

ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION R 1260

GUIDE TO THE USE OF ISO RECOMMENDATION R 390,
"SAMPLING AND INSPECTION OF ASBESTOS-CEMENT PRODUCTS"

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FOREWORD

The ISO Recommendation R 390, *Sampling and inspection of asbestos-cement products*, was drawn up by Technical Committee ISO/TC 77, *Products in asbestos-cement*, the Secretariat of which is held by the Association Suisse de Normalisation.

The Committee has studied the American Military Standards 105 B* and 414 and has used many of the principles underlying these in the drawing up of ISO Recommendation R 390. It was felt, however, that the relationship between manufacturer and purchaser of asbestos-cement products is very often quite different from the typical relationship in military procurements. For this and various other reasons the Committee decided to prepare its own Recommendation concerning asbestos-cement products and an associated Guide.

With respect to the Guide it is also appropriate to refer to additional works of a more extensive character, for example :

- (1) Administration of sampling procedures for acceptance inspection, Handbook H 105, Department of Defense, Washington D.C., 1954**.
- (2) Defence guide to sampling inspection, Ministry of Defence, London, 1962***.
- (3) Mathematical and statistical principles underlying Military Standard 414, Department of Defense, Washington D.C., 1958.

Anybody interested in systems of sampling inspection will profit from reading these handbooks.

The present Guide, however, has the much more limited purpose of explaining the use of the very simple collection of sampling plans in ISO Recommendation R 390 which represents a balanced compromise between theoretical statistical points of view and practical economical considerations. It is the hope of the Committee that the sampling plans will prove applicable in practice, and they will certainly give a safer basis for the distinction between good and inferior material than do the rules and methods hitherto used, thus providing greater protection to the user.

The sampling plans recommended have approximately the same properties as certain plans for which the *acceptable quality level (AQL)* is equal to 4 % in the Military Standards studied.

The Committee has found it useful to include in the Guide an additional section dealing with the conditions under which a rejected lot may be resubmitted for inspection.

* The latest edition is now (1969) No. 105 D.

** The latest edition is now (1969) : H 53, Guide to sampling inspection.

*** The 1966 edition of the Defence Guide has not been taken into account by the Committee.

GUIDE TO THE USE OF ISO RECOMMENDATION R 390, "SAMPLING AND INSPECTION OF ASBESTOS-CEMENT PRODUCTS"

1. SCOPE

This ISO Recommendation explains in more detail than in ISO Recommendation R 390 the rules laid down for batching, sampling and inspection, and clarifies the consequences of using the methods of sampling inspection recommended. Also, a number of examples are given. In addition, it describes the conditions under which rejected lots can be resubmitted for inspection.

2. UNIT OF PRODUCT

The term *unit of product* means the entity to be inspected in order to determine its quality characteristics. The unit of product is specified in the relevant ISO Recommendation.

The unit of product is used as a *counting unit* in determining lot size, sample size, number of conforming units, etc.

3. CONFORMING AND NON-CONFORMING UNITS

A *conforming unit* is a unit of product having quality characteristics in conformity with the specified requirements in the relevant ISO Recommendation.

Examples :

ISO Recommendation R 391, *Building and sanitary pipes in asbestos-cement*, (clause 4.3.1) specifies :
The unit bursting stress R_t of pipes of type A should be not less than 100 kgf/cm^2 [10 MN/m^2].

This means that a building and sanitary pipe of type A (i.e. one unit of product) having R_t equal to or larger than 100 kgf/cm^2 (10 MN/m^2) is a *conforming unit*, whereas a pipe having R_t less than 100 kgf/cm^2 (10 MN/m^2) is a *non-conforming unit*.

ISO Recommendation R 393, *Asbestos-cement corrugated sheets for roofing and cladding*, (clause 2.5.3) specifies : During the 24 hours of the impermeability test, traces of moisture may appear on the lower surface, but in no instance should there be any formation of drops of water.

This means that the corrugated sheet from which the test piece is cut and which shows formation of drops of water during testing is a *non-conforming unit*.

4. INSPECTION LOT

An inspection lot is a collection of units of product which is accepted or rejected as a whole, depending on the quality characteristics established by inspection of the units of product drawn from the lot.

The manufacturer should arrange for the dividing of the consignment into inspection lots and provide for identification and segregation of each lot. It is important to maintain a separate identity until a decision regarding acceptance or rejection of the lot has been taken on the basis of the results of the sampling and testing.

The inspection lot should be presented in such a form that every unit of product is accessible as far as practically possible.

Inspection lots should be homogeneous, i.e. consist of units of product made under essentially the same conditions. This may be attained by forming the lots from units that are produced

- within a relatively short period;
- from similar raw materials;
- by means of similar moulds (or patterns);
- under similar conditions of manufacture, hardening and maturing, etc.

It should be emphasized that by selection of homogeneous lots, the system of sampling inspection employed will lead to a better discrimination between lots of good quality and lots of bad quality.

The relative sample size — i.e. the sample size as a fraction of the lot size — is decreased considerably as the lot size is increased. Therefore, taking into account the costs of sampling, inspection and testing, it will be advantageous to use as large inspection lots as possible, subject to the limitation discussed above with respect to the homogeneity of the inspection lot. Also the discriminating power of the sampling system will increase with increasing sample size.

It is therefore recommended that the parties concerned should agree upon a maximum lot size as large as possible without coming into conflict with the homogeneity requirements and other obviously practical considerations. To avoid unreasonable inspection and testing costs for small lots, a minimum inspection lot size should also be agreed upon. In the event of agreement not being reached, the figures for maximum and minimum inspection lot sizes given in the relevant ISO Recommendation should be used.

Example :

Size of inspection lot	Sample size	Relative sample size
200	4	2 %
2 000	15	0.75 %
20 000	35	0.175 %

5. DIVISION OF A CONSIGNMENT INTO INSPECTION LOTS

By a consignment is meant a delivery or the part of a delivery which comprises units of the same category.

Examples :

Sheets of same profile but of different lengths may be regarded as of the same category.

Sheets of different profiles are regarded as of different categories.

Pipes of same diameter, class, type, or series, but of different lengths, may be regarded as of the same category.

Pipes of different diameters are regarded as of different categories.

Pipes of same diameter but of different classes or types are regarded as of different categories.

Any consignment which is known to be, or is expected to be, non-homogeneous as regards any of the properties to be tested by sampling should be divided by the manufacturer into assumed homogeneous sub-consignments prior to the division into inspection lots.

Any homogeneous consignment or sub-consignment should be divided by the manufacturer into inspection lots.

If larger than the minimum inspection lot size, any fraction of a consignment remaining after the highest possible number of maximum inspection lots has been taken out forms an inspection lot. Similarly, if larger than the minimum inspection lot size, any homogeneous consignment or sub-consignment smaller than the maximum inspection lot size forms an inspection lot.

Consignments or fractions of consignments smaller than the minimum inspection lot size are not submitted to sampling and testing.

However, should the testing of one or more of the inspection lots justify rejection of any of these lots the parties may agree to disregard this provision and to submit the remaining fraction to sampling and inspection.

Example to show the importance of having the largest possible inspection lot :

Suppose that a consignment consists of 1400 building and sanitary pipes of 250 mm diameter and that the maximum and the minimum inspection lot sizes agreed upon are 400 and 100 pipes respectively (see ISO Recommendation R 391, clause 4.2.2), then the consignment should be divided into 3 inspection lots of size 400 and 1 inspection lot of size 200. According to Table 1 of ISO Recommendation R 390, the sample size for lots of size 400 is 5 pipes and for lots of size 200 is 4 pipes, making a total of 19 pipes.

If the consignment consists of 1250 pipes, it is divided into 3 inspection lots of 400 pipes – from each lot 5 pipes, totalling 15, are drawn – and a remainder of 50 pipes which is not normally submitted to sampling and testing.

If the parties had instead agreed upon a maximum inspection lot size of 1500 pipes, and the same minimum lot size, then the sample size would in both cases have been 10 pipes, which represents a saving of 9 and 5 pipes respectively.