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IS 7422-4 (1985): Symbols and abbreviations for use in geological maps, sections and subsurface exploratory logs, Part 4: Metamorphic rocks [WRD 5: Geological Investigation and Subsurface Exploration]



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“Knowledge is such a treasure which cannot be stolen”

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IS : 7422 (Part 4) - 1985

Indian Standard

SYMBOLS AND ABBREVIATIONS FOR USE IN
GEOLOGICAL MAPS, SECTIONS AND
SUBSURFACE EXPLORATORY LOGS

PART 4 METAMORPHIC ROCKS

UDC 003.62 : 550.81 : 528.9 : 552.4



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MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
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Indian Standard

SYMBOLS AND ABBREVIATIONS FOR USE IN GEOLOGICAL MAPS, SECTIONS AND SUBSURFACE EXPLORATORY LOGS

PART 4 METAMORPHIC ROCKS

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SYMBOLS AND ABBREVIATIONS FOR USE IN GEOLOGICAL MAPS, SECTIONS AND SUBSURFACE EXPLORATORY LOGS

PART 4 METAMORPHIC ROCKS

0. FOREWORD

0.1 This Indian Standard (Part 4) was adopted by the Indian Standards Institution on 20 November 1985, after the draft finalized by the Geological Investigation and Subsurface Exploration Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 In all spheres of engineering construction, data on the nature of the geological formations constituting the foundations are indispensable. Often, these data are given on maps or in geological sections using symbols and abbreviations. Geological maps and sections are also required for other activities, such as mining and mineral prospecting. Such maps and sections are therefore being prepared by various agencies in the country. In the absence of any standard for the guidance of the engineering geologist or engineer, different symbols and abbreviations are being used by different agencies, the result being entirely different representations of the same geological data. The data collected and presented by one agency for a particular purpose is often useful to other agencies investigating for a different job. It, therefore, becomes essential for all agencies to follow the same practice. This standard has been prepared to fulfil this need.

0.2.1 This standard (Part 4) deals with metamorphic rocks while other parts are as follows :

Part 1 Abbreviations,

Part 2 Igneous rocks,

Part 3 Sedimentary rocks, and

Part 5 Line symbols for formation contacts and structural features.

0.3 The symbolization of rock types is based on the principles laid down by the International Organization for Standardization. For the rock types to be covered for symbolization classification of metamorphic rocks as adopted by United States Bureau of Reclamation, for engineering purposes, has been used.

0.4 In the formulation of this standard due weightage has been given to international co-ordination among the standards and practices prevailing in different countries in addition to relating it to the practices in the field in this country.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard (Part 4) covers symbols for metamorphic rocks for use in geological maps, sections and logs of bore holes, test pits, exploratory drifts and shafts for river valley projects. Rock types covered in the standard are restricted to those commonly met with in engineering practice.

2. BASIC PRINCIPLES OF SYMBOLIZATION

2.1 In order to represent a type of rock on a map or on a plan, the corresponding surface should be covered by the symbols representing the rock in question. The surfaces occupied by rocks of different types should be separated by a continuous thin line if there is a clear demarcation among the different types in nature.

2.2 The graphic symbols should be used in black and white for the representation of rocks and minerals. Additional letter symbols may be used to designate other characteristics, such as age.

2.3 There is a great variety of rocks and it is impossible to have an individual symbol for each of the rock types that are found in nature. For this reason, the symbols are developed for the most important and frequently occurring rock types. For listing the rock types, one of the simpler systems used for classification of rocks has been followed; however, the tables of symbols for rock types are not meant to provide a standard system of classification. The symbolization is based on the following principles:

- a) In order to characterise the properties of rocks, elementary symbols are chosen, which should be:
 - i) as simple as possible and therefore easily traceable,

*Rules for rounding off numerical values (*revised*).

- ii) express the nature of the rock, and
 - iii) be of such a dimension that several elementary symbols can be placed next to each other;
- b) Principal rock types are represented by the juxtaposition of several identical elementary symbols; the variations of the above are shown by the addition of the elementary symbols which characterize the principal constituents;
- c) In order to characterize the loose form of rock, symbols should be arranged with no determined order; a systematic staggered arrangement should represent the consolidated form of a rock; and
- d) The individual elements or the rows of symbols should be arranged either parallel to the stratification or foliation where applicable or parallel to the margin of the map or the geological formation under portrayal, as found convenient. The procedure adopted should be indicated on the plan.

2.3.1 The basic symbols given in this standard should not be used for representations other than specified. Within the framework of these principles, symbols for other rocks not covered in this standard may be developed and intimated to the Indian Standards Institution. Similarly, for any characteristic not represented by a symbol, a new symbol may be chosen.

3. GRAPHIC SYMBOLS FOR METAMORPHIC ROCKS

3.1 Basic Symbols — The symbols relating to the zone of origin are given in Table 1.

3.2 Derived Symbols

3.2.1 Individual symbols for rock types consist of the wavy line symbol given in Table 1 and a simplified symbol of the original igneous or sedimentary rock; or, when it is impossible to identify the latter, the symbol representing the typical mineral (*see* Table 2).

3.2.2 The symbols for different rock types commonly met with in engineering practice are given in Table 3. Symbols for rock types not given in this table may be developed on the basis of the principles laid down in **3.2.1**.

TABLE 1 BASIC SYMBOLS FOR METAMORPHIC ZONES
(Clauses 3.1 and 3.2.1)






















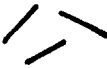





FACIES OF GREEN SCHISTS (EPIZONE)		FACIES OF AMPHIBOLITES (MESOZONE)		FACIES OF GRANULITES (CATAZONE)	
Schists (Sericitic) phyllites		Mica schist		Acid gneiss	
Green schist		Gneiss		Granulite (light)	
		Amphibolite		Hornblende-pyroxene gneiss	
				Pyroxene granulite	

TABLE 2 SYMBOLS FOR SOME COMMON ROCK FORMING
(Clause 3.2.1)

MINERAL	SYMBOL	MINERAL	SYMBOL
Albite		Andalusite	
Amphibole		Biotite	

(Continued)

TABLE 2 SYMBOLS FOR SOME COMMON ROCK FORMING — *Contd*

MINERAL	SYMBOL	MINERAL	SYMBOL
Calcite		Graphite	
Chlorite		Hypersthene	
Cordierite		Kyanite	
Epidote		Magnetite	
Feldspar		Muscovite	
Garnet		Olivine	
Glauconite		Phosphorite	

(*Continued*)

TABLE 2 SYMBOLS FOR SOME COMMON ROCK FORMING — Contd








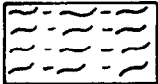
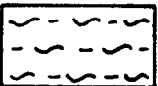
MINERAL	SYMBOL	MINERAL	SYMBOL
Plagioclase		Sillimanite	
Pyrite		Staurolite	
Pyroxene		Tourmaline	
Quartz			

TABLE 3 SYMBOLS FOR METAMORPHIC ROCK TYPES

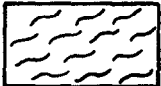


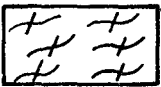


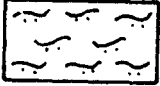
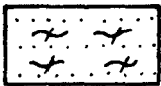
(Clause 3.2.2)

(A) Symbols for Main Metamorphic Rock Types

ROCK TYPE	SYMBOL
Argillite	
Slate	

(Continued)



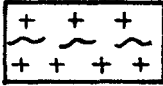
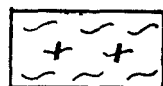
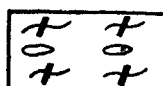
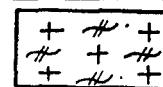
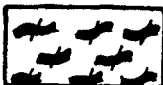
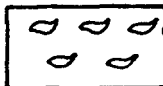

TABLE 3 SYMBOLS FOR METAMORPHIC ROCK TYPES — *Contd*

ROCK TYPE	SYMBOL
Phyllite	
Schist	
Green schist	
Mica schist	
Serpentinite	
Quartzitic schist	
Quartziferous phyllite (quartzose phyllite)	
Flaggy quartzite*	

*Flaggy quartzite—thin beds of quartzite which tend to split due to interbedded occurrence of sericite or mica yielding thin slabs.

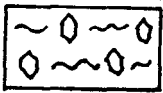
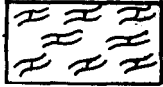

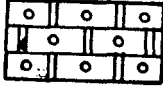
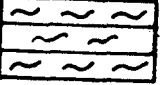

(*Continued*)

TABLE 3 SYMBOLS FOR METAMORPHIC ROCK TYPES — *Contd*

ROCK TYPE	SYMBOL
Hornfels	
Jaspilite	
Streaky granite	
Streaky gneiss	
Augen gneiss	
Charnockite	
Amphibolite	
Migmatite	
Eclogite	

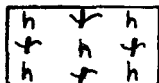
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TABLE 3 SYMBOLS FOR METAMORPHIC ROCK TYPES — Contd

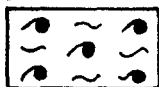
ROCK TYPE	SYMBOL
Khondalite	
Marble	
Dolomitic marble	
Calc silicate rock (calc gneiss)	
Quartzite	
Mylonite	

NOTE — In case of metamorphic rocks having predominance of a particular mineral/minerals, the abbreviation or the symbol for minerals given in IS : 7422 (Part 1) - 1974 in Tables 3 and 4 may be incorporated with the symbol of the metamorphic rock, for example:

Horblende gneiss



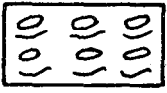
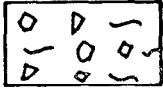
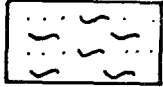
Chlorite schist



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TABLE 3 SYMBOLS FOR METAMORPHIC ROCK TYPES — Contd

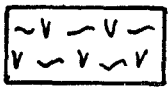
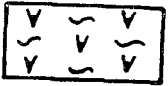
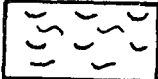
(B) Derived Symbols for Metamorphic Rock Types

ROCK TYPE	SYMBOL
Streaky conglomerate	
Breccia (metamorphosed)	
Quartzitic sandstone	

(C) Symbols for Metamorphosed Igneous Rocks

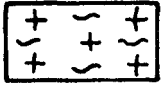
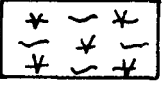
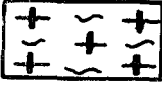
For metamorphosed igneous rocks like metarhyolite, metabasalt, metadiorite, etc, incorporate waveline (~) in the symbols for igneous rock types given in

IS : 7422 (Part 2) - 1974, Table 2, for example:

ROCK TYPE	SYMBOL
Metarhyolite	
Metabasalt	
Metatuff	

(Continued)

TABLE 3 SYMBOLS FOR METAMORPHIC ROCK TYPES — *Contd*

ROCK TYPE	SYMBOL
Metadiorite	
Metadolerite	
Metagabbro	

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

<i>Quantity</i>	<i>Unit</i>	<i>Symbol</i>
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

<i>Quantity</i>	<i>Unit</i>	<i>Symbol</i>
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

<i>Quantity</i>	<i>Unit</i>	<i>Symbol</i>	<i>Definition</i>
Force	newton	N	1 N = 1 kg.m/s ²
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m ²
Frequency	hertz	Hz	1 Hz = 1 c/s (s ⁻¹)
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m ²



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