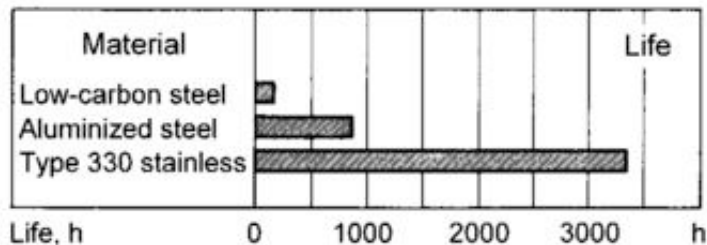


## Pack Carburizing

### Carburizing Containers

**Materials.** Carburizing containers are made of carbon steel, of aluminum-coated carbon steel, or of iron-nickel-chromium heat-resisting alloys. Although uncoated carbon steel boxes scale severely during carburizing and have short lives (Fig. 7), they often are the most economical for processing odd lots and unusual shapes.



**Fig. 7 Service life comparison of three materials for containers for pack carburizing**

Aluminum coating can significantly extend the life of a carbon steel container, making this material potentially the lowest in cost per hour per unit weight carburized.

In the long run, heat-resisting alloys are the most economical container materials for carburizing large numbers of moderate-sized parts. However, because heat-resisting alloys are considerably higher in initial cost than plain or aluminum-coated carbon steel, they must be used continuously if they are to approach the lowest possible prorated cost.

**Design and Construction.** For containers of all three materials, the trend has been toward lighter construction from sheet or plate, rather than the heavier cast construction. These lighter containers require ribbing, corrugating, or other bracing methods to make them rigid enough to withstand long periods at high temperature. Containers often are equipped with braced lifting eyes or hooks, special lid-receiving sections, and test-pin openings.

A carburizing container should be no larger than necessary. If possible, it should be narrow in at least one dimension to promote uniform heating of the contents. A properly designed box will provide a cooling rate high enough to minimize formation of a carbide network in the case but low enough to avoid distortion or excessive hardening.

**Lid Construction.** Lids for carburizing containers vary from simple sheet-metal plates to built-up lids of metal and refractory material. The lid may add rigidity to the container. It must be tight enough to prevent air from entering and burning the compound, yet not so tight as to prevent easy expulsion of excess gas generated within the container. Lids must be capable of venting the container, and the venting means must be able to withstand the intense heat liberated by combustion of flammable gas. Lids that fit too loosely can be partly sealed with clay-based cements.

**Conditioning.** Before new alloy carburizing containers are placed in service, they may be conditioned by “precarburizing” without a load. This pretreatment eliminates the possibility of the container, rather than the work load, being carburized during the first production carburizing cycle.