

Carbomer 940

The key to easy formulation of gels and suspension products.

INCI Name: Carbomer
Usage Rate: 0.25%-1%

Definition

Carbomer 940 is a polyvinyl carboxy polymer used as a viscosity enhancer, gelling agent, or suspension agent. Carbomer 940 is cross linked with ethers of pentaerythritol, and is used primarily in systems where sparkling clarity or a sharp viscosity response is required.

Description

Carbomer 940 can be used to thicken surfactant systems, and to create a suspension product. Viscosity actually has nothing to do with the ability of a product to suspend items such as jojoba beads or capispheres. For instance, a shower gel as thick as jello will allow the beads to either sink or rise...while a water thin product that contains Carbomer can suspend ball bearings. This is because the Carbomer forms a "Network" that suspends the beads very effectively.

It can also be used to create gel products very easily and cost effectively. And, Carbomer viscosity stands up to the incorporation of different fragrance and essential oils much better than surfactant thickeners. When surfactant thickeners are used, fragrance and essential oils can get into the middle of the micellar structure of the gel formed and interfere with it, having dramatic effects on surfactant systems. By contrast, the network created by Carbomer 940 is not influenced in such a way.

General Data

Shelf Life: 18 months when properly stored.
Storage: Store in a tightly closed container. Humidity controlled environment is necessary for storage, as Carbomer 940 is very hygroscopic.



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Specifications

Appearance:	Fine, White Powder
pH:	2.7 to 3.3 (0.5% Neutralized Solution)
Clarity:	80% Minimum (Neutralized Solution)
Carbon:	47.0 to 50.8%
Hydrogen:	5.0 to 6.2%
Equivalent Wt:	69-78
Loss on Drying:	2.0% Maximum
Characteristic:	Anionic

Usage Guidelines

NOTE: Adding hot water to Carbomer or to a gum such as Guar, causes only the outside of the granule to swell, and keeps the molecule from hydrating. This causes what is known as “fisheyes” or floating swollen granules in the product. The action of the ingredient (such as conditioning or thickening) will not be active if this occurs.

1. Hydrating the Carbomer: As with gums, Carbomer 940 should be put into a dry container to which the amount of room temperature distilled/deionized water in your formula will be added. Carbomer 940 should then be allowed to swell/hydrate. The pH of the Carbomer gel will be about 3.3 prior to neutralization (see 4).
2. Continue: When the Carbomer is fully hydrated, and IF the formula does not contain ingredients that may have compatibility issues with Carbomer (see 3), incorporate the remaining aqueous ingredients and heat if necessary. Incorporate other phases if applicable.
3. Compatibility: Carbomer 940 is anionic, and therefore may experience compatibility problems with any cationic material. Sodium or salt may have a negative effect on the viscosity of Carbomer 940 products. To minimize these negative effects, neutralize (see 4) Carbomer gel before adding in the other phases/ingredients.
4. Neutralization: Preferably, neutralization would take place at the end of formulation. This would be the instruction in all cases except as mentioned in 3. This is preferable because the Carbomer will not fully thicken the product until you raise the pH. This makes the formulation easier to work with.

We recommend using Tetrasodium EDTA or Suttocide A to neutralize the Carbomer. Test the pH of the formulation with your pH meter. Then add neutralizing agent until a pH of 5.5-7 (depending on preference) is achieved.

Items that can be used to neutralize Carbomer 940 (in ratio):

- TEA (Triethanolamine)99%: Begin with 99% pure Triethanolamine, and create a 50% solution with distilled water. Of this solution, you would generally use 4 parts TEA to every 1 part Carbomer 940.
- NaOH (Sodium Hydroxide): Begin with Caustic Soda Pearls and make a 25% solution with distilled water. Of this solution, you would generally use 2 parts NaOH to every 1 part Carbomer 940.
- KOH (Potassium Hydroxide): Begin with Potassium Hydroxide and make a 25% solution with distilled water. Of this solution, you would generally use 2 parts KOH to every 1 part Carbomer 940.
- DOW Versene 100 (Tetrasodium EDTA): Generally, you would add 1 part Tetrasodium EDTA to 1 part Carbomer 940.
- Suttocide A: Generally, you would use slightly more Suttocide A than Carbomer 940, for instance 0.9% Carbomer 940 and 1% Suttocide A will 1.) Preserve the formulation, and 2.) Neutralize the Carbomer. This is the exact ratio I typically use, and find I can achieve adequate suspension, viscosity, and preservation with these exact usage rates.

*Using KOH or NaOH to neutralize Carbomer 940 may affect the clarity of the formulation in some cases.