STORAGE AND HANDLING OF VINYL PLASTISOLS

A vinyl plastisol is a liquid dispersion of polyvinyl chloride (PVC) resins, plasticizers, and miscellaneous additives. When baked, this liquid plastic becomes a fused solid plastic. Plastisols can separate and tend to age, often defined as an increase in viscosity, over time. Proper handling and storage can help minimize these issues, which will help maximize the shelf life of the plastisol, and minimize potential manufacturing issues and their associated costs.

It is common for plastisols to increase in viscosity (thicken) over time. The rate of increase is dependent upon a number of factors, including the plastisol formula and age as well as storage conditions.

As a result of the plastisol aging characteristics mentioned above and potential differences in testing methodology, it is strongly recommended that incoming quality control (QC) specifications not be established based on plastisol Technical Data Sheets (TDS), or Certificates of Analysis (COA). QC specifications should be based on the needs of the process and end product.

Plastisol shelf life is dependent upon the specific plastisol. Shelf life is really broken down into two areas, the first being actual usage while the second is settling.

Plastisols will most likely change over time and material should be used on a first-in-first-out (FIFO) basis and as quickly as possible. Typically, the listed shelf life of most plastisols will be 60 days, depending upon the plastisol formulation. While the shelf life is listed at 60 days, plastisol formulations may stay usable for considerably longer periods. This estimated shelf life requires storage of the plastisol under good warehousing practices. Good warehousing practices include keeping the container tightly closed when not in use, storage of the plastisol at room temperature, away from heat sources and direct sunlight, and avoiding exposure to water.

Foreign contamination, including water, is minimized when the container is tightly closed when the plastisol is not in use. The obvious issue of foreign contamination is well known. However, one must also be concerned with the presence, or absorption of water, by the plastisol. The presence of water, in large enough quantities, will result in the formation of blisters during fusion.

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In smaller quantities, the presence of water may create cloudiness in fused parts, especially those parts produced from clear or transparent plastisols. As the temperature of the plastisol is increased, the viscosity of the plastisol will decrease. While at times this may seem desirable, exposure to sources of heat will result in a faster rate of viscosity increase, or even gelation (solidification) of the plastisol.

Decreased plastisol temperatures will result in higher plastisol viscosities. Exposure to cold will generally not harm the plastisol. If exposed to cold temperatures, it is recommended that the container of plastisol be stored at room temperature for 1 - 2 days before the plastisol is used.

Depending upon the plastisol formula, separation, or settling will occur. The timing of this phenomenon will vary. Upon opening the container initially, and on some routine frequency thereafter, the plastisol should be gently stirred. Stirring should be done gently enough so as not to reintroduce air, or heat, into the plastisol, but forceful enough so as to re-disperse any settled material on the bottom. The frequency of this re-mixing will typically vary between 1 week and 1 month.

A visual examination of the plastisol is key in determining the proper re-mixing frequency, or if separation has occurred. The visual appearance of a clear surface layer, or the formation of sediment on the bottom of the container is an indication that separation has occurred and that the plastisol needs to be re-mixed. Sediment on the bottom of the container can be determined by inserting a clean pole, of sufficient length, into the container and pushing the end to the bottom.

Using plastisol that has separated will have serious ramifications on the manufacturing process. Utilizing separated plastisol from the top of the container will result in a part that has poor strength and will take additional time to fuse, if fusion occurs. Utilizing separated plastisol from the bottom of the container will result in a part that is harder than normal and may even exhibit brittleness in severe cases of separation.