

Olerup SSP[®] HLA-C*03

Product number:	101.611-12 – including <i>Taq</i> polymerase
Lot number:	85K
Expiry date:	2013-July-01
Number of tests:	12
Number of wells per test:	48
Storage - pre-aliquoted primers:	dark at -20°C
- PCR Master Mix:	-20°C
- Adhesive PCR seals	RT
- Product Insert	RT

This Product Description is only valid for Lot No. 85K.

CHANGES COMPARED TO THE PREVIOUS *OLERUP SSP*[®] HLA-C*03 Lot

The HLA-C*03 specificity and interpretation tables have been updated for the HLA-C alleles described since the previous *Olerup SSP*[®] HLA-C*03 lot was made (Lot No. 54G).

Three well have been added to the HLA-C*03 kit,
wells **46 to 48**.
The amplification patterns for some rare HLA-C*03 alleles only differ
by the length of the specific PCR products.

The primers of the wells detailed below have been exchanged, added or modified compared to the previous lot.

Well	5'-primer	3'-primer	rationale
11	Added	Added	Primer pair added for the C*03:87 allele.
15	Modified	-	Increased yield of specific PCR product, decreased primer dimer formation.
17	Added	Modified, added	Increased yield of specific PCR product, primer pair added for the C*03:101 allele.
18	Added	-	Primers added for the C*03:83 and 03:102 alleles.
20	Modified	-	Increased specificity of primer pair.
21	Added	-	Primer added for the C*03:88 allele.
23	-	Added	Primer added for the C*03:90 allele.

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24	-	Added	Primer added for the C*03:79 allele.
29	-	Added	Primers added for the C*03:96 and C*03:98 alleles.
30	-	Added	Primer added for the C*03:96 allele.
32	-	Added	Primer added for the C*03:84 allele.
34	-	Added	Primer added for the C*03:98 allele.
35	-	Added	Primers added for the C*03:79, C*03:82 and C*03:85 alleles.
38	-	Added	Primer added for the C*03:95 allele.
39	Added	Added	Primer pair added for the C*03:77 allele.
40	Added	Added, modified	Primer pair added for the C*03:80 allele, increased specificity of primer pair.
41	Added	Added	Primer pair added for the C*03:100 allele.
42	Added	Added	Primer pair added for the C*03:78 allele.
43	Added	Added	Exchanged positive control primer pair, primer pairs added for the C*03:81 and C*03:97 alleles.
44	Modified	Added	Primer added for the C*03:91 allele, increased specificity of primer pair.
45	Added	Added	Primer pair added for the C*03:93 allele.
46	New	New	New primer pairs for the C*03:86, C*03:94 and C*03:99 alleles.
47	New	New	New primer pair for the C*03:92 allele.
48	New	New	New primer pair for the C*03:99 allele.

PRODUCT DESCRIPTION

HLA-C*03 SSP subtyping

CONTENT

The primer set contains 5'- and 3'-primers for identifying the HLA-C*03:02 to C*03:102 alleles.

PLATE LAYOUT

Each test consists of 48 PCR reactions in a 48 well cut PCR plate.

1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32
33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48

The 48 well cut PCR plate is marked with ‘HLA-C*03’ in silver/gray ink.

Well No. 1 is marked with the Lot Number ‘85K’.

A faint row of numbers is seen between wells 1 and 2 or wells 7 and 8 of the PCR trays. These stem from the manufacture of the trays, and should be disregarded.

The PCR plates are heat-sealed with a PCR-compatible foil.

Please note: When removing each 48 well PCR plate, make sure that the remaining plates stay sealed. Use a scalpel or a similar instrument to carefully cut the foil between the plates.

INTERPRETATION

The interpretation of HLA-C*03 SSP subtypings will be influenced by most C*01, the C*02, the C*04, two C*05, the C*06, most C*07, four C*12, the C*14, the C*15, the C*16:18, the C*17 and C*18 alleles when present on the other haplotype. In addition, the B*07:93 and 51:76 alleles are amplified by primer mix 7, the B*08:39 allele is amplified by primer mix 7 and 29, the B*15:96 allele is amplified by primer mixes 5, 6, 26 and 43, the B*35:101:02 allele is amplified by primer mix 7 and 33 and the B*55:30 allele is amplified by primer mix 42.

UNIQUELY IDENTIFIED ALLELES

All the HLA-C*03 alleles, i.e. **C*03:02 to C*03:102**, recognized by the HLA Nomenclature Committee in October 2010¹ will give rise to unique amplification patterns by the primers in the HLA-C*03 subtyping kit.

The HLA-C*03 subtyping kit cannot distinguish the C*03:02:01-03:02:06 alleles, the C*03:03:01-03:03:11 and 03:03:13 alleles, the C*03:04:01-01-03:04:19 alleles or the C*03:38:01-03:38:02 alleles.

The C*03:28 and 03:90 alleles can be distinguished by the different sizes of the specific PCR products generated by primer mix 23.

The C*03:56 and 03:85 alleles and the C*03:64 and 03:82 alleles can be distinguished by the different sizes of the specific PCR products generated by primer mix 35.

The C*03:70 and 03:78 alleles can be distinguished by the different sizes of the specific PCR products generated by primer mix 42.

¹HLA-C alleles listed on the IMGT/HLA web page 2010-October-15, release 3.2.0, www.ebi.ac.uk/imgt/hla.

RESOLUTION IN HOMO- AND HETEROZYGOTES

A total of 141 alleles generate 100 amplification patterns that can be combined in 5050 homozygous and heterozygous combinations. 1833 of these genotypes do not give rise to unique amplification patterns. The different lengths of the specific PCR products were not considered in these calculations.

++++++	-----	-----	-----	-----	-----	*03:43:01, *03:71 = *03:43:02, *03:71 = *03:62, *03:71
++++++	-----	-----	-----	-----	-----	*03:03:01, *03:71 = *03:22Q, *03:71
++++++	-----	-----	-----	-----	-----	*03:05, *03:43:01 = *03:17, *03:43:01 = *03:17, *03:43:02
++++++	-----	-----	-----	-----	-----	*03:21, *03:42 = *03:21, *03:89
++++++	-----	-----	-----	-----	-----	*03:02:01, *03:21 = *03:21, *03:40
++++++	-----	-----	-----	-----	-----	*03:31, *03:42 = *03:31, *03:89
++++++	-----	-----	-----	-----	-----	*03:11:01, *03:42 = *03:11:01, *03:89
++++++	-----	-----	-----	-----	-----	*03:03:12, *03:42 = *03:03:12, *03:89
++++++	-----	-----	-----	-----	-----	*03:42, *03:102 = *03:89, *03:102
++++++	-----	-----	-----	-----	-----	*03:12, *03:42 = *03:12, *03:89
++++++	-----	-----	-----	-----	-----	*03:20N, *03:42 = *03:20N, *03:89
++++++	-----	-----	-----	-----	-----	*03:42, *03:83 = *03:83, *03:89
++++++	-----	-----	-----	-----	-----	*03:42, *03:88 = *03:88, *03:89
++++++	-----	-----	-----	-----	-----	*03:42, *03:69 = *03:69, *03:89
++++++	-----	-----	-----	-----	-----	*03:42, *03:49 = *03:49, *03:89
++++++	-----	-----	-----	-----	-----	*03:42, *03:79 = *03:79, *03:89
++++++	-----	-----	-----	-----	-----	*03:30, *03:42 = *03:30, *03:89
++++++	-----	-----	-----	-----	-----	*03:11:02, *03:42 = *03:11:02, *03:89 = *03:22Q, *03:60
++++++	-----	-----	-----	-----	-----	*03:42, *03:96 = *03:89, *03:96
++++++	-----	-----	-----	-----	-----	*03:42, *03:67 = *03:67, *03:89
++++++	-----	-----	-----	-----	-----	*03:42, *03:61 = *03:61, *03:89
++++++	-----	-----	-----	-----	-----	*03:42, *03:59 = *03:59, *03:89
++++++	-----	-----	-----	-----	-----	*03:09, *03:43:01 = *03:42, *03:43:01 = *03:42, *03:43:02 = *03:42, *03:62 = *03:43:01, *03:89 = *03:43:02, *03:89 = *03:62, *03:89
++++++	-----	-----	-----	-----	-----	*03:42, *03:53 = *03:53, *03:89
++++++	-----	-----	-----	-----	-----	*03:42, *03:56 = *03:56, *03:89
++++++	-----	-----	-----	-----	-----	*03:42, *03:50 = *03:50, *03:89
++++++	-----	-----	-----	-----	-----	*03:42, *03:55 = *03:55, *03:89
++++++	-----	-----	-----	-----	-----	*03:22Q, *03:95 = *03:42, *03:52 = *03:52, *03:89
++++++	-----	-----	-----	-----	-----	*03:42, *03:66 = *03:66, *03:89
++++++	-----	-----	-----	-----	-----	*03:42, *03:68 = *03:68, *03:89
++++++	-----	-----	-----	-----	-----	*03:42, *03:81 = *03:42, *03:97 = *03:81, *03:89
++++++	-----	-----	-----	-----	-----	*03:42, *03:75 = *03:75, *03:89
++++++	-----	-----	-----	-----	-----	*03:42, *03:76 = *03:76, *03:89
++++++	-----	-----	-----	-----	-----	*03:02:01, *03:22Q = *03:03:01, *03:42 = *03:03:01, *03:89 = *03:22Q, *03:40 = *03:22Q, *03:42 = *03:22Q, *03:89
++++++	-----	-----	-----	-----	-----	*03:03:12, *03:15 = *03:11:01, *03:15
++++++	-----	-----	-----	-----	-----	*03:15, *03:43:01 = *03:15, *03:43:02 = *03:15, *03:62
++++++	-----	-----	-----	-----	-----	*03:03:01, *03:15 = *03:11:02, *03:15
++++++	-----	-----	-----	-----	-----	*03:08, *03:43:01 = *03:43:01, *03:87
++++++	-----	-----	-----	-----	-----	*03:02:01, *03:31 = *03:31, *03:40
++++++	-----	-----	-----	-----	-----	*03:08, *03:43:02 = *03:43:02, *03:87
++++++	-----	-----	-----	-----	-----	*03:02:01, *03:11:01 = *03:03:12, *03:60 = *03:11:01, *03:40 = *03:11:01, *03:60
++++++	-----	-----	-----	-----	-----	*03:02:01, *03:03:12 = *03:03:12, *03:40
++++++	-----	-----	-----	-----	-----	*03:02:01, *03:102 = *03:40, *03:102
++++++	-----	-----	-----	-----	-----	*03:02:01, *03:12 = *03:12, *03:40
++++++	-----	-----	-----	-----	-----	*03:02:01, *03:20N = *03:20N, *03:40
++++++	-----	-----	-----	-----	-----	*03:02:01, *03:83 = *03:40, *03:83
++++++	-----	-----	-----	-----	-----	*03:24, *03:43:01 = *03:33, *03:43:01 = *03:33, *03:43:02 = *03:33, *03:62
++++++	-----	-----	-----	-----	-----	*03:02:01, *03:88 = *03:40, *03:88
++++++	-----	-----	-----	-----	-----	*03:02:01, *03:69 = *03:40, *03:69
++++++	-----	-----	-----	-----	-----	*03:02:01, *03:49 = *03:40, *03:49
++++++	-----	-----	-----	-----	-----	*03:02:01, *03:79 = *03:40, *03:79

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+++++ - - - - - +	----- +	-----	-----	*03:02:01, *03:30 = *03:30, *03:40
+++++ - - - - - +	----- +	-----	-----	*03:36, *03:43:01 = *03:36, *03:43:02 = *03:36, *03:62 = *03:43:01, *03:77
+++++ - - - - - +	----- +	-----	-----	*03:37, *03:43:01 = *03:43:01, *03:60 = *03:43:02, *03:60 = *03:60, *03:62
+++++ - - - - - +	----- +	-----	-----	*03:11:02, *03:95 = *03:52, *03:60
+++++ - - - - - +	----- +	-----	-----	*03:02:01, *03:11:02 = *03:03:01, *03:60 = *03:11:02, *03:40 = *03:11:02, *03:60
+++++ - - - - - +	----- +	-----	-----	*03:16, *03:43:01 = *03:16, *03:43:02
+++++ - - - - - +	----- +	-----	-----	*03:02:01, *03:96 = *03:40, *03:96
+++++ - - - - - +	----- +	-----	-----	*03:02:01, *03:67 = *03:40, *03:67
+++++ - - - - - +	----- +	-----	-----	*03:02:01, *03:61 = *03:40, *03:61
+++++ - - - - - +	----- +	-----	-----	*03:02:01, *03:59 = *03:40, *03:59
+++++ - - - - - +	----- +	-----	-----	*03:43:01, *03:48 = *03:43:01, *03:84 = *03:43:02, *03:84 = *03:62, *03:84
+++++ - - - - - +	----- +	-----	-----	*03:43:01, *03:73 = *03:43:01, *03:95 = *03:43:02, *03:95 = *03:62, *03:95
+++++ - - - - - +	----- +	-----	-----	*03:02:01, *03:43:01 = *03:02:01, *03:43:02 = *03:02:01, *03:62 = *03:04:01:01, *03:43:01 = *03:40, *03:43:01 = *03:40, *03:43:02 = *03:40, *03:62
+++++ - - - - - +	----- +	-----	-----	*03:02:01, *03:53 = *03:40, *03:53
+++++ - - - - - +	----- +	-----	-----	*03:02:01, *03:56 = *03:40, *03:56
+++++ - - - - - +	----- +	-----	-----	*03:02:01, *03:50 = *03:40, *03:50
+++++ - - - - - +	----- +	-----	-----	*03:02:01, *03:55 = *03:40, *03:55
+++++ - - - - - +	----- +	-----	-----	*03:02:01, *03:52 = *03:03:01, *03:95 = *03:40, *03:52 = *03:52, *03:95
+++++ - - - - - +	----- +	-----	-----	*03:02:01, *03:66 = *03:40, *03:66
+++++ - - - - - +	----- +	-----	-----	*03:02:01, *03:68 = *03:40, *03:68
+++++ - - - - - +	----- +	-----	-----	*03:02:01, *03:81 = *03:40, *03:81 = *03:40, *03:97
+++++ - - - - - +	----- +	-----	-----	*03:02:01, *03:75 = *03:40, *03:75
+++++ - - - - - +	----- +	-----	-----	*03:02:01, *03:76 = *03:40, *03:76
+++++ - - - - - +	----- +	-----	-----	*03:02:01, *03:03:01 = *03:03:01, *03:40
+++++ - - - - - +	----- +	-----	-----	*03:14, *03:43:02 = *03:14, *03:62
+++++ - - - - - +	----- +	-----	-----	*03:14, *03:81 = *03:14, *03:97
+++++ - - - - - +	----- +	-----	-----	*03:13, *03:71 = *03:13, *03:89
+++++ - - - - - +	----- +	-----	-----	*03:02:01, *03:58 = *03:58, *03:84 = *03:84, *03:86
+++++ - - - - - +	----- +	-----	-----	*03:25, *03:42 = *03:47, *03:71
+++++ - - - - - +	----- +	-----	-----	*03:27, *03:42 = *03:57, *03:71
+++++ - - - - - +	----- +	-----	-----	*03:34, *03:71 = *03:35, *03:42
+++++ - - - - - +	----- +	-----	-----	*03:04:01:01, *03:71 = *03:05, *03:42 = *03:09, *03:71 = *03:17, *03:42 = *03:40, *03:71 = *03:42, *03:71
+++++ - - - - - +	----- +	-----	-----	*03:05, *03:40 = *03:17, *03:40
+++++ - - - - - +	----- +	-----	-----	*03:06, *03:42 = *03:06, *03:89
+++++ - - - - - +	----- +	-----	-----	*03:02:01, *03:06 = *03:06, *03:40
+++++ - - - - - +	----- +	-----	-----	*03:29, *03:42 = *03:29, *03:89
+++++ - - - - - +	----- +	-----	-----	*03:08, *03:42 = *03:08, *03:89
+++++ - - - - - +	----- +	-----	-----	*03:39, *03:42 = *03:39, *03:89
+++++ - - - - - +	----- +	-----	-----	*03:18, *03:42 = *03:18, *03:89
+++++ - - - - - +	----- +	-----	-----	*03:08, *03:15 = *03:15, *03:29
+++++ - - - - - +	----- +	-----	-----	*03:02:01, *03:29 = *03:29, *03:40
+++++ - - - - - +	----- +	-----	-----	*03:02:01, *03:08 = *03:08, *03:40
+++++ - - - - - +	----- +	-----	-----	*03:02:01, *03:39 = *03:39, *03:40
+++++ - - - - - +	----- +	-----	-----	*03:02:01, *03:18 = *03:18, *03:40
+++++ - - - - - +	----- +	-----	-----	*03:09, *03:15 = *03:15, *03:42
+++++ - - - - - +	----- +	-----	-----	*03:42, *03:45 = *03:45, *03:89
+++++ - - - - - +	----- +	-----	-----	*03:07, *03:42 = *03:07, *03:89
+++++ - - - - - +	----- +	-----	-----	*03:10, *03:42 = *03:10, *03:89
+++++ - - - - - +	----- +	-----	-----	*03:42, *03:87 = *03:87, *03:89
+++++ - - - - - +	----- +	-----	-----	*03:19, *03:42 = *03:19, *03:89
+++++ - - - - - +	----- +	-----	-----	*03:42, *03:101 = *03:89, *03:101
+++++ - - - - - +	----- +	-----	-----	*03:23, *03:42 = *03:23, *03:89
+++++ - - - - - +	----- +	-----	-----	*03:09, *03:33 = *03:24, *03:42 = *03:24, *03:89 = *03:33, *03:42
+++++ - - - - - +	----- +	-----	-----	*03:42, *03:47 = *03:47, *03:89
+++++ - - - - - +	----- +	-----	-----	*03:26, *03:42 = *03:26, *03:89
+++++ - - - - - +	----- +	-----	-----	*03:38:01, *03:42 = *03:38:01, *03:89
+++++ - - - - - +	----- +	-----	-----	*03:42, *03:57 = *03:57, *03:89
+++++ - - - - - +	----- +	-----	-----	*03:28, *03:42 = *03:28, *03:89
+++++ - - - - - +	----- +	-----	-----	*03:42, *03:65 = *03:65, *03:89
+++++ - - - - - +	----- +	-----	-----	*03:32, *03:42 = *03:32, *03:89
+++++ - - - - - +	----- +	-----	-----	*03:09, *03:36 = *03:36, *03:42 = *03:42, *03:77 = *03:77, *03:89
+++++ - - - - - +	----- +	-----	-----	*03:34, *03:42 = *03:34, *03:89
+++++ - - - - - +	----- +	-----	-----	*03:09, *03:60 = *03:37, *03:42 = *03:37, *03:89 = *03:42, *03:60
+++++ - - - - - +	----- +	-----	-----	*03:42, *03:98 = *03:89, *03:98
+++++ - - - - - +	----- +	-----	-----	*03:42, *03:51 = *03:51, *03:89



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+++++	-----	-----	-----	-----	*03:42, *03:46 = *03:46, *03:89
+++++	-----	-----	-----	-----	*03:42, *03:44 = *03:44, *03:89
+++++	-----	-----	-----	-----	*03:09, *03:84 = *03:42, *03:48 = *03:42, *03:84 = *03:48, *03:89
+++++	-----	-----	-----	-----	*03:42, *03:54 = *03:54, *03:89
+++++	-----	-----	-----	-----	*03:42, *03:64 = *03:64, *03:89
+++++	-----	-----	-----	-----	*03:42, *03:72 = *03:72, *03:89
+++++	-----	-----	-----	-----	*03:42, *03:80 = *03:80, *03:89
+++++	-----	-----	-----	-----	*03:42, *03:92 = *03:89, *03:92
+++++	-----	-----	-----	-----	*03:09, *03:95 = *03:42, *03:73 = *03:42, *03:95 = *03:73, *03:89
+++++	-----	-----	-----	-----	*03:42, *03:63 = *03:63, *03:89
+++++	-----	-----	-----	-----	*03:42, *03:100 = *03:89, *03:100
+++++	-----	-----	-----	-----	*03:42, *03:70 = *03:70, *03:89
+++++	-----	-----	-----	-----	*03:42, *03:74 = *03:74, *03:89
+++++	-----	-----	-----	-----	*03:42, *03:91 = *03:89, *03:91
+++++	-----	-----	-----	-----	*03:42, *03:93 = *03:89, *03:93
+++++	-----	-----	-----	-----	*03:42, *03:94 = *03:42, *03:99
+++++	-----	-----	-----	-----	*03:14, *03:42 = *03:14, *03:89
+++++	-----	-----	-----	-----	*03:02:01, *03:09 = *03:02:01, *03:42 = *03:04:01:01, *03:42 = *03:04:01:01, *03:89 = *03:09, *03:40 = *03:09, *03:42 = *03:09, *03:89 = *03:40, *03:42 = *03:40, *03:89 = *03:42, *03:42 = *03:42, *03:89
+++++	-----	-----	-----	-----	*03:15, *03:32 = *03:15, *03:38:01 = *03:15, *03:45
+++++	-----	-----	-----	-----	*03:04:01:01, *03:15 = *03:07, *03:15 = *03:10, *03:15 = *03:15, *03:37 = *03:15, *03:40 = *03:15, *03:57
+++++	-----	-----	-----	-----	*03:02:01, *03:45 = *03:40, *03:45 = *03:45, *03:60
+++++	-----	-----	-----	-----	*03:02:01, *03:07 = *03:07, *03:40
+++++	-----	-----	-----	-----	*03:02:01, *03:10 = *03:10, *03:40
+++++	-----	-----	-----	-----	*03:02:01, *03:87 = *03:40, *03:87
+++++	-----	-----	-----	-----	*03:02:01, *03:19 = *03:19, *03:40
+++++	-----	-----	-----	-----	*03:02:01, *03:101 = *03:40, *03:101
+++++	-----	-----	-----	-----	*03:02:01, *03:23 = *03:23, *03:40
+++++	-----	-----	-----	-----	*03:24, *03:36 = *03:33, *03:77
+++++	-----	-----	-----	-----	*03:24, *03:60 = *03:33, *03:37
+++++	-----	-----	-----	-----	*03:24, *03:84 = *03:33, *03:48
+++++	-----	-----	-----	-----	*03:24, *03:95 = *03:33, *03:73
+++++	-----	-----	-----	-----	*03:02:01, *03:24 = *03:04:01:01, *03:33 = *03:24, *03:33 = *03:24, *03:40 = *03:33, *03:40
+++++	-----	-----	-----	-----	*03:02:01, *03:47 = *03:40, *03:47
+++++	-----	-----	-----	-----	*03:02:01, *03:26 = *03:26, *03:40
+++++	-----	-----	-----	-----	*03:02:01, *03:38:01 = *03:38:01, *03:40
+++++	-----	-----	-----	-----	*03:02:01, *03:57 = *03:40, *03:57
+++++	-----	-----	-----	-----	*03:02:01, *03:28 = *03:28, *03:40
+++++	-----	-----	-----	-----	*03:02:01, *03:65 = *03:40, *03:65
+++++	-----	-----	-----	-----	*03:02:01, *03:32 = *03:32, *03:40 = *03:32, *03:60
+++++	-----	-----	-----	-----	*03:36, *03:37 = *03:60, *03:77
+++++	-----	-----	-----	-----	*03:36, *03:48 = *03:77, *03:84
+++++	-----	-----	-----	-----	*03:36, *03:73 = *03:77, *03:95
+++++	-----	-----	-----	-----	*03:02:01, *03:77 = *03:04:01:01, *03:36 = *03:34, *03:36 = *03:36, *03:40 = *03:36, *03:63 = *03:36, *03:77 = *03:40, *03:77
+++++	-----	-----	-----	-----	*03:02:01, *03:34 = *03:34, *03:40
+++++	-----	-----	-----	-----	*03:37, *03:84 = *03:48, *03:60
+++++	-----	-----	-----	-----	*03:37, *03:95 = *03:60, *03:73
+++++	-----	-----	-----	-----	*03:02:01, *03:37 = *03:04:01:01, *03:60 = *03:37, *03:40 = *03:37, *03:60 = *03:40, *03:60
+++++	-----	-----	-----	-----	*03:02:01, *03:98 = *03:40, *03:98
+++++	-----	-----	-----	-----	*03:02:01, *03:51 = *03:40, *03:51
+++++	-----	-----	-----	-----	*03:02:01, *03:46 = *03:40, *03:46
+++++	-----	-----	-----	-----	*03:02:01, *03:44 = *03:40, *03:44
+++++	-----	-----	-----	-----	*03:48, *03:95 = *03:73, *03:84
+++++	-----	-----	-----	-----	*03:02:01, *03:48 = *03:04:01:01, *03:84 = *03:40, *03:48 = *03:40, *03:84 = *03:48, *03:84
+++++	-----	-----	-----	-----	*03:02:01, *03:54 = *03:40, *03:54
+++++	-----	-----	-----	-----	*03:02:01, *03:64 = *03:40, *03:64
+++++	-----	-----	-----	-----	*03:02:01, *03:72 = *03:40, *03:72
+++++	-----	-----	-----	-----	*03:02:01, *03:80 = *03:40, *03:80
+++++	-----	-----	-----	-----	*03:02:01, *03:92 = *03:40, *03:92
+++++	-----	-----	-----	-----	*03:02:01, *03:73 = *03:04:01:01, *03:95 = *03:40, *03:73 = *03:40, *03:95 = *03:73, *03:95
+++++	-----	-----	-----	-----	*03:02:01, *03:63 = *03:40, *03:63
+++++	-----	-----	-----	-----	*03:02:01, *03:100 = *03:40, *03:100
+++++	-----	-----	-----	-----	*03:02:01, *03:70 = *03:40, *03:70
+++++	-----	-----	-----	-----	*03:02:01, *03:74 = *03:40, *03:74
+++++	-----	-----	-----	-----	*03:02:01, *03:91 = *03:40, *03:91
+++++	-----	-----	-----	-----	*03:02:01, *03:93 = *03:40, *03:93



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++++--	-----	-----	-----	-----	-----	*03:40, *03:94 = *03:40, *03:99
++++--	-----	-----	-----	-----	-----	*03:02:01, *03:14 = *03:14, *03:40
++++--	-----	-----	-----	-----	-----	*03:02:01, *03:04:01:01 = *03:02:01, *03:40 = *03:04:01:01, *03:40 = *03:40, *03:40
++-+--	-----	-----	-----	-----	-----	*03:14, *03:94 = *03:14, *03:99
++++--	-----	-----	-----	-----	-----	*03:04:01:01, *03:14 = *03:14, *03:14
++-+--	-----	-----	-----	-----	-----	*03:25, *03:71 = *03:25, *03:89
++++--	-----	-----	-----	-----	-----	*03:27, *03:71 = *03:27, *03:89
++++--	-----	-----	-----	-----	-----	*03:35, *03:71 = *03:35, *03:89
++++--	-----	-----	-----	-----	-----	*03:71, *03:94 = *03:71, *03:99
++++--	-----	-----	-----	-----	-----	*03:02:01, *03:71 = *03:05, *03:71 = *03:05, *03:89 = *03:17, *03:71 = *03:17, *03:89 = *03:71, *03:71 = *03:71, *03:89
++-+--	-----	-----	-----	-----	-----	*03:05, *03:15 = *03:15, *03:17 = *03:15, *03:27
++++--	-----	-----	-----	-----	-----	*03:05, *03:33 = *03:17, *03:33
++++--	-----	-----	-----	-----	-----	*03:05, *03:36 = *03:17, *03:36 = *03:35, *03:36
++++--	-----	-----	-----	-----	-----	*03:05, *03:60 = *03:17, *03:60
++++--	-----	-----	-----	-----	-----	*03:05, *03:84 = *03:17, *03:84
++++--	-----	-----	-----	-----	-----	*03:05, *03:95 = *03:17, *03:95
++++--	-----	-----	-----	-----	-----	*03:02:01, *03:05 = *03:02:01, *03:17
++-+--	-----	-----	-----	-----	-----	*03:89, *03:94 = *03:89, *03:99
++++--	-----	-----	-----	-----	-----	*03:02:01, *03:89 = *03:89, *03:89
++-+--	-----	-----	-----	-----	-----	*03:15, *03:94 = *03:15, *03:99
++++--	-----	-----	-----	-----	-----	*03:02:01, *03:15 = *03:15, *03:15 = *03:15, *03:60
++-+--	-----	-----	-----	-----	-----	*03:33, *03:94 = *03:33, *03:99
++++--	-----	-----	-----	-----	-----	*03:02:01, *03:33 = *03:33, *03:33
++++--	-----	-----	-----	-----	-----	*03:36, *03:94 = *03:36, *03:99
++++--	-----	-----	-----	-----	-----	*03:02:01, *03:36 = *03:36, *03:36
++++--	-----	-----	-----	-----	-----	*03:60, *03:94 = *03:60, *03:99
++++--	-----	-----	-----	-----	-----	*03:02:01, *03:60 = *03:60, *03:60
++++--	-----	-----	-----	-----	-----	*03:84, *03:94 = *03:84, *03:99
++++--	-----	-----	-----	-----	-----	*03:02:01, *03:84 = *03:84, *03:84
++++--	-----	-----	-----	-----	-----	*03:94, *03:95 = *03:95, *03:99
++++--	-----	-----	-----	-----	-----	*03:02:01, *03:95 = *03:95, *03:95
++++--	-----	-----	-----	-----	-----	*03:02:01, *03:94 = *03:02:01, *03:99
++++++	-----	-----	-----	-----	-----	*03:09, *03:13 = *03:22Q, *03:35
++++++	-----	-----	-----	-----	-----	*03:08, *03:13 = *03:13, *03:87 = *03:31, *03:35
++++++	-----	-----	-----	-----	-----	*03:12, *03:35 = *03:13, *03:19
++++++	-----	-----	-----	-----	-----	*03:13, *03:101 = *03:20N, *03:35
++++++	-----	-----	-----	-----	-----	*03:13, *03:23 = *03:35, *03:83
++++++	-----	-----	-----	-----	-----	*03:13, *03:26 = *03:35, *03:88
++++++	-----	-----	-----	-----	-----	*03:13, *03:38:01 = *03:35, *03:69
++++++	-----	-----	-----	-----	-----	*03:05, *03:69 = *03:27, *03:69
++++++	-----	-----	-----	-----	-----	*03:13, *03:28 = *03:35, *03:49
++++++	-----	-----	-----	-----	-----	*03:13, *03:65 = *03:30, *03:35
++++++	-----	-----	-----	-----	-----	*03:11:02, *03:35 = *03:13, *03:37
++++++	-----	-----	-----	-----	-----	*03:13, *03:51 = *03:35, *03:67
++++++	-----	-----	-----	-----	-----	*03:13, *03:46 = *03:35, *03:61
++++++	-----	-----	-----	-----	-----	*03:13, *03:44 = *03:35, *03:59
++++++	-----	-----	-----	-----	-----	*03:13, *03:54 = *03:35, *03:53
++++++	-----	-----	-----	-----	-----	*03:13, *03:64 = *03:35, *03:56
++++++	-----	-----	-----	-----	-----	*03:13, *03:72 = *03:35, *03:50
++++++	-----	-----	-----	-----	-----	*03:13, *03:92 = *03:35, *03:55
++++++	-----	-----	-----	-----	-----	*03:13, *03:73 = *03:35, *03:52
++++++	-----	-----	-----	-----	-----	*03:13, *03:63 = *03:13, *03:77
++++++	-----	-----	-----	-----	-----	*03:13, *03:100 = *03:35, *03:68
++++++	-----	-----	-----	-----	-----	*03:13, *03:74 = *03:35, *03:81
++++++	-----	-----	-----	-----	-----	*03:13, *03:91 = *03:35, *03:75
++++++	-----	-----	-----	-----	-----	*03:13, *03:93 = *03:35, *03:76
++++++	-----	-----	-----	-----	-----	*03:03:01, *03:35 = *03:04:01:01, *03:13 = *03:13, *03:34
++++++	-----	-----	-----	-----	-----	*03:08, *03:21 = *03:21, *03:87
++++++	-----	-----	-----	-----	-----	*03:04:01:01, *03:21 = *03:06, *03:21 = *03:06, *03:55 = *03:21, *03:92
++++++	-----	-----	-----	-----	-----	*03:06, *03:81 = *03:06, *03:97
++++++	-----	-----	-----	-----	-----	*03:08, *03:22Q = *03:09, *03:31 = *03:22Q, *03:87
++++++	-----	-----	-----	-----	-----	*03:09, *03:12 = *03:19, *03:22Q
++++++	-----	-----	-----	-----	-----	*03:09, *03:20N = *03:22Q, *03:101
++++++	-----	-----	-----	-----	-----	*03:09, *03:83 = *03:22Q, *03:23
++++++	-----	-----	-----	-----	-----	*03:09, *03:88 = *03:22Q, *03:26
++++++	-----	-----	-----	-----	-----	*03:09, *03:69 = *03:22Q, *03:38:01
++++++	-----	-----	-----	-----	-----	*03:09, *03:49 = *03:22Q, *03:28
++++++	-----	-----	-----	-----	-----	*03:09, *03:30 = *03:22Q, *03:65
++++++	-----	-----	-----	-----	-----	*03:09, *03:11:02 = *03:22Q, *03:37
++++++	-----	-----	-----	-----	-----	*03:09, *03:67 = *03:22Q, *03:51
++++++	-----	-----	-----	-----	-----	*03:09, *03:61 = *03:22Q, *03:46



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++++++	-----	-----	-----	-----	-----	*03:09, *03:59 = *03:22Q, *03:44
++++++	-----	-----	-----	-----	-----	*03:09, *03:53 = *03:22Q, *03:54
++++++	-----	-----	-----	-----	-----	*03:09, *03:56 = *03:22Q, *03:64
++++++	-----	-----	-----	-----	-----	*03:09, *03:50 = *03:22Q, *03:72
++++++	-----	-----	-----	-----	-----	*03:09, *03:55 = *03:22Q, *03:92
++++++	-----	-----	-----	-----	-----	*03:09, *03:52 = *03:22Q, *03:73
++++++	-----	-----	-----	-----	-----	*03:09, *03:68 = *03:22Q, *03:100
++++++	-----	-----	-----	-----	-----	*03:09, *03:81 = *03:09, *03:97 = *03:22Q, *03:74
++++++	-----	-----	-----	-----	-----	*03:09, *03:75 = *03:22Q, *03:91
++++++	-----	-----	-----	-----	-----	*03:09, *03:76 = *03:22Q, *03:93
++++++	-----	-----	-----	-----	-----	*03:09, *03:86 = *03:22Q, *03:94
++++++	-----	-----	-----	-----	-----	*03:03:01, *03:09 = *03:04:01:01, *03:22Q = *03:09, *03:22Q
++++++	++++++	-----	-----	-----	-----	*03:03:12, *03:45 = *03:11:01, *03:45
++++++	++++++	-----	-----	-----	-----	*03:45, *03:81 = *03:45, *03:97
++++++	++++++	-----	-----	-----	-----	*03:03:01, *03:45 = *03:11:02, *03:45
++++++	++++++	-----	-----	-----	-----	*03:07, *03:81 = *03:07, *03:97
++++++	++++++	-----	-----	-----	-----	*03:29, *03:81 = *03:29, *03:97
++++++	++++++	-----	-----	-----	-----	*03:03:01, *03:29 = *03:10, *03:31 = *03:29, *03:31
++++++	++++++	-----	-----	-----	-----	*03:10, *03:81 = *03:10, *03:97
++++++	++++++	-----	-----	-----	-----	*03:08, *03:11:01 = *03:11:01, *03:87
++++++	++++++	-----	-----	-----	-----	*03:03:12, *03:08 = *03:03:12, *03:87
++++++	++++++	-----	-----	-----	-----	*03:08, *03:102 = *03:87, *03:102
++++++	++++++	-----	-----	-----	-----	*03:08, *03:12 = *03:12, *03:87 = *03:19, *03:31
++++++	++++++	-----	-----	-----	-----	*03:08, *03:20N = *03:20N, *03:87 = *03:31, *03:101
++++++	++++++	-----	-----	-----	-----	*03:08, *03:83 = *03:23, *03:31 = *03:83, *03:87
++++++	++++++	-----	-----	-----	-----	*03:08, *03:88 = *03:26, *03:31 = *03:87, *03:88
++++++	++++++	-----	-----	-----	-----	*03:08, *03:69 = *03:31, *03:38:01 = *03:69, *03:87
++++++	++++++	-----	-----	-----	-----	*03:08, *03:49 = *03:28, *03:31 = *03:49, *03:87
++++++	++++++	-----	-----	-----	-----	*03:08, *03:79 = *03:79, *03:87
++++++	++++++	-----	-----	-----	-----	*03:08, *03:30 = *03:30, *03:87 = *03:31, *03:65
++++++	++++++	-----	-----	-----	-----	*03:08, *03:11:02 = *03:11:02, *03:87 = *03:31, *03:37
++++++	++++++	-----	-----	-----	-----	*03:08, *03:96 = *03:87, *03:96
++++++	++++++	-----	-----	-----	-----	*03:08, *03:67 = *03:31, *03:51 = *03:67, *03:87
++++++	++++++	-----	-----	-----	-----	*03:08, *03:61 = *03:31, *03:46 = *03:61, *03:87
++++++	++++++	-----	-----	-----	-----	*03:08, *03:59 = *03:31, *03:44 = *03:59, *03:87
++++++	++++++	-----	-----	-----	-----	*03:08, *03:58 = *03:58, *03:87
++++++	++++++	-----	-----	-----	-----	*03:08, *03:62 = *03:62, *03:87
++++++	++++++	-----	-----	-----	-----	*03:08, *03:53 = *03:31, *03:54 = *03:53, *03:87
++++++	++++++	-----	-----	-----	-----	*03:08, *03:56 = *03:31, *03:64 = *03:56, *03:87
++++++	++++++	-----	-----	-----	-----	*03:08, *03:50 = *03:31, *03:72 = *03:50, *03:87
++++++	++++++	-----	-----	-----	-----	*03:08, *03:55 = *03:31, *03:92 = *03:55, *03:87
++++++	++++++	-----	-----	-----	-----	*03:08, *03:52 = *03:31, *03:73 = *03:52, *03:87
++++++	++++++	-----	-----	-----	-----	*03:08, *03:66 = *03:66, *03:87
++++++	++++++	-----	-----	-----	-----	*03:08, *03:68 = *03:31, *03:100 = *03:68, *03:87
++++++	++++++	-----	-----	-----	-----	*03:08, *03:81 = *03:08, *03:97 = *03:31, *03:74 = *03:81, *03:87 = *03:87, *03:97
++++++	++++++	-----	-----	-----	-----	*03:08, *03:75 = *03:31, *03:91 = *03:75, *03:87
++++++	++++++	-----	-----	-----	-----	*03:08, *03:76 = *03:31, *03:93 = *03:76, *03:87
++++++	++++++	-----	-----	-----	-----	*03:08, *03:86 = *03:31, *03:94 = *03:86, *03:87
++++++	++++++	-----	-----	-----	-----	*03:03:01, *03:08 = *03:03:01, *03:87 = *03:04:01:01, *03:31 = *03:08, *03:31 = *03:31, *03:87
++++++	++++++	-----	-----	-----	-----	*03:03:12, *03:32 = *03:11:01, *03:32
++++++	++++++	-----	-----	-----	-----	*03:03:12, *03:37 = *03:04:01:01, *03:11:01 = *03:11:01, *03:37
++++++	++++++	-----	-----	-----	-----	*03:12, *03:101 = *03:19, *03:20N
++++++	++++++	-----	-----	-----	-----	*03:04:01:01, *03:102 = *03:12, *03:23 = *03:19, *03:83 = *03:19, *03:102 = *03:23, *03:102
++++++	++++++	-----	-----	-----	-----	*03:12, *03:26 = *03:19, *03:88
++++++	++++++	-----	-----	-----	-----	*03:12, *03:38:01 = *03:19, *03:69
++++++	++++++	-----	-----	-----	-----	*03:12, *03:28 = *03:19, *03:49
++++++	++++++	-----	-----	-----	-----	*03:12, *03:65 = *03:19, *03:30
++++++	++++++	-----	-----	-----	-----	*03:11:02, *03:19 = *03:12, *03:37
++++++	++++++	-----	-----	-----	-----	*03:12, *03:51 = *03:19, *03:67
++++++	++++++	-----	-----	-----	-----	*03:12, *03:46 = *03:19, *03:61
++++++	++++++	-----	-----	-----	-----	*03:12, *03:44 = *03:19, *03:59
++++++	++++++	-----	-----	-----	-----	*03:12, *03:54 = *03:19, *03:53
++++++	++++++	-----	-----	-----	-----	*03:12, *03:64 = *03:19, *03:56
++++++	++++++	-----	-----	-----	-----	*03:12, *03:72 = *03:19, *03:50
++++++	++++++	-----	-----	-----	-----	*03:12, *03:92 = *03:19, *03:55
++++++	++++++	-----	-----	-----	-----	*03:12, *03:73 = *03:19, *03:52
++++++	++++++	-----	-----	-----	-----	*03:12, *03:100 = *03:19, *03:68
++++++	++++++	-----	-----	-----	-----	*03:12, *03:74 = *03:19, *03:81 = *03:19, *03:97
++++++	++++++	-----	-----	-----	-----	*03:12, *03:91 = *03:19, *03:75
++++++	++++++	-----	-----	-----	-----	*03:12, *03:93 = *03:19, *03:76

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+++++	-----	-----	-----	-----	+++++	*03:12, *03:94 = *03:19, *03:86
+++++	-----	-----	-----	-----	-----	*03:03:01, *03:19 = *03:04:01:01, *03:12 = *03:12, *03:19
+++++	-----	+++++	-----	-----	-----	*03:20N, *03:23 = *03:83, *03:101
+++++	-----	+++++	-----	-----	-----	*03:20N, *03:26 = *03:88, *03:101
+++++	-----	+++++	+++++	-----	-----	*03:20N, *03:38:01 = *03:69, *03:101
+++++	-----	+++++	-----	-----	-----	*03:20N, *03:28 = *03:49, *03:101
+++++	-----	+++++	+++++	-----	-----	*03:20N, *03:65 = *03:30, *03:101
+++++	-----	+++++	-----	-----	-----	*03:11:02, *03:101 = *03:20N, *03:37
+++++	-----	+++++	+++++	-----	-----	*03:20N, *03:51 = *03:67, *03:101
+++++	-----	+++++	-----	-----	-----	*03:20N, *03:46 = *03:61, *03:101
+++++	-----	+++++	+++++	-----	-----	*03:20N, *03:44 = *03:59, *03:101
+++++	-----	+++++	-----	-----	-----	*03:20N, *03:54 = *03:53, *03:101
+++++	-----	+++++	-----	-----	-----	*03:20N, *03:64 = *03:56, *03:101
+++++	-----	+++++	-----	-----	-----	*03:20N, *03:72 = *03:50, *03:101
+++++	-----	+++++	+++++	-----	-----	*03:20N, *03:92 = *03:55, *03:101
+++++	-----	+++++	-----	-----	-----	*03:20N, *03:73 = *03:52, *03:101
+++++	-----	+++++	-----	+++++	-----	*03:20N, *03:100 = *03:68, *03:101
+++++	-----	+++++	-----	-----	-----	*03:20N, *03:74 = *03:81, *03:101 = *03:97, *03:101
+++++	-----	+++++	-----	+++++	-----	*03:20N, *03:91 = *03:75, *03:101
+++++	-----	+++++	-----	-----	-----	*03:20N, *03:93 = *03:76, *03:101
+++++	-----	+++++	-----	-----	+++++	*03:20N, *03:94 = *03:86, *03:101
+++++	-----	+++++	-----	-----	-----	*03:03:01, *03:101 = *03:04:01:01, *03:20N = *03:20N, *03:101
+++++	-----	+++++	-----	-----	-----	*03:23, *03:88 = *03:26, *03:83
+++++	-----	+++++	+++++	-----	-----	*03:23, *03:69 = *03:38:01, *03:83
+++++	-----	+++++	-----	-----	-----	*03:23, *03:49 = *03:28, *03:83
+++++	-----	+++++	-----	-----	-----	*03:23, *03:30 = *03:65, *03:83
+++++	-----	+++++	-----	-----	-----	*03:11:02, *03:23 = *03:37, *03:83
+++++	-----	+++++	-----	-----	-----	*03:23, *03:67 = *03:51, *03:83
+++++	-----	+++++	-----	-----	-----	*03:23, *03:61 = *03:46, *03:83
+++++	-----	+++++	+++++	-----	-----	*03:23, *03:59 = *03:44, *03:83
+++++	-----	+++++	-----	-----	-----	*03:23, *03:53 = *03:54, *03:83
+++++	-----	+++++	-----	-----	-----	*03:23, *03:56 = *03:64, *03:83
+++++	-----	+++++	-----	-----	-----	*03:23, *03:50 = *03:72, *03:83
+++++	-----	+++++	+++++	-----	-----	*03:23, *03:55 = *03:83, *03:92
+++++	-----	+++++	-----	-----	-----	*03:23, *03:52 = *03:73, *03:83
+++++	-----	+++++	-----	+++++	-----	*03:23, *03:68 = *03:83, *03:100
+++++	-----	+++++	-----	-----	-----	*03:23, *03:81 = *03:23, *03:97 = *03:74, *03:83
+++++	-----	+++++	-----	+++++	-----	*03:23, *03:75 = *03:83, *03:91
+++++	-----	+++++	-----	-----	-----	*03:23, *03:76 = *03:83, *03:93
+++++	-----	+++++	-----	-----	+++++	*03:23, *03:86 = *03:83, *03:94
+++++	-----	+++++	-----	-----	-----	*03:03:01, *03:23 = *03:04:01:01, *03:83 = *03:23, *03:83
+++++	-----	+++++	-----	-----	-----	*03:24, *03:81 = *03:24, *03:97
+++++	-----	+++++	-----	-----	-----	*03:47, *03:81 = *03:47, *03:97
+++++	-----	+++++	+++++	-----	-----	*03:26, *03:69 = *03:38:01, *03:88
+++++	-----	+++++	-----	-----	-----	*03:26, *03:49 = *03:28, *03:88
+++++	-----	+++++	+++++	-----	-----	*03:26, *03:30 = *03:65, *03:88
+++++	-----	+++++	-----	-----	-----	*03:11:02, *03:26 = *03:37, *03:88
+++++	-----	+++++	-----	-----	-----	*03:26, *03:67 = *03:51, *03:88
+++++	-----	+++++	+++++	-----	-----	*03:26, *03:61 = *03:46, *03:88
+++++	-----	+++++	-----	-----	-----	*03:26, *03:59 = *03:44, *03:88
+++++	-----	+++++	-----	-----	-----	*03:26, *03:53 = *03:54, *03:88
+++++	-----	+++++	-----	-----	-----	*03:26, *03:56 = *03:64, *03:88
+++++	-----	+++++	-----	-----	-----	*03:26, *03:50 = *03:72, *03:88
+++++	-----	+++++	-----	-----	-----	*03:26, *03:55 = *03:88, *03:92
+++++	-----	+++++	+++++	-----	-----	*03:26, *03:52 = *03:73, *03:88
+++++	-----	+++++	-----	+++++	-----	*03:26, *03:68 = *03:88, *03:100
+++++	-----	+++++	-----	-----	-----	*03:26, *03:81 = *03:26, *03:97 = *03:74, *03:88
+++++	-----	+++++	-----	-----	-----	*03:26, *03:75 = *03:88, *03:91
+++++	-----	+++++	-----	-----	-----	*03:26, *03:76 = *03:88, *03:93
+++++	-----	+++++	-----	-----	+++++	*03:26, *03:86 = *03:88, *03:94
+++++	-----	+++++	-----	-----	-----	*03:03:01, *03:26 = *03:04:01:01, *03:88 = *03:26, *03:88
+++++	-----	+++++	+++++	-----	-----	*03:28, *03:69 = *03:38:01, *03:49
+++++	-----	+++++	-----	-----	-----	*03:30, *03:38:01 = *03:65, *03:69
+++++	-----	+++++	+++++	-----	-----	*03:11:02, *03:38:01 = *03:32, *03:69 = *03:37, *03:69
+++++	-----	+++++	-----	-----	-----	*03:38:01, *03:67 = *03:51, *03:69
+++++	-----	+++++	+++++	-----	-----	*03:38:01, *03:61 = *03:46, *03:69
+++++	-----	+++++	-----	-----	-----	*03:38:01, *03:59 = *03:44, *03:69
+++++	-----	+++++	+++++	-----	-----	*03:38:01, *03:53 = *03:54, *03:69
+++++	-----	+++++	-----	-----	-----	*03:38:01, *03:56 = *03:64, *03:69
+++++	-----	+++++	-----	-----	-----	*03:38:01, *03:50 = *03:69, *03:72
+++++	-----	+++++	+++++	-----	-----	*03:38:01, *03:55 = *03:69, *03:92
+++++	-----	+++++	-----	-----	-----	*03:38:01, *03:52 = *03:69, *03:73
+++++	-----	+++++	-----	+++++	-----	*03:38:01, *03:68 = *03:69, *03:100

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+++++	-----	-----	-----	-----	*03:03:01, *03:51 = *03:04:01:01, *03:67 = *03:51, *03:67
+++++	-----	-----	-----	-----	*03:44, *03:61 = *03:46, *03:59
+++++	-----	-----	-----	-----	*03:46, *03:53 = *03:54, *03:61
+++++	-----	-----	-----	-----	*03:46, *03:56 = *03:61, *03:64
+++++	-----	-----	-----	-----	*03:46, *03:50 = *03:61, *03:72
+++++	-----	-----	-----	-----	*03:46, *03:55 = *03:61, *03:92
+++++	-----	-----	-----	-----	*03:46, *03:52 = *03:61, *03:73
+++++	-----	-----	-----	-----	*03:46, *03:68 = *03:61, *03:100
+++++	-----	-----	-----	-----	*03:46, *03:81 = *03:46, *03:97 = *03:61, *03:74
+++++	-----	-----	-----	-----	*03:46, *03:75 = *03:61, *03:91
+++++	-----	-----	-----	-----	*03:46, *03:76 = *03:61, *03:93
+++++	-----	-----	-----	-----	*03:46, *03:86 = *03:61, *03:94
+++++	-----	-----	-----	-----	*03:03:01, *03:46 = *03:04:01:01, *03:61 = *03:46, *03:61
+++++	-----	-----	-----	-----	*03:44, *03:53 = *03:54, *03:59
+++++	-----	-----	-----	-----	*03:44, *03:56 = *03:59, *03:64
+++++	-----	-----	-----	-----	*03:44, *03:50 = *03:59, *03:72
+++++	-----	-----	-----	-----	*03:44, *03:55 = *03:59, *03:92
+++++	-----	-----	-----	-----	*03:44, *03:52 = *03:59, *03:73
+++++	-----	-----	-----	-----	*03:44, *03:68 = *03:59, *03:100
+++++	-----	-----	-----	-----	*03:44, *03:81 = *03:44, *03:97 = *03:59, *03:74
+++++	-----	-----	-----	-----	*03:44, *03:75 = *03:59, *03:91
+++++	-----	-----	-----	-----	*03:44, *03:76 = *03:59, *03:93
+++++	-----	-----	-----	-----	*03:44, *03:86 = *03:59, *03:94
+++++	-----	-----	-----	-----	*03:03:01, *03:44 = *03:04:01:01, *03:59 = *03:44, *03:59
+++++	-----	-----	-----	-----	*03:48, *03:81 = *03:48, *03:97
+++++	-----	-----	-----	-----	*03:04:01:01, *03:58 = *03:48, *03:58 = *03:48, *03:86
+++++	-----	-----	-----	-----	*03:53, *03:64 = *03:54, *03:56
+++++	-----	-----	-----	-----	*03:50, *03:54 = *03:53, *03:72
+++++	-----	-----	-----	-----	*03:53, *03:92 = *03:54, *03:55
+++++	-----	-----	-----	-----	*03:52, *03:54 = *03:53, *03:73
+++++	-----	-----	-----	-----	*03:53, *03:100 = *03:54, *03:68
+++++	-----	-----	-----	-----	*03:53, *03:74 = *03:54, *03:81 = *03:54, *03:97
+++++	-----	-----	-----	-----	*03:53, *03:91 = *03:54, *03:75
+++++	-----	-----	-----	-----	*03:53, *03:93 = *03:54, *03:76
+++++	-----	-----	-----	-----	*03:53, *03:94 = *03:54, *03:86
+++++	-----	-----	-----	-----	*03:03:01, *03:54 = *03:04:01:01, *03:53 = *03:53, *03:54
+++++	-----	-----	-----	-----	*03:50, *03:64 = *03:56, *03:72
+++++	-----	-----	-----	-----	*03:55, *03:64 = *03:56, *03:92
+++++	-----	-----	-----	-----	*03:52, *03:64 = *03:56, *03:73
+++++	-----	-----	-----	-----	*03:56, *03:100 = *03:64, *03:68
+++++	-----	-----	-----	-----	*03:56, *03:74 = *03:64, *03:81 = *03:64, *03:97
+++++	-----	-----	-----	-----	*03:56, *03:91 = *03:64, *03:75
+++++	-----	-----	-----	-----	*03:56, *03:93 = *03:64, *03:76
+++++	-----	-----	-----	-----	*03:56, *03:94 = *03:64, *03:86
+++++	-----	-----	-----	-----	*03:03:01, *03:64 = *03:04:01:01, *03:56 = *03:56, *03:64
+++++	-----	-----	-----	-----	*03:50, *03:92 = *03:55, *03:72
+++++	-----	-----	-----	-----	*03:50, *03:73 = *03:52, *03:72
+++++	-----	-----	-----	-----	*03:50, *03:100 = *03:68, *03:72
+++++	-----	-----	-----	-----	*03:50, *03:74 = *03:72, *03:81 = *03:72, *03:97
+++++	-----	-----	-----	-----	*03:50, *03:91 = *03:72, *03:75
+++++	-----	-----	-----	-----	*03:50, *03:93 = *03:72, *03:76
+++++	-----	-----	-----	-----	*03:50, *03:94 = *03:72, *03:86
+++++	-----	-----	-----	-----	*03:03:01, *03:72 = *03:04:01:01, *03:50 = *03:50, *03:72
+++++	-----	-----	-----	-----	*03:52, *03:92 = *03:55, *03:73
+++++	-----	-----	-----	-----	*03:80, *03:81 = *03:80, *03:97
+++++	-----	-----	-----	-----	*03:55, *03:80 = *03:66, *03:92
+++++	-----	-----	-----	-----	*03:03:01, *03:80 = *03:66, *03:80
+++++	-----	-----	-----	-----	*03:55, *03:100 = *03:68, *03:92
+++++	-----	-----	-----	-----	*03:55, *03:74 = *03:81, *03:92 = *03:92, *03:97
+++++	-----	-----	-----	-----	*03:55, *03:91 = *03:75, *03:92
+++++	-----	-----	-----	-----	*03:55, *03:93 = *03:76, *03:92
+++++	-----	-----	-----	-----	*03:55, *03:94 = *03:86, *03:92
+++++	-----	-----	-----	-----	*03:03:01, *03:92 = *03:04:01:01, *03:55 = *03:55, *03:92
+++++	-----	-----	-----	-----	*03:52, *03:100 = *03:68, *03:73
+++++	-----	-----	-----	-----	*03:52, *03:74 = *03:73, *03:81 = *03:73, *03:97
+++++	-----	-----	-----	-----	*03:52, *03:91 = *03:73, *03:75
+++++	-----	-----	-----	-----	*03:52, *03:93 = *03:73, *03:76
+++++	-----	-----	-----	-----	*03:52, *03:94 = *03:73, *03:86
+++++	-----	-----	-----	-----	*03:03:01, *03:73 = *03:04:01:01, *03:52 = *03:52, *03:73
+++++	-----	-----	-----	-----	*03:63, *03:81 = *03:63, *03:97
+++++	-----	-----	-----	-----	*03:68, *03:74 = *03:81, *03:100 = *03:97, *03:100
+++++	-----	-----	-----	-----	*03:68, *03:91 = *03:75, *03:100
+++++	-----	-----	-----	-----	*03:68, *03:93 = *03:76, *03:100

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+-----+	-----	-----	-----	+-----+	*03:68, *03:94 = *03:86, *03:100
+-----+	-----	-----	-----	+-----	*03:03:01, *03:100 = *03:04:01:01, *03:68 = *03:68, *03:100
+-----+	-----	-----	-----	+-----	*03:70, *03:81 = *03:70, *03:97
+-----+	-----	-----	-----	+-----	*03:74, *03:75 = *03:81, *03:91 = *03:91, *03:97
+-----+	-----	-----	-----	+-----	*03:74, *03:76 = *03:81, *03:93 = *03:93, *03:97
+-----+	-----	-----	-----	+-----	*03:74, *03:86 = *03:81, *03:94
+-----+	-----	-----	-----	+-----	*03:03:01, *03:74 = *03:04:01:01, *03:81 = *03:04:01:01, *03:97 = *03:74, *03:81 = *03:74, *03:97
+-----+	-----	-----	-----	+-----	*03:75, *03:93 = *03:76, *03:91
+-----+	-----	-----	-----	+-----	*03:75, *03:94 = *03:86, *03:91
+-----+	-----	-----	-----	+-----	*03:03:01, *03:91 = *03:04:01:01, *03:75 = *03:75, *03:91
+-----+	-----	-----	-----	+-----	*03:76, *03:94 = *03:86, *03:93
+-----+	-----	-----	-----	+-----	*03:03:01, *03:93 = *03:04:01:01, *03:76 = *03:76, *03:93
+-----+	-----	-----	-----	+-----	*03:03:01, *03:94 = *03:04:01:01, *03:86
+-----+	-----	-----	-----	+-----	*03:13, *03:94 = *03:35, *03:86
+-----+	-----	-----	-----	+-----	*03:05, *03:13 = *03:13, *03:35
+-----+	-----	-----	-----	+-----	*03:25, *03:57 = *03:27, *03:47
+-----+	-----	-----	-----	+-----	*03:25, *03:34 = *03:35, *03:47
+-----+	-----	-----	-----	+-----	*03:04:01:01, *03:25 = *03:05, *03:47 = *03:25, *03:47
+-----+	-----	-----	-----	+-----	*03:05, *03:38:01 = *03:27, *03:38:01
+-----+	-----	-----	-----	+-----	*03:27, *03:34 = *03:35, *03:57
+-----+	-----	-----	-----	+-----	*03:04:01:01, *03:27 = *03:05, *03:57 = *03:27, *03:57
+-----+	-----	-----	-----	+-----	*03:05, *03:77 = *03:35, *03:63 = *03:35, *03:77
+-----+	-----	-----	-----	+-----	*03:04:01:01, *03:35 = *03:05, *03:34 = *03:34, *03:35
+-----+	-----	-----	-----	+-----	*03:06, *03:94 = *03:06, *03:99
+-----+	-----	-----	-----	+-----	*03:04:01:01, *03:06 = *03:06, *03:06
+-----+	-----	-----	-----	+-----	*03:08, *03:45 = *03:29, *03:45
+-----+	-----	-----	-----	+-----	*03:07, *03:08 = *03:07, *03:29
+-----+	-----	-----	-----	+-----	*03:29, *03:94 = *03:29, *03:99
+-----+	-----	-----	-----	+-----	*03:04:01:01, *03:29 = *03:08, *03:10 = *03:08, *03:29 = *03:10, *03:29 = *03:29, *03:29 = *03:29, *03:87
+-----+	-----	-----	-----	+-----	*03:08, *03:39 = *03:39, *03:87
+-----+	-----	-----	-----	+-----	*03:08, *03:18 = *03:18, *03:87
+-----+	-----	-----	-----	+-----	*03:08, *03:94 = *03:08, *03:99
+-----+	-----	-----	-----	+-----	*03:04:01:01, *03:08 = *03:08, *03:08 = *03:08, *03:87
+-----+	-----	-----	-----	+-----	*03:18, *03:98 = *03:39, *03:54 = *03:39, *03:98
+-----+	-----	-----	-----	+-----	*03:04:01:01, *03:39 = *03:18, *03:51 = *03:39, *03:51
+-----+	-----	-----	-----	+-----	*03:09, *03:94 = *03:09, *03:99
+-----+	-----	-----	-----	+-----	*03:04:01:01, *03:09 = *03:09, *03:09
+-----+	-----	-----	-----	+-----	*03:38:01, *03:45 = *03:45, *03:57
+-----+	-----	-----	-----	+-----	*03:45, *03:94 = *03:45, *03:99
+-----+	-----	-----	-----	+-----	*03:04:01:01, *03:45 = *03:07, *03:32 = *03:07, *03:45 = *03:10, *03:45 = *03:32, *03:45 = *03:37, *03:45 = *03:45, *03:45
+-----+	-----	-----	-----	+-----	*03:07, *03:94 = *03:07, *03:99
+-----+	-----	-----	-----	+-----	*03:04:01:01, *03:07 = *03:07, *03:07 = *03:07, *03:10
+-----+	-----	-----	-----	+-----	*03:10, *03:94 = *03:10, *03:99
+-----+	-----	-----	-----	+-----	*03:04:01:01, *03:10 = *03:10, *03:10
+-----+	-----	-----	-----	+-----	*03:87, *03:94 = *03:87, *03:99
+-----+	-----	-----	-----	+-----	*03:04:01:01, *03:87 = *03:87, *03:87
+-----+	-----	-----	-----	+-----	*03:19, *03:94 = *03:19, *03:99
+-----+	-----	-----	-----	+-----	*03:04:01:01, *03:19 = *03:19, *03:19
+-----+	-----	-----	-----	+-----	*03:94, *03:101 = *03:99, *03:101
+-----+	-----	-----	-----	+-----	*03:04:01:01, *03:101 = *03:101, *03:101
+-----+	-----	-----	-----	+-----	*03:23, *03:94 = *03:23, *03:99
+-----+	-----	-----	-----	+-----	*03:04:01:01, *03:23 = *03:23, *03:23
+-----+	-----	-----	-----	+-----	*03:24, *03:94 = *03:24, *03:99
+-----+	-----	-----	-----	+-----	*03:04:01:01, *03:24 = *03:24, *03:24
+-----+	-----	-----	-----	+-----	*03:47, *03:94 = *03:47, *03:99
+-----+	-----	-----	-----	+-----	*03:04:01:01, *03:47 = *03:47, *03:47
+-----+	-----	-----	-----	+-----	*03:26, *03:94 = *03:26, *03:99
+-----+	-----	-----	-----	+-----	*03:04:01:01, *03:26 = *03:26, *03:26
+-----+	-----	-----	-----	+-----	*03:32, *03:38:01 = *03:32, *03:57 = *03:37, *03:38:01
+-----+	-----	-----	-----	+-----	*03:38:01, *03:94 = *03:38:01, *03:99
+-----+	-----	-----	-----	+-----	*03:04:01:01, *03:38:01 = *03:38:01, *03:38:01 = *03:38:01, *03:57
+-----+	-----	-----	-----	+-----	*03:57, *03:94 = *03:57, *03:99
+-----+	-----	-----	-----	+-----	*03:04:01:01, *03:57 = *03:57, *03:57
+-----+	-----	-----	-----	+-----	*03:28, *03:94 = *03:28, *03:99
+-----+	-----	-----	-----	+-----	*03:04:01:01, *03:28 = *03:28, *03:28
+-----+	-----	-----	-----	+-----	*03:65, *03:94 = *03:65, *03:99
+-----+	-----	-----	-----	+-----	*03:04:01:01, *03:65 = *03:65, *03:65
+-----+	-----	-----	-----	+-----	*03:32, *03:94 = *03:32, *03:99
+-----+	-----	-----	-----	+-----	*03:04:01:01, *03:32 = *03:32, *03:32 = *03:32, *03:37
+-----+	-----	-----	-----	+-----	*03:77, *03:94 = *03:77, *03:99

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+++++-----+	-----	+++++-----+	-----	-----	*03:04:01:01, *03:77 = *03:34, *03:63 = *03:34, *03:77 = *03:63, *03:77 = *03:77, *03:77
+++++-----+	-----	+++++-----+	-----	-----	*03:34, *03:94 = *03:34, *03:99
+++++-----+	-----	+++++-----+	-----	-----	*03:04:01:01, *03:34 = *03:34, *03:34
+++++-----+	-----	+++++-----+	-----	-----	*03:37, *03:94 = *03:37, *03:99
+++++-----+	-----	+++++-----+	-----	-----	*03:04:01:01, *03:37 = *03:37, *03:37
+++++-----+	-----	+++++-----+	-----	-----	*03:94, *03:98 = *03:98, *03:99
+++++-----+	-----	+++++-----+	-----	-----	*03:04:01:01, *03:98 = *03:51, *03:54 = *03:51, *03:98 = *03:54, *03:98 = *03:98, *03:98
+++++-----+	-----	+++++-----+	-----	-----	*03:51, *03:94 = *03:51, *03:99
+++++-----+	-----	+++++-----+	-----	-----	*03:04:01:01, *03:51 = *03:51, *03:51
+++++-----+	-----	+++++-----+	-----	-----	*03:46, *03:94 = *03:46, *03:99
+++++-----+	-----	+++++-----+	-----	-----	*03:04:01:01, *03:46 = *03:46, *03:46
+++++-----+	-----	+++++-----+	-----	-----	*03:44, *03:94 = *03:44, *03:99
+++++-----+	-----	+++++-----+	-----	-----	*03:04:01:01, *03:44 = *03:44, *03:44
+++++-----+	-----	+++++-----+	-----	-----	*03:48, *03:94 = *03:48, *03:99
+++++-----+	-----	+++++-----+	-----	-----	*03:04:01:01, *03:48 = *03:48, *03:48
+++++-----+	-----	+++++-----+	-----	-----	*03:54, *03:94 = *03:54, *03:99
+++++-----+	-----	+++++-----+	-----	-----	*03:04:01:01, *03:54 = *03:54, *03:54
+++++-----+	-----	+++++-----+	-----	-----	*03:64, *03:94 = *03:64, *03:99
+++++-----+	-----	+++++-----+	-----	-----	*03:04:01:01, *03:64 = *03:64, *03:64
+++++-----+	-----	+++++-----+	-----	-----	*03:72, *03:94 = *03:72, *03:99
+++++-----+	-----	+++++-----+	-----	-----	*03:04:01:01, *03:72 = *03:72, *03:72
+++++-----+	-----	+++++-----+	-----	-----	*03:80, *03:94 = *03:80, *03:99
+++++-----+	-----	+++++-----+	-----	-----	*03:04:01:01, *03:80 = *03:80, *03:80
+++++-----+	-----	+++++-----+	-----	-----	*03:92, *03:94 = *03:92, *03:99
+++++-----+	-----	+++++-----+	-----	-----	*03:04:01:01, *03:92 = *03:92, *03:92
+++++-----+	-----	+++++-----+	-----	-----	*03:73, *03:94 = *03:73, *03:99
+++++-----+	-----	+++++-----+	-----	-----	*03:04:01:01, *03:73 = *03:73, *03:73
+++++-----+	-----	+++++-----+	-----	-----	*03:63, *03:94 = *03:63, *03:99
+++++-----+	-----	+++++-----+	-----	-----	*03:04:01:01, *03:63 = *03:63, *03:63
+++++-----+	-----	+++++-----+	-----	-----	*03:94, *03:100 = *03:99, *03:100
+++++-----+	-----	+++++-----+	-----	-----	*03:04:01:01, *03:100 = *03:100, *03:100
+++++-----+	-----	+++++-----+	-----	-----	*03:70, *03:94 = *03:70, *03:99
+++++-----+	-----	+++++-----+	-----	-----	*03:04:01:01, *03:70 = *03:70, *03:70
+++++-----+	-----	+++++-----+	-----	-----	*03:74, *03:94 = *03:74, *03:99
+++++-----+	-----	+++++-----+	-----	-----	*03:04:01:01, *03:74 = *03:74, *03:74
+++++-----+	-----	+++++-----+	-----	-----	*03:91, *03:94 = *03:91, *03:99
+++++-----+	-----	+++++-----+	-----	-----	*03:04:01:01, *03:91 = *03:91, *03:91
+++++-----+	-----	+++++-----+	-----	-----	*03:93, *03:94 = *03:93, *03:99
+++++-----+	-----	+++++-----+	-----	-----	*03:04:01:01, *03:93 = *03:93, *03:93
+++++-----+	-----	+++++-----+	-----	-----	*03:04:01:01, *03:94 = *03:04:01:01, *03:99
+++++-----+	-----	+++++-----+	-----	-----	*03:05, *03:16 = *03:16, *03:17
+++++-----+	-----	+++++-----+	-----	-----	*03:17, *03:94 = *03:17, *03:99
+++++-----+	-----	+++++-----+	-----	-----	*03:05, *03:17 = *03:17, *03:17
+++++-----+	-----	+++++-----+	-----	-----	*03:25, *03:94 = *03:25, *03:99
+++++-----+	-----	+++++-----+	-----	-----	*03:05, *03:25 = *03:25, *03:25
+++++-----+	-----	+++++-----+	-----	-----	*03:27, *03:94 = *03:27, *03:99
+++++-----+	-----	+++++-----+	-----	-----	*03:05, *03:27 = *03:27, *03:27
+++++-----+	-----	+++++-----+	-----	-----	*03:35, *03:94 = *03:35, *03:99
+++++-----+	-----	+++++-----+	-----	-----	*03:05, *03:35 = *03:35, *03:35
+++++-----+	-----	+++++-----+	-----	-----	*03:05, *03:94 = *03:05, *03:99
+++++-----+	-----	+++++-----+	-----	-----	*03:16, *03:94 = *03:16, *03:99
+++++-----+	-----	+++++-----+	-----	-----	*03:16, *03:16 = *03:16, *03:41
+++++-----+	-----	+++++-----+	-----	-----	*03:41, *03:94 = *03:41, *03:99
+++++-----+	-----	+++++-----+	-----	-----	*03:94, *03:94 = *03:94, *03:99
+++++-----+	-----	+++++-----+	-----	-----	*03:03:12, *03:43:01 = *03:18, *03:43:01
+++++-----+	-----	+++++-----+	-----	-----	*03:03:12, *03:43:02 = *03:18, *03:43:02
+++++-----+	-----	+++++-----+	-----	-----	*03:43:01, *03:81 = *03:43:01, *03:97
+++++-----+	-----	+++++-----+	-----	-----	*03:43:01, *03:86 = *03:43:01, *03:99
+++++-----+	-----	+++++-----+	-----	-----	*03:03:01, *03:43:01 = *03:43:01, *03:43:01 = *03:43:01, *03:43:02 = *03:43:01, *03:62
+++++-----+	-----	+++++-----+	-----	-----	*03:43:02, *03:81 = *03:43:02, *03:97
+++++-----+	-----	+++++-----+	-----	-----	*03:43:02, *03:86 = *03:43:02, *03:99
+++++-----+	-----	+++++-----+	-----	-----	*03:03:01, *03:43:02 = *03:43:02, *03:43:02 = *03:43:02, *03:62
+++++-----+	-----	+++++-----+	-----	-----	*03:03:12, *03:13 = *03:13, *03:18
+++++-----+	-----	+++++-----+	-----	-----	*03:03:12, *03:21 = *03:18, *03:21
+++++-----+	-----	+++++-----+	-----	-----	*03:21, *03:81 = *03:21, *03:97
+++++-----+	-----	+++++-----+	-----	-----	*03:21, *03:86 = *03:21, *03:99
+++++-----+	-----	+++++-----+	-----	-----	*03:03:01, *03:21 = *03:21, *03:21 = *03:21, *03:55
+++++-----+	-----	+++++-----+	-----	-----	*03:03:12, *03:22Q = *03:18, *03:22Q
+++++-----+	-----	+++++-----+	-----	-----	*03:22Q, *03:81 = *03:22Q, *03:97
+++++-----+	-----	+++++-----+	-----	-----	*03:22Q, *03:86 = *03:22Q, *03:99

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----	----	----	----	----	----	*03:03:01, *03:22Q = *03:22Q, *03:22Q
----	----	----	----	----	----	*03:03:12, *03:31 = *03:18, *03:31
----	----	----	----	----	----	*03:31, *03:81 = *03:31, *03:97
----	----	----	----	----	----	*03:31, *03:86 = *03:31, *03:99
----	----	----	----	----	----	*03:03:01, *03:31 = *03:31, *03:31
----	----	----	----	----	----	*03:03:12, *03:102 = *03:18, *03:102
----	----	----	----	----	----	*03:03:12, *03:12 = *03:12, *03:18
----	----	----	----	----	----	*03:03:12, *03:20N = *03:18, *03:20N
----	----	----	----	----	----	*03:03:12, *03:83 = *03:18, *03:83
----	----	----	----	----	----	*03:03:12, *03:88 = *03:18, *03:88
----	----	----	----	----	----	*03:03:12, *03:69 = *03:18, *03:69
----	----	----	----	----	----	*03:03:12, *03:49 = *03:18, *03:49
----	----	----	----	----	----	*03:03:12, *03:79 = *03:18, *03:79
----	----	----	----	----	----	*03:03:12, *03:30 = *03:18, *03:30
----	----	----	----	----	----	*03:11:01, *03:39 = *03:11:01, *03:67 = *03:11:02, *03:39
----	----	----	----	----	----	*03:11:01, *03:81 = *03:11:01, *03:97
----	----	----	----	----	----	*03:11:01, *03:86 = *03:11:01, *03:99
----	----	----	----	----	----	*03:03:01, *03:11:01 = *03:03:12, *03:11:01 = *03:03:12, *03:11:02 = *03:11:01, *03:11:01 = *03:11:01, *03:11:02 = *03:11:01, *03:18 = *03:11:02, *03:18
----	----	----	----	----	----	*03:03:12, *03:96 = *03:18, *03:96 = *03:39, *03:61 = *03:39, *03:96
----	----	----	----	----	----	*03:39, *03:81 = *03:39, *03:97
----	----	----	----	----	----	*03:03:01, *03:39 = *03:03:12, *03:39 = *03:03:12, *03:67 = *03:18, *03:67 = *03:39, *03:67
----	----	----	----	----	----	*03:03:12, *03:61 = *03:18, *03:61
----	----	----	----	----	----	*03:03:12, *03:59 = *03:18, *03:59
----	----	----	----	----	----	*03:03:12, *03:58 = *03:18, *03:58
----	----	----	----	----	----	*03:03:12, *03:62 = *03:18, *03:62
----	----	----	----	----	----	*03:03:12, *03:53 = *03:18, *03:53
----	----	----	----	----	----	*03:03:12, *03:56 = *03:18, *03:56
----	----	----	----	----	----	*03:03:12, *03:50 = *03:18, *03:50
----	----	----	----	----	----	*03:03:12, *03:55 = *03:18, *03:55
----	----	----	----	----	----	*03:03:12, *03:52 = *03:18, *03:52
----	----	----	----	----	----	*03:03:12, *03:66 = *03:18, *03:66
----	----	----	----	----	----	*03:03:12, *03:68 = *03:18, *03:68
----	----	----	----	----	----	*03:03:12, *03:81 = *03:03:12, *03:97 = *03:18, *03:81 = *03:18, *03:97
----	----	----	----	----	----	*03:03:12, *03:75 = *03:18, *03:75
----	----	----	----	----	----	*03:03:12, *03:76 = *03:18, *03:76
----	----	----	----	----	----	*03:03:12, *03:86 = *03:03:12, *03:99 = *03:18, *03:86
----	----	----	----	----	----	*03:03:01, *03:03:12 = *03:03:01, *03:18 = *03:03:12, *03:03:12 = *03:03:12, *03:18
----	----	----	----	----	----	*03:81, *03:102 = *03:97, *03:102
----	----	----	----	----	----	*03:86, *03:102 = *03:99, *03:102
----	----	----	----	----	----	*03:03:01, *03:102 = *03:12, *03:83 = *03:12, *03:102 = *03:83, *03:102 = *03:102, *03:102
----	----	----	----	----	----	*03:12, *03:81 = *03:12, *03:97
----	----	----	----	----	----	*03:12, *03:86 = *03:12, *03:99
----	----	----	----	----	----	*03:03:01, *03:12 = *03:12, *03:12
----	----	----	----	----	----	*03:20N, *03:81 = *03:20N, *03:97
----	----	----	----	----	----	*03:20N, *03:86 = *03:20N, *03:99
----	----	----	----	----	----	*03:03:01, *03:20N = *03:20N, *03:20N
----	----	----	----	----	----	*03:81, *03:83 = *03:83, *03:97
----	----	----	----	----	----	*03:83, *03:86 = *03:83, *03:99
----	----	----	----	----	----	*03:03:01, *03:83 = *03:83, *03:83
----	----	----	----	----	----	*03:81, *03:88 = *03:88, *03:97
----	----	----	----	----	----	*03:86, *03:88 = *03:88, *03:99
----	----	----	----	----	----	*03:03:01, *03:88 = *03:88, *03:88
----	----	----	----	----	----	*03:69, *03:81 = *03:69, *03:97
----	----	----	----	----	----	*03:69, *03:86 = *03:69, *03:99
----	----	----	----	----	----	*03:03:01, *03:69 = *03:69, *03:69
----	----	----	----	----	----	*03:49, *03:81 = *03:49, *03:97
----	----	----	----	----	----	*03:49, *03:86 = *03:49, *03:99
----	----	----	----	----	----	*03:03:01, *03:49 = *03:49, *03:49
----	----	----	----	----	----	*03:79, *03:81 = *03:79, *03:97
----	----	----	----	----	----	*03:79, *03:86 = *03:79, *03:99
----	----	----	----	----	----	*03:03:01, *03:79 = *03:30, *03:56 = *03:30, *03:79 = *03:56, *03:79 = *03:79, *03:79
----	----	----	----	----	----	*03:30, *03:81 = *03:30, *03:97
----	----	----	----	----	----	*03:30, *03:86 = *03:30, *03:99
----	----	----	----	----	----	*03:03:01, *03:30 = *03:30, *03:30
----	----	----	----	----	----	*03:11:02, *03:81 = *03:11:02, *03:97
----	----	----	----	----	----	*03:11:02, *03:86 = *03:11:02, *03:99
----	----	----	----	----	----	*03:03:01, *03:11:02 = *03:11:02, *03:11:02



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--++--	-----	-----	-----	-----	*03:81, *03:96 = *03:96, *03:97
--++--	-----	-----	-----	-----	*03:86, *03:96 = *03:96, *03:99
--++--	-----	-----	-----	-----	*03:03:01, *03:96 = *03:61, *03:67 = *03:61, *03:96 = *03:67, *03:96 = *03:96, *03:96
--++--	-----	-----	-----	-----	*03:67, *03:81 = *03:67, *03:97
--++--	-----	-----	-----	-----	*03:67, *03:86 = *03:67, *03:99
--++--	-----	-----	-----	-----	*03:03:01, *03:67 = *03:67, *03:67
--++--	-----	-----	-----	-----	*03:61, *03:81 = *03:61, *03:97
--++--	-----	-----	-----	-----	*03:61, *03:86 = *03:61, *03:99
--++--	-----	-----	-----	-----	*03:03:01, *03:61 = *03:61, *03:61
--++--	-----	-----	-----	-----	*03:59, *03:81 = *03:59, *03:97
--++--	-----	-----	-----	-----	*03:59, *03:86 = *03:59, *03:99
--++--	-----	-----	-----	-----	*03:03:01, *03:59 = *03:59, *03:59
--++--	-----	-----	-----	-----	*03:62, *03:81 = *03:62, *03:97
--++--	-----	-----	-----	-----	*03:62, *03:86 = *03:62, *03:99
--++--	-----	-----	-----	-----	*03:03:01, *03:62 = *03:62, *03:62
--++--	-----	-----	-----	-----	*03:53, *03:81 = *03:53, *03:97
--++--	-----	-----	-----	-----	*03:53, *03:86 = *03:53, *03:99
--++--	-----	-----	-----	-----	*03:03:01, *03:53 = *03:53, *03:53
--++--	-----	-----	-----	-----	*03:56, *03:81 = *03:56, *03:97
--++--	-----	-----	-----	-----	*03:56, *03:86 = *03:56, *03:99
--++--	-----	-----	-----	-----	*03:03:01, *03:56 = *03:56, *03:56
--++--	-----	-----	-----	-----	*03:50, *03:81 = *03:50, *03:97
--++--	-----	-----	-----	-----	*03:50, *03:86 = *03:50, *03:99
--++--	-----	-----	-----	-----	*03:03:01, *03:50 = *03:50, *03:50
--++--	-----	-----	-----	-----	*03:55, *03:81 = *03:55, *03:97
--++--	-----	-----	-----	-----	*03:55, *03:86 = *03:55, *03:99
--++--	-----	-----	-----	-----	*03:03:01, *03:55 = *03:55, *03:55
--++--	-----	-----	-----	-----	*03:52, *03:81 = *03:52, *03:97
--++--	-----	-----	-----	-----	*03:52, *03:86 = *03:52, *03:99
--++--	-----	-----	-----	-----	*03:03:01, *03:52 = *03:52, *03:52
--++--	-----	-----	-----	-----	*03:66, *03:81 = *03:66, *03:97
--++--	-----	-----	-----	-----	*03:66, *03:86 = *03:66, *03:99
--++--	-----	-----	-----	-----	*03:03:01, *03:66 = *03:66, *03:66
--++--	-----	-----	-----	-----	*03:68, *03:81 = *03:68, *03:97
--++--	-----	-----	-----	-----	*03:68, *03:86 = *03:68, *03:99
--++--	-----	-----	-----	-----	*03:03:01, *03:68 = *03:68, *03:68
--++--	-----	-----	-----	-----	*03:75, *03:81 = *03:75, *03:97
--++--	-----	-----	-----	-----	*03:76, *03:81 = *03:76, *03:97
--++--	-----	-----	-----	-----	*03:81, *03:86 = *03:81, *03:99
--++--	-----	-----	-----	-----	*03:03:01, *03:81 = *03:03:01, *03:97 = *03:81, *03:81 = *03:81, *03:97
--++--	-----	-----	-----	-----	*03:75, *03:86 = *03:75, *03:99
--++--	-----	-----	-----	-----	*03:03:01, *03:75 = *03:75, *03:75
--++--	-----	-----	-----	-----	*03:76, *03:86 = *03:76, *03:99
--++--	-----	-----	-----	-----	*03:03:01, *03:76 = *03:76, *03:76
--++--	-----	-----	-----	-----	*03:03:01, *03:86 = *03:03:01, *03:99
--++--	-----	-----	-----	-----	*03:13, *03:86 = *03:13, *03:99
--++--	-----	-----	-----	-----	*03:58, *03:58 = *03:58, *03:86 = *03:58, *03:99
--++--	-----	-----	-----	-----	*03:86, *03:97 = *03:97, *03:99
--++--	-----	-----	-----	-----	*03:86, *03:86 = *03:86, *03:99
--++--	-----	-----	-----	-----	*03:18, *03:39 = *03:39, *03:39

*03:02:01 = *03:02:01-03:02:06
 *03:03:01 = *03:03:01-03:03:11, 03:03:13
 *03:04:01:01 = *03:04:01:01-03:04:19
 *03:38:01 = *03:38:01-03:38:02
 *03:28 = *03:28 and 03:90
 *03:56 = *03:56 and 03:85
 *03:64 = *03:64 and 03:82
 *03:70 = *03:70 and 03:78



SPECIFICITY TABLE

HLA-C*03 SSP subtyping

Specificities and sizes of the PCR products of the 48 primer mixes used for HLA-C*03 SSP subtyping

Primer Mix	Size of spec. PCR product ¹	Size of control band ²	Amplified HLA-C*03 alleles ³	Other amplified HLA Class I alleles ⁴
1⁶	280 bp	800 bp	*03:02:01-03:02:06, 03:04:01:01-03:10, 03:14-03:17, 03:19, 03:23-03:29, 03:32-03:38:02, 03:40-03:42, 03:44-03:48, 03:51, 03:54, 03:57, 03:60, 03:63-03:65, 03:70-03:74, 03:77-03:78, 03:80, 03:82, 03:84, 03:87, 03:89-03:95, 03:98, 03:100-03:101	*02:02:01-02:02:03, 02:02:05-02:03, 02:04 ^w , 02:05-02:13, 02:14 ^w , 02:15-02:25Q, 02:26:02-02:32, 02:34-02:40, 02:42-02:46, 04:03, 04:06, 04:16, 04:80, 06:03, 07:96, 15:02:01-15:09, 15:10:02-15:11, 15:13, 15:15-15:22, 15:24-15:35, 15:37-15:45
2	210 bp	1070 bp	*03:02:01-03:02:06, 03:14-03:15, 03:33, 03:36, 03:40, 03:42-03:43:02, 03:60, 03:71, 03:84, 03:89, 03:95	*07:133, B*15:96
3⁷	280 bp	800 bp	*03:03:01-03:03:13, 03:11:01-03:13, 03:20N-03:22Q, 03:30-03:31, 03:43:01-03:43:02, 03:49-03:50, 03:52-03:53, 03:55-03:56, 03:58-03:59, 03:61-03:62, 03:66, 03:67 ^w , 03:68-03:69, 03:75-03:76, 03:79, 03:81, 03:83, 03:85-03:86, 03:88, 03:96-03:97, 03:102	*15:12
4	275 bp	1070 bp	*03:03:01-03:04:19, 03:06-03:12, 03:14, 03:18-03:24, 03:26, 03:28-03:32, 03:34, 03:37-03:40, 03:42-03:57, 03:59, 03:61-03:70, 03:72-03:83,	

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			03:85, 03:87-03:88, 03:90-03:93, 03:96, 03:98, 03:100-03:102	
5	275 bp	1070 bp	*03:05, 03:13, 03:17, 03:25, 03:27, 03:35, 03:71	*07:133, B*15:96
6^{5,9}	90 bp, 215 bp	800 bp	*03:06, 03:21	B*15:96
7^{5,6,10}	110 bp, 185 bp	1070 bp	*03:03:01-03:03:13, 03:08, 03:11:01-03:13, 03:18, 03:20N-03:22Q, 03:29-03:31, 03:39, 03:43:01-03:43:02, 03:49-03:50, 03:52- 03:53, 03:55-03:56, 03:58-03:59, 03:61- 03:62, 03:66-03:69, 03:75-03:76, 03:79, 03:81, 03:83, 03:85- 03:86, 03:88, 03:96- 03:97, 03:102	*06:44, 06:53, 07:01:01- 07:01:16, 07:06-07:07, 07:09, 07:16, 07:18- 07:20, 07:22, 07:24, 07:26, 07:28, 07:30, 07:35-07:36, 07:40, 07:44, 07:52-07:53, 07:55N-07:56:01, 07:57- 07:60, 07:65, 07:70- 07:71, 07:73, 07:77- 07:79, 07:81-07:83, 07:86, 07:89, 07:91- 07:96, 07:98N, 07:103- 07:104N, 07:106, 07:108- 07:113, 07:115-07:116, 07:118-07:120, 07:122, 07:124, 07:128-07:129, 07:131-07:132, 07:134, 07:140-07:141, 07:148, 07:150Q-07:151, 07:153, B*07:93, B*08:39, B*35:101:02, B*51:76
8	250 bp	1070 bp	*03:09, 03:22Q, 03:42, 03:71, 03:89	*07:133
9	240 bp	1070 bp	*03:07, 03:15, 03:45	*02:02:01-02:02:03, 02:02:05-02:02:11, 02:02:13-02:03, 02:04 ^w , 02:05-02:11, 02:13, 02:14 ^w , 02:15-02:25Q, 02:26:02, 02:28-02:40, 02:42-02:46, 04:03, 04:06, 04:16, 04:80, 06:03, 15:02:01-15:06:03, 15:08-15:09, 15:10:02- 15:13, 15:15-15:20, 15:22, 15:24, 15:26- 15:35, 15:37-15:42, 15:44-15:45

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10⁷	250 bp	800 bp	*03:07, 03:10, 03:15, 03:29, 03:45	*02:02:01 ^W , 02:02:02- 02:02:03, 02:02:05-02:03, 02:04 ^W , 02:05-02:13, 02:14 ^W , 02:15-02:25Q, 02:26:02, 02:28-02:40, 02:42-02:46, 04:03, 04:06, 04:16, 04:80, 06:03, 15:02:01-15:06:03, 15:08-15:09, 15:10:02- 15:13, 15:15-15:22, 15:24, 15:26-15:35, 15:37-15:42, 15:44-15:45
11¹¹	145 bp, 415 bp	1070 bp	*03:08, 03:29, 03:31, 03:87	*05:36, 06:44, 12:08
12	260 bp	1070 bp	*03:03:12, 03:11:01, 03:18, 03:39	*06:53, 07:56:01, 07:60, 07:79, 07:109, 15:12
13^{5,12}	80 bp, 140 bp	1070 bp	*03:02:01-03:02:06, 03:15-03:17, 03:33, 03:36, 03:40, 03:42- 03:43:01, 03:60, 03:71, 03:84, 03:89, 03:95	*04:37, 04:54, 06:02:08, 14:02:01, 14:02:03-14:16, 14:18-14:25
14	210 bp	1070 bp	*03:12, 03:19, 03:102	
15⁵	135 bp	1070 bp	*03:02:01-03:17, 03:19-03:38:02, 03:40- 03:66, 03:67 ^W , 03:68- 03:98, 03:100-03:102	*02:02:13, 06:03 ^W , 07:96, 15:43
16	150 bp	1070 bp	*03:07, 03:10, 03:15, 03:29, 03:45	*01:14, 02:02:13, 04:01:23, 05:01:12, 06:02:01:01-06:02:01:02, 06:02:03-06:04, 06:06- 06:10, 06:12-06:55, 07:07, 07:09, 07:76, 12:04:01, 14:12, 17:01:01:01-17:01:03, 17:01:05-17:08, 18:01- 18:04
17⁵	100 bp	1070 bp	*03:20N, 03:101	
18¹³	165 bp, 195 bp, 225 bp	1070 bp	*03:23, 03:83, 03:102	B*15:96
19^{5,14}	105 bp, 260 bp	800 bp	*03:24, 03:33	
20¹⁵	165 bp, 255 bp	1070 bp	*03:25, 03:47	
21	220 bp	1070 bp	*03:26, 03:88	

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22 ¹⁶	195 bp, 240 bp	800 bp	*03:15, 03:27, 03:38:01-03:38:02, 03:57, 03:69	*02:12, 04:03, 04:06, 04:16, 04:80, 07:20, 07:96, 07:127, 15:03, 15:16, 15:25
23 ^{5,17}	90 bp, 260 bp	1070 bp	*03:28, 03:49, 03:90	
24	200 bp	1070 bp	*03:30, 03:65, 03:79	
25 ¹⁸	305 bp, 355 bp	1070 bp	*03:32, 03:38:01- 03:38:02, 03:45, 03:69	*04:80, 06:14, 07:10, 07:43, 12:44, 15:03, 15:16, 15:25
26 ^{5,8,19}	70 bp, 105 bp, 265 bp	1070 bp	*03:13, 03:34-03:36, 03:77	*07:133, B*15:96
27 ^{5,20}	80 bp, 275 bp	1070 bp	*03:11:01-03:11:02, 03:15, 03:32, 03:37, 03:45, 03:60	*02:42, 04:03, 04:06, 04:16, 04:80, 06:03, 07:96, 15:25
28 ⁸	170 bp	1070 bp	*03:16, 03:41	*04:01:01:01-04:01:04, 04:01:06, 04:01:08, 04:01:10-04:01:17, 04:01:19-04:01:21, 04:01:23-04:01:25, 04:03-04:04:01, 04:05- 04:20, 04:23-04:49, 04:51-04:63, 04:65- 04:76, 04:78-04:81, 06:02:08, 14:02:01, 14:02:03-14:16, 14:18- 14:25, 18:01-18:04
29 ^{8,21}	140 bp, 170 bp, 285 bp,	1070 bp	*03:39, 03:51, 03:67, 03:96, 03:98	*04:64, 06:53, 07:56:01, 07:60, 07:79, 07:109, B*08:39
30	160 bp	1070 bp	*03:46, 03:61, 03:96	*04:64
31 ^{5,22}	100 bp, 210 bp	800 bp	*03:44, 03:59	
32 ^{5,8,23}	90 bp, 180 bp	1070 bp	*03:48, 03:58, 03:84	*01:03, 01:24, 04:37
33 ^{5,24}	110 bp, 365 bp	1070 bp	*03:43:01-03:43:02, 03:62	*07:60, 07:79, 14:10, B*35:101:02
34 ^{5,25}	130 bp, 240 bp	1070 bp	*03:53-03:54, 03:98	*12:17
35 ^{5,26}	70 bp, 120 bp, 210 bp	1070 bp	*03:56, 03:64, 03:79, 03:82, 03:85	*02:08, 15:10:02
36	240 bp	1070 bp	*03:50, 03:72	

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37	140 bp	1070 bp	*03:16, 03:21, 03:55, 03:80, 03:92	*04:01:01:01-04:01:04, 04:01:08, 04:01:10- 04:01:21, 04:01:23- 04:01:25, 04:03-04:04:01, 04:05-04:07, 04:09N- 04:20, 04:23-04:31, 04:33, 04:35-04:49, 04:51-04:58, 04:60- 04:76, 04:78-04:81, 06:02:08, 14:02:01, 14:02:03-14:16, 14:18- 14:19, 14:21N-14:24, 18:01-18:02, 18:04
38 ^{5,27}	100 bp, 265 bp	1070 bp	*03:52, 03:73, 03:95	*04:43
39 ^{5,28}	110 bp, 170 bp	1070 bp	*03:36, 03:63, 03:77	*04:34
40 ^{5,29}	70 bp, 260 bp	1070 bp	*03:66, 03:80	
41 ^{5,8,30}	120 bp, 195 bp	1070 bp	*03:68, 03:100	
42 ^{5,8,31}	120 bp, 205 bp	1070 bp	*03:70, 03:78	B*55:30
43 ^{7,32}	225 bp, 275 bp	800 bp	*03:74, 03:81, 03:97	B*15:96
44 ^{5,33}	70 bp, 160 bp	1070 bp	*03:75, 03:91	
45 ³⁴	140 bp, 295 bp	1070 bp	*03:76, 03:93	
46	210 bp	1070 bp	*03:58, 03:86, 03:94, 03:99	*01:02:01-01:03, 01:06- 01:08, 01:10-01:11, 01:13-01:20, 01:23- 01:33, 01:38-01:45, 04:37
47 ⁵	70 bp	1070 bp	*03:14, 03:21, 03:55, 03:92	*07:133
48	555 bp	1070 bp	*03:58, 03:86, 03:94, 03:99	*15:37, 16:18

¹ Alleles are assigned by the presence of specific PCR product(s). However, the sizes of the specific PCR products may be helpful in the interpretation of HLA-C*03 SSP typings.

When the primers in a primer mix can give rise to specific PCR products of more than one length this is indicated if the size difference is 20 base pairs or more. Size differences shorter than 20 base pairs are not given. For high resolution SSP kits the respective lengths of the specific PCR product(s) of the alleles amplified by these primer mixes are given.

Nonspecific amplifications, i.e. a ladder or a smear of bands, may sometimes be seen. GC-rich primers have a higher tendency of giving rise to nonspecific amplifications than other primers.

PCR fragments longer than the control bands may sometimes be observed. Such bands should be disregarded and do not influence the interpretation of the SSP typings.

PCR fragments migrating faster than the control bands, but slower than a 400 bp fragment may be seen in some gel read-outs. Such bands can be disregarded and do not influence the interpretation of the SSP typings.

Some primers may give rise to primer oligomer artifacts. Sometimes this phenomenon is an inherent feature of the primer pair(s) of a primer mix. More often it is due to other factors such as too low amount of DNA in the PCR reactions, taking too long time in setting up the PCR reactions, working at elevated room temperature or using thermal cyclers that are not pre-heated.

²The internal positive control primer pairs amplify segments of the human growth hormone gene. The two different control primer pairs give rise to either an internal positive control band of 1070 base pairs, for most wells, or a band of 800 base pairs, for some wells.

Well number 1 contains the primer pair giving rise to the shorter, 800 bp, internal positive control band in order to help in the correct orientation of the HLA-C*03 subtyping.

In addition, wells number 3, 6, 10, 19, 22, 31 and 43 contain the primer pair giving rise to the shorter, 800 bp, internal positive control band in order to allow kit identification.

In the presence of a specific amplification the intensity of the control band often decreases.

³For several HLA-C*03 alleles 1st, 4th, 5th, 6th and 7th exon nucleotide sequences are not available. In these instances it is not known whether some of the primers of the SSP sets are completely matched with the target sequences or not. We assume that unknown sequences in the 1st, 4th, 5th, 6th and 7th exons are conserved within allelic groups.

The C*03:28 and 03:90 alleles can be distinguished by the different sizes of the specific PCR products generated by primer mix 23.

The C*03:56 and 03:85 alleles and the C*03:64 and 03:82 alleles can be distinguished by the different sizes of the specific PCR products generated by primer mix 35.

The C*03:70 and 03:78 alleles can be distinguished by the different sizes of the specific PCR products generated by primer mix 42.

⁴Due to the sharing of sequence motifs between HLA-C alleles the primer pairs in wells 1 to 3, 5, 7 to 13, 15, 16, 22, 25 to 30, 32 to 35, 37 to 39 and 46 to 48 will amplify some non-HLA-C*03 alleles. In addition, the B*07:93 and 51:76 alleles are amplified by primer mix 7, the B*08:39 allele is amplified by primer mix 7 and 29, the B*15:96 allele is amplified by primer mixes 5, 6, 26 and 43, the B*35:101:02 allele is amplified by primer mix 7 and 33 and the B*55:30 allele is amplified by primer mix 42.

⁵Short specific PCR fragments are less intense and not as sharp as longer specific bands.

⁶Primer mixes 1 and 7 may yield less specific PCR product than the other HLA-C*03 primer mixes.

⁷Primer mixes 3, 10 and 43 may give rise to primer oligomer formation.

⁸Primer mixes 26, 28, 29, 32, 41 and 42 may give rise to nonspecific amplifications.

⁹Primer mix 6: Specific PCR fragment of 90 bp in the C*03:21 and B*15:96 alleles. Specific PCR fragment of 215 bp in the C*03:06 alleles.

¹⁰Primer mix 7: Specific PCR fragment of 110 bp in the C*03:08 and 03:29 and in the C*06:44, 07:01:01-07:01:16, 07:06-07:07, 07:09, 07:16, 07:18-07:20, 07:22, 07:24, 07:26, 07:28, 07:30, 07:35-07:36, 07:40, 07:44, 07:52-07:53, 07:55N, 07:57-07:59, 07:65, 07:70-07:71, 07:73, 07:77-07:78, 07:81-07:83, 07:86, 07:89, 07:91-07:96, 07:98N, 07:103-07:104N, 07:106, 07:108, 07:110-07:113, 07:115-07:116, 07:118-07:120, 07:122, 07:124, 07:128-07:129, 07:131-07:132, 07:134, 07:140-07:141, 07:148, 07:150Q-07:151 and 07:153 alleles. Specific PCR fragment of 185 bp in the C*03:03:01-03:03:13, 03:11:01-03:13, 03:18, 03:20N-03:22Q, 03:30, 03:39, 03:43:01-03:43:02, 03:49-03:50, 03:52-03:53, 03:55-03:56, 03:58-03:59, 03:61-03:62, 03:66-03:69, 03:75-03:76, 03:79, 03:81, 03:83, 03:85-03:86, 03:88, 03:96-03:97 and 03:102 and in the C*06:53, 07:56:01 and 07:79 and in the B*07:93, B*08:39, B*35:101:02 and B*51:76 alleles. Specific PCR fragments of 110 and 185 bp in the C*03:31 and in the C*07:60 and 07:109 alleles.

¹¹Primer mix 11: Specific PCR fragment of 145 bp in the C*03:87 allele. Specific PCR fragment of 415 bp in the C*03:08, 03:29 and 03:31 and in the C*05:36, 06:44 and 12:08 alleles.

¹²Primer mix 13: Specific PCR fragment of 80 bp in the C*03:02:01-03:02:06, 03:15-03:16, 03:33, 03:36, 03:40, 03:42-03:43:01, 03:60, 03:84, 03:89 and 03:95 and in the C*04:54, 14:08 and 14:09 alleles. Specific PCR fragment of 140 bp in the C*03:17 and in the C*04:37, alleles. Specific PCR fragments of 80 and 140 bp in the C*03:71 and in the C*06:02:08, 14:02:01, 14:02:03-14:07N, 14:10-14:16 and 14:18-14:25 alleles.

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¹³Primer mix 18: Specific PCR fragment of 165 bp in the C*03:102 and in the B*15:96 alleles. Specific PCR fragment of 195 bp in the C*03:83 allele. Specific PCR fragment of 225 bp in the C*03:23 allele.

¹⁴Primer mix 19: Specific PCR fragment of 105 bp in the C*03:24 allele. Specific PCR fragment of 260 bp in the C*03:33 allele.

¹⁵Primer mix 20: Specific PCR fragment of 165 bp in the C*03:25 allele. Specific PCR fragment of 255 bp in the C*03:47 allele.

¹⁶Primer mix 22: Specific PCR fragment of 195 bp in the C*03:15, 03:27, 03:38:01-03:38:02 and 03:69 and in the C*02:12, 04:03, 04:06, 04:16, 04:80, 07:20, 07:96, 07:127, 15:03, 15:16 and 15:25 alleles. Specific PCR fragment of 240 bp in the C*03:57 allele.

¹⁷Primer mix 23: Specific PCR fragment of 90 bp in the C*03:28 and 03:49 alleles. Specific PCR fragment of 260 bp in the C*03:90 allele.

¹⁸Primer mix 25: Specific PCR fragment of 305 bp in the C*03:32 and 03:45 alleles. Specific PCR fragment of 355 bp in the C*03:38:01-03:38:02 and 03:69 and in the C*12:44, 15:03, 15:16 and alleles. Specific PCR fragments of 305 and 355 bp in the C*04:80, 06:14, 07:10, 07:43 and 15:25 alleles.

¹⁹Primer mix 26: Specific PCR fragment of 70 bp in the C*03:34 allele. Specific PCR fragment of 105 bp in the C*03:36 and 03:77 alleles. Specific PCR fragment of 265 bp in the C*03:13 and 03:35 and in the C*07:133 and the B*15:96 alleles.

²⁰Primer mix 27: Specific PCR fragment of 80 bp in the C*03:11:01-03:11:02 and 03:37 and in the C*02:42 alleles. Specific PCR fragment of 275 bp in the C*03:15, 03:32, 03:45 and 03:60 and in the C*04:03, 04:06, 04:16, 04:80, 06:03, 07:96 and 15:25 alleles. Specific PCR fragment of 80 and 275 bp in the C*06:03 allele.

²¹Primer mix 29: Specific PCR fragment of 140 bp in the C*03:98 allele. Specific PCR fragment of 170 bp in the C*03:51 and 03:96 and in the C*04:64 alleles. Specific PCR fragment of 285 bp in the C*03:39 and 03:67 and in the C*06:53, 07:56:01, 07:60, 07:79 and 07:109 and the B*08:39 alleles.

²²Primer mix 31: Specific PCR fragment of 100 bp in the C*03:59 allele. Specific PCR fragment of 210 bp in the C*03:44 allele.

²³Primer mix 32: Specific PCR fragment of 90 bp in the C*03:58 and in the C*01:03, 01:24 and 04:37 alleles. Specific PCR fragment of 180 bp in the C*03:48 and 03:84 alleles.

²⁴Primer mix 33: Specific PCR fragment of 110 bp in the C*03:62 allele. Specific PCR fragment of 365 bp in the C*03:43:01-03:43:02 and in the C*07:60, 07:79 and 14:10 and the B*35:101:02 alleles.

²⁵Primer mix 34: Specific PCR fragment of 130 bp in the C*03:54 and 03:98 alleles. Specific PCR fragment of 240 bp in the C*03:53 and the C*12:17 alleles.

²⁶Primer mix 35: Specific PCR fragment of 70 bp in the C*03:64, 02:08, 15:10:02 alleles. Specific PCR fragment of 120 bp in the C*03:56 allele. Specific PCR fragment of 210 bp in the C*03:79, 03:85 and 03:82 alleles.

²⁷Primer mix 38: Specific PCR fragment of 100 bp in the C*03:52 and 03:95 and in the C*04:43 alleles. Specific PCR fragment of 265 bp in the C*03:73 allele.

²⁸Primer mix 39: Specific PCR fragment of 110 bp in the C*03:36 and 03:77 and in the C*04:34 alleles. Specific PCR fragment of 170 bp in the C*03:63 allele.

²⁹Primer mix 40: Specific PCR fragment of 70 bp in the C*03:80 alleles. Specific PCR fragment of 260 bp in the C*03:66 allele.

³⁰Primer mix 41: Specific PCR fragment of 120 bp in the C*03:68 alleles. Specific PCR fragment of 195 bp in the C*03:100 allele.

³¹Primer mix 42: Specific PCR fragment of 120 bp in the C*03:78 alleles. Specific PCR fragment of 205 bp in the C*03:70 and in the B*55:30 alleles.

³²Primer mix 43: Specific PCR fragment of 225 bp in the C*03:74 and 03:81 and in the B*15:96 alleles. Specific PCR fragment of 275 bp in the C*03:97 allele.

³³Primer mix 44: Specific PCR fragment of 70 bp in the C*03:91 allele. Specific PCR fragment of 160 bp in the C*03:75 allele.

³⁴Primer mix 45: Specific PCR fragment of 140 bp in the C*03:93 alleles. Specific PCR fragment of 295 bp in the C*03:76 allele.

'w', might be weakly amplified.

INTERPRETATION TABLE

HLA-C*03 SSP subtyping

Amplification patterns of the C*03:02 to C*03:102 alleles

	Well ^o																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Length of spec.	280	210	280	275	275	90	110	250	240	250	145	260	80	210	135	150	100	165	105	165	220	195	90	200
PCR product(s)						215	185				415		140					195	260	255		240	260	
Length of int. pos. control ¹	800	1070	800	1070	1070	800	1070	1070	1070	800	1070	1070	1070	1070	1070	1070	1070	1070	800	1070	1070	800	1070	1070
5'-primer(s) ²	5'-gCT 3' 105	5'-gTC 3' 419	5'-gCT 3' 105	5'-TCA 3' 355	5'-CCC 3' 355	5'-TgT 3' 413	5'-CCg 3' 201	5'-CTA 3' 374	5'-gCT 3' 105	5'-gCT 3' 105	5'-TCA 3' 28	5'-ggA 3' 126	5'-AgT 3' 361	5'-TTA 3' 420	5'-gCT 3' 105	5'-CCg 3' 201	5'-CCT 3' 19	5'-gCA 3' 406	5'-gCT 3' 105	5'-CAA 3' 86	5'-gCA 3' 395	5'-CCA 3' 134	5'-gTC 3' 368	5'-TCA 3' 355
3'-primer(s) ³	5'-C 3' 343	5'-CTT 3' 589	5'-T 3' 343	5'-CTT 3' 589	5'-CTT 3' 589	5'-TAG 3' 270	5'-CTT 3' 589	5'-ggT 3' 302	5'-AgT 3' 312	5'-TAG 3' 270	5'-T 3' 343	5'-AgA 3' 459	5'-CTT 3' 589	5'-CTC 3' 201	5'-AgT 3' 312	5'-ggC 3' 70	5'-CTT 3' 589	5'-ACC 3' 167	5'-ggC 3' 302	5'-CTT 3' 589	5'-AgC 3' 289	5'-CTT 3' 589	5'-CTT 3' 589	5'-CTT 3' 589
Well No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24



INTERPRETATION TABLE

HLA-C*03 SSP subtyping

Amplification patterns of the C*03:02 to C*03:102 alleles

Well ⁹																									
25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48		
																									Length of spec. PCR product(s)
																									Length of int. pos. control ¹
																									5'-primer(s) ²
																									3'-primer(s) ³
																									Well No.



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Length of spec.	280	210	280	275	275	90	110	250	240	250	145	260	80	210	135	150	100	165	105	165	220	195	90	200	
PCR product(s)						215	185				415		140					225	195	260	255		240	260	
HLA-C* allele ⁴																									
Well No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
*03:02:01-03:02:06	1	2											13		15										
*03:03:01-03:03:11, 03:03:13			3	4			7								15										
*03:03:12			3	4			7					12			15										
*03:04:01:01-03:04:19	1			4											15										
*03:05	1				5										15										
*03:06	1			4		6									15										
*03:07	1			4					9	10					15	16									
*03:08	1			4			7				11				15										
*03:09	1			4				8							15										
*03:10	1			4						10					15	16									
*03:11:01			3	4			7					12			15										
*03:11:02			3	4			7								15										
*03:12			3	4			7							14	15										
*03:13			3		5		7								15										
*03:14	1	2		4											15										
*03:15	1	2							9	10			13		15	16							22		
*03:16	1												13		15										
*03:17	1				5								13		15										
*03:18				4			7					12													
*03:19	1			4										14	15										
*03:20N			3	4			7								15		17								
*03:21			3	4		6	7								15										
*03:22Q			3	4			7	8							15										
*03:23	1			4											15		18								
*03:24	1			4											15			19							
*03:25	1				5										15				20						
*03:26	1			4											15						21				
*03:27	1				5										15							22			
*03:28, 03:90 ⁵	1			4											15								23		
*03:29	1			4			7			10	11				15	16									
*03:30			3	4			7								15									24	
*03:31			3	4			7				11				15										
*03:32	1			4											15										
*03:33	1	2											13		15			19							
*03:34	1			4											15										
*03:35	1				5										15										
*03:36	1	2											13		15										
Well No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	

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HLA-C*03															Product Insert															Page 27 of 48								
101.611-12 – including <i>Taq</i> polymerase															General “Instructions for Use”															IFU-01 Rev. No. 02 can be downloaded from								
Lot No.: 85K															Lot-specific Information															www.olerup-ssp.com								
355	305														140	160	100	90	110	130	70	240	140	100	110	70	120	120	225	70	140	210	70	555	Length of spec. PCR product(s)			
265															285		210	180	365	240	210			265	170	260	195	205	275	160	295							
25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	HLA-C* allele ⁴ Well No.														
																								*03:02:01-03:02:06														
																								*03:03:01-03:03:11, 03:03:13														
																								*03:03:12														
																								*03:04:01:01-03:04:19														
																								*03:05														
																								*03:06														
																								*03:07														
																								*03:08														
																								*03:09														
																								*03:10														
		27																						*03:11:01														
		27																						*03:11:02														
																								*03:12														
	26																							*03:13														
																						47		*03:14														
			27																					*03:15														
				28								37												*03:16														
																								*03:17														
																								*03:18														
																								*03:19														
												37										47		*03:20N														
																								*03:21														
																								*03:22Q														
																								*03:23														
																								*03:24														
																								*03:25														
																								*03:26														
																								*03:27														
																								*03:28, 03:90 ⁵														
																								*03:29														
																								*03:30														
																								*03:31														
25		27																						*03:32														
																								*03:33														
		26																						*03:34														
		26																						*03:35														
		26											39											*03:36														
25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	Well No.														

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Length of spec.	280	210	280	275	275	90	110	250	240	250	145	260	80	210	135	150	100	165	105	165	220	195	90	200	
PCR product(s)						215	185				415		140					225	195	260	255		240	260	
Well No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
*03:37	1			4											15										
*03:38:01-03:38:02	1			4											15							22			
*03:39				4			7					12													
*03:40	1	2		4									13		15										
*03:41	1														15										
*03:42	1	2		4				8					13		15										
*03:43:01		2	3	4			7						13		15										
*03:43:02		2	3	4			7								15										
*03:44	1			4											15										
*03:45	1			4					9	10					15	16									
*03:46	1			4											15										
*03:47	1			4											15					20					
*03:48	1			4											15										
*03:49			3	4			7								15								23		
*03:50			3	4			7								15										
*03:51	1			4											15										
*03:52			3	4			7								15										
*03:53			3	4			7								15										
*03:54	1			4											15										
*03:55			3	4			7								15										
*03:56, 03:85 ⁶			3	4			7								15										
*03:57	1			4											15							22			
*03:58			3				7								15										
*03:59			3	4			7								15										
*03:60	1	2											13		15										
*03:61			3	4			7								15										
*03:62			3	4			7								15										
*03:63	1			4											15										
*03:64, 03:82 ⁷	1			4											15										
*03:65	1			4											15									24	
*03:66			3	4			7								15										
*03:67			w	4			7								w										
*03:68			3	4			7								15										
*03:69			3	4			7								15							22			
*03:70, 03:78 ⁸	1			4											15										
*03:71	1	2			5			8					13		15										
*03:72	1			4											15										
*03:73	1			4											15										
*03:74	1			4											15										
Well No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	



Lot No.: **85K**

Lot-specific Information

www.olerup-ssp.com

355 305		265 105	275 80	170	285 170	160	210 100	180 90	365 110	240 130	210 120	70	240	140	265 100	170 110	260 70	195 120	205 120	275 225	160 70	295 140	210	70	555	Length of spec. PCR product(s)
25		26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	Well No.	
			27																						*03:37	
25																									*03:38:01-03:38:02	
					29																				*03:39	
																									*03:40	
			28																						*03:41	
																									*03:42	
									33																*03:43:01	
									33																*03:43:02	
							31																		*03:44	
25		27																							*03:45	
						30																			*03:46	
																									*03:47	
								32																	*03:48	
																									*03:49	
												36													*03:50	
					29																				*03:51	
														38											*03:52	
									34																*03:53	
									34																*03:54	
													37										47		*03:55	
											35														*03:56, 03:85 ⁶	
																									*03:57	
								32														46	48		*03:58	
							31																		*03:59	
		27																							*03:60	
							30																		*03:61	
									33																*03:62	
																39									*03:63	
											35														*03:64, 03:82 ⁷	
																									*03:65	
																40									*03:66	
						29																			*03:67	
																		41							*03:68	
25																									*03:69	
																				42					*03:70, 03:78 ⁸	
																									*03:71	
												36													*03:72	
																38									*03:73	
																									*03:74	
																				43					*03:74	
25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	Well No.		



Lot No.: **85K**

Lot-specific Information

www.olerup-ssp.com

Length of spec.	280	210	280	275	275	90	110	250	240	250	145	260	80	210	135	150	100	165	105	165	220	195	90	200	
PCR product(s)						215	185				415		140					225	195	260	255		240	260	
Well No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
*03:75			3	4			7								15										
*03:76			3	4			7								15										
*03:77	1			4											15										
*03:79			3	4			7								15									24	
*03:80	1			4											15										
*03:81			3	4			7								15										
*03:83			3	4			7								15		18								
*03:84	1	2											13		15										
*03:86			3				7								15										
*03:87	1			4						11					15										
*03:88			3	4			7								15						21				
*03:89	1	2						8					13		15										
*03:91	1			4											15										
*03:92	1			4											15										
*03:93	1			4											15										
*03:94	1														15										
*03:95	1	2											13		15										
*03:96			3	4			7								15										
*03:97			3				7								15										
*03:98	1			4											15										
*03:99																									
*03:100	1			4											15										
*03:101	1			4											15		17								
*03:102			3	4			7						14	15			18								
*01:02:01-01:02:13, 01:06-01:08, 01:10- 01:11, 01:13, 01:15- 01:20, 01:23, 01:25- 01:33, 01:38-01:45																									
*01:03, 01:24																									
*01:14															16										
*02:02:01	1								9	w															
Well No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	

Lot No.: **85K**

Lot-specific Information

www.olerup-ssp.com

355	305	70	80	170	140	160	100	90	110	130	70	240	140	100	110	70	120	120	225	70	140	210	70	555	Length of spec. PCR product(s)
265				285			210	180	365	240	210			265	170	260	195	205	275	160	295				Well No.
25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48		
																			44						*03:75
																					45				*03:76
	26														39										*03:77
															35										*03:79
													37		40										*03:80
																		43							*03:81
																									*03:83
							32																		*03:84
																						46		48	*03:86
																									*03:87
																									*03:88
																				44					*03:89
													37										47		*03:91
																						45			*03:92
																						46		48	*03:93
																									*03:94
														38											*03:95
				29	30																				*03:96
																			43						*03:97
				29					34																*03:98
																						46		48	*03:99
																41									*03:100
																									*03:101
																									*03:102
																							46		*01:02:01-01:02:13, 01:06-01:08, 01:10- 01:11, 01:13, 01:15- 01:20, 01:23, 01:25- 01:33, 01:38-01:45
							32																46		*01:03, 01:24
																							46		*01:14
																									*02:02:01
25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	Well No.	

Lot No.: **85K**

Lot-specific Information

www.olerup-ssp.com

Length of spec.	280	210	280	275	275	90	110	250	240	250	145	260	80	210	135	150	100	165	105	165	220	195	90	200	
PCR product(s)						215	185				415		140					225	195	260	255		240	260	
Well No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
*02:02:02-02:02:03, 02:02:05-02:02:11, 02:02:14-02:03, 02:05- 02:07, 02:09-02:11, 02:13, 02:15-02:25Q, 02:26:02, 02:28-02:32, 02:34-02:40, 02:43- 02:46, 15:02:01- 15:02:07, 15:04- 15:06:03, 15:08-15:09, 15:11, 15:13, 15:15, 15:17-15:20, 15:22, 15:24, 15:26-15:35, 15:38-15:42, 15:44- 15:45	1								9	10															
*02:02:12, 15:21	1								10																
*02:02:13	1								9	10				15	16										
*02:04, 02:14	w								w	w															
*02:08, 15:10:02	1								9	10															
*02:12	1								10													22			
*02:27:01-02:27:02, 15:07	1																								
*02:33									9	10															
*02:42	1								9	10															
*04:01:01:01-04:01:04, 04:01:08, 04:01:10- 04:01:17, 04:01:19- 04:01:21, 04:01:24- 04:01:25, 04:04:01, 04:05, 04:07, 04:09N- 04:15:02, 04:17-04:20, 04:23-04:31, 04:33, 04:35-04:36, 04:38- 04:42, 04:44-04:49, 04:51-04:53, 04:55- 04:58, 04:60-04:63, 04:65-04:76, 04:78- 04:79, 04:81																									
*04:01:06, 04:08, 04:32, 04:59Q																									
Well No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	



Lot No.: **85K**

Lot-specific Information

www.olerup-ssp.com

355	305	355	105	70	80	170	140	160	100	90	110	130	70	240	140	100	110	70	120	120	225	70	140	210	70	555	Length of spec.		
		265					285		210	180	365	240	120			265	170	260	195	205	275	160	295				PCR product(s)		
25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	Well No.					
																												*02:02:02-02:02:03, 02:02:05-02:02:11, 02:02:14-02:02:03, 02:05- 02:07, 02:09-02:11, 02:13, 02:15-02:25Q, 02:26:02, 02:28-02:32, 02:34-02:40, 02:43- 02:46, 15:02:01- 15:02:07, 15:04- 15:06:03, 15:08-15:09, 15:11, 15:13, 15:15, 15:17-15:20, 15:22, 15:24, 15:26-15:35, 15:38-15:42, 15:44- 15:45	
																												*02:02:12, 15:21	
																												*02:02:13	
																												*02:04, 02:14	
										35																		*02:08, 15:10:02	
																												*02:12	
																												*02:27:01-02:27:02, 15:07	
																												*02:33	
		27																										*02:42	
																												*04:01:01:01-04:01:04, 04:01:08, 04:01:10- 04:01:17, 04:01:19- 04:01:21, 04:01:24- 04:01:25, 04:04:01, 04:05, 04:07, 04:09N- 04:15:02, 04:17-04:20, 04:23-04:31, 04:33, 04:35-04:36, 04:38- 04:42, 04:44-04:49, 04:51-04:53, 04:55- 04:58, 04:60-04:63, 04:65-04:76, 04:78- 04:79, 04:81	
			28																									*04:01:06, 04:08, 04:32, 04:59Q	
25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	Well No.					



Lot No.: **85K**

Lot-specific Information

www.olerup-ssp.com

Length of spec.	280	210	280	275	275	90	110	250	240	250	145	260	80	210	135	150	100	165	105	165	220	195	90	200	
PCR product(s)						215	185				415		140					225	195	260	255		240	260	
Well No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
*04:01:18																									
*04:01:23, 18:01-18:02, 18:04																16									
*04:03, 04:06, 04:16	1								9	10													22		
*04:34																									
*04:37													13												
*04:43																									
*04:54, 14:02:01, 14:02:03-14:09, 14:11, 14:13-14:16, 14:18-14:19, 14:21N-14:24													13												
*04:64																									
*04:80	1								9	10													22		
*05:01:12, 06:02:01:01-06:02:01:02, 06:02:03-06:02:07, 06:02:09-06:02:11, 06:04, 06:06-06:10, 06:12-06:13, 06:15-06:43, 06:45-06:52, 06:54-06:55, 07:76, 12:04:01, 17:01:01:01-17:01:03, 17:01:05-17:08																16									
*05:36, 12:08											11														
*06:02:08, 14:12													13			16									
*06:03	1								9	10						w 16									
*06:14																16									
*06:44						7					11					16									
*06:53						7						12				16									
Well No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	

Lot No.: **85K**

Lot-specific Information

www.olerup-ssp.com

355	305	70	80	170	140	160	100	90	110	130	70	240	140	100	110	70	120	120	225	70	140	210	70	555	Length of spec.
265	105	275		285	170		210	180	365	240	120			265	170	260	195	205	275	160	295				PCR product(s)
25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	Well No.	
												37													*04:01:18
			28									37													*04:01:23, 18:01-18:02, 18:04
		27	28									37													*04:03, 04:06, 04:16
			28											39											*04:34
			28				32					37									46				*04:37
			28									37	38												*04:43
			28									37													*04:54, 14:02:01, 14:02:03-14:09, 14:11, 14:13-14:16, 14:18-14:19, 14:21N-14:24
				29	30							37													*04:64
25		27	28									37													*04:80
																									*05:01:12, 06:02:01:01-06:02:01:02, 06:02:03-06:02:07, 06:02:09-06:02:11, 06:04, 06:06-06:10, 06:12-06:13, 06:15-06:43, 06:45-06:52, 06:54-06:55, 07:76, 12:04:01, 17:01:01:01-17:01:03, 17:01:05-17:08
			28									37													*05:36, 12:08
		27																							*06:03
25																									*06:14
																									*06:44
				29																					*06:53
25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	Well No.	

Lot No.: **85K**

Lot-specific Information

www.olerup-ssp.com

Length of spec.	280	210	280	275	275	90	110	250	240	250	145	260	80	210	135	150	100	165	105	165	220	195	90	200	
PCR product(s)						215	185				415		140					225	195	260	255		240	260	
Well No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
*07:01:01-07:01:16, 07:06, 07:16, 07:18- 07:19, 07:22, 07:24, 07:26, 07:28, 07:30, 07:35-07:36, 07:40, 07:44, 07:52-07:53, 07:55N, 07:57-07:59, 07:65, 07:70-07:71, 07:73, 07:77-07:78, 07:81-07:83, 07:86, 07:89, 07:91-07:95, 07:98N, 07:103- 07:104N, 07:106, 07:108, 07:110- 07:113, 07:115- 07:116, 07:118- 07:120, 07:122, 07:124, 07:128- 07:129, 07:131- 07:132, 07:134, 07:140-07:141, 07:148, 07:150Q- 07:151, 07:153, <i>B*07:93, B*51:76</i>							7																		
*07:07, 07:09							7									16									
*07:10, 07:43, 12:44																									
*07:20							7																22		
*07:56:01, 07:109							7					12													
*07:60, 07:79							7					12													
*07:96	1						7								15								22		
*07:127																							22		
*07:133		2			5			8																	
*12:17																									
*14:10													13												
*14:20, 14:25													13												
*15:03, 15:16	1								9	10													22		
*15:12			3						9	10	12														
*15:25	1																						22		
*15:37	1								9	10															
Well No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	



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Lot-specific Information

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355	305	70	80	170	140	160	100	90	110	130	70	240	140	100	110	70	120	120	225	70	140	210	70	555	Length of spec.
265	105	275		285	170		210	180	365	240	120			265	170	260	195	205	275	160	295				PCR product(s)
25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	Well No.	
																									*07:01:01-07:01:16, 07:06, 07:16, 07:18- 07:19, 07:22, 07:24, 07:26, 07:28, 07:30, 07:35-07:36, 07:40, 07:44, 07:52-07:53, 07:55N, 07:57-07:59, 07:65, 07:70-07:71, 07:73, 07:77-07:78, 07:81-07:83, 07:86, 07:89, 07:91-07:95, 07:98N, 07:103- 07:104N, 07:106, 07:108, 07:110- 07:113, 07:115- 07:116, 07:118- 07:120, 07:122, 07:124, 07:128- 07:129, 07:131- 07:132, 07:134, 07:140-07:141, 07:148, 07:150Q- 07:151, 07:153, B*07:93, B*51:76
25																									*07:07, 07:09 *07:10, 07:43, 12:44 *07:20
				29					33																*07:56:01, 07:109 *07:60, 07:79 *07:96 *07:127
		27		29																					*07:133 *12:17 *14:10 *14:20, 14:25
	26								34													47			*15:03, 15:16 *15:12 *15:25 *15:37
			28					33				37												48	
25																									
25	27																								
25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	Well No.	



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Lot-specific Information

www.olerup-ssp.com

Length of spec.	280	210	280	275	275	90	110	250	240	250	145	260	80	210	135	150	100	165	105	165	220	195	90	200	
PCR product(s)						215	185				415		140					225	195	260	255		240	260	
Well No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
*15:43	1														15										
*16:18																									
*18:03																16									
B*08:39							7																		
B*15:96		2			5	6											18								
B*35:101:02							7																		
B*55:30																									
Well No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	

¹The internal positive control primer pairs amplify segments of the human growth hormone gene. The two different control primer pairs give rise to either an internal positive control band of 1070 base pairs, for most wells, or a band of 800 base pairs, for some wells. Well number 1 contains the primer pair giving rise to the shorter, 800 bp, internal positive control band in order to help in the correct orientation of the HLA-C*03 subtyping. In addition, wells number 3, 6, 10, 19, 22, 31 and 43 contain the primer pair giving rise to the shorter, 800 bp, internal positive control band in order to allow kit identification.

²The nucleotide position, in the 1st, 2nd or 3rd exons or the 3rd intron, matching the specificity-determining 3'-end of the primer is given. Nucleotide numbering as on the www.ebi.ac.uk/imgt/hla web site. The sequence of the 3 terminal nucleotides of the primer is given.

³The nucleotide position, in the 1st, 2nd, 3rd or 4th exons, matching the specificity-determining 3'-end of the primer is given in the anti-sense direction. Nucleotide numbering as on the www.ebi.ac.uk/imgt/hla web site. The sequence of the 3 terminal nucleotides of the primer is given.

⁴The nucleotide sequence of the HLA-Cw*0301 allele has been shown to be identical to C*03:04:01:01.

⁵The C*03:28 and 03:90 alleles can be distinguished by the different sizes of the specific PCR products generated by primer mix 23.

⁶The C*03:56 and 03:85 alleles can be distinguished by the different sizes of the specific PCR products generated by primer mix 35.

⁷The C*03:64 and 03:82 alleles can be distinguished by the different sizes of the specific PCR products generated by primer mix 35.

⁸The C*03:70 and 03:78 alleles can be distinguished by the different sizes of the specific PCR products generated by primer mix 42.

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Lot-specific Information

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355 305		70 80		170 140		160 100		90 110		130 240		140 100		110 70		240 120		140 120		225 70		140 210		70 555		Length of spec. PCR product(s)
265 105		275 80		285 170		210 100		180 90		365 110		265 100		170 110		260 70		195 120		205 120		295 140				
25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	Well No.		
																										*15:43
																									48	*16:18
			28																							*18:03
				29																						B*08:39
	26																	43								B*15:96
								33																		B*35:101:02
																	42									B*55:30
25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	Well No.		

⁹Primer mix 6: Specific PCR fragment of 90 bp in the C*03:21 and B*15:96 alleles. Specific PCR fragment of 215 bp in the C*03:06 alleles.

Primer mix 7: Specific PCR fragment of 110 bp in the C*03:08 and 03:29 and in the C*06:44, 07:01:01-07:01:16, 07:06-07:07, 07:09, 07:16, 07:18-07:20, 07:22, 07:24, 07:26, 07:28, 07:30, 07:35-07:36, 07:40, 07:44, 07:52-07:53, 07:55N, 07:57-07:59, 07:65, 07:70-07:71, 07:73, 07:77-07:78, 07:81-07:83, 07:86, 07:89, 07:91-07:96, 07:98N, 07:103-07:104N, 07:106, 07:108, 07:110-07:113, 07:115-07:116, 07:118-07:120, 07:122, 07:124, 07:128-07:129, 07:131-07:132, 07:134, 07:140-07:141, 07:148, 07:150Q-07:151 and 07:153 alleles. Specific PCR fragment of 185 bp in the C*03:03:01-03:03:13, 03:11:01-03:13, 03:18, 03:20N-03:22Q, 03:30, 03:39, 03:43:01-03:43:02, 03:49-03:50, 03:52-03:53, 03:55-03:56, 03:58-03:59, 03:61-03:62, 03:66-03:69, 03:75-03:76, 03:79, 03:81, 03:83, 03:85-03:86, 03:88, 03:96-03:97 and 03:102 and in the C*06:53, 07:56:01 and 07:79 and in the B*07:93, B*08:39, B*35:101:02 and B*51:76 alleles. Specific PCR fragments of 110 and 185 bp in the C*03:31 and in the C*07:60 and 07:109 alleles.

Primer mix 11: Specific PCR fragment of 145 bp in the C*03:87 allele. Specific PCR fragment of 415 bp in the C*03:08, 03:29 and 03:31 and in the C*05:36, 06:44 and 12:08 alleles.

Primer mix 13: Specific PCR fragment of 80 bp in the C*03:02:01-03:02:06, 03:15-03:16, 03:33, 03:36, 03:40, 03:42-03:43:01, 03:60, 03:84, 03:89 and 03:95 and in the C*04:54, 14:08 and 14:09 alleles. Specific PCR fragment of 140 bp in the C*03:17 and in the C*04:37, alleles. Specific PCR fragments of 80 and 140 bp in the C*03:71 and in the C*06:02:08, 14:02:01, 14:02:03-14:07N, 14:10-14:16 and 14:18-14:25 alleles.

Primer mix 18: Specific PCR fragment of 165 bp in the C*03:102 and in the B*15:96 alleles. Specific PCR fragment of 195 bp in the C*03:83 allele. Specific PCR fragment of 225 bp in the C*03:23 allele.

Primer mix 19: Specific PCR fragment of 105 bp in the C*03:24 allele. Specific PCR fragment of 260 bp in the C*03:33 allele.

Primer mix 20: Specific PCR fragment of 165 bp in the C*03:25 allele. Specific PCR fragment of 255 bp in the C*03:47 allele.

Primer mix 22: Specific PCR fragment of 195 bp in the C*03:15, 03:27, 03:38:01-03:38:02 and 03:69 and in the C*02:12, 04:03, 04:06, 04:16, 04:80, 07:20, 07:96, 07:127, 15:03, 15:16 and 15:25 alleles. Specific PCR fragment of 240 bp in the C*03:57 allele.

Primer mix 23: Specific PCR fragment of 90 bp in the C*03:28 and 03:49 alleles. Specific PCR fragment of 260 bp in the C*03:90 allele.

Primer mix 25: Specific PCR fragment of 305 bp in the C*03:32 and 03:45 alleles. Specific PCR fragment of 355 bp in the C*03:38:01-03:38:02 and 03:69 and in the C*12:44, 15:03, 15:16 and alleles. Specific PCR fragments of 305 and 355 bp in the C*04:80, 06:14, 07:10, 07:43 and 15:25 alleles.

Primer mix 26: Specific PCR fragment of 70 bp in the C*03:34 allele. Specific PCR fragment of 105 bp in the C*03:36 and 03:77 alleles. Specific PCR fragment of 265 bp in the C*03:13 and 03:35 and in the C*07:133 and the B*15:96 alleles.

Lot No.: **85K**

Lot-specific Information

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Primer mix 27: Specific PCR fragment of 80 bp in the C*03:11:01-03:11:02 and 03:37 and in the C*02:42 alleles. Specific PCR fragment of 275 bp in the C*03:15, 03:32, 03:45 and 03:60 and in the C*04:03, 04:06, 04:16, 04:80, 06:03, 07:96 and 15:25 alleles. Specific PCR fragment of 80 and 275 bp in the C*06:03 allele.

Primer mix 29: Specific PCR fragment of 140 bp in the C*03:98 allele. Specific PCR fragment of 170 bp in the C*03:51 and 03:96 and in the C*04:64 alleles. Specific PCR fragment of 285 bp in the C*03:39 and 03:67 and in the C*06:53, 07:56:01, 07:60, 07:79 and 07:109 and the B*08:39 alleles.

Primer mix 31: Specific PCR fragment of 100 bp in the C*03:59 allele. Specific PCR fragment of 210 bp in the C*03:44 allele.

Primer mix 32: Specific PCR fragment of 90 bp in the C*03:58 and in the C*01:03, 01:24 and 04:37 alleles. Specific PCR fragment of 180 bp in the C*03:48 and 03:84 alleles.

Primer mix 33: Specific PCR fragment of 110 bp in the C*03:62 allele. Specific PCR fragment of 365 bp in the C*03:43:01-03:43:02 and in the C*07:60, 07:79 and 14:10 and the B*35:101:02 alleles.

Primer mix 34: Specific PCR fragment of 130 bp in the C*03:54 and 03:98 alleles. Specific PCR fragment of 240 bp in the C*03:53 and the C*12:17 alleles.

Primer mix 35: Specific PCR fragment of 70 bp in the C*03:64, 02:08, 15:10:02 alleles. Specific PCR fragment of 120 bp in the C*03:56 allele. Specific PCR fragment of 210 bp in the C*03:79, 03:85 and 03:82 alleles.

Primer mix 38: Specific PCR fragment of 100 bp in the C*03:52 and 03:95 and in the C*04:43 alleles. Specific PCR fragment of 265 bp in the C*03:73 allele.

Primer mix 39: Specific PCR fragment of 110 bp in the C*03:36 and 03:77 and in the C*04:34 alleles. Specific PCR fragment of 170 bp in the C*03:63 allele.

Primer mix 40: Specific PCR fragment of 70 bp in the C*03:80 alleles. Specific PCR fragment of 260 bp in the C*03:66 allele.

Primer mix 41: Specific PCR fragment of 120 bp in the C*03:68 alleles. Specific PCR fragment of 195 bp in the C*03:100 allele.

Primer mix 42: Specific PCR fragment of 120 bp in the C*03:78 alleles. Specific PCR fragment of 205 bp in the C*03:70 and in the B*55:30 alleles.

Primer mix 43: Specific PCR fragment of 225 bp in the C*03:74 and 03:81 and in the B*15:96 alleles. Specific PCR fragment of 275 bp in the C*03:97 allele.

Primer mix 44: Specific PCR fragment of 70 bp in the C*03:91 allele. Specific PCR fragment of 160 bp in the C*03:75 allele.

Primer mix 45: Specific PCR fragment of 140 bp in the C*03:93 alleles. Specific PCR fragment of 295 bp in the C*03:76 allele.

‘w’, might be weakly amplified.

CELL LINE VALIDATION SHEET																			
HLA-C*03 SSP subtyping kit																			
				Well															
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
				Prod. No.:															
				200737001	200737002	200737003	200854204	200737005	200966206	200966207	200854208	200737009	200737010	201080711	200737012	200737013	200737014	201080715	200737016
	IHWC cell line		C*																
1	9001 SA		*07:02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	9280 LK707		*07:01	*15:05	+	-	-	-	-	-	+	-	+	+	+	-	-	-	-
3	9011 E4181324		*12:02		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	9275 GU373		*03:04	*04:01	+	-	-	+	-	-	-	-	-	-	-	-	-	+	-
5	9009 KAS011		*06:02		-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
6	9353 SM		*03:04	*07:02	+	-	-	+	-	-	-	-	-	-	-	-	-	+	-
7	9020 QBL		*05:01		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	9025 DEU		*04:01		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	9026 YAR		*12:03		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	9107 LKT3		*01:02		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	9051 PITOUT		*16:01		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	9052 DBB		*06:02		-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
13	9004 JESTHOM		*01:02		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	9071 OLGA		*01:02	*03:04	+	-	-	+	-	-	-	-	-	-	-	-	-	+	-
15	9075 DKB		*03:04		+	-	-	+	-	-	-	-	-	-	-	-	-	+	-
16	9037 SWEIG007		*02:02		+	-	-	-	-	-	-	+	+	-	-	-	-	-	-
17	9282 CTM3953540		*03:03	*07:01	-	-	+	+	-	-	+	-	-	-	-	-	-	+	-
18	9257 32367		*01:02	*07:05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19	9038 BM16		*07:01		-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
20	9059 SLE005		*03:04		+	-	-	+	-	-	-	-	-	-	-	-	-	+	-
21	9064 AMALA		*03:03		-	-	+	+	-	-	+	-	-	-	-	-	-	+	-
22	9056 KOSE		*12:03		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23	9124 IHL		*01:02	*15:02	+	-	-	-	-	-	-	+	+	-	-	-	-	-	-
24	9035 JBUSH		*12:03		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	9049 IBW9		*08:02		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26	9285 WT49		*07:01		-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
27	9191 CH1007		*07:04	*15:05	+	-	-	-	-	-	-	+	+	-	-	-	-	-	-
28	9320 BEL5GB		*05:01	*16:01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	9050 MOU		*16:01		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30	9021 RSH		*17:01		-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
31	9019 DUCAF		*05:01		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
32	9297 HAG		*17:01	*17:03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
33	9098 MT14B		*03:04		+	-	-	+	-	-	-	-	-	-	-	-	-	+	-
34	9104 DHIF		*12:03		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
35	9302 SSTO		*05:01		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	9024 KT17		*03:03	*04:01	-	-	+	+	-	-	+	-	-	-	-	-	-	+	-
37	9065 HHKB		*07:02		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
38	9099 LZL		*03:03		-	-	+	+	-	-	+	-	-	-	-	-	-	+	-
39	9315 CML		*02:02	*07:01	+	-	-	-	-	-	+	-	+	+	-	-	-	-	-
40	9134 WHONP199		*01:02	*06:02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
41	9055 H0301		*08:02		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42	9066 TAB089		*01:02		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43	9076 T7526		*01:02	*08:01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
44	9057 TEM		*12:03		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	9239 SHJO		*06:02	*17:01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
46	9013 SCHU		*07:02		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47	9045 TUBO		*07:04	*15:02	+	-	-	-	-	-	-	+	+	-	-	-	-	-	-
48	9303 TER-ND		*04:01	*16:01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

CELL LINE VALIDATION SHEET																					
HLA-C*03 SSP subtyping kit																					
				Prod. No.:	Well																
					17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	
	IHWC cell line		C*		201080717	201080718	201080719	201080720	201080721	200966222	201080723	201080724	200966225	200966226	200966227	200966228	201080729	201080730	200966231	201080732	
1	9001 SA		*07:02		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	9280 LK707		*07:01	*15:05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	9011 E4181324		*12:02		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	9275 GU373		*03:04	*04:01	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-
5	9009 KAS011		*06:02		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	9353 SM		*03:04	*07:02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	9020 QBL		*05:01		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	9025 DEU		*04:01		-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-
9	9026 YAR		*12:03		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	9107 LKT3		*01:02		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	9051 PITOUT		*16:01		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	9052 DBB		*06:02		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13	9004 JESTHOM		*01:02		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	9071 OLGA		*01:02	*03:04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	9075 DKB		*03:04		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	9037 SWEIG007		*02:02		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17	9282 CTM3953540		*03:03	*07:01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	9257 32367		*01:02	*07:05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19	9038 BM16		*07:01		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	9059 SLE005		*03:04		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21	9064 AMALA		*03:03		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22	9056 KOSE		*12:03		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23	9124 IHL		*01:02	*15:02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
24	9035 JBUSH		*12:03		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	9049 IBW9		*08:02		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26	9285 WT49		*07:01		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27	9191 CH1007		*07:04	*15:05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28	9320 BEL5GB		*05:01	*16:01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	9050 MOU		*16:01		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30	9021 RSH		*17:01		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31	9019 DUCAF		*05:01		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
32	9297 HAG		*17:01	*17:03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
33	9098 MT14B		*03:04		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
34	9104 DHIF		*12:03		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
35	9302 SSTO		*05:01		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	9024 KT17		*03:03	*04:01	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-
37	9065 HHKB		*07:02		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
38	9099 LZL		*03:03		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39	9315 CML		*02:02	*07:01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	9134 WHONP199		*01:02	*06:02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
41	9055 H0301		*08:02		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42	9066 TAB089		*01:02		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43	9076 T7526		*01:02	*08:01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
44	9057 TEM		*12:03		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	9239 SHJO		*06:02	*17:01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46	9013 SCHU		*07:02		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47	9045 TUBO		*07:04	*15:02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48	9303 TER-ND		*04:01	*16:01	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-

CELL LINE VALIDATION SHEET																					
HLA-C*03 SSP subtyping kit																					
				Prod. No.:	Well																
					33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	
	IHWC cell line		C*		200966233	201080734	201080735	200966236	200966237	201080738	201080739	201080740	201080741	201080742	201080743	201080744	201080745	201080746	201080747	201080748	
1	9001 SA		*07:02		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	9280 LK707		*07:01	*15:05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	9011 E4181324		*12:02		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	9275 GU373		*03:04	*04:01	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
5	9009 KAS011		*06:02		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	9353 SM		*03:04	*07:02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	9020 QBL		*05:01		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	9025 DEU		*04:01		-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
9	9026 YAR		*12:03		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	9107 LKT3		*01:02		-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-
11	9051 PITOUT		*16:01		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	9052 DBB		*06:02		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13	9004 JESTHOM		*01:02		-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-
14	9071 OLGA		*01:02	*03:04	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-
15	9075 DKB		*03:04		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	9037 SWEIG007		*02:02		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
17	9282 CTM3953540		*03:03	*07:01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
18	9257 32367		*01:02	*07:05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-
19	9038 BM16		*07:01		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	9059 SLE005		*03:04		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21	9064 AMALA		*03:03		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22	9056 KOSE		*12:03		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23	9124 IHL		*01:02	*15:02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-
24	9035 JBUSH		*12:03		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	9049 IBW9		*08:02		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26	9285 WT49		*07:01		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
27	9191 CH1007		*07:04	*15:05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28	9320 BEL5GB		*05:01	*16:01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	9050 MOU		*16:01		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30	9021 RSH		*17:01		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31	9019 DUCAF		*05:01		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
32	9297 HAG		*17:01	*17:03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
33	9098 MT14B		*03:04		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
34	9104 DHIF		*12:03		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
35	9302 SSTO		*05:01		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	9024 KT17		*03:03	*04:01	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
37	9065 HHKB		*07:02		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
38	9099 LZL		*03:03		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39	9315 CML		*02:02	*07:01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	9134 WHONP199		*01:02	*06:02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-
41	9055 H0301		*08:02		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
42	9066 TAB089		*01:02		-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-
43	9076 T7526		*01:02	*08:01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-
44	9057 TEM		*12:03		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	9239 SHJO		*06:02	*17:01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46	9013 SCHU		*07:02		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47	9045 TUBO		*07:04	*15:02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
48	9303 TER-ND		*04:01	*16:01	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-

CERTIFICATE OF ANALYSIS

Olerup SSP® HLA-C*03 SSP

Product number: 101.611-12 – including *Taq* polymerase
Lot number: 85K
Expiry date: 2013-July-01
Number of tests: 12
Number of wells per test: 48

Well specifications:

Well No.	Production No.	Well No.	Production No.	Well No.	Production No.
1	2007-370-01	17	2010-807-17	33	2009-662-33
2	2007-370-02	18	2010-807-18	34	2010-807-34
3	2007-370-03	19	2010-807-19	35	2010-807-35
4	2008-542-04	20	2010-807-20	36	2009-662-36
5	2007-370-05	21	2010-807-21	37	2009-662-37
6	2009-662-06	22	2009-662-22	38	2010-807-38
7	2009-662-07	23	2010-807-23	39	2010-807-39
8	2008-542-08	24	2010-807-24	40	2010-807-40
9	2007-370-09	25	2009-662-25	41	2010-807-41
10	2007-370-10	26	2009-662-26	42	2010-807-42
11	2010-807-11	27	2009-662-27	43	2010-807-43
12	2007-370-12	28	2009-662-28	44	2010-807-44
13	2007-370-13	29	2010-807-29	45	2010-807-45
14	2007-370-14	30	2010-807-30	46	2010-807-46
15	2010-807-15	31	2009-662-31	47	2010-807-47
16	2007-370-16	32	2010-807-32	48	2010-807-48

The specificity of each primer solution of the kit has been tested against 48 well characterized cell line DNAs.

No DNAs carrying the alleles to be amplified by primer solutions 8, 11, 12, 17 to 21, 23 to 26, 29, 31 to 36, 38 to 45, 47 and 48 were available. The specificities of the primers in primer solutions 8, 11, 12, 17, 18, 21, 23, 25, 26, 29, 32, 33, 35, 39, 41 to 43, 47 and 48 were tested by separately adding one additional 5'-primer, respectively one additional 3'-primer. In primer solutions 20, 31, 36 and 45 it was only possible to test the 3'-primers, the 5'-primers were not possible to test. In primer solutions 19, 24, 34, 38, 40 and 44 it was only possible to test the 5'-primer, the 3'-primer was not possible to test. In primer solutions 8, 17, 18, 21, 22, 41 and 43 it was not possible to test one or two of the 5'-primers and in primer solutions 17, 29, 30, 32, 33, 35, 39, 41 and 42 one, two or three 3'-primers were not possible to test. Finally, additional primers in primer solutions 6, 22 and 30 were tested by separately adding an additional 5'- or 3'-primer.

Results: No false positive or false negative amplifications were obtained.

Date of approval: 2011-January-31

Approved by:

Quality Control, Supervisor

Declaration of Conformity

Product name: *Olerup* SSP® HLA-C*03
Product number: 101.611-12
Lot number: 85K

Intended use: HLA-C*03 high resolution histocompatibility testing

Manufacturer: *Olerup* SSP AB
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SE-133 33 Saltsjöbaden, Sweden
Phone: +46-8-717 88 27
Fax: +46-8-717 88 18

We, *Olerup* SSP AB, hereby declare that this product, to which this Declaration of Conformity relates is in conformity with the following Standard(s) and other normative document(s) ISO 9001:2008 and ISO 13485:2003, following the provisions of the 98/79/EC Directive on *in vitro* diagnostic medical devices, Annex III, as transposed into the national laws of the Member States of the European Union.

The Technical Documentation File is maintained at *Olerup* SSP AB, Hasselstigen 1, SE-133 33 Saltsjöbaden, Sweden.

The Authorized Representative located within the Community is: *Olerup* SSP AB.

Saltsjöbaden, Sweden
2011- January-31

Olle Olerup
Managing Director

Lot No.: **85K**

Lot-specific Information

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