



IRAN ALUMINIUM CO.
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Introduction

Nowadays, the world industries are on massive efforts more than ever sizing upon standards renovation and modernization to enhance saving energy efficiency, effectiveness and Considering IRAN natural capacities such as man power, talent work forces, fuel , electricity and pave the way for modernization and achieving above mentioned goals which have been priority for iralco to produce primary aluminum.

Iran Aluminum co.

“IRALCO” The first Producer of Aluminum in Iran, is located at 5th km off Arak - Tehran rd.

The issue of establishment was confirmed by the government board in 1963 and the plant was inaugurated in Arak (capital of central province of IRAN) in 1972 with 45000 T/Al annually basis.

The area of the plant is 232 hectares and after Islamic revolution The capacity was increased, the current annual production capacity is more than 180000 T/Alpy. About 11,000 fabrication plant and workshops with more than 250,000 personnels are working in industries affiliated to aluminium. The products of the firm are produced according to the international standards, and the purity degree of aluminum is 99.85%, L.M.E member and the holder of ISO 9001, ISO 14001, OHSAS 18001.





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The Main Work Shops of Iralco are :

1. Reduction cells (70KA & 200KA)
2. Carbon plant consists of (Green mill, anode bake , anode Rodding)
3. Cast house consists of (casting , cutting & packaging)

Provision Units

1. Power distribution stations:
 - A - Old transformers, 70 KA technology, rectifiers and control room
 - B - New transformers, 200KA technology, rectifiers and control room
2. Utilities
3. Repair & maintenance units
4. Control pollution in carbon plant F.T.P.(old &new)
5. Control pollution in reduction cells F.T.P (new smelter)





Reduction Cells (Work Shops)

The new 110,000 t/apy, 200KA reduction cells are located in two parallel two floor buildings, 24 spans, 744 long on the ground floor. Four channels are available to connect Pot Room buildings, for purpose of transportation of Alumina and other material or equipments. In each Pot Room, there are 105 sets of 200kA reduction pot, totally, 210 sets of reduction pot included in the pot line and the daily production capacity of each pot is 1500 kg Al and the energy consumption for each pot is 13/4-14 kwh.



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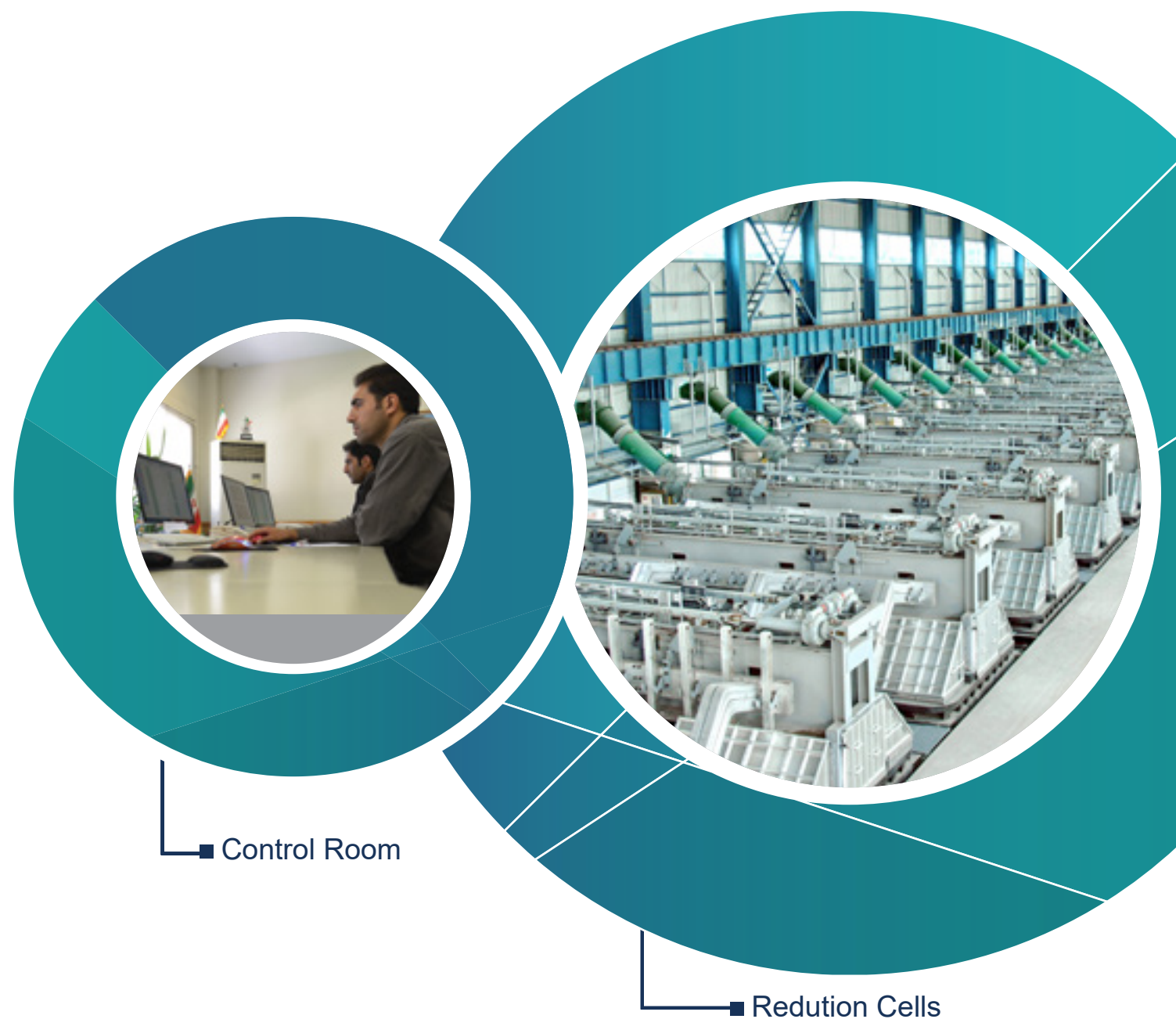


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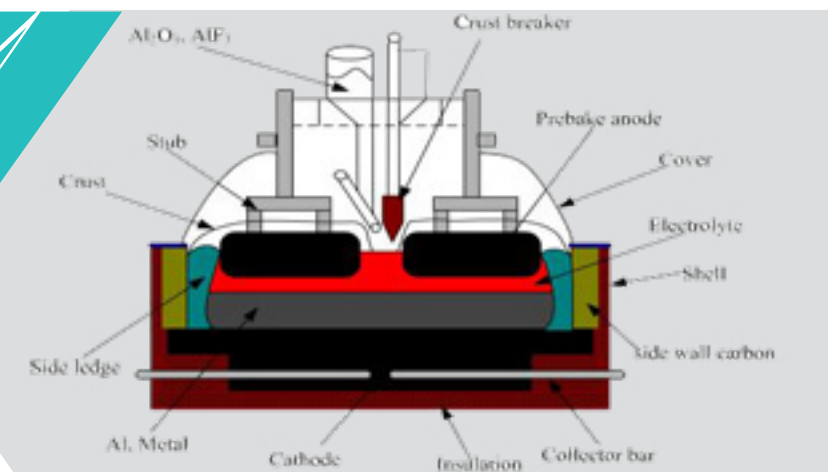
IRALCO New Smelter (Central Work Pre- Baked)

Along the side-by-side reduction pots, there are one set of intelligent pot control device and pneumatic control cabinet for each single pot mounted on the wall and there is control room for monitoring and controlling all the process of production line to exchange the data. Pot cover are used for sealing of pot, while fume are collected in reduction pot fume exhaust pipe and sent into F.T.P(fume treatment plant) for controlling pollution, environmentally friendly. For the crust breaking, feeding, replacement of anode and aluminum tapping and there are 8 sets of advanced PTM, Elevation of PTM track is +9.150m. In Pot Room, there are compressed air piping, to provide compressed air for pneumatic control.





■ (F.T.P) System



■ Aluminium Reduction Cell

The Structure of Reduction Cell And Control Pollution Process

The steel shell construction of pot and its ship structure are designed for high stability and tolerating thermal pressure, during the time that pot is operating, to prevent shape changing, specially gas collection hood to prevent emitting pollutant gases. Each pot contains 18 cathode and 28 anode and the weight of anode is 815 Kg, the number of stub to an anode are 4 and the pot dimensions are 11794* 4738*1700 mm, each pot contains the following items: bus bar, pot exhaust gas, crust breaker, point feeder electrolyte, Alumina, crust, steel shell, collector bar, anode, cathode. Iralco 200 KA technology is equipped with control pollution system (F.T.P), control process system, and all the processes are performed automatically and minimum man power, for creating electrolyte bath, gradually cryolite is poured in the pot till to reach 1000 C°, and gradually the cryolite will start melting and the space between positive and negative poles (anode and cathode) will be filled with melted cryolite, this trend will be continue till the height of the bath reach to 10 inches then pot feeding with alumina will be started, alumina (AL₂O₃) in the bath will divide.

$\text{Al}_2\text{O}_3 \rightarrow 2\text{Al}^{+3} + 3\text{O}^{-2}$ Positive ions move to cathode and negative ions, will move to anode and they lose their electrons.

All exhausted gases, dust and particles emitted in the pot will evacuated by pipe which is adjustable to butterfly valve and guide to F.T.P system, the principle is absorption reaction, physical absorption and chemical reaction: $\text{Al}_2\text{O}_3 + 6\text{HF} \rightarrow 2\text{AlF}_3 + 3\text{H}_2\text{O}$



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(F.T.P) System

The exemplary exporter
of the country



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Carbon Plant

As Aluminium production process take place in electrolytic cells or "Pot", where carbon cathodes from the bottom of the pot, acts as the negative electrode , and anode (positive electrodes) are held on the top of the pot and are consumed during the process when they react with oxygen released from Alumina.

The required anodes for reduction plant (pot room) and mixture materials for lining pots (reduction cells) are produced in this workshop.



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Carbon Plant Consists of 3 Sections

1- Green Mill

The Green mill (paste plant) consists of several possible combinations of equipments and the basic process stages are as follow:

1-raw material handling 2-dry aggregate preparation 3-mixing and paste cooling 4-forming and anode cooling .The incoming coke and recycled material are Crushed, Screened, Sized and added to form a dry aggregate recipe. This is then mixed 13 to 18% weights pitch at a temperature of 150 to 180 °c. The result is “green paste” which is formed into anode block by hydraulic pressing.The green anode is cooled, stored and ready for baking.

2- Anode Baking

In order to meet the physical requirement of the anode for the application in the electrolysis cell, the green anodes need to be baked. During baking process, the lighter components of the pitch binder are evaporated and the heavier components are coked and binding the petroleum coke grains together.





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3. Iralco "Rodding Rooms"

Iralco enjoys of 2 rodding rooms (anode rodding for 70 ka & 200ka)

The operation of these work shops performed as follow:

- 1- Bath cleaning
- 2- Shotblasting
- 3- Carbon Breaking
- 4- Thimble press
- 5- Rod straighter
- 6- Rod Brusher
- 7- Stub Graphitizing
- 8- Flame Pre Heating
- 9- Mating Station



Aluminium the metal of the future





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Iralco Power Station

Iralco power supply is introduced from 230 kv over head line from Iranian electrical network , to provide power for two sets of 240" MVA" main transformers which 3 coils for" HV" high voltage 230kv," MV" (Medium Voltage) 132kv and "LV" (low voltage) 6.6 kv sides. The" MV" 132kv sides of the main transformer is connected to rectifying unite. There are 4 sets of 132kv rectifying units. The capacity of rectifying transformer (30500KVA) for 4 units. The DC output is 200 KA and voltage 960V for reduction cells.



Cast House

At regular intervals, molten aluminum tapped from pots is transported to the Cast House where it is alloyed in holding furnaces by the addition of other metals or elements, according to the request of the customers, cleaned of oxides and gases, and then casting into ingots.



■ Billet cast house



■ Pure & Alloyed Cast House

Iralco Cast House

Enjoying different furnaces such as, holding, re-melting, homogenizing vertical and horizontal casting machines and pig machines, is able to produce all kinds of aluminum alloys according to the request of the customers and AA.,GB, ISO, DIN and other standards.

The products of this workshop are produced as follow:

1. Wrought Alloys such as Slab and T- bar by the D.C direct chill method
2. Casting Alloys such as T-bar, 1000 lb,50 lb.

In alloy ,making the quality processes of the metal such as Fluxing, Skimming, Degassing, Filtration, Grain Sizing are performed.

The capacity of this work shop is 180,000 TAl/py and products after Q.C. confirmation, cutting and packaging are delivered to the customer.



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IRALCO PRODUCTS



■ BILET

T-BAR INGOTS ■



■ 1000-lb INGOTS



■ 50-lb INGOTS

Slab ■





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		Grade		6063	
		composition			
		Si	0.40	Mg	0.50
		Fe	0.14	Zn	0.01
Cast no.	800731	Cu	-	Ti	0.01
QC	OK	Mn	-	etc	-



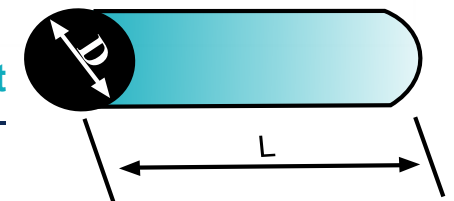
dimensions of ingot		No. of ingots in bundle	Average Weight (kg)
D	L		
7 $\frac{1}{8}$	24	19	891
8	30	18	667
10	37	7	900
	43	7	1046
7	236	5	2000

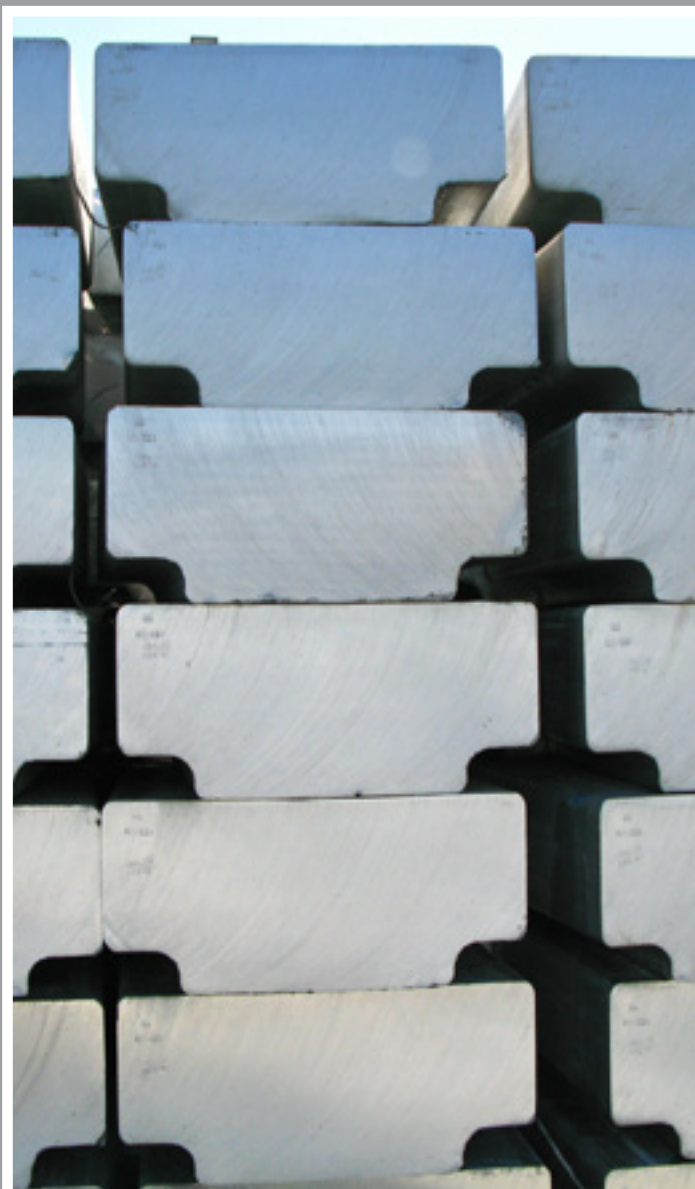
Billet

These products are applied by Extrusion industries and at to the customers request, diameters ranging from 5 1/8 to 14 3/4 inches, and lengths from 236 to 24 inches, are available. They are produced according to the AA international standard.

- Nowadays most of the aluminium producers are eager to produce long length billet exceeded 5 meters which are produced out of primary aluminium mostly. Iran aluminium company "Iralco" cast house (50000 Ton Aluminium Billet) enjoying Air slip mold, Titanium injection system, Ceramic filters with rotary degassing sets and magnetic stirrer furnaces is able to produce billet with high quality, homogenized, strict quality control which are engineered to meet the customers 'design requirement' and AA international standard. These products are used in a member of application area line Automotive and Transport industry Building, Heat transfer, general engineering Electronic and aviation, industrial enterprises and ...

This length can be changed at to the customer's request





T-BAR INGOTS

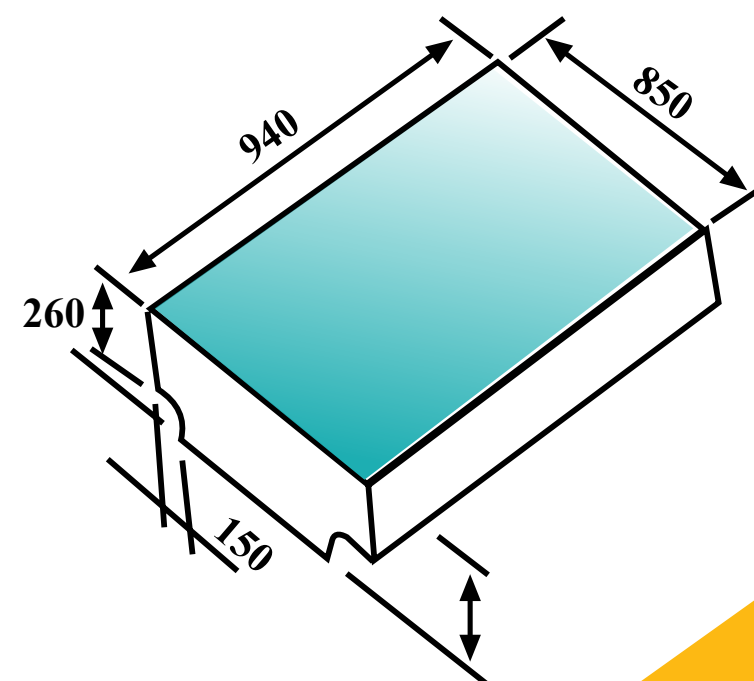
These ingots are used by factories which are able to remelt solid aluminium for producing electrical conductors (E.C.) and other fabricated parts, household appliances, cables and etc. they are produced in different types : pure and 1350 AA.

This length can be changed at to the customer's request



		Grade		E.C	
		composition			
		Si	0.08	Mg	0.002
		Fe	0.20	Zn	0.013
Cast no.	100181	Cu	0.009	Ti	0.002
QC	OK	Mn	0.002	etc	0.02

weight	657 kg
length	940 mm
width	850 mm



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Alumina loading and unloading in Imam khomeini port in Persian Gulf



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Slab

These products are used at mill plants for the production of all kinds of sheets, coils, straps, etc.

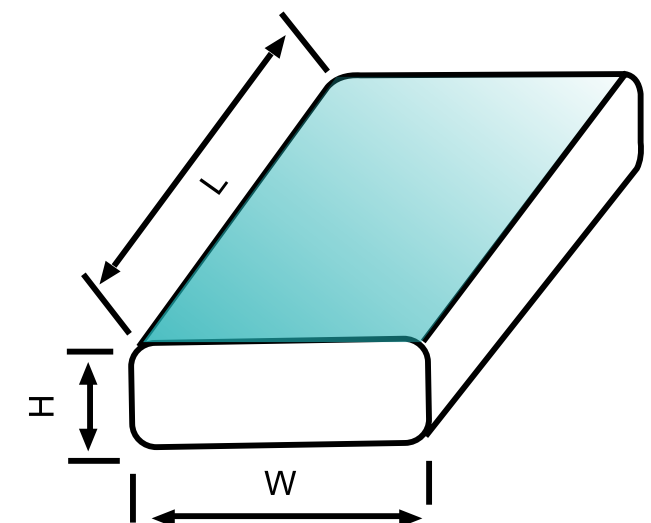
Standard Bundle

Dimension			Weight kg
W mm	H mm	L mm	
1060	300	2700	2300
1100	270	2700	2165

This length can be changed
at to the customer's request



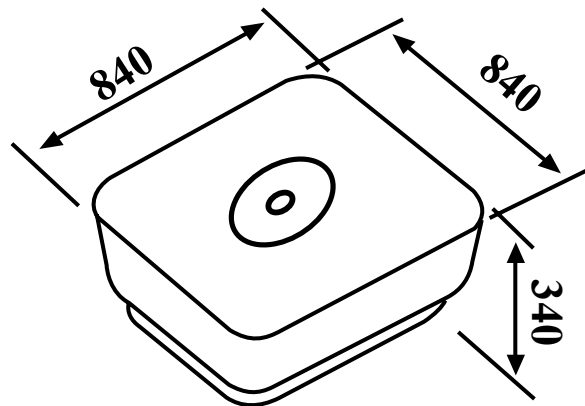
		Grade		1100	
		composition			
		Si	0.05	Mg	0.00
		Fe	0.12	Zn	0.00
Cast no.	100631	Cu	0.00	Ti	0.00
QC	OK	Mn	0.00	etc	0.00



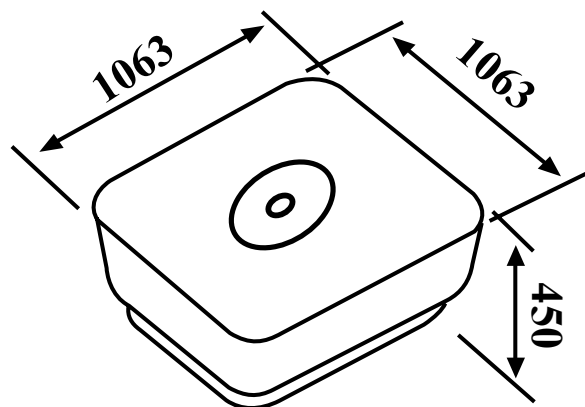
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average weight 400 kg for 1000lb and
500 kg for 1200 lb self-palletized for
mechanical handling.



1000 lb ingots



1200 lb ingots



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		composition			
		Al	99.83	Ga	-
		Si	0.06	V	0.01
Cast no.	120629	Fe	0.09	Zn	0.01
QC	OK	Cu	-	Ti	-

1000lb & 1200 lb INGOTS

These types of ingots are mainly pure aluminium for manufacturers of electrical cabls, foils, etc. The purity rate of these ingots is 99.85% and often used in remelting industries.





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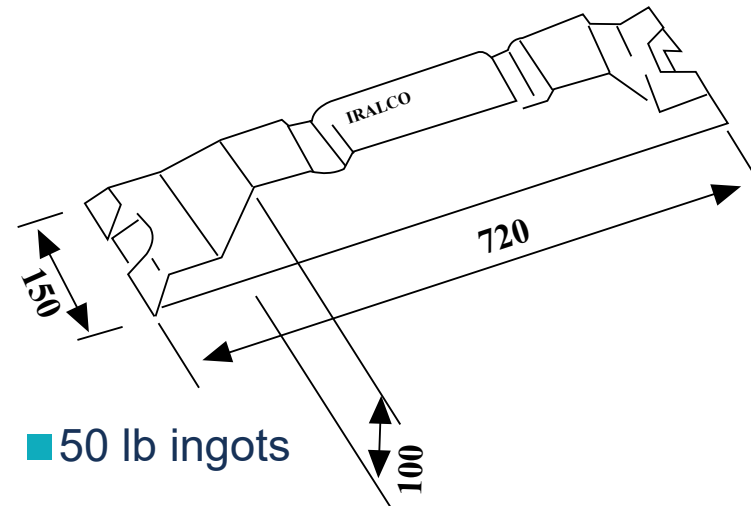
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PURE 50 lb & PURE 35 lb INGOTS

These types of products are mostly produced as pure and alloy aluminium and employed in producing car making industries, casting industries household manufacturing appliances and foils. These are also used in packing, hygienic industries and etc. The purity is 99/85%, and are known as p1020 in international trade.

**self-palletized for mechanical, handling
banded with four 11/4 steel straps**

Standard Bundle		50 lb	35 lb
No. of INGOTS		44	60
Average Weight		900 Kg	820 Kg
Approximate Dimensions	Width	750 mm	
	Length	750 mm	
	Height	900 mm	



		composition					
		Si	9.44	Mg	0.31	Ti	-
QC	OK	Fe	0.51	Cr	-	Pb	0.13
Alloy	AS5U3G	Cu	3.35	Ni	-	p	-
Cast no.	900031	Mn	0.30	Zn	0.01	Sb	-



Quality Control (Q.C)

Q.C performs all monitoring and controlling the raw material, production process, operation of workshops performance and customer relations.

(Q.C) compromise following Units:

Q.C. of Cast House workshop, Reduction Cells, Carbon plant, raw material, Statistics and Distribution.



Laboratory

IRALCO laboratory enjoying various and modern equipments and tools has capability to analyze and test different samples of (pot room, cast house,...) such as ratio, Aluminum fluoride, Free Alumina and other raw materials,....

Central Laboratory consists as follow:

1. Quantometry
2. Chemistry
3. Physical chemistry
4. X-ray (xrd & xrf)
5. Granulation & mesh analysis





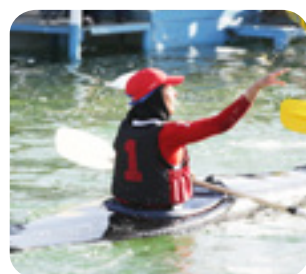
Iralco Shohada Park
(next to the plant)
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Iralco, Welfare & Sport Facilities

Iralco ambition on motivating its personnel and their family, by performing sport & welfare facilities such as:

1. 2 Foot Ball Fields
2. IRALCO Multipurpose sport complex (next to plant site)
3. IRALCO Multipurpose sport complex (in industrial city)

Welfare Facilities

Iralco Guest Houses 2. Iralco facilities in north of IRAN 3. Iralco facilities in Mashhad 4. Iralco facilities in family park.



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