



# FrontLine®

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## The Science of Instantizing

Only One Facility in the World Makes "Magic Crystals" in Milk Replacers.

Our Chilton, Wisconsin plant is the only facility in the world using the Peebles System to make milk replacer. It is the same technology that allowed Carnation to revolutionize the human powdered milk industry. Although the patent for instantizing has expired, this system still produces a quality milk replacer that can't be duplicated.

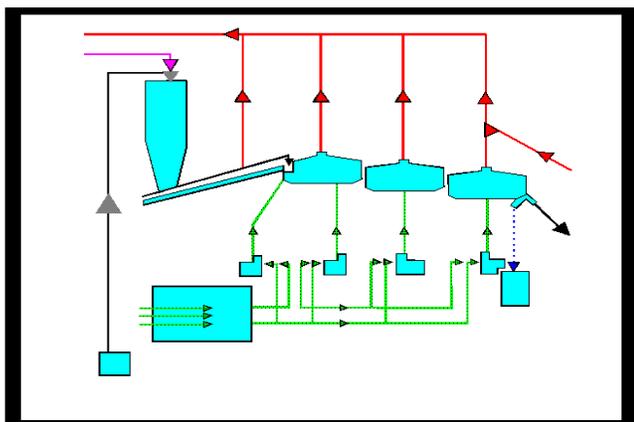


Fig. 1. Peebles System Schematic

### Production Process

The heart of the equipment is the hydrator tower, where moisture is added to dry powder ingredients. The system uses an orifice and spinner combination to atomize particles of powder with particles of water. Using warm water under high pressure, the system re-wets the powder and raises moisture of the material from 4% to 8%.

As these less dense, re-wet particles fall down through the hydrator they stick to each other forming larger, snowflake-like agglomerates. Later, when finished product is added to water, these larger particles literally suck up the water which causes the rapid breaking of water tension.

There is also a chemical change taking place during the Milk Products manufacturing process involving transformation of alpha forms of crystalline lactose to beta forms, which are much more stable. This change results in a finished product that is much more shelf-stable.

These new, larger particles with improved crystalline lactose are the famous "magic crystals".

Milk Products' technology not only can make a better "crystal" but also has more flexibility to agglomerate alternative ingredients and make a wider selection of high quality, finished products.

### Instantizing Improves Milk Replacer Quality.

There are three important factors that are used to judge milk replacer quality.



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1. **Wettability** is a measure of how fast the powder breaks water tension, or drops below the surface of the water. An instantized milk replacer product should break water tension in 3-5 seconds.
2. **Mixability** is a measure of how completely the powder goes into solution and stays in suspension. The majority of milk-replacer users are most concerned about mixability. Most users gauge the quality of a milk replacer by the number of 'floaters, sinkers and clingers' they see in the pail after feeding.
3. **Free fat** is a measure of how much of the fat in a product separates off and floats to the surface. Free fat in a milk replacer is controlled in most instances through homogenization of the formulation. In a market research study conducted to determine the basis for selecting a milk replacer, mixability of the product and reduced scours were mentioned as the main deciding factors. The advantages of Milk Products' instantizing process should be emphasized in terms of the following benefits to customers:

## The Advantages of Instantizing

1. Dissolves instantly in warm water with little or no mixing which assures you of complete distribution of the nutrients throughout the liquid milk replacer.
2. Stays in suspension longer after mixing than does non-instantized milk replacers.
3. After mixing there are no lumps of unmixed product left floating on top.
4. Free flowing product doesn't bridge or cake like a non-instantized milk replacer. Works excellent in automatic dispensing machines.
5. Milk Products' milk replacers are 100% instantized. (Not just some of the ingredients, but all of the ingredients).
6. Improved fat digestion due to smaller fat particles and better protection from rancidity. This benefit is achieved through the agglomeration process which takes place during instantizing.
7. The instantizing process makes Milk Products' milk replacers "thermostable" i.e. more stable under hot storage conditions.