

# PRIMCOTE® BINDER

## High Performance, Industry Leading Binder

Developed to optimize ceramic shell slurries, Primcote binder is the investment casting industry's leading colloidal silica based primary binder. Primcote binder was formulated to eliminate buckling, lifting and cracking of primary shell coats.



Primcote binder allows faster drying of primary coats with lower humidity and/or increased air circulation. Shell coats using Primcote binder can not be over dried as shell coats using standard colloidal silica can.

Primcote binder contains a wetting agent, an antifoam agent and a color indicator to monitor shell dryness, as well as several other proprietary ingredients. Primcote binder is compatible with conventional refractory materials and shell room equipment.

Whether casting simple or complicated parts, Primcote binder is the industry's primary binder of choice.

## Typical Material Properties\*

Base Composition	Colloidal Silica
Other Composition	Proprietary
Total Solids Content (Including SiO <sub>2</sub> )	30.0%/weight
Particle Size (Approximate)	10 nm
pH at 77 ° F (25 ° C)	10.6
Specific Gravity	1.18
Weight / Volume	9.85 lbs/gal (1.18 kg/l)
Na <sub>2</sub> O Content (Weight)	0.48%
Particle Charge	Negative
Color with ReDip™ indicator	Greenish Yellow
Color without ReDip indicator	Milky White

\*These results are based on the testing methods, frequency and procedures of Ransom & Randolph or its approved suppliers. The levels referenced herein are only for general guidance and do not constitute a firm specification.



## RANSOM & RANDOLPH

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## Formulations

If you currently have a primary slurry formulation, use the same percentages and loadings of your current refractories. The following formulations are for casters just starting out.

Intended Slurry Use	Target Slurry Density (g/ml)	Target Viscosity (sec)**	Formula for 10 Gallons (lbs)			Formula for 10 Liters (kgs)		
			Primcote binder	Ranco-Sil™ 4 fused silica	Zircon (-200 mesh)	Primcote binder	Ranco-Sil 4 fused silica	Zircon (-200 mesh)
Ferrous	2.99-3.03	16.5-18.5	43.9	—	206.7	5.28	—	24.85
Non-Ferrous	1.69-1.73	21.8-27.1	47.0	95.4	—	5.65	11.47	—

\*\*Viscosity measured using through the hole method with a #5 Signature Zahn cup.

## Application Recommendations

1. Remix the Primcote binder prior to use to ensure a homogeneous blend of material.
2. For best results, weigh all ingredients when making up a new slurry or making additions to an existing slurry.
3. When building the slurry, add the refractory last. If more than one refractory is used, add the lowest density refractory first: fused silicas (2.2 g/cc), aluminosilicates (2.7 g/cc), zircon (4.5 g/cc). Add refractory slowly for best results.
4. New and makeup slurries must be prepared with a propeller mixer, not in a rotating tank. This ensures proper dispersion of the refractory particles. The propeller mixer must be of adequate HP and RPM. Excessive mixing action can introduce air into the slurry and cause erratic viscosity and/or bubbles in the slurry coat.
5. As with any slurry, the viscosity of the slurry must be stable before use. A stable viscosity is one that does not change by more than 1 second when checked at 1 hour intervals. Viscosity can be increased by adding more refractory and decreased by adding more binder.
6. It is required to replace water lost to evaporation. When water is needed (based on test results for viscosity and/or binder solids), use distilled or deionized water as opposed to tap water, which can contain contaminants that can negatively affect slurry life.
7. Antifoam, wetting and bactericide agents are already formulated into Primcote binder and other additions may not be compatible. Contact R&R's technical team before making these additions to the slurry.
8. Patterns must be clean and free from silicones or other contaminants before dipping.
9. It is not usually necessary to use a prewet before applying the first primary coat to the wax pattern. If a prewet is needed, use Primcote binder only.
10. If a prewet is needed between coats, the Primcote binder should be diluted to 26% binder solids (binder to water ratio of 5.8:1 by volume, 6.9:1 by weight). Drain the prewet well so that no pockets of liquid are left on the pattern.

## Slurry Control Procedures

Slurry Control Worksheets are available for download at [www.ransom-randolph.com](http://www.ransom-randolph.com). Slurry Control Worksheets allow you to input data directly and help you calculate values.



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## Slurry Testing Frequency

R&R recommends running the following tests accordingly.

Slurry Test	Recommended Testing Frequency
Slurry Viscosity	Two Times Per Shift
Binder Solids	Two Times Per Week
Binder pH	Weekly

## Target Binder Solids Range

The target binder solids range for Primcote binder is 28.8-30.8% by weight.

Specific Gravity	Binder Solids	Specific Gravity	Binder Solids	Specific Gravity	Binder Solids
1.160	26.8	<b>1.173</b>	<b>28.8</b>	1.186	30.9
1.161	27.0	<b>1.174</b>	<b>29.0</b>	1.187	31.0
1.162	27.1	<b>1.175</b>	<b>29.1</b>	1.188	31.2
1.163	27.3	<b>1.176</b>	<b>29.3</b>	1.189	31.3
1.164	27.4	<b>1.177</b>	<b>29.5</b>	1.190	31.5
1.165	27.6	<b>1.178</b>	<b>29.6</b>	1.191	31.6
1.166	27.7	<b>1.179</b>	<b>29.8</b>	1.192	31.8
1.167	27.9	<b>1.180</b>	<b>29.9</b>	1.193	31.9
1.168	28.1	<b>1.181</b>	<b>30.1</b>	1.194	32.1
1.169	28.2	<b>1.182</b>	<b>30.2</b>	1.195	32.3
1.170	28.4	<b>1.183</b>	<b>30.4</b>	1.196	32.4
1.171	28.5	<b>1.184</b>	<b>30.6</b>	1.197	32.6
1.172	28.7	<b>1.185</b>	<b>30.7</b>	1.198	32.7

## Safety

OSHA-approved respiratory protection should always be worn to avoid inhalation of respirable silica dust, which can result in an irreversible lung disease, silicosis. Such exposure includes slurry makeup, casting, knockout and cleanup. Refer to SDS for specific details.

## Storage & Handling

Keep from freezing. Primcote binder must be maintained above 35°F (2°C) to prevent the material from precipitating irreversibly and making the product unsuitable for use. Binder stored in transparent or translucent containers should be sheltered from direct sunlight. Shelf life is 1 year from date (MMDDYY) in batch lot number on label. Rotate stock to maximize shelf life.



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## Technical Tips

For additional information and recommendations, refer to the Shell Building, Slurry Control, Autoclaving, FlashFire Dewax Method and Viscosity Cup Correlations Technical Tips available for download at [www.ransom-randolph.com](http://www.ransom-randolph.com).

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