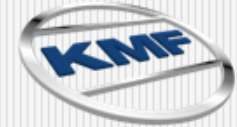


- engineering your visions -



Aluminium Dross and Scrap Recycling

The Hybrid Tilting Rotary Furnace MASTERmax from KMF



Maschinenfabriken
Kärntner Maschinenfabriken Egger GmbH

www.kmf.at



What we do

Recycling Furnaces

Tilting Rotary
Furnaces
„MASTERmax“ for
Aluminium Recycling



Mills & Grinders

Stirr ball mills and
hydro classifiers for
various industrial
minerals



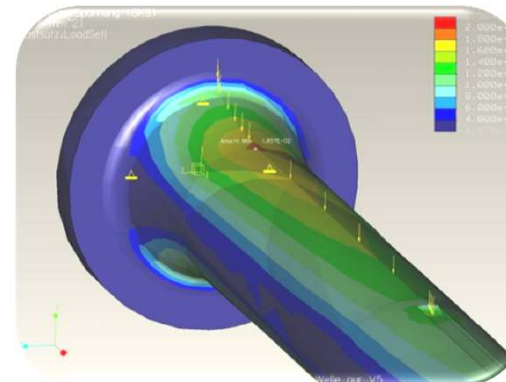
Special Machinery

Ffleece applicators
„FLEECEmax“ for
profiled sheet metals,
contract manufacturing

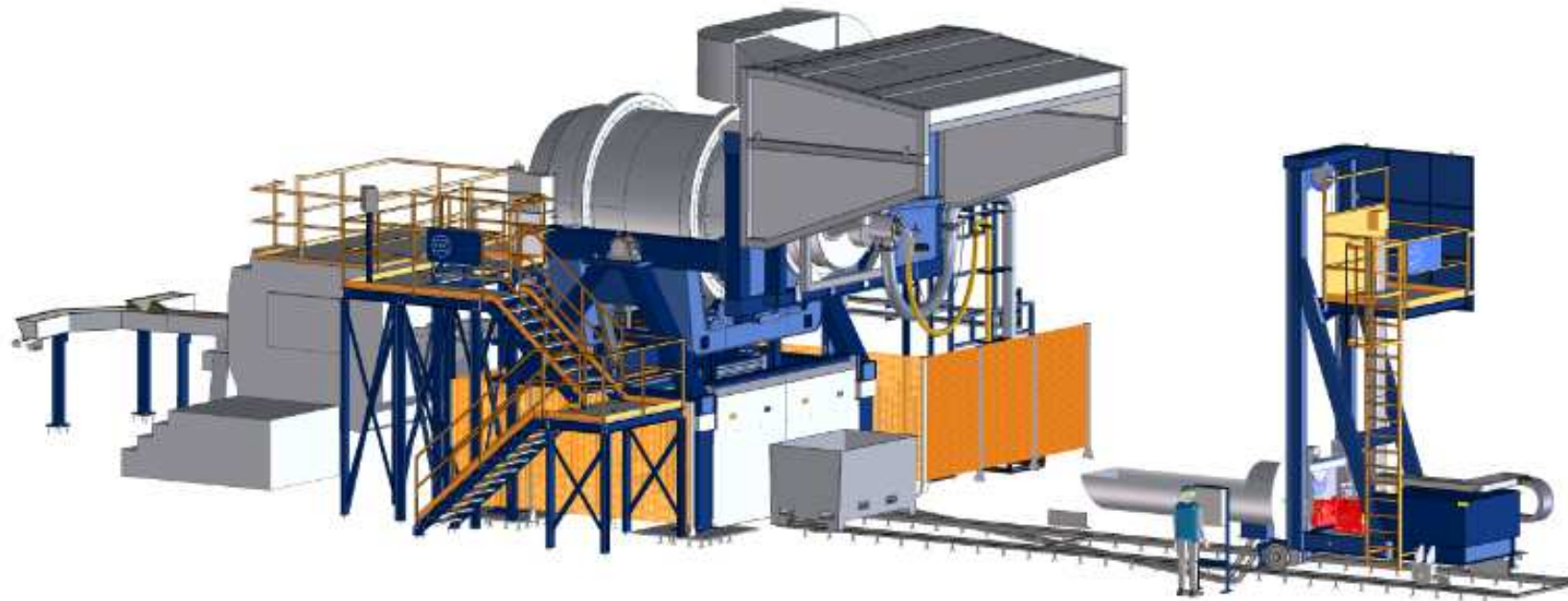


Engineering & Construction

Construction
Layouting
FEM Calculation
Design



MASTERmax in 0° Horizontal Position



MASTERmax in -8° Backtilted Position



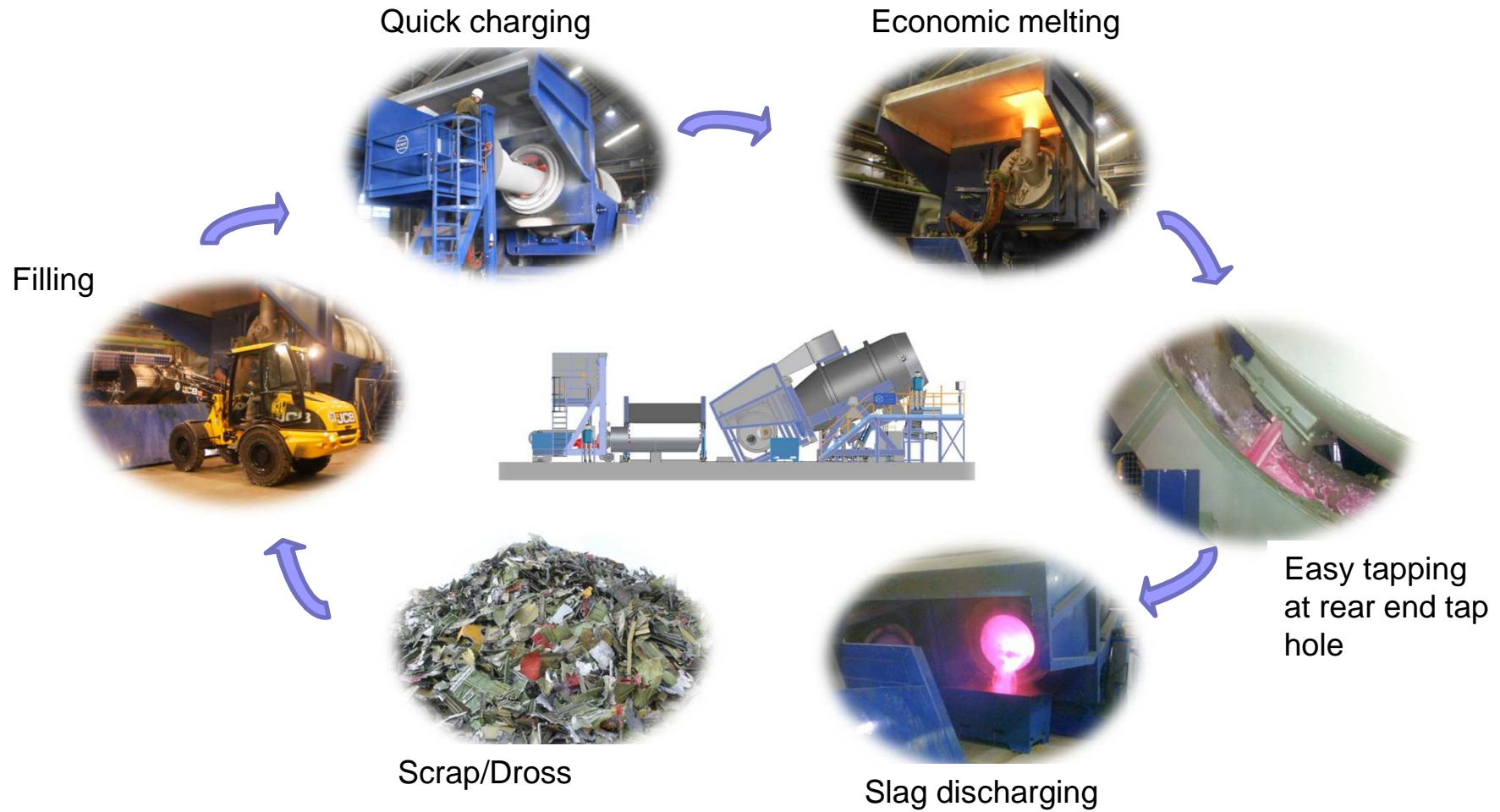
MASTERmax in 25° Tilted Position for Deslagging



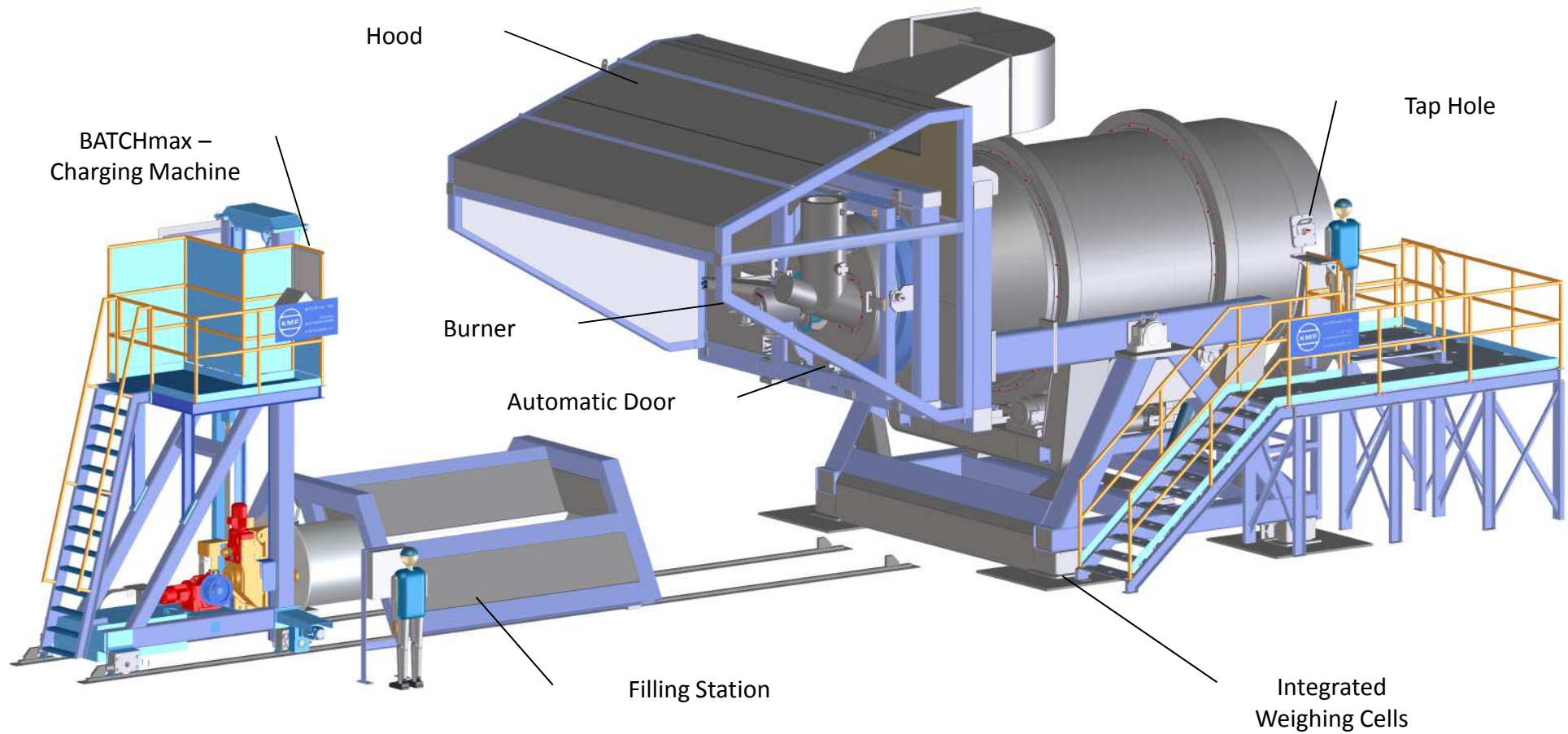
Multiple Scrap, One Furnace



MASTERmax Cycle for Liquid and Dry Slag Process



The Tilting Hybrid Rotary Furnace MASTERmax



Hybrid Tilting Rotary Furnace MASTERmax with Maximized Recycling Efficiency

- Most innovative technology available
- Modular capacity range from 2 t to 25 t
- Daily scrap throughput from 15 t to 130 t
- Tilttable from -8° up to 25°



- Turn-Key plants inclusive holding furnaces, ingot casting machines and dust filters, chip processing units, launder heaters

BATCHmax – Charging Machine



- Turning charging box
- Mimimized charging time
- Mimimized door opening time (ca. 80s)
- Uniform distribution of scrap along the whole furnace



Efficient Tapping and Cleaning

Excellent phase separation due to tapping valve at the furnace bottom



Process slag is discharged through furnace door



Process Optimization with Real Time Weighing System



Ofen - Waage

Waage				
Brutto [kg]	Tara [kg]	Netto [kg]	Delta [kg/min]	Differenz [kg]
86929	81299	5630	0,0	0,0

5630 kg

Chargiergewicht [kg] Ofenreinigung durchgeführt:

01:	320	02:	815	03:	624	04:	786	05:	951	06:	714
07:	812	08:	630	09:		10:		11:		12:	
13:		14:		15:		16:		17:		18:	
19:		20:		21:		22:		23:		24:	
25:		26:		27:		28:		29:		30:	

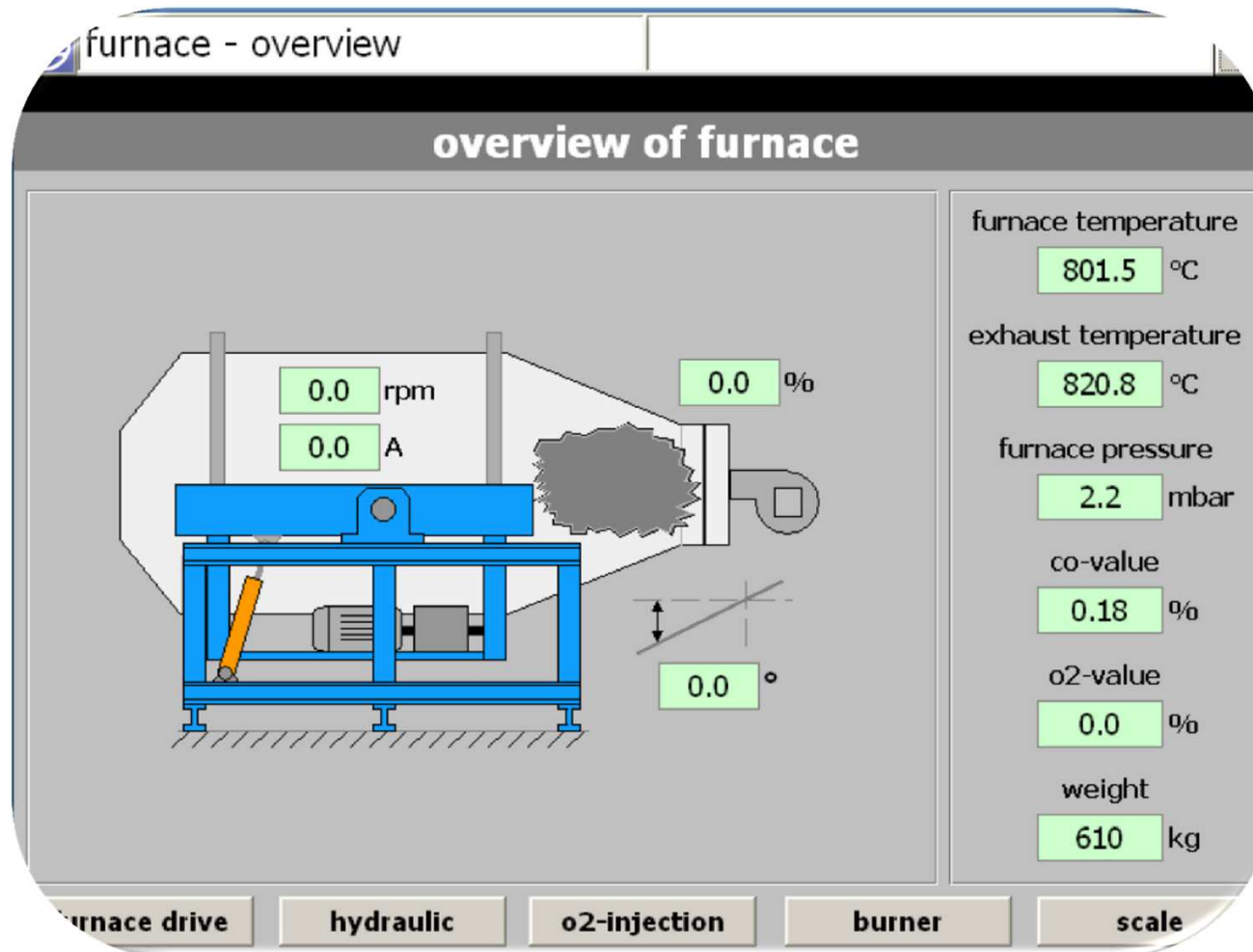




MELTmax –Melt Processor with Touch Panel



MELTmax –Melt Processor with Touch Panel





MELTmax –Melt Processor with Touch Panel

scrap types

scrap administration

selection:

name:

picture selection:

storage place:

spec. weight: kg/m³

melt yield: %

flux factor:

humidity: %

organic: %

priority (0..9):

alloying:

Al: % Si: % Fe: %
Cu: % Cr: % Mn: %
Mg: % Zn: % Ti: %
Sn: % Ni: % Pb: %
others: % **test melting**





oil & fat: paper: plastic: paint: Σ 1,00



MELTmax – only 1 operator is needed to run the furnace





product administration

product administration

selection: test1    

name: test1 9 auto sort:

type of scrap:

<input type="button" value="▲▼"/>	<input type="button" value="▲▼"/>	<input type="button" value="▲▼"/>	<input type="button" value="▲▼"/>
Kabel mit 30% Eis	Gus mit 8% Eisen	Sheredit-Shredder	
			

weight: 2000 1500 4500 kg

melt yield: 60.0 78.0 65.0 %

flux factor: 0.10 0.20 0.30

humidity: 0.5 1.5 1.5 %

organic: 1.0 3.0 3.5 %

kg-charging = kg-scrap + kg-flux --> kg-liquid

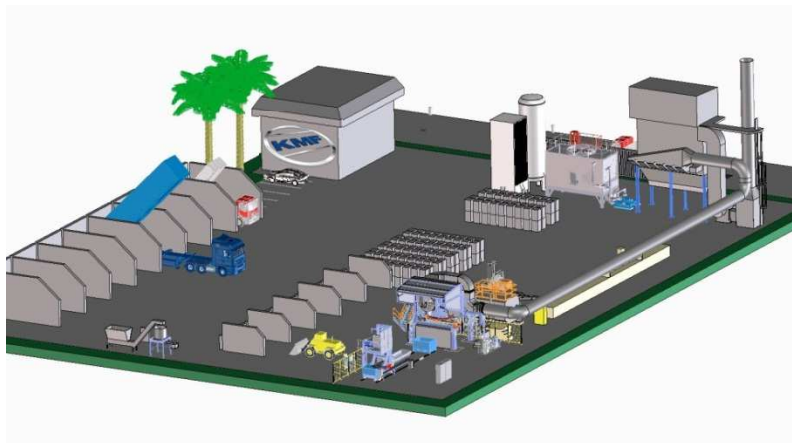
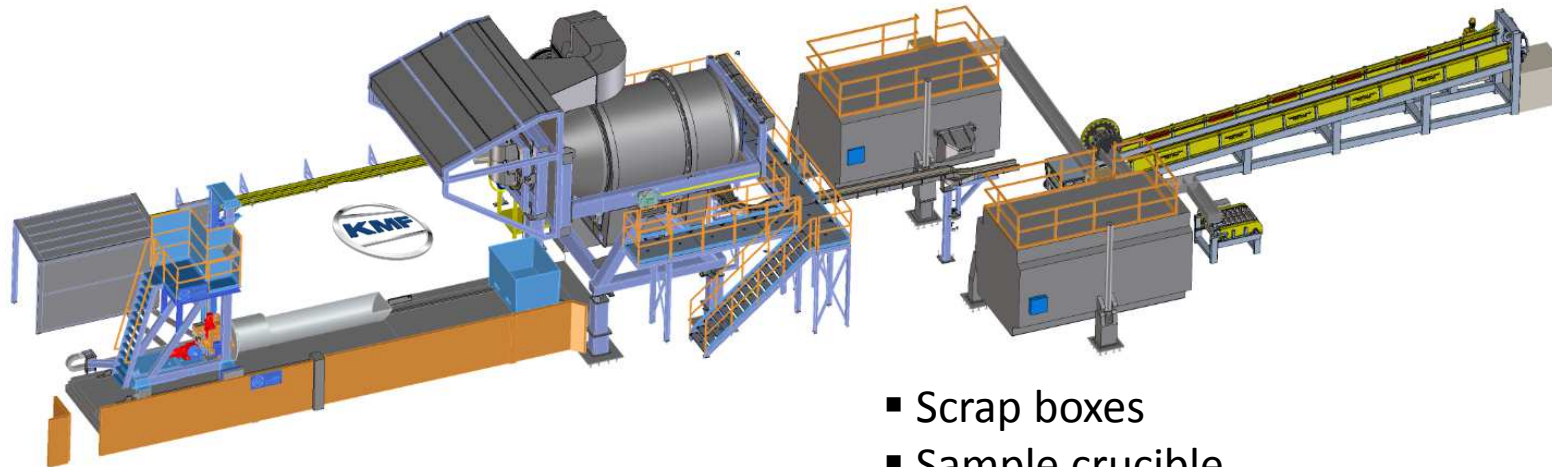
8619 = 8000 + 619 --> 5295



MASTERmax Features

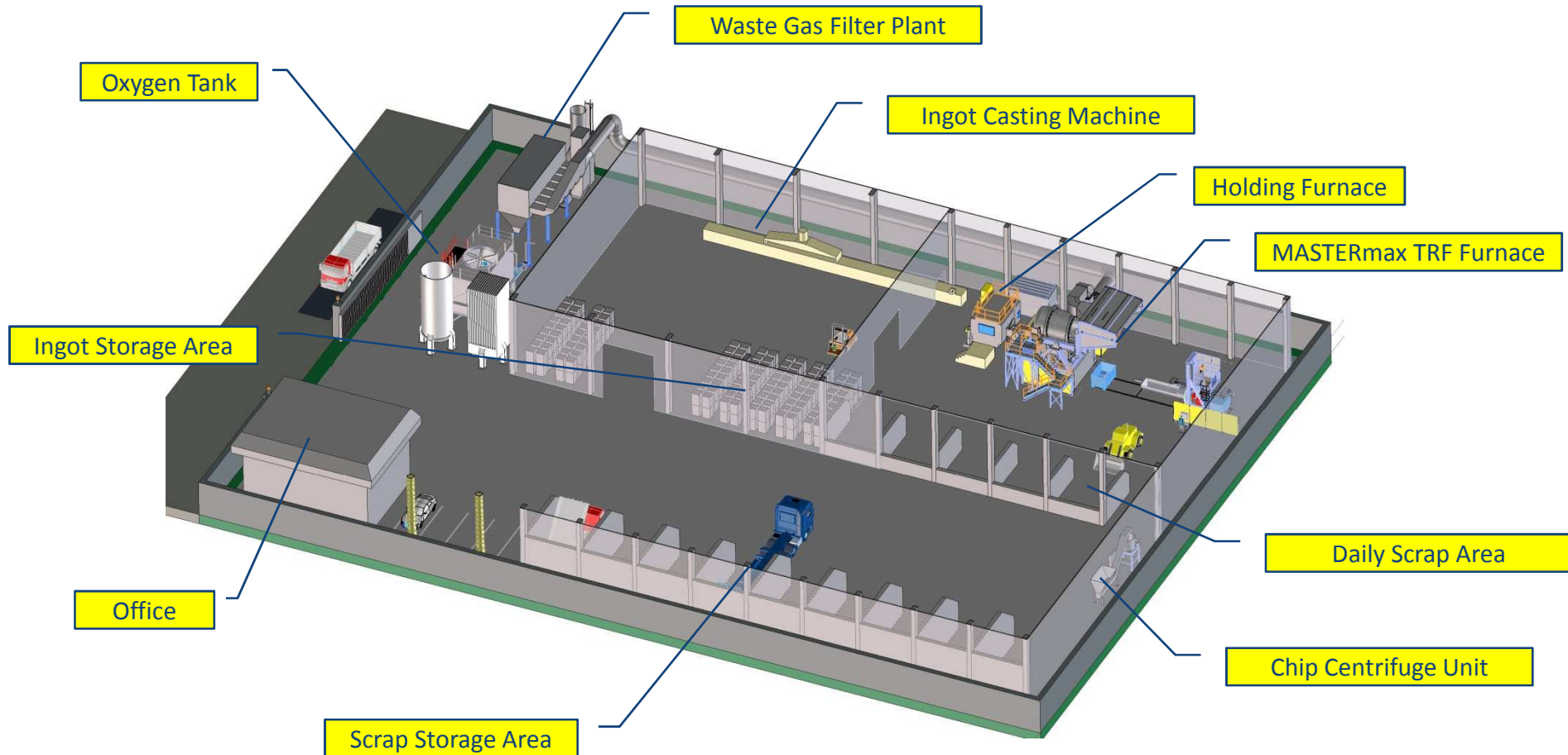
- Rugged horizontal design and high furnace chamber ratio for **controlled melting** of organically contaminated scraps with up to 8% organics
- Counter (reverse) flow combustion system for optimum **energy efficiency** and maximum combustion of hydrocarbons, assisted by optional oxygen injection.
- **Real time weighing system** with unique precision for immediate materials balance after each charge.
- Tapping valve with positive slag and metal phase separation.
- Unique melt processor MELTmax with **scrap data base**, salt factor calculation and total process control for **repeatable results** of melting cycle.
- Compliance with EC emission laws in connection with suitable bag filter unit.
- **Higher yield and lower salt additions** due to controlled furnace atmosphere, thus minimizing presence of oxygen during melting.
- Operation either with horizontal axis for highly contaminated scrap and thin walled scrap requiring the **liquid slag process**, or with inclined axis up to 8° for the low salt, **dry slag process**.
- Special temperature resistant high hot-strength insulation for stability of the refractory lining and long refractory life with low maintenance costs due to non-wetting lining.
- **Automatic operation** with permanent PLC process control and display of all parameters.

Design, Construction and Installing of Turn-Key Recycling Cast Houses



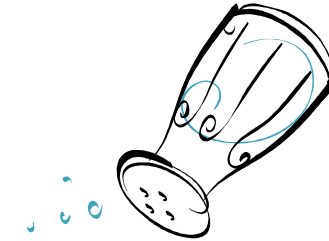
- Scrap boxes
- Sample crucible
- MASTERmax TRF
- Holding furnace
- Connecting Launders
- Dust Filter Plants
- Thermos crucible for liquid transportation
- Ingot casting machine
- Cast accessories
- Financing Options

Basic Engineering – Turn Key Aluminium Recycling Plant Layout





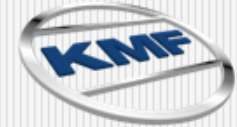
Clean Scrap with MASTERmax



Salt: 3-4%

Yield
93 – 97%

Gas
40 – 50
m³/t scrap



Coated Sheet Scrap with MASTERmax



Salt: 4-6%

Yield
85 – 90%

Gas
35 – 40
m³/t scrap
13-18 m³/t
O₂ Injection

Baled UBC with MASTERmax



Salt: 5-7%

Yield
75 – 80%

Gas
35 – 40
m³/t scrap
15-25 m³/t
O₂ Injection



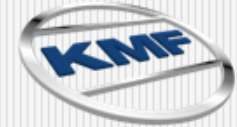
Shredded UBC with MASTERmax



Salt: 5-7%

Yield
80 – 88%

Gas
35 – 40
m³/t scrap
15-25 m³/t
O₂ Injection



Chips with max 5% moisture with MASTERmax



Salt: 5-15%
dep. on chip size and
contamination level

Yield
88 – 92%

Gas
40 – 45
m³/t scrap



Contaminated cast scrap with MASTERmax



Salt: 6-8%

Yield
85 – 90%

Gas
30 – 35
m³/t scrap
15-20 m³/t
O₂ Injection



Oxidized flotated shredder scrap with MASTERmax



Salt: 7-9%

Yield
75 – 85%

Gas
35 – 40
m³/t scrap
15-25 m³/t
O₂ Injection



Dross with app. 35-50% Aluminium with MASTERmax



Salt: 6-8%

Yield
30 – 45%

Gas
40 – 45
m³/t scrap

Dross with app. 50-75% Aluminium with MASTERmax



Salt: 5-6%






Yield
45 – 70%

Gas
35 – 40
m³/t scrap


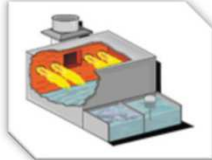

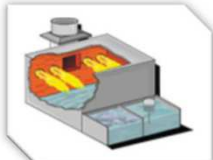






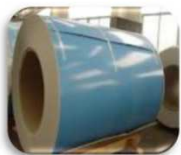













Operating Figures of KMF Hybrid Tilting Rotary Furnace MASTERmax

Generally 4% – 6% higher yield and 30% – 70% less energy consumption compared to fixed axis rotary and reverberatory furnaces.

Clean scrap	Organically contaminated scrap	UBC	Chips with max. 5% humidity	Dross (35-75% Al)
				
Energy Consumption [kWh/t] 350-400	Energy Consumption [kWh/t] 300-350	Energy Consumption [kWh/t] 300-400	Energy Consumption [kWh/t] 400-450	Energy Consumption [kWh/t] 350-450
Yield [%] 95-97	Yield [%] 85-90	Yield [%] 75-88	Yield [%] 88-92	Yield [%] 40-70

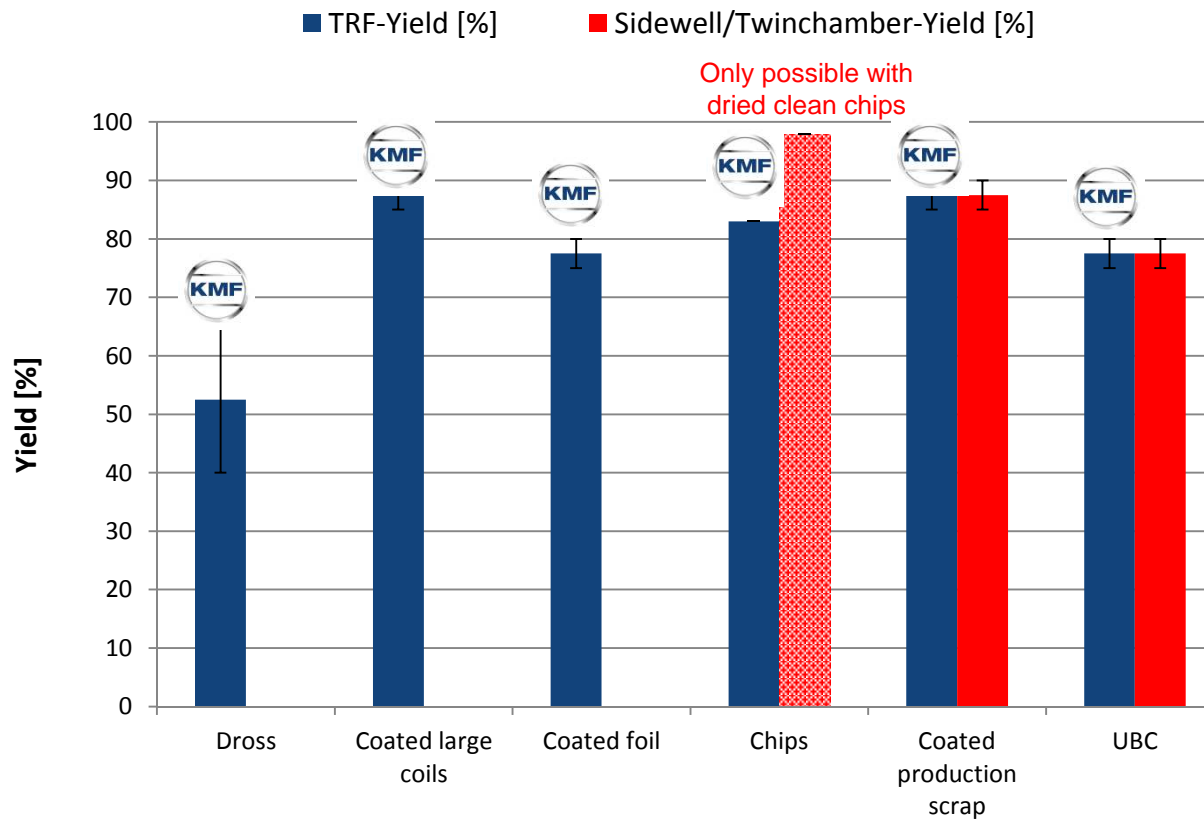
Comparison of TRF and Reverberatory/Sidewell Furnace

	MASTERmax Tilting Rotary Furnace	Sidewell furnace / Twin Chamber Furnace		MASTERmax Tilting Rotary Furnace	Sidewell furnace / Twin Chamber Furnace
					
DROSS 	Suitable  for 30% to 80% aluminium content	Not suitable 	CHIPS 	Suitable  for unprocessed chips up to appr. 6% moisture Yield up to 83%, 400 kWh/t	Suitable only for processed, dried chips. Vortex and pump necessary, high capital investment 
COATED LARGE COILS 	Suitable  Yield 85% – 90%, 400 kWh/t	Not suitable 	COATED PRODUCTION SCRAP 	Suitable  Yield 85% – 90%, 350 kWh/t	Suitable  Yield 85 – 90%, 750 kWh/t
COATED FOIL 	Suitable  Yield 75% – 80%, 350 kWh/t	Not suitable 	UBC 	Suitable  Yield 75 – 80%, 350 kWh/t	Suitable  Yield 75 – 80%, 750 kWh/t



Comparison of TRF and Reverbatory/Sidewell Furnace

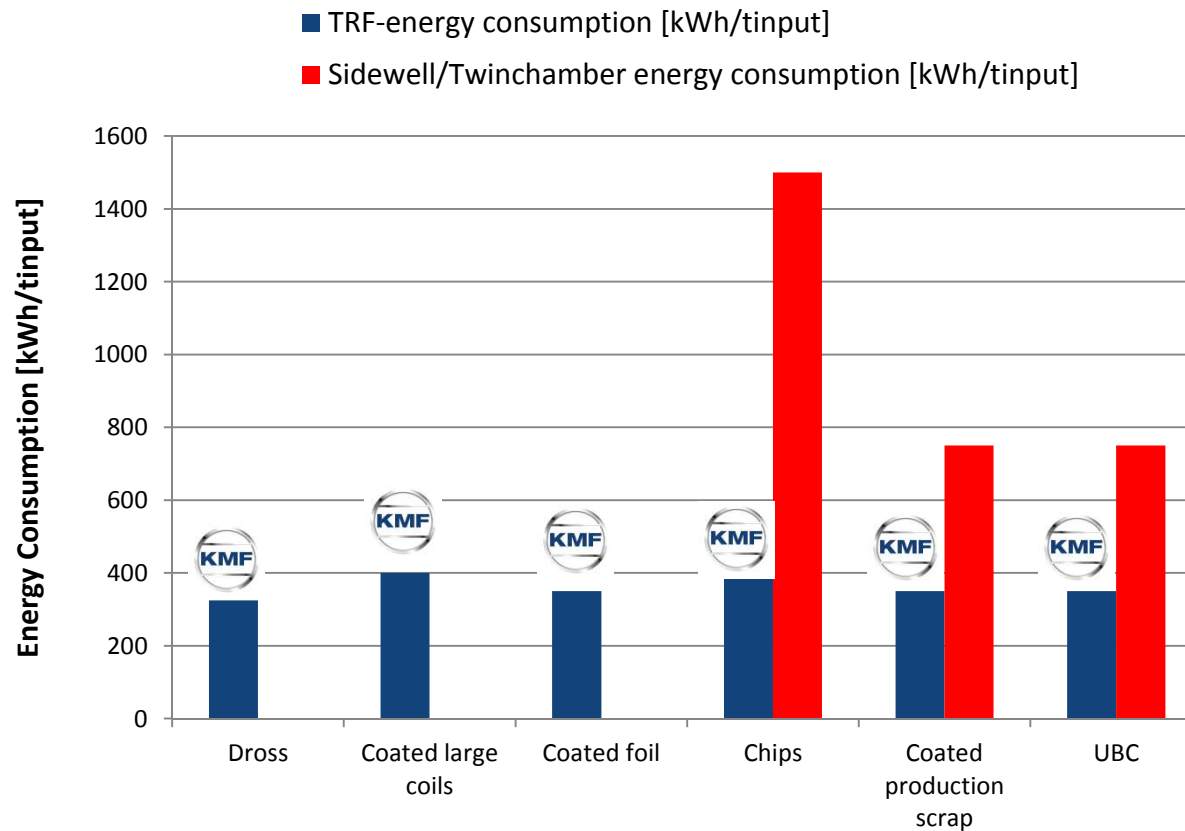
Comparison of Yield





Comparison of TRF and Reverbatory/Sidewell Furnace

Comparison of Energy Consumption



Worldwide Transport, Assembly and Installation



- Crane capacity up to 60 t
 - Forklift capacity up to 6 t
 - Railway connection
 - Worldwide installation, commissioning and production training



Selected Reference Projects



8 t MASTERmax, Hungary



9 t MASTERmax, Turkey



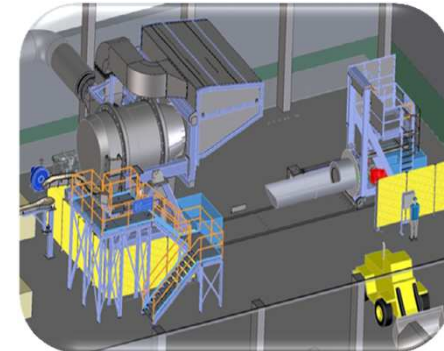
12 t MASTERmax, Spain



12 t MASTERmax, Czech Republic



9 t MASTERmax, Germany

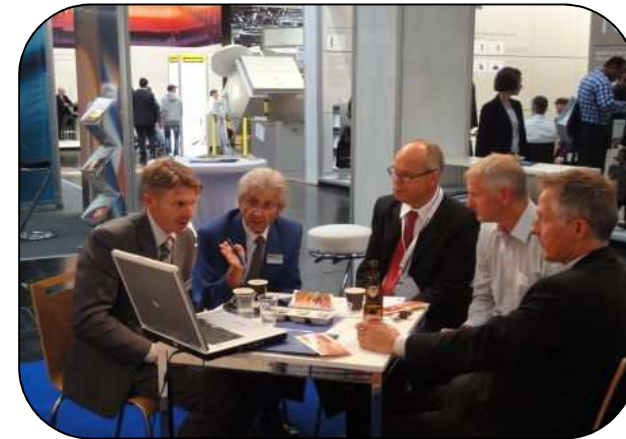


5 t MASTERmax, India
9 t MASTERmax, India

Customer Profile

Europe

- Andritz (A)
- Agip (I)
- Arcelor Mittal (F)
- Cincinnati (A)
- Corus (UK)
- Engel (A)
- Euroclad (UK)
- Global Hydro Energy (A)
- Hobas (A)
- JAKE (D)
- Kone Cranes (Fin)
- Köfem (Hungary)
- Lindner Recyclingtechnik (A)
- Samesor (Fin)
- Hobas (CH)
- Maerz Ofenbau (CH)
- Mitsubishi (D)
- Omya (CH)
- Plannja (DK)
- Rheinfelden Alloys (D)
- RHI (A)
- Salvagnini (A)
- Siemens VAI (A)
- SMS (D)
- Danieli (I)
- Heraklith (A)
- CoreAL (ES)
- Lenzing (A)
- Polysius (D)



Africa/Asia / Middle East

- Mondi Paper (South Africa)
- Mitsui (JP)
- TAHA (Bahrain)
- Kiliçlar (Turkey)
- Rio Tinto (NZ)
- Axayya Alloys (India)
- LCP Building (Singapore)
- Marudhar Industries



Contact



Maschinenfabriken
Kärntner Maschinenfabriken Egger GmbH

Italiener Strasse 62
9500 Villach, Austria / Europe

Dr. Erhard Ogris
Head of Sales

phone: [+43] (0) 699 1200 3307
erhard.ogris@kmf.at

Peter Kalkusch
Senior Sales Manager

phone: [+43] (0) 699 1200 3322
peter.kalkusch@kmf.at

