



Manarco Pipes Manufacturing Company

HDPE



INTRODUCTION

Al-Manar Pipes Factory is an ISO Certified company, established in 2003 that develops, manufactures and distribute a wide range of plastic piping systems such as UPVC, CPVC, PE, and PP.R pipes and fittings. With a vision of being a global leader of producing high quality pipes and fittings, it made us one of the most preferred manufacturers and exporters in the region.

Al-Manar Pipes come with various ranges of classes, shapes and sizes to meet all infrastructural needs as our target market consist of diverse lines of businesses. Companies involved in water and sewerage system, energy and power distribution, construction, industrial applications even telecommunications, Al-Manar caters them all.

At Al-Manar, our mission is to improve the quality of life by providing cost-effective solutions for the protection and flow of water and energy, definitely assuring that our products are manufactured in accordance to international quality standards and specifications such as BS, DIN and ASTM standards. In addition, Al-Manar just received the Water Regulations Advisory Scheme (WRAS) certification for our products, which without doubt elevated the company to greater heights, locally and internationally.

المقدمة

أنشئ مصنع أنابيب المنار للصناعات البلاستيكية في عام ٢٠٠٣م لتصنيع المنتجات البلاستيكية على مختلف أنواعها ، ومن أهم منتجاته الأنابيب البلاستيكية UPVC ، CPVC ، HDPE ، PPR والتي تحمل العلامة التجارية المنار وكذلك القطع البلاستيكية والتي تحمل العلامة التجارية مناركو والتي أصبحت البديل الأمثل لفعاليتها وسهولة نقلها وتركيبها وعدم تعرضها للصدأ ومقاومتها للعناصر الكيماوية بفضل هذه المميزات فإنها الرد المثالي على تحديات العصر الحديث والحل الأفضل لمشكلاته الفنية المستعصية .

إن لأنابيب مصنع أنابيب المنار استخدامات في كل المجالات المهمة خصوصا في تمديدات خطوط المياه ذات الضغط العالي والمنخفض وتمديدات المجاري والصحي وتمديدات الهاتف والكهرباء والإتصالات .

ويقوم مصنع أنابيب المنار بإنتاج هذه الأنابيب طبقا لأحدث المواصفات العالمية المقررة ووفقا للمتطلبات الهندسية وتخضع الأنابيب بنوعيتها وأحجامها للمواصفات المقررة من قبل الهيئة العربية السعودية للمواصفات والمقاييس SASO ويتم مراقبة الإنتاج وفقا لنظام دقيق في مختبرات مراقبة الجودة بواسطة أحدث وسائل التكنولوجيا والمعدات الحديثة لضمان جودة ونوعية عالية من الإنتاج . لذا تمكن مصنع أنابيب المنار من الحصول على

شهادتي :

ISO QMS 2008 :9001

Water Regulations Advisory Scheme (WRAS)


كنتيجة طبيعية لأسلوبها الإداري المتميز وتبنيها مبدأ الجودة في منتجاتها . وتتوفر أنابيب مصنع أنابيب المنار بكل المقاسات والسماكات والتي تناسب كل الضغوط ، ويتم تسويق منتجات مصنع أنابيب المنار من الأنابيب على نطاق واسع في السوق المحلية في جميع أنحاء المملكة العربية السعودية

CERTIFICATION



CERTIFICATION

Approved: Supplier registration with NEOM



NEOM

Registration with NEOM

Congratulations! We are pleased to inform you that NEOM has approved your supplier registration. **Al-Manar Pipes Industry Company** has now been included in the supplier database of NEOM.

Please use your vendor ID : **510601345** for all future communications with NEOM.

From now onwards, your company may receive requests to participate in tenders (RFI/RFP/Q) for Goods and/or Services and/or Projects in line with your competencies. However, please do not rely on this email that it constitutes a guarantee that you will receive such requests, as these are dependent on many factors evaluated according to our discretion as needs arise.

You will be notified when new steps of the supplier onboarding process require your attention.

We appreciate your interest in becoming a NEOM supplier and look forward to the opportunity to work with you.

No commenting, you must review your comments, and we reserve the right to delete any comments. Comments that contain: a) any defamatory or libelous content, b) abusive content, c) any content that is illegal, d) any content that is in violation of applicable laws, e) any content that is in violation of applicable regulations, f) any content that is in violation of applicable policies, g) any content that is in violation of applicable standards, h) any content that is in violation of applicable codes of conduct, i) any content that is in violation of applicable terms of service, j) any content that is in violation of applicable privacy policies, k) any content that is in violation of applicable data protection laws, l) any content that is in violation of applicable intellectual property rights, m) any content that is in violation of applicable trade secrets, n) any content that is in violation of applicable confidential information, o) any content that is in violation of applicable trade secrets, p) any content that is in violation of applicable confidential information, q) any content that is in violation of applicable trade secrets, r) any content that is in violation of applicable confidential information, s) any content that is in violation of applicable trade secrets, t) any content that is in violation of applicable confidential information, u) any content that is in violation of applicable trade secrets, v) any content that is in violation of applicable confidential information, w) any content that is in violation of applicable trade secrets, x) any content that is in violation of applicable confidential information, y) any content that is in violation of applicable trade secrets, z) any content that is in violation of applicable confidential information.

شركة المنارة للصناعات البلاستيكية
Al-Manar Pipes Industry Company

Material Approval Certificate

| Item No. | Material Name | Approved By | Approved Date |
|----------|------------------|------------------------------|---------------|
| 01 | UPVC Pipe 110mm | Mr. Ahmed Ali Ahmed Siddiqui | 20/05/2024 |
| 02 | UPVC Pipe 150mm | Mr. Ahmed Ali Ahmed Siddiqui | 20/05/2024 |
| 03 | UPVC Pipe 200mm | Mr. Ahmed Ali Ahmed Siddiqui | 20/05/2024 |
| 04 | UPVC Pipe 250mm | Mr. Ahmed Ali Ahmed Siddiqui | 20/05/2024 |
| 05 | UPVC Pipe 300mm | Mr. Ahmed Ali Ahmed Siddiqui | 20/05/2024 |
| 06 | UPVC Pipe 350mm | Mr. Ahmed Ali Ahmed Siddiqui | 20/05/2024 |
| 07 | UPVC Pipe 400mm | Mr. Ahmed Ali Ahmed Siddiqui | 20/05/2024 |
| 08 | UPVC Pipe 450mm | Mr. Ahmed Ali Ahmed Siddiqui | 20/05/2024 |
| 09 | UPVC Pipe 500mm | Mr. Ahmed Ali Ahmed Siddiqui | 20/05/2024 |
| 10 | UPVC Pipe 600mm | Mr. Ahmed Ali Ahmed Siddiqui | 20/05/2024 |
| 11 | UPVC Pipe 700mm | Mr. Ahmed Ali Ahmed Siddiqui | 20/05/2024 |
| 12 | UPVC Pipe 800mm | Mr. Ahmed Ali Ahmed Siddiqui | 20/05/2024 |
| 13 | UPVC Pipe 900mm | Mr. Ahmed Ali Ahmed Siddiqui | 20/05/2024 |
| 14 | UPVC Pipe 1000mm | Mr. Ahmed Ali Ahmed Siddiqui | 20/05/2024 |

Mr. Ahmed Ali Ahmed Siddiqui
General Manager, Supply Chain

القنطرة
almanar

Postal Address: P.O. Box 86544
Riyadh 11632, Saudi Arabia.
Tel: (966) 73086111 Ext. 4300/4329
Fax (966) 11 - 494 5473
E-mail: Sales@almanar.com

To : Ms. AL-MANAR PIPES INDUSTRY COMPANY
Attn : Mr. Ahmed Ali Ahmed Siddiqui
Tel : 73086111
Email : Ahmed.Ali.Ahmed.Siddiqui@almanar.com

Our Ref: QUAL/0873
Date : 20/05/2024

SUBJECT: QUALIFICATION


Dear Sir,

Based on our assessment, we are pleased to inform that Ms Al-Manar Pipes Industry Company is now qualified vendor of Al-Manar Projects for supply of UPVC, CPVC, PPR, HDPE pipes and fittings of various sizes.

Qualification means that Ms Al-Manar Pipes Industry Company is eligible to receive requests for quotations and orders for the designated materials, but this approval should not be considered as a commitment by Al-Manar Projects to send Request for Quotation or procure materials from Ms Al-Manar Pipes Industry Company.

Thanks for your interest in being a supplier to Al-Manar Projects.

Best Regards,


TAREQ DASSAR
General Manager, Supply Chain
Cc: Manager TOM

Vendor Registry

Registration Approval Letter

18 May 2024

Attention : Al Manar Pipes Factory Company
CR Num. : 1011004000
VAT Num. : 311107000000
Location : Saudi Arabia

Dear Sir:
We are pleased to inform you that Al Manar Pipes Factory Company is now registered in **AI-RABEH TRADING AND CONTRACTING** supplier management system. Under Vendor No : 11524, provided to your company continues to meet all RTCC standards.

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

We would like to thank you for your interest in RTCC, and take this opportunity to reiterate that it is RTCC policy to encourage the use of approved manufactured materials.


Eng. Mubarak Al-Majed
General Manager

This is an electronically generated letter by RTCC to verify supplier approval status, please contact supplier Help Desk at helpdesk@rtcc.com if you have any queries.

This document only represents the registration of the supplier in contractor with the company's record, which gives you the opportunity to present the best quotation.

The supplier is responsible for all the information provided without liability by RTCC company.



القنطرة
almanar

Document Title: Supplier's Prequalification Assessment Form
Ref. No.: QRS.4.1/1
Issue: 02
Rev: 01
Issuing Date: 15/04/2019

Name of Supplier: Al-Manar Pipes Industry Company
Nature of Business: Manufacturer
Year(s) of Experience: Relevant: 07 Others: NA
Address: St. 26, Alkhaj Industrial City, Alkhaj, KSA
Contact Person: Apeel Ahmed Ali Ahmed Siddiqui
Tel. No.: 966531548941
Fax No.: 966 11 4781723
E-mail: apeel.ahmed@almanarplastic.com

Nature of Supply: Manufacturing and sales of UPVC, CPVC, PPR & HDPE pipes and fittings of various sizes

Assessed on the basis of:

- Company Information:
 - Details of HQ: St. 26, Alkhaj Industrial City, Alkhaj, KSA
 - Branch Offices and other Business / Sister concern etc: No
- Organization Structure:
 - Company Organizational Chart: provided
 - Others: NA
- Staff Strength, skills & qualification: Total manpower: 129
- Major Products: UPVC, CPVC, PPR & HDPE pipes and fittings of various sizes
- Main Client / Customer: Almajid trading & Contracting Company, Ministry of Transport and Logistic services, National Water company
- Quality & Safety Set up (that can be Lab etc): 9001, 14001, 45001
- Social Accountability Practices (if applicable) (such as Human Rights, Child Labor, Slaves, Trafficking, Working Hours etc.): Saudi Law

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almanar

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Red Sea Global

Registration with Red Sea Global

Vendor Name: AL MANAR PIPES FACTORY COMPANY
Registered Vendor ID: 51054302

Congratulations! We are pleased to inform you that your application for vendor registration with Red Sea Global has been successfully approved. You have been added to our database and you will be notified when the next step of onboarding is required.

We look forward to working with you and building a successful partnership.

Red Sea Global


SAP Ariba

مركز ضمانات الجودة للمقاولين
Appendix (License for Use of The Quality Mark)

| رقم الترخيص | اسم المقاول | نوع العمل | تاريخ الترخيص |
|-------------|--------------------------------|--------------------------|---------------|
| 05-96-2007 | AL MANAR PIPES FACTORY COMPANY | توريد وتركيب خطوط المياه | 20/05/2024 |
| 04-02-0723 | AL MANAR PIPES FACTORY COMPANY | توريد وتركيب خطوط المياه | 20/05/2024 |
| 08-07-1473 | AL MANAR PIPES FACTORY COMPANY | توريد وتركيب خطوط المياه | 20/05/2024 |
| 27-08-1473 | AL MANAR PIPES FACTORY COMPANY | توريد وتركيب خطوط المياه | 20/05/2024 |

مركز ضمانات الجودة للمقاولين
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| رقم الترخيص | اسم المقاول | نوع العمل | تاريخ الترخيص |
|-------------|--------------------------------|--------------------------|---------------|
| 11-07-1402 | AL MANAR PIPES FACTORY COMPANY | توريد وتركيب خطوط المياه | 20/05/2024 |
| 15-12-3773 | AL MANAR PIPES FACTORY COMPANY | توريد وتركيب خطوط المياه | 20/05/2024 |
| 19-01-1473 | AL MANAR PIPES FACTORY COMPANY | توريد وتركيب خطوط المياه | 20/05/2024 |

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| رقم الترخيص | اسم المقاول | نوع العمل | تاريخ الترخيص |
|-------------|--------------------------------|--------------------------|---------------|
| 25-05-0723 | AL MANAR PIPES FACTORY COMPANY | توريد وتركيب خطوط المياه | 20/05/2024 |
| 14-05-1473 | AL MANAR PIPES FACTORY COMPANY | توريد وتركيب خطوط المياه | 20/05/2024 |
| 22-05-1473 | AL MANAR PIPES FACTORY COMPANY | توريد وتركيب خطوط المياه | 20/05/2024 |
| 12-04-1473 | AL MANAR PIPES FACTORY COMPANY | توريد وتركيب خطوط المياه | 20/05/2024 |

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| رقم الترخيص | اسم المقاول | نوع العمل | تاريخ الترخيص |
|-------------|--------------------------------|--------------------------|---------------|
| 02-08-1473 | AL MANAR PIPES FACTORY COMPANY | توريد وتركيب خطوط المياه | 20/05/2024 |
| 03-08-1473 | AL MANAR PIPES FACTORY COMPANY | توريد وتركيب خطوط المياه | 20/05/2024 |
| 04-08-1473 | AL MANAR PIPES FACTORY COMPANY | توريد وتركيب خطوط المياه | 20/05/2024 |
| 05-08-1473 | AL MANAR PIPES FACTORY COMPANY | توريد وتركيب خطوط المياه | 20/05/2024 |



AL-MANARCO
HDPE PIPES AND
FITTING

HDPE Pressure Pipe Systems ADVANTAGES

High density polyethylene pipe has been used extensively around the world since the 1950's. The unique properties of High density polyethylene pipe have offered an alternative to traditional material like steel and copper and also in non pressure applications where clay and fibre cement pipes were used.

The material has been developed internationally from PE 80 to today's PE 100 material which has shown a saving of approximately %30 on the wall thickness from the early days of Polyethylene. This mass saving relates back to a cost saving and a better performance as the internal diameter of the pipe is bigger. In many cases, because of the excellent flow characteristics of Polyethylene, pipes could be down sized while still performing within the expected parameters.

The pipes' properties such as impact resistance and resistance abrasion have made HDPE pipe the obvious choice in the Mining and Industrial markets.

Piping made from polyethylene is a cost effective solution for a broad range of piping applications in the municipal, industrial, marine, mining, landfill, duct and agricultural industries. It has been tested and proven effective for above ground, surface, buried, slip-lined, floating and sub-surface

marine applications. High-density polyethylene pipe (HDPE) can carry potable water, wastewater, slurries, chemicals, hazardous wastes, and compressed gases. In fact, polyethylene pipe has a long and distinguished history of service in the gas, oil, mining and other industries. It has the lowest repair frequency per kilometer of pipe per year compared with all other pressure pipe materials used for urban gas distribution.

Polyethylene is a strong, extremely tough, very durable product which offers long service and trouble-free installation. HDPE is generally used for high pressure applications ranging from 3.2 to 25 Bar, in conjunction with compression, butt-weld or electrofusion fittings. Manarco HDPE piping conforms to the SABS ISO 4427:1996 specification.

Applications

Manarco High Density Polyethylene pressure pipes are specified with confidence in the following applications:

- Civil engineering. Water mains and reticulation systems.
- Building. House connections and cold water reticulation systems.
- Agriculture. Irrigation and water supply schemes.
- Industrial. Sewer effluent control and water purification. Conveyance of chemicals and water in most industrial plants.
- Mining. Conveyance of water and air in underground operations. Used extensively in treatment and recovery plants.

Quality

Manarco HDPE pipe is manufactured to the relevant SABS and international quality specifications.

Manarco HDPE Pressure Pipe Systems QUALITY

HDPE Material

Polyethylene pressure pipe systems offer many advantages when compared to traditional products, namely:

- Weather resistance in above ground applications
- Highly corrosion resistant
- Ease of handling and installation, exceptional toughness
- Excellent abrasion resistance
- Manufactured in long lengths and coils
- Manufactured to internationally accepted standards
- Service performance in excess of 50 years Resistance to weather degradation.

The high percentage of carbon black in the formulation of the pipe raw material enables HDPE pipe to resist degradation by ultraviolet rays. The pipe is impervious to rain and wind conditions.

Chemical resistance

HDPE pipes are chemically inert but there are some chemicals which could affect the pipe. As the product is also not electrically conductive, reactions cannot take place within the pipe and affect its performance.

HDPE has excellent corrosion resistance and is virtually inert so it does not need expensive cathodic protection. It offers better resistance to corrosive acids, bases and salts than most piping materials and also has good resistance to many organic substances such as solvents and fuels.

Natural soil chemicals cannot degrade the pipe in any way.



Manarco HDPE Pressure Pipe Systems **QUALITY**

Ease of handling

Conventional materials are much heavier than HDPE and will require cranes and lifting gear. Handling of the product can often be done by hand allowing ease of installation in confined spaces and difficult terrain.

High strength and flexibility HDPE material has a high degree of impact resistance and is robust and ductile. Pipes can bend quite easily allowing for savings in design as less critical angle changes can be made without bends. HDPE pipe can be laid across uneven surfaces and in narrow trenches. Pipe can be joined outside of the trench before installation into the trench. The ability to absorb pressure surges makes the product superior to other plastic pipe materials. Even in sub zero temperatures HDPE can still perform to expectation.

Resistance to abrasion

Where very abrasive mediums have to be transported HDPE has proved itself to be the pipe product of choice. HDPE outperforms traditional pipe materials such as steel and steel with sacrificial layers (rubber lined steel). The product is used extensively in mine tailings and washing plants.

Ease of handling

The smooth internal surface of the pipe and the impermeability of HDPE allows a greater flow capacity and minimal friction loss. It has less drag and a lower tendency for turbulence at high velocity.

Its superior chemical resistance and non-stick surface combines to eliminate scaling and pitting.

This preserves the excellent hydraulic characteristics throughout the pipe's service life. When designing pipelines, use the Hazen-Williams C factor of 150 and an in factor of 0.009, when using the Manning formula.



Manarco HDPE Pressure Pipe Systems CHARACTERISTIC

Properties Material

| Property | Typical Value | Unit Test Method | PE 80 | PE 100 |
|------------------------------|------------------|------------------|------------|------------|
| Physical Properties | | | | |
| Density (Compound) | D 792 | g/cc | 0.955 | 0.955 |
| Carbon black content | D 1603 | % | 0.25+ 2.25 | 0.25+ 2.25 |
| Melt Index,load 2.16 Kg | D 3350 | g/10min | <0.1 | <0.1 |
| Induction temp. (DSC) | - | °C | >220 | >220 |
| Poisson ratio | D 1693 | - | 0.45 | 0.45 |
| ESCR | D 256 | h | >10000 | >10000 |
| Izod impact (notch) | Hazen William | ft.lb/in | >2.5 | >2.5 |
| Co-efficient of friction | Colebrook white | Factor"C" | 150 | 150 |
| | | Factor"K" mm | 0.003 | 0.00 |
| Mechanical Properties | | | | |
| Tensile Strength (Break) | (50mm/min) 638 D | MPa | >27.2 | 38 |
| Tensile Strength (Yield) | (50mm/min) 638 D | MPa | >22 | 25 |
| Elongation (Ultimate) | (50mm/min) 638 D | % | >600 | >600 |
| Modulus of elasticity | 790 D | MPa | 1000 | 1400 |
| Hardness | 2240 D | Shore"D" | >57 | >60 |
| Electrical Propertise | | | | |
| Volume resistivity | DIN 5382 | ohm.cm | >1017 | >1017 |
| Surface resistance | DIN 5382 | ohm | >1014 | >1014 |
| Dielectric Strength | DIN 5382 | KV cm | 3X102 | 2.2 X102 |
| Dielectric Constant | DIN 5382 | Factor | 2.6 | 2.6 |
| Thermal Propertise | | | | |
| Brittle Temperature | D 746 | °C | <100- | <100- |
| Vicat Softing Temp. | D 1525 | °C | >125 | >125 |
| Co-efficient of linear | D 696 | °C | 1.3 X 4 10 | 1.3 X 4 10 |
| Thermal Expansion | | mm/m °C | 2.9-0.2 | 2.9-0.2 |
| Specific Heat | Calorimetric | kJ/kg °K | 0.38 | 0.38 |
| Thermal conductivity | DIN 52612 | W/m. °C | | |

NOTE: All values are taken at °23

Manarco HDPE Pressure Pipe Systems CHARACTERISTIC

Manufacturing standard

Manarco Polyethylene pipes are manufactured and comply with the following standards for various application.

| Orgabization | Code Number | |
|--------------|----------------|---|
| DIN | DIN 8074 | PE Pipes (PE80,PE100)-Dimension |
| | DIN 8075 | PE Pipes (PE80,PE100)-General quality requirement |
| | DIN 19537 | Pipe of HDPE for drainage and sewerage. |
| | DIN EN 1-1519 | PE Pipes for Soil and water discharge |
| | DIN EN 2-12201 | PE piping system for water supply |
| | DIN EN 13244 | PE Pipes pressure system for water for general purpose range and sewerage |
| ISO | ISO 2-4427 | PE Pipes for water supply-specification |
| | ISO 8770 | HDPE Pipe for soil and west discharge system |

Material Classification

A new generation of High Performance Polyethylene materials have been developed by the leading resin manufacturers for the production of pipes and fittings. these newly developed compounds now used by Manarco and are designed for PE pipe as follows:

| Standard | Designation | Description |
|-----------------------|------------------------------------|-------------|
| EN ISO 12162/DIN 8075 | MIN. REEQUIRED STRENGTH;MRS 10 MPa | PE 100 |
| EN ISO 12162/DIN 8075 | MIN. REEQUIRED STRENGTH;MRS 8 MPa | PE 80 |
| ASTM 3350 | CLASSIFICATION; CELL CLASS | PE 345434C |

Note:

1. PE Pipes to American (ASTM), United Kingdom water industry standards (WIS), Saudi Arabia (SASO) and other specification consult or consult our Technical sales departments
2. European Standards DIN EN and BS EN are identical.



Al-Manar HDPE Pressure Pipe For WATER SUPPLY

Al-Manar Higher Performance PE 100 Pipe

| Nominal Outside Diameter Mm | SDR 26 S 12.5 PN 6.3 | | SDR 17 S 8 PN 10 | | SDR 13.6 S 6.3 PN 12.5 | | SDR 11 S 5 PN 16 | | SDR 9 S 4 PN 20 | |
|-----------------------------|--------------------------|-------------|----------------------|-------------|----------------------------|-------------|----------------------|-------------|---------------------|-------------|
| | Wall Thickness mm | Weight Kg/M | Wall Thickness mm | Weight Kg/M | Wall Thickness mm | Weight Kg/M | Wall Thickness mm | Weight Kg/M | Wall Thickness mm | Weight Kg/M |
| 16 | - | - | - | - | - | - | - | - | 1.8 | 0.084 |
| 20 | - | - | - | - | 1.8 | 0.107 | 1.9 | 0.112 | 2.3 | 0.133 |
| 25 | - | - | 1.8 | 0.137 | 1.9 | 0.144 | 2.3 | 0.171 | 2.8 | 0.2 |
| 32 | - | - | 1.9 | 0.187 | 2.4 | 0.232 | 2.9 | 0.272 | 3.6 | 0.327 |
| 40 | 1.8 | 0.227 | 2.4 | 0.29 | 3 | 0.356 | 3.7 | 0.43 | 4.5 | 0.509 |
| 50 | 2 | 0.314 | 3 | 0.453 | 3.7 | 0.549 | 4.6 | 0.666 | 5.6 | 0.788 |
| 63 | 2.5 | 0.494 | 3.8 | 0.721 | 4.7 | 0.873 | 5.8 | 1.05 | 7.1 | 1.26 |
| 75 | 2.9 | 0.675 | 4.5 | 1.02 | 5.6 | 1.24 | 6.8 | 1.47 | 8.4 | 1.76 |
| 90 | 3.5 | 0.978 | 5.4 | 1.46 | 6.7 | 1.77 | 8.2 | 2.21 | 10.1 | 2.54 |
| 110 | 4.2 | 1.43 | 6.6 | 2.17 | 8.1 | 2.62 | 10 | 3.14 | 12.3 | 3.78 |
| 125 | 4.8 | 1.84 | 7.4 | 2.76 | 9.2 | 3.37 | 11.4 | 4.08 | 14 | 4.87 |
| 140 | 5.4 | 2.32 | 8.3 | 3.46 | 10.3 | 4.22 | 12.7 | 5.08 | 15.7 | 6.11 |
| 160 | 6.2 | 3.04 | 9.5 | 4.52 | 11.8 | 5.5 | 14.6 | 6.67 | 17.9 | 7.96 |
| 180 | 6.9 | 3.79 | 10.7 | 5.71 | 13.3 | 6.98 | 16.4 | 8.42 | 20.1 | 10.1 |
| 200 | 7.7 | 4.69 | 11.9 | 7.05 | 14.7 | 8.56 | 18.2 | 10.4 | 22.4 | 12.4 |
| 225 | 8.6 | 5.89 | 13.4 | 8.93 | 16.6 | 10.9 | 20.5 | 13.1 | 25.2 | 15.8 |
| 250 | 9.6 | 7.3 | 14.8 | 11 | 18.4 | 13.4 | 22.7 | 16.2 | 27.9 | 19.4 |
| 280 | 10.7 | 9.1 | 16.6 | 13.7 | 20.6 | 16.8 | 25.4 | 20.3 | 31.3 | 24.3 |
| 315 | 12.1 | 11.6 | 18.7 | 17.4 | 23.2 | 21.2 | 28.6 | 25.6 | 35.2 | 30.8 |
| 355 | 13.6 | 14.6 | 21.1 | 22.1 | 26.1 | 26.9 | 32.2 | 32.5 | 39.7 | 39.1 |
| 400 | 15.3 | 18.6 | 23.7 | 28 | 29.4 | 34.1 | 36.3 | 41.3 | 44.7 | 49.6 |
| 450 | 17.2 | 23.5 | 26.7 | 35.4 | 33.1 | 43.2 | 40.9 | 52.3 | 50.3 | 62.7 |
| 500 | 19.10 | 28.9 | 29.7 | 43.8 | 36.8 | 53.3 | 45.4 | 64.5 | 55.8 | 77.3 |
| 560 | 21.40 | 36.2 | 33.2 | 54.8 | 41.2 | 66.9 | 50.8 | 80.8 | 62.5 | 97 |
| 630 | 24.10 | 45.9 | 37.4 | 69.4 | 46.3 | 84.6 | 57.2 | 102 | - | - |
| 710 | 27.20 | 58.4 | 42.1 | 88.1 | 52.2 | 107 | 102 | 130 | - | - |
| 800 | 30.60 | 73.9 | 47.4 | 112 | 58.8 | 136 | 72.7 | 159.35 | - | - |
| 900 | 34.40 | 93.4 | 53.3 | 141 | 66.1 | 172 | - | - | - | - |
| 1000 | 38.20 | 115 | 59.3 | 175 | 73.5 | 203 | - | - | - | - |
| 1100 | 42.30 | 134 | 64.7 | 200 | 80 | 244 | - | - | - | - |
| 1200 | 45.90 | 166 | 70.6 | 250 | - | - | - | - | - | - |
| 1400 | 53.50 | 226 | 83 | 328 | - | - | - | - | - | - |
| 1600 | 53.50 | 295 | - | - | - | - | - | - | - | - |

Pipe length coil and length

Al-Manar Polyethylene pipes in size range from 16 mm to 110 mm outside diameter are available in coils (rolls) of 50 meter and 100 meter lengths.

The pipes in large diameters are supplied in straight lengths of 6,9 or 12 meters.

Other lengths can be supplied by arrangements.

*Pipe dimension based on ISO 2-4427, DIN 8074, EN 2-12201

Al-Manar Pipe PE 80 Pipe

| Nominal Outside Diameter Mm | SDR 41 S 20 PN 3.2 | | SDR 33 S 16 PN 4 | | SDR 22 S 10.5 PN 6 | | SDR 13.6 S 6.3 PN 12.5 | | SDR 11 S 5 PN 12.5 | | SDR 9 S 4 PN 16 | |
|-----------------------------|------------------------|-------------|----------------------|-------------|------------------------|-------------|----------------------------|-------------|------------------------|-------------|---------------------|-------------|
| | Wall Thickness mm | Weight Kg/M | Wall Thickness mm | Weight Kg/M | Wall Thickness mm | Weight Kg/M | Wall Thickness mm | Weight Kg/M | Wall Thickness mm | Weight Kg/M | Wall Thickness mm | Weight Kg/M |
| 16 | - | - | - | - | - | - | - | - | - | - | 1.8 | 0.084 |
| 20 | - | - | - | - | - | - | 1.8 | 0.107 | 1.9 | 0.112 | 2.3 | 0.133 |
| 25 | - | - | - | - | - | - | 1.9 | 0.144 | 2.3 | 0.171 | 2.8 | 0.2 |
| 32 | - | - | - | - | - | - | 2.4 | 0.232 | 2.9 | 0.272 | 3.6 | 0.327 |
| 40 | - | - | - | - | 1.9 | 0.238 | 3 | 0.356 | 3.7 | 0.43 | 4.5 | 0.509 |
| 50 | - | - | 1.8 | 0.287 | 2.3 | 0.361 | 3.7 | 0.549 | 4.6 | 0.666 | 5.6 | 0.788 |
| 63 | 1.8 | 0.364 | 2 | 0.399 | 2.9 | 0.563 | 4.7 | 0.873 | 5.8 | 1.05 | 7.1 | 1.26 |
| 75 | 1.9 | 0.457 | 2.3 | 0.551 | 3.5 | 0.807 | 5.6 | 1.24 | 6.8 | 1.47 | 8.4 | 1.76 |
| 90 | 2.2 | 0.643 | 2.8 | 0.791 | 4.1 | 1.14 | 6.7 | 1.77 | 8.2 | 2.12 | 10.1 | 2.54 |
| 110 | 2.7 | 0.943 | 3.4 | 1.17 | 5 | 1.67 | 8.1 | 2.62 | 10 | 3.14 | 12.3 | 3.78 |
| 125 | 3.1 | 1.23 | 3.9 | 1.51 | 5.7 | 2.16 | 9.2 | 3.37 | 11.4 | 4.08 | 14 | 4.87 |
| 140 | 3.5 | 1.54 | 4.3 | 1.88 | 6.4 | 2.72 | 10.3 | 4.22 | 12.7 | 5.08 | 15.7 | 6.11 |
| 160 | 4.0 | 2 | 4.9 | 2.42 | 7.3 | 3.54 | 11.8 | 5.5 | 14.6 | 6.67 | 17.9 | 7.96 |
| 180 | 4.4 | 2.49 | 5.5 | 3.07 | 8.2 | 4.47 | 13.3 | 6.98 | 16.4 | 8.42 | 20.1 | 10.1 |
| 200 | 4.9 | 3.05 | 6.2 | 3.84 | 9.1 | 5.57 | 14.7 | 8.56 | 18.2 | 10.4 | 22.4 | 12.4 |
| 225 | 5.5 | 3.86 | 6.9 | 4.77 | 10.3 | 7 | 16.6 | 10.9 | 20.5 | 13.1 | 25.2 | 15.8 |
| 250 | 6.2 | 4.83 | 7.7 | 5.92 | 11.4 | 8.59 | 18.4 | 13.4 | 22.7 | 16.2 | 27.9 | 19.4 |
| 280 | 6.9 | 5.98 | 8.6 | 7.4 | 12.8 | 10.8 | 20.6 | 16.8 | 25.4 | 20.3 | 31.3 | 24.3 |
| 315 | 7.7 | 7.52 | 9.7 | 9.37 | 14.4 | 13.6 | 23.2 | 21.2 | 28.6 | 25.6 | 35.2 | 30.8 |
| 355 | 8.7 | 9.55 | 10.9 | 11.8 | 16.2 | 17.3 | 26.1 | 26.9 | 32.2 | 32.5 | 39.7 | 39.1 |
| 400 | 9.8 | 12.1 | 12.3 | 15.1 | 18.2 | 21.9 | 29.4 | 34.1 | 36.3 | 41.3 | 44.7 | 49.6 |
| 450 | 11.0 | 15.3 | 13.8 | 19 | 20.5 | 27.7 | 33.1 | 43.2 | 40.9 | 52.3 | 50.3 | 62.7 |

*Pipe dimension based on ISO 2-4427, DIN 8074, EN 2-12201

Effective of Elevated Temperature

Maximum working pressure given in Table 6 is rated for use with Potable water at 23 °C. To determine pressure at elevated temperature, multiply (*23C) maximum working pressure by appropriate derating Safety factor at Stated in table 6 below

| working Etedleva Etedleva Temperature | C | 20 | 25 | 30 | 35 | 40 | 45 |
|--|---------|----|------|------|-----|------|------|
| | F | 68 | 77 | 86 | 95 | 104 | 113 |
| Derating Safety factors suitable at elevated temperature | Factors | 1 | 0.93 | 0.87 | 0.8 | 0.74 | 0.67 |



Manarco HDPE Non PRESSURE PIPE

Manarco HD,PE 80 Pipe

For Soil and waste discharge system (Low and high temperature)

| Nominal Outside Diameter mm | Nominal wall Thickness mm | Nominal weight kg/m | Pipe Class (Series) |
|--------------------------------|------------------------------|------------------------|------------------------|
| 32 | 3 | 0.277 | S-16 |
| 40 | 3 | 0.357 | S16 |
| 50 | 3 | 0.454 | S-16 |
| 63 | 3 | 0.58 | S-16 |
| 75 | 3 | 0.696 | S-16 |
| 90 | 3.5 | 0.978 | S-12.5 |
| 110 | 4.2 | 1.43 | S-12.5 |
| 125 | 4.8 | 1.84 | S-12.5 |
| 160 | 6.2 | 3.04 | S-12.5 |
| 200 | 6.2 | 3.84 | S-16 |

For Drainage and Sewerage system

| Nominal Outside Diameter mm | Nominal wall Thickness mm | Nominal weight kg/m | Pipe Class (Series) |
|--------------------------------|------------------------------|------------------------|------------------------|
| 110 | 4 | 1.46 | SERIES 3 |
| 125 | 4.9 | 1.88 | SERIES 3 |
| 140 | 5.4 | 2.32 | SERIES 3 |
| 160 | 6.2 | 3.04 | SERIES 3 |
| 200 | 6.2 | 3.84 | SERIES 2 |



Color of Al-Manar PE Pipe is black especially suited for extreme weathering conditions and where U.V. attack can occur. and any other color can be supplied by arrangement.



IDENTI-PIPE PE 100 AS/NZS 4130
Drinking / Potable Water



IDENTI-PIPE PE 100 AS/NZS 4130
Telecommunication



IDENTI-PIPE PE 100 AS/NZS 4130
Telecommunication



IDENTI-PIPE PE 100 AS/NZS 4130
Telecommunication & Drinking / Potable Water



IDENTI- PIPE PE 100 AS/NZS 4130
Electrical



IDENTI- PIPE PE 100 AS/NZS 4130
Telecommunication

ManarcoHDPE Pressure Pipe Systems QUALITY

Manarco HD,PE 80 Pipe

The need for PE pipes is increasing throughout the whole world. Their small weight allows easy handling, and simple, swift and reliable assembling. They are flexible and can be delivered in the rollers of 200m. They are extremely resistant to chemical, therefore they can be easily placed into the aggressive ground. They have a very high impact resistance even at very low temperatures, especially if made of network like polyethylene. These pipes do not corrode and with a life time of more than 50 years.

Technology

The pipes are entirely in accordance with EN 1555, ISO 4437 (DIN 8074) standards. Manarco PE pipe System uses materials made by the world known companies, which have been checked and approved by its own laboratory. The production itself is being monitored and controlled by the contemporary scanners. At the same time Manarco PE pipe System controls the quality of its products in its own fully equipped laboratory.

| Nominal Outside Diameter mm | SDR 17.6 (S-8.3)PN1 | | SDR 11 (S-5)PN4 | |
|-----------------------------|---------------------|---------------------|-----------------|---------------------|
| | S | Nominal Weight kg/m | S | Nominal Weight kg/m |
| 20 | 2.3 | 0.133 | 3 | 0.163 |
| 25 | 2.3 | 0.171 | 3 | 0.211 |
| 32 | 2.3 | 0.224 | 3 | 0.279 |
| 40 | 2.3 | 0.285 | 3.7 | 0.43 |
| 50 | 2.9 | 0.44 | 4.6 | 0.666 |
| 63 | 3.6 | 0.688 | 5.8 | 1.05 |
| 75 | 4.3 | 0.976 | 6.8 | 1.47 |
| 90 | 5.2 | 1.41 | 8.2 | 2.12 |
| 110 | 6.3 | 2.08 | 10 | 3.14 |
| 160 | 9.1 | 4.35 | 14.6 | 6.67 |
| 200 | 11.4 | 6.79 | 18.2 | 10.4 |
| 225 | 12.8 | 8.55 | 20.5 | 13.1 |
| 250 | 14.2 | 10.6 | 22.7 | 16.2 |
| 315 | 17.9 | 16.7 | 28.6 | 25.6 |

Manarco HDPE GAS Pipe

Preferences

Manarco PE pipe System produces gas pipes out of PE80 polyethylene in yellow or black color with yellow longitudinal lines.

The material used for the gas pipe production is approved by the European Union for this application. Wall thickness for both PE80 and PE100 gas pipes is the same, but with the difference in working pressure which is 2,6,6,4,1 and 10 bar

Manarco HDPE Cable Ducts

Manarco HD Cable Ducts

These pipes are produced out of PE100, according to EN 4-2-50086 & DIN 8074. Standard production length is 300m to 500m; other lengths are available on request. Available colors are Black/Black, Black/Orange, Black/Blue and Black with orange stripes.

| Nominal Outside Diameter mm | SDR 17.6 (S8.3-)PN1 | | SDR 11 (S5-)PN4 | |
|-----------------------------|---------------------|---------------------|-----------------|---------------------|
| | S | Nominal Weight kg/m | S | Nominal Weight kg/m |
| 25 | 1.8 | 0.137 | 2.3 | 0.171 |
| 32 | 1.9 | 0.187 | 2.9 | 0.279 |
| 40 | 2.3 | 0.285 | 3.7 | 0.43 |
| 50 | 2.9 | 0.44 | 4.6 | 0.666 |

PE 100 Cable Ducts

These pipes are produced out of PE100, according to EN 4-2-50086 & DIN 8074. Standard production length is 300m to 500m; other lengths are available on request. Available colors are Black/Black, Black/Orange, Black/Blue and Black with orange stripes.

| Nominal Outside Diameter mm | SDR 17.6 PN 6 | |
|-----------------------------|---------------|---------------------|
| | S | Nominal Weight kg/m |
| 25 | 1.8 | 0.137 |
| 32 | 2.9 | 0.275 |
| 40 | 3.7 | 0.434 |
| 50 | 4.6 | 0.672 |
| | 10 | 3.17 |

AI-MANAR Micro-Duct System HDPE, SILICON CORE



What Makes AI-Manar Micro-Ducts different?

HDPE Micro-Duct assemblies offer multi-duct flexibility, and future proofing all in the same assembly. Suitable for direct burial, and available in different tube counts.

- Various colors available.

FEATURES:

- MicroDucts factory bundled with a polyethylene over-sheath: Configurations: -7way, -4way, -3way or -2way
- Cost-Effective – multiple pathways for one installation cost
- Ships on a Standard Reel
- FuturePath is designed for installation using the same tools and equipment that are used for traditional conduit or innerduct. No special tools or equipment are required.
- Multiple pathways in place for Future growth
- Optional 20 gauge locate wire making locates easy and reliable

BENEFITS:

- Can be used in any environment.
- Ducts are future proof.
- Requires less technical skills and time in the field.
- Cost effective, multiple lines for one installation cost



PHYSICAL PROPERTIES

| Test | | | |
|---|---------------|-------------------|-------------|
| Density | 0.930 – 0.959 | Kg/m ³ | ISO 1183 |
| Melt Flow Rate (MFR), (190/5.0 kg) | 0.25 – 1.2 | g/10 min | ISO 1133 |
| Tensile Stress at Yield (50 mm/min) | 25 | Mpa | ISO 527-2 |
| Tensile Modulus (1mm/min) | >110 | Mpa | ISO 527-2 |
| Elongation at break | >350 | % | ISO 527-2 |
| Carbon Black Content | 2.25 ± 0.25 | % | ASTM D 1603 |
| Bending Radius | 20 × OD | mm | DIN 8074 |
| Coefficient of Friction | <0.1 | % | ISO 8295 |
| Resistance to Slow Crack Growth, (8.0 Bar, 80 C0) | >1000 | H | ISO 13479 |

MARKET APPLICATION

- Telecom, Enterprise, C&I,
- Energy and DOT

Manarco Single Micro-duct DI Direct Install: TECHNICAL SPECIFICATIONS:

| SIZE | T(mm) | OD (mm) | TOLERANCE (mm) | Min bending radius at 20 (mm) | Max blowing pressure (Bar) | Pressure Burst (Bar) |
|---------|-------|---------|----------------|-------------------------------|----------------------------|----------------------|
| 4/3 | 0.5 | 4 | ±0.05 | 80 | 10 | >30 |
| 5/3.5 | 0.75 | 5 | ±0.05 | 100 | 10 | >30 |
| 7/5.5 | 0.75 | 7 | ±0.15 | 140 | 10 | >30 |
| 10/8 | 1 | 10 | ±0.15 | 200 | 10 | >30 |
| 12/10 | 1 | 12 | ±0.15 | 240 | 10 | >30 |
| 14/11.5 | 1.25 | 14 | ±0.15 | 280 | 10 | >30 |
| 16/12 | 2 | 16 | ±0.15 | 320 | 10 | >30 |
| 18/14 | 2 | 18 | ±0.3 | 260 | 10 | >30 |

Manarco Single Micro-duct DB Direct Buried: TECHNICAL SPECIFICATIONS:

| SIZE | T(mm) | OD (mm) | TOLERANCE (mm) | Min bending radius at 20 (mm) | Max blowing pressure (Bar) | Pressure Burst (Bar) |
|-------|-------|---------|----------------|-------------------------------|----------------------------|----------------------|
| 7/4 | 1.5 | 7 | ±0.15 | 140 | 16 | >50 |
| 8/3.5 | 2.25 | 8 | ±0.15 | 200 | 16 | >50 |
| 10/6 | 2 | 10 | ±0.15 | 240 | 16 | >50 |
| 12/8 | 2 | 12 | ±0.15 | 280 | 16 | >50 |
| 14/10 | 2 | 14 | ±0.15 | 280 | 16 | >50 |
| 16/10 | 3 | 16 | ±0.15 | 320 | 16 | >50 |
| 18/12 | 3 | 18 | ±0.3 | 360 | 16 | >50 |

Manarco X-way Micro-duct: General specifications:

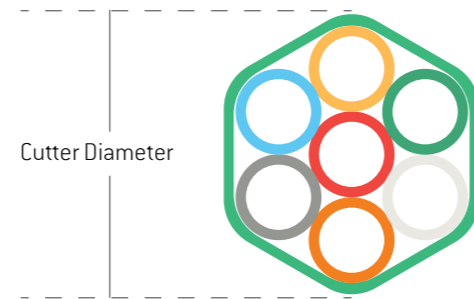
Construction

- Outer sheath PO with different colors.
- Inner Micro-duct with low friction silicone layer.

Product Performance

- Bending > 20 × diameter of duct at 20 C0.
- UV stabilized.

Monar'co Micro-Duct 7Way



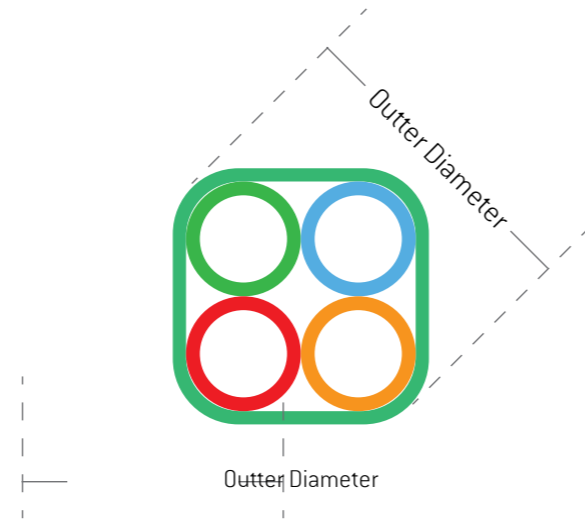
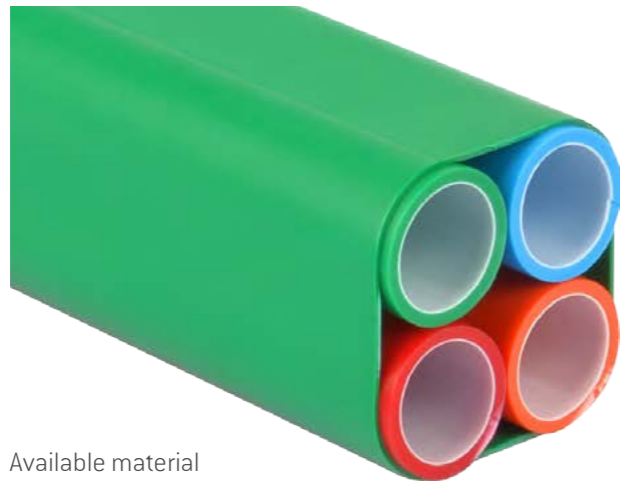
Available material

- HDPE
- Riser Rated
- Plenum
- LSHF

| MICRODUCT INFO FOR -7WAY: | |
|---------------------------|--------------|
| OD/ID mm | MIN ID mm/in |
| 22 / 16 | 15.5 / 0.61 |
| 18 / 14 | 13.6 / 0.54 |
| 16 / 13 | 12.8 / 0.50 |
| 16 / 11.76 | 11.54 / 0.45 |
| 14 / 10 | 9.8 / 0.39 |
| 12.7 / 10 | 9.8 / 0.39 |
| 10 / 8 | 7.9 / 0.31 |
| 8.5 / 6 | 5.9 / 0.23 |
| 7 / 5.5 | 5.4 / 0.21 |
| 5 / 3.5 | 3.4 / 0.13 |
| 12 / 8 | 12 / 8 |

| OD/ID (mm) | Nom OD (in) | Over Sheath (in) | Weight (#/ft) | Bend Radius Supported (in) | Bend Radius Unsupported (in) | Safe Working Pull Strength (lbs) |
|-------------------------|-------------|------------------|---------------|----------------------------|------------------------------|----------------------------------|
| 22 / 16 | 2.62 | 0.050 | 0.869 | 26 | 52 | 5,001 |
| 18 / 14 | 2.08 / 2.27 | 0.070 | 0.656 | 21 / 23 | 42 / 46 | 3,522 |
| 14 / 18 (Thicker OS) | 2.33 | 0.100 | 0.743 | 23 | 46 | 3,998 |
| 16 / 13 | 1.86 / 2.03 | 0.070 | 0.471 | 19 / 20 | 38 / 40 | 2,530 |
| 13 / 16 (Thicker OS) | 1.91 / 2.08 | 0.100 | 0.550 | 19 / 21 | 38 / 42 | 2,962 |
| 16 / 11.76 | 1.86 / 2.03 | 0.070 | 0.593 | 19 / 20 | 38 / 40 | 3,171 |
| 11.76 / 16 (Thicker OS) | 1.92 / 2.09 | 0.100 | 0.671 | 19 / 21 | 38 / 40 | 3,597 |
| 14 / 10 | 1.62 / 1.77 | 0.050 | 0.465 | 16 / 18 | 32 / 36 | 2,474 |
| 10 / 14 (Thicker OS) | 1.72 / 1.87 | 0.100 | 0.579 | 17 / 19 | 34 / 38 | 3,096 |
| 12.7 / 10 | 1.51 / 1.64 | 0.070 | 0.360 | 15 / 17 | 30 / 34 | 1,926 |
| 10 / 12.7 (Thicker OS) | 1.56 / 1.70 | 0.100 | 0.424 | 16 / 17 | 32 / 34 | 2,264 |
| 10 / 8 | 1.18 / 1.29 | 0.050 | 0.204 | 12 / 13 | 24 / 25 | 1,080 |
| 6 / 8.5 (No Locate) | 1.04 / 1.13 | 0.060 | 0.207 | 11 / 12 | 22 / 24 | 1,112 |
| 7 / 5.5 | 0.930 | 0.050 | 0.116 | 9 | 18 | 633 |
| 3.5 / 5 (No Locate) | 0.62 / 0.67 | 0.040 | 0.075 | 6 / 7 | 12 / 14 | 409 |

Monar'co Micro-Duct 4Way



Available material

- HDPE
- Riser Rated
- Plenum
- LSHF

| MICRODUCT INFO FOR -4WAY: | |
|---------------------------|--------------|
| OD/ID mm | MIN ID mm/in |
| 22 / 16 | 15.5 / 0.61 |
| 18 / 14 | 13.6 / 0.54 |
| 16 / 13 | 12.8 / 0.50 |
| 16 / 11.76 | 11.54 / 0.45 |
| 14 / 10 | 9.8 / 0.39 |
| 12.7 / 10 | 9.8 / 0.39 |
| 10 / 8 | 7.9 / 0.31 |
| 8.5 / 6 | 5.9 / 0.23 |
| 5 / 3.5 | 3.4 / 0.13 |
| 12/8 | 9.8 / 0.39 |

| MICRODUCT INFO FOR -4WAY FLAT: | |
|--------------------------------|--------------|
| OD/ID mm | MIN ID mm/in |
| 12 / 8 | 12 / 8 |
| 28/24 | 12 / 8 |



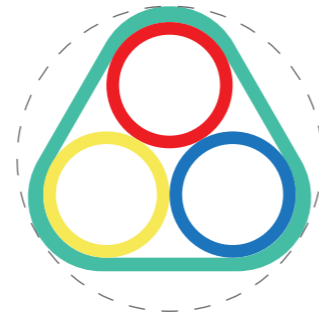
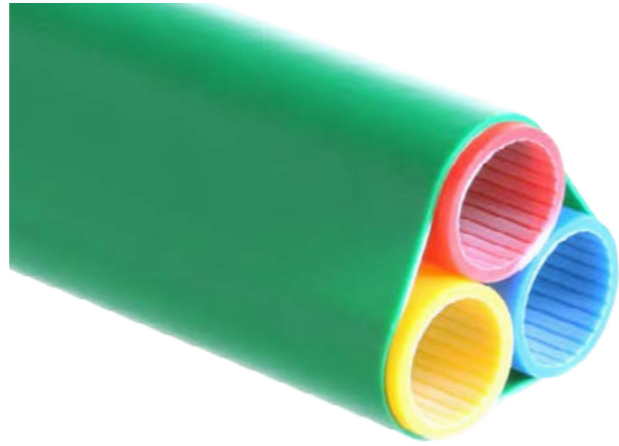
4Way

| OD/ID (mm) | Nom OD (in) | Over Sheath (in) | Weight (#/ft) | Bend Radius Supported (in) | Bend Radius Unsupported (in) | Safe Working Pull Strength (lbs) |
|-------------------------|--------------|------------------|---------------|----------------------------|------------------------------|----------------------------------|
| 22 / 16 | 1.78 / 2.13 | 0.050 | 0.531 | 18 / 22 | 36 / 44 | 2,840 |
| 18 / 14 | 1.56 / 1.86 | 0.070 | 0.417 | 16 / 19 | 32 / 38 | 2,243 |
| 14 / 18 (Thicker OS) | 1.62 / 1.91 | 0.100 | 0.482 | 16 / 20 | 32 / 40 | 2,598 |
| 16 / 13 | 1.39 / 1.65 | 0.070 | 0.308 | 14 / 17 | 28 / 34 | 1,658 |
| 13 / 16 (Thicker OS) | 1.45 / 1.71 | 0.100 | 0.370 | 15 / 17 | 30 / 34 | 1,996 |
| 13 / 16 (Flat) | 0.73 / 2.62 | 0.050 | 0.290 | 8 / 26 | 16 / 52 | 1,516 |
| 16 / 11.76 | 1.40 / 1.66 | 0.070 | 0.376 | 14 / 17 | 28 / 34 | 2,015 |
| 11.76 / 16 (Thicker OS) | 1.46 / 1.72 | 0.100 | 0.439 | 15 / 17 | 30 / 34 | 2,359 |
| 14 / 10 | 1.25 / 1.47 | 0.070 | 0.320 | 12 / 15 | 24 / 30 | 1,709 |
| 12.7 / 10 | 1.14 / 1.34 | 0.070 | 0.236 | 12 / 14 | 24 / 48 | 1,260 |
| 10 / 12.7 (Thicker OS) | 1.20 / 1.41 | 0.100 | 0.289 | 12 / 14 | 24 / 28 | 1,549 |
| 10 / 12.7 (Flat) | 0.060 / 2.09 | 0.050 | 0.223 | 6 / 21 | 12 / 42 | 1,189 |
| 10 / 8 | 0.87 / 1.04 | 0.040 | 0.120 | 9 / 11 | 18 / 21 | 635 |
| 8 / 10 (Thicker OS) | 0.93 / 1.09 | 0.070 | 0.157 | 10 / 11 | 20 / 22 | 837 |
| 6 / 8.5 (No Locate) | 0.79 / 0.93 | 0.060 | 0.136 | 8 / 10 | 16 / 20 | 733 |
| 3.5 / 5 (No Locate) | 0.48 / 0.56 | 0.040 | 0.050 | 5 / 6 | 10 / 12 | 276 |

4Way flat

| Outer Dia (mm) | Inner Dia (mm) | Wall Thickness (mm) | Weight kg/m | Drum Length m |
|----------------|----------------|---------------------|-------------|---------------|
| 20 | 16 | 2.0 | 0.569 | 1000 |
| 18 | 14 | 2.0 | 0.508 | 1000 |
| 16 | 12 | 2.0 | 0.448 | 2000 |
| 14 | 10 | 2.0 | 0.389 | 2000 |
| 12 | 8 | 2.0 | 0.325 | 2000 |
| 10 | 6 | 2.0 | 0.264 | 2000 |
| 7 | 3.5 | 1.75 | 0.162 | 2000 |

Monar'co Micro-Duct 3Way



Outer Diameter

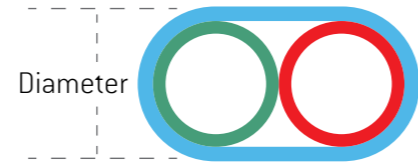
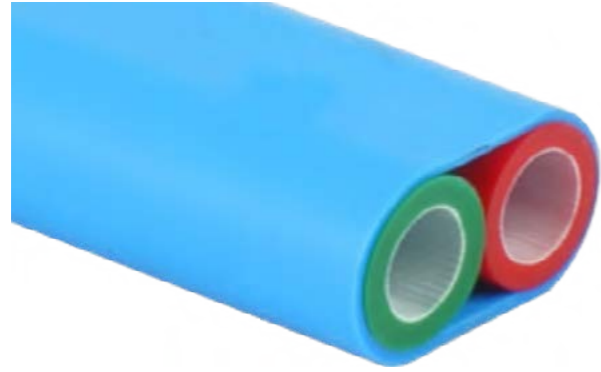
Available material

- HDPE
- Riser Rated
- Plenum
- LSHF

| MICRODUCT INFO FOR -3WAY: | |
|---------------------------|--------------|
| OD/ID mm | MIN ID mm/in |
| 22 / 16 | 15.5 / 0.61 |
| 18 / 14 | 13.6 / 0.54 |
| 16 / 13 | 12.8 / 0.50 |
| 16 / 11.76 | 11.54 / 0.45 |
| 14 / 10 | 9.8 / 0.39 |
| 12.7 / 10 | 9.8 / 0.39 |
| 10 / 8 | 7.9 / 0.31 |
| 8.5 / 6 | 5.9 / 0.23 |

| OD/ID (mm) | Nom OD (in) | Over Sheath (in) | Weight (#/ft) | Bend Radius Supported (in) | Bend Radius Unsupported (in) | Safe Working Pull Strength (lbs) |
|-------------------------|-------------|------------------|---------------|----------------------------|------------------------------|----------------------------------|
| 22 / 16 | 1.67 / 1.79 | 0.050 | 0.413 | 17 / 18 | 34 / 36 | 2,111 |
| 18 / 14 | 1.47 / 1.67 | 0.070 | 0.330 | 15 / 17 | 30 / 34 | 1,776 |
| 14 / 18 (Thicker OS) | 1.73 | 0.100 | 0.387 | 18 | 36 | 2,087 |
| 14 / 18 (Flat) | 0.81 / 2.23 | 0.050 | 0.306 | 8 / 23 | 16 / 46 | 1,645 |
| 16 / 13 | 1.31 / 1.49 | 0.070 | 0.247 | 13 / 15 | 26 / 30 | 1,331 |
| 13 / 16 (Flat) | 0.73 / 1.98 | 0.050 | 0.220 | 8 / 20 | 16 / 40 | 1,184 |
| 16 / 11.76 | 1.31 / 1.49 | 0.070 | 0.298 | 13 / 15 | 26 / 30 | 1,598 |
| 11.76 / 16 (Flat) | 0.73 / 1.98 | 0.050 | 0.271 | 8 / 20 | 16 / 40 | 1,418 |
| 14 / 10 | 0.64 / 1.74 | 0.040 | 0.217 | 7 / 18 | 14 / 36 | 1,157 |
| 12.7 / 10 | 1.08 / 1.14 | 0.070 | 0.191 | 11 / 12 | 22 / 24 | 1,021 |
| 10 / 8 | 0.88 / 0.99 | 0.070 | 0.128 | 9 / 10 | 18 / 20 | 684 |
| 8 / 10 (Flat) | 0.50 / 1.29 | 0.050 | 0.116 | 5 / 13 | 10 / 26 | 619 |
| 8 / 10 (Flat/Double OS) | 0.55 / 1.34 | 0.040 | 0.154 | 6 / 14 | 12 / 24 | 826 |
| 6 / 8.5 (No Locate) | 0.75 / 0.85 | 0.060 | 0.110 | 8 / 9 | 16 / 18 | 593 |
| 5 / 3.5 | 0.45 / 0.48 | 0.040 | 0.040 | 5 / 5 | 10 / 10 | 220 |

Monar'co Micro-Duct 2Way



Available material

- HDPE
- Riser Rated
- Plenum
- LSHF

| MICRODUCT INFO FOR -2WAY: | |
|---------------------------|--------------|
| OD/ID mm | MIN ID mm/in |
| 22 / 16 | 15.5 / 0.61 |
| 18 / 14 | 13.6 / 0.54 |
| 16 / 13 | 12.8 / 0.50 |
| 16 / 11.76 | 11.54 / 0.45 |
| 14 / 10 | 9.8 / 0.39 |
| 12.7 / 10 | 9.8 / 0.39 |
| 10 / 8 | 7.9 / 0.31 |
| 8.5 / 6 | 5.9 / 0.23 |
| 5 / 3.5 | 3.4 / 0.13 |

| OD/ID (mm) | Nom OD (in) | Over Sheath (in) | Weight (#/ft) | Bend Radius Supported (in) | Bend Radius Unsupported (in) | Safe Working Pull Strength (lbs) |
|-------------------------|-------------|------------------|---------------|----------------------------|------------------------------|----------------------------------|
| 22 / 16 | 0.94 / 1.79 | 0.050 | 0.295 | 10 | 20 | 1,581 |
| 18 / 14 | 0.85 / 1.56 | 0.070 | 0.244 | 9 / 16 | 18 / 32 | 1,316 |
| 14 / 18 (Thicker OS) | 0.91 / 1.62 | 0.100 | 0.292 | 9 / 16 | 18 / 32 | 1,578 |
| 16 / 13 | 0.73 / 1.35 | 0.050 | 0.153 | 7 / 14 | 14 / 28 | 824 |
| 16 / 11.76 | 0.73 / 1.35 | 0.050 | 0.186 | 8 / 14 | 16 / 28 | 972 |
| 11.76 / 16 (Thicker OS) | 0.83 / 1.45 | 0.100 | 0.266 | 8 / 15 | 16 / 30 | 1,433 |
| 14 / 10 | 0.54 / 1.19 | 0.040 | 0.149 | 7 / 12 | 14 / 24 | 795 |
| 12.7 / 10 | 0.60 / 1.10 | 0.050 | 0.119 | 6 / 11 | 12 / 22 | 635 |
| 10 / 12.7 (Thicker OS) | 0.64 / 1.14 | 0.070 | 0.143 | 7 / 12 | 14 / 24 | 766 |
| 10 / 8 | 0.47 / 0.87 | 0.040 | 0.070 | 5 / 9 | 10 / 18 | 373 |
| 8 / 10 (Thicker OS) | 0.50 / 0.89 | 0.050 | 0.081 | 5 / 9 | 10 / 18 | 433 |
| 6 / 8.5 (No Locate) | 0.44 / 0.77 | 0.050 | 0.075 | 5 / 8 | 10 / 16 | 404 |
| 3.5 / 5 (No Locate) | 0.26 / 0.45 | 0.030 | 0.026 | 3 / 5 | 6 / 10 | 143 |

Manar'co Polyethylene Corrugated Duct (PEC) TYPICAL SCHEMATICS

MATERIAL:

High Density Polyethylene (HDPE 100) Inner Silicon-Core

COLOR:



COD SPECIFICATION:

ASTM F 405 Standard specification for Corrugated Polyethylene pipe and fitting

ASTM D 2412 Standard Test Method for Determination of External Loading Characteristic of Plastic pipe by Parallel-plate loading

ASTM D 1505 Standard Test Method for Density of Plastic

ASTM D 882 Standard Test Method for Tensile Properties of Plastic

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

ASTM D 1603 Standard Test Method for Carbon Black in Olefin Plastic

ASTM D 2122 Test Method for Determining Dimension of Thermoplastic pipe & Fitting

INSTALLATION APPLICATION:

- Underground
- Plowed
- Saw Cut
- Open Trench
- Directional Drilled

MARKET APPLICATION:

- Telecom
- CATV
- Energy
- DOT
- Enterprise
- C&I
- IoT

STANDARDS:

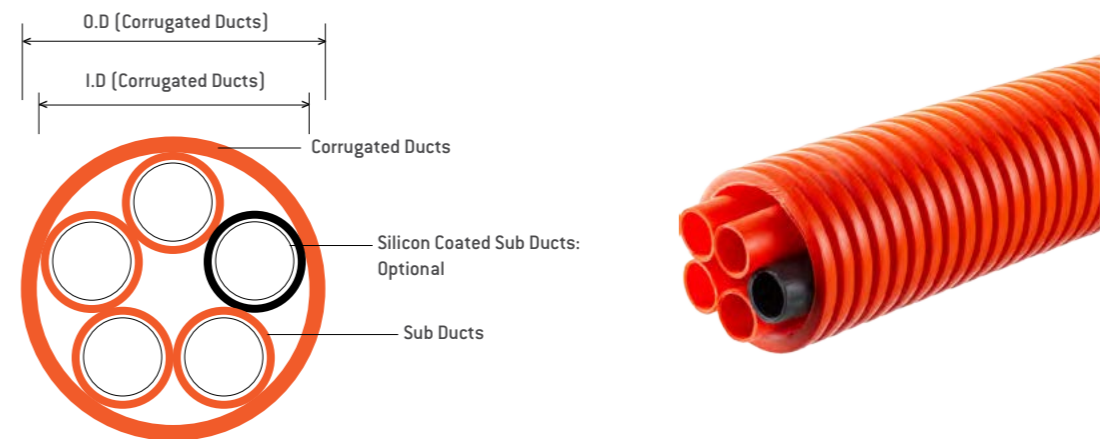
MANAR'CO corrugated pipes for cable protection are produced according to EN50086 2-4 (DIN 16961, NFC 68-171), i.e. EN 13476 standards

COD ADVANTAGES:

- Better Flexibility
- Safety
- High Reliability
- Stronger
- Lighter in weight
- Easy insertion of optic fibre cables
- Better resistance against chemicals
- Cost Efficiency

The HDPE-COD shall comply with the test requirements

| Clause | Properties | Values | Test Method |
|--------|--|--|--------------------------------|
| 1. | Compound Density @ 25°C | 0.95 g/cm ³ , min | ASTM D 1505 |
| 2. | Pipe Stiffness @ 5% Deflection, average: – HDPE-CD (with 7-29 mm OD sub-ducts) – HDPE-CD (with 5-33 mm OD sub-ducts) – HDPE-CD (with 3-42 mm OD sub-ducts) – HDPE-CD 110 mm OD (Empty main duct) – HDPE-CD (with 3-27 mm Outside Dia. sub-ducts) – HDPE-CD 77 mm OD (Empty main duct) | > 27 kgf/cm ² 27 kgf/cm ² 21 kgf/cm ² 15 kgf/cm ² 27 kgf/cm ² 24 kgf/cm ² | ASTM D 2412 |
| 3. | Compressive Strength @ 5% Deflection, average: – HDPE-CD (with 7-29 mm OD sub-ducts) – HDPE-CD (with 5-33 mm OD sub-ducts) – HDPE-CD (with 3-42 mm OD sub-ducts) – HDPE-CD 110 mm OD (Empty main duct) – HDPE-CD (with 3-27 mm OD sub-duct) – HDPE-CD 77 mm OD (Empty main duct) | > 1,200 kgf/m 1,200 kgf/m 950 kgf/m 660 kgf/m 770 kgf/m 668 kgf/m | ASTM D 2412 |
| 4. | Tensile Strength @ Yield (film properties) | 30 MPa | ASTM D 882 |
| 5. | Elongation @ Break (film properties) | 400% | ASTM D 882 |
| 6. | Carbon Black Content (for black color) | 2% minimum | ASTM D 1603 |
| 7. | Water Absorption | 0.03% maximum | ASTM D 570 24 hrs immersion |
| 8. | Voltage Resistance | 2,000 Vac, >15 min | |
| 9. | Insulation Resistance | > 200 Mohm | |



Polyethylene Corrugated Duct (PEC)

MATERIAL PROPERTIES

MANAR'CO HDPE ducts are made from high density polyethylene compound fully meeting the material requirements of DIN8075. Also meets the requirements of ASTM D3350 for Class:345444 C/E

MANAR'CO HDPE ducts shall meet all the material properties and test requirements as specified in ASTM F2160 with customized sizes and dimensions to metric measurements (DIN 8074) and inch measurements (ASTM D3035 and F2160 SDR11)

| Properties | Requirements | Test Method |
|---|--|------------------------------------|
| Density (compound) | 0.941 to 0.955 g/cc, >0.955 g/cc (Cell 3 or 4 as per ASTM D3350) | ASTM D 792 |
| Melt Flow index at 190°C/2.16 Kg | < 0.15 g/10 min | ASTM D 1238 E |
| Flexural Modulus | 552 - < 1103 Mpa | ASTM D 790 |
| Tensile Strength | 21 - < Mpa | ASTM D 638 |
| Slow Crack Growth Resistance (10% Igepal) | F20 > 600 Hours ESCR per ASTM D 1693 condition C; or > 10 hours per ASTM F 1473 PENT | ASTM D 1693; ASTM F 1473 |
| Color and UV Resistance | C-Black with 2% min. Carbon Black. E-Colored with UV Stabilizer. Note that Carbon Black content, 2.25 +0.25% as per ASTM D1603 | ASTM D 3350 |
| Physical Properties | | |
| Induction temp (DSC) | 220°C | |
| Poisson Ratio | 0.45 | - |
| Izod Impact (Notch) | > 2.5 ft. lb/in | ASTM D 256 |
| Co-efficient of friction | </=0.15 | Telcordia GR-356 |
| Ovality (Prior to building or coiling) | < 5% | ASTM D 2160 |
| Mechanical Properties | | |
| Tensile Strength (Break) (50 mm/min) | 38 MPa | ASTM D 638 |
| Tensile Strength (Yield) (50 mm/min) | 25 MPa | ASTM D 638 |
| Elongation at Break (ultimate) | > 600% | ASTM D 638 |
| Hardness | > 60 Shore "D" | ASTM D 2240 |
| Thermal Properties | | |
| Brittle Temperature | < -100°C | ASTM D 746 |
| Vicat Softening Temp | 127°C | ASTM D 1525 |
| Specific Heat | 2.7 - 2.9 kJ/kg°k | Calorimetric |
| Thermal Conductivity | 0.38 W/m. °C | DIN 52612 |
| Chemical Properties | | |
| Chemical Resistance | Resistance to hydrous solution of acids, alkalis and salts as well as to a large number of organic solvents | DIN 8075 Supplement 1 ISO/TR 10358 |

*All values at 23°C unless specified otherwise

Polyethylene Corrugated Duct (PEC)

Manarco® 5WAY Corrugated Duct COD System TYPICAL SCHEMATICS

MANAR'CO COD is available from diameter 90 mm to diameter 160 mm in coils and bars

| ASTM D 3350 | Corrugated Duct | | Sub Duct | | | No# Sub Duct |
|-------------|-----------------|----------|----------|--------|----------|--------------|
| | OD (mm) | I.D (mm) | O.D (mm) | T (mm) | I.D (mm) | |
| 28X3 Lines | 90.00 | 70.00 | 33.00 | 2.50 | 28.00 | 3 |
| 28X4 Lines | 100.00 | 80.00 | 33.00 | 2.50 | 28.00 | 4 |
| 28X5 Lines | 110.00 | 90.00 | 33.00 | 2.50 | 28.00 | 5 |
| 32X4 Lines | 110.00 | 90.00 | 38.00 | 3.00 | 32.00 | 4 |
| 32X5 Lines | 110.00 | 90.00 | 38.00 | 3.00 | 32.00 | 5 |
| 36X3 Lines | 110.00 | 90.00 | 42.00 | 3.00 | 36.00 | 3 |
| 36X4 Lines | 120.00 | 100.00 | 42.00 | 3.00 | 36.00 | 4 |
| 50X3 Lines | 160.00 | 125.00 | 59.00 | 4.50 | 50.00 | 3 |



Manarco HDPE SUB-DUCT AND MINI DUCT

Technical Specification

MATERIAL:

HDPE Ducts are manufactured from piping grade compound fully meeting the material requirements of DIN 8075, also meets the requirements of ASTM D 3350 for class PE 345444C/E designated as PE 3408

STANDARD:

HDPE Sub-Duct manufacturing is in accordance to

- 1) German Standard DIN 8074 and 8075 conforming to the STC material specification. TC 4111
- 2) American Standard ASTM D3035 / ASTM F2160

Dimensions based on DIN 8074 SDR 11

| Nominal Duct Size | Nominal Out Diameter | Nominal Wall Thickness | Nominal Weight |
|-------------------|----------------------|------------------------|----------------|
| mm | mm | mm | mm |
| 32 | 32 | 3.0 | 0.279 |
| 40 | 40 | 3.7 | 0.430 |
| 50 | 50 | 4.6 | 0.666 |

Dimensions based on STC.TS 4111 and DIN 8074

| Duct Type | Nominal Out Diameter | Nominal Wall Thickness | Nominal ID | SDR |
|------------|----------------------|------------------------|------------|------|
| | mm | mm | mm | |
| Main Duct | 110 | 5.0 | 100 | 22 |
| | 75 | 3.4 | 68.2 | 22 |
| Mini Duct | 50 | 3.0 | 44 | 17 |
| | 40 | 2.4 | 35.2 | 17 |
| | 32 | 1.9 | 28.2 | 17 |
| Micro Duct | 20 | 1.8 | 16.4 | 13.6 |
| | 14 | 1.5 | 11 | 9 |

Dimensions based on ASTM D3035 F2160 SDR 11

| Nominal Duct Size | Nominal Out Diameter | Nominal Wall Thickness | Nominal Weight |
|-------------------|----------------------|------------------------|----------------|
| Inch | mm | mm | kg/m |
| 1 | 33.40 | 3.05 | 0.299 |
| 1 1/4 | 42.16 | 3.84 | 0.465 |
| 1 1/2 | 48.26 | 4.39 | 0.610 |
| 2 | 60.33 | 3.49 | 0.952 |

MATERIAL PROPERTIES

MANARCO HDPE ducts are made from high density polyethylene compound fully meeting the material requirements of DIN8075. Also meets the requirements of ASTM D3350 for Class:345444 C/E. MANARCO HDPE ducts shall meet all the material properties and test requirements as specified in ASTM F2160 with customized sizes and dimensions to metric measurements (DIN 8074) and inch measurements (ASTM D3035 and F2160 SDR11)

| Properties | Requirements | Test Method |
|---|--|------------------------------------|
| Density (compound) | 0.941 to 0.955 g/cc, >0.955 g/cc (Cell 3 or 4 as per ASTM D3350) | ASTM D 792 |
| Melt Flow index at 190°C/2.16 Kg | < 0.15 g/10 min | ASTM D 1238 E |
| Flexural Modulus | 552 - < 1103 Mpa | ASTM D 790 |
| Tensile Strength | 21 - < Mpa | ASTM D 638 |
| Slow Crack Growth Resistance (10% Igepal) | F20 > 600 Hours ESCR per ASTM D 1693 condition C; or > 10 hours per ASTM F 1473 PENT | ASTM D 1693; ASTM F 1473 |
| Color and UV Resistance | C-Black with 2% min. Carbon Black. E-Colored with UV Stabilizer Note that Carbon Black content, 2.25 +0.25% as per ASTM D1603 | ASTM D 3350 |
| PHYSICAL PROPERTIES | | |
| Tensile Strength (Break) (50 mm/min) | 38 MPa | ASTM D 638 |
| Tensile Strength (Yield) (50 mm/min) | 25 MPa | ASTM D 638 |
| Elongation at Break (ultimate) | > 600% | ASTM D 638 |
| Hardness | > 60 Shore "D" | ASTM D 2240 |
| THERMAL PROPERTIES | | |
| Brittle Temperature | < -100°C | ASTM D 746 |
| Vicat Softening Temp | 127°C | ASTM D 1525 |
| Co-efficient of linear thermal expansion | 0.2 mm/m°C | ASTM D 696 |
| Specific Heat | 2.7 - 2.9 kj/kg°k | Calorimetric |
| Thermal Conductivity | 0.38 W/m. °C | DIN 52612 |
| CHEMICALS PROPERTIES | | |
| Chemical Resistance | Resistance to hydrous solution of acids, alkalis and salts as well as to a large number of organic solvents | DIN 8075 Supplement 1 ISO/TR 10358 |

All values at 23°C unless specified otherwise





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