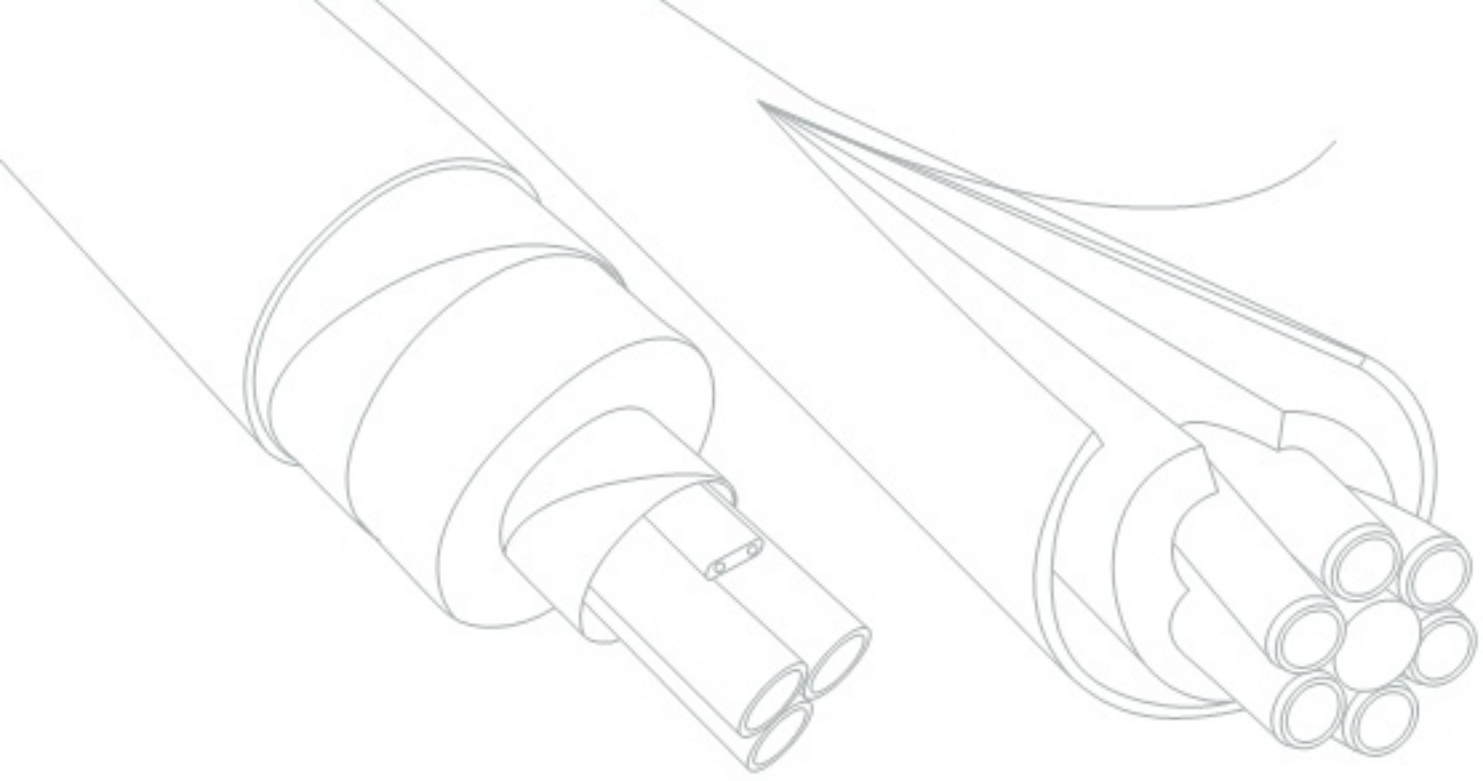


DAECHUN
INDUSTRIAL CO. LTD.

Total Tube Solutions

Multi Core Tube
Pre-Insulation Tube
Steam or Electric Traced Heating Tube

DAECHUN INDUSTRIAL CO. LTD.

CEO Message

DAECHUN INDUSTRIAL CO. LTD. manufactures Multi Core Tube, Stainless Steel Coiled Tube & Straight Tube for marine, offshore and industrial application with approvals from all classification societies.

As a world's leading specializer in the field we have supplied and installed our products on more than ten thousand new buildings and retrofits by 2014.

Providing with high quality products and comprehensive services worldwide, we are prepared to serve our customers across the world.

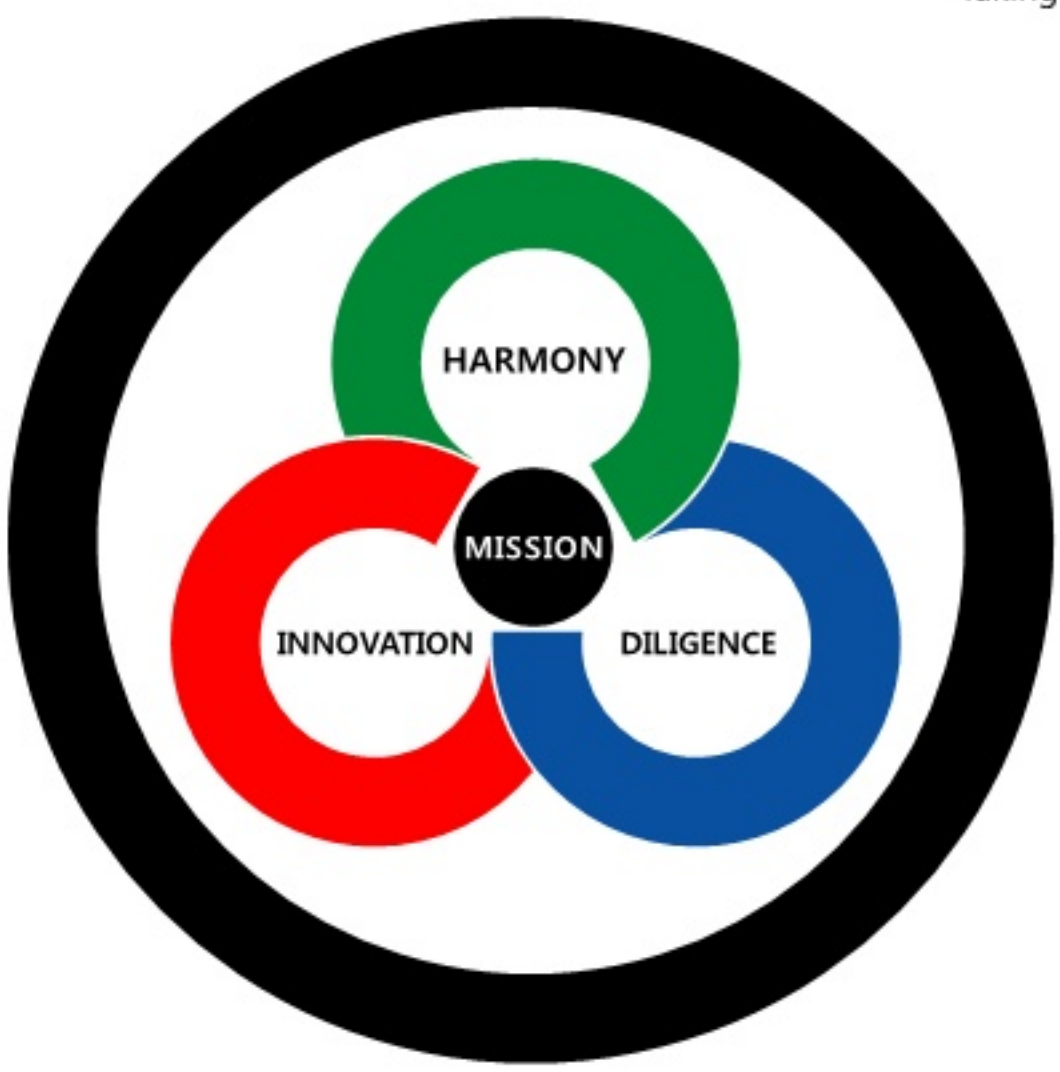
Mission & Value

SOCIETY

- Compliance with Laws & Regulations
- Fair Competition
- Contribute to National Welfare
- Provide Educational Support to Community
- Protect Shareholder's Interest

CUSTOMER

- Offer Best Quality
- Respect
- Creating & Providing Value
- Customer Satisfaction
- Privacy & Data Protection
- Taking Responsibility



ENVIRONMENT

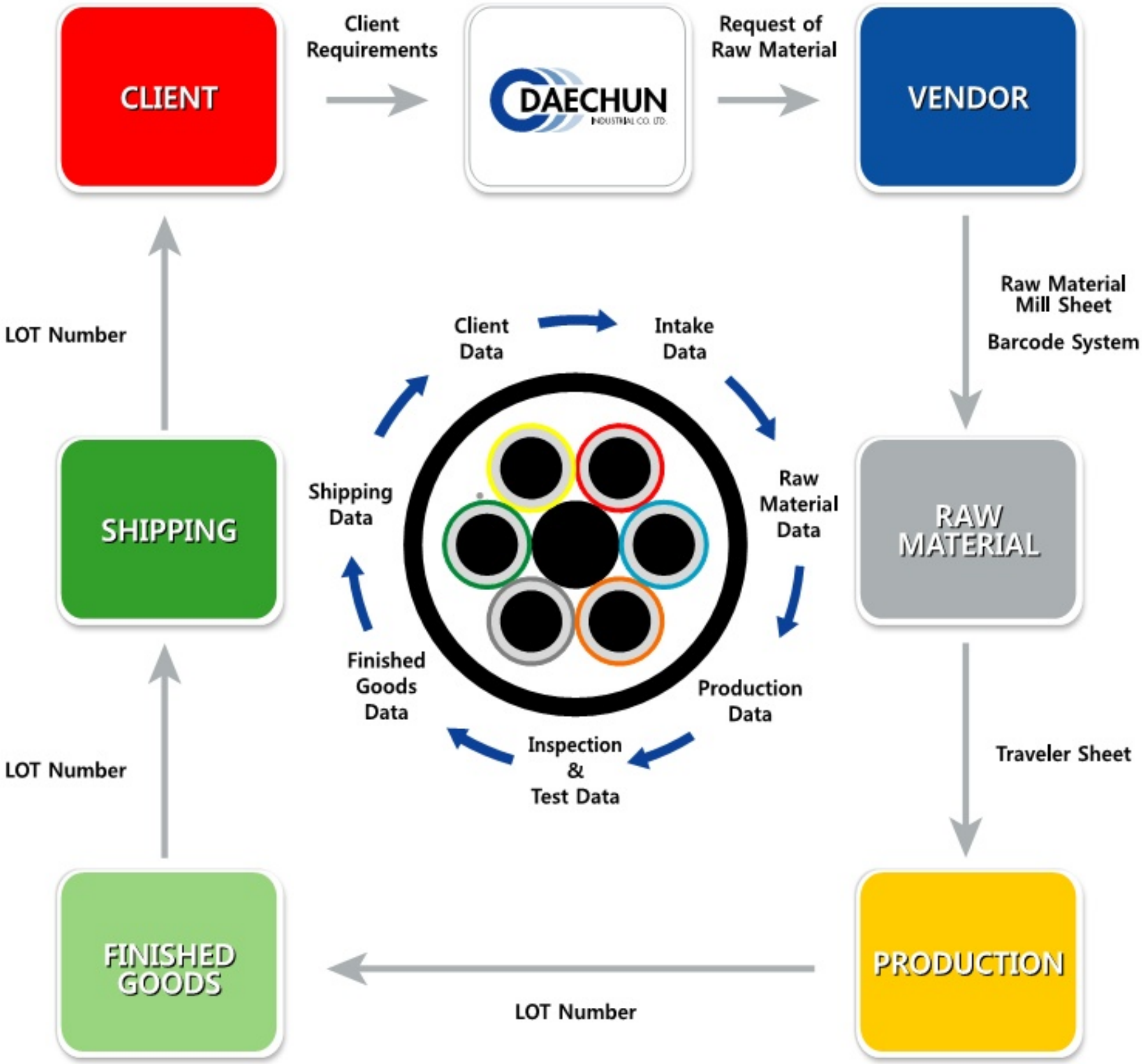
- Waste Reduction
- Recycle & Utilization of the Material
- Eco-efficient Operation
- Implementation of Energy Saving
- Continuos Improvement & Prevention of Pollution

EMPLOYEE

- Diversity & Equal Opportunity
- Training & Development
- Employee Health, Safety and Welfare
- Mutual Respect
- Reward & Discipline Action
- Anti-bribery Policy
- Protect Whistleblower

Product Traceability

Our Product Traceability System ensures full traceability of our products from raw materials to delivery of the final products and vice versa. Identification and status of products are provided by LOT numbering system. Our tubes are continuously marked with LOT number every 1 meter throughout the entire length and this enables the identification of product lot, production & inspection history, origin of raw material and delivery record. Our traceability system keeps track of the quality of our products to best fulfill our client's needs.



Approval Programs

American Bureau of Shipping

Bureau Veritas

China Classification Society

DNV GL

Korean Register of Shipping

Lloyd's Register

Nippon Kaiji Kyokai

RINA SERVICES S.p.A.

Russian Maritime Register of Shipping

WORLD CLASS PRODUCT OF KOREA

Achilles JQS
empowered by Achilles
Qualified

ISO 9001

ISO 14001

OHSAS 18001

Brief History

2016. 12 Received Korean World-class Product Award by MOTIE, Korea
02 Registered in Achilles Joint Qualification System
2014. 10 Achieved 10000 Shipset Supply
10 Obtained NK Factory Approval Certificate
05 Obtained RMRS Factory Approval Certificate
2013. 09 Received Silver Tower Industry Order by MOTIE, Korea
2012. 06 Obtained CCS Factory Approval Certificate
2008. 11 Received Ten Million Dollar Export Tower Award from KITA, Korea
2006. 11 Approved ISO 14001 Environmental Management System Certificate
10 Approved OHSAS 18001 Occupational Health & Safety Management System Certificate
06 Received Five Million Dollar Export Tower Award from KITA, Korea
2002. 09 Obtained BV Factory Approval Certificate
2001. 12 Obtained ABS Product Type Approval Certificate
09 Designated as Venture Business by SMBA, Korea
02 Obtained Utility Model Registration of The Bond Type Tube from KIPO (No. 0220542)
02 Selected as Promising Small and Mid-sized Business by KB Bank, Korea
2000. 10 Obtained RINA Factory Approval Certificate
09 Obtained GL Factory Approval Certificate
08 Obtained Self-quality Control Certificate by HMD, Korea
01 Received Award as Best Cooperating Company by DSME, Korea
1999. 04 Obtained LR Factory Approval Certificate
01 Received Award as Excellent Cooperating Company by HHI, Korea
1998. 10 Approved ISO 9001 Quality Management System Certificate
1997. 12 Obtained KR Factory Approval Certificate
01 Expanded facilities and moved to current place Gimhae, Korea
1995. 08 Obtained DNV Factory Approval Certificate
1994. 11 Received Award as Excellent Cooperating Company of 'Hope of 90s' by DSME, Korea
11 Re-established DAECHUN Industrial Co. Ltd.
06 Obtained The Patent regarding MCT from KIPO (No. 074403)
03 Received Award as Excellent Cooperating Company by HHIC, Korea
1991. 12 Selected as Advanced-tech Small and Mid-sized Company by MOTIE, Korea
1990. 07 Completed Multi Core Tube (MCT) development
1981. 10 Initiated Business under the name of DAECHUN Machinery

Product Information

DAECHUN leverages its state-of-the-art technology and facilities to manufacture and supply Multi Core Tube, Stainless Steel Tube, Copper Tube which are customized to each industry.




Multi Core Tube

Multi Core Tube is a bundled tube tied together to efficiently install, maintain and control at once. It is used in shipbuilding, on/offshore plants and other industries to transport hydraulic oil, air, gas and etc.

Product Advantages

Material Cost Reduction

- Dramatically decrease or eliminate welding and fittings
- Conveniently cut tubings to a precise length on site, reducing product scraps and wastes

Easy & Fast Installation

- Achieve convenient installation due to easy manual bending in any directions
- Reduce installation/inspection time by eliminating fittings and bundled tubings

Corrosion Prevention

- Prevent and shield tube from dissimilar metal contacts
- Protect tube from contamination such as construction debris, chloride deposit, abrasion and etc.

Complete Tube Protection

- Furnish complete tube protection by triplicate sheath system from outside impact
- Provide reliable protection from physical and service damage by sheathing tubes

Cost-effective Solution

- Reduce labor cost by faster installation and minimized inspection process
- Free from maintenance time and cost by its long term durability
- Provide space-saving and cost effective design solution

Tube Identification

- Ensure easy individual tube identification with different color identifying inner sheath
- Stencil tube specifications and detailed information every meter

Product Application

- Valve Remote Control(VRC) Lines
- Fire Fighting Control Lines
- Pressure Sensing Lines
- Tank Level & Draft Gauging Lines
- Wellhead Control Panel Lines
- Process Instrument Lines
- Control & Instrumentation Lines
- Deck Machinery Remote Control Lines
- Fixed Gas Detection Sensing Lines
- Sampling & Drain Lines
- Heat Tracing Lines
- Chemical Injection Lines
- Hydraulic Control Lines
- Process & Power Plants
- Shipbuilding, Oil, Gas, Petrochemical, Desalination, Fertilizer & Chemical Industries

Multi Core Tube and Single Sheathed Tube

The corrosion of metals and alloys in natural and chlorinated seawater has presented tough challenges for Marine & Offshore Industries. Stainless Steel & Copper tubings are acclaimed for their excellent corrosion resistance and widely used in the field. Nonetheless, they are also susceptible to corrosion attack in the presence of water, oxygen, chloride and construction debris. Furthermore, there are common factors which lead tubing system to failure.

- Contact with Dissimilar Metal
- Construction Debris
- Incorrect or Poor Installation
- High Ambient Temperature
- Crevice Formation
- Periodic Testing of Seawater Deluge System
- Tray Vibration Damage on Bare Tube
- Strong Sand Wind

Consequences of Corrosion

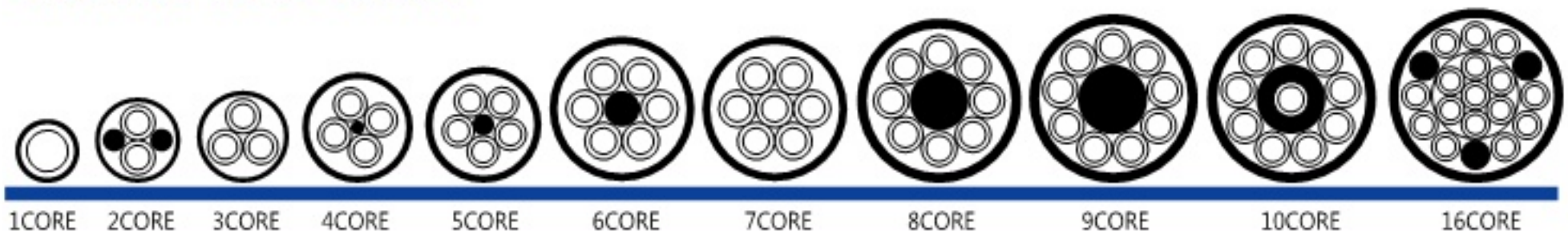
The consequences of corrosion have been critical problems of worldwide vessels and offshore projects.

- Material Cost Loss
- Leakage & Damage in the process
- Incurring Replacement & Maintenance Cost
- Operating Cost Hike
- Increase in Labor cost
- Structural Failure or Breakdown
- Cause of Contamination
- Lost Production Opportunity

Total Tube Solution

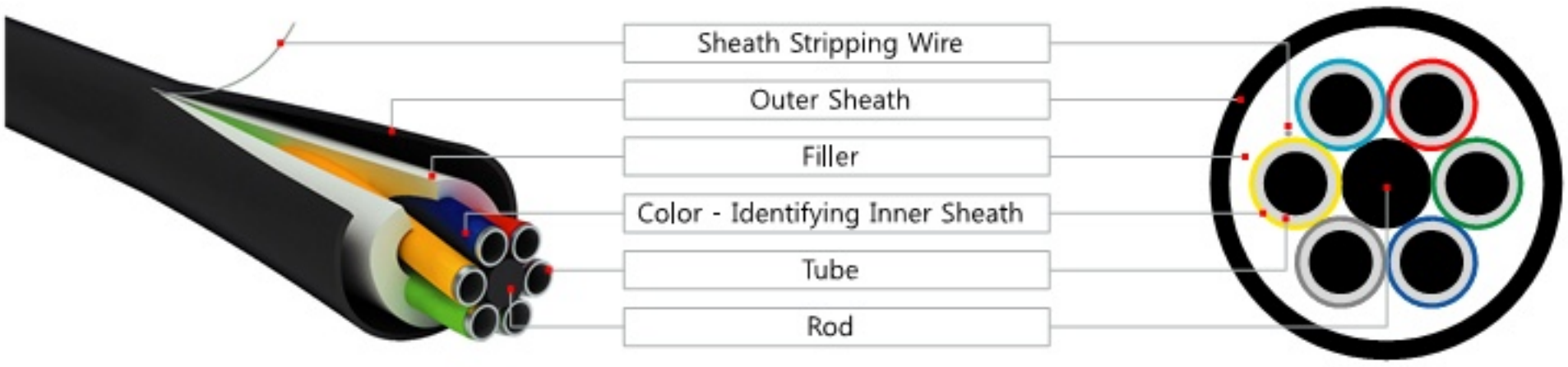
Tube is durable and protected from physical & service damage and corrosive environment by sheathing the tube. UV resistant Polyvinyl Chloride (PVC) jacketed TP316L stainless steel coil tubing is highly proposed as most economical & effective choice considering the life cycle cost for shipbuilding and offshore projects.

Structural Cross - Section



Construction

Cross Section View



Tube Material

Material	National Standard					
	Alloy	UNS CODE	ASTM	KS	JIS	DIN
Stainless Steel	304 316 316L 317L 321 347	S30400 S31600 S31603 S31703 S32100 S34700	304 316 316L 317L 321 347	STS 304 STS 316 STS 316L STS 317L STS 321 STS 347	SUS 304 SUS 316 SUS 316L SUS 317L SUS 321 SUS 347	1.4301 1.4401 1.4404 1.4438 1.4541 1.4550
High Alloy Stainless Steel	904L	N08904	-	STS 890L	SUS 890L	1.4539
Super Austenitic	6 Mo	S31254	-	-	-	1.4547
Nickel Alloy	Monel 400 Nickel 200 Inconel 600 Inconel 625 Inconel 825 Hastelloy C22 Hastelloy C276	N04400 N02200 N06600 N06625 N08825 N06022 N10276	400 200 I600 I625 I825 C22 C276	NCF 690 TB NCF 600 TB NCF 800 TB NCF 625 TB NCF 825 TB NW6022 NW0276	NCF 690 TB NCF 600 TB NCF 800 TB NCF 625 TB NCF 825 TB NW6022 NW0276	2.4360 2.4066 2.4816 2.4856 2.4858 2.4602 2.4819
Duplex	Duplex Super Duplex	S31803, S32205 S32750	- -	STS329J3L -	SUS329J3L -	1.4462 1.4410
Copper	Copper	C12200	C12200	C1220	C1220	SF-Cu
Copper-Nickel 90/10	Cu-Ni 90/10	C70600	C70600	C7060	C7060	CW352H

Please consult us for other materials not listed.

Sheath Material

Material		PVC	FR PVC	HR PVC	HFFR TPU	HFFR PE	HDPE	MDPE	LDPE	XLPE
Tensile Strength (kgf/㎟)		1.2~1.4	1.5~1.7	2.0~2.4	2.3~2.8	1.0~1.4	2.6 ~ 3.0	2.3~2.7	2.2~2.6	2.0~2.4
Service Temperature (℃)		-40/+70	-40/+70	-50/+105	-50/+90	-45/+70	-75/+75	-75/+75	-75/+60	-50/+90
Elongation (%)		250~290	250~290	300~500	400~600	500~700	800~1000	750~950	450~650	400~600
Hardness	Shore A	84~90	86~90	81~85	88~92	93~95	N/A	N/A	N/A	N/A
	Shore D	N/A	N/A	N/A	N/A	N/A	61~65	57~61	53~57	91~95
Halogenated		Detected	Detected	Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected	Not Detected
Flame Retardant (IEC60332-1)		Satisfied	Satisfied	Satisfied	Satisfied	Satisfied	Not Satisfied	Not Satisfied	Not Satisfied	Not Satisfied
Flame Retardant (IEC60332-3-22 Category A)		Not Satisfied	Satisfied	Satisfied	Satisfied	Satisfied	Not Satisfied	Not Satisfied	Not Satisfied	Not Satisfied

Please consult us for other materials not listed.

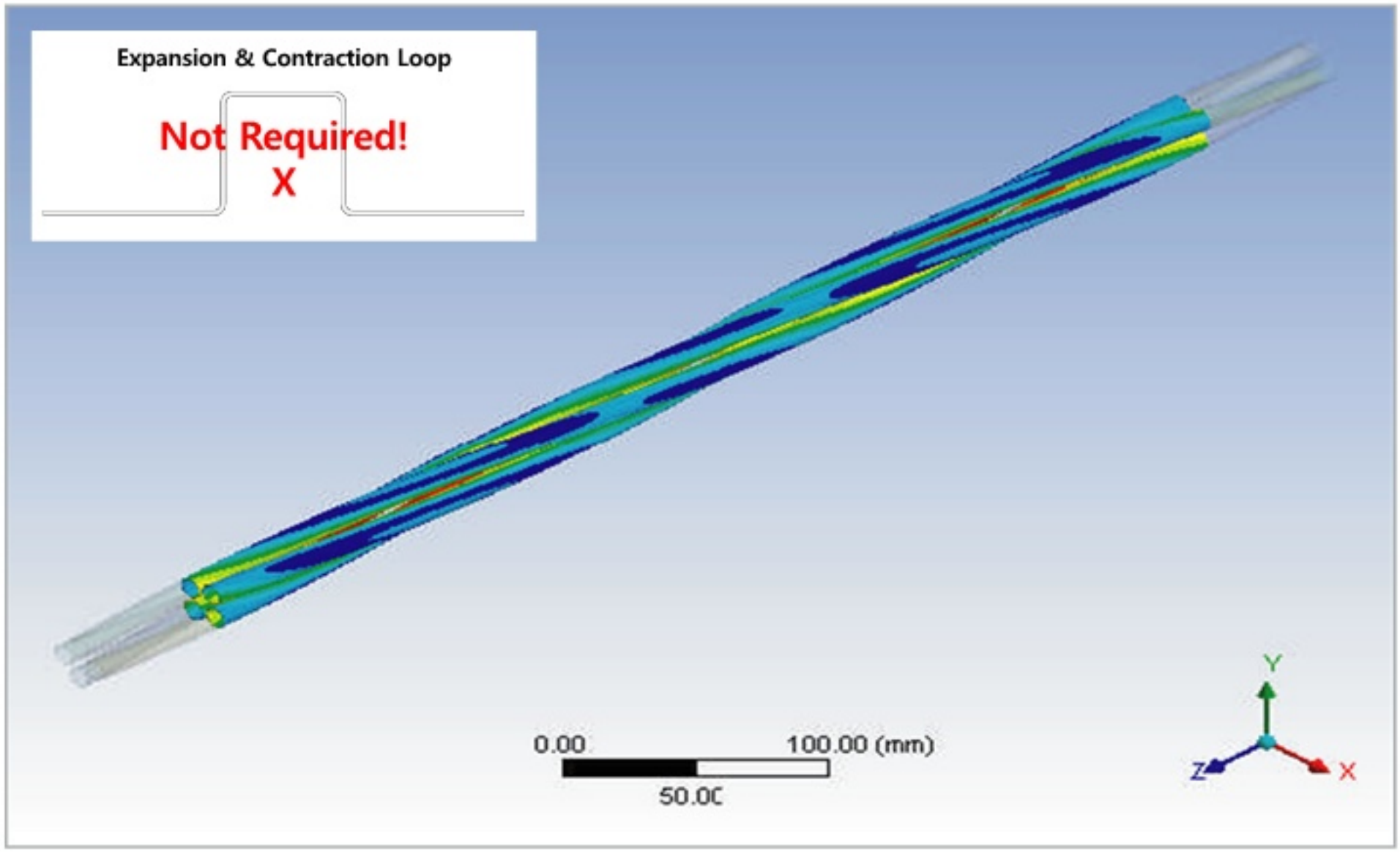
FR : Flame Retardant, HR : Heat Resistant, HFFR : Halogen Free & Flame Retardant, HD: High Density, MD: Medium Density, LD: Low Density
XL : Cross-linked, PVC : Polyvinyl Chloride, TPU : Thermoplastic Polyurethane, PE : Polyethylene

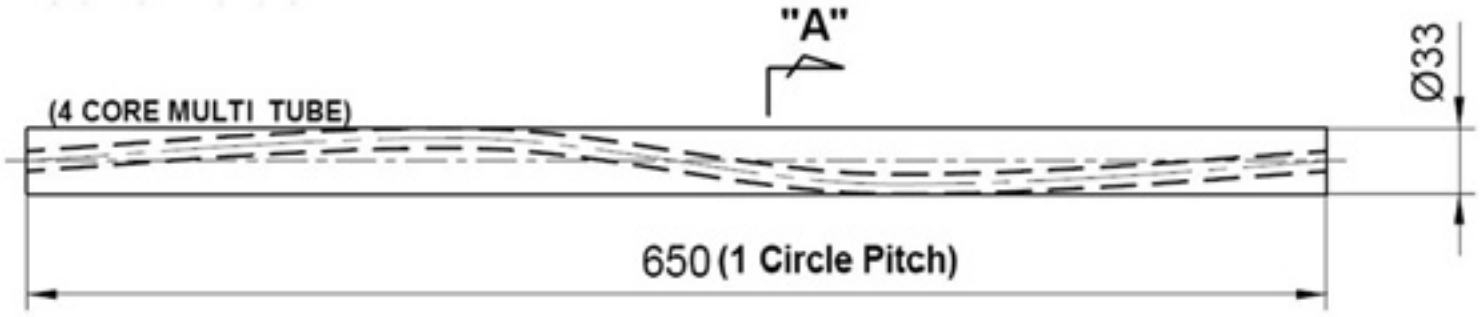
Free from Expansion & Contraction Loop

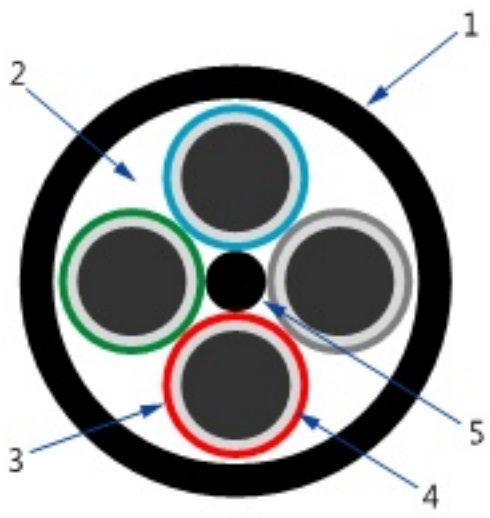
Considering a vessel's hull deflection stainless steel stick bare tubing is installed with a bend loop to allow for expansion and contraction. As this regular tube bend loop work is one of the main reasons increasing labor cost, time and installation space installers in shipbuilding and offshore industries have been in search of alternative tubings. Stranded Multi Core Tube bundle has the advantage to absorb hull deflection without doing routine and time-consuming bend procedures. Well-designed DAECHUN's Multi Core Tube from 2core and over naturally absorbs every vessel type's hull deflection with its own structure without an artificial expansion and contraction bend loop.

Multi Core Tube Design

Example







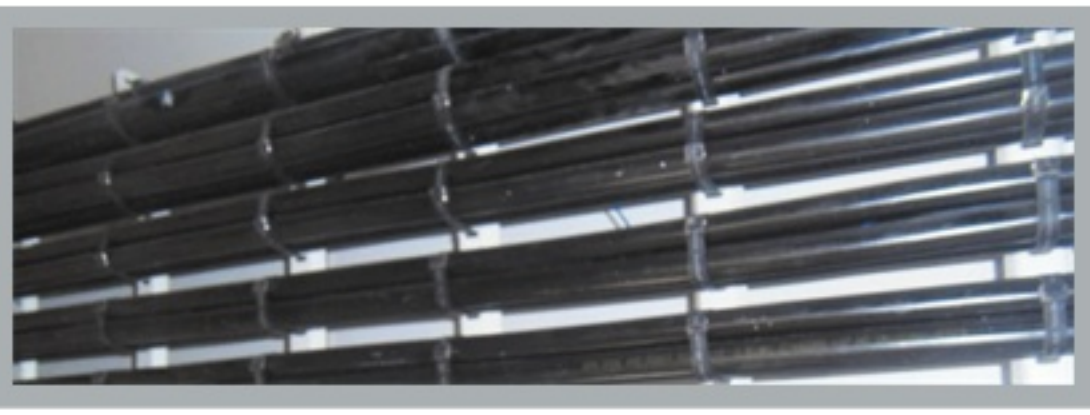
No.	Description	Material	Thickness	Q'ty
1	Outer Sheath	PVC	2.5mm	1
2	Filler	Synthetic rubber	-	1
3	Color Identifying Inner Sheath	PVC	0.5mm	4
4	Tube	SUS316L	0.8mm	4
5	PVC Rod	PVC	4.7mm	1

Specification (Metric size)

O.D.(mm) x Core	Bundle Weight(Kg/M)								Overall Diameter Approx. (mm)
	Stainless Steel				Copper & Copper Alloy				
	Wall Thickness(mm)				Wall Thickness(mm)				
	0.5	0.8	1.0	1.2	0.8	1.0	1.2	1.4	
6 x 1	0.12	0.16	0.18	0.20	0.17	0.20	-	-	9
6 x 2	0.49	0.56	0.60	0.64	0.58	0.63	-	-	19
6 x 3	0.57	0.66	0.72	0.78	0.69	0.77	-	-	20
6 x 4	0.72	0.86	0.95	1.03	0.91	1.01	-	-	23
6 x 5	0.81	0.98	1.08	1.18	1.04	1.16	-	-	24
6 x 6	1.01	1.22	1.34	1.46	1.29	1.43	-	-	27
6 x 7	1.04	1.28	1.43	1.57	1.36	1.53	-	-	27
6 x 8	1.39	1.67	1.84	2.01	1.76	1.96	-	-	32
6 x 9	1.60	1.92	2.10	2.28	2.10	2.22	-	-	34
6 x10	1.63	1.98	2.18	2.39	2.17	2.37	-	-	34
8 x 1	0.17	0.22	0.25	0.28	0.23	0.27	0.30	-	11
8 x 2	0.64	0.74	0.80	0.86	0.81	0.88	0.94	-	23
8 x 3	0.71	0.86	0.95	1.03	0.94	1.04	1.14	-	24
8 x 4	0.94	1.14	1.26	1.38	1.24	1.38	1.51	-	28
8 x 5	1.19	1.44	1.60	1.75	1.56	1.73	1.89	-	31
8 x 6	1.35	1.65	1.83	2.01	1.78	1.99	2.18	-	33
8 x 7	1.37	1.72	1.93	2.14	1.87	2.11	2.34	-	33
8 x 8	2.07	2.47	2.72	2.96	2.64	2.92	3.18	-	41
8 x 9	2.43	2.83	3.08	3.37	2.88	3.20	3.49	-	43
8 x10	2.45	2.90	3.18	3.47	2.97	3.32	3.64	-	43
10x 1	-	0.27	0.32	0.35	0.33	0.34	0.38	0.41	13
10x 2	-	1.02	1.10	1.18	1.07	1.16	1.25	1.33	28
10x 3	-	1.20	1.32	1.44	1.27	1.40	1.54	1.66	29
10x 4	-	1.55	1.71	1.87	1.64	1.82	2.20	2.36	33
10x 5	-	1.96	2.17	2.37	2.07	2.30	2.52	2.72	37
10x 6	-	2.26	2.50	2.74	2.39	2.67	2.93	3.17	40
10x 7	-	2.33	2.62	2.90	2.49	2.80	3.11	3.39	40
10x 8	-	3.23	3.55	3.87	3.41	3.77	4.12	4.45	48
10x 9	-	3.72	4.05	4.41	-	4.29	4.68	5.05	51
10x10	-	3.79	4.11	4.51	-	4.38	4.81	5.22	51
12x 1	-	0.32	0.38	0.42	0.34	0.41	0.46	0.51	15
12x 2	-	1.35	1.45	1.55	1.41	1.52	1.72	1.82	33
12x 3	-	1.90	2.05	2.20	-	2.15	2.32	2.47	38
12x 4	-	2.02	2.23	2.43	-	2.36	2.58	2.78	39
12x 5	-	2.17	2.43	2.68	-	2.59	-	-	44
12x 6	-	3.01	3.32	3.62	-	3.52	-	-	48

O.D.(mm) x Core	PVC Sheathed Tube Weight(Kg/M)						Overall Diameter Approx. (mm)
	Stainless Steel				Copper & Copper Alloy		
	Wall Thickness(mm)				Wall Thickness(mm)		
	1.0	1.2	1.5	2.0	1.0	1.2	
10 x 1	0.32	0.35	0.40	0.48	0.34	0.38	13
12 x 1	0.38	0.42	0.49	0.60	0.41	0.46	15
15 x 1	0.47	0.54	0.63	-	0.51	0.59	18

Please consult us for other sizes not listed.



Specification (Imperial size)

O.D.(inch) x Core	Bundle Weight (Kg/M)					Overall Diameter Approx. (mm)
	Stainless Steel			Copper & Copper Alloy		
	Wall Thickness (inch)			Wall Thickness (inch)		
	0.035	0.049	0.065	0.035	0.049	
1/4 x 1	0.17	0.21	0.24	0.19	0.23	9
1/4 x 2	0.75	0.83	0.90	0.78	0.87	21
1/4 x 3	0.82	0.93	1.04	0.87	0.99	22
1/4 x 4	1.10	1.28	1.43	1.16	1.34	25
1/4 x 5	1.20	1.40	1.59	1.27	1.50	26
1/4 x 6	1.40	1.64	1.87	1.49	1.76	29
1/4 x 7	1.50	1.76	2.03	1.57	1.85	29
1/4 x 8	1.94	2.24	2.55	2.02	2.34	34
1/4 x 9	2.22	2.56	2.91	2.31	2.67	36
1/4 x 10	2.29	2.67	3.06	2.39	2.79	36
3/8 x 1	0.28	0.35	0.41	0.31	0.38	13
3/8 x 2	1.14	1.27	1.40	1.18	1.33	28
3/8 x 3	1.30	1.49	1.69	1.37	1.59	29
3/8 x 4	1.59	1.85	2.12	1.68	1.98	32
3/8 x 5	1.99	2.32	2.66	2.10	2.47	36
3/8 x 6	2.35	2.74	3.14	2.47	2.86	39
3/8 x 7	2.41	2.87	3.34	2.58	3.09	39
3/8 x 8	3.31	3.84	4.38	3.50	4.09	47
3/8 x 9	3.72	4.31	4.92	3.92	4.59	50
3/8 x 10	3.87	4.53	5.21	4.10	4.84	50
1/2 x 1	-	0.47	0.57	-	0.51	16
1/2 x 2	-	1.84	2.04	-	1.92	35
1/2 x 3	-	2.61	2.91	-	2.74	41
1/2 x 4	-	2.83	3.23	-	3.00	42
1/2 x 5	-	3.50	4.00	-	3.71	47
1/2 x 6	-	4.14	4.74	-	4.39	51

Please consult us for other sizes not listed.

Maximum Allowable Working Pressure

Stainless Steel Seamless Tube

(Unit : bar)

O.D. (mm)	Wall Thickness (mm)					
	0.5	0.8	1.0	1.2	1.5	2.0
6	200	330	425	525	-	-
8	145	245	310	380	-	-
10	115	190	245	295	380	530
12	-	160	200	245	310	430
15	-	-	160	190	245	335

(Unit : bar)

O.D. (inch)	Wall Thickness (inch)		
	0.035	0.049	0.065
1/4	350	515	720
3/8	225	330	450
1/2	165	240	325

Stainless Steel Seam-welded Tube

(Unit : bar)

O.D. (mm)	Wall Thickness (mm)					
	0.5	0.8	1.0	1.2	1.5	2.0
6	160	265	340	420	-	-
8	115	195	245	305	-	-
10	90	155	195	235	305	425
12	-	125	160	195	250	345
15	-	-	125	155	195	270

(Unit : bar)

O.D. (inch)	Wall Thickness (inch)		
	0.035	0.049	0.065
1/4	280	410	575
3/8	180	260	360
1/2	135	190	260

Copper Tube (Soft-annealed)

(Unit : bar)

O.D. (mm)	Wall Thickness (mm)				
	0.8	1.0	1.2	1.4	1.6
6	95	120	150	-	-
8	70	85	110	-	-
10	55	70	85	105	-
12	45	55	70	85	100
15	35	45	55	65	-

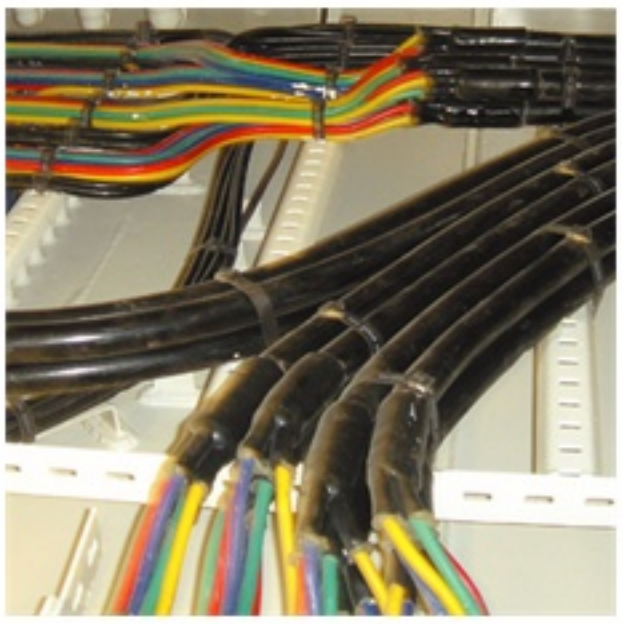
O.D. (inch)	Wall Thickness (inch)	
	0.035	0.049
1/4	95	150
3/8	60	95
1/2	45	70

Cu-Ni(90/10) Tube

(Unit : bar)

O.D. (mm)	Wall Thickness (mm)				
	0.8	1.0	1.2	1.4	1.5
6	180	230	280	-	-
8	130	165	205	-	-
10	100	130	160	190	205
12	-	105	130	155	165
15	-	85	100	120	130

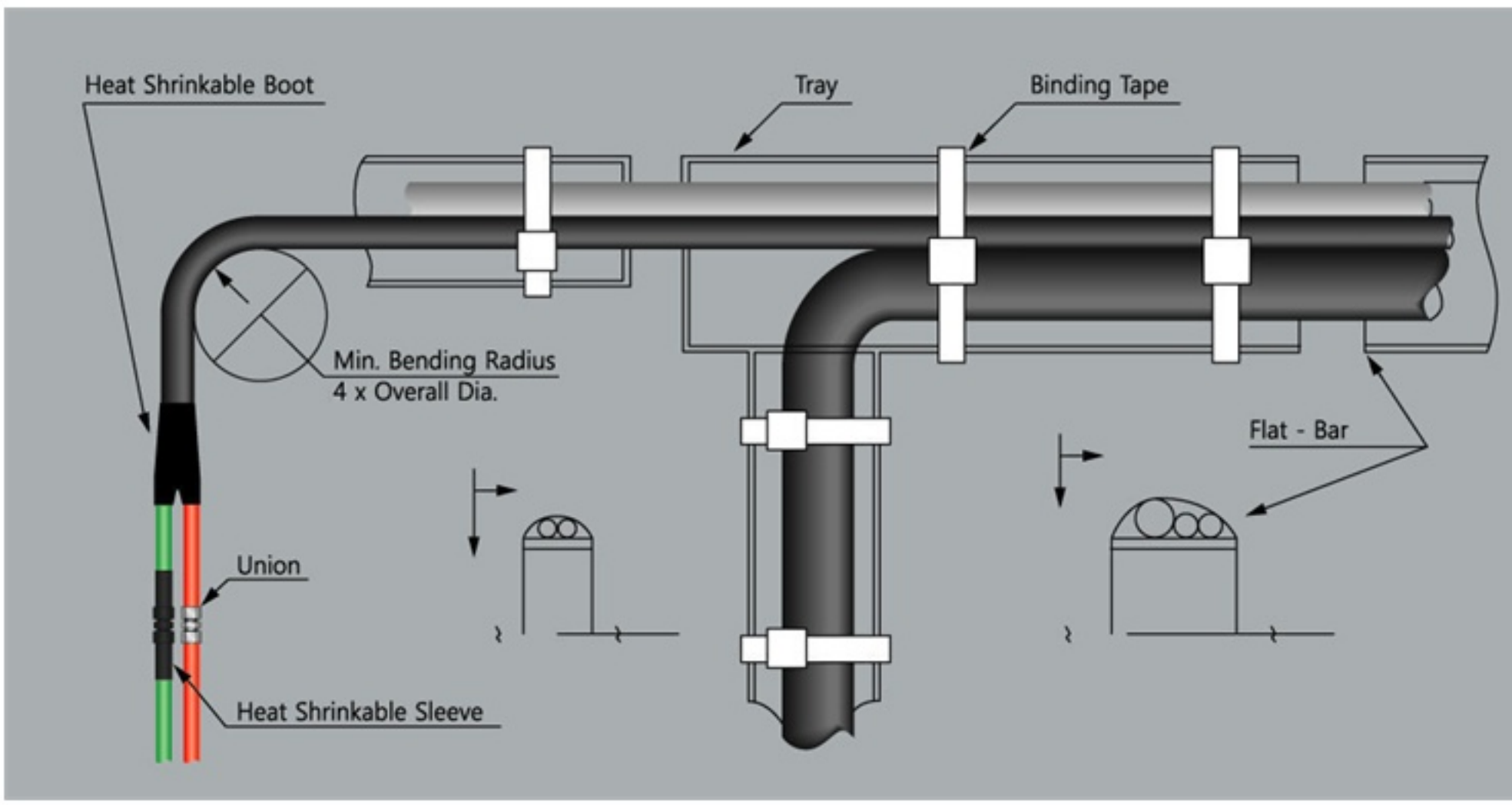
O.D. (inch)	Wall Thickness (inch)	
	0.035	0.049
1/4	190	275
3/8	120	175
1/2	90	125

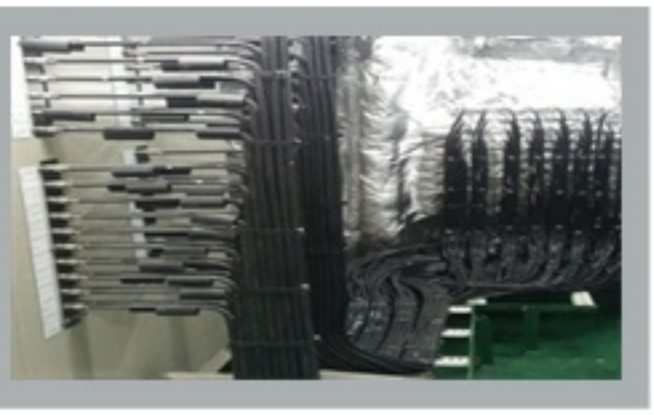


Installation

Multi Core Tube bundle is wound onto wooden drums and supplied to customers worldwide. Installation of Multi Core Tube, e.g. uncoiling from wooden drums, straightening, running, cutting, etc. is applied in the same way as that of electrical cable. See typical installation shown below.

Multi Core Tube can be run on ladder tray, perforated tray or flat-bar tray and penetrate deck or bulkhead (wall) by either coaming or appropriate penetration fittings. Suitable fittings such as straight union, male/female connector, penetration gland, etc. are used for connection or termination of the tube.

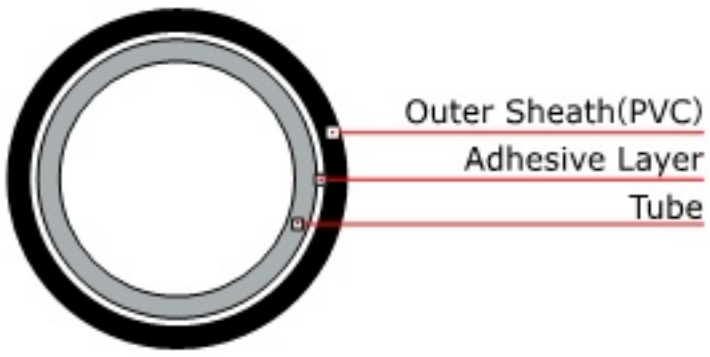




Special Single Core Tube

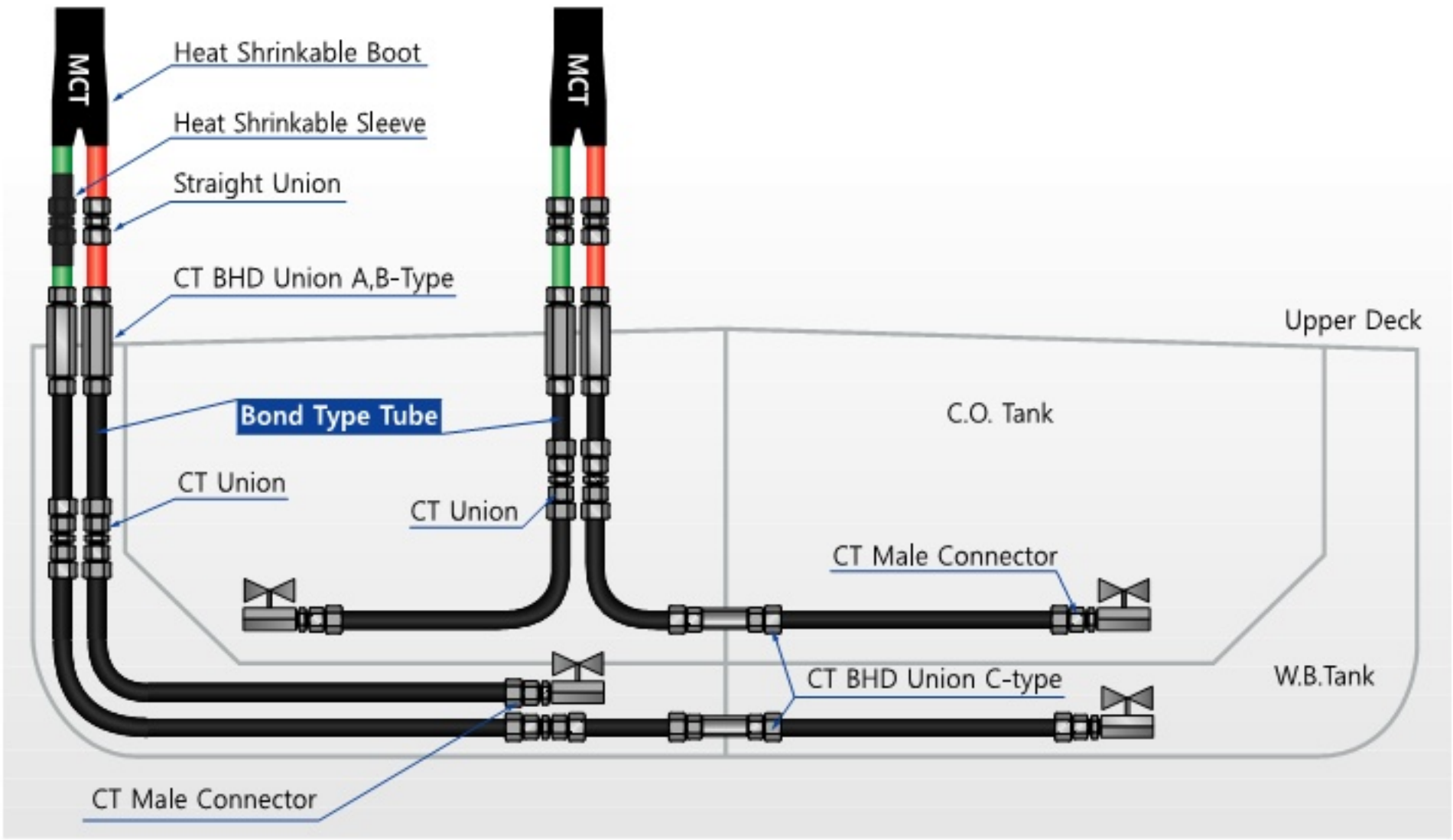
Single Core Bond Type Tube

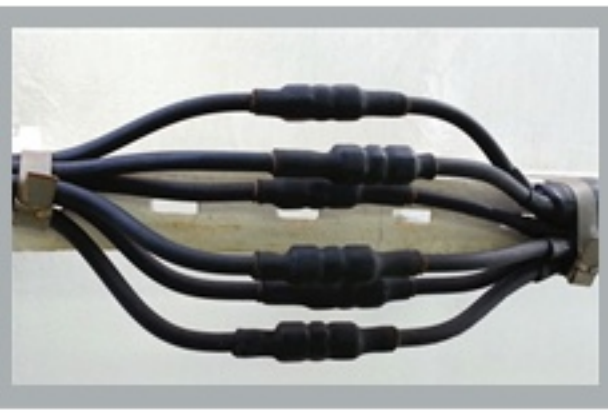
The bond type tube is installed in water ballast tank (WBT) and crude oil tank (COT). This tube has a special adhesive layer between tube and protective outer sheath, capable of localizing any physical damage of the tube.
When compared to conventional use of bare tube (typically 2mm wall), the bond type tube of 0.8-1.0mm wall is commonly adopted, which enables yard's installation easier and minimizes corrosion of tube in service.



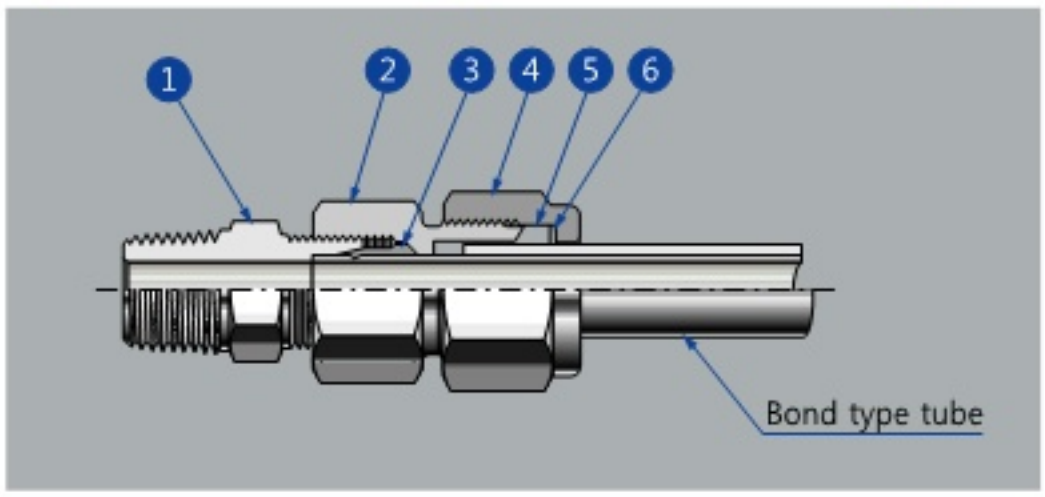
O.D. (mm)	Wall Thickness (mm)	Overall Diameter Approx. (mm)
12	0.8 / 1.0 / 1.2	15
10	0.8 / 1.0 / 1.2	13
8	0.8 / 1.0 / 1.2	11

Typical Installation

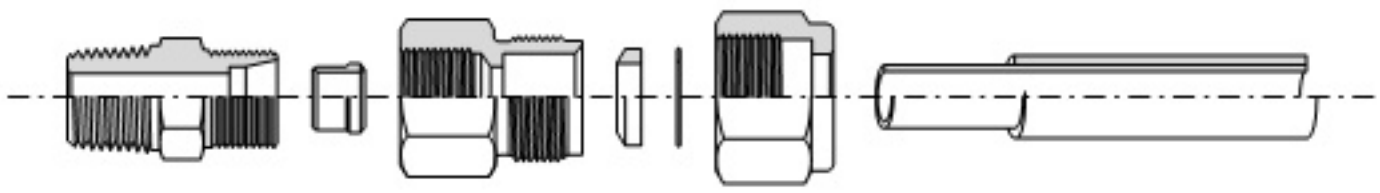




Special Fittings For Bond Type Tube

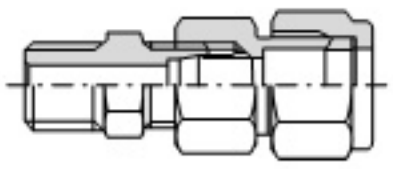


No	Part name	Material
1	Body	AISI 316
2	Coupling	AISI 316
3	Sleeve	AISI 304
4	Nut	AISI 316
5	Packing	NBR
6	Bearing	POM



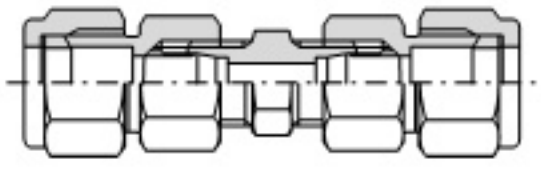
The bond type tube is installed together with suitable fittings for intended connection (see below) allowing no intermediate cuts.
Sealing is achieved by means of bite mechanism, NBR packing and CT nut.

CT connector (male)
bond type tube - equipment (valve actuator)



CT connector (female)
bond type tube - equipment (valve actuator)

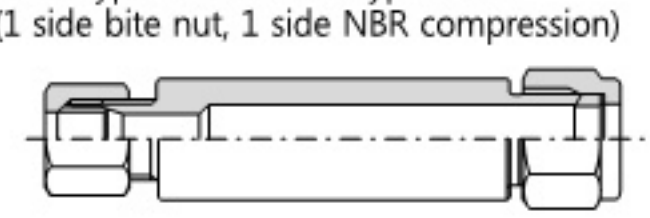
CT union
bond type tube - bond type tube



CTxB union
bond type tube - bare tube

CT bulkhead union A type
bond type tube – bond type tube
(both sides NBR compression)

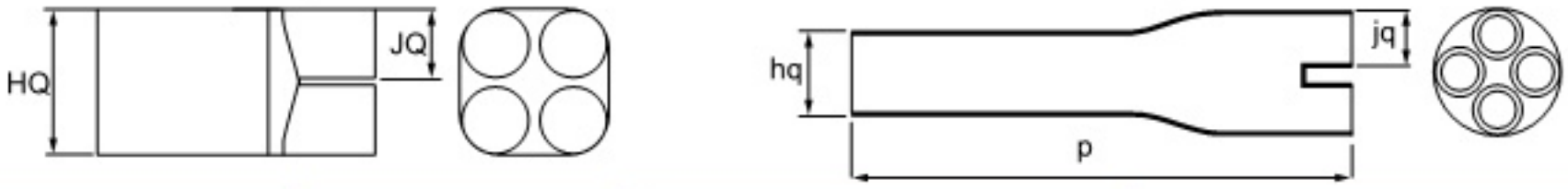
CT bulkhead union B type
bond type tube - bond type tube
(1 side bite nut, 1 side NBR compression)



CT bulkhead union C type
bond type tube – bond type tube
(both sides bite & NBR compression)

Heat Shrinkable Boot

Material	Cross - linked Polyolefin (Flame Retardant)	
Temperature	Operating Temperature Range	-40°C ~ 100°C
	Minimum Shrinking Temperature	125°C



Type	As Supplied		After Recovery (min.)			Suitable Multi Core Tube
	HQ	JQ	hq	jq	p	
DCHB - 02 - 1	34	14	12	4	78	O.D. 6mm X 2CORE O.D. 8mm X 2CORE
DCHB - 02 - 2	45	18	15	6	90	O.D. 10mm X 2CORE O.D. 12mm X 2CORE
DCHB - 03 - 1	35	15	17	5	76	O.D. 6mm X 3CORE O.D. 8mm X 3CORE
DCHB - 03 - 2	50	25	27	9	100	O.D. 10mm X 3CORE O.D. 12mm X 3CORE
DCHB - 04 - 1	40	14	22	5	90	O.D. 6mm X 4CORE O.D. 8mm X 4CORE
DCHB - 04 - 2	50	18	26	5	90	O.D. 10mm X 4CORE O.D. 12mm X 4CORE
DCHB - 05 - 1	40	13	20	5	90	O.D. 6mm X 5CORE O.D. 8mm X 5CORE
DCHB - 05 - 2	55	17	23	5	110	O.D. 10mm X 5CORE O.D. 12mm X 5CORE
DCHB - 06 - 1	45	12	20	4	100	O.D. 6mm X 6CORE O.D. 8mm X 6CORE
DCHB - 06 - 2	85	23	37	7	140	O.D. 10mm X 6CORE O.D. 12mm X 6CORE

Heat Shrinkable Sleeve

Material	Cross - linked Polyolefin (Flame Retardant)	
Temperature	Operating Temperature Range	-40°C ~ 110°C
	Minimum Shrinking Temperature	125°C

Type	As Supplied	After Recovery (min)	Wall Thickness After Recovery
	D(mm)	d(mm)	w(mm)
DCHT 12 / 4	12	4	1.5
DCHT 15 / 5	15	5	1.9
DCHT 19 / 6	19	6	3.4
DCHT 25 / 6	25	6	2.2
DCHT 32 / 8	32	8	2.5
DCHT 40 / 13	40	13	2.5
DCHT 48 / 16	48	16	2.7
DCHT 55 / 16	55	16	2.7
DCHT 72 / 18	72	18	3.0

Heat Shrinkable Boot and Sleeve (HSB & HSS)

Corrosion Protective

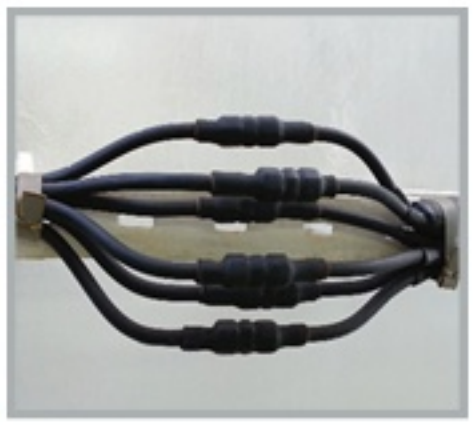
Special care is required for installers due to the potential corrosion of metals and alloys when installed in aggressive shipyard environments such as scratches, salt water, alien objects and carbon dusts.
Those contaminants may start breaking the passivity of stainless steel bare tube & fitting, combine with the oxygen and result in tube corrosion.

During the installation scratches, metallic dusts, and etc. must be avoided. For longer and more reliable protection purposes, we highly recommend sheathed tubes and jacket bare exposed stainless steel tubes and fitting surfaces with heat shrinkable boots and sleeves.

Designed for insulating and sealing a multicore tube crotch and individual tube, a cross-linked polyolefin HSB and HSS are supplied along with an adhesive inner coating for reliable environmental sealing.

Installation of HSB and HSS



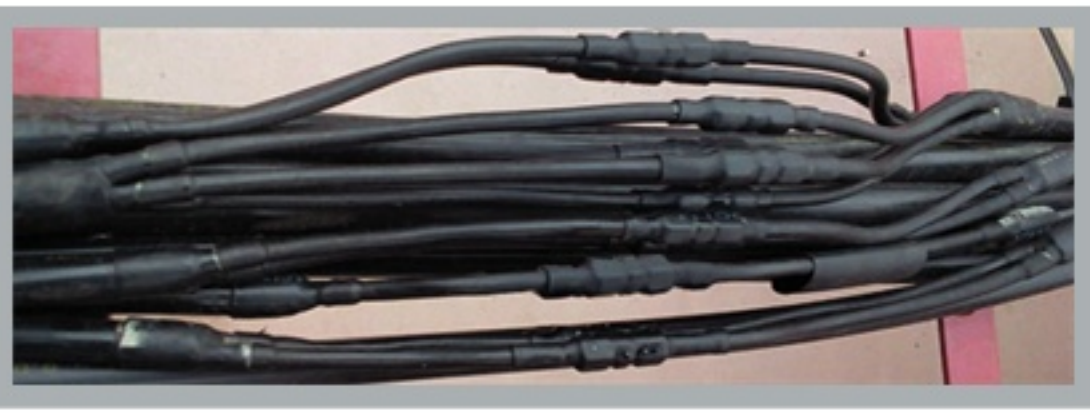



Installation Steps for HSB

1. Pass the breakout over the cores and push it well down into the crotch.
2. Shrink the breakout into place starting at the center. Work first towards the over-sheath and then shrink the fingers onto the cores.
3. When installation of breakout is completed allow the breakout to cool before applying any mechanical strain.

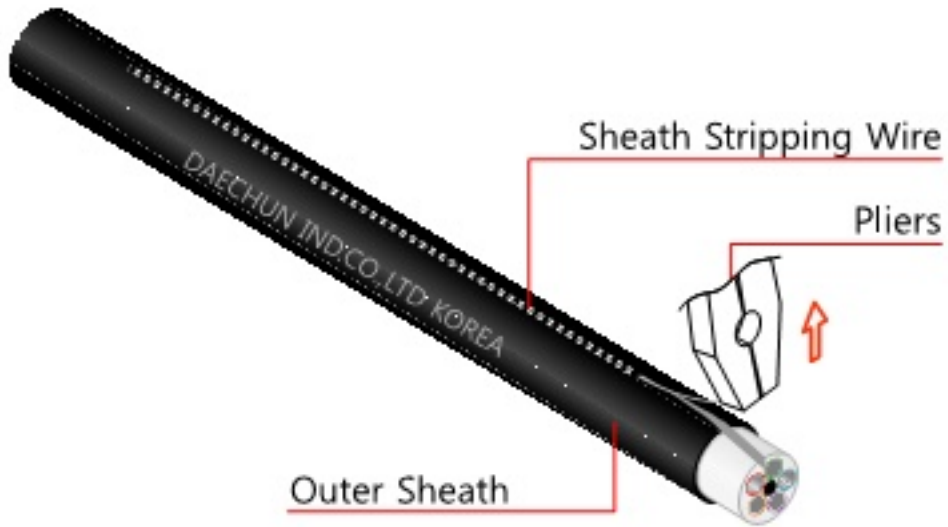
Installation Steps for HSS

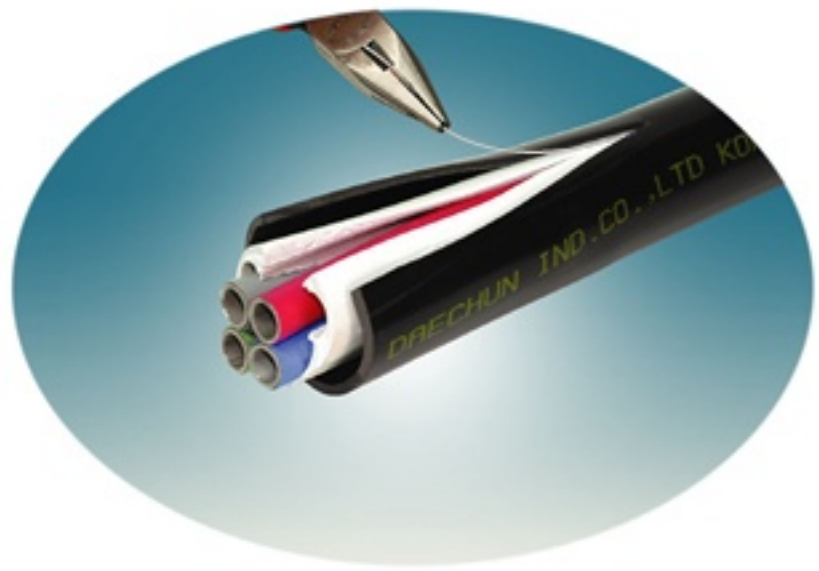
1. Cut(square) to desired length and slide the expanded tubing over the item to be covered.
2. Shrink tubing by applying heat using a heat gun or other heat sources. Tubing starts to shrink at around 125°C.
   As heat is applied, move heat source back and forth and around the tubing to be shrunk.
   Shrink from the center toward the ends to ensure even shrinkage and avoid air entrapment.
3. When the tubing has shrunk enough to assume the configuration of the item covered, discontinue heating.
   Additional heating will not make the tubing shrink tighter.

Easier & Safer Sheath Removing Procedure

Sheath stripping wire embedded along the tube (see below picture) ensures easier and safer sheath removing procedure. The sheath can be simply stripped out by pulling the wire without using tools like knife, etc.





Stainless Steel Bare Tube Handling

When stainless steel bare tube is required at a shipyard the shipyard should handle it with care. The stainless steel bare tube can be subject to corrosion when it is exposed to metallic dusts and salty environments containing water and chlorides. While installing the stainless steel bare tube, scratches, metallic dusts and etc. must be avoided.

Tools & Accessories

Manual Bender

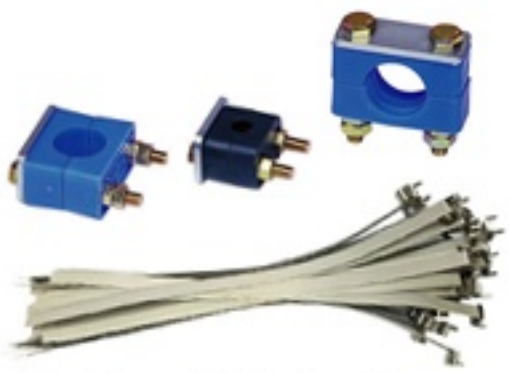
Tube Cutter and Blade

Sheath Removing Knife

Tube Deburring Tool

Tube Fitting

Bulkhead Penetration Gland



Plastic Clamp & Binding Tape

Heat Shrinkable Boot and Sleeve

Hot Air Gun

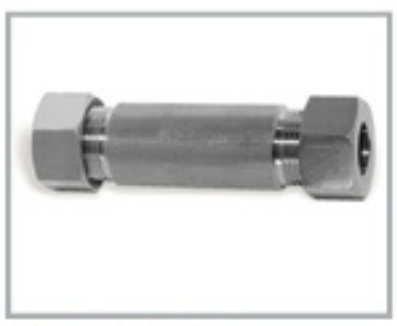
Fittings

LOK/DIN/JIS
(Union)

LOK/DIN/JIS
(Union Tee)

LOK/DIN/JIS
(Bulkhead Union)

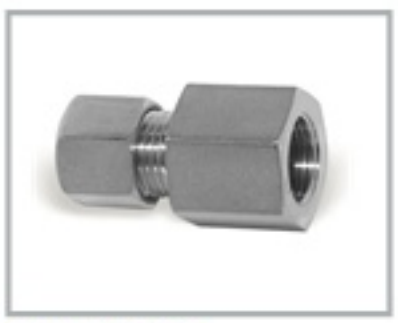
LOK/DIN/JIS
(Male Connector)



LOK/DIN/JIS
(Welding Bulkhead Union)

LOK/DIN/JIS
(Male Connector)

LOK/DIN/JIS
(Union Elbow)



LOK/DIN/JIS
(Female Connector)

How To Choose Fitting

1 Step Type

Type
LOK - (S)
DIN 2353 - (D)
JIS B2351 - (B)

Please consult us for other types not listed

2 Step Material

Material
Stainless Steel 316
Brass
Carbon Steel
Alloy 400
Duplex

Please consult us for other materials not listed

3 Step Design

Design
Union
Union Tee
Bulkhead Union
Male Connector
Female Connector

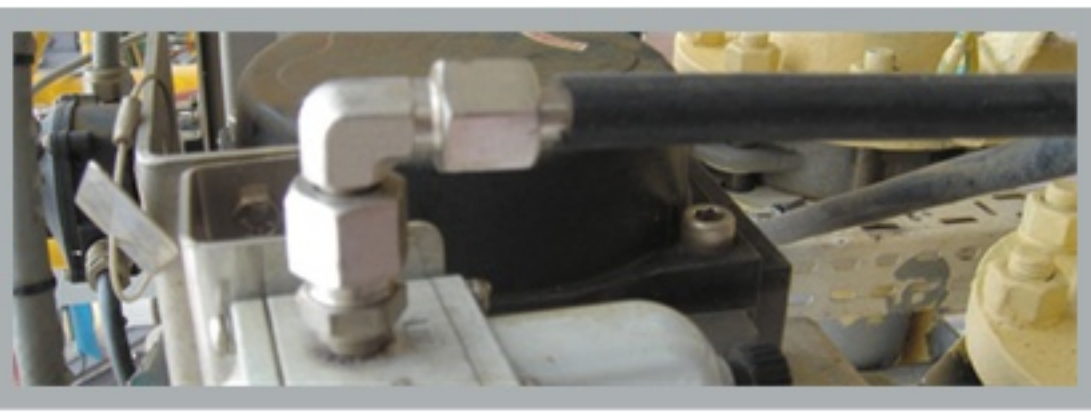
Please consult us for other designs not listed

4 Step Size

(Metric/Imperial)

O.D.	Metric (mm)			
	6	8	10	12
	Imperial (inch)			
	1/4	3/8	1/2	5/8

Please consult us for other sizes not listed



System Selection Guidance

Insulated or Not?

NO Insulation → **Multi Core Tube (MCT)**

- Hydraulic or Pneumatic Control System Line
- Instrument Line or Level Gauge Line
- Effective Tube Protection for Corrosive Condition
- 1 through 10 Cores in a bundle
- Refer to Daechun MCT catalog for more info

Insulation embedded ↓

Tracing or Not?

NO Tracing → **Pre-Insulation Tube (PIT)**

- Cooling Water or Refrigeration Line
- Liquid Nitrogen Gas Line
- Steam Supply and Condensate Return Lines
- Single Tube thermally insulated with Non-Hydroscopic E-glass

Contains Tracing Tube ↓

Steam Tracing or Electric Tracing?

Steam Tracing →

Freeze Protection or Temp. Control?

Temp. Maintenance → **Heavy Steam Tracing Tube (HST)**

- Heat Trace Instrument Line (Elevated Temp.)
- Pressure Transmission and analyzer sample lines
- High Temperature Steam Line
- Ideal for Temp. Control & Steam Cleaned Line
- Direct Contact for Higher Heat Transfer

Freeze Protection → **Light Steam Tracing Tube (LST)**

- Process, Impulse, and Instrument Line
- Ideal for Freeze Protection and Crystallization
- Low Temp. Control and Viscosity Reduction
- Isolated Insulation for Lower heat Transfer

Electric Tracing ↓

Temp. Maintenance or Freeze Protection?

Temp. Maintenance → **Temperature Maintenance (T)**

- Process, Impulse, and Instrument Line
- Consistent Temperature end-to-end
- Ideal for Temperature and Viscosity Control
- Self-Regulating Heating Cable

Freeze Protection → **Freeze Protection (F)**

- Process, Impulse, and Instrument Line
- Consistent Temperature end-to-end
- Freeze Protection or Low Temp. Maintenance
- Self-Regulating Heating Cable

Heat-up (H)

- Gas Sampling Line
- Process, Impulse, and Instrument Line
- Consistent Temperature end-to-end
- Ideal for Higher Temperature Control
- Mineral Insulated or Power Limiting Heat Cable

System Information

Pre-Insulated Tube System

Daechun Industrial Pre-Insulation Tube (PIT) bundles are wrapped up with non-hydroscopic E-glass insulation layers and protected by various sheath materials as per customer's request, of which bundles are inexpensive, easier and faster alternatives compared to conventional piping and field insulation.
They are mainly installed in hot liquid, gas, condensate and steam transport lines.

- Personnel protection, complete insulation, and weather resistance
- Secure effective and consistent heat transfer
- Easy to handle due to light weight & flexibility
- Installation, maintenance, and repair time & cost saving compared to conventional field insulation
- Cut-down on fitting connections owing to long-length supply

Steam Tracing Heating Tube System

Daechun Industrial Co. Ltd. offers a variety of highly cost-effective and reliable steam tracing instrument and small diameter process tube bundles. Our steam tracing instrument tubes are generally installed for winterization.
They are also applicable for high temperatures for viscous processes or to keep gas samples above pre-determined dew point and prevent condensation.

- Personnel protection, complete insulation, and weather resistance
- Secure effective and consistent heat transfer
- Easy to handle due to light weight & flexibility
- Installation, operation, and maintenance time & cost saving compared to conventional field insulation

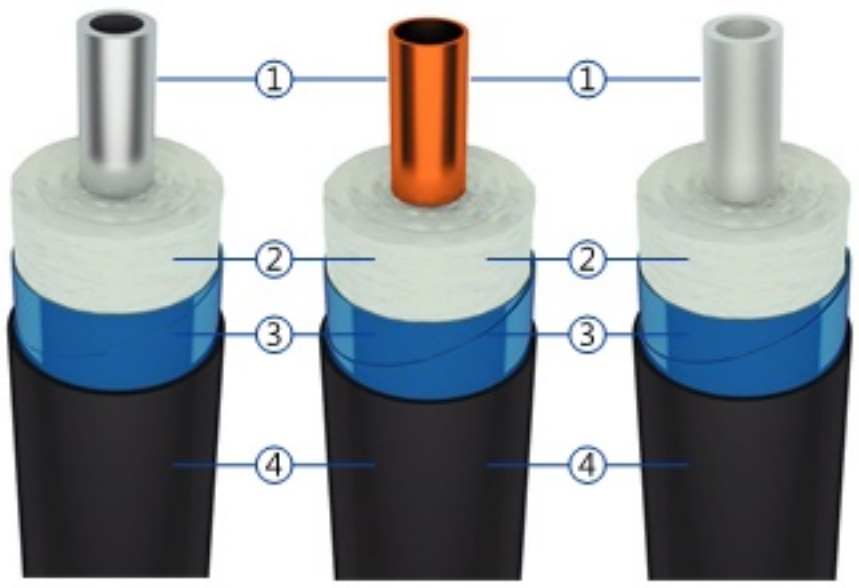
Electric Tracing Tube System

Daechun Industrial Electric Tracing Tube bundles typically consist of single or two core process tubes, self-regulating or mineral insulated heating cable, heat reflecting foil wrap, non-hygroscopic E-glass insulation and various jacket materials as per customer's request.
ETT bundles are chosen to keep consistent temperatures end-to-end and also selected for freeze protection, temperature maintenance and heat-up application. Three different types of bundles are available : Freeze Protection (F), Temperature Maintenance (T) and Heat-up (H).

- Self-regulating or externally powered heating tracer embedded
- Various process operating temp. ranges or freeze protection purpose in analyzer, instrument, impulse, sample and process lines
- Easy to design & install based on flexibility and cut-to-length applicability
- Ensure flow, level, and pressure transmitter reliability and safety better than field insulation

Pre-Insulation Tube (PIT)

- Simple, Fast, Economical, and Effective compared to Conventional Field-Installed Insulation
- Fluids & Gases Transport, Steam Supply, Weather-Resistant, and Personnel Protection
- Normally Maximum Tube Temperature 400°F (204°C) and also Higher Temperature available upon Request
- Maximum Sheath Surface Temperature 140°F (60°C) at 80°F (27°C) with 10mph (16 km/h) Wind
- Supplied on Wooden Drums with Long Coil Tube Length depending on Tube Size



Tube Construction (Factory Standard)

① Process Tubing
316/316L SS seamless, Copper tube, PTFE
② Thermal Insulation
Non-hydroscopic inorganic, water soluble chlorides less than 100ppm E-Glass for minimum heat loss
③ Heat Reflective Foil
Aluminum Heat Transfer Foil
④ Outer Sheath
PVC or TPU Jacket

Pre-Insulation Tube → **Sheath** →

DC	-P	XX*	XX**	XX***	X****	X*****	X******

Tube Material
- 01 : 316/316L SS Seamless
- 02 : 316/316L SS Welded
- 03 : 304/304L SS Welded
- 04 : 317L SS Seamless
- 05 : 321 SS Seamless
- 06 : 347 SS Seamless
- 07 : 316/316L Min MO 2.5%
- 08 : 6MO
- 09 : 904L
- 10 : Duplex
- 11 : Super Duplex
- 12 : Monel 400
- 13 : Inconel 600/625/825
- 14 : Hasteloy C22/C276
- 15 : Copper
- 16 : Tefron PTFE/PFA/ETFE

Outside Diameter
- 1/4" : 14
- 3/8" : 38
- 1/2" : 12
- 5/8" : 58
- 6mm : M6
- 8mm : M8
- 10mm : M10
- 12mm : M12
- 15mm : M15

Wall Thickness
- 0.035" : 35
- 0.049" : 49
- 0.065" : 65
- 0.8mm : 08
- 1.0mm : 10
- 1.2mm : 12
- 1.5mm : 15

# of Tube

Outer Sheath Material
- 1 : HR-PVC
- 2 : HFFR-TPU

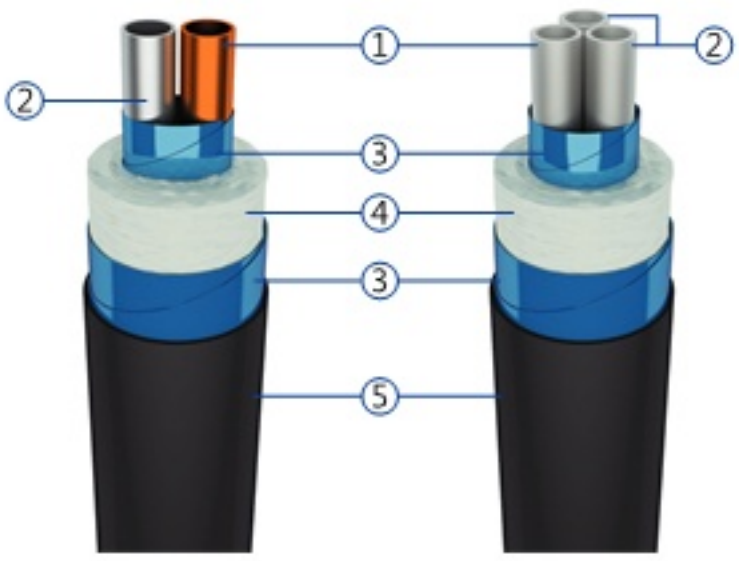
Outer Sheath Color
- 1 : Black
- 2 : Red
- 3 : Yellow
- 4 : Blue
- 5 : Green
- 6 : Orange
- 7 : Gray

Example : DC-P011235111

Pre-Insulation Tube consisting of 316L Stainless Steel Seamless Tube with 1/2" Outside Diameter and 0.035" Thickness, 1 Tube, Non-hydroscopic E-Glass Insulation, and Heat Resistant(HR) Polyvinyl Chloride(PVC) Black Color Sheath.

Heavy Steam Traced Heating Tube (HST)

- Maintain Process Temp. between 200°F (93°C) and 400°F (204°C)
- Designed to Limit Surface Temp. less than 140°F (60°C) when Ambient Temp. at 80°F (27°C)
- MTR(Maximum Temp. Rating) : Steam Saturation at Temp. 400°F (204°C) and 232.6PSIG (16Bar)
- Direct Contact of Tracer and Process Tubes for higher Heat Transfer



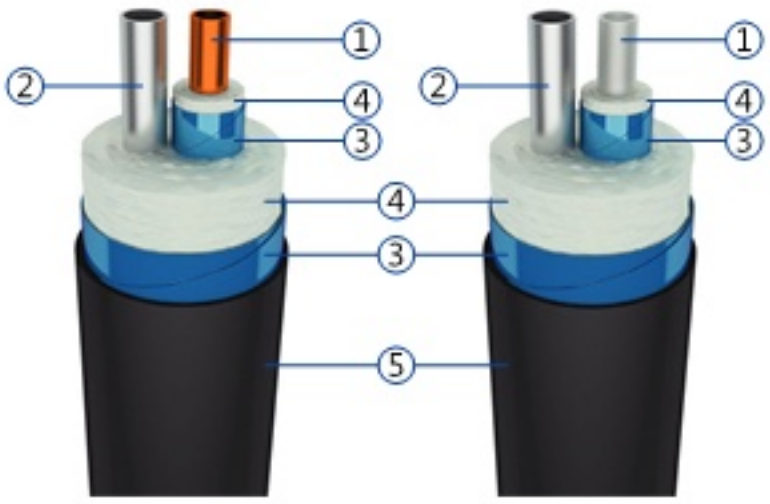
Tube Construction (Factory Standard)

① Tracing Tube : Copper, 316/316L SS Seamless, PTFE
② Process Tube : Copper, 316/316L SS Seamless, PTFE
③ Aluminum Heat Reflective Foil
④ Thermal Insulation
⑤ PVC or TPU Jacket

- One tracing tube & one or two process tubes as standard and others available upon request

Light Steam Traced Heating Tube (LST)

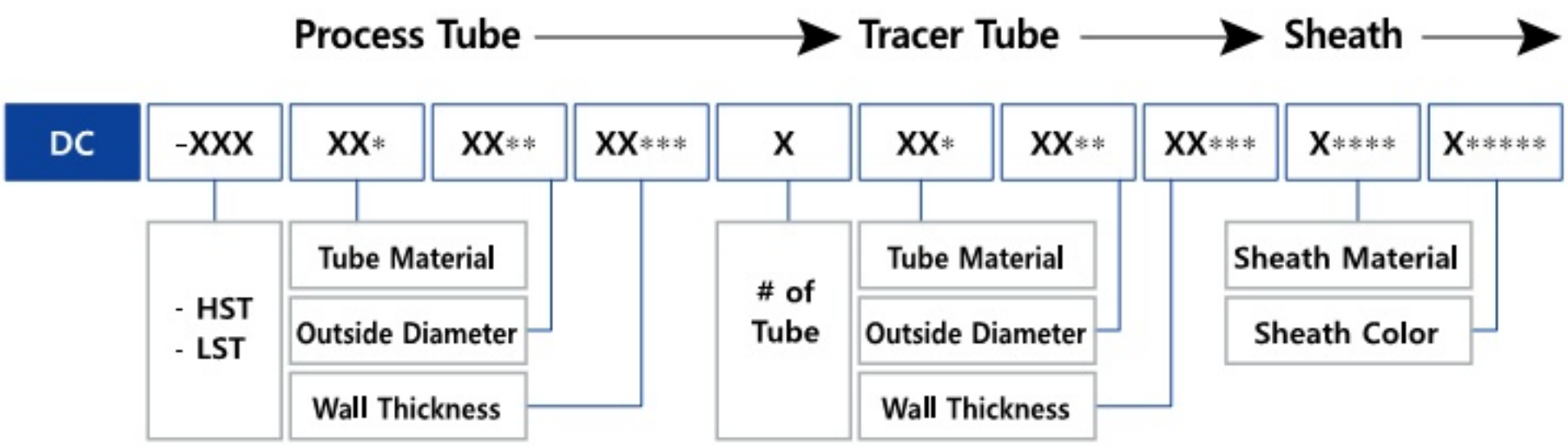
- Maintain Process Temp. between 50°F (10°C) and 200°F (93°C)
- Designed to Limit Surface Temp. less than 140°F (60°C) when Ambient Temp. at 80°F (27°C)
- MTR : Steam Saturation at Temp. 400°F (204°C) and 232.6PSIG (16Bar)
- Indirect Contact of Tracer ad Process Tubes for less Heat Transfer



Factory Standard

① Tracing Tube : Copper, 316/316L SS Seamless, PTFE
② Process Tube : Copper, 316/316L SS Seamless, PTFE
③ Aluminum Heat Reflective Foil
④ Thermal Insulation
⑤ PVC or TPU Jacket

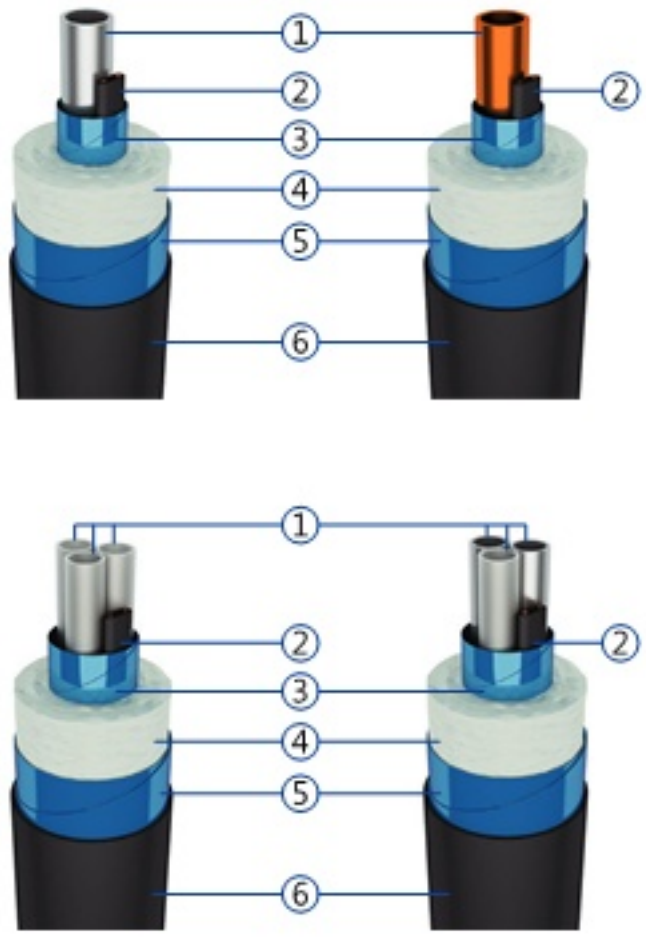
- One tracing tube & one or two process tubes as standard and others available upon request



Example : DC-LST01M1010201M61021

Light Steam Tracing Tube consisting of Two 316L Stainless Steel Seamless Tubes with 10mm Outside Diameter and 1.0mm Thickness for Process Line, 316L Stainless Steel Seamless Tube of 6mm Outside Diameter and 1.0mm Thickness for Steam Line, Non-hydroscopic E-Glass Insulation, and Halogen Free Flame Retardant(HFFR) Thermoplastic Polyurethane (TPU) Black Color Sheath.

Electric Traced Heating Tube (F/T/H)



Tube Construction (Factory Standard)

① Process Tube : Copper, 316/316L SS Seamless, PTFE
② Self Regulating or MI Heating Cable
③ Aluminum Heat Reflective Foil
④ E-Glass Thermal Insulation
⑤ Aluminum Heat Transfer Foil
⑥ PVC or TPU Jacket

■ One tracing tube & one or two process tubes as standard and others available upon request

Heating Cable Used for Classified Area FM, CSA, PTB, Baseefa, DNV, ABS Approvals

Process Tube → Heating Cable → Sheath →

DC	-XX	XX*	XX**	XX***	X	Y*	Y**	YY	X****	X*****
	-ET	Tube Material	Outside Diameter	Wall Thickness	# of Tube	Heating Cable Type • F : Freeze Protection • T : Temperature Maintenance • H : Heat-up	Heating Cable Voltage • 1 : 120V • 2 : 240V	Heating Cable Power • 01 : 5W/ft (16W/m) • 02 : 8W/ft (26W/m) • 03 : 10W/ft (33W/m) • 04 : 15W/ft (49W/m) • 05 : 20W/ft (66W/m)		Sheath Material	Sheath Color

Example : DC-ET1512492F20311

Electric Heat Tracing Tube consisting of Two Copper Tubes with 1/2" Outside Diameter and 0.049" Thickness for Process Line, Freeze Protection Cable(F) designed for 240V, 10W/ft, and Heat Resistant(HR) Polyvinyl Chloride(PVC) Black Color Sheath.

Global Service Network

www.daechun.co.kr

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