

Glassrobots: multi-convection - a choice looking to the future

New glass types, increased demand, more complex applications, all factors that glass processors need to consider when buying machinery, equipment and lehrs. With convection heating, Glassrobots is able to respond fully to these requests with its RoboTemp furnace, presented to us in a real-life “case study” in this article.



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CHOOSING A NEW TEMPERING FURNACE

In the flat glass sector, where new glass types need more and more sophisticated machinery for tempering operations, *Veneto Vetro*, located in Montebelluna, close to Treviso, north-east Italy, made a precise choice when looking for a new tempering furnace to substitute its flat tempering lehr built by *Selas* many years ago.

Two of the owners of *Veneto Vetro* and of its sister company *Vetromeccanica*, Jesolo, near Venice, Mario and Valentino Giacchetto, took into consideration not only the company's tradition in supplying clients with the highest quality glass for windows and doors, shower doors, special vehicles, and nautical applications and showcases, but also the market demand for more and more for low emissivity glasses due to the need to fight energy consumption.

The choice was not easy and took almost two years examining and studying many roll hearth furnaces and their production. The main characteristics that *Vetro Veneto* was looking for were tempered glass production with minimum anisotropy, flatness close to perfection and, particularly, high, competitive capacity.

ROBOTEMP

The final decision was made for a Finnish glass furnace manufacturing company - *Glassrobots* - well known in the field of bending and laminating installations for both bent and flat glass, including automotive, industrial vehicles, truck and bus windshields. In Italy and

Excellent
optical quality



North African countries, *Glassrobots* is represented by **Vitrododi**.

Glassrobots uses a certain number of its own ideas and patents: one of these is a very interesting temperature control system of the heating chamber, called *FuzzyTemp*. This fully-automatic system is capable of adjusting temperature distribution all over large glass sheets during treatment. Moreover, the *RoboTemp* multiconvection flat glass tempering lehr installed in *Veneto Vetro* is a fully convection model, and, therefore, the heating system is real hot air heating.

Radiation is not significant: if you look inside the heating chamber you will see a dark red colour, without incandescent areas radiating at high temperature, the well known effects which are able to burn the coating of low emissivity glass if not properly controlled.

The average heating chamber temperature of a traditional furnace is more than 720°C while inside *RoboTemp* the temperature is less than 680°C. Convection heating is capable of obtaining high speed heating of 25-30 seconds per millimetre of thickness instead of the traditional 39-40 seconds per millimetre and more of the radiation lehrs. It is quite obvious that the short-



Mario Giacchetto, the owner of *Veneto Vetro*, is satisfied of both the speed and quality of the *RoboTemp*

ROBOTEMP TEST DATA

Glass type	thickness (mm)	heating time (seconds)	edge deformation (mm)	flatness (%)
PILKINGTON CLEAR	4	110	0.03-0.1	0.16
PILKINGTON CLEAR	5	138	0.02-0.08	0.10
PILKINGTON CLEAR	6	162	0.02-0.04	0.06
PILKINGTON CLEAR	8	216	0.00-0.04	0.05
PILKINGTON CLEAR	10	260	0.00-0.04	0.04
PILKINGTON CLEAR	12	350	0.02-0.04	0.02
PILKINGTON CLEAR	15	440	0.00-0.04	0.01
PILKINGTON CLEAR	19	580	0.00-0.04	0.01
PILKINGTON K-GLASS	4	120	0.06-0.12	0.16
SGG PLANITHERM FUTURE II	4	128	0.04-0.08	0.15
SGG PLANITHERM II	6	174	0.02-0.04	0.11
SGG ANTELIO HAVANNA	6	150	0.01-0.04	0.10
GUARDIAN LOW-E NT 1,1	4	125	0.05-0.1	0.15
GUARDIAN LOW-E NT 1,1	6	175	0.03-0.06	0.12
GUARDIAN SUN GUARD LE 40	8	220	0.02-0.04	0.05
PPG SOLARBAN 60	6	175	0.03-0.07	0.12
PPG SOLARBAN 80	6	180	0.03-0.07	0.16
GLAVERBEL PLANIBEL TOP TN	4	130	0.02-0.08	0.14
GLAVERBEL PLANIBEL G	4	130	0.02-0.08	0.14

*Typical Roller Wave values are 0.025-0.08mm

er the time the glass is standing on the roller hearth, the less it is subject to optical deformations or damages on the surface. The uniform heating obtained on the glass.

Obviously, Glassrobots installation works fully-automatically without any need of tempering experience, since the lehr is equipped with a menu library, a collection of recipes suitable for all the types of thickness and glass.

These features fully convinced Vetro Veneto, who now have the Glassrobots RoboTemp lehr up and running. All data coming from tests made by Glassrobots on existing installations can be checked and even improved (for some typical applications) which are resumed in the RoboTemp test data table.

RESULTS

Results are obtained and checked with basic recipes, but are continuously improved by making more sophisticated sub-recipes, depending on the particular production of each customer.

The results obtained on various Glassrobots' flat glass tempering lehrs existing in the world are obtained with roughly 65 per cent of the loading surface. Edge deformation is measured with the glass in a vertical position.

With smaller batch areas, heating times

lower than 24 seconds per millimetre of thickness have been reached. Flatness values have been checked by taking samples from normal production. ■

GI SSR TS

Glassrobots OY

Lasikaari 1 - FIN-33960 Pirkkala
Finland

Tel: +358 - 3 - 31323000

Fax: +358 - 3 - 31323350

E-mail: glassrobots@glassrobots.fi
www.glassrobot.fi



Vitrododi Int. Co.

Via Darwin 19/2-3
20019 Settimo Milanese (Milano)
Italy

Tel: +39 - 02 - 33501225

Fax: +39 - 02 - 3285617

E-mail: info@vitrododi.com
www.vitrododi.com