# P-SS & P-SF

## CEMENTING SERVICE BULLETIN

01/2918

**P-SS & P-SF (PETROCHEM-SILICA SAND & PETROCHEM-SILICA FLOUR)**

**TECHNICAL DATA**

**P-SS and P-SF** are divided Silica Sand products used to prevent strength retrogression and the associated increase in permeability that occurs in set Portland cement at high temperatures. These silica products stabilize cement systems for use not only in deep, high temperature wells but also in slurries that are used in cementing geothermal wells or where thermal recovery methods will be used at some time in the future.

The difference in these materials is their mesh size. P-SS is the coarser material having a particle size between 70 and 200 mesh. P-SF has a particle size of approximately 325 mesh.

**PROPERTIES**

| MATERIAL | FORM | SP. GR. | ABSOLUTE VOLUME |
|---|---|---|---|
| P-SS | Light Colored Powder | 2.63 | 0.0456 gal/lb. |
| P-SF | White Powder | 2.63 | 0.0456 gal/lb. |

**SAFETY**

Eyes: If eye contact occurs, flush the eyes with water for at least five minutes. If irritation persists, get medical attention.

Skin: Normal cleanliness should prevent irritation.

Inhalation: Use approved **OSHA** dust masks. As breathing this material is dangerous, if overcome move to fresh air.



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## DISCUSSION

In most cases, there are only minor differences in the properties of the final set cement containing P-SS and cement containing P-SF. In general, P-SS is preferred where dust would be a problem or where a dense, low-water slurry is to be prepared. P-SF is advantageous in preparing low-density slurries where settling might be a problem. At well temperatures above 300°F P-SF is preferred for:

1. Regulated Fill-Up Cement Slurries.
2. Salt cements containing more than 10% sodium chloride by weight of water.
3. Slurries containing the liquid fluid-loss additive P-FLAL.
4. Slurries prepared with cements having a high Blaine number (fine grind), such as Class C. Initial compressive strengths may be greater where P-SF is used, but long term strengths where P-SS is used will be very similar.

## CONCENTRATIONS TO USE

Tests have shown that approximately 35% silica **P-SS or P-SF** by weight of Portland cement produces optimum properties. Additional silica is not added for pozzolans, extenders or weighing agents that may be used in the slurry.

Some extenders contain sufficient silica to provide cement stability with less that 35% silica, however the minimum concentration of silica that shows any improvement in high-temperature stability is about 20%. The addition of 5 to 10% silica is often worse than no silica at all. Addition of more than 35 % silica merely acts as an extender for the cement. If for any reason less than 35 % silica must be added, then fine silica should be used. If more than 35 % silica is added, it is desirable to use P-SS since it will have the least effect on other properties.

## EFFECT ON SLURRY PROPERTIES

When **P-SS & P-SF** are used in Portland cement slurries with the recommended increase of water content, they have only a slight effect on other slurry properties.

The slight change in slurry weight is easily calculated.

The change in the thickening time, due to P-SS or P-SF, is slight. Thickening time tests should be run for static temperatures of 300°F or above. The tests should be performed before the job. Changes in millruns of cements and the use of other additives may have considerable effect.

With the recommended water addition, P-SS has little effect on either the viscosity or yield point. However, P-SF will slightly thicken the slurry.



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