



Hawkins Watts Limited

Dispersion of colloidal grades Avicel® Cellulose Gel (Microcrystalline Cellulose)

Proper dispersion is the key to obtaining the combination of functional properties unique to Avicel cellulose gel.

If the Avicel is flocculated or undispersed, its full functionality will not be reflected in your formulation. There are a few things to consider in using an Avicel RC or CL grade product:

- The grade or type you choose depends on the amount of shear in your process.
- Avicel cellulose gel should be dispersed in water **before** any other ingredients are added. Avicel does not bind water and so will not interfere with the subsequent addition of the remaining ingredients.
- The state of the dispersion can be determined microscopically. (see illustrations.)
- A protective colloid may be required to prevent flocculation if the pH of your system is less than 4. Cellulose gum, methylcellulose and xanthan gum are the best protective colloids.

Factors That May Interfere with Obtaining a Good Dispersion

• Inadequate shear

- Homogenization is required to disperse RC-501 and RC-581.
- High speed mixing or pumping is needed to disperse RC-591F and CL-611
- If you are working with a low shear system, MicroQuick® stabilizer should be used.

• Hard water

- Cations may cause flocculation.

• Order of ingredients addition

- **Avicel cellulose gel should be dispersed in water first before any other ingredients are added.**

• Low pH

- If the pH of your system is less than 4, a protective colloid may be needed.

• Electrolytes

- Avicel cellulose gel can be flocculated by low pH, or by cationic polymers of some surfactants when these are present in the system before the addition of Avicel.

Checking Your Dispersion

- If Avicel cellulose gel did not achieve dispersion, clumps of powder will be visible.
- If Avicel is properly dispersed, you will see a very even crystalline pattern under polarized light.
- If your dispersion is flocculated, you will see gaps where no microcrystals are present.
- To prevent flocculation, FMC recommends that a protective colloid be added immediately after dispersing the Avicel cellulose gel. Cellulose gum, methylcellulose, and xanthan gum are the best protective colloids and should be added at 15-20% of the weight of the Avicel.



Undispersed
100x polarized light



Fully Dispersed
100x polarized light



Flocculated
100x polarized light