Chaplets, long part of the metalcaster's trade, are metal spacers that support cores in a manner illustrated by Fig. 1. They are used when the casting design makes it impossible to provide adequate core prints or when the core is likely to sag, float or shift position as molten metal enters the mold.

Chaplets are made of mild steel, sheet or cast metal. They are tin-coated (hot dipped or electroplated) to prevent their oxidation and subsequent contamination of the melt. Uncoated high nickel alloys also are used to produce chaplets.

Chaplet Types

Chaplets are available in a wide variety of sizes and shapes, as shown in Fig. 2, because their configurations must cover such a diverse set of mold designs. Basically, they can be categorized as being either studs or perforated chaplets.

Studs—Though many variations are available, studs fall into three main types:

- Plain studs are held in place by gluing or by the forces exerted between mold and core or core and core;
- pin studs are held secure by piercing the mold with a projecting pin;
- multiple studs are used to support long and heavy cores.

Stud heads can either be plain or perforated and stems can be plain or grooved. Perforated heads and grooved stems facilitate fusion and are recommended for pressure-tight castings. Head diameters and stem thicknesses are functions determined by the area and weight of the core to be supported. Chaplet sections should not be so thin that they prematurely melt, bend or sag when metal is poured around them, or so thick that they prevent adequate fusion.

Perforated chaplets—These are box-shaped, bridged or unbridged fabrications. The bridged chaplets are stronger than the unbridged using an additional center support for use with heavier cores.

Potential Problems

Unless adequate care is taken with the selection and use of chaplets, the following problems may be experienced:

Lack of fusion—This condition is caused by using a chaplet that is too heavy in cross section or by too low a pouring temperature, both conditions that can cause leakage in pressure-tight castings and reduced load-bearing capacity.

Premature fusion—Chaplet collapse caused by premature fusion can be prevented by avoiding unnecessarily high pouring temperatures.

Biowholes—The presence of moisture or rust on the surface of a chaplet will invariably cause casting biowholes. They can be avoided by:

- keeping chaplets warm and dry;
- not putting cold chaplets into warm sand molds, a combination that causes condensation to form on the metal;
- using dry compressed air to clean out mold cavities;
- examining for and discarding damaged or rusty chaplets.

Undesirable graphite—This can be found in a casting in the vicinity of the chaplet if the chaplet coating contains lead.

References


For a free copy of this article circle No. 312 on the Reader Action Card.