BRITISH STANDARD

BS ISO/IEC TR 9573-13:1991

Implementation of ISO/IEC TR 9573-13:1991

Information technology — SGML support facilities — Techniques for using SGML —

Part 13: Public entity sets for mathematics and science

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The preparation of this British Standard was entrusted by the Information Systems Technology Standards Policy Committee (IST/-) to Technical Committee IST/18, upon which the following bodies were represented:

British Computer Society
British Facsimile Industry Consultative Committee
British Photographic Association
British Printing Industries Federation
British Telecommunications plc
Computing Services Association
Department of Trade and Industry (Information Technology Division)
EEA (the Association of Electronics, Telecommunications and Business Equipment Industries)
HM Treasury (Central Computer and Telecommunications Agency)
Her Majesty's Stationery Office
Institute of Information Scientists
Joint Network Team
Ministry of Defence
National Computer Users' Forum
National Computing Centre Ltd.
National Health Services
SGML Users' Group
University of London
User Standards Forum for Information Technology (Institute of Data Processing Management)

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National foreword

This British Standard reproduces verbatim ISO/IEC TR 9573-13:1991 and implements it as the UK national standard.

This British Standard is published under the direction of the Information Systems Technology Standards Policy Committee whose Technical Committee IST/18 has the responsibility to:

— aid enquirers to understand the text;

— present to the responsible international committee any enquiries on interpretation, or proposals for change, and keep UK interests informed;

— monitor related international and European developments and promulgate them in the UK.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the ISO/IEC TR title page, pages ii to iv, pages 1 to 56, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

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TECHNICAL REPORT

ISO/IEC TR 9573-13

First edition
1991-07-01

Information technology — SGML support facilities — Techniques for using SGML —

Part 13:
Public entity sets for mathematics and science

Technologies de l'information — Facilités de support pour SGML — Techniques d'utilisation du SGML —

Partie 13: Ensembles d'entités publiques pour les domaines mathématique et scientifique

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

The main task of technical committees is to prepare International Standards, but in exceptional circumstances a technical committee may propose the publication of a Technical Report of one of the following types:

— type 1, when the required support cannot be obtained for the publication of an International Standard, despite repeated efforts;

— type 2, when the subject is still under technical development or where for any other reason there is the future but not immediate possibility of an agreement on an International Standard;

— type 3, when a technical committee has collected data of a different kind from that which is normally published as an International Standard ("state of the art", for example).

Technical Reports of types 1 and 2 are subject to review within three years of publication, to decide whether they can be transformed into International Standards. Technical Reports of type 3 do not necessarily have to be reviewed until the data they provide are considered to be no longer valid or useful.

ISO/IEC/TR 9573-13, which is a Technical Report of type 3, was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*.

ISO/IEC/TR 9573 consists of the following parts, under the general title *Information technology — SGML support facilities — Techniques for using SGML:*

— *Part 1: SGML tutorial;*

— *Part 2: Basic techniques;*

— *Part 3: Advanced techniques;*

— *Part 4: Using short references for identifying markup;*

— *Part 5: Using non-Latin alphabets;*

— *Part 6: Referencing and synchronisation;*

— *Part 7: Mathematics and chemistry;*

— *Part 8: Tables;*

— *Part 9: Using SGML for computer to computer interchange;*

— *Part 10: Designing application for database interfacing;*

— *Part 11: Application at ISO/CS for International Standards and Technical Reports;*

— *Part 12: Public entity sets for general and publishing symbols;*

— *Part 13: Public entity sets for mathematics and sciences;*

— *Part 14: Public entity sets for Latin based alphabets;*

— *Part 15: Public entity sets for non-Latin based alphabets;*

— *Part 16: Public entity sets for ideograms.*

ISO/IEC/TR 9573 was first published in 1988 as a single volume. The material has undergone revision and expansion and some of the tutorial material of ISO 8879:1986 has been incorporated in some parts:

a) Part 1 replaces ISO 8879:1986 Annexes B and C (in part);

b) Part 2 replaces ISO/IEC/TR 9573:1988 clauses **4**, **5**, **6**, **7**, **10**, **13**, and **14**, and ISO 8879:1986 Annex E (in part);

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c) Part 3 replaces ISO 8879:1986 Annexes C (in part), and D (in part);
d) Part 5 replaces ISO/IEC/TR 9573 clauses **11**, **12**, and **15**;
e) Part 7 replaces ISO/IEC/TR 9573 clause **8**;
f) Part 8 replaces ISO/IEC/TR 9573 clause **9**;
g) Part 12 replaces ISO 8879:1986 Annex D (in part);
h) Part 13 replaces ISO 8879:1986 Annex D (in part);
i) Part 14 replaces ISO 8879:1986 Annex D (in part);
j) Part 15 replaces ISO 8879:1986 Annex D (in part);

Annex A of this part of ISO/IEC/TR 9573 is for information only.

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Introduction

ISO 8879, *Information processing — Text and office systems — Standard Generalized Markup Language (SGML)*, states the rules for the description and markup of documents for publishing and interchange. ISO/IEC TR 9573 complements ISO 8879 by providing additional tutorial information. It is not intended, and should not be regarded, as an extension, modification, or interpretation of ISO 8879.

ISO/IEC TR 9573 includes a tutorial on the basic components of the SGML language. It includes notes on the analysis of a document prior to the writing of a formal document type definition, and a series of examples illustrating the use of SGML in various situations together with a discussion of the advantages and disadvantages of different approaches. One example given is for a general document type, others of a general nature are for letter and memorandum, and the mixing of text and graphics. The special considerations that apply for use of SGML with non-Latin based languages, as well as linguistic applications, are discussed and examples shown. Other parts of ISO/IEC TR 9573 contain sample applications of a specialized nature, such as for mathematics, chemistry, and tables. Public entity sets covering a wide variety of widely used special graphic characters are defined.

The titles of the parts of ISO/IEC TR 9573 are listed in the foreword.

1 Scope

Tens of thousands of graphic characters are used in the publishing of text, of which relatively few have been incorporated into standard coded character sets. Even where standard coded representations exist, however, there may be situations in which they cannot be keyboarded conveniently; or in which it is not possible to display the desired visual depiction of the characters.

To help overcome these barriers to successful interchange of SGML documents, this part of ISO/IEC TR 9573 defines character entity sets for some of the widely used special graphic characters. The entity repertoires are based on applicable published and proposed International Standards for coded character sets, and current industry and professional society practice.

NOTE 1 Entity repertoires are necessarily larger and more repetitious than character sets, as they deal in general with higher-level constructs. For example, unique entities have been defined for each accented Latin alphabetic character, while a character set might represent such characters as combinations of letters and diacritical mark characters. These public entity sets should therefore not be construed as requirements for new standard coded character sets.

In many instances upper- and lower-case is used to differentiate the names of different entities. It is thus assumed that a concrete syntax where entity names are case sensitive is used.

NOTE 2 In the reference concrete syntax, the entity names are case sensitive.

2 Reference

The following standard contains provisions which, through reference in this text, constitute provisions of this part of ISO/IEC/TR 9573. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this part of ISO/IEC/TR 9573 are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 8879:1986, *Information processing — Text and office systems — Standard Generalized Markup Language (SGML).*

3 Definitions

For the purposes of this part of ISO/IEC/TR 9573, the definitions given in ISO 8879 apply.

4 General considerations

This clause discusses design criteria applicable to the public entity sets included in this part of ISO/IEC TR 9573.

4.1 Format of Declarations

The entity sets published here are definitional; the entity text simply consists of the entity name in square brackets, and there is a comment describing the symbol, rather than (possibly) system-dependent data that would cause a visual depiction of it to be rendered:

<!ENTITY frac78 SDATA “[frac78]”--fraction seven-eighths-->

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If, as in the following example, the comment includes a name (of any length) preceded by a solidus, the name is an identifier of a visual depiction of the character in *MathSci, an expansion of mathfile, Appendix D*, 1/90, published by the American Mathematical Society, 201 Charles St., Providence, RI 02904, U.S.A.

<!ENTITY frown SDATA "[frown]"--/frown R: down curve-->

NOTE 3 In the MathSci document, an identifier is preceded by a reverse solidus, rather than a solidus.

A comment can include a single upper-case letter, followed by a colon, as in the previous example. The letter indicates that the character belongs to a class whose glyphs are given special treatment in conventional mathematical typesetting. These characters are:

A Relation (arrow)
B Binary operator
C Closing delimiter
L Large operator
N Relation (negated)
O Opening delimiter
P Punctuation
R Relation

4.2 Corresponding Display Entity Sets

Each character has a characteristic visual depiction a "glyph". A system will need to provide corresponding display entity sets for the output devices it supports, in which the entity text is replaced by system data that will cause the glyph to be rendered. The entity name and descriptive comment would, of course, remain the same. For example, the declaration

<!ENTITY frac78 SDATA "7/8"--fraction seven-eighths-->

might be used in a display character entity set for output devices that did not support ISO 6937-2, while

<!ENTITY frac78 SDATA "ß"--fraction seven-eighths-->

might be used in an entity set for 8-bit coded devices that did. For a text formatter driving a photocomposer, a declaration like the following might be used:

<!ENTITY frac78 SDATA "AFII-glyph 00DF"--fraction 7/8-->

NOTE 4 All of the entity declarations use the "SDATA" keyword as a reminder that the entity text could be system-specific character data that might require modification for different output devices and applications.

4.3 Entity Names

The entity names are derived from the English language. They were chosen for maximum mnemonic value, consistent with the logical and systematic use of abbreviations.

NOTE 5 Translations may be desired for other languages.

The entity names are case-sensitive, so the case of letters within the name can identify the case of the character, indicate the doubling of a line, or be used for some other convention.

The entity names employ only letters and numerals, so they can be used with a variety of concrete syntaxes.

NOTE 6 If shorter names are desired for frequently used entities, they can be defined in the documents where the frequent use occurs.

Some characters have different semantic connotations in different application contexts. Multiple entities were defined for some of them.

NOTE 7 If a different name would be more expressive in the context of a particular document, the entity can be redefined within the document.

As many technical symbols can be used in more than one context, the entity names in this category normally describe the character's usual glyph, rather than attempting to convey the semantic concept of the characters.

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The following abbreviations are used with substantial consistency:

Prefixes:

l=left; r=right; u=up; d=down; h=horizontal; v=vertical
b=back, reversed
cu=curly
cw=clockwise; aw=anti-clockwise
g=greater than; l=less than
n=negated
o=in circle
s=small, short
sq=square shaped
thk=thick
x=extended, long, big (large)

Bodies:

ap=approx
arr=arrow; har=harpoon
pr=precedes; sc=succeeds
sub=subset; sup=superset

Suffixes:

b=boxed
f=filled, black, solid
e=single equals; E=double equals
hk=hook
s=slant
t=tail
v=variant
w=wavy, squiggly
2=two of

An upper-case letter means “doubled” (or sometimes “two of”) or upper-case;

4.4 Organization of Entity Sets

The entity sets were organized principally to reflect the structure of the ISO 6937 character sets, or to group large numbers of similar characters together. This organization is not likely to be optimal for most applications, which will normally require a mix of entities from a number of sets. Permission is granted to copy all or part of the public entity sets in clause **6** in any form for use with conforming SGML systems and applications, provided the ISO copyright notice (including the permission-to-copy text) is included in all copies. In particular, entities can be copied from a number of public sets to form a new set, provided the ISO copyright notice is included in the new set.

NOTE 8 If the same entity name occurs in more than one public set, and both are needed in a document, an entity with a different name should be declared for one of them within the document.

It should be noted, however, that permission is not granted to copy the tables in clause **5** illustrating the characteristic glyphs corresponding to the entities.

5 Entity names, characteristic glyph, registered glyph identifier, and short description

The columns of the table contain:

— the name of the entity (see also **4.3**);

— a characteristic rendition (“glyph”) of the character;

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— a glyph identifier, registered in accordance with ISO/IEC 10036[1]).The glyph identifier is shown in decimal[2]) and hexadecimal representation;

— a comment describing the character (see also **4.1**).

5.1 Basic mathematical and scientific symbols

5.1.1 *General*

Entity name	Characteristic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
acd	∿	DB3B	56123	as current
aleph	ℵ	E140	57664	/aleph aleph, Hebrew
and	∧	22B2	8882	/wedge/land B: logical and
And	⩓	DB3C	56124	dbl logical and
andand	⩕	DB3D	56125	two logical and
andd	⩜	DB3E	56126	and, horizontal dash
andslope	⩘	DB3F	56127	sloping large and
andv	⩚	DB40	56128	and with middle stem
angrt	∟	EEDD	61149	right (90 degree) angle
angsph	∢	EBDB	60379	/sphericalangle angle-spherical
angst	Å	F12A	61738	Angstrom capital A, ring
ap	≈	EF79	61305	/approx R: approximate
apacir	≋	DB41	56129	approximate, circumflex accent
awconint	∳	EBC2	60354	contour integral, anti-clockwise
awint	⨑	DB42	56130	anti clock-wise integration
becaus	∵	EF6F	61295	/because R: because
bernou	ℬ	DB43	56131	Bernoulli function (script capital B)
bne	≌	DB44	56132	reverse not equal
bnequiv	≢	DB45	56133	reverse not equivalent
bnot	⌐	EE6A	61034	reverse not
bNot	⫭	DB46	56134	reverse not with two horizontal strokes
bottom	⊥	22AA	8874	/bot bottom
cap	∩	EF56	61270	/cap B: intersection
Cconint	∰	EB37	60215	triple contour integral operator
cirfnint	⨐	DB47	56135	circulation function
compfn	∘	EB5A	60250	/circ B: composite function (small circle)
cong	≅	EF78	61304	/cong R: congruent with
conint	∮	EF76	61302	/oint L: contour integral operator

[1]) Registrar designated by the Registration Authority: Association for Font Information Interchange, 2961 Copa de Oro, Los Alamitos, CA 90720, U.S.A.

[2]) This form is given to assist in the creation of ISO 10036 glyph names. These are of the form "ISO/IEC 10036/RN// Glyphs::*nnnn*"; where *nnnn* is the decimal representation of the glyph identifier.

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Entity name	Characteristic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
Conint	∯	EB36	60214	double contour integral operator
ctdot	⋯	DB48	56136	/cdots, three dots, centered
cup	∪	EF57	61271	/cup B: union or logical sum
cwconint	∲	EBC1	60353	contour integral, clockwise
cwint	∱	DB49	56137	clockwise integral
cylcty	⌭	EE4B	61003	cylindricity
disin	⋲	DB4A	56138	set membership, long horizontal stroke
Dot	¨	2322	8994	dieresis or umlaut mark
DotDot	⃜	EB5C	60252	four dots above
dsol	⧶	DB4B	56139	solidus, bar above
dtdot	⋱	DB4C	56140	/ddots, three dots, descending
dwangle	⦦	DB4D	56141	large downward pointing angle
elinters	⏧	DB4E	56142	electrical intersection
epar	⋕	DB4F	56143	parallel, equal; equal or parallel
eparsl	⧣	DB50	56144	parallel, slanted, equal; homothetically congruent to
equiv	≡	EF72	61298	/equiv R: identical with
eqvparsl	⧥	DB51	56145	equivalent, equal; congruent and parallel
exist	∃	EFB4	61364	/exists at least one exists
fltns	▱	EE4A	61002	flatness
fnof	ƒ	EE54	61012	function of (italic small f)
forall	∀	EFB5	61365	/forall for all
fpartint	⨍	DB52	56146	finite part integral
ge	≥	2166	8550	/geq/ge R: greater-than-or-equal
hamilt	ℋ	EB22	60194	Hamiltonian (script capital H)
iff	⇔	2268	8808	/iff if and only if
iinfin	⧜	DB53	56147	infinity sign, incomplete
imped	Ƶ	EE39	60985	impedance
infin	∞	2167	8551	/infty infinity
infintie	⧝	DB54	56148	tie, infinity
int	∫	EF75	61301	/int L: integral operator
Int	∬	226A	8810	double integral operator
intlarhk	⨗	DB55	56149	integral, left arrow with hook
isin	∈	EF4A	61258	/in R: set membership

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Entity name	Characteristic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
isindot	⋵	DB56	56150	set membership, dot above
isinE	⋹	DB57	56151	set membership, two horizontal strokes
isins	⋴	DB58	56152	set membership, vertical bar on horizontal stroke
isinsv	⋳	DB59	56153	large set membership, vertical bar on horizontal stroke
isinv	∈	DB5A	56154	set membership, variant
lagran	ℒ	EE44	60996	Lagrangian (script capital L)
lang	〈	EF32	61234	/langle O: left angle bracket
Lang	⟪	2238	8760	left angle bracket, double
lArr	⇐	EF4D	61261	/Leftarrow A: is implied by
lbbrk	⎴	214C	8524	left broken bracket
le	≤	2165	8549	/leq/le R: less-than-or-equal
loang	⟬	2148	8520	left open angular bracket
lobrk	⟦	214A	8522	left open bracket
lopar	⦅	EB38	60216	left open parenthesis
lowast	*	EB5D	60253	low asterisk
minus	−	EE2D	60973	B: minus sign
mnplus	∓	EF7D	61309	/mp B: minus-or-plus sign
nabla	∇	EFB9	61369	/nabla del, Hamilton operator
ne	≠	2162	8546	/ne/neq R: not equal
nedot	≠	DB5B	56155	not equal, dot
nhpar	∦	DB5C	56156	not, horizontal, parallel
ni	∋	EF4C	61260	/ni/owns R: contains
nis	⋻	DB5D	56157	contains, vertical bar on horizontal stroke
nisd	⋺	DB5E	56158	contains, long horizontal stroke
niv	∋	DB5F	56159	contains, variant
Not	⫬	DB60	56160	not with two horizontal strokes
notin	∉	EF4B	61259	/notin N: negated set membership
notindot	⋵̸	DB61	56161	negated set membership, dot above
notinE	⋹̸	DB62	56162	negated set membership, two horizontal strokes
notinva	∉	DB63	56163	negated set membership, variant
notinvb	⋶	22BA	8890	negated set membership, variant
notinvc	⋷	DB64	56164	negated set membership, variant
notni	∌	21F8	8696	negated contains
notniva	∌	EBBB	60347	negated contains, variant
notnivb	⋾	DB65	56165	contains, variant

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Entity name	Characteristic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
notnivc	∌	DB66	56166	contains, variant
nparsl	⫽̸	DB67	56167	not parallel, slanted
npart	∂̸	DB68	56168	not partial differential
npolint	⨔	DB69	56169	line integration, not including the pole
nvinfin	⧞	DB6A	56170	not, vert, infinity
olcross	⦻	DB6B	56171	circle, cross
or	∨	22B3	8883	/vee/lor B: logical or
Or	⩔	DB6C	56172	dbl logical or
ord	⩝	DB6D	56173	or, horizontal dash
order	ℴ	DB6E	56174	order of (script small o)
oror	⩖	DB6F	56175	two logical or
orslope	⩗	DB70	56176	sloping large or
orv	⩛	DB71	56177	or with middle stem
par	∥	2142	8514	/parallel R: parallel
parsl	⫽	EF48	61256	parallel, slanted
part	∂	EFBA	61370	/partial partial differential
permil	‰	EF41	61249	per thousand
perp	⊥	EF70	61296	/perp R: perpendicular
pertenk	‱	223E	8766	per 10 thousand
phmmat	ℳ	EB5E	60254	physics M-matrix (script capital M)
pointint	⨕	EB34	60212	integral around a point operator
prime	′	216C	8556	/prime prime or minute
Prime	″	216D	8557	double prime or second
profalar	⌮	EE4E	61006	all-around profile
profline	⌒	EE4C	61004	profile of a line
profsurf	⌓	EE4D	61005	profile of a surface
prop	∝	2279	8825	/propto R: is proportional to
qint	⨌	DB72	56178	/iiiint quadruple integral operator
qprime	⁗	DB74	56180	quadruple prime
quatint	⨖	EB35	60213	quaternion integral operator
radic	√	EF7C	61308	/surd radical
rang	〉	EF33	61235	/rangle C: right angle bracket
Rang	⟫	2239	8761	right angle bracket, double
rArr	⇒	EF4F	61263	/Rightarrow A: implies
rbbrk	❳	214D	8525	right broken bracket
roang	⟩	2149	8521	right open angular bracket

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Entity name	Characteristic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
robrk	⟧	214B	8523	right open bracket
ropar	⦆	EB39	60217	right open parenthesis
rppolint	⨒	DB76	56182	line integration, rectangular path around pole
scpolint	⨓	DB77	56183	line integration, semi-circular path around pole
sim	∼	EE7E	61054	/sim R: similar
simdot	⩪	DB78	56184	similar, dot
sime	≃	EF77	61303	/simeq R: similar, equals
smeparsl	⧤	DB79	56185	similar, parallel, slanted, equal
square	□	2222	8738	/square, square
squarf	■	2223	8739	/blacksquare, square, filled
strns	⏤	EE49	61001	straightness
sub	⊂	EF5B	61275	/subset R: subset or is implied by
sube	⊆	EF59	61273	/subseteq R: subset, equals
sup	⊃	EF5A	61274	/supset R: superset or implies
supe	⊇	EF58	61272	/supseteq R: superset, equals
tdot	⋯	EB5B	60251	three dots above
there4	∴	2168	8552	/therefore R: therefore
tint	∭	EB59	60249	/iiint triple integral operator
top	⊤	EE70	61040	/top top
topbot	⌶	EED3	61139	top and bottom
topcir	⫱	DB7A	56186	top, circle below
tprime	‴	216B	8555	triple prime
utdot	⋰	DB7B	56187	three dots, ascending
uwangle	⦦	DB7C	56188	large upward pointing angle
vangrt	⦜	DB7D	56189	right angle, variant
veeeq	≚	EE3E	60990	logical or, equals
Verbar	‖	2142	8514	/Vert dbl vertical bar
wedgeq	≙	EE3D	60989	/wedgeq R: corresponds to (wedge, equals)
xnis	∋	DB7E	56190	large contains, vertical bar on horizontal stroke

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5.1.2 *Greek Symbols*

This entity set defines the Greek character names for use as variable names in technical applications.

Entity name	Characteristic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
alpha	α	2661	9825	/alpha small alpha, Greek
beta	β	2662	9826	/beta small beta, Greek
chi	χ	267B	9851	/chi small chi, Greek
delta	δ	2665	9829	/delta small delta, Greek
Delta	Δ	2645	9797	/Delta capital Delta, Greek
epsi	ϵ	FD5B	64859	/straightepsilon, small epsilon, Greek
epsiv	ε	2666	9830	/varepsilon
eta	η	266A	9834	/eta small eta, Greek
gamma	γ	2664	9828	/gamma small gamma, Greek
Gamma	Γ	2644	9796	/Gamma capital Gamma, Greek
gammad	$\digamma$	2668	9832	/digamma
Gammad	$\Digamma$	2648	9800	capital digamma
iota	ι	266C	9836	/iota small iota, Greek
kappa	κ	266D	9837	/kappa small kappa, Greek
kappav	$\varkappa$	FD60	64864	/varkappa
lambda	λ	266E	9838	/lambda small lambda, Greek
Lambda	Λ	264E	9806	/Lambda capital Lambda, Greek
mu	μ	266F	9839	/mu small mu, Greek
nu	ν	2670	9840	/nu small nu, Greek
omega	ω	267D	9853	/omega small omega, Greek
Omega	Ω	265D	9821	/Omega capital Omega, Greek
phi	ϕ	267A	9850	/straightphi — small phi, Greek
Phi	Φ	265A	9818	/Phi capital Phi, Greek
phiv	φ	FD5F	64863	/varphi — curly or open phi
pi	π	2673	9843	/pi small pi, Greek
Pi	Π	2653	9811	/Pi capital Pi, Greek
piv	ϖ	FD5C	64860	/varpi
psi	ψ	267C	9852	/psi small psi, Greek
Psi	Ψ	265C	9820	/Psi capital Psi, Greek
rho	ρ	2675	9845	/rho small rho, Greek
rhov	ϱ	FD5E	64862	/varrho
sigma	σ	2676	9846	/sigma small sigma, Greek
Sigma	Σ	2656	9814	/Sigma capital Sigma, Greek
sigmav	ς	2677	9847	/varsigma
tau	τ	2678	9848	/tau small tau, Greek

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Entity name	Characteristic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
theta	θ	266B	9835	/theta straight theta, small theta, Greek
Theta	Θ	264B	9803	/Theta capital Theta, Greek
thetav	ϑ	FD5D	64861	/vartheta — curly or open theta
upsi	υ	2679	9849	/upsilon small upsilon, Greek
Upsi	Υ	2659	9817	/Upsilon capital Upsilon, Greek
xi	ξ	2671	9841	/xi small xi, Greek
Xi	Ξ	2651	9809	/Xi capital Xi, Greek
zeta	ζ	2669	9833	/zeta small zeta, Greek

5.1.3 *Alternative Greek Symbols*

The characters in this entity set can be used in conjunction with the preceding one when a separate class of variables is required. By convention they are displayed in a different font or style (usually emboldened).

Entity name	Characteristic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
b.alpha	α	N/A	N/A	small alpha, Greek
b.beta	β	N/A	N/A	small beta, Greek
b.chi	χ	N/A	N/A	small chi, Greek
b.delta	δ	N/A	N/A	small delta, Greek
b.Delta	Δ	N/A	N/A	capital Delta, Greek
b.epsi	ϵ	N/A	N/A	small epsilon, Greek
b.epsiv	ε	N/A	N/A	variant epsilon
b.eta	η	N/A	N/A	small eta, Greek
b.gamma	γ	N/A	N/A	small gamma, Greek
b.Gamma	Γ	N/A	N/A	capital Gamma, Greek
b.gammad	$\digamma$	N/A	N/A	digamma
b.Gammad	$\Digamma$	N/A	N/A	capital digamma
b.iota	ι	N/A	N/A	small iota, Greek
b.kappa	κ	N/A	N/A	small kappa, Greek
b.kappav	$\varkappa$	N/A	N/A	variant kappa
b.lambda	λ	N/A	N/A	small lambda, Greek
b.Lambda	Λ	N/A	N/A	capital Lambda, Greek
b.mu	μ	N/A	N/A	small mu, Greek
b.nu	ν	N/A	N/A	small nu, Greek
b.omega	ω	N/A	N/A	small omega, Greek
b.Omega	Ω	N/A	N/A	capital Omega, Greek

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Entity name	Characteristic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
b.phi	$\boldsymbol{\phi}$	N/A	N/A	straight phi, small phi, Greek
b.Phi	Φ	N/A	N/A	capital Phi, Greek
b.phiv	φ	N/A	N/A	variant phi — curly or open phi
b.pi	π	N/A	N/A	small pi, Greek
b.Pi	Π	N/A	N/A	capital Pi, Greek
b.piv	$\boldsymbol{\varpi}$	N/A	N/A	variant pi
b.psi	ψ	N/A	N/A	small psi, Greek
b.Psi	Ψ	N/A	N/A	capital Psi, Greek
b.rho	ρ	N/A	N/A	small rho, Greek
b.rhov	ϱ	N/A	N/A	variant rho
b.sigma	σ	N/A	N/A	small sigma, Greek
b.Sigma	Σ	N/A	N/A	capital Sigma, Greek
b.sigmav	ς	N/A	N/A	variant sigma
b.tau	τ	N/A	N/A	small tau, Greek
b.theta	θ	N/A	N/A	straight theta, small theta, Greek
b.Theta	Θ	N/A	N/A	capital Theta, Greek
b.thetav	ϑ	N/A	N/A	variant theta — curly or open theta
b.upsi	υ	N/A	N/A	small upsilon, Greek
b.Upsi	Υ	N/A	N/A	capital Upsilon, Greek
b.xi	ξ	N/A	N/A	small xi, Greek
b.Xi	Ξ	N/A	N/A	capital Xi, Greek
b.zeta	ζ	N/A	N/A	small zeta, Greek

5.2 Additional mathematical symbols

5.2.1 *Ordinary Symbols*

Entity name	Characteristic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
ang	$\angle$	EF6C	61292	/angle — angle
ange	$\angle\!\!=$	DBA1	56225	angle, equal
angmsd	$\measuredangle$	EF6D	61293	/measuredangle — angle-measured
angmsdaa	$\measuredangle\!\!\uparrow$	DBA2	56226	angle-measured, arrow, up, right
angmsdab	$\measuredangle\!\!\uparrow$	DBA3	56227	angle-measured, arrow, up, left
angmsdac	$\measuredangle\!\!\downarrow$	DBA4	56228	angle-measured, arrow, down, right
angmsdad	$\measuredangle\!\!\downarrow$	DBA5	56229	angle-measured, arrow, down, left
angmsdae	$\measuredangle\!\!\rightarrow$	DBA6	56230	angle-measured, arrow, right, up
angmsdaf	$\measuredangle\!\!\leftarrow$	DBA7	56231	angle-measured, arrow, left, up
angmsdag	$\measuredangle\!\!\rightarrow$	DBA8	56232	angle-measured, arrow, right, down

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Entity name	Characteristic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
angmsdah	⦩	DBA9	56233	angle-measured, arrow, left, down
angrtvb	⊾	DBAA	56234	right angle-measured
angrtvbd	⦝	DBAB	56235	right angle-measured, dot
bbrk	⎵	2F32	12082	bottom square bracket
bbrktbrk	⎶	DBAC	56236	bottom above top square bracket
bemptyv	⦰	EEC4	61124	reversed circle, slash
beth	ב	E141	57665	/beth — beth, Hebrew
boxbox	⧉	DBAD	56237	two joined squares
bprime	‵	222B	8747	/backprime — reverse prime
bsemi	⁏	DBAE	56238	reverse semi-colon
cemptyv	⦲	DBAF	56239	circle, slash, small circle above
cirE	⧃	DBB0	56240	circle, two horizontal stroked to the right
cirscir	⧂	DBB1	56241	circle, small circle to the right
comp	∁	EE69	61033	/complement — complement sign
daleth	ד	E143	57667	/daleth — daleth, Hebrew
demptyv	⦱	DBB2	56242	circle, slash, bar above
ell	ℓ	EF69	61289	/ell — cursive small l
empty	∅	22A7	8871	/emptyset — zero, slash
emptyv	∅	EF61	61281	/varnothing — circle, slash
gimel	ג	E142	57666	/gimel — gimel, Hebrew
iiota	℩	EBD0	60368	inverted iota
image	ℑ	22A9	8873	/Im — imaginary
imath	ı	00F5	245	/imath — small i, no dot
jmath	ȷ	00E5	229	/jmath — small j, no dot
laemptyv	⦴	D843	55363	circle, slash, left arrow above
lltri	◺	DBB3	56243	lower left triangle
lrtri	◿	DBB4	56244	lower right triangle
mho	℧	227C	8828	/mho — conductance
nang	∠⃒	DBB5	56245	not, vert, angle
nexist	∄	EE71	61041	/nexists — negated exists
oS	Ⓢ	7653	30291	/circledS — capital S in circle
plank	ℎ	EE2F	60975	/hbar — Planck's over 2pi
plankv	ℏ	EF68	61288	/hslash — variant Planck's over 2pi
raemptyv	⦳	DBB6	56246	circle, slash, right arrow above
range	⦥	DBB7	56247	reverse angle, equal
real	ℜ	22A8	8872	/Re — real

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