

# Supplying the World's Best

**SeAH** Aerospace & Defense is  
A leading world-class manufacturer and supplier  
of hard alloy extruded and forged aluminum  
products



**SeAH** Aerospace & Defense

# Changwon Precision Extrusions, CPE

SeAH Aerospace & Defense Co., Ltd. is a leading world-class company manufacturing and supplying extruded/forged high-strength alloy aluminum products. Our products are used for thousands of purposes, including:

- / **Aerospace** - Aircraft wings and fuselages, Aircraft interior parts
- / **Defense** - Special defense development total solution car
- / **Automotive and Commercial Transportation** - Compressor wheels, Drive shaft
- / **Recreation products** – Tent poles, Climbing sticks, Baseball products, and Bicycle parts

With decades of experience, we provide a wide range of customers with extruded/forged aluminum products for a wide range of applications. Our production tolerances and quality characteristics are becoming industry standards. We have a wide range of extruding and forging facilities and offer quality products. We manufacture and supply products according to customer requirements and specifications, and continue to meet all customer requirements.

Using its superior production capacity, our Changwon Precision Extrusions (CPE) Center provides customers with leading skills, expertise, and integrated solutions for various products. The Changwon Precision Extrusions Center produces extruded high-strength alloy aluminum products used for defense, aerospace and general industries around the world.





# History & Certifications

## History

**1945**

Established Siheung Engineering

**1973**

Designated by the government as a defense contractor

**1997**

Changed to Doore Air Metal

**2016**

Changed to Arconic Korea Ltd.

**2020**

Changed to SeAH Aerospace & Defense Co., Ltd.

**1967**

Changed to Samsun Engineering

**1980**

Constructed a factory in the city of Changwon

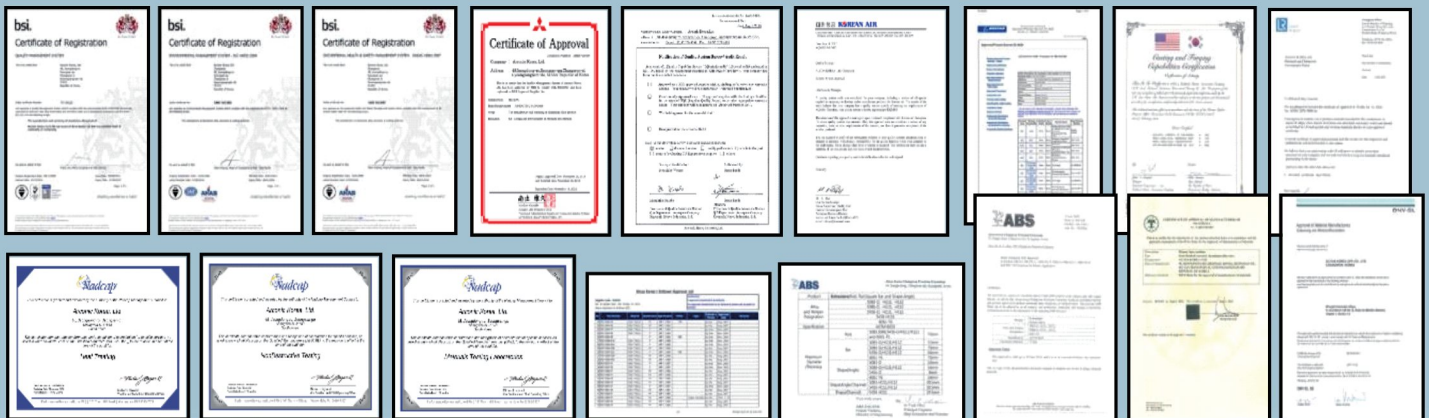
**2002**

Taken over by Alcoa, Inc.

**2019**

Announced sell-off and takeover of SeAHbesteel(Oct. 30)

## Certification



- ①AS9100 ②ISO 14001 ③OHSAS\_18001 ④NADCAP Certification (HT/NDT/Chemical/Lab) ⑤ Boeing  
 ⑥KHI ⑦MHI ⑧Embraer ⑨McDonnell Douglas ⑩KAI ⑪KAL ⑫LSI Aerospace ⑬Lockheed Martin  
 ⑭ABS(American Bureau of Shipping) ⑮Designated Korea defense contractor

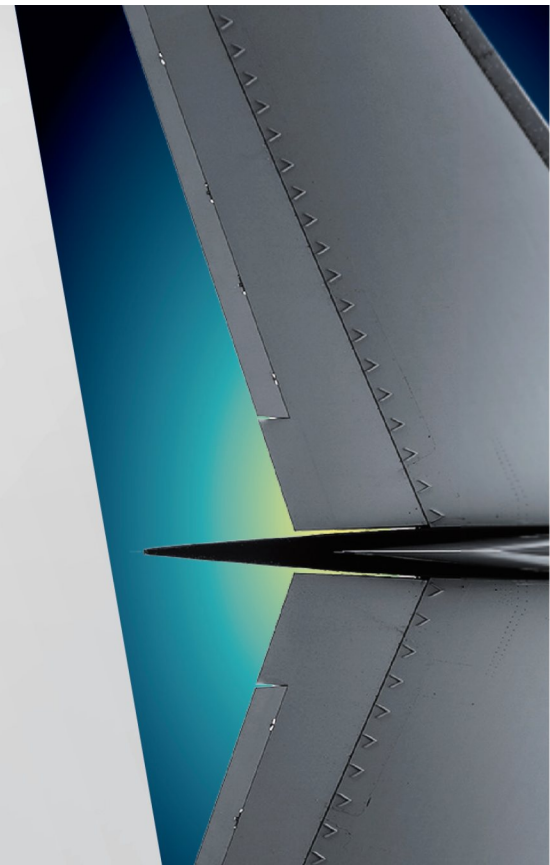
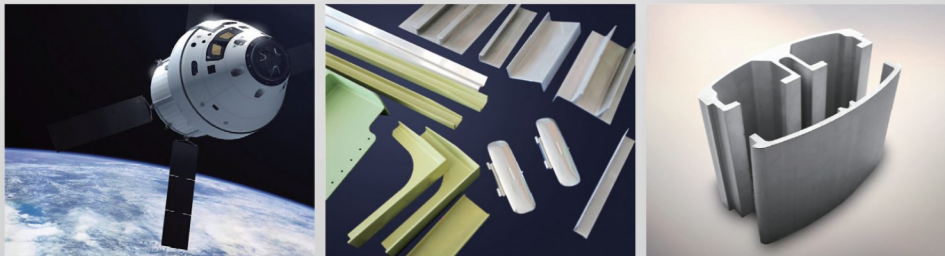


# Markets We Serve

## Aviation

Using the latest aluminum extrusion equipment and technology, SeAH Aerospace & Defense Co., Ltd. has been producing extruded/forged aluminum products for the aerospace industry since the early 1970s. Our efforts for quality and service are recognized by major aircraft makers purchasing our products from abroad, including Bell Helicopter Textron, Lockheed Martin, Cessna, Boeing, KAI and KAL.

Using various types of hard alloys, SeAH aerospace & Defense Co., Ltd. provides extruded/forged products for the aerospace industry. The production range includes a wide variety of small/medium/large extruded section members and rods.



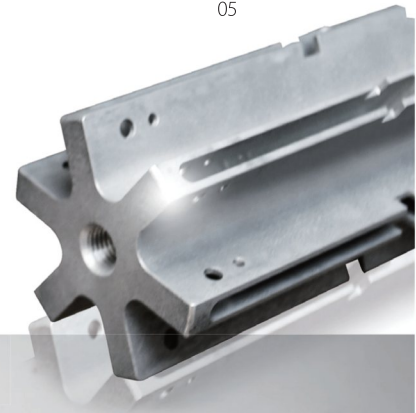
## Defense

Since our designation as a special defense contractor by the government in 1973, Changwon Precision Extrusions has contributed to the defense industry of Korea by producing various special aluminum.

Since 2008, we have provided total solutions for machining/plating/painting aluminum alloys beyond extruded high-strength aluminum alloy materials. From 2020, we will contribute to the defense industry with special steel (AIS14130/SUS, etc.), as well as with large-scale seamless tubing and high-strength aluminum alloys specialized through SeAH's technology.

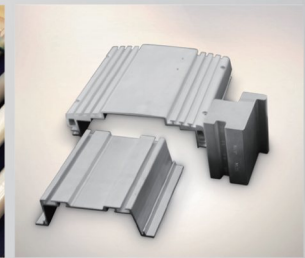
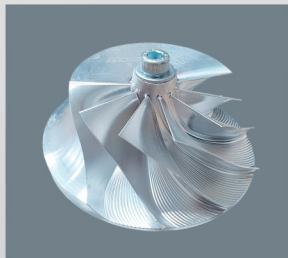






## Automotive

SeAH Aerospace & Defense Co., Ltd is a world-class supplier of extruded/forged aluminum products for passenger cars and small trucks. Our products include industrial section members, tubes (seamless), rescue tubes, pipes, sewing products, machining products, compressor wheels, shaft tubes, heat exchanger tubes (flat and circular), power train parts, brake/HVAC components, bumper systems, and rescue parts.



## Industrial

SeAH Aerospace & Defense Co., Ltd has secured excellent product consistency (product uniformity) by adapting special manufacturing processes designed to enhance your production and process productivity. We produce and offer various types of extruded and forged aluminum products including various electrical/electronic parts, transport equipment parts (railways, ships, etc.) and leisure goods (tent poles, ski poles, etc.).

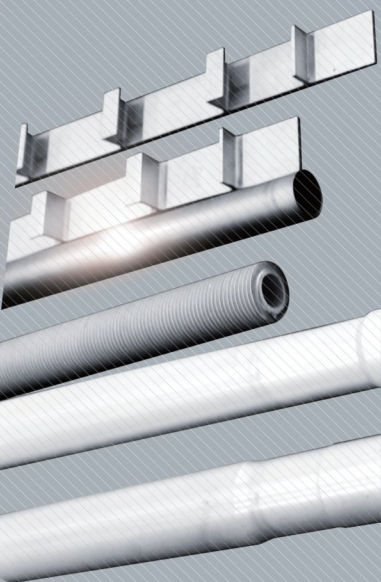
We always take pride in our products and do not spare efforts to improve them for a better future of our customers.





# Production Capabilities

SeAH Aerospace & Defense Co., Ltd is capable of meeting customer requirements for extruded/forged high-strength alloy products and produces the most diverse kinds of alloy products in Korea. Combining our technology and the production capacity of our factories around the world, we meet the customer requirements for extruded/forged products.



## Alloy

	Excalibar® 6013	UltraAlloy® 6020		Toolrite 2011®	Deltalloy® 4032	
1xxx Series	1050	1070	1100			
	2007	2011	2012	2014	2014a	
2xxx Series	2017	2024	2026	2214	2219	
	2618	2618A				
3xxx Series	3003					
4xxx Series	4032	AHS1	AHS2	A332	A356	
	AP2	4045				
5xxx Series	5052	5056	5083	5086	5AAA	
	5356	5454	5456			
6xxx Series	6005	6013	6020	6042	6061	
	6063	6066	6070	6082	6101	
	6106	6262	6262A	6351		
7xxx Series	7001	7003	7050	7055	7075	
	7085	7129	7150	7175	7475	
	TH72M	CE75	CE76			

► CE75, CE76 – specially designed for consumer electronics

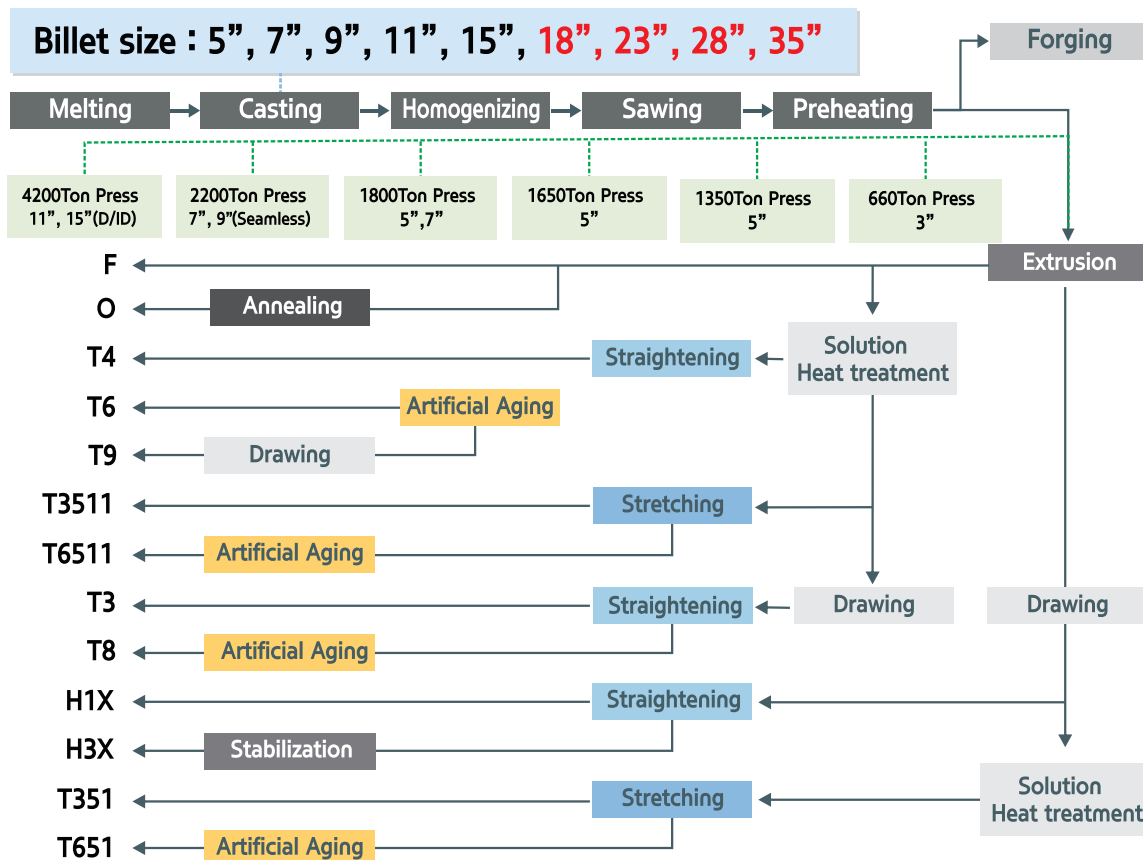
## Temper

Non-Heat Treated	F
	H111, H112, H32, H34
Heat Treated	O
	T3, T351, T3510, T3511
	T4, T4(BD), T451, T4510, T4511
	T5
	T6, T6(BD), T62, T651, T6510, T6511
	T7, T73, T7351, T73510, T73511, T76, T76510, T76511
	T8, T81, T851, T8510, T8511
	T9

► ASTM, AMS quality guaranteed



## Production Capabilities



## Process Flow Path (in General)



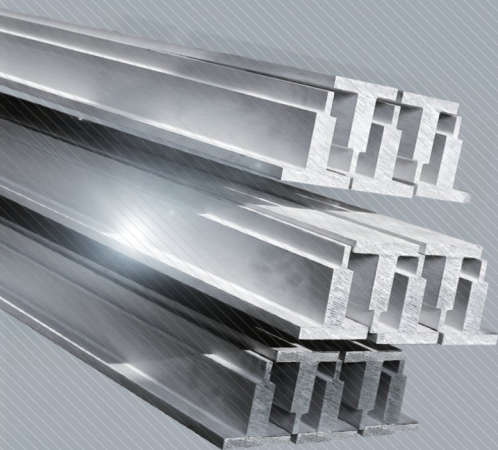


# Quality

SeAH Aerospace & Defense Co., Ltd. operates an excellent quality management system to satisfy customers through exceptional quality. We have acquired various quality certifications such as the Certificate for Quality Management System(AS9100) for the defense and aviation industries and the Nadcap for heat treatment, labs, and UT testing. And we are doing our best to enhance product machinability and coherence through thorough quality control.

## Strict adherence to heat treatment standards for aluminum alloys and 100% satisfaction guaranteed

We meet all of the following standards by complying with international regulations such as AMS2772 and AMS2750 as required in the heat treatment of aluminum alloys:



### Customer order specifications

AMS-QQ-A xxx  
 QQ-A-xxx  
 ASTM x xxx  
 AMS xxxx  
 KS x xxx  
 JIS x xxxx ...

#### Advantages

- 100% adherence to product specifications
- Better machinability/productivity through product uniformity
- Product liability

AMS  
2772

Heat treatment of aluminum alloy raw materials

AMS  
2750

#### Pyrometry

- TUS (Temperature Uniformity Survey)
- SAT (System Accuracy Test)
- Surveillance test





## Testing and Measuring Instruments

The purpose of the etching test is to detect any and all internal discontinuities and defects in the final product. It is an inspection method of checking product soundness and detecting any metal defects in all products over 0.125 inches(3.2mm) thick through etching testing following sampling in the final phase of extrusion and subsequent machining.



### Heat Treatment



## Applying SeAH's best production technology

- // World-class, high-strength alloy casting & production technology
- // Management of chemicals in high-strength alloys (self-management range)
- // Degasification device A622 designed by SeAH's patented method
- // 27-channel spectrometer
- // Design technology for complex-shaped molds
- // Indirect extrusion technology for securing structural consistency before extrusion and in the later phase of extrusion
- // Metallurgical structure control technology (recrystallized structures, etc)
- // Temperature control technology in the melting and the extrusion process



### Testing & Measuring Instruments



### Ultrasonic Testing Equipment



	Capacity	Manufacturer
U.T.M	15TONS	Instron(U.S.A)
Spectrometer	MA-610:27 channels	Thermo ARL(Switzerland)
Potable Spectrometer	25 channel	Delta XRF STD(Olympus)
Microscope	x:50-1000	Leica(Swiss)
Conductivity Tester	Sigma a Scope SMP10	FISCHER(U.S.A)
Surface Roughness Tester	1336520	Taylor Hobs(Denmark)
Profile Projector	PJ-300	Mitutoyo(Japan)
HardnessTester	Rockwell	AR-3/2001T
	Brinell	500/1000/3000kg
Stress Corrosion Cracking Testing	C-Ring Type	DAEYOUNG(Korea)
Hydrogen Gas Detector	Alscan(F)	Korea
Ultrasonic Testing	Immersion	Bomem(Canada)
	Contact	USIP 40(GE)
Coordinate Measuring Machine	1200(x)x1500(y)x1000(z)	USM 35X(GE)/EPOCH600(Olympus)
		Dukin(Victor)

USIP40(GE Inspection Technologies)	
Model	USIP40(GE Inspection Technologies)
Number of Channels	10 Multiple Channels
Frequency Range	02.~30MHz
Operation Mode	Multiple A-Scan and C-Scan
Water Tank Size	H:1654, W:1726, L:8600(mm)
Applicable Products	-Automatic Loading System : Dia 12.7 ~ 200mm -Manual Loading System : Dia 12.7~820mm, Various Types of Product Lines
Applicable Specifications	AMS-STD-2154, ASTM B594, BSS7055, etc. (All passing grades)



## R&D Innovation

Our product development team boasts of over 60 years of experience.

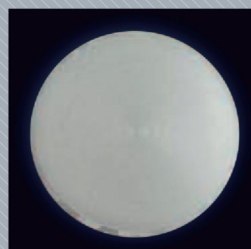
Our engineering capability optimizes procedures for alloy heating and extrusion design, processing, and shaping and offers structural solutions with minimal installation cost. And in response to the advanced market and changed customer requirements, we are focusing on developing new alloys and processes to manufacture customized products.



Providing superior  
machinability  
and anodizing  
response through  
CFRB

We deploy our best practice in 2xxx, 6xxx, and 7xxx alloys to get the excellent machinability and anodizing response for the good finish through CFRB (Cold Finished Rod & Bar)

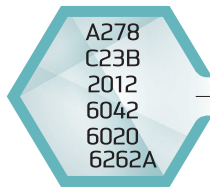
No duplex,  
fully recrystallized structure





## 01 / Contribute to low lead and lead free alloy market for replacing leaded alloy

Alloys with 0.4wt% of Pb or less (A278, C238, and 6042) and Lead-free alloy (6020) to replace Alloys (C278, 2011, and 6262)



### Low lead alloys with 0.4wt% or less of lead (Pb)

- Satisfies ROHS & ELV
- Has the same machinability and anodizing response

### Lead-free alloy

- Satisfies ROHS & ELV
- Better machinability & anodizing response

Typical Properties

Alloy	Temper	Tensile Strength (MPa)	Yield Strength (MPa)	Elongation %	General Corrosion Resistance	Machinability	Brazing	Weldability	Anodize Response
2011	T3	379	296	15	D	A	D	C	C
	T8	407	310	12	C	A	D	C	C
2012	T3	380	296	15	D	A	D	C	C
	T8	410	310	12	C	A	D	C	C
6262A	T8	352	332	15	B	B	B	B	A
	T9	399	379	10	B	B	B	B	A
6061	T6	296	276	17	B	C	A	A	A
	T651								
6020	T8	324	310	14	B	A	B	B	A
	T9	379	365	8	B	A	B	B	A

## 02 / High-strength 6xxx series alloys for better finish and machinability

Alloys 6013 and H6082, at least 20% stronger than existing 6061 and 6082 with better machinability and anodizing response.



### High-strength 6xxx alloys

- 20% higher mechanical properties than 6061 and 6082
- Good machinability and anodizing response
- At least 20% better machinability assured

## 03 / Aluminum rings & Cogging bars

Cogging bars with structures and mechanical properties made better than existing cast billets through larger-than-8" OD rods. Stress-free aluminum rings up to outer diameter of 2.7m through large billets (35" OD)

## 04 / Big billets for forging

We provide forging billets for large products, on which ultrasonic testing is performed according to ASTM B 594 and AMS STD 2154. Hydrogen gas is restricted under 0.1cc/100g up to 35" OD.

## 05 / Component development using big high-strength billets in 7xxx series

In keeping with the recent trend of larger components, we produce billets in 21", 22", 28" and 35" in 7xxx series, larger than the biggest (15") of existing billets through die forging/free forging, contributing to sizing up components.





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