

Glass fibers are made generally by drawing from a melt¹¹ as shown in Figure 1.9. The sizing solution is a mixture of binders, lubricants, and coupling and antistatic agents; binders allow filaments to be packed in strands, lubricants prevent abrasion of filaments, and coupling agents give better adhesion between the inorganic glass fiber and the organic matrix. The melt is formed in a refractory furnace at about 2550°F (1400°C) from a mixture that includes sand, limestone, and alumina. The wound array of strands is then removed and dried in an oven to remove any water or sizing solutions. It passes through as many as 250 heated platinum alloy nozzles of about 394 $\mu\text{in.}$ (10 μm) diameter, where it is drawn into filaments of needed size at high speeds of about 361 mi/h (25 m/s). These fibers are sprayed with an organic sizing solution before they are drawn.