



احسب كفاءة شبكتك:
استخدم حاسبة الهيدروليكا
المتقدمة من تكوين بلاست
OPTIMIZE YOUR NETWORK:
Use Takween's Plast Advanced
Hydraulics Calculator.



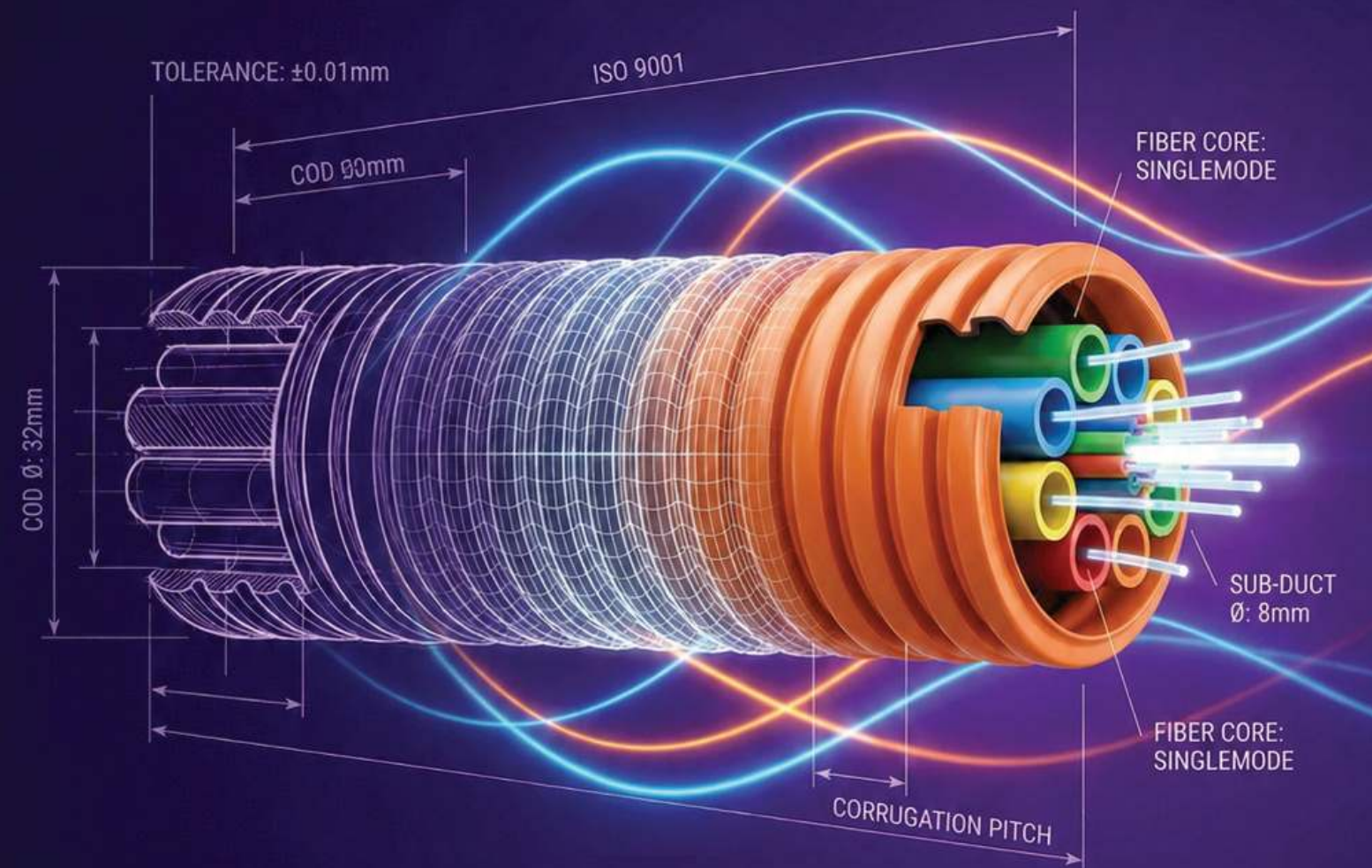
صمم بدقة:
حمل مكتبة (BIM)
لمنتجات تكوين الآن.
DESIGN WITH PRECISION:
Download Takween's BIM
Library Now.



شارع عبد الرحمن الغافقي - 3285 الروضة - بناء رقم 13213 الطابق الأول - الرياض
ABDULRAHMAN ALGHAFAQY - ST.3285 AR RAWDAH,
RIYADH 13213 1ST FLOOR
WWW.TAKWEENPLAST.COM



DISTRIBUTED BY: INNOVATION EXPORTS CO. LTD.



TAKWEEN PLAST
One of Innovation Experts Brands إحدى علامات شركة صادرات الابتكار التجارية

**HDPE CORRUGATED
OPTICAL DUCT (COD)
PIPES & FITTINGS**

رسالتنا

بناء قاعدة صلبة ومتنامية من العملاء المخلصين عبر تقديم أنظمة أنابيب بلاستيكية عالية الجودة تتوافق مع أرفع المعايير الدولية. نحن ملتزمون بتوفير منتجات موثوقة وحلول مبتكرة وخدمات استثنائية تدعم النجاح طويل الأمد لعملائنا وشركائنا، وتسهم بفاعلية في التنمية المستدامة للبنية التحتية الحديثة.

رؤيتنا

أن نصبح رائداً عالمياً معترفاً به في مجال أنظمة الأنابيب البلاستيكية، واضعين معايير جديدة للثقة والابتكار والتميز الصناعي. نطمح "تكوين بلاست" لقيادة الأسواق الإقليمية من خلال التقنيات المتقدمة والحلول المستدامة والشراكات الاستراتيجية، لتصبح مرجعاً موثقاً لمشاريع البنية التحتية والمرافق العامة حول العالم.

قيمنا الجوهرية

1. التميز في الجودة: نلتزم بأعلى معايير التصنيع لتقديم حلول أنابيب موثوقة وطويلة الأمد تلبى المتطلبات الدولية وتتجاوز تطلعات عملائنا.
2. الالتزام تجاه العملاء: نضع عملائنا في قلب اهتماماتنا، ونبني شراكات طويلة الأمد قائمة على الثقة، والأداء المتفوق، والنجاح المشترك.
3. الابتكار والتحسين المستمر: نسعى دوماً لتطوير حلول متقدمة وتحسين عملياتنا لمواكبة الاحتياجات المتطورة في قطاع البنية التحتية والصناعة.
4. النزاهة والموثوقية: نعمل بشفافية ومسؤولية ومهنية عالية، بما يضمن أداءً يعتمد عليه في كل مشروع ندعمه.
5. الاستدامة والمسؤولية: نلتزم بممارسات تصنيعية مسؤولة بيئياً تساهم في تطوير بنية تحتية مستدامة وحماية البيئة للأجيال القادمة.



من نحن تكوين بلاست



تعد شركة "صائدات الابتكار" المظلة المؤسسية والمالك لعلامة "تكوين بلاست" التجارية. حيث يجسد هذا الارتباط تكاملاً استراتيجياً يجمع بين الرؤية الاستثمارية والخبرة الصناعية العميقة؛ بينما تقود "صائدات الابتكار" قاطرة الابتكار والنمو، تبرز "تكوين بلاست" كذراع صناعي متميز يمثل تحالفاً استراتيجياً لنخبة من كبار المصنعين في العديد من الدول عبر خمس دول.

نحن ملتزمون بتقديم حلول مستدامة ومبتكرة لأنظمة الأنابيب البلاستيكية المستخدمة في شبكات تصريف المياه، والاتصالات، وأنظمة التكييف (HVAC)، وتطبيقات الطاقة. ونفخر بتوفير أنظمة متطورة تتماشى مع المتطلبات المتسارعة لمشاريع البنية التحتية الحديثة، على المستويين الإقليمي والعالمي.

تكمّن قوتنا في العمل التشاركي، والوحدة التنظيمية، والالتزام المشترك بالتميز. ومن خلال تواجدها الاستراتيجي في مراكز الأعمال الرئيسية بالمملكة العربية السعودية ومنطقة الخليج والشرق الأوسط، تستند "تكوين بلاست" إلى كوادر بشرية عالية الكفاءة، وشبكة موثوقة من الموزعين، وشراكات تجارية متينة لخدمة قاعدة عريضة ومتنوعة من العملاء.

وتعمل "تكوين بلاست" كشبكة متكاملة من شركات التصنيع المحلية، بالتعاون مع أكثر من 20 شريك إنتاج دولي، مدعومة بسلسلة توريد قوية في كافة أنحاء المملكة ودول مجلس التعاون الخليجي والشرق الأوسط الكبير. تتيح لنا هذه القدرات الجماعية تقديم جودة ثابتة، وحلولاً مخصصة، وخدمات موثوقة في كافة الأسواق التي نتواجد فيها.

Who We Are **TAKWEEN PLAST**



About Us "Innovation Expeerts" (Innovation Exports) is the institutional umbrella and the proud owner of the "Takween Plast" brand. This relationship represents a strategic integration combining investment vision with industrial expertise, where "Innovation Expeerts" drives innovation and growth, while "Takween Plast" operates as a distinguished industrial arm representing a strategic consortium of leading Saudi manufacturers. We are committed to delivering sustainable and innovative plastic piping solutions for water drainage, telecommunications, HVAC, and energy applications. We take pride in providing advanced piping systems that align with the evolving requirements of modern infrastructure projects, both regionally and globally. Our strength lies in collaboration, organizational unity, and a shared commitment to excellence. With a strategic presence across key business hubs in the Kingdom of Saudi Arabia, the Gulf region, and the Middle East, TAKWEEN PLAST leverages a highly skilled workforce, a trusted network of distributors, and strong business partnerships to serve a broad and diverse client base. Operating as an integrated network of local manufacturing companies, and collaborating with more than 20 international production partners, TAKWEEN PLAST is supported by a robust distribution chain throughout Saudi Arabia, the GCC, and the wider Middle East. This collective capability enables us to deliver consistent quality, customized solutions, and reliable service across all markets we serve.



OUR MISSION

To build a strong and continuously expanding base of satisfied and loyal customers by consistently delivering high-quality plastic piping systems that meet the highest international standards. We are committed to providing reliable products, innovative solutions, and exceptional service that support the long-term success of our clients and partners while contributing to the sustainable development of modern infrastructure.

OUR VISION

To become a globally recognized leader in plastic piping systems, setting benchmarks for trust, innovation, and manufacturing excellence. Takween Plast aims to lead regional markets through advanced technologies, sustainable solutions, and strategic partnerships, becoming a trusted reference for infrastructure and utility projects worldwide.

Our Core Values

1. **Quality Excellence:** We uphold the highest standards in manufacturing, delivering reliable and long-lasting piping solutions that meet international requirements and exceed customer expectations.
2. **Customer Commitment:** We place our customers at the center of everything we do, building long-term partnerships based on trust, performance, and mutual success.
3. **Innovation & Continuous Improvement:** We continuously develop advanced solutions and enhance our processes to meet evolving infrastructure and industry demands.
4. **Integrity & Reliability:** We operate with transparency, accountability, and consistency, ensuring dependable performance in every project we support.
5. **Sustainability & Responsibility:** We are committed to environmentally responsible manufacturing practices that contribute to sustainable infrastructure development and long-term environmental protection.



Infrastructure

From the concern point of view to a green environment, a major change to the production facility has been introduced to reduce emissions, meet environmental commitments, and therefore improve a clean quality of work to increase employee's satisfaction and happiness in addition to enhancing production quality.



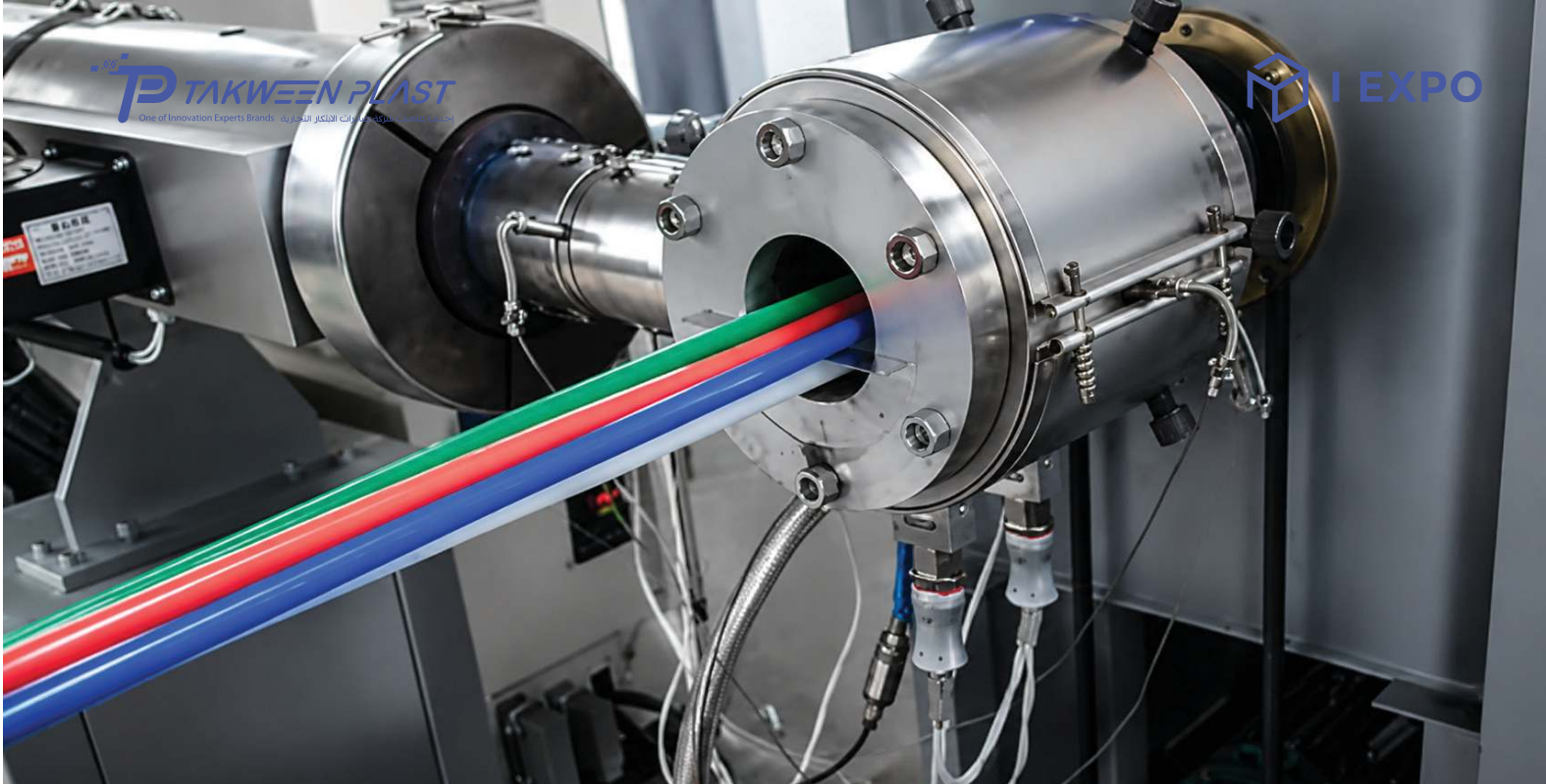
The huge construction demand that the Kingdom is witnessing under vision 2030 energized **TAKWEEN PLAST** to introduce products that can improve the quality of piping systems and reduce projects costs; the latest advanced products that proved its advancements internationally over the classical piping systems for certain applications, like COD polyethylene pipes for telecommunication and electrical cabling applications that proven its superiority to the old the existing PVC pipes and fittings.

TAKWEEN PLAST adopts a high standard of quality control and certifies its products from many reputed international third parties. The round clock quality control and the strict safety measures are subjects of "no toleration" moto inside the factory. These advanced technologies and control systems are the facilities of **TAKWEEN PLAST**'s professional team of production, sales and management who work to achieve their customers' satisfaction.



HDPE CORRUGATED OPTICAL DUCT (COD) PIPES & FITTINGS

CORRUGATED
OPTIC DUCT (COD)
SYSTEM



BUSINESS OVERVIEW

TAKWEEN PLAST Pipes is a prominent name in the plastic pipes and fittings industry, playing a vital role in major infrastructure and real estate projects across the region.

With an impressive annual production capacity, **TAKWEEN PLAST** is recognized for its wide and diverse range of products. Moreover, their ready-to-ship strategy ensures a unique service by delivering the required standard products to customers at any given time.

TAKWEEN PLAST's vision is to be at the forefront of innovation, introducing new pipe and fitting systems to meet the growing demand in construction, especially infrastructure projects.

TAKWEEN PLAST team members are considered a valuable asset to the company. The production process is overseen by top industry professionals, ensuring world-class quality that meets international standards. With a skilled team and extensive experience, **TAKWEEN** is at the forefront of producing specialized HDPE and UPVC products, serving clients and partners around the world.

TAKWEEN PLAST takes great pride in being a leading supplier for the construction efforts in KSA, working closely with renowned consultants, construction firms, and developers.

TAKWEEN PLAST Pipes actively contributes to major projects in both the Middle East and Asia.

The content and data in this brochure are licensed to **TAKWEEN PLAST**, and no photocopies or microfilms are permitted without written authorization from the licensee.

TAKWEEN PLAST has the right to modify the published data in this brochure without prior notice to meet specific project needs.

For any technical inquiries, it is advised to contact **TAKWEEN PLAST**.

INTRODUCTION :

COD refers to Corrugated Optical Duct, a specialized product made from high-density polyethylene (PE). It consists of a multi-channel cable duct with a smooth inner surface, a specially coated inner pipe, and a corrugated outer pipe, all integrated into a single body. This design allows for flexible combinations of inner pipe sizes based on customer requirements.)



The innovative design of COD sets it apart from traditional PVC ducting systems, offering telecommunication companies significant advantages in cost-efficiency and ease of installation.

Its application services extend to the construction of underground ducts in urban areas, business districts, and underseas infrastructure, marking a new era in telecommunication backbone development.

COD ducts facilitate uninterrupted duct laying between manholes, eliminating the need for cuts. They directly laid into trenches at standard The necessity of sand bedding.

Typically, there is requirement for concrete encaseme Corugated



ADVANTAGES OF TAKWEEN COD SYSTEMS

The primary advantages of TAKWEEN PLAST corrugated optical ducts systems can be outlined as follows

Coiled COD systems significantly reduce installation costs by eliminating the need for multiple connections between manholes during installation.

The spiral structure of COD provides high flexibility, allowing for easy bending without the need for excessive force, making it simple to navigate obstacles along the ducting route.

Cables can be easily inserted into COD systems up to the maximum coil length due to perfect alignment of inner ducts and minimal friction from infrequent connections.

Designers can extend the distance between manholes with ease, thanks to the alignment of inner ducts in COD systems.

COD systems are lighter than conventional ducts, making transportation and handling at construction sites more efficient.

The cost efficiency of COD systems is maintained throughout all stages of work and operational life.

The built-in subducts in COD systems eliminate loose space inside the corrugated duct, providing a significant advantage in terms of compressive loads.

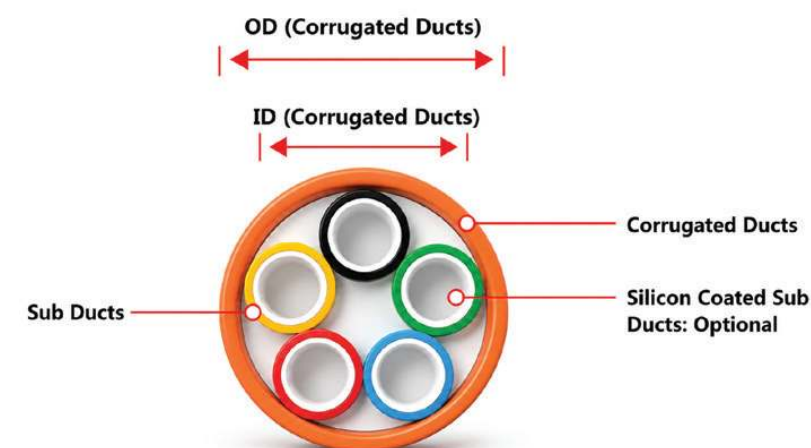
COD systems do not conduct electricity, making them ideal for use in power cable ducts.

The high flexibility and strength of COD systems make them resistant to ground movement and earthquakes.

COD systems are resistant to chemical attack and corrosion from salty seaground water, ensuring durability in harsh environments.

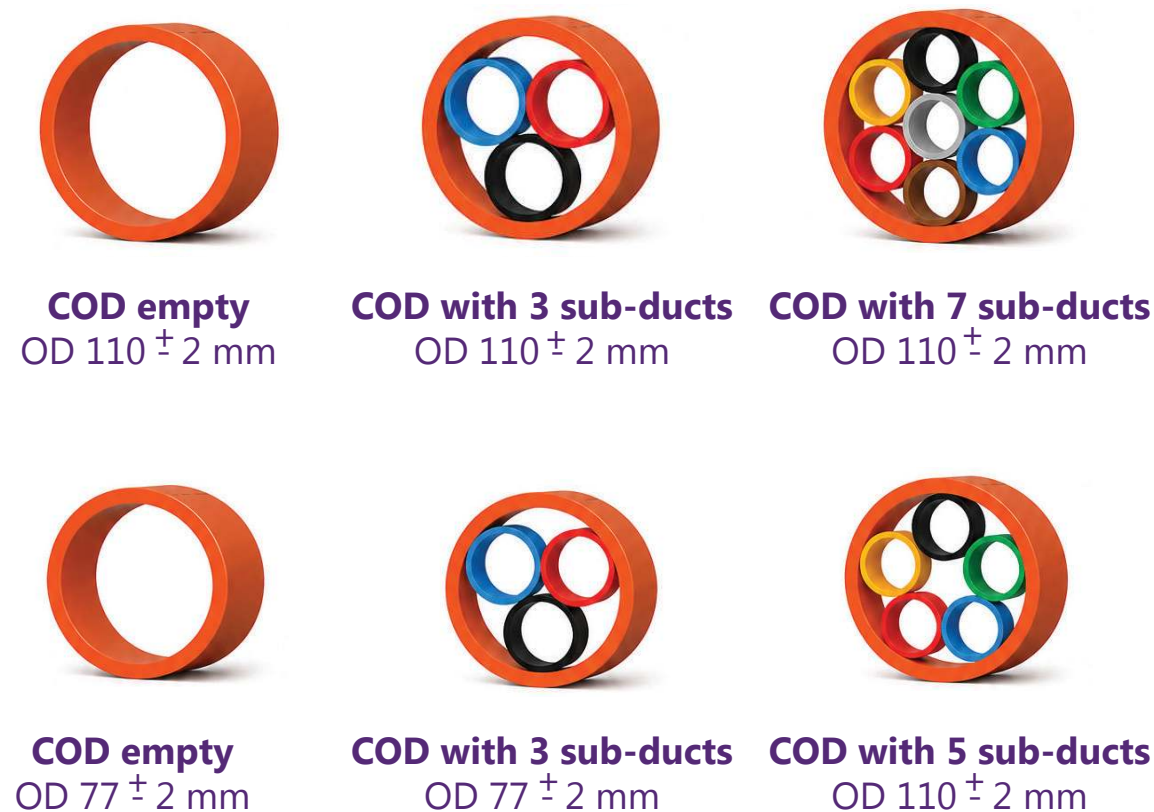
FEATURES OF TAKWEEN COD SYSTEMS

- **TAKWEEN PLAST** COD products are produced as a unified single unit featuring a corrugated external pipe that houses numerous sub-ducts. Upon request, the sub-ducts can come with a smooth coated surface to minimize friction during cable installations. The corrugated pipes and sub-ducts are both made from High Density Polyethylene (HDPE) material.



- The main corrugated duct and built-in sub-ducts are fused together during the extrusion process to prevent movement or twisting of the subducts inside the main COD duct.
- This allows for a single and continuous duct laying operation without any breaks or connections and can be laid directly into a trench at standard depths without the need for sand bedding or concrete encasement.
- **TAKWEEN PLAST** COD systems are available in single, 3-way, 5-way, and 7-way configurations, providing flexibility in size and layout options for various applications.





To access detailed information regarding the sizes and configurations of the **TAKWEEN PLAST** COD systems, kindly consult Section III: Product Range.

The **TAKWEEN PLAST** product portfolio offers a wide range of configurations and sizes of COD, making it suitable for almost any fiber optic project. Our ducting technology can help reduce initial construction costs and future-proof the network.

TECHNICAL SPECIFICATIONS

Specifications for raw materials used in TAKWEEN PLAST corrugated opticalducts
TAKWEEN PLAST utilizes premium raw materials sourced from top international suppliers for manufacturing their products, with physical properties verified by independent laboratories. Additionally, in-house testing is conducted at TAKWEEN PLAST's advanced laboratory to maintain high quality standards. The table below outlines the physical properties of the raw materials used in the production of TAKWEEN PLAST COD. The table below outlines the physical properties of the raw materials used

Characteristics	Value	Unit	Test Method
Density	≥0.950	kg/m3	ISO 1183
Melt Flow Rate (MFR) 190/5,0 kg)	≥0.23	g/10 min	ISO 1133
Tensile Stress at Yield (50 mm/min)	2 5	MPa	ISO 527-2
Tensile Modulus (1 mm/min)	> 110	MPa	ISO 527- 2
Elongation at break	> 400	%	ISO 527-2
Carbon Black Content	2.25 \$	0.25 %	ISO 6964
Coefficient of Friction	< 0.1	%	ISO 8295
MRS classification	10	MPa	ISO/TR 9080
Charpy notched impact strength(23 C)	26	kJ/m2	ISO 179

TAKWEEN PLAST COD systems meet both local and international standards, as outlined in the table below:

Characteristics	Value	Unit	Test Method
Resistance to slow crack growth - SCR (8.0 Bar, 80 C)	> 1000	Hours	ISO 13479
Bending Radius	3 0 x outer diameter	mm	DIN8074
Pressurization	5min @ 16 Bar	Bar	EN 50411-6-1
Crush (800N,60 Sec)	≤ 1 5 %	%	IEC 60794-1
Kink test	No Residual deformation ≥ 15% for inner & outer diameter		ISO 13479
Impact resistance	No cracks after a 9.1 kg load are dropped from a height of 1m at a temperature of 0 C		ASTM D 2444

COLOR RANGE

TAKWEEN PLAST provides a variety of colors for COD to meet customer needs.



The color configuration of micro duct stripes can be tailored to meet the specific needs of the customer.



UV Resistance

TAKWEEN PLAST COD systems have been UV stabilized to allow for outdoor storage in direct sunlight for up to one year. However, if the exposure period exceeds one year, it is recommended to provide additional protection like an opaque covering, as these products are not intended for prolonged outdoor use.

Quality Assurance

TAKWEEN PLAST systems aim to surpass both national and international standards by maintaining top-notch quality levels achieved through meticulous manufacturing processes and a cutting-edge quality control system that oversees every aspect from raw materials to post-sales support.

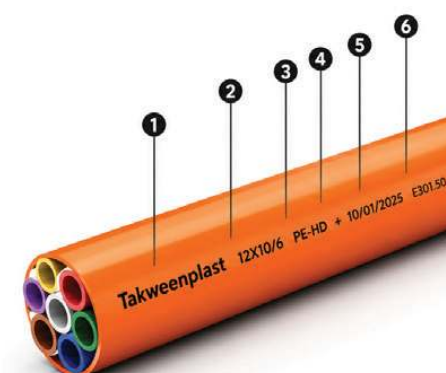


Temperature Resistance

TAKWEEN PLAST COD systems are capable of being stored, installed, and operated within the temperature range of - 20°C to +40°C. Brief periods of higher temperatures may also be accommodated.

Packaging

TAKWEEN PLAST COD will be coiled on either metal or wooden drums for packaging. Standard Big Wooden or metal Drums (DB) are heavy-duty packaging options for ducts, designed for reusability.



1. Manufacturer.
2. Dimensions.
3. Material.
4. Machine.
5. Production Date.
6. Meterage.

Various sizes are offered to accommodate different project needs.



MARKING

TAKWEEN PLAST systems feature distinct lettering at one-meter intervals indicating the date of production, dimensions, sequential meter marking, and can accommodate additional customer-specified information.



Marking

TAKWEEN PLAST systems feature distinct lettering at one-meter intervals indicating the date of production, dimensions, sequential meter marking, and can accommodate additional customer-specified information. Our COD systems are crafted using state-of-the-art machinery operated by expert professionals backed by ongoing research and development efforts, ensuring product quality is consistently upheld through rigorous quality checks conducted by our in-house laboratory.

TAKWEEN PLAST COD systems adhere to the following international standards:

ASTM F 405	Specification for Corrugated Polyethylene (PE) Pipe and Fittings.
ASTM D 2412	Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading.
ASTM D 1505	Test Method for Density of Plastics by the Density-Gradient Technique.
ASTM D 882	Test Method for Tensile Properties of Thin Plastic Sheeting.
ASTM D 1693	Test Method for Environmental Stress-Cracking of Ethylene Plastics.
ASTM D 1603	Test Method for Carbon Black Content in Olefin Plastics.
ASTM D 2122	Test Method for Determining Dimensions of Thermoplastic Pipe and Fitting
ASTM D 2444	Test Method for Determination of the Impact Resistance of Thermoplastic Pipe and Fittings.
ASTM D 2122	Test Method for Determining Dimensions of Thermoplastic Pipe and Fitting
ISO 13479:2009	Polyolefin pipes for the conveyance of fluids - Determination of resistance to crack propagation -Test method for slow crack growth on notched pipes.
DIN 8074	Polyethylene (PE) - Pipes PE 80, PE 100 - Dimensions.
IEC 60794-1	Optical fibre cables - Basic optical cable test procedures - Mechanical test methods.
ISO 1183-1:2019	Test Method for Determining the Density of non-cellular plastics.
ISO 1133-2:2011	Test Method for Determining the Melt Mass-Flow Rate (MFR) and Melt Volume-Flow Rate (MVR) of thermoplastics.
ISO 527-2	Test Method for Determining the Tensile Properties.
BS EN 50086-2-4*	Specification for conduit systems for cable management- Part2: Particular requirements - Section2.4: Conduit systems buried underground
DIN 16961*	Thermoplastics pipes and fittings with profiled wal and smooth pipe inside.
NFC 68-171*	Materials For Insulated Wiring Layings - Conduits Intended For The Protection Of Underground Electrical Installations Associated Coupling Accessories.
EN 13476*	Plastics piping systems for non-pressure underground drainage and sewerage. Structured- wall piping systems of unplasticized polyvinyl chloride (PVC-U), polypropylene (PP) and polyethylene (PE).

* **TAKWEEN** corrugated pipes for cable protection are manufactured in compliance with EN50086 2-4 (DIN 16961, NFC 68-171), specifically EN 13476 standards.

Long-term performance criteria

The specifications necessitate that COD ducts and their acesoris are to be:



1. Able to endure the standard service conditions in **Saudi Arabia** for at least fifty (50) years with out affecting its operation and maintenance.



2. Be crafted, produced, and assembled to ensure that their physical, operational, and maintenance attributes remain unaffected when subjected to the environmental conditions of Saudi Arabia, as well as the anticipated conditions during storage and transit beyond the country's borders. (Environmental factors in Saudi Arabia include ambient air temperature fluctuations ranging from **-10°C to +50°C**).



• Ensure that COD meets the latest installation standards and operation and maintenance practices for telecommunication duct systems.



• COD must be free of blisters, shrink holes, and inhomogeneities that could affect service performance, and must be acceptably round with clean-cut ends.



• COD should have easily connect able accessories such as connectors for manholes/hand-holes and joint closures for enclosing COD joints.



Durability
Up to 50 Years



Temperature Resilience
-10°C to +50°C



Standards Compliance



High Quality & Reliability



Easy Installation & Connectivity

ADVANTAGES OF COD



Better Flexibility

Because of the spiral shape of the product, COD can be easily bent without requiring any special bending techniques, making it simple to navigate around or over obstacles along the duct line.



Lengthy pipe

Save time and money with the long and coiled-on drum that minimizes labor costs and installation time by eliminating the need for multiple connections between manholes in a single installation. Additionally, the COD system eliminates the need to insert sub duct into corrugated outer ducts due to the built-in production of multiple sub ducts.



Lighter in weight

COD is significantly lighter than the traditional duct, making it easier to transport and handle on the work site, providing clear advantages.



Stronger

The numerous pre-installed sub ducts effectively remove any excess space within the spiral corrugated duct, providing COD with a significant edge in terms of compressive load capacity. Safety COD is a reliable choice for areas prone to Earthquakes and Land Subsidence due to its robust compressive strength and flexibility, ensuring safety and stability in challenging conditions.



Easy insertion of optic fiber cables

Our COD allows for effortless cable insertion up to the maximum coiled length due to the precise alignment of inner ducts and minimal friction, thanks to its lack of connections. Furthermore, it allows for extending the distance between manholes.



High Reliability

COD is an excellent choice for power cable ducts due to its non-conductive properties, ensuring safety and reliability in electrical applications.



Cost Efficiency

Choose COD for unparalleled cost efficiency across all stages of work and durability.

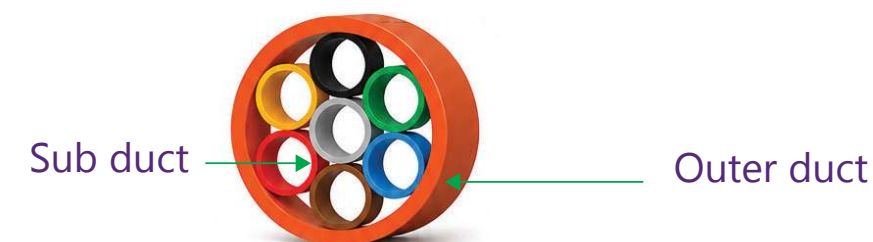


Better resistance against chemicals

COD provides long-lasting protection, withstanding exposure to chemicals and resisting corrosion from salt water and wetland environments.



Properties	Values	Test Method
► Compound Density @ 25°C	0.95 g/cm 3 min	ASTM D 1505
► Pipe Stiffness @ 5 % Deflection average:		
HDPE-CD (with 7-29 mm OD sub-ducts)	> 27 kgf/cm2	ASTM D 2412
HDPE-CD (with 5-33 m m OD sub-ducts)	27 kgf/cm2	
HDPE-CD (with 3-42 mm OD sub-ducts)	21 kgf/cm2	
HDPE-CD 110 mm OD (Empty main duct)	15 kgf/cm2	
HDPE-CD (with 3-27 mm Outside Dia. sub-ducts)	27 kgf/cm2	
HDPE-CD 77 mm OD (Empty main duct)	24 kgf/cm2	
► Compressive Strength @ 5% Deflection average:		
HDPE-CD (with 7-29 m m OD sub-ducts)	>1,200 kgf/m	ASTM D 2412
HDPE-CD (with 5-33 m m OD sub-ducts)	1,200 kgf/m	
HDPE-CD (with 3-42 m m OD sub-ducts)	950 kgf/m	
HDPE-CD 110 mm OD (Empty main duct)	660 kgf/m	
HDPE-CD (with 3-27 mm OD sub-duct)	770 kgf/m	
HDPE-CD 77 m m OD (Empty main duct)	668 kgf/m	
► Tensile Strength @ Yield (flm properties)	30 MOa	ASTM D 882
► Elongation @ Break (flm properties)	400%	ASTM D 882
► Carbon Black Content (for black color)	2% minimum	ASTM D 1603
► Water Absorption	0.03% maximum	ASTM D 570
		24 hrs immersion
► Voltage Resistance	2,000 Vac, immersion	
► Insulation Resistance	>200 Mohm	



PRODUCT RANGE

The **TAKWEEN PLAST** COD comes in sizes ranging from 90 mm to 160 mm and is available in both coils and bars.

Model	Design	O.D(mm)	I.D(mm)	O.D(mm)	THK(mm)	I.D(mm)	No.Sub	Application
28x3 Lines		90.0	70.0	33.0	2.5	28.0	3.0	FOC installations
28x4 Lines		100.0	80.0	33.0	2.5	28.0	4.0	FOC installations
28x5 Lines		110.0	90.0	33.0	2.5	28.0	5.0	FOC installations
28x4 Lines		110.0	90.0	38.0	3.0	32.0	4.0	FOC installations
28x3 Lines		110.0	90.0	42.0	3.0	36.0	3.0	FOC installations
28x4 Lines		120.0	100.0	42.0	3.0	36.0	4.0	FOC installations
28x3 Lines		160.0	125.0	59.0	4.5	50.0	3.0	FOC installations

TAKWEEN PLAST offers a variety of sizes and configurations for its corrugated optical ducts systems, as detailed in the table below.

Type	Design configuration	Outer Diameter OD (mm)	Inner Diameter D (mm)	Wall Thickness mm
COD empty	COD main duct	77±2	58±2	2.5±0.5
COD empty	COD main duct	110±2	90±2	2.5±0.5
COD empty	COD main duct sub-ducts	110±2 29±1	90±2 25±1	2.5±0.5 2.0±0.2
COD empty	COD main duct sub-ducts	110±2 33±1	90±2 28±1	2.5±0.5 2.5±0.5
COD empty	COD main duct sub-ducts	77±2 27.2±1	58±2 22.0±1	2.5±0.5 2.5±0.5
COD empty	COD main duct sub-ducts	110±2 42±1	90±2 36±1	2.5±0.5 ±0.5

ACCESSORIES

TAKWEEN PLAST provides a wide range of accessories designed for corrugated optical ducts, including connectors, cutters, and end-caps.



Line Connector

Connecting Jig

Cutter



Manhole connectors

Outer duct end cap

TAKWEEN PLAST provides a variety of subduct connectors in various sizes with the following dimensions.

Sub-duct couplings	Dimensions			
	OD (mm)	ID (mm)	Wall thickness (mm)	Length (mm)
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

INSTALLATION OF TAKWEEN PLAST COD SYSTEMS

TAKWEEN optical ducting systems are versatile for various installation methods such as trenching, direct plow, and installation into existing main pathways. The flexibility of PE conduit allows for directional bore installations to overcome obstacles like rivers or highways, enabling cable to be pulled or blown over long distances at high speeds due to its low coefficient of friction.

TAKWEEN COD systems must be installed by skilled specialists under qualified supervision. It is crucial to employ highly trained personnel to ensure the correct handling and installation of COD systems.

UNCOILING FROM THE REEL (DRUM) The COD system must be carefully uncoiled from the drum to guarantee a straight installation, avoiding rolling the drum on the ground and using a drum trailer or installation trolley instead.

During uncoiling, the COD system should be pulled straight from beneath the drum and kept under traction to prevent spiral unwinding.

Once uncoiled, the COD system can be secured in the trench with sand piles for optimal arrangement.

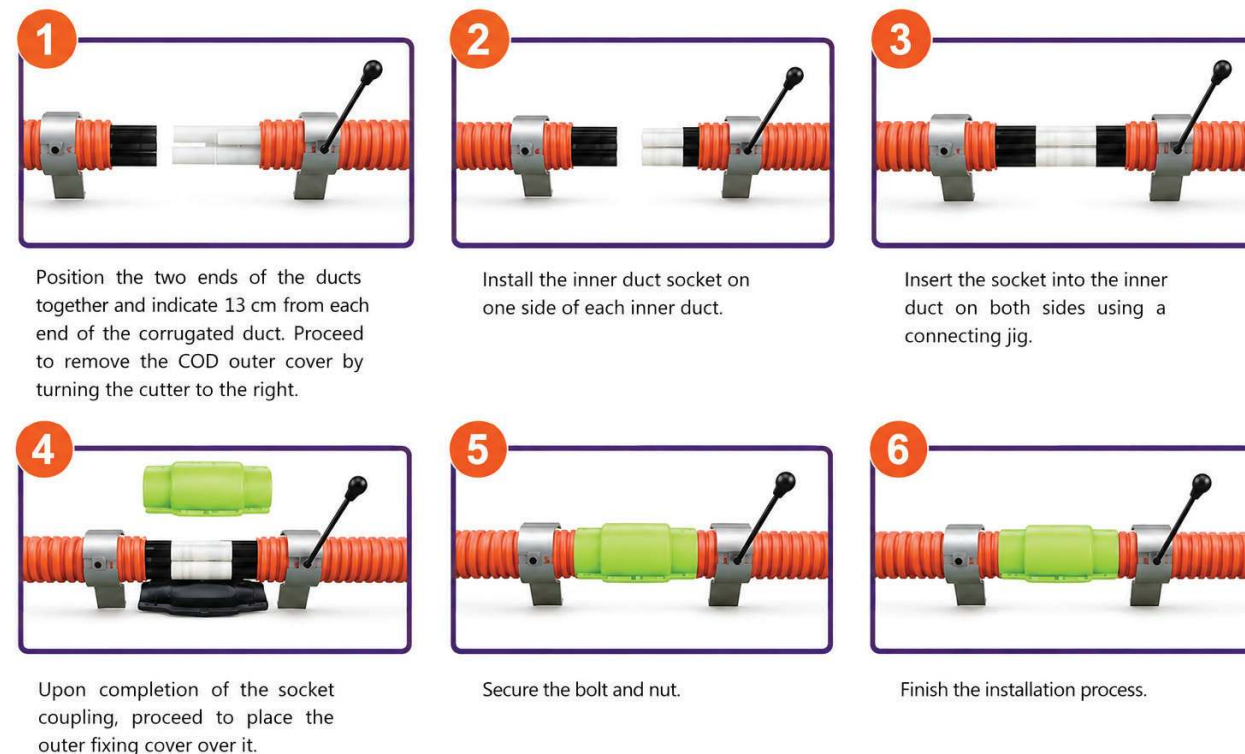
In high temperatures, avoid excessive stretching of the COD system during unwinding and installation.

Allow the COD system to rest in the trench before backfilling to prevent tensioning, especially in summer, allowing it to contract to its original dimensions.

TRENCH PREPARATION AND ALIGNMENT OF COD IN THE TRENCH The trench width is determined by the number of CODs laid, considering installation costs and safety. A 0.2m (W) x 0.5m (H) dimension is recommended for up to 2 lines of COD, regardless of inner ducts. When laying multiple COD systems in parallel, they should be arranged with a specified distance and straightened every 3 or 4 meters using a gauge. Sand or equivalent material should be used to hold the COD in place, with mechanical leveling of the trench bed by an excavator being sufficient unless otherwise specified.

The lowermost COD should not be placed directly on rocks or sharp pebbles, and the excavated area should be leveled and covered with sand or soft soil before laying the COD to prevent soil, sand, and water entry.

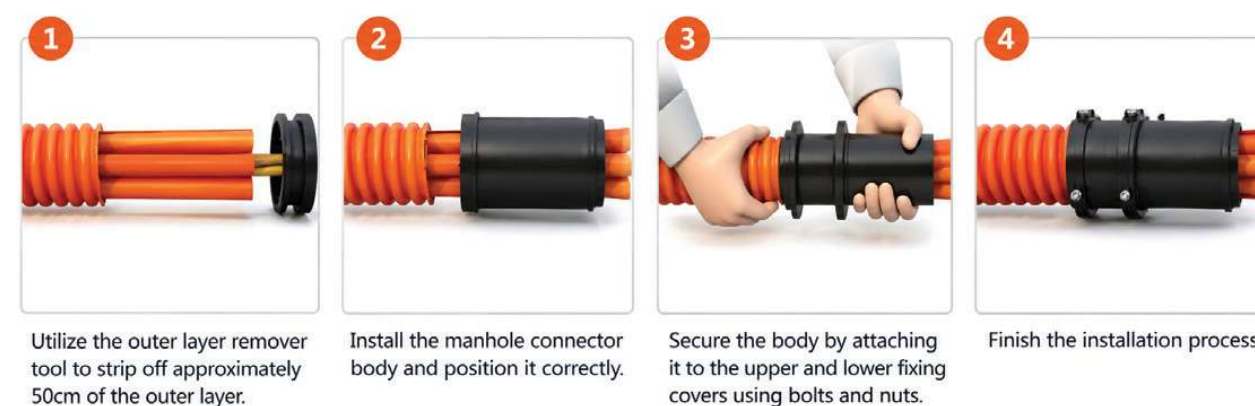
COD INSTALLATION (LINE CONNECTOR)



Various Manhole Connector

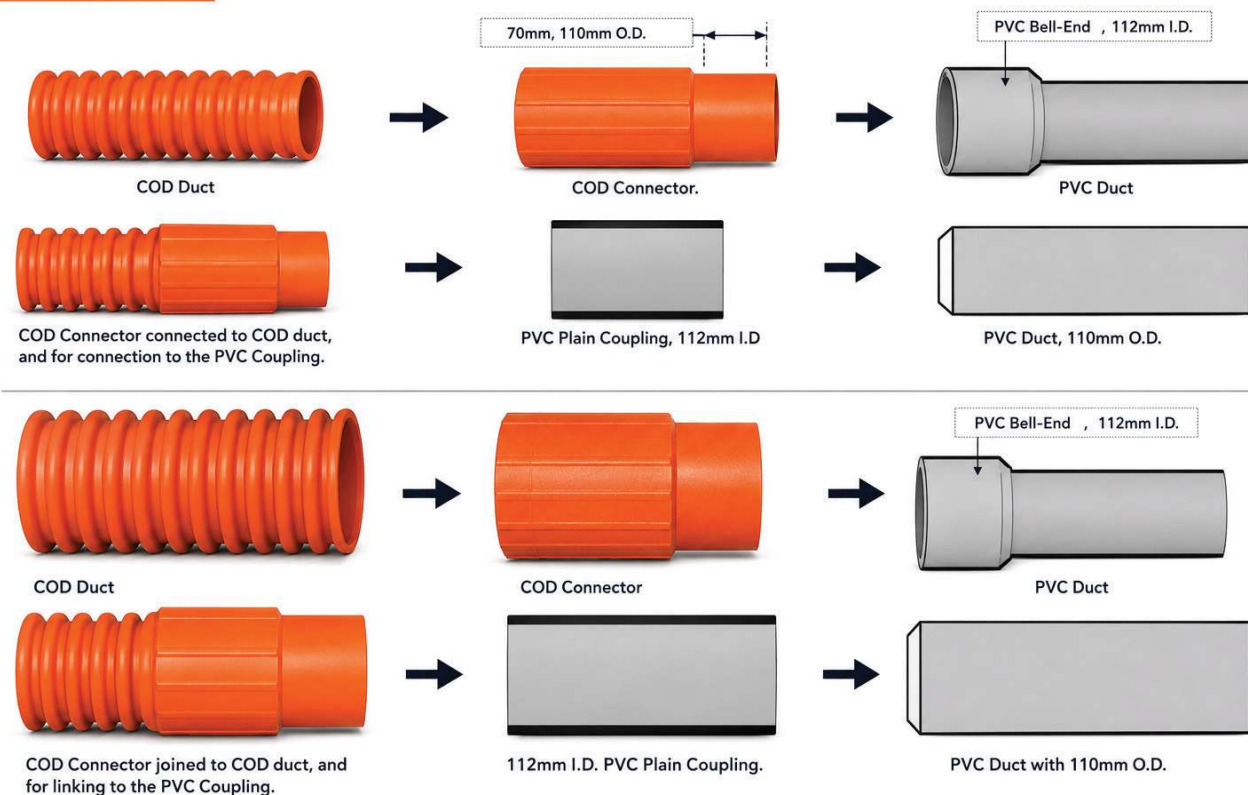


COD INSTALLATION (Manhole Connectors)



COD INSTALLATION (to PVC)

Connection to PVC Bell-End



To connect the main HDPE-CD to manhole or handhole's duct entry holes



A- Designed to fit standard sizes of COD.
B-125 mm.
C-70mm.
D- Designed to fit standard diameter Manhole/Handhole entry hole

HANDLING AND STORAGE OF TAKWEEN PLAST COD SYSTEMS HANDLING

Drums with COD must be transported using appropriate vehicles and handled properly during loading and unloading.

The COD systems need to be sealed with end caps to prevent contamination. It is important to avoid point loading and contact with sharp objects during transport. The drums should always be transported on the provided drum support frame. The special drum support frame with a protective guard allows forklift forks to be inserted under the duct bundles on both sides without causing damage.

STORAGE

Ensure that the COD systems are stored in a manner that prevents contamination or damage, with the ends securely sealed using transport caps or heat-shrinkable caps for temporary protection, and sand-tight enclosure or end caps for longer-term, pressure-tight seal.

Store the drums on the provided drum support frame on level ground or suitable supports to avoid contact with the ground, preventing damage and deformation that could impact blow-in widths.

The **TAKWEEN PLAST** COD systems, which are UV-stabilized, can be stored outdoors during installation, but for exposure periods exceeding one - year, additional protection like covering with an opaque sheet is necessary, as they are not intended for permanent outdoor exposure.

Transportation, storage, and installation must occur within the temperature range of -10°C to +50°C. Deformations may occur with even low mechanical loads above 50°C, and no impact loads should be applied below -15°C. Handling ducts at temperatures below zero requires greater bending radii, and it is advisable to store ducts in heated rooms before installation.

The length variation in ducts due to temperature changes should be taken into account during production.

For HDPE ducts, there is a 0.2 mm change in length per meter for every 1 °C change in duct wall temperature.

For instance, a 100-meter duct can experience a length variation of approximately 20 cm with a 10°C change in temperature.



Proper vehicles should be used to transport the drums, ensuring correct loading and unloading procedures are followed. It is essential to keep the battens of the drums intact during transportation and storage, while also avoiding point loading and contact with sharp objects to prevent damage.

Micro Ducts

Description:

Micro Subducts are high-performance HDPE conduits designed for the installation and protection of fiber optic micro cables. They provide an efficient and reliable solution for modern telecommunication networks, ensuring maximum space utilization, flexibility, and long-term durability. The inner surface is smooth or silicon-coated to allow easy and long-distance cable blowing. Micro Subducts are available in single or bundled configurations to meet diverse project



Technical Specifications

Compliance and Standards:
Manufactured in accordance with:

- Saudi Standards, Metrology and Quality Organization (SASO)
- Technical specifications of Saudi Telecom Company (STC), Mobily, Zain, Dawiyat Integrated Telecommunications & Information Technology Co., and Saudi Electricity Company (SEC)
- International Standards: IEC 60794, ISO 11801, and EN 61386

The physical properties of raw materials for manufacturing core micro-ducts are provided in the following table:

Characteristics	Value	Unit	Test Method
Density	≥0.950	kg/m ³	ISO 1183
Melt Flow Rate (MFR), 190/5.0 kg	≥0.23	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	> 400	%	ISO 527-2
Carbon Black Content	2.25 ± 0.25	%	ISO 6964
Coefficient of Friction	< 0.1	%	ISO 8295
MRS classification	10	MPa	ISO/TR 9080
Charpy notched impact strength (23 °C)	26	kJ/m ²	ISO 179

The physical properties of raw materials for manufacturing core conduit micro-ducts systems are provided in the following table:

Characteristics	Value	Unit	Test Method
Density	≥0.923	kg/m ³	ISO 1183
Melt Flow Rate (MFR), 190/5.0 kg	≥0.25	g/10 min	ISO 1133
Tensile Strength at break (MD)	300	MPa	ISO 527-2
Tensile Elongation at break (MD)	> 110	%	ISO 527-2
Tensile Strength at yield (MD)	12	MPa	ISO 527-2
Coefficient of Friction	> 80	%	ISO 8295

APPLICATIONS



Fiber optic and telecommunication networks (FTTx / FTTH / backbone systems)



Data centers and infrastructure networks



Underground or direct burial installations



Micro trenching and ducting systems



DIRECT BURY (DB)



Direct Buried products are generally thick-walled and of heavier construction. Their thick sheath serves as a strong and protective external surface, enabling them to endure crush loads, thus allowing for their direct laying into the ground.

Direct Bury Sizes for Microducts

OD (mm)	ID (mm)
7	3.5
10	6
12	8
14	10
16	12
20	16



DIRECT INSTALL (DI)



Direct Install products are thin-walled and of lighter construction. Ducts require installation into another outer protective duct to avoid direct exposure and damage of ducts.

Direct Install Sizes for Microducts

OD (mm)	ID (mm)
5	3.5
10	8
12	10
14	12
16	14



★ KEY FEATURES



Manufactured from high-quality HDPE material



High crush resistance and long-term stability



Low-friction or silicon-coated inner surface



UV, chemical, and weather resistant



Available in single or multi-duct bundles



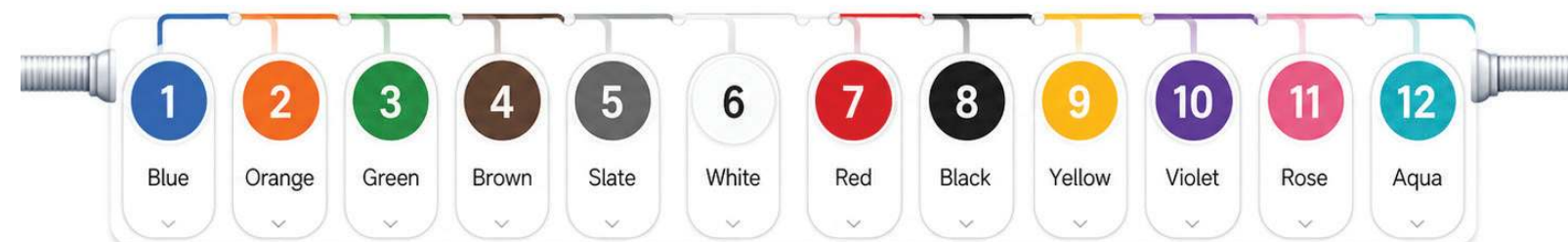
Supplied in coils or drums for easy handling



Custom colors and identification markings available

Color Options:

The color[s] of the MicroDuct is assigned according to the Standard or as per customer's request.



Temperature Resistance:

Micro-ducts and silicone core conduits are designed to be stored, installed, and operated within a temperature range of -20°C to +40°C. Higher temperatures may be tolerated, but only for short durations.

2.3 UV Resistance

The micro-ducts and silicone core conduits are UV-stabilized and suitable for outdoor storage under direct sunlight for a maximum period of one (1) year. For exposure periods exceeding one year, additional protective measures, such as opaque or UV-resistant coverings, shall be applied. These products are not designed for continuous or permanent outdoor exposure.

Standard Sizes (Typical):

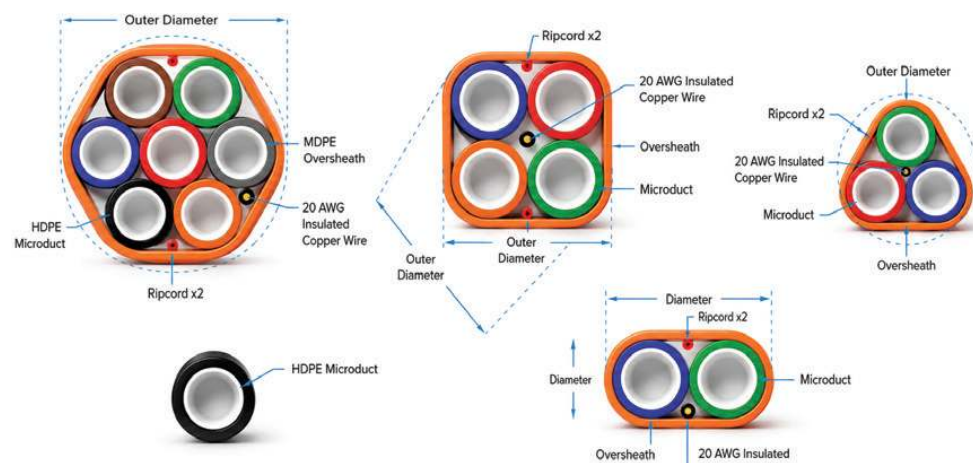
- 5/3.5 mm
- 7/5.5 mm
- 10/8 mm
- 12/10 mm
- Other sizes available upon request



Microduct Sizes and FuturePath Configurations

Microduct Size (OD/ID mm)	Application (Installation Options)	Configuration (Number of Microducts)
10/8	Direct Install (in an existing conduit system)	Single, 2-way, 3-way, 4-way, 7-way FuturePath
12.7/10	Direct Install/Direct Buried (functions well in both environments)	Single, 2-way, 3-way, 4-way, 7-way FuturePath
12/10	Direct Install	Single, 2-way, 3-way, 4-way, 7-way FuturePath
14/10	Direct Buried	Single, 2-way, 3-way, 4-way, 7-way FuturePath
16/12	Direct Buried	Single, 2-way, 3-way, 4-way, 7-way FuturePath
16/13	Direct Install	Single, 2-way, 3-way, 4-way, 7-way FuturePath
18/14	Direct Buried, Plenum, Riser, General	Single, 2-way, 3-way, 4-way, 7-way FuturePath
27/20	Direct Buried, General	Single, 2-way, 3-way, 4-way FuturePath

Each configuration is available with a toning wire. Aerial versions are also available.



3.2 Silicon Core 2-Way Micro-Duct Bundle



application DB/DI	microduct size OD/ID (mm)	protective sheath thickness (mm)	OD (mm)	minimum bending radius 20 °C (mm)	Insulated Cooper Wire (mm)*
DI	4/3	1	10/6	200	0.6
DI	5/3.5	1	12/7	240	0.6
DI	7/5.5	1	16/9	320	0.6
DI	10/8	1	22/12	440	0.6
DI	12/10	1	26/14	520	0.6
DI	14/11.5	1	30/16	600	0.6
DB	14/10	1.2	30/16	600	0.6
DB	16/12	1.2	32/18	640	0.6
DB	18/14	1.2	38/20	760	0.6

*insulated copper wire can be added upon request

Silicon Core 3-Way Micro-Duct Bundle



application DB/DI	microduct size OD/ID (mm)	protective sheath thickness (mm)	OD (mm)	minimum bending radius 20 °C (mm)	Insulated Cooper Wire (mm)*
DI	4/3	1	10/10	200	0.6
DI	5/3.5	1	12/12	240	0.6
DI	7/5.5	1	16/16	320	0.6
DI	10/8	1	22/22	440	0.6
DI	12/10	1	26/26	520	0.6
DI	14/11.5	1	30/30	600	0.6
DB	14/10	1.2	30/30	600	0.6
DB	16/12	1.2	32/32	640	0.6
DB	18/14	1.2	38/38	760	0.6

*insulated copper wire can be added upon request

Silicon Core 4-Way Micro-Duct Bundle



application DB/DI	microduct size OD/ID (mm)	protective sheath thickness (mm)	OD (mm)	minimum bending radius 20 °C (mm)	Insulated Cooper Wire (mm)*
DI	4/3	1	10/10	200	0.6
DI	5/3.5	1	12/12	240	0.6
DI	7/5.5	1	16/16	320	0.6
DI	10/8	1	22/22	440	0.6
DI	12/10	1	26/26	520	0.6
DI	14/11.5	1	30/30	600	0.6
DB	14/10	1.2	30/30	600	0.6
DB	16/12	1.2	32/32	640	0.6
DB	18/14	1.2	38/38	760	0.6

*insulated copper wire can be added upon request

Silicon Core 7-Way Micro-Duct Bundle

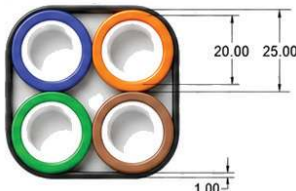
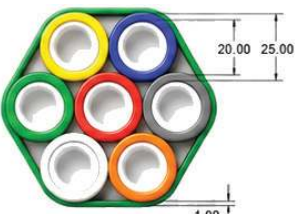


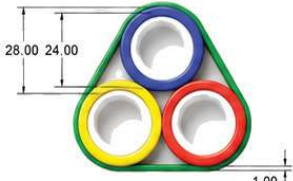
application DB/DI	microduct size OD/ID (mm)	protective sheath thickness (mm)	OD (mm)	minimum bending radius 20 °C (mm)	Insulated Cooper Wire (mm)*
DI	4/3	1 protective	14/14	420 minimum	0.6 Insulated
DI	5/3.5	1	17/17	510	0.6
DI	7/5.5	1	23/23	690	0.6
DI	10/8	1	32/32	960	0.6
DI	12/10	1	38/38	1,140	0.6
DI	14/11.5	1	44/44	1,320	0.6
DB	14/10	1.2	44.4/44.4	1,320	0.6
DB	16/12	1.2	50.4/50.4	1,500	0.6

*insulated copper wire can be added upon request

S.No.	List of Products Bundle Ducts	Client Name	Product Image
1	Microduct 2 WAY 12/08 MM	STC	
2	Microduct 4 WAY SQUARE 12/08 MM	STC	
3	Microduct 4 WAY SQUARE 20/16 MM	STC	
4	Microduct 4 WAY SQUARE 25/20 MM	STC	
5	Microduct 7 WAY 20/16 MM	STC	
6	Microduct 7 WAY 25/20 MM	STC	
7	Microduct 2 WAY 10/06 MM	STC	

S.No.	List of Products Bundle Ducts	Client Name	Product Image
1	Microduct 4 WAY SQUARE 12/08 MM	SECO	
2	Microduct 7 WAY 20/16 MM	SECO	
3	Microduct 7 WAY 25/20 MM	SECO	
1	Microduct 2 WAY 12/08 MM	SALAM/TLS	
9	Microduct 7 WAY 25/20 MM	SALAM/TLS	

S.No.	List of Products Bundle Ducts	Client Name	Product Image
1	Microduct 2 WAY 12/08 MM	MOBILY	
2	Microduct 4 WAY SQUARE 25/20 MM	MOBILY	
3	Microduct 7 WAY 25/20 MM	MOBILY	

S.No.	List of Products Bundle Ducts	Client Name	Product Image
1	Microduct 3 WAY 28/24 MM	MOI	
2	Microduct 4 WAY SQUARE 28/24 MM	MOI	



End caps should always be used to seal cable ends, as using tape for this purpose is not recommended. To prevent the cable from rubbing against the reel flange, ensure that the cable drum is placed in line with the intended direction of deployment.



The drums must be transported using appropriate vehicles and loaded and unloaded properly.



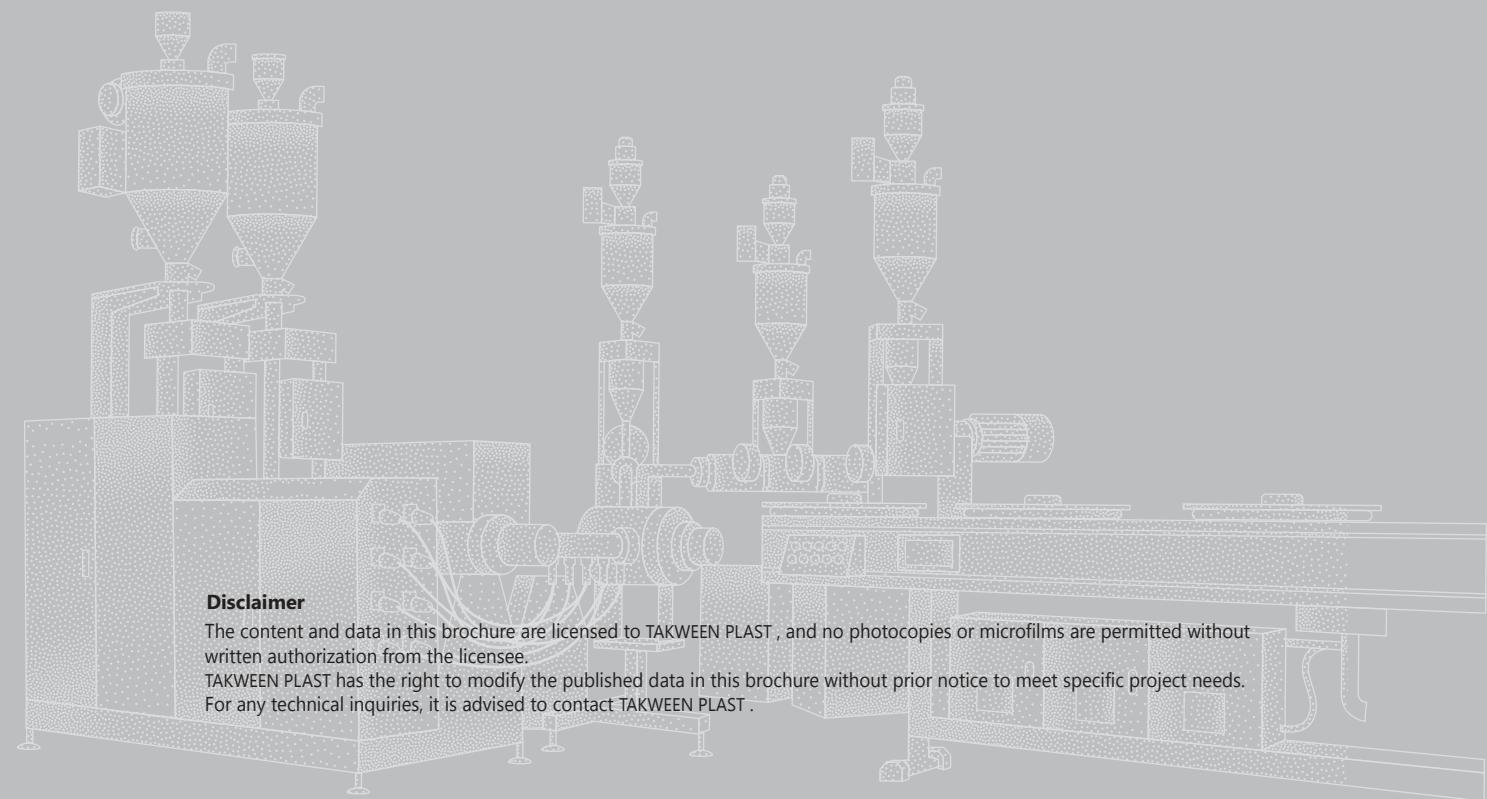
Do not roll the drums on the ground to uncoil a duct bundle. Always use a drum trailer or installation trolley. When uncoiling the micro duct bundle, make sure to pull it in a straight line from beneath the drum. Do not pull the bundle from the side via the flange. The bundle must be under traction during the unwinding process and the drum should be braked from the first meter to prevent it unwinding in a spiral shape.





TAKWEEN PLAST

One of Innovation Experts Brands لحد علامات صادرات الابتكار التجارية



Disclaimer

The content and data in this brochure are licensed to TAKWEEN PLAST , and no photocopies or microfilms are permitted without written authorization from the licensee.
TAKWEEN PLAST has the right to modify the published data in this brochure without prior notice to meet specific project needs.
For any technical inquiries, it is advised to contact TAKWEEN PLAST .

