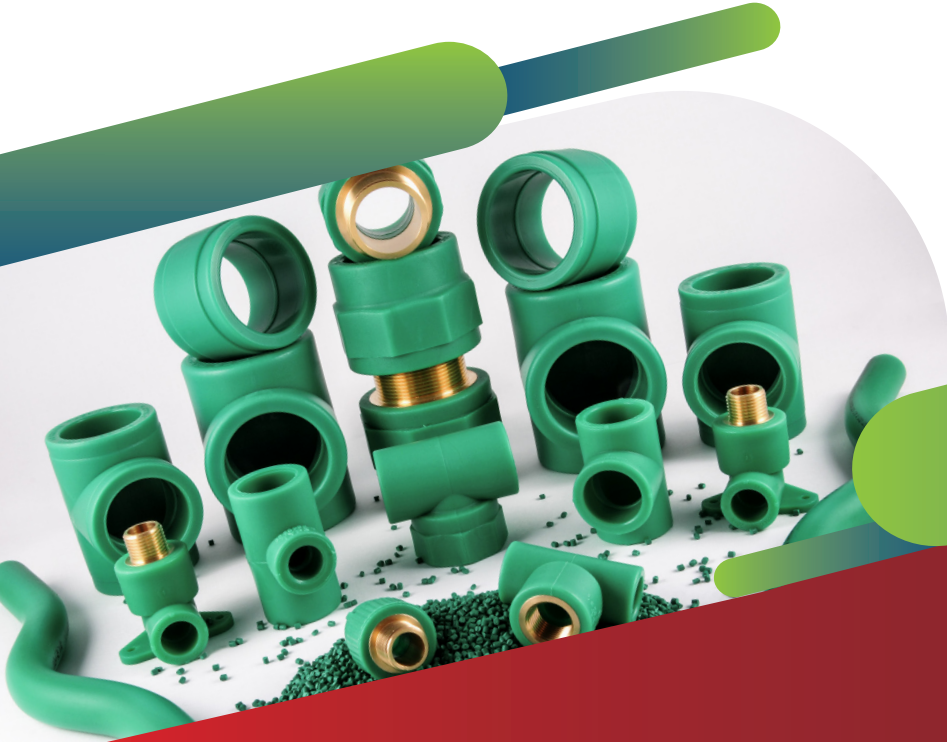


أبو غالي  
about ghaly  
للصناعات البلاستيكية



German Therm 



## INTEGRATED PLUMBING SYSTEM P.P.R PIPES & FITTINGS



**aboughaly**  
For Plastic Industries



## كلمة رئيس مجلس الإدارة



إنه لمن دواعي سروري أن أتقدم الى أسرة شركة أبو غالى للصناعات البلاستيكية وعملائها الكرام بكل الحب والترحيب حامدًا الله تعالى أن وفقنا الى مانحن عليه أملا فى مزيد من النجاح والتقدم والأزدهار وموقنا اننا أسرة شركة أبو غالى لسنا وحدنا اصحاب النجاح بل يشاركنا فيه كل من تعامل معنا أو سمع عنا ولهم جميعا منا كل الحب والعرفان والتقدير

رئيس مجلس الادارة  
محمد السيد غالي

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# 1. Mission

**Abou Ghaly** is one of the first manufacturer of plastic water supply systems.

It has been operating in the market since 1997.

**Abou Ghaly** products are made from polypropylene PP-R, the material designed for the needs of internal water installations and central heating.

**Abou Ghaly** has a complete system of pipes, fiberglass pipes, isolated pipes and fittings with diameters ranging from Ø20 to Ø110 mm as well as complementary products.

The highest quality of Abou Ghaly products is certified by National Research Institute, Plastic technology Center, Chemistry Administration, Egyptian organization for standardization & quality(EOS) and ISO 9001 and ISO 18001 from BV.

**Abou Ghaly** has all indispensable technical approvals, Hygienic Certificate and we are under constant control of internal engineering institutes including all which ensures a consistent high quality of our products.

Service life of **Abou Ghaly** products is up to 20 years. The wide range of available diameters (20-110mm) allows to construct hydro-water supply systems in big and small buildings, water-main system on boats, Residential apartments, condominiums, public housing, Hospital, schools, laboratories, Hotel and resorts, Office buildings and commercial shopping centers.

Our systems show an excellent performance conveying drinking water as well as other kind of fluids.

**Abou Ghaly** product is the perfect mix between a cared craft production and a vision of global market.



## 2. A philosophy of Craft Production

**Abou Ghaly** conceives, design and produces each product in-house, a mean of safety that gives our company a great value.

Always attentive to technological innovation, the goods are under control at every stage from the raw material and its first process, from the design and production of a single product to packaging made by hand. The ability of skilled technicians and their knowledge of the entire production cycle distinguishes our company for quality and reliability.

This production structure allows us to satisfy any single request. We can offer series of customized items according to specific needs, having high production flexibility.

While maintaining the philosophy of craftsmanship, we are attentive to the use of the most advanced skills and technologies in the plastic sector, without neglecting productivity, according to the demands of the domestic and international markets.

## 3. Raw Material

### 3-1. Specification of raw material used in production

Pipes and fittings of **Abou Ghaly** system are made of polypropylene (random copolymer, type 3 PP-R).

This material is known for its strength, stability and resistance to high temperatures. Physical and chemical properties of the material meet the special requirements of drinking water supply and heating systems.



### 3-2. Properties of Unit PP-R Value

Properties of Unit PP-R value	Unit	PP-R value	Test method
Density	g/cm <sup>3</sup>	0.90	ISO 1183
Melt Flow Rate (230°C/2,16kg)	g/10min	0.30	ISO 1133 Condition 12
Coefficient of linear thermal expansion	/1K	1.510-4x	DIN 53752
Thermal Conductivity	W/m K	0.24	DIN 52612
Modulus of Elasticity in (tension 1mm/min)	MPa	900	ISO 527
Charpy's Impact Strength, notched	kJ/m2	20	ISO 179
	kJ/m2	4	
	kJ/m2	2	

### 3-3. PP-R Selected Technical Feature

1. Long life service – even 50 years.
2. Corrosion resistance.
3. Low thermal conductivity – 0.22 W/m°K.
4. High resistance to inner pressure.
5. Low pipe friction- low roughness rate – low Flow resistance.
6. High surface smoothness – lack of lime scale formation as in other systems.
7. Quick, easy and clean assembly.
8. Total reliability and leak tightness of joints.
9. Low price when compared to other materials.
10. Resistance to many chemical agents.
11. Low weight.
12. Esthetic appearance.
13. Vibration and noise suppression.
14. Good electric current insulator.
16. Environmental friendliness (recycling).
17. No harmful gas emission from burning.
18. Light impermeability – no risk of algae Development.
19. One type of pipe connectors to all pipes.
20. Non-toxic.
21. Smell and taste neutral.
22. Very good welding applications.
23. Resistance to abrasion.
24. No change in organoleptic properties of water.
25. High cracking resistance under stress.

## 4. Chemical Resistance of PP-R

The chemical resistance of PP is very good. The Information is provided below on the chemical resistance of PP for some major groups of chemicals for using in areas as industrial pipe applications.

- Inorganic salts PP has a very good resistance to non-oxidative salts. However certain metal ions, such as copper can accelerate the thermal oxidation of the material at elevated temperatures above 70C .

- Acids PP has a very good resistance to non-oxidative acids, even at elevated temperatures. Its resistance to oxidative acids, such as sulfuric acid, in concentrations above 60% is less good, especially at elevated temperature. This also applies to nitric acid.

- Alkalis PP has a good resistance to alkalis.

Creep resistance can be affected.

- Organic substances Organic acids, alcohols, or esters usually do not react with PP. However, they do swell the material, and influence mechanical behavior.

- A cautious approach is recommended for PP in organic substances if mechanical strain is present.

resistant =	+
less resistant =	(+)
limited chemical resistance =	0
poor resistance =	(-)
not resistant =	-
aqueous solution =	aq
saturated solution at room temperature =	sat.
colour =	c

These values apply to the material.  
To be sure about the suitability of ABOU GHALY system for your special application please contact  
ABOU GHALLY

Chemical resistance					
Substance examined	concentrat.	temperat. (c)			
		100%	20	60	100
Acetic anhydride	100	+			
Acetic acid	100	+	+		
Acetone	100	+	0		
Acid (see name of acid )	-				
Acid of strage batteries	-	+	+		
Almond oil	-	+	+		
Alum	sat.sol.	+	+		
Aluminium salt	t	+	+	+	
Ammonia . Gas	100	+	+		
Ammonia . Liquid	conc.	+	+		
Ammonium acerate	t	+	+	+	
Ammonium carbonate	t	+	-	0	
Ammonium cholride	t	+			
Ammonium nitrate	t				+
Ammonium phosphate	t	+	+	+	
Ammonium sulphate	t		0	+	
Anline	100				
Animal oil	-	+	(+)	+	
Antifreeze	-	+			
Apple juice	-	+	+		
Asphalt	-	+	0		
Aspirin (R )	-	+			
Barium chloride	t	+	+	+	
Beer	-	+			
Benzaldehyde	100	+			
Benzoic acide	100	+	+		
Benzol	100	0	-		
Benzoyl chloride	100	0	-		
Bleach	12.5%chlorine	0	0		
Borax	sat . Sol.	+	+		
Boric acid	100	+	+		
Boric water	sat . Sol. 4.9	+	+		
Bromine , dry vapour	high con	-	-		
Bromine , dry vapour	low conc	0	-		
Bromine liquid	100	-			
Butane liquid	100	+			
Betanol	100	+			
Butane . Gas	100	+	+		
Butter	100	+	+		
Butyl acetate	100	*			

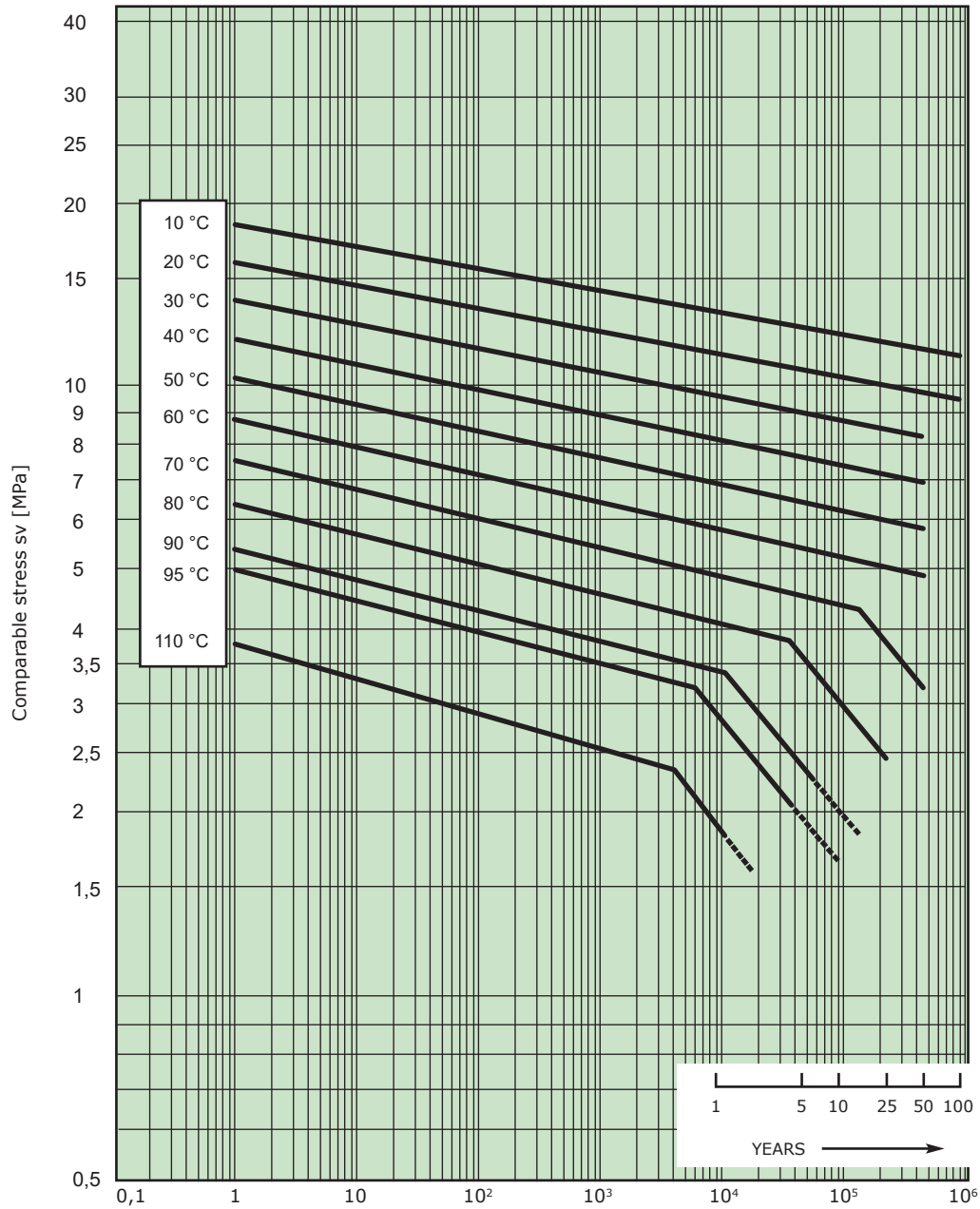
Chemical resistance					
Substance examined	concentrat.	temperat. (c)			
		100%	20	60	100
Butyl alcohol	-	+	+		
Calcium chloride	sat.sol.	+	+	+	
Camphor	-	+	+		
Carbon bisulphide	-	0			
Carbon tetrachlonde	100	φ	-		
Caustic potash solution	50	+	+		
Caustic soda solution	50	+	+		
Cheese		+			
Chloride of lite		+	+		
Chlorine, gas, dry	100	-	-	-	
Chlorine, gas humid	10	0		-	
Chlorine, liquid	100	-			
Chlorine water	Sat	0			
Chlrosulphonic acid	100	-	-		
Chromic acid	Sat	+	-		
Chromic/sulphuric acid			-	-	
Chromium plating solution		+	+		
Chromium salts		+	+		
Cinnamon (cane)		+			
Cinnamon (ground)		+			
Citric acid aa.	Sat	+	+	+	
Clove oil		+	0		
Cloves					
Coca-cola®		+			
Cocoa		+	+	+	
Coconut oil		+	(+)		
Cod-liver oil		+	+		
Coffee (beans and ground)		+			
Coffee (ready-to-drink)		+	+	+	
Common salt, driy		+	+	+	
Copper salts aq.	Sat	+	+	+	
Com seed oil		+	0		
Cream, whipped cream		+			
Cresol solution		+			
Cresol	100	+	0		
Cresols aq.	Sat	+	0		
Curds		+			
Cyclohexane	100	+			
Cyclohexanol	100	+	+		
Cyclohexanone	100	+	-		

Substance examined	concentrat.	temperat. (c)		
	100%	20	60	100
Decahydronaphthalene	100	+	-	-
Detergents. synthetic**	high	+	+	
	ready-for use		+	+
Dimethylformamide	100	+		
DIXAN® solution	ready-for use		+	+
Eggs  uncooked & cooked)	100	+	+	(+)
Ether* (diethylene ether)	100	0		
	Ethyl acetate	0	0	
Ethyl alcohol not denatured	100	+		
Ethyl alcohol aa..		+	+	
not denatured		+	+	
Ethyl benzene	100	0	-	
Ethyl chloride***	100	-		
Ink*		+	+	
Iron salts aq.	Sat	+	+	+
Isooctone	100	+	0	
Isopropyl alcohol	100	+	+	
Jam			+	(+)
Jelly			+	(+)
Lactic acid aq.	90	+	+	
	50	+	+	
	10	+	+	+
LANOLIN®			+	0
Lard		+	+	0
Lemonadas		+		
Lemon arome		+		
Lemon peel		+	+	
Lemon peel oil		+		
Linseed oil		+		
LITEX®		+	+	
Liqueur	any	+		
LYSOL		+	0	
Magnesium salts aq.	sat.	+	+	+
Margarine		+	+	
MARLIPAL MG	50	+	+	
MARLON (42 % active detergent)	20	+	+	
MARLOPHEN 83	100	+		
MARLOPHEN 89	5	+		
	100	+		
MARLOPHEN 810	100	+		
	20	+	+	
	5	+	+	
Mashed potatoes		+	+	(+)
Mayonnaise		+		
Menthol		+		
Mercurie salta aq	Salt	+	+	

Substance examined	concentrat.	temperat. (c)		
	100%	20	60	100
Mercury	100	+	+	
Methyl alcohol	100	+	+	
Methl alcohol aq.	50	+	+	
Methylene chloride*	100	0		
Methyl ethyl ketone		+		
Milk		+	+	
Milk food		+	0	(+)
Mineral oil (whitout aromatic hydrocarbons)*				-
Moth bals***		+		
Motor oil (cars)** (see also Two-stroke oil and oil according to ASTM)			0	
Mustard		+		
Nail polish*		+	0	0
Nail polish remover*		+	0	0
Naphthalane		100	+	
Nickel salts. aq.		Sat	+	+
Nitric acid		50	0	
		25	+	+
		10	+	+
Nitrobenzene		100	0	0
Octane (see Ieotane) Oil no. 3 according to ASTM D38059	100	+	0	
Oil of bitter almonds		+		
Oleic acid	100	+		
Oleum	any	-	-	
Olive oil		+	+	
Orange juice		+	+	
Orange peell		+		
Orange peel oil		+		+
Oxalix acid aq.	sat	+	+	
Ozone (0,5 ppm)		+	-	
Palm oil		+	0	
Paperika		+	+	
Pectin	sat	+	+	
Peppermint oil		+	+	
Pickled heming		+	(+)	
Pineapple juice		+		
Pine needle oil	100			
Plasticizers		+	0	
Dibuthylphthalate				
Dibuthylebacate		+		
Dihexylphthalate		+		
Dinonyladipate		+		
Dleonylphthalase		+		

Substance examined	concentrat.	temperat. (c)		
	100%	20	60	100
Quinine				
Rum	40	+	+	
Rum aroma		+	0	
SAGRATON		+	0	
Salad oil, animal		+	+	+
Salad oil vegetable		+	+	
Salted water	any	+	+	+
Sausage		+	0	
Sea water		+	(+)	
Shoe polish*		+	+	
Siliconeoil*		+	+	
Silver salts aq.	sat	+	+	
Soap, solution	sat	+	+	+
Soda water	10	+	+	
Sodium bicarbonate aq.	sat	+	+	
Sodium busilphite aq.	sat	+	+	
Sodium carbonate aq.	sat	+	+	
Sodium chlorateaq.(commonsalt)	10	+	+	+
Sodium chlorite aq.	5	+		
Sodium hydroxide (caustic		+	+	
Sodium hyphochlorite aq.	5	+	+	
Sodium nitrate aq.	sat	+		
Sodium nitride aq.	sat	+		
Sodium parbrot aq.	sat	+		
Sodium phosphates aq.	1.4			
Sodium sulphate aq.	sat	+		
Sodium sulphite ag.**	sat	+		
Sodium sulphite ag.	sat	+		
Sodium thlosulphate aq.	sat	+		
Soybaan oil		+	0	
Stannous chloride		+		
starch solution aq.	any	+	+	
Stearic acid	100	+		
Storage-battery acid		+	+	
Succinic acid aq.	sat	+	+	
(dry)		+	+	+
beet sirup		+	+	(+)
solution aq	any	+	+	(+)
solution aq	sat	+	+	
Xylene		+	0	-
Zinc salts aq.		+	+	+

## 5. Service Life of Abou Ghaly Systems TTT



Service life in hours

Termination of an isotherm indicates maximum service life also at lower tension.

The isotherms in the chart do not extended.

# Allowable operating pressure for pipes made of PP-R, SF = 1.5

Temperature °C Years of Use		pipe Series S										
		20	16	12,5	8,3	8	5	4	3,2	2,5	2	
		Standard Dimension Ratio SDR										
		41	33	26	17,6	17	11	9	7,4	6	5	
		Operating Pressure bar										
10	1	4,4	5,5	7	10,5	11,1	17,5	22,1	27,8	35,1	44,1	
	5	4,1	5,2	6,6	9,9	10,4	16,5	20,8	26,2	33	41,6	
	10	4	5,1	6,4	9,7	10,1	16,1	20,3	25,6	32,2	40,5	
	25	3,9	4,9	6,2	9,3	9,8	15,6	19,6	24,7	31,1	39,2	
	50	3,8	4,8	6	9,1	9,6	15,2	19,1	24,1	30,3	38,2	
	100	3,7	4,6	5,9	8,9	9,3	14,8	18,6	23,5	29,6	37,2	
20	1	3,7	4,7	5,9	9	9,4	15	18,8	23,7	29,9	37,7	
	5	3,5	4,4	5,6	8,4	8,9	14,1	17,7	22,3	28,1	35,4	
	10	3,4	4,3	5,4	8,2	8,6	13,7	17,2	21,7	27,4	34,5	
	25	3,3	4,1	5,2	7,9	8,3	13,2	16,6	21	26,4	33,3	
	50	3,2	4	5,1	7,7	8,1	12,9	16,2	20,4	25,7	32,4	
	100	3,1	3,9	5	7,5	7,9	12,5	15,8	19,9	25	31,5	
30	1	3,2	4	5	7,6	8	12,7	16	20,2	25,4	32	
	5	3	3,7	4,7	7,2	7,5	11,9	15	18,9	23,8	30	
	10	2,9	3,6	4,6	7	7,3	11,6	14,6	18,4	23,2	29,2	
	25	2,8	3,5	4,4	6,7	7	11,2	14,1	17,7	22,3	28,1	
	50	2,7	3,4	4,3	6,5	6,8	10,9	13,7	17,2	21,7	27,4	
	100	2,6	3,3	4,2	6,3	6,6	10,6	13,3	16,8	21,1	26,6	
40	1	2,7	3,4	4,3	6,5	6,8	10,8	13,6	17,1	21,6	27,2	
	5	2,5	3,2	4	6	6,3	10,1	12,7	16	20,2	25,4	
	10	2,4	3,1	3,9	5,9	6,2	9,8	12,3	15,5	19,6	24,7	
	25	2,3	2,9	3,7	5,6	5,9	9,4	11,9	15	18,8	23,7	
	50	2,3	2,9	3,6	5,5	5,8	9,2	11,5	14,5	18,3	23,1	
	100	2,2	2,8	3,5	5,3	5,6	8,9	11,2	14,1	17,8	22,4	
50	1	2,3	2,8	3,6	5,5	5,7	9,1	11,5	14,5	18,2	23	
	5	2,1	2,7	3,4	5,1	5,3	8,5	10,7	13,5	17	21,4	
	10	2	2,6	3,3	4,9	5,2	8,2	10,4	13,1	16,5	20,8	
	25	2	2,5	3,1	4,7	5	7,9	10	12,6	15,9	20	
	50	1,9	2,4	3	4,6	4,8	7,7	9,7	12,2	15,4	19,4	
	100	1,8	2,3	2,9	4,5	4,7	7,5	9,4	11,8	14,9	18,8	
60	1	1,9	2,4	3	4,6	4,8	7,7	9,7	12,2	15,4	19,4	
	5	1,8	2,2	2,8	4,3	4,5	7,1	9,1	11,3	14,3	18	
	10	1,7	2,2	2,7	4,1	4,3	6,9	8,7	11	13,9	17,5	
	25	1,6	2,1	2,6	4	4,2	6,6	8,4	10,5	13,3	16,7	
	50	1,6	2	2,5	3,8	4	6,4	8,1	10,2	12,9	16,2	
	100	1,5	1,9	2,4	3,6	3,8	6	7,5	9,5	12	15,1	
70	1	1,6	2	2,5	3,9	4,1	6,5	8,1	10,3	12,9	16,3	
	5	1,5	1,9	2,4	3,6	3,8	6	7,5	9,5	12	15,1	
	10	1,4	1,8	2,3	3,5	3,6	5,8	7,3	9,2	11,6	14,6	
	25	1,2	1,5	2	3	3,1	5	6,3	8	10	12,7	
	50	1	1,3	1,7	2,5	2,6	4,2	5,3	6,7	8,5	10,7	
	100	0,9	1,2	1,5	2,3	2,4	3,8	4,8	6,1	7,6	9,6	
80	1	1,3	1,7	2,1	3,2	3,4	5,4	6,8	8,6	10,8	13,7	
	5	1,2	1,5	1,9	2,9	3	4,8	6	7,6	9,6	12,1	
	10	1	1,2	1,6	2,4	2,5	4	5,1	6,4	8,1	10,2	
	25	0,8	1	1,2	1,9	2	3,2	4,1	5,1	6,5	8,1	
	50	0,7	0,9	1,1	1,6	1,7	2,8	3,5	4,4	5,5	6,8	
	100	0,6	0,8	1	1,5	1,6	2,6	3,2	4,1	5,2	6,5	
95	1	0,9	1,2	1,5	2,3	2,4	3,8	4,8	6,1	7,6	9,6	
	5	0,6	0,8	1	1,5	1,6	2,6	3,2	4,1	5,2	6,5	
	10	0,5	0,6	0,8	1,3	1,3	2,2	2,7	3,4	4,3	5,5	
	25	0,4	0,5	0,6	1,1	1,1	1,8	2,2	2,8	3,5	4,4	
	50	0,3	0,4	0,5	0,9	0,9	1,4	1,8	2,3	2,9	3,7	
	100	0,2	0,3	0,4	0,7	0,7	1,1	1,4	1,8	2,3	2,9	



# Allowable operating pressure for pipes made of PPR-CT, SF = 1.25

Temperature °C		Pipe Series S									
		20	16	12,5	8,3	8	5	4	3,2	2,5	2
		Standard Dimension Ratio SDR									
		41	33	26	17,6	17	11	9	7,4	6	5
		Operating Pressure bar									
10	1	5,7	7,2	9,1	13,7	14,4	22,8	28,8	36,2	45,6	57,4
	5	5,5	7,0	8,8	13,3	14,0	22,1	27,9	35,1	44,2	55,7
	10	5,5	6,9	8,7	13,1	13,8	21,9	27,5	34,7	43,7	55,0
	25	5,4	6,8	8,5	12,9	13,5	21,5	27,1	34,1	42,9	54,0
	50	5,3	6,7	8,4	12,7	13,4	21,4	26,7	33,6	42,3	53,3
	100	5,2	6,6	8,3	12,6	13,2	20,9	26,3	33,2	41,8	52,6
20	1	5,0	6,3	7,9	11,9	12,5	19,9	25,0	31,5	39,7	50,0
	5	4,8	6,1	7,6	11,6	12,1	19,3	24,2	30,5	38,5	48,4
	10	4,7	6,0	7,5	11,4	12,0	19,0	23,9	30,1	37,9	47,8
	25	4,0	5,0	7,4	11,2	11,7	18,8	23,5	29,6	37,2	46,0
	50	4,6	5,8	7,3	11,0	11,6	18,4	23,1	29,2	36,7	46,2
	100	4,5	5,7	7,2	10,9	11,4	18,1	22,8	28,8	36,2	45,6
30	1	4,3	5,4	6,8	10,3	10,8	17,2	21,7	27,3	34,4	43,3
	5	4,1	5,2	6,6	10,0	10,5	16,6	20,9	26,4	33,2	41,8
	10	4,1	5,1	6,5	9,8	10,3	16,4	20,6	26,0	32,7	41,2
	25	4,0	5,0	6,4	9,6	10,1	16,1	20,2	25,5	32,1	40,4
	50	3,9	5,0	6,3	9,5	10,0	15,8	19,9	25,1	31,6	39,8
	100	3,9	4,9	6,2	9,4	9,8	15,6	19,7	24,8	31,2	39,3
40	1	3,7	4,6	5,9	8,9	9,3	14,8	18,6	23,5	29,6	37,2
	5	3,5	4,5	5,7	8,6	9,0	14,3	18,0	22,6	28,5	35,9
	10	3,5	4,4	5,6	8,4	8,8	14,1	17,7	22,3	28,1	35,4
	25	3,4	4,3	5,4	8,3	8,7	13,8	17,3	21,8	27,5	34,6
	50	3,4	4,3	5,4	8,1	8,5	13,6	17,1	21,5	27,5	34,1
	100	3,3	4,2	5,3	8,0	8,4	13,3	16,8	21,2	26,7	33,6
50	1	3,1	4,0	5,0	7,6	8,0	12,6	15,9	20,1	25,3	31,8
	5	3,0	3,8	4,8	7,3	7,7	12,2	15,3	19,3	24,3	30,6
	10	3,0	3,7	4,7	7,2	7,5	12,0	15,1	19,0	23,9	30,1
	25	2,9	3,7	4,6	7,0	7,4	11,7	14,7	18,6	23,4	29,5
	50	2,9	3,6	4,6	6,9	7,2	11,5	14,5	18,3	23,0	29,0
	100	2,8	3,5	4,5	6,8	7,1	11,3	14,3	18,0	22,6	28,5
60	1	2,7	3,4	4,2	6,4	6,7	10,7	13,5	17,0	21,4	27,0
	5	2,5	3,2	4,1	6,2	6,5	10,3	13,0	16,3	20,6	25,9
	10	2,5	3,2	4,0	6,1	6,4	10,1	12,7	16,0	20,2	25,5
	25	2,4	3,1	3,9	5,9	6,2	9,9	12,4	15,7	19,8	24,9
	50	2,4	3,0	3,8	5,8	6,1	9,7	12,2	15,4	19,4	24,5
70	1	2,2	2,8	3,6	5,4	5,7	9,0	11,3	14,3	18,0	22,7
	5	2,1	2,7	3,4	5,2	5,4	8,6	10,9	13,7	17,3	21,7
	10	2,1	2,6	3,3	5,1	5,3	8,5	10,7	13,5	16,9	21,3
	25	2,0	2,6	3,3	5,0	5,2	8,3	10,4	13,1	16,5	20,8
	50	2,0	2,5	3,2	4,9	5,1	8,1	10,2	12,9	16,2	20,5
80	1	1,8	2,3	3,0	4,5	4,7	7,5	9,5	11,9	15,0	18,9
	5	1,8	2,2	2,8	4,3	4,5	7,2	9,0	11,4	14,4	18,1
	10	1,7	2,2	2,8	4,2	4,4	7,0	8,9	11,2	14,1	17,7
	25	1,7	2,1	2,7	4,1	4,3	6,9	8,6	10,9	13,7	17,3
95	1	1,4	1,7	2,2	3,4	3,5	5,6	7,1	8,9	11,2	14,2
	5	1,3	1,7	2,1	3,2	3,3	5,3	6,7	8,5	10,7	13,5
	10	1,3	1,6	2,1	3,1	3,3	5,2	6,6	8,3	10,5	13,2

## 6. Quality Assurance

**ABOU GHALY** is well-known for its high quality products. We produce in compliance with European EN ISO15874 and German standards DIN 8077, DIN 8078,

The laboratory is well equipped with state-of-the-art devices to test raw materials, production process and end products.

- The control of basic raw material polypropylene through determination of mass flow rate.(MFR) and density measure.
- Check of geometric parameters during the production process by means of inspection and electronic gauges.
- Optical microscope testing – structure of raw material in end products, welded joints after tests and the quality of plastic connection with threaded inserts.
- Laboratory tests of end products - a reflection of the extreme conditions of use, among others determination of inner pressure resistance.



CAIRO: 1/10/2018

### BUREAU VERITAS CERTIFICATION DECLARATION FOR OHSAS 18001: 2007

BUREAU VERITAS CERTIFICATION EGYPT DECLARES THAT:

**GHALICO FOR PLASTIC INDUSTRIES** IS BEEN AWARDED OHSAS 18001: 2007 CERTIFICATE

**Scope: MANUFACTURING OF PLASTIC PIPES AND FITTINGS**

The Certification is done successfully, & the last audit date was on 3<sup>rd</sup> July 2018

THE CERTIFICATE IS IN PROCESSING TO BE ISSUED FROM OUR OFFICE IN EGYPT  
FOR FURTHER DETAILS PLEASE CONTACT OUR OFFICE IN CAIRO.

0020 02 24183020  
0020 02 24182998  
0020 02 22900195

OR FAX NUMBER 002 024183016  
VISIT OUR INTERNATIONAL WEBSITE WWW.BUREAUVERITAS.COM

BUREAU VERITAS EGYPT CERTIFICATION MANAGER

Certification BL Manager



Head Office  
25, Hassan Al-Banna street,  
6<sup>th</sup> Floor, El Golf, New City,  
Cairo, Egypt  
Tel.: +202 24183020 - 24182998  
22900195 - 0020 024183016  
Fax: +202 24183016  
P.O. Box 1731, Cairo-Egypt

Alex. Branch  
601, El Horeya Road, El Gharbia  
Tower, Flat 601, Zekin,  
Alexandria, Egypt  
Tel.: +202 5757504 - 5757509  
5757510 - 0101 621475  
Fax: +202 5757515

Suez Branch  
2nd floor, 46 Gharbar El Kerd -  
Beside Suez Canal Authority Hospital  
Port Tawfik - Suez - Egypt  
Tel.: +062 062 3180001  
Fax: +062 062 3180002

Limited Company  
With 100,000 L.E. Capital  
R.C.: Cairo 279158





**المركز القومي للبحوث**  
القاهرة - جمهورية مصر العربية  
وحدة التحاليل والخدمات العلمية المركزية  
معمل اختبار المواد

**NATIONAL RESEARCH CENTRE**  
TAHRIR St. DOKKI, CAIRO, EGYPT  
Central Unit For Analysis And  
Scientific Services (CUASS)  
Material Test Lab.

وبذلك فإن العينة المختبرة تصلح للاستخدام في مياه الشرب.

وقد أعطى لكم هذا التقرير بناءً على طلبكم ملاحظات نتائج الاختبارات على عينة كروم بولي بروبيلين من ٢٠٠٨م ، ولقارنته من شايكو الصناعات البلاستيكية (بوغالي)، ودون أدنى مسؤولية تجاه قسم الميكانيك والبياناتك والمواد الصلبة بمعمل اختبار المواد بالمركز القومي للبحوث في تحديد و انتقاء العينات المرشحة للاختبار .

علما بأن نتائج هذا التقرير لا تشمل أي حال من الأحوال أي نوعية مماثلة ومخرطة ومشونة بواقع التطبيق والتقيد والاستخدام .

ولا يجوز استخدام هذا التقرير في الدعاية والإعلان عن المنتج المختبر إلا بعد الرجوع إلى المركز القومي للبحوث والاتفاق على ذلك .

**مع ملاحظة أنه يتم نقل وتصوير هذا التقرير بما يشمله من نتائج إيجابية وصادقة ومسجلة من قسم الميكانيك والبلاستيك والمواد الصلبة بمعمل اختبار المواد بالمركز القومي للبحوث بالقاهرة:**

رئيس مجلس إدارة وحدة التحاليل والخدمات العلمية  
معمل اختبار المواد  
أ.م. مصطفى زكي مصطفى

(٨٠٢٨ - ٥/٥)

٢٢٢٧١٦١٥ - ٢٢٢٧١٦٢ - داخلي ١٢٢١ ميناشر ٢٢٢٨٧٨٠٢ شارع التحرير - الدقي - القاهرة

**المركز القومي للبحوث**  
القاهرة - جمهورية مصر العربية  
وحدة التحاليل والخدمات العلمية المركزية  
معمل اختبار المواد

**NATIONAL RESEARCH CENTRE**  
TAHRIR St. DOKKI, CAIRO, EGYPT  
Central Unit For Analysis And  
Scientific Services (CUASS)  
Material Test Lab.

**تقرير الاختبارات**

رقم التقرير	٢٢٢٧١٦١٥ - ٢٢٢٧١٦٢ - داخلي ١٢٢١ ميناشر ٢٢٢٨٧٨٠٢ شارع التحرير - الدقي - القاهرة
إسم الشركة أو العميل	شركة غاليكو للصناعات البلاستيكية
تاريخ الطلب	٢٠١٧/٧/٨
المهندس المطلوب لإختباره	مهندس إجراء اختبارات صلاحية الاستخدام في مياه الشرب على عينة (١) عينة البستوت لقي (٢/١)
المواصفات المستخدمة	طبقاً للمواصفة Standard Method for Examination of Water 6920 BSR القرار الوزاري في صلاحية مياه الشرب رقم ١٠٨
الفتاوى	جميع نتائج الاختبارات مبنية ومبنية بالتقيد في صلاحية التقرير (معد) ملاحظات التقرير ٤ صفحات ( )
أختابته كيميوت	كيميوت / عداد محمد عبد السميع كيميوت / سارة عبد الرحيم لسماعيل كيميوت / منهي منصور ربيع كيميوت / إيتسانم نبوت معصود
الفرق القائم بالتشغيل	عينة سمان / إيتسانم نبوت معصود عينة سمان / إيتسانم نبوت معصود إتسانم نبوت معصود / إيتسانم نبوت معصود إتسانم نبوت معصود / إيتسانم نبوت معصود إتسانم نبوت معصود / إيتسانم نبوت معصود
أشرف	أ.م. مصطفى زكي مصطفى
المدير المسؤول	أ.م. مصطفى زكي مصطفى
تاريخ الإصدار	٢٠١٧/٨/٢٠
ظروف التشغيل والاختبار	كل الاختبارات قد تمت عند ٢٢ ± درجة مئوية مابين ٥٠ - ٦٠ مع إجراء جميع المعاملات اللازمة لأجهزة القياس بصفة دائمة ومستمرة

٢٢٢٧١٦١٥ - ٢٢٢٧١٦٢ - داخلي ١٢٢١ ميناشر ٢٢٢٨٧٨٠٢ شارع التحرير - الدقي - القاهرة

**المركز القومي للبحوث**  
القاهرة - جمهورية مصر العربية  
وحدة التحاليل والخدمات العلمية المركزية  
معمل اختبار المواد

**NATIONAL RESEARCH CENTRE**  
TAHRIR St. DOKKI, CAIRO, EGYPT  
Central Unit For Analysis And  
Scientific Services (CUASS)  
Material Test Lab.

وبذلك فإن العينة المختبرة ليس لها تأثير سمي .

وقد أعطى لكم هذا التقرير بناءً على طلبكم ملاحظات نتائج الاختبارات صلاحية الاستخدام في مياه الشرب على عينة (١) عينة البستوت لقي (٢/١) ، ودون أدنى مسؤولية تجاه قسم الميكانيك والبياناتك والمواد الصلبة بمعمل اختبار المواد بالمركز القومي للبحوث في تحديد و انتقاء العينات المرشحة للاختبار .

علما بأن نتائج هذا التقرير لا تشمل أي حال من الأحوال أي نوعية مماثلة ومخرطة ومشونة بواقع التطبيق والتقيد والاستخدام .

**مع ملاحظة أنه يتم نقل وتصوير هذا التقرير بما يشمله من نتائج إيجابية وصادقة ومسجلة من قسم الميكانيك والبلاستيك والمواد الصلبة بمعمل اختبار المواد بالمركز القومي للبحوث بالقاهرة:**

رئيس مجلس إدارة وحدة التحاليل والخدمات العلمية  
والهشوف على معمل اختبار المواد  
أ.م. مصطفى زكي مصطفى

٢٢٢٧١٦١٥ - ٢٢٢٧١٦٢ - داخلي ١٢٢١ ميناشر ٢٢٢٨٧٨٠٢ شارع التحرير - الدقي - القاهرة

**المركز القومي للبحوث**  
القاهرة - جمهورية مصر العربية  
وحدة التحاليل والخدمات العلمية المركزية  
معمل اختبار المواد

**NATIONAL RESEARCH CENTRE**  
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**المسادة / شركة غاليكو للصناعات البلاستيكية**

تحية طيبة ... وبعد ...

بالإشارة لخطابكم بتاريخ ٢٠١٧/٧/٨ بشأن إجراء الاختبارات التالية على عينة (١) عينة البستوت لقي (٢/١) ، وكانت الاختبارات كالتالي:

(١) اختبار تأثير المادة على PH الأس الهيدروجيني .

(٢) اختبار السمية .

- تم عمل الاختبارات طبقاً للمواصفة Standard Method for Examination of Water 6920 BSR والقرار الوزاري لصلاحية مياه الشرب رقم ١٠٨ ، وبالتعاون مع الجهات المختصة بالمركز القومي للبحوث .

- تم استخدام جهاز ميكرو توكس موديل ٥٠٠ .

- علماً بأن جميع الأجهزة المستخدمة معايرة .

وفيما يلي نتائج الاختبار التي تمت على العينات الواردة من قبلكم علماً بأن هذه النتائج تمثل فقط العينات الواردة إلى قسم الميكانيك والبلاستيك والمواد الصلبة بمعمل اختبار المواد بالمركز القومي للبحوث .

٢٢٢٧١٦١٥ - ٢٢٢٧١٦٢ - داخلي ١٢٢١ ميناشر ٢٢٢٨٧٨٠٢ شارع التحرير - الدقي - القاهرة

**المركز القومي للبحوث**  
القاهرة - جمهورية مصر العربية  
وحدة التحاليل والخدمات العلمية المركزية  
معمل اختبار المواد

**NATIONAL RESEARCH CENTRE**  
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Central Unit For Analysis And  
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نتيجة الاختبارات التي تمت على عينة البستوت لقي (٢/١) والواردة من شركة غاليكو للصناعات البلاستيكية

**١- تأثير المادة على PH الأس الهيدروجيني**

أظهرت النتائج عدم وجود تغير في الأس الهيدروجيني للماء التي تعرضت لهذه العينة والعينة تصلح للاستخدام في مشاريع مياه الشرب .

**٢- اختبار السمية :-**

تم إجراء اختبار السمية على العينة الواردة من الشركة باستخدام جهاز ميكرو توكس موديل ٥٠٠ . وقد دل اختبار السمية بأن المياه التي تعرضت لهذه العينة البستوت ان العينة ليس لها تأثير سمي وتصلح للاستخدام في مشاريع مياه الشرب .

٢٢٢٧١٦١٥ - ٢٢٢٧١٦٢ - داخلي ١٢٢١ ميناشر ٢٢٢٨٧٨٠٢ شارع التحرير - الدقي - القاهرة

**جمهورية مصر العربية**  
**وزارة التجارة والصناعة**  
**مصلحة التسجيل التجاري**  
**إدارة العلامات التجارية**

(مستدرة رقم ٧ "علامات تجارية")

**شهادة تسجيل علامات تجارية**

العلامة

German Therm

جيرمان تيرم

٢٢٢٧١٦١٥ - ٢٢٢٧١٦٢ - داخلي ١٢٢١ ميناشر ٢٢٢٨٧٨٠٢ شارع التحرير - الدقي - القاهرة

## 7. Standards & Regulations

It is our mission at ABOU GHALY to maintain the highest levels of quality through clear operating procedures, work instructions, forms and records throughout the company. Statistical quality control and sound documentation ensures traceability is maintained anytime in the future. This means that all corporate and plant functions within ABOU GHALY, whether commercial, or operational, are required to be clearly stated and documented, ensuring that the quality of your product is never compromised or been left to chance.

**- ABOU GHALY** Pipes and fittings are produced with the following standards and regulations:

DIN 8077	Polypropylene (PP) pipe dimensions.
DIN 8078	Polypropylene (PP) pipes; general quality requirements testing & chemical
ISO 15874	Polypropylene (PP) Plastic piping systems for hot and cold water installations. resistance of pipes and fittings.
DIN 2999	Standards for fittings with threaded metallic inserts.
DIN 16962	Pipe joint assemblies and fittings for type 1 & 2 polypropylene (PP) pressure pipes; bends produced by segment inserts for buff welding dimensions.
DIN 4109	Noise control in buildings.
DIN 4140	Insulation of service installations.
DVS 2207	Welding of thermoplastic pipes and fitting.
DVS 2208	Welding machines & devices for thermoplastic pipes and fittings.
BS 6920	Suitability of non-metallic products for use in contact with water intended for human consumption with regard to their effect on the quality of the water.
DIN 16836	Multilayer Pipes-General Requirement and Testing
DVGW W544	General Requirements and Testing of plastic pipes
ISO 9001 -2015	Quality Management system.
OHSAS 1 8001	British standard for Health and safety management system.

## 8. Quality Guarantee

**ABOU GHALY** always maintains the highest standards of quality for its users. To support this, **ABOU GHALY** Warrants a 10-year guarantee for all its piping network components from the date of purchase. (Please ask your local representative for details).

**ABOU GHALY** maintains a comprehensive quality control system beginning from designing the required specifications, to control of incoming raw materials processing of the product, packing, storage, shipping to the customer, and finally continuous servicing and support to guarantee that complete total quality is achieved. This is accomplished parallel to the Quality Assurance Program with the objective to ensure that total quality, and not only localized quality is maintained as required.

The overall quality system operated and documented by **ABOU GHALY** is implemented throughout the plant. The overall system has been designed to exceed requirements stated by national and international authorities and institutions. Regular checks are done by neutral bodies, to further eliminate any chance of quality deviation. This is yet another quality assurance for our customer.

## 9. Product Range

- Pipes and fittings of **ABOU GHALY** PP-R system is produced in the following sizes:  
20, 25, 32, 40, 50, 63, 75, 90, 110mm.
- The pipe types are produced in various combinations of operating pressures and temperatures in separate
- pressure lines various wall thicknesses: SDR 11 (PN 10) - generally for cold water and floor heating; SDR 7,4 (PN 16)
- generally, for hot water and floor heating; SDR 6 (PN 20) - generally for hot water and central heating
- PPR fiber glass reinforced pipe is a higher performance pipe, which uses multilayer co-extruded, special techniques and equipment.
- It also has characteristics as low expansion coefficient, high pressure resistance.

**ABOU GHALY** PPR piping system is designed for cold and hot water installations as well as in floor and central heating systems.

**ABOU GHALY** piping systems can also be used for distribution owing to their chemical Resistance and other properties.

Fittings (adapting pipes) are manufactured jointly for all piping types in the highest PN 20 pressure range and in various design types

1. All-plastic fittings (sockets, elbows, T-pieces reduced and full-sized, reductions, crosspieces).
2. Combined fittings with brass threads for threaded joints (reducing sleeves with metal thread).
3. T-pieces, elbows for wall mounting
4. Special elements (crossovers, compensation pipes, clips).

## 10. Marking

**ABOU GHALY** produces in compliance with European UNI-EN ISO 15874 and German standards DIN 8077/ DIN 8078.

Pipes and fittings are marked during the manufacturing process.

All elements are marked:

### Pipes:

GERMAN THERM PPR TYPE3 SDR... PN .... Ø... x...mm GERMAN STD (DIN) 8077-8078

MADE IN EGYPT Date ..... TIME .... ABOU GHALY logo.

## Fittings:

ABOU GHALY logo PPR type3, size..., iso 15874, application class.... PN... and made in EGYPT

-Packaging: carton box with plastic bags inside containing the fittings, the possibility to identify each element in a system is an important vehicle of quality control management as well as an evidence for potential settlements.

On the basis of UNI EN ISO 15874 requirements applied for piping system manufacture, we are going to change the class marking from PN to S (series) coding.

S = Series

SDR – Standard Dimension Ratio

$SDR = 2 \times S + 1 = d/s$

d - external diameter of pipe,

s - wall thickness

PN	S	SDR
10	5	11
16	3.2	7.4
20	2.5	6
25	2	5

PN = Nominal Pressure

## 11. Application areas

### Operating conditions according to UNI EN ISO 15874:

In terms of pressure and temperature for pipes and fittings, the operating conditions set forth in ISO 15874 are taken as the basic conditions. Water supply and heating systems are classified according to ISO 15874 in the following way:

Scope of application	Time at Temerg.	Emerg. temp.	Time at Tmax	Max.design temp.	Time at TD	design temp. TD	Appl. Class
	Hours	°C	years	°C	years	°C	
Hot water supply (60°C)	100	95	1	80	49	60	1
Hot water supply (70°C)	100	95	1	80	49	70	2
Floor heating Low temp. radiators	100	100	2.5	70	2.5 20 25		4
High-temperature heating	100	100	1	90	14 25 10		5

TD. - design temperature defined by the application.

Tmax. - maximum design temperature, with its time-limited exposure.

Temerg. - emergency temperature arising under emergencies due to troubles in control systems.

Maximum service life of pipelines for every class of application is determined by total performance time of pipeline under temperatures of TD, Tmax. and Temerg. and it amounts to 50 years. Other classes of application may be established; however, the value of temperatures shall not exceed those provided for Class 5. ISO 15874 determines admissible maximum operating pressure for every type of pipeline made of PP-R material. Proper and correct determination of the required pipeline type during engineering work is required. It shall be, based on operational data, i.e. application class and operating pressure.

Calculated series Smax shall be > series S, indicated on pipes and in technical documents of **ABOU GHALY**

Design Pressure PD	Application			
Bar	Calculated series S max			
	Class 1	Class 2	Class 3	Class 4
4	6.9	5.3	6.9	4.8
6	5.2	3.6	5.5	3.2
8	3.9	2.7	4.1	2.4
10	3.1	2.1	3.3	1.9

German Therm 





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**G German Therm**



**P.P.R & U.P.V.C PIPES & FITTINGS**



ISO 9001  
BUREAU VERITAS  
OHSAS 18001  
BUREAU VERITAS  
UKAS  
iso 9001:2008 - OHSAS 18001:2007



[www.aboughaly.com](https://www.aboughaly.com)

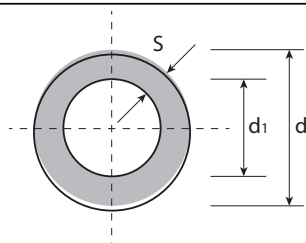
Long life guarantee



Global Technology With Egyptian Hands

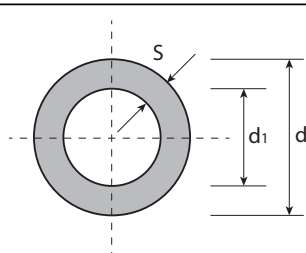
# 12. ABOU GHALY Products

## PIPE – PN 10 / SDR 11



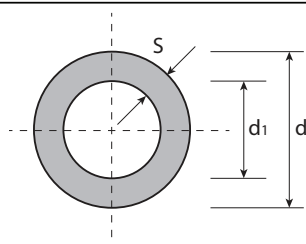
d	d 1	s	Kg/m	PN	SDR
32	26.2	2.9	0.261	10	11
40	32.6	3.7	0.412	10	11
50	40.8	4.6	0.638	10	11
63	51	5.8	1.01	10	11
75	61.4	6.8	1.41	10	11
90	73.6	8.2	2.03	10	11
110	90	10	3.01	10	11

## Pipe – PN 16 /SDR 7.4



d	d 1	s	Kg/m	PN	SDR
20	14.4	2.8	0.148	16	7.4
25	18	3.5	0.23	16	7.4
32	23.2	4.4	0.37	16	7.4
40	29	5.5	0.575	16	7.4
50	36.2	6.9	0.896	16	7.4
63	45.8	8.6	1.41	16	7.4
75	54.4	10.3	2.01	16	7.4
90	65.4	12.3	2.87	16	7.4
110	79.8	15.1	4.3	16	7.4

## Pipe – PN 20 / SDR 6

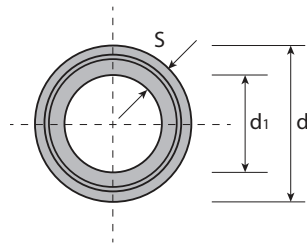


d	d 1	s	Kg/m	PN	SDR
20	13.2	3.4	0.172	20	6
25	16.6	4.2	0.266	20	6
32	21.2	5.4	0.434	20	6
40	26.2	6.7	0.671	20	6
50	33.4	8.3	1.04	20	6
63	42	10.5	1.65	20	6
75	50	12.5	2.34	20	6
90	60	15	3.36	20	6
110	73.4	18.3	5.01	20	6

German Therm 

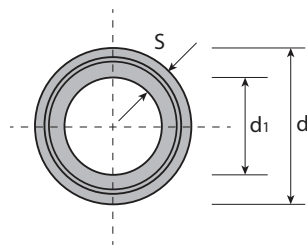


## Fiber – Glass – PN 16 / SDR 7.4 / series 3.2



D	d 1	S	PN	SDR
32	23.2	4.4	16	7.4
40	29.0	5.5	16	7.4
50	36.2	6.9	16	7.4
63	45.8	8.6	16	7.4
75	54.4	10.3	16	7.4
90	65.4	12.3	16	7.4
110	79.8	15.1	16	7.4

## Fiber – Glass – PN 20 / SDR 6 / series 2.5



D	d 1	S	PN	SDR
25	16.6	4.2	20	6
32	23.2	5.4	16	7.4
40	29.0	6.7	16	7.4
50	36.2	8.3	16	7.4
63	45.8	10.5	16	7.4
75	54.4	12.3	16	7.4
90	65.4	15	16	7.4
110	79.8	18.3	16	7.4

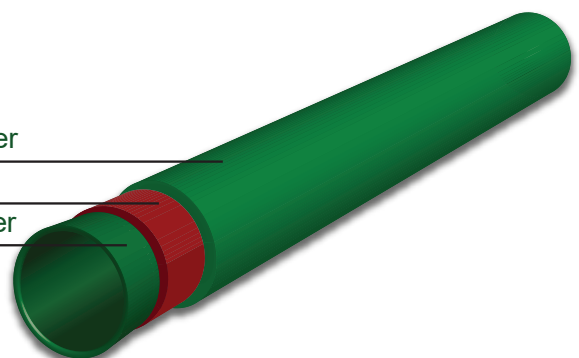


## ABOU GHALY Fiber-Glass

The range **ABOU GHALY** fiberglass pipes, multilayer pipes are in random polypropylene, reinforced with an intermediate layer of a special composite. Fiberglass **ABOU GHALY** can be used with all connections of the range System **ABOU GHALY**. For welding using the traditional methods of welding and electro fusion welder.

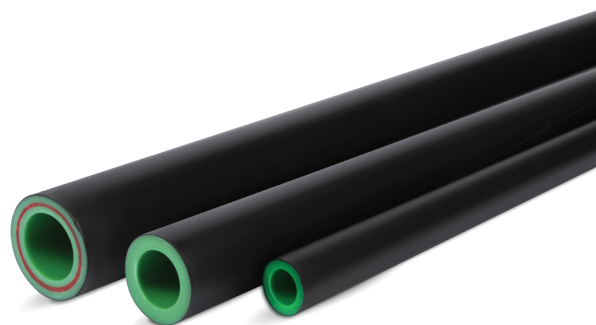
- Pressure systems of cold and hot water
- Systems for swimming pools
- Compressed air system
- Cooling system
- Heating system
- PP-R out layerClosed system
- Fiberglass Transport of chemicals
- PP-R inner layer Irrigations

PP-R outer layer  
Fiberglass  
PP-R inner layer

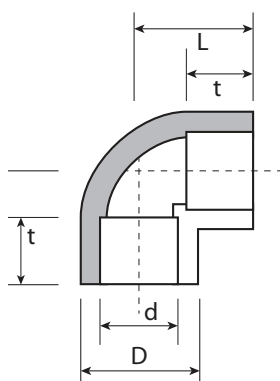


# ABOU GHALY Isolated Pipes

**ABOU GHALLY** is leading company in manufacturing drinking water pipes made from polypropylene coated with layer of availed to avoid the adverse effect of ultraviolet Rays As well **ABOU GHALLY** is leading company in manufacturing drinking water pipes made from polypropylene pipe with 3 layers and 4 layers.

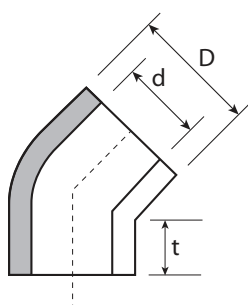


## 90° Plain Elbow



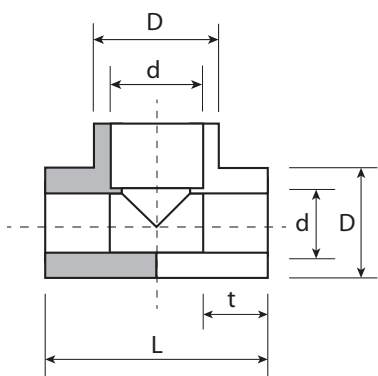
Ø	d	D	L	t
20	19.3	29	30	14.5
25	24.3	35	33	16.0
32	31.3	42	35	18.0
40	39.2	52	41	20.5
50	49.2	67	51	23.5
63	62.1	81	58	27.5
75	74.1	99	69	30
90	89.2	120	80	33
110	109.2	146	95	37

## 45° Plain Elbow



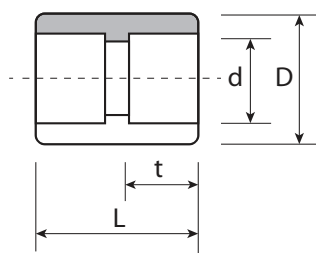
Ø	d	D	T
20	19.3	29	14.5
25	24.3	36	16.0
32	31.3	43	18.0
40	39.2	55	20.5
50	49.2	69.0	23.5
63	62.1	87.0	27.5
75	74.1	100	30
90	89.2	120	33
110	109.2	146	37

## 90° Plain Tee



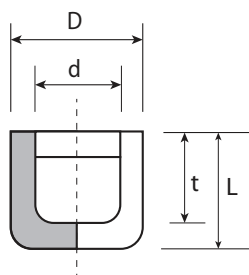
Ø	d	D	L	T
20	19.3	29	30	14.5
25	24.2	33.8	33	16
32	31.3	41	35	18
40	39.2	54	35	20.5
50	49.2	63	34	23.5
63	62.1	84	40	27.5
75	74.1	100	57	30
90	89.2	120	63	33
110	109.2	146	85	37

## Sleeve



Ø	d	D	L	T
20	19.3	29	32	14.5
25	24.3	34	38.4	16.0
32	31.3	42	38	18.0
40	39.2	51	48	20.5
50	49.2	66	56	23.5
63	62.1	80	60	27.5
75	74.1	100	68	30
90	89.2	120	80	33
110	109.2	146	86	37

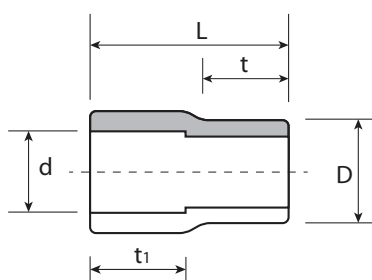
## Plain Cap



Ø	d	D	L	T
20	19.2	29	30	14.5
25	24.3	33.8	33	16
32	31.1	41	35	18
40	39.2	54	35	20.5
50	49.2	63	34	23.5
63	62.1	84	40	27.5
75	74.1	100	57	30
90	89.2	120	63	33
110	109.2	146	85	37

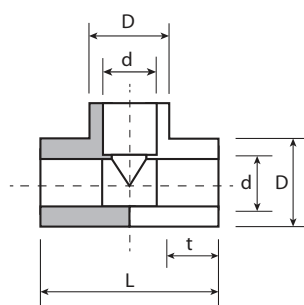


## M / F Plain Reduction



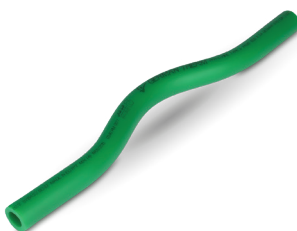
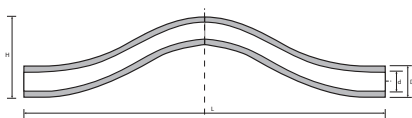
Ø	d	D	t	t1	L
25*20	19.2	25.5	18	17	40
32*25	24.3	23.5	20	18	53.3
32*20	19.3	32.5	20.0	21.6	42
40*20	19.3	40.5	23.5	25.2	19
40*25	24.2	40.5	23.5	25.5	49
40*32	31.2	40.5	25.5	26	51.3
50*20	19.3	50.5	15	21.7	38.5
50*25	24.2	50.5	16.5	21.7	38.5
50*32	31.2	50.5	12.6	21.7	35
50*40	39.2	50.5	19.6	25	44.5
63*20	19.3	63.5	15.2	25	40
63*25	24.2	63.5	15.2	25	40
63*32	31.2	63.5	15.2	25	41
63*40	39.2	63.5	18.7	25	43.7
63*50	49.1	63.5	24.7	27	49.7

## 90° Plain Reduced Tee



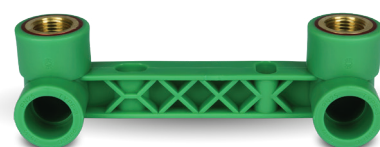
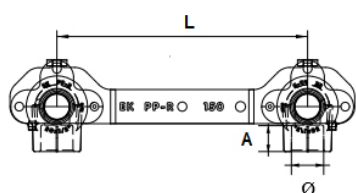
Ø	d	D	d1	L	T
25*20*25	19.3	34	24	64	16
32*20*32	19.3	34	30.5	76.6	19
32*25*32	24.2	34	30.5	76.6	19
40*20*40	19.3	34	39.2	80	20.5
40*25*40	24.2	34	39.2	80	20.5
40*32*40	31.1	43	39.2	80	20.5
50*20*50	19.3	43	49.2	98	23.5
50*25*50	24.2	34	49.2	98	23.5
50*32*50	31.1	43	49.2	98	23.5
50*40*50	39.2	53	49.2	98	23.5
63*20*63	19.3	34	62.1	117	28.0
63*25*63	24.2	34	62.1	117	28.0
63*32*63	31.1	43	62.1	117	28.0
63*40*63	39.2	53	62.1	117	28.0
63*50*63	49.2	65	62.1	117	28.0

## B y – Pass



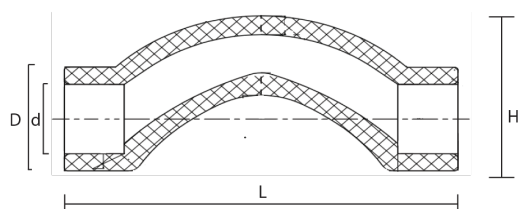
Ø	d	D	H	L
20	13.2	2.3	50	31
25	16.6	25.3	55	31
32	21.2	32.3	63	31

## Mounting Plate



Ø	A	L
20	19.2	150mm
25	24.2	150mm

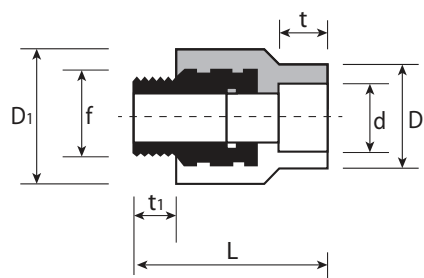
## Py – Pass With Coupling



Ø	d	D	H	L
20	19.2	28	53	11.5
25	24.2	36	53	11.5

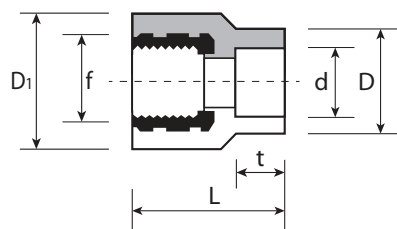


## Male Threaded Joint



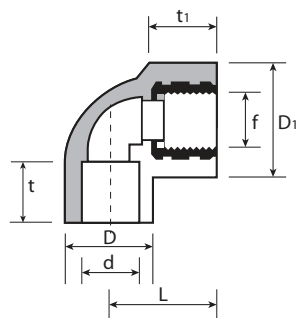
Ø	d	f	D	D1	t	L	t1
20*½	19.3	½	29	35	15	55	15
25*½	24.2	½	34	35	16.0	55	15
25*¾	24.2	¾	34	43	16.5	55	15
32*¾	31.1	¾	43	50	18.0	62.2	15
32*1	31.1	1"	43	50	18.0	62.2	18
40*1¼	39.2	1¼	51	55	20.5	63	18
50*1½	48.9	1½	64.5	69.5	23.5	77	21
63*2	61.9	2"	80.5	86	27.5	93	24.5

## Female Threaded Joint



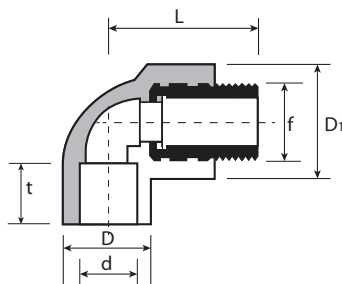
Ø	d	f	D	D1	t	L
20*½	19.3	½	29	35	15	39
25*½	24.2	½	34	35	16	40
25*¾	24.2	¾	34	43	16.5	39
32*¾	31.1	¾	43	50	18.0	46.5
32*1	31.1	1"	43	50	18.0	46.5
40*1¼	39.2	1¼	51	55	20.5	47
50*1½	48.9	1½	64.5	69.5	23.5	55.5
63*2	61.9	2"	80.5	86	27.5	67

### Female threaded elbow



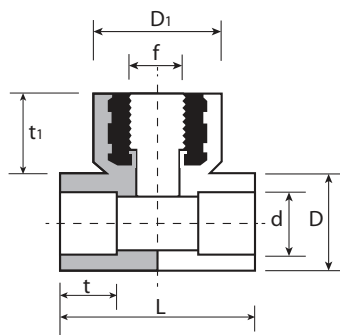
Ø	d	f	D	D1	t	L	t1
20*1/2	19.3	1/2	30	39	16	37.5	27
25*1/2	24.2	1/2	34.4	37	17	40	25
25*3/4	24.2	3/4	35	44.4	15.5	37.4	26
32*3/4	31.1	3/4	42	51	20	48	29
32*1	31.1	1"	42	51	20	48	29

### Male threaded elbow

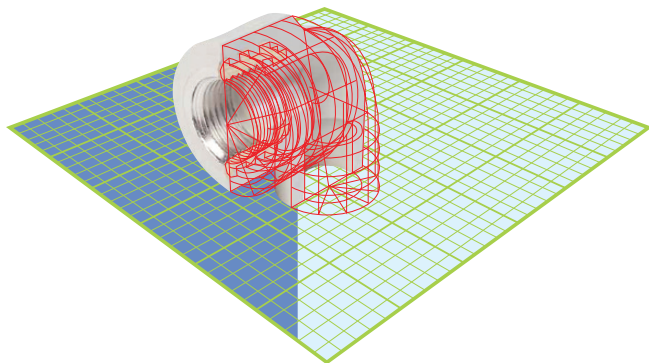


Ø	d	f	D	D1	t	L
20*1/2	19.3	1/2	30	39	16	52
25*1/2	24.2	1/2	34.4	37	17	55

### Female Threaded Tee

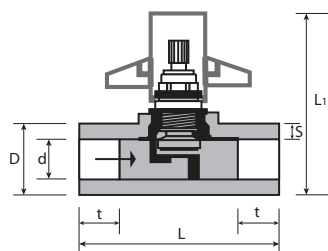


Ø	d	f	D	D1	t	L	t1
20*1/2	19.3	1/2	30	37	14.5	62	22
25*1/2	24.2	1/2	34	37	16.0	76	20
32*3/4	31.1	3/4	42	51	18	75	25
32*1	31.1	1"	42	51	18	75	25
40*1 1/4	39.2	1 1/4	51	60	20.5	78	26





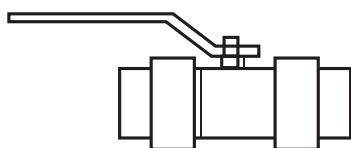
## Concealed Valve



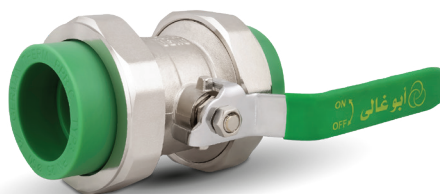
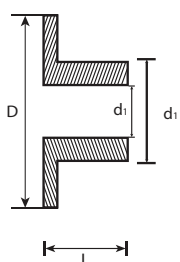
Ø	d	D	L	S	t	V	L1
20	19.2	32.9	75	7	14	1/2"	134
25	24.2	36	82	6	15	3/4"	134



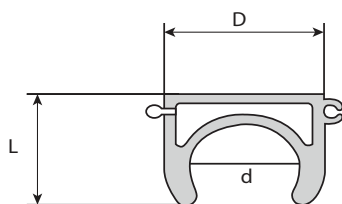
## Ball Valve



Ø	d1	d	D	L
3/4"	34	24.2	40	24.5
1"	43	30.1	49	27
1 1/2"	66.5	48.9	76.5	32
2"	61.5	62.5	96.5	35

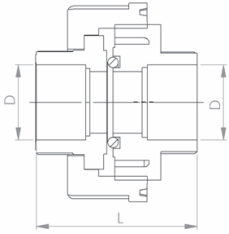


## Bracket for Pipe



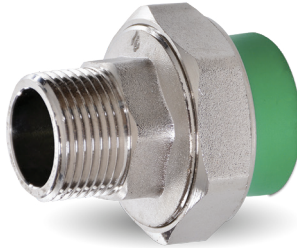
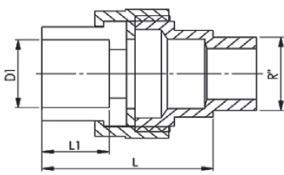
Ø	d	D	L
20	19.2	26	25.2
25	24.2	33.3	30.2
32	31.1	45	28.2

## Female Union Both Ends Welding



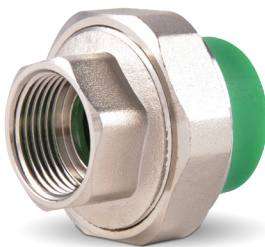
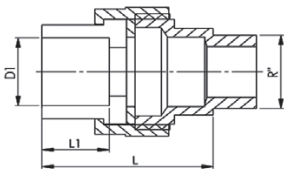
Ø	d	L
25	24.2	63
32	31.1	72
50	49.0	89.5
63	61.9	107

## Transition PP-R Male Union



Ø	d	L
¾"	24.2	61.5
1"	31.1	66
1½"	49.0	78
2"	61.9	90

## Transition PP-R Female Union



Ø	d	L
¾"	24.2	46
1"	31.1	53
1½"	49.0	69
2"	61.9	81

## 13. Mounting Guidelines

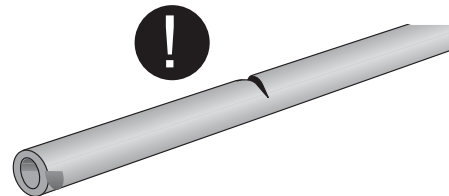
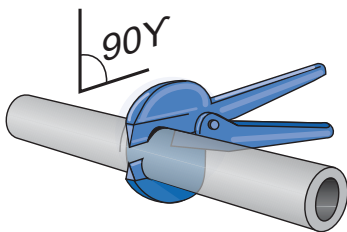
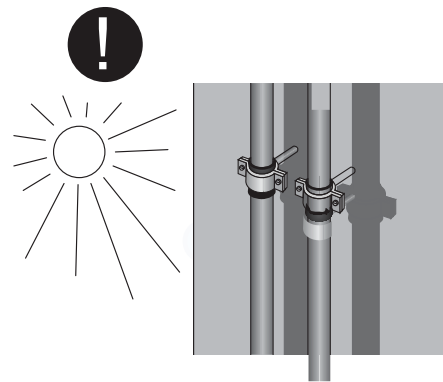
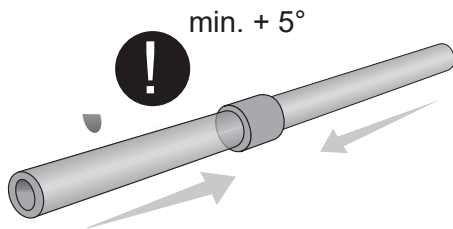
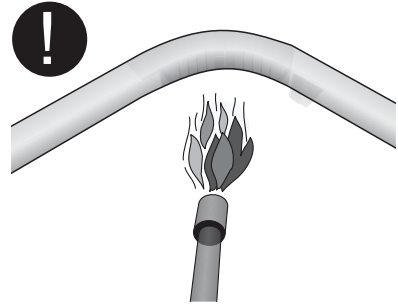
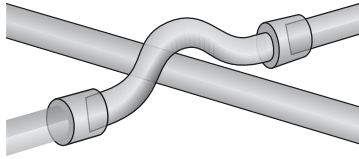
### 13-1. Basic principles of routing and fixing polypropylene pipes

1. Pipe installation should be carried out by licensed and qualified people.
2. PP pipes in water supply installations inside buildings should not be laid above gas and electric supply systems.
3. Minimum distance between PP pipes and heat pipes shall be 10 cm counting from the pipes' surface. Otherwise an insulation should be applied.
4. In case of warm domestic water installations it is recommended to insulate a riser and horizontal piping whereas in central heating installations to insulate a riser piping in wall channels and a horizontal piping running through unheated spaces.
5. Pipes in water supply installations inside buildings should be laid in such a way that they are protected against mechanical damage.
6. All elements of the installation directly adjoining plastics shall be equipped with an elastic separator.
7. Where the pipes are laid through a building wall, protective sleeves, at least 2 cm longer than wall thickness, should be applied.  
The space between a pipe and a sleeve should be filled with an elastic material.
8. Clamps used to fix PP pipes should allow the pipe a free sliding movement.
9. Thermal elongation of a pipe should be taken into account and a self-compensation should be applied.
10. PP pipes should be joined by welding and by means of connectors.
11. During welding adequate welding parameters determined for a certain material should be observed.
12. The system components must be protected against radiation UV. Long-term exposure to sunlight can degrade the operating properties of the system.

When the elements are installed unprotected on outdoor wall surface they must be covered with suitable insulation.

Components of plastic piping systems must be protected against impact, falling, blow or any other mechanical damage during their transport and installation.

- Only the components that are not damaged or contaminated, during storage or transportation, may be used for installation works.
  - A minimum temperature for plastic piping installation, as regards welding, is +5 °C. At lower temperatures it is difficult to provide working conditions for high quality pipe joints.
  - Pipeline crossings are made by means of the components specially designed for this purpose.
  - Joining of plastic parts is done by polyfusion welding which results in a high-quality homogeneous joint.
  - Joining must be performed under specified working conditions with the use of appropriate tools.
- It is not recommended to weld **ABOU GHALY** components together with other brand products  
It is (no warranty).
- Components must not be exposed to open fire.
  - Sharp and professional tools can only be used to cut the pipes.



## 13-2. Pipe Fixing

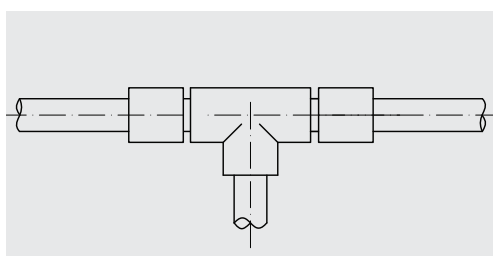
The design of a pipeline route must consider the material of the distribution system (thermal expansion coefficient), the necessity to allow for expansion, given operating conditions (a combination of pressure and temperature levels) and a type of pipe joints. Fixing of distribution systems shall be performed so that fixed and sliding points are planned with respect to expected linear changes of the pipes.

## Types of pipe fixing techniques

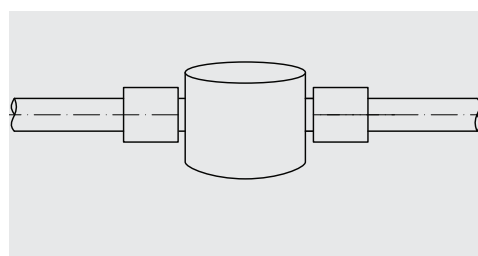
There are two kinds of supports in terms of pipe fixing.

**Fixed point**– closely fit set of two connectors blocking a fastening clamps, restraining axis movements of a pipe. It is designed for an adequate division of an installation into sections subject to separate elongations (thermal elongation is not transmitted beyond a fixed point). The distance between fixed points arises from the need to allow an adequate pipe compensation. Besides fixed points fastening is obligatory in the following cases:

- At draw off points.
- Before and after the fittings installed on a pipe or additional utilities (filters, water meters, settling tanks).

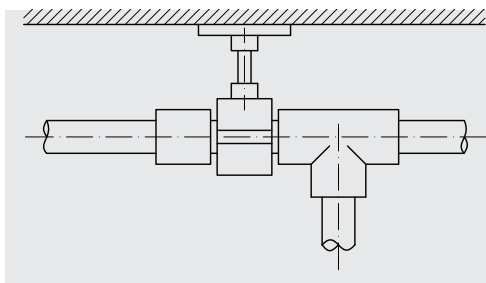


At pipe branch

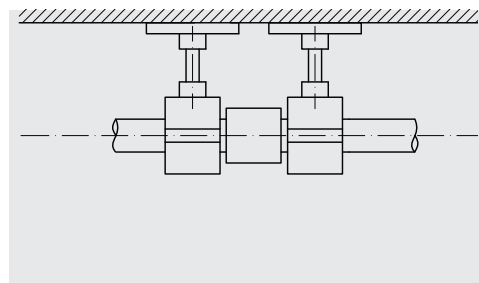


At the place of pipe fitting

**Sliding point** – a fastening clamp designed for anchoring the installation to the structural component of a building and preventing the pipes against excessive buckling. The distance between sliding point depends on the temperature of a medium and the outer diameter of a pipe. The list of maximum permissible distances for the pipes laid horizontally is set forth in Table.



By loose pipe-straps



By pipe-straps suspended on hooks

### 13-3. Maximum distances between supports:

Fixed clamp spacing's at horizontally installed **ABOU GHALY** Pipes can be founded by the help of the table below.

Clamp spacing's in vertical installation should be the same with those in horizontal installation. Distance between support clamps (both fixed and slide) should be carefully maintained as per the table below:

Pipe diameter (mm)	20°C	30°C	40°C	50°C	60°C	70°C	80°C
20	80	75	75	70	65	60	60
25	85	85	85	80	75	75	70
32	100	95	90	85	80	75	70
40	110	110	105	100	95	90	85
50	125	120	115	110	105	100	90
63	140	135	130	125	120	115	105
75	150	150	140	140	125	115	105
90	165	160	150	150	140	125	115
110	190	180	170	170	160	140	130

### 13-4. Linear Expansion

Polypropylene has a considerable coefficient of linear expansion  $\alpha = 0.13-0.18 \text{ mm/m}^\circ\text{K}$  (depending on the temperature of the material).

Consequently, during the mounting the system, pipe linear expansion, resulting from the change of temperature should be taken into account. The expansion of a pipe section is calculated with the following formula:  $\Delta L = \alpha \times L \times \Delta t$

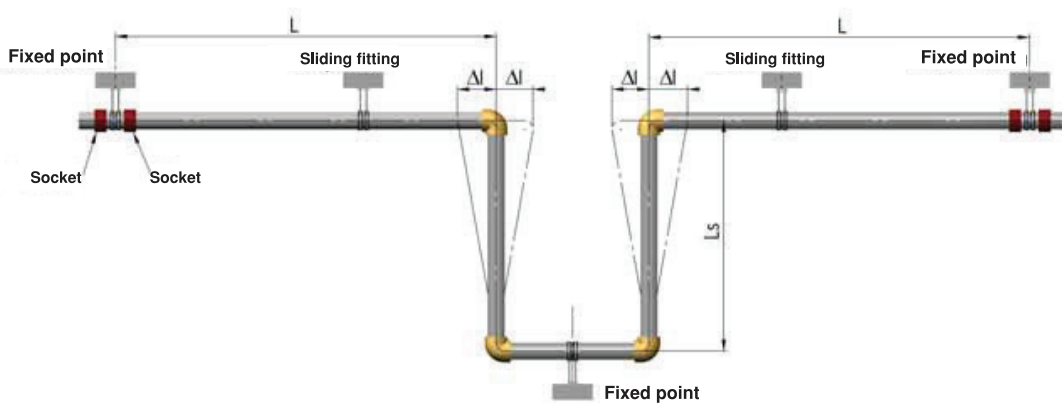
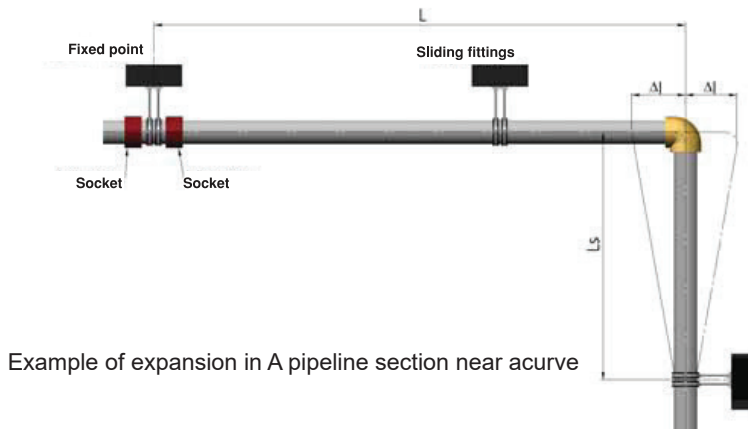
Where:  $\Delta L$  - linear expansion (mm)  
 $\alpha$  - is coefficient of linear expansion {mm/m $^{\circ}$ K}  
 $L$  - is initial length of a pipe {m}  
 $\Delta t$  - is temperature difference { $^{\circ}$ K}

The compensation of elongation is done by means of a flexible arm, an expansion loop and U-shape compensator.

The length of a flexible arm may be calculated with the following formula:

$$L_s = Kx\sqrt{Dx\Delta L}$$

Where:  $L_s$  - the length of flexible arm {mm}  
 $K$  - material constant for polypropylene PP-R is 20  
 $\Delta L$  - expansion of a pipe {mm}  
 $D$  - outer diameter {mm}



### Example of U-expander compensator

In order to make U-shape compensator outside flexible arm, the width of compensator should be known i.e. the distance between the arms  $S = 2 \times \Delta L + A_{min}$  ( $A_{min}$ . – Safety Width – assigned as 150mm)  
In order to minimize the dimensions of compensators during assembly the initial wire tension is used.  
The assembly along with initial tension ensures aesthetic appearance of a system.  
Length of initial tension =  $\Delta L/2$

Linear expansion  $\Delta L = \alpha \times L \times \Delta t$

$\Delta L = 0,15 \times 10 \times 40 = 60 \text{ mm}$

Compensating length:

Symbol	Name	Value	Unit
$\alpha$	Coefficient of linear expansion	0,15	mm/ m°C
L	Length of pipe	10	m
$t_p$	Operating Temperature	60	°C
$t_m$	Temperature during mounting	20	°C
$\Delta t$	Temperature difference $\Delta t = t_p - t_m$	40	°C

Compensation length with initial tension:

$$L_s = K \times \sqrt{D \times \frac{\Delta L}{2}}$$

$$L_s = 20 \times \sqrt{40 \times \frac{60}{2}} = 693 \text{ mm}$$

Symbol	Name	Value	Unit
K	PP-R material constant	20	-
D	Outside pipe diameter	40	mm
$\Delta L$	Linear expansion	60	mm



Length of flexible arm with initial tension may be calculated in the following way:

Length of pipeline L(m)	Difference in temperatures $\Delta t$ (°C)						
	10	20	30	40	50	60	70
1	1,5	3,0	4,5	6,0	7,5	9,0	10,5
2	3,0	6,0	9,0	12,0	15,0	18,0	21,0
3	4,5	9,0	13,5	18,0	22,5	27,0	31,5
4	6,0	12,0	18,0	24,0	30,0	36,0	42,0
5	7,5	15,0	22,5	30,0	37,5	45,0	52,5
6	9,0	18,0	27,0	36,0	45,0	54,0	63,0
7	10,5	21,0	31,5	42,0	52,5	63,0	73,5
8	12,0	24,0	36,0	48,0	60,0	72,0	84,0
9	13,5	27,0	40,5	54,0	67,5	81,0	94,5
10	15,0	30,0	45,0	60,0	75,0	90,0	105,0
15	22,5	45,0	67,5	90,0	112,5	135,0	157,5
20	30,0	60,0	90,0	120,0	150,0	180,0	210,0

Length of pipeline L(m)	Difference in temperatures $\Delta t$ (°C)						
	10	20	30	40	50	60	70
1	0,3	0,6	0,9	1,2	1,5	1,8	2,1
2	0,6	1,2	1,8	2,4	3,0	3,6	4,2
3	0,9	1,8	2,7	3,6	4,5	5,4	6,3
4	1,2	2,4	3,6	4,8	6,0	7,2	8,4
5	1,5	3,0	4,5	6,0	7,5	9,0	10,5
6	1,8	3,6	5,4	7,2	9,0	10,8	12,6
7	2,1	4,2	6,3	8,4	10,5	12,6	14,7
8	2,4	4,8	7,2	9,6	12,0	14,4	16,8
9	2,7	5,4	8,1	10,8	13,5	16,2	18,9
10	3,0	6,0	9,0	12,0	15,0	18,0	21,0
15	4,5	9,0	13,5	18,0	22,5	27,0	31,5
20	6,0	12,0	18,0	24,0	30,0	36,0	42,0

## 13-5. Pipeline Routing

Pipes should be installed with a minimum gradient of 0.5 % towards the lowest system points where system emptying by drain faucet or shut off valves with outlet is made possible.

The piping system must be divided into separate parts that can be closed, if necessary. Straight valves and plastic ball taps are used for this purpose. For build in installation the shut off valves or ball taps are used.

It is recommended to test fitting functions (closing/opening) before they are installed. A wall mounting group with tap connectors is recommended to be used in a termination place where valve mixers are installed.

## Routing of **ABOU GHALY** inlet piping

Inlet piping systems are made mainly of 20 mm diameters that are usually laid in wall channels.

The channel of insulated pipe routing must be free of obstacles and allow for expansion.

Beside its thermal properties the insulation system also protects the pipe against mechanic damage as well as a layer making piping expansion more easy.

An insulation system of expanded polystyrene or polyurethane (foam) is recommended.

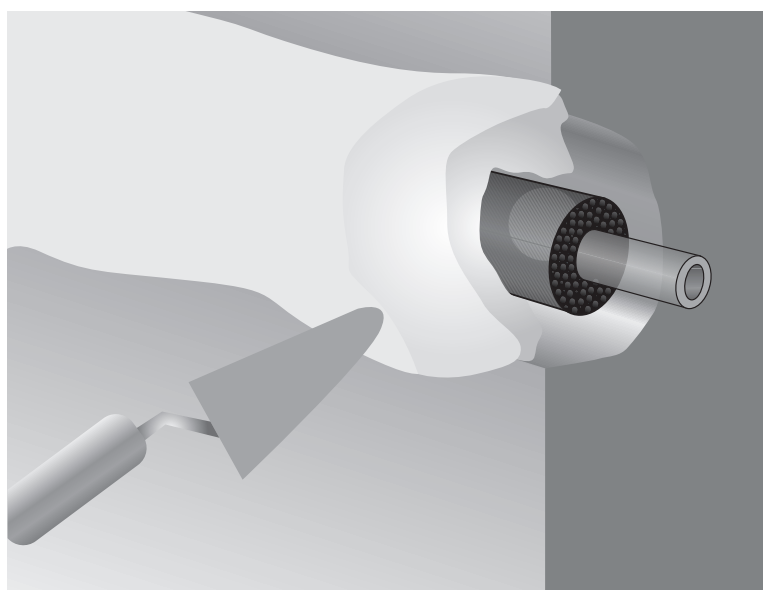
Before the piping system is bricked in the pipes must be thoroughly fixed to the channel (using plastic or metal pipe-straps or by plastering at some places, etc.).

If water supply piping systems are installed inside stack partitions then they must be fixed in a suitable way such as with a system of metal clamps and supporting elements.

The systems must be insulated and positioned allowing for expansion. If water supply /distribution piping systems are installed inside floor/ ceiling structures then flexible plastic protective sleeves (made of polyethylene) are used for protection against mechanic damage while the air layer between the sleeve and pipe works as a thermal insulation.

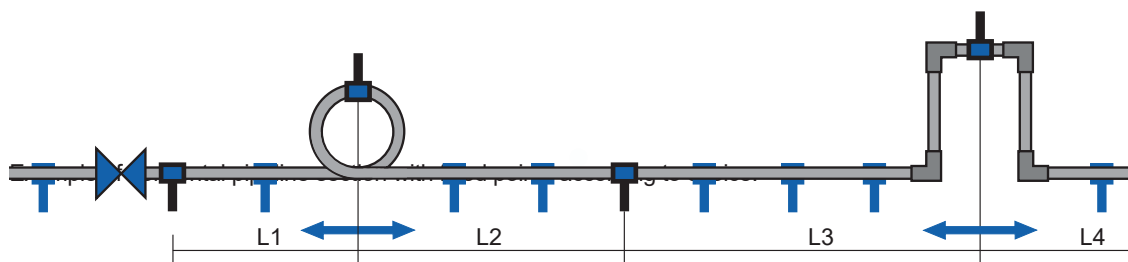
Piping systems freely laid are rarely used for short distances in areas where visual appearance is not a priority (laundry, building service areas, etc.). Supporting elements must be positioned with a necessary care to fix the piping and consider a compensation of pipe expansion in connecting sections where the pipes are covered as well as to apply a good insulation system to the piping, (if, for instance, a cold water pipe is led freely on-wall in a heated area then a risk of surface condensation will be considerable).

Piping systems may be led freely on-wall where there is no risk of mechanic damage while in normal operation.

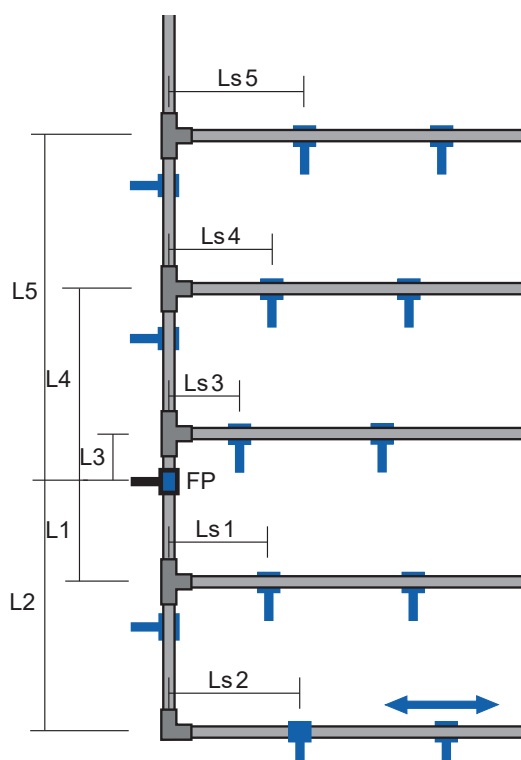


# Routing of **ABOU GHALY** riser piping

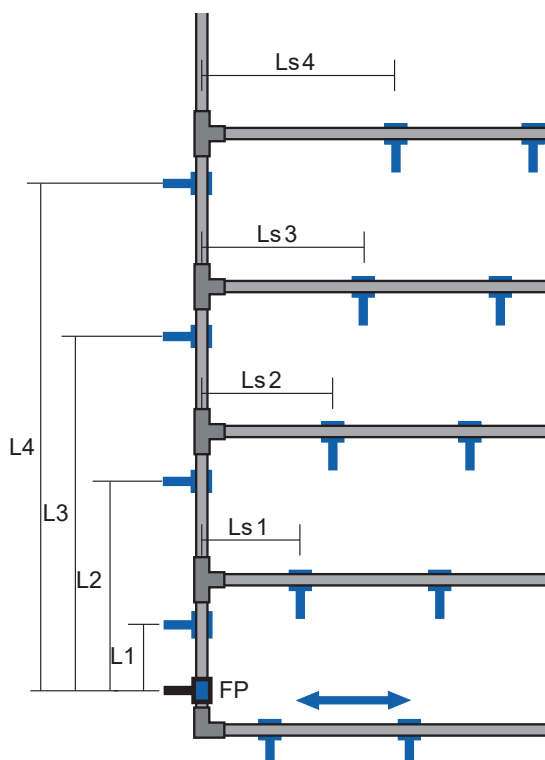
In the case of riser piping it is necessary to consider precisely the layout of fixed points and sliding mounts as well as creation of a suitable expansion compensation system. The adjustments for expansion in riser piping systems are provided as follows:



Expansion is counterbalanced by a circular compensator and by an expansio curve.



Example of placing a fixed point at the first floor.



Example of placing a fixed point at the ground floor.



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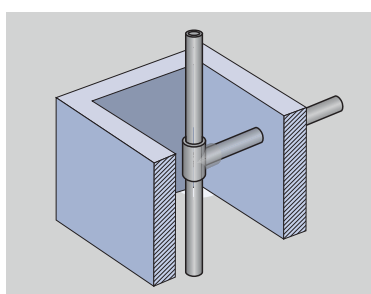


## 14. installation in ducts

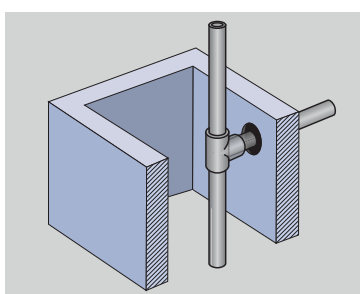
If it is necessary to divide the riser into several expansion sections then it can be achieved by placing fixed points. The riser fixed points are always fixed under and over T-pieces at a branch pipe or socket which, at the same time, prevents the riser to fall.

The pipe expansion must accounted for between these fixed points as follows:

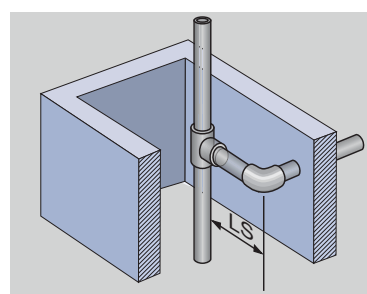
In branching off feeder piping it is necessary to allow for the riser expansion by:



Keeping a sufficient distance from the wall pass-through point.



Creating a possibility of branch pipe movement in the wall pass through point



Creating a compensating length allowing for expansion at the riser normal line.

## 15. Welding

### 15-1. Welding process

1 - Cutting pipes to proper length.

Cut pipes perpendicularly to its axis with a pipe cutter or a rotary pipe cutter.

2 - Cleaning and marking.

Before fusion clean up the end of a pipe and a fitting and mark the depth of the insertion of a pipe into a fitting in accordance with the table.

3 - Welding of elements.

When the heating temperature has reached the required 260°C, push the fitter and the end of the pipe on the welding ends by means of a sliding non-rotary motion to the depth previously marked and heat them according to the time specified in the table.

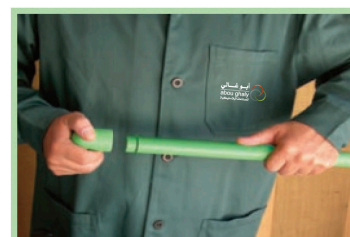
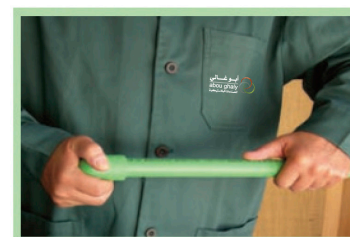
4 - Joining.

Take a pipe and a fitting off the welding ends and join them by pushing without turning, up to the previously marked welding depth. During pushing determine the mutual position of a pipe and a fitting. Leave a joint still until it reaches the required stability.



## 15-2. Times of working

Pipe outside diameter (mm)	Fitting depth (mm)	Heating time (s)	Working time (s)	Cooling time (min)
20	4	5	4	2
25	5	7	4	2
32	5.5	8	4	2
40	18	12	6	4
50	20	18	6	4
63	24	24	8	6



## 15-3. General requirements for welding:

Only the same kind of material can be welded together.

Pipes and fittings should be heated simultaneously and not more than once.

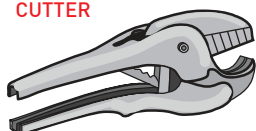
All operations during a welding process shall be performed without turning a pipe against a fitting and welding ends.

It should be taken into account that welding time differs depending on elements' diameters. Welding time for PN 10 pipes is shortened by about half.

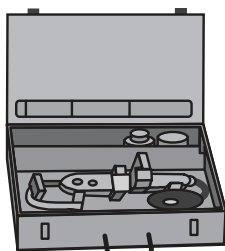
The recommended surrounding temperature during welding shall be above 5°C. In lower temperature the welding time should be increased by 50% and the level of heating of the welding ends should be constantly checked. Welding below 0°C should be avoided.

Double, even flash on the whole weld surface indicates a good quality of a joint.

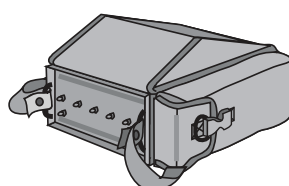
CUTTER



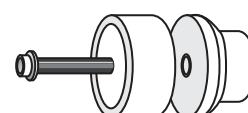
FUSION MACHINE



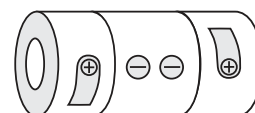
ELECTRICAL WELDING MACHINE



MOULD



PEELER

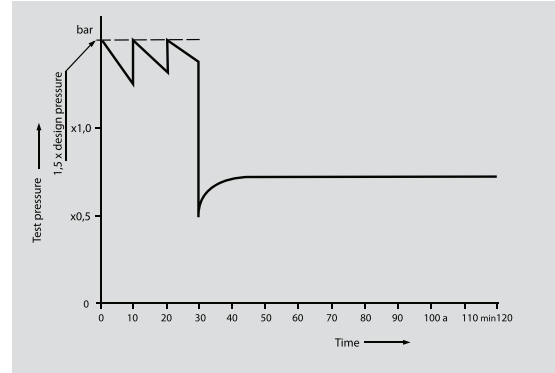


# 16. Pressure test

## Test procedure A

To use Procedure A to apply the hydrostatic test pressure conduct the procedure as follows:

- Open the venting system;
- Purge the system with water to expel all air that can be removed thereby. Stop the flow and close the venting system;
- Apply the selected hydrostatic test pressure equal to 1,5 times the design pressure by pumping according to Figure 12 during the first 30 min, during which time an inspection should be carried out to identify any obvious leaks with the system under test;
- Reduce the pressure by rapidly bleeding water from the system to 0,5 times design pressure according to Figure 12;
- Close the valve. The recovery of a constant pressure, which is higher than 0,5 times the design pressure, is indicative of a sound system. Monitor the situation for 90 min. Visually check for leaks. If during that period there is a drop in pressure, this indicates a leak within the system;
- The test result should be recorded.

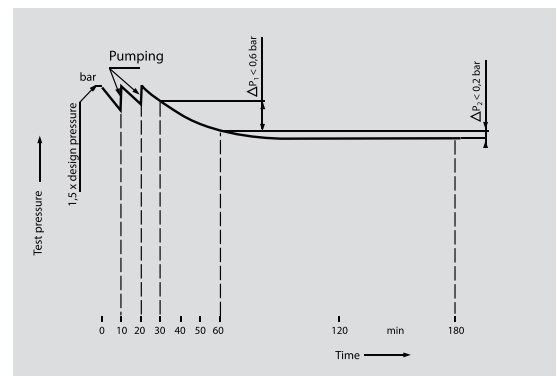


## Test procedure B

To use Procedure B to apply the hydrostatic test pressure, conduct the procedure as follows:

- Open the venting system;
- Purge the system with water to expel all air that can be removed thereby. Stop the flow and close the venting system;
- Apply the selected test pressure equal to 1,5 times the design pressure by pumping according to Figure 13 during the first 30 min;
- Read the pressure when the first 30 min have elapsed;
- Read the pressure after another 30 min and visually check for leaks. If the pressure has dropped by less than 0,6 bar conclude the system has no obvious leakage and continue the test without further pumping;
- Visually check for leaks and if during the next 2 h, the pressure drops by more than 0,2 bar this indicates a leak within the system;
- Indicates a leak within the system;

The test result should be recorded. For smaller sections of an installation the test Procedure B may be reduced to only stages a) to e) and g).





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## 17. Storage, handling and transportation

The system components must be protected against ultraviolet radiation, weather and contamination. UV radiation is damaging to polypropylene. Long – term exposure to sunlight can degrade the operating properties of the system. When the elements are stored in outdoors area or installed unprotected on outdoor wall surface, they must be taken to indoor storage or be covered with a suitable insulation.

When stacked Plastic pipes must be supported along their whole length or protected against deflection in another suitable way.

Plastic pipe and fittings are usually stored in sacks or on palettes or are freely loaded in boxes, containers, baskets, etc.

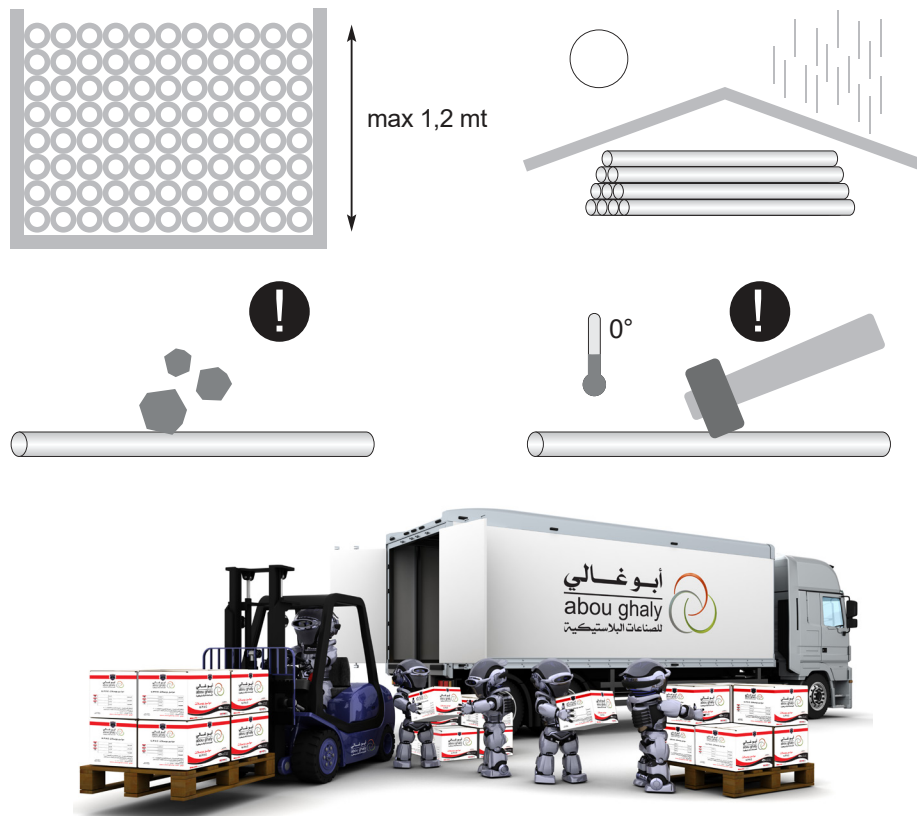
Maximum storage height of 1,2 m must be respected if plastic pipes are kept in plastic sleeves and or pipe fittings in plastic sacks. Different types of pipes and fittings are stored separately.

During handling it is not allowed to drag pipes over the ground or a lorry deck. The pipes must not be moved by throwing or letting them fall off the lorry to the ground.

During transportation the pipes must be protected against mechanical damage and stored on a suitable underlay where protected against dirt, solvents, direct heat (contact with a radiator, etc.).

The pipes are put into protective covers (pipes in polyethylene bags, pipe fittings also in sacks or cardboard boxes) and it is recommended to let them stay in there as long as possible before the installation works start (as a protection against dirt).

Pipes and fittings should be treated with special caution at the temperature of 0°C or lower.



## 18. Boxing and Shipping

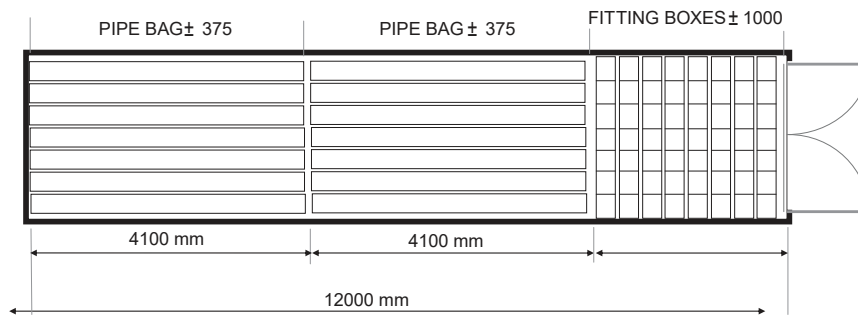
### NOTE:

**Pipe:** diameter 25mm **Bags:** Length :35 cm

**Wide:** 25 cm **Height:** 22 cm

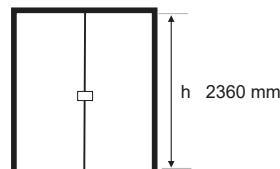
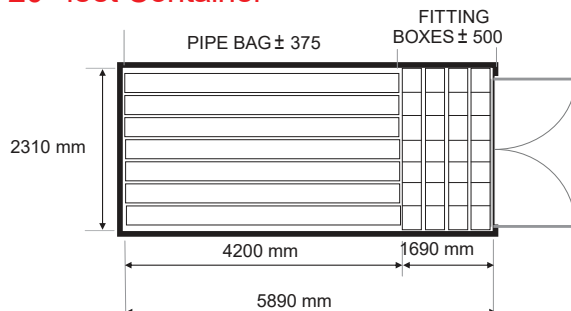


### 40" feet Container



Max Bags n 750  
Max Boxes n 1000

### 20" feet Container



Max Bags n 375  
Max Boxes n 500







# THANK YOU



OHSAS 18001



ISO 9001









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info@aboughaly.com

www.aboughaly.com

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