

# RELIABLE GREEN INNOVATION

## 可靠的绿色创新

# MASERCATA LTD



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MAZANAZU & TECHNOLOGY & SAMPLE PRODUCTS

MAZANASU & 技术 & 样品产品

Masercata Ltd

BETTER MATERIAL - BETTER ENVIRONMENT  
更好的材料 - 更好的环境

10/19/2020



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创新技术节省能源和资源！

Innovative New Technology Saves  
Energy & Resources!

# 关于我们 ABOUT US



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Masercata Oy 成立于2018年1月

- 制造
- 服务
- 营销

公司总部位于芬兰，欧盟  
地区

- 新材料 SCI 系列和 F10
- 采矿流程
- 回收（30% 金属含量，20...70% 水分）

保护环境  
高科技公司

Masercata Ltd



- Masercata Oy was established in January 2018
  - manufacturing
  - service
  - marketing
- Company based in Finland, EU
- Areas
  - New materials SCI Series & F10
  - Mining processes
  - Recycling (30% metal content with 20...70% moisture)
- Environment friendly
- High Technology Company

Test Facility at Finland  
芬兰测试设施

10/19/2020

# 产品供应 PRODUCT OFFERING



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## 1. MAZANASU SPAF炉

- 为工艺和材料定制
- 根据需求调整的容量

## 2. 技术

- 要使MAZANASU加热炉正常工作，  
需要根据具体  
的应用技术和工艺

## 3. 权限

- 提供特定流程和地理区域的技术、  
产品及业务权利

## 1. MAZANASU SPAF Furnaces

- Customized for the process and material
- Capacity adjusted to the requirement

## 2. Technology

- Technology and Processes according to  
the specific application are required to  
make Mazanazu Furnaces to work

## 3. Rights

- Technology, Product & Business rights for  
the specific process and geographical  
area are available

## MAZANASU RM -SPAF-12

SPAF = SPECIAL PLASMA  
ARC FURNACE





## MASERCATA SOLUTION - MAZANASU RM - RECOVER FROM RED MUD - OUTPUT

- **IRON**

- Make Pig Iron
- Make Ferro Alloys
- Make Iron & Super Cast Iron (pat. pending) Castings
- Make F10 Maserata material (pat. pending)
- Make Hi wear life parts (some with special Maserata process)

- **SLAG**

- Used in: concrete, cement, mortar, asphalt, sand, land fill, soil improvement etc. (non toxic)
- Recover Al<sub>2</sub>O<sub>3</sub>, TiO<sub>2</sub>, Sc<sub>2</sub>O<sub>3</sub>, Y<sub>2</sub>O<sub>3</sub>, CeO

- **SMOKE**

- Is filtered, precious metals expected to be recovered from filters - large scale testing required

- **WATER**

- Red mud contains about 20% water, it is released to atmosphere with smoke (but can be recovered)

- **PROCESS HEAT**

- Could be utilized, currently released to surroundings

- **PROCESS**

- RED MUD Processing is profitable
- Low CO<sub>2</sub> generation / produced metal ton
- Other modules (SC, SM) can be added if required



## MASERCATA 解决方案 - MAZANASU RM - 从红泥中恢复 - 输出

- **铁**
  - 制作生铁
  - 制造铁合金
  - 使铁 + 超级铸铁 (Pat. 待定) 铸件
  - 制作 F10 MASERCATA材料 (待定)
  - 使 Hi 磨损生活部件 (有些具有特殊的 MASERCATA工艺)
- **渣**
  - 用于: 混凝土、水泥、砂浆、沥青、砂、填土、土壤改良等 (无毒)
  - 恢复 Al<sub>2</sub>O<sub>3</sub>, TiO<sub>2</sub>, Sc<sub>2</sub>O<sub>3</sub>, Y<sub>2</sub>O<sub>3</sub>, CeO
- **烟**
  - 过滤、可检测的金属, 预计从过滤器中回收 - 需要大规模测试
- **水**
  - 红泥含有约20%的水, 它被释放到烟雾的球层 (但可以回收)
- **工艺热**
  - 可以利用, 目前释放到周围
- **过程**
  - 红泥是有利可图的
  - 低 CO<sub>2</sub> 一代 / 生产金属吨 如果需要,
  - 可以添加其他模块 (SC、SM)

# MASERCATA LTD



## 铝

- 生产 1 吨铝需要 4 吨铝土矿和 14000kWh 能源
- 4 吨铝土矿转换为 2tn 氧化铝 (0.8 = 1.5 吨红泥)
- 2 tn 氧化铝转换为 1tn 铝

Top Ten Aluminium Producers 28Aug2017			
Rank	Company	Country	Mtn
1	UC Rusal RU	Russia	4,173
2	Alco	USA	3,742
3	Chinalco	China	3,502
4	China Power Investment Co.	China	2,693
5	Rio Tinto Inc.	Canada	2,174
6	Norsk Hydro	Norway	1,985
7	China Hongqiao Group Ltd.	China	1,821
8	Shandong Weiqiao Aluminium & Power Co.	China	1,715
9	Shandong Xinha Aluminium & Electricity Group Ltd.	China	1,630
10	Dubai Aluminium	UAE	1,420
	Mtn = million metric tons		24,855

Country	2016	2017 <sup>e</sup>	2017 (% of Total)	2016-2017 (% Change)	2017 Capacity	2017 (% Capacity)
China	31,900	32,600	54.30%	2.20%	44,500	73.30%
Russia	3,560	3,707	6.00%	1.10%	3,900	92.30%
Canada	3,210	3,210	5.40%	0.00%	3,270	98.20%
India	2,720	3,200	5.30%	17.60%	3,600	88.90%
UAE	2,500	2,600	4.30%	4.00%	2,600	100.00%
Australia	1,630	1,490	2.50%	-8.60%	1,720	86.60%
Norway	1,220	1,220	2.00%	0.00%	1,550	78.70%
Bahrain	971	960	1.60%	-1.10%	1050	91.40%
Iceland	855	870	1.50%	1.80%	870	100.00%
Saudi Arabia	740	740	1.20%	0.00%	740	100.00%
Brazil	793	800	1.30%	0.90%	1,400	57.10%
Malaysia	620	760	1.30%	22.60%	760	100.00%
United States	841	740	1.20%	-12.00%	2,000	37.00%
South Africa	697	714	1.20%	2.40%	720	99.20%
Subtotal	52,257	53,504	89.20%	2.40%	68,680	77.90%
Other countries	5,743	6,496	10.80%	13.10%	9,700	67.00%
<b>World Total</b>	<b>58,000</b>	<b>60,000</b>	<b>100%</b>	<b>3.40%</b>	<b>76,900</b>	<b>78.00%</b>

Source: U.S. Geological Survey, Mineral Commodity Summaries, January 2017.  
 All figures in thousand metric tons.  
<sup>e</sup> = Year estimated.

Aluminium production by Country

1.1.2020



## ALUMINIUM

- To make 1 ton of Aluminium requires 4 tons Bauxite and 14000kWh energy
- 4 tn Bauxite is converted to 2tn Alumina (0.8 - 1.5 tn Red Mud)
- 2 tn Alumina is converted to 1tn Aluminium

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Source: U.S. Geological Survey, Mineral Commodity Summaries, January 2017.  
All figures in thousand metric tons.  
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Aluminium production by Country





WORLD  
BAUXITE,  
ALUMINA &  
BAUXITE  
RESIDUE  
世界铝石,  
铝铝和铝

## ANNUAL RED MUD "PRODUCTION" 年度红泥"生产"

2016						
ALUMINA PRODUCTION			"RED MUD"	BAUXITE PRODUCTION		
Rank	Country	ktn	ktn	Rank	Country	ktn
1	China	60,907	66,998	1	Australia	82,000
2	Australia	20,893	22,982	2	China	65,000
3	Brazil	10,900	11,990	3	Guinea	19,700
4	India	6,028	6,631	4	Brazil	34,500
5	Russia	2,680	2,948	5	India	25,000
6	US	2,360	2,596	6	Jamaica	8,500
7	Ireland	1,967	2,164	7	Russia	5,400
8	Germany	1,900	2,090	8	Kazakhsta	4,600
9	Jamaica	1,865	2,052	9	Indonesia	1,000
10	Spain	1,579	1,737	10	Vietnam	1,500
<b>World Total</b>		<b>122,463</b>	<b>134,709</b>	<b>World Total</b>		<b>266,960</b>
ktn = 1000 metric tons				* 55700 in 2013		

**RED MUD**  
**GLOBAL**  
**"INVENTORY" IS**  
**3 BILLION TONS**  
红泥 全球"库存"是  
30亿吨

**EXTREMELY LOW**  
**UTILIZATION**  
极低的利用率



## WORLD BAUXITE, ALUMINA & "RED MUD"

### ANNUAL RED MUD "PRODUCTION"

2016						
ALUMINA PRODUCTION			"RED MUD"	BAUXITE PRODUCTION		
Rank	Country	ktn	ktn	Rank	Country	ktn
1	China	60,907	66,998	1	Australia	82,000
2	Australia	20,893	22,982	2	China	65,000
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ktn = 1000 metric tons				* 55700 in 2013		

### RED MUD

GLOBAL  
"INVENTORY" IS  
3 BILLION TONS

2-4 MILLION TONS  
UTILIZED  
ANNUALLY, 135  
MILLION TONS  
"PRODUCED"  
IN 2016



## MAZANASU RM - 样品测试数据

### RED MUD PROCESSING SAMPLE

RED MUD SAMPLE	Mass	Fe2O3	Al2O3	SiO2	TiO2	CaO	MgO	K2O	Na2O	P	S	H2O	Scandium	Cerium	Lanthanum	Yttrium	Strontium	Total
DUST	1000.0 kg	46.44%	16.51%	10.55%	6.60%	0.98%	0.09%	0.06%	6.38%	0.10%	0.22%	11.95%	0.015%	0.039%	0.029%	0.030%	0.010%	100.00%

RESULTS AFTER MAZANASU PROCESS	METAL	325.5 kg	Fe	C	Si	Mn	Cr	Ni	Mo	Ti	Cu	P	S	Al	Total			
			96.64%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.68%	0.00%	0.00%	0.00%	1.68%	100.00%		
	SLAG	340.0 kg	Fe2O3	Al2O3	SiO2	MnO2	Cr2O3	TiO2	CaO	MgO	Sc2O3	V2O5	SrO	ZrO	Y2O3	SO3	CeO	Total
			2.10%	46.02%	18.77%	0.85%	0.27%	6.67%	19.23%	3.30%	0.45%	0.07%	0.94%	0.29%	0.14%	0.70%	0.20%	100.00%
ELEMENTS IN SLAG			O	Al	Si	Mn	Cr	Ti	Ca	Mg	S	Sr	Zr	Y	Ce	Fe	Sc	Total
		43.05%	24.36%	8.77%	0.54%	0.18%	4.00%	13.74%	1.99%	0.30%	0.80%	0.20%	0.12%	0.19%	1.47%	0.29%	100.00%	
SMOKE	215.0 kg																	
STEAM	119.5 kg																	

- 金属氧化物以一定的常数、给定参数提取，"Mazanasu RM"支持参数在恒定、不变模式下 [>稳定常量过程]
- Sc2O3 乘以 3...30 x = 从复杂化合物中释放 Sc (仅适用于马扎纳苏)
- 电源使用 700...800千瓦时 /
- 液体费 (230...260千瓦时 /
- 红泥吨如上一样品)
- 从 Fe2O3 到 96.7% 的高 Fe 恢复率



## MAZANASU RM - SAMPLE TEST DATA

### RED MUD PROCESSING SAMPLE

RED MUD SAMPLE	Mass	Fe2O3	Al2O3	SiO2	TiO2	CaO	MgO	K2O	Na2O	P	S	H2O	Scandium	Cerium	Lanthanum	Yttrium	Strontium	Total
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RESULTS AFTER MAZANASU PROCESS	METAL	325.5 kg	Fe	C	Si	Mn	Cr	Ni	Mo	Ti	Cu	P	S	Al	Total			
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	SLAG	340.0 kg	Fe2O3	Al2O3	SiO2	MnO2	Cr2O3	TiO2	CaO	MgO	Sc2O3	V2O5	SrO	ZrO	Y2O3	SO3	CeO	Total
			2.10%	46.02%	18.77%	0.85%	0.27%	6.67%	19.23%	3.30%	0.45%	0.07%	0.94%	0.29%	0.14%	0.70%	0.20%	100.00%
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SMOKE	215.0 kg																	
STEAM	119.5 kg																	

- Metal oxides are extracted at certain, constant, given parameters, Mazanasu RM supports the parameters in a constant, unchanged mode => **STABLE CONSTANT PROCESS**
- Sc2O3 is multiplied 3...30 x – release of Sc from complex compounds (only with Mazanasu)

- Power Used 700...800 kWh / ton of liquid Fe (230...260 kWh / red mud ton as in above sample)
- High Fe Recovery rate from Fe2O3 - 96.7%

# 稀土元素 RARE EARTH ELEMENTS



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Rare Earth Elements (REE) in Red Mud																	
ppm	Sc	Y	La	Ce	Pr	Nd	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	Total
Sample 1	34.16	12.19	86.55	160.64	15.17	51.79	7.41	1.97	6.63	0.82	3.43	0.54	1.38	0.20	1.38	0.20	384.46
Sample 2	33.23	9.43	69.83	121.57	11.58	34.50	5.45	1.64	5.19	0.69	2.97	0.47	1.25	0.19	1.26	0.19	299.44
Sample 3	30.42	8.26	65.26	120.00	10.84	32.03	5.10	1.41	4.86	0.61	2.68	0.46	1.20	0.18	1.33	0.18	284.82
Sample 4	36.49	10.02	85.30	148.53	15.03	45.91	7.21	1.86	6.38	0.78	3.38	0.55	1.44	0.36	1.49	0.21	364.94
Sample 5	33.53	10.32	71.17	127.99	11.89	35.32	5.64	1.58	5.40	0.65	2.91	0.50	1.30	0.19	1.35	0.20	309.94
<b>AVG</b>	<b>33.57</b>	<b>10.04</b>	<b>75.62</b>	<b>135.75</b>	<b>12.90</b>	<b>39.91</b>	<b>6.16</b>	<b>1.69</b>	<b>5.69</b>	<b>0.71</b>	<b>3.07</b>	<b>0.50</b>	<b>1.31</b>	<b>0.22</b>	<b>1.36</b>	<b>0.20</b>	<b>328.72</b>
%	0.003357	0.001004	0.007562	0.013575	0.00129	0.003991	0.000616	0.000169	0.000569	0.000071	0.000307	0.000050	0.000131	0.000022	0.000136	0.000020	0.03287

SLAG TESTING AFTER MAZANASU PROCESS (REE)																	
Content (10 <sup>-4</sup> )	Scandium Oxide	Yttrium Oxide	Lanthanum Oxide	Cerium Dioxide	Praseodymium Oxide	Neodymium Oxide	Samarium Oxide	Europium Oxide	Yttrium Oxide	Terbium Oxide	Dysprosium Oxide	Holmium Oxide	Erbium Oxide	Thulium Oxide	Ytterbium Oxide	Lutetium Oxide	Total
	Sc <sub>2</sub> O <sub>3</sub>	Y <sub>2</sub> O <sub>3</sub>	La <sub>2</sub> O <sub>3</sub>	CeO <sub>2</sub>	Pr <sub>6</sub> O <sub>11</sub>	Nd <sub>2</sub> O <sub>3</sub>	Sm <sub>2</sub> O <sub>3</sub>	Eu <sub>2</sub> O <sub>3</sub>	Gd <sub>2</sub> O <sub>3</sub>	Tb <sub>4</sub> O <sub>7</sub>	Dy <sub>2</sub> O <sub>3</sub>	Ho <sub>2</sub> O <sub>3</sub>	Er <sub>2</sub> O <sub>3</sub>	Tm <sub>2</sub> O <sub>3</sub>	Yb <sub>2</sub> O <sub>3</sub>	Lu <sub>2</sub> O <sub>3</sub>	
		1.2	0.887	2.125	3.139	0.555	1.209	0.359	0.027	0.216	0.019	0.101	0.028	0.069	0.009	0.046	0.009
g / ton	120	88.7	212.5	313.9	55.5	120.9	35.9	2.7	21.6	1.9	10.1	2.8	6.9	0.9	4.6	0.9	999.8

注意 Sc 同意进入熔渣， 它从 3... 30 倍变化。MAZANASU工艺从复杂化合物中释放 Sc， 如果红泥中的阿维拉贝

Note: Sc<sub>2</sub>O<sub>3</sub> concentration into the slag, it varies from 3...30 times. Mazanasu process releases Sc from complex compounds, if available in red mud

# MAZANASU RM - 示例测试数据

## MAZANASU RM - SAMPLE TEST DATA



TWO SAMPLE OUTPUTS FROM ONE TON OF RED MUD:		
Red Mud Content	(%)	(%)
Fe2O3	56.14	46.44
Al2O3	16.42	16.51
Sc2O3	0.003	0.015
After Mazanasu Process	kg	kg
<b>1. Iron</b>	<b>380</b>	<b>325.5</b>
<b>2. Slag (total)</b>	<b>250</b>	<b>340</b>
Al2O3	120	156
CaO2	70	73
SiO2	34	64
TiO2	14	23
V2O3	0.153	0.238
Sc2O3 (out put from 1 ton of red mud)	0.03	1.53
Sc2O3 in one ton of slag	0.12	4.5
<b>3. Smoke</b>	<b>269</b>	<b>215</b>
<b>4. Steam</b>	<b>101</b>	<b>119.5</b>

46.44% Fe2O3 第7页的附加数据, 详细的稀土分析是 Fe2O3 含量为 56.14%

46.44% Fe2O3 additional data on page 7, Detailed Rare Earth Analysis is for Fe2O3 content of 56.14%

Item	Element	Formula	Content (10 <sup>-4</sup> )	Total REE Content (10 <sup>-4</sup> )	g / ton of slag
1	Lanthanum Oxide	La <sub>2</sub> O <sub>3</sub>	2.125	8.8	880
2	Cerium Dioxide	CeO <sub>2</sub>	3.139		
3	Praseodymium Oxide	Pr <sub>6</sub> O <sub>11</sub>	0.555		
4	Neodymium Oxide	Nd <sub>2</sub> O <sub>3</sub>	1.209		
5	Samarium Oxide	Sm <sub>2</sub> O <sub>3</sub>	0.359		
6	Europium Oxide	Eu <sub>2</sub> O <sub>3</sub>	0.027		
7	Yttrium Oxide	Gd <sub>2</sub> O <sub>3</sub>	0.216		
8	Terbium Oxide	Tb <sub>4</sub> O <sub>7</sub>	0.019		
9	Dysprosium Oxide	Dy <sub>2</sub> O <sub>3</sub>	0.101		
10	Holmium Oxide	Ho <sub>2</sub> O <sub>3</sub>	0.028		
11	Erbium Oxide	Er <sub>2</sub> O <sub>3</sub>	0.069		
12	Thulium Oxide	Tm <sub>2</sub> O <sub>3</sub>	0.009		
13	Ytterbium Oxide	Yb <sub>2</sub> O <sub>3</sub>	0.046		
14	Lutetium Oxide	Lu <sub>2</sub> O <sub>3</sub>	0.009		
15	Yttrium Oxide	Y <sub>2</sub> O <sub>3</sub>	0.887	1.2	120
16	Scandium Oxide	Sc <sub>2</sub> O <sub>3</sub>	1.2		
17	Vanadium Oxide	V <sub>2</sub> O <sub>3</sub>	6.1		

# MAZANASU RM



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## PROCESSING CENTER CONCEPT 加工中心概念

铸造加工，  
现成产品

**CASTING PROCESSING, READY PRODUCTS**  
h 12...24 m 120 x 30 m

EXPANSION, PHASE 2

EXPANSION; PHASE 3

炉部分，  
熔炼

**FURNACES SECTION, MELTING**  
h 24 m 120 x 30 m

EXPANSION, PHASE 2

EXPANSION; PHASE 3

原材料  
(红泥)  
部分

**RAW MATERIAL (RED MUD) SECTION**  
h 12....24 m 120 x 30 m

EXPANSION, PHASE 2

EXPANSION; PHASE 3

10 x Mazanazu RM 18/12

300 m x 90 m building

24 m inside height

Adjustable to required  
Volume

可调节到需要 体积

Phase - 相 1: 4 Mazanasu RM-SPAF-18/12

Phase - 相 2: 4 Mazanasu RM-SPAF-18/12

Phase - 相 3: 2 Mazanasu RM-SPAF-18/12

# MAZANASU RM



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Furnaces  
Section

炉部分

Melting Span

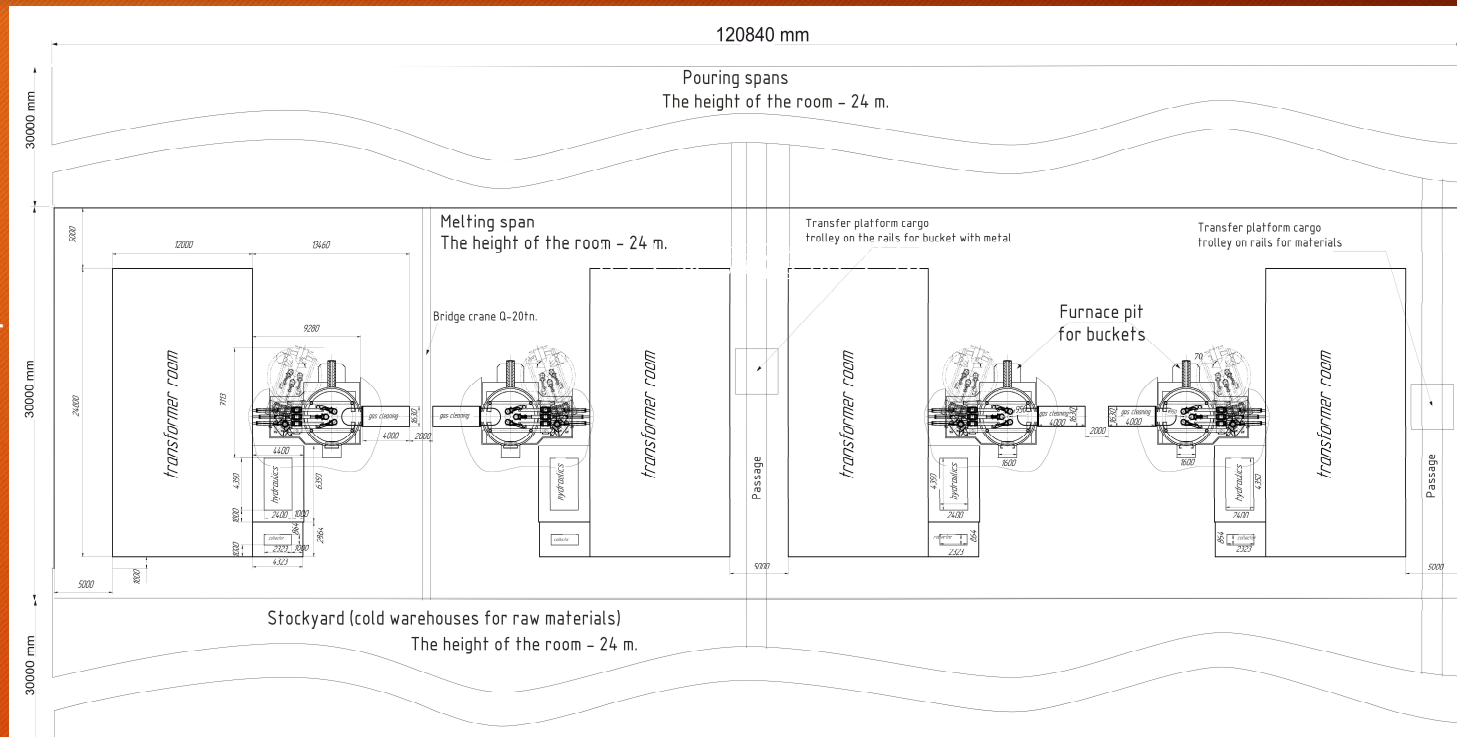
熔段

4 x MAZANASU RM-  
SPAF-18/12

120m x 90m  
Building 建筑

120m x 30m  
24m inside height  
内部高度

Masercata Ltd



PROCESSING  
CENTER CONCEPT

加工中心概念

PHASE 相 1

264,480 tn

铝土矿残渣加工每年

Bauxite Residue  
Processing  
Annually

with 4 x  
MAZANASU RM-  
SPAF-18/12

10/19/2020



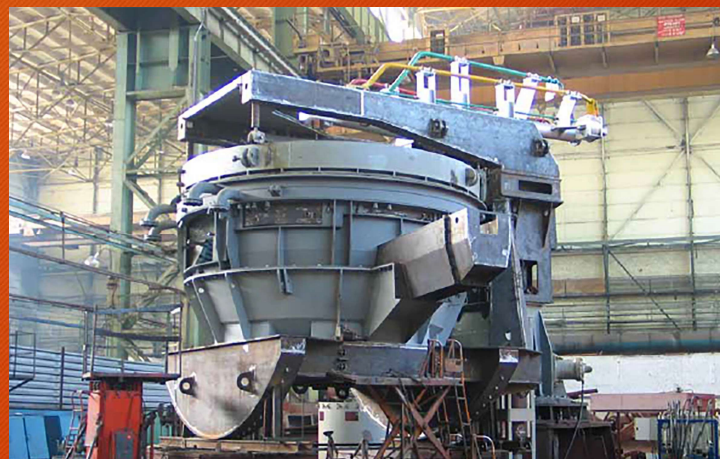
# MAZANASU RM-SPAF-18/12-15



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## Technical Data 技术数据

- Special Plasma Arc Furnace for Red Mud
- Upgraded cycle time & efficiency
- Lower power consumption per processed ton of red mud
- Capacity in continuous (24/7) Bauxite Residue operation: 324 tn / day
- Power required:
  - Peak 12000 kVA
  - Nominal 9600 kVA
  - Operation 4000 kVA



## 技术数据

- 标称容量: 12吨
- 连续铝土矿剩余作业能力: 192吨/天
- 需要电源:
  - 峰值 12000 kVA
  - 正常 9600 kVA
  - 功率4000 kVA

# MAZANASU RM-DCPAF-18/12

Main Dimensions 主要尺寸



Furnace 炉

7.4 m x 9.2m x h 10.9m

Transformer 变压器

12m x 12m x h 5 m

Collector 收集器

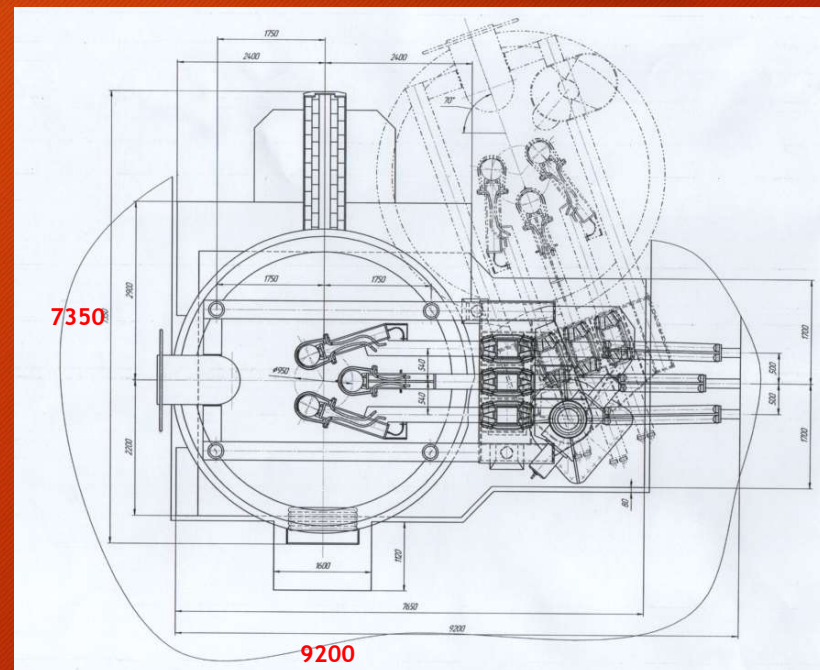
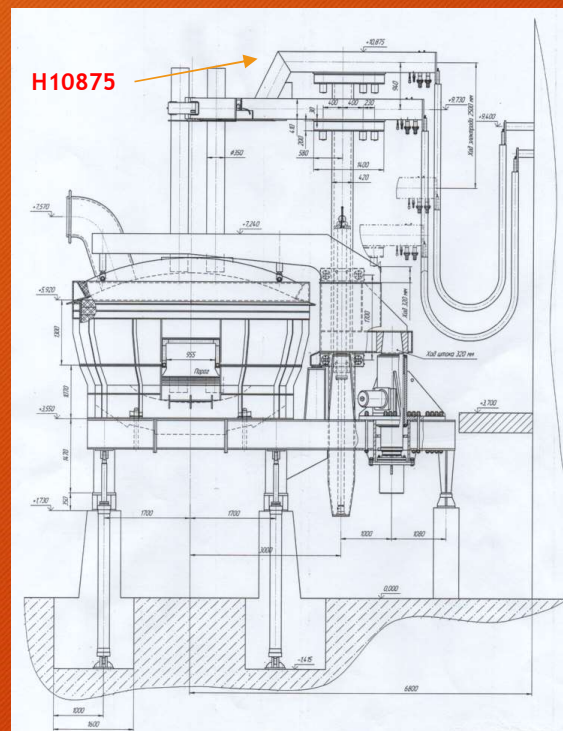
2.3 m x 0.8 m x h 3 m

Gas Cleaning 气体清洗

4 m x 1.6 x h 9 m

Hydraulics 液压

2.4 m x 4.3 m x h 3 m





## MAZANASU RM - SAMPLE TEST DATA (46% Fe<sub>2</sub>O<sub>3</sub>) Red Mud Processing Volume

MAZANASU SPAF-12/15 Red Mud Processing Output (tons) (Typical Red Mud)										
Number of Units	1	2	3	4	5	6	7	8	9	10
<b>RED MUD</b>										
Daily (24h)	<b>280</b>	560	840	1,120	1,400	1,680	1,960	2,240	2,520	2,800
Monthly (25d)	7,000	14,000	21,000	28,000	35,000	42,000	49,000	56,000	63,000	70,000
<b>Yearly (12m)</b>	<b>84,000</b>	<b>168,000</b>	<b>252,000</b>	<b>336,000</b>	<b>420,000</b>	<b>504,000</b>	<b>588,000</b>	<b>672,000</b>	<b>756,000</b>	<b>840,000</b>
<b>IRON (Fe)</b>	<b>32.6%</b>									
Daily (24h)	91	182	273	365	456	547	638	729	820	911
Monthly (25d)	2,279	4,557	6,836	9,114	11,393	13,671	15,950	18,228	20,507	22,785
<b>Yearly (12m)</b>	<b>27,342</b>	<b>54,684</b>	<b>82,026</b>	<b>109,368</b>	<b>136,710</b>	<b>164,052</b>	<b>191,394</b>	<b>218,736</b>	<b>246,078</b>	<b>273,420</b>
<b>SLAG</b>	<b>34.0%</b>									
Daily (24h)	95	190	286	381	476	571	666	762	857	952
Monthly (25d)	2,380	4,760	7,140	9,520	11,900	14,280	16,660	19,040	21,420	23,800
<b>Yearly (12m)</b>	<b>28,560</b>	<b>57,120</b>	<b>85,680</b>	<b>114,240</b>	<b>142,800</b>	<b>171,360</b>	<b>199,920</b>	<b>228,480</b>	<b>257,040</b>	<b>285,600</b>

- POWER CONSUMPTION 700...800 kWh/ liquid iron metric ton
- Fe recovery: 96,7%
- 27...28 days per month operation is realistic (25 days used in calculation), up to 320 tn daily capacity can be possible when routine operation



## MAZANASU RM - 样品测试数据 (46% Fe<sub>2</sub>O<sub>3</sub>) 红泥处理量

MAZANASU SPAF-12/15 Red Mud Processing Output (tons) (Typical Red Mud)										
Number of Units	1	2	3	4	5	6	7	8	9	10
<b>RED MUD</b>										
Daily (24h)	280	560	840	1,120	1,400	1,680	1,960	2,240	2,520	2,800
Monthly (25d)	7,000	14,000	21,000	28,000	35,000	42,000	49,000	56,000	63,000	70,000
Yearly (12m)	84,000	168,000	252,000	336,000	420,000	504,000	588,000	672,000	756,000	840,000
<b>IRON (Fe)</b>	32.6%									
Daily (24h)	91	182	273	365	456	547	638	729	820	911
Monthly (25d)	2,279	4,557	6,836	9,114	11,393	13,671	15,950	18,228	20,507	22,785
Yearly (12m)	27,342	54,684	82,026	109,368	136,710	164,052	191,394	218,736	246,078	273,420
<b>SLAG</b>	34.0%									
Daily (24h)	95	190	286	381	476	571	666	762	857	952
Monthly (25d)	2,380	4,760	7,140	9,520	11,900	14,280	16,660	19,040	21,420	23,800
Yearly (12m)	28,560	57,120	85,680	114,240	142,800	171,360	199,920	228,480	257,040	285,600

- 功耗 700...800 kWh/ 液态铁公吨
- 费恢复: 96, 7%
- 27...每月 28 天操作是现实的 (25 天用于计算), 当常规操作时, 可以达到 320 tn 的每日容量

# PROPOSED PRODUCTS



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## 1. Fe 产品

- 生铁
- **F10 or FeAl 30/40/50**
- **SCI 钢坯**
- **磨球SCI – 3.5% Cr or 5-7% Cr**
- **铁或钢铸造件 ?如采矿用的磨损件**

## 2. 相关矿渣产品

生产用的砂

分离矿渣元素

- $Al_2O_3$  –铝加工?或者用作耐火材料
- $Sc_2O_3$  销售
- 剩余的转卖给其他行业

## 1. Fe Products:

- Pig Iron
- **F10 or FeAl 30/40/50**
- **SCI Billets**
- **Mili Balls SCI – 3.5% Cr or 5-7% Cr**
- **Iron or Steel Castings (for ex. Wear parts for mining industry)**

## 2. Slag Products

- Manufactured aggregate (sand)
- Seperate Slag Elements:
  - $Al_2O_3$  –Processing to aluminium? Or use as refractory material?
  - $Sc_2O_3$  sales
  - Remaining elements sold to different industries - to be checked

# 产品制造



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## 产品销售价格（仅铁回收）

### 1. 大宗产品 + 原材料（330 美元/吨 ---1100 美元/吨）

- 生铁
- 球磨球
- 各种铁合金

### 2. 铸铁（700....1400 美元 / 吨）

- 检修孔
- 发动机缸体
- 阀门外壳

### 3. 钢铸件（...1500美元/吨）

- 采矿和加工行业使用的磨损部件
- 装饰化产品。对于前磨损零件铸件 = 800----- 1500 EUR/tn

### 4. 此数据仅适用于价格，产品价格取决于市场和时间



# PRODUCTS TO MAKE



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## PRODUCTS SALES PRICE (Only Iron Recovery)

- Mass products - raw materials (330 USD/tn ---1100 USD/tn)
  - Pig Iron
  - Ball Mill Balls
  - Various Ferro Alloys
- Iron Castings (700....1400 USD / tn)
  - Manholes
  - Engine Cylinder Blocks
  - Valve Housings
- Steel Castings (...1500 USD / tn)
  - Wear Parts used in mining and processing industry
  - pecialised products. For ex wear parts castings - 800----- 1500 EUR/tn
- This data is only for guideline, product prices are depend on the market and time



# MASANASU RM + SM



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## 球磨球 - 材料比较测试

类型	奥金	化学成分 %				硬度	吹韧性	冲击测试	磨损测试 时丢失的 材料	微观结构
		C	Cr	Mn						
HiCr 球	比利时	2.20	18.10			60	20	无裂纹	50.2	C 碳化物在谷物板在网状形式和碳化物 在小颗粒珍珠框架·谷物大小 4.5 点
		2.50	18.50			62	21	无裂纹	50.3	
	印度	2.10	18.50			60	18	无裂纹	180	
		2.60	15.80			58	16	无裂纹	250	
马滕西特球	俄罗斯	0.66		1.10		55	48	无裂纹	900	奥斯汀石, 50% 马特伦西特
		0.70		1.10		57	49	无裂纹	1000	
Masercata 球	SCI-Cr	2.00	3.00			60	60	无裂纹	46.1	Cr 和 Xx 碳化物在网格中的网格, 颗粒大小 8.9 点
		2.50	3.50			63	65	无裂纹	43.8	







## Ball Mill Balls - Material Comparison Test

Type	Orgin	Chemical Content %				Hardness	Impact Toughness	Impact test	Material lost on wear test	Micro Structure
		C	Cr	Mn						
HiCr Balls	Belgium	2.20	18.10			60	20	No cracks	50.2	Cr Carbides at grain boardes in mesh form and carbide eutectics in small grain perlite frame, grain size 4.5 points
		2.50	18.50			62	21	No cracks	50.3	
	India	2.10	18.50			60	18	No cracks	180	
		2.60	15.80			58	16	No cracks	250	
Martensite Balls	Russia	0.66		1.10		55	48	No cracks	900	50% Austenite, 50% Matrensite
		0.70		1.10		57	49	No cracks	1000	
Masercata Balls	SCI-Cr	2.00	3.00			60	60	No cracks	46.1	Cr and Xx carbides in mesh in martensite frame, grain size 8.9 points
		2.50	3.50			63	65	No cracks	43.8	

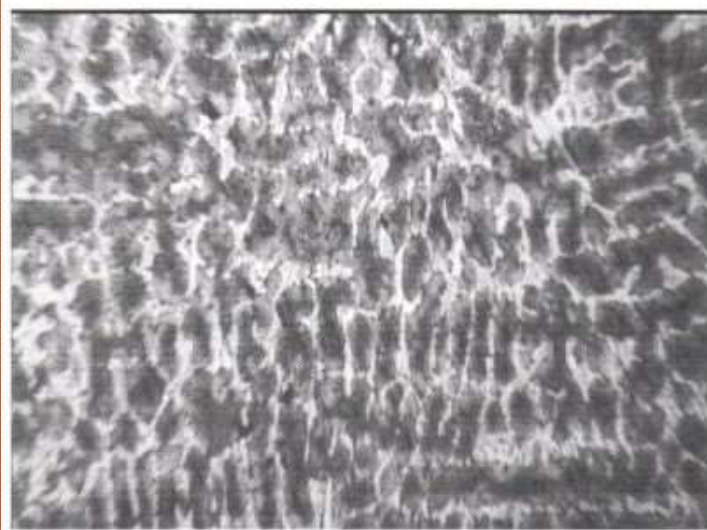


# MASANASU SM

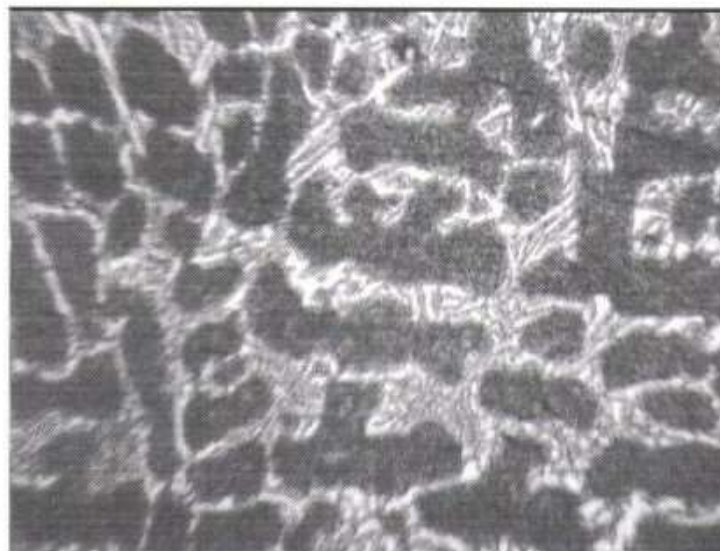


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SCI-Cr  
Super  
Balls  
超级球  
Cr 3.5%



x100



x100

Normal Cr  
Balls  
普通Cr球

Cr 14%

# F10



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## FeAl30/40/50

- Al 含量为 30-50%
- 当 Al 含量为 28-35% [ 比重为 4-5 g/cm<sup>3</sup> 时
- 将"浮动"
- 将在钢渣上造成 Al<sub>2</sub>O<sub>3</sub> 污染
- 超过 30% 的 Al 含量 - Al 会燃烧产生对钢的杂质
- 如果铝含量高 40-50%，铝被氧化物层覆盖 - 这些氧化物层将作为杂质转移到钢中，从而降低钢质



## Vs. F10 先进的 DEOXIDANT

- 最有效的钢脱氧剂
- 比重 6.4...6.6 克/厘米<sup>3</sup> (钢 7.8 克/厘米)
- 是固体的，不会在上面升起
- F10 消耗 1.5 ~ 2%
- 良好的钢细微结构
- 不会为 (钢) 有毒熔渣 (\* 问题浪费) 创建 Al<sub>2</sub>O<sub>3</sub>
- 无毒废渣
- F10 只能由 MAZANASU 制造
- (只能用 MAZANASU 和微观结构制成)

# F10



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## FeAl30/40/50

- Al content is 30-50%
- When Al content is 28-35% => specific gravity is 4-5 g/cm<sup>3</sup>
- Will "float"
- Will create Al<sub>2</sub>O<sub>3</sub> contamination on steel slag
- Over 30% Al content - Al will burn creating impurities to steel
- If Al content is high 40-50%, aluminium is covered with oxide layers - these oxide layers will transfer to steel as impurities, lowering steel quality



## Vs. F10 THE ADVANCED DEOXIDANT

- The most effective steel deoxidant
- Specific gravity 6.4...6.6 g/cm<sup>3</sup> (Steel 7.8 g/cm<sup>3</sup>)
- Is solid, will not rise on top
- F10 Consumption 1.5 - 2%
- Good steel finer microstructure
- Will not create Al<sub>2</sub>O<sub>3</sub> for the (steel) toxic slag (=> problem waste)
- Non toxic waste slag
- F10 can be made only by MAZANASU RM
- (Can be made only with Mazanasu - micro structure)

# 替代原材料 ALTERNATIVE RAW MATERIAL



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- 使用铝土矿残留物（红泥）
  - 问题浪费 = 可用充足
  - 直接加工到 Fe 产品
  - 加工后的其他元素可以出售
  - 通常 S & P 免费 Fe
- USE BAUXITE RESIDUE (RED MUD)
  - Problem waste - Plentiful available
  - Direct processing to Fe products
  - Other Elements after processing can be sold
  - Typically S & P free Fe

与钢厂的合资企业？  
JV with Steel Mills?



SCI 油钻衬套磨损寿命是2-4倍长

# 技术亮点 Technology Highlights



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- 100% Bainite / Matrix / Perlite structures are possible - environment friendly effective methods
- Carbon (C) can be reduced to 0.001%
- Cost efficient reduction of P & S to 0.001%
- Refractory lining lasts 5 – 10 times longer compared to current furnaces
- Material with 70% non metal material is possible to process
- 20% moisture content material can be processed directly (some cases up to 70%)
- High rate of metal recovery from oxides (99.5%)
- Fine forged like microstructure (SCI)
- 100% BAINITE/ MATRIX/ PERLITE结构是可能的 - 环保有效方法
- 碳 (C) 可降低至 0.001%
- 经济高效的将 P & S 降低到 0.001%
- 与当前熔炉相比, 耐火衬里的使用寿命延长 5 到 10 倍
- 具有 70% 非金属材料的材料可以加工
- 20% 水分含量材料可直接处理 (有些情况下高达 70%)
- 高金属回收率从氧化物 (99.5%)
- 细锻造像微观结构 (SCI)

Masercata Ltd



SCI 油钻衬套磨损寿命是2-4倍长

10/19/2020

# 优势 - 收益

## BENEFITS



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- 能耗更低
    - 降低电费
  - 降低排放
    - 低碳信贷支付
  - 原材料节省
    - 可使用免费或低成本材料
  - 简单、简短、有效的处理
    - 直接从熔炉锻造像微结构
    - BAINITE直接出炉
  - 更好的产品质量
    - 材料的持续时间是现有材料的 2-4 倍，提供 SCI 材料 ls
    - 所有材料;小微结构，杂质少=>更强更好的材料
- **LESS ENERGY USED**
    - lower electricity bill
  - **LOWER EMISSIONS**
    - lower carbon credit payments
  - **SAVINGS IN RAW MATERIAL**
    - free or lower cost material can be used
  - **SIMPLE, SHORT & EFFECTIVE PROCESSING**
    - Forging like microstructure directly from furnace
    - Bainite directly from furnace
  - **BETTER PRODUCT QUALITY**
    - Materials lasting 2-4 times longer than current ones are available SCI materials
    - All materials; small micro structure, less impurities => stronger better material

# MASERCATA LTD



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## MAZANASU 解决方案

材料的化学分析允许估计产量  
输出量要求允许我们选择设备  
样品可以在我们的测试设施进行测试，从而获得更准确的评估  
每种材料至少需要 500 千克（200 千克）  
我们欢迎参观者跟进测试

## MAZANASU SOLUTION

- Chemical analysis of material allows to estimate output
- Output volume requirement allows us to select equipment
- Samples can be tested at our test facility, resulting to more accurate evaluation
- Minimum 500 kg (200 kg) per type of material is required
- We welcome visitors to follow up testing



Test Facility at Finland  
芬兰测试设施





# MASERCATA LTD



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## 可持续合作伙伴

YOUR PARTNER FOR SUSTAINABLE PROCESSING



Matti Hurtta  
CEO

[matti.hurttam@masercata.com](mailto:matti.hurttam@masercata.com)  
+3585063953

## Additional Information: [info@masercata.com](mailto:info@masercata.com)

Juhani Honkanen  
Director, Asia Development

[juhani.honkanen@masercata.com](mailto:juhani.honkanen@masercata.com)  
[juhani.masercata@outlook.com](mailto:juhani.masercata@outlook.com)  
+358503082658  
+8613802020071  
+917619267091

Masercata Ltd



芬兰于1950年1月13日重新注册PR中国  
1950年10月28日建交  
Finland regoniced PR China on 13 January 1950  
Diplomatic relations from 28 October 1950

10/19/2020

# MASERCATA LTD



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## MAZANASU SC 0.5/400:

- Centrifugal casting parts for oil drilling company: SCI (Super Cast Iron, HRC 55-60)



Masercata Ltd

## MAZANASU SC:

- 石油钻井公司的离心铸造件：SCI（超级铸铁，HRC 55-60）



0/19/2020



## MAZANASU RM - SAMPLE TEST DATA

### 56.14% Fe2O3 Content Bauxite Residue - Test Results April 2020

RED MUD SAMPLE	Mass	Fe2O3	Al2O3	SiO2	TiO2	CaO	MgO	K2O	Na2O	V2O5	MnO	ZnO
	DUST	1000 kg	56.14%	16.42%	6.93%	4.64%	1.91%		0.08%	3.75%	0.14%	
		P	S	H2O	LOI at 1000C	Scandium	Cerium	Lanthanum	Yttrium	Neodymium	Strontium	Total
				10.07%		0.003%	0.014%	0.020%	0.010%		0.010%	100.00%

RESULTS AFTER MAZANASU PROCESS	METAL	380 kg	Fe	C	Si	Mn	Cr	Ni	Mo	Ti	Cu	P	S	Al	Total			
				96.88%	2.86%	0.04%					0.005%		0.00%	0.00%	0.21%	100.00%		
	SLAG	250 kg	Fe2O3	Al2O3	SiO2	MnO2	Cr2O3	TiO2	CaO	MgO	Sc2O3	V2O5	SrO	ZrO	Y2O3	SO3	CeO	Total
			1.50%	47.82%	14.60%			5.80%	28.48%		0.10%	0.07%	0.94%	0.01%	0.08%	0.50%	0.10%	100.00%
	SMOKE	269 kg	* Iron recovery 96.69%									*** Dust Emissions 3kg/ton of raw material						
	STEAM	101 kg	** Power required is 700...800 kWh / liquid iron ton (265...305 kWh / red mud ton)									**** Gas Emissions 30 cbm/ton of raw material						