## Purpose:

This procedure describes the standard procedure of Master batch manufacturing i.e. weighing, mixing, extrusion and packing.

This SOP deals with the procedures adopted from issuance the raw material from RM store to dispatch the finish good product to FG store.

## Scope:

This SOP shall apply to the manufacturing of Master Batch that is being produced in Bin Rasheed Colors and Chemicals Mfg. Co. (Pvt.) Ltd (SMD). The Master batch may be Prime/Cheap Color, Filler, Additive, White, black and special effect colors.

## Responsibilities:

* PM, APM are responsible to comply this SOP in all sections of production dept,
* SHIFT I/C, SUPERVISOR shall comply these standard protocol in their respective area

## Procedure:

* 1. **Issuing of Raw Material**

Weighing & Mixing Supervisor will receive Production Order from Quality Control Lab, than he will issue the material from the Raw Material Store according to the Production Order, after that Raw material store personnel will deliver the respective raw material on weighing area.

Weighing & Mixing Supervisor will verify the material according to the production order and place the bags in order of usage. Weighing & Mixing Supervisor will mention/write the name or code of raw material on open bags with permanent marker.

* 1. **Weighing of Material**

Scale calibration will be checked before weighing the raw material. Before regular production of any grade trial will be weighed according to the recipe for trial production. As soon as the supervisor gets go ahead for regular production from the Quality Control Lab, he will make the final weighing recipe and get it verified from the weighing & mixing shift in-Charge.

Weighing of trial for critical and prime grades will be done under the supervision of Weighing Mixing Shift In-charge for counter check, after the final weighing recipe is verified, the recipe will be displayed on the wall beside the weighing scale so that the weighing man can easily see the quantity of material to be weighed.

* 1. **Cleaning of Mixer**

Mixer and Mixer Area will be cleaned properly for mixing the raw material of new grade under the supervision of Weighing Mixing Shift In-Charge. W/Mixing In-charge will check the cleaning of mixer.

There are two types of mixer cleaning, mentioned below,

**3.3.1 Partial Cleaning**

First switch off the electrical supply, partial cleaning of mixer will be carried out while the grade having same color with different tone.

Partial cleaning is usually done for white filler grades and white grades having same pigmentation and optical brighteners. Mixer is properly cleaned by using cotton waste, and also dismantles the mixer discharge to remove the sticky material.

* + 1. **Full Cleaning**

Full cleaning of mixer will be carried out for mixing the raw material of new grade, critical grade or a grade with different color or undertone as compared to the previously run grade.

* Switch off the electrical supply
* Mixer blades, Lid and Discharge will be dismantled and cleaned separately by using white oil
* Use wire brush to clean sticky material from Mixer wall and blades
  1. **Mixing of Weighed Raw Materials**

Before mixing the raw material, go through the work instructions of Mixer. PP Woven bag must be fastened to the discharge of mixer and place a pallet below the discharge. Mixer man will pour the material into the mixer as per instructions from the supervisor. Discharge and lid is then closed and mixing is carried out.

* + 1. **Mixing of Prime Grades**

1. The grades in which the polymer percentage in above 45 % and if the percentage of organic pigment is lower, it will be mixed at low speed of 25 Hz for 10 minutes.
2. The grades in which the percentage of inorganic pigments is above 25 %, it will be mixed at a low speed of 25 Hz for 10 minutes.
3. The grades in which the percentage of organic pigments is above 25 % and the percentage of polymer is low, it will be mixed at a high speed of 45 Hz. The material may take 30 to 45 minute to mix homogeneously.
4. Mixing of red color is mixed in two steps. First, White material is mixed for 4 minutes and then pigment is mixed for 4 minutes. Second, White material is mixed for 6 minutes and then pigment is mixed for 6 minutes.

Note: mixing time and procedure may be vary, depends upon Recipe

The weighed material is poured into the mixer all at once then after mixing the material is delivered at line for extrusion.

* + 1. **Mixing of Color Cheap Grades**

The weighed material of color cheap grades is poured into the mixer all at once and mixed for 3 minutes at low speed of 25 Hz and then mixed for 12 minutes at high speed of 50 Hz.(mixing time may be vary, depends upon Recipe)

* + 1. **Mixing of White Grades**

The grades in which the percentage of Titanium dioxide is above 50 % will be mixed at low speed of 25 Hz for 10 minutes.(mixing time may be vary, depends upon Recipe)

The mixed material is taken out into PP woven bags and delivered onto the line for extrusion.

* + 1. **Mixing of Filler Grades**

In filler grades pour all material into mixer and mix it from 5-25 minutes according to Recipe and line. (Mixing time may be vary, depends upon Recipe)

* 1. **Extrusion**
     1. **Startup**
  + Before starting to set up for run, examine the extruder to be sure all power is shut off. Examine the inside of the barrel and hopper to check for dirt or debris and remove it.
  + Gloves should be worn during assembly to avoid cuts from metal parts.
  + Inspect all pressure gauges; make sure all transducers are working by checking for bent in shafts.
  + Select the proper screw and insert it in the front end of the barrel. The screw should slide in easily by hand. Use a brass hammer to tap the screw into place if the fit is a little snug. DO NOT FORCE.
  + Do not use excessive force to push the screw into the extruder. Look for instruction or call maintenance for assistance.
  + Inspect the die and breaker plate carefully before assembly to ensure cleanliness and good mechanical condition.
  + Assemble the die and install it on extruder, insert correct screens.
  + Assemble the heater bands and thermocouples on the die and plug them into the appropriate receptacles.
  + Turn on the main power, the power on the panel board and for the heater band plugs.
  + Set the barrel, die and adopter zones to achieve the correct melt temperature.
  + While waiting for the extruder to heat up, set up all the needed downstream equipment .Start all the downstream equipment to ensure they are operating properly before trying to process material through them.
  + Retighten all the die bolts and clamps after the extruder has heated and soaked.
  + Fill the hopper with the material to be processed.
  + WARNING! Use common sense when starting up. If the material takes too long to come out, something is wrong. The temperature set points on the barrel or die may be too low to melt the material .DO NOT STAND IN FRONT OF DIE.
  + When material is freely coming out of the front of die, gradually increase the screw RPM to the desired set points. Watch the amps and pressure closely.
  + Never stick hands near the saw blade or puller to remove jammed pieces. Turn off the equipment first.

## Shut Down:

* + Empty the feeding hopper and lower the heats of the barrel.
  + Turn off all the power to the heater bands while running the remaining material out of barrel.
  + Clean the die parts with the help of wire brush.
  + After the screw is empty, turn off the main power switches.
    1. **Safety**:
* Normal safety precautions for working around any moving machinery are to be observed.
  + Avoid loose clothing such as unbuttoned shirt sleeves, lab coats or dangling ties.
  + Inspect tools and electrical equipment such as heater bands for defects.
  + Never place fingers or metal probes in the feed throat. If necessary, use a plastic probe for clearing the throat.
  + Because of possible overpressure, clamp or bolt failure, never stand directly in front of any extruder during start up, operation or shut down.
  + Use a vacuum for cleaning and air hose with low-pressure nozzle for cleaning inaccessible areas.
  + Keep the floor area around the extruder clean of compound and water, which could cause slipping or electrical shock hazard.
  + Check the pressure gauge in the head of the extruder to be sure it is indicating pressure correctly.
  1. **PACKING**
* Master batch received from extrusion section.
* Handover that sample to QC department to check their quality from data color machines.
* After approval from QC, put that material into the dryer to remove the moisture, then screening the materials.
* Calibrate the packing scale
* Start packing of that material into our standard packing procedure which is

20-25Kg per bag in Aristo bag with the help of scale,

* Handover all bags to finish good store.
  1. **Acceptable Wastage:**

We cannot eliminate the wastage factor from the system, but we can minimize it with the help of training of workers.

Wastage is inversely proportional to Produced Quantity,

In Our system Avg wastage 1-2% is tolerable according to recipe and plan quantity

## Associated Documents and Records

Final weighing recipe **(DOC #: BRCC/SMD-WM/ FRM-007)**

Daily production and wastage calculation (**DOC#: BRCC/SMD-PRO/FRM-001)**

Daily line wise packing activity report **(DOC #: BRCC/SMD-PKG/FRM-001)**

**Amendment History Record**

| **Revision Number** | **Section** | **Amended Text** |
| --- | --- | --- |
| **1** | **3** | Added accepted Avg wastage value which is 1 to 2% |
| **2** | **2** | Change of authority/responsibility |
| **3** | **ALL** | ALL procedure are merged (weighing, mixing, extrusion and packing) + Remove approvals from front page and added it in footer |