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melting temperature (glass). The range of furnace temperatures within which melting takes place at a commercially desirable rate and within which the resulting glass generally has a viscosity of $10^{0.5}$ to $10^{1.5}$ Pa · s ($10^{1.5}$ to $10^{2.5}$ P). To compare the melting temperatures of glasses, it is assumed that a glass at its melting temperature has a viscosity of 10 Pa · s (10^2 P).

melting temperature (metals). See *melting point* (metals).

melt lubrication. Lubrication provided by steady melting of a lubricating species. Also known as *phase-change lubrication*.

melt-off rate. See *melting rate*.

melt strength. The strength of a plastic while in the molten state.

melt-through. Complete joint penetration for a joint welded from one side. To prevent melt-through, the welding current and the width of the root opening should be reduced, and travel speed increased.

membrane. Any thin sheet or layer.

Menstruum method. A method of producing multicarbide powder, such as WC + TiC solid solution, by introducing the individual elements into a molten bath of a noncarbide-forming metal such as cobalt or nickel. The multicarbide is formed above 2100 °C (3800 °F), slowly cooled in the dispersed condition in the Menstruum to room temperature, and finally won by chemical separation.

mer. The repeating structural unit of any polymer.

merchant mill (obsolete). A mill, consisting of a group of stands of three rolls each arranged in a straight line and driven by one power unit, used to roll rounds, squares or flats of smaller dimensions than would be rolled on a bar mill.

mesh. (1) The number of screen openings per linear inch of screen; also called *mesh size*. (2) The screen number on the finest screen of a specified standard screen scale through which almost all of the particles of a powder

sample will pass. See also *sieve analysis* and *sieve classification*.

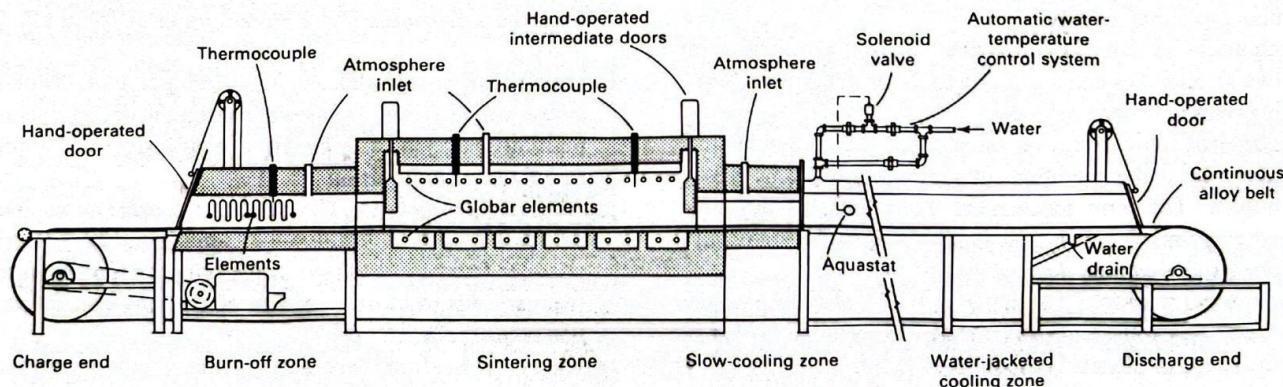
mesh-belt conveyor furnace. A continuously operating furnace that uses a conveyor belt for the transport of the charge. Mesh-belt conveyor furnaces consist of a belt-driven table, a burn-off zone, a slow-cooling zone, a final-cooling zone, and a discharge table (Fig. 324).

mesh size. (1) The opening(s) or size of opening(s) in a designated sieve or screen, hence the approximate diameter of particles below which they will pass through and above which they will be retained on the screen. Mesh sizes are given as number of wires per inch of standard screen construction, for example, Tyler or U.S.; these are translated by tables into equivalent particle diameters in inches (in.), millimeters (mm), or micrometers (μm). (2) The width of the aperture in a cloth or wire screen. See also *sieve analysis* and *sieve classification*.

mesophase. An intermediate phase in the formation of carbon from a pitch precursor. This is a liquid crystal phase in the form of microspheres, which, upon prolonged heating above 400 °C (750 °F), coalesce, solidify, and form regions of extended order. Heating to above 2000 °C (3630 °F) leads to the formation of graphite structure.

metal. (1) An opaque lustrous elemental chemical substance that is a good conductor of heat and electricity and, when polished, a good reflector of light. Most elemental metals are malleable and ductile and are, in general, denser than the other elemental substances. (2) As to structure, metals may be distinguished from nonmetals by their atomic binding and electron availability. Metallic atoms tend to lose electrons from the outer shells, the positive ions thus formed being held together by the electron gas produced by the separation. The ability of these "free electrons" to carry an electric current, and the fact that this ability decreases as temperature increases, establish the prime distinctions of a metallic solid. (3) From a chemical view-

FIG. 324



Longitudinal section of a mesh-belt sintering furnace