|  |
| --- |
| **STANDARD OPERATING PROCEDURE**  **BULK DENSITY** |



|  |  |  |
| --- | --- | --- |
| **Author** | | |
| Name : | Mr. Arif Kamal | **Signature** |
| Designation: | Asst. QCM |
| Date: | 28 July ,2021 |
| **Review** | | |
| Name: | Mr.Ghulam Murtaza | **Signature** |
| Designation: | LAB Head |
| Date: | 28 July ,2021 |
| **Approval** | | |
| Name: | Mr. Ahsan Abid | **Signature** |
| Designation: | General Manager Operations |
| Date: | 28 July ,2021 |

## Scope

* 1. These test methods describe the determination of the Bulk Density of Master Batch in form such as Pallets or granules.
  2. This test method should be performed in the laboratory under controlled conditions of temperature and humidity.
  3. The values stated in SI units are to be regarded as the standard.

1. **Terminology**
   1. *Definitions:*
      1. *Bulk density, n—*the weight per unit volume of a loosely packed material, such as master batch pellet or granular polymer.
      2. *Master Batch, n* *—* Master Batch is a concentrated mixture of pigments and/or additives encapsulated during a heat process into a carrier resin which is then cooled and cut into a granular shape.
2. **Significance and Use**
   1. The bulk density of a master batch is a property that is conveniently measured to identify a material, to follow physical changes in a sample, to indicate degree of uniformity among different sampling units or specimens, or to indicate the average bulk density of a large item.
   2. Changes in bulk density of a single material are due to change in pellet size of master batch localized differences in crystallinity, loss of plasticizer, absorption of solvent, or to other causes. It is possible that portions of a sample differ in density because of their differences in crystallinity, thermal history, porosity, and composition (types or proportions of resin, plasticizer, pigment, or filler).
   3. The data from this test can be used to estimate the bulk density of materials in bins and hoppers and for material handling applications such as feeders.
   4. The test results can be greatly affected by the sample selected for testing. For meaningful results it is necessary to select a representative sample of the master batch with respect to moisture (water) content, particle-size distribution and temperature. For the tests an appropriate size sample should be available, and fresh material should be used for each individual test specimen.
   5. Bulk Density is useful for calculating dosage in auto dosing system.
3. **Sampling**
   1. The sampling units used for the determination of Bulk Density shall be representative of the quantity of product for which the data are required.
4. **Conditioning**
   1. *Conditioning*—Condition the test specimens at 23 ± 2°C.
   2. *Test Conditions*—Conduct tests in the standard laboratory atmosphere of 23 ± 2°C unless otherwise specified in this specification or by the relevant material specification.
5. **Apparatus**
   1. Graduated Cylinder—any graduated cylinder with capacity 100ml-250ml.
   2. Electronic Balance—a balance having the capability to weigh the sample to the nearest 0.01 g. The balance should be checked periodically to ensure accuracy.
6. **Test procedure**
   1. Weigh out the empty graduated cylinder on the electronic balance and note down the value. Record the resulting value as W1.
   2. Put the master batch in the graduated cylinder and fill it to a desired volume mark (Height) properly by gently taping the bottle to a resilient surface, such as a rubber pad or book, until the height of the sample in the bottle is at a minimum i.e. the sample height does not reduce with further tapping.
   3. Read off volume of sample in cc (ml). Record the resulting value as V.
   4. Weigh the graduated cylinder with filled master batch and jot down the value. Record the resulting value as W2.
7. **Calculation**
   1. Calculate the Bulk Density of the master batch as follows:

Bulk density (Tapped) =

Where:

W1 = mass of empty graduated cylinder, g,

W2 = mass of empty graduated cylinder, g plus mass of the Sample Master Batch, g,

and

V = Volume of Sample Master Batch, cc (ml), cm3

* 1. Bulk Density is thus calculated in g/cm3 or g/cc.

**AMENDMENT HISTORY**

|  |  |  |  |
| --- | --- | --- | --- |
| **REV. #** | **DCR #** | **SECTION** | **AMENDED TEXT** |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |