

# LS Aluminium Products TITIT and a second

Energy Cables & Systems LS Cable-setting the standards in power solution business

#### **Industrial Materials** Realizing a convenient future

with cutting-edge materials

Telecommunications Providing cutting-edge, innovative technologies for a ubiquitous network

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# Integrated Modules

& Cable Systems Providing the best customized cable solutions for all environments

LS Cable Company Profile

# Total Solution Provider for Electric Power and Telecommunication Industries

LS Cable, the longtime de facto holding company of LS Group, officially transformed into a holding company in July of 2008. The company's operations now encompass a total solution for electric power and telecommunication industries.

The latest change in corporate structure comes as the company is accelerating efforts to improve management efficiency in rapidly expanding markets. The move also results from efforts to effect a more responsible and transparent management structure. Management is now prepared to take more aggressive action to enhance our businesses and to identify new growth engines. The holding company will take the lead in fostering new growth engines and in identifying lucrative investment opportunities, while the company's other business units will focus on improving management and on making operations more efficient. With the continued support of the holding company, LS Cable will spearhead efforts to strengthen our business expertise, corporate competitiveness and management.

# Toward the Global Leading Cable Company

In August of 2008 LS Cable acquired Superior Essex, North America's largest cable company, making LS Cable the third-largest player in the global cable industry. Superior Essex's flagship line of magnet wires and telecommunication cables further strengthened LS Cable's product lineup, which had focused on power cables, fiber optic cables and industrial materials. Superior Essex's extensive North America and European production and distribution networks will help LS Cable cement a presence in the region and bring the company one step closer to becoming a full-fledged global enterprise.

#### Superior Essex

Superior Essex Inc., a FORTUNE 1,000 company, is one of the largest wire and cable manufacturers in the world. The company manufactures and supplies a broad portfolio of wire and cable products for the communications, energy, automotive, industrial, and commercial & residential end-markets. It is a leading manufacturer of magnet wire, fabricated insulation products, and copper and fiber optic communications wire and cable. It is also a leading distributor of magnet wire, insulation and related products.

# LS Cable

Korea's foremost cable maker in both product list and service range, LS Cable has an integrated supply system from basic raw materials to ultrahigh voltage cables, optical fiber cables, system engineering and installation works. In non-cable sector as well, LS Cable flourishes as a top-rate supplier of information and communication networks, connectors, lead frames, industrial rubber, and aluminum products. Reputed for its outstanding technology and quality, LS Cable is at the service of customers within and outside Korea.

Armed with the world's leading technology in electric power and optic fiber,

it has been successful with four joint ventures in Malaysia and Vietnam.

It has thus demonstrated leadership in establishing a global

network in the domains of electric power, other energy and information.

# LS Aluminium Products







# What is LS Cable Aluminium?

LS Cable aluminium is light and non-toxic and possesses good low temperature strength properties. It also has vacuum, heat, and electric conductivity properties.

It is made of environmentally friendly materials that can be easily processed or recycled.

When aluminium is alloyed with copper, manganese, zinc, nickel, magnesium, and silicon, its mechanical features can be greatly improved. Thus, demand for aluminium is expected to increase for electric, electronic, civil engineering, vehicle, shipbuilding and aerospace applications.

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# Automotive • Transport

Aluminium can save the fuel of transportation vehicle and simultaneously obtain heat exchange efficiency as heat exchanger parts, utilizing the light weight, high strength and high thermal conductivity of aluminium.

#### Product



# Automotive · Transport Multi-port Extruded Tube & Precision Tube

## **Multi-port Extruded Tube**

#### **Cross Section**



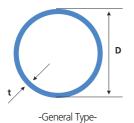
#### **Dimension & Tolerance**

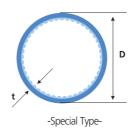
Items	Dimension	Tolerance
Height (H)	1.0~4.0mm	<u>+</u> 0.02
Width (W)	10~38mm	<u>+</u> 0.02
Wall Thickness	Normal 0.5mm	
	Min. 0.2mm	
Cutting Length	200~3,000mm	<u>+</u> 0.5

Application : Condenser, Evaporator, Radiator, Oil-cooler etc

# **Precision Tube**









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#### **Dimension & Tolerance**

	Dimension	Tolerance		
Diameter(D)	4~22mm	<u>+</u> 0.05		
Thickness(T)	0.5~1.8mm	±0.05		
Cutting Length	100~4,000mm	<u>+</u> 0.5		

\* Material: 1xxx, 3xxx, 6xxx.

# Automotive · Transport Functional Multi-port Extruded Tube (Pre-flux Tube, Sil-flux Tube)

# **Pre-flux Tube**

#### **Features**

Coating Material	NOCOLOK Flux		
Zn-spray	O/X		
Fin	3-layer Clad Fin (4XXX / 3XXX / 4XXX)		
Filler Metal	Clad Material (4XXX)		
Devel	- No need flux-spray process in brazing line		
Benefit	- Easy to keep clean the brazing area		



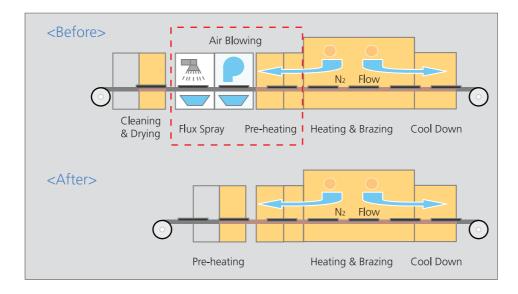


# Sil-flux Tube

#### **Features**

Coating Material	Silicon Powder + NOCOLOK Flux
Zn-spray	O/X
Fin	Bare Fin (3xxx)
Filler Metal	Si-powder in the mixture
	- No need flux-spray process in brazing line
Benefit	- Only use bare fin instead of Al-Si clad fin
	- Save the material cost and processing cost (Using bare fin)

# Brazing Process(Using Pre/Sil-flux Tube)



### Automotive · Transport DURACOT<sup>®</sup>

## PA 12 Coated Aluminium Tube

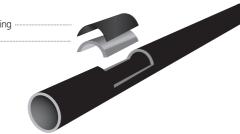
#### **Features**

- . Excellent resistance to salt corrosion
- Same work ability as for the Aluminium Tube
- without PA12 coating
- High cleanliness
- $\boldsymbol{\cdot}$  High resistance to stone chips
- High Durability
- · Low weight and therefore lower fuel consumption
- Recyclable

#### Construction

- Polyamide 12 Coating
- · Aluminium ......





#### Application

#### Tube Material

• Core : AA3003

Coating Colors • Black

Coating : PA 12

• Black

#### **Tube Mechanical Properties**

Property	Value
Tensile strength( $N/m^2$ )	105 ↑
Elongation(%)	15 ↑

#### Tube Cleanliness

All internal and external surface are free from foreign materials that might impair the performance.

#### Cut-to-length

• Length : 100 ~ 4,000 mm

#### Main dimension and tolerance of tube

- $\cdot$  Outer diameter of tube : 4 ~ 22 mm
- Thickness of tube : 0.5 ~ 1.8 mm
- · Coating thickness : 100 ~ 1,000  $\mu m$
- Tolerance : Accoding to KSD 6761



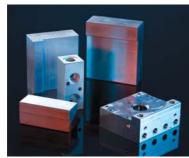
#### Al-Tube : A3003

Si	0.6 ↓
Fe	0.7↓
Cu	0.05 ~ 0.2
Mn	1.0 ~ 1.5
Zn	0.1↓
Others	0.15 ↓

\* Coating Material : Polyamide 12

### Automotive · Transport Profiles

#### **Product**







ABS & ESC Pump housing

Heat sink for HEV



Container profile

Truck side panel

Industrial profiles

We offer extruded aluminium profiles, semi-manufactured components,

systems and finished products - meeting our customer's demands for performance, quality, precision and economy.

Extrusion is the process that provides virtually unlimited opportunities for adapting product shapes. Costs are cut by using fewer components, which reduce the finishing

process and simplify assembly.

Customer satisfaction and product excellence are our key goals.

Aluminium extrusions inspire creative designs and technical solutions that improve, simplify and reduce costs.

At the initial stage, we work together with our customers on product development.

# Material

The light weight, high strength and high wear-resistance of aluminium improves the working efficiency of high velocity rotating parts allowing them to be made even smaller. Aluminium is used for everything frim automobile compressors to anything else requiring strength and light weight.

#### Product



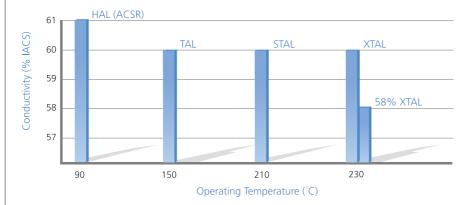








#### **Thermal Resistant Al-rod**



Туре	Application	UTS(Mpa)	Conductivity (% IACS)	Operating Temperature (Short time) / (° <u>C</u> )
HAL	ACSR	159 ~ 169 ↑	61.3 ↑	90 (120)
TAL	TACSR	159 ~ 169 ↑	60.0 ↑	150 (180)
STAL	STACIR	159 ~176 ↑	60.0 ↑	210 (240)
HITAL	HI-TACSR	225 ~238 ↑	55.0 ↑	150
XTAL	XTACIR	159 ~ 169 ↑	58.0 ↑ 60.0 ↑	230 (310)

#### High Capacity XTAL Alloy Lines

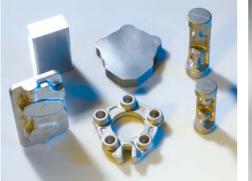
The first of its kind in the world, the main items of the XTAL alloy lines of a 60% level have world-class characteristics. This alloy is used for conductors for overhead power transmission lines that supply power from power plants to substations in suburban areas

#### Mother material for CONFORM® extrusion

Alloy : AA1050, AA1070, AA1100, AA3003, LLA\*™ (Mn,Cu) \*LLA : Long life alloy

# Material Al-bar(High-Si) for forging

#### Product



Forging Material & Final products

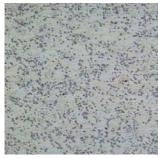


Al-bar

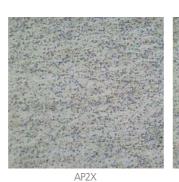
#### **Chemical Composition**

Alloy	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Ni	Other	Al
A4032	11.00~13.50	1.00 ↓	0.50~1.30	-	0.80~1.30	0.10 ↓	0.20↓	-	0.50~1.30	0.05 ↓	BAL
4000A	10.50~12.50	0.50 ↓	3.50~5.00	0.20 ↓	0.30~1.00	-	-	0.20↓	-	0.20 ↓	BAL
AP2X	11.00~12.50	0.20~0.30	4.00~4.60	0.20~0.30	0.50~0.70	-	0.25↓	0.30↓	-	0.20 ↓	BAL
A332	8.50~10.50	1.20↓	2.00~4.00	0.50 ↓	0.50~1.50	-	1.00↓	0.25↓	0.50 ↓	0.50 ↓	BAL

#### **Micro-structure**



A4032



4000A

#### Application

- $\cdot$  Swash Plate
- Socket Plate

Piston RodSuction & Discharge

• Clutch Piston

### Material Aluminum Alloy 6024

LS Aluminum, a leading company for the development of new Al alloy, has developed 6024 which is much stronger alloy than conventional 6061 Al alloy in the ways of LS's own.

Corrosion Resistance	Strength	Impact Resistance
Excellent Corrosion Resistance $\rightarrow$ The lowest cost of maintenance	Strength -40% higher than 6061 Al allov	Excellent Impact Resistance → The safety is

#### 6024 Alloy

The 6024, adding Cu, Mn in Al-Mg-Si alloy, is more definitely superior than 6000 alloy.

#### **Chemical Composition**

Materials	Si	Fe	Cu	Mn	Mg	Zn	Ti	Cr	Ν	Other
6061	0.4~0.8	0.7↓	0.15~0.4	0.15↓	0.8~1.2	0.25 ↓	0.15 ↓	0.04~0.35	-	-
6024	0.7~1.3	0.05~0.7	0.3~0.9	0.6~1.2	0.3~1.0	0.2↓	0.1 ↓	-	-	-

#### **Mechanical Properties**

Materials –		Tensile Strength	Yield Strength	Elongation	Fatigue Property		Impact Resistance
ויומנכוונ		(kg/mm²)	(kg / mm²)	%	$\Delta$ (Threshold)	m	J
SS 400 (SS	41)	41 ~ 52	25 ~	21	-	-	-
SUS 316		41 ~ 53	20 ~ 28	20 ~ 40	-	-	-
6061	T4	18 ↑	11 ↑	16 ↑	-	-	43.9
0001	T6	27 ↑	25 ↑	8 ↑	9.64	1.32	16.7
6024	T4	31 ~ 35	23 ~ 26	8 ↑	9.6 ~10.8	2.04 ~ 2.8	47.1
0024	T6	38 ~ 43	33 ~ 41	8 ↑	10.5 ~ 11.0	0.89 ~ 1.30	30.8

#### **Material Properties**

Materials	Tensile Strength	Corrosion Resistance	Weldability	Machinability	Microstructure
STEEL	100	D	А, В	В	-
6061	75	В	A, B	С	B, C
6024	~ 100	В	A, B	В	А

# Certificates



# Global Network

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**LSCU**(London)

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Mayzieu, France 📲

**Compiegne, France** 

(SPSX Europe HQ)

Viana de Castelo, Portugal -

Franklin, Indiana USA (Femcoe JV)

Simcoe, Canada

Clifton Park, New York USA
LSCA(New Jersey)

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Always with Our Customers **LS Cable** 

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