

PLASTIC SHEET PRODUCTS CATALOGUE



FIRAT



P L A S T I C S H E E T P R O D U C T S C A T A L O G U E

TABLE OF CONTENTS

2	- Firat Corporate
4	- TRNC Water Supply Project
5	- Plastic Sheet Products
6	- Advantages
7	- Areas of Application
8	- Product Variety
10	- Material Features
11	- Application Technique
12	- Welding Methods
13	- Potable water tanks
15	- Metal Coating Facilities
16	- Chemical Waste Tank
17	- Cesspool
	Chemical Storage Tanks
	Ventilation Systems
18	- Miscellaneous Applications
19	- Oil Trap Tank Application
20	- Silo and Tank Applications
	Abrasion Resistance Application
21	- Table of Resistance to Chemical Substances
24	- Quality Assurance Certificates
	Ministry of Health Analysis Reports
26	- Applying Internal Surface Insulation to Water Tanks



FIRAT

FIRAT was established in 1972 to carry out production in construction materials sector. Setting off with the principles of “always high quality production” and “high quality product range”, FIRAT succeeded to become “a leader company in its sector” and leading exporter of the sector” with major progresses it has achieved in Turkey in a short time.

FIRAT carries out production for various sectors such as construction, agriculture, automotive, medical and white appliances with its plastic based products. Carrying out its productions for these sectors in its modern factories located in İstanbul-Büyükçekmece and Ankara-Sincan, FIRAT owns one of the three largest production facilities in Europe.

As of 2013, FIRAT has 1700 employees. Adopting the understanding of “human is the most important asset”, FIRAT performs regular on-the-job trainings to improve both professional experience and provide corporate knowledge of the employees.

Product Variety and Groups

FIRAT, offers more than 4500 product varieties. FIRAT manufactures its products as integrated systems to ensure that customers ensure highest benefit and satisfaction with these products.

Thousands of FIRAT products such as PVC Door and Window Profiles, PVC Gutters, PVC Sanitary Piping and Fittings, PVC Waste Water Piping and Fittings, PVC Hose Groups, Rubber and PE-based Hoses, PPRC Sanitary Piping and Fittings, PP Composite Pipe and Fittings, HDPE Pipe and Fittings, PP&PE Panels, LDPE Pipe and Fittings, EF Fittings, PE 80 Natural Gas Piping, Drainage Piping, Tunnel Type Drainage Piping, Double Wall Cable Conduits, EPDM Seal Production, TPE Seal Production, Metal Injection Production (Hinge and Window Fittings), PEX Mobile System and Floor Heating Piping, PEX Piping and Metal Fittings, Pex Al Pex Piping, Sprinkler and Drip Irrigation Piping are offered to service in many locations of Turkey and the World.

FIRAT is the only company which manufactures all components that constitute PVC Window and Door systems except for glazing and screw in the world plastics sector. FIRAT manufactures all PVC Profile, EPDM Seal, TPE Seal, Support Sheet and Metal Accessories with integration in its own facilities since complete intercompatibility of PVC Windows and Doors can only be achieved through production at the same source.

FIRAT manufactures FKS Sewage Pipes which have a testable operating life up to 100 years. These pipes which can be manufactured up to a diameter of 3600 mm with HDPE (high density polyethylene) raw material are resistant against seismic movements, reptiles, plant roots and chemical wastes. FKS pipes are manufactured with technology and under licence of German Krah company.

Again manufactured in FIRAT facilities, Double Wall Triplex Pipes which are employed in outdoor installations and underground levels are mainly used in sewage lines and also for domestic connections, rain water drainage lines, industrial waste water installations, water conveying channels and drainage systems. Triplex Pipes have major advantages in terms of high flow performance, external load resistance, extended operating life, ease of shipping and stocking, economy, resistance to chemicals, pricing and ease of maintenance, tightness and ability to install without wastage.

Firat developed FCS Piping Systems which is a new system with an operating pressure up to 10 bar to meet increasing high diameter and high operating pressure piping demand. FCS piping systems which ensure production of all pipes diameters at the range of 800 mm - 4000 mm have become a significant solution option for infrastructure needs with its lightweight, jointing with electro-fusion welding, easy and quick installation features.

FIRAT can perform raw material analysis; source, torrent and wind strength, impact and jagged impact resistance, pressure, tensile and breaking strength, ring stiffness (resistance of FKS and Triplex pipes against soil load) in the most advanced test and analysis laboratories in the sector. Our products are only offered to the customers upon obtaining "Quality Approval".

FIRAT products which are subjected to all quality control products are offered to the market with "FIRAT Quality Assurance Certification". FIRAT is the only company in the sector who holds international quality certifications such as RAL, GOST, SKZ, BDS, SABS, EMI, DVGW, VDE, TSE and also all ISO/IEC 17025 accreditation, ISO 14001, OHSAS 18001, ISO 10002 ve ISO 9001 system certifications. Firat holds ISO 14001 Environment Management System Certificate as an environmentally friendly manufacturer. Products of FIRAT achieved customer satisfaction in more than 60 countries and got the standing they deserved.

FIRAT aims to utilize all of its resources, advance, grow and catch perfection and excellence with advanced technology for ensuring continuous customer satisfaction.

In line with the goals of perfectionism and excellence of FIRAT, our products are largely preferred due to features of reliability, ease of accessibility and after-sales support.



TRNC WATER SUPPLY PROJECT

Having very limited aboveground water resources, almost the entire water demand of the TRNC is met through underground water resources. Water quality is derogating since underground waters which are polluted due to landfill areas that are close to water resources blend into potable water and water potential is reducing every other day.

Numerous projects were developed by Republic of Turkey, Ministry of Forestry and Water Affairs in order to meet water demand of TRNC, however, "TRNC Potable Water Supply Project" was implemented considering that a permanent water line shall be laid from Turkey to TRNC as the best method for a long-term solution. With this project, water to be supplied from Alaköprü Dam to be constructed in Turkey will be passed through the sea in a water pipeline and conveyed to Geçitköy Dam to be constructed in TRNC. Consisting of three stages as Turkey, sea passage and TRNC, the most critical stage of this project is "sea passage".

FIRAT has become the pipe manufacturer of TRNC Potable Water Supply Project by outpacing the world's most important 500 meter continuous HDPE Pipe manufacturers with its successful projects known in the world plastic literature, extensive engineering knowledge, experience, capacity and speed in PE Pipe production.

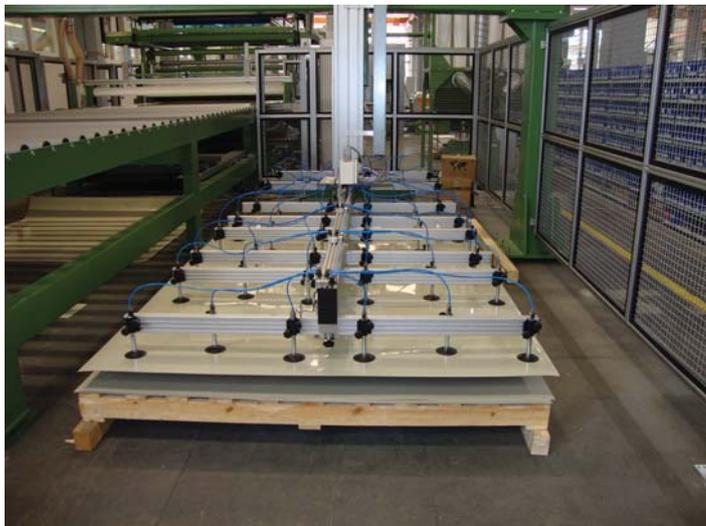
In order to produce PE 100 pipes to be used for 80 kilometer line, within a short period as one year, FIRAT has built a production plant which has 3 large PE 100 pipe extrusion lines on a total area of 85,000 square meters with 5,500 square meters indoor area in Mersin-Taşucu-Seka Port site.

PE 100 pipeline to be established with "TRNC Potable Water Supply Project" is a unique application in the world with 80,151 meter long sea passage distance and suspended fixation at 250 meter deep. 25,000 tons of rawmaterial will be used in the project which will use a total quantity of 160 pipes with 1600 mm diameter, 500 m. of continuous length with operating pressures of PN 8 and PN 6.4 bar.

Planning to complete PE 100 pipe production until December 31st, 2013, this gigantic project will ensure delivery of 75 million cubic meters of water to TRNC, and TRNC will have a resource to meet 50 years of water demand.

Also to be used for irrigation purposes in addition to drinking, utility and industrial purposes, this resource will ensure irrigated farming on an area of 4,824 hectares and provide extensive contribution for the economic growth of the region.

PLASTIC SHEET PRODUCTS



Recently, areas of use of plastic materials are increasing every other day. Having long years of background and experience in both piping systems and PVC Window systems, FIRAT has made an advanced technology investment and introduced "Plastic Sheets" which is a new complementary intermediate product into its product range.

Sheets are made of HDPE-High Density Polyethylene and PP-Polypropylene raw material classes. Production which is carried out through panel extrusion depend on very precise parameters. Production performed with specially designed extrusion production line and Quality Assurance System of FIRAT in combination, offer a safe use and serviceability of the system over long years.

ADVANTAGES

PP - Polypropylene Sheets

Lightweight. Offers ease of application.

Has a wide application area with high operating temperature resistance in 0-100°C range.

Suitable for heavy chemical solution environments.

Used conveniently in coating plants.

Since it has a high flexibility module, it can be employed in areas which require bending resistance.

It has high abrasion resistance.

Resistant to impacts.

Suitable for thermal forming.

Contributes to production of solutions in the application area.

It has a very low surface roughness coefficient.

Does not absorb water.

Has surface glossiness.

Suitable for health.

PE - Polyethylene Sheets

Lightweight. Offers ease of application.

Withstands to extreme operating temperatures up to -40°C.

Suitable for heavy chemical solution environments. Does not corrode.

It has high abrasion resistance.

Suitable for thermal forming. Contributes to production of solutions in the application area.

It has a very low surface roughness coefficient.

It has high impact resistance.

Has surface glossiness.

Does not absorb water.

Natural colored panels have opaque light transmission properties.

Employed in decorative applications.

Suitable for health.

AREAS OF APPLICATION

- Production of silo, tank and connection components
- Chemical plants
- Industrial applications
- Reinforced concrete potable water coating
- Dock and quay concrete piling coating
- Metal surface coating plants
- Food industry storage tanks and pools
- Machinery production sector
- Yacht and ship building sector
- Ventilation and air conditioning applications
- Manhole bases and covers
- Swimming pool diving platforms
- Open office applications
- Decoration applications
- Advertisement and exhibition applications
- Automotive industry
- Storage boxes
- Marine boat manufacture
- Sea buoy and fender manufacture
- Pump enclosure cabin, valve, diaphragm and miscellaneous cylinder applications for waste water plants



Product Variety

Polypropylene Sheets

		1000 X 2000	1500 X 2000	1500 X 3000	2000 X 3000	2000 X 4000
PP-H	Gray	2-30	2-30	2-30	2-30	2-30
PP-H	White	2-30	2-30	2-30	2-30	2-30
PP-C	Gray	2-30	2-30	2-30	2-30	2-30
PP-C	White	2-30	2-30	2-30	2-30	2-30
PP-R	Gray	2-30	2-30	2-30	2-30	2-30
PP-R	White	2-30	2-30	2-30	2-30	2-30

Polyethylene Sheets

		1000 X 2000	1500 X 2000	1500 X 3000	2000 X 3000	2000 X 4000
HDPE	Natural	2-30	2-30	2-30	2-30	2-30
HDPE	Blue	2-30	2-30	2-30	2-30	2-30
HDPE	Black	2-30	2-30	2-30	2-30	2-30
PE 80	Natural	2-30	2-30	2-30	2-30	2-30
PE 80	Blue	2-30	2-30	2-30	2-30	2-30
PE 80	Black	2-30	2-30	2-30	2-30	2-30
PE100	Natural	2-30	2-30	2-30	2-30	2-30
PE 100-uv	Blue	2-30	2-30	2-30	2-30	2-30
PE 100-uv	Black	2-30	2-30	2-30	2-30	2-30
PE 100-RC	Blue	2-30	2-30	2-30	2-30	2-30
PE 100-HMW	Natural	2-30	2-30	2-30	2-30	2-30
PE 100-HMW	Blue	2-30	2-30	2-30	2-30	2-30
PE 100-HMW	Black	2-30	2-30	2-30	2-30	2-30

Polypropylene Sheets with Styrofoam

		1000 X 2000	1500 X 2000	1500 X 3000	2000 X 3000	2000 X 4000
PP	Gray	2-30	2-30	2-30	2-30	2-30
PP	White	2-30	2-30	2-30	2-30	2-30

Polyethylene Sheets with Styrofoam

		1000 X 2000	1500 X 2000	1500 X 3000	2000 X 3000	2000 X 4000
HDPE	Gray	2-30	2-30	2-30	2-30	2-30
HDPE	White	2-30	2-30	2-30	2-30	2-30

Nominal wall thicknesses in the table : 2/ 3 / 4 / 5 / 6 / 8/ 10 / 12 / 15 / 20 / 25 / 30 mm dir.
Dimensions are in mm.

Product Variety

3 Layer Polypropylene Sheets

			1000 X 2000	1500 X 2000	1500 X 3000	2000 X 3000	2000 X 4000
PP	Top	Blue	5-30	5-30	5-30	5-30	5-30
	Middle	Black					
	Bottom	Blue					
PP	Top	Green	5-30	5-30	5-30	5-30	5-30
	Middle	Black					
	Bottom	Green					
PP	Top	White	5-30	5-30	5-30	5-30	5-30
	Middle	Black					
	Bottom	White					

Different colors can be custom manufactured.

3 Layer Polyethylene Sheets

			1000 X 2000	1500 X 2000	1500 X 3000	2000 X 3000	2000 X 4000
HDPE	Top	Blue	5-30	5-30	5-30	5-30	5-30
	Middle	Black					
	Bottom	Blue					
HDPE	Top	Green	5-30	5-30	5-30	5-30	5-30
	Middle	Black					
	Bottom	Green					
HDPE	Top	White	5-30	5-30	5-30	5-30	5-30
	Middle	Black					
	Bottom	White					

Nominal wall thicknesses in the table : 2/ 3 / 4 / 5 / 6 / 8/ 10 / 12 / 15 / 20 / 25 / 30 mm dir.
 Dimensions are in mm.

MATERIAL PROPERTIES

Properties	Test Method	Unit	PP Natural	PP Gray-White	HDPE Natural	HDPE Black-UV
Density	ISO 1183	Gr/cm ³	0,910	0,91-0,92	≥0,940	≥0,950
MRF-Melting Flow Rate 230°C/2,16 kg 190°C/5 kg	ISO 1133	Gr/10dk	0,2-1,0	0,2-1,0	0,1-2,0	0,1-2,0
Elasticity Module	ISO 527	N/mm ²	>1200	>1200	>800	>800
Thermal Expansion Coefficient	DIN 53752	K ⁻¹ x10 ⁻¹	1,5	1,5	1,8	1,8
Surface Resistance	DIN VDE 0303,T3		>10 ¹⁴	>10 ¹⁴	>10 ¹²	>10 ¹²
Thermal conductivity	DIN 52612	W/mK	0,24	0,24	0,4	0,4
Melting Temperature		°C	165	165		
Stiffness	ISO 868	Shore D	65	65	60	60
Flammability	DIN 4102	---	B2**	B2**	B2**	B2**

* Values indicated in the table are typical values. Indicated for information purposes.

** B2: Normally flammable.



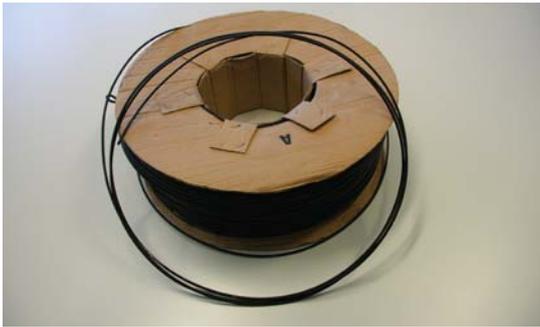
APPLICATION TECHNIQUE

Extruder welding method is used for joining PE and PP sheets for manufacturing final products. The procedure includes preheating using welding rod made of the same class raw material and spreading the molten state material on the welding area at a certain speed by applying pressure.



Welding Extruder

Aspects to be Considered During Application



Welding Rods

Welding operation shall not be performed under 5 centigrade degree or if such is inevitable, measures shall be take to ensure that the welding environment reaches to a minimum temperature of 5°C.

Material to be welded and the welding rod shall be made of identical class polymer and diameter of the welding rod shall be 3-4 mm.

Surfaces to be welded shall be clean, irregularities which may impair welding quality such as oil, dust, soil etc. shall be cleaned prior to the welding operation.

Welding surface shall always be scraped during surface preparation stage and oxidized layer shall be removed. Beveled welding groove shall be established.

Manual welding extruder shall always be kept at an angle of 45° to the welding surface.

Pre-welding shall be performed by using 4 mm welding rod for large and deep welding operations then it shall be followed with second or if required, third welding operations using welding rods with suitable size and shape. Welding zone shall cool down before applying the succeeding welding layer.



Scraper Reamer wire

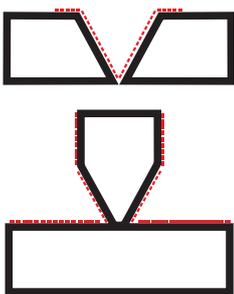


Scraper - Reamer

WELDING METHODS

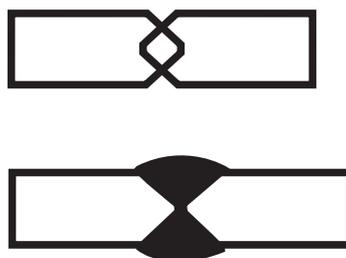
Fillet Welding Preparation

Fillet Welding Preparation Details



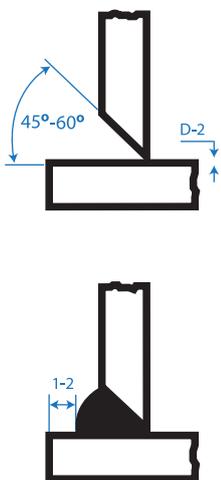
Horizontal Part Welding Methods

Double Side Horizontal Fillet Welding Appearance



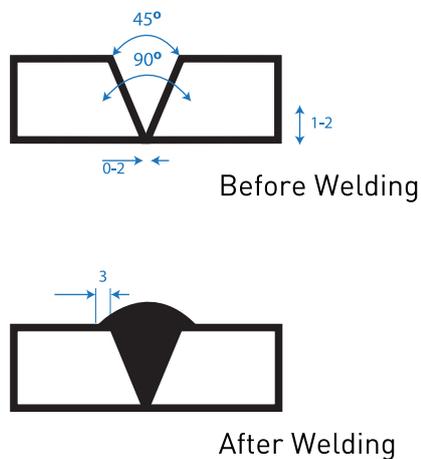
Fillet Welding Vertical Part Welding Methods

Single Side Vertical Fillet Welding Appearance



Fillet Welding Horizontal Part Welding Methods

Single Side Horizontal Fillet Welding Appearance



DVS 2207 Fillet Welding Parameters (Ambient Temperature 20 °C)

Class of the Material to be Welded	Welding Force (N)		Welding Extruder Hot Air Temperature Value (°C)	Hot Air Flow Rate (1/min)
	3mm welding rod	4 mm welding rod		
HDPE	10...16	25...35	300...350	40...60
PP	10...16	25...35	280...330	40...60

Output diameter of the hot air blowing tip of the extruder shall be 5mm.

POTABLE WATER TANKS

Before



After



POTABLE WATER TANKS

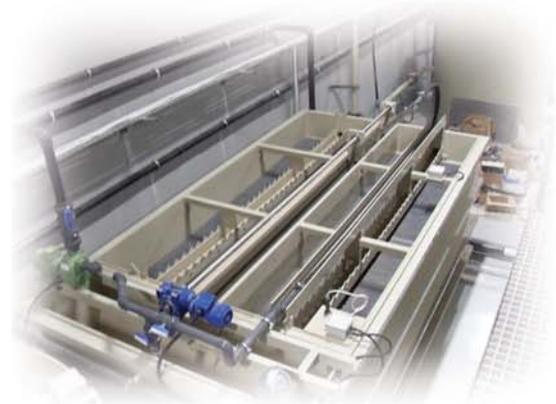
Before



After



METAL COATING FACILITIES



**CHEMICAL
WASTE TANK**

Before



After



CESSPOOL

Before



After



CHEMICAL STORAGE TANKS



VENTILATION SYSTEMS



MISCELLANEOUS APPLICATIONS



OIL TRAP TANK APPLICATION

Before



After



After



After



SILO AND TANK APPLICATIONS



ABRASION RESISTANCE APPLICATION



TABLE OF RESISTANCE TO CHEMICAL SUBSTANCES

NAME OF CHEMICAL SUBSTANCE	% CONCENTRATION	T(°C)	HDPE	PP
ADIPIC ACID	Saturated solution %1,4	20	D	D
		60	D	D
ALLYL ALCOHOL	technical purity,liquid	20	D	D
		60	D	D
ALUMINUM HYDROXIDE	suspension	20	D	D
		60	D	D
AMMONIAC, DRY GAS	technical purity,gas	20	D	D
		60	D	D
AMMONIAC, HYDROUS	Saturated solution	20	D	D
		60	D	D
AMMONIAC, LIQUID	technical purity,gas	20	D	D
		60	D	D
AMMONIUM CHLORIDE	Saturated solution	20	D	D
		60	D	D
AMMONIUM SULFATE	Saturated solution	20	D	D
		60	D	D
ACETIC ACID	50	20	D	D
		60		D
ACETIC ACID, GLACIAL	>96	20	D	D
		60	SD	SD
ACETONE	technical purity,liquid	20	SD	D
		60	SD	D
COPPER (II) SULFATE	Saturated solution	20	D	D
		60	D	D
BENZENE	technical purity,liquid	20	SD	SD
		60	SD	DZ
GASOLINE [FUEL]	working solution	20	D	DZ
		60	SD	DZ
BEER	working solution	20	D	D
		60	D	D
BUTANE, GAS	technical purity,gas	20	D	D
		60	D	
MERCURY	technical purity,liquid	20	D	D
		60	D	D
IRON (II) AND (III) CHLORIDE	Saturated solution	20	D	D
		60	D	D
ETHANOL	40	20	D	
		60	SD	
ETHYLENE GLYCOL	technical purity,liquid	20	D	D
		60	D	D
PHENOL	solution	20	D	
		60	D	
FORMALDEHYDE	30 - 40	20	D	D
		60	D	

TABLE OF RESISTANCE TO CHEMICAL SUBSTANCES

NAME OF CHEMICAL SUBSTANCE	% CONCENTRATION	T(°C)	HDPE	PP
GLYCERIN	At technical purity, liquid	20	D	D
		60	D	D
AIR	At technical purity, gas	20	D	D
		60	D	D
HYDROGEN	At technical purity, gas	20	D	D
		60	D	
HYDROGEN PEROXIDE	30	20	D	D
		60	D	SD
HYDROCHLORIC ACID	30	20	D	D
		60	D	SD
	Concentrated	20	D	D
		60	D	
URINE		20	D	D
		60	D	D
IODINE (IN ALCOHOL)	working solution	20	DZ	D
		60	DZ	
CALCIUM CARBONATE	susp.	20	D	D
		60	D	D
CALCIUM CHLORIDE	saturated solution	20	D	D
		60	D	D
"CARBON DIOXIDE, HUMID GAS"	At technical purity, gas	20	D	D
		60	D	D
"CARBON MONOXIDE, GAS"	At technical purity, gas	20	D	D
		60	D	D
"CARBON TETRACHLORIDE"	At technical purity, liquid	20	SD	DZ
		60	DZ	DZ
CHLORINE (DRY GAS)	At technical purity, gas	20	SD	DZ
		60	DZ	DZ
CHLORINATED WATER	saturated solution	20	SD	D
		60	DZ	SD
CHLOROFORM	At technical purity, liquid	20	DZ	SD
		60	DZ	DZ
LEAD ACETATE	saturated solution	20	D	D
		60	D	D
SULFUR DIOXIDE, DRY GAS		20	D	D
		60	D	
METHYL ALCOHOL	At technical purity, liquid	20	D	D
		60	D	
NITRIC ACID	10	20	D	D
		60	D	DZ
	25	20	D	D
		60	D	DZ
	>50	20	DZ	DZ
		60	DZ	DZ
NITRIC ACID (WITH FUMING NITROGENOXIDE)		20	DZ	DZ
		60	DZ	DZ
OXYGEN, GAS	At technical purity, gas	20	D	D
		60	SD	
POTASSIUM HYDROXIDE	solution up to 50	20	D	
		60	D	
		20		D
		60		D

NAME OF CHEMICAL SUBSTANCE	% CONCENTRATION	T(°C)	HDPE	PP
PROPANE (gas)	technical purity, gas	20		D
		60		
SOAP	solution	20	D	D
		60		
Cyclohexanol	At technical purity, solid	20	D	SD
		60	D	D
Sodium Bicarbonate	Saturated solution	20	D	D
		60	D	D
Vinegar	working solution	20	D	D
		60	D	D
Sodium Hydroxide	solution	20	D	D
		60	D	D
	40	20	D	D
		60	D	D
Sodium carbonate	Saturated solution	20	D	D
		60	D	D
	up to 50	20	D	D
		60	D	D
Sodium Chloride	Saturated solution	20	D	D
		60	D	D
Sodium Sulfate	Saturated solution	20	D	D
		60	D	D
WATER. distilled, sea		20	D	D
		60	D	D
WATER. utility, mineralî	working solution	20	D	D
		60	D	D
SULFURIC ACID	10 30	20	D	D
		60	D	D
	50	20	D	SD
		60	D	SD
	98	20	DZ	DZ
		60	DZ	SD
	fuming	20	DZ	DZ
		60	DZ	DZ
MILK	working solution	20	D	D
		60	D	D
WINE	working solution	20	D	D
		60	D	D
TOLUENE	technical purity,liquid	20	SD	SD
		60	DZ	DZ
TRICHLOROETHYLENE	technical purity,liquid	20	DZ	DZ
		60	DZ	DZ
UREA	solution	20	D	
		60	D	
FATS (vegetable and animal)	technical purity,liquid	20	D	
		60	SD	

HDPE: HIGH DENSITY POLYETHYLENE

PP: Polypropylene

D: RESISTANT

No adverse change occurs in the properties of products which are indicated with "D" symbol in the table when used under specified temperatures and with chemicals with specific concentrations unless a mechanical factor acts on them.

DZ: NONRESISTANT

Products which are indicated with "DZ" symbol in the table are not employed in the applications since they are highly affected by chemicals.

ts.: At technical purity, minimum

ts -k: At technical purity, solid

ts - s:At technical purity, liquid

ts- g:At technical purity, gas

süsp.:Suspension, at 20°C

prepared in saturated solution

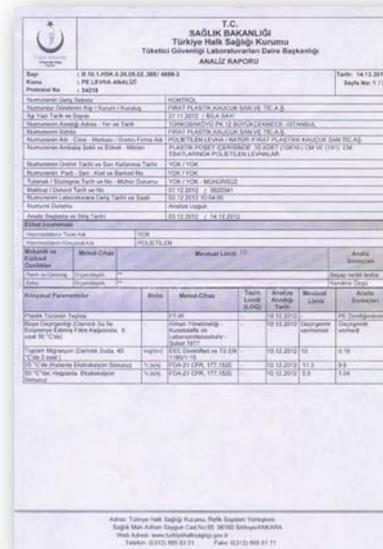
SD: LIMITED RESISTANT

No adverse change occurs in the properties of products which are indicated with "SD" symbol in the table when used under specified temperatures and with chemicals with specific concentrations unless a mechanical factor acts on them.

Quality Assurance Certificates



MINISTRY OF HEALTH Analysis Reports



APPLYING INTERNAL SURFACE INSULATION TO WATER TANKS TECHNICAL SPECIFICATIONS

WATER INSULATION WITH HDPE PANEL

These specifications define production of “WATER INSULATION WITH HDPE SHEET” to be employed in water insulation works that will be performed on potable water tanks. All reinforced concrete surfaces of the water tank that are in direct contact with water shall be insulated using the specified materials.

WATER INSULATION WITH HDPE PANEL TECHNICAL SPECIFICATIONS

1. Base and surfaces of four walls of water tanks (base and internal lateral surfaces of cylindrical tanks) will be insulated.
2. Material to be used in water insulation shall be water insulation material made of HDPE with natural color and with a minimum density of 0.94 g/cm³.
3. Construction, dismantling of scaffolds, lifts to be used in insulation works and horizontal and vertical carries shall be within contractor's responsibility. No additional fee shall be paid to the contractor for these works.
4. All surfaces to be insulated shall be cleaned with 250 bar pressurized water jet, all dirt, dust etc. on the surfaces shall be eliminated and any matter that inhibits adhesion during chemical application shall be removed.
5. Weak and loose particles on the surfaces shall be thoroughly eliminated using pressurized water or compressed air. Deteriorated concrete sections shall be cut-off or cleaned until reaching to intact concrete and surface repair shall be performed with the repair mortar suitable for the purpose and technique of the insulation work to be performed and rendered ready for water insulation application. No additional fee shall be paid for this work.
6. The administration shall supply to the contractor, the required electrical power required for the work of coating the potable water tank with HDPE sheet to be insulated.
7. HDPE sheet material to be used in water insulation shall be specially designed and manufactured for water insulation of potable water tanks. Test reports concerning suitability of the material for contact with potable water shall be submitted.
8. Crack sections in the interior surfaces shall be grooved in V profile and filled with cement and crystalline based, elastic repair mortar suitable for the technique and purpose of the water insulation to be applied, for rendering the surface ready for water insulation.
9. Features of the material structure to be used in water insulation shall be in the below specified values.

Feature	Test Method	Unit	Value Natural
Density	ISO 1183	Gr/cm ³	≥0,940
MRF-Melting Flow Rate 190 0C/5 kg	ISO 1133	Gr/10dk	0,1-2,0
Elasticity Module	ISO 527	N/mm ²	>800
Elongation at Breaking Point	ISO 527	%	≥ 350
Thermal Expansion Coefficient	DIN 53752	K ⁻¹ x10 ⁻¹	1,8
Surface Resistance	DIN VDE 0303,T3	Ω	>1012
Thermal Conductivity	DIN 52612	W/mK	0,4
Stiffness	ISO 868	Shore D	60

10. Upon completion of all insulation works, pipes which establish output from the water tank shall be blocked with blind plugs or valves to shut off water output completely and the water tank shall be filled with water and observed for 24 hours for testing purposes. Maximum 1% (one percent) reduction shall be allowed in the measurement performed at the end of this period.

11. In the case that the water level measured at the end of the specified period is reduced in excess of the above specified rate, the water shall be discharged and insulation work shall be continued until the specified value is satisfied. Contractor may not claim any fee for this work.

12. All consumables, personnel and members, horizontal and vertical handling employed in the insulation works specified above shall be covered by the contractor.

13. Work safety concerning the insulation works to be performed and all protective measures for ensuring work safety, supply of required personnel and protective equipment according to the chemical properties of the employed material shall be covered by the contractor.

14. Insulation product shall have ISO 9001 quality certificate.

15. Material thickness shall be in 3-5 mm range.

16. Shall not be applied at temperatures lower than +5 °C or on a frozen surface.

17. Hexagon nuts shall comply with TS 1026-43 ISO 7417,

18. Nuts - For stone and concrete - With metric screw shall comply with TS 1034.

19. Iron and steel materials shall be hot dipped galvanized with a ratio of 488 gr/ m² according to TS 914 EN ISO 1461 using zinc ingot according to TS 951 EN 1179.
20. Welding rods to be used in the welding extruder shall have the same density with HDPE sheets to be welded and provide smooth extrusion.
21. Tank to be coated shall be delivered completely empty by the administration and then, dryness condition shall be inspected. Water on the bottom shall not be higher than 0.3 cm. If this level is exceeded, water on the bottom shall be discharged using a sewage truck with vacuum feature and water flows administered to the tank shall be stopped.
22. HDPE sheets to be used for coating shall be unloaded inside the tank, cut in respective sizes and shaped, welding grooves will be opened and then, fixed with 1 steel expansion bolt per each m² as minimum. This number may be required to be increased if necessary.
23. Upon fixing the panels and ensuring that the dimensioning is accurate, welding machine adjusted to ambient temperature and dried welding rods are subjected to pre-heating process and HDPE sheets with suitable welding grooves for jointing point shall be joined using extruder welding.
24. Upon performing the welding process, galvanized nut and washer sets shall be welded to the panel using HDPE blind plug or extrusion HDPE material to prevent contact with water. Welding surface shall always be scraped prior to welding process to remove the oxidized layer.
25. If the tank is required to have separate chambers, partitions will be established by using HDPE material.

FIRAT

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