

## **SAMPLING STANDARD FOR MATERIALS IN GRANULE, BROKEN CATHODE OR FLAKE FORM**

This sampling standard is to be used for materials in granule, broken cathode or flake form, and is based on procedures laid down in all relevant ISO standards for the products in question. Any deviation from this standard must be notified and agreed by the principals prior to the commencement of sampling operations.

The description / tonnages of material which are covered by this standardised procedure are as follows:

- Broken Cathodes, Granules, Flakes: small quantities i.e. 1 – 20 m/t – packed in big bags or drums

Detailed photographs are to be taken during all stages of the operations.

The material must first be described by name of warehouse, place of storage within the warehouse location, tonnage, date of storage, weight list per bag/drum/pallet, markings and seals affixed, or if relevant, broken, as found prior to sampling. List of seals affixed by sampler after sampling. Prior to commencement of the sampling operation, the parcel must be inspected as part of the materials' control. Any contamination found must be reported and an assessment made as to the level of contamination and overall percentage of the total lot. Contaminants may include, but are not restricted to, solid pieces of iron and steel, wood and wood splinters, firestone from furnaces, free slag, attached slag, inherent slag, sand and dirt. A visual description of the material should also be noted, including any discolouration, blow holes or other physical variants.

The size distribution of the parcel is vital, and should take into consideration the 3-dimensional nature of the material, especially as one of the characteristics of Ferro Alloys is that the quality diminishes with the physical size, i.e. the smaller the size the lower the quality, therefore the sampler must ensure that the sample being drawn has the same size distribution as the consignment being sampled. Samplers will form an opinion on the size distribution visually or by using the screen test method, as outlined in ISO 4551 (amongst others). The size distribution shall be recorded in the final sampling report in the form of percentages for the following ratios, unless otherwise agreed by the principals. It is therefore essential that client instructions are specific, as to whether additional or different ratios are required.

### **Standard Size Distribution Ratios**

0-10mm  
10-25mm  
25-50mm  
Above 50mm

The topline material must also be noted in the sampling report.

The only equipment acceptable for the sampling procedure is an ISO shovel – dimensions of the shovels are dependent on the size of material and are detailed as per ISO 3713.

### **Sampling of Granules, Broken Cathodes & Flakes**

Manual sampling is to be undertaken on a low capacity stream of the product where the maximum top size is 100mm. To achieve this low capacity stream, the product is to be tipped from the original drums / big bags and sampling will be undertaken from the product stream.

100% sampling must always be undertaken, i.e. samples are to be drawn from the top, middle and bottom of each bag or drum in the lot.

The minimum number of sample increments drawn will be 3 from each drum / big bag (top, middle and bottom), and will be dependent on the size distribution. Each increment drawn will reflect the size distribution of the consignment.

### **Preparation of Samples for Chemical Analysis**

The total number of sample increments drawn will be collected in new, clean, dry, airtight plastic sacks. The sacks will be closed between the taking of increments to prevent moisture loss and will be sealed with numbered seals if left unattended at any time. Each parcel should be clearly identified by an assigned lot number, material type and date and the sacks are to be marked accordingly.

The sample increments will then be prepared either at the place of sampling if the facilities are available or, if not, the sacks containing the sample increments will be removed from the place of sampling to the inspector's property for preparation.

The entire gross sample is screened over a 10mm sieve with any oversize material to be crushed and screened again. This process is repeated until all of the material passes through the screen. The crushed sample is thoroughly mixed (as per ISO 3713 paragraph 6.4) and placed into a special container (as per ISO 3713 paragraph 6.5). The sample material is then tipped from the container whilst it is lightly shaken so the alloy falls uniformly along the centre line of the riffles (a set of dividers which equally divides a sample into two parts) and then one of the two parts obtained is selected at random by the sampler.

The part selected continues to be divided in the riffled container in the above manner until the weight of the remaining sample is approximately 4-5 kilos. A part of this sample is then split and placed into a thermostatically controlled drying oven and dried at a temperature of 105 degrees centigrade until a constant weight is reached and the moisture content is subsequently calculated. The remaining part of the sample is then pulverised down to 80 mesh in size and a renewed division with a riffle should be repeated until the final sample is obtained. A final mixing should be undertaken whereby the sample is poured onto a piece of glazed paper which cannot contaminate it. Each corner is folded to the opposite side and back again to its original position. This operation shall be repeated a minimum of 25 times.

The mass of a test sample for chemical analysis shall not be less than 50 grams and must be placed in a clean, hermetically sealed container showing the full identifying

information. A minimum of four final samples shall be prepared from each consignment and these are then disposed of in accordance with the Principal's instructions, i.e. one to be sent to a laboratory for analysis, two to be held in reserve, etc.

All sample material not used for the final analytical samples is to be returned to the parcel from which it was drawn, i.e. repacked into the drums/bags within 48 hours of the sample being taken. This is the responsibility of the Sampling Company and they should confirm on their certificate into which drums or bags the gross sample was returned.