



The mixing superiority provided by the Processall Mixmill device has allowed the evolution of a machine that is capable of processing beyond mixing to include drying and dispersing.

In the plastics industry, resin, plastisol and organosols require superior pre-mixing of dry ingredients prior to dispersion in liquids. The paint and printing ink industry also require pigment preparation steps such as mixing, flushing, and drying prior to dispersion. In the food industry candy coatings, flavor emulsions, compound coatings and other applications require preblending of dry ingredients, prior to dispersion in a liquid media.

The desire for dispersion after primary processing in one vessel created a need that is filled by Processall's new Mixperser. With the action of a special high shear mill augmented by efficient plow agitation action, Processall equipment is able to mix, agglomerate, dry and disperse in one vessel. The vessel is totally enclosed which allows for dynamic deaeration of material under vacuum. It also forces the particles to work against each other in the absence of trapped air bubbles for increased performance. In the dry phase, the Processall Mixperser is capable of efficiently and accurately mixing via the mechanical fluidized bed agitation principle. This results in intimate mixing of all ingredients in a short period of time.

When liquids are introduced in large quantities to change the dry product to a viscous mass, the effect of mixing principle completely changes. In this phase mixing and dispersion is accomplished with either attrition or by shear. With attrition dispersion, the particle size reduction is accomplished by the hammering and smashing of the mills and plows. With shear dispersion, physical tearing apart (smashing) of the agglomerates takes place. If the attrition principle is to be used, the viscosity must be low enough so the maximum velocity for impinging material can be obtained to achieve attrition. The viscosity should not be too low since this will prohibit the efficient transfer of energy from media to projectile. In other words there must be viscosity/mass balance in the mix. Efficient shearing requires higher viscous resistance. The forces that cause shearing are parallel to the surface as compared to perpendicular forces to the surface to provide optimum attrition.

To better understand viscosity. Viscosity is defined as resistance to flow.

Viscosity (poises) = Shear Stress/Shear Rate

In the production of plastisols and organosols the complete dispersion of pigments and other solids in a liquid carrier (plasticizer) is essential for a superior finished product. Because of the intensive mixing action achieved with the plow-shaped agitators working in conjunction with high speed mills homogeneous dispersion of the solids is accomplished rapidly. Heat build-up in the product due to shear is minimized since it is a totally enclosed vessel and can be equipped with a jacket for cooling purposes.

In the food industry, dispersing cocoa powder, non-fat dry milk, sugar with cocoa butter or liquid shortening is very demanding. All dry ingredients are normally mixed separately, then charged into



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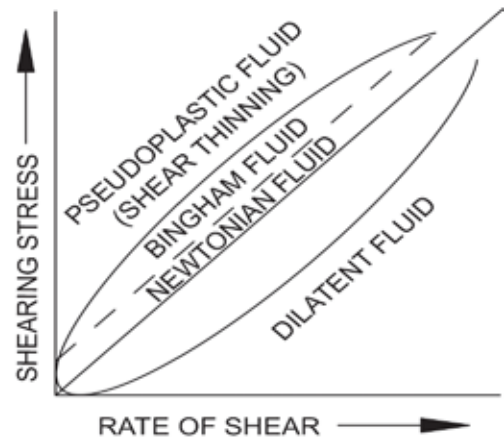
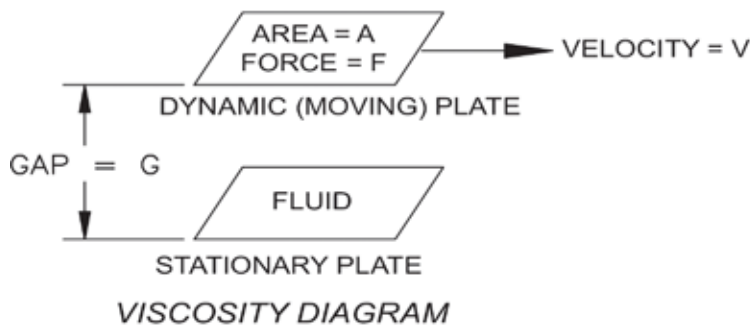


a special heater/disperser. After the pre-dispersion is achieved, a final milling step is required to achieve uniform dispersion. The Processall Mixperser can do all processing in the same machine with shorter cycle and no material handling between steps.

In the Pigment industry dry color is what is normally used. however, the usage of aqueous dispersions, presscakes of a high-solids nature and flushed colors is increasing. Pigment dispersions or pre-dispersion enable the processor to easily disperse these concentrates into compatible coatings system. Pre dispersions offer a ready means to expand market share with minimal capital investment.

Dry pigments used in the paint industry consist of small particles which loosely adhere together, but the particles are strongly bonded by forces that requires considerable work to separate them for dispersion in a paint system without any reaggiomeration or settling. A softer texture pigment is desirable as compared to a hard gritty pigment which is harder to disperse. Processall's U-Max dryer can remove moisture and condition the pigment and keep it flowable for easy wetting. This can be done all in one vessel. Processall equipment accom-plishes this task efficiently with the aid of the high shear mill, forced fed with the plows action.

For further information on testing and in-plant demonstrations contact Processall.



WITH NEWTONIAN FLUID
(VISCOSITY) $\mu = \tau / \dot{\gamma}$

WITH PSEUDOPLASTIC OR DILATANT
(VISCOSITY) $\mu_{PD} = m \alpha^{n-1}$

where $\alpha = \dot{\gamma} = V/G$ and is called as SHEAR RATE (VELOCITY/GRADIENT)

m = CONSISTENCY
n = FLOW INDEX

