



# PYROTEK R3 CONTINUOUS CASTING TIPS

## CONTINUOUS SHEET CASTING FOR TWIN-ROLL CASTERS

Pyrotek R3 continuous casting tips are made from ceramic fibres bonded with an inorganic silica binder. Casting tips are used to produce high quality, continuous cast aluminium sheet. The tips are used on all twin-roll caster types and are dimensionally stable, thermal shock resistant and do not cause outgassing. The tips have progressive zone density, reduced porosity and moisture absorption, and increased mechanical strength and durability compared to the former standard material.

Pyrotek R3 tips can be up to 2413 millimetres (95 inches) wide, eliminating the cemented joint requirement. Single-piece caster tips have increased strength, dimensional accuracy and smooth interior and exterior surfaces. The tips have a hard exterior surface, and a soft fibrous inner core that creates excellent dimensional stability and low thermal conductivity. Custom-made assembled tips can be provided ready to insert into the caster tip base. Internal designs can be modified to meet project requirements.

The material is also used to create inside spacer boards and baffles. The standard inside board dimensions are 1016 millimetres wide x 228.6 millimetres high x 15–22 millimetres thick (40 inches x 9 inches x 0.6–0.8 inches). The thickness depends on the caster tip's orifice opening size. Individual baffles, end risers and base strips can be modified to meet project requirements. End dams, made from layers of ceramic fibre paper or machined calcium silicate board, can be designed to meet the caster setup's project tip profile.

During use, the tip sections must be lined with ceramic fibre paper or coated with ZYP Boron Nitride Lubricoat® to prevent reactions between molten aluminium alloys and the tip material.

### COMPOSITION

Material	Approximate Percentage of Weight
SiO <sub>2</sub>	66%
Al <sub>2</sub> O <sub>3</sub>	32%
Na <sub>2</sub> O	0.5%
Other	1.5%

### BENEFITS

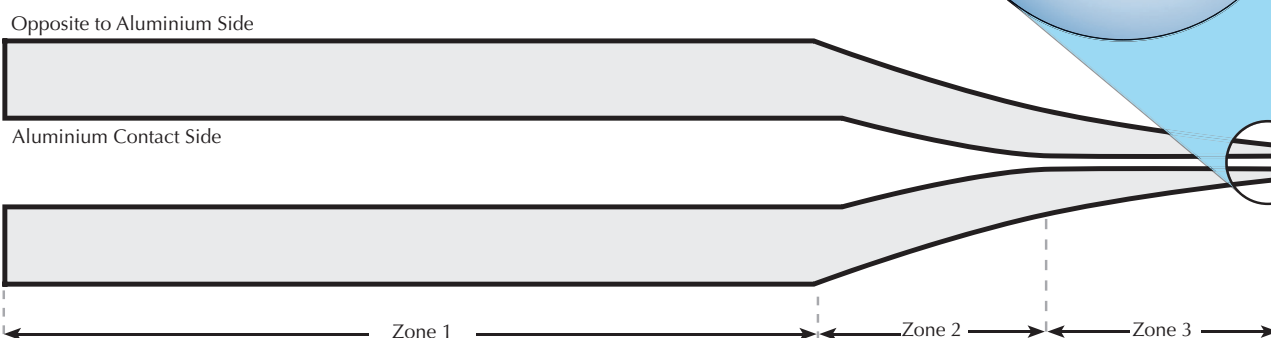
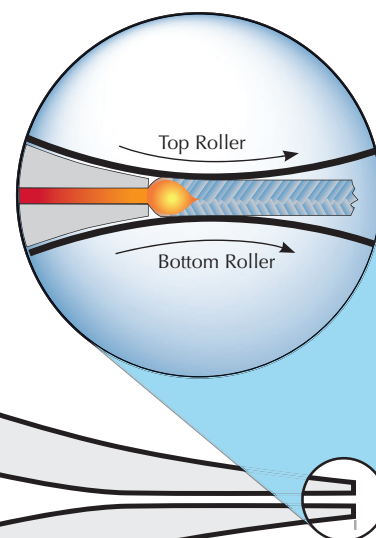
- Custom-developed, premium-grade ceramic paper
- Dimensionally stable
- No thermal shock
- Produces no outgassing
- Preheating recommended, but not required
- Premium-grade raw materials
- Reduced porosity
- Increased mechanical strength
- Reduced moisture absorption
- Higher density orifice ends
- Improved appearance

### PHYSICAL PROPERTIES—ZONE 1

Property	Value
Continuous Service Temperature	1093°C (2000°F)
Maximum Service Temperature	1260°C (2300°F)
Density—kg/m <sup>3</sup> (lb/ft <sup>3</sup> )	657 (41)
Modulus of Rupture—MPa (psi)	4.72 (685)
Compression Strength—MPa (psi)	1.72 (250)
Thermal Conductivity W/m·K (BTU·in/ft <sup>2</sup> ·hr·°F)	
at 315°C (600°F)	0.12 (0.83)
at 538°C (1000°F)	0.15 (1.04)
at 760°C (1400°F)	0.19 (1.32)



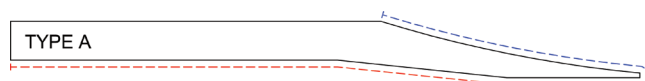
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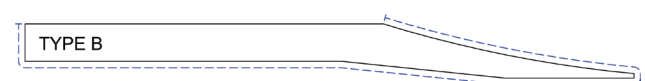
Pyrotek offers four types of protective coatings and linings to prevent molten aluminium from attacking the tip material silica content. In the following diagrams, premium ceramic paper is indicated with the red-dashed line and boron nitride (BN) Lubriccoat is shown as a blue-dashed line. The paper is custom developed, contains less shot, has more consistent density and improves surface quality.

### Ceramic Paper

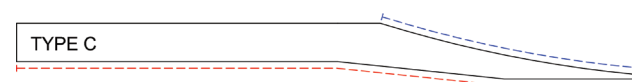
**TYPE A**—Apply ceramic paper to the entire tip section surface on the metal contact area. Apply BN Lubriccoat to the orifice end and at least 50 millimetres (2 inches) up the radius. Do this for all vertical and tilt caster tip sections, and for horizontal casters that feed through a narrow headbox opening.



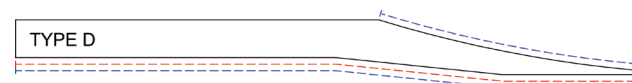
**TYPE B**—Apply BN Lubriccoat to the tip section's metal contact surface, base end and orifice end and at least 50 millimetres (2 inches) up the radius. Do this for all horizontal caster tip sections that feed into the tip using a wide tundish. Do **NOT** use ceramic paper on horizontal casters that feed through a wide tundish, as the metal can flow between the paper lining and the tip section causing the paper to pull away from the tip section and clog the orifice opening. Do **NOT** use BN Lubriccoat on the entire metal contact surface of tilt or vertical casting tips.



**TYPE C**—Line the tip section's metal contact surface with ceramic paper up to the final 25–50 millimetres (1–2 inches) of the orifice end. Apply BN Lubriccoat to the metal contact surface, orifice end and at least 50 millimetres (2 inches) up the radius.



**TYPE D**—Line the tip section's metal contact surface with ceramic paper, then spray BN Lubriccoat on the paper to form an additional barrier. Also apply BN Lubriccoat to the orifice end and at least 50 millimetres (2 inches) up the radius.



NOTE: Additional surface finish options are available on request.

Lubriccoat® is a registered trademark of ZYP Coatings, Inc.

