# **NEPROPLAST** Polyethylene **Corrugated Optical Duct** (COD) & Sub Duct For Electrical and Telecommunication Networks

NEPROPLAST

NEW PRODUCTS INDUSTRIES CO. LTD



Distributed by National Marketing Est. Co .Ltd



### NSF.) Live safer.\*

NSF Product and Service Listings

> Close window to exit NSF Listing

These NSF Official Listings are current as of Mendey, June 18, 2012 at 12:15 a.m. Eastern Time. Please contact NSF International to confirm the status of any Listing, report errors, or make suggestions. Alert: NSF is concerned about fraudulent downloading and manipulation of website text. Always confirm this information by dicking on the below link for the most accurate information: <a href="http://www.nsf.org">http://www.nsf.org</a> (Certified/PwsComponentsAlstings.asp?Company=C00269658Standard=0616)

#### NSF/ANSI STANDARD 61 Drinking Water System Components - Health Effects

NOTE: Unless otherwise indicated for Materials, Certification is only for the Water Contact Material shown in the Listing. Click here for a list of Abhreviations used in these Listings.

New Products Industries Co., Ltd. (Neproplast) Jeddah Industrial City, Phase 3 P.O. Box 460 Jeddah 21411 Saudi Arabia 966 26363558 Vint this company's website

Facility : Jeddah, Saudi Arabia

### 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 NEPRO-PLAST 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. NEPRO-PLAST 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.



### INTRODUCTION

COD stand for Corrugated Optical Duct, specialized products, COD is a Multiple channel cable duct with plain surface, specially coated inner pipe and corrugated outer pipe as an integrated single body. both are manufactured from high Density Polyethelene(PE) materials. Possible combinations of inner pipe sizes can be done upon customer,s reuest. Hence, Combination is flexible, resistance enabling a rolled-on spool regardless of numbers of subduct built-in which can be coiled over 500m. COD is possible to transport easily and therfore reduce labour cost as well as faster installation and lower the construction cost.

COD open the new era of the telecommunication back bone with its built-in multiple sub ducts inside of the corrugated duct, with very distinctive differencec from the conventional telecommunication PVC ducting System. Telecommunication companies agree on the proven benifets of this product with its great economics and convenient installation than any other system.

COD application services include Construction of underground ducts for High Speed Internet Superhighway networks Cable Television CCTV on the express highway, high & low voltage power cables, Video Phone Communication Downtown / Business quarters infrastructure Undersea's infrastructure.





Fig: 1.c - COD Pipes

All contact surfaces between main duct and built-in sub-ducts shall fuse together during extrusion process. This fusion shall prevent movement or twisting of subducts inside the main COD duct (in finished products).

COD ducts are used to provide a single and continuous duct laying operation from one point to another between manhole to manhole, without any cut. It can be laid directly into trench at standard depths even without sand bedding. Concrete encasement is normally not required.

#### **Product Range:**

NEPROPLAST COD is available from diameter 90 mm to diameter 160 mm in coils and bars

Madal	Design	Corrugated Duct		Sub Duct			No.Sub	
woder		O.D (mm)	I.D (mm)	O.D (mm)	THK (mm)	I.D (mm)	Duct	Application
28 x 3 Lines	8	90.0	70.0	33.0	2.5	28.0	3	FOC installations
28 x 4 Lines		100.0	80.0	33.0	2.5	28.0	4	FOC installations
28 x 5 Lines	8	110.0	90.0	33.0	2.5	28.0	5	FOC installations
32 x 4 Lines		110.0	90.0	38.0	3.0	32.0	4	FOC installations
36 x 3 Lines	8	110.0	90.0	42.0	3.0	36.0	3	FOC installations
36 x 4 Lines		120.0	100.0	42.0	3.0	36.0	4	FOC installations
50 x 3 Lines		160.0	125.0	59.0	4.5	50.0	3	FOC installations

#### Table 1:

#### Standards

NEPROPLAST corrugated pipes for cable protection are produced according to EN50086 2-4 (DIN 16961, NFC 68-171), i.e. EN 13476 standards

#### Color

The standard color is orange and is offered in a variety of other colors.





### INTRODUCTION

#### Marking





#### COD Specification

The following international and/or national standards are integral part of this specification:

ASTM F 405 Standard Specification for Corrugated Polyethylene Pipe and Fittings

ASTM D 2412 Standard Test Method for Determination of External Loading Characteristics of Plastic Pipe By Parallel-Plate Loading

ASTM D 1505 Standard Test Method for Density of Plastics

ASTM D 882 Standard Test Method for Tensile Properties of Plastics

ASTM D 1693 Standard Test Method for Environmental Stress-Cracking of Ethylene Plastics

ASTM D 1603 Test Method for Carbon Black in Olefin Plastics

ASTM D 2122 Test Method for Determining Dimensions of Thermoplastic Pipes & Fittings

#### Long Term Performance Requirements

The above specification require COD ducts and its accessories be

1- capable of withstanding the typical service conditions of the Kingdom of Saudi Arabia for a minimum period of fifty (50) years without detriment to the operation and maintenance of the product.

2- Designed, manufactured and packaged so that its physical or operation and maintenance characteristics shall not degrade when exposed to the environmental conditions of Saudi Arabia, and the expected environmental conditions during storage and transportation outside of the Kingdom.(The environmental conditions of Saudi Arabia may include ambient air temperature variations from -10° to +50°C.

#### **Technical Requirements**

COD should be compatible with the latest installation standards and operation and maintenance practices for the telecommunication's duct system.

COD should be free of blisters, shrinkholes and inhomogeneities, that might impair the service performance. COD should to be acceptably round. Supplied with its ends cut cleanly at right angles to the axis of the duct. COD deemed to have accessories easily connectable, e.g., connector, for connecting the duct to manholes/handholes; and joint closure, for enclosing COD joints.

### **ADVANTAGES OF COD**

#### Better Flexibility

Due to the spiral formation of the product, COD bends easily without special bending efforts, and is easy to by-pass or over pass hurdles along with the duct line.

#### Lengthy pipe

The lengthy and coiled-on drum reduces considerable labor cost as well working period of installation by waving numerous connections in between two manholes in a one-time installation. On top of this, COD never requires inserting of sub duct into corrugated outer duct owing to the built-in production of multiple sub ducts.

#### Lighter in weight

Compared to the conventional duct, COD is considerably lighter which offers benefit while transporting and handling in the work site.

#### Stronger

The readily built-in multiples numbers of sub ducts perfectly eliminates any loose space inside of spiral corrugated duct, allowing COD to offer considerable advantage in terms of compressive load.

### **ADVANTAGES OF COD**

#### Safety

COD stands safe in Earthquakes and Land Subsidence owing to its strong compressive load and flexibility.

#### Easy insertion of optic fiber cables

COD facilitate easy insertion of cables up to the maximum-coiled length owing to perfect alignment of inner ducts and less friction, as it has no connections. In addition, it enables to extend the manhole distance.

#### High Reliability

COD is non-conductive of electricity, and therefore, it is ideal to apply for power cable ducts.

#### **Cost Efficiency**

COD offers cost efficiency throughout all consecutive work stages and endurance.

Better resistance against chemicals

COD lasts semi-permanently, having resistance against chemicals and corrosion from salt water or wetland.

The HDPE-COD shall comply with the test requirements of Table 2.

Table 2:

Clause	Properties	Values	Test Method		
1	Compound Density @ 25°C	0.95 g/cm3, min	ASTM D 1505		
2	Pipe Stiffness @ 5% Deflection, average:				
	- HDPE-CD ( with 7-29 mm OD sub-ducts )	> 27 kgf/cm²			
	- HDPE-CD ( with 5-33 mm OD sub-ducts )	27 kgf/cm <sup>2</sup>			
	- HDPE-CD ( with 3-42 mm OD sub-ducts )	21 kgf/cm <sup>2</sup>	ASTM D 2412		
	- HDPE-CD 110 mm OD ( Empty main duct )	15 kgf/cm <sup>2</sup>			
	- HDPE-CD (with 3-27 mm Outside Dia. sub-ducts)	27 kgf/cm²			
	- HDPE-CD 77 mm OD ( Empty main duct )	24 kgf/cm <sup>2</sup>			
3	Compressive Strength @5% Deflection, average:				
	- HDPE-CD ( with 7-29 mm OD sub-ducts )	> 1,200 kgf/m			
	- HDPE-CD ( with 5-33 mm OD sub-ducts )	1,200 kgf/m			
	- HDPE-CD ( with 3-42 mm OD sub-ducts )	950 kgf/m	ASTM D 2412		
	- HDPE-CD 110 mm OD ( Empty main duct )	660 kgf/m			
	- HDPE-CD (with 3-27mm OD sub-ducts )	770 kgf/m			
	- HDPE-CD 77 mm OD ( Empty main duct )	668 kgf/m			
4	Tensile Strength @ Yield (film properties)	30 MPa	ASTM D 882		
5	Elongation @ Break (film properties)	400%	ASTM D 882		
6	Nominal Pressure (Sub-duct)	16 Bar	SASO 15		
7	Hydrostatic Strength (Sub-duct)	8 MPa	ASTM D 2837		
8	Environmental Stress Crack Resistance (ESCR),F20	192 h, Condition C.	ASTM D 1693		
9	Carbon Black Content	2%	ASTM D 1603		
10	Water Absorption	0.03%, maximum	ASTM D 570 24 hrs immersion		
11	Voltage Resistance	2,000 Vac,>15 min			
12	Insulation Resistance	> 200 Mohm			



### **COMPARISON BETWEEN CONVENTIONAL PRODUCT & COD**

Description	Conventional system		New system		
Description	PVC & FC duct	PE duct	COD		
	B				
	①PVC				
Material	②Foamed polyvinyl chloride	High Density polyethylene	High Density polyethylene		
	①Duct made of PVC	①One piece duct made of polyethylene	①Corrugated concavo-convex shape.		
Shape	②PVC + foamed vinyl         ②Flat surface of inside and outside duct		②Multiple sub ducts are readily built-in		
	③Flat surface of inside and outside duct		③The inside of sub duct is protruded connecting		
Connection	in every 6 meters	none	none		
Length	6m (At Maximum)	No Limit	Up to 500 to 1000m		
Weight	medium	light	light		
Insertion of Inner Duct	Insert	Insert	No Need		
Excavation Depth	100%	60%	60%		
Working condition	medium	medium	fine		
Flexibility	medium	fine	fine		
Coefficient of friction	high	medium	low		
Tension	high	high	low		
Strength	weak	strong	strong		
Use of inner space	-	low	high		
Torsion of the inner duct	-	occur	free from torsion		
Breakage	-	may occur	free from crash		
Damage Rate	Over 90%	0 %	0 %		



### **COD INSTALLATION**

#### **Striping Outer duct**



Set the two ends of the ducts to be jointed. Mark each end of the duct to13 cm from duct end.



Put the cutter into the outer duct



Pill off the skin of COD spinning right



Cutting Skin of COD and remove COD cutter spinning left



Trimming Sub-duct and complete



To clamp and secure both ends of the COD ducts.



Insert Couplings in each sub duct clamped beside the tool's lever arm.



Operate the lever arm of the Jointing Tool to move the duct towards the opposite duct.



Guide the Sub duct Couplings until they mate with the opposite sub-ducts.



To close and cover the joint. One part below the joint, covering 2 grooves of the duct and the other part to mate with the other half.





Tighten the bolts of the closure. The completed PECD jointing is as shown.

# COD MANHOLE CONNECTORS TYPE I:





COD Manhole connector M,L Body: PE-Cap: PP(PP 90% + PE 10%) - Fixing cover:(PP 90%+PE 10%) -Rubber gasket



Remove outer layer: use the outer layer remover to remove about 50cm of outer layer.



Insert Body of Manhole Connector, Place the Body in the correct position.



use bolts and nuts to connect the body with the upper and lower fixing covers



Complete The Installation

# COD MANHOLE CONNECTORS TYPE II:







Pull the COD duct up to the manhole or hand-hole wall.



Use COD CONNECTOR to connect COD duct into MH or HH entry hole. Apply duct solvent cement



Insert the COD duct into the MH or HH entry hole.



### COD CONNECTOR TYPE III FOR EMPTY DUCT



#### COD CORRUGATED COUPLING

Designed to fit 116mm OD COD

COD Corrugated	Dimension ( mm )					
Coupling	Inside Dia. Wall Thickness		А	В		
For 110 mm COD	94	2.5 +/-0.5	116	250		





Use COD CORRUGATED COUPLING, for jointing the two ducts. Screw the full length of the Coupling into one end of COD



### SEALING OF INSTALLED COD DUCT



Insert the COD into the MH or HH entry hole. The sub-ducts shall protrude outside the hole by approx. 20 cm.



Prepare the Plugging Compound and inject between the foam barriers.



First, insert foams around the spaces at one end of the duct terminator.



Insert foams near the hole's opening.



**Completed Installations** 



# COD ACCESSORIES

#### **COD Cutter:**



#### **COD Connecting Jig:**



#### **COD Cutter:**

Material of COD Cutter

- Flange Adapter : ABS
- Steel ring/Handle/Fixing plate/Blade 90 degree
  Steel
- Bolt, Nut and Washer : Steel or SUS

#### **COD Cutter:**

Material of COD Connecting Jig

Steel ring/Handle/Fixing plate/Locking Mechanism

#### **Minor tools**



A set of minor tools installation of COD

#### **COD Connectors**



#### **COD End Caps**



#### Sub-duct End-cap







# **COD ACCESSORIES**

#### Sub-Duct Coupling:



Sub-Duct Coupling	Dimension ( mm )			
Туре	Α	В	С	D
Sub-Duct Coupling , for 29 mm OD sub-ducts, Type 1	39	31	4 +/- 0.5	170
Sub-Duct Coupling , for 33 mm OD sub-ducts, Type 2	43	35	4 +/- 0.5	170
Sub-Duct Coupling , for 42 mm OD sub-ducts, Type 3	52	44	4 +/- 0.5	170
Sub-Duct Coupling , for 27.2 mm OD sub-ducts, Type 4	37.2	29.2	4 +/- 0.5	170



Sub-Duct Coupling after Connection











# SSD (SILICONE SUB DUCT) - Protecting fiber optical cable

NEPROPLAST SSD is made from virgin, flexible HDPE and is used for Optic Fiber and copper cable networks. It can easily be swept to make gradual bends without special forming equipment.. It has Superior resistance to natural or mechanical damage. The inner wall of the duct is with silicone coated.

Silicone coated internal wall is a solid slick lubricant insulator. Silicone Sub Duct has 80% reduction of co-efficient of friction than non-silicone coated internal ducts, and provides complete cable protection before, during and after installation.

#### Advantages:

Silicone lasts as long as the Duct itself

Silicone does not evaporate or burn out due to heat or friction

Silicone does not dry by high volume of air nor reduce its efficiency

Silicone is preferred by all Network Builders of the world and is the Industry standard for duct lubrication Silicone co-efficient of friction does not change with time

Silicone supports blowing and pulling







#### Long Term Performance Requirements

	Test Name	Performance			Related Materials
	Tensile strength	180kgf/cm	KS M 3006		
	Coefficient of friction	0.30 Below			Bellcore Spec
		Division	5% strain (kgf or higher)	Inner contact (kgf or higher)	
		22mm	4	33	KS M 3413
Mechanical	Compressive strength (flat)	25mm	7	50	
Properties		29mm	10	100	
		35mm	14	130	
	Compression resilience	Recovery rate more than 10.0%			KS C 8454
	Heat deformation	Strain 3.0%			KS M 3408
	impact	Balance shall be free from cracks			KS C 8454
		HCL aqueous solution: change in weight 12g/m <sup>2</sup>			= KS M 3407
Chemical Properties	Chemical resistance	NaOH aqı			
		Polyethyle			
		Should be sample an			

# SSD (SILICONE SUB DUCT) - Protecting fiber optical cable

#### Sub-duct wall design

Outer and inner walls shall be plain and smooth. Inner wall shall have low coefficient of friction to facilitate cable installation by blowing technique.

Fusion of main duct and Subducts

All contact surfaces between main duct and built-in subducts shall fuse together during extrusion process. This fusion shall prevent movement or twisting of sub-ducts inside the main COD (in finished products).

#### Color of Sub-ducts:

Sub Duct shall have the same color as that of the main duct, except that one sub-duct should always have a distinct color separate from the other. So, if one sub-duct is black the remaining shall be orange. Likewise, if one sub-duct is orange the remaining shall be black.











### 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 PO. 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.grenawi@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





شركة صناعات المنتوجات البجديده الخدودة

انابيب نيبروبلاست المموجة من البولي اثيلين للقنوات البصرية الرئيسية و الفرعية

> التوزيع الحصري شركة المؤسسة الوطنية للتسويق المحدودة www.namat.com | www.neproplast.com www.namat-plasticwelding.com

