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Graphical symbols for use on detailed maps, plans and geological cross-sections — Part II : Representation of sedimentary rocks

*Symboles graphiques à utiliser sur les cartes, les plans et les coupes géologiques détaillés —
Partie II : Représentation des roches sédimentaires*

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FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up has the right to be represented on that Committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the Technical Committees are circulated to the Member Bodies for approval before their acceptance as International Standards by the ISO Council.

Prior to 1972, the results of the work of the Technical Committees were published as ISO Recommendations; these documents are now in the process of being transformed into International Standards. As part of this process, Technical Committee ISO/TC 82 has reviewed ISO Recommendation R 710/II and found it suitable for transformation. International Standard ISO 710/II therefore replaces ISO Recommendation R 710/II-1968.

ISO Recommendation R 710/II was approved by the Member Bodies of the following countries :

Belgium	Greece	Poland
Brazil	Hungary	Portugal
Chile	India	South Africa, Rep. of
Czechoslovakia	Italy	Spain
Egypt, Arab Rep. of	Japan	Sweden
France	Korea, Rep. of	Turkey
Germany	Netherlands	U.S.S.R.

The Member Bodies of the following countries expressed disapproval of the Recommendation on technical grounds :

New Zealand*
Yugoslavia

The Member Body of the following country disapproved the transformation of ISO/R 710/II into an International Standard :

Poland

Other documents in this series on graphical symbols for use on detailed maps, plans and geological cross-sections include :

Part I : *General rules of representation.*

Part III : *Representation of magmatic rocks.*

Part IV : *Representation of metamorphic rocks.* (In preparation.)

Part V : *Representation of minerals.* (In preparation.)

* Subsequently, this Member Body approved the Recommendation.

Graphical symbols for use on detailed maps, plans and geological cross-sections — Part II : Representation of sedimentary rocks

1 SCOPE AND FIELD OF APPLICATION

This International Standard provides a unified series of symbols and ornaments for the representation of sedimentary rocks on detailed maps, plans and geological cross-sections.

The symbols and ornaments may be divided in two groups, as follows :

- 1) principal types;
- 2) varia.

They are reproduced in two tables which, being derived from a logical system, may be completed easily in case of need.

2 PRINCIPAL TYPES

2.1 Principles of representation (see table 1)

In columns 1 to 15 of the table comprising 18 principal types, i.e. 18 rows numbered 1 to 18, the nature of the rock is specified as far as possible by means of an adjective; each column designates a petrographic property of the rock in question (box 3/12, for example, represents an area of sandy limestone.¹⁾ At the top of table 1 (line entitled "Elementary symbols") are given the individual symbols, several of which, when juxtaposed, form the ornaments of the corresponding rocks. The constituents of rocks are given from left to right : first the clastic constituents (from detritus to clay), followed by the chemical and organic sediments. In the main, the same order is observed for the horizontal subdivision of table 1.

2.1.1 The elementary symbols shown have been used to form the ornaments with an irregular arrangement to characterize loose rocks and a systematic staggered arrangement to represent consolidated rocks.

2.1.2 The column "Basic types", comprises rocks with no supplementary characterization, and pure types. "Mixed types", on the other hand, are rocks whose composition is

characterized by their petrographic peculiarities, for example, by a binder such as argillaceous sandstone, box 5/8, or by additional constituents such as gritty sand, box 2/3. The boxes at the intersection of a basic type (horizontal line) and of the same character (vertical column) are left white and are emphasized by a diagonal.

2.2 Individual symbols

As far as possible, the selected ornaments express in a diagrammatic way the nature of the rocks. This is relatively easy to accomplish in the case of clastic sedimentary rocks.

2.2.1 Detritus

This is represented by sharp-cornered particles; rounded gravel is represented by round particles. The smaller grain of sand is marked on the drawing by a dot. A more detailed subdivision according to the size of the grains, for example, division into coarse, medium or fine sand, may be obtained by a corresponding variation in the dimension of the symbols. As an example, the four following ornaments show the way in which it is possible to distinguish between the different types of sand depending on the size of the grains (see figures 1 to 4).

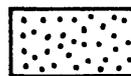


FIGURE 1 — Coarse sand

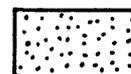


FIGURE 2 — Medium sand

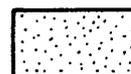


FIGURE 3 — Fine sand



FIGURE 4 — Sand with grains of different sizes

1) In order to designate a box, always quote first the number of the column and second the number of the line, the two numbers being separated by a stroke, for example, 3/12.

2.2.2 Silt

The elementary symbol is made up of two dots (the symbol of sand) and a line (the symbol of clay) corresponding to the dimension of its particles which have an intermediary place between sand and clay. It should, however, be noted that the dots should touch the line.

2.2.3 Clay and clay rocks

A horizontal ornament has been chosen among the basic types, in order to illustrate the imperviousness of these rocks. In the ornament for shale which is characterized by the highest degree of consolidation, the lines are elongated so that they form continuous lines.

2.2.4 Limestone

The ornament retained is already widely used and has the form of a trellised framework. It represents a stratified limestone with its fissures.

2.2.5 Dolomite

In this ornament, where calcium is partially replaced by magnesium, the vertical lines slope slightly towards the right, forming an angle of 60° with the horizontal. The same oblique line is found again in the ornaments for potassium-magnesium salts. The elementary symbols for the two carbonates make use of the characteristic part of the corresponding ornaments.

2.2.6 Gypsum

The elementary symbol is a simplified reproduction of its typical twin crystal known under the name "fer de lance".¹⁾ The angle shall be 90° in order to give a more elongated form to the symbol.

2.2.7 Anhydrite

The same symbol as in 2.2.6, but reversed, is used to represent anhydrite. Being similar to the letter A (Anhydrite), it is relatively easy to remember.

2.2.8 Sodium salt

This is represented by a square, derived from the cubic shape of its crystal. In order to distinguish sodium salt from potassium-magnesium salts, a diagonal line shall be traced in the square, descending from left to right in the case of a magnesium salt (by analogy with the symbol for dolomite).

2.2.9 "Ferruginous" and "siliceous" symbols

The forms finally retained have been adopted because no better ones were available. None of the efforts made to find a descriptive method of showing the property of these rocks have led to any fully satisfactory solution.

1) This designation means "spear-head".

2.2.10 Carbonaceous nature

This is represented by a black band resembling the cross-section of a seam of coal.

2.2.11 Peat

This symbol is composed of two black rectangles placed slightly out of alignment, recalling the manner of superimposing layers of peat to dry them in air. The black triangle signifying "bituminous" is already widely used.

2.2.12 Mineable deposits of any nature

These are represented by black or by a very densely cross-hatched portion. This representation shall be used primarily for mineable deposits such as coal (hard coal or lignite), bauxite, iron ores, phosphates, sulphur, and manganese ores.

When a mineable deposit is constituted by a rock for which an ornament has already been provided in table 1 (for example, rock-salt, gypsum), it may be represented either by black or by a densely hatched portion or even by the corresponding ornament. Where the black colour or the hatched portion would cover too large a surface on the map, preference shall be given to the ornament.

In order to characterize particular properties of mineable deposits, corresponding symbols are included in white areas on the black background (see figures 5 and 6).

Examples :



FIGURE 5 – Sandy coal

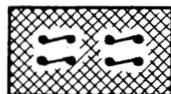


FIGURE 6 – Phosphoric iron ore

Wherever a deposit is represented by black or by a densely hatched portion, the nature of the rock shall be indicated in a key.

2.2.13 Mixed rocks

These ornaments are combinations of ornaments of the basic types and of the elementary symbols. Obviously, it is possible to include in a basic ornament several accessory elementary symbols in order to give a more detailed representation of a rock. In the table this representation of a more detailed nature has been abandoned with a view to obtaining greater clarity.

The series of mixed types appearing in table 1 is far from being exhaustive.

TABLE 1 - Principal types

Nature of rock		Detritus	Gritty pebbly	Sandy	Silty	Argillaceous	Calcareous	Dolomitic
Elementary symbols								
		1	2	3	4	5	6	7
BASIC TYPES		MIXED TYPES						
1	Detritus							
2	Gravel							
3	Sand							
4	Silt							
5	Clay							
6	Breccia							
7	Conglomerate							
8	Sandstone							
9	Siltstone							
10	Mudstone							
11	Shale							
12	Limestone							
13	Dolomite							
14	Gypsum							
15	Anhydrite							
16	Sodium salt							
17	Silicious rocks							
18	Peat							

Mineable deposits

2.2.14 *Combination limestone/clay*

Table 1 includes only two ornaments, namely that for argillaceous limestone (box 5/12) and that for calcareous clay (box 6/10). In more or less equal proportions these two constituent elements make up marlstone which, because of the frequency of its occurrence, has been mentioned in table 2. The following ornaments show the large range of possibilities of a more detailed subdivision if this is found to be necessary.



FIGURE 7 – Limestone



FIGURE 8 – Argillaceous limestone
(see box 5/12)

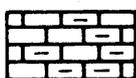


FIGURE 9 – Marly limestone



FIGURE 10 – Calcareous marl

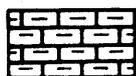


FIGURE 11 – Marl
(see table 2, No. 105)

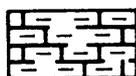


FIGURE 12 – Clayey marl

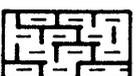


FIGURE 13 – Marly mudstone

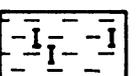


FIGURE 14 – Calcareous mudstone
(see box 6/10)

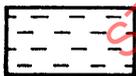


FIGURE 15 – Mudstone

3 VARIA

3.1 Principles of representation (see table 2)

Table 2 "Varia" is complementary to table 1 "Principal types" (see clause 2). It comprises not only symbols and ornaments for sedimentary rocks which are relatively rare or which are hardly suitable for diagrammatic representation as used in the case of principal types, but also symbols for the inclusions found in sedimentary rocks (minerals, etc.).

Table 2 has been compiled taking into account the principles which guided the preparation of table 1 containing the principal types. It is subdivided into the three different groups described below, containing

- a) ornaments for rocks;
- b) symbols for minerals;
- c) ornaments and symbols for other important features concerning sedimentary rocks.

3.2 Groups of varia

3.2.1 Rocks

This group contains ornaments for rocks for which the diagrammatic representation of the principal types is not very suitable.

Examples :

1 *Greywacke* (No. 101). Figures 16, 17 and 18 below show a combination of the elementary symbols of the essential constituents of this type of rock, i.e. of the symbol for sandstone, the principal constituent of greywacke, of symbols for rock fragments (for example, volcanic rocks) and of the symbol for feldspar.

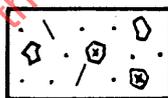


FIGURE 16 – Greywacke

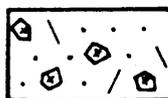


FIGURE 17 – Greywacke

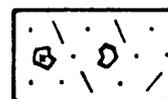


FIGURE 18 – Greywacke

2 *Loess* (No. 111). Since the size of the particles of loess is almost equal to the size of the particles of silt, the same elementary symbol (see 2.2.2) has been retained for loess; the lines however are arranged vertically and the dots added irregularly either on the right or on the left of each line. The vertical arrangement of the lines is a reminder of the straight walls which are characteristic of loess.

3 *Boulder clay* (No. 113). When it is necessary to distinguish between boulder clay and boulder marlstone, the oblique line shown in No. 113 of table 2, which represents the clay-like character, is replaced by a relatively short vertical line, which indicates the lime content of marlstone (see figure 19).

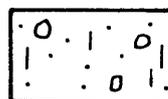


FIGURE 19 – Boulder marlstone