telefon 200-1 (Deutschland 300-270)  
Telefax 200-3-486  
Grafik: ICI/22-2-51, 3-2/76

## Prüfbescheid

## Gegenstand des Prüfbescheides:

Formstücke aus PVC hart für erdverlegte Grundleitungen DN 100 bis DN 300

## Antragsteller:

SpA REDI  
Via Madonna del Prati, 5/A  
I-40 069 Sola Predosa

## Geltungsdauer bis:

31. Dezember 1985

## Prüfzeichen:

PA-I 2481

Dieser Prüfbescheid wird den oben genannten Gegenstand unter den nachstehenden Bedingungen zugestellt / erteilt.

## Bemerkungen:

Dieser Prüfbescheid ersetzt den Prüfbescheid vom 1. Juli 1980 mit Prüfzeichen PA-I 2481.

Der in Abs. 11 der Allgemeinen Bestimmungen (Seite 2 dieses Prüfbescheides) geforderte Eignungs- und Überwachungsnachweis ist erbracht.

Der Gegenstand dieses Prüfbescheides darf nur verwendet werden, wenn seine Herstellung überwacht / überwacht ist und dies auf der Baustelle nachgewiesen wird (siehe Abschnitt 11 der Allgemeinen Bestimmungen).

Die Fremdüberwachung des Herstellwerks erfolgt durch die Staatliche Materialprüfungsanstalt Darmstadt.

Dieser Prüfbescheid enthält sechs Seiten und \*\*\* Blatt Anlagen, die Bestandteil dieses Bescheides sind.

001 1046 107101\_017

Tel. 0241.31.31.11.00

## ISTITUTO ITALIANO DEI PLASTICI

20140 MILANO - VIA C. F. PETTITI, 16

Rappresentanza con IIP  
n° 10 del 1° gennaio 1978

Milano, 1 giugno 1985

Dichiarazione scritta  
Merktik der Anmeldung

MARCHIO DI CONFORMITA' IIP

Contratto n. 68 - appendice n. 8 (annulla e sostituisce la precedente appendice n. 7)

Concessionario: F.I.P. - Formatura Iniezione Polimeri S.p.A.  
(n° distrettuale 122)

RACCORDI IN PVC RIGIDO PER CONDOTTE DI FLUIDE IN PESSIONE (UNI 2442/75)

Manufatti iscritti al marchio

I manufatti iscritti al marchio IIP sono i seguenti:

Raccordo tipo E D I	dal Ø al Ø mm	PN	nome commerciale del raccordo
Rocchetto B	16x63	16	BIV
T a 90°	20x160	16	TIV
Gonfio G 90°	16x160	16	GIV
Gonfio G 45°	20x160	16	XIV
Mancotto M	16x160	16	MIV
Curva C 90°	20x110 125x160	16 10	CVV
Croci CR	25x63	16	XIV
Riduzioni R	16x12x10x90	16	RIV
Riduzioni concentriche	20x16x160x140	16	DEV
Calotte CL	16x110	16	CLV
Flange libere con collare FL	16x160	16	DFV+QVT

La ditta concessionaria

l'Istituto Italiano dei Plastici  
e SEGRETARIO GENERALE



MARQUE NATIONALE NF — TUBES ET RACCORDES EN PVC  
POUR L'EVACUATION DES EAUX

AFNOR Tour Europe CEDEX 7 92000 PARIS LA DEFENSE Tel (1) 778-13 26

organisme certificateur agréé n° 01-29

Service Technique /  
Centre d'Essai de Matières Plastiques  
65, rue de France  
75004-PARIS CEDEX 17ADMISSION À LA MARQUE NF  
n° 287A de 1984.07.03  
RECONDUCTION DE LA MARQUE NF  
n° 287A de 1985.07.03

La Société REDI Spa

Usine: SOLA PREDOSA

Siège Social: Via Madonna del Prati, n° 40069 PREDOSA (BO) Italie

est autorisée à apposer le marque de conformité aux normes françaises sur les types de tubes et/ou raccords en PVC pour l'évacuation des eaux usées.

## Types de Produits adhésifs à la marque NF

— RACCORDI IN POLICLORURE DI VINILE RIGIDI PER ASSIEMEGLIATI PER COLLAGGI

- Condes à 45°, série HF DN 32, 40, 50, 63, 75, 100 et 110  
- Condes à 45°, série FF DN 32, 40, 50, 63, 75, 100 et 110  
- Condes à 87°30', série HF et FF DN 100  
- Condes à 87°30', série HF DN 30, 40, 50, 63, 75, 100 - 110 et 125\*  
- Condes à 87°30', série FF DN 32, 40, 50, 75, 100 et 110  
- Colottes à 45°, série HF DN 32, 40, 50, 75, 100 et 110  
- Colottes à 45°, série FF DN 32, 40, 50, 75, 100 et 110  
- Colottes à 87°30', série HF DN 32, 40, 50 et 75  
- Colottes à 87°30', série FF DN 32, 40, 50 et 75  
- Rouleaux concentriques réduits, série HF 30-40  
- Rouleaux concentriques réduits, série FF 30-32

NF = Nœud-Feuille FFT = Feuille-Feuille-Feuille Types adhésifs de 1984.07.03.

Ces déclarations annule et remplace toute déclaration antérieure.

Le Certificat Particulier reconduit au moins deux fois par an les droits d'usage de la marque NF et, le cas échéant, les modifications au les annule.

Pour le Service Technique

J. PARIOT

Pour l'Association Française de Normalisation



Issued to Messrs Arabian Gulf Manufacturers Ltd., Jeddah, Saudi Arabia  
Object of test PVC-pipes  $\varnothing$  110 mm PN 10  
Test Determination of resistance to internal pressure according to ISO/DIS 4422/1.2 sect 6.1.1.

On March 1st 1984 we received the following PVC pressure pipes delivered by the Client.

Dimension Marking  
 $\varnothing$  110 mm PN 10 ASARIAN GULF CO JEDDAH  
 $\varnothing$  110 MM SERIES J

The colour of all pipes were grey.

The tests were performed as Quality tests at +60°C at an induced stress of 10 MPa. End fittings type B according to ISO 1167 have been used.

TEST RESULTS

Test temperature: 60 ± 1°C

$\varnothing$  110 mm PN 10

Sample No.	Maximum mean out-side diam mm	Min wall-thickness mm	Induced stress MPa	Time to rupture h
1	110,4	1,75	10	> 1000
2	110,2	1,70	10	> 1000
3	110,4	1,70	10	> 1000
4	110,4	1,65	10	> 1000
5	110,4	1,70	10	> 1000

The results fulfil the quality test requirements of ISO/DIS 4422/1.2 sect. 6.1.1.

STATENS-PROVINCINSANSTALT  
(Swedish National Testing Institute)  
Department of Materials and Mechanics  
Göteborg

*Jan Hilding*  
Jan Hilding

PERSONEN	ADRESS	TELEFON	FAX	BOKFÖR
<input type="checkbox"/> RÅDGIVNING	Box 517, SE-40030	031 423000	031 423000	755 001
<input type="checkbox"/> STATISK	Box 508, SE-40030	031 423000	031 423000	755 002
<input type="checkbox"/> KONSTRUKTION	Box 510, SE-40030	031 423000	031 423000	755 003
<input type="checkbox"/> SVENSK	Box 512, SE-40030	031 423000	031 423000	755 004

Issued to Messrs Arabian Gulf Manufacturers Ltd., Jeddah, Saudi Arabia  
Object of test PVC-pipes  $\varnothing$  90 mm PN 10  
Test Determination of resistance to internal pressure according to ISO/DIS 4422/1.2 sect 6.1.1.

On March 1st 1984 we received the following PVC pressure pipes delivered by the Client.

Dimension Marking  
 $\varnothing$  90 mm PN 10 ---

The colour of all pipes were grey.

The tests were performed as Quality tests at +60°C at an induced stress of 10 MPa. End fittings type B according to ISO 1167 have been used.

TEST RESULTS

Test temperature: 60 ± 1°C

$\varnothing$  90 mm PN 10

Sample No.	Maximum mean out-side diam mm	Min wall-thickness mm	Induced stress MPa	Time to rupture h
1	89,8	1,90	10	> 1000
2	89,8	1,95	10	> 1000
3	89,8	1,90	10	> 1000
4	89,8	1,90	10	> 1000
5	89,8	1,90	10	> 1000

The results fulfil the quality test requirements of ISO/DIS 4422/1.2 sect 6.1.1.

STATENS-PROVINCINSANSTALT  
(Swedish National Testing Institute)  
Department of Materials and Mechanics  
Göteborg

*Jan Hilding*  
Jan Hilding

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<input type="checkbox"/> KONSTRUKTION	Box 510, SE-40030	031 423000	031 423000	755 003
<input type="checkbox"/> SVENSK	Box 512, SE-40030	031 423000	031 423000	755 004

MARQUE NATIONALE NF – TUBES PVC ET LEURS RACCORDS  
POUR RÉSEAUX D'EAU AVEC PRESSION

AFNOR Tour Europe CEDEX 7 93080 PARIS LA DÉFENSE TEL (1) 778-13-28

organisme certificateur agréé n° 01-28

Centre Scientifique et Technique  
du Bâtiment  
NF 02 – CHAMPS SUR MARNE  
77421 – MARNE LA VALLÉE CEDEX 2



ADMISSION À LA MARQUE NF  
NF ..... de .....

RECONDUCTION DE LA MARQUE NF  
NF ..... de 1983.04.28.

La Société ... FIV

siège : CIRELIA (Italie)

Siège Social: Via E. Carrel, 6 & - 16030 SORI (GE)

est autorisé à apposer le marque de conformité aux normes françaises sur les types de tubes en PVC et leurs raccords pour réseaux d'eau avec pression suivants:

Types de Produits admis à la marque NF

- RACCORDS EN POLYCARBONATE DE VINYLE NON PLASTIFIÉS POUR ASSEMBLAGES PAR COLLAGE
  - Coudes à 90°, orifices FF { DN 16, 20, 25, 32, 40, 50, 63, 75, 90, 110, 125, 140 - 160 - /-/-
  - Tés égaux à 90°, orifices FFF
  - Manches droits égaux, orifices FF
- Coudes à 45°, orifices FF { DN 20, 25, 32, 40, 50, 63, 75, 90, 110, 125, 140 - 160 - /-/-
- Manches réduits courts, orifices NF: 20-16, 25-20, 32-25, 40-32, 50-40, 63-50, 75-63, 90-75, 110-90, 125-110- 140-125, 160-140 - /-/-

FF = Femelle-Femelle FFF = Femelle-Femelle-Femelle suite au verso  
Cette décision annule et remplace toute attestation antérieure.

Le Comité Particulier reconduit au moins deux fois par an les droits d'usage de la marque NF et, le cas échéant, les modalités de son usage.

Pour le Secrétariat Technique  
27 MARSEILLE

Pour l'Association Française de Normalisation  
A. NORMAN

UPVC pipes and fittings supplied by AGM conform to national and international standards, thus assuring continued reliable service and compatibility with other system components.

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## شركة مصانع الخليج العربي المحدودة

للصناعات البلاستيكية

الإدارة والمبيعات : جدة - ت ٦٨٠١٤١٦ - مباشر ٦٨٠٣٤٨٤ - ص.ب ٢١٤٣ جدة ٢١٤٥١  
تلكس ٦٠٠٢٢٩ بلاستيك أس جي - فاكس ٦٨٨٣٥٨٨

المصانع : جدة - المدينة الصناعية - ت ٦٣٧٧٩٤٤ (٥ خطوط)، ٦٣٨٠٥٤٥ (٧ خطوط)  
فاكس ٦٣٨٠٥٤٠

الفروع :	جدة : ت ٦٤٢٤٩٣ - ٦٩١١٧١٢	الرياض : ت ٤٠٣٦١٦٠ - ٤٤٦٣٣١٢
	الدممام : ت ٨٣٤٠٤٧٢ - ٨٣٣٨٢٤٣	تبوك : ت ٤٢٣٨٨٦١