

Tamglass UK Ltd

QUOTATION

NEIL BUTLER

Date 09/07/2020

1 (8)

Nova Group

For the attention

Dear

We thank you for your inquiry and have the pleasure in offering our HTF type tempering furnace for production of high quality flat, tempered safety glass.

TAMGLASS HORIZONTAL TEMPERING FURNACE TYPE HTF™-2136-C10

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1. General

For over 30 years, **TAMGLASS** has been leading the development of glass tempering technology. The experience for new innovations and

solutions represent the state-of-art in its field resulting in more than 200 international patents.

- Tamglass has supplied **close to 700 tempering furnaces** to customers world-wide, including all leading glass manufacturing companies.
- The extensive **network of TAMGLASS offices** provides ~~br~~ and quick assistance to our clients.
- **All technical solutions are tested in actual production conditions** at our TAMGLASS safety glass production facility. Our customers can see the benefit in trouble-free, reliable operation right from the beginning.

Our clients benefit of the training and testing possibilities at Tamglass Safety Glass production facility.

2. System description and benefits

The most important pre-requisites for good final product at a Horizontal Tempering Furnace are uniform heating of the glass sheets in the heating oven, a uniform quenching and cooling of the glass and a reliable transport system with an even roller speed in all parts of the system.

The **TAMGLASS Horizontal Tempering Furnace, HTF™** serves processing of flat safety glass for architectural, industrial and vehicle use. The furnace is known of its unique **“HTF tempering method”** , a combination of focused electrical and convection heating.

The above requirements must be fulfilled with all glass and batch sizes, glass thickness and glass types. This can only be reached with an exactly correct combination of technical concept, materials, control system and process knowledge.

The Horizontal Tempering Furnace Type HTF™ is designed to satisfy the needs of demanding users and glass market. The final products fulfil high standards concerning strength, breaking pattern, optical quality and flatness. The design incorporates a multitude of exclusive, patented

features, which give the customers important advantages in everyday use of the plant:

- **Ease of operation and glass processing - fast deliveries**

- All commercial and temperable glass types including LOW-E.
- Automatic heating and cooling control according to recipes
- Thin and thick glass in large sizes

- **High glass quality - optics and flatness**

The state-of-the-art, low surface-temperature heaters with sensors, combined with build-in forced convection system (patented).

- Uniform heating resulting in high quality final products. Glass surface damage and coating “burning” effect avoided.
- Heating is automatically focused on area with glass
- No overheating of roller areas without glass
- Allows effective use of heating profiles if needed

- **Real savings in operation cost - low peak power, small transformer size and flexible layout**

Low connection power and total freedom in blowers arrangement :

- Small installed power - small power cables and transformer
- Free placement of blowers on the side, below or above the quench/cooling section
- Small footprint - easy to fit in narrow, existing premises

- **Trouble free glass processing, high up-time**

Technical leadership and reliability

- Proven systems with hundreds of customers

- Computer linked preventing maintenance and consulting services available
- New built in features for future upgrading to fulfil the market requirements

3. The equipment, performance and data

1. Tamglass Tempering Furnace Type HTF™-2136-C10

- Glass thickness range 3,8 - 12 mm
- maximum glass size 2100 x 3600(3900)* mm
- Minimum glass size 100 x 250 mm
- Capacity by 4 mm, K=100% 160 m²/hour
- Total installed power 800 kW **

*) Oversized glass with reduced production capacity and glass thickness

**) The average power consumption is 1/2 - 2/3 of the installed value depending on the load area utilisation

For more detailed technical data please see the attached Technical Specification and Data.

4. The options

The optional property enhancements for **TAMGLASS HTF™** tempering furnace include the following:

- N85** Noise reduction cabin around the quench/chiller. The cabin is made of wood based panels, insulated inside with mineral wool based insulating materials. The

cabin covers the quench and chiller areas for sound pressure level $L_{p(A)} = 85\text{dB(A)}$

V	Second VDU at unload end.
QMS	Quality Monitoring System
MR	Motorised Pyrometer

5. Spare parts

A set of spare parts is recommended to be included in the delivery to secure a smooth operation after the start-up.

6. Engineering and documentation

Engineering services include plant design, project co-ordination, drawings for electrical and mechanical assembly, manuals for assembly, maintenance and operation. All documentation will be in English according to Tamglass standard documentation.

7. Installation supervision and training

Installation:

The equipment can be installed on a flat floor.

The installation will be carried out by Tamglass expert(s) The customer is recommended to provide maintenance personnel to assist the installation work, which in part serves as training for customer's operating and maintenance personnel.

Training:

The training of the customer's production staff will be organised at the installation site after start-up.

Duration:

The installation and training time is 5-6 weeks.

8. Maintenance and consulting

The tempering furnace is an investment of tens of years. The continuous availability of the Equipment can best be guaranteed by means of a preventive maintenance program. For this purpose, we offer a Maintenance and Consulting Contract, **MCC™**. Regularly and in general twice a year, a Tamglass' maintenance expert will visit the customer's plant according to a mutually agreed schedule including preventive maintenance measures, recommendations for future maintenance actions and additional training.

In addition to the services described above, the customer will get extra benefits, such as reduced prices for spare parts, priority position in case of emergency calls etc. As a part of **MCC™** contract, Tamglass provides a Remote On-line System, **ROLS™**, by which the customer's equipment can be connected to Tamglass Maintenance Service Office via a modem for any possible problem analysis or updating any recipes.

9. Price

		<u>GBP</u>
Item 3.1	HTF-2136-C-10	440,000-
Item 4	optional features	
	N85 - Noise reduction cabin	Included
	V – Second VDU at unload	Included
	QMS – Quality Monitoring System	Included
	N85 - Noise reduction cabin	Included
Item 5	Spare parts	Not Included
Item 6	Engineering and Documentation	Included
Item 7	Turn key installation and Training	Included
Item 8	Maintenance and consulting	Included
	Contract (MCC) for 1 year	

10. Scope of delivery

The delivery includes complete and operational flat tempering unit. The furnace has heating system, glass transport system, quench and chiller with blowers , motors, starters and standard ducting, the user interface, the necessary control panels and the internal wiring.

The Buyer shall provide the supplies for electricity to three points and compressed air to the points indicated by Tamglass.

11. Commercial terms

Payment terms

25 % down payment with order
75 % by an Irrevocable Letter of Credit confirmed and payable with Merita Bank, Helsinki, Finland as follows:

25% of total price at sight against shipping documents
25% on signing of acceptance protocol. however
 latest 90 days from the date of B/L .
25% 90 days from the date of B/L .

Delivery terms

FCA (Free carrier) Tampere, according to Incoterms 1990.

Despatch time

Week 14/2000 if receipt of the down payment and signed contract by end November 99.

Week 18/2000 if receipt of the down payment and signed contract by end December 99.

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Date 09/07/2020

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Warranty

12 months from the first production run.

Validity

This quotation is valid for two months from its date. The final and binding terms are to be defined in the contract signed by both parties only.

We hope our quotation meets your requirements. The Tamglass team is ready to make its extensive expertise available to you, to ensure a successful project for your company. We will soon contact you for to hear your comments. In meantime, please do not hesitate to contact us for any questions or further assistance or information.

Yours sincerely,

TAMGLASS UK Ltd.
Neil Butler

ENCLS. - Technical Description, Specification and Data,
 - Tamglass Corporate Profile

THE EQUIPMENT AND SERVICES

1. **TAMGLASS HTF HORIZONTAL TEMPERING FURNACE**
TYPE HTF 2136 C 10
N85- ACOUSTIC CABIN
V -2nd VDU at unload
QMS -Quality Monitoring System
MR – Motorised Pyrometer

2. **TURN KEY INSTALLATION AND TRAINING AT SITE**
for max. 6 weeks

MANUFACTURING STANDARDS

The standards used in manufacturing of the Equipment are SFS and DIN.
Metric system is used.

SAFETY STANDARDS

The machinery complies with the essential health and safety requirements of the Machinery Directive (89/392/EEC).

All weights, dimensions, and specifications set forth in this Agreement are guidelines only and should be understood to be estimates. The Seller reserves the right to alter the foregoing, except that no specifications relating to glass length, width, thickness or production rate may be altered without Buyer's written consent.

TECHNICAL SPECIFICATION AND DATA

**TAMGLASS HORIZONTAL TEMPERING FURNACE
HTF™-2136-C-10**

Type of operation:	1-stage
Glass thickness range:	3.8...12 mm tempering
Loading area: 3.8 mm and over	2100 mm x 3600 mm

Maximum glass size:	ANSI Z97.1-1984	ECE R43
4.7 mm and over	2100 mm x 3600 mm (3900)*	1000 mm x 1500 mm
3.8 mm and over	2100 mm x 3000 mm	-

*Single sheets 300 mm longer can be tempered with reduced production rate

Minimum glass size:	
3.8 mm and over	100 mm x 250 mm

Maximum production rates with K = 100 %, with clear float glass.

4 mm	160 m ² /h
5 mm	135 m ² /h
6 mm	112 m ² /h
8 mm	84 m ² /h
10 mm	67 m ² /h
12 mm	56 m ² /h

In actual operation, the production rates reach 50-85 % of the maximum and depend on the glass dimensions, edgework quality, and loading area utilization.

Minimum distance of sheets from each other is 30 mm.

Environmental conditions:

Temperature 20...40 °C
 Relative humidity < 80%

Installed power at sea level:

Heating and drive		480 kW
Blowers	2 x 160 kW	320 kW
Total		800 kW

Preheating time from 20°C to 700°C is abt. 2.5 h.

Outcoming glass temperature is environmental + 20 ... 60 °C.

Dimensions of the plant:

Roller diameter 95.25 mm
 Roller distance 120 mm

Total length abt. 18.5 m
 Total height 3.1 m
 Working height 880 mm
 Total width 4.9 m + abt. 7 m x 8 m for blower room

The plant can be installed on a flat floor.

Tamglass reserves the right to alter specifications without notice

REQUIREMENTS FOR PERFORMANCE**1.****Raw materials**

1. The raw material for the test run shall be clear float glass suitable for tempering.
2. The glass sheet material which is supposed to be tempered by the HTF-process, shall be clean and the edge work has to fulfil the Seller's requirements. For ANSI Z97.1-1984 Standard at thicknesses 8 mm and over, the glass edges shall be diamond ground. For thinner glass sheets according to ANSI Z97.1-1984 Standard cross-belt sanding is required. For ECE R 43 Standard diamond grinding is needed for all thicknesses.

2.**Environmental conditions**

1. Maximum ambient temperature inside the factory + 37° C.
2. Minimum ambient temperature inside the factory + 16° C.
3. Maximum relative humidity inside the factory 85 %.
4. The fan room shall be clean of dust and other kind of particles, which can be taken by the fans to the system.
5. The compressed air for the plant shall be water free and oil free and the volume and pressure shall fulfil the Seller's requirements.

3.**Electrical conditions**

1. Maximum allowed voltage variation is +/- 5 %.
2. Maximum allowable frequency variation is +/- 1%.

PRICE, CURRENCY AND PAYMENT TERMS**PURCHASE PRICE including:**

- MAIN MACHINERY AND EQUIPMENT according to Appendix 1
- INSTALLATION SUPERVISION AND TRAINING according to Appendix 8, except the costs specified in Appendix 8
- ENGINEERING & DOCUMENTATION

TOTAL PRICE

GBP 440,000:00 (FOUR HUNDRED & FORTY THOUSAND POUNDS)

PAYMENT TERMS

25 % down payment with order
 75 % by an Irrevocable Letter of Credit confirmed and payable with Merita Bank, Helsinki, Finland as follows:

25% of total price at sight against shipping documents
 25% on signing of acceptance protacol.however latest 90 days from the date of B/L .
 25% 90 days from the date of B/L .

L/C to be opened latest two (2) months from the date of downpayment but in any case four (4) months prior to shipping. L/C shall be valid three (3) months from the estimated shipping date from the Seller's factory.

All costs and expenses arising from or connected with establishing, maintaining and obtaining payment pursuant to such Letter of Credit, without limitation, shall be the sole responsibility of the Buyer.

Any payments not received by the Seller by the due dates stipulated in this Appendix shall entitle the Seller to charge interest at the rate of fourteen percent (14 %) p. a. from the respective due date until receipt by the Seller of the payment.

DELIVERY TERMS AND DELIVERY TIME

Delivery term is FCA TAmperre according to Incoterms 1990.

The Equipment will be delivered from the Seller's factory as follows

1. HTF furnace

Week 14/2000 if receipt of the down payment and signed contract by end November 99.

Week 18/2000 if receipt of the down payment and signed contract by end December 99.

Dates above given from the receipt by the Seller of the down payment and signed Agreement, whichever comes later, subject to all payment terms, as stipulated in Appendix 6, and delivery of acceptable technical documents, as stipulated in Appendix 4, being complied with.