NEPROPLAST HDPE

WATER , GAS & SEWAGE SYSTEM

NEPROPLAST

NEW PRODUCTS INDUSTRIES CO. LTD

Distributed by
National Marketing Est. Co .Ltd

Saudi Arabian Oil Company
Supplier Registration Unit
Supplier Relationship Management Division
Projects & Strategic Purchasing Dept.
Wing A, C-4143, North Park 1
Dhahran 31311, Saudi Arabia

June 06, 2012

SRU-088-12

MOHAMMED AL-HAIRASSI, Acting Assistance General Manager
New Products Industries Co. Ltd. (NEPRO)
P. O. BOX 460
JEDDAH 21411
Fax: (2)636-2364

ارامكو السعودية
Saudi Aramco

Mr. Al-Hairassi,

We are pleased to inform you that your company is now included in the Saudi Aramco Supplier Information System, under Vendor no. 10013406, plant no. 30000736, for the following product, provided your company continues to meet relevant Saudi Arabian and Saudi Aramco standards:

9COM	Description
6000000031	PIPE; NON-METALLIC; ALL SIZES; THERMOPLA
6000000030	PIPE; NON-METALLIC; THERMOPLASTIC; CPVC;
6000000023	PIPE;NON-METALLIC;8 IN&SMALLER;THERMOPLA
6000000039*	PIPE; NON-METALLIC; METRIC SIZE; THERMOP

*Approved with limitation

This approval, however, should not be construed as a commitment by Saudi Aramco to purchase from you, but your company will have the opportunity along with other approved sources to respond to requests for submitting proposals in accordance with Saudi Aramco's established policies and procedures.

We would like to thank you for your interest in Saudi Aramco, and take this opportunity to reiterate that it is Saudi Aramco's policy to encourage the use of nationally manufactured materials.

For further information or assistance, please contact Ahmad A. Al-Shaer on 874-0316.

Ali M. Al-Hussain, Supervisor
Supplier Registration Unit

Kingdom of Saudi Arabia
Ministry of Water & Electricity
General Directorate of Water Eastern Province

المملكة العربية السعودية
وزارة المياه والكهرباء
المديرية العامة للمياه بالمنطقة الشرقية
إدارة التنفيذ

الموضوع : اعتماد نيرو لأنابيب البولي ايثلين

اسم المنتج : أنابيب البولي ايثلين (HDPE) عالي الكثافة وملحقاتها من القطع الخاصة ضغط ١٦ بار بالقطار حتى ٢٢٥ ملم – PE ١٠٠ – SDR ١١

اسم المصنع : (نيرو بلاست) شركة صناعات المنتوجات الجديدة المحدودة

اسم الوكيل : شركة المؤسسة الوطنية للتسويق

الاستخدام : شبكات المياه

السادة / شركة المؤسسة الوطنية للتسويق المحترمين
ص.ب ٢١٤٥ الخبر ٣١٩٥٢

إشارة إلى خطابكم رقم المؤرخ في ٢٠١٠/٠٦/٠٢م بخصوص اعتماد المنتج أعلاه ، وحيث تم تزويدنا بشهادة مطابقة المنتج للمواصفات القياسية السعودية (SASO) بتاريخ ١٤٣١/١٢/٢٥هـ ، وحيث تم رفع تقرير فني عن الشركة وتوصية لجنة المواد الى سعادة المدير العام بالخطاب رقم ١٤٣٢/٣٠٠٠٨/٣٢٢ بتاريخ ١٤٣٢/٠٢/٠٦هـ فوافق سعادته حسب تأشيرته على اعتماد المصنع لمدة سنة من تاريخه كما يحق للمديرية سحب أو إلغاء هذا الاعتماد في حالة مخالفة الشروط والمواصفات الفنية والتقديم من خلال المقاولين المنفذين مع الالتزام بما جاء بالكتالوجات والمواصفات الفنية المقدمة والضمانات وشهادات الاختبارات والدعم الفني ضمن مستندات الاعتماد.

ولكم تحياتنا،،،

مدير عام المشاريع
م/ حمد بن عبدالرحمن الوابل

Consortium
FAISAL ELECTRO-MECHANICAL CO. LTD.
YUKSEL INSAAT SAUDIA CO. LTD.
Project of Research Centers
University of Dammam

تضامن
شركة فيصل للأعمال الكهربائية والميكانيكية ذ.م.م
شركة يوكسل للإنشاءات السعودية المحدودة
مشروع المراكز البحثية
جامعة الدمام

Date: June 6th, 2012

TO WHOM IT MAY CONCERN

This is to certify that M/s National Marketing Est. Co. Sole agent of New Product Industry for HDPE pipes (NEPRO) & the German Manufacture for Electro Fusion HDPE fittings "FRIATEC". Has successfully supplied us with HDPE pipes & Electro Fusion fittings for GAS line project in Dammam University (previously known as King Faisal University).

The quality of their product and their services are satisfactory.

This certificate is issued on their request and FEMCO do not take any responsibility for their product.

Orhan OZEL
Project Manager

عنوان التضامن : ص.ب ٢١٦١٤ - الخبر ٣١٩٥٢ - المملكة العربية السعودية - هاتف ٨٥٧٣١١٣ (٠٠٩٦٦٣) - فاكس ٨٥٧٣١٩٥ (٠٠٩٦٦٣)
Consortium Address : P. O. Box 21614 - Al-Khobar 31952 - Kingdom of Saudi Arabia - Tel. (+966 3) 857 1113 - Fax (+966 3) 857 2706
E-mail : femco2@emco.com.sa

Kingdom of Saudi Arabia
Ministry of Water & Electricity
Minister's Office

المملكة العربية السعودية
وزارة المياه والكهرباء
مكتب الوزير

سعادة وكيل الوزارة لشئون المياه وفقه الله
سعادة وكيل الوزارة لشئون الكهرباء وفقه الله
سعادة وكيل الوزارة للتخطيط والتطوير وفقه الله
سعادة المدير العام للمياه بمنطقة الرياض وفقه الله
سعادة المشرف العام على المياه بمنطقة مكة المكرمة وفقه الله
سعادة المدير العام للمياه بمنطقة المدينة المنورة وفقه الله
سعادة المدير العام للمياه بمنطقة القصيم وفقه الله
سعادة المدير العام للمياه بالمنطقة الشرقية وفقه الله
سعادة المدير العام للمياه بمنطقة عسير وفقه الله
سعادة المدير العام للمياه بمنطقة تبوك وفقه الله
سعادة المدير العام للمياه بمنطقة حائل وفقه الله
سعادة المدير العام للمياه بمنطقة الحدود الشمالية وفقه الله
سعادة المدير العام للمياه بمنطقة جازان وفقه الله
سعادة المدير العام للمياه بمنطقة نجران وفقه الله
سعادة المدير العام للمياه بمنطقة الباحة وفقه الله
سعادة المدير العام للمياه بمنطقة الجوف وفقه الله

السلام عليكم ورحمة الله وبركاته.

إشارة إلى خطاب المديرية العامة للمياه بمنطقة الرياض رقم (٤٢٩/١٣٣٢٧٢) ، وتاريخ ١٤٢٩/٧/٦هـ ، المشار فيه إلى خطاب مصنع اليمامة لمعدات المياه المؤرخ في ١٤٢٩/٦/١٢هـ ، المتضمن اجتياز وصلات اللحام بالصهر الكهربائي (Electro Fusion Fitting) من الصنف (PE 100 SRD11 PN16) إنتاج مصنع (FRIATEC) الألماني للاختبارات التي أجراها فريق المديرية الفني أثناء زيارته للمصنع المذكور وأوصى باعتمادها، ورغبة في تعدد مصادر هذه الوصلات وبالنوعية التي تتوافق مع شروط ومواصفات الوزارة.

بناءً عليه اعتمدوا قبول وصلات اللحام بالصهر الكهربائي. (Electro Fusion Fitting) من الصنف (PE 100 SRD11 PN16) من إنتاج مصنع (FRIATEC) الألماني في المشاريع التي يجري طرحها.

مع أطيب تحياتي ،،،
وزير المياه والكهرباء
عبدالله بن عبدالرحمن الحصين

الرقم : ١١٢٨٠ التاريخ : ١٢ رجب ١٤٢٩ المشفوعات :

الرياض - طريق الملك فهد - الرياض ١١٢٣٣ - هاتف الاتصالات الإدارية ٢٠٥٢٧١٨ - فاكس ٢٠٥٢٧١٩
Riyadh - King Fahd Road - Riyadh 11233 - Communications Dept. Tel.: 2052748 - Fax: 2052749

FOREWARD

NEPROPLAST (New Products Industries) was established in the 1969 as the first manufacturing facility to introduce the uPVC piping systems to the market in Saudi Arabia. Since its establishment, NEPROPLAST has followed a strict policy in producing high quality pipes. Using state of the art equipment and tools in its production facilities, hiring a highly trained professional staff, and working with a very experienced team of consultants in the industry. The initial production of NEPROPLAST uPVC pipes were manufactured according to British Standard Specifications BS 3505/3506. At a later stage, NEPROPLAST started to manufacture pipes and fittings according to International Specifications ISO. NEPROPLAST actively participated with Saudi Arabia Standard Organization SASO to set the Saudi Arabian Standard SAS 14/15/1396. In the mid 80s, NEPROPLAST started the production of PVC pipes and fittings according to ASTM standards for schedule 40, schedule 80, and CPVC pipes for sch80.
By producing a wide range of pipes and fittings according to different standards, NEPROPLAST has established for itself a strong position in the market to serve the construction industry in the fields of water network pressure lines, sewerage and drainage non-pressure lines, and electrical & telecommunication conduits . NEPROPLAST made its pipes and fittings available in both options of Rubber Ring or Solvent Cement jointing systems.

In 2009, NEPROPLAST made a significant move into modern, heavy metal free stabilizers for all its uPVC & cPVC products. A move which ensured total elimination of toxicological content throughout the entire NEPROPLAST product range.Organic stabilizers pipes and fittings ensure a safe drinking water supply, free of any possible toxic traces which can develop through the use of heavy metal uPVC stabilizers.

All NEPROPLAST drinking water products are now accreditised through NSF, proof of its excellent health safety factor.

NEPROPLAST added to its products portfolio the production of Polyethylene pipes (HDPE) in 2009. NEPROPLAST HDPE products range covers pipes and ducts to serve the water, gas, electrical, and telecommunication applications. NEPROPLAST recently introduced to the market the Polyethylene Corrugated-Optic-Ducts (COD) as a unique product for fiber optic and electrical cabling installations.

All NEPROPLAST products are marketed and sold through National Marketing Est. Co LTD. which has more than 23 branches covering all cities and urban areas across the Kingdom of Saudi Arabia. National Marketing has an export department responsible for exporting NEPROPLAST products to Middle East and North African (MENA) markets. In addition to NEPROPLAST products, National Marketing Est. Co. imports a wide range of fittings, valves, solvent cements, and other accessory components. Nowadays, National Marketing Est. Co LTD. is considered the largest trading company in Saudi Arabia that has all kinds of plastic pipes, fittings, valves, and cements available in its stocks for all traders and contractors in the Saudi market.
Both NEPROPLAST and NATIONAL MARKETING strive to be the largest quality leader in the supply of plastic piping systems to serve the water, gas, electrical & telecommunication sectors across the Middle East.

Isam K.Kabbani
Chairman
IKK Group of Companies

CATALOGUES

NEPROPLAST uPVC PIPES CATALOGUE
DIN, BS STANDARDS

NEPROPLAST uPVC ORANGE COLOR DRAINAGE FITTINGS CATALOGUE
For Drainage System

NEPROPLAST RIGID PVC PIPES ASTM STANDARD CATALOGUE
For potable Water and Sewage Systems
SCHEDULE 40 AND 80

NEPROPLAST FLOWGUARD ™ (CPVC) PIPES CATALOGUE
Quality Pipe with Stripe For Potable Water Network
SCHEDULE 80

NEPROPLAST PVC AND CPVC ASTM FITTINGS CATALOGUE
For potable Water and Sewage Systems
SCHEDULE 40 AND 80

NEPROPLAST PVC DRAIN-WASTE-VENT (DWV) ASTM FITTINGS CATALOGUE
For Drainage Systems

NEPROPLAST RIGID PVC CONDUIT PIPES AND FABRICATED FITTINGS CATALOGUE
For Electrical and Telecommunication Networks

NEPROPLAST CASING AND SCREEN PIPES CATALOGUE

NEPROPLAST HDPE WATER, GAS AND SEWAGE SYSTEMS CATALOGUE

NEPROPLAST HDPE ELECTRICAL CONDUIT PIPES (COD) CATALOGUE

GALLERY

GALLERY

GALLERY

INDEX

1. INTRODUCTION

world wide Infrastructure is ageing by time. While developed countries water and gas infrastructure is not completed and remains to be constructed, hence decisions are to be taken of what material to be used to avoid what has happened in the more industrialized developed countries.

Inside and outside piping system experience severe irreversible corrosive environment. Water and drain piping system if not protected internally and externally will rapidly deteriorate as the result of complex chemical reaction due to the presence of air, soil and electrical current. The choice of HDPE pipe and fittings surely reduces and the remedies such problems, offering the best suitable piping system for the complicated environmental conditions prevailing in the Kingdom and neighboring countries.

2. STRUCTURE OF POLYETHYLENE

2.1 What is Polyethylene?

Polyethylene is a thermoplastic resin obtained through the polymerization of ethylene (C_2H_4), an unsaturated hydrocarbon normally occurring, under normal conditions, as a gas.The polymerization process consists of molecules in long chains to give solid compounds which are base resins called polymers. The molecules forming polymers can be more or less ramified, close together or far apart, and long or short. These features determined the properties of polyethylene. Thus PE is usually a mixture of similar organic compound that differ in terms of the value of n. Depending on the crystallinity and molecular weight, a melting point and glass transition may or may not be observable. The temperature at which these occur varies strongly with the type of polyethylene. For common commercial grades of medium- and high-density polyethylene the melting point is typically in the range 120 to 130 °C (248 to 266 °F).

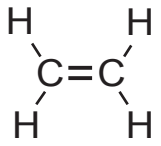


Fig 2.1.a : Single HDPE,MDPE Molecule

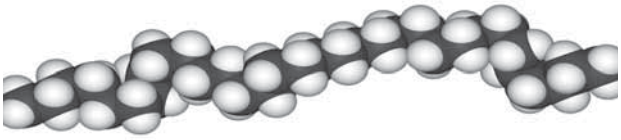


Fig 2.1.a : Chain HDPE,MDPE Molecule

Polyethylene being a semi-crystalline thermoplastic that is generally characterized by good resistance, high viscosity and elongation at rupture. The polymerization of ethene at low pressure results in a PE with high density and mostly linear chains (High-Density - PE 100 with increasing density the following chracteristicsare improved,Tensile strength (Yield stress) resistance to chemicals, modulus of elasticity, hardness, impermeability to gases and vapors. Modern PE 100 consist of both relatively short, linear chains and very long chains with many short branches. Thus, the term bimodal polyethylene is also used. Short chains form crystallites, results in a high rigidity. Long chains from the amorphous areas; ensure high viscosity, low sensitivity to stress cracks and notches.

3. RAW MATERIAL CLASSIFICATIONS

Table 3.1 **General Properties of HDPE Raw-Material**

Property	Value	Test Method
Density	>930 kg/m^3	ISO 1183 Test Method D
Thermal Stability	> 20 minutes	EN 728
MFR	+20% of the value in which producer determines	ISO 1133
Water Content	<300 mg/kg	ISO 15512
Carbon Black Content	≥ 2.0 %	ISO 6964

3.2 Raw Material Colour

HDPE basic materials are classified as a non-coloured material. Pre-compound, coloured HDPE materials from the supplier are recommended for the manufacturing of pipes. HDPE is available in black & other colors. Pipe colour is dictated by the application for which they are to be used Black and Blue Coloured pipes are for potable water applications and yellow are for gas application. Other pipe colours are posible depending on the relevant water/district authority requirements.

Fig 3.2.a : Coloured HDPE and MDPE Granules

4. CLASSIFICATION

4.1 Classification

PE pipe materials are classified according to Minimum Required Strength (MRS) Values. This Value indicates the long-term internal resistance to pressure for 50 years at 20ºC in water. The Classification number for HDPE material is 10 times the minimum required strength of the material (MRS).

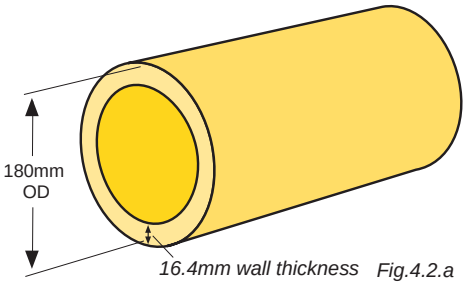
Table 4.1.a

Type of raw Material	Values for 20°C & 50 years life time MRS	Max. Hydrostatic Design Stress(Mpa)
PE 32	MRS > 03.2 N/mm^2	2.5
PE 46	MRS > 04.00 N/mm^2	3.2
PE 63	MRS > 06.3 N/mm^2	5.0
PE 80	MRS > 08.0 N/mm^2	6.3
PE 100	MRS > 10.0 N/mm^2	8.0

4.2 Standard Dimensional Ratio (SDR):

The SDR of a pipe/fitting is the constant ratio between the wall thickness and the outside diameter:

$$SDR = \frac{\text{nominal (minimum) outside diameter}}{\text{minimum wall thickness}} \qquad SDR\ 11 = \frac{180}{16.4}$$



Example

Fig.4.2.a

Relationship between wall thickness and outside diameter (OD)

5. EXTRUDER MODEL PROCESS

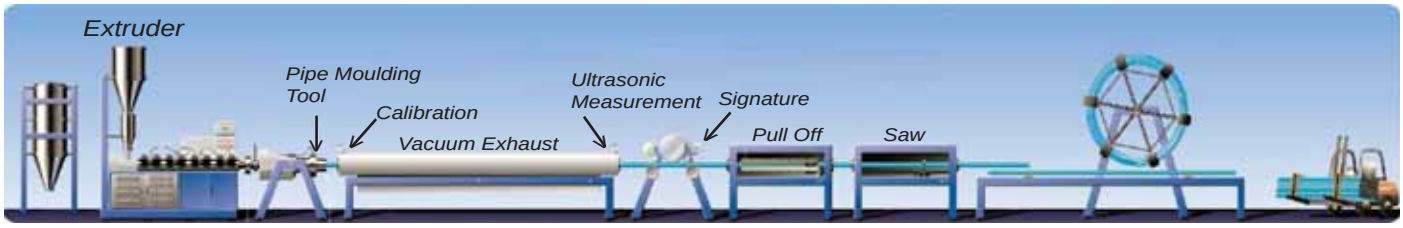


Fig 5.1.a : Extruder Machine for HDPE Pipes

1.HDPE Raw Materials is conveyed into the extruder, material heating process start in the barrel of extruder
2.The melted material is extruded through the die set, shaped according to th size of the pipe required.
3.The pipe enter the vacum tank once it leaves the die set. The pipe is sized by the internal pressure and goes through the cooling process.
4.The pipe is indelibly marked at preset intervals, with identification of trademark, pipe size and wall thickness, SDR, Nominal pressure, PE Classification, Raw material grade code, and date of manufacture
5.The pre-cooled and shaped pipe is pulled down by haul-off machine at a constant speed
6.The pipe is cut into the required length by using a cut-off saw machine or coiled up as required.

6. PROPERTIES OF HDPE PIPES

Table 6.1.a

TECHNICAL SPECIFICATION	PE 100	UNIT	TEST METHOD
Density at 23° C	0.95	gr/cm^3	ISO 1183
MFR 190° / 5 kg	0.23	gr/10 min	ISO 1133
MFR 190° /21.6 kg	6,6	gr/10 min	ISO 1133
Mechanical Properties			
Yield Stress (23°C , 50 mm/min)	23	MPa	ISO 527
Tensile Modulus	900	MPa	ISO 527
Notched Impact Strength			
+23° C	26	Kj/m^2	ISO 179/1 eA
-30° C	13	Kj/m^2	ISO 179/1 eA
Oxidation – Introduce time at 210°C	>20	Min	ISO TR 10837
Carbon Black content	> 2.0	%	ISO 6964
Carbon Black Dispersion	< Grade 3		ISO 18553
MRS minimum required Strength	10.6	MPa	ISO TR 9080
Resistance to S.C.P(Slow Crack propagation=4.6 Mpa, 80°C Notched)	>500	h	ISO 13479
Elongation at break	> 350	%	ISO 6259
Linear Thermal Expansion	0.2	KJ/m^2	ASTM D 696 (20-90 °C)
Specific Heat Capacity	2.0	mm/m° C	DSC

7. QUALITY CONTROL EQUIPMENTS

Fig : 7.1.a Hydrostatic Strength

7.1 Hydrostatic Strength
Determines the capability of the sample to withstand internal pressure for both long and short periods of time,
1.Test Reference ISO 1167.
2.More than 100 hours. @ 20^{o}C on stress level: 12.4 MPa for PE 100 MPa
3.165 Hours , @ 80oC on stress level:5.5 MPa for PE 100.

Fig : 7.2 Density / Specific Gravity

7.2 Density / Specific Gravity
Determines the specific gravity and density to help in material identification.

1.Test Reference: ISO 1183

2.Value: Density Shall Fall within PE material density range (≥0.94).

Fig : 7.3 Vicat Softening Temperature

7.3 Vicat Softening Temperature
Determines the softening temperature of material when penetrated by a flattened needle to 1.0 mm. depth under a specific load.

Fig : 7.4 Dispersion of Carbon Black

7.4 Dispersion of Carbon Black
1.Test Reference:ISO 11420
2.Value:Carbon Balck dispersion must be < Grade 3 as per ISO 4427 requirements, and appearance rating must not be inferior to micrograph B1 in annax B of ISO 11420.

Fig : 7.5 Melt Mass Flow Rate Test

7.5 Melt Mass Flow Rate Test
measures the molten viscosity or the ease of the flow of the melt of a plastic material.
1. Test Reference : ISO 1133
Value: 0.27+0.068 change in MFR value caused by processing, between the measured value for material from the pipe and the measured value for the compound, must not be greater than ± 25%

Fig : 7.6 Longitudinal Reversion / Effects of Heating:

7.6 Longitudinal Reversion/ Effects of Heating:
Measures the change in length of the sample after exposure to high temperature and the ability to resist heat without showing delamination, cracks or blisters.
1.Test Reference : !SO 2505-1
2.Value: Longitudinal Reversion (Shrinkage) shall be < 3%

Fig : 7.7 Thermal Stability Oxidation Induction Time Test(OIT)

7.7 Thermal Stability Oxidation Induction Time Test(OIT)
measures the level of thermal stabilization of the material tested.

1.Test Reference: ISO / TR 10837

2.OIT must be ≥20minutes when tested at 210^{o}C

Fig : 7.8 Impact Strength

7.8 Impact Strength
Measures the toughness of the sample against impact or the ability of the sample to absorb applied energy.

Fig : 7.9 Wall Thickness and Outside Diameter Measurement

7.9 Wall Thickness and Outside Diameter Measurement
1.Test Reference:ISO 3126
2.Value:Wall thickness must confirm to 11922(Grade-T Tolerance for minimum wall thickness up to 16mm) and (Grade-U Tolerance for wall thickness exceeding 16mm)OD must confirm to ISO 11922 Grade-B

Fig : 7.10 Tensile Strength

7.10 Tensile Strength
Measures the strength of material (Resistance) being pulled apart
1. Test Reference: ISO 6259 1.3
2.Value: Elongation at break must be>350%

Modulus of Elasticity
Measures the stiffness of material

Elongation at Break
Measures the extension length of the sample until it breaks.

8. PIPE DIMENSION FOR PE80 - PE100 BASED ON ISO 4427 - 2 , DIN 8074 & DIN EN 12201 - 2

Table :8.1.a

NOMINAL OUTSIDE DIAMETER		PN 20	PN 16		PN 16	PN 12.5		PN 12.5	PN 10		PN 10	PN 8		PN 6		PN 6		PN 4		PN 4	PN 3.2	NOMINAL OUTSIDE DIAMETER
		PE 100	PE 80		PE 100	PE 80		PE 100	PE 80		PE 100	PE 80		PE 100		PE 80		PE 80		PE 100	PE 80	
	MRS	10	8	MRS	10	8	MRS	10	8	MRS	10	8	MRS	10	MRS	8	MRS	8	MRS	10	8	
	SIGMA	8	6.3	SIGMA	8	6.3	SIGMA	8	6.3	SIGMA	8	6.3	SIGMA	8	SIGMA	6.3	SIGMA	6.3	SIGMA	8	6.3	
	Series	S 4		S 5			S 6.3			S 8			S 13.3		SDR 10.5		S 16		S 20			
	SDR	SDR 9		SDR 11			SDR 13.6			SDR 17			SDR 27.6		SDR 22		SDR 33		SDR 41			
Diameter mm	Wall Thickness mm	Approximately Weight Kg/m		Wall Thickness mm	Approximately Weight Kg/m		Wall Thickness mm	Approximately Weight Kg/m		Wall Thickness mm	Approximately Weight Kg/m		Wall Thickness mm	Approximately Weight Kg/m	Wall Thickness mm	Approximately Weight Kg/m	Wall Thickness mm	Approximately Weight Kg/m	Wall Thickness mm	Approximately tWeigh Kg/m		Diameter mm
16	01.8	00.084																				16
20	02.3	00.113		1.9	0.116		1.8	0.107														20
25	02.8	00.200		2.3	0.169		1.9	0.144		1.8	0.137					0.150						25
32	03.6	00.327		2.9	0.277		2.4	0.232		1.9	0.187					0.196						32
40	04.5	00.509		3.7	0.427		3.0	0.356		2.4	0.295				1.9	0.238						40
50	05.6	00.788		4.6	0.662		3.7	0.549		3.0	0.453		1.9	0.273	2.3	0.361	1.8	0.287				50
63	07.1	01.260		5.8	1.047		4.7	0.873		3.8	0.721		2.3	0.417	2.9	0.563	2.0	0.399	1.8	0.364		63
75	08.4	01.760		6.8	1.462		5.6	1.240		4.5	1.020		2.8	0.603	3.5	0.807	2.3	0.551	1.9	0.457		75
90	10.1	02.540		8.2	2.119		6.7	1.770		5.4	1.460		3.3	0.854	4.1	1.140	2.8	0.791	2.2	0.643		90
110	12.3	03.780		10.0	3.143		8.1	2.620		6.6	2.160		4.0	1.266	5.0	1.670	3.4	1.170	2.7	0.943		110
125	14.0	04.870		11.4	4.080		9.2	3.370		7.4	2.760		4.5	1.653	5.7	2.160	3.9	1.510	3.1	1.230		125
140	15.7	06.110		12.7	5.080		10.3	4.220		8.3	3.460		5.1	2.054	6.4	2.720	4.3	1.880	3.5	1.540		140
160	17.9	07.960		14.6	6.670		11.8	5.500		9.5	4.513		5.8	2.670	7.3	3.540	4.9	2.420	4.0	2.000		160
180	20.1	10.100		16.4	8.420		13.3	6.980		10.7	5.710		6.6	3.416	8.2	4.470	5.5	3.070	4.4	2.490		180
200	22.4	12.400		18.2	10.396		14.7	8.560		11.9	7.045		7.3	4.199	9.1	5.510	6.2	3.840	4.9	3.050		200
225	25.2	15.800		20.5	13.160		16.6	10.900		13.4	8.935		8.20	5.306	10.3	7.000	6.9	4.770	5.5	3.860		225
250	27.9	19.400		22.7	16.184		18.4	13.400		14.8	10.950		9.1	6.543	11.4	8.590	7.7	5.920	6.2	4.830		250
280	31.3	24.300		25.4	20.290		20.6	16.800		16.6	13.700		10.2	8.214	12.8	10.800	8.6	7.400	6.9	5.980		280
315	35.2	30.800		28.6	25.683		23.2	21.200		18.7	17.421		11.5	10.33	14.4	13.600	9.7	9.370	7.7	7.520		315
355	39.7	39.100		32.2	32.500		26.1	26.900		21.1	22.172		12.9	13.173	16.2	17.300	10.9	11.800	8.7	9.550		355
400	44.7	49.060		36.3	41.300		29.4	34.10		23.7	28.021		14.5	16.685	18.2	21.900	12.3	15.100	9.8	12.100		400
450	50.3	62.070		40.9	52.300		33.1	43.20		26.7	35.400		16.4	21.101	20.5	27.700	13.8	19.000	11.0	15.300		450
500	55.8	77.030		45.4	64.500		36.8	53.30		29.7	43.800		18.2	26.035	22.8	34.200	15.3	23.400	12.3	19.000		500
560	62.5	97.000		50.8	80.800		41.2	66.90		33.2	54.800		20.3	32.702	25.5	42.800	17.2	29.400	13.7	23.600		560
630	-----	-----		57.2	102.000		46.3	84.60		37.4	69.400		22.9	41.323	28.7	54.100	19.3	37.100	15.4	29.900		630

9. NEPROPLAST HDPE PIPES BETTER PIPING SOLUTIONS

High Density Polyethylene (HDPE) Solid Wall Pipe has been used in Potable Water applications since the '60's, and has been gaining approval and growth in municipalities ever since. HDPE Pipe is specified and/or approved in AWWA C901, AWWA C906, NSF 14, NSF 61 and ASTM D3035. Some distinctive advantages of HDPE pipe that provide important benefits for water applications are listed below:

NEPROPLAST, High density polyethylene plastic pipe (HDPE) delivers exceptional value, unwavering reliability and remarkable advantages over conventional types of piping. It's today's right choice for water, drainage, fuel gas, conduit and plumbing & heating. Other reasons HDPE is a superior choice, see below

9.1 Flexibility & Fatigue Resistant:

NEPROPLAST HDPE pipes are flexible and can be bent to a minimum bending radius of 30 times the pipe's outside diameter. This flexibility is critical in applications such as submarine pipe lines, mine subsidence and earthquake prone areas. This inherent resiliency and flexibility allows the pipe to absorb surge pressures, vibration and stresses caused by soil movement including areas prone to earthquake..

Fig : 9.1.a Flexibility

9.2 Chemical Resistance:

Outstanding resistance to a wide range of chemical reagents allows the use of polyethylene systems in applications such as Tailings pipelines and chemical treatment applications used in mining operations. NEPROPLAST HDPE pipes are also not adversely affected by atmospheric conditions and are well suited for outdoor installations.

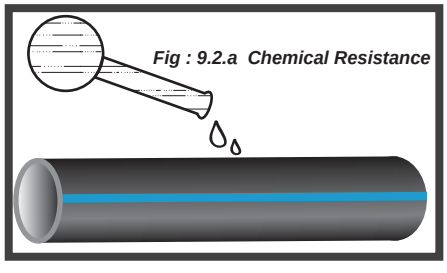


Fig : 9.2.a Chemical Resistance

9.3 Weathering Resistance:

NEPROPLAST HDPE pipes are stabilised against ultra violet (UV) light degradation by the inclusion of carbon black in the raw material. Black HDPE pipes are, suitable for installations where the pipes are exposed to direct sunlight and cold weather.

Fig : 9.3.a Weather Resistance

9.4 Ease of Handling, Installation & Maintenance:

NEPROPLAST HDPE pipes are easy to install with their light weight and long lengths. Polyethylene coiled pipes are widely used in applications such as stock watering, irrigation systems, pwer & telecomunication, and gas due to rapid installation and the ease and less frequent jointing.

Fig : 9.4.a Ease of Handling, Installation & Maintenance

9.5 Superior flow Characteristics:

NEPROPLAST HDPE pipes has lower friction factors than most non-plastics materials. Hazen Williams C Factor is 150 and doesn't change over time. The surface energy characteristics of HDPE ensure that material deposition is inhibited and the smooth bore characteristic is maintained over the working life of the pipeline. Because polyethylene is smoother than steel, cast iron, ductile iron, or concrete, a smaller PE pipe can carry an Equivalent Volumetric flow rate at the same pressure. it has less drag and a lower tendency for turbulence at high flow. its superior chemical resistance and “non-stick” surface combine to almost eliminate scaling and pitting and preserve the excellent hydraulic characteristic throughout the pipe service life.

Fig : 9.5.a Superior Flow Characteristic

9.6 Cost Effective, Long Term and Permanent:

NEPROPLAST HDPE pipes have a proven high reliability record across a wide range of industries and applications, now approaching a period of 50 years. HDPE also provides a long maintenance free lifetime with low whole life costs, compared to many other materials. The polyethylene pipe industry estimates a service life for HDPE pipe to conservatively be 50-100 years. This relates to savings in replacement costs for generations to come.

9. NEPROPLAST HDPE PIPES BETTER PIPING SOLUTIONS

9.7 Joining:

NEPROPLAST Poly Ethlene Pipes can be joined by variety of methods. The preferred method is heat fusion. This encompasses butt fusion, saddle fussion, socket fusion and electro-fusion. This type of connection offers a completely leak proof, fuly restrained joint.

Fig : 9.7.a Joining

9.8 High Impact Strength:

High impact strength of NEPROPLAST HDPE pipes compared with other plastic materials ensures greater resistance to the rigours of pipe laying conditions.

9.9 MINING

More than 30 years, polyethylene (PE) pipe's unique characteristics made it the product of choice for numerous applications in the mining industry. It is a proven product in rugged terrains, extreme climates, and changing site environments. Heat-fused joints create a monolithic structure that allows long lengths of pipe to be pulled from one area to another. PE pipe's flexibility, abrasion resistance and leak-free joints have helped the product prove itself long-term in demanding environments.

PE pipe is the accepted standard for these mining applications:

Solution Mining - Heap Leaching- Process Water - Process Slurry - Tailings Transportation - Dust Suppression - Mine Dewatering - Pit Dewatering

9.10 Industries Using HDPE Pipe:

Fertilizer- Paper and Pulp Manufacturing- Power Plants- Petrochemical- Semi-Conductor- Plastic resin Manufacturers- Dredge operators- Clean & ultra-pure water process- Tank farms - fire loops and mains- LNG (Liquefied Natural Gas)

9.11 Corrosion:

Corrosion and Chemical Resistant Benefit

HDPE pipe will not corrode, tuberculate or support biological growth. HDPE pipe has superb chemical resistance and is the material of choice in harsh chemical environments

The advantages of corrosion and chemical resistance over traditional metal pipes are shared by many plastic pipes, but HDPE pipe uniquely combines these attributes with the aforementioned advantages of heat fused joints, flexibility and fatigue resistance.

Fig : 9.11.a Corrosion

9.12 Light Weight & Flexible:

Polyethylene pipe is produced in straight lengths or in coils. Made from materials about one-eighth the density of steel, it is lightweight and does not require the use of heavy lifting equipment for installation. It reduces the need for fittings, is e xcellent in shifting soils and per forms well in earthquake-prone areas. HDPE resists the effects of freezing and allows bending without the need for an excessive number of fittings. Since HDPE is not a brittle material, it can be installed with bends over uneven terrain easily in continuous lengths without additional welds or couplings.

Fig : 9.12.a Light Weight and Flexibility

9.13 Biological Resistance:

NEPROPLAST HDPE pipe is not known to be subjected to any form of microbiological corrosion. It has excellent resistance to the attack of termites, fungi, insects, mildew, mold, fungus, rot, and bacteria or biological agents when it is buried in soil. Polyethylene does not support fungi and even relatively virulent fungi.

This is due mainly to the fact that water can easily be wiped off of the surface of the pipe rather than absorbed within it.

Polyethylene has been tested for resistance to marine-biological attack and it was found that in their biochemical oxygen demand-type tests, Polyethylene was not utilized by bacteria.

9.14 Abrasion Resistance:

The smooth, tough, interior surface of NEPROPLAST HDPE pipe out-performs most conventional piping materials against abrasion. NEPROPLAST HDPE pipe has particularly demostrated this exeptional advantage in slurry tailing applications. Concrete testimonies of this desirable quality are the uses of NEPROPLAST HDPE pipes in the most of the leading mining operations in the country.

9.15 Thermal Conductivity:

NEPROPLAST HDPE pipes have lower thermal conductivity than for metal which reduces heat losses (essentially acts as an insulator) and offer better uniform fluid temperature, prevent "sweating" formation of condensation on the pipe wall. Insulation in certain instances, may be completely eliminated.

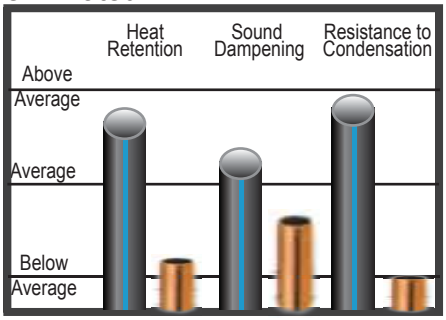


Fig : 9.15.a Thermal Conductivity

10. APPLICATION OF NEPROPLAST HDPE PIPES

10.1 WATER SUPPLIES:
Non-toxic NEPROPLAST HDPE pipes will not affect the taste, color or smell of drinking water. They will never corrode and are therefore extremely sanitary. Deposits and scales will not build up inside as in the case for conventional steel pipes. Their strength is greater than that of asbestos pipes. NEPROPLAST obtained SASO Certification and NSF 61 for drinking water use.

10.2 IRRIGATION SYSTEMS:
NEPROPLAST HDPE pipes are ideal for agricultural irrigation and sprinkler systems. Non-corrosive NEPRO HDPE pipes are perfect for carrying water which contains chemical fertilizers and insect inhibiters. In thick wall and large diameter NEPROPLAST HDPE pipes liquids can be transported under high pressure, which is convenient for the management of large volumes.

10.3 INDUSTRY:
Fertilizer, - Paper and Pulp Manufacturing, Power Plants, Petrochemical, Semi-Conductor, Plastic resin Manufacturers, Clean & ultra-pure water process, - Tank farms, fire loops and mains, LNG (Liquefied Natural Gas) etc. Resistant to most chemicals, NEPRO HDPE have an important role to play in industrial plants. Light, noncorrosive, and easy to assemble, they allow more complex piping work than with steel or cast-iron pipes.

10.4 SOIL, WASTE & DRAINAGE SEWER SYSTEM:
Waste lines for corrosive gases, ventilation for office buildings and factories, drainage systems for private homes and elevated highways these are a few of the many possibilities for NEPROPLAST HDPE pipes. A full line of HDPE fittings is available to ensure easy installation.

10.5 MINING:
Solution Mining, Heap Leaching, Process Water, Process Slurry, Water Transportation, Tailings Transportation, Dust Suppression, Mine Dewatering, Pit Dewatering, Depressurization**.** NEPROPLAST HDPE pipes particularly are well suited for draining corrosive liquids found in mines. They make an ideal vent line for pits because they are easily installed in hard to reach places.

10.6 ELECTRICAL & TELECOMMUNICATIONS CABLES PROTECTION:
NEPROPLAST HDPE pipes form an integral insulator, hence there is an ever-increasing demand for them as electrical conduit. To facilitate work, a full line of fittings is available and fabricated from the same material as the pipes.
HDPE conduit is flexible which allows ease of installation in existing pathways, yet its stiffness can withstand crush forces at the calculated level for buried applications. HDPE conduit is installed along highways or roads and in buildings. It is used to protect Power Distribution lines (600V secondary, <69kV primary) and telecommunication lines (network backbones), landline (wireline) and broadban; such as DSL Internet and CATV. The different installation methods are project specific and dictate what strength conduit is used.

11. INSTALLATION METHODS

11.1 Butt Welding Method

Polyethylene pipes can be produced so that they will be linked by butt weld method depending on the project. Butt welding process is a hot-weld type of welding. However, there are technical limitations for both diameter and wall thickness in such procedure of linking. Linking by this method is done from minimum 5 mm wall thickness to 100 mm wall thickness for 50 mm radius to 1600 mm radius. During the butt weld process, the pipe butt surfaces are heated by a hot plate until they reach the welding temperature. After the heater plate is removed, the pipe butt surfaces are linked under pressure.

11.1.a Equipment Used for Butt Welding:

1.Clamps
2.Trimming unit
3.Heating unit
4.Hydraulic unit

Fig : 11.1.a Equipment of Butt Welding

11.1.b Processes before Butt Weld

The following processes are carried out before butt welding,

1.The temperature of heating unit plates must be checked. 10 minutes stand-by time is required for the heat to be dispersed homogeneously.
2.The hot plate surface must be cleaned before every process.
3.The pipes must be fixed horizontally in the welding machine and should be clamped tension free and axis parallel into the basic chassis of the butt fusion machine.
4.The surfaces of the trimmed pipes to be welded must not be contaminated.
5. The environment where the welding will be done must be protected against unfavorable weather conditions (moisture, dust, low temperature, etc), which may cause an inhomogeneous heating in the welding area affecting welding quality negatively. The temperature of the welding environment must not be lower than 5^{o}C.
6. Butt welding machine to be used for welding must be certificated.
7. Most importantly, the welder must be well-trained and certified by known international certification institute.
8. The pipes to be welded must have the same properties (same type of material, same pressure, same wall thickness). The wall thicknesses of the pipes that will be linked must be equal; if they are different, wall thickness difference must not be more than 10%

11.1.c Carrying out the Butt Weld Process

A- Welding surfaces must be trimmed so that oxidation will be removed and the surfaces must touch each other completely. The surfaces that will be welded must be alcohol before being heated by iron

B- Hot plate temperature must be between 200-220^{o}C. Temperature must be checked periodically Higher temperatures for thinner-walled pipes, and lower temperatures for thicker-walled pipes must be chosen..

C- The pipe butt surfaces must be leaned against the hot plate under low pressure.

1- Heating pressure is kept at P<0,02 N/mm level.
2- Heating time is pipe wall thickness x 10 seconds.
3- The thickness that is formed as a result of leaning between hot plate and pipe butt surface under P=0,15 N/mm^2 pressure is called lip height.
4- Changing time is the time elapsed while the pipe butt surfaces are removed away from hot plate after heating process is over.

D- Welding Process Start, Pipe surfaces must be linked in a very short time after changing time is over. The pressure required is P=0,15 ± 0,01 N/mm^2. see table below

E- Cooling process Start, pipes must not be moved until it cools down. Cooloing pressure must be kept as that of linkage pressure during welding. see table below

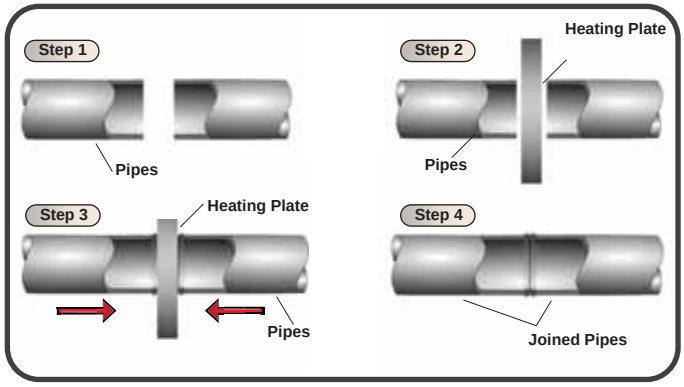


Fig : 11.1.c Butt Welding Process

Table : 11.1.c

PIPE WALL THICKNESS (mm)	LIP HEIGHT(mm)	HEATING TIME(sec)	CHANGING TIME(sec)	LINKING TIME(sec)	LINKING TIME(sec)
.....4,5	0,5	45	5	5	6
4,5.....7	1,0	45.....70	5.....6	5.....6	6.....10
7.....12	1,5	70.....120	6.....8	6.....8	10.....16
12.....19	2,0	120.....190	8.....10	8.....11	16.....24
19.....26	2,5	190.....260	10.....12	11.....14	24.....32
26.....37	3,0	260.....370	12.....16	14.....19	32.....45
37.....50	3,5	370.....500	16.....20	19.....25	45.....60
50.....70	4,0	500.....700	20.....25	25.....35	60.....80

Base values under 20^{o} ambient temperature

11. INSTALLATION METHODS

11.2 Electrofusion Welding Method

Electrofusion welding method is welding the pipes with the linking materials whose internal surfaces are covered with special resistance wires. The resistances that are heated by the stretching force applied on the sockets on the linking materials by the electrofusion machine melt the plastic material, thus the welding process is achieved. Applying electrofusion welding on small diameter pipes (Q20-250 mm) is economical.

11.2.a Equipments used in Electrofusion Welding Process

1. Electrofusion Welding Unit
2. Pipe Scrapers
3. Pipe Cutting Devices
4. Clamp Kit

11.2.b Operations Before Electrofusion Welding

1. The materials that will be welded must have the same properties.
2. Fittings to be used must be cabable to join with pipes made of PE 100, PE 80, PE 63, PE 50 according to DIN 8074/75, EN 1555-2, EN 12201-2, EN 13244-2, ISO 4437 and ISO 4427.
3. Fusion with other pipe materials such as e.g. PP, PVC etc. is not possible.
4. During processing, pipes and fittings should have a balanced temperature level in the permissible range of application between -10°C and +45°C (fittings from d 710 between 0 °C and + 45 °C).
5. Fitting general storage specifications should be adhered to. When properly stored (inclosed rooms or containers (boxes) and/or not exposed to UV radiation as well as effects of weather like humidity etc.), a storage and processing period of more than 4 years can be assumed.
6. Fittings traceability should be possible when using e.g. traceability-capable Electrofusion Units with a special barcode which contains the specific data of the fitting, e.g. manufacturer, dimension, material, batch. Data on component traceability can be electronically ar-chived together with the fusion process data.
7. When operating with other media than drinking water and natural gas, please contact supplier.
8. Welding area must be kept clean.
9. Fittings must show Pressure Loading capacity printed in SDR.

B1- Pipe Cutting to length:

Cut off the pipe in a right angle to the pipe axis (see Fig.B1-1). A suitable tool is a PE pipe cutter or a saw with toothing suitable for plastics

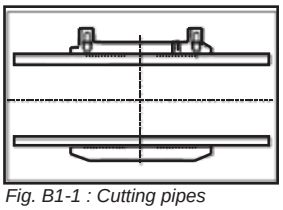


Fig. B1-1 : Cutting pipes

A non-rectangular pipe cutting cause the heating coil partially not being covered by the pipe which result in overheating, uncontrolled melt formation or self-ignition (see Fig.B1-2)

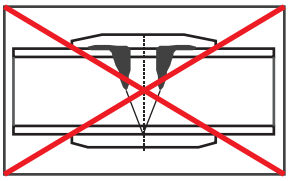


Fig.B1-2

B2- Mark fusion zone with a marker:

Fusion zone:

Insertion depth of Fittings is,

A- The distance between the coupler edge and the internal stop.

B- For slide over couplers, the distance between the coupler edge and the centre of the coupler.

B3- Remove contaminations from the pipe surface:

Use a manual scraper or a Scraper tools FWSG (see Fig. B3-1,B3-2,B3-3), to remove the oxide layer, which formed on the surface of HDPE pipes and spigot fittings during storage.

Fig B3-1 : FWSG 63 d 20 - d 63

Fig B3-2: FWSG 225 d 75 - d 225

*Fig B3-3: FWSG SE d 63 - d 315**

11. INSTALLATION METHODS

Notes on Scraping

A- Allow approx. +5mm in addition of the insertion depth provides proof after fusion that the oxide layer has been removed properly.
B- If the oxide layer is not removed completely, inhomogeneous, leaking fusion joints may result.
C- Approximate removal of (min. 0.15 mm) is sufficient . Damages to the pipe surface as e.g. axial grooves or scratches may not be located within the fusion zone.

B4- Chamfering of the cutting edge Externally and internally.

The manual scraper is a suitable tool. Remove swarves from within the pipe.

B5- Restoration of irregular / oval pipes.

Pipes, in bundled coils and drums, may loose their roundness during storage. Pipe out-of-roundness in the fusion zone area should not exceeds 1.5% of d (outer diameter) or is > 3.0 mm, Welders must use rounding clamps for this purpose which are installed at the end of the fusion zone(see Fig.B5).

Fig. B5 : Restoration of irregular

B6- Cleaning

The surfaces of the pipes to be fused and the interior surfaces of the Fittings must be absolutely clean, dry and free from any grease. Clean with a cleaning agent and exclusively with absorbent, lint-free and non-dyed paper directly before the assembly and after scraping (see Fig.B6).When cleaning, ensure that no contaminations from the unscraped pipe surface are introduced into the fusion zone. Cleaned fusion zone should not be touched with bare hands.

Fig. B6 : Cleaning

B7- ***Pipe ends insertion into the fitting***

When connecting Fittings and pipes,

a- Contact sockets for connecting the fusion plug should be accessible.See Fig:B7-1
b- The Fittings should be slipped on without using force or jaming when connecting.
c- The processed insertion end must be inserted into the fitting up to the mark.
e- Repeated scraping may not be performed to remedy installation problems due to out-of-roundness
f- If required, the piping or the fitting is to be supported with suitable fixing facilities. The tension-free fixing of the joint is to be maintained until the cooling time stated on the barcode and in the table (see Item Fig:B7-2) is reached.

Fig. B7-1

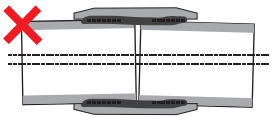


Fig. B7-2

B8-Carrying out Electrofusion fusion

Notes on Fusion:

1- Only use fusion units which have been approved by the manufacturer.
2- The fusion parameters are contained in the main barcode affixed to the Fitting. When using fully automatic fusion units the parameters are entered into the fusion unit using the reader.
3- The fusable pipe series are listed in the SDR labelling on the label.
4- The fusion units automatically monitor the fusion process and control the supplied energy.

After reading of the barcode, the fitting data are to be compared with the data shown on the unit's display.If they are identical, **start fusion.** Please observe the operating instruction of the fusion unit.

Fig. B8-1 : Mark fusion time on pipe Surface

Actual fusion time is to be compared with the **target fusion time** on the unit and to be noted on the pipe or the Fitting(see Fig:B8-1).

In case of doubt, a fusion can be repeated. But the joint surfaces must be cooled down to ambient temperature before each renewed fusion.

B9- Cooling times.

The cooling time is

a) The time which is required to cool down the component to the temperature which facilitates the movement of the joint. This time is also listed on the barcode and is identified by CT (Cooling Time)

b) the time which is required to cool down the component to the temperature which facilitates the application of the full test or operating pressure.

This is classified into pressure volumes of up to 8 bar and > 8 bar.

Table : 11.2.B9-a:

Diameter in mm	Cooling time in minutes for couplers and fittings		
	CT until the joint may be moved	Upto pressurising at up to 8 bar	Upto pressurising at > 8 bar
20 - 32	5	8	10
40 - 63	7	15	25
75 - 110	10	30	40
125 - 140	15	35	45
160 - 225	20	60	75

11.2.C - Pressure Tapping Tees, Pressure Tapping Valves

Pressure Tapping Tees and Tapping Valves are suitable to be used as branches for pressurised pipings.

WARNING!

for tapping-technical reasons

a- Saddle components d 40 – d 63 cannot be processed with SDR 17 HD-PE pipes.

b- Generally Pressure Tapping Tees cannot be processed with SDR 7.4 pipes, and pressure tapping valves cannot be processed with SDR 7.4 and SDR 9 pipes.

C1. Measuring of fusion zone of the pipes (and the lateral outlet spigot), marking and removing oxide layer

Fig. C2-1

C2. Fusion zone:

1- Mark the area to be welded Fusion Zone using marker lines Fig:C2-1

Removing oxide layer

2- Using a Scraper tool (see Fig:C2-2), remove completely the oxide layer, formed on the surface during storage.

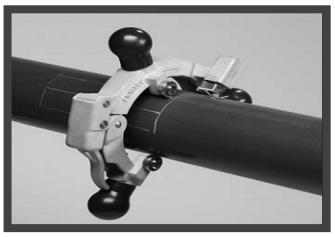


Fig. C2-2

WARNING!

A- If the oxide layer is not removed completely, leaking fusion joints may result.

B- Worn blades of the scraper tool and manual scraper must be replaced.

C- Filing or sanding of the pipe is not permitted because contaminations are introduced.

d-The scraped zone must be protected against dirt, soap, grease, sub -sequently flowing water and effects of weather (e.g. moisture, frost formation).

C3. Cleaning:

The surfaces of the pipes and the interior surfaces of the Fittings must be absolutely clean, dry and free from any grease, The cleaned fusion zone should not be touched with bare hands.

C4. Assembly

- Loosen pre-mounted screws on one side.
- Open upper and lower part; still screwed side serves as hinge.
- Place onto scrapped pipe area.
- Tighten all four screws equally, using an Allen wrench (see Fig:C4-1).

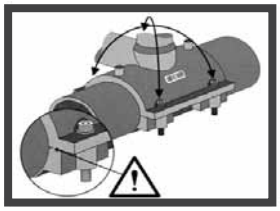


Fig. C4-1 : Assembly

11. INSTALLATION METHODS

C5. Carrying out of fusion Process

Please refer to previous Page No.11 and Item No:B8 for fusion process.

When fusing Pressure T**apping Tees and Valves**, the following operating pressures may not be exceeded until the pipe has cooled down completely.

Pipe Material	PE 80		PE 100	
SDR	17	11	17	11
Maximum oermissible operating pressure in bar				
Gas Pipe	01	04	05	10
Water Pipe	07	12,5	10	16

11.2.D - Tapping Application

D1. Tapping of Pressure Tapping Tees

Remove blanking plug.

1- Turn the drill down up to the lower stop using the matching activating key (see Fig:D1-1)
2- Turn the drill backwards up to the upper stop
3- Position the blanking plug and turn down the activating key until the collar of the plug slightly touches the front face of the drill spigot.
4- Subsequently, turn back the plug half a turn to relieve the O-ring tension.

Fig. D1-1 : Tapping of Pressure Tapping Tees

D2. Tapping of Pressure Tapping Valves

Tap with a suitable key via the 14mm square turning clockwise (see Fig:D2-1) until the lower stop is reached. The valve is now closed. In order to open the valve, the drill has to be turned anti-clockwise until the stop. The metallic stops for the positions “open” and “closed” of the valve result in a clearly noticeably increase in the activation force.

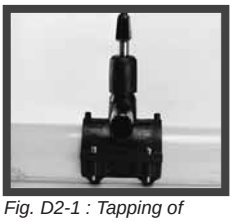


Fig. D2-1 : Tapping of Pressure Tapping Valves

11.2. E - PE shut-off valve

PE shut-off valves made of PE 100, can be used in water supply systems according to DVGW Ger-man Technical and Scientific Asso-ciation for Gas and Water) W400-2 and EN 805 with a maximum component part operating pressure PFA (PN) of 16 bar.
PE shut-off valves can be both buried or installed in systems above ground.
PE shut-off valves are maintenance-free.

E1. Advantages of PE Shut - Off valve compared to traditional gate valve shut - Off:

1. Low Actuation forces, smooth - running even given full differential pressure
2. Low number of turns for actuation
3. Excellent long-term operating characteristics thanks to low-wear drive, proven in dynamic fatigue test
4. Fixed metal stops clearly indicate the reached end position in open/closed position
5. High rigidity of the stops: >5 x maximum actuation torque(breakaway torque, 80Nm)
6. Double Shut-off valve with dynamic seating behavior, flexible valve fits perfectly into the existing internal contour
7. Dead water-free design, no stagnation, no risk of microbial/bacterial contamination
8. Minimised sealing surface reduces microbiological growth with regard to W 270, the Valves are not fully rubberised but only equipped with elastomer in actual functional area

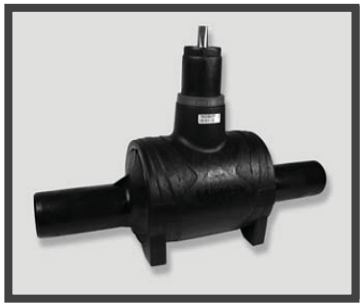


Fig. 11.2.E: PE Shut-Off Valve

NOTES

NEPROPLAST

Manufacturing Plant,JEDDAH
P.O. Box 460 - zip Code 21411
Tel.: 02-6363558/1596/1205 Fax: 02-6362364
Email : info@neproplast.com

MARKETING OFFICES

• Eastern Region

National Marketing Est Co. Ltd.
Dammam
P.O. Box 2145 - zip code 31952.
Tel.: 03 847-1315
Fax: 03 847-1312
E-mail : dammam@namat.com

National Marketing Est Co. Ltd. Dammam
(Saud Branch)
P.O. Box 2145 - zip code 31952
Tel.: 03 834-4904
Fax: 03 834-5247
E-mail : dammam@namat.com

National Marketing Est Co. Ltd. Al-Ahsa
P.O. Box 4251, Al Ahsa 31982
Tel.: 03 580-0699 / 5885682
Fax: 03 588-5681
E-mail : alahsa@namat.com

National Marketing Est Co. Ltd.
Jubail : 31951
P.O.Box : 810
Tel:03 3612159 , Fax: 03 3612155
Email: jubail@namat.com

National Marketing Est Co. Ltd..
Hafr Btain 31991
Tel.: 03 723-5200
Fax: 03 723-5240
E-mail : hafralbaten@namat.com

National Marketing Est Co. Ltd. Khafji
Jubail : 31951 , P.O.Box : 810
Tel:03 7670557 , Fax: 03 7671146
Email: khafji@namat.com

• Central Region

National Marketing Est Co.Ltd.
Riyadh
PO.Box 60738-Zip Code 11555
Tel.: 01 478 0015 / 477 3378
Fax: 01 4/82567
E-mail : Riyadh@namat.com

National Marketing Est Co. Ltd.Al-Kharj
P.O. Box 2589 , Al-Kharj 11942
Tel.: 01 548 9057
Fax: 01 548 4773
E-mail : Kharj@namat.com

National Marketing Est Co. Ltd.Qassim
P.O. Box 2218, Qassim, Buraidah
Tel.: 06 382-0916 / 381-3350
Fax: 06 381-3982
E-mail : qassim@namat.com

National Marketing Est Co. Ltd.Hail
P.O. Box 7479 , Hail
Tel.: 06 533-0476
Fax: 06 534-4248
E-mail : hail@namat.com

National Marketing Est Co. Ltd.Arar
P.O. Box 1251 , Arar 91431
Tel.: 04 664 2529
Fax: 04 662 1626
E-mail : arar@namat.com

National Marketing Est Co. Ltd. Wadi Dawasser
P.O.Box : 2589 , Al - Kharj : 11942
Tel: 01 7861029 , Fax: 01 7861029
Email: kharj@namat.com

National Marketing Est Co. Ltd. Qurrayat
P.O.Box : 1251 , Arar : 91431
Tel: 04 6427779 , Fax: 04 6416233
Email: arar@namat.com

• Western Region

National Marketing Est Co. Ltd.
Jeddah (Bani Malik)
P.O. Box 16375, Jeddah 21464
Tel.: 02-617-1655/670-1603
Fax: 02-673-6384
E-mail :cont@namat.com

National Marketing Est Co. Ltd. Taif
King Khaled Street , Beside Al Muhaidib
Tel. 02 744-1345 , Fax: 02 744-1645
Email: nader.qrenawi@ikkgroup.com

National Marketing Est Co. Ltd. Madina
P.O. Box: 5362 , Al Jamaat Road
Beside Central Market Al-Dar
Tel: 04 8500011/8501010/8500505 , Fax: 04 8500165
Email: madinah@namat.com

National Marketing Est Co. Ltd. Yanbu
P.O. Box: 773 , Yanbu 41911
Tel. 04 322 3880 / 3917483 / 390 2372
Fax: 04 322 3857
Email: yanbu@namat.com

National Marketing Est Co. Ltd. Tabuk
Al-Madinah Al-Munawarah Road
Tel: 04 4230550/04 4232502 , Fax: 04 4215761
Email:tabuk@namat.com

National Marketing Est Co. Ltd. Jezan
Sabia City , Dair Baney Malk Street , Jezan
Tel. 07 3270072 , Fax: 07 3267577
Email: saher.almossa@ikkgroup.com

National Marketing Est Co. Ltd. Sabt Al Alaya
Near Al Farouk Mosque , Sabt Al Alaya
Tel: 07 6300701 , Fax: 07 6300705
Email: waheeb.trad@ikkgroup.com

National Marketing Co.Ltd. Khamis Mushait
P.O. Box:2819,
New Khamis Mushait Industrial Area
Tel. 07 233 0997 / 2382 977 / 887 ,
Fax: 07 233 0660
Email : Khamis@namat.com

Export Offices

National Marketing Est Co. Ltd. Export Office
P.O. Box 16375 - Zip Code 21464
Tel.: 02-647-4204
Fax: 02-647-4503
E-mail : export@namat.com

NEPROPLAST

نيبروبلاست

شركة صناعات المنتوجات الجديده المحدودة

انابيب بولي إثيلين عالي الكثافة

توصيلات مياه الشرب, الغاز و الصرف الصحي

التوزيع الحصري
شركة المؤسسة الوطنية للتسويق المحدودة

www.namat.com | www.neproplast.com
www.namat-plastiewelding.com