

TECHNICAL DATA SUMMARY
Striko Shaft Meter Type MHII –T 3000/2000

Furnace:

Holding Capacity	3,000 kgs (6,600 lbs)
Melting Capacity	2,000 kgs (4,400 lbs)
Melt Loss	Less than 1.5% when melting 50% ingots and 50% returns
Standard Holding Temperature	780° C
Number of Burners	Holding – 1 Melting – 2
Total Burner Rating	1,650 kW (5,629,800 BTU's)
Melting Energy	Less than 980 BTU's per lb @ 780° C
Holding Energy	Less than 75 BTU per lb/hr
Tapping Height	1000 mm (can be adjusted to meet the height of the transfer ladle)

Control System:

PLC	Omron
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Charging Machine:

Model Type	K 1000 with chain lift
Gross lifting capacity	1,000 kgs – including charging skip & skip carrier
Lift Speed	6.6 meters / min. (21.6 ft. / min)
Tilting Angle	145 °

Chain Breaking Strain	5,500 Pa	
Charging Skip	Type	BW3
	Size	950mm x 950mm
	Volume	0.52 m³
	Weight	134 kg
Electrical Ratings:		
Furnace Total	5.4 kVA	
Charging Machine	2.7 kVA	
Service Platform	0.9 kVA	
Flue Baffle	0.9 kVA	
Waste Gas Hood	0.9 kVA	
Electrical Requirements	575 V 60 Hz	

All technical information is subject to operating conditions and use

INSTALLATION REQUIREMENTS MH II-T 3000/2000

Operating Environment

Ambient Temperature	Ambient temperature exceeding 40° C (104°F) requires an air conditioning system
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Emissions Data	Form sent on January 22, 2007
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Waste Gas System

Chimney Diameter	560 mm (22 inches)
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Waste Gas Volume	6,050 m³ (Vn) / h in standard waste gas Hood
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Exhaust Flue Draught	Minimum 10Pa to maximum 20Pa -measured in center of waste gas hood-
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Energy Requirements

Natural Gas	Heating Value – 8.8 – 12.0 kWh/m³ (confirmed by F. Leclerc on Jan. 18)
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Miscellaneous	Overall floor loading – 320 N / cm²
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TECHNICAL FEATURES

Brief furnace description of MH II – T series with ETAmox® system

This Striko-Melter type MH II-T with ETAmox® is a non- crucible combined melting and holding furnace design and ensures a constant supply of molten metal for your casting requirements. The furnace is equipped with separate melting and holding chambers side by side and is heated by two independent burner systems. This allows Liquid metal at the required temperature to be tapped from the holding chamber at any time. Molten aluminium is always drawn from the bottom of the holding bath, via the tilting of the furnace, ensuring that it is free of dross.

The patented **StrikoWestofen ETAmox® furnace shaft** system is charged automatically and guarantees pre-cleaning and drying of the charged material before melting, thus improving metal quality and avoiding inclusions in the melt (**StrikoWestofen patent**) whilst **minimizing the danger of explosion** if wet material is charged via the furnace shaft. The tapered (choked) shaft provides for a continuous melting operation and ensures that bulky and entangled returns need not be handled manually.

The shaft design also enables the use of automatic melting control by means of the waste gas temperature. Exhaust gasses are led through the **ETAmox®** melting shaft into the waste gas system ensuring heat transfer to the charge material. The resultant recuperative system results in very high energy utilization and consequent waste gas outlet temperatures as low as 200 – 400°C dependant on the bulk density of the charged material. Conventional melting furnaces have exhaust gas temperatures between 900-1100°C.

The geometry of the furnace shaft also results in the cleaning cycles of the furnace being reduced in relation to conventional furnaces with consequent savings in personnel requirements.

The furnace body is lined with a high grade, heat and abrasion resistant, **refractory lining** material. Different refractory materials will be used according to the furnace type and service requirements. These refractories have been developed especially by StrikoWestofen, together with well-known refractory suppliers, and consist of state of the art materials, chosen according to customer's operating procedure. Over 40 years of StrikoWestofen experience in constructing and building of non-crucible melting and holding furnaces for aluminium goes into guaranteeing the reliability of our furnaces.

The **waste gas hood** above the furnace shaft is integrated with the charging system and is interlocked with the waste gas hood sliding door by a limit switch, to prevent accidental charging.

The fully automated **charging unit** allows ingots and foundry returns to be placed directly into a skip which is then be placed in the charging equipment and emptied into the furnace shaft. The unit itself consists of 2 double shell closed steel side-walls, which protect the carrier chains. The chains have a breaking strength of 5500 KP. And the drive, mounted in the bottom part of the charging unit, consists of a flanged motor and worm gear. The unit is protected against overload by a multiple-stage electronic torque control.

The carrier for the charging skip is attached to the chain with steel pins and runs on maintenance-free bearings and guide runners. Safety is ensured through a protective guard, height 2,50 m, with separate door, controlled and interlocked by limit switches. Operation can be fully automatic or by manual push button (dead man's button).

The **working and service platform** allows for safe access to the furnace and shaft for chain adjustment and furnace shaft control/ repair, inspection of baffle, waste gas hood, insulating material etc.

The **burner equipment** is based on separate burner installations for the melting and holding chambers giving accurate control of holding bath temperatures and melting rates.

Burner systems installed for gas heated furnaces are equipped with electric ignition, whilst those for oil fired furnaces are ignited with separate gas ignition burners. Melting burners are equipped with a 2-step switch for a burner output of either 100 % or 70 %, and each individual burner is equipped with air/fuel ratio controllers to ensure optimum combustion control.

Flame monitoring takes place via ionisation probes and the burner operating periods are monitored and controlled through the selected waste gas temperature, which is also interlocked with the automated charging system. The operation of the melting burners is also controlled through the metal level probes in the holding bath. This ensures that overfilling of the holding bath is avoided but that melting will resumes immediately when metal is tapped. The holding bath temperature is controlled via the PLC control against a pre-selected temperature.

During the melting process the waste gas temperature is monitored in the waste gas hood as an indication of the charge shaft status, as the shaft empties the waste gas temperature increases and at a pre-determined waste gas temperature the charging cycle is initiated. This ensures an optimum recuperative use of the waste gas heat and improves furnace efficiency.

The furnace status is shown continuously on the **PLC display** in the control cabinet and aided visually by a three colour signal light on top of the control cabinet. An optional alarm horn can also be installed.

Temperatures are controlled by the PLC through thermocouples installed in the melting chamber, holding bath and waste gas hood, ensuring reliability and consistency of operation. Nominal and actual values are indicated on the OP17 operator's panel along with any equipment failures and operator instructions, and can be altered, along with program selection and alarm monitoring, via the keyboard.

Advantages of the PLC control

- Secure control of the furnace operation
- Operational comfort and good serviceability
- Continuous indication of operating parameters
- Control of the operating variables from single unit
- Detailed indication of 40 fault messages
- Possibility of optional communication with external data systems
- Extension possible in various stages

Operating efficiencies are further enhanced by the use of a **waste gas baffle** that allows the partial closing of the waste gas hood to restrict heat loss and conserve energy during idling periods. The baffle position is interlocked to prevent the use of melting burners and/or the charging unit when in the closed position.

DETAILED TECHNICAL OFFER DESCRIPTIONS
Technical details of for MH II-N 3000/2000
(PRICE SUMMARY ON PAGE 14)

1.00 Furnace (Items 1.01 thru 1.01.4)

1.01 Furnace body and controls

The furnace casing is strongly designed and constructed of securely welded mild steel plates with an integrated furnace shaft. Cleaning and access doors, one each for the melting and holding areas, with heat shields to protect the burner equipment, are raised by geared motors.. A steel roller is mounted in front of the cleaning doors for use with the cleaning tools. The furnace body is mounted on **separate steel supports** to achieve the specified tapping height.

A StrikoWestofen tapping valve for dross free metal tap out is fitted at the lowest point of the metal bath and incorporates a safety guard to prevent accidental damage. The tap hole centreline (standard) is positioned at a height of 1000 mm above foundry floor. *For Toral Cast, StrikoDynarad will provide a special pressure pocket, which is priced elsewhere in this text.* Thermocouples (NiCr/Ni type) with graphite protection tubes are installed for measurement of temperatures of the melting and holding chambers. A pocket with removable cover is included for the installation of the holding bath thermocouple and level electrodes

1.01,1 Burner equipment - The installation is made in accordance with NFPA and European norm EN 746-2 dated March 1995 and the German regulations for industrial furnaces and consists of:

- Three medium speed burners, 2 for melting and 1 for the holding bath.
- All necessary gas and air controls, regulating components such as solenoid valves, pressure control devices, stop plugs, butterfly valves, ball valves, gas filter, main gas solenoid and the gas main shut-off valve.
- A blower fan, with filter, to supply the burners with combustion air, with electric motor protected against overloading by NTC-element.

1.01.2 Furnace control cabinet – of standard design with all necessary contactors and controls for furnace operation, burner control units, micro-ammeters to monitor the flame ionisation current, main switch, key-operated switch for the control voltage, interior lighting and separate three-pin socket, push buttons and indicator lamps, ready wired on terminal strips, including the terminal box on the furnace. A 3 colour signal lamp is installed on top of the cabinet to indicate operating status.

The panel is electrically checked before despatch and in accordance with Euro norm EN 60204.

NOTE - maximum internal panel temperature should not exceed 50°C (120°F)

1.01.3 PLC control type Allen-Bradley CompactLogix and Panelview Plus 600 Grayscale display (standard) - consisting of all necessary hardware, CPU, digital input and output modules, analogue input modules to register furnace temperatures, ethernet connection, power supply components. **Note: Canimex is requesting Omron controls.**

1.01.4 Refractory lining - The refractory lining materials, developed and proven over 40 years by **StrikoWestofen** and it's suppliers consist of high quality insulation materials and castables with an Al_2O_3 content between 40 % and 85 %, depending on requirements. The **ETAmix®** shaft system is lined with a high quality castable refractory material reinforced with stainless steel needles to improve abrasion resistance in the charging areas.

The refractory lining in contact with the liquid aluminium contains non-wetting agents to inhibit the penetration of aluminium and the formation of corundum.

The complete refractory lining is installed in our works in Wiehl or Zeeland and the sintering takes place at customer's site.

1.02 Waste gas hood - Z-WGH

The waste gas hood for the collection of the exhaust gases into the chimney is of steel construction, includes the connection flange to the customer's chimney and is completely lined on the inside to reduce heat losses and burner noise levels. The hood is installed on the furnace shell in such a way as to include an air gap to enhance gas flow and to dilute exhaust gases.

The charging opening of the waste gas hood is closed by an electrically operated and insulated sliding door controlled by a limit switch and interlocked with the waste gas temperature.

A sheathed thermocouple is installed at the waste gas outlet to provide input for the automatic charging cycle.

1.03 Waste gas baffle - T-FC

The baffle is used to control heat loss by covering the ETAmix® melting shaft during extended holding or idling periods and consists of an electrically operated and insulated framework pivoted within the waste gas hood and with the necessary drive and control units. The baffle is interlocked to the main control system to prevent accidental operation of the melting burners and charging machine.

The use of this baffle can provide considerable energy savings (up to 50 %) during holding periods and will reduce the danger of thermal shock during shut down and re-start cycles.

1.04 Gas consumption meter

\$2,990.00

A gas consumption meter is required for accurate adjustment of the burner system during commissioning and for operational adjustments and servicing. A remote readout of the gas consumption at the Panelview is available as an option. This uses a frequency power converter for the conversion of the oil flow rate into an analogue signal of 0-20 mA.

2.0 CHARGING EQUIPMENT

2.01 StrikoWestofen automatic charging unit K 1000

The electrically operated charging unit is equipped with a protective enclosure, 2.5 m high on three sides, with separate access door for loading. The door is interlocked and the installation is in accordance with the GERMAN UVV.

A multi-stage torque control electric motor is installed and integrated with the PLC. Alarm messages are indicated on the panel in the control cabinet.

NOTE an automated charging cycle is possible only if the waste gas hood is installed

The unit is designed for use with StrikoWestofen charging skip.

NOTE On request the customers own charging cars may be used if suitable although additional design costs could be incurred.

2.02 Hinged working and service platform – Electrically operated

Integrated into the upper part of the charging machine, the service platform provides for safe access to the **ETAmix®** shaft, waste gas hood and the charging equipment for inspection and maintenance. Consisting of a platform frame and support, galvanized grid, access ladder and hand rail, the unit is operated with an electric winch and interlocked to the charging system by a limit switch.

2.03 StrikoDynarad closed charging cart

Closed cart for the charging of returns and of solid steel construction, with 2 casters and 2 rollers, all with solid rubber tyres, suitable for StrikoWestofen skip charger.

2.03.1 StrikoDynarad open charging cart

Open fronted cart for the loading of ingot stacks and of solid steel construction, with 2 casters and 2 rollers, all with solid rubber tyres, suitable for StrikoWestofen-skip charger.

3.00 FURNACE CLEANING AND MAINTENANCE

3.01 Working platform

price on request

Installed in front of the furnace to allow for access to the holding and melting chambers, the platform is of steel construction with ribbed cover plates and includes stairs and hand-rails, the skimmed dross is raked into the dross truck (or other container) in front of the platform.

3.02 Set of cleaning tools

To allow regular and consistent cleaning of the furnace lining, with "hot zone" parts made from stainless steel and consisting of the following parts; 1 scraper (short), 1 scraper (long), 1 ram, 1 scraper, 1 dross rake, 1 wall holder.

3.03 StrikoWestofen flux spray

price on request

The sprayer utilizes compressed air for the application of fluxes to the furnace walls and the surface of the metal bath to improve cleaning efficiency and allow flux to be applied to all parts of the furnace interior. The sprayer consists of: hopper funnel and application lance. (1 inch connection) The flexible tubing between lance and unit is NOT supplied and is dependent upon customer requirements.

3.04 StrikoWestofen dross truck - (fixed frame)

price on request

The non-tilting V-shaped dross truck is made of heavy steel sections, supported on a chassis made of welded steel profiles with 2 casters and 2 malleable cast iron rollers and with openings for fork lift transport and a handle for manual use.

3.05 StrikoWestofen dross truck - (tilting)

As described under item 3.40 but constructed as a tilting unit

4.0 ACCESSORIES

4.01 Connection cables - 10 meters

Connection cables between control cabinet, terminal box at furnace, charging equipment

operator panel. **NOTE supply excludes cable trays and installation**

4.02 Air conditioning for control cabinet

In cases where high ambient temperatures exceed 40°C, and particularly with associated high humidity levels, it is advisable to install air conditioning into the control cabinet to protect the PLC and associated equipment.

4.03 Alarm Horn

pricing on request

A horn can be mounted on top of the control cabinet for audible alarm warnings.

4.04 Gas pressure reducing system

Consisting of all necessary safety components for pressure reduction for installations where the existing gas supply is higher than 100 mbar.

4.05 Gas booster system**pricing if needed**

Consisting of one gas booster fan and all necessary safety components to boost the gas pressure where the existing supply is below 70 mbar.

4.06 Gas pressure tightness tester**pricing on request**

For safety reasons this gas tightness test is a necessity for liquid gas supplies (LPG) such as propane or butane. The tester detects leaks in the burner gas supply lines using an over-pressure proofing system and is fully integrated into the gas main on the furnace.

4.07 Noise insulation for combustion air fan**pricing on request**

In situations where additional noise reduction is required, an acoustic cover is supplied to enclose the combustion fan assembly

4.08 Laser scanner for charging shaft**pricing on request**

When low bulk density charges are being used (eg wheels) it is necessary to monitor the charge level in the shaft to protect against the dangers of over charging an already full shaft.

4.09 Data recorder – 6 color**pricing on request**

A high precision paperless chart recorder is available for the recording of process data such as metal bath and furnace interior temperatures etc.

4.10 Gas consumption recording on data printer**pricing on request**

A record of the gas consumption can be added to the data recorder via the frequency power converter

4.11 Remote operator panel with clear text display**pricing on request**

In situations where the main control panel is sited remote to the furnace, a separate "Operator Panel" can be sited adjacent to the charging unit for the separate display of "operating status" and "alarm messages".

5.00 WASTE GAS SYSTEM

5.00 Waste gas system (pricing includes items 5.01 – 5.06)

5.01 Exhaust gas chimney – for first 20 feet

Exhaust chimney ducting with mating flanges to fit the waste-gas hood.

5.02 Roof passage for chimney

Designed to protect and insulate the passage of the exhaust chimney through the roof panels and consisting of a cylindrical shell, roof-plate and rain shroud with distance pieces.

NOTE -the roof-plate has to be assembled and welded according to the roof pitch and the rain shroud has to be welded to the chimney after assembly. The packing of the roof passage with insulation and the

sealing of the roof in the area of the plate is the responsibility of the customer.

5.03 Rain protection hood

Standard hood to ensure that rain is kept out of the waste gas system.

5.04 Deflector hood in stainless steel

Constructed in stainless steel as a deflection hood to keep rain out of the waste gas system

5.05 Additional exhaust gas chimney sections above 20 ft

Additional heights according to customer specific requirements, pricing includes 7 additional feet.

5.06 Banana Duct Hood

Stationary hood that prevents waste gases from escaping into the plant when the furnace is tilted.

6.0 Installation Assistance

Installation assistance consists of cabinet interconnection wiring, a check of all main utility connections, commissioning, sintering, training of Canimex personnel and conducting the melt test. Please note that this does not include shipping, off-loading at Canimex, furnace placement, main utility hook-up and chimney installation. CSA, PSHR and TSSA inspections are the responsible of Canimex. StrikoDynarad will build the furnaces to these requirements and will change any non-compliant component at no charge.

PAYMENT TERMS:

25%	Upon receipt of purchase order
50%	Upon completion of refractory
15%	Upon readiness to ship
10%	Upon acceptance and customer sign-off, PSHR and TSSA approvals

DELIVERY:

24 to 26 weeks for production time (after final sign-off of furnace, conveyor and layout). Please allow another 1 week for shipment from Zeeland, MI and another 3 weeks for installation and commissioning.