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YTO Binder

Yttrium Titanate Binder, Suspender, and Infiltrant

YTO Binder has a modest ability to suspend solids. The binder yields the very refractory $Y_2O_3 \cdot TiO_2$ (Y_2TiO_5 , Yttrium Titanate) compound with melting point of 1842 C ⁽¹⁾ and CTE of $8.77 \times 10^{-6}/C$ ⁽¹⁾ as the phase that bonds any added 'filler' solids added to the binder. Being pH-Acidic, this binder should only be used with powder solids that are stable in acidic medium. For example, if a TiO_2 'filler' is added at 32%, a good coating results. Examples [not all-inclusive] of powders which are expected to be compatible with the binder include Alumina, Zirconia, Ceria, Silicon Carbide, Silicon Nitride, Yttrium-Silicon-Aluminum Oxynitride (Y-SiAlON or Alpha SiAlON), Boron Nitride, and Titanium Nitride. YTO Binder has a long shelf life of over 12 months and is usable in all atmospheres to above 1700 C.

Key Attributes

- Forms very stable Yttrium Titanate bond
- Compatible with many 'filler' powders
- Good in all atmospheres, including air
- Minimal outgassing -- complete by 500 C
- Safe, water-based
- No cure needed

Ideal Uses

- Binder
- Suspender
- Infiltrant

Possible Fillers

- TiO_2 , Al_2O_3 , ZrO_2 , CeO_2 , SiC, Si_3N_4 , Y-SiAlON, BN, TiN
- Consider eutectics that lower the use temperature

Use Notes

1. Binder settles: resuspend before use.
2. Add refractory 'filler' ($<10 \mu m$) at 30 to 50%.
3. Mix by shaking or rolling.
4. Dilute with water if desired.
5. Apply coating to substrate, dry* (no cure needed), and place into use.

NOTE ALSO: If better suspension is desired, YTO binder can be mixed with HPC or YZ binder with little change in the final composition.

* Above ambient...suggest 60 C with dryer, hot air blower, or low velocity flame.

CAUTION: DO NOT CONTACT WET COATINGS WITH MOLTEN METAL.

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Specifications

Active Ingredients	Y_2O_3, TiO_2
Max Use Temperature	1700 C
Use Atmosphere	All
Fired Composition	Y_2TiO_5
Binder Phase	Yttrium Titanate
Hardness	Medium+
Liquid Carrier	Water
Water Resistance (after drying only)	Low
Ability to Suspend Solids	Low
Brookfield Viscosity (cps)	26 @1/60
Specific Gravity	1.35
Shelf Life (months)	>12
Coating pH	2
H F R Ratings	1-0-0
Substrate Use	All
% Volatiles	82

Reference

⁽¹⁾ C. E. Holcombe, M. K. Morrow, D. D. Smith, and D. A. Carpenter, "Survey of Low Expanding High Melting Mixed Oxides," Report Y-1913, Union Carbide Oak Ridge Y-12 Plant, Oak Ridge, Tennessee (1974)

Safety Information

- Consult SDS before use.
- Avoid breathing of spray/vapors.
- For Industrial Use only.

Sizes and colors

YTC Binder is white, milky liquid.
Standard Size: 1 gallon and 1 quart Nalgene containers.