

Waytop Microspheres

Cool Roof Coating/Insulation Paint Formula With Expanded Microspheres

T e c h n i c a l G u i d e

www.expandablemicrosphere.com



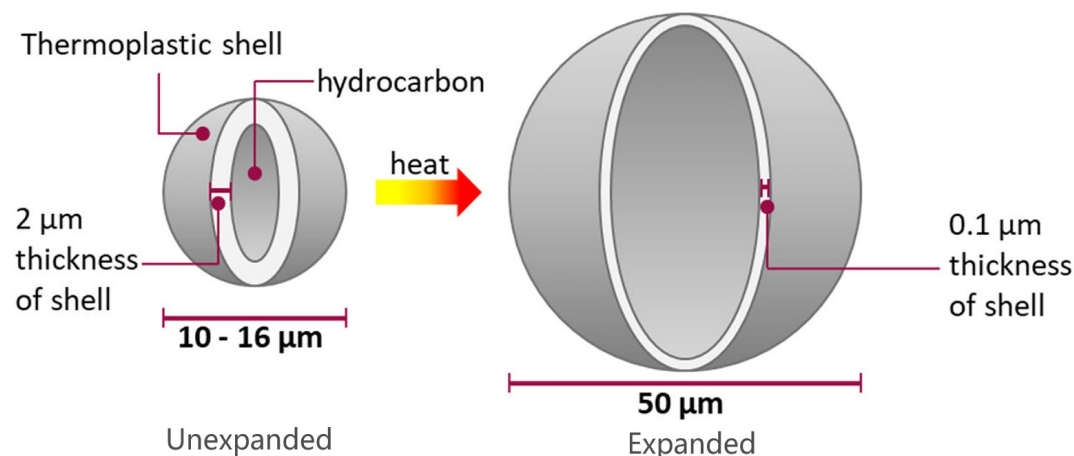
Subjects

- Introduction of Expanded Microspheres
- Benefits with Expanded Microspheres
- Properties of Paints with Microspheres
- Suitable Expanded Microspheres Grades
- Preparation of Paints with Microspheres
- Application of Paints with Microspheres
- Basic Formulations

Introduction of Expanded Microspheres

Expanded Microspheres is a super lightweight filler, which will add volume dramatically with small dosage in weight, without losing much of the original properties of your products. Our lightweight fillers allow you to substitute heavier substances with small portions of microspheres and achieve better overall results, saving raw material costs in the process..

- Extremely low density, 20kg/m³;
- Free-flowing white powder, hollow spheres;
- Thermoplastic polymer shell and hydrocarbon gas inside;



Benefits with Expanded Microspheres

Here are some benefits that can be achieved with microspheres:

- Density Reduction
- Thermal Insulation
- Good Filling Capacity
- Cost Reduction
- Higher Water Vapor Permeability
- Lower Water Absorption
- Matting Surface
- Low VOC Emission
- ...



Properties of Paints with Microspheres (1)

• Thermal Insulation

Expanded microspheres are hollow closed cells and encapsulated a large amount of gas. Microspheres create tiny air-filled voids within the paint, improving its thermal insulation property.



• Good Filling Capacity

The addition of microspheres increases the solid content per unit volume of the paint, resulting higher filling capacity of the paint and providing better coverage for cracks.



Properties of Paints with Microspheres (2)

• Weight Reduction

Due to the extremely low density of microspheres, the weight of the paints can be significantly reduced. By adding 5-10 percent by weight of wet expanded microspheres, a can of 20 kg of paint will reduce its weight to 10-15 kg.

• Cost Reduction

The weight reduction of paints saves workload, energy and transportation costs. Moreover, the low demand of microspheres for binders means saving the binder cost.



Properties of Paints with Microspheres (3)

• Higher Water Vapor Permeability

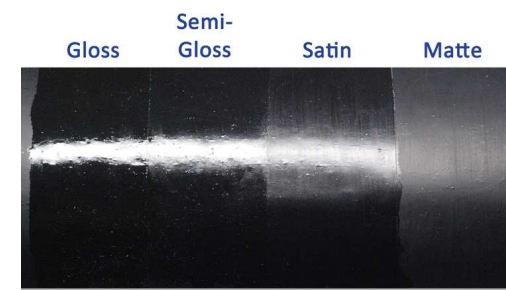
Paints with microspheres have higher permeability compared to the ordinary paints, which may extend the shell life of the paint.

• Lower Water Absorption

Paints with microspheres have lower water absorption compared to the ordinary paints.

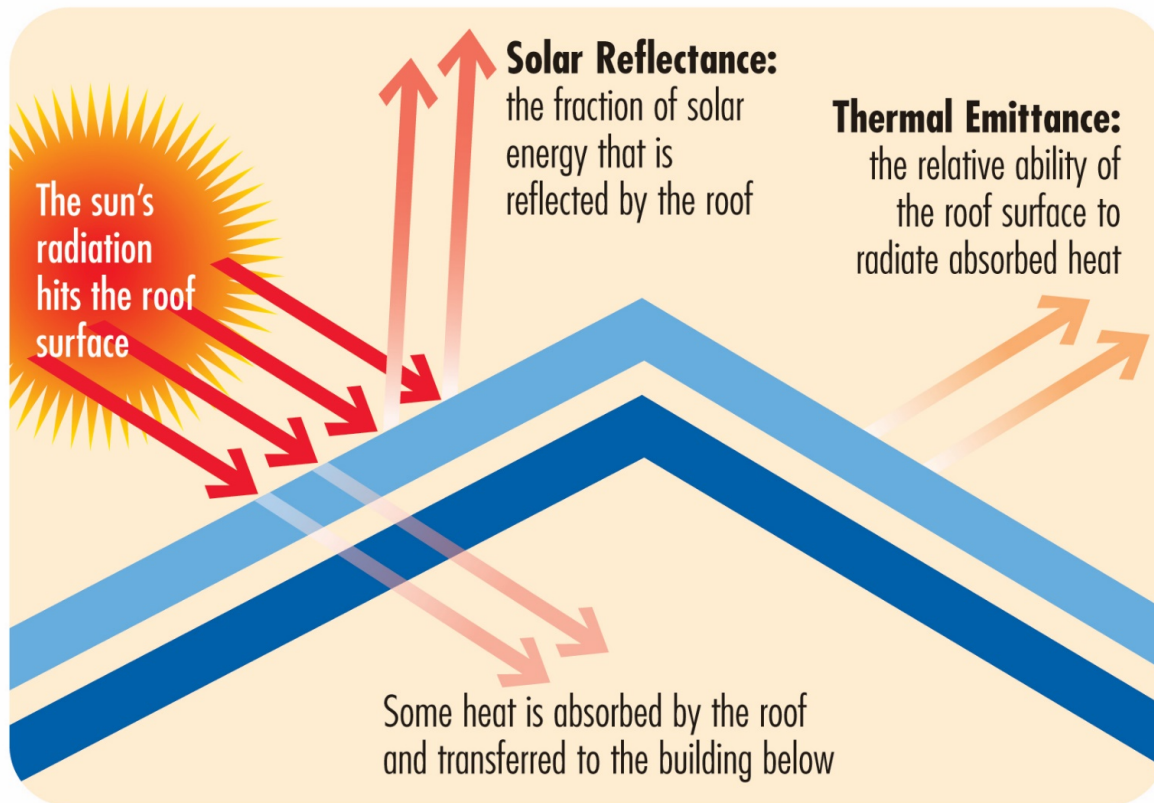
• Matting Surface

Adding a small amount of microspheres to the paint can achieve different matting surface with different particle size of microspheres.





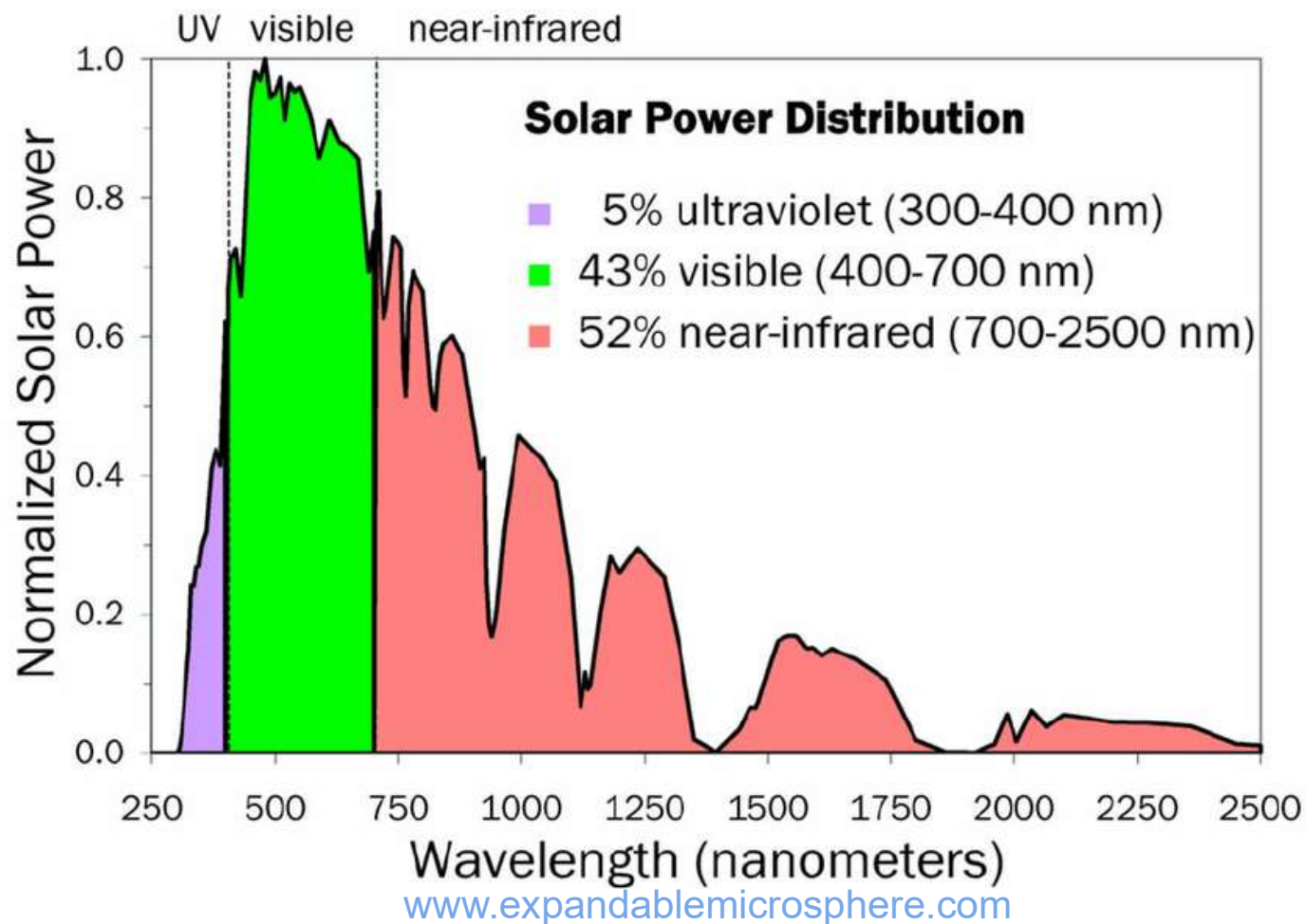
Reflectivity Properties of Paints with Microspheres



- The main effect of expanded microspheres is probably reflection rather than insulation. It is not enough to measure only insulating effects .
- “Closed packed units of gas filled spheres of diameter ~10-50 micron, makes up a very efficient NIR reflecting system.”



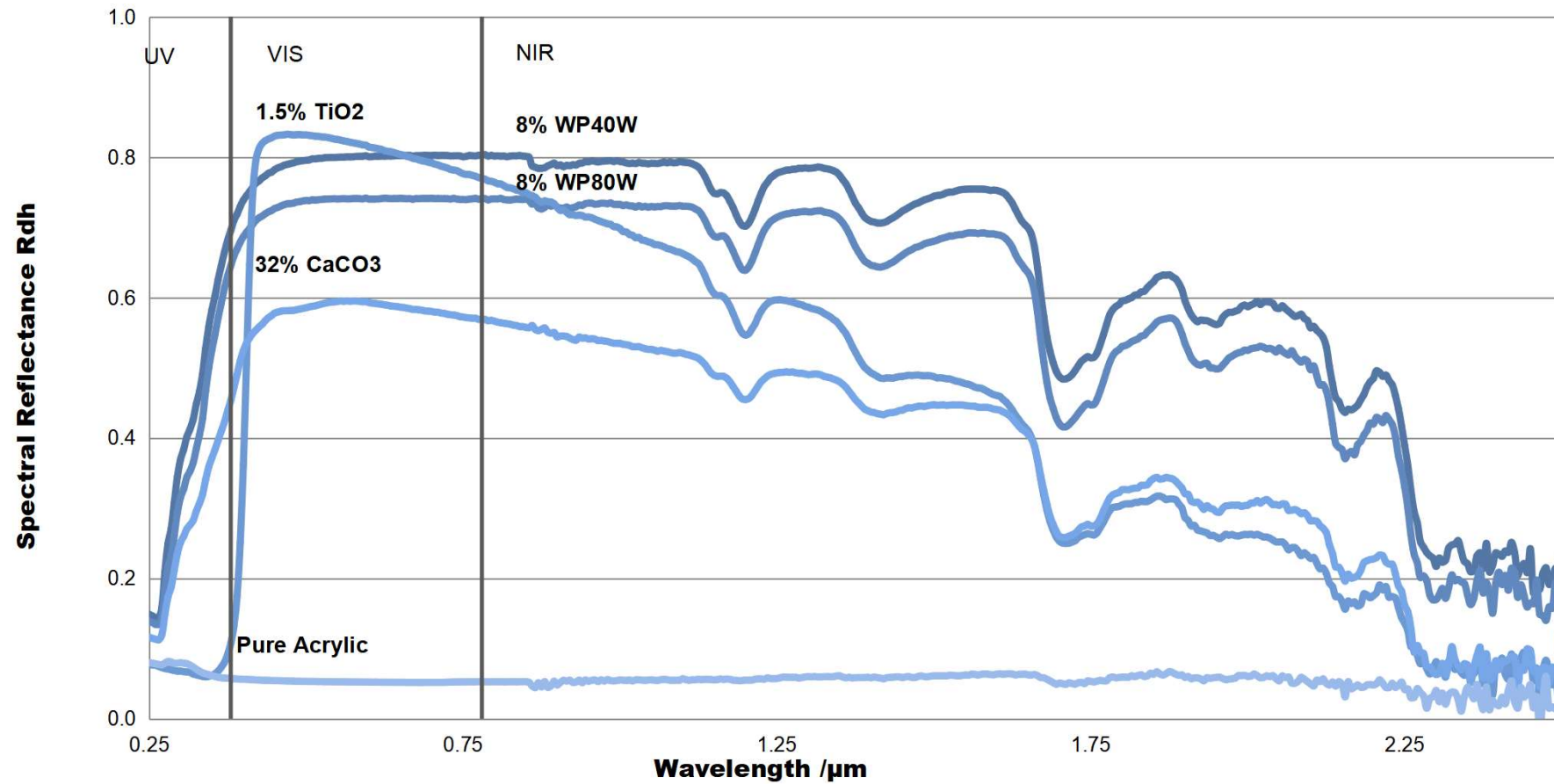
Reflectivity Properties of Paints with Microspheres





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Reflectivity Properties of Paints with Microspheres Directional-hemispherical reflectance 半球定向反射





Suitable Expandable Microspheres Grades

You can choose the suitable microspheres according to your needs. The following is several microspheres that can be used as additive to waterborne paints.

Grade	Average Particle Size (μm)	Solid Content (%)	Density kg/m^3 , Dry
WP20W	20-30	15 ± 2	30-40
WP40W	30-50	15 ± 2	20-30
WP80W	70-90	15 ± 2	15-25



Preparation of Paints with Microspheres

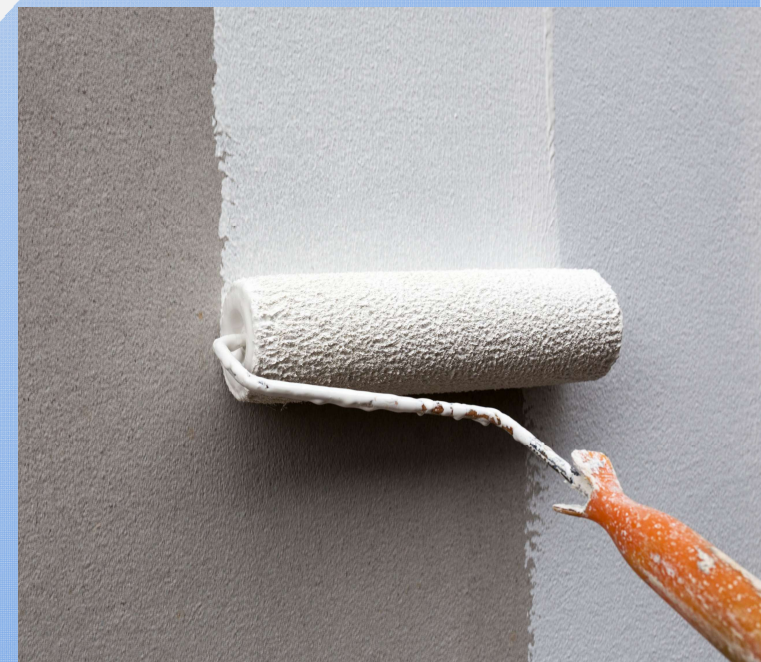


The preparation can be carried out through the following steps:

1. Choose appropriate mixing equipment such as dissolvers, disc mixers, or planetary mixers to disperse and mix the materials.
2. Disperse heavy fillers such as pigments and inorganic fillers in the equipment for a period of time.
3. Expanded microspheres should be added after step 2, and the stirring speed should be high enough to ensure that the microspheres are fully dispersed.
4. Add thickeners to adjust the viscosity.
5. Stir all materials evenly.

Application of Paints with Microspheres

- Paints with expanded microspheres can be used by rollers, brushes or even spray guns.
- Due to the low density, microspheres may float after a long-time of storage. Therefore, before using, the paints should be mixed evenly to avoid uneven application.
- It can be applied on surfaces such as concrete, wood, and metal plates.
- Microspheres can be used in interior flat paint, exterior house paint, texture paint, cool roof paint, etc.



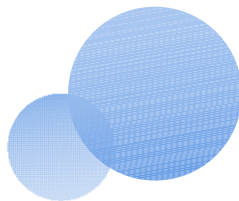
Guidelines to Modify Formulations

Below is a basic formulation.

Ingredients	Material	Parts by weight
Expanded Microspheres	WP40W	5.0~10.0
Water	Water	10.0~30.0
Emulsion	Acrylic	20.0~45.0
Dispersing agents	-	0.3~1.0
Pigment	TiO ₂	5.0~20.0
Fillers	CaCO ₃	10.0~20.0
Thickener	-	0.2~0.5
Defoamer	-	0.2~1.0

A small amount of the following additives can be added as needed:

- Preservative
- Opacifying Extender
- Wetting Agent
- Leveling Agent
- Antifreeze
- PH-adjuster
- Etc



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Thank You!

If you want to learn more, please contact us.

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