



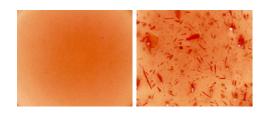


Morning Star Paste Finish Standards of Identity

To ensure greater consistency of your product, Morning Star has developed an improved means of identifying the finish for tomato paste and concentrated crushed tomatoes. These Morning Star Finish Standards of Identity use a set of photographs to classify the texture of the tomato paste being desired.

What is finish?

Finish describes the texture of tomato paste. The texture refers to the amount of peel, seed, or core material (insoluble solids) remaining in the juice before it is concentrated. More solid material gives a coarser finish. Minimal seed and peel results in a smoother finish.



Why is finish important?

Finish is a key factor for both the yield and texture of your final product. The quantity of insoluble solids significantly improves ingredient yields, while the texture adds to the mouthfeel of your final product.





Why is traditional finish terminology unreliable?

Traditional finish terminology is based on the size of the holes in the finisher screen through which tomato juice is passed. This may sound standardized, but the reality is something else. Factors other than hole size influence the amount of seed, peel, and other solid material passed through a screen, as described below, **variation occurs for five main reasons:**

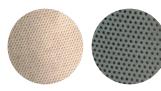
- 1) Process: The volume rate at which the pulp is passed through the finishers and whether or not the pulp has been precooked changes finisher performance. Break temperatures affect finisher performance, as well as the use of pulpers prior to finishers.
- 2) Speed and pitch of rotor paddles: Rotor paddles act as both a centrifuge and a press, slinging and extracting the pulp into various tomato components: pomace and tomato juice. The speed of the rotor and flow rate of the pulp can vastly increase or reduce peel content relative to customer requirements. In addition, the "pitch" of the rotor paddles will either retain pulp in the screen for a longer or shorter period of time. Longer periods result in additional pressing of the pulp through the screen for a coarser finish while shorter periods result in an accelerated discharge of pomace through the finisher.
- **3) Type of equipment:** Finishers separate juice and solid material differently depending on the screen manufacturer and the technology employed.
- **4) Variation in screen size:** Some screen manufacturers punch their holes while others drill them, creating variation in the size of the holes.
- **5) Wear and tear.** Over time, the screen wears, making the holes larger and dulling their edges. Finish varies depending on the timing processors choose to change the screen.

What is a finisher screen?

A finisher screen begins as a sheet of metal. Holes are drilled or punched through the sheet. The sheet is cut, then shaped into a cylinder. Screens are identified by the diameter of their holes.

Common screen sizes:

.020", .033", .045", .060", .078", .090", .156", .250"







Morning Star finishes are classified by visual method vs. screen size.

At its most basic level, tomato concentrating is the process of removing water, peel and seeds from tomatoes until a desired thickness is obtained. Evaporators remove water, while machines called finishers do the rest. The finisher separates tomatoes into juice and solid material (pomace). Pomace is a nutrient-dense mixture and is utilized in a multitude of ways, including soil amendments, animal feed and pet food.

Morning Star's process for identifying finishes.

Paste is diluted to 8.5% NTSS and evenly spread on a white tray to allow careful examination of its insoluble solids content. The dilute sample is also placed in a standard Petri dish and photographed for record. The sample is then compared to customer specification to determine customer acceptability. By using this method of identity, the texture of your ingredient will be more consistent, even when different processors make it.



Typical Design of a Tomato Finisher

Note that there are important differences between brands of finishers.

The tomato pulp

enters the finisher and is immediately fed into the rotor/screen chamber.

Spun by the motor, the rotor passes pulp through the screen. separating the pulp into juice and pomace.

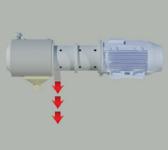
The juice exits to a tank by the force of gravity, then on to the evaporators.

The pomace drops out the back of the finisher into a conveyor for removal from the process.

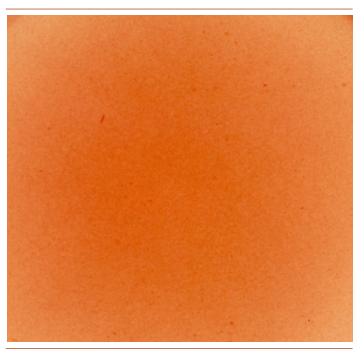






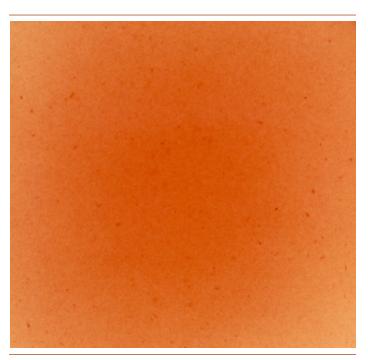


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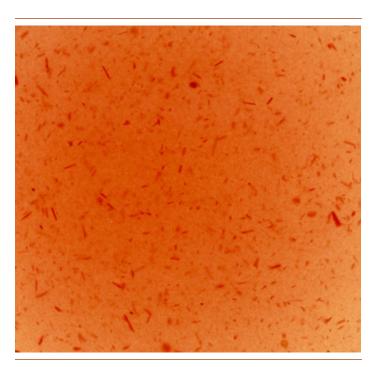
Morning Star - Very Fine Finish

Typically .020 -.033 Finish Smoothest texture, no seeds, almost no pulp.



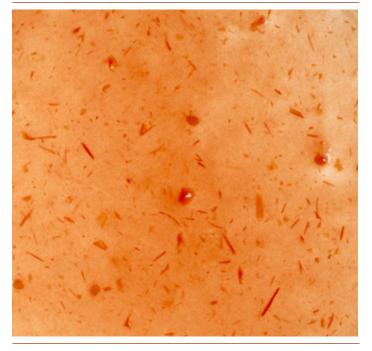
Morning Star - Fine Finish

Typically .027 -.045 Finish Very little peel, no seeds.



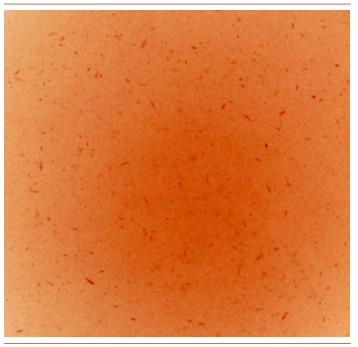
Morning Star - Very Coarse Finish

Typically .060 -.078 Finish
Small lengths of peel, some seeds and seed pieces.



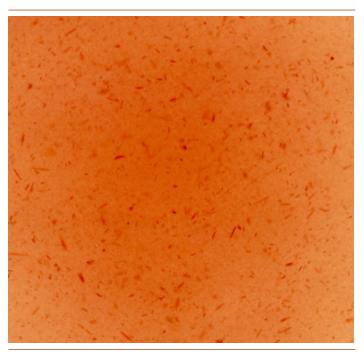
Morning Star - Fine Crushed

Typically .078 -.090 Finish Long lengths of peel with seeds and seed pieces. Use these pictures to choose the Morning Star Finish you require in order to reduce unexpected variations that decrease your yields, alter your final product, or plug your pumps.



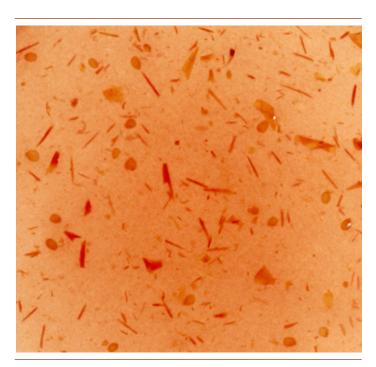
Morning Star - Medium Finish

Typically .033 -.060 Finish
Some flecks of peel and no seeds.



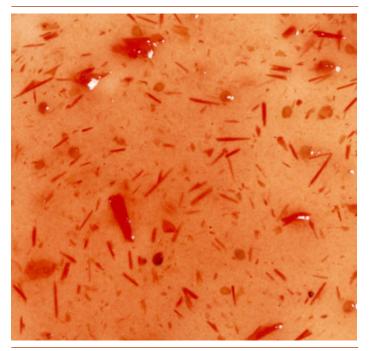
Morning Star - Coarse Finish

Typically .045 -060 Finish
Fair amount of peel and some seed pieces.



Morning Star - Medium Crushed

Typically .090 -.125 Finish Long sections of peel, many whole seeds, pulp.



Morning Star - Coarse Crushed

Typically .156 -.250 Finish
Pieces of peel, whole seeds, and tomato chunks.

Products you can rely on.

In addition to traditional ingredient products, we also offer organic products, green tomato products, chili sauce, custom formulated tomato products, high-fiber tomato pulp, tomato pomace, foodservice and retail pouched and canned tomatoes, as well as several additional R&D products.



Products.

Hot Break Paste (31% NTSS) Cold Break Paste (31% and 37% NTSS) Diced (3/8" to 1" cut) Fire Roasted Diced (1/2" to 3/4" cut) Concentrated Crushed (26% and 28% NTSS) Ground in Puree Puree (1.07) **Sun-Dried Tomatoes**

Organic Hot Break Paste (31% NTSS) Organic Cold Break Paste (31% NTSS) Organic Diced (1/2" and 3/4" cut)

Packaging.

300-gallon aseptic bag-in-box 55-gallon aseptic fiber or steel drum 30lb bag-in-box (sun-dried) 25lb bag-in-box (sun-dried)



PASTE



GROUND IN PUREE



CONC. CRUSHED



PUREE



DICED IN JUICE



GREEN DICED



GREEN CRUSHED



FIRE ROASTED GREEN CRUSHED



DARK FIRE ROASTED CRUSHED



FIRE ROASTED DICED

Ask your sales colleague about our extensive line of innovative value-added products.







DICED IN JUICE WITH CONCENTRATED TOMATO



FIRE ROASTED DICED WITH CONCENTRATED TOMATO



FIRE BOASTED SALSA