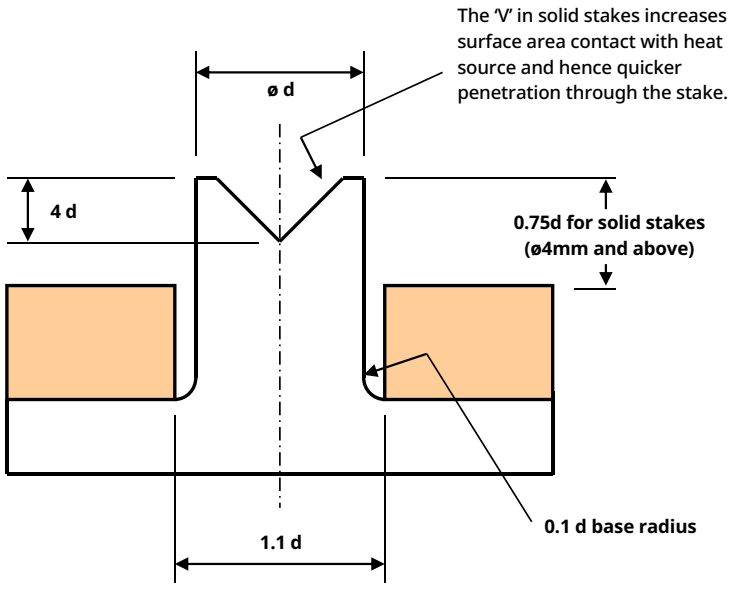
Branson™ PulseStaker

Stake Design Guideline

Gain greater design freedom through high-quality joins and superior aesthetics.

Solid Stake Design

- Allow a clearance hole of 10% for solid stakes.
- Allow minimum allowance of up to 2.5Ø head diameter. Domed and cap head forms are most common.
- Avoid a square transition between substrate and stake base as this will provide a stress propagation area and premature failure. Always incorporate a small radius or radius undercut.
- Splines may be incorporated in the stakes to provide positive location before processing. This is particularly beneficial in long, narrow or large assemblies that are pre- assembled “off machine”.
- The ‘V’ feature generally applies to stakes of between 3mm diameter and above. The smaller sizes will not benefit unless they are moulded from high temperature polymers or heavily filled materials.



Stake	'V' depth	Exposed stake height	Hole Clearance ø
1 mm	Not applicable	1.7 mm	1.1 mm
2 mm	Not applicable	2.4 mm	2.2 mm
3 mm	1.2 mm depth 'V'	2.7 mm	3.3 mm
4 mm	1.6 mm depth 'V'	3.0 mm	4.4 mm

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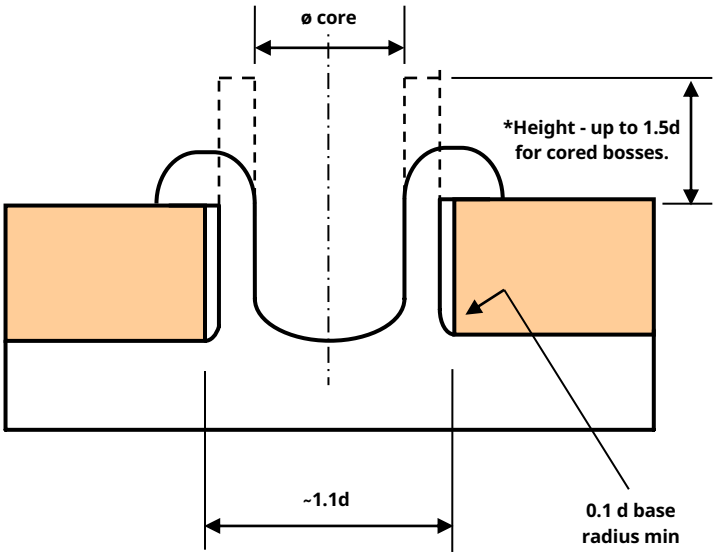
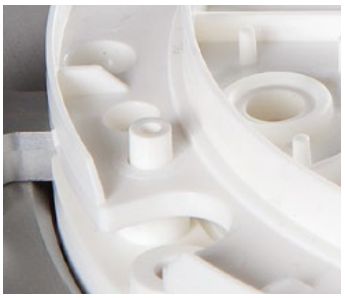
Cored Boss Design

- Allow a hole clearance between 10% and 15% for cored bosses.
- Allow an exposed height of up to 1.5Ø for cored bosses.
- Avoid a square transition between substrate and the base of the boss as this will provide a stress propagation area and premature failure. Always incorporate a small radius or undercut.
- Splines may be incorporated in the bosses to provide positive location before processing. This is particularly beneficial for long, narrow or large assemblies that are pre-assembled "off machine".
- Bosses of 5mm diameter and above are recommended as these reduce the heat energy required to soften the material, the thin wall sections avoid "A" surface sink marking and are generally more stable during processing.
- Large polypropylene parts for example: vehicle interior door finishers, IP's and other trim assemblies are items particularly suited to multiple boss assembly as often large hole clearances and expansion slots through which the bosses pass through are required, the larger head thereby providing increased contact area to the mating surface.





Before

After

Boss ø	Core ø	*Exposed boss height	Hole Clearance ø
5 mm	3.5 mm core	7.5 mm	5.5 mm
6 mm	4.5 mm core	8.5 mm	6.6 mm
8 mm	6.0 mm core	14.0 mm	8.8 mm
10 mm	7.5 mm core	16.0 mm	11.0 mm
12 mm	9.0 mm core	18.0 mm	13.2 mm

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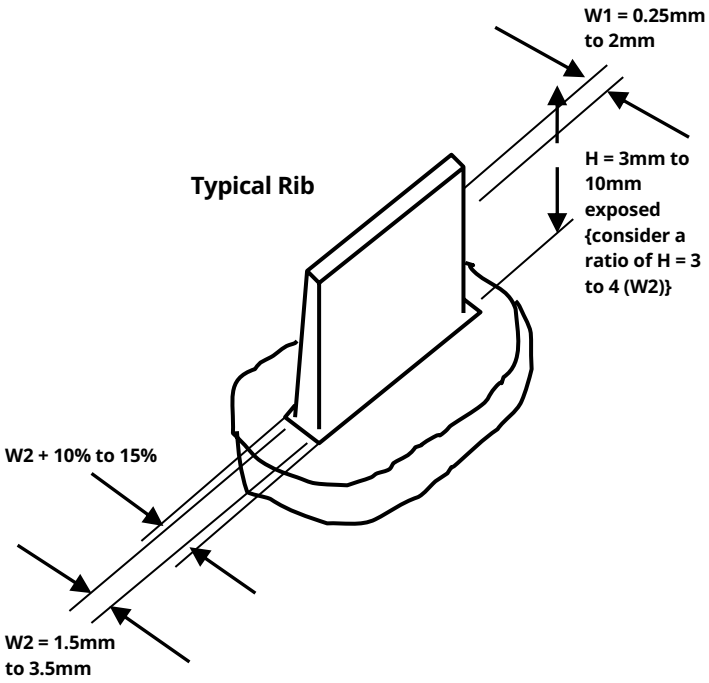
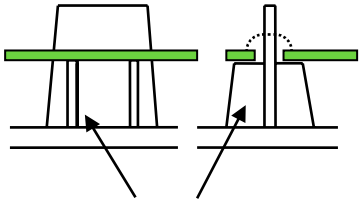
Rib Design

- Ribs are beneficial where space is limited, for example narrow flanges or channel sections. They can be projected as trapezoidal forms or from curved surfaces "in line of draw" in order to simplify design.
- The base thickness of a rib assembly should be minimal – generally no more than 0.6 of the substrate thickness in order to avoid sink. It is always longer than its width in order to remain upright and stable during reforming. Slot clearance should also be minimal in order to avoid excessive material being lost into the space instead of forming the head.
- Avoid a square transition between the substrate and the base of the rib as this will provide a stress propagation area and premature failure. Always incorporate a small radius or radius undercut.





Stand - off features

Surface Rib after staking

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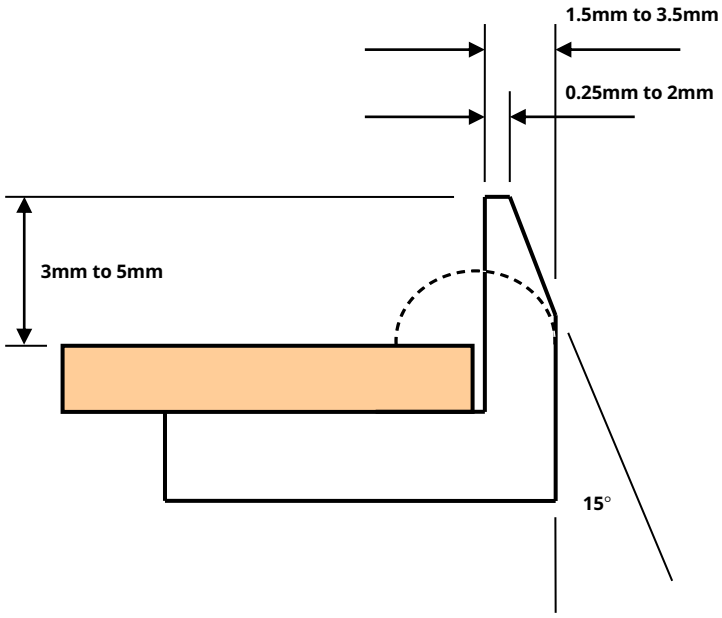
Radial / Lip Form Design

Radial or Lip forming is a way of tightly captivating parts for example - thin metals , thin ceramics, washers, inserts, spring steel, glass/acrylic lenses or PCB's to a base moulding.

The section opposite shows a typical moulded section which can be either a raised rib or radial form. The PulseStaker tooling would advance vertically onto the section.

The outer angled face allows the tooling to bias the polymer inwards to captivate the part. It also minimizes puckering of the plastic on the outer edge ahead of the descending tooling.



The unique heat staking process provided by the Branson GPX platform offers manufacturers a broad range of benefits, such as superior product aesthetics and reduced energy use.

The information provided in this document is for guidelines purposes only, before using any of this information for design purposes consult a Branson Representative.