



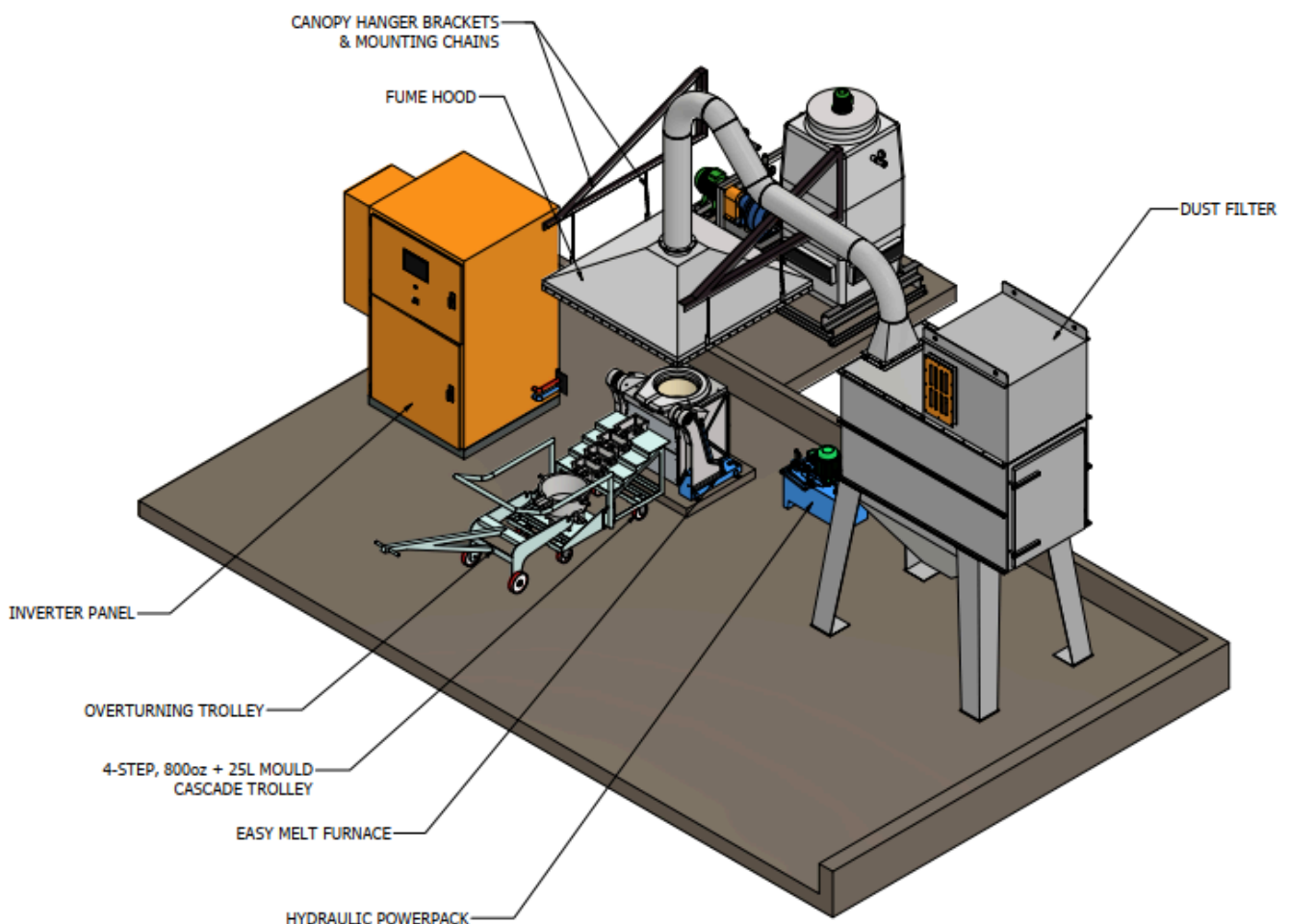
# 100KW INDUCTION FURNACE SPECIFICATIONS

## Overview

This type of equipment has been extensively manufactured by ourselves for the precious metals industry since our inception in 1959. We have steadily grown over the years into the enviable position of being market leaders in this field in Southern Africa, as well as various other parts of the world. More specifically, the equipment proposed is identical to the very many units we have manufactured and supplied to gold mines around the world.

“KEEGOR” is a registered trade/brand name to the Keegor Group of companies and has become synonymous with the quality and reliability expected by the precious metals mining industry.

## Equipment Layout





# 100KW INDUCTION FURNACE SPECIFICATIONS

## Induction Furnace Overview

### Inverter Panel

Prime consideration is given to high reliability. The equipment is designed for easy access to all major components for maintenance or repair.

- Isolation transformer, giving the correct voltage to the inverter, while galvanically isolating the furnace from the main supply for increased safety.
- 100KW continuously rated converter power supply with BST-2 diagnostic control. The power is infinitely variable from 0 to full power, with very good power factor across the full range (better than 0,95). Independent power limit is available with digital display of true power to 3 decimal places allowing for very accurate control. Constant accurate power output is ensured, irrespective of incoming voltage fluctuations. This is made possible by an independent adjustable power limit, located conveniently inside the cabinet to avoid unauthorised adjustment. The inverter circuit is protected to avoid damage to costly electrical components.
- All semiconductors are standardized and are over-rated for the application giving a high margin of safety. Simple component layout gives access to semiconductors including the clamping.
- Essential parameters such as frequency, voltage and current are displayed on the panel. Should unsafe conditions arise, the heater will operate under restricted conditions or will automatically trip.
- The inverter water-cooling is a built-in closed loop circuit. This is complete with a stainless steel pump, heat exchanger and tank that ensures no contaminated or chemically unsound water is passed through the internal water circuits. This water passes through an in line water conditioning cartridge which keeps the water conductivity low. This cooling circuit interfaces with the cooling tower and pump quoted separately.



# 100KW INDUCTION FURNACE SPECIFICATIONS

## Induction Furnace Overview

### Furnace Cooling System:

For the design, manufacture, shop testing and delivery of an Evaporative type Cooling Tower, complete with fan, pump, all switches, interlocks (pressure, flow and temperature), etc.

### Cascade Trolley With Moulds:

For the design, manufacture, shop testing and delivery of a stepped cascade trolley to suit 5 cascade bullion moulds and 1 Slag Mould.

The trolley would be mounted on large diameter castors for ease of maneuverability.

### Bar Moulds and 25l Slag Mould

Available in

1. 500 OZ (0.8 Litre)
2. 800 OZ (1.3 Litre)
3. 1000 OZ (1.6 Litre)

Multiple configurations are available depending on smelting needs.



Centre Pour



Right Pour



Left Pour



Double Pour



End Pour

### Slag Mould Handling Trolley

Slag mould handling trolley which will allow a full (hot) slag mould to be removed from the trolley and placed remotely for cooling. The handling trolley also has the facility to invert the slag mould once the slag has solidified, for easy emptying.

### Furnace Tilting Hydraulic Power Pack:

For the design, manufacture, shop testing and delivery of a Hydraulic Power Pack, complete, for the above furnace. As a standard, a hand operated pump would additionally be fitted, to allow for manual tilting in the event of a power failure.

### Bar Lifter:

This lifter allows bars of metal to be easily lifted for carrying, even when still hot, to the cleaning area.

### Bar Mould Lifting Tong:

These tongs allow bar moulds (even when still hot) to be handled and inverted for emptying the bar and slag out the mould.



# 100KW INDUCTION FURNACE SPECIFICATIONS

## Induction Furnace Overview

### Furnace Bag Filter System

To operate the Induction Furnace, it is essential to install a comprehensive dust extraction system to draw away and filter fumes and capture dust particles (which can and often do contain precious metal fines requiring reprocessing). Without the correctly rated system in place it is all but impossible to operate the equipment properly because the dust and fumes would make it all but impossible for the operators to see what they are doing. It is important to also consider the associated occupational health implications and environmental controls as well. Thus, this Dust Control Equipment is therefore an essential part of the installation which cannot be omitted.

The proposed unit is of the automatic reverse-jet self-cleaning type, with "POLYESTER" filter bags. A hood over the furnace, with silica-glass curtains would be supplied together with mounting brackets for support of the roof or an adjacent building wall. All interconnecting ducting between hood to filter and filter to exhaust would be supplied, provided the filter is positioned in close proximity of the furnace with ducting runs as short and direct as possible. For the design, manufacture, shop testing and ex-works delivery of a Bag Filter system complete for the furnace. This will include the following:

- Bag Filter
- Set of inlet and outlet ducting, with the arrangement of the equipment such that it stands in close proximity to the furnace and adjacent building wall, for exhaust (i.e. no long duct runs have been allowed for but can be accommodated, if required and within reason).
- Local control panel to control all aspects of the dust extraction system (fan motor controls as well as control circuitry for the reverse-jet pulsing system). This local panel would be mounted on the side of the filter and cabled up to the various connection points on the filter, requiring only an incoming supply to be connected.

### Canopy, Curtain Supports and Ducting

Furnace Canopy, canopy support and silicon glass curtains.

Set of inlet and outlet ducting, with the arrangement of the equipment such that it stands near the furnace and adjacent building wall, for exhaust (i.e. no long duct runs.)



# 100KW INDUCTION FURNACE SPECIFICATIONS

## IMPORTANT INFORMATION

### WARRANTY

- We, KEEGOR warrant the satisfactory operation and durability of the mechanical parts supplied by us for a period of 12 (TWELVE) months from date of commissioning or 15 (FIFTEEN) months from date of shipping (whichever expires first) and will replace free of charge any parts which may prove defective either through faulty design, materials, or workmanship, fair wear and tear or accidents due to faulty operation excepted. KEEGOR has been a key global role player in the Precious Metals Refining and Assaying Industry for +65 years, with a very long and distinguished track record.
- It is understood that this warranty does not apply to the refractory materials or consumable items.
- Notice of a claim for alleged defective equipment must be given within 14 (FOURTEEN) days of a defect becoming evident.
- This warranty is limited to the supply of replacement parts and labour only, as may be required - shipping / transport / travel costs are not included.
- Full support is available at our ruling rates after expiry of the warranty.
- KEEGOR is not liable for any consequential damages.
- Electronic and electrical components sourced from sub suppliers are excluded or subject to supplier warranty conditions.
- Power electronic components and items which are subject to usage and operational conditions, are excluded.
- The connecting, usage and maintenance of induction coils is excluded. In particular failures due to incorrect clamping or water cooling of coils to bus bars.
- The responsibility for maintaining the quality of the cooling water is outside of our control and therefore we assume no responsibility for problems arising due to the end user failing to meet our specifications. For queries relating to the water-cooling requirements, please contact our service department.
- The warranty is not valid unless the make-up water supply to the cooling tower is installed and functioning. All cooling systems, internal and external are to be maintained to comply with the specifications defined in the instruction manual.



# 100KW INDUCTION FURNACE SPECIFICATIONS

## Technical Specification

100kW Induction Furnace - Smelting Furnace						
<b>Dimensions</b>						
External (mm)	(W)1000 x (H)1000 x (D)800					
External Tilted (mm)	(W)1000 x (H)1605 x (D)800					
Mass (Kg)	(+/-) 390					
Tilting Action	Hydraulic					
<b>Furnace Crucible Options, Capacity &amp; Volume</b>						
TEX330R	Brim full	33.7Ltr	0.0337m <sup>3</sup>	Working	30.3Ltr	0.0303m <sup>3</sup>
TEX447R	Brim full	13.7 Ltr	0.0137m <sup>3</sup>	Working	12.3 Ltr	0.0123m <sup>3</sup>
AX150	Brim full	22.4 Ltr	0.0224m <sup>3</sup>	Working	20.1 Ltr	0.0201m <sup>3</sup>
AX120	Brim full	18.4 Ltr	0.0184m <sup>3</sup>	Working	16.5 Ltr	0.0165m <sup>3</sup>
AX100	Brim full	16.0 Ltr	0.0160m <sup>3</sup>	Working	14.4 Ltr	0.0144m <sup>3</sup>
<b>Furnace Assembly</b>						
As per above option Crucible options						
Hydraulically tilted furnace.						
3m water-cooled cables for connection to the inverter panel.						
Constructed using cast aluminium side frames giving superior strength and magnetic screening.						
Furnace design is such that coil maintenance can take place without completely disassembling the frame.						
The heating coil is made of standard copper sections.						
Refractory lining ensures fast crucible changes.						
Good protection from loss of gold and high thermal efficiency.						
<b>Nominal Power</b>						
Electrical Rating	110kVA		Nominal Power			
Voltage	3 Phase+E	400V	Standard			
Voltage	3 Phase+E	Other	On request			
Min Breaker Supply	300A		For inrush current			
Power Factor	>0.95					
<b>Power And Melt Rate</b>						
First smelt can be easily completed within 45-50 minutes (from cold startup to pouring gold)						
Nominal power rating of 100 kW.						
First smelt can be easily completed within 50-60 minutes (from cold startup to pouring gold)						
Subsequent smelts in 35-40 minutes (once the furnace is hot).						
If a low cost (budget) operation is planned, a unit with lower power can be manufactured, but this will also negatively affect furnace capacity, smelt times, efficiency of operation						



# 100KW INDUCTION FURNACE SPECIFICATIONS

## Technical Specification

100kW Induction Furnace - Inverter Panel	
Design and Construction	
▪ Dimensions (mm)	(W)1200 x (H)2075 x (D)1200
▪ Mounting	Floor Standing
▪ Mass (Kg)	(+/-) 1050
▪	<ol style="list-style-type: none"> <li>1. Prime consideration is given to high reliability</li> <li>2. The equipment is designed for easy access to all major components for maintenance or repair.</li> <li>3. Isolation transformer, giving the correct voltage to the inverter, while galvanically isolating the furnace from the main supply for increased safety</li> <li>4. 100kW continuously rated converter power supply with BST-2 diagnostic control</li> <li>5. The power is infinitely variable from 0 to full power, with very good power factor across the full range</li> <li>6. Constant accurate power output is ensured, irrespective of incoming voltage fluctuations</li> <li>7. The inverter circuit is protected to avoid damage to costly electrical components</li> <li>8. All semiconductors are standardized and are over-rated for the application giving a high margin of safety</li> <li>9. Simple component layout gives good access to semiconductors and semiconductor clamping</li> <li>10. Essential parameters such as frequency, voltage and current are displayed on the HMI</li> <li>11. Should an unsafe condition arise, the heater will either operate under restricted conditions or will automatically trip</li> <li>12. The transformer and converter power supply would be continuously rated for connection to any specified 3-phase supply.</li> </ol>

100kW Induction Furnace - Hydraulic Power Pack			
▪ Design Pressure	6 Mpa		
▪ Flow	6 l/min		
▪ Oil reservoir	60 ltr		
▪ Hydraulic Fluid	40 ltr	Hydraulic oil 68	
▪ Control	Solenoid valve with manual override		
▪ Motor	1.1KW	4 Pole	1455 rpm
▪ Dimensions (mm)	(W) 1120 x (H) 660 x (D) 400		
▪ Mass (Kg) Dry	(+-)65		
▪ Mass (Kg) Filled	(+-)100		



# 100KW INDUCTION FURNACE SPECIFICATIONS

## Technical Specification

100kw Induction Furnace - Water Requirements		
Closed Loop Water Requirements (Inside Inverter Panel)		
De-ionized or Distilled		
PH	7.0 to 8.5	Ph
Chloride Content	20	ppm Max
Nitrate Content	20	ppm Max
Sulphate Content	100	ppm Max
Total Solids	250	ppm Max
Hardness(Calc, Carb)	250	ppm Max
Resistivity not less	2500	Ohm/cm
A heat exchanger, stainless steel circulating pump and make-up tank is built into the generator which ensures no contaminated or chemically unsound water is passed through the internal water circuits and/or the sensitive electronics		
The internal closed loop water passes through an in-line water-conditioning cartridge, which keeps the water conductivity low		
Open Loop Water Requirements (Single or Double Pumps Skid)		
Particle Size, less than	0.5mm	
Water Temp Max	25° C	
Water Pressure Min	350 kPa	
Water Pressure Max	500 kPa	
Flow Minimum	150 l/min	

100kw Induction Furnace - Pumps Skids	
Design And Construction	
Double Pump	Standard
1. There are (normally) two separate water-cooling circuits in an operational furnace, one inside the Inverter (closed loop cooling) and one to/from the external Cooling Tower (open circuit water) Inverter (closed loop cooling) and one to/from the external Cooling Tower (open circuit water). 2. The two circuits interface with each other through a heat exchanger inside the Inverter Panel.	

100kw Induction Furnace - Pump (Double)				
Cooling Tower	EWK065			
Water Consumption	143l/h	0.143 m3/h		
Cooling Tower Fan	0.75KW	4-Pole	1420 rpm	
Pump 1	SPP	5 Bar	253 l/min	15.18m <sup>3</sup> /h
Pump 1 Motor	5.5KW	2-Pole	2930 rpm	
Pump 2	SPP	1.5 Bar	151 l/min	9.08m <sup>3</sup> /h
Pump 1 Motor	1.1KW	4-Pole	1455 rpm	
Dimensions (mm)	(W) 2470 x (H) 2165 x (D) 1600			
Mass (Kg)	395			