

RoboTemp™



Glassrobots

The new generation convection technology gives an edge

RoboTemp™, Glassrobots' revolutionary full convection flat tempering furnace is an interesting and proven design. It offers important new benefits to glass processors that want to boost their productivity, save energy and achieve the best possible quality of production.

Innovative furnace section

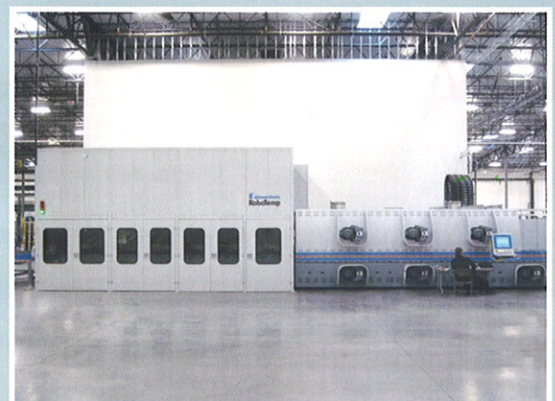
The patented full convection system gives improved quality and speed of production. Hot air is circulated inside the furnace and blown onto the upper and lower glass surfaces through nozzles.

Outstanding optical quality

Glass flatness during the heating process is guaranteed by the rapidity and even distribution of heating, which results in distortion-free optics and minimal iridescence. Extra capacity from the faster heating rate is not the only significant factor from a practical viewpoint. Extremely high optical quality, flatness and consistency in the end product give the glass processor a competitive edge.

Flexibility in production

The innovative and patented FuzzyTemp™ control system facilitates automatic online adjustment of the heating profile, which is important with large architectural glass sizes. The furnace temperature is kept constant regardless of glass thickness. The heating profile can be separately adjusted for each load. Profiling is also convectional as each heating element can be adjusted so that the temperature of the air blown onto the glass surface matches the required profiling.



The RoboTemp™



Tempering of high performance glass

The full convection heating system provides perfect tempering results with value added glass types from bronze silvered glass to painted, coated solar control and Super Low-E glass. RoboTemp™ rises to the challenge where other existing tempering systems fail. This is particularly true when new glass types with emissivity level as low as 0.02 are tempered with back-to-back loadings. The furnace is capable of sustaining heavy loadings without loss of power, maintaining quality.

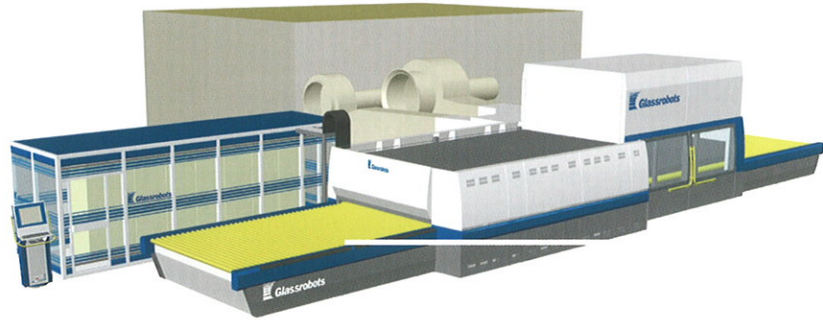
Highest productivity

Heating times for clear glass are below 30 s/mm depending on glass thickness. Soft coated Low-E takes only 10–20 % more. RoboTemp™ thus offers higher capacity, and since it is easy to operate with a user friendly recipe system, it also gives a higher yield.

Low maintenance costs

RoboTemp™ has been designed with a special view to good ergonomics, reduced energy consumption, safety of operation and ease of maintenance. All this translates into low maintenance costs.

Glassrobots – an experienced manufacturer of tempering machines and flat laminating lines for the architectural glass industry as well as windscreen bending technology for the automotive glass industry.



GLASSROBOTS Flat Tempering Machine RoboTemp™

Type of RoboTemp™ FTM	Loadings per h	40.0	31.0	26.7	22.2	16.7	12.9	9.7	6.0	4.5
	Heat total (sec*)	90	116	135	162	216	280	372	600	800
	Heat.time (sec/mm)	30	29	27	27	27	28	31		
		Glass thickness (mm)								
Load area (m²)		3	4	5	6	8	10	12	15	19
180/340-1	6.12	244	189	163	136	102	78	59	36	27
180/400-1	7.20	288	223	192	160	120	92	69	43	32
218/400-1	8.72	348	270	232	193	145	112	84	52	39
218/460-1	10.03	401	311	267	222	167	128	97	60	45
218/520-1	11.34	453	351	302	251	188	145	109	68	51
254/460-1	11.68	467	362	311	259	194	150	113	70	52
254/520-1	13.21	528	409	352	293	220	169	127	79	59
254/640-1	16.26	650	504	433	361	270	209	157	97	73
280/520-1	14.56		451	389	323	243	188	141	87	65
280/640-1	17.92		555	478	398	299	231	174	107	81
320/640-1	20.48		635	547	455	342	264	199	123	92
320/800-1	25.60		794	683	568	430	330	248	154	115

* Heating time may vary ±10% depending on the glass and ambient conditions

The capacity data above is based on clear float glass, 100% loading efficiency, (k=100%). In actual operation the loading efficiencies vary between 50% and 85%. For 15 mm and 19 mm, capacities are calculated according to the cooling time that for these thicknesses is longer than the heating time.

Power data for 3 mm to 19 mm thickness (3 mm optional)

Type of RoboTemp™ FTM	INSTALLED POWER / kW				
	Heating Convection Drives	Quench * 4-19 mm	Quench ** 3-19 mm	Total > 4 mm	Total > 3 mm
180/340-1	570	475	660	1045	1230
180/400-1	654	475	660	1129	1314
218/400-1	758	515	760	1273	1518
218/460-1	859	515	760	1374	1619
218/520-1	963	565	810	1528	1773
254/460-1	978	605	880	1583	1858
254/520-1	1099	635	910	1734	2009
254/640-1	1331	670	945	2001	2276
280/520-1	1238	635		1873	
280/640-1	1503	710		2213	
320/640-1	1674	755		2429	
320/800-1	2147	900		3047	

Energy consumption kWh/m² depending on the glass thickness with 65% efficiency:

3 mm	4 mm	5 mm	6 mm	8 mm	10 mm	12 mm	15 mm	19 mm
3.5	3.3	3.5	3.6	4.8	5.7	6.9	7.7	9.8

At the maximum altitude of 300 m and in the maximum ambient temperature of 30°C
 * Quench power is defined within international standards for tempered glass in buildings
 ** Quench power with 3.0 mm option meets international norms



Lasikaari 1, FI-33960 Pirkkala, Finland
 Tel. +358 3 3132 3000, Fax +358 3 3132 3350
 www.glassrobots.fi, glassrobots@glassrobots.fi