



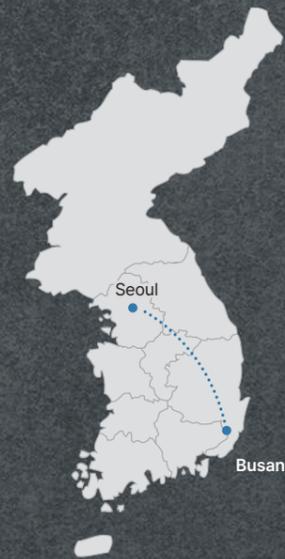
# RINNO

## ALUMINUM



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Sangbuk-myeon, Ulju-gun,  
Ulsan, Korea

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Seoul~Ulsan. About 2hour 10min (by KTX)  
Ulsan~Busan. About 15min (by KTX)



Our company with the high technology of  
Aluminum extrusion gives customers satisfaction

# RINNO ALUMINUM

RINNO Aluminum stands at the forefront of aluminum technology, from extrusion and machining to bending and assembly.



RINNO Aluminum is about enterprising spirit and tenacious dedication to technology.



We will be a company that does our best to give you the greatest satisfaction and impression



RINNO ALUMINUM that makes a better future



## Welcome to RINNO ALUMINUM

Pioneering a new age of customer success through leading aluminum extrusion and machining technology.



### CEO Greeting

RINNO ALUMIUM was founded in 1988, starting business in the field of industrial furnaces. It expanded its business field into the processing and assembly of aluminum window systems for Daewoo buses and others and acquired the technology and experience in the area of automotive parts, especially "rubber bush", one of the highly functional automotive parts along with the production technology in other functional aluminum automotive parts. Having the best technologies in the field of extrusion, processing, bending and assembly of aluminium materials, it has been making every effort to meet the needs of customers. I think that all these accomplishments are achieved through the support and interest of our customers. We will do our best to keep meeting the demands of our customers.

CEO *Sae-young Lee*

### Company Overview

<b>Linno Aluminum Company information</b>	 <b>Company Name</b> Linno Aluminum Co., Ltd.	 <b>CEO</b> Lee Se-young	 <b>Date of establishment</b> Established A Corporation On June 1, 2009
	 <b>Address</b> 1236-2, Gilcheon Ri, Sangbuk Myun, Ulju Gun, ULSAN, KOREA	 <b>Main Phone</b> +82-52-707-5001	 <b>Fax</b> +82-52-707-5002

### Strategy

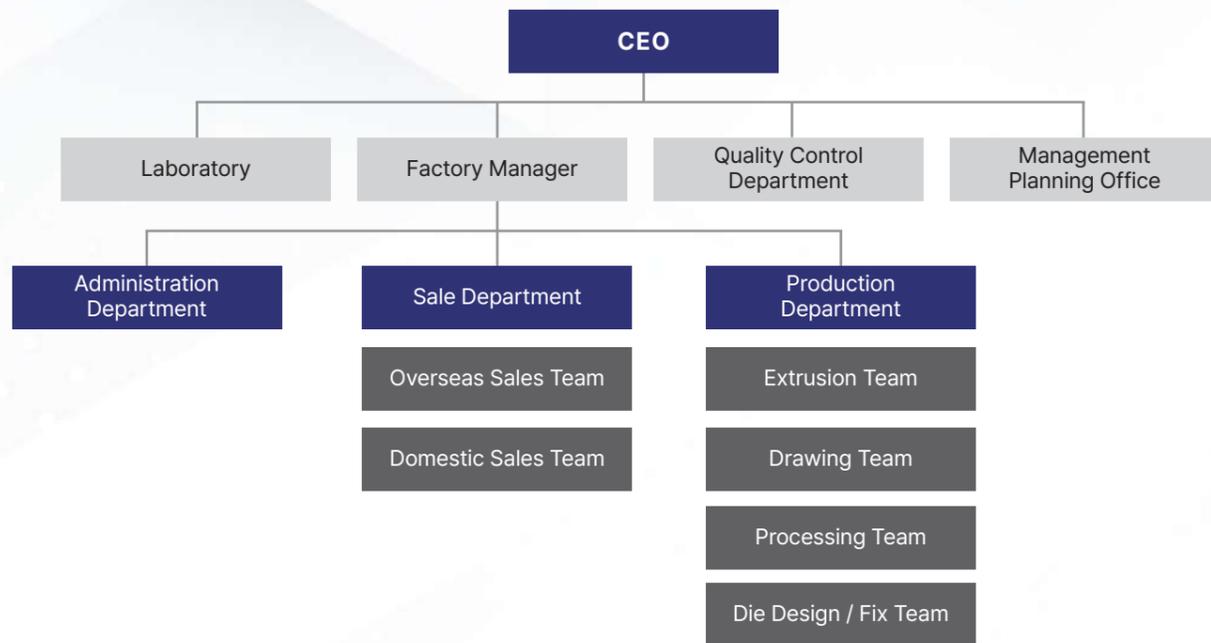
<b>01</b>  Innovative reduction of energy using the lighter chassis through the development of the alternative material.	<b>02</b>  Prevention of the global warming through the reduction of the fossil fuels and usage of the energy with high efficiency for the cars, railroads, and ships.	<b>03</b>  Guardian of the clean environment with the development of the industrial material applying the regeneration effect and incombustibility of Aluminum.
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### Key Clients

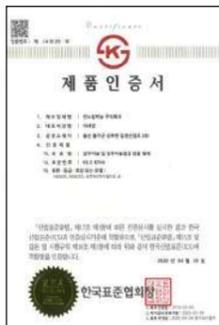
 GM	 FORD	 MAZDA	 FCA
 TESLA	 BMW	 RIVIAN	 TOYOTA



Organization



Quality Certificate



KS Certification



IATF 16949 : 2016



ISO 9001



SQ Certification



CE Certification



UL Certification



DNV



INNO-BIZ

# RINNO ALUMINUM HISTORY



- 2022** 07 Industrial Bank of Korea – IBK Family Award  
04 Won Entrepreneur of the Year Award
- 2021** 12 Korea International Trade Association(KITA) – Won the 10 million dollar Export Tower Award  
12 Ulsan Metropolitan Office of Education – Plaque of Appreciation Award from Ulsan Edu-Administration  
12 Gyeongsangbuk-do Office of Education – Gyeongsangbuk-do superintendent of education Plaque of Appreciation Award  
10 Silla Technical High School – MOU  
04 Ministry of SMEs and Startups – Designated as a global Strong competitive SME  
01 Certified as a component material company
- 2020** 06 Ministry of SMEs and Startups - Management Innovative SME (MAIN-BIZ)
- 2019** 12 Ulsan Metropolitan City – Management Innovation & Technology Development Award  
12 Ulsan College – Activation of Human Resource Development Plaque of Appreciation Award  
12 Korea International Trade Association(KITA) - Won the 7 million dollar Export Tower Award
- 2018** 09 Ulsan Metropolitan City – Selected as a company Excellent in Job Creation
- 2017** 12 Korea International Trade Association(KITA) - Won the 3 million dollar Export Tower Award
- 2016** 09 Prime Ministerial Citation for SME Innovation Competition
- 2015** 09 Korea Productivity Center – Productivity SMEs Award  
05 Ministry of Commerce Industry and Energy - Korea Electric Culture Award  
04 Ulsan Economic Promotion Agency – Excellent Company Management Award
- 2014** 12 Ministry of SMEs and Startups - Selected as an SME with outstanding employee development programs  
06 Ulsan Technopark - Selected as a promising small and medium-sized enterprises  
04 Ministry of SMEs and Startups – SMEs Excellent Technician Award  
03 KS Certification (Aluminum & Aluminum Alloy Extruded Shapes)  
03 Korea Chamber of Commerce and Industry - designated as a IP Star company
- 2013** 12 Selected as a Good Company to Work For  
12 Korea International Trade Association(KITA) – New Export Excellent Company Award  
11 Selected as Military Service Designation Company  
10 Korea SMEs and Startups Agency – a Supreme Company Certification  
09 Inno-Biz Association – a Good Company to Work for Certification  
02 Start to produce Aluminum Cable Tray
- 2012** 09 Industrial Bank of Korea - Selected as a promising small and medium-sized enterprises
- 2011** 12 Ministry of SMEs and Startups – Excellent Businessmen Award
- 2010** 12 Korea Institute of Industrial Technology – Selected as a Partner Company  
05 Established a corporate research institute of RINNO ALUMINUM  
01 BAICA – Selected as Global Strategy Parts
- 2009** 05 Established RINNO ALUMINUM CO., LTD.
- 2007** 04 Regional Intellectual Property Center – Selected as a Star Company
- 2006** 08 Established a corporate research institute of SAMWOO EMC  
04 Ministry of SMEs and Startups – INNO-BIZ Certification
- 2005** 06 Industrial Bank of Korea - Selected as a promising small and medium-sized company  
02 Obtained IATF16949 Quality Management System Certificate
- 2004** 05 Start to produce RUBBER BUSH CORE
- 2003** 01 Create a aluminum extrusion process and produce of extruded products
- 2001** 10 Obtained ISO 9001 Quality Management System Certificate
- 1996** 12 Established SAMWOO Engineering CO., LTD.
- 1995** 08 Start to produce parts of DAEWOO bus (glass molding, bus window)
- 1988** 01 Established SAMWOO Engineering Co.

## GENERAL STATUS

### 01 Production line

- 7 inch aluminum extrusion (1,800Ton) production line 2 lines
- Heat treatment line : 2 lines
- Press quenching line (Conveyor system type)
- Machining line (Cutting, Chamfering, CNC, MCT, Tapping Machine, Etc)
- Automation machining & Assembly line
- Assembly and packing line
- Coating line (Powder coating / Painting process to spray powder on the product surface)
- Anodizing surface treatment line

### 02 Production capacity

- Production : 1,000 tons / month
  - Production possibility SIZE :  $\phi$ 10mm ~  $\phi$ 200mm
  - Production length : Up to 10M as requested by customers
- Over-standard products : Manufactured and supplied by our suppliers

### 03 Total Sales

- Export : 45%
- Domestic : 55%

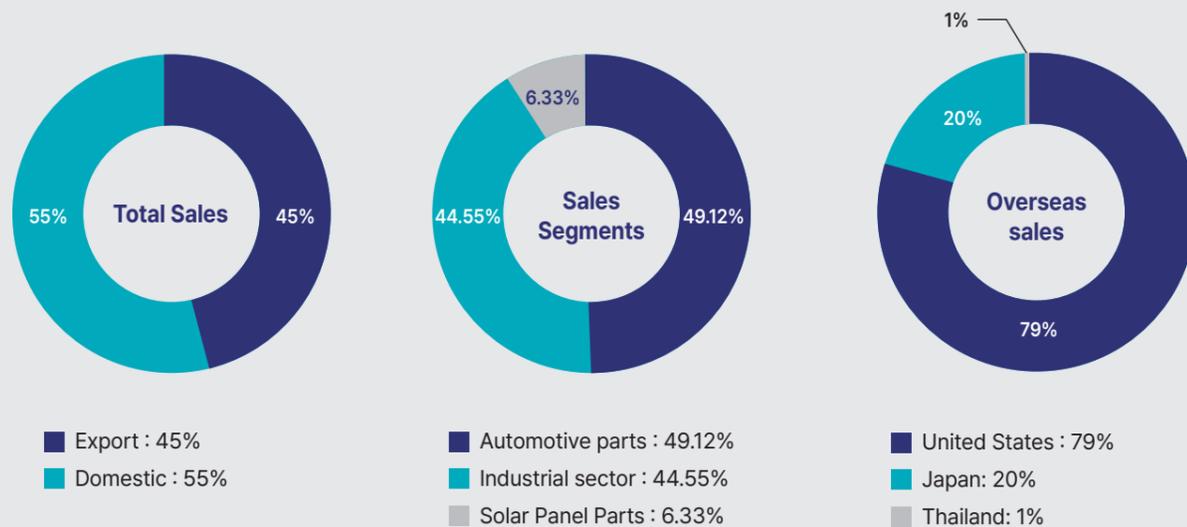
### 04 Sales Segments

- Automotive parts : 49.12%
- Industrial sector : 44.55%
- Solar Panel Parts : 6.33%

### 05 Overseas sales

- United States : 79%
- Japan : 20%
- Thailand: 1%

## Annual Turnover



## PLANT INTRODUCTION

### Extrusion process (7inch , 1800 Ton , 2 Lines)



Billet

Heat the billet

Billet Cutting (HOT saw)

Extrusion(1,800 Ton / 7 inch) 2 line



Water Quenching

Cooling

Stretching

Auto Stack

Heat treatment process

### Press quenching line (Conveyor system type)



01

02

03

## PLANT INTRODUCTION

### Machining Process (Cutting, Chamfering, CNC, MCT, Tapping Machine, Etc)

#### Cutting & Chamfering Process



01 Automatic Cutting machine for Rubber-bush



02 Automatic cutting



03 Testing after cutting



04 Chamfering machine line



05 Chamfering



06 Chamfering Machining



07 Product Inspection



08 Packing (for export)



09 Export

#### 기타가공공정



01 MCT (6m)



02 Bending Machine



03 Twin-head Cutting Machine



04 Knurling Machine line



05 Drawing Machine



06 Cold Drawing Process



07 Tapping Machine

## PLANT INTRODUCTION

### Automation Machining & Assembly line



01



02



03



04

### CNC Machining line



01



02



03



04

### Anodizing line



01



02



03



04

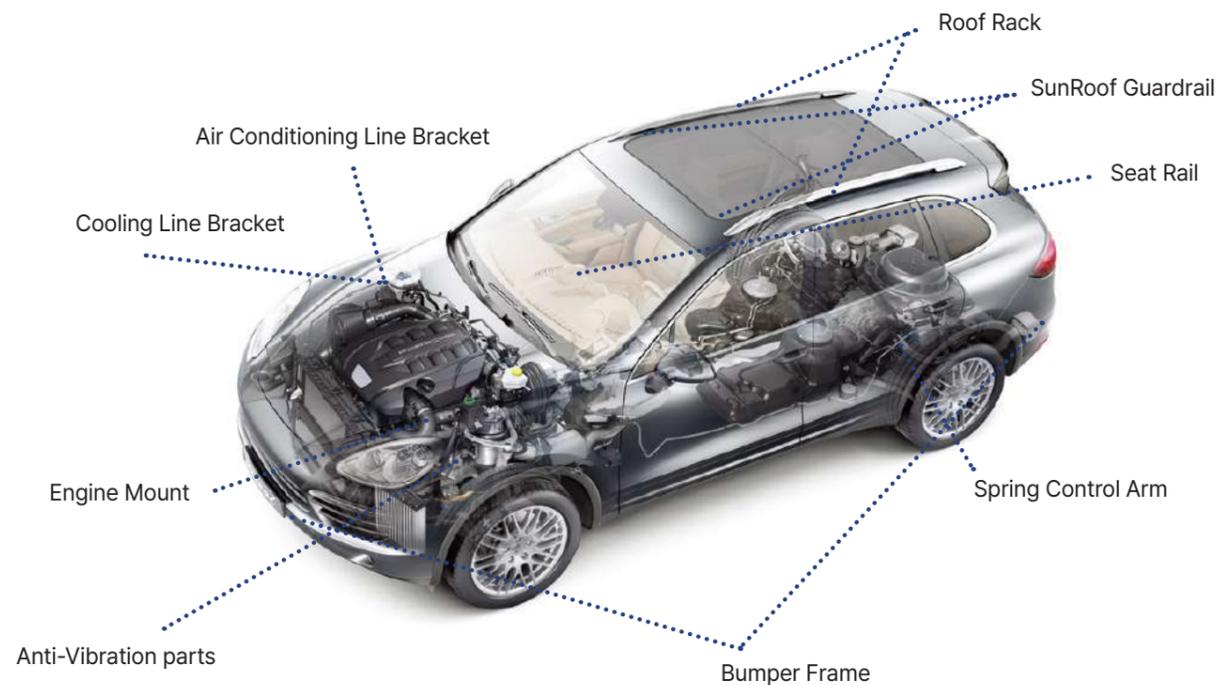


05

**PRODUCT INFORMATION**

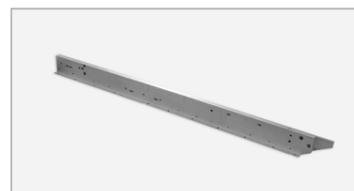
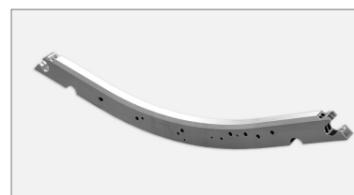
- Parts of Automobile
- EV components

**Parts of Automobile**

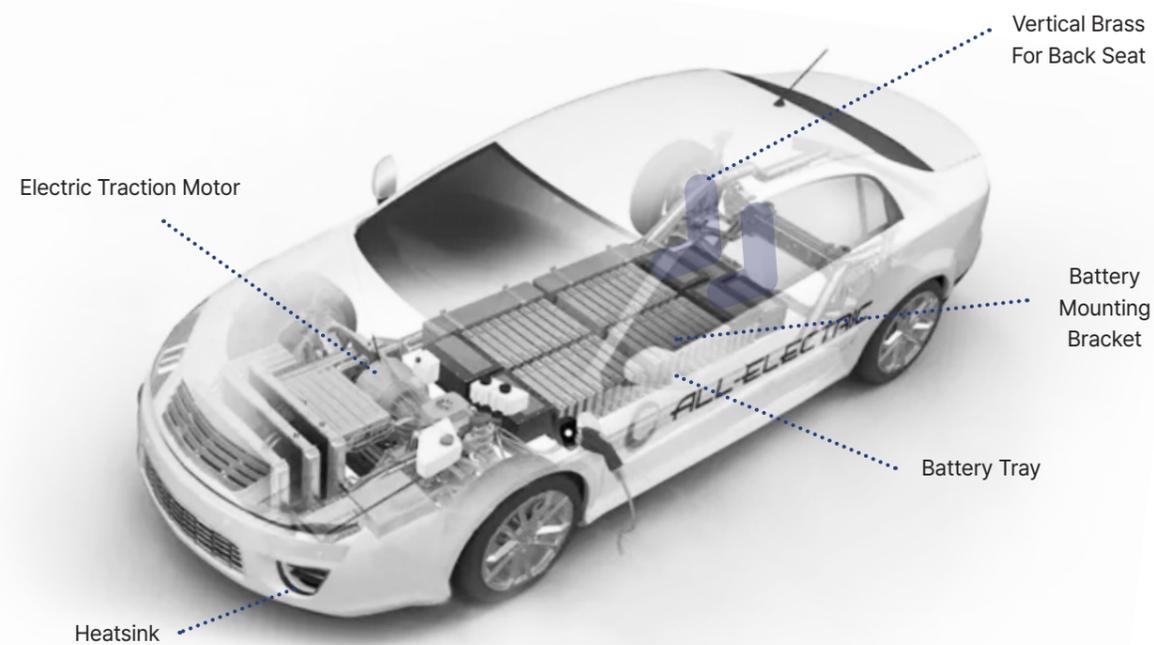


**Frame**

Development and mass production of high-strength, ultralight aluminum frames for EVs



**EV components**



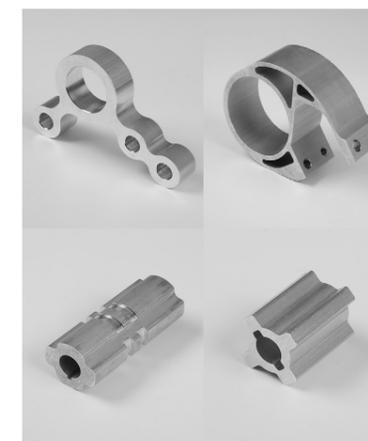
**Brackets**

Development and mass production of high-strength, lightweight aluminum components with outstanding wear and corrosion resistance.



**Inner**

Development and mass production of high-strength, lightweight aluminum components with outstanding wear and corrosion resistance.



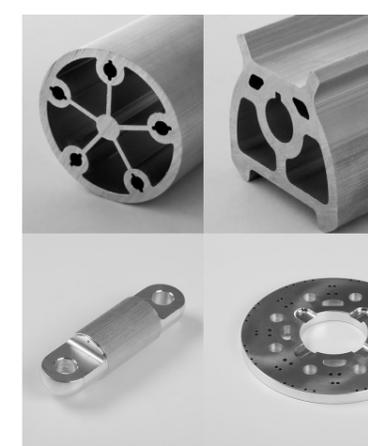
**Built-in part of automobiles**

Development and mass production of high performance automotive aluminum RUBBER BUSH components



**Motor parts and other componens**

Development and mass-production of high-strength, ultralight aluminum frame for EVs



PRODUCT INFORMATION

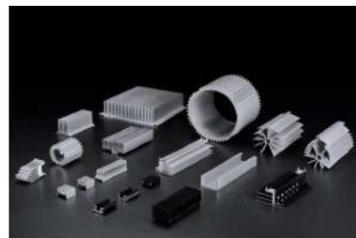


PRODUCT INFORMATION



Profile of Electronic Product

- Frames for electric motor
- Heat sink for home appliances, garden plant
- Heat Sink Parts for electronic product



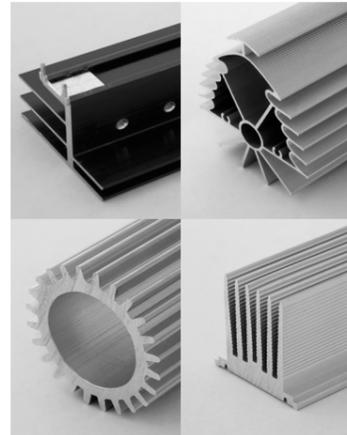
Heat Sinks

Industry-leading technology in extrusion, machining, bending and assembly of aluminum materials



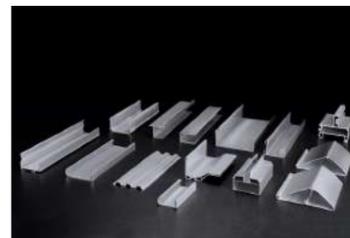
Pipe

Industry-leading technology in extrusion, machining, bending and assembly of aluminum materials



Parts for Ship Build and Industrial material

- Frames for Window, Door, Blind, Pullman Bed
- Ladder, Grating
- Aluminum Cable Tray



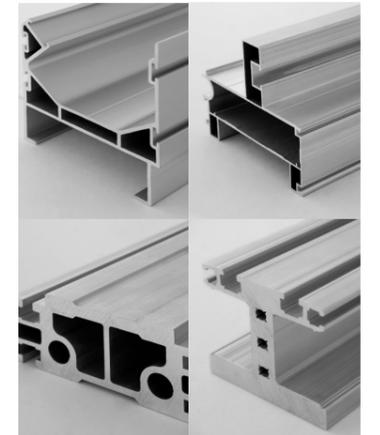
Structure

Industry-leading technology in extrusion, machining, bending and assembly of aluminum materials



Etc

Industry-leading technology in extrusion, machining, bending and assembly of aluminum materials

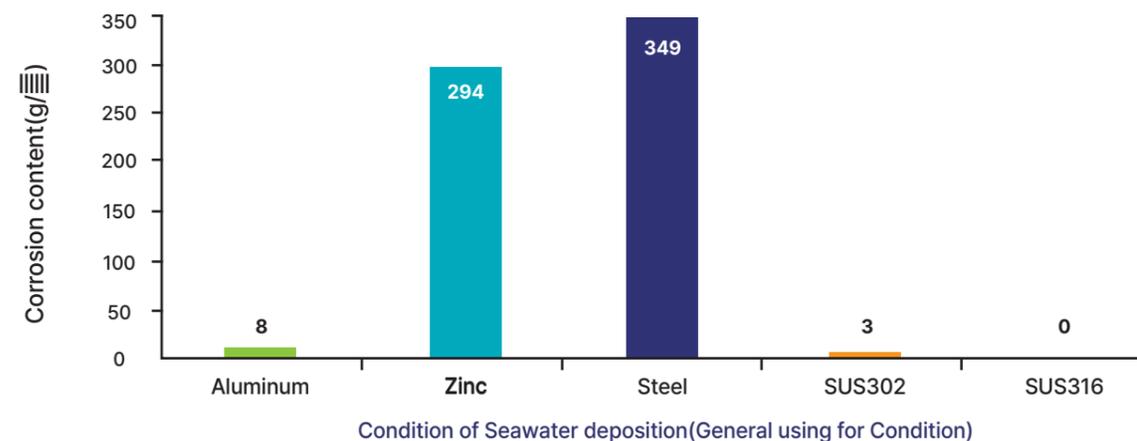




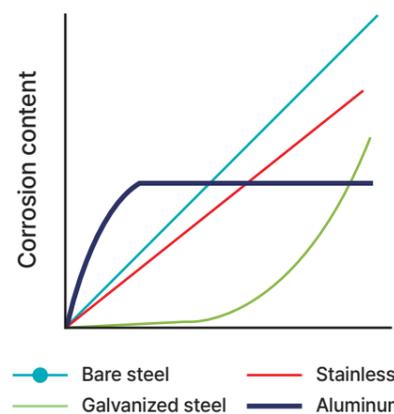
### Aluminum Solar System

#### Comparison for Corrosivity

Exposure test result for 16 years



#### Corrosion amount hourly comparison



#### 1. Bare steel

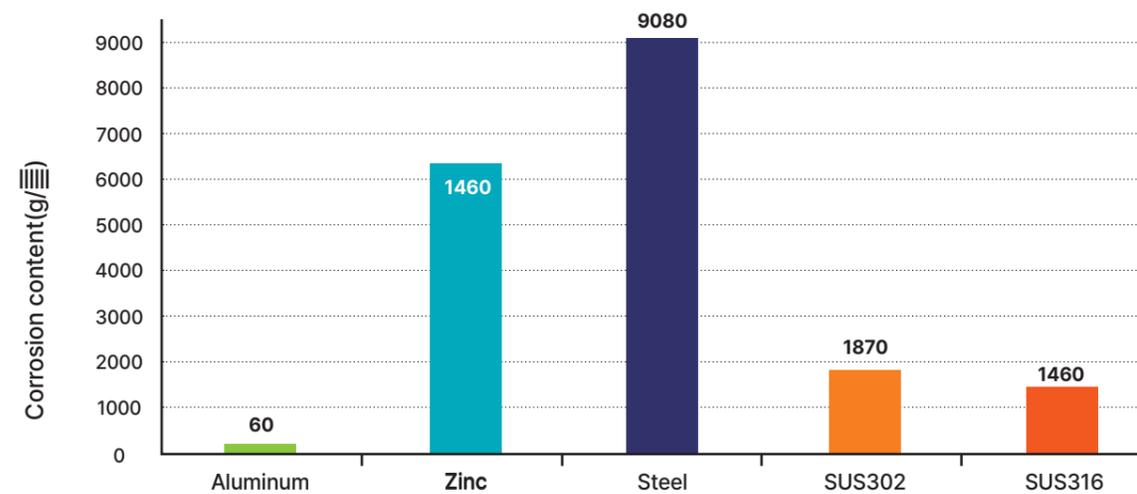
Corrosion continues to grow over time.

#### 2. Galvanized steel

The Corrosion progress is low for a period time, but it is rapid from a certain point in time.

#### 3. Aluminum construction

Corrosion will not proceed by creating an Al<sub>2</sub>O<sub>3</sub> oxide layer on the initial surface.



### Aluminum Solar System

#### Characteristics and Advantage from Aluminum Solar system

##### 01 Decrease of Construction weight

- It is 1/3 lighter than steel
- Slim and Concise

##### 02 Corrosive

- There is no rust or corrosion.

##### 03 Quality

- Quality Guaranteed for 10 years

##### 04 Shorten period of Construction

- The weight of the construction makes it easy to work with a single person.
- It has the 100% self assembly structure and it makes shorten construction period.

##### 05 Durability of Construction

- Aluminum construction bear last more than 50 years.



Condition of Seawater deposition (General using for Condition)

## Chemical Composition

Bezeichnung der Legierung		Si	Fe	Cu	Mn	Mg	Cr	Ni	Zn	Ti	Ga	V	Bemerkungen	Andere Beimengungen <sup>a</sup>		Alu- minium min.
Numerisch	Chemische Symbole													Einzel	Ins-gesamt <sup>b</sup>	
EN AW-6005A	EN AW-Al SiMg(A)	0.50 -0.9	0.35	0.30	0.50	0.40 -0.7	0.30	-	0.20	0.10	-	-	0.12-0.50 Mn+Cr	0.05	0.15	Rest
EN AW-6061	EN AW-Al Mg1SiCu	0.40 -0.8	0.7	0.15 -0.40	0.15	0.8 -1.2	0.04 -0.35	-	0.25	0.15	-	-	-	0.05	0.15	Rest
EN AW-6063	EN AW-Al Mg0,7Si	0.20 -0.6	0.35	0.10	0.10	0.45 -0.9	0.10	-	0.10	0.10	-	-	-	0.05	0.15	Rest
EN AW-6082	EN AW-Al Si1MgMn	0.7 -1.3	0.50	0.10	0.40 -1.0	0.6 -1.2	0.25	-	0.20	0.15	-	-	-	0.05	0.15	Rest
EN AW-6110A	EN AW-Al Mg0,9Si0,9MnCu	0.7 -1.1	0.50	0.30 -0.8	0.30 -0.9	0.7 -1.1	0.05 -0.25	-	0.20	-	-	-	0.20 Ti+Zr	0.05	0.15	Rest

## Mechanical Properties

Alloy EN	Temper	Wall thickness t mm	R <sub>m</sub> MPa		R <sub>p0.2</sub> MPa		A % min.	A <sub>50mm</sub> % min.	Hardness Typical value HBW
			min.	max.	min.	max.			
6005A	T6°	≤ 5	270	-	225	8	8	6	90
		5 < t ≤ 10	270	-	225	8	8	6	90
6001	T4°	≤ 25	180	-	110	-	15	13	65
	T6°	≤ 25	240	-	240	-	8	6	95
			260	-	240	-	10	8	95
6063	T4°	≤ 10	130	-	65	-	14	12	50
		10 < t ≤ 25	120	-	65	-	12	10	50
	T6°	≤ 25	215	-	170	-	10	8	75
6082	T4°	≤ 25	205	-	110	-	14	12	70
	T6°	≤ 25	290	-	250	-	8	6	95
		5 ≤ t ≤ 25	310	-	260	-	10	8	95
6110	T4°	≤ 25	320	-	220	-	16	14	85
	T6°	≤ 25	380	-	360	-	10	8	120

## MEMO