भारतीय मानक

Indian Standard

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

भाग 2 अग्निज शैल

(पहला पुनरीक्षण)

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

PART 2 IGNEOUS ROCKS

(First Revision)

ICS 07.060

भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
मानक भवन, 9 बहादुर शाह ज़फर मार्ग, नई दिल्ली - 110002
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI - 110002
www.bis.gov.in www.standardsbis.in

October 2023 **Price Group**

Geological Investigations and Subsurface Exploration Sectional Committee, WRD 05

FOREWORD

In all spheres of engineering construction, data on the nature of the geological formations constituting the foundations are indispensable. Often, the 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 of engineer, different symbols and abbreviations are being used by different agencies, resulting in 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 2) deals with igneous rocks while other parts are as follows:

Part 1 Abbreviations

Part 3 Sedimentary rocks

Part 4 Metamorphic rocks

Part 5 Line symbols for formation contacts and structural features

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 igneous rocks as adopted by United States Bureau of Reclamation for engineering purposes has been used.

The standard was published in 1974. The first revision of this standard 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 first revision of standard, assistance have been derived from ISO 710-5 : 1989 '*Graphical symbol for use on detailed maps, plans and geological cross section- Part 5 Representation of Minerals'.*

The composition of the Committee, responsible for the formulation of this standard is listed 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 revised)'*. 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 GEOLOGlCAL MAPS, SECTIONS AND SUBSURFACE EXPLORATORY LOGS

PART 2 IGNEOUS ROCKS

(*First Revision*)

1 SCOPE

This standard (Part 2) covers symbols for igneous 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 in nature there is a clear demarcation between the different types.

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 like 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:
   i. be a simple as possible and, therefore, easily traceable;
   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.

d) The individual elements or the rows of symbols should be arranged either parallel to the stratification of 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 other representations. Within the framework of these principles, symbols for other rocks not covered in this standard may be developed and intimation may be made to the Indian Standards Institution. Similarly for any characteristic not represented by a symbol, a new symbol may be chosen.

3 GRAPHIC SYMBOLS FOR IGNEOUS ROCKS

3.1 Basic Symbols — The basic symbols of the principal types of igneous rocks are given in Table 1.

3.2 Symbols for Rock Types

3.2.1 For developing symbols for different rock types from these basic symbols the following points should be kept in view:

a) A distinction in the grain size of rocks may be shown by the smaller or greater size of the basic symbols.

b) To indicate porphyritic texture the basic symbol is replaced at intervals by a larger symbol of the same type.

c) The symbols representing plutonic rocks are derived from a cross  or the letter  ; for volcanic rocks, the basic symbol chosen is a right angle placed on its point  The symbols for feldspathoidal rocks are always asymmetrical 

d) In the symbols for alkaline rocks with the exception of feldspathoidal rocks, an open space in always left at the point of intersection of the lines for example  and 

Table 1 Basic Symbols of the Types of Igneous Rocks

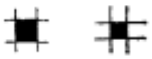
(*Clause* 3.1)

	PLUTONIC ROCKS				VOLCANIC ROCKS			
Sl No.	**Rock Group**	**Group Symbol**	**More Differentiated Rock Types**	**Symbol**	**Rock Group**	**Group Symbol**	**More Differentiated Rock Types**	**Symbol**
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	Alkali-granite				Alkali-rhyolite			
2	Very acid granite				Leucorhyolite			
3	Granite		Normal granite		Rhyolite		Rhyolite	
			Granodiorite				Rhyodacite	
			Quartz-diorite				Dacite	
4	Syenite		Alkali-syenite		Trachyte		Alkali trachyte	
			Syenite				Trachyte	
			Monzonite				Latite	
5	Diorite				Andesite			
6			Gabbro					
	Gabbro		Norite		Basalt			

								
			Anorthosite					
7	Feldspathoidal plutonic rocks		Nepheline-syenite		Feldspathoidal volcanic rocks		Phonolite	
			Essexite/Theralite					
			Ijolite				Feldspathoidal basalt	
8	Ultra basic rock				Picrite, Picrite - basalt			

e) To indicate the very acid character of a rock, a point is placed at the centre of the symbol, the lines being interrupted around the point of intersection 

f) With increasing basicity, the lines are thickened so that the darker appearance of the rock is reflected in the symbol.

g) The various types of ultrabasic rocks may be represented by the greater or lesser length of lines in relation to the black square 

3.2.2 The symbols for different rock types commonly met with in engineering practice are given in Table 2. Symbols for rock types not given in Table 2 may be developed using the basic symbols given in Table 1 on the basic of the principles laid down in **2** and **3.2.1.**

3.2.3 Where features are too small for graphical representation either an asterisk may be given against the feature and explained in the legend or the name of the rock written out.

Table 2 Symbols for Igneous Rocks

(*Clause* 3.2.2)

ESSENTIAL MINERALS	FELDSPARS: CHIEF FELDSPARS IN ROCK	ALKALI FELDSPARS PREDOMINATE			ALKALI AND SODA-LIME FELDSPARS ABOUT EQUAL		SODA-LIME FELDSPARS PREDOMINATE					Some alkali feldspar may occur	FELDSPARS ABSENT	
	SODA-LIME FELDSPARS IN NORMAL ROCK	OLIGOCLASE TO ANDESINE (WHERE ALBITE IS PRESENT, PREFIX "ALKALI" IS USED)		ALBITE	OLIGOCLASE TO ANDESINE		OLIGOCLASE AND ANDESINE		LABRADORITE, BYTOWNITE AND ANORTHITE		ANDESINE TO BYTOWNITE	SOME SODA-LIME FELDSPAR MAY BE PRESENT	SOME SODA-LIME FELDSPAR MAY CONSTITUTE UPTO 10% OF ROCK LABRADORITE TO ANORTHITE	
	Other minerals whose presence is necessary or wohle virtual absence is characteristic + Signifies presence in significant amounts - Signifies virtual absence	+ QUARTZ (> 5%)	- QUARTZ (< 5%)	NEPHELINE OR LEUCITE (-QUARTZ)	+ QUARTZ (> 5%)	- QUARTZ (< 5%)	+ QUARTZ (> 5%)	- QUARTZ (< 5%)	- OLIVINE	+ OLIVINE	+ LEUCITE OR + NEPHELINE	+ NEPHELINE OR + LEUCITE OR + ANALCITE	- NEPHELINE - LEUCITE - OLIVINE + PYROXENE OR + HORNBLENDE	- NEPHELINE - LEUCITE + OLIVINE + PYROXENE
	TYPICAL MODESA OF OCCURRENCE													
V O L C A N I C	Uniform or irregular beds, deposites or accumulations of volcanic ejectamenta	RHYOLITE ASH RHYOLITE BRECCIA RHYOLITE TUFF RHYOLITE AGGLO-MERATE	TRACHYTE ASH TRACHYTE BRECCIA TRACHYTE TUFF TRACHYTE AGGLO-MERATE	PHONOLITE OR LEUCITE PHONOLITE ASH PHONOLITE OR LEUCITE PHONOLITE BRECCIA PHONOLITE OR LEUCITE PHONOLITE TUFF PHONOLITE OR LEUCITE PHONOLITE AGGLO-MERATE	QUARTZ LATITE (DELLENITE) ASH QUARTZ LATITE (DELLENITE) BRECCIA QUARTZ LATITE (DELLENITE) TUFF QUARTZ LATITE (DELLENITE) AGGLO-MERATE	LATITE (TRACHYAN-DESITE) ASH LATITE (TRACHYAN-DESITE) BRECCIA LATITE (TRACHYAN-DESITE) TUFF LATITE (TRACHYAN-AGGLO-MERATE	DACITE ASH DACITE BRECCIA DACITE TUFF DACITE AGGLO-MERATE	ANDESITE ASH ANDESITE BRECCIA ANDESITE TUFF ANDESITE AGGLO-MERATE	BASALT ASH BASALT BRECCIA BASALT TUFF BASALT AGGLO-MERATE	OLIVINE BASALT ASH OLIVINE BASALT BRECCIA OLIVINE BASALT TUFF OLIVINE BASALT AGGLO-MERATE	TEPHRITE OR BASANITE ASH TEPHRITE OR BASANITE BRECCIA TEPHRITE OR BASANITE TUFF TEPHRITE OR BASANITE AGGLO-MERATE			
	Surface flows ; shallow small intrusives	ACIDIC GLASSES AND RARE PHONOLITIC GLASSES: OBSIDIAN	PRELITE	PUMICA	PITCHSTONE	INTERMEDIATE GLASSES: OBSIDIAN	PUMICA	SCORIA	BASIC GLASSES: SCORIA	VARIOLITE TACHYLITE		ULTRA BASIC GLASSES		
	Surface flows ; shallow dykes, sills, sheets, marginal zones of hypabyssal intrusives	RHYOLITE	TRACHYTE	PHONOLITE OR LEUCITE PHONOLITE	QUARTZ LATITE (DELLENITE)	LATITE (TRACHYAN-AESITE)	DACITE	ANDESITE	BASALT (Rarely porphyritic) DIABASE	OLIVINE BASALT OLIVINE DIABASE	TEPHRITE	NEPHELINITE LEUCITITE NEPHELINITE BASALT LEUCITE BASALT	AUGITITE	LIMBURGITE PICRITE PICRITE BASALT MELILITE BASALT
		F E L S I T E												
H Y P A B Y S S A L	Hypabyssal and shallow dykes, sills, laccoliths, interiors of thick surface flows	RHYLITE PORPHYRY GRANO PORPHYRY (QUARTZ PORPHTRY)	TRACHYTE PORPHTRY)	PHONOLITE PORPHYRY OR LEUCITE PHONOLITE PORPHYRY	QUARTZ LATITE PORPHYRY (DELLENITE PORPHYRY)	LATITE PORPHYRY (TRACHYAN-DESITE PORPHTRY)	DACITE PORPHYRY	ANDESITE PORPHTRY	DIABASE (Rarely porphyritic) D O L E R I T E	OLIVINE DIABASE	THERALITE ESSEXITE			
	Deep-seated dykes and laccoliths as well as border zones of larger intrusive masses. Composition same as that of related granitic rock	GRANITE PORPHYRY GRANOPHYRE	SYENITE PORPHYRY	NEPHELINE SYENITE PORPHYRY OR LEUCITE SYENITE PORPHYRY	QUARTZ MONZONITE PORPHYRY (ADAMELLITE PORPHYRY)	MONZONITE PORPHYRY	QUARTZ DIARITE PORPHYRY (TONALITE PORPHYRY)	DIORITE PORPHYRY	DIABASE (Rarely porphyritic) D O L E R I T E	OLIVINE DIABASE	THERALITE ESSEXITE	IJOLITE MISSOURITE	PYROXENITE HORNBLEN-DITE Rarely porphyritic	PERIDOTITE PICRITE DUNITE
P L U T O N I C	Deep-seated dykes in part hypabyssal (esp. lamprophyres) Acidic and basic differentiates (segregations) from parent magma — APLITES (acidic segrega-tions)	APLITE	SYENITE APLITE BOSTONITE	NEPHELINE SYENITE APLITE	QUARTZ MONZONITE APLITE (ADAMELLITE APLITE)	MONZONITE APLITE	MALCHITE	DIORITE APLITE	GABBRO APLITE NORITE APLITE B E E R B A C H I T E	OLIVINE GABBRO APLITE				
	Mainly associated with granites, syenites, monzonites and diorites — LAMPRO-PHYRES (basic seg-regations)	LAMPRO-PHYRE	MINETTE VOGESITE				QUARTZ KERSANTITE	KERSANTITE SPESSARTITE CAMPTONITE	KERSANTITE SPESSARTITE ODINITE	OLININE KERSANTITE		FOURCHITE MONCHIQUI		ALNOITE
	Deep-seated dykes and irregular masses of all sizes, related to large intrusive bodies, where concentrations of gases and vapours were present during solidification	GRANITE PEGMATITE	SYENITE PEGMATITE	NEPHELINE SYENITE PEGMATITE	QUARTZ MONZONITE PEGMATITE (ADAMELLITE PEGMATITE)	MONZONITE PEGMATITE	QUARTZ DIORITE PEGMATITE (PONALITE PEGMATITE)	DIORITE PEGMATITE	GABBRO PEGMATITE NORITE PEGMATITE	OLIVINE GABBRO PEGMATITE				
	Large deep-seated intrusive, such as ; batholiths, stocks, laccoliths and dykes	GRANITE CHARNOC-KITE	SYENITE	NEPHELINE SYENITE (FOYAITE) OR SODALITE SYENITE	QUARTZ MONZONITE (ADAMELLITE)	MONZONITE GRANODIORITE	QUARTZ DIORITE (TONALITE)	DIORITE	GABBRO ENSTATITE NORITE ANORTHO-SITE	OLIVINE GABBRO OLIVINE NORITE TROCTOLITE	THERALITE ESSEXITE	IJOLITE MISSOURITE	PYROXENITE HORNBLEN-DITE	PERIDOTITE DUNITE

ANNEX A

(*Foreword*)

COMMITTEE COMPOSITION

Geological Investigations and Subsurface Exploration Sectional Committee, WRD 05

Organization	*Representative(s)*
In Personal Capacity, Gurgaon	DR.P.C. NAWANI (Chairperson)
Aecs Engineering & Geotechnical Services Pvt. Limited, Noida	DR. TANU RAGHUVANSHI (MANAGER LABORATORY) MR. SANJEEV TREHAN DIRECTOR (*Alternate*)
Afcons Infrastructure Limited, Mumbai	DR. SUNIL BASARKAR, GM (DESIGNS) DR. LAKSHMANA RAO MANTRI, ASSISTANT GM (DESIGN) (*Alternate*)
Aimil Limited, New	SHRI LAXMIDHAR MOHAPATRA SHRI HEMAN MANCHANDA (*Alternate*)
Csir — Central Building Research Institute, Roorkee	SHRI KOUSHIK PANDIT SCIENTIST DR P. K. S. CHAUHAN PRINCIPAL SCIENTIST (*Alternate*)
Csir - Central Institute for Mining And Fuel Research, Dhanbad	DR J. K. MOHNOT, CHIEF SCIENTIST & SCIENTIST-IN-CHARGE DR. ANIL SWARUP (*Alternate*)
Central Soil & Material Research Station, New Delhi	SHRI N P HONKANDAVAR, SC E SHRI HARI DEV, SC E (*Alternate*)
Central Water & Power Research Station, Pune	DR. G. DHANUNJAYA, SC C SHRI V. CHANDRA SHEKAR, SC C (*Alternate*) SHRI B. SURESH KUMAR SC. C (*Alternate*)
Central Water Commission, New Delhi	SHRI SAMIR KUMAR SHUKLA DIRECTOR (FE&SA) SHRI S K DAS, DIRECTOR CMDD (E&NE) (*Alternate*)
Ferro Concrete Construction Pvt Ltd, Indore	DR. MAHAVIR BIDASARIA (*Alternate*)
Geological Survey of India	SHRI P.K. GAJBHIYE, DIRECTOR SHRI IMTIKUMZUK, DIRECTOR (*Alternate*)

Gujarat Engineering Research Institute, Vadodara	SHRI N. R. MAKWANA, JOINT DIRECTOR (IRRIGATION) SHRI R. K. CHAUHAN, SENIOR GEOLOGIST, ENGINEERING GEOLOGY DIVISION (*Alternate*)
Himachal Pradesh Power Corporation Limited, Shimla	SHRI ER. R. K. KAUNDAL, GENERAL MANAGER (DESIGNS) SHRI SANJAY RANA DY GM (*Alternate*)
Indian Institute of Remote Sensing, Dehradun	DR. R.S. CHATTERJEE, SC 'G' & HEAD, GEOSCIENCES DEPARTMENT
J&K State Power Development Corporation Limited	SHRI RAVI PANDITA
M/S Parsons Overseas Ltd.	SHRI SANJAY RANA, MANAGING DIRECTOR SHRI ASHUTOSH KAUSHIK, CEO (*Alternate*)
Narmada Control Authority, Indore	SHRI MK CHAUHAN
National Institute of Rock Mechanics, Karnataka	DR. AJAY KUMAR NAITHANI DR. SANDEEP NELLIAT (*Alternate*)
National Hydroelectric Power Corporation Ltd, Faridabad	SHRI SHYAM LAL KAPIL, EXECUTIVE DIRECTOR SHRI AJAY SINGH, DEPUTY GM SHRI MOHINDER PAL SINGH, SENIOR MANAGER (GEOPHYSICS) (*Alternate*)
National Thermal Power Corporation Limited, Noida	SHRI NAVEEN KUMAR JAIN SHRI BHUVNESH KUMAR (*Alternate*)
North Eastern Electric Power Corporation Ltd.	SHRI GIRISH KALITA, MANAGER (GEOLOGY)
Satluj Jal Vidyut Nigam Ltd. Limited	SH AJAY KUMAR, MANAGER SH BRIJESH BADONI, MANAGER (*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	SHRI GOPAL DHAWAN,
In Personal Capacity	SHRI IMRAAN SYEED

In Personal Capacity	SHRI R.K. GOEL
BIS DIRECTORATE GENERAL	SHRI R. BHANU PRAKASH SCIENTIST-E / DIRECTOR & HEAD (WRD) [REPRESENTING DIRECTOR GENERAL (*Ex-Officio)]*

Member Secretary

Shri Ajay Meena
Assistant Director/Scientist 'B'
(Water Resources Department), BIS