



**Graphical symbols for use on detailed maps, plans and geological cross-sections —
Part 6 : Representation of contact rocks and rocks which have undergone metasomatic, pneumatolytic or hydrothermal transformation or transformation by weathering**

Symboles graphiques à utiliser sur les cartes, les plans et les coupes géologiques détaillés — Partie 6 : Représentation des roches de contact et des roches ayant subi une transformation métasomatique, pneumatolytique ou hydrothermale ou une transformation par altération

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (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 authorized 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.

International Standard ISO 710/6 was developed by Technical Committee ISO/TC 82, *Mining*, and was circulated to the member bodies in October 1983.

It has been approved by the member bodies of the following countries :

Australia	Czechoslovakia	Romania
Austria	France	United Kingdom
Bulgaria	Germany, F.R.	Yugoslavia
China	Poland	

No member body expressed disapproval of the document.

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0 Introduction

ISO 710, a series of documents on graphical symbols for use on detailed maps, plans and geological cross-sections, comprises the following parts :

Part 1 : General rules of representation.

Part 2 : Representation of sedimentary rocks.

Part 3 : Representation of magmatic rocks.

Part 4 : Representation of metamorphic rocks.

Part 5 : Representation of minerals.

Part 6 : Representation of contact rocks and rocks which have undergone metasomatic, pneumatolytic or hydrothermal transformation or transformation by weathering.

Part 7 : Tectonic symbols.

1 Scope and field of application

This part of ISO 710 provides a series of graphical symbols to represent on a map, plan or geological cross-section, rocks which have originated as the result of contact metamorphism, of metasomatic, pneumatolytic or hydrothermal transformation or transformation by weathering.

The symbols are divided into four groups (see the table) :

- a) contact metamorphism;
- b) metasomatic;
- c) pneumatolytic and hydrothermal transformation;
- d) weathering.

2 General

The rocks dealt with in this part of ISO 710 are formed either by isochemical processes (in which case they are pure contact rocks) or allochemical processes, i.e. transformation processes with allochthonous material which generally also take place within the aureole of a magmatic intrusion.

In general, these rocks owe their existence to pneumatolytic or hydrothermal processes with allochthonous material but there are also some rocks formed by molecular diffusion at elevated temperatures and by autohydration. These processes may result in a greater or lesser degree of transformation which is reflected in the rock.

Occasionally, the transformation processes have produced rocks which are identical to those of the metamorphic facies; the hydrothermal sericitisation of a volcanic rock, for example, may lead to the formation of a sericitic schist. In such a case, it is considered advisable to use the symbol for the metamorphic rock, particularly when no residue of the original volcanic rock remains.

3 Principles of representation (see the table)

3.1 General

Basically, the symbols serve to represent the rocks formed by the various transformation processes. They are not intended for characterization or interpretation of genetic processes.

In the various rock forming processes, different degrees of transformation can be seen which range from slight weathering of the original rock to the formation of a completely new rock.

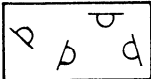
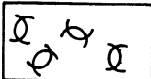
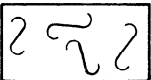
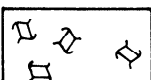
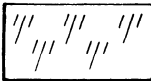
Therefore, symbols have been developed with a view to

- representing the new rock;
- acting as an additional symbol which is added to the original rock.

Table — Symbols

a) Contact rocks					
101	Contact rock in general		104	Spotted schist	
102	Contact quartzite		105	Nodular schist	
103	Contact marble		106	Hornfels	
b) Metasomatic transformation					
201	Adinole		210	Skarnification	
202	Formation of potash feldspar		211	Skarn	
203	Fenitisation		212	Skarn with ferric mineralization	
			213	Calcareous hornstone	
c) Pneumatolytic and hydrothermal processes					
301	Pneumatolytic and hydrothermal transformation in general		309	Kaolinisation	
302	Topazisation		310	Chloritisation	
303	Tourmalinisation		311	Serpentinisation	
304	Greisenisation		312	Montmorillonitisation	
305	Silicification		313	Alunitisation	

Table — Symbols (*concluded*)

c) Pneumatolytic and hydrothermal processes (concluded)					
306	Propylitisation		314	Haematitisation	
307	Saussuritisation		315	Carbonatisation	
308	Sericitisation				
d) Weathering processes					
401	Weathering				

3.2 Contact rocks (without allochthone material)

Contact rocks are the result of isochemical processes. The symbols therefore represent the new rock and are arranged uniformly over the map, the plan or the geological section.

The symbols selected are a variation of the symbol for the original rock (for example, contact marble) or else they seek to give an idea of the appearance of the rock in question (for example, spotted schist or nodular schist).

When it is desired only to indicate that a rock mass is situated within the contact zone of a plutonic rock, the general symbol for a contact rock may be added to the symbol for the original rock (see figure 1).

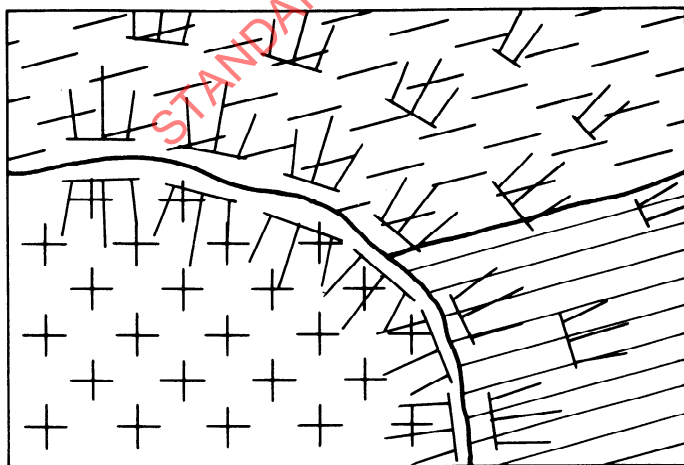


Figure 1 — Contact rock

3.3 Rocks resulting from an allochemical process

3.3.1 Metasomatic process

For rocks resulting from a metasomatic process, symbols are used either to represent the rock formed or else to characterize the nature of the transformation process by adding the symbols to those of the original rock.

As these transformation processes, most of which take place within the aureole of a magmatic intrusion, do not result in an oriented texture but rather cause the existing texture to disappear, the symbols are arranged without any orientation.

In the symbols which represent the new rock formed, the elements are also arranged without any orientation but in alternate lines (see figure 2).

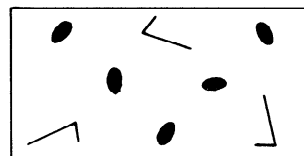


Figure 2 — Adinole

In the others, the symbol characterizing the transformation process is distributed at irregular intervals over the symbol for the original rock (see figure 3).

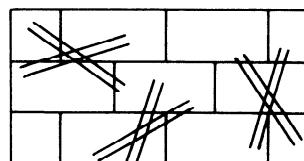


Figure 3 — Skarnification in limestone

3.3.2 Pneumatolytic and hydrothermal processes

Rocks which may have resulted from a pneumatolytic or hydrothermal process are so numerous that it is impossible to use a separate symbol for each one. It has therefore been decided to devise additional symbols which are added to the symbol for the original rock.

To characterize the nature of the process, symbols which have already been standardized for minerals formed during transformation are used. These, too, are arranged at irregular intervals. The distribution density of the additional symbols provides a method of expressing the degree of mineralization (see figures 4 and 5).

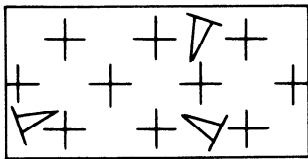


Figure 4 — Slight greisenisation in granite



Figure 5 — Advanced tourmalinisation of argillaceous schist

3.4 Weathering

Only one symbol will be used for weathering; this can be used as an additional symbol. This symbol represents influences starting from the earth's surface.

Other than the original rock, the concentration or formation of a mineral as a result of weathering can be indicated, but for this purpose only a system of abbreviations is used (see figure 6).

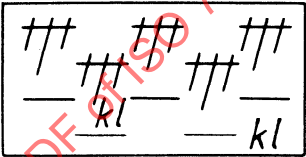


Figure 6 — Formation of kaolinite in clay by weathering