CHEMTECH COMPANY LIMITED

XLPE MANUFACTURER

TPC
THE ASEAN PVC LEADER

INTRODUCTION

Thai Plastic and Chemicals (TPC)
is a manufacturer and distributor of polyvinyl chloride polymer (PVC) with headquarters in Bangkok, Thailand.

With over 30 years of experience in servicing the PVC markets in Thailand and other Asian countries, TPC is the leading supplier in South East Asia with the largest capacity in this region.

TPC
THE ASEAN PVC LEADER

HISTORY OF COMPANY

1966
TPC is registered as a limited company.

1971
The first PVC plant in Thailand, in Samut Prakarn, commences commercial production.

1984
TPC registered common shares as a registered company in the Stock Exchange of Thailand.

TPC joins the state's Eastern Seaboard Industrial Project as a founding member and invests in a 5.40% share of National Petrochemical Co., Ltd., (NPC).

1989
TPC establishes Riken (Thailand) Co., Ltd. as a joint venture to produce special-grade PVC compound. TPC holds a 35% share.

1990
TPC's second PVC plant, at Map Ta Phut Industrial Estate, begins commercial production.

TPC establishes Siam Stabilizers and Chemicals Co., Ltd. as a joint venture to produce compound additives that enhance the capacity of PVC to withstand high temperatures. TPC holds a 60% share.

1992
His Majesty the King and Her Royal Highness Princess Chakri Sirindhorn graciously presided over the official opening of the Group 1 Petrochemical Industry (of which TPC is one in four companies of the group) at Map Ta Put Industrial Estate.

1993
TPC establishes TPC Oxy Co., Ltd. as a joint venture in Thailand for producing and distributing PVC paste resin. TPC holds a 51% share.

1994
TPC acquires public company status.

1996
TPC invests in Rayong Olefins Co., Ltd. to manufacture and distribute ethylene. TPC holds a 7% share.

1998
TPC establishes Total Plant Service Co., Ltd. to provide engineering design, plant repair and maintenance, production process design, and environmental management services.

1999
TPC buys shares in Nawaplastic Industries (Saraburi) Co., Ltd., which manufactures and distributes PVC pipe and finished PVC products, to serve as a base for developing new finished PVC products and markets for the construction industry, and thereby increase the use of PVC resin in Thailand.

2001
Purchases all shares in TPC Oxy Co., Ltd., which becomes TPC Paste Resin Co., Ltd..

2004
Siam Cement Public Co., Ltd. offers to purchase common shares of TPC from other shareholders, thus making SCG a major shareholder in TPC.





THAILAND


VIETNAM

INDONESIA

1993
TPC establishes a branch office in Ho Chi Minh City, Socialist Republic of Vietnam.

1994
TPC establishes Viet-Thai Plastchem Co., Ltd. (VTPC) as a joint venture to manufacture and distribute PVC compound in Vietnam. TPC holds a 66.28% share.

VTPC

1995
TPC establishes Mitsui Vina Plastic and Chemical Corp.,Ltd. (MVPC) as a joint venture to manufacture and distribute PVC resin in Vietnam. TPC holds a 24% share.

1996
TPC establishes, with Cementhai Chemicals Co., Ltd., PT. Siam Maspion Polymers (SMP) as a joint venture to produce and distribute PVC resin in Indonesia. TPC holds a 20% share.

1998
The first PVC plant in the Socialist Republic of Vietnam, belonging to MVPC,begins commercial production.

1999
By converting its debt into equity, TPC increase its proportion of shares held in VTPC from 66.28% to 72.48%

2000
TPC increases its proportion of shares held in MPVC from 24% to 70%. Together with that the name of the company changes to TPC Vina Plastic and Chemical Corp.,Ltd.(TPC Vina)

2004
A subsidiary establishes Chemtech Co.,Ltd. to manufacture and distribute XLPE compound in the Socialist Republic of Vietnam.

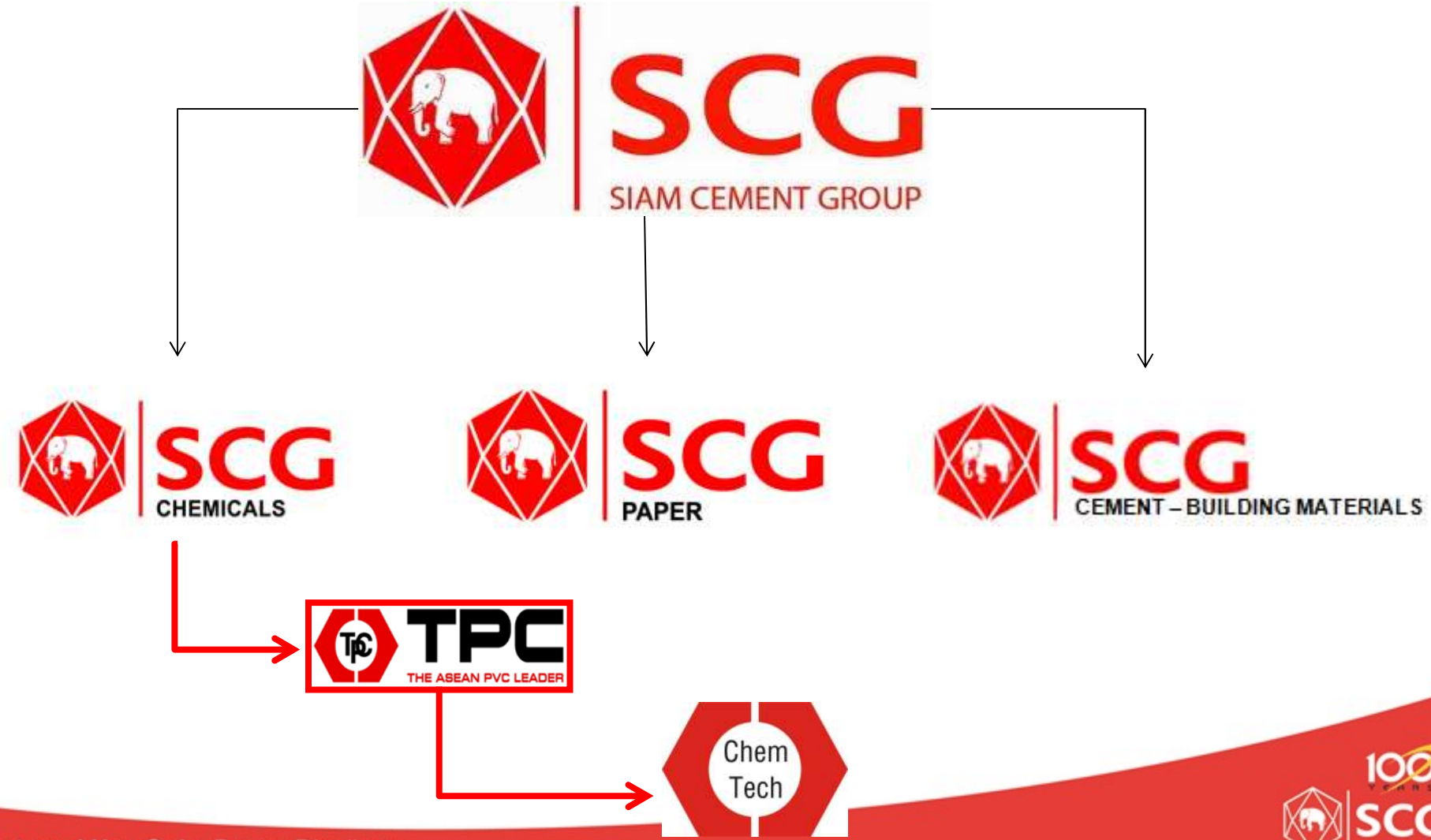
Chem Tech

2005
TPC purchases, with Siam Cement Public Co., Ltd., all common shares of SMP, and changes its name to PT. TPC Indo Plastic and Chemicals (TPC Indo), indirectly increasing TPC's share in the company from 20% to 40%.

2006
A subsidiary establishes Minh Thai HouseComponent Co., Ltd. together with a local investor to manufacture and distribute finished PVC products for construction purposes in the Socialist Republic of Vietnam. The subsidiary holds 60% of all shares.

Introduction

SCG was established in 1913



CHEMTECH COMPANY LIMITED
XLPE MANUFACTURER

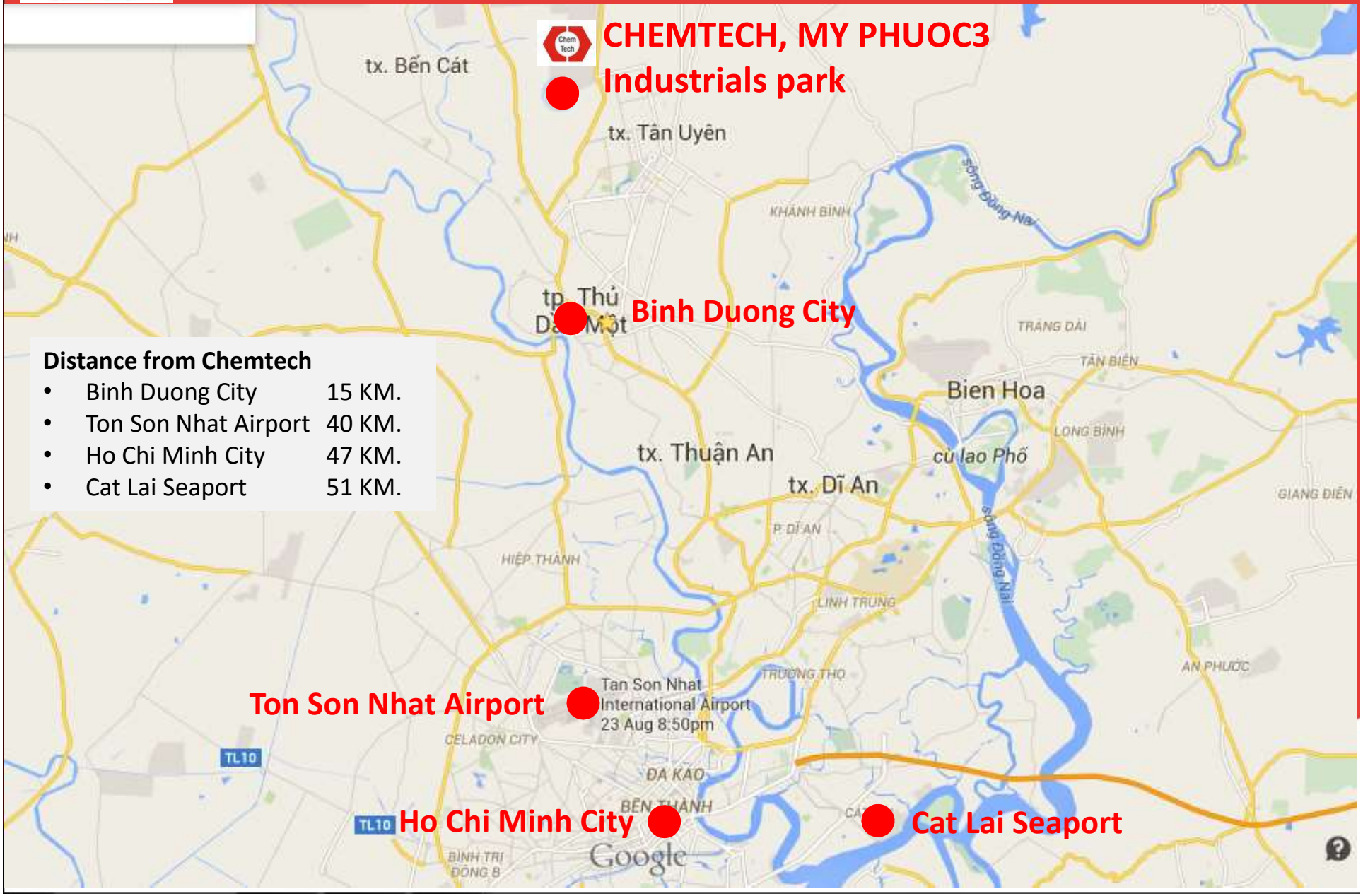
INTRODUCTION

Chemtech Company
is a manufacturer and distributor of Crosslink Polyethylene (XLPE) Compound headquarters in Binh Duong, Vietnam.

ESTABLISHMENT: October, 2004

CURRENT CAPACITY : 12,000 MT/yr.

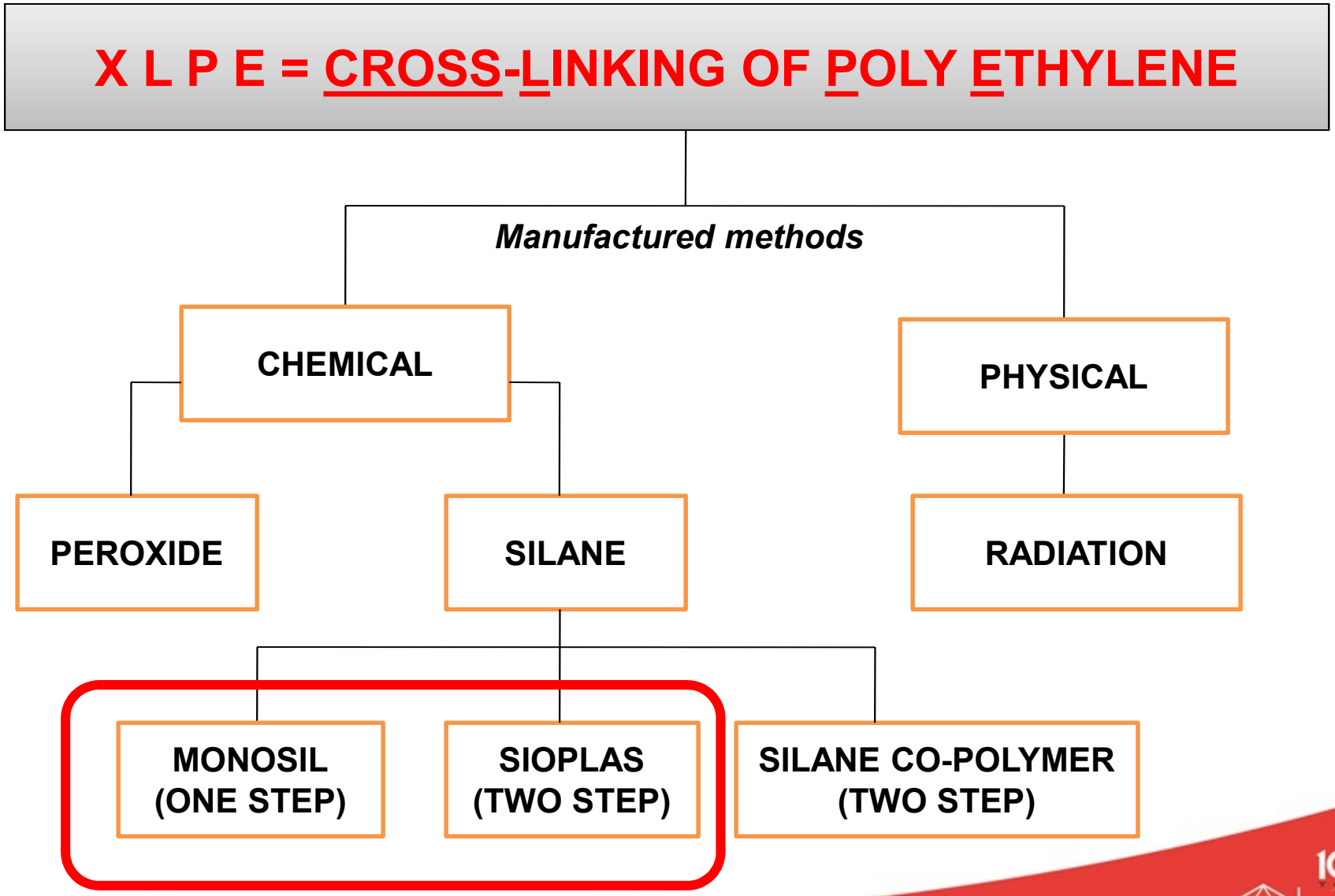
ADDRESS: D8_A4CN - My Phuoc 3 Industrial Park, Ben Cat Town, Binh Duong Province.



Distance from Chemtech

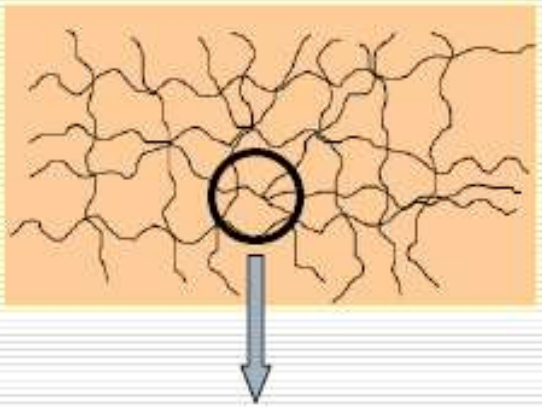
• Binh Duong City	15 KM.
• Ton Son Nhat Airport	40 KM.
• Ho Chi Minh City	47 KM.
• Cat Lai Seaport	51 KM.

What is Crosslinked PE (XLPE) ?



What is Crosslinked PE (XLPE) ?

What is XLPE ?



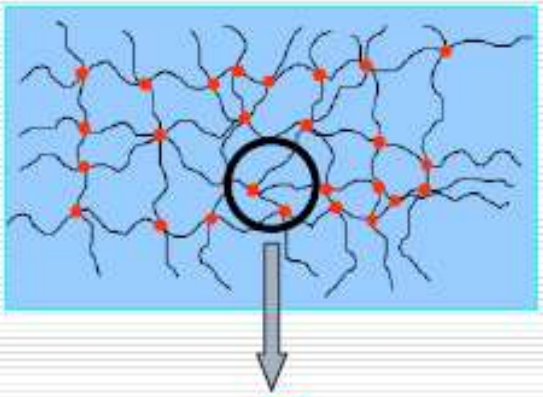
-CH2-CH2-CH2-CH2-CH2-

-CH2-CH2-CH2-CH2-CH2-

PE (Polyethylene)

: Separate Molecule

: Melt, Flow



-CH2-CH2-CH2-CH2-CH2-

Silane

-CH2-CH2-CH2-CH2-CH2-

XLPE (Crosslinked PE)

: Crosslinking attaches molecules together

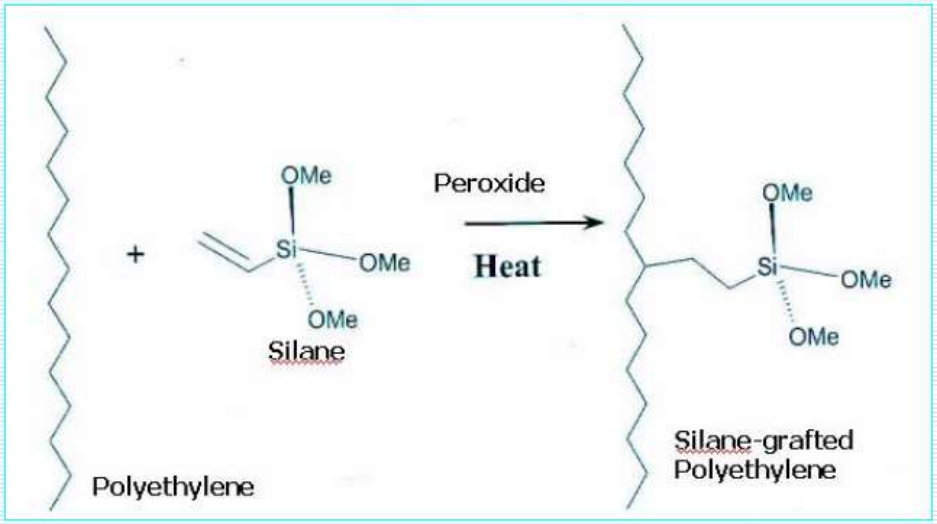
Crosslinking

Thermoplastic

Thermosetting

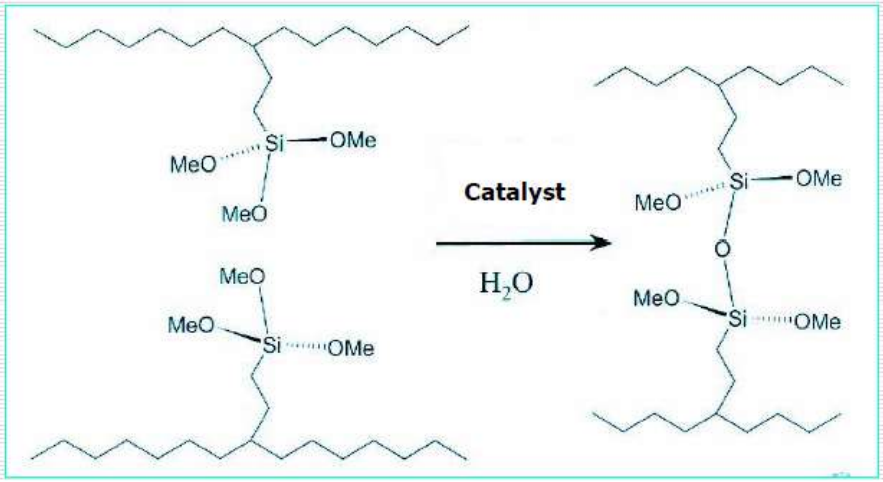
How to produce XLPE?

1. Silane Grafting to Polyethylene Step



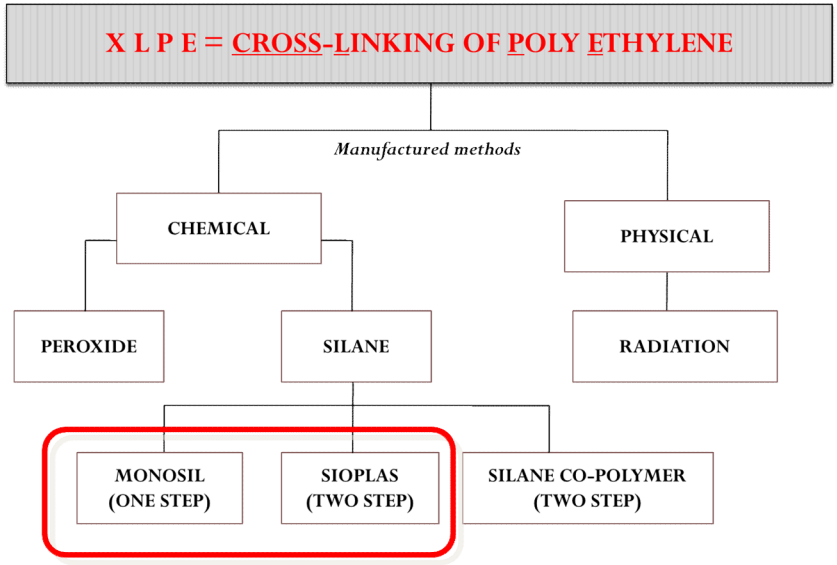
- Grafting reaction in the extruder (140-240 oC)
- L/D of Extruder 24 - 30

2. Crosslinking Step of Silane Grafted PE in the Presence of Moisture

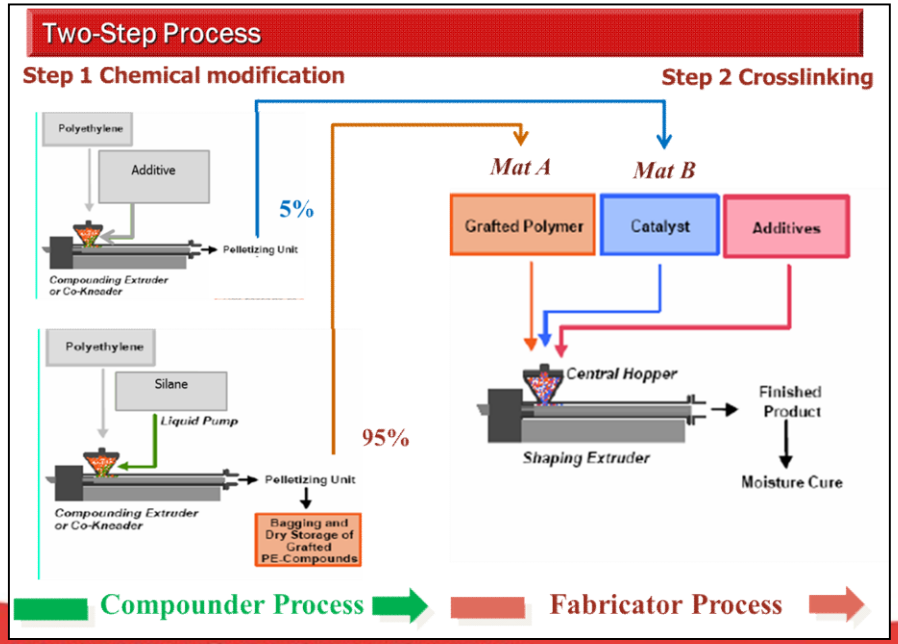


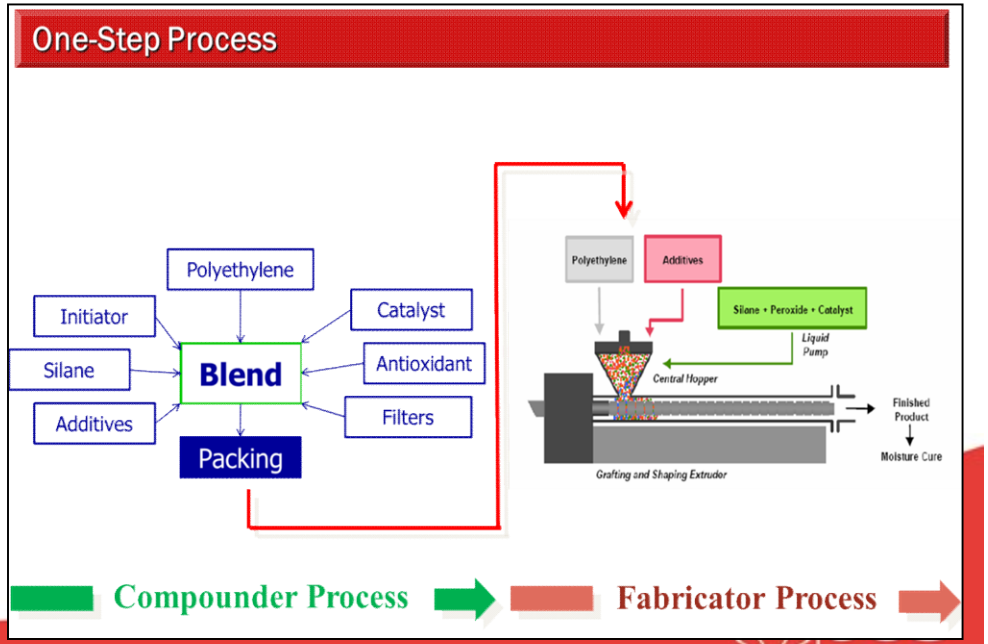
- Crosslinks at temp 70-90 oC

XLPE Technology and process



Chemtech manufacturing of 1-step and 2-step technology





One-Step and Two-Step XLPE Comparison

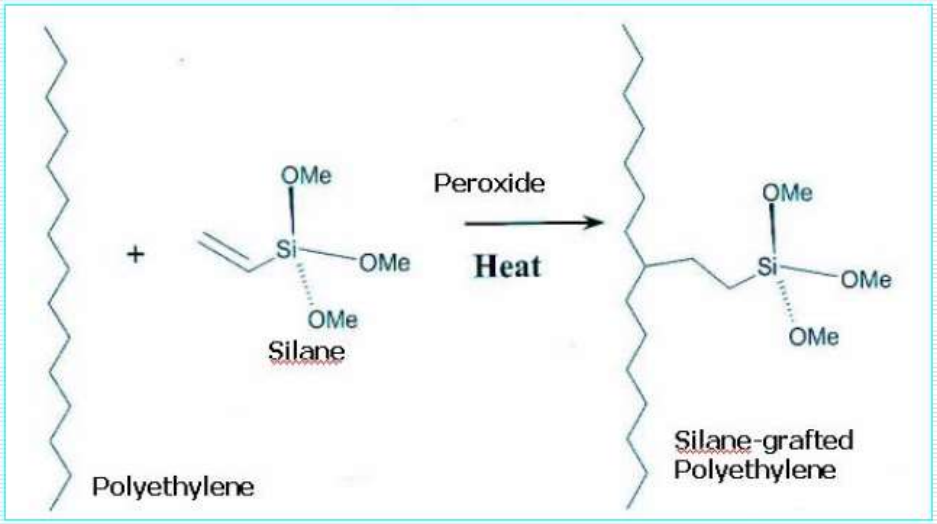
Process	Advantage	Disadvantage
One Step Silane XLPE (Monsil Process)	☑ Ready-to-use , no mixing step required	☒ Request long L/D ratio of Cable Extruder L/D 27 ~ 30 to process
	☑ Lower investment for XLPE manufacture	☒ Required high processing temperature in cable Extruder
		☒ If not use up after open the bag - Silane will evaporate to the air - No crosslink
Two Step Silane XLPE (Sioplas Process)	☑ Stable cross link rate, Silane already grafted on PE in Material A	☒ Need mixing step to mix Mat A + Mat B
	☑ Suitable for normal L/D ratio of Cable extruder L/D 20 ~ 26	☒ Higher investment cost for XLPE manufacture.
	☑ Low processing temperature 140 – 180^{O}C	☒ If not use up after open Mat A bag. - Pre-crosslinking problem (scorch)

Typical properties

- **Specific Gravity**
- **Tensile Strength**
  - ***Aging – Change of tensile strength***
- **Elongation at Break**
  - ***Aging – Change of elongation***
- **Electrical properties**
  - **Dielectric Strength**
  - **Dielectric Constant**
- **% Crosslinking**
  - **Hot set**
  - **Gel content**

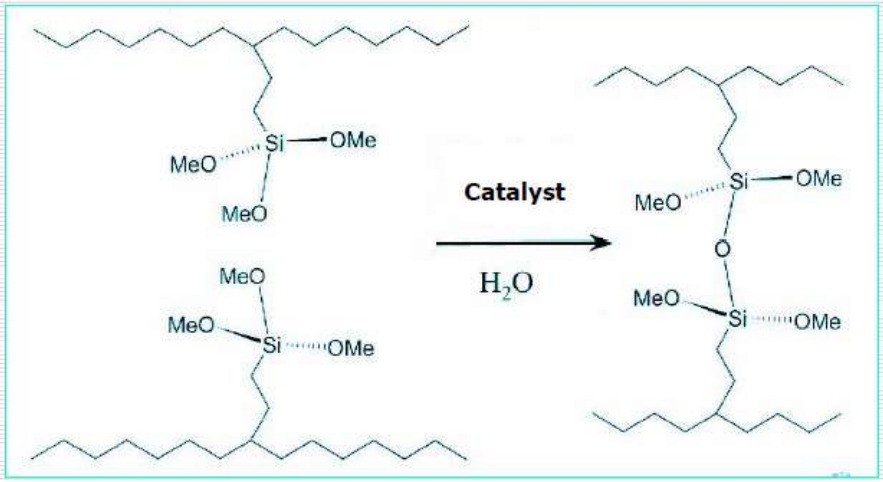
How to produce XLPE?

1. Silane Grafting to Polyethylene Step



- Grafting reaction in the extruder (140-240 oC)
- L/D of Extruder >30

2. Crosslinking Step of Silane Grafted PE in the Presence of Moisture



- Crosslinks at temp 70-90 oC

Product and Sales

MAIN RAW MATERIAL

CHEMTECH PRODUCT

CABLE MANUFACTURER

LV cable insulation
up to 1KV

MV cable insulation
From 1KV to 24KV

XLPE FOR LOW AND MEDIUM VOLTAGE CABLE INSULATION

Products Brochure

XLPE FOR LOW AND MEDIUM VOLTAGE CABLE INSULATION

ChemTech Technology 1 step and 2 steps provides XLPE compound applied on low and medium insulation with outstanding properties. With additives's presentation such as metal deactivator, processing aids and catalysts make better properties of XLPE insulation: high crosslinking rate, gloss, smooth surface and easy processing. ChemTech also guarantees Mechanical and Electrical properties meet with IEC or NFC standard for XLPE insulation.

XLPE PROPERTIES					GRADE						
					MEDIUM VOLTAGE	LOW VOLTAGE					
						2 Steps					1 Step
Item	Test Items	Test Method	Unit	Spec.	LS243NTA	LS210NTA	LS211NTA	LS240NTA	LS220NTA	LS212NTA	LS121NTA
1	Density (Base resin)	ASTM D-1505	g/cm^3	-	~ 0.92						
2	Elongation At Break	IEC 60811-1-1	%	Min.200	485	552	525	515	528	540	560
3	Tensile Strength	IEC 60811-1-1	MPa	Min.12.5	> 20						
After ageing (135°C, 168 hrs.)											
4	Change of Elongation	IEC 60811-1-2	%	±25	-9	-12	-15	-10	-8	-15	-18
5	Change of Tensile Strength	IEC 60811-1-2	%	±25	14	10	9	15	17	10	17
Hot Set Test (200°C, 0.2 MPa, 15 min.)											
6	Elongation under load	IEC 60811-2-1	%	Max.175	20	65	45	25	65	25	20
7	Elongation after cooling	IEC 60811-2-1	%	Max.15	-11	-5	-10	-10	-10	-10	-15
Electrical Properties											
8	Dielectric Strength	IEC 60243	KV/mm	-	30 - 35						
9	Dielectric Constant (50 Hz)	IEC 60250	-	-	1.7 - 1.8						
10	Volume Resistivity (1 kV)	IEC 60093	Ω.cm	-	> 1.0x10^{17}						
Recommended applications					Medium voltage up to 24 kV	Cable with thickness < 1.5 mm	Big size and small size of cable	Cable with thickness over 1.5 mm to ~ 2.0 mm	Cable with thickness < 1.5 mm	Thickness 0.5 mm - 2.0 mm	All sizes of cable
Benefits					Fast curing	Good surface	Meet NFC 33_209 Standard	Fast curing	Contains metal deactivator additive	Gloss surface, fast curing	Easier processing

LS210NTA, LS212NTA and Benchmark product(VN)

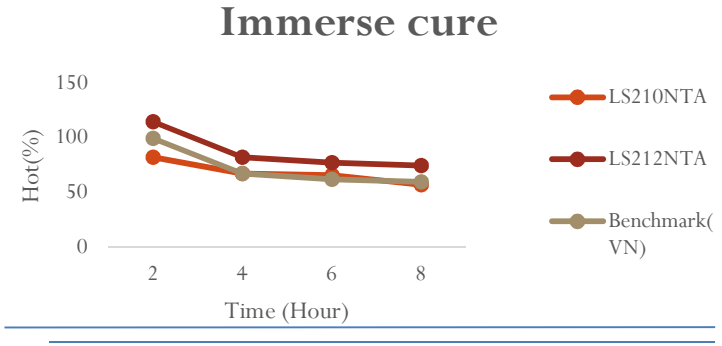
Process condition:

Grade	L/D	Screw dia. (mm)	Size of cable (mm^2)	Thickness (mm)	CMB (%)	Screw speed (rpm)	Line speed (M/m)	Temperature condition (with torch) (° C)	Gloss level	Shrinkage Immerse cure @ 90 ° C 4 hours
LS210NTA	25	120	95	1.7	4.5	19	20.2	150-159-159-164-172-178-184-300	**	1
LS212NTA						18.9	21.3	149-159-157-164-172-177-180-287	***	0.75
Benchmark (VN)						19	20.4	150-159-157-164-172-177-180-294	***	0.75

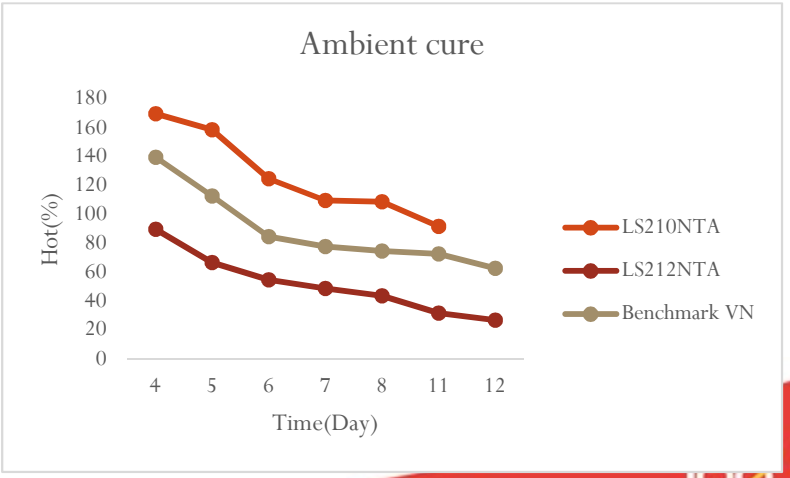
Test results

Test on sample cable

Immerse cure @ 90 ° C (hour)	LS210NTA		LS212NTA		Benchmark (VN)	
	Hot (%)	Set (%)	Hot (%)	Set (%)	Hot (%)	Set (%)
2	82.5	10	115	1.25	100	5
4	67.5	5	82.5	5	67.5	3.75
6	66.25	0	77.5	1.25	62.5	0
8	57.5	0	75	3.75	60	1.25



Ambient cure (day)	LS210NTA		LS212NTA		Benchmark (VN)	
	Hot (%)	Set (%)	Hot (%)	Set (%)	Hot (%)	Set (%)
4	170	10	90	15	140	20
5	159	7.5	67	12.5	112.5	8.75
6	125	5	55	10	85	5
7	110	5	49	10	77.5	5
8	109	2.5	44	6.25	75	2.5
11	92.5	2.5	32	3.75	72.5	1
12	Out of sample		27	1.25	62.5	0



Curing Time

Grade		Thickness and curing time			
		3.5 mm		5 mm	
		Force cure (hour)	Ambient cure (day)	Force cure (hour)	Ambient cure (day)
Medium voltage	LS243NTA	5	10	10	21
		1 mm		2 mm	
Low voltage	LS210NTA	2	6	8	15
	LS220NTA	2	6	8	15
	LS211NTA (*)	2	4	8	15
	LS240NTA	1	2	4	8
	LS212NTA	0.5	1.5	2	6
	LS121NTA	1	2	4	8

(*) LS211NTA is accordance with NFC 33_209 standard, the other grades are accordance with IEC 60502 standard

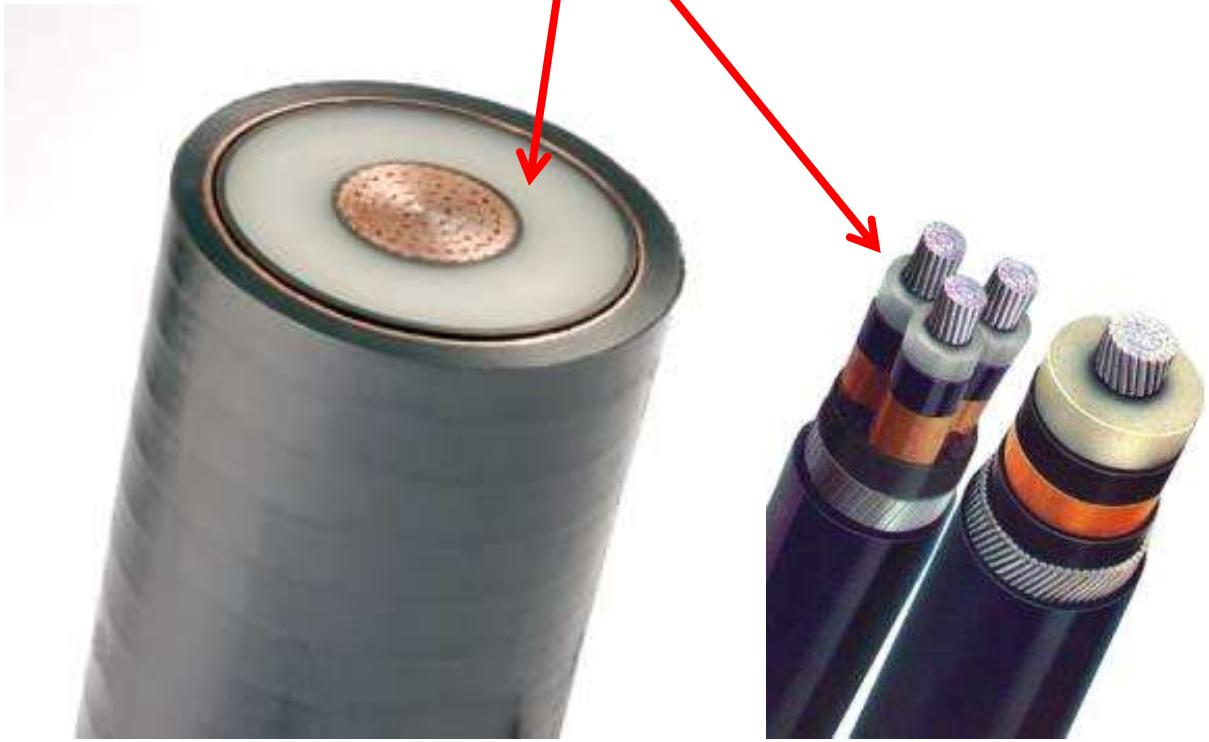
Surface

Product Application

Grade	Application
LS 243 NTA	Medium Voltage Insulation up to 24KV, Fast curing
LS 210 NTA	Low Voltage Insulation - Cable with thickness < 1.5 mm, Good surface
LS 211 NTA	Low Voltage Insulation – Meet NFC 33 – 209 Standard (higher spec. than IEC)
LS 240 NTA	Low Voltage Insulation – Fast Curing and suitable for wall thickness from over 1.5 to ~2 mm
LS 220 NTA	Low Voltage Insulation – Cable with thickness < 1.5 mm, Contains Metal deactivator
LS 212 NTA	Low Voltage Insulation – Thickness from 0.5-2.0mm with gloss surface, fast curing
LS 121 NTA	Low Voltage Insulation – One step grade, easier processing

Application

XLPE Insulation



CV Cable

ABC Cable

Low Voltage and Medium Voltage

Application of XLPE

1. XLPE Insulation for Power Cable

- Low Volt (< 1 kV)
- Medium Volt (1-33/45 kV)
- High Volt (33/45-132 kV)
- Extra High Volt (>132 kV)

Packaging

- Packed in 25kg paper/PP bag consisting of:
  - 23.75 Kg Material A in vacuum sealed aluminum bag
  - 1.25 Kg Material B in small aluminum bag

➢ 

=

← Mat. B

← Mat. A

- 55 bags on 1 pallet (1,375 MT)

Packaging

570 kg / box

Customer name list

Vietnam

LS

CADAVI

ĐẠI LONG

LEADER since 1976

LUCKY STAR

TÍN THÀNH

Tai Sin Cables & Wires

CABLE THIPHA

TSC

TA YA

TANGHENAM

VINH THINH

DAPHACO

EVERTOP

LIDACO

TACACO

DNTN SX NGỌC LAN

OVI CABLES

Thailand

BCC BANGKOK CABLE CO., LTD.

CTW

phelps dodge

Korea

koryo www.koryocable.co.kr 고려전선

taihan

Nexans BRINGS ENERGY TO LIFE

Sri Lanka

AFL CABLES everywhere

KELANI CABLES

Pakistan

Indonesia

PRYSMIAN Draka

India

unicab UNIFLEX CABLES LIMITED

KEI Wires and Cables

South Africa

MBT South Africa Distributors of Plastics Raw Materials

Malaysia

Universal Cable (Sarawak) Sdn Bhd

CCC

SCG

Certificated

ISO 9001 - Surveillance

bsi.

By Royal Charter

Certificate of Registration

QUALITY MANAGEMENT SYSTEM - ISO 9001:2015

This is to certify that:

CHEMTECH CO., LTD.
D_8A4_CN, My Phuoc 3 Industrial Park,
Ben Cat Town,
Binh Duong Province,
Vietnam

Holds Certificate Number: **FM 702823**

and operates a Quality Management System which complies with the requirements of ISO 9001:2015 for the following scope:

The manufacture and supply of crosslinked polyethylene (XLPE).

For and on behalf of BSI:

Chris Cheung, Head of Compliance & Risk - Asia Pacific

Original Registration Date: 2019-02-28
Latest Revision Date: 2019-02-28

Effective Date: 2019-02-28
Expiry Date: 2022-02-27

Page: 1 of 1

...making excellence a habit.

This certificate was issued electronically and remains the property of BSI and is bound by the conditions of contract.
An electronic certificate can be authenticated online. Printed copies can be validated at www.bsi-global.com/ClientDirectory or telephone +44 (0) 3620 0066.
Further clarifications regarding the scope of this certificate and the applicability of ISO 9001:2015 requirements may be obtained by consulting the organization.
This certificate is valid only if provided original copies are in complete set.

Information and Contact: BSI, Kitemark Court, Davy Avenue, Knowhill, Milton Keynes MK5 8PP. Tel: + 44 345 080 9000
BSI Assurance UK Limited, registered in England under number 7805321 at 389 Chiswick High Road, London W4 4AL, UK.
A Member of the BSI Group of Companies.

ISO 14001 – Re-Certificate

bsi.

Certificate of Registration

ENVIRONMENTAL MANAGEMENT SYSTEM - ISO 14001:2015

This is to certify that:

CHEMTECH CO., LTD.
Lot D-8A4-CN, My Phuoc 3 Industrial Park,
Ben Cat Town,
Binh Duong Province,
Vietnam

Holds Certificate Number: **EMS 623288**

and operates an Environmental Management System which complies with the requirements of ISO 14001:2015 for the following scope:

The manufacture and supply of crosslinked polyethylene (XLPE).

For and on behalf of BSI:

Chris Cheung, Head of Compliance & Risk - Asia Pacific

Original Registration Date: 2015-02-08
Latest Revision Date: 2021-01-29

Effective Date: 2021-02-08
Expiry Date: 2024-02-07

Page: 1 of 1

...making excellence a habit.

This certificate was issued electronically and remains the property of BSI and is bound by the conditions of contract.
An electronic certificate can be authenticated online. Printed copies can be validated at www.bsi-global.com/ClientDirectory or telephone +44 (0) 3620 0066.
Further clarifications regarding the scope of this certificate and the applicability of ISO 14001:2015 requirements may be obtained by consulting the organization.
This certificate is valid only if provided original copies are in complete set.

Information and Contact: BSI, Kitemark Court, Davy Avenue, Knowhill, Milton Keynes MK5 8PP. Tel: + 44 345 080 9000
BSI Assurance UK Limited, registered in England under number 7805321 at 389 Chiswick High Road, London W4 4AL, UK.
A Member of the BSI Group of Companies.

ISO 45001 - Re-Certificate

bsi.

Certificate of Registration

OCCUPATIONAL HEALTH & SAFETY MANAGEMENT SYSTEM - ISO 45001:2018

This is to certify that:

CHEMTECH CO., LTD.
Lot D-8A4-CN, My Phuoc 3 Industrial Park,
Ben Cat Town,
Binh Duong Province,
Vietnam

Holds Certificate Number: **OHS 623290**

and operates an Occupational Health and Safety Management System which complies with the requirements of ISO 45001:2018 for the following scope:

The manufacture and supply of crosslinked polyethylene (XLPE).

[Previously certified to OHSAS 18001 since 2013-02-08]

For and on behalf of BSI:

Chris Cheung, Head of Compliance & Risk - Asia Pacific

Original Registration Date: 2021-01-29
Latest Revision Date: 2021-01-29

Effective Date: 2021-01-30
Expiry Date: 2024-02-07

Page: 1 of 1

...making excellence a habit.


CHEMTECH CO.,LTD
XLPE MANUFACTURER
Chem Tech
Tỉnh Bình Dương


HAPRO


NGỌC MINH HUY
HYUNDAI


SƠ ĐỒ THOÁT HIỂM
EMERGENCY EVACUATION MAP
AN TOÀN LÀ TRÊN HẾT
SAFETY FIRST
05/12/13
1600
348
1000


BẢNG CÁC HOẠT ĐỘNG CỦA NHÓM
SMALL GROUP ACTIVITIES BOARD