AN DAT PHAT SAI GON JOINT STOCK COMPANY
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COMPANY & PRODUCT PROFILE

HDPE corrugated impact-resistance pipe

OSPEN

Establish credibility -
Sustainable future

CONTENTS

INTRODUCTION

Dear Esteemed Customers

We, **An Dat Phat Sai Gon** JSC, would like to introduce to our esteemed customer the product of HDPE corrugated pipe OSPEN and the **C**orrugated **O**ptical **D**uct - COD which are specially designed for power and telecommunication cable underground. Our products are manufactured by the imported and modern technology and high grade of HDPE resin material from USA, Korea, Singapore …

All our products are manufactured to conform to requirements of:

TCVN 7417-23:2004 IEC 61386-23:2002	Vietnam National Standard: Conduit systems for cable management - Part 2.3 Particular requirements - Flexible conduit system
TCVN 7997:2009 JIS C 3653:1994	Vietnam National Standard: Power cable buried ground – Installation methods
TCVN 8699:2011	Vietnam National Standard Telecommunication Network, Plastic Ducting use for Underground Cable lines – Technical requirements
KSC 8455:2005	Korea Standard Committee – Corrugated PE pipe

For reliable product of OSPEN and COD, all manufacturing process are applied the latest update of Quality Management System ISO 9001:2008 and have been used countrywide in many important constructions or projects

We would like express our special thanks for your support during the past years and we hope for further cooperation in the future.

1 PRODUCT

1.1 Corrugated Pipe - OSPEN

1.1.1 Description

- Product Name : OSPEN Corrugated Impact-Resistance Pipe or **Corrugated Pipe** for short.
- Origin : Vietnam
- Manufacturer : AN DAT PHAT SAI GON JSC
- Application : Protect power and telecomunication cable in underground or outside uses
- Material : HDPE plastic (High Density Polyethylene)
- Color :
  - Orange : underground use
  - Grey : with UV additives applied for outside use
  - Other color : available per customer's requests

1.1.2 Standard Conformity

OSPEN is manufactured under the QMS of ISO 9001:2008 and conformed to the following standards

- TCVN 7417-23:2004 — Vietnam National Standard
  IEC 61386-23:2002 — International Electrotechnical Commission
  Conduit systems for cable management - Part 2.3 Particular requirements - Flexible conduit system
- TCVN 7997:2009 — Vietnam National Standard
  JIS C 3653:1994 — Japanese Industrial Standard
  Power cable buried ground – Installation methods
- TCVN 8699:2011 — Vietnam National Standard
  Telecommunication Network, Plastic Ducting use for Underground Cable lines – Technical requirements
- KSC 8455:2005 — Korea Standard Committee
  Corrugated hard polyethylene pipe

1.1.3 Material Properties

Physical Properties	Testing method	Conditions	Units	Result
Melting Index	ASTM D1238	190^{O}C/2,16		
Density	ASTM D1505	23 ^{O}C		
Metlting Temperature	ASTM D1238	^{10O}C/min		
Tensile Strength at Break	ASTM D638	50mm/min	daN/cm^2	350
IZOD Impact Strength	ASTM D256	23 ^{O}C	daN/cm^2	>20

Physical Properties	Testing method	Conditions	Units	Result
Hardness (D scale)	ASTM D785			71
Environmental Chemical Resistance ECSR	ASTM D1693		h	200

1.1.4 Product specification

- ❖ OSPEN is packed as a roll. Standard of coil length as following table
- ❖ A steel wire covered with PVC is attached inside the pipe as pilot wire
  - ○ OSPEN 25, 30, 40, 50 : steel wire Ø 1,6mm
  - ○ OSPEN 65, 70, 80, 90, 100, 125 : steel wire Ø 1,8mm
  - ○ OSPEN 150, 160, 175, 200, 250 : steel wire Ø 2,3mm

Pipe Type Nominal Diameter	Inside Diameter (mm)	Outside Diameter (mm)	Wall thickness (mm)	Pitch (mm)	Standard Coil Length (m)	Standard outer diameter and height of a coil (m)
OSPEN 25	25 ± 2.0	32 ± 2.0	1,5 ± 0,3	8 ± 0.5	400	0,60 x 1,20
OSPEN 30	30 ± 2.0	40 ± 2.0	1,5 ± 0,3	10 ± 0.5	300	0,65 x 1,35
OSPEN 40	40 ± 2.0	50 ±2.2	1,5 ± 0,3	13 ± 0.8	300	0,65 x 1,40
OSPEN 50	50 ± 2,5	65 ± 2.5	1,7 ± 0,3	17 ± 1.0	200	0,75 x 1,45
OSPEN 65	65 ± 2.5	85 ± 2.5	2,0 ± 0,3	21 ± 1.0	100	0,75 x 1,30
OSPEN 70	70 ± 2.5	90 ± 2.5	2,0 ± 0,3	25 ± 1.0	100	0,75 x 1,40
OSPEN 80	80 ± 3.0	105 ± 3.0	2,1 ± 0,3	25 ± 1.0	100	0,75 x 1,50
OSPEN 90	90 ± 3.0	110 ± 3.0	2,2 ± 0,3	25 ± 1.0	100	0,75 x 1,60
OSPEN 100	100 ± 4.0	130 ± 4.0	2,3 ± 0,4	30 ± 1.0	100	0,80 x 1,75
OSPEN 125	125 ± 4.0	160 ± 4.0	2,5 ± 0,5	38 + 1.0	50	0,80 x 1,55
OSPEN 150	150 ± 4.0	190 ± 4.0	2,8 ± 0,5	45 ± 1.5	50	0,85 x 1,75
OSPEN 160	160 ± 4.0	210 ± 4.0	3,0 ± 0,5	50 ± 1.5	50	0,85 x 2,00
OSPEN 175	175 ± 4.0	230 ± 4.0	3,5 ± 0,6	55 ± 1.5	40 -50	0,85 x 2,10
OSPEN 200	200 ± 4.0	260 ± 4.0	4,0 ± 0,8	60 ± 2.0	30-50	0,90 x 2,15
OSPEN 250	250 ± 5.0	320 ± 5.0	5,0 ± 0,8	70 ± 2.0	30-50	1,00 x 2,30

Remarks:

- When purchasing OSPEN it is recommended that the normal diameter of pipe should be more than 1.5 times bigger than the outside diameter of the cable accommodated.
- Standard coil length as above table. Orders for dimension of length other than the above standard are acceptable but request for longer length can not always be met due to transportation consideration.
- The technical specifications may be changed without prior notice for product development. For latest updated indexes please contact us

1.1.5 Product properties - Test method & result

Thông số/ Indexes		Phù hợp tiêu chuẩn Standard Conformity	Test method	Đơn vị Unit	Kết quả thử nghiệm mẫu ống OSPEN /						
					25	30	40	50	65	70	80
Tính chất cơ lý Mechanical Properties	Độ bền kéo đứt / Tensile Strength	KSC 8455:2005	TCVN 7434:2004	N/cm^2	1927	1927	1866	1878	1808	1923	2085
	Độ bền va đập / Impact Strength	KSC 8455:2005	ISO 3127:1980 KSC 8455:2005	Kg/ 2m	1,25 Không vỡ Unbroken	1,375 Không vỡ Unbroken	1,5 Không vỡ Unbroken	1,75 Không vỡ Unbroken	2,0 Không vỡ Unbroken	2,15 Không vỡ Unbroken	2,25 Không vỡ Unbroken
	Độ biến dạng khi chịu nén Deformation at compressive load	TCVN 7997:2009	TCVN 7997:2009 A.5.1	N %	303 2,2%	373 2,2%	479 2,5%	612 2,5%	799 2,4%	852 2,4%	985 2,1%
	Lực ép đạt được khi ép ống xuống 60% đường kính ngoài Force at 60% outside diameter			N	2.970	2.970	2.555	4.210	5.480	5534	5.825
	Lực đạt được khi ép sát ống Force at flat pressed			N	4.001	4.001	3.890	5.208	6.437	6410	6.422
Tính chất cách điện Insulated Properties	Độ bền điện áp 10kV/1 phút Withstand Voltage 10kV/1minuute	KSC 8455:2005	KSC 8455:2005		Không hỏng No defect	Không hỏng No defect	Không hỏng No defect	Không hỏng No defect	Không hỏng No defect	Không hỏng No defect	Không hỏng No defect
	Điện áp đánh thủng Breakdown Voltage		TCVN 9535:1995	kV	45	45	45	50	45	45	45
	Độ cách điện Insulated Resistance		IEC 614-2-2	MΩ	>300	>300	>300	>300	>300	>300	>300
Độ bền với hóa chất /Chemical Resistance • NaOH 40%, HNO_3 30% • NaCl 10%, H_2SO_4 30%		KSC 8455:2005	KSM 3413:95 KSC 8455:2005		Không phai màu No discoloration	Không phai màu No discoloration	Không phai màu No discoloration	Không phai màu No discoloration	Không phai màu No discoloration	Không phai màu No discoloratio	Không phai màu No discoloratio
Vicat Softening Point			ASTM D 1525:2009	°C	86	86	86	88	86	85	87
Working temperature				°C	-60 ÷ 60	-60 ÷ 60	-60 ÷ 60	-60 ÷ 60	-60 ÷ 60	-60 ÷ 60	-60 ÷ 60

1.2 Corrugated Optical Duct – COD

1.2.1 Description

- Product Name : COD – Corrugated Optical Duct
- Application : Protect Telecommunication Cable, Copper or Fiber Optical Cable in underground or outside use
- Material : HDPE plastic (High Density Polyethylene)
- Origin : South Korea
- Manufacturer : Optiroad Inc
- Color :
  - Outer duct: orange / black or other per customer's requests
  - Inner duct: different color for each duct / same color with color stripped line
- COD are manufactured by licensed of Optiroad Inc. **Other suppliers manufacturing and provide COD without permission for Optiroad is illegal.**

1.2.2 Standard Conformity

COD is manufactured under the QMS of ISO 9001:2008, ISO 14000:2008 and conformed to

- IEC 61386-23:2002 — International Electrotechnical Commission
  Conduit systems for cable management - Part 2.3 Particular requirements - Flexible conduit system
- TCVN 8699:2011 — Vietnam National Standard
  Telecommunication Network, Plastic Ducting use for Underground Cable lines – Technical requirements
- KSC 8455:2005 — Korean Standard Committee
  Corrugated PE pipe

1.2.3 Product specification

COD Model Code	Inner duct		Dimension of Inner Duct (mm)			Dimension of Outer Duct (mm)			Standard Coil Length (m)
	Section	Numbers	I.D.	Thickness	O.D.	I.D.	O.D.	Pitch	
283000		3	28 ± 1	2.5 ± 0.5	33 ± 1	72 ± 2	93 ± 2	25.4 ± 1	600
323000		3	32 ± 1	3.5 ± 0.5	38 ± 1	80 ± 2	100 ± 2	25.4 ± 1	600

COD Model Code	Inner duct		Dimension of Inner Duct (mm)			Dimension of Outer Duct (mm)			Standard Coil Length (m)
	Section	Numbers	I.D.	Thickness	O.D.	I.D.	O.D.	Pitch	
363000		3	36 ± 1	2.8 ± 0.5	42 ± 1	90 ± 2	110 ± 2	25.4 ± 1	500
503000		3	50 ± 1	4.0 ±1.0	59 ± 2	125 ± 2	160 ± 4	35.4 ± 1	150
284000		4	28 ± 1	2.5 ± 0.5	33 ± 1	80 ± 2	100 ± 2	25.4 ± 1	600
324000		4	36 ± 1	2.8 ± 0.5	42 ± 1	90 ± 2	110 ± 2	25.4 ± 1	400
364000		4	36 ± 1	2.8 ± 0.5	42 ± 1	100 ± 2	120 ± 2	25.4 ± 1	400
285000		5	28 ± 1	2.5 ± 0.5	33 ± 1	90 ± 2	110 ± 2	25.4 ± 1	500
264361		5	4x26 ± 1 1x36 ± 1	2.5 ± 0.5 2.8 ± 0.5	31 ± 1 42 ± 1	90 ± 2	110 ± 2	25.4 ± 1	500
218341		9	8x21 ± 1 1x34 ± 1	2.0 ± 0.5 3.0 ± 0.5	25 ± 1 40 ± 1	90 ± 2	110 ± 2	25.4 ± 1	500

Remark:

- Max. O.D. of inserting cables through COD: 80% off I.D. of Inner Duct

Inner Duct (mm)		Max. O.D of Fiber Optical Cable (mm)
I.D	O.D	
21	25	16.8
26	31	20.8
28	33	22.4
32	38	25.6
36	42	28.8

Explanation of COD Model Code

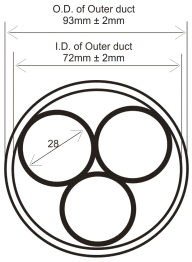
Exp.: 218341

21	8	34	1
⇩		⇩	
8 Inner Duct x 21mm of I.D.		1 Inner Duct x 34mm of I.D.	

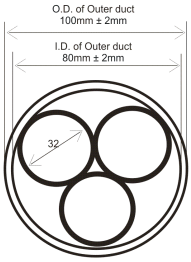
50	59	40.0

1.2.4 Structure and Dimension

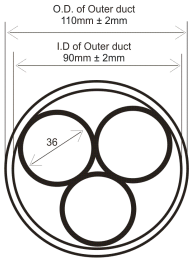
COD: 283000



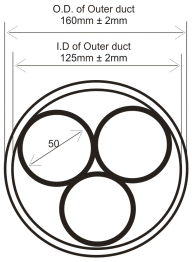
COD: 323000



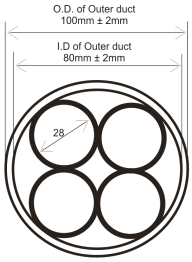
COD: 363000



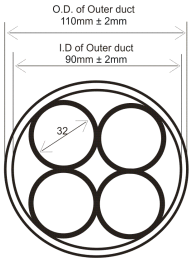
COD: 503000



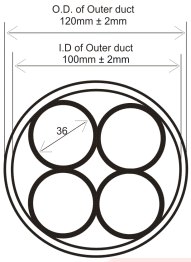
COD: 284000



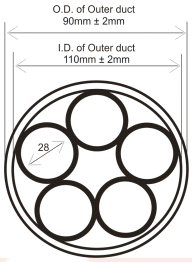
COD: 324000



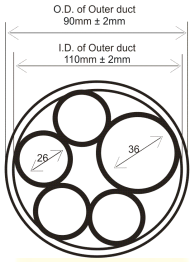
COD: 364000



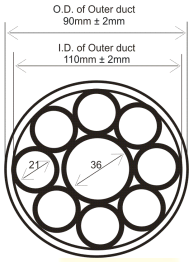
COD: 285000



COD:264361



COD:218341



1.2.5 Sample Test

Properties		Criterion	Test method	Indexes
Mechanical Properties	Tensile Strength	>20Mpa	ASTM D 882	22.0
	Compressive Load at 5% Deformation	–	ADTM D 2412-87	1,665.5KN/m^2
	Enlongation at Break	>350%	ASTM D 638	600
	Impact Strength	No Defect	KSC 8455:2005 TCVN 8699:2011	No Defect
Insulated Properties	Withstand Voltage	No Defect	KSC 8455:2005 TCVN 8699:2011 10kV/1Min	No Defect
	Insulated Resistance	Over 100 MΩ	IEC 614-2-2	Over 500MΩ
Chemical Resistance	HNO_3 40%	Within ± 1.0	KSC 8455:2005 TCVN 8699:2011	0.1
	NaOH 40%,	Within ± 0.5		-0.3
	H_2SO_4 30%,	Within ± 1.5		-0.1
	NaCl 10%	Within ± 1.5		0

Properties		Criterion	Test method	Indexes
	EtOH 95%	Within ± 4.0		0.6

2 PRODUCTION CAPACITY

2.1 HDPE Corrugated Pipe - OSPEN

- Production line: 12 completed lines for pipe from Ø 25mm to Ø 250mm at Hanoi and Hô Chí Minh city
  - 08 lines in Ngoc Hoi Industrial Park, Thanh Tri dist., Hanoi
  - 10 lines in 409 Nguyen Van Ba, Thu Duc dist., Ho Chi Minh city
  - 04 lines in 29, Hoang Van Thai rd., Lien Chieu dist., Danang city
  - 03 lines in An Thới, Phú Quốc, Kiên Giang
- The daily total output capacity is on following table

No	Pipe Type	Output Capacity per day
1.	OSPEN 25	15.000
2.	OSPEN 30	15.000
3.	OSPEN 40	12.000
4.	OSPEN 50	12.000
5.	OSPEN 65	8.000
6.	OSPEN 70	3.000
7.	OSPEN 80	12.000
8.	OSPEN 90	12.000
9.	OSPEN 100	15.000
10.	OSPEN 125	10.000
11.	OSPEN 150	10.000
12	OSPEN 160	2.000
13.	OSPEN 175	2.000
14.	OSPEN 200	2.000
15.	OSPEN 250	1.000

- Other line for OSPEN accessories: joint-sleve for pipe connecting, end-cap, bell-mouth, Y-connector, ect

2.2 Corrugated Optical Duct – COD

- Manufacturer: Optiroad Inc.

- Production line:
  - 6 line in 137, Giro-ri, Ipjang-myeon, Cheonan-si, Chungnam, South Korea
  - 2 line in Kaesong Industrial Park
- Output capacity: 16km daily

3 LISCENCE, PATENT & CERTIFFICATE

3.1 HDPE Corrugated Pipe - OSPEN

- Registered **Trademark of OSPEN** by National Office of Intellectual Property of Vietnam
- **ISO 9001:2008** for Quality Management System of Manufacturing and Trading of Industrial Plastic Tubes by VINACERT
- Certificate of Standard Conformity to the **TCVN 7417-23:2004** – HDPE corrugated pipe for cable management issued by VINACERT.
- Certificate of Standard Conformity to the **TCVN 8699:2011** – Telecommunication Network, Plastic Ducting use for Underground Cable lines – Technical requirements issued by VINACERT
- Certificate of Standard Conformity to the **TCVN 7997:2009** – Installation methods of power cable burried ground by VINACERT
- Certificate of Standard Conformity to the **TCVN KSC 8455:2005** – Korea Standard for corrugated hard polyethylen pipe issued by VINACERT
- Certificate of Standard Conformity issued by Directorate of Information and Communication Technology Quality Control
- Quality Control Testing Conformity to **TCVN 7997:2009 -** Power cable buried ground – Installation methods
- Quality Control Testing Conformity to **TCVN 8699:2011 -** Telecommunication Network, Plastic Ducting use for Underground Cable lines – Technical requirements

3.2 Corrugated Optical Duct – COD

- **Patent Right of COD** manufacturing by National Office of Intellectual Property of Vietnam
- **ISO 9001:2008** for Quality Management System of Design, Manufacture and Servicing of Electric Cables, Copper Clad Wire, Communication Cable, Optical Fiber Cables, Plastic Pipe and Accessories by QSM Certification Services Pty Ltd.
- **ISO 140001:2004/KSA 14001**:2004 for Quality Management System of Design, Manufacture and Servicing of Electric Cables, Copper Clad Wire, Communication Cable, Optical Fiber Cables, Plastic Pipe and Accessories by QSM Certification Services Pty Ltd.

4 SUPPLY RECORD

4.1 Supply record by works

- New and Improving Traffic Lighting System Project in Hanoi
- Power lighting sytem in 3rd ring road in Hanoi
- Power supply system and lighting system for Keangnam Tower
- Power supply system and lighting system in Vĩnh Tuy Bridge.
- Power supply system and lighting system in Lê Văn Lương – Hà Đông, Hanoi.
- Power supply system & lighting system Văn Phú, Mỗ Lao, Văn Khê, Dương Nội,… in Hà Đông, Hanoi.
- Power supply system & lighting system in Ecopark city, Hanoi
- Power lighting system in Đại An, Đồng Văn, Tiên Sơn Industrial Park
- Power supply system & lighting system Inter Continental resort in Sơn Trà, Đà Nẵng.
- Power supply system & lighting system Sun City resort in Sơn Trà, Đà Nẵng
- Power supply system and lighting system in Stanley factor – Phú Thụy Gia Lâm.
- Nghi Sơn Oil refinery factory in Nghi Sơn, Thanh Hóa.
- Power supply system of Canon, Mitsubishi, TOTO, Sumitomo factory in Tu Son industrial park
- You – Zuni factory, Việt Nam – Singapo Industrial park, Bình Dương.
- ViJa Gas factory –Biên Hòa 2 Industrial park- Biên Hòa, Đồng Nai.
- NOK factory, Amata Industrial park, Biên Hòa, Đồng Nai.
- Lighting system in Hoa Lac high-tech industrial park
- Hanoi power and telecommunication cable undergroud project
    - Bạch Mai, Phố Huế, Hàng Bài
    - Tràng Tiền, Hàng Khay, Tràng Thi
    - Quán Thánh, Phan Đình Phùng
    - Lê Duẩn, Giải Phóng,
    - Lý Thường Kiệt
    - Vạn Phúc, Vạn Bảo
    - Sài Đồng, Long Biên,
    - Hàng Trống, Bảo Khánh
    - Đê Phú Thụy, Long Biên
    - Thanh Trì bridge and Highway 5 interchange
    - ….
- Lighting system on Nhan Tan Bridge
- Dinh Vy Port in Hải Phòng

- Power system in Mui Dinh, Ninh Thuan
- Phu Quoc International Airport
- Vinpearl Phú Quốc
- Safari Phú Quốc.
- Vinpearl Nha Trang expendision period
- Vinpearl Bãi Dài, Nha Trang
- Vincom Tuyên Quang
- …ect

4.2 Supply record by customers

- Kinden Vietnam Ltd
- Kurihara – Thanglong joint venture
- Yurtec Corporation
- Sanyo Engineering and Construction Inc.
- Shinryo Vietnam Ltd.
- Lighting and Urban Equipment Company, Ltd - Hapulico
- Vinaconex 21
- Housing and Urban Development Holding (HUD)
- AIN KOREA Ltd., Co.
- COMIN VIỆT NAM Ltd., Co.
- HOA PHAT CEMENT, HOA PHAT STEEL, HOA PHAT GROUP
- Hanoi Communication and Computer JSC
- Vimeco Mechanical and Trading
- ect

4.3 Supply record of COD from Optiroad Inc.

Company	Country	Year	Project	Quantity
Korea Highway Corp.	Korea	2002	Korean highway project	125km
		2003		133km
		3004		140km
		2005		500km
		2006		800km
		2007		250km
Korea Telecom	Korea	2004	Korean teclom expansion project	52km
		2005		252km
		2006		450km
		2007		280km
Hanaro Telecom	Korea	2002		26km
		2003		22km
		2004		24km
Optiroad Japan	Japan	2002	NTT Tocomo	45km
		2004	Sekisui	90km
Taiwan/CPC	Taiwan	2001	Chinese Petroleum Corporation (CPC)	55km
		2002	Taiwan Railway	90km
		2003	Taiwan Area National Freeway Bureau (TANFB)	48km
		2004	Keelung Port Construction Project	106km
		2005	Chiang Kai-Shek International Alrport R.O.C	10km
Maser Technology Group	New Zealand	2006	Trial sample	5km
NTC(Nepal Telecom)	Nepal	2007	Telecom expansion project	80km
SLT(Sri Lanka Telecom)	Sri Lanka	2007	Telecom expansion project	100km
PT Telcom	Indonesia	2007	Telecom expansion project	180km
Dialec Telecom	Malaysia	2007	Mobile service	150km
Reliance Telecom	India	2007	Telecom expansion project	95km
ICETEL	Costa Rica	2006	Border to border project	672Km
		2007		150km
		2008		280km
		2009		140km
Indonesia Telkom	Indonesia	2008	Palapa-Ring Backbone project	90km
NESMA	Saudi Arbia	2009	KAEC project	50km
Customers	Vietnam	2010	Hanoi Undergroud Project	15km
CADPRO	Vietnam	2011	Intelligent Transffic System on Phap Van – Cau Gie – Ninh Binh Expressway project	42.5km
CADPRO	Vietnam	2012	Intelligent Transffic System on Phap Van – Cau Gie – Ninh Binh Expressway project	20km