

## Mould Tapers for Rounds

### Question

For a round section of 200 mm diameter on a billet caster, what is the correct mould taper for carbon steel grades with C > 0.5 % ? Is it necessary to have different mould tapers for carbon less than 0.5 % and carbon greater than 0.5% or will it be possible to use the same mould taper for all grades of steel ?

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### Answer

The mould taper used on round moulds is normally a very heavy single taper. For smaller moulds the taper can be as low as 1.2% and for larger moulds the taper can be as high as 1.6%. These tapers are traditional and have little regard for the contraction rates of steel being cast. What makes these tapers effective are the use of powder lubrication and the circular shape of the mould.

The taper at the top of the mould is less than the actual contraction conditions but the use of powder lubrication ensures a coupling between the shell and the mould. This allows the shell to grow uniformly and prevents any longitudinal cracks from forming.

At the bottom of the mould the taper is far too high but as the binding load is uniformly distributed about the mould perimeter, which will not happen on a rectangular mould, the binding load per unit length of perimeter is less than that needed to cause transverse cracks. The loading again ensures the uniform shell growth.

At a constant casting speed the thermal load on a mould is constant above 0.18 % C, so a common taper can be used for all carbon levels above this figure. There is a significant reduction in heat transfer below 0.18 % C with a minimum at about 0.12% C. The heat transfer reduction is about 40 % when oil casting and about 20 % for powder casting. As the steel shell is not very taper sensitive when casting rounds, the same taper as used above 0.18% C will work for lower carbon grades. If any excessive binding occurs when casting steels under 0.18% C, dropping

the mould level or using an older mould with wear at the bottom will eliminate the problem.

This answer was provided courtesy of Don Lorento, General Manager ACCUMOLD, 7B New Brunswick Crescent, Huron Park, Ontario, Canada, N0M 1Y0 who can be contacted directly at [admin@accumold.com](mailto:admin@accumold.com) or via fax at +1 (519) 228-6739.

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