AS 2806.7—2004

Australian Standard™

Aluminium ores—Sampling

Part 7: Determination of quality variation (ISO 6139:1993, MOD)

STANDARDS AUSTRALIA

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Australian Aluminium Council
CSIRO Minerals
Royal Australian Chemical Institute

Additional Interests:

Aluminium ore exporters
Aluminium ores industry laboratories
Aluminium ore mining companies
Aluminium ore refineries
Producers of alumina
Superintending organization

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PREFACE

This Standard was prepared by the Standards Australia Committee MN-003, Aluminium Ores, to supersede AS 2806.7—1994, *Aluminium ores—Sampling,* Part 7*: Determination of quality variation.*

The objective of this Standard is to provide the aluminium ores industries with experimental methods for evaluating the quality variation or the increment variation of a lot.

This Standard is an adoption with national modifications and has been reproduced from ISO 6139:1993, *Aluminium ores—Experimental determination of the heterogeneity of distribution of a lot*. The changes made to ISO 6139:1993 are to make it acceptable by using terminology used in the Australian aluminium ores industry and are indicated by marginal bars and explained in Appendix ZZ.

As this Standard is reproduced and modified from an international Standard, the following applies:

(a) Its number appears on the cover and title page while the International Standard number appears only on the cover.

(b) A full point substitutes for a comma when referring to a decimal marker.

References to International Standards should be replaced by references to Australian Standards as follows:

Reference to International Standard		*Australian Standard*	
ISO		AS	
8685	Aluminium ores—Sampling procedures	2806 2806.1	Aluminium ores—Sampling Part 1: Sampling procedures
10277	Aluminium ores—Experimental methods for checking the precision of sampling	2806 2806.5	Aluminium ores—Sampling Part 5: Methods for checking the precision of sampling

The term ‘normative’ has been used in this Standard to define the application of the appendix to which it applies. A ‘normative’ appendix is an integral part of a Standard.

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AUSTRALIAN STANDARD

Aluminium ores—Sampling

Part 7:
Determination of quality variation (ISO 6139:1993, MOD)

1 Scope

This International Standard specifies experimental methods for evaluating the heterogeneity of distribution of aluminium ores, for the purpose of determining the minimum number of primary increments and consequently the sampling scheme.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 8685:1992, *Aluminium ores — Sampling procedures.*

ISO 10277:—[1)], *Aluminium ores — Experimental methods for checking the precision of sampling.*

3 General

3.1 Origin of heterogeneity of distribution

The heterogeneity of distribution is a measure of the distribution variability of the aluminium ore and hence the manner in which the particles are distributed throughout the lot. It depends on the natural variability of the aluminium ore being mined, how well it is blended, and how it is subsequently handled. It can be reduced by mixing, but it can never be completely eliminated. Unlike the heterogeneity of constitution, the heterogenity of distribution is not a function of sample mass. Its contribution to the sampling variance can be reduced only by increasing the number of increments.

3.2 Method of estimating the heterogeneity of distribution

The heterogeneity of distribution, characterized by the distribution variance, is determined by experimentally measuring the sampling variance. However, because both the composition variance (V_c) and distribution variance (V_D) contribute to the measured sampling variance, it is necessary to separate these two components. This is achieved by measuring the sampling variance at two different increment masses.

Two methods of data analysis are permitted. The first (see 5.1) is based on Visman's theory of sampling which uses classical statistics. This method gives conservative estimates of the sampling variance and hence the distribution variance. The second method (see 5.2) is based on the variogram which takes into account serial correlation between adjacent increments and the spacing between increments. It gives a better estimate of the sampling variance and should be used to optimize the sampling scheme.

In both cases, the variance of sample preparation and analysis shall be determined separately in accordance with ISO 10277, and subtracted from the measured variances.

3.3 Characteristics measured

The quality characteristics chosen for measuring the heterogeneity of distribution should be those that are most relevant to the sampling operation. For aluminium ores these could be

— aluminium content, expressed as a percentage by mass of Al_2O_3;

— silicon content, expressed as a percentage by mass of SiO_2;

1) To be published.