

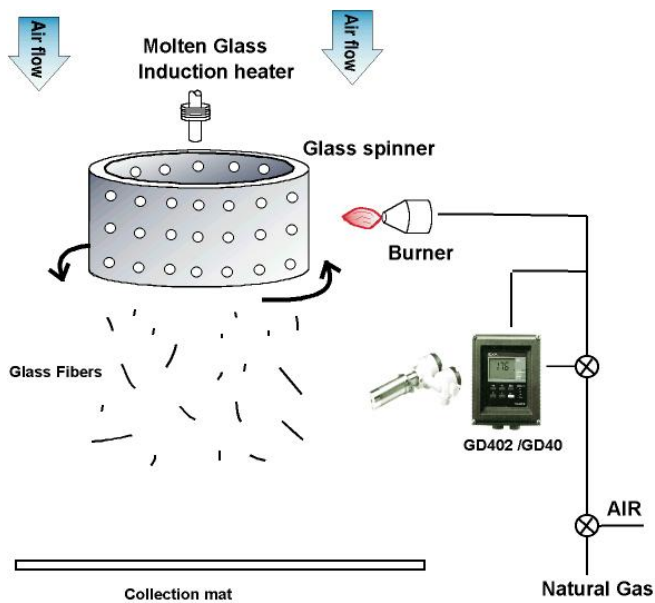


Fiberglass Spinner

Industry: Manufacturing: Glass
Product: GD40 and GD402

Introduction

In the manufacturing of Glass-Fiber wool for insulation a melt of a material such as glass is inductively heated at a stage intermediate an initial liquefying stage and a refining stage. Induction heating is the process of heating an electrically conducting object (usually a metal) by electromagnetic induction, where eddy currents are generated within the metal and resistance leads to Joule heating of the metal. An induction heater (for any process) consists of an electromagnet, through which a high-frequency Alternating current (AC) is passed. Heat may also be generated by magnetic hysteresis losses in materials that have significant relative permeability. The frequency of AC used depends on the object size, material type, coupling (between the work coil and the object to be heated) and the penetration depth.

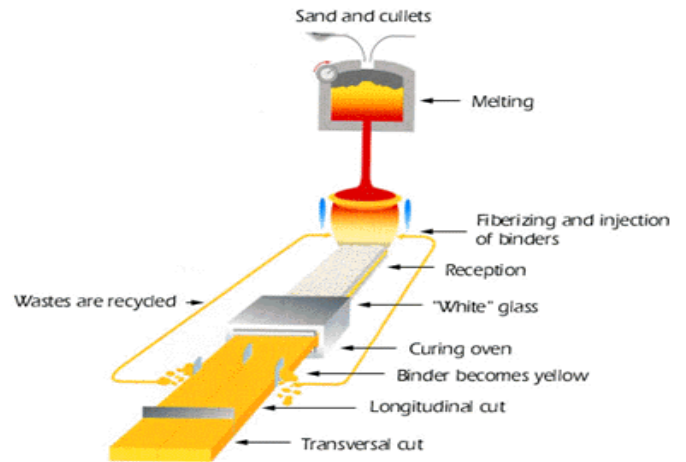


The function of the intermediate induction heating stage is essentially limited to raising the temperature of the melt a relatively minor amount to a refining temperature. Therefore, the induction heating stage may be compact with an intensified heating rate and rapid throughput, thereby

permitting the induction heating zone to be a "cold" walled vessel without an appreciable effect on efficiency.

A stream of molten glass is dropped into a spinning cup that has numerous holes in its wall. Glass fibers extrude through the holes under centrifugal force and meet a high-velocity air blast that breaks them into short lengths. On their descent to a traveling belt below, the fibers are bonded together with an adhesive spray. The binder is cured, and the wool is gently packed into chopped batts or rolls.

Process



The molten glass will harden and collect in the spinner cup if allowed to cool. The spinner cup temperature must be controlled to maintain fiber quality and a functional spinner mechanism. The GD402 / GD40 gas density analyzer is used for control of the spinner cup temperature. By measuring the Specific Gravity (S.G) of the Natural Gas (N.G.) air mixture used for fuel gas, the BTU (heat) value of the fuel can be determined. The BTU value of the N.G. will change as air is mixed with it. The output of the GD402 can be fed to a control loop configured to hold an optimal fuel gas S.G.

APPLICATION NOTE



There are usually multiple applications in each fiberglass-manufacturing site. The historic measurement technology is Gravometric or thermal conductivity. There are limitations in performance, supply and cost of ownership of each one. Calibration time, thermal stability, parts availability are the three most immediate issues faced by owners of thermal conductivity or Gravometric technologies.

* A table similar to the one below for Propane / Air mixture is used for control purposes*

		Propane / Air Mixture			
		% LPG	% Air	SGU	BTU/cuft
		47.54	52.46	1.252	1196
		50.87	49.13	1.27	1280
		54.24	45.76	1.287	1365
		57.65	42.35	1.306	1450
		61.11	38.89	1.324	1538
		64.62	35.38	1.342	1626
		68.16	31.84	1.361	1715
		71.76	28.24	1.38	1805
		75.4	24.6	1.4	1897
		46.62	53.38	1.247	1173
		49.88	50.12	1.264	1254
		53.18	46.82	1.282	1338
		56.52	43.48	1.3	1422
		59.9	40.1	1.317	1507
		63.33	36.67	1.336	1593
		66.8	33.2	1.354	1681
		70.32	29.68	1.373	1769
		73.88	26.12	1.392	1859
		45.76	54.24	1.243	1151
		48.95	51.05	1.259	1232
		52.18	47.82	1.276	1313
		55.45	44.55	1.294	1395
		58.76	41.24	1.311	1478
		62.12	37.88	1.329	1563
		65.51	34.49	1.347	1648
		68.95	31.05	1.365	1735
		72.43	27.57	1.384	1822

		Propane / Air Mixture			
		% LPG	% Air	SGU	BTU/cuft
		44.93	55.07	1.238	1130
		48.06	51.94	1.255	1209
		51.23	48.77	1.272	1289
		54.43	45.57	1.288	1369
		57.68	42.32	1.306	1451
		60.97	39.03	1.323	1534
		64.29	35.71	1.341	1618
		67.66	32.34	1.359	1702
		71.07	28.93	1.377	1788
		44.15	55.85	1.234	1111
		47.22	52.78	1.25	1188
		50.32	49.68	1.267	1266
		53.47	46.53	1.283	1345
		56.65	43.35	1.3	1425
		59.87	40.13	1.317	1506
		63.13	36.87	1.335	1588
		66.44	33.56	1.352	1672
		69.78	30.22	1.37	1756
		43.41	56.59	1.23	1092
		46.42	53.58	1.246	1168
		49.47	50.53	1.262	1245
		52.55	47.45	1.262	1322
		55.68	44.32	1.295	1401
		58.84	41.16	1.312	1480
		62.04	37.96	1.329	1561
		65.27	34.73	1.346	1642
		68.55	31.45	1.363	1725

Product Recommendations

Analyzer: GD402 Gas Density Meter

Sensor: GD40 Gas Density Detector

For more information contact you local Yokogawa Analytical Marketing Department.