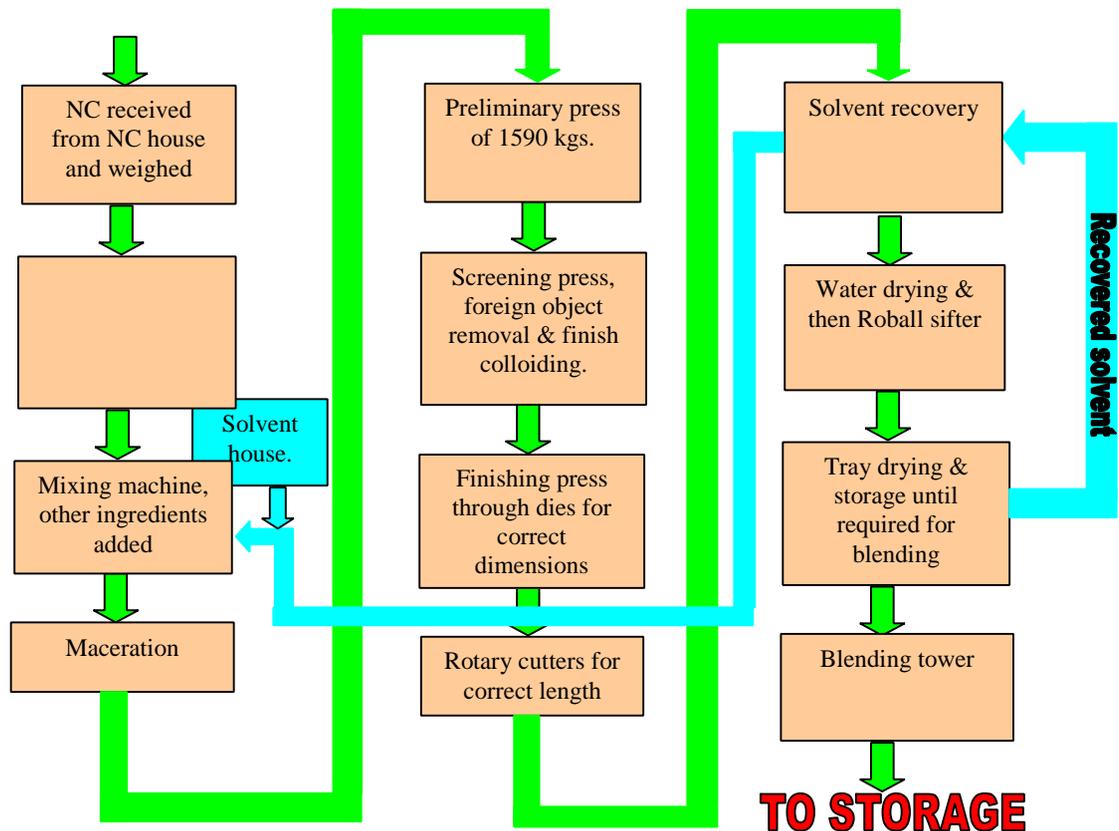


CANNON POWDER MANUFACTURE



SUMMARY OF MANUFACTURING PROCESS

The Nitrocellulose received from the Nitration house is weighed taking the moisture content into account to achieve a known quantity of nitrocellulose. This weighed quantity is loaded into a hydraulic press where it is put under moderate pressure to remove most of the water and then 95% pure alcohol is pumped through the nitrocellulose to displace the remainder of the water and to ensure that the alcohol content reaches the desired level.

The dehydrated block of nitrocellulose is now passed to the mixing house and placed in a mixing machine with a solvent consisting of two parts ether and one part alcohol.

The mixing machine consists of a tank with a heated jacket and two contra-rotating blades. It is at this stage that the ingredients Dibutylphthalate and Diphenylamine are added. These two ingredients are dissolved in the ether. Other ingredients such as Dinitrotoluene and Potassium sulphate are added in a dry state and the mixing is carried out for a specified time.

From the mixing house the nitrocellulose is then passed to another mixing machine where it is macerated. This macerated colloid is then passed to a press where it is given a press of approximately 1600kg. This almost completes the colloid process.

From here the block is taken to the press house where the screening process takes place. The

material is extruded through a series of very fine perforations to remove any foreign material and to complete the colloid process. This material is then passed through fine mesh screens and then through dies with carefully controlled hole and pin measurements to give cords of the correct dimensions both internally and externally. These cords are then passed through cutters whose feed and cutting rates are finely adjusted to give the required grain length.

Throughout the manufacturing process great efforts are exerted to recover solvent at every stage of the process. When the powder grains have been made they are loaded into a solvent recovery tank where hot air is passed through the tank. You only have to smell some newly made propellant to realize that not all solvent is recovered. There is always a very strong solvent smell from the propellant.

After this solvent recovery the powder is passed to the "Jetting house" where the powder is unloaded into a fast moving jet of cold water which carries the powder to a sifter called a "Roball Sifter" which removes over and under sized grains. These sifted grains are then dropped into a hopper where they are treated with a hot jet of water thence into a water-drying tank where hot water is passed through the grains for several hours.

After the water dry process the powder is passed to the "Tray drying" house where the powder is loaded onto trays with holes in the bottom and air at 55°C is passed over them.

After the powder is dried it is stored until required for blending. Because each batch has been carefully manufactured and closely monitored for quality and identity, a blend of batches can be arranged to give any desired ballistic qualities. Blending is achieved by taking four batches in trucks to a blending house that has a conical mixing chute and four ducts that lead to empty trucks at the bottom of the chute. The trucks containing the original four batches are transported up to the top of the chute and the contents tipped into the chute. The batches are mixed during the passage down the chute and the ducts. The mixed batches are in turn taken to the top of the chute and tipped in to repeat the procedure. The whole process consists of three blending runs. The blending tower is a very hazardous operation as static electricity is a constant danger and every effort is taken to eliminate it. Most of the operation is carried out by remote control. The blended powder is passed to storage where various tests will be carried out to determine its characteristics to enable correct ballistic charges to be made up.