

# LEVASIL® COLLOIDAL SILICA

Levasil colloidal silica is an alkaline, aqueous dispersion of microfine colloidal silica that is approximately 30% solids by weight. The silica sol is sodium stabilized and the amorphous silica particles carry a negative surface charge. The particles are discrete, have a slightly rough, spherical shape, and are present in a narrow particle size distribution. The physical appearance of the sol is a translucent liquid, slightly more viscous than water.

Levasil colloidal silica is a standard slurry component and can be used in either primary or backup slurries. Akzo Nobel manufactures Levasil colloidal silica at plants throughout the world. These colloidal silica binders are known for their consistency and quality, batch to batch and plant to plant.

## Typical Material Properties\*

	Levasil F0830 colloidal silica	Levasil F01430 colloidal silica
Silica (Weight %)	30	30
Specific Surface Area (m <sup>2</sup> /g)	305	250
pH	10.5	10.0
Viscosity (cP)	7	5
Density (g/cm <sup>3</sup> )	1.2	1.2
Na <sub>2</sub> O (Weight %)	0.4	0.6

\*Akzo Nobel has determined test method and provided analysis as noted herein. The levels referenced herein are only for general guidance and do not constitute a firm specification.

When using standard colloidal silica in a slurry for investment casting, it may be necessary to make additions to the binder in order to achieve the required slurry properties. These additions include wetting agent, antifoam and drying indicators.

## Formulations

The formulation implemented will vary from foundry to foundry. This flexibility allows the foundry to obtain the maximum number of benefits from Levasil colloidal silica.

For specific slurry formulations, please call our Technical Department at 800.800.7496 to discuss your specific application and to obtain the proper formulation to fit your needs.

## Application Recommendations

1. For best results, weigh all ingredients when making up a new slurry or making additions to an existing slurry.
2. 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.
3. 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.
4. 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.
5. 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.
6. Contact R&R's technical team before making any additions of antifoam, wetting or bactericide agents to the slurry.



## RANSOM & RANDOLPH

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## 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.

## Slurry Testing Frequency

R&R recommends running the following tests accordingly.

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

## Target Silica Solids Range

The target silica solids range for Levasil colloidal silica is 24.1-25.9% by weight.

Specific Gravity	Silica Solids	Specific Gravity	Silica Solids	Specific Gravity	Silica Solids
1.143	22.0	<b>1.158</b>	<b>24.1</b>	1.173	26.1
1.144	22.2	<b>1.159</b>	<b>24.2</b>	1.174	26.2
1.145	22.3	<b>1.160</b>	<b>24.3</b>	1.175	26.3
1.146	22.4	<b>1.161</b>	<b>24.5</b>	1.176	26.5
1.147	22.6	<b>1.162</b>	<b>24.6</b>	1.177	26.6
1.148	22.7	<b>1.163</b>	<b>24.7</b>	1.178	26.7
1.149	22.8	<b>1.164</b>	<b>24.9</b>	1.179	26.9
1.150	23.0	<b>1.165</b>	<b>25.0</b>	1.180	27.0
1.151	23.1	<b>1.166</b>	<b>25.1</b>	1.181	27.2
1.152	23.2	<b>1.167</b>	<b>25.3</b>	1.182	27.3
1.153	23.4	<b>1.168</b>	<b>25.4</b>	1.183	27.4
1.154	23.5	<b>1.169</b>	<b>25.5</b>	1.184	27.6
1.155	23.6	<b>1.170</b>	<b>25.7</b>	1.185	27.7
1.156	23.8	<b>1.171</b>	<b>25.8</b>	1.186	27.8
1.157	23.9	<b>1.172</b>	<b>25.9</b>	1.187	28.0



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## Storage & Handling

Levasil colloidal silica should be transported and stored at a temperature of 40-120°F (5-50°C). Protect from freezing. If the silica dispersion is allowed to freeze, the silica will irreversibly precipitate. For bulk storage, the tank should be sealed and constructed of plastic, fiberglass reinforced plastic, or stainless steel. For packaged goods, any translucent packages should be stored out of direct sunlight or bright light. Under recommended conditions, Levasil CS40-316 LSP has a shelf life of at least eighteen months after production.

## 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. See SDS for more information.

## Technical Tips

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

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