भारतीय मानक **IS 7422 (Part 4) : 2024**

Indian Standard

भूवैज्ञानिक मानचित्र, खंड और उपसतही अन्वेषी लॉग में प्रयुक्त चिह्न और संक्षिप्त रूप

भाग 4 रूपांतरित चट्टानें

(पहला पुनरीक्षण)

Symbols and Abbreviations for Use in Geological Maps, Sections and Subsurface Exploratory Logs

Part 4 Metamorphic Rocks

(First Revision)

ICS 07.060

भारतीय मानक ब्यूरो
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October 2024 **Price Group 6**

Geological Investigations and Subsurface Exploration Sectional Committee, WRD 05

FOREWORD

This Indian Standard (Part 4) (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Geological Investigation and Subsurface Exploration Sectional Committee had been approved by the Water Resources Division Council.

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.

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

Part 5 Line symbols for formation contacts and structural features

The standard was first published in 1985. This revision has been brought out to bring the standard in latest style and update with respect to the latest field practices. In revision 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. In this revision, assistance have been derived from ISO 710-4 : 1982 ‘Graphical symbol for use on detailed maps, plans and geological cross sections — Part 4: Representation of metamorphic rocks’.

The composition of the Committee responsible for the formulation of this standard is given in Annex A.

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 : 2022 ‘Rounding off numerical values (*second revision*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

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

PART 4 METAMORPHIC ROCKS

(First Revision)

1 SCOPE

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 characterize the properties of rocks, elementary symbols are chosen, which should be:

   1) as simple as possible and therefore easily traceable;

   2) express the nature of the rock, and

   3) 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.

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)

Sl No.	Facies-of Green Schists (Epizone)	Facies of Amphibolites (Mesozone)	Facies of Granulites (Catazone)
(1)	(2)	(3)	(4)
i)	Schists (Sericitic) phyllites 	Mica schist 	Acid gneiss 
ii)	Green schist 	Gneiss 	Granulite (light) 
		Amphibolite 	Hornblende pyroxene gneiss 
			Pyroxene granulite 

Table 2 Symbols for Some Common Rock Forming

(*Clause* 3.2.1)

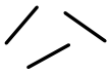
Sl No.	Mineral	Symbol	Mineral	Symbol
(1)	(2)	(3)	(4)	(5)
i)	Albite 		Andalusite 	
ii)	Amphibole 		Biotite	
iii)	Calcite 		Graphite 	
iv)	Chlorite 		Hypersthene 	
v)	Cordierite 		Kyanite 	
vi)	Epidote 		Magnetite 	
vii)	Feldspar 		Muscovite	

Table 2 (*Concluded*)

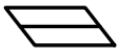
Sl No.	Mineral	Symbol	Mineral	Symbol
(1)	(2)	(3)	(4)	(5)
viii)	Garnet		Olivine	
ix)	Glauconite		Phosphorite	
x)	Plagioclase		Sillimanite	
xi)	Pyrite		Staurolite	
xii)	Pyroxene		Tourmaline	
xiii)	Quartz			

Table 3 Symbols for Metamorphic Rock Types

(*Clause* 3.2.2)

(A) Symbols for Main Metamorphic Rock Types

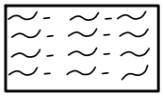
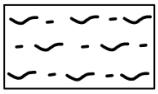
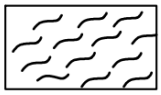
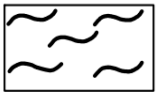
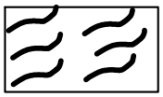
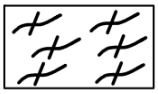
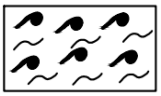
Sl No.	Rock type	Symbol
(1)	(2)	(3)
i)	Argillite	
ii)	Slate	
iii)	Phyllite	
iv)	Schist	
v)	Green schist	
vi)	Mica schist	
vii)	Serpentinite	

Table 3 (*Continued*)

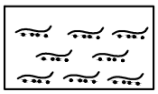
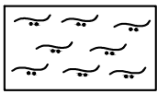
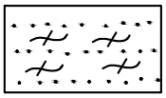
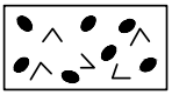
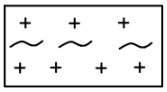
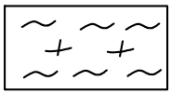
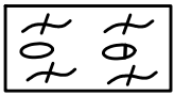
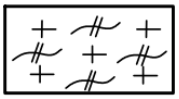
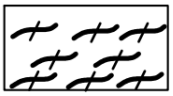
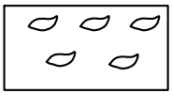
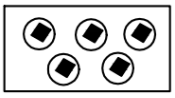
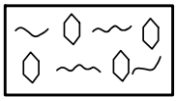
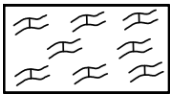
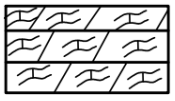
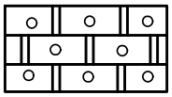
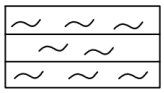
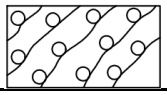
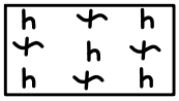
Sl No.	Rock type	Symbol
(1)	(2)	(3)
viii)	Quartzitic schist	
ix)	Quartziferous phyllite (quartzone phyllite)	
x)	Flaggy quartzite *Flaggy quartzite-thin beds of quartzite which tend to split due to interbedded occurrence of sericite or mica yielding thin slabs*)	
xi)	Hornfels	
xii)	Jaspillite	
xiii)	Streaky granite	
xiv)	Streaky gneiss	
xv)	Augen gneiss	
xvi)	Charnockite	
xvii)	Amphibolite	
xviii)	Migmatite	
xix)	Eclogite	
xx)	Khondalite	
xxi)	Marble	
xxii)	Dolomitic marble	

Table 3 (*Concluded*)

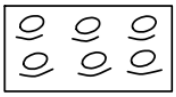
Sl No.	Rock type	Symbol
(1)	(2)	(3)
xxiii)	Calc silicate rock (calc gneiss)	
xxiv)	Quartzite	
xxv)	Mylonite	

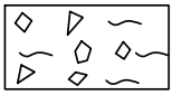
NOTE — In case of metamorphic rocks having predominance of a particular mineral/minerals, the abbreviation or the symbol for minerals given in IS 7422 (Part 1) in Table 3 and Table 4 may be incorporated with the symbol of the metamorphic rock, for example:

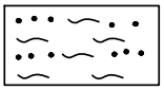
Horblende gneiss 

Chlorite schist 

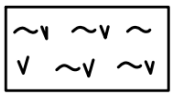
(B) Derived Symbols for Metamorphic Rock Types

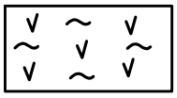
Streaky conglomerate 

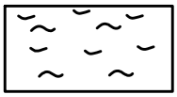
Breccia (metamorphosed) 

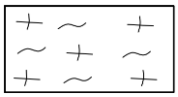
Quartzitic sandstone 

(C) Symbols for Metamorphosed igneous rocks like metarhyolite, metabasalt, metadiorite, etc, incorporate  **in the symbols for igneous rock types given in IS 7422 (Part 2) Table 2, for example**

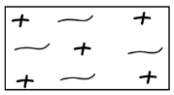
Metarhyolite 

Metabasalt 

Metatuff 

Metadiorite 

Metadolerite 

Metagabbro 

ANNEX A

(*Foreword*)

COMMITTEE COMPOSITION

Geological Investigations and Subsurface Exploration Sectional Committee, WRD 05

Organization	*Representative*(*s*)
In Personal Capacity (*G-202, JMD Garden Sohna Road, Sector 33 Gurgaon 122018 – Haryana*)	DR P. C. NAWANI **(*Chairperson*)**
AECS Engineering & Geotechnical Services Pvt Ltd, Noida	DR TANU RAGHUVANSHI SHRI SANJEEV TREHAN DIRECTOR (*Alternate*)
Afcons Infrastructure Limited, Mumbai	DR SUNIL BASARKAR, G. M. DR LAKSHMANA RAO MANTRI, ASSISTANT G. M. (*Alternate*)
Aimil Limited, New Delhi	SHRI LAXMIDHAR MOHAPATRA SHRI HEMAN MANCHANDA (*Alternate*)
CSIR – Central Building Research Institute, Roorkee	SHRI KOUSHIK PANDIT DR P. K. S. CHAUHAN (*Alternate*)
CSIR - Central Institute for Mining and Fuel Research, Dhanbad	DR J. K. MOHNOT DR ANIL SWARUP (*Alternate*)
Central Soil & Material Research Station, New Delhi	SHRI N P HONKANDAVAR SHRI HARI DEV (*Alternate*)
Central Water Commission, New Delhi	SHRI SAMIR KUMAR SHUKLA SHRI S. K. DAS (*Alternate*)
Central Water & Power Research Station, Pune	DR G. DHANUNJAYA SHRI V. CHANDRA SHEKAR (*Alternate* I) SHRI B. SURESH KUMAR (*Alternate* II)
Ferro Concrete Construction Pvt Ltd, Indore	DR MAHAVIR BIDASARIA (*Alternate*)
Geological Survey of India, New Delhi	SHRI P. K. GAJBHIYE, DIRECTOR SHRI IMTIKUMZUK, DIRECTOR (*Alternate*)
Gujarat Engineering Research Institute, Vadodara	SHRI N. R. MAKWANA SHRI R. K. CHAUHAN (*Alternate*)
Himachal Pradesh Power Corporation Limited, Shimla	ER R. K. KAUNDAL SHRI SANJAY RANA (*Alternate*)
Indian Institute of Remote Sensing, Dehradun	DR R. S. CHATTERJEE
J&K State Power Development Corporation Limited, Srinagar	SHRI RAVI PANDITA
M/S Parsons Overseas Ltd, New Delhi	SHRI SANJAY RANA SHRI ASHUTOSH KAUSHIK (*Alternate*)

Organization	*Representative*(*s*)
Narmada Control Authority, Indore	SHRI M. K. CHAUHAN
National Hydroelectric Power Corporation Ltd, Faridabad	SHRI SHYAM LAL KAPIL SHRI AJAY SINGH (*Alternate* I) SHRI MOHINDER PAL SINGH (*Alternate* II)
National Institute of Rock Mechanics, Karnataka	DR AJAY KUMAR NAITHANI DR SANDEEP NELLIAT (*Alternate*)
National Thermal Power Corporation Limited, Noida	SHRI NAVEEN KUMAR JAIN SHRI BHUVNESH KUMAR (*Alternate*)
North Eastern Electric Power Corporation Ltd, Shillong	SHRI GIRISH KALITA
Satluj Jal Vidyut Nigam Ltd Limited, Shimla	SH AJAY KUMAR SHRI BRIJESH BADONI (*Alternate*)
Tehri Hydro Development Corporation India Limited, Rishikesh	SHRI AJAY KUMAR SHRI KAILASAH CHANDRA UNIYAL (*Alternate*)
Uttarakhand Jal Vidyut Nigam Ltd, Dehradun	DIRECTOR (PROJECTS) DR HARISH BAHUGUNA (*Alternate*)
In Personal Capacity (*House No. 120, Jalshakti Vihar (NHPC Society) Sector PHI 1, Pocket 4 Greater Noida, Gautam Budhha Nagar UP- 201310*)	SHRI GOPAL DHAWAN
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