UDC 551.11 : 003.62

Ref. No. : ISO/R 710/II-1968 (E)

ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION

R 710/II

GRAPHICAL SYMBOLS FOR USE ON DETAILED MAPS, PLANS AND GEOLOGICAL CROSS SECTIONS

PART II : REPRESENTATION OF SEDIMENTARY ROCKS

1st EDITION
April 1968

Printed in Switzerland

Also issued in French and Russian. Copies to be obtained through the national standards organizations.

BRIEF HISTORY

The ISO Recommendation R 710/II, *Graphical symbols for use on detailed maps, plans and geological cross sections – Part II : Representation of sedimentary rocks,* was drawn up by Technical Committee ISO/TC 82, *Mining,* the Secretariat of which is held by the Deutscher Normenausschuss (DNA).

Work on this question by the Technical Committee began in 1959 and led, in 1963, to the adoption of a Draft ISO Recommendation.

In January 1965, this Draft ISO Recommendation (No. 728) was circulated to all the ISO Member Bodies for enquiry. It was approved, subject to a few modifications of an editorial nature, by the following Member Bodies :

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

Two Member Bodies opposed the approval of the Draft :

New Zealand
Yugoslavia

The Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided, in April 1968, to accept it as as ISO RECOMMENDATION.

ISO Recommendation R 710/II April 1968

GRAPHICAL SYMBOLS FOR USE ON DETAILED MAPS, PLANS AND GEOLOGICAL CROSS SECTIONS

PART II : REPRESENTATION OF SEDIMENTARY ROCKS

1. SCOPE

This ISO Recommendation is intended to unify symbols and ornaments for the representation of sedimentary rocks on maps, plans and detailed geological cross-sections.

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

(1) Principal types and

(2) Varia.

They are reproduced in two tables coming within the framework of a logical system which makes it possible to complete them easily in case of need.

2. PRINCIPAL TYPES

2.1 **Diagrammatic representation** (see Table 1, pages 8 and 9).

In columns 1 to 15 of the Table comprising 18 principal types, i.e. 18 lines 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)*. 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.

* 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 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 the smaller or the larger 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 Fig. 1 to 4).

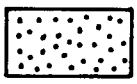

FIG. 1 – Coarse sand

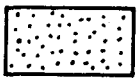

FIG. 2 – Medium sand

FIG. 3 – Fine sand

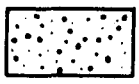

FIG. 4 – Sand with grains of different sizes

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"*. The angle should be 90° in order to give a more elongated form to the symbol.

2.2.7 *Anhydrite.* The same symbol as in clause 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 salt, a diagonal line should be traced in the square, descending from left to right in the case of a magnesium salt (by analogy with the symbol for dolomite).

* This designation means "spear-head".

1 – Principal types

ous	Dolomitic	Gypsiferous	Anhydrite	Sodium salt	Potassium-magnesium salt	Ferruginous	Siliceous	Carbonaceous	Bituminous
	7	8	9	10	11	12	13	14	15

MIXED TYPES (see also Table 2 – Varia)

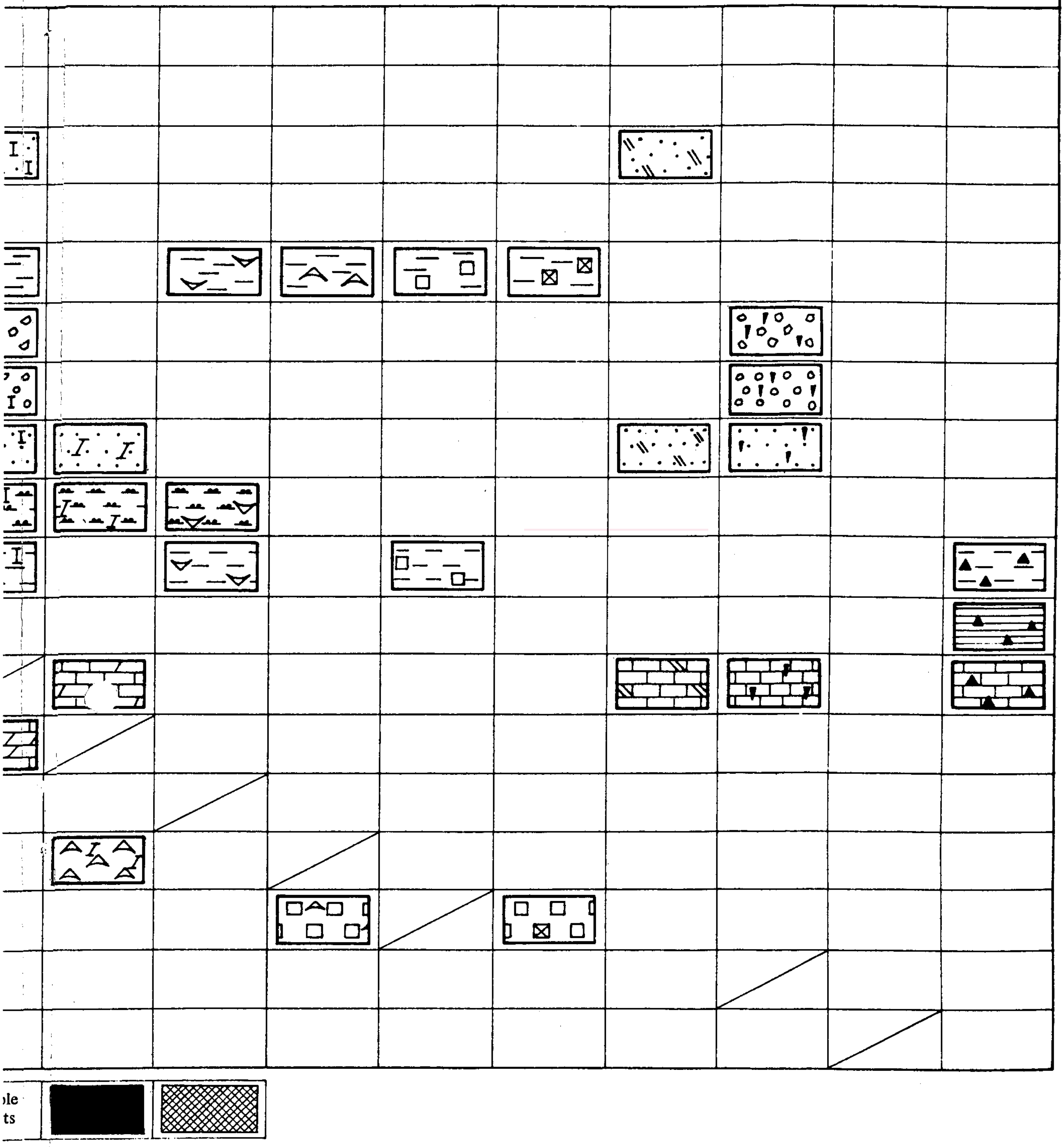

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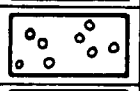
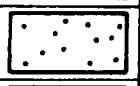
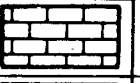
TABLE 1 – P

Nature of rock			Detritus	Gritty pebbly	Sandy	Silty	Argillaceous	Calcareous
Elementary symbols								
			1	2	3	4	5	6
BASIC 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

2.2.9 *"Ferruginous" and "siliceous" symbols.* The forms finally retained have been adopted because no better ones were available. All the efforts made to find a descriptive method of showing the property of these rocks have led to no fully satisfactory solution.

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 represented by 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 should 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), this 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 should 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 Fig. 5 and 6 below).

Examples :

FIG. 5 – **Sandy coal**

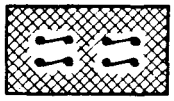


FIG. 6 – **Phosphoritic iron ore**

Wherever a deposit is represented by black or by a densely hatched portion, the nature of the rock should 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.

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, "Varia". The following ornaments show the large range of possibilities of a more detailed subdivision if this is found to be necessary.

FIG. 7 – Limestone

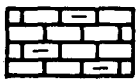


FIG. 8 – Argillaceous limestone (see box 5/12)

FIG. 9 – Marly limestone

FIG. 10 – Calcareous marl

FIG. 11 – Marl (see Table 2, No. 105)

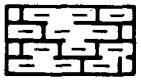


FIG. 12 – Clayey marl

FIG. 13 – Marly mudstone

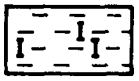


FIG. 14 – Calcareous mudstone (see box 6/10)

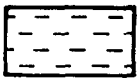


FIG. 15 – Mudstone

3. VARIA

3.1 **Diagrammatic representation** (see Table 2, page 15).

Table 2 "Varia" is complementary to Table 1 "Principal types" (see section 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

- ornaments and symbols for rocks,
- symbols for minerals, and
- ornaments and symbols for other important features concerning sedimentary rocks.

3.2 Groups of Varia

3.2.1 *The first group, Rocks,* contains symbols and ornaments of 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.

FIG. 16 – Greywacke

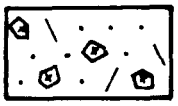


FIG. 17 – Greywacke

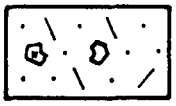


FIG. 18 – Greywacke

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 clause 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 Figure 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 Fig. 19).

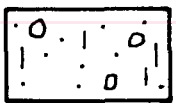


FIG. 19 – Boulder marlstone

3.2.2 *The second group, Minerals,* contains the symbols of certain minerals which may serve for a more precise characterization of sedimentary rocks (see Fig. 20).

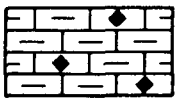


FIG. 20 – Marl with pyrite inclusions

Examples :

1. *Feldspar* No. 201. The symbol represents several long crystals of feldspar included in a sedimentary rock.

2. *Mica* No. 202. The symbol confers the impression of a few small flakes of mica.

3. *Glauconite* No. 203. The combination of three circles in contact filled in with black has been selected to show the botryoidal structure of glauconite.