

		zul. Abw. DIN ISO 2768		Fertigmasse	Maßstab 1:50	Position - Menge -
		Datum		Name		Layout HST-Ofen max. glassize 5000/5200x2500
Bearb.	01.06.17	ManigC		Version Blatt - Bl		
Gepr.						
Norm						
Auftr.-Nr.:		45.240-50.79.10 017.dwg		(Ers.f.)-	(Ers.d.)-	

- Flachglas – Maschinen und Anlagen
- Photovoltaik – Maschinen und Anlagen
- Logistik für Flachglas und Photovoltaik
- Entwicklung, Fertigung und Service

Torgauer Maschinenbau GmbH Solarstraße 29 04860 Torgau

Ravensby Glass Co. Ltd.

Mr. Nicholas Cunningham
 West Pitkerrro Industrial Estate
 Brought Ferry
 Fowler Road
DD5 3RU DUNDEE/SCOTLAND
 GROSSBRITANNIEN

ORDER CONFIRMATION 170028

Customer No. : 008174.002
 Your reference : Mr. Nicholas Cunningham
 Your phone No. : (0044) 1382/480842
 Your fax No. : (0044) 13 82/480323
 Our reference : Knöchelmann, Eckhard/PE
 Telephone : +49 (0) 34 21/72 05-11
 E-mail : knoechelmann@tmb-torgauer.de
 Date : 2017-01-25
 Title : HST-Ofen EK 5000/5200x2500
 engl

Your written PO dd 19.01.2017

Order No.: 024885TJR

Dear Mr. Cunnigham, dear Mr. Dickson,

we thank you for your purchase order which we confirm as the following:

Item	Quantity	Unit	Specification	Unit price	Net price
1	1.00	piece	Heat-Soak-Test-Oven EK 5000/5200 x 2500 mm incl. digital recorder		
			consisting of:		
1.1	1.00	piece	HST-Oven EK 5000/5200 x 2500 incl. digital recorder		

Features:

- assembly space needed approx.: height: 4600 mm
length: 7000 mm
width: 2700 mm
- chamber volume: approx. 27 m³
- max. glass capacity: approx. 5,0 t
- inside dimensions of chamber approx.: height: 3100 mm
length: 5400 mm
width: 1600 mm
- clear door height: 3000 mm
- clear door width: 1600 mm
- max. glass size: 5000/5200 mm x 2500 mm (perpendicularly)
- The oven consists of a single chamber electrically heated
- The glass sheets to be tested are put on a special stillage (Item 2) in vertical mode separated by spacers; the stillages are transported by means of pallet trucks into the test chamber and out respectively.
- residence time at 290 °C: adjustable
- The oven features a steel skeleton construction with optimum heat insulation incl. bottom insulation
- The outside covering consists of steel sheet.
- The inside lining and air conducting devices are made of zinc galvanized steel sheet.
- The hot air is circulated by high-performance vents in order to achieve a homogeneous distribution of temperature.
- A forced air-flow guarantees an optimal heating of the glass.
- A vent is used for a rapid removal of the resting hot air after finishing the test.
- separate waste air outlet (duct to open air upon request)
- The oven is equipped with a swivel door on front side which is locked mechanically and electrically (standard right hinged).
- For the floorground a concrete plate is required with a capacity of 1500 kg/m².

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- Bottom cavity (approx. 70 mm in depth) within the area of the oven place is to be provided in accordance with our instructions. Thus the oven flushes with the floorground.
- Evenness of the floorground and the cavity respectively: ± 4 mm, but not more than 3 mm/m
- Instead of a bottom cavity an access ramp can be provided as an alternative (option).

Oven control:

- PLC-control for the technological regimen and for monitoring
- operating the oven via touch panel display
- digital input of test temperature and holding time
- standard test temperature $290\text{ °C} \pm 10\text{ °C}$ (adjustable)
- holding time: 1 - 10 h (adjustable)
- digital preselection of heating-up and cooling-down time e.g. for different glass thickness and charging of the oven
- automatical temperature guiding during heating-up and cooling down time
- automatic loop control of the test temperature
- a value limited thermostate observes the maximum oven temperature of 320 °C (adjustable)
- digital preselection of starting time
- The heat-soak test is exactly recorded for certification of the tested glass by a digital recorder.
- After finishing the test the operating mode is automatically set to cooling.
- release signal for unloading the glass
- switch cabinet with main switch, fuse elements, control unit and recorder

Digital recording:

- Screen recorder for recording the test curves
- graphical display for indicate the curves
- Industrial USB-stick (2 GB) for saving the test data
- original recordings protected against manipulations
- at least one reserve channel for additional recordings
- Interface RS232 is existing for exporting of the test data to a separate PC or host computer

Supply features:

- electrical power supply: 3 x 400 V $\pm 10\%$, 60 Hz, TNC-s, PEN (*other supplies upon request*)
- internal control voltage: 24 V DC
- total power rating: approx. 220 kW
- compressed air: 6 bar, dry, without oil
- weight: approx. 8000 kg
- permanent sound level: 78 dB(A)
- max. ambient temperature: 35 °C
- max. air humidity: 85 %
- color: silver grey

The heat-soak-test oven is in accordance with the process-technical requirements of the European standard EN 14179-1 (E):09/2005, the German "Bauregelliste 2014/2" asa rule for manufacturing of tempered glass (ESG-H) as well as DIN 18 516, part 4 and is designed and manufactured according to the valid European standards (CE). Our warranties comprising a glass surface temperature of $290\text{ °C} \pm 10\text{ °C}$.

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Item	Quantity	Unit	Specification	Unit price	Net price
1.2	1.00	piece	Interface RJ45-Ethernet - prepared for connection between digital Recorder of the HST-oven and customer side computer network		
2	1.00	piece	Bar-stillage 5000 mm for special coated glass (special design) consisting of:		
2.1	1.00	piece	Bar-stillage 5000 mm for special coated glass (special design) <u>Technical parameters:</u> - Capacity: 5,0 t - Length: approx. 5000 mm - Width: 1300 mm - Total height: approx. 3000 mm - Backbearer height: approx. 2500 mm - Base bearer length: approx. 475 mm each side - Number of back bearers: 12 pcs each side - Number of base bearers: 12 pcs each side - Distance between bearers: approx. 450 mm - back bearer angle: approx. 3° - Angle between back and base bearers: 90° - back bearers: spacer bars (see separate item) - upholstery of base bearers: Teflon strips - 11 pcs double-row perforated strips above and below per side - Hole pitch: approx. 30/15 mm, staggered - no craning possible in loaded condition - excluding spacer bars - Surface treatment: untreated <u>including:</u> - forklift pockets at the long side		
2.2	1.00	set	fixed wheels on one side and ball reception on the other side for floor transport of the stillages - floor transport alternatively <u>with</u> : • lever roller (see separate item) • forklift adapter (see separate item) • special tractor - not necessary if using the rail guided System - incl. wheel position shifted to the end of the trolley		
3	280.00	piece	Spacer bars for bar-stillages - Ø 20 mm - Length: approx. 2600 mm - core material: steel tube - Tubes covered with heat-resistant material		

The spacer bars serves simultaneously as glass block safing bars.

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Item	Quantity	Unit	Specification	Unit price	Net price
4	1.00	piece	Packing and Transport DAP Dundee/Scotland with 1 Special flat bed truck		
5	1.00	piece	Installation, commissioning and training with 1 Supervisor from TMB in Dundee/Scotland - qualified fitters and electricians from customer side free of charge - incl. training and acceptance - incl. traveling expenses, flight, accommodation - excl. transportation in customers country only		
6	1.00	piece	Calibration of the HST-Oven according to EN standards - necessary for glass export to the European Union - execution under production conditions on site at the customer - procedure in accordance with European Standard EN14179-1 (E) 09/2005, Annex A, page 24-34 - 20 measuring points per load - procedure for 100 % and 10 % load - helpers from customer side free of charge for the whole time of calibration - calibration report in english language - execution of the calibration directly after Installation, so that no additional travel expenses occur		

Not included in this order:

- provision of free space for construction
- possibly necessary construction works (roof and wall openings and their sealing)
- media supply to interface oven
- supply of hoisting machinery, crane, forklift etc.
- pavement work
- helpers free of charge
- costs for certification

For possible tests the glass is to provide by customer.

- Documentation: 1 set in English (on paper, or usual data storage medium)

Training and Acceptance test

The Customer has to provide the necessary and suitable material and personnel for Training and Acceptance test. Training and Acceptance test take place without interruption directly after installation and commissioning

Delivery Period: calendar week 27th/2017

in advance 130 pcs spacer bars for bar-stillages in calendar week 7th/2017 (pick up by the customer)

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Pricing Conditions: DAP Dundee/Scotland
incl. packing, transport, installation, commissioning and training
excl. value added tax

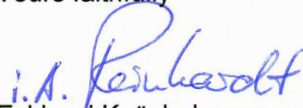
Payment Terms: ~~100 % by L/C: (deleted)~~
• 30 % down payment
• 60 % before delivery against documents
• 10 % after acceptance, but latest 6 weeks after delivery

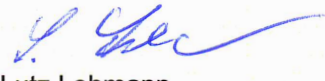
Grace Period: 30 days after rendering account, down payment immediately

Warranty: 12 months (excluding wear parts)
Precondition for warranty are properly executed care and maintenance procedure.

If not otherwise agreed the "General terms and conditions of the TMB" are to apply. You can find this at our website www.tmb-TorgauerMaschinenbau.de or request it by phone under +49 (0) 3421 72 05 25.

Yours faithfully


Eckhard Knöchelmann
Sales Manager


Lutz Lehmann
Sales Dept.