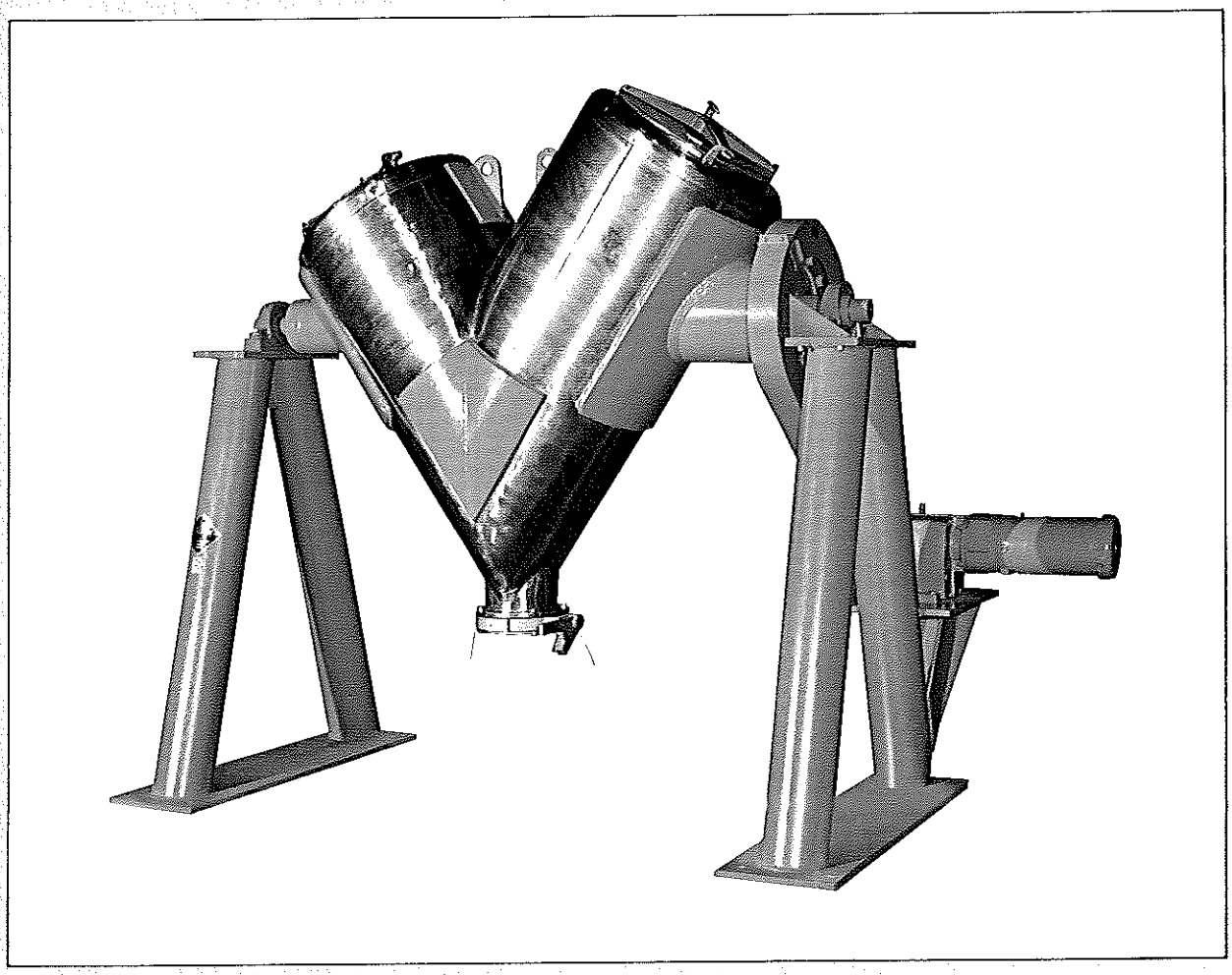
P-K Cross-Flow™ Blender

A new dimension in solids and liquid-solids blending



PATTERSON-KELLEY CO.
Division of HARSCO Corporation
East Stroudsburg, PA 18301 (717)421-7500

The *Cross-Flow™ Blender... for unique blending

Fast, Precision Blending

The new Patterson-Kelley Cross-Flow™ blender represents a vast improvement of the Twin-Shell® "V" blender.

While the Cross-Flow blender retains the advantages of the Twin-Shell — quick charging and discharging, easy cleaning and low horsepower operation — its performance goes beyond that of the Twin-Shell.

The Cross-Flow blender is the ultimate solids blender because it not only duplicates the precise blending accuracy of the Twin-Shell, but it does it with much greater speed. It can blend materials up to 266% faster than the Twin-Shell, which till now has been the most efficient solids blender available for critical applications.

Axial Movement Speeds Blending

The key to the Cross-Flow blender's rapid blending speed is its uneven leg design. This design is based on a new blending principle: unequal displacement, which produces a strong axial exchange of material from each leg of the blender to the other, a blending action and a blending speed not found in any other blender.

How it Works

When the Cross-Flow blender is in the upright position, each leg holds an equal volume of material. However, in one revolution 25% of the material has been exchanged from leg to leg. As the blender continuously rotates, there is a constant axial shift of material. This combines with the radial blending action as the two inclined cylinders intermesh their flows. This divergent flow concept was the very basis of the original Twin-Shell design when we introduced it in 1950 to the chemical process industries.

While offering the same control and predictability as the Twin-Shell, the Cross-Flow blender has the added advantage of improved discharge because of a sharper angle of the legs, which our engineers designed into the unit. Its uniform blending accuracy and rapid speed make it the ideal solids blender for the most critical blending applications.

Standard Sizes

Production-sized Cross-Flow blenders are constructed of 304 stainless steel. Carbon steel construction is also available. Standard sizes range from 1 to 150-cu.-ft. capacity, with larger sizes available.

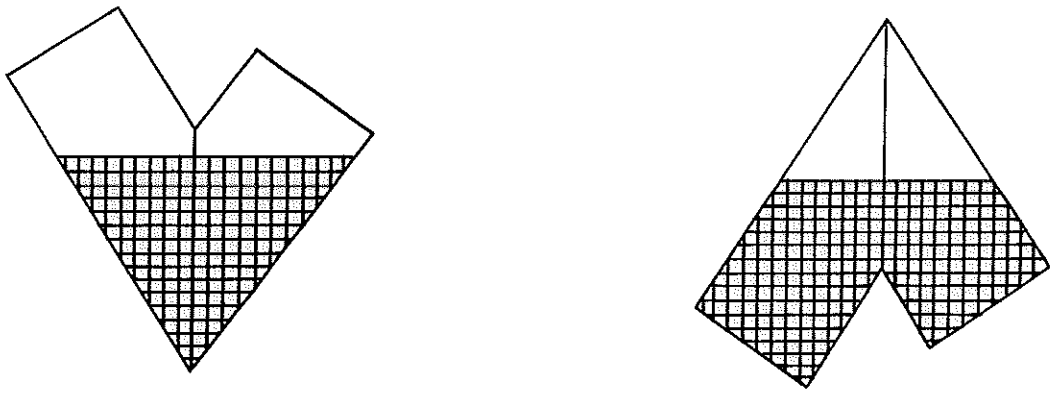
Laboratory models, such as the one illustrated on the opposite page, have a cantilevered design. They are available in 8-qt. and 16-qt. capacities, with a stainless steel shell or a plexiglass shell so you can see the mixing action. Laboratory models are cantilevered; production models have a double trunnion.

Interchangeable Shells on Lab Models

Since the Cross-Flow laboratory models have a cantilevered design, the shells are easily interchanged. All you need to do is loosen two set screws and slip off the shell. Then it can be readily stored, sterilized or transported. On the 8-qt. model, you can interchange 8-qt. plexiglass and stainless steel shells. On the 16-qt. model, you can interchange 8-qt. shells with 16-qt. shells, in either plexiglass or stainless steel.

*U.S. Patent 4,141,657
other U.S. and foreign
patents pending.

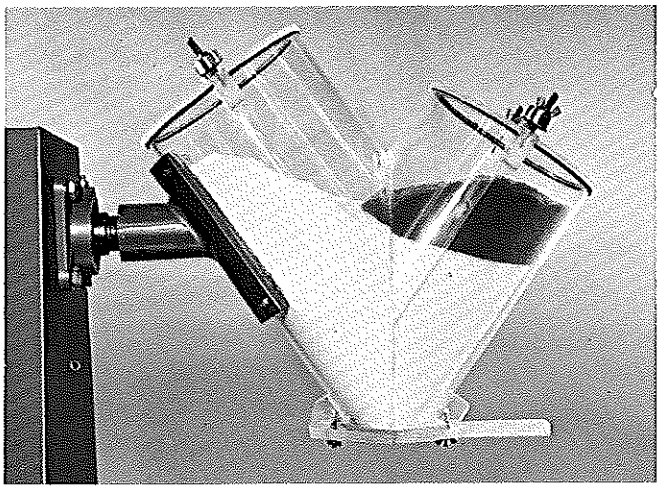
Principle of Unequal Displacement

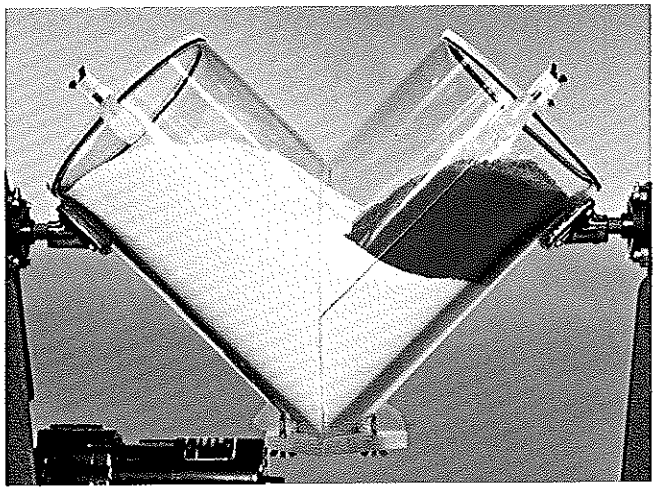


In the upright position, each blender leg holds an equal amount of material. As the blender rotates, the uneven legs force the material to shift continuously from one leg to the other, quickly producing a uniform blend.

The effect of axial shift on blending time

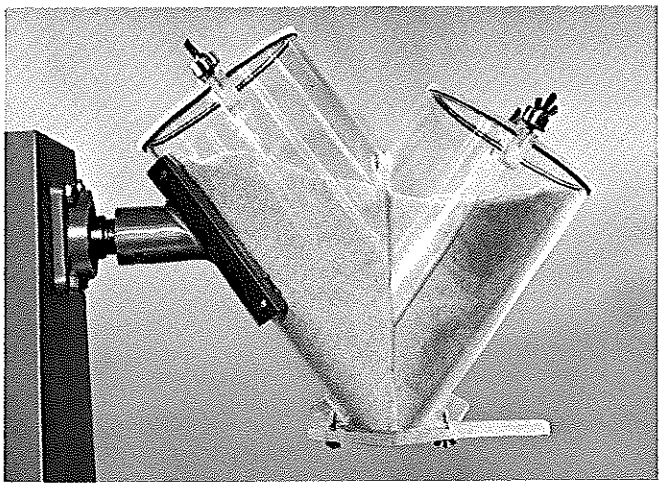
Cross-Flow™ Blender vs. Conventional "V" Blender

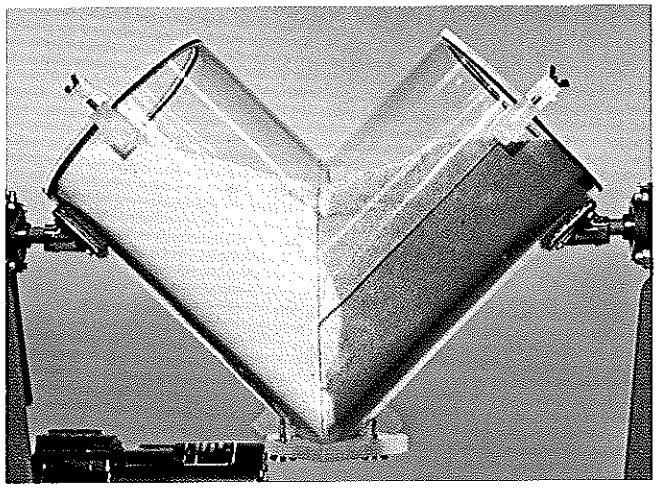




In this demonstration, we charged both 8-qt. lab blenders with 20 lbs. of white salt and 4 lbs. of red salt. To show the Cross-Flow blender's rapid axial exchange of material from each leg to the other, we purposely placed the red salt on one side of both blenders.

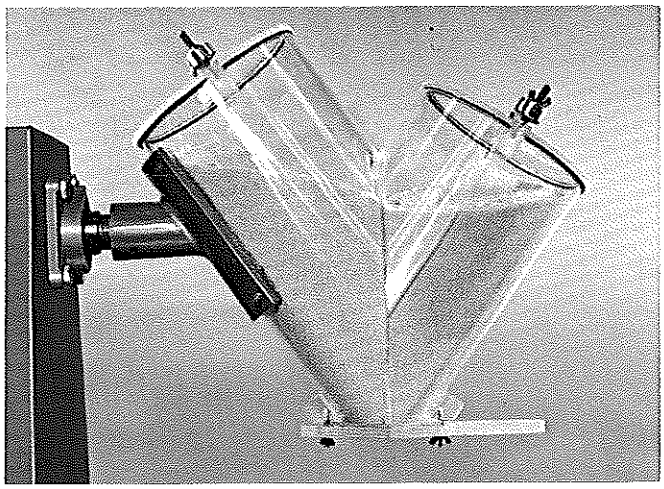
ONE MINUTE BLEND

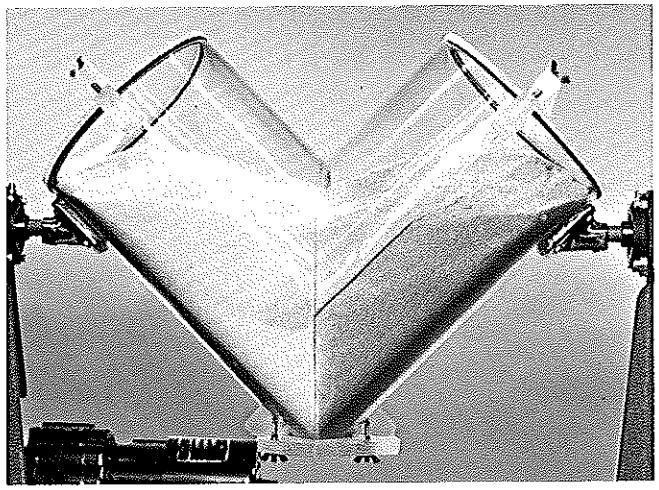




After operating each blender for one minute, there's a marked difference between the batches. Substantial blending has already occurred in the Cross-Flow blender, which shows pronounced splashes of red salt in the long leg, while the material in the Twin-Shell is just beginning to show a semblance of a blend.

TWO MINUTE BLEND





The Cross-Flow blender's finished uniform blend in just two minutes contrasts sharply with the partly blended material in the Twin-Shell. Note the color separation in the Twin-Shell. It took the Twin-Shell an additional eight minutes to complete the blend.

The New Liquid-Solids Model

After we introduced the Cross-Flow solid-solids blender to the chemical processing industries in 1977, the next logical step was to develop an internal intensifier that would be effective for both high-intensity dry blending and controlled, uniform addition of liquids into solids. This research and development project took several years because of the complex problems faced in how to consistently produce uniform particle wetting of material that was rapidly moving axially within the blender.

Newly Designed Intensifier

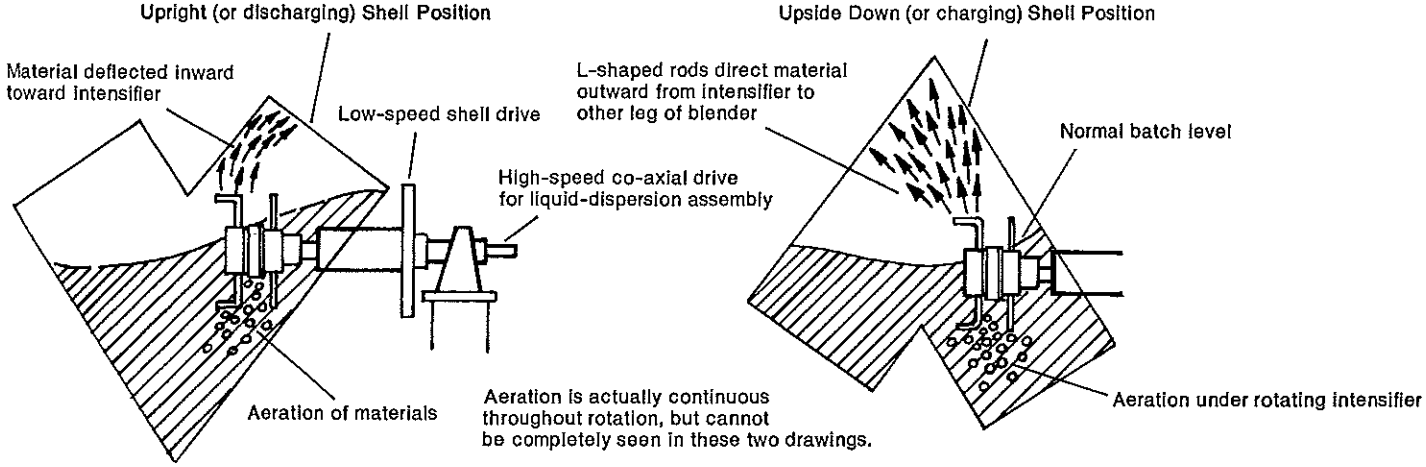
The result of this development program is our new cantilevered liquid-dispersion intensifier with a combination of L-shaped and straight rods. This design complements the unique shape of the Cross-Flow shell and the axial material movement it produces. The key to producing uniform solid-solids or liquid-solids blending is the action of the intensifier rods combined with the unique shape of the shell. As the intensifier revolves rapidly, the L-shaped rods propel the material inward and outward, quickly producing a uniform blend of the dry materials. When a liquid is added, this same action creates continuous aeration around the intensifier, causing the liquid to be uniformly distributed.

Operating Advantages

The Cross-Flow liquid-solids model produces the same uniform blending accuracy and control as our Twin-Shell liquid-solids blender, but with fewer components. The advantages to you:

- Cantilevered design cuts intensifier horsepower by up to 50%, resulting in energy savings.
- Cartridged shaft with tapered roller bearings is readily removed for bench testing or maintenance.
- Only one product seal means easier, quicker maintenance.
- Intensifier is easily removed for cleaning.

How it achieves uniform liquid distribution



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