

Automated Gun Propellant Metrology System -VisAM GP

Gun propellant grains are of different compositions, and are designed to meet the internal ballistics requirements of various calibres of guns. Other than the chemical composition, dimensions of gun propellant grains are also very important parameters in the design of grains for fulfilling the internal ballistic requirements. To ensure that the manufactured grains are within the design tolerance, various dimensions such as sizes of inner web, outer web, diameter of inner holes, outer diameter and length etc are measured on a sample size of grains drawn from manufactured lot. The physical dimensions of gun propellant grains are not only important in inspection of grains, but they are also very important parameters for internal ballistics evaluation of gun propellant (GP) grains. The manual process of measurement is time consuming and is also prone to errors as the consistency of measurement varies from person to person. Hence there was a requirement for the development of an automated gun propellant metrology system.

DRDO Laboratory High Energy Materials Research Laboratory (HEMRL), Pune has designed and developed an Automated Gun Propellant Metrology System-VisAM GP (Vision assisted Automated Measurement Gun Propellant) for accurate and robust measurement of simple as well as complex geometry of gun propellant grains. The system has capability of automated and simultaneous measurement of dimensions of GP Grains such as outer diameter, outer web(s), diameter of internal hole(s), inner web(s) & length of the grain etc, without requiring a person to perform any manual measurements. The system also performs statistical analysis for automated calculation of Average Web size, Average outer diameter etc for a batch of large numbers of grains, which assists the user to accept or reject the batch under inspection.

VisAM GP online metrology and inspection of gun propellants in a production line, to save the time, efforts and manpower requirements for the end user.

The salient features of Automated Gun Propellant Metrology System

- Simultaneous measurement across multiple axis.
- Automated, reliable, faster and accurate measurement.
- Measurement for different shapes of grains.
- Non contact method without manual intervention.
- Automated detection of grain features such as holes and outer boundary.
- Image processing algorithms for inspection of Grains with complex geometry and shape.
- Menu to create a new record for storing the measurement of fresh batch, and also to update the results in the existing record for earlier batch.
- Automated calculation of statistical parameters such as average web, average OD etc for a batch of grains.
- Scalability for inspection of newer type of grain with different geometry, shape & color.