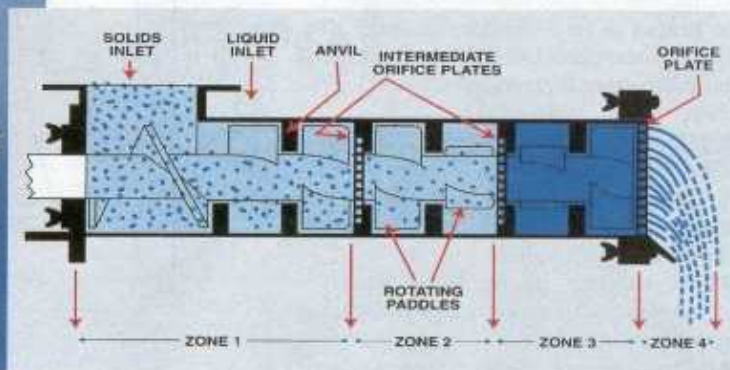


The Extrad-O-Mix can be designed with one, two or three orifice plates. Orifice plates can be located in two positions internally in the closed section of the body, and at the discharge end.



Pictures: Hosokawa Micron

A piece of cake

Rapid mixing of doughy products

Mixing continuously is often easier than mixing batchwise – but that's not the case with dough and similar materials. Thanks to its unique characteristics, the Extrad-O-Mix continuous mixer can solve the problem.

Continuous mixing is often relatively straightforward, as long as the product is a powder or a low-viscosity liquid. Engineers can choose from a wide range of mixers, each with its own operating characteristics and proven range of application.

When it comes to dough, however, continuous mixing is anything but a piece of cake. The same applies to most products in the form of very viscous pastes or plastic masses, and in these cases it is necessary to choose the mixer with great care.

For products of this kind, Hosokawa has developed a dedicated continuous mixer known as the Extrad-O-Mix. Thanks to its special design, it can accept plastic materials as feedstock or generate them internally by mixing solids and liquids.

The Extrad-O-Mix has a single horizontal shaft carrying rows of "hammers" arranged in a spiral so as to move the material through the mixing chamber. Stationary anvils attached to the housing are arranged to fit between the rotating hammers. Material fed into the housing at one end is forced forward by the rotating hammers until it comes in contact with a stationary anvil. As the hammer passes the anvil, part of the material is moved forward while the remainder lags behind. The action of the anvil prevents the material from rotating with the shaft. The effect of the unit is therefore to give a continuous

kneading, mulling and mixing action on materials ranging from light or somewhat-stiff pastes to heavy plastic-like doughs and putties.

Various orifice plates and extrusion dies may be installed within the barrel and the discharge end of the unit to vary the mixing action. Dies of various shapes and sizes can be used to create the necessary amount of backpressure.

Processing influences can be broken down into two major areas: those primarily attributable to the mechanical design, and those dictated more by the raw materials and final product characteristics. Each of these affects the other, of course, and many designs are dictated by the characteristics of a particular material.

Factors influencing the performance of the Extrad-O-Mix include:

Material conveying

During the process of conveying the material towards the discharge die plate, any liquid present is mixed into the surface of the solid material. Particle size, bulk density, product tackiness and rotor speed all influence the way the material is conveyed.

Heat sensitivity

Heat-sensitive materials dictate special considerations in the design of the Extrad-O-Mix, such as a cooling jacket on the bo-

dy, use of larger orifice plates, and reduced operating speed. Heat sensitivity results in a conflict between the need to remove heat and the need to add the mechanical energy required to mix the material.

Orifice plate design

The Extrad-O-Mix can be designed with one, two or three orifice plates. Orifice plates can be located in two positions internally in the closed section of the body, and at the discharge end. Internal orifice plates are used to restrict the conveyance of material, which has the effect of increasing the intensity of mixing.

The end orifice plate provides the ultimate control over the amount of mixing, and so determines the final product quality. Factors such as plate thickness, total open area, hole size and length-to-diameter ratio are considerations in determining the proper end plate design.

Typical applications for the Extrad-O-Mix include:

- mixing a bakery premix powder with a low-melting-point fat;
- mixing feed premix powder with an animal fat and molasses;
- mixing sugar, oil and other additives to produce a doughy cookie filling;
- mixing potato flakes with water and other additives;
- homogenizing wet pectin;
- mixing starch with water and plastifying the mixture.

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• The working principle and further details of the Extrad-O-Mix



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