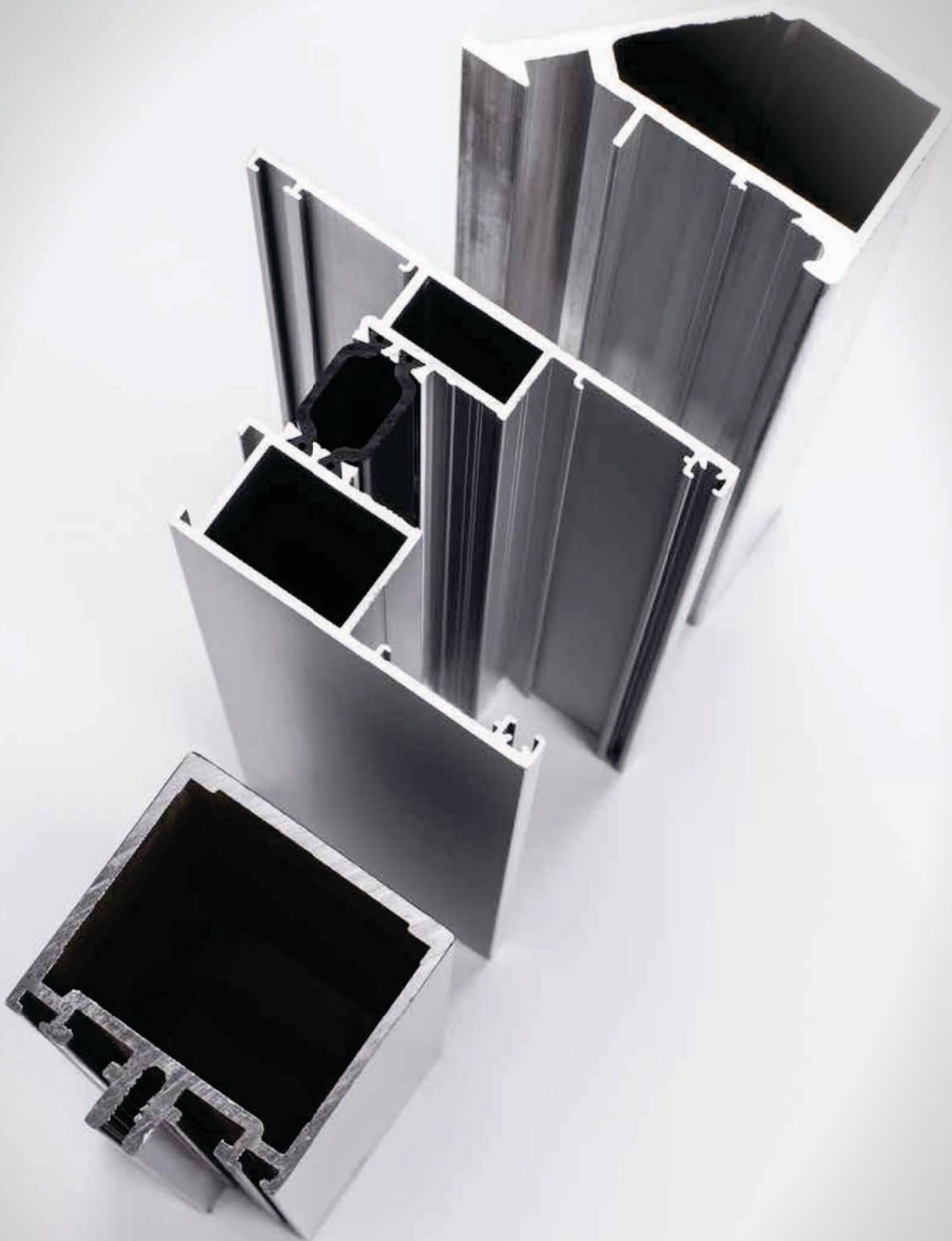




EXTRUDING BEYOND  
BLUEPRINTS







His Majesty Sultan Qaboos bin Said

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# ABOUT US

National Aluminium Products Company SAOG (NAPCO) was established in 1984 and is one of the leading extruders of aluminium profiles in the GCC market. Located in the Sultanate of Oman, the manufacturing plant is spread over 65,000 sq meters in the Rusayl Industrial estate.

NAPCO offers a wide range of Aluminium profile extrusions in finishes that suit functional modern design specifications. The company has left its mark on the architectural landscape of the Middle East with its renowned quality products being used in a number of prominent structures.

Our annual production capacity is 36,000 MT with four (4) state of the art presses. The extrusion presses are complemented by one anodizing line and two powder coating lines (vertical & horizontal). NAPCO also houses two wood finish lines and a crimping and bending facility.

NAPCO's commitment to quality has made it the first extrusion company in the Gulf to receive ISO certifications. We are also the only public limited aluminium extrusion company in the entire GCC.

With a consistent focus on innovative production skills and high service standards, we will continue our objective to meet customer demands and expectations.

ROBERT HOLTKAMP  
CEO

ON GLOBE



## MACHINERY

EXTRUSION	4	2000 MT (8') SMS Schloeman Germany
		2800 MT (9') Danieli Breda, Italy
		1800 MT (7') Tecalex, Spain
		1800 MT (7') Tecalex, Spain
POWDER COATING PLANT	2	Horizontal Type, Ercon, UK
		Vertical Type, Trasmetal, Italy
ANODIZING LINE	1	SAS, Germany
NATURALL WOOD FINISH	2	EuroIacca, Italy
THERMAL CRIMPING FACILITY		
BENDING FACILITY		

## PROFILE

### LOCATION:

Muscat, Oman

### OWNERSHIP:

Public Limited Company  
(Joint Stock Company)

### YEAR OF COMMERCE:

1987

### PRODUCT/BUSINESS:

Manufacturer of Aluminium Extrusions in Various Finishes and Design of Associated Systems.

### CERTIFICATION:

ISO 9001:2008



# WHY ALUMINIUM

Aluminium is the second most widely specified metal in buildings after steel, and is used in all construction sectors, from commercial buildings to domestic dwellings.

The two series of alloys most widely used in construction are the 5000 series work-hardened magnesium alloys and the 6000 series heat-treatable magnesium silicone alloys. The latter are more extrudable and, therefore, offer greater scope for complex shapes.

Silicone alloys (such as LM6) and manganese alloys (such as 3103) are also used for specific construction applications. By selecting the right alloy, the designer is offered a wide range of properties including high strength (up to 400 MPa or 26 tones per sq inch), low density, high thermal conductivity, and good forming and joining characteristics.

The choice of the most appropriate alloy of the 6000 series for a particular extrusion depends on the nature of the task it has to perform.

A balance has to be struck between strength, ease of forming and finish. The 6063 alloy, for instance, has good extrudability, corrosion resistance and surface finish; and is thus widely used in fenestration. The properties of the individual alloys are amplified by the shape of the extruding die. Careful and knowledgeable design can take advantage of the ability of the extrusion process to distribute the material across the section to exactly where it is needed for a particular performance requirement.

## ADVANTAGES OF ALUMINIUM

Excellent strength to weight ratio \* Corrosion-resistance \* Design flexibility \* Durability \* Hundreds of surface finishes \* Low maintenance \* Strong at low & high temperatures \* Fire safety \* 100% recyclable

## ALUMINIUM IN BUILDINGS

Aluminium alloy components are widely used in building as windows, doors, curtain walls, structural glazing, sky lights, louvers, roofing, partitions, handrails to mention a few.

# PROCESS

**Extrusion:** The production is carried out as per planning schedule through two Presses. The entire process involves the following prime activities in sequence.

- Appropriate die maintenance and service through corrections and trials to meet quality criteria. Pre-heating of dies. Selection of billets. Pre-heating of billets. Extrusion.
- Computerised profiles inspection Adequate cooling of hot extrusions.
- Controlled stretching to straighten the profiles.
- Quality checks to ensure that the shape, dimension, surface areas are to the standard specification Sawing to specified length.
- Quality clearance for next stages of process. Age hardening is a process of heat treatment applied to profiles in an oven under controlled parameters to increase its mechanical strength.
- The hardness checks at this stage is carried out to confirm the strength achievement, which is denoted as the completion of T5 or T6 temper.

**Surface Treatment:** Our finishing treatment comprises of Anodizing and Powder Coating. After extrusion the extruded profiles are routed to either Anodizing or Powder Coating depending on the required steps.

**Anodizing:** This technical process is applied to profiles through oxidation by electrolysis involving the following steps.

**Pre-treatment:** Either chemically by etching in strong alkaline solution or mechanically by polishing.

- Anodizing by itself in an acid bath under controlled direct current electrical parameters.
- Colouring in silver, bronze and black in matt and polish finish.
- The final stage in completing this process is sealing.
- Quality checks and tests are carried out on shift basis at the off-loading area to ensure that the colour and surface quality are to be the right specification.

**Powder Coating:** This process involves the following steps:

- Pre-treatment comprises of cleaning and non chromating.
- Electrostatically charged polyester powder particles are sprayed on cleaned and chromatized profiles in a specially designed spray booth with controlled parameters to maintain its uniformity.
- Followed by "curing" in oven at a controlled parameters to create a hard, uniform and well bonded powder coating film.
- Quality checks and tests are carried out in the off-loading area-prior to packing and dispatch.

## CHEMICAL COMPOSITION

	Alloy AA6063	Alloy AA6061	Alloy AA6082	Alloy AA6005A
% Mg	0.45 - 0.90	0.80 - 1.20	0.6 1.2	0.40 - 0.70
% Si	0.20 - 0.60	0.40 - 0.80	0.7 1.3	0.50 - 0.90
% Cr	0.10	0.04 - 0.35	0.25	0.30
% Zn	0.10	0.25	0.20	0.20
% Fe	0.35	0.70	0.50	0.35
% Cu	0.10	0.15 - 0.40	0.10	0.30
% Mn	0.10	0.15	0.40 - 1.0	0.50
% Ti	0.10	0.15	0.10	0.10
Other Impurities	0.15 (0.05 Each)	0.15 (0.05 Each)	0.15 (0.05 Each)	0.15 (0.05 Each)
Aluminium	REMAINDER	REMAINDER	REMAINDER	REMAINDER

## MECHANICAL PROPERTIES

	6063			6061			6082			6005		
	T4	T5	T6	T4	T5	T6	T4	T5	T6	T4	T5	T6
Ult. Tensile Strength N/mm <sup>2</sup>	130	160 - 175	195 - 215	180	--	260	205	270	290 - 310	180	--	250 - 270
0.2% Proof Stress	65	110 - 130	160 - 170	110	--	240	110	230	250 - 260	90	--	200 - 215
Hardness (Brinell)	50	65	75	65	--	95	70	90	95	50		85 - 90
Ult. Tensile Strength N/mm <sup>2</sup>	155			205			211			205		
% Elongation on 50mm	12	5-6	6	16	--	6-8	12	6	6	6	--	6
Density - g/cm <sup>3</sup>	2.7											
Melting Range -°C	650			600-650			580-650			580-650		
Coefficient on Linear Expansion X10 <sup>-6</sup> /Deg.C	23			24			24			24		
Modulus of Elasticity N/mm <sup>2</sup>	67000			69000			69000			69000		
Fatigue Strength (50x 10 <sup>6</sup> ) cycle N/mm <sup>2</sup>	75			95			105			95		

## CHOICE OF MATERIALS AND ALLOY

The word 'aluminium' effectively represents not one material but many. It covers a range of purities and a very large number of alloys whose alloying elements – Copper(Cu), Silicon(Si), Magnesium(Mg) and Manganese(Mn) to mention only the main one – combine to give properties responsible for aluminium's widespread use. These properties, different in combination for each alloy, include response to Surface Treatment especially like Anodizing and Powder Coating.

So it is important that it is considered equally with mechanical and physical properties when the choice of alloy is made, preferably at the design stage. NAPCO has taken all the considerations into its stride to meet all the requirement of Architects, Designers and Consultants. The concise specifications preferable to construction industry as well as to the structural applications are presented.

## MATERIAL SPECIFICATION

ALLOY CHARACTERISTICS, CHEMICAL COMPOSITION & MECHANICAL PROPERTIES OF ALLOY AA6063, AA6061, AA6005A & AA6082 TEMPER T4, T5 & T6

### ALLOY CHARACTERISTICS

ALLOY AA6063	ALLOY AA6061	ALLOY AA6082	ALLOY AA6005
The most popular extrusion alloy. It has good surface finish, is corrosion resistant and can be heat treated for strength.	Most versatile alloy of the group. Has an improved magnesium silicon alloy with the ability to develop strengths higher than 6063 alloy. Has good corrosion resistance and used in structural & transportation applications.	This alloy has good tensile strength and has good extrudability. Widely used for railways, automobiles, profile structures with complex sections, platforms, pipelines, masts for sailing boats, furniture etc.	A versatile alloy that can be used for various structural and architectural applications in the transportation, industrial, electrical machinery and equipment industries. Alloy 6005A can be used to produce standard and custom shape, extrusions that are solid (open) or hollow in design. 6005A provides good corrosion resistance and finishing characteristics for anodizing or paint.

## TEMPER DESIGNATION

Temper : T4 : Solution heat treatment and naturally aged to a substantially stable condition (Exclusively recommended for bending ARCHES and should be carried out within a month of extrusion).

Temper : T5 : Cooled from an elevated temperature shaping process and then artificially age hardened.

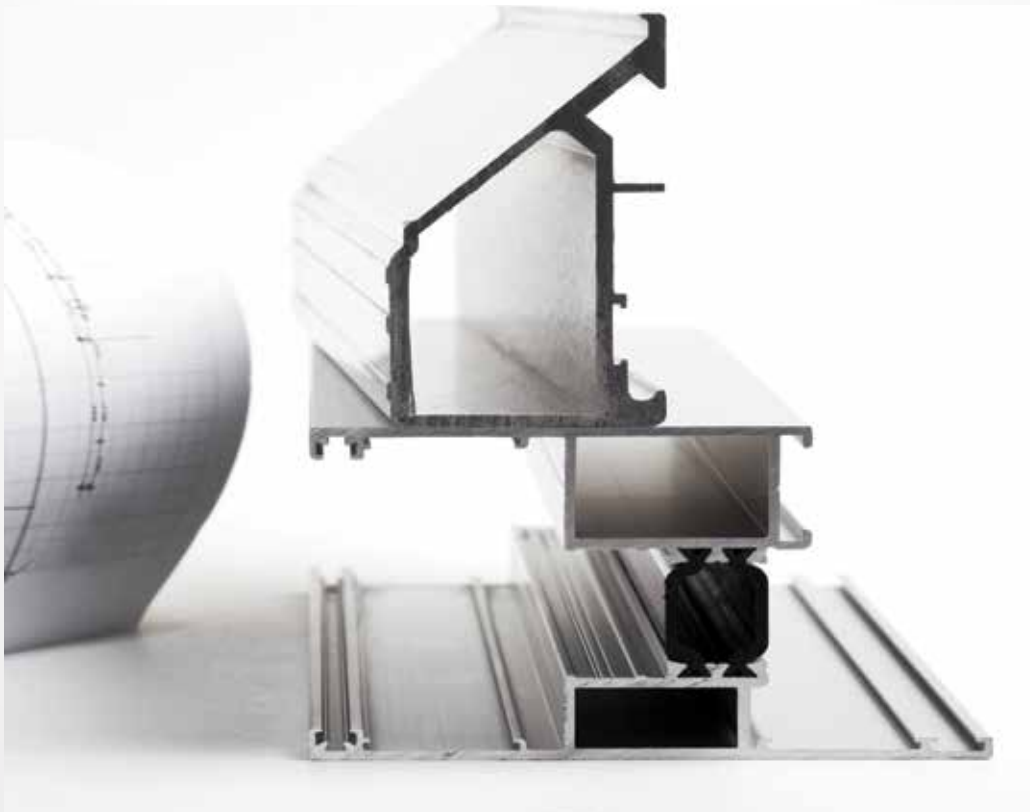
Temper : T6 : Solution heat treatment and age hardened.

## LOW TEMPERATURE PROPERTIES

In contrast to steel, aluminium alloys do not have brittleness in low temperature but rather shows an improvement in ductility, toughness below room temperature.

## FIRE RATING

Aluminium alloys are “non-combustible” and are rated AA (the highest possible under international classification systems).



## INTERNATIONAL STANDARD COMPLIANCE

Extrusion Dimensions Tolerances	BS EN 2:2008 -12020 (for 6060 and 6063 alloys) BSEN 2008: 755 & ASTM B 221 (Other alloys)
Anodizing Finish	BS EN 2001 1-12373 BSEN ISO 2010 : 7599 BS: 3987 Clause 6 ,5 ,3 ,2 Appendix-A, B, C, D, E, F, G, H, J, K, L
Powder Coating	BS:6496 Clause: 10.8 & 10.7 ,10.6 ,10.5 ,10.4 Minimum Coating Thickness – 60 Microns
Warranty Period:	Powder Coating  10 years For PEF powders 20 years For SDF powders 30 Years For Durasole powders (Warranty will be as per powder manufacturer's Technical Data sheet)

## QUALITY STANDARDS



# MAJOR PROJECTS

## OMAN

- MUSCAT INTERNATIONAL AIRPORT
- THE WAVE HOMES
- ROYAL OMAN POLICE HEADQUARTERS
- ROYAL OPERA HOUSE
- MINISTRY OF DEFENCE
- SALALAH AIRPORT
- BANK MUSCAT HQ

## UAE

- BURJ AL ARAB
- EMIRATES TOWERS
- BURJ KHALIFA
- ABU DHABI INTERNATIONAL AIRPORT
- DUBAI INTERNATIONAL AIRPORT

## QATAR

- HILTON HOTEL
- SHERATON HOTEL

## SAUDI ARABIA

- MADINAH INTERNATIONAL AIRPORT

## AUSTRALIA

- BENDIGO HOSPITAL





## OMAN

Corporate Office and Factory  
National Aluminium Products Co.  
PO Box 15 Rusayl,  
PC 124 Sultanate of Oman.  
Phone: 00968-24446450  
Fax: 00968-24446453  
E-mail: [info@napco.co.om](mailto:info@napco.co.om)  
[sales@napco.co.om](mailto:sales@napco.co.om)

## UNITED ARAB EMIRATES

Branch Office- Dubai  
National Aluminium Products Co.  
PO Box 116912  
Dubai, United Arab Emirates  
Phone: 009714-3354531  
Fax: 009714-3355728

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NATIONAL ALUMINIUM PRODUCTS CO. SAOG, RUSAYL, OMAN

