

भूवैज्ञानिक मानचित्र, खंड और उपसतही  
अन्वेषी लॉग में प्रयुक्त चिह्न और संक्षिप्त रूप  
भाग 5 रचना, सम्पर्क तथा संरचनात्मक आकृतियों  
के लिए रेखिक चिह्न  
( पहला पुनरीक्षण )

**Symbols and Abbreviations for Use  
in Geological Maps, Sections and  
Subsurface Exploratory Logs  
Part 5 Line Symbols for Formation  
Contacts and Structural Features  
( First Revision )**

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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  
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## FOREWORD

This Indian Standard (Part 5) (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 geological formation, constituting the foundations is 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 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, 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 for 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 5) deals with line symbols for formation contacts and structural features while other parts deal with the following:

- Part 1 Abbreviations
- Part 2 Igneous rocks
- Part 3 Sedimentary rocks
- Part 4 Metamorphic rocks

The standard was first published in 1992. This revision has been brought out to bring the standard in latest style and update with respect to the latest field practices. In this revision, 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 'Graphical symbol for use on detailed maps, plans and geological cross section'.

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 5 LINE SYMBOLS FOR FORMATION CONTACTS AND STRUCTURAL FEATURES***( First Revision )***1 SCOPE**

The symbols covered in this standard (Part 5) are:

- a) Line symbols for formation contacts and other structural features;
- b) Symbols for surface openings and exploration;
- c) Symbols for underground working and exploration, and
- d) Other miscellaneous symbols.

**2 BASIC PRINCIPLES OF REPRESENTATION**

**2.1** The symbols used are intended to characterize the existing state as found in nature and shall not be used to represent genetic processes and their connections.

**2.2** The tectonic elements can be regarded as surfaces or lineations characterized by their situations in space.

**2.2.1 Planes**

Tectonic planes are represented by their traces in the reference plane. The basic symbols for traces is a continuous line to which additional symbols characterizing the nature of the surface are added.

**2.2.2 Lineation**

Lineations are represented by their projection on the reference plane. The basic symbols for the projection of lineations is a compound line of alternate dots and dashes to which additional symbols characterizing the nature of the lineations in question are added.

**2.2.3 Indication of Position**

The position of the planes and lineations are given by the oriented representation of their traces and projections on the map or plan.

**3 LINE SYMBOLS FOR FORMATION, CONTACTS AND STRUCTURAL FEATURES**

**3.1** The line symbols representing formation contacts and various structural features are given in tabular form as listed below:

|                                  |                         |
|----------------------------------|-------------------------|
| Contacts                         | <a href="#">Table 1</a> |
| Faults                           | <a href="#">Table 2</a> |
| Folds                            | <a href="#">Table 3</a> |
| Planar features                  | <a href="#">Table 4</a> |
| Line features                    | <a href="#">Table 5</a> |
| Slip plane and minor shear seams | <a href="#">Table 6</a> |
| Contours and isopleths           | <a href="#">Table 7</a> |

NOTE — For representing the fault, letter 'F' may be indicate at both the ends of the symbol. Similarly, for lineament, letter 'L' may be used at both the ends of the symbol.

**4 SYMBOLS FOR SURFACE OPENINGS AND EXPLORATION**

The symbols representing surface openings and exploration are given in tabular form as listed below:

|                                     |                         |
|-------------------------------------|-------------------------|
| Symbols for use in large scale maps | <a href="#">Table 8</a> |
| Symbols for use in small scale maps | <a href="#">Table 9</a> |

**5 SYMBOLS FOR UNDERGROUND WORKING AND EXPLORATION**



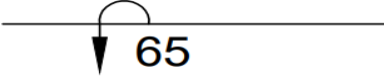

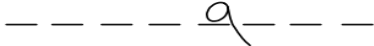

The symbols representing underground workings and such exploration are given in [Table 10](#).

**6 OTHER MISCELLANEOUS SYMBOLS**

Symbols for sections, water wells and springs and other miscellaneous items are given in [Table 11](#).

**Table 1 Line Symbols for Contacts**

([Clauses 3.1](#))

| SI No.<br>(1) | Description<br>(2)                                       | Symbol<br>(3)  |
|---------------|--|--|
| i)            | Contact  |  |
| ii)           | Contact showing dip, vertical contact with topside known |  |
| iii)          | Overturned contact, showing dip                          |  |
| iv)           | Approximate contact                                      |  |
| v)            | Possible contact   |  |
| vi)           | Concealed contact  |  |

**Table 2 Line Symbol for Faults**

([Clause 3.1](#))


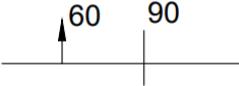

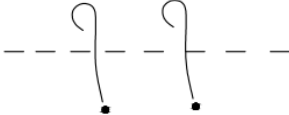


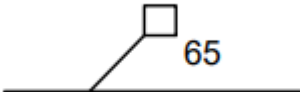
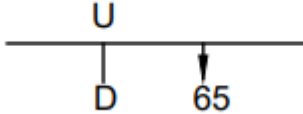
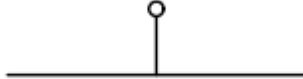
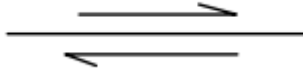
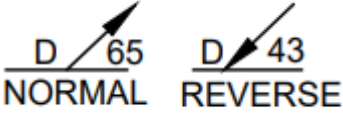

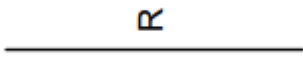



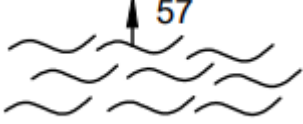



| SI No.<br>(1) | Description<br>(2)   | Symbol<br>(3)  |
|---------------|--|--|
| i)            | Fault  |  |
| ii)           | Fault, showing dip   |  |
| iii)          | Fault, approximately located   |  |
| iv)           | Fault, inferred or doubtful  |  |
| v)            | Concealed fault  |  |
| vi)           | Lineament  |  |
| vii)          | Fault (showing bearing and plunge of grooves, striation or slickensides) |  |

Table 2 (Concluded)

| Sl No.<br>(1) | Description<br>(2)   | Symbol<br>(3)  |
|---------------|--|--|
| viii)         | Fault, showing dip (U-upthrown side, D-downthrown side)                                      |    |
| ix)           | Fault (bar and ball on downthrown side)  |    |
| x)            | Fault showing relative horizontal movement   |    |
| xi)           | Fault (showing bearing and plunge of apparently downthrown block)                            |    |
| xii)          | Normal fault (hachures on downthrown side)   |    |
| xiii)         | Reverse fault (R, upthrown side)   |   |
| xiv)          | Thrust fault (T, upper plate)  |  |
| xv)           | Thrust fault (sawteeth on upper plate, major thrust fault)                                   |  |
| xvi)          | Overturned thrust fault, sawteeth in dip direction, bar on side of tectonically higher plate |  |
| xvii)         | Fault (shear or mylonite) zone showing dip   |  |
| xviii)        | Fault breccia  |  |
| xix)          | Fault, intruded by dyke  |  |
| xx)           | Termination of fault   |  |

**Table 3 Line Symbols for Folds**


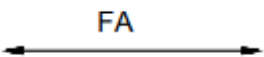
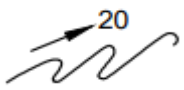
([Clause 3.1](#))

| SI No.<br>(1) | Description<br>(2)  | Symbol<br>(3) |
|---------------|---|---------------|
| i)            | Anticline, showing crestline  |               |
| ii)           | Anticline showing crestline and direction of plunge                                     |               |
| iii)          | Anticline showing crestline and plunge  |               |
| iv)           | Asymmetric anticline showing crestline and plunge, shorter arrow indicates steeper limb |               |
| v)            | Asymmetric anticline showing dip of limbs and plunge                                    |               |
| vi)           | Overtured anticline showing direction of dip of limbs and plunge                        |               |
| vii)          | Inverted anticline, arrows show direction of dip of limbs                               |               |
| viii)         | Dome  |               |
| ix)           | Antiform  |               |
| x)            | Syncline showing troughline   |               |

Table 3 (Continued)

| SI No.<br>(1) | Description<br>(2)   | Symbol<br>(3) |
|---------------|--|---------------|
| xi)           | Syncline showing troughline and direction of plunge                                    |               |
| xii)          | Syncline showing troughline and plunge   |               |
| xiii)         | Asymmetric syncline showing trough line and plunge. Short arrow indicates steeper limb |               |
| xiv)          | Asymmetric syncline showing dip of limbs and plunge                                    |               |
| xv)           | Overtaken syncline showing direction of dip of limbs and plunge                        |               |
| xvi)          | Basin  |               |
| xvii)         | Inverted syncline, arrows show direction of dip of limbs                               |               |
| xviii)        | Synform, drawn on foliation, cleavage or bedding                                       |               |
| xix)          | Monocline showing trace and plunge of axes, dashed where approximately located         |               |
| xx)           | Anticlinal bend showing trace and plunge of axis. Dashed where approximately located   |               |
| xxi)          | Synclinal bend showing trace and plunge of axis. Dashed where approximately located    |               |
| xxii)         | Minor anticline, showing plunge  |               |
| xxiii)        | Minor syncline, showing plunge   |               |

**Table 3 (Concluded)**

| SI No.<br>(1) | Description<br>(2)                 | Symbol<br>(3)  |
|---------------|------------------------------------|--|
| xxiv)         | Minor fold axis, showing plunge    |  |
| xxv)          | Minor fold axis, horizontal        |  |
| xxvi)         | Minor folds showing plunge of axes |  |

**Table 4 Planar Features**

([Clause 3.1](#))

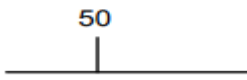
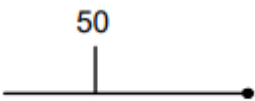
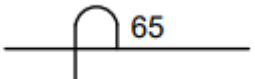
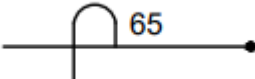
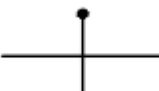



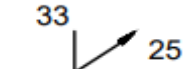
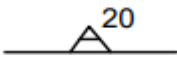


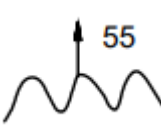




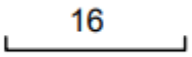


| SI No.<br>(1) | Description<br>(2)  | Symbol<br>(3)   |
|---------------|---|---|
| i)            | Strike and dip of beds  |    |
| ii)           | Strike and dip of beds (top beds known from sedimentary features, used only in areas of complex structure where overturning is also recognized) |  |
| iii)          | Strike and dip of overturned beds   |  |
| iv)           | Strike and dip of overturned beds (top of beds known)   |  |
| v)            | Strike of vertical beds (top of beds known)   |  |
| vi)           | Strike of vertical beds   |  |
| vii)          | Component of dip (dot marks point of observation)   |  |
| viii)         | Horizontal beds   |  |
| ix)           | Strike and dip of beds and plunge of slicken-sides  |  |



Table 4 (Continued)

| SI No.<br>(1) | Description<br>(2)  | Symbol<br>(3)   |
|---------------|---|---|
| x)            | Strike and dip of foliation   |    |
| xi)           | Strike of vertical foliation (relationship of foliation or shistosity, to bedding not shown in outcrop) |    |
| xii)          | Horizontal foliation  |    |
| xiii)         | Crumpled, plicated, crenulated, or undulatory beds and average dip                                      |    |
| xiv)          | Strike and dip of foliation and parallel bedding  |    |
| xv)           | Strike of vertical foliation and parallel bedding   |   |
| xvi)          | Strike and dip of foliation and parallel bedding  |  |
| xvii)         | Horizontal foliation and bedding  |  |
| xviii)        | Strike and dip of cleavage  |  |
| xix)          | Strike of vertical cleavage   |  |
| xx)           | Horizontal cleavage   |  |

**Table 4 (Concluded)**

| SI No.<br>(1) | Description<br>(2) | Symbol<br>(3) |
|---------------|--------------------|---------------|
| xxi)          | Inclined vertical  |               |
| xxii)         | Vertical           |               |
| xxiii)        | Horizontal         |               |



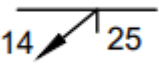

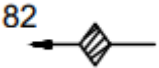
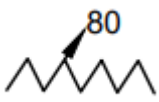
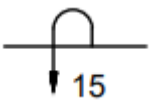
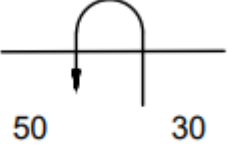

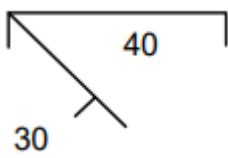
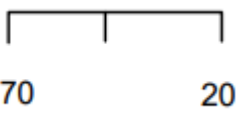


Contrasting symbols can be used to distinguish between different kinds of planar structures :  
Type of planar structure should be specified in explanation.

**Table 5 Line Symbols for Liner Features**

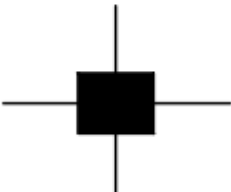
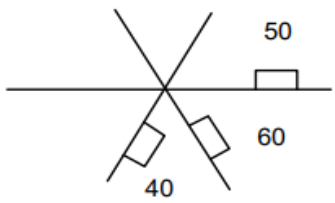
*(Clause 3.1)*

| SI No.<br>(1) | Description<br>(2)  | Symbol<br>(3) |
|---------------|---|---------------|
| i)            | Bearing and plunge of lineation                                       |               |
| ii)           | Vertical lineation (use open symbol in combination with line symbols) |               |
| iii)          | Vertical beds, showing horizontal lineation                           |               |
| iv)           | Horizontal beds showing trend of horizontal lineation                 |               |
| v)            | Vertical beds showing plunge of lineation                             |               |
| vi)           | Horizontal lineation  |               |
| vii)          | Strike and dip of foliation and plunge of lineation                   |               |

Table 5 (Continued)






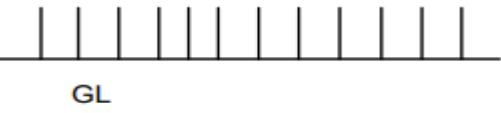
| Sl No.<br>(1) | Description<br>(2)  | Symbol<br>(3)   |
|---------------|---|---|
| viii)         | Vertical foliation showing horizontal lineation   |    |
| ix)           | Strike and dip of foliation showing horizontal lineation  |    |
| x)            | Strike and dip of beds and plunge of lineation  |    |
| xi)           | Vertical foliation and vertical lineation   |    |
| xii)          | Strike of vertical foliation showing plunge of lineation  |    |
| xiii)         | Approximate strike of folded beds showing plunge of fold axes                                   |    |
| xiv)          | Attitude of overturned beds and parallel foliation  |   |
| xv)           | Attitude of foliation and overturned beds, strikes parallel but dips differ                     |  |
| xvi)          | Double lineation  |  |
| xvii)         | Strike and dip of beds and intersecting slip cleavage (symbols joined at points of observation) |  |
| xviii)        | Strike and dip of beds and intersecting slip cleavage   |  |
| xix)          | Strike and dip of joints  |  |
| xx)           | Strike of vertical joints   |   |

**Table 5 (Concluded)**

| SI No.<br>(1) | Description<br>(2)                 | Symbol<br>(3)   |
|---------------|------------------------------------|---|
| xxi)          | Horizontal joints                  |  |
| xxii)         | Strike and dips of multiple joints |   |

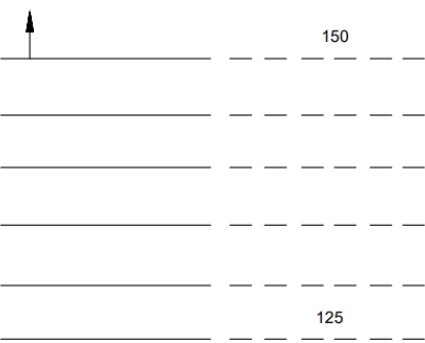



**Table 6 Line Symbols for Slip Planes and Minor Shkar Seams**

*(Clause 3.1)*

| SI No.<br>(1) | Description<br>(2)   | Symbol<br>(3)  |
|---------------|--|--|
| i)            | Joint plane  |  |
| ii)           | Slip plane   |  |
| iii)          | Shear zone – 1 cm to 5 cm<br>(thick crushed rock)            |  |
| iv)           | Shear zone – 5 cm to 15 cm<br>(thick crushed rock)           |  |
| v)            | Shear zone – thickness of<br>zone defined by border<br>lines |  |
| vi)           | Glide crack  |  |



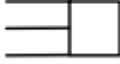



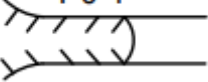
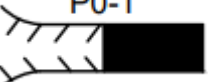
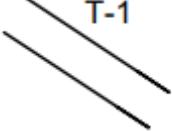
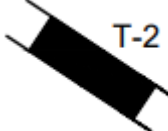



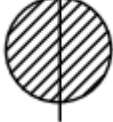
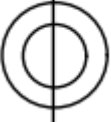


**Table 7 Lines Symbols for Contours and Isopleths**

([Clause 3.1](#))

| SI No.<br>(1) | Description<br>(2)   | Symbol<br>(3)  |
|---------------|--|--|
| i)            | Structure contours drawn on top (or base) of given geological horizon, long-dashed where control less accurate, short dashed where datum is above land surface, contour interval 5 m, arrow indicates direction of dip (structure contours generally not shown as concealed; may be omitted in areas of no information. Arrows used only where index contours fail to show dip). |    |
| ii)           | Outcrop point used for structural control  |   |
| iii)          | Isopachs   |  |
| iv)           | Isograds (add key mineral names to map and describe in explanation)  |  |

**Table 8 Symbols for Surface Openings and Exploration for Use in Large Scale Maps**

(Clause 4)

| Sl No.<br>(1) | Description<br>(2)                            | Symbol<br>(3)  |   |
|---------------|---|--|---|
| i)            | Vertical shaft                                | S-1<br>    | S-1<br>    |
| ii)           | Inclined shaft                                | IS-1<br>   | IS-1<br>   |
| iii)          | Portal or slit                                | P-1<br>    | P-1<br>    |
| iv)           | Portal or open cut                            | P0-1<br>   | P0-1<br>   |
| v)            | Trench  | T-1<br>   | T-2<br>   |
| vi)           | Prospect pit or open cut                      | OC-1<br> | OC-1<br> |
| vii)          | Drill hole (up to and including 150 mm)       | DH-1<br> | DH-1<br> |
| viii)         | Drill hole, large diameter (more than 150 mm) | DH-1<br> | DH-1<br> |
| ix)           | Drill hole (no geological data available)     | HD<br>   |   |

**Table 8 (Concluded)**

| SI No.<br>(1) | Description<br>(2)   | Symbol<br>(3) |
|---------------|--|---------------|
| x)            | Auger hole (up to and including 150 mm)                            |               |
| xi)           | Auger hole, large diameter (above 150 mm)                          |               |
| xii)          | Drill hole, inclined (showing bearing and inclination for surface) |               |
| xiii)         | Mine dump  |               |

NOTE — Wherever two symbol. are given, the left hand figure denotes the proposed and the right hand figure, the completed working.

**Table 9 Symbols for Surface Openings and Exploration for Use in Small Scale Maps**

([Clause 4.1](#))

| SI No.<br>(1) | Description<br>(2)              | Symbol<br>(3) |
|---------------|---------------------------------|---------------|
| i)            | Vertical shaft                  |               |
| ii)           | Inclined shaft                  |               |
| iii)          | Portal of tunnel, adit or slope |               |

Table 9 (Concluded)

| SI No. | Description                          | Symbol |
|--------|--------------------------------------|--------|
| (1)    | (2)                                  | (3)    |
| iv)    | Inaccessible tunnel, adit or slope   |        |
| v)     | Trench                               |        |
| vi)    | Prospect pit                         |        |
| vii)   | Sand, gravel, clay or placer pit     |        |
| viii)  | Mine, quarry, glory hole or open pit |        |

NOTE — The left hand figure denotes the proposed, and the right hand figure, the completed working.

Table 10 Symbols for Under Ground Working and Exploration

(Clause 5)

| SI No. | Description                  | Symbol |
|--------|------------------------------|--------|
| (1)    | (2)                          | (3)    |
| i)     | Shaft at surface             |        |
| ii)    | Shaft, above and below level |        |





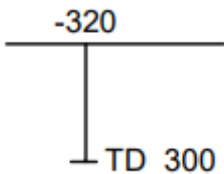
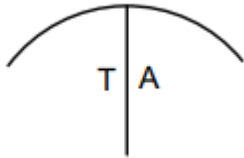
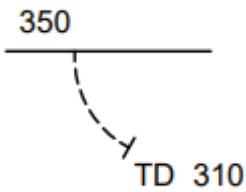


Table 10 (Concluded)

| SI No. | Description   | Symbol |
|--------|---|--------|
| (1)    | (2)   | (3)    |
| iii)   | Bottom of shaft (show bottom of pump by note on map of lower level)                               |        |
| iv)    | Winze or head or raise  |        |
| v)     | Raise or winze extending through level  |        |
| vi)    | Raise or foot of winze  |        |
| vii)   | Stopes (can also be explained by note stoped above or stoped below)                               |        |
| viii)  | Oil well  |        |
| ix)    | Shaft or dig  |        |
| x)     | Dry hole (Showing formation and altitude at surface, formation at bottom of hole and total depth) |        |

Km 350  
 Kd 450

**Table 11 Symbols for Sections, Water Wells and Springs and Other Miscellaneous Items**

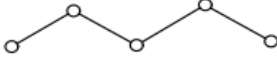

(Clause 6)

| SI No. | Description   | Symbol  |
|--------|---|---|
| (1)    | (2)   | (3)   |
| i)     | Thrust (arrow shows relative direction of movement)   |     |
| ii)    | Fault (arrow shows relative direction of movement)  |     |
| iii)   | Fault, showing lateral movement (T towards observer; A away from observer, may be combined with arrows to show strike slip and dip slip movement) |     |
| iv)    | Drill hole or well on section (showing surface altitude and depth in m) (angle of deviation from vertical plotted)                                |   |
| v)     | Drill hole or wall projected to section (showing surface altitude and total depth in m)   |   |
| vi)    | Nonflowing well   |  |
| vii)   | Flowing well  |  |

**Table 8 (Continued)**

| SI No. | Description  | Symbol |
|--------|--|--------|
| (1)    | (2)  | (3)    |
| viii)  | Test hole, abandoned or not in use   |        |
| ix)    | Nonflowing well with pumping plant [generally shown on blue (drainage) base plate in ground-water and surface-water reports] |        |
| x)     | Flowing well with pumping plant  |        |
| xi)    | Spring   |        |
| xii)   | Thermal spring   |        |
| xiii)  | Mineral spring   |        |
| xiv)   | Glacial striae   |        |

**Table 8 (Concluded)**


| SI No. | Description  | Symbol   |
|--------|--|--|
| (1)    | (2)  | (3)  |
| xv)    | Line of stratigraphic section  |  |
| xvi)   | Line of section (generally omitted from explanation, used only to avoid confusion with other line) |  |

## ANNEX A

*(Foreword)*

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