

# Certificate, CRL and OCSP Profile for Personal Identification Documents of the Republic of Estonia

Version 8.3

05.June 2019

Version History		
Date	Version	Changes
05.06.2019	8.3	Chapter 2.1 <ul style="list-style-type: none"> <li>■ the natural person semantics identifier is included in <i>serialNumber</i> attribute field</li> <li>■ Mobile-ID O and OU fields removed from certificate subject</li> </ul> Chapter 3.1 - specified CRL nextUpdate field description Chapter 5 - updated ETSI document versions
01.11.2018	8.2	Chapter 2.2.1 - corrections and improvements of AuthorityKeyIdentifier and SubjectKeyIdentifier descriptions. Chapter 4 - new extensions are added: Archive Cutoff and Extended Revoked Definition; CertStatus description is renewed.
04.11.2017	8.1	Chapter 1 - specified Mobile-ID authentication certificate usage Chapter 3.1 - removed CRL extension "Invalidity Date" Chapter 2.2.2 - specified RSA and ECC <i>Key Usage</i> values
24.10.2017	8.0	Removed Mobile-ID for E-residents from the document; Chapter 2.2.2 - Added <i>KeyAgreement</i> key usage value and removed unnecessary key usages; Chapter 2.2.1 - Removed <i>Extended Key Usage</i> extension from Mobile-ID certificates; Chapter 2.1 - added new supported NIST P-384 key algorithm; Chapter 5 - changed reference RFC5639 to RFC5480 (NIST Elliptic Curve Cryptography); Replaced company name "Sertifitseerimiskeskus AS" with "SK ID Solutions AS"; Chapter 2.2.1 - use new short URL in calssuers (c.sk.ee); Chapter 2.2.3 - added missing Policy Qualifier unnotice, from profile version 6.0; Chapter 3.2 - use new short URL's in CRL (c.sk.ee); Chapter 4 - changed Responder ID values; added notice about OCSP nonce.

01.11.2016	7.0	<p>Document name change;</p> <p>Document structure change;</p> <p>Chapter 2 - improved "Technical Profile of the Certificate";</p> <p>Chapter 2.2 - improved certificate extensions table;</p> <p>Chapter 2.2.3 - new OID's added in certificate policies;</p> <p>Chapter 4 - added OCSP profile description; changed Common Name</p> <p>Removed certificate examples</p>
01.01.2016	6.0	<p>In clause 3.2 changed certificate owner details ASN.1 types.</p> <p>In clause 4 renewed Referred and Related Documents.</p> <p>In appendix A in clause A.2.3 complemented the list of the certificate signing algorithms with RSA.</p> <p>In appendix A in clause A.2.5 complemented key lengths of Public Key in the Certificate.</p> <p>In appendix A in clause A.3 renewed Certificate Extensions.</p> <p>In appendix A in clause A.3.4 complemented Certificate Policies.</p> <p>In appendix A in clause A.3.7 complemented CSP Additional Data.</p> <p>In appendix A in clause A.3.10 changed Identification of Qualified Certificate.</p> <p>In appendix A in clauses A.5.1 ja A.5.2 renewed Sample Certificates.</p>
01.01.2015	5.0	<p>Chapter 4.1 - updated references to Legal Acts of Republic of Estonia.</p> <p>Chapter A.2.3 of appendix A removed SHA-1 from the list of certificate signing algorithms</p>
01.12.2014	4.0	<p>Changed the name of the document.</p> <p>Editorial corrections and improvements to document formatting.</p> <p>Document is aligned with RFC5280. Chapter 1 - adjusted the document content description.</p> <p>Chapter 1.2.1 - updated with new terms of Resident digi-ID, Eresident digi-ID, E-resident mobile-ID,</p> <p>Document; removed terms Identity document and Validity period of identity document.</p> <p>Chapter 3.1 updated certificate issuer details.</p> <p>Chapter 3.2 updated certificate owner details.</p> <p>Chapter A.2.3 of appendix A updated list of certificate signing algorithms.</p> <p>Chapter A.2.4 of appendix A specified the certificate validity period.</p> <p>Chapter A.2.5 of appendix A updated list of public keys in the certificate and its presentation algorithms.</p> <p>Chapter A.5.1 and A.5.2 of appendix A updated sample Certificates.</p>
01.06.2014	3.5	<p>All changes planned into version 3.4 will take effect in version 3.5 except limitation of validity of Mobile-ID certificates.</p>

01.05.2014	3.4	<p>Amended with version information table; referred and related documents are now described in dedicated chapter 4; editorial corrections and improvements to document formatting;</p> <p>Adjusted the document content description in chapter 1;</p> <p>Chapter 1.2.1 updated with new terms of RP-card, Digi-ID, Mobile-ID and updated the definitions of ID-card and Identity document;</p> <p>Certificate validity periods of different documents are now described in chapter A.2.4 of appendix A;</p> <p>In chapter A.3.6 of appendix A, the rules of e-mail address creation updated regarding handling dots (in effect since 28.02.2013); The identifiers of the qualified certificate extensions updated in chapter A.3.10 of appendix A (in effect since 28.02.2013);</p> <p>The identifiers of the qualified certificates updated in examples described in chapters A.5.1 and A.5.2 of appendix A (in effect since 28.02.2013).</p> <p>This version never took effect because the decree of the Government of the Republic of Estonia describing the issuance details of the digital identity document in the form of MobileID which changing the validity period of the Mobile-ID certificates issued from May 1st 2014 until December 31st 2014 was not adopted.</p>
01.01.2010	3.3	Version to be published.

- 1. Introduction
  - 1.1. Terms and Abbreviations
- 2. Technical Profile of the Certificate
  - 2.1. Certificate Body
  - 2.2. Certificate Extensions
    - 2.2.1. Extensions
    - 2.2.2. Variable Extensions
    - 2.2.3. Certificate Policy
- 3. Profile of Certificate Revocation List
  - 3.1. CRL Main Fields
  - 3.2. CRL Extensions
- 4. OSCP Profile
- 5. Referred and Related Documents
- 6. Appendix A - Additional Certificate-specific Technical Information
  - 6.1. (Subject Alternative Name)

## 1. Introduction

The document describes the profiles of the digital certificates loaded to the personal identification documents of Republic of Estonia (with the exception of travel documents),

CRL-s and OSCP responses, issued by ESTEID [22]. This document complements Certificate Policies [2][3][4] and Certification Practice Statement [1].

Chapter 2 describes the technical details and delivers the examples of the certificates.

This document does not address other data stored in the personal identification documents

There are two types of certificates loaded to the Documents:

- 1 Qualified Electronic Signature Certificate is intended for:
  - creating Qualified Electronic Signatures compliant with eIDAS [13].
  
- 2 Authentication Certificate is intended for:
  - Authentication,
  - Encryption\*,
  - secure e-mail.

\*Not applicable for Mobile-ID

The certificates are being issued by SK

22 - Intermediate CA can be ESTEID-SK 2011 and ESTEID-SK 2015

## 1.1. Terms and Abbreviations

Refer to p 1.6 in Certification Practice Statement [1] and Certificate policies [2], [3], [4].

## 2. Technical Profile of the Certificate

Natural person certificate is compiled in accordance with the X.509 version 3, IETF RFC 5280 [6], ETSI EN 319 412-2 [8] and ETSI EN 411-2 (chapter 6.6) [15].

### 2.1. Certificate Body

Field	OID	Mandatory	Value	Changeable	Description
Version		yes	V3	no	Certificate format version
Serial Number		yes		no	Unique serial number of the certificate
Signature Algorithm	1.2.840.113549.1.1.11	yes	sha256WithRSAEncryption	no	Signature algorithm in accordance to RFC 5280
Issuer Distinguished name					
Common Name (CN)	2.5.4.3	yes	ESTEID-SK 2015		Certificate authority name



Organisation Identifier	2.5.4.97	yes	NTREE-10747013	no	Identification of the issuer organisation different from the organisation name. Certificates may include one or more semantics identifiers as specified in clause 5.1.4 of ETSI EN 319 412-1 [7].
Organisation (O)	2.5.4.10	yes	AS Sertifitseerimiskeskus		Issuer organisation name
Country (C)	2.5.4.6	yes	EE		Country code: EE - Estonia (2 character ISO 3166 country code [5])
Valid from		yes			First date of certificate validity.
Valid to		yes			The last date of certificate validity.
Subject Distinguished Name		yes		yes	Unique subject name in the infrastructure of certificates.
Serial Number (S)	2.5.4.5	yes		yes	Person identity code as specified in clause 5.1.3 of ETSI EN 319 412-1 [7] <i>Applicable only for Mobile-ID.</i>
Given Name (G)	2.5.4.42	yes		yes	Person given names in UTF8 format according to RFC5280. Also pursuant to IDA [12], international letters SHALL be encoded according to ICAO transcription rules where necessary.



SurName (SN)	2.5.4.4	yes		yes	Person surnames in UTF8 format according to RFC5280. Also pursuant to <a href="#">IDA [12]</a> , international letters SHALL be encoded according to ICAO transcription rules where necessary.
Common Name (CN)	2.5.4.3	yes		yes	Comma-separated surnames, first names and personal identity code.
Organisational Unit (OU)	2.5.4.11	yes		yes	Area of use of the certificate. The following values are used depending on certificate type: "authentication" or "digital signature". <i>Not applicable for Mobile-ID.</i>
Organisation Name (O)	2.5.4.10	yes		yes	Type of the certificate <a href="#">[17]</a> <i>Not applicable for Mobile-ID.</i>
Country (C)	2.5.4.6	yes		yes	Country of origin in accordance with ISO 3166 <a href="#">[5]</a> .
Subject Public Key		yes	RSA 2048, NIST P-256, NIST P-384	yes	RSA algorithm in accordance with RFC 4055 <a href="#">[10]</a> and ECC algorithm created in accordance with RFC 5480 <a href="#">[11]</a>

- ID-card and RP-card O = ESTEID
- Digi-ID: O = ESTEID (DIGI-ID)
- E-resident digi-ID: O = ESTEID (DIGI-ID E-RESIDENT)

## 2.2. Certificate Extensions

### 2.2.1. Extensions

The following table describes the extensions used in the certificates:

Extension	OID	Values and Limitations	Criticality	Mandatory
-----------	-----	------------------------	-------------	-----------

Basic Constraints	2.5.29.19	Subject Type=End Entity Path Length Constraint=None	Non-critical	yes
Certificate Policies	2.5.29.32	Refer to p 2.2.3 "Certificate policy"	Non-critical	yes
Subject Alternative Name	2.5.29.17	Refer to p 2.2.2 "Variable Extensions"	Non-critical	yes
Key Usage	2.5.29.15	Refer to p 2.2.2 "Variable Extensions"	Critical	yes
Extended Key Usage	2.5.29.37	Refer to p 2.2.2 "Variable Extensions"	Critical	yes
Qualified Certificate Statement	1.3.6.1.5.5.7.1.3	Refer to p 2.2.2 "Variable Extensions"	Non-critical	yes
AuthorityKeyIdentifier	2.5.29.35	SHA-1 hash of the public key	Non-critical	yes
CRL distribution Points	2.5.29.31	[1]CRL Distribution Point Distribution Point Name: Full Name: URL=http://c.sk.ee/esteid2015.crl	Non-critical	yes
SubjectKeyIdentifier	2.5.29.14	SHA-1 hash of the public key	Non-critical	yes
Authority Information Access	1.3.6.1.5. 5.7.1.1		Non-critical	yes
ocsp	1.3.6.1.5. 5.7.48.1	http://aia.sk.ee/esteid2015		yes
calssuers	1.3.6.1.5. 5.7.48.2	http://c.sk.ee/ESTEID-SK_2015.der.crt		yes

## 2.2.2. Variable Extensions

Following variable extensions for ID-card, RP-card, Digi-ID (also for E-resident) and Mobile-ID

Extension	DIGITAL AUTHENTICATION	DIGITAL SIGNATURE
Subject Alternative Name	Refer to p 6.1 "Appendix A"	
<b>For ECC keys:</b> Key Usage	DigitalSignature, KeyAgreement	nonRepudiation
<b>For RSA keys:</b> Key Usage	DigitalSignature, KeyEncipherment, dataEncipherment	nonRepudiation
Extended Key Usage <i>(Used only for: ID-card, RP-card, Digi-ID)</i>	Client Authentication (1.3.6.1.5.5.7.3.2) Secure Email (1.3.6.1.5.5.7.3.4)	-
Qualified Certificate Statement [18]		

id-etsi-qcs-QcCompliance		yes
id-etsi-qcs-QcSSCD		yes
id-etsi-qcs-QcType [19]		1
id-etsi-qcs-QcPDS	<a href="https://sk.ee/en/repository/conditions-for-use-of-certificates/">https://sk.ee/en/repository/conditions-for-use-of-certificates/</a>	<a href="https://sk.ee/en/repository/conditions-for-use-of-certificates/">https://sk.ee/en/repository/conditions-for-use-of-certificates/</a>

18 - qcStatements according to clause 6.6.1 specified in ETSI EN 319 411-2 [15]

19 - Types according to clause 4.2.3 specified in ETSI EN 319 412-5 [14]

### 2.2.3. Certificate Policy

Profile	PolicyIdentifier (authentication)	PolicyIdentifier (digital signature)	PolicyQualifier	PolicyQualifier notice [20]
ID-card; RP-card	1.3.6.1.4.1.10015.1.1 0.4.0.2042.1.2	1.3.6.1.4.1.10015.1.1 0.4.0.194112.1.2	<a href="https://www.sk.ee/repositoorium/CPS">https://www.sk.ee/repositoorium/CPS</a>	
Digi-ID; E-resident digi-ID	1.3.6.1.4.1.10015.1.2 0.4.0.2042.1.2	1.3.6.1.4.1.10015.1.2 0.4.0.194112.1.2	<a href="https://www.sk.ee/repositoorium/CPS">https://www.sk.ee/repositoorium/CPS</a>	
Mobile-ID;	1.3.6.1.4.1.10015.1.3 0.4.0.2042.1.2	1.3.6.1.4.1.10015.1.3 0.4.0.194112.1.2	<a href="https://www.sk.ee/repositoorium/CPS">https://www.sk.ee/repositoorium/CPS</a>	Contract 1.11-9

21 - Reference to contract, according which the certificates are issued.

## 3. Profile of Certificate Revocation List

SK issues CRLs in accordance to the guides of RFC 5280 [6]

### 3.1. CRL Main Fields

Field	OID	Mandatory	Value	Description
Version		yes	Version 2	CRL format version pursuant to X.509.



Signature Algorithm		yes	sha256WithRSA Encryption	CRL signing algorithm pursuant to RFC 5280
Issuer Distinguished Name		yes		Distinguished name of crl issuer
Common Name (CN)	2.5.4.3	yes	ESTEID-SK 2015 or ESTEID-SK 2011	Name of certification authority
Organisation Identifier	2.5.4.97	yes	NTREE-10747013	Identification of the issuer organisation different from the organisation name (Does not apply to ESTEID-SK 2011 certificate). Certificates may include one or more semantics identifiers as specified in clause 5.1.4 of ETSI EN 319 412-1 [7]
Organisation (O)	2.5.4.10	yes	AS Sertifitseerimiskeskus	Organisation name
Country (C)	2.5.4.6	yes	EE	Country code: EE - Estonia (2 character ISO 3166 country code [5])
Last Update		yes		Date and time of CRL issuance.
Next Update		yes		Date and time of issuance of the next CRL. The conditions are also described ESTEID CPS chapter 4.9.7. If last CRL is issued [19], the nextUpdate field value is defined as in ETSI EN 319 411-1 [21], clause 6.3.9, Requirement CSS-6.3.9-06.
Revoked Certificates				List of revoked certificates.
Serial Number		yes		Serial number of the certificate revoked.
CRL Reason Code	2.5.29.21	yes		Reason code for certificate revocation.
Revocation Date		yes		Date which is the time, when CA processed the revocation.

- SK as TSP shall not issue a last CRL until all certificates in the scope of the CRL are either expired or revoked as stated in ETSI EN 319 411-2 [15] clause 6.3.10.

### 3.2. CRL Extensions

Field	OID	Values and Limitations	Criticality
CRL Number	2.5.29.20	CRL sequence number	no
Authority Key Identifier	2.5.29.35	Matching the subject key identifier of the certificate	no

Issuing Distribution Point	2.5.29.28	Identifies the CRL distribution point http://c.sk.ee/esteid2015.crl or http://c.sk.ee/esteid2011.crl	yes
----------------------------	-----------	---	-----

## 4. OCSP Profile

OCSP v1 according to [RFC 6960] [9]

Field	Mandatory	Value	Description
ResponseStatus	yes	0 for successful or error code	Result of the query
ResponseBytes			
ResponseType	yes	id-pkix-ocsp-basic	Type of the response
Response Data	yes		
Version	yes	1	Version of the response format
Responder ID	yes	CN = ESTEID-SK 2015 AIA OCSP RESPONDER YYYYMM OU = OCSP 2.5.4.97 = NTREE-10747013 O = SK ID Solutions AS C = EE	Distinguished name of the OCSP responder.  Note: the Common Name will vary each month and includes the month in YYYYMM format.
Produced At	yes		Date when the OCSP response was signed
Responses	yes		
CertID	yes		Serial number of the certificate
Cert Status	yes		Status of the certificate as follows:  <i>good</i> - certificate is issued and has not been revoked or suspended  <i>revoked</i> - certificate is revoked, suspended or not issued by this CA  <i>unknown</i> - the issuer of certificate is unrecognized by this OCSP responder
Revocation Time	no		Date of revocation or expiration of certificate
Revocation Reason	no		Code for revocation Reason according to RFC5280 [6]
This Update	yes		Date when the status was queried from database
Archive Cutoff	no	CA's certificate "valid from" date.	ArchiveCutOff date - the CA's certificate "valid from" date.  Pursuant to RFC 6960 [9] clause 4.4.4

Extended Revoked Definition	no	NULL	Identification that the semantics of certificate status in OCSP response conforms to extended definition in RFC 6960 clause 2.2 [9]
Signature Algorithm	yes	sha256WithRSAEncryption	Signing algorithm pursuant to RFC 5280
signature	yes		
Certificate	yes		Certificate corresponding to the private key used to sign the response.

\*OCSP does not support using *nonce* extension.

## 5. Referred and Related Documents

- 1 SK ID Solutions AS - Certification Practice Statement for ESTEID, published: <https://sk.ee/en/repository/CPS/>;
- 2 Certificate Policy for ID card: <https://sk.ee/en/repository/CP/>;
- 3 Certificate Policy for Digi-ID: <https://sk.ee/en/repository/CP/>;
- 4 Certificate Policy for Mobile-ID: <https://sk.ee/en/repository/CP/>;
- 5 ISO 3166 Codes [http://www.iso.org/iso/country\\_codes](http://www.iso.org/iso/country_codes);
- 6 RFC 5280 - Internet X.509 Public Key Infrastructure Certificate and Certificate Revocation List (CRL) Profile;
- 7 ETSI EN 319 412-1 v1.1.1 Electronic Signatures and Infrastructures (ESI) Certificate Profiles; Part 1: Overview and common data structures;
- 8 ETSI EN 319 412-2 v2.1.1 Electronic Signatures and Infrastructures (ESI) Certificate Profiles; Part 2: Certificate profile for certificates issued to natural persons;
- 9 RFC 6960 - X.509 Internet Public Key Infrastructure Online Certificate Status Protocol - OCSP;
- 10 RFC 4055 - Additional Algorithms and Identifiers for RSA Cryptography for use in the Internet X.509 Public Key Infrastructure Certificate and Certificate Revocation List (CRL) Profile;
- 11 RFC 5480 - Elliptic Curve Cryptography Subject Public Key Information;
- 12 Identity Documents Act, RT I 1999, 25, 365, published: <https://www.riigiteataja.ee/en/eli/511042016001/consolide/current>;
- 13 eIDAS - Regulation (EU) No 910/2014 of the European Parliament and of the Council of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC;
- 14 ETSI EN 319 412-5 v2.2.1 Electronic Signatures and Infrastructures (ESI) Certificate Profiles; Part 5: QCStatements;
- 15 ETSI EN 319 411-2 v2.2.2 Electronic Signatures and Infrastructures (ESI); Policy and security requirements for Trust Service Providers issuing certificates; Part 2: Requirements for trust service providers issuing EU qualified certificates.
- 16 ETSI EN 319 411-1 v.1.2.2 Electronic Signatures and Infrastructures (ESI); Policy and security requirements for Trust Service Providers issuing certificates; Part 1: General requirements

## 6. Appendix A - Additional Certificate-specific Technical Information

## 6.1. (Subject Alternative Name)

The e-mail address of the certificate owner is presented in this field. The e-mail address is included only in the certificate facilitating digital authentication.

The e-mail address is composed of person's given- and surnames (forenames.surnames@eesti.ee) in accordance to the values of the G and SN fields of the certificate. The character substitutions shall be made as necessary in accordance to this chapter. In case of repeated names, if the basic form is already issued, an incremental decimal number is added to the name in form of forenames.surnames.N@eesti.ee. The subdomain for the addresses is eesti.ee.

In the address, the dot (.) character is used to separate name parts. If the name contains a dash, a dash is also present in the e-mail address. All other characters besides dash are replaced with the dot character.

If the replacement of characters results in more than one sequent dot, they will be replaced with one dot (for example, person named as ANTS E. PALUSAAR shall have an e-mail address in form of ants.e.palusaar@eesti.ee). In case if character replacement results with a dot in the beginning of the email address or straight before @ character, these dots will be removed (for example, for a person named as MARK GIREE' shall have an e-mail address in form mark.giree@eesti.ee).

Character codes are presented in hexadecimal form in the table above correspond to UTF-32 encoding specified in the international standard ISO/IEC 10646 (Unicode).

The following substitutions shall be made for the characters in names:

No	Char	Char code	New char	New char code
1	A	0041		
2	a	0061		
3	B	0042		
4	b	0062		
5	C	0043		
6	c	0063		
7	D	0044		
8	d	0064		
9	E	0045		
10	e	0065		
11	F	0046		
12	f	0066		
13	G	0047		
14	g	0067		
15	H	0048		
16	h	0068		
17	I	0049		
18	i	0069		
19	J	004A		
20	j	006A		
21	K	004B		
22	k	006B		



23	L	004C		
24	l	006C		
25	M	004D		
26	m	006D		
27	N	004E		
28	n	006E		
29	O	004F		
30	o	006F		
31	P	0050		
32	p	0070		
33	Q	0051		
34	q	0071		
35	R	0052		
36	r	0072		
37	S	0053		
38	s	0073		
39	Š	0160	S	0053
40	š	0161	s	0073
41	Z	005A		
42	z	007A		
43	Ž	017D	Z	005A
44	ž	017E	z	007A
45	T	0054		
46	t	0074		
47	U	0055		
48	u	0075		
49	V	0056		
50	v	0076		
51	W	0057		
52	w	0077		
53	Õ	00D5	O	004F
54	õ	00F5	o	006F
55	Ä	00C4	A	0041
56	ä	00E4	a	0061
57	Ö	00D6	O	004F
58	ö	00F6	o	006F
59	Ü	00DC	U	0055
60	ü	00FC	u	0075
61	X	0058		



62	x	0078		
63	Y	0059		
64	y	0079		
65	À	00C0	A	0041
66	à	00E0	a	0061
67	Á	00C1	A	0041
68	á	00E1	a	0061
69	Â	00C2	A	0041
70	â	00E2	a	0061
71	Ã	00C3	A	0041
72	ã	00E3	a	0061
73	Ä	0100	A	0041
74	ä	0101	a	0061
75	Å	0102	A	0041
76	å	0103	a	0061
77	Ă	00C5	A	0041
78	ă	00E5	a	0061
79	Ą	0104	A	0041
80	ą	0105	a	0061
81	Æ	00C6	A	0041
82	æ	00E6	a	0061
83	Ć	0106	C	0043
84	ć	0107	c	0063
85	Č	010C	C	0043
86	č	010D	c	0063
87	Ç	00C7	C	0043
88	ç	00E7	c	0063
89	Ď	010E	D	0044
90	ď	010F	d	0064
91	Đ	0110	DJ	0044; 004A
92	đ	0111	dj	0064; 006A
93	Ð	00D0	DH	0044; 0048
94	ð	00F0	dh	0064; 0068
95	È	00C8	E	0045
96	è	00E8	e	0065
97	É	00C9	E	0045
98	é	00E9	e	0065
99	Ê	00CA	E	0045
100	ê	00EA	e	0065



101	Ě	0112	E	0045
102	ě	0113	e	0065
103	Ě	0116	E	0045
104	ě	0117	e	0065
105	Ě	00CB	E	0045
106	ě	00EB	e	0065
107	Ě	011A	E	0045
108	ě	011B	e	0065
109	Ę	0118	E	0045
110	ę	0119	e	0065
111	Ĝ	011E	G	0047
112	ĝ	011F	g	0067
113	Ĝ	0122	G	0047
114	ĝ	0123	g	0067
115	Ì	00CC	I	0049
116	ì	00EC	i	0069
117	Í	00CD	I	0049
118	í	00ED	i	0069
119	Î	00CE	I	0049
120	î	00EE	i	0069
121	Ī	012A	I	0049
122	ī	012B	I	0069
123	İ	0130	I	0049
124	ı	0131	i	0069
125	Ī	00CF	I	0049
126	ī	00EF	i	0069
127	Ĭ	012E	I	0049
128	ĭ	012F	i	0069
129	Ķ	0136	K	004B
130	ķ	0137	k	006B
131	Ĺ	0139	L	004C
132	ĺ	013A	I	006C
133	Ľ	013D	L	004C
134	ľ	013E	I	006C
135	Ł	013B	L	004C
136	ł	013C	I	006C
137	Ł	0141	L	004C
138	ł	0142	I	006C
139	Ń	0143	N	004E



140	ñ	0144	n	006E
141	Ñ	00D1	N	004E
142	ñ	00F1	n	006E
143	Ñ	0147	N	004E
144	ñ	0148	n	006E
145	Ŋ	0145	N	004E
146	ŋ	0146	n	006E
147	Ò	00D2	O	004F
148	ò	00F2	o	006F
149	Ó	00D3	O	004F
150	ó	00F3	o	006F
151	Ô	00D4	O	004F
152	ô	00F4	O	006F
153	Õ	014C	O	004F
154	õ	014D	o	006F
155	Ö	0150	O	004F
156	ö	0151	o	006F
157	Ø	00D8	O	004F
158	ø	00F8	o	006F
159	OE	0152	OE	004F; 0045
160	oe	0153	oe	006F; 0065
161	Ř	0154	R	0052
162	ř	0155	r	0072
163	Ř	0158	R	0052
164	ř	0159	r	0072
165	Ŗ	0156	R	0052
166	ŗ	0157	r	0072
167	Ś	015A	S	0053
168	ś	015B	s	0073
169	Ş	015E	S	0053
170	ş	015F	s	0073
171	ß	00DF	ss	0073; 0073
172	Ť	0164	T	0054
173	ť	0165	t	0074
174	Ť	0162	T	0054
175	ť	0163	t	0074
176	Þ	00DE	TH	0054; 0048
177	þ	00FE	Th	0074; 0068
178	Ù	00D9	U	0055





179	ù	00F9	u	0075
180	Ú	00DA	U	0055
181	ú	00FA	u	0075
182	Û	00DB	U	0055
183	û	00FB	u	0075
184	Ū	016A	U	0055
185	ū	016B	u	0075
186	Ů	016E	U	0055
187	ů	016F	u	0075
188	Ů	0170	U	0055
189	ů	0171	u	0075
190	Ů	0172	U	0055
191	ų	0173	u	0075
192	Ÿ	00DD	Y	0059
193	ý	00FD	y	0079
194	Ÿ	0178	Y	0059
195	ÿ	00FF	y	0079
196	Ż	0179	Z	005A
197	ż	017A	z	007A
198	Ź	017B	Z	005A
199	ź	017C	z	007A