

SIEVE ANALYSIS OF CUT WIRE SHOTS

PURPOSE Sieve analysis determines the particle size distribution of granular materials by passing them through a series of progressively smaller sieves.

WHAT IS SIEVE ANALYSIS?

Also called a gradation test, sieve analysis assesses particle size distribution (PSD). A stack of sieves arranged from largest to smallest separates the material by size. The mass retained on each sieve is weighed and expressed as a percentage of the total sample, producing a gradation curve.

PRINCIPLE

Mechanical separation occurs by particle size: particles larger than a sieve opening are retained, while smaller particles pass to the next sieve. The cumulative percentage passing can be plotted against sieve size on a semi-log graph.

STANDARD TEST PROCEDURE

01	Sample Preparation	Dry the sample to constant mass and mix thoroughly to ensure representativeness.
02	Sieve Stack Setup	Arrange sieves from largest to smallest opening, with a pan at the bottom to collect fines.
03	Sieving	Place the sample on the top sieve and agitate using a mechanical shaker or manually until the mass on each sieve stabilizes.
04	Weighing	Remove each sieve and weigh the retained material to calculate percentage retained and cumulative percentage passing.
05	Data Analysis	Plot the results to generate a gradation curve for material classification and engineering assessment.

ADVANTAGES

- Simple and cost-effective method.
- Accurate and reproducible for coarse-grained materials.
- Supports material performance and suitability assessment.

LIMITATIONS

- Less effective for very fine particles ($<75\text{ }\mu\text{m}$), which require hydrometer analysis.
- Manual sieving can be tedious and prone to errors if not carefully performed.

CUT WIRE SHOT – EXAMPLE SIEVE DISTRIBUTION

Reference acceptance pattern for stainless steel cut wire shots

Sieve Size / Product	Distribution Requirement
Ø 0.80 mm	
1.00 mm	100% pass
0.90 mm	95% pass
0.80 mm	90% retained
0.70 mm	5% pass
0.60 mm	0% pass

Sieve Size / Product	Distribution Requirement
Ø 1.00 mm	
1.20 mm	100% pass
1.10 mm	95% pass
1.00 mm	90% retained
0.90 mm	5% pass
0.80 mm	0% pass

QUALITY ASSURANCE NOTE
Sieve analysis remains a fundamental test for understanding particle size distribution and supporting material selection, quality control and performance evaluation in industrial applications.