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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 Technical Reports of type 3 do not necessarily have to be reviewed until the data they provide are considered to be no longer valid or useful.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

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— 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);

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.

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.

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

Part 13:
Public entity sets for mathematics and science

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-->
```

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 "&#223;"--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.

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;

— 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	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
acd	~	DB3B	56123	ac 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

---

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 ISO10036 glyph names. These are of the form "ISO/IEC 10036/RA//Glyphs::*nnnn*"; where *nnnn* is the decimal representation of the glyph identifier.

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
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

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Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
compfn	○	EB5A	60250	/circ B: composite function (small circle)
cong	≅	EF78	61304	/cong R: congruent with
conint	∮	EF76	61302	/oint L: contour integral operator
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

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
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	Z	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

Entity name	Character-istic 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

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Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
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

Entity name	Character-istic 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 /or 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

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
pertenk	‰₀	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

Entity name	Character-istic 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

Entity name	Characteristic glyph	Registered glyph identifier (hexadecimal)	Registered glyph identifier (decimal)	Short description
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

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 (hexadecimal)	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

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
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	ϝ	2668	9832	/digamma
Gammad	ϝ	2648	9800	capital digamma
iota	ι	266C	9836	/iota small iota, Greek
kappa	κ	266D	9837	/kappa small kappa, Greek
kappav	ϰ	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

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
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
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

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
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	Character-istic 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

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
b.gammad	F	N/A	N/A	digamma
b.Gammad	F	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	ϰ	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
b.phi	ϕ	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	ϖ	N/A	N/A	variant pi
b.psi	ψ	N/A	N/A	small psi, Greek

Entity name	Characteristic glyph	Registered glyph identifier (hexadecimal)	Registered glyph identifier (decimal)	Short description
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	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
ang	∠	EF6C	61292	/angle - angle
ange	∠	DBA1	56225	angle, equal
angmsd	∡	EF6D	61293	/measuredangle - angle-measured
angmsdaa	∡	DBA2	56226	angle-measured, arrow, up, right
angmsdab	∡	DBA3	56227	angle-measured, arrow, up, left
angmsdac	∡	DBA4	56228	angle-measured, arrow, down, right
angmsdad	∡	DBA5	56229	angle-measured, arrow, down, left
angmsdae	∡	DBA6	56230	angle-measured, arrow, right, up
angmsdaf	∡	DBA7	56231	angle-measured, arrow, left, up
angmsdag	∡	DBA8	56232	angle-measured, arrow, right, down
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

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
beth	⊐	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	⊓	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	⊐	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

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
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	ℏ	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
tbrk	⎴	2F31	12081	top square bracket
trpezium	▱	DBB8	56248	trapezium
ultri	◸	DBB9	56249	upper left triangle
urtri	◹	DBBA	56250	upper right triangle
vzigzag	⌇	DBBB	56251	vertical zig-zag line
weierp	℘	22A6	8870	/wp - Weierstrass p

5.2.2 Binary and Large Operators

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
ac	∾	EBC6	60358	most positive
acE	≎	DBBC	56252	most positive, two lines below
amalg	⨿	21AD	8621	/amalg B: amalgamation or coproduct
barvee	⊽	EBB9	60345	bar, vee
barwed	⊼	EECA	61130	/barwedge B: logical and, bar above
Barwed	⩞	EEDA	61146	/doublebarwedge B: log and, dbl bar above
bsolb	⧅	DBBD	56253	reverse solidus in square
Cap	⋒	EE62	61026	/Cap /doublecap B: dbl intersection
capand	⩄	DBBE	56254	intersection, and
capbrcup	⩉	DBBF	56255	intersection, bar, union
capcap	⩋	DBC0	56256	intersection, intersection, joined
capcup	⩇	DBC1	56257	intersection above union
capdot	⩀	DB30	56112	intersection, with dot
caps	⩍	DBC2	56258	intersection, serifs
ccaps	⩍	DBC3	56259	closed intersection, serifs
ccups	⩌	DBC4	56260	closed union, serifs
ccupssm	⩐	DBC5	56261	closed union, serifs, smash product

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
coprod	∐	22B7	8887	/coprod L: coproduct operator
Cup	⋓	EE63	61027	/Cup /doublecup B: dbl union
cupbrcap	⩈	DBC6	56262	union, bar, intersection
cupcap	⩅	EBDA	60378	union above intersection
cupcup	⩊	DBC7	56263	union, union, joined
cupdot	⊍	EB32	60210	union, with dot
cupor	⩖	DBC8	56264	union, or
cups	∪	DBC9	56265	union, serifs
cuvee	⋎	EEEA	61162	/curlyvee B: curly logical or
cuwed	⋏	EEE9	61161	/curlywedge B: curly logical and
dagger	†	EF30	61232	/dagger B: dagger relation
Dagger	‡	EF31	61233	/ddagger B: double dagger relation
diam	◇	21AF	8623	/diamond B: open diamond
divonx	⨰	EE3F	60991	/divideontimes B: division on times
eplus	⩲	DBCA	56266	equal, plus
hercon	⊹	DBCB	56267	hermitian conjugate matrix
intcal	⊺	EEA1	61089	/intercal B: intercal
iprod	⨼	DBCC	56268	/intprod

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
loplus		DBCD	56269	plus sign in left half circle
lotimes		DBCE	56270	multiply sign in left half circle
lthree		EED8	61144	/leftthreetimes B:
ltimes		EED6	61142	/ltimes B: times sign, left closed
midast	*	EE7D	61053	/ast B: asterisk
minusb		2230	8752	/boxminus B: minus sign in box
minusd		EE3B	60987	/dotminus B: minus sign, dot above
minusdu		DBCF	56271	minus sign, dot below
ncap		DBD0	56272	bar, intersection
ncup		DBD1	56273	bar, union
oast		2178	8568	/circledast B: asterisk in circle
ocir		22F5	8949	/circledcirc B: small circle in circle
odash		2177	8567	/circleddash B: hyphen in circle
odiv		DBD2	56274	divide in circle
odot		22BD	8893	/odot B: middle dot in circle
odsold		DBD3	56275	dot, solidus, dot in circle
ofcir		DB3A	56122	filled circle in circle
ogt		DBD4	56276	greater-than in circle

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
ohbar		DBD5	56277	circle with horizontal bar
olcir		217D	8573	large circle in circle
olt		DBD6	56278	less-than in circle
omid		EEC3	61123	vertical bar in circle
ominus		2274	8820	/ominus B: minus sign in circle
opar		DBD7	56279	parallel in circle
operp		DBD8	56280	perpendicular in circle
oplus		2273	8819	/oplus B: plus sign in circle
osol		2276	8822	/oslash B: solidus in circle
otimes		2275	8821	/otimes B: multiply sign in circle
Otimes		DBD9	56281	multiply sign in double circle
otimesas		DBDA	56282	multiply sign in circle, circumflex accent
ovbar		EEC3	61123	circle with vertical bar
plusacir		DBDB	56283	plus, circumflex accent above
plusb		222F	8751	/boxplus B: plus sign in box
pluscir		DBDC	56284	plus, small circle above
plusdo		EE2B	60971	/dotplus B: plus sign, dot above
plusdu		DBDD	56285	plus sign, dot below

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
pluse		DBDE	56286	plus, equals
plussim		DBDF	56287	plus, similar below
plustwo		DBE0	56288	plus, two; Nim-addition
prod	∏	EF7B	61307	/prod L: product operator
race		DBE1	56289	reverse most positive, line below
roplus		DBE2	56290	plus sign in right half circle
rotimes		DBE3	56291	multiply sign in right half circle
rthree		EED9	61145	/rightthreetimes B:
rtimes		EED7	61143	/rtimes B: times sign, right closed
sdot	·	EEB4	61108	/cdot B: small middle dot
sdotb	⊡	2232	8754	/dotsquare /boxdot B: small dot in box
setmn	\	005C	92	/setminus B: reverse solidus
simplus		DBE4	56292	plus, similar above
smashp	※	DBE5	56293	smash product
solb	⧄	DBE6	56294	solidus in square
sqcap	⊓	22AE	8878	/sqcap B: square intersection
sqcaps	⊓	DBE7	56295	square intersection, serifs
sqcup	⊔	22AD	8877	/sqcup B: square union

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
sqcups	⊔	DBE8	56296	square union, serifs
ssetmn	╲	EE3C	60988	/smallsetminus B: sm reverse solidus
sstarf	★	226D	8813	/star B: small star, filled
subdot	⊑	EB33	60211	subset, with dot
sum	Σ	EF7A	61306	/sum L: summation operator
supdot	⊐	DBE9	56297	superset, with dot
timesb	⊠	2231	8753	/boxtimes B: multiply sign in box
timesbar	⨱	DBEA	56298	multiply sign, bar below
timesd	⨰	DBEB	56299	times, dot
tridot	△	DBEC	56300	dot in triangle
triminus	△	DBED	56301	minus in triangle
triplus	△	DBEE	56302	plus in triangle
trisb	△	DBEF	56303	triangle, serifs at bottom
tritime	△	DBF0	56304	multiply in triangle
uplus	⊎	22AB	8875	/uplus B: plus sign in union
veebar	⊻	EEDB	61147	/veebar B: logical or, bar below
wedbar	⩟	DBF1	56305	wedge, bar below
wreath	≀	227D	8829	/wr B: wreath product

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
xcap	∩	EE56	61014	/bigcap L: intersection operator
xcirc	○	227E	8830	/bigcirc B: large circle
xcup	∪	EE57	61015	/bigcup L: union operator
xdtri	▽	2226	8742	/bigtriangledown B: big dn tri, open
xodot	⊙	22EC	8940	/bigodot L: circle dot operator
xoplus	⊕	22EA	8938	/bigoplus L: circle plus operator
xotime	⊗	22EB	8939	/bigotimes L: circle times operator
xsqcup	⊔	22B6	8886	/bigsqcup L: square union operator
xuplus	⊎	22AF	8879	/biguplus L:
xutri	△	2224	8740	/bigtriangleup B: big up tri, open
xvee	∨	EFB7	61367	/bigvee L: logical and operator
xwedge	∧	EFB6	61366	/bigwedge L: logical or operator

5.2.3 Relations

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
ape	≈	EE78	61048	/approxeq R: approximate, equals
apE	≊	DBF2	56306	approximately equal or equal to

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
apid	≈	EB24	60196	approximately identical to
asymp	≍	2264	8804	/asymp R: asymptotically equal to
Barv	⊤	DBF3	56307	vert, dbl bar (over)
bcong	≦	21CB	8651	/backcong R: reverse congruent
bepsi	϶	22B9	8889	/backepsilon R: such that
bowtie	⋈	226C	8812	/bowtie R:
bsim	∽	22BE	8894	/backsim R: reverse similar
bsime	⋍	EEFD	61181	/backsimeq R: reverse similar, eq
bsolhsub	⟍⊂	DBF4	56308	reverse solidus, subset
bump	≎	EE42	60994	/Bumpeq R: bumpy equals
bumpe	≏	EE79	61049	/bumpeq R: bumpy equals, equals
bumpE	≎	DBF5	56309	bump, equals
cire	≗	21A9	8617	/circeq R: circle, equals
Colon	∷	EF6E	61294	/Colon, two colons
colone	≔	2254	8788	/coloneq R: colon, equals
Colone	∷=	DBF6	56310	double colon, equals
congdot	≅	DBF7	56311	congruent, dot
csub	⊏	DBF8	56312	subset, closed

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Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
csube	⊑	DBF9	56313	subset, closed, equals
csup	⊐	DBFA	56314	superset, closed
csupe	⊒	DBFB	56315	superset, closed, equals
cuepr	⋞	2154	8532	/curlyeqprec R: curly eq, precedes
cuesc	⋟	2155	8533	/curlyeqsucc R: curly eq, succeeds
dashv	⊣	EF37	61239	/dashv R: dash, vertical
Dashv	⊫	EF39	61241	dbl dash, vertical
easter	≛	DBFC	56316	equal, asterisk above
ecir	≖	21AA	8618	/eqcirc R: circle on equals sign
ecolon	≕	2255	8789	/eqcolon R: equals, colon
eDDot	⩷	DBFD	56317	/ddotseq R: equal with four dots
eDot	≑	21A8	8616	/doteqdot /Doteq R: eq, even dots
efDot	≒	2262	8802	/fallingdotseq R: eq, falling dots
eg	⪖	DBFE	56318	equal-or-greater
egs	⪖	2161	8545	/eqslantgtr R: equal-or-gtr, slanted
egsdot	⪗	D921	55585	equal-or-greater, slanted, dot inside
el	⪕	D922	55586	equal-or-less
els	⪕	2160	8544	/eqslantless R: eq-or-less, slanted

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
elsdot	⩿	D923	55587	equal-or-less, slanted, dot inside
equest	≟	EF74	61300	/questeq R: equal with questionmark
equivDD	≣	D924	55588	equivalent, four dots above
erDot	≓	2263	8803	/risingdotseq R: eq, rising dots
esdot	≐	EF73	61299	/doteq R: equals, single dot above
esim	≂	EE68	61032	/esim R: equals, similar
Esim	≊	D925	55589	equal, similar
fork	⋔	21AC	8620	/pitchfork R: pitchfork
forkv	⋔	DB2E	56110	fork, variant
frown	⌢	EFC0	61376	/frown R: down curve
gap	⪆	2164	8548	/gtrapprox R: greater, approximate
gE	≧	2171	8561	/geqq R: greater, double equals
gel	⋛	214F	8527	/gtreqless R: greater, equals, less
gEl	⪌	2175	8565	/gtreqqless R: gt, dbl equals, less
ges	⩾	2173	8563	/geqslant R: gt-or-equal, slanted
gescc	⪩	D926	55590	greater than, closed by curve, equal, slanted
gesdot	⪀	D927	55591	greater-than-or-equal, slanted, dot inside
gesdoto	⪂	D928	55592	greater-than-or-equal, slanted, dot above

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
gesdotol		D929	55593	greater-than-or-equal, slanted, dot above left
gesl		D92A	55594	greater, equal, slanted, less
gesles		D92B	55595	greater, equal, slanted, less, equal, slanted
Gg		2147	8519	/ggg /Gg /gggtr R: triple gtr-than
gl		EE6D	61037	/gtrless R: greater, less
gla		D92C	55596	greater, less, apart
glE		D92D	55597	greater, less, equal
glj		D92E	55598	greater, less, overlapping
gsim		EE6F	61039	/gtrsim R: greater, similar
gsime		D92F	55599	greater, similar, equal
gsiml		D930	55600	greater, similar, less
Gt		EF43	61251	/gg R: dbl greater-than sign
gtcc		D931	55601	greater than, closed by curve
gtcir		D932	55602	greater than, circle inside
gtdot		2141	8513	/gtrdot R: greater than, with dot
gtquest		D933	55603	greater than, questionmark above
gtrarr		D934	55604	greater than, right arrow
homtht		EBC7	60359	homothetic

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
lap		2163	8547	/lessapprox R: less, approximate
lat		D935	55605	larger than
late		D936	55606	larger than or equal
lates		D937	55607	larger than or equal, slanted
lE		2170	8560	/leqq R: less, double equals
leg		214E	8526	/lesseqgtr R: less, eq, greater
lEg		2174	8564	/lesseqqgtr R: less, dbl eq, greater
les		2172	8562	/leqslant R: less-than-or-eq, slant
lescc		D938	55608	less than, closed by curve, equal, slanted
lesdot		D939	55609	less-than-or-equal, slanted, dot inside
lesdoto		D93A	55610	less-than-or-equal, slanted, dot above
lesdotor		D93B	55611	less-than-or-equal, slanted, dot above right
lesg		D93C	55612	less, equal, slanted, greater
lesges		D93D	55613	less, equal, slanted, greater, equal, slanted
lg		EE6C	61036	/lessgtr R: less, greater
lgE		D93E	55614	less, greater, equal
Ll		2146	8518	/Ll /lll /llless R: triple less-than
lsim		EE6E	61038	/lesssim R: less, similar

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
lsime		D93F	55615	less, similar, equal
lsimg		D940	55616	less, similar, greater
Lt		EF42	61250	/ll R: double less-than sign
ltcc		D941	55617	less than, closed by curve
ltcir		D942	55618	less than, circle inside
ltdot		2140	8512	/lessdot R: less than, with dot
ltlarr		D943	55619	less than, left arrow
ltquest		D944	55620	less than, questionmark above
ltrie		EEEB	61163	/trianglelefteq R: left triangle, eq
mcomma		D945	55621	minus, comma above
mDDot		EE64	61028	minus with four dots, geometric properties
mid		EF46	61254	/mid R:
mlcp		D946	55622	/mlcp
models		22AC	8876	/models R:
mstpos		D947	55623	most positive
pr		2150	8528	/prec R: precedes
Pr		D849	55369	dbl precedes
prap		21A3	8611	/precapprox R: precedes, approximate

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Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
prcue		2152	8530	/preccurlyeq R: precedes, curly eq
pre		2265	8805	/preceq R: precedes, equals
prE		D84A	55370	precedes, dbl equals
prsim		21A1	8609	/precsim R: precedes, similar
prurel		EBC8	60360	element precedes under relation
ratio		EE34	60980	/ratio
rtrie		EEEC	61164	/trianglerighteq R: right tri, eq
rtriltri		D948	55624	right triangle above left triangle
sc		2151	8529	/succ R: succeeds
Sc		D949	55625	dbl succeeds
scap		21A4	8612	/succapprox R: succeeds, approximate
sccue		2153	8531	/succcurlyeq R: succeeds, curly eq
sce		2266	8806	/succeq R: succeeds, equals
scE		D94A	55626	succeeds, dbl equals
scsim		21A2	8610	/succsim R: succeeds, similar
sdote		D94B	55627	equal, dot below
sfrown		21A6	8614	/smallfrown R: small down curve
simg		D94C	55628	similar, greater

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
simgE	≳̰	D94D	55629	similar, greater, equal
siml	≲	D94E	55630	similar, less
simlE	≲̰	D94F	55631	similar, less, equal
smid	∣	21A7	8615	/shortmid R:
smile	⌣	226F	8815	/smile R: up curve
smt	⋖	D950	55632	smaller than
smte	⩽	D951	55633	smaller than or equal
smtes	⩽	D952	55634	smaller than or equal, slanted
spar	∥	2176	8566	/shortparallel R: short parallel
sqsub	⊏	EE52	61010	/sqsubset R: square subset
sqsube	⊑	22B0	8880	/sqsubseteq R: square subset, equals
sqsup	⊐	EE53	61011	/sqsupset R: square superset
sqsupe	⊒	22B1	8881	/sqsupseteq R: square superset, eq
ssmile	⌣	21A5	8613	/smallsmile R: small up curve
Sub	⋐	215E	8542	/Subset R: double subset
subE	⊆	215C	8540	/subseteqq R: subset, dbl equals
subedot	⊆̇	D953	55635	subset, equals, dot
submult	⊆ₓ	D954	55636	subset, multiply

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
subplus	⊊	D955	55637	subset, plus
subrarr	⊆	D956	55638	subset, right arrow
subsim	⊆	D957	55639	subset, similar
subsub	⊑	D958	55640	subset above subset
subsup	⊆	D959	55641	subset above superset
Sup	⊐	215F	8543	/Supset R: dbl superset
supdsub	⊃⊂	D95A	55642	superset, subset, dash joining them
supE	⊒	215D	8541	/supseteqq R: superset, dbl equals
supedot	⊒̇	D95B	55643	superset, equals, dot
suphsol	⊃/	D95C	55644	superset, solidus
suphsub	⊃⊂	D95D	55645	superset, subset
suplarr	⊃	D95E	55646	superset, left arrow
supmult	⊃×	D95F	55647	superset, multiply
supplus	⊋	D960	55648	superset, plus
supsim	⊇	D961	55649	superset, similar
supsub	⊇	D962	55650	superset above subset
supsup	⊐	D963	55651	superset above superset
thkap	≈	2278	8824	/thickapprox R: thick approximate

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Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
thksim	~	2277	8823	/thicksim R: thick similar
topfork	丕	D964	55652	fork with top
trie	≜	21AB	8619	/triangleq R: triangle, equals
twixt	≬	EE30	60976	/between R: between
vBar	⊥	D965	55653	vert, dbl bar (under)
Vbar	⊥⊥	DB34	56116	dbl vert, bar (under)
vBarv	≑	D966	55654	dbl bar, vert over and under
vdash	⊢	EF36	61238	/vdash R: vertical, dash
vDash	⊨	EF38	61240	/vDash R: vertical, dbl dash
Vdash	⊩	2143	8515	/Vdash R: dbl vertical, dash
VDash	⊫	D967	55655	dbl vert, dbl dash
Vdashl	⊢	D968	55656	vertical, dash (long)
vltri	◁	EEB3	61107	/vartriangleleft R: l tri, open, var
vprop	∝	EF71	61297	/varpropto R: proportional, variant
vrtri	▷	EEB2	61106	/vartriangleright R: r tri, open, var
Vvdash	⊪	216F	8559	/Vvdash R: triple vertical, dash

5.2.4   Negated Relations

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
gnap	⪊	21F7	8695	/gnapprox N: greater, not approximate
gne	⪈	21E3	8675	/gneq N: greater, not equals
gnE	⪉	21F3	8691	/gneqq N: greater, not dbl equals
gnsim	⋧	21E5	8677	/gnsim N: greater, not similar
gvnE	⪚	21F5	8693	/gvertneqq N: gt, vert, not dbl eq
lnap	⪉	21F6	8694	/lnapprox N: less, not approximate
lne	⪇	21E2	8674	/lneq N: less, not equals
lnE	⪇	21F2	8690	/lneqq N: less, not double equals
lnsim	⋦	21E4	8676	/lnsim N: less, not similar
lvnE	⪇	21F4	8692	/lvertneqq N: less, vert, not dbl eq
nap	≉	21C0	8640	/napprox N: not approximate
napE	≉	D969	55657	not approximately equal or equal to
napid	≋	D96A	55658	not approximately identical to
ncong	≇	21CC	8652	/ncong N: not congruent with
ncongdot	≇	D96B	55659	not congruent, dot
nequiv	≢	EE72	61042	/nequiv N: not identical with
nge	≱	21E7	8679	/ngeq N: not greater-than-or-equal

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
ngE		21F1	8689	/ngeqq N: not greater, dbl equals
nges		21E1	8673	/ngeqslant N: not gt-or-eq, slanted
nGg		D96C	55660	not triple greater than
ngsim		21DA	8666	not greater, similar
ngt		21CA	8650	/ngtr N: not greater-than
nGt		D96D	55661	not, vert, much greater than
nGtv		D96E	55662	not much greater than, variant
nle		21E6	8678	/nleq N: not less-than-or-equal
nlE		21F0	8688	/nleqq N: not less, dbl equals
nles		21E0	8672	/nleqslant N: not less-or-eq, slant
nLl		D96F	55663	not triple less than
nlsim		21D9	8665	not less, similar
nlt		21C9	8649	/nless N: not less-than
nLt		D970	55664	not, vert, much less than
nltri		21BB	8635	/ntriangleleft N: not left triangle
nltrie		21BD	8637	/ntrianglelefteq N: not l tri, eq
nLtv		D971	55665	not much less than, variant
nmid		EF47	61255	/nmid

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
npar		EF49	61257	/nparallel N: not parallel
npr		21D0	8656	/nprec N: not precedes
nprcue		21D6	8662	not curly precedes, eq
npre		21D2	8658	/npreceq N: not precedes, equals
nrtri		21BC	8636	/ntriangleright N: not rt triangle
nrtrie		21BE	8638	/ntrianglerighteq N: not r tri, eq
nsc		21D1	8657	/nsucc N: not succeeds
nsccue		D972	55666	not succeeds, curly eq
nsce		21D3	8659	/nsucceq N: not succeeds, equals
nsim		21B0	8624	/nsim N: not similar
nsime		21BF	8639	/nsimeq N: not similar, equals
nsmid		21B5	8629	/nshortmid
nspar		21B6	8630	/nshortparallel N: not short par
nsqsube		21EE	8686	not, square subset, equals
nsqsupe		21EF	8687	not, square superset, equals
nsub		D973	55667	not subset
nsube		D974	55668	/nsubseteq N: not subset, equals
nsubE		21C3	8643	/nsubseteqq N: not subset, dbl eq

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
nsup		D975	55669	not superset
nsupe		D976	55670	/nsupseteq N: not superset, equals
nsupE		21C4	8644	/nsupseteqq N: not superset, dbl eq
ntgl		21E9	8681	not greater, less
ntlg		21E8	8680	not less, greater
nvap		D977	55671	not, vert, approximate
nvdash		21B7	8631	/nvdash N: not vertical, dash
nvDash		21B8	8632	/nvDash N: not vertical, dbl dash
nVdash		21B9	8633	/nVdash N: not dbl vertical, dash
nVDash		21BA	8634	/nVDash N: not dbl vert, dbl dash
nvge		EE66	61030	not, vert, greater-than-or-equal
nvgt		EF45	61253	not, vert, greater-than
nvle		EE65	61029	not, vert, less-than-or-equal
nvlt		EF44	61252	not, vert, less-than
nvltrie		D978	55672	not, vert, left triangle, equals
nvrtrie		D979	55673	not, vert, right triangle, equals
nvsim		EEFE	61182	not, vert, similar
parsim		D97A	55674	parallel, similar

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
prnap		21B3	8627	/precnapprox N: precedes, not approx
prnE		21D4	8660	/precneqq N: precedes, not dbl eq
prnsim		21B1	8625	/precnsim N: precedes, not similar
rnmid		D97B	55675	reverse /nmid
scnap		21B4	8628	/succnapprox N: succeeds, not approx
scnE		21D5	8661	/succneqq N: succeeds, not dbl eq
scnsim		21B2	8626	/succnsim N: succeeds, not similar
simne		EBB7	60343	similar, not equals
solbar		EEC8	61128	solidus, bar through
subne		21C5	8645	/subsetneq N: subset, not equals
subnE		21C1	8641	/subsetneqq N: subset, not dbl eq
supne		21C6	8646	/supsetneq N: superset, not equals
supnE		21C2	8642	/supsetneqq N: superset, not dbl eq
vnsub		EF5F	61279	/nsubset N: not subset, var
vnsup		EF5E	61278	/nsupset N: not superset, var
vsubne		EF55	61269	/varsubsetneq N: subset, not eq, var

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
vsubnE	⊊	21C7	8647	/varsubsetneqq N: subset not dbl eq, var
vsupne	⊋	EF54	61268	/varsupsetneq N: superset, not eq, var
vsupnE	⊋	21C8	8648	/varsupsetneqq N: super not dbl eq, var

5.2.5 Arrow Relations

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
angzarr	⅃	D97C	55676	angle with down zig-zag arrow
cirmid	￠	D97D	55677	circle, mid below
cudarrl	⤷	EBCF	60367	left, curved, down arrow
cudarrr	↲	EBCE	60366	right, curved, down arrow
cularr	↶	EEF2	61170	/curvearrowleft A: left curved arrow
cularrp	↶+	D97E	55678	curved left arrow with plus
curarr	↷	EEF3	61171	/curvearrowright A: rt curved arrow
curarrm	↷-	D9A1	55713	curved right arrow with minus
dArr	⇓	2261	8801	/Downarrow A: down dbl arrow
Darr	↡	D9A2	55714	down two-headed arrow
ddarr	⇊	2243	8771	/downdownarrows A: two down arrows

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
DDotrahd	····>	D9A3	55715	right arrow with dotted stem
dfisht	⊥	D9A4	55716	down fish tail
dHar	⇊	D9A5	55717	down harpoon-left, down harpoon-right
dharl	↓	2249	8777	/downharpoonleft A: dn harpoon-left
dharr	↓	224B	8779	/downharpoonright A: down harpoon-rt
duarr	↓↑	EB2F	60207	down arrow, up arrow
duhar	↓↑	D9A6	55718	down harp, up harp
dzigrarr	⤳	EBCB	60363	right long zig-zag arrow
erarr	⇉	D9A7	55719	equal, right arrow below
harr	↔	EF52	61266	/leftrightarrow A: l&r arrow
hArr	⇔	EF4E	61262	/Leftrightarrow A: l&r dbl arrow
harrcir	↔	D9A8	55720	left and right arrow with a circle
harrw	↭	2252	8786	/leftrightsquigarrow A: l&r arr-wavy
hoarr	↔	D9A9	55721	horizontal open arrow
imof	•—o	EBC4	60356	image of
lAarr	⇐	2244	8772	/Lleftarrow A: left triple arrow
Larr	↞	2246	8774	/twoheadleftarrow A:
larrbfs	↤	D9AA	55722	left arrow-bar, filled square

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
larrfs		D9AB	55723	left arrow, filled square
larrhk		225B	8795	/hookleftarrow A: left arrow-hooked
larrlp		224E	8782	/looparrowleft A: left arrow-looped
larrpl		D9AC	55724	left arrow, plus
larrsim		D9AD	55725	left arrow, similar
larrtl		224C	8780	/leftarrowtail A: left arrow-tailed
latail		D9AE	55726	left arrow-tail
lAtail		D9AF	55727	left double arrow-tail
lbarr		D9B0	55728	left broken arrow
lBarr		D9B1	55729	left doubly broken arrow
ldca		F0BE	61630	left down curved arrow
ldrdhar		D9B2	55730	left harpoon-down over right harpoon-down
ldrushar		D9B3	55731	left-down-right-up harpoon
ldsh		22EE	8942	left down angled arrow
lfisht		D9B4	55732	left fish tail
lHar		D9B5	55733	left harpoon-up over left harpoon-down
lhard		2257	8791	/leftharpoondown A: l harpoon-down
lharu		2256	8790	/leftharpoonup A: left harpoon-up

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Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
lharul		D9B6	55734	left harpoon-up over long dash
llarr		2240	8768	/leftleftarrows A: two left arrows
llhard		D9B7	55735	left harpoon-down below long dash
loarr		D9B8	55736	left open arrow
lrarr		EF51	61265	/leftrightarrows A: l arr over r arr
lrhar		EEF6	61174	/leftrightharpoons A: l harp over r
lrhard		D9B9	55737	right harpoon-down below long dash
lsh		2250	8784	/Lsh A:
lurdshar		D9BA	55738	left-up-right-down harpoon
luruhar		D9BB	55739	left harpoon-up over right harpoon-up
map		226B	8811	/mapsto A:
Map		D9BC	55740	twoheaded mapsto
midcir		EBDC	60380	mid, circle below
mumap		2253	8787	/multimap A:
nearhk		D9BD	55741	NE arrow-hooked
nearr		EF3E	61246	/nearrow A: NE pointing arrow
neArr		D9BE	55742	NE pointing dbl arrow
nesear		D9BF	55743	/toea A: NE & SE arrows

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
nharr	↔	EEF9	61177	/nleftrightarrow A: not l&r arrow
nhArr	⇔	EEFC	61180	/nLeftrightarrow A: not l&r dbl arr
nlarr	↚	EEF7	61175	/nleftarrow A: not left arrow
nlArr	⇍	EEFA	61178	/nLeftarrow A: not implied by
nrarr	↛	EEF8	61176	/nrightarrow A: not right arrow
nrArr	⇏	EEFB	61179	/nRightarrow A: not implies
nrarrc	↝	D9C0	55744	not right arrow-curved
nrarrw	↝	D9C1	55745	not right arrow-wavy
nvHarr	⇔	D9C2	55746	not, vert, left and right double arrow
nvlArr	⇍	D9C3	55747	not, vert, left double arrow
nvrArr	⇏	D9C4	55748	not, vert, right double arrow
nwarhk	↖	D9C5	55749	NW arrow-hooked
nwarr	↖	EF3C	61244	/nwarrow A: NW pointing arrow
nwArr	⇖	D9C6	55750	NW pointing dbl arrow
nwnear	⤤	D9C7	55751	NW & NE arrows
olarr	↺	EEF4	61172	/circlearrowleft A: l arr in circle
orarr	↻	EEF5	61173	/circlearrowright A: r arr in circle
origof	⊶	D9C8	55752	original of

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Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
rAarr	⇛	2245	8773	/Rrightarrow A: right triple arrow
Rarr	↠	2247	8775	/twoheadrightarrow A:
rarrap	⇈	D9C9	55753	approximate, right arrow above
rarrbfs	↦	D9CA	55754	right arrow-bar, filled square
rarrc	↝	D9CB	55755	right arrow-curved
rarrfs	→●	D9CC	55756	right arrow, filled square
rarrhk	↪	225A	8794	/hookrightarrow A: rt arrow-hooked
rarrlp	↬	224F	8783	/looparrowright A: rt arrow-looped
rarrpl	⇥	D9CD	55757	right arrow, plus
rarrsim	⇀	D9CE	55758	right arrow, similar
rarrtl	↣	224D	8781	/rightarrowtail A: rt arrow-tailed
Rarrtl	⤖	D9CF	55759	right two-headed arrow with tail
rarrw	↝	EF53	61267	/rightsquigarrow A: rt arrow-wavy
ratail	↼	D9D0	55760	right arrow-tail
rAtail	↼	D9D1	55761	right double arrow-tail
rbarr	⤍	EB30	60208	/bkarow A: right broken arrow
rBarr	⤏	D9D2	55762	/dbkarow A: right doubly broken arrow
RBarr	⤐	D9D3	55763	/drbkarow A: twoheaded right broken arrow

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Entity name	Characteristic glyph	Registered glyph identifier (hexadecimal)	Registered glyph identifier (decimal)	Short description
rdca	↳	D9D4	55764	right down curved arrow
rdldhar	⇌	D9D5	55765	right harpoon-down over left harpoon-down
rdsh	↳	22EF	8943	right down angled arrow
rfisht	⇁	D9D6	55766	right fish tail
rHar	⇉	D9D7	55767	right harpoon-up over right harpoon-down
rhard	⇀	2259	8793	/rightharpoondown A: rt harpoon-down
rharu	⇀	2258	8792	/rightharpoonup A: rt harpoon-up
rharul	⇁	D9D8	55768	right harpoon-up over long dash
rlarr	⇄	EE50	61008	/rightleftarrows A: r arr over l arr
rlhar	⇌	EF50	61264	/rightleftharpoons A: r harp over l
roarr	⇀	D9D9	55769	right open arrow
rrarr	⇉	2241	8769	/rightrightarrows A: two rt arrows
rsh	↱	2251	8785	/Rsh A:
ruluhar	⇌	D9DA	55770	right harpoon-up over left harpoon-up
searhk	↘	D9DB	55771	/hksearow A: SE arrow-hooken
searr	↘	EF3D	61245	/searrow A: SE pointing arrow
seArr	⇘	D9DC	55772	SE pointing dbl arrow
seswar	⤩	D9DD	55773	/tosa A: SE & SW arrows

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
simrarr	⥲	2236	8758	similar, right arrow below
slarr	←	D9DE	55774	short left arrow
srarr	→	D9DF	55775	short right arrow
swarhk	⤦	D9E0	55776	/hkswarow A: SW arrow-hooked
swarr	↙	EF3F	61247	/swarrow A: SW pointing arrow
swArr	⇙	D9E1	55777	SW pointing dbl arrow
swnwar	⤪	D9E2	55778	SW & NW arrows
uArr	⇑	2260	8800	/Uparrow A: up dbl arrow
Uarr	↟	D9E3	55779	up two-headed arrow
Uarrocir	⥉	D9E4	55780	up two-headed arrow above circle
udarr	⇅	EB2E	60206	up arrow, down arrow
udhar	⥮	D9E5	55781	up harp, down harp
ufisht	⥾	D9E6	55782	up fish tail
uHar	⥣	D9E7	55783	up harpoon-left, up harpoon-right
uharl	↿	2248	8776	/upharpoonleft A: up harpoon-left
uharr	↾	224A	8778	/upharpoonright /restriction A: up harp-r
uuarr	⇈	2242	8770	/upuparrows A: two up arrows
varr	↕	EEB5	61109	/updownarrow A: up&down arrow

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
vArr	↕	EE51	61009	/Updownarrow A: up&down dbl arrow
xharr	⟷	2267	8807	/longleftrightarrow A: long l&r arr
xhArr	⟺	2269	8809	/Longleftrightarrow A: long l&r dbl arr
xlarr	⟵	225C	8796	/longleftarrow A: long left arrow
xlArr	⟸	225E	8798	/Longleftarrow A: long l dbl arrow
xmap	⟼	D9E8	55784	/longmapsto A:
xrarr	⟶	225D	8797	/longrightarrow A: long right arrow
xrArr	⟹	225F	8799	/Longrightarrow A: long rt dbl arr
zigrarr	↝	D9E9	55785	right zig-zag arrow

5.2.6 Opening and Closing Delimiters

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
dlcorn	⌞	22F3	8947	/llcorner O: lower left corner
drcorn	⌟	22F4	8948	/lrcorner C: lower right corner
gtlPar	⦅	D9EA	55786	dbl left parenthesis, greater
langd	⟨	D9EB	55787	left angle, dot
lbrke	⦋	D9EC	55788	left bracket, equal

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
lbrksld	[	D9ED	55789	left bracket, solidus bottom corner
lbrkslu	[	D9EE	55790	left bracket, solidus top corner
lceil	⌈	EFB0	61360	/lceil O: left ceiling
lfloor	⌊	EFB2	61362	/lfloor O: left floor
lmoust	∫	EEE7	61159	/lmoustache
lparlt	⦓	D9EF	55791	O: left parenthesis, lt
ltrPar	⦔	D9F0	55792	dbl right parenthesis, less
rangd	⟩	D9F1	55793	right angle, dot
rbrke	]	D9F2	55794	right bracket, equal
rbrksld	]	D9F3	55795	right bracket, solidus bottom corner
rbrkslu	]	D9F4	55796	right bracket, solidus top corner
rceil	⌉	EFB1	61361	/rceil C: right ceiling
rfloor	⌋	EFB3	61363	/rfloor C: right floor
rmoust	⎰	EEE8	61160	/rmoustache
rpargt	⦒	D9F5	55797	C: right paren, gt
ulcorn	⌜	22F1	8945	/ulcorner O: upper left corner
urcorn	⌝	22F2	8946	/urcorner C: upper right corner

5.3 Symbols based on the Latin alphabet

The entities in this subclause are intended to be used as symbols and not for text. Thus they have been limited to the upper- and lower-case letters of the English language. Complete sets, also including additional letters used in other languages, are included in ISO/IEC TR 9573-14.

NOTE 9   These sets are enumerated lists of alphabetic glyphs from a writing system rendered in a particular type style. There are thus no specific glyph identifiers assigned.

5.3.1 Fraktur

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
afr	𝔞	N/A	N/A	/frak a, lower case a
Afr	𝔄	N/A	N/A	/frak A, upper case a
bfr	𝔟	N/A	N/A	/frak b, lower case b
Bfr	𝔅	N/A	N/A	/frak B, upper case b
cfr	𝔠	N/A	N/A	/frak c, lower case c
Cfr	ℭ	N/A	N/A	/frak C, upper case c
dfr	𝔡	N/A	N/A	/frak d, lower case d
Dfr	𝔇	N/A	N/A	/frak D, upper case d
efr	𝔢	N/A	N/A	/frak e, lower case e
Efr	𝔈	N/A	N/A	/frak E, upper case e
ffr	𝔣	N/A	N/A	/frak f, lower case f
Ffr	𝔉	N/A	N/A	/frak F, upper case f
gfr	𝔤	N/A	N/A	/frak g, lower case g
Gfr	𝔊	N/A	N/A	/frak G, upper case g

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
hfr	ħ	N/A	N/A	/frak h, lower case h
Hfr	ℌ	N/A	N/A	/frak H, upper case h
ifr	i	N/A	N/A	/frak i, lower case i
Ifr	ℑ	N/A	N/A	/frak I, upper case i
jfr	j	N/A	N/A	/frak j, lower case j
Jfr	ℑ	N/A	N/A	/frak J, upper case j
kfr	ſ	N/A	N/A	/frak k, lower case k
Kfr	ℜ	N/A	N/A	/frak K, upper case k
lfr	l	N/A	N/A	/frak l, lower case l
Lfr	ℒ	N/A	N/A	/frak L, upper case l
mfr	m	N/A	N/A	/frak m, lower case m
Mfr	ℳ	N/A	N/A	/frak M, upper case m
nfr	n	N/A	N/A	/frak n, lower case n
Nfr	ℜ	N/A	N/A	/frak N, upper case n
ofr	o	N/A	N/A	/frak o, lower case o
Ofr	ℒ	N/A	N/A	/frak O, upper case o
pfr	p	N/A	N/A	/frak p, lower case p
Pfr	℘	N/A	N/A	/frak P, upper case p

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
qfr	q	N/A	N/A	/frak q, lower case q
Qfr	ℚ	N/A	N/A	/frak Q, upper case q
rfr	r	N/A	N/A	/frak r, lower case r
Rfr	ℜ	N/A	N/A	/frak R, upper case r
sfr	ſ	N/A	N/A	/frak s, lower case s
Sfr	𝔖	N/A	N/A	/frak S, upper case s
tfr	t	N/A	N/A	/frak t, lower case t
Tfr	𝔗	N/A	N/A	/frak T, upper case t
ufr	u	N/A	N/A	/frak u, lower case u
Ufr	𝔘	N/A	N/A	/frak U, upper case u
vfr	v	N/A	N/A	/frak v, lower case v
Vfr	𝔙	N/A	N/A	/frak V, upper case v
wfr	w	N/A	N/A	/frak w, lower case w
Wfr	𝔚	N/A	N/A	/frak W, upper case w
xfr	x	N/A	N/A	/frak x, lower case x
Xfr	𝔛	N/A	N/A	/frak X, upper case x
yfr	y	N/A	N/A	/frak y, lower case y

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
Yfr	𝔜	N/A	N/A	/frak Y, upper case y
zfr	𝔷	N/A	N/A	/frak z, lower case z
Zfr	𝔷	N/A	N/A	/frak Z, upper case z

5.3.2 Open Face (Blackboard Bold)

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
Aopf	𝔸	N/A	N/A	/Bbb A, open face A
Bopf	𝔹	N/A	N/A	/Bbb B, open face B
Copf	ℂ	N/A	N/A	/Bbb C, open face C
Dopf	𝔻	N/A	N/A	/Bbb D, open face D
Eopf	𝔼	N/A	N/A	/Bbb E, open face E
Fopf	𝔽	N/A	N/A	/Bbb F, open face F
Gopf	𝔾	N/A	N/A	/Bbb G, open face G
Hopf	ℍ	N/A	N/A	/Bbb H, open face H
Iopf	𝕀	N/A	N/A	/Bbb I, open face I
Jopf	𝕁	N/A	N/A	/Bbb J, open face J
Kopf	𝕂	N/A	N/A	/Bbb K, open face K

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
Lopf	L	N/A	N/A	/Bbb L, open face L
Mopf	M	N/A	N/A	/Bbb M, open face M
Nopf	N	N/A	N/A	/Bbb N, open face N
Oopf	O	N/A	N/A	/Bbb O, open face O
Popf	P	N/A	N/A	/Bbb P, open face P
Qopf	Q	N/A	N/A	/Bbb Q, open face Q
Ropf	R	N/A	N/A	/Bbb R, open face R
Sopf	S	N/A	N/A	/Bbb S, open face S
Topf	T	N/A	N/A	/Bbb T, open face T
Uopf	U	N/A	N/A	/Bbb U, open face U
Vopf	V	N/A	N/A	/Bbb V, open face V
Wopf	W	N/A	N/A	/Bbb W, open face W
Xopf	X	N/A	N/A	/Bbb X, open face X
Yopf	Y	N/A	N/A	/Bbb Y, open face Y
Zopf	Z	N/A	N/A	/Bbb Z, open face Z

5.3.3 Script

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
ascr	*a*	N/A	N/A	/scr a, script letter a
Ascr	*A*	N/A	N/A	/scr A, script letter A
bscr	*b*	N/A	N/A	/scr b, script letter b
Bscr	*B*	N/A	N/A	/scr B, script letter B
cscr	*c*	N/A	N/A	/scr c, script letter c
Cscr	*C*	N/A	N/A	/scr C, script letter C
dscr	*d*	N/A	N/A	/scr d, script letter d
Dscr	*D*	N/A	N/A	/scr D, script letter D
escr	*e*	N/A	N/A	/scr e, script letter e
Escr	*E*	N/A	N/A	/scr E, script letter E
fscr	*f*	N/A	N/A	/scr f, script letter f
Fscr	*F*	N/A	N/A	/scr F, script letter F
gscr	*g*	N/A	N/A	/scr g, script letter g
Gscr	*G*	N/A	N/A	/scr G, script letter G
hscr	*h*	N/A	N/A	/scr h, script letter h
Hscr	*H*	N/A	N/A	/scr H, script letter H
iscr	*i*	N/A	N/A	/scr i, script letter i

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
Iscr	*ℐ*	N/A	N/A	/scr I, script letter I
jscr	*j*	N/A	N/A	/scr j, script letter j
Jscr	*𝒥*	N/A	N/A	/scr J, script letter J
kscr	*k*	N/A	N/A	/scr k, script letter k
Kscr	*𝒦*	N/A	N/A	/scr K, script letter K
lscr	*ℓ*	N/A	N/A	/scr l, script letter l
Lscr	*ℒ*	N/A	N/A	/scr L, script letter L
mscr	*m*	N/A	N/A	/scr m, script letter m
Mscr	*ℳ*	N/A	N/A	/scr M, script letter M
nscr	*n*	N/A	N/A	/scr n, script letter n
Nscr	*𝒩*	N/A	N/A	/scr N, script letter N
oscr	*o*	N/A	N/A	/scr o, script letter o
Oscr	*𝒪*	N/A	N/A	/scr O, script letter O
pscr	*p*	N/A	N/A	/scr p, script letter p
Pscr	*𝒫*	N/A	N/A	/scr P, script letter P
qscr	*q*	N/A	N/A	/scr q, script letter q
Qscr	*𝒬*	N/A	N/A	/scr Q, script letter Q
rscr	*r*	N/A	N/A	/scr r, script letter r

Entity name	Character-istic glyph	Registered glyph identifier (hexa-decimal)	Registered glyph identifier (decimal)	Short description
Rscr	ℛ	N/A	N/A	/scr R, script letter R
sscr	𝓈	N/A	N/A	/scr s, script letter s
Sscr	𝒮	N/A	N/A	/scr S, script letter S
tscr	𝓉	N/A	N/A	/scr t, script letter t
Tscr	𝒯	N/A	N/A	/scr T, script letter T
uscr	𝓊	N/A	N/A	/scr u, script letter u
Uscr	𝒰	N/A	N/A	/scr U, script letter U
vscr	𝓋	N/A	N/A	/scr v, script letter v
Vscr	𝒱	N/A	N/A	/scr V, script letter V
wscr	𝓌	N/A	N/A	/scr w, script letter w
Wscr	𝒲	N/A	N/A	/scr W, script letter W
xscr	𝓍	N/A	N/A	/scr x, script letter x
Xscr	𝒳	N/A	N/A	/scr X, script letter X
yscr	𝓎	N/A	N/A	/scr y, script letter y
Yscr	𝒴	N/A	N/A	/scr Y, script letter Y
zscr	𝓏	N/A	N/A	/scr z, script letter z
Zscr	𝒵	N/A	N/A	/scr Z, script letter Z

6 Public text

6.1 Basic mathematical and scientific symbols

6.1.1 General

```
<!-- (C) International Organization for Standardization 1991
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     conforming SGML systems and applications as defined in
     ISO 8879, provided this notice is included in all copies.
-->
<!-- Character entity set. Typical invocation:
     <!ENTITY % ISOTECH  PUBLIC
        "ISO 9573-13:1991//ENTITIES General Technical //EN">
     %ISOTECH;
-->
<!ENTITY acd      SDATA "[acd     ]"--ac current-->
<!ENTITY aleph    SDATA "[aleph   ]"--/aleph aleph, Hebrew-->
<!ENTITY and      SDATA "[and     ]"--/wedge /land B: logical and-->
<!ENTITY And      SDATA "[And     ]"--dbl logical and-->
<!ENTITY andand   SDATA "[andand  ]"--two logical and-->
<!ENTITY andd     SDATA "[andd    ]"--and, horizontal dash-->
<!ENTITY andslope SDATA "[andslope]"--sloping large and-->
<!ENTITY andv     SDATA "[andv    ]"--and with middle stem-->
<!ENTITY angrt    SDATA "[angrt   ]"--right (90 degree) angle-->
<!ENTITY angsph   SDATA "[angsph  ]"--/sphericalangle angle-spherical-->
<!ENTITY angst    SDATA "[angst   ]"--Angstrom capital A, ring-->
<!ENTITY ap       SDATA "[ap      ]"--/approx R: approximate-->
<!ENTITY apacir   SDATA "[apacir  ]"--approximate, circumflex accent-->
<!ENTITY awconint SDATA "[awconint]"--contour integral, anti-clockwise-->
<!ENTITY awint    SDATA "[awint   ]"--anti clock-wise integration-->
<!ENTITY becaus   SDATA "[becaus  ]"--/because R: because-->
<!ENTITY bernou   SDATA "[bernou  ]"--Bernoulli function (script capital B)-->
<!ENTITY bne      SDATA "[bne     ]"--reverse not equal-->
<!ENTITY bnequiv  SDATA "[bnequiv ]"--reverse not equivalent-->
<!ENTITY bnot     SDATA "[bnot    ]"--reverse not-->
<!ENTITY bNot     SDATA "[bNot    ]"--reverse not with two horizontal strokes-->
<!ENTITY bottom   SDATA "[bottom  ]"--/bot bottom-->
<!ENTITY cap      SDATA "[cap     ]"--/cap B: intersection-->
<!ENTITY Cconint  SDATA "[Cconint ]"--triple contour integral operator-->
<!ENTITY cirfnint SDATA "[cirfnint]"--circulation function-->
<!ENTITY compfn   SDATA "[compfn  ]"--/circ B: composite function (small circle)-->
<!ENTITY cong     SDATA "[cong    ]"--/cong R: congruent with-->
<!ENTITY conint   SDATA "[conint  ]"--/oint L: contour integral operator-->
<!ENTITY Conint   SDATA "[Conint  ]"--double contour integral operator-->
<!ENTITY ctdot    SDATA "[ctdot   ]"--/cdots, three dots, centered-->
<!ENTITY cup      SDATA "[cup     ]"--/cup B: union or logical sum-->
<!ENTITY cwconint SDATA "[cwconint]"--contour integral, clockwise-->
<!ENTITY cwint    SDATA "[cwint   ]"--clockwise integral-->
<!ENTITY cylcty   SDATA "[cylcty  ]"--cylindricity-->
<!ENTITY disin    SDATA "[disin   ]"--set membership, long horizontal stroke-->
<!ENTITY Dot      SDATA "[Dot     ]"--dieresis or umlaut mark-->
<!ENTITY DotDot   SDATA "[DotDot  ]"--four dots above-->
<!ENTITY dsol     SDATA "[dsol    ]"--solidus, bar above-->
<!ENTITY dtdot    SDATA "[dtdot   ]"--/ddots, three dots, descending-->
<!ENTITY dwangle  SDATA "[dwangle ]"--large downward pointing angle-->
<!ENTITY elinters SDATA "[elinters]"--electrical intersection-->
<!ENTITY epar     SDATA "[epar    ]"--parallel, equal; equal or parallel-->
<!ENTITY eparsl   SDATA "[eparsl  ]"--parallel, slanted, equal; homothetically
                                                congruent to-->
<!ENTITY equiv    SDATA "[equiv   ]"--/equiv R: identical with-->
<!ENTITY eqvparsl SDATA "[eqvparsl]"--equivalent, equal; congruent and parallel-->
```

```
<!ENTITY exist    SDATA "[exist   ]"--/exists at least one exists-->
<!ENTITY fltns    SDATA "[fltns   ]"--flatness-->
<!ENTITY fnof     SDATA "[fnof    ]"--function of (italic small f)-->
<!ENTITY forall   SDATA "[forall  ]"--/forall for all-->
<!ENTITY fpartint SDATA "[fpartint]"--finite part integral-->
<!ENTITY ge       SDATA "[ge      ]"--/geq /ge R: greater-than-or-equal-->
<!ENTITY hamilt   SDATA "[hamilt  ]"--Hamiltonian (script capital H)-->
<!ENTITY iff      SDATA "[iff     ]"--/iff if and only if-->
<!ENTITY iinfin   SDATA "[iinfin  ]"--infinity sign, incomplete-->
<!ENTITY imped    SDATA "[imped   ]"--impedance-->
<!ENTITY infin    SDATA "[infin   ]"--/infty infinity-->
<!ENTITY infintie SDATA "[infintie]"--tie, infinity-->
<!ENTITY int      SDATA "[int     ]"--/int L: integral operator-->
<!ENTITY Int      SDATA "[Int     ]"--double integral operator-->
<!ENTITY intlarhk SDATA "[intlarhk]"--integral, left arrow with hook-->
<!ENTITY isin     SDATA "[isin    ]"--/in R: set membership-->
<!ENTITY isindot  SDATA "[isindot ]"--set membership, dot above-->
<!ENTITY isinE    SDATA "[isinE   ]"--set membership, two horizontal strokes-->
<!ENTITY isins    SDATA "[isins   ]"--set membership, vertical bar on horizontal
                                     stroke-->
<!ENTITY isinsv   SDATA "[isinsv  ]"--large set membership, vertical bar on
                                     horizontal stroke-->
<!ENTITY isinv    SDATA "[isinv   ]"--set membership, variant-->
<!ENTITY lagran   SDATA "[lagran  ]"--Lagrangian (script capital L)-->
<!ENTITY lang     SDATA "[lang    ]"--/langle O: left angle bracket-->
<!ENTITY Lang     SDATA "[Lang    ]"--left angle bracket, double-->
<!ENTITY lArr     SDATA "[lArr    ]"--/Leftarrow A: is implied by-->
<!ENTITY lbbrk    SDATA "[lbbrk   ]"--left broken bracket-->
<!ENTITY le       SDATA "[le      ]"--/leq /le R: less-than-or-equal-->
<!ENTITY loang    SDATA "[loang   ]"--left open angular bracket-->
<!ENTITY lobrk    SDATA "[lobrk   ]"--left open bracket-->
<!ENTITY lopar    SDATA "[lopar   ]"--left open parenthesis-->
<!ENTITY lowast   SDATA "[lowast  ]"--low asterisk-->
<!ENTITY minus    SDATA "[minus   ]"--B: minus sign-->
<!ENTITY mnplus   SDATA "[mnplus  ]"--/mp B: minus-or-plus sign-->
<!ENTITY nabla    SDATA "[nabla   ]"--/nabla del, Hamilton operator-->
<!ENTITY ne       SDATA "[ne      ]"--/ne /neq R: not equal-->
<!ENTITY nedot    SDATA "[nedot   ]"--not equal, dot-->
<!ENTITY nhpar    SDATA "[nhpar   ]"--not, horizontal, parallel-->
<!ENTITY ni       SDATA "[ni      ]"--/ni /owns R: contains-->
<!ENTITY nis      SDATA "[nis     ]"--contains, vertical bar on horizontal stroke-->
<!ENTITY nisd     SDATA "[nisd    ]"--contains, long horizontal stroke-->
<!ENTITY niv      SDATA "[niv     ]"--contains, variant-->
<!ENTITY Not      SDATA "[Not     ]"--not with two horizontal strokes-->
<!ENTITY notin    SDATA "[notin   ]"--/notin N: negated set membership-->
<!ENTITY notindot SDATA "[notindot]"--negated set membership, dot above-->
<!ENTITY notinE   SDATA "[notinE  ]"--negated set membership, two horizontal
                                     strokes-->
<!ENTITY notinva  SDATA "[notinva ]"--negated set membership, variant-->
<!ENTITY notinvb  SDATA "[notinvb ]"--negated set membership, variant-->
<!ENTITY notinvc  SDATA "[notinvc ]"--negated set membership, variant-->
<!ENTITY notni    SDATA "[notni   ]"--negated contains-->
<!ENTITY notniva  SDATA "[notniva ]"--negated contains, variant-->
<!ENTITY notnivb  SDATA "[notnivb ]"--contains, variant-->
<!ENTITY notnivc  SDATA "[notnivc ]"--contains, variant-->
<!ENTITY nparsl   SDATA "[nparsl  ]"--not parallel, slanted-->
<!ENTITY npart    SDATA "[npart   ]"--not partial differential-->
<!ENTITY npolint  SDATA "[npolint ]"--line integration, not including the pole-->
<!ENTITY nvinfin  SDATA "[nvinfin ]"--not, vert, infinity-->
<!ENTITY olcross  SDATA "[olcross ]"--circle, cross-->
<!ENTITY or       SDATA "[or      ]"--/vee /lor B: logical or-->
<!ENTITY Or       SDATA "[Or      ]"--dbl logical or-->
```

```
<!ENTITY ord      SDATA "[ord     ]"--or, horizontal dash-->
<!ENTITY order    SDATA "[order   ]"--order of (script small o)-->
<!ENTITY oror     SDATA "[oror    ]"--two logical or-->
<!ENTITY orslope  SDATA "[orslope ]"--sloping large or-->
<!ENTITY orv      SDATA "[orv     ]"--or with middle stem-->
<!ENTITY par      SDATA "[par     ]"--/parallel R: parallel-->
<!ENTITY parsl    SDATA "[parsl   ]"--parallel, slanted-->
<!ENTITY part     SDATA "[part    ]"--/partial partial differential-->
<!ENTITY permil   SDATA "[permil  ]"--per thousand-->
<!ENTITY perp     SDATA "[perp    ]"--/perp R: perpendicular-->
<!ENTITY pertenk  SDATA "[pertenk ]"--per 10 thousand-->
<!ENTITY phmmat   SDATA "[phmmat  ]"--physics M-matrix (script capital M)-->
<!ENTITY pointint SDATA "[pointint]"--integral around a point operator-->
<!ENTITY prime    SDATA "[prime   ]"--/prime prime or minute-->
<!ENTITY Prime    SDATA "[Prime   ]"--double prime or second-->
<!ENTITY profalar SDATA "[profalar]"--all-around profile-->
<!ENTITY profline SDATA "[profline]"--profile of a line-->
<!ENTITY profsurf SDATA "[profsurf]"--profile of a surface-->
<!ENTITY prop     SDATA "[prop    ]"--/propto R: is proportional to-->
<!ENTITY qint     SDATA "[qint    ]"--/iiiint quadruple integral operator-->
<!ENTITY qprime   SDATA "[qprime  ]"--quadruple prime-->
<!ENTITY quatint  SDATA "[quatint ]"--quaternion integral operator-->
<!ENTITY radic    SDATA "[radic   ]"--/surd radical-->
<!ENTITY rang     SDATA "[rang    ]"--/rangle C: right angle bracket-->
<!ENTITY Rang     SDATA "[Rang    ]"--right angle bracket, double-->
<!ENTITY rArr     SDATA "[rArr    ]"--/Rightarrow A: implies-->
<!ENTITY rbbrk    SDATA "[rbbrk   ]"--right broken bracket-->
<!ENTITY roang    SDATA "[roang   ]"--right open angular bracket-->
<!ENTITY robrk    SDATA "[robrk   ]"--right open bracket-->
<!ENTITY ropar    SDATA "[ropar   ]"--right open parenthesis-->
<!ENTITY rppolint SDATA "[rppolint]"--line integration, rectangular path around pole-->
<!ENTITY scpolint SDATA "[scpolint]"--line integration, semi-circular path around pole-->
<!ENTITY sim      SDATA "[sim     ]"--/sim R: similar-->
<!ENTITY simdot   SDATA "[simdot  ]"--similar, dot-->
<!ENTITY sime     SDATA "[sime    ]"--/simeq R: similar, equals-->
<!ENTITY smeparsl SDATA "[smeparsl]"--similar, parallel, slanted, equal-->
<!ENTITY square   SDATA "[square  ]"--/square, square-->
<!ENTITY squarf   SDATA "[squarf  ]"--/blacksquare, square, filled-->
<!ENTITY strns    SDATA "[strns   ]"--straightness-->
<!ENTITY sub      SDATA "[sub     ]"--/subset R: subset or is implied by-->
<!ENTITY sube     SDATA "[sube    ]"--/subseteq R: subset, equals-->
<!ENTITY sup      SDATA "[sup     ]"--/supset R: superset or implies-->
<!ENTITY supe     SDATA "[supe    ]"--/supseteq R: superset, equals-->
<!ENTITY tdot     SDATA "[tdot    ]"--three dots above-->
<!ENTITY there4   SDATA "[there4  ]"--/therefore R: therefore-->
<!ENTITY tint     SDATA "[tint    ]"--/iiint triple integral operator-->
<!ENTITY top      SDATA "[top     ]"--/top top-->
<!ENTITY topbot   SDATA "[topbot  ]"--top and bottom-->
<!ENTITY topcir   SDATA "[topcir  ]"--top, circle below-->
<!ENTITY tprime   SDATA "[tprime  ]"--triple prime-->
<!ENTITY utdot    SDATA "[utdot   ]"--three dots, ascending-->
<!ENTITY uwangle  SDATA "[uwangle ]"--large upward pointing angle-->
<!ENTITY vangrt   SDATA "[vangrt  ]"--right angle, variant-->
<!ENTITY veeeq    SDATA "[veeeq   ]"--logical or, equals-->
<!ENTITY Verbar   SDATA "[Verbar  ]"--/Vert dbl vertical bar-->
<!ENTITY wedgeq   SDATA "[wedgeq  ]"--/wedgeq R: corresponds to (wedge, equals)-->
<!ENTITY xnis     SDATA "[xnis    ]"--large contains, vertical bar on horizontal stroke--
```

6.1.2 Greek Symbols

```
<!-- (C) International Organization for Standardization 1991
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     conforming SGML systems and applications as defined in
     ISO 8879, provided this notice is included in all copies.
-->
<!-- Character entity set. Typical invocation:
     <!ENTITY % ISOGRK3  PUBLIC
       "ISO 9573-13:1991//ENTITIES Greek Symbols //EN">
     %ISOGRK3;
-->
<!ENTITY alpha     SDATA "[alpha  ]"--/alpha small alpha, Greek-->
<!ENTITY beta      SDATA "[beta   ]"--/beta small beta, Greek-->
<!ENTITY chi       SDATA "[chi    ]"--/chi small chi, Greek-->
<!ENTITY delta     SDATA "[delta  ]"--/delta small delta, Greek-->
<!ENTITY Delta     SDATA "[Delta  ]"--/Delta capital Delta, Greek-->
<!ENTITY epsi      SDATA "[epsi   ]"--/straightepsilon, small epsilon, Greek-->
<!ENTITY epsiv     SDATA "[epsiv  ]"--/varepsilon-->
<!ENTITY eta       SDATA "[eta    ]"--/eta small eta, Greek-->
<!ENTITY gamma     SDATA "[gamma  ]"--/gamma small gamma, Greek-->
<!ENTITY Gamma     SDATA "[Gamma  ]"--/Gamma capital Gamma, Greek-->
<!ENTITY gammad    SDATA "[gammad ]"--/digamma-->
<!ENTITY Gammad    SDATA "[Gammad ]"--capital digamma-->
<!ENTITY iota      SDATA "[iota   ]"--/iota small iota, Greek-->
<!ENTITY kappa     SDATA "[kappa  ]"--/kappa small kappa, Greek-->
<!ENTITY kappav    SDATA "[kappav ]"--/varkappa-->
<!ENTITY lambda    SDATA "[lambda ]"--/lambda small lambda, Greek-->
<!ENTITY Lambda    SDATA "[Lambda ]"--/Lambda capital Lambda, Greek-->
<!ENTITY mu        SDATA "[mu     ]"--/mu small mu, Greek-->
<!ENTITY nu        SDATA "[nu     ]"--/nu small nu, Greek-->
<!ENTITY omega     SDATA "[omega  ]"--/omega small omega, Greek-->
<!ENTITY Omega     SDATA "[Omega  ]"--/Omega capital Omega, Greek-->
<!ENTITY phi       SDATA "[phi    ]"--/straightphi - small phi, Greek-->
<!ENTITY Phi       SDATA "[Phi    ]"--/Phi capital Phi, Greek-->
<!ENTITY phiv      SDATA "[phiv   ]"--/varphi - curly or open phi-->
<!ENTITY pi        SDATA "[pi     ]"--/pi small pi, Greek-->
<!ENTITY Pi        SDATA "[Pi     ]"--/Pi capital Pi, Greek-->
<!ENTITY piv       SDATA "[piv    ]"--/varpi-->
<!ENTITY psi       SDATA "[psi    ]"--/psi small psi, Greek-->
<!ENTITY Psi       SDATA "[Psi    ]"--/Psi capital Psi, Greek-->
<!ENTITY rho       SDATA "[rho    ]"--/rho small rho, Greek-->
<!ENTITY rhov      SDATA "[rhov   ]"--/varrho-->
<!ENTITY sigma     SDATA "[sigma  ]"--/sigma small sigma, Greek-->
<!ENTITY Sigma     SDATA "[Sigma  ]"--/Sigma capital Sigma, Greek-->
<!ENTITY sigmav    SDATA "[sigmav ]"--/varsigma-->
<!ENTITY tau       SDATA "[tau    ]"--/tau small tau, Greek-->
<!ENTITY theta     SDATA "[theta  ]"--/theta straight theta, small theta, Greek-->
<!ENTITY Theta     SDATA "[Theta  ]"--/Theta capital Theta, Greek-->
<!ENTITY thetav    SDATA "[thetav ]"--/vartheta - curly or open theta-->
<!ENTITY upsi      SDATA "[upsi   ]"--/upsilon small upsilon, Greek-->
<!ENTITY Upsi      SDATA "[Upsi   ]"--/Upsilon capital Upsilon, Greek-->
<!ENTITY xi        SDATA "[xi     ]"--/xi small xi, Greek-->
<!ENTITY Xi        SDATA "[Xi     ]"--/Xi capital Xi, Greek-->
<!ENTITY zeta      SDATA "[zeta   ]"--/zeta small zeta, Greek-->
```

6.1.3 Alternative Greek Symbols

```
<!-- (C) International Organization for Standardization 1991
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     conforming SGML systems and applications as defined in
     ISO 8879, provided this notice is included in all copies.
-->
<!-- Character entity set. Typical invocation:
     <!ENTITY % ISOGRK4  PUBLIC
       "ISO 9573-13:1991//ENTITIES Alternative Greek Symbols //EN">
     %ISOGRK4;
-->
<!ENTITY b.alpha  SDATA "[b.alpha ]"--small alpha, Greek-->
<!ENTITY b.beta   SDATA "[b.beta  ]"--small beta, Greek-->
<!ENTITY b.chi    SDATA "[b.chi   ]"--small chi, Greek-->
<!ENTITY b.delta  SDATA "[b.delta ]"--small delta, Greek-->
<!ENTITY b.Delta  SDATA "[b.Delta ]"--capital Delta, Greek-->
<!ENTITY b.epsi   SDATA "[b.epsi  ]"--small epsilon, Greek-->
<!ENTITY b.epsiv  SDATA "[b.epsiv ]"--variant epsilon-->
<!ENTITY b.eta    SDATA "[b.eta   ]"--small eta, Greek-->
<!ENTITY b.gamma  SDATA "[b.gamma ]"--small gamma, Greek-->
<!ENTITY b.Gamma  SDATA "[b.Gamma ]"--capital Gamma, Greek-->
<!ENTITY b.gammad SDATA "[b.gammad]"--digamma-->
<!ENTITY b.Gammad SDATA "[b.Gammad]"--capital digamma-->
<!ENTITY b.iota   SDATA "[b.iota  ]"--small iota, Greek-->
<!ENTITY b.kappa  SDATA "[b.kappa ]"--small kappa, Greek-->
<!ENTITY b.kappav SDATA "[b.kappav]"--variant kappa-->
<!ENTITY b.lambda SDATA "[b.lambda]"--small lambda, Greek-->
<!ENTITY b.Lambda SDATA "[b.Lambda]"--capital Lambda, Greek-->
<!ENTITY b.mu     SDATA "[b.mu    ]"--small mu, Greek-->
<!ENTITY b.nu     SDATA "[b.nu    ]"--small nu, Greek-->
<!ENTITY b.omega  SDATA "[b.omega ]"--small omega, Greek-->
<!ENTITY b.Omega  SDATA "[b.Omega ]"--capital Omega, Greek-->
<!ENTITY b.phi    SDATA "[b.phi   ]"--straight phi, small phi, Greek-->
<!ENTITY b.Phi    SDATA "[b.Phi   ]"--capital Phi, Greek-->
<!ENTITY b.phiv   SDATA "[b.phiv  ]"--variant phi - curly or open phi-->
<!ENTITY b.pi     SDATA "[b.pi    ]"--small pi, Greek-->
<!ENTITY b.Pi     SDATA "[b.Pi    ]"--capital Pi, Greek-->
<!ENTITY b.piv    SDATA "[b.piv   ]"--variant pi-->
<!ENTITY b.psi    SDATA "[b.psi   ]"--small psi, Greek-->
<!ENTITY b.Psi    SDATA "[b.Psi   ]"--capital Psi, Greek-->
<!ENTITY b.rho    SDATA "[b.rho   ]"--small rho, Greek-->
<!ENTITY b.rhov   SDATA "[b.rhov  ]"--variant rho-->
<!ENTITY b.sigma  SDATA "[b.sigma ]"--small sigma, Greek-->
<!ENTITY b.Sigma  SDATA "[b.Sigma ]"--capital Sigma, Greek-->
<!ENTITY b.sigmav SDATA "[b.sigmav]"--variant sigma-->
<!ENTITY b.tau    SDATA "[b.tau   ]"--small tau, Greek-->
<!ENTITY b.theta  SDATA "[b.theta ]"--straight theta, small theta, Greek-->
<!ENTITY b.Theta  SDATA "[b.Theta ]"--capital Theta, Greek-->
<!ENTITY b.thetav SDATA "[b.thetav]"--variant theta - curly or open theta-->
<!ENTITY b.upsi   SDATA "[b.upsi  ]"--small upsilon, Greek-->
<!ENTITY b.Upsi   SDATA "[b.Upsi  ]"--capital Upsilon, Greek-->
<!ENTITY b.xi     SDATA "[b.xi    ]"--small xi, Greek-->
<!ENTITY b.Xi     SDATA "[b.Xi    ]"--capital Xi, Greek-->
<!ENTITY b.zeta   SDATA "[b.zeta  ]"--small zeta, Greek-->
```