2.1.6 Rotary Metal Parts Treatment Unit

Rotary metal parts treatment (RMPT) is used in the decontamination of empty projectile and mortar shells. The RMPT consists of a cylindrical structure rotating at a prescribed speed inside a cylindrical furnace. The dimensions of the RMPT are 4 feet, 8-inches inner diameter by 15 feet, 7-inches in length with design conditions of 15 psig/full vacuum at 1,500 °F. The inside cylinder contains 15 cages which are evenly distributed around a 36-inch outside diameter inner pipe, supported and strengthened by baffles. Each cage is constructed with three ½-inch diameter stainless steel rods, positioned at a 120-degree angle and parallel in the axial direction. The size of the cages is dependant on the different munitions and mortars to be treated.

The RMPT is heated by using external electric induction coils and superheated steam as the carrier gas.

Munitions that have been washed and drained are transported by a conveyor system and loaded into the cages on a unit feed basis. The furnace is heated by induction power supplied from a radio frequency generator. The entire furnace wall area must be heated and maintained at a temperature of 1,250° F. The furnace shell must have a high emittance in order to optimize performance. In addition, the shell must also have good chemical resistance to corrosion, in order to resist the acid gases that are generated during operation. The total residence time for each munition ranges from 75 minutes for 105-mm projectiles and 4.2-inch mortars to 105 minutes for 155-mm projectiles. At the same time as a munition is loaded on the front end of the unit, a treated munition is discharged at the opposite end of the furnace. A vent gas reheater is installed downstream of the RMPT to complete destruction of the agent. Downstream of the reheater, the vent stream is cooled and condensed in a quench condenser which is in contact with a recirculated brine stream. Noncondensable gases will be sent to a dedicated CATOX® offgas treatment system.

Detailed process flow diagrams and design specifications for the RMPT, the BMPT and the associated ancillary equipment are in provided in following document: Rotary Metals Parts Treatment.

Internal parts removed from the 105-mm, 155-mm munitions and 4.2-inch mortars are processed in a smaller Batch Metal Parts Treatment (BMPT) unit. The internal parts consist of burster wells, burster tubes, fuzes, nose cones, lifting lugs and plugs. Similiar to the RMPT, the BMPT consists of a cylindrical furnace which uses external induction coils as the primary heat source and superheated steam as the carrier. The BMPT measures 4 feet, 8-inches in diameter by 11 feet in length with design conditions of 15-psig/full vacuum at 1,500 ° F. The internal parts are removed from the main bodies of the projectiles or mortars and collected into rectangular boxes. These boxes are placed on a rolling plane and fed into the furnace on a batch basis.