

Sample Division of Large Volumes: Clever Solutions Provided by RETSCH

Representative sampling of large sample volumes is an integral part of the physical and chemical analysis of bulk goods and has a decisive influence on the quality of the results. A precisely defined procedure is crucial for this process.

The objective of sample division is to obtain representative part samples suitable for the determination of characteristic properties of the original sample.

However, extraction of a sample from the bulk is not always carried out in a way to ensure representativeness. This is a widespread flaw in the quality control process with a negative impact on the subsequent analysis results. Therefore, more attention should be paid to the correct sampling procedure. Sample division is often considered as a labor-intensive process which not always leads to representative results. RETSCH provides some convenient solutions which help to improve working conditions and thereby the quality of the sampling process.

The challenge of sample division is to obtain a part sample which represents the original sample and which can therefore be used directly for analysis. For example, if 200 ml are to be extracted from 60 liters of sample, a sample splitter is often the first choice. A large-sized sample splitter has a feed hopper of 25 l max. and divides the sample into two parts of 12.5 l each in the first step. It is not recommended to split more sample material in one go because the collecting vessels might be difficult to lift due to their weight and the material might overflow. To obtain 200 ml of representative sample, approximately 20 sample splittings are necessary. It is more than doubtful if these part samples can still be called representative. Not to forget that the use of sample splitters involves dust exposure.

Comparison of different sampling and sample division methods

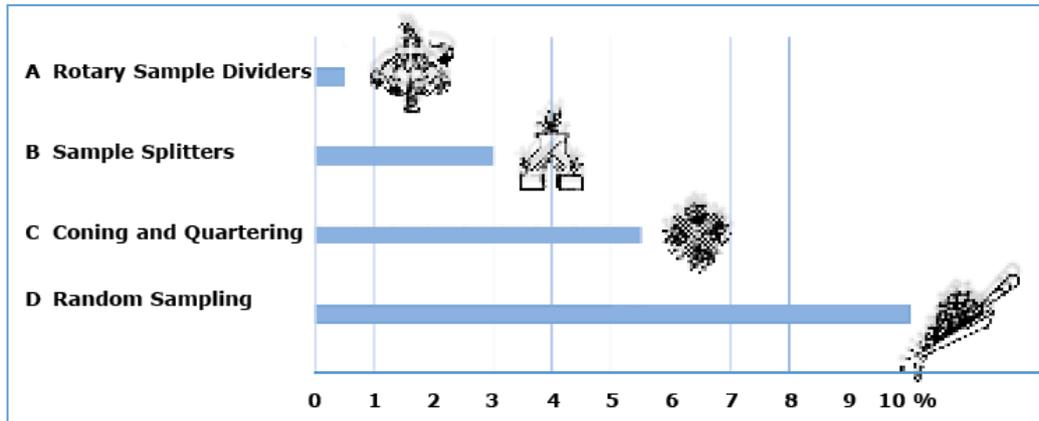


Fig. 1: Bulk material, feed size < 5 mm. The diagram shows qualitative variations among part samples for various methods of sampling and sample division.

A faultless and reproducible analysis requires accurate sample preparation. Meaningful analysis results can only be obtained if the sample is representative of the original material. Rotating sample dividers provide representative part samples and thus ensure reproducible analysis results.

Solutions from RETSCH

RETSCH's PT 600 XL sample divider is the perfectly efficient solution for exactly this type of application.



Fig. 2: RETSCH PT 600 XL



Fig. 3a: Module for part sample with reject



Fig. 3b: Module for eight part samples

In the rotating sample divider PT 600 XL the sample is fed in a controlled continuous stream via a vibratory chute. **Either one part sample is extracted or the stream is divided into equal segments by the action of a "circle" of segmental buckets rotating beneath it** (fig. 3 a+b).

The instrument features **two modules for either discontinuous or continuous operation** with reject receptacle. Different volumes may be processed by simply exchanging the sample vessels; no additional instrument is required. Thanks to the differently sized segmental buckets it is also possible to extract single samples in varying volumes. The previously mentioned sample of 60 l can thus be fed to the hopper in one go (fig. 4).



Fig. 4: Up to 60 l of sample material can be fed to the hopper of the PT 600 XL



Fig. 5: Removal of the 6 l sample vessel

In continuous mode the integrated vibratory chute transports the entire sample amount to a cone with outlet (module for one part sample with reject), where the major part of the sample is collected in the reject receptacle. Inside the reject module is a 6 l sample vessel which collects a representative part sample of the complete sample stream with each rotation. The speed of the PT 600 XL can be set from 18 to 53 rpm. After the first division step, the 6 l vessel is removed (fig. 5).

Then the reject module is replaced with the module for discontinuous operation, containing 6, 8 or 10 segments (6 x 10 liters / 8 x 7.5 liters / 10 x 6 liters), fig. 6. This module is exclusively used for batch-wise sampling without reject.

Fig. 6: Module with 8 segments



The first part sample of 6 liters is again fed to the hopper and reduced to the desired number of part samples with the module for discontinuous operation, for example 10 samples of 600 ml (fig. 7).



Both division processes don't take longer than 10 minutes and not only offer considerable time saving but also consistent working conditions resulting in reliable sampling results; this is a clear advantage over manual sample division or using a sample splitter. Another pro: the PT 600 XL is quickly and easily cleaned because all parts coming into contact with the sample can be easily removed.

Fig. 7: The first part sample of 6 liters is again fed to the hopper

Typical applications:

The rotating sample divider PT 600 XL reliably and reproducibly processes a large variety of bulk materials: soil, construction materials, chemicals, fertilizers, filling material, grain, coffee, flour, metal powders, minerals, nuts, seeds, sand, washing powder, cement clinker etc.

Advantages PT 600 XL

- Exact division of large sample volumes
- Modularer design
- Variable speed 18 to 53 rpm
- Continuous sampling: 1 part sample with reject
- Discontinuous operation: 6 to 10 part samples
- Vibratory feeder with chute for easy cleaning

More information on www.retsch.com/pt600xl