

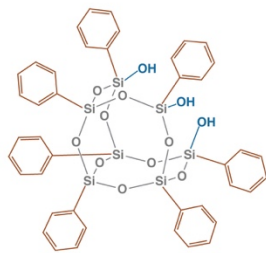
Thermoplastic Compounding with solid POSS[®] Additives

√ Compoundable Additive
 √ Flow Aid for Thermoplastics

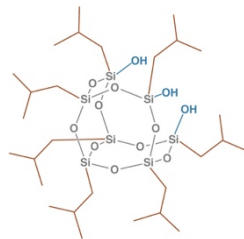
√ Thermal and UV Improvement
 √ Dispersant for Additives

Hybrid Plastics' sales and development teams work with each customer to ensure the best match of our proprietary Nanostructured[®] POSS[®] additives to meet application needs and budget.

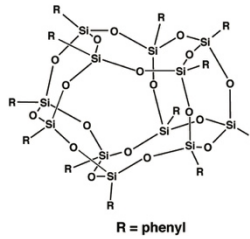
POSS[®] Molecular Silicas[®] such as MS0802, MS0825 possess non-reactive groups and are designed to be directly incorporated into thermoplastics via high shear mixing or compounding. POSS[®] trisilanols such as SO1458, SO1450, possess three reactive silanols and seven non-reactive groups and are designed to be directly incorporated into thermoplastics via high shear mixing or compounding. The silanol groups aid in dispersion of metal oxide and related ingredients.



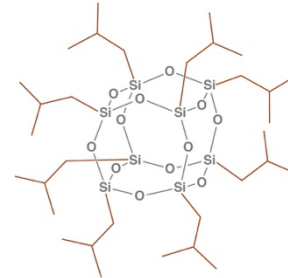
Trisilanol Phenyl
SO1458



Trisilanol i-Butyl
SO1450



Dodecaphenyl
MS0802



Octa i-Butyl
MS0825

As a starting point, we suggest adding 3 wt% of POSS relative to resin weight. Then depending on the level of rheological effect, decrease to 1 wt % (for less flow) or increase to 5 wt% (for more flow). Typical use levels range from 0.1 wt% to 3 wt% relative to resin.

Process to Follow:

1. Use a twinscrew extruder with intermeshing screws and two high shear mixing sections.
2. Dry resin prior to compounding following supplier instructions.
3. Dry POSS at 100 °C for 2 hr in a convection oven.
4. Add resin to a pellet feeder.
5. Add POSS to a powder feeder.
6. Adjust dosing rates from each feeder.
7. Feed POSS and resin pellets into the throat of the feeder.
8. Upon addition of POSS, notice the extruder torque value decreases from the addition of POSS.
9. Observe the clarity of the extrudate. When hot, the strand should appear clear or homogeneous in color.
10. Pelletize the strand.
11. Dry the pellets prior to use in molding operations.

Typical Compatible pairing of POSS with thermoplastic resins

POSS	Sampling of Compatible Resins
MS0825	MS0825 up to 3 wt% in PP, PE, PA6, PPE. This POSS will increase surface roughness and reduce extruder torque.
SO1450	SO1450 up to 5 wt% in PP, PE, PA6, POM. This POSS will increase surface roughness, hydrophobicity, and reduce extruder torque. Aids in dispersion
SO1458	SO1458 up to 3 wt% in PA6, PC, PMMA, PPS, PPE, PEEK, PEKK, PPS, PPSU. This POSS will reduce extruder torque and improve dispersion of fillers.
MS0802	MS0802 up to 3 wt% in PPS, PPSU, PPE, PEEK, PEKK, PFA. This POSS will reduce extruder torque and improve dispersion of fillers.