

Olerup SSP® HLA-C*04

Product number:	101.612-12u – without <i>Taq</i> polymerase
Lot number:	12M
Expiry date:	2013-November-01
Number of tests:	12
Number of wells per test:	47
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. 12M.

CHANGES COMPARED TO THE PREVIOUS *OLERUP SSP*® HLA-C*04 Lot

The HLA-C*04 specificity and interpretation tables have been updated for the HLA-C alleles described since the previous *Olerup SSP*® HLA-C*04 lot was made (Lot No. 06H).

Sixteen wells has been added to the HLA-C*04 kit,
wells **32** to **47**.

The amplification patterns for some rare HLA-C*04 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
14	Modified	Modified	Improved yield and specificity of HLA-specific primer pairs.
17	Modified	-	Improved yield of HLA-specific primer pairs.
18	Added	Added	Primer pair added for the C*04:70 allele.
28	Added	Added	Primer pair added for the C*04:75 allele.
32	New	New	New primer pairs for the C*04:59Q, C*04:77 and C*04:78 alleles.
33	New	New	New primer pairs for the C*04:58, C*04:65 and C*04:72 alleles.

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34	New	New	New primer pair for the C*04:61 allele.
35	New	New	New primer pairs for the C*04:62 and C*04:76 alleles.
36	New	New	New primer pairs for the C*04:57 and C*04:63 alleles.
37	New	New	New primer pairs for the C*04:63, C*04:73 and C*04:74 alleles.
38	New	New	New primer pairs for the C*04:74 and C*04:83 allele.
39	New	New	New primer pairs for the C*04:71 and C*04:79 alleles.
40	New	New	New primer pairs for the C*04:56 and C*04:64 alleles.
41	New	New	New primer pair for the C*04:54 allele.
42	New	New	New primer pairs for the C*04:69 and C*04:82 alleles.
43	New	New	New primer pair for the C*04:81 allele.
44	New	New	New primer pair for the C*04:60 allele.
45	New	New	New primer pair for the C*04:66 allele.
46	New	New	New primer pair for the C*04:67 allele.
47	New	New	New primer pair for the C*04:84 allele.

Change in revision R01 compared to R00:

1. Primer mix 26 may have tendencies of unspecific amplification.

Change in revision R02 compared to R01:

1. Primer mix 42 does not amplify the C*04:82 allele. This has been corrected in the specificity and amplification tables. Thus, this lot of the HLA-C*04 subtyping kit cannot distinguish the C*04:01:01:01-04:01:09, 04:01:11-04:01:22, 04:01:24-04:01:27 and 04:01:29-04:01:37 alleles and the C*04:82 allele.

PRODUCT DESCRIPTION

HLA-C*04 SSP subtyping

CONTENT

The primer set contains 5'- and 3'-primers for identifying the HLA-C*04:01 to HLA-C*04:84 alleles.

PLATE LAYOUT

Each test consists of 47 PCR reactions in a 48 well PCR plate. Well 48 is empty.

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	empty

The 48 well cut PCR plate is marked with ‘HLA-C*04’ in silver/gray ink. Well No. 1 is marked with the Lot No. ‘12M’.

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*04 SSP subtypings will be influenced by other HLA-C alleles, as primer mixes 1, 2, 4, 5, 7, 8, 10 to 12, 14, 16, 17, 20, 24, 30, 33, 34, 39, 41 and 42 amplify non-HLA-C*04 alleles. In addition, the A*24:96 and A*24:146 alleles will be amplified by primer mix 15, the B*58:02 allele will be amplified by primer mixes 5 and 8, the B*07:90 allele will be amplified by primer mix 30 and the B*40:100 allele will be amplified by primer mixes 32 and 33.

UNIQUELY IDENTIFIED ALLELES

All the HLA-C*04 alleles, i.e. **C*04:01 to C*04:84**, recognized by the HLA Nomenclature Committee in January 2011¹ will give rise to unique amplification patterns by the primers in the HLA-C*04 subtyping kit².

The HLA-C*04 subtyping kit cannot distinguish the C*04:01:01:01-04:01:09, 04:01:11-04:01:22 and 04:01:24-04:01:26 alleles, the C*04:01:10 and 04:01:23 alleles, the C*04:04:01-04:04:02 alleles or the C*04:15:01 and 04:15:03 alleles.

The C*04:15:02, C*04:44 and C*04:47 alleles can be distinguished by the different sizes of the specific PCR products generated by primer mix 20.

The C*04:23, C*04:38 and C*04:39 alleles can be distinguished by the different sizes of the specific PCR products generated by primer mix 21.

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The C*04:25, C*04:40 and C*04:41 alleles can be distinguished by the different sizes of the specific PCR products generated by primer mix 23.

The C*04:46 and C*04:50 alleles can be distinguished by the different sizes of the specific PCR products generated by primer mix 27.

The C*04:48 and C*04:75 alleles can be distinguished by the different sizes of the specific PCR products generated by primer mix 28.

The C*04:56 and C*04:64 alleles can be distinguished by the different sizes of the specific PCR products generated by primer mix 40.

The C*04:59Q and C*04:78 alleles can be distinguished by the different sizes of the specific PCR products generated by primer mix 32.

The C*04:62 and C*04:76 alleles can be distinguished by the different sizes of the specific PCR products generated by primer mix 35.

The C*04:65 and C*04:72 alleles can be distinguished by the different sizes of the specific PCR products generated by primer mix 33.

The C*04:69 and C*04:82 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 2011-January-14, release 3.3.0, www.ebi.ac.uk/imgt/hla.

²Primer mix 42 does not amplify the C*04:82 allele. Thus, this lot of the HLA-C*04 subtyping kit cannot distinguish the C*04:01:01:01-04:01:09, 04:01:11-04:01:22, 04:01:24-04:01:27 and 04:01:29-04:01:37 alleles and the C*04:82 allele.

RESOLUTION IN HOMO- AND HETEROZYGOTES

A total of 123 alleles generate 69 amplification patterns that can be combined in 2415 homozygous and heterozygous combinations. 1266 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.

+++++---	-----	-----	-----	-----	-----	*04:03, *04:34 = *04:06, *04:08
+++++---	-----	-----	-----	-----	-----	*04:06, *04:29 = *04:06, *04:33
+++++---	-----	-----	-----	-----	-----	*04:06, *04:12 = *04:06, *04:52
+++++---	-----	-----	-----	-----	-----	*04:01:01:01, *04:06 = *04:01:10, *04:06 = *04:03, *04:04:01
+++++---	-----	-----	-----	-----	-----	*04:29, *04:80 = *04:33, *04:80
+++++---	-----	-----	-----	-----	-----	*04:03, *04:29 = *04:03, *04:33
+++++---	-----	-----	-----	-----	-----	*04:12, *04:80 = *04:52, *04:80
+++++---	-----	-----	-----	-----	-----	*04:03, *04:12 = *04:03, *04:52
+++++---	-----	-----	-----	-----	-----	*04:14, *04:80 = *04:28, *04:80
+++++---	-----	-----	-----	-----	-----	*04:03, *04:14 = *04:03, *04:28
+++++---	-----	-----	-----	-----	-----	*04:03, *04:17 = *04:15:02, *04:80 = *04:17, *04:80
+++++---	-----	-----	-----	-----	-----	*04:01:01:01, *04:80 = *04:01:10, *04:80
+++++---	-----	-----	-----	-----	-----	*04:01:01:01, *04:03 = *04:01:10, *04:03
+++-+---	-----	-----	-----	-----	-----	*04:07, *04:34 = *04:27, *04:34 = *04:32, *04:34
+++-+---	-----	-----	-----	-----	-----	*04:07, *04:58 = *04:27, *04:58 = *04:32, *04:58
+++-+---	-----	-----	-----	-----	-----	*04:07, *04:13 = *04:13, *04:27 = *04:13, *04:32
+++-+---	-----	-----	-----	-----	-----	*04:04:01, *04:07 = *04:04:01, *04:27 = *04:04:01, *04:32
+++-+---	-----	-----	-----	-----	-----	*04:11, *04:34 = *04:34, *04:36
+++-+---	-----	-----	-----	-----	-----	*04:10, *04:34 = *04:31, *04:34
+++-+---	-----	-----	-----	-----	-----	*04:29, *04:34 = *04:33, *04:34
+++-+---	-----	-----	-----	-----	-----	*04:12, *04:34 = *04:34, *04:52
+++-+---	-----	-----	-----	-----	-----	*04:16, *04:34 = *04:18, *04:34
+++-+---	-----	-----	-----	-----	-----	*04:26, *04:34 = *04:34, *04:42
+++-+---	-----	-----	-----	-----	-----	*04:34, *04:71 = *04:34, *04:79
+++-+---	-----	-----	-----	-----	-----	*04:01:01:01, *04:34 = *04:01:10, *04:34 =

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*04:04:01, *04:08 = *04:08, *04:34
+++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:11, *04:58 = *04:36, *04:58
+++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:11, *04:13 = *04:13, *04:36
+++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:04:01, *04:11 = *04:04:01, *04:36
+++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:10, *04:58 = *04:31, *04:58
+++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:10, *04:13 = *04:13, *04:31
+++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:04:01, *04:10 = *04:04:01, *04:31
+++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:29, *04:58 = *04:33, *04:58
+++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:13, *04:29 = *04:13, *04:33
+++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:04:01, *04:29 = *04:04:01, *04:33
+++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:12, *04:58 = *04:52, *04:58
+++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:12, *04:13 = *04:13, *04:52
+++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:04:01, *04:12 = *04:04:01, *04:52
+++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:26, *04:58 = *04:42, *04:58
+++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:13, *04:26 = *04:13, *04:42
+++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:58, *04:71 = *04:58, *04:79
+++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:01:01:01, *04:58 = *04:01:10, *04:58 =
*04:13, *04:65 = *04:16, *04:58 = *04:18, *04:58 =
= *04:58, *04:61 = *04:58, *04:65
+++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:13, *04:71 = *04:13, *04:79
+++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:01:01:01, *04:13 = *04:01:10, *04:13 =
*04:13, *04:16 = *04:13, *04:18 = *04:13, *04:61
+++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:04:01, *04:16 = *04:04:01, *04:18
+++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:04:01, *04:26 = *04:04:01, *04:42
+++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:04:01, *04:71 = *04:04:01, *04:79
+++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:01:01:01, *04:04:01 = *04:01:10, *04:04:01
+++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:05, *04:07 = *04:05, *04:27 = *04:05, *04:32
+++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:05, *04:11 = *04:05, *04:36
+++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:05, *04:10 = *04:05, *04:31
+++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:05, *04:29 = *04:05, *04:33
+++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:05, *04:12 = *04:05, *04:52
+++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:05, *04:16 = *04:05, *04:18
+++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:05, *04:14 = *04:05, *04:28
+++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:05, *04:26 = *04:05, *04:42
+++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:05, *04:71 = *04:05, *04:79
+++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:01:01:01, *04:05 = *04:01:10, *04:05 =
*04:05, *04:05
++++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:07, *04:08 = *04:08, *04:27 = *04:08, *04:32
++++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:07, *04:35 = *04:27, *04:35 = *04:32, *04:35
++++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:07, *04:30 = *04:27, *04:30 = *04:30, *04:32
++++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:07, *04:09N = *04:09N, *04:27 = *04:09N,
*04:32
++++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:07, *04:55 = *04:32, *04:55
++++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:11, *04:77 = *04:36, *04:77
++++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:07, *04:11 = *04:07, *04:36 = *04:11, *04:32
= *04:27, *04:36 = *04:32, *04:36
++++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:10, *04:77 = *04:31, *04:77
++++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:07, *04:10 = *04:07, *04:31 = *04:10, *04:27
= *04:10, *04:32 = *04:27, *04:31 = *04:31,
*04:32
++++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:29, *04:77 = *04:33, *04:77
++++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:07, *04:29 = *04:07, *04:33 = *04:27, *04:29
= *04:29, *04:32 = *04:32, *04:33
++++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:12, *04:77 = *04:52, *04:77
++++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:07, *04:12 = *04:07, *04:52 = *04:12, *04:27
= *04:12, *04:32 = *04:32, *04:52
++++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:16, *04:77 = *04:18, *04:77
++++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:07, *04:18 = *04:16, *04:32 = *04:18, *04:27
= *04:18, *04:32
++++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:14, *04:77 = *04:28, *04:77
++++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:07, *04:68 = *04:27, *04:68 = *04:32, *04:68
++++----- -+++++--- ----- -+++++--- ----- -+++++--- ----- *04:07, *04:14 = *04:07, *04:28 = *04:14, *04:27
= *04:14, *04:32 = *04:27, *04:28 = *04:28,
*04:32



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+++++--	-----+	--+-----	-----	-----	-----	*04:07, *04:37 = *04:27, *04:37 = *04:32, *04:37
+++++--	-----+	-----	-----	-----	-----	*04:07, *04:15:01 = *04:15:01, *04:27 = *04:15:01, *04:32
+++---+	-----+	+---+---	-----	-----	-----	*04:07, *04:17 = *04:17, *04:27 = *04:17, *04:32
+++++--	-----+	--+-----	-----	-----	-----	*04:07, *04:19, 04:70 = *04:19, 04:70, *04:27 = *04:19, 04:70, *04:32
+++++--	-----+	--+-----	-----	-----	-----	*04:07, *04:20 = *04:20, *04:27 = *04:20, *04:32
+++++--	-----+	--+-----	-----	-----	-----	*04:07, *04:15:02 = *04:15:02, *04:27 = *04:15:02, *04:32
+++++--	-----+	-----	-----	-----	-----	*04:07, *04:23 = *04:23, *04:27 = *04:23, *04:32
+++++--	-----+	-----	-----	-----	-----	*04:07, *04:24 = *04:24, *04:27 = *04:24, *04:32
+++++--	-----+	-----	-----	-----	-----	*04:07, *04:25 = *04:25, *04:27 = *04:25, *04:32
+++++--	-----+	-----	-----	-----	-----	*04:26, *04:77 = *04:42, *04:77
+++++--	-----+	-----	-----	-----	-----	*04:07, *04:26 = *04:26, *04:27 = *04:26, *04:32 = *04:32, *04:42
+++++--	-----+	-----	-----	-----	-----	*04:07, *04:43 = *04:27, *04:43 = *04:32, *04:43
+++++--	-----+	-----	-----	-----	-----	*04:07, *04:45 = *04:27, *04:45 = *04:32, *04:45
+++++--	-----+	-----	-----	-----	-----	*04:07, *04:46 = *04:27, *04:46 = *04:32, *04:46
+++++--	-----+	-----	-----	-----	-----	*04:07, *04:48 = *04:27, *04:48 = *04:32, *04:48
+++++--	-----+	-----	-----	-----	-----	*04:07, *04:49 = *04:27, *04:49 = *04:32, *04:49
+++++--	-----+	-----	-----	-----	-----	*04:07, *04:53 = *04:27, *04:53 = *04:32, *04:53
+++++--	-----+	-----	-----	-----	-----	*04:07, *04:51 = *04:27, *04:51 = *04:32, *04:51
+++++--	-----+	-----	-----	-----	-----	*04:71, *04:77 = *04:77, *04:79
+++++--	-----+	-----	-----	-----	-----	*04:01:01:01, *04:77 = *04:01:10, *04:77 = *04:07, *04:59Q = *04:27, *04:77 = *04:32, *04:59Q = *04:32, *04:77 = *04:59Q, *04:77 = *04:77, *04:77
+++++--	-----+	-----	-----	-----	-----	*04:07, *04:65 = *04:27, *04:65 = *04:32, *04:65
+++++--	-----+	-----	-----	-----	-----	*04:07, *04:61 = *04:27, *04:61 = *04:32, *04:61
+++++--	-----+	-----	-----	-----	-----	*04:07, *04:62 = *04:27, *04:62 = *04:32, *04:62
+++++--	-----+	-----	-----	-----	-----	*04:07, *04:63 = *04:27, *04:63 = *04:32, *04:63
+++++--	-----+	-----	-----	-----	-----	*04:07, *04:57 = *04:27, *04:57 = *04:32, *04:57
+++++--	-----+	-----	-----	-----	-----	*04:07, *04:74 = *04:27, *04:74 = *04:32, *04:74
+++++--	-----+	-----	-----	-----	-----	*04:07, *04:73 = *04:27, *04:73 = *04:32, *04:73
+++++--	-----+	-----	-----	-----	-----	*04:07, *04:83 = *04:27, *04:83 = *04:32, *04:83
+++++--	-----+	-----	-----	-----	-----	*04:07, *04:71 = *04:07, *04:79 = *04:27, *04:71 = *04:27, *04:79 = *04:32, *04:71 = *04:32, *04:79
+++++--	-----+	-----	-----	-----	-----	*04:07, *04:56 = *04:27, *04:56 = *04:32, *04:56
+++++--	-----+	-----	-----	-----	-----	*04:07, *04:54 = *04:27, *04:54 = *04:32, *04:54
+++++--	-----+	-----	-----	-----	-----	*04:07, *04:69 = *04:27, *04:69 = *04:32, *04:69
+++++--	-----+	-----	-----	-----	-----	*04:07, *04:81 = *04:27, *04:81 = *04:32, *04:81
+++++--	-----+	-----	-----	-----	-----	*04:07, *04:60 = *04:27, *04:60 = *04:32, *04:60
+++++--	-----+	-----	-----	-----	-----	*04:07, *04:66 = *04:27, *04:66 = *04:32, *04:66
+++++--	-----+	-----	-----	-----	-----	*04:07, *04:67 = *04:27, *04:67 = *04:32, *04:67
+++++--	-----+	-----	-----	-----	-----	*04:07, *04:84 = *04:27, *04:84 = *04:32, *04:84
+++++--	-----+	-----	-----	-----	-----	*04:01:01:01, *04:07 = *04:01:01:01, *04:27 = *04:01:01:01, *04:32 = *04:01:10, *04:07 = *04:01:10, *04:32 = *04:07, *04:32 = *04:27, *04:32 = *04:32, *04:32
+++++--	-----+	-----	-----	-----	-----	*04:08, *04:11 = *04:08, *04:36
+++++--	-----+	-----	-----	-----	-----	*04:08, *04:10 = *04:08, *04:31
+++++--	-----+	-----	-----	-----	-----	*04:08, *04:29 = *04:08, *04:33
+++++--	-----+	-----	-----	-----	-----	*04:08, *04:12 = *04:08, *04:52
+++++--	-----+	-----	-----	-----	-----	*04:08, *04:16 = *04:08, *04:18
+++++--	-----+	-----	-----	-----	-----	*04:08, *04:14 = *04:08, *04:28
+++++--	-----+	-----	-----	-----	-----	*04:08, *04:26 = *04:08, *04:42
+++++--	-----+	-----	-----	-----	-----	*04:08, *04:71 = *04:08, *04:79
+++++--	-----+	-----	-----	-----	-----	*04:01:01:01, *04:08 = *04:01:10, *04:08 = *04:08, *04:08
+++++--	-----+	-----	-----	-----	-----	*04:11, *04:35 = *04:35, *04:36
+++++--	-----+	-----	-----	-----	-----	*04:11, *04:30 = *04:30, *04:36
+++++--	-----+	-----	-----	-----	-----	*04:09N, *04:11 = *04:09N, *04:36



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+++-----	+++-----	--+-----	-----	-----	-----	*04:10, *04:35 = *04:31, *04:35
+++-----	+++-----	-----+	-----	-----	-----	*04:10, *04:30 = *04:30, *04:31
+++-----	+++-----	-----	-----	-----	-----	*04:09N, *04:10 = *04:09N, *04:31
+++-----	+-----	--+-----	-----	-----	-----	*04:29, *04:35 = *04:33, *04:35
+++-----	+-----	-----+	-----	-----	-----	*04:29, *04:30 = *04:30, *04:33
+++-----	+-----	-----	-----	-----	-----	*04:09N, *04:29 = *04:09N, *04:33
+++-----	+-----	--+-----	-----	-----	-----	*04:12, *04:35 = *04:35, *04:52
+++-----	+-----	-----+	-----	-----	-----	*04:12, *04:30 = *04:30, *04:52
+++-----	+-----	-----	-----	-----	-----	*04:09N, *04:12 = *04:09N, *04:52
+++-----	+-----	--+-----	-----	-----	-----	*04:16, *04:35 = *04:18, *04:35
+++-----	+-----	-----+	-----	-----	-----	*04:16, *04:30 = *04:18, *04:30
+++-----	+-----	-----	-----	-----	-----	*04:09N, *04:16 = *04:09N, *04:18
+++-----	+-----	--+-----	-----	-----	-----	*04:14, *04:35 = *04:28, *04:35
+++-----	+-----	-----+	-----	-----	-----	*04:14, *04:30 = *04:28, *04:30
+++-----	+-----	-----	-----	-----	-----	*04:09N, *04:14 = *04:09N, *04:28
+++-----	+-----	--+-----	-----	-----	-----	*04:09N, *04:37 = *04:15:01, *04:35 = *04:35, *04:37
+++-----	+-----	-----+	-----	-----	-----	*04:20, *04:30 = *04:26, *04:35 = *04:30, *04:35 = *04:35, *04:42
+++-----	+-----	--+-----	-----	-----+	-----	*04:35, *04:71 = *04:35, *04:79
+++-----	+-----	-----	-----	-----	-----	*04:01:01:01, *04:35 = *04:01:10, *04:35 = *04:09N, *04:20 = *04:09N, *04:35 = *04:20, *04:35 = *04:35, *04:35
+++-----	+-----	-----+	-----	-----+	-----	*04:30, *04:71 = *04:30, *04:79
+++-----	+-----	-----+	-----	-----	-----	*04:01:01:01, *04:30 = *04:01:10, *04:30 = *04:09N, *04:26 = *04:09N, *04:30 = *04:09N, *04:42 = *04:26, *04:30 = *04:30, *04:30 = *04:30, *04:42
+++-----	+-----	-----	-----	-----+	-----	*04:09N, *04:71 = *04:09N, *04:79
+++-----	+-----	-----	-----	-----	-----	*04:01:01:01, *04:09N = *04:01:10, *04:09N = *04:09N, *04:09N
+++-----	-++++-+	-----	-----	-----	-----	*04:14, *04:55 = *04:28, *04:55
+++-----	-++++-+	-----	-----	-----	-----	*04:01:01:01, *04:55 = *04:11, *04:12 = *04:12, *04:36 = *04:12, *04:55 = *04:29, *04:55 = *04:31, *04:55 = *04:36, *04:52
+++-----	-++++-+	-----	-----	-----	-----	*04:11, *04:18 = *04:18, *04:36
+++-----	-++++-+	-----	-----	-----	-----	*04:11, *04:68 = *04:36, *04:68
+++-----	-++++-+	-----	-----	-----	-----	*04:11, *04:14 = *04:11, *04:28 = *04:14, *04:36 = *04:28, *04:36
+++-----	-++++-+	--+-----	-----	-----	-----	*04:11, *04:37 = *04:36, *04:37
+++-----	-++++-+	-----	-----	-----	-----	*04:11, *04:15:01 = *04:15:01, *04:36
+++-----	-++++-+	+-----	-----	-----	-----	*04:11, *04:17 = *04:17, *04:36
+++-----	-++++-+	--+-----	-----	-----	-----	*04:11, *04:19, 04:70 = *04:19, 04:70, *04:36
+++-----	-++++-+	-----	-----	-----	-----	*04:11, *04:20 = *04:20, *04:36
+++-----	-++++-+	-----	-----	-----	-----	*04:11, *04:15:02 = *04:15:02, *04:36
+++-----	-++++-+	-----+	-----	-----	-----	*04:11, *04:23 = *04:23, *04:36
+++-----	-++++-+	-----	-----	-----	-----	*04:11, *04:24 = *04:24, *04:36
+++-----	-++++-+	-----+	-----	-----	-----	*04:11, *04:25 = *04:25, *04:36
+++-----	-++++-+	-----+	-----	-----	-----	*04:11, *04:26 = *04:26, *04:36
+++-----	-++++-+	-----	+-----	-----	-----	*04:11, *04:43 = *04:36, *04:43
+++-----	-++++-+	-----	--+-----	-----	-----	*04:11, *04:45 = *04:36, *04:45
+++-----	-++++-+	-----	-----+	-----	-----	*04:11, *04:46 = *04:36, *04:46
+++-----	-++++-+	-----	-----	-----	-----	*04:11, *04:48 = *04:36, *04:48
+++-----	-++++-+	-----	-----+	-----	-----	*04:11, *04:49 = *04:36, *04:49
+++-----	-++++-+	-----	-----+	-----	-----	*04:11, *04:53 = *04:36, *04:53
+++-----	-++++-+	-----	-----+	-----	-----	*04:11, *04:51 = *04:36, *04:51
+++-----	-++++-+	-----	-----+	-----	-----	*04:11, *04:59Q = *04:36, *04:59Q
+++-----	-++++-+	-----	-----	-----	-----	*04:11, *04:65 = *04:36, *04:65
+++-----	-++++-+	-----	-----	-----	-----	*04:11, *04:61 = *04:36, *04:61
+++-----	-++++-+	-----	-----	-----	-----	*04:11, *04:62 = *04:36, *04:62
+++-----	-++++-+	-----	-----	-----	-----	*04:11, *04:63 = *04:36, *04:63
+++-----	-++++-+	-----	-----	-----	-----	*04:11, *04:57 = *04:36, *04:57
+++-----	-++++-+	-----	-----	-----	-----	*04:11, *04:74 = *04:36, *04:74
+++-----	-++++-+	-----	-----	-----	-----	*04:11, *04:73 = *04:36, *04:73



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+++-----	-++++-----	-----	-----	-----+--	-----	*04:11, *04:83 = *04:36, *04:83
+++-----	-++++-----	-----	-----	-----+--	-----	*04:11, *04:79 = *04:36, *04:79
+++-----	-++++-----	-----	-----	-----+--	-----	*04:11, *04:56 = *04:36, *04:56
+++-----	-++++-----	-----	-----	-----+--	-----	*04:11, *04:54 = *04:36, *04:54
+++-----	-++++-----	-----	-----	-----+--	-----	*04:11, *04:69 = *04:36, *04:69
+++-----	-++++-----	-----	-----	-----+--	-----	*04:11, *04:81 = *04:36, *04:81
+++-----	-++++-----	-----	-----	-----+--	-----	*04:11, *04:60 = *04:36, *04:60
+++-----	-++++-----	-----	-----	-----+--	-----	*04:11, *04:66 = *04:36, *04:66
+++-----	-++++-----	-----	-----	-----+--	-----	*04:11, *04:67 = *04:36, *04:67
+++-----	-++++-----	-----	-----	-----+--	-----	*04:11, *04:84 = *04:36, *04:84
+++-----	-++++-----	-----	-----	-----+--	-----	*04:01:01:01, *04:11 = *04:01:01:01, *04:36 =
						*04:01:10, *04:36 = *04:10, *04:29 = *04:10,
						*04:33 = *04:11, *04:29 = *04:11, *04:31 =
						*04:29, *04:31 = *04:29, *04:36 = *04:31, *04:33
						= *04:31, *04:36 = *04:33, *04:36
+++-----	-++++-----	-----	-----	-----+--	-----	*04:10, *04:12 = *04:10, *04:52 = *04:12, *04:31
						= *04:31, *04:52
+++-----	-++++-----	-----	-----	-----+--	-----	*04:10, *04:18 = *04:16, *04:31 = *04:18, *04:31
+++-----	-++++-----	-----	-----	-----+--	-----	*04:10, *04:68 = *04:31, *04:68
+++-----	-++++-----	-----	-----	-----+--	-----	*04:10, *04:14 = *04:10, *04:28 = *04:14, *04:31
						= *04:28, *04:31
+++-----	-++++-----	-----	-----	-----+--	-----	*04:10, *04:37 = *04:31, *04:37
+++-----	-++++-----	-----	-----	-----+--	-----	*04:10, *04:15:01 = *04:15:01, *04:31
+++-----	-++++-----	-----	-----	-----+--	-----	*04:10, *04:17 = *04:17, *04:31
+++-----	-++++-----	-----	-----	-----+--	-----	*04:10, *04:19, *04:70 = *04:19, *04:70, *04:31
+++-----	-++++-----	-----	-----	-----+--	-----	*04:10, *04:20 = *04:20, *04:31
+++-----	-++++-----	-----	-----	-----+--	-----	*04:10, *04:15:02 = *04:15:02, *04:31
+++-----	-++++-----	-----	-----	-----+--	-----	*04:10, *04:23 = *04:23, *04:31
+++-----	-++++-----	-----	-----	-----+--	-----	*04:10, *04:24 = *04:24, *04:31
+++-----	-++++-----	-----	-----	-----+--	-----	*04:10, *04:25 = *04:25, *04:31
+++-----	-++++-----	-----	-----	-----+--	-----	*04:10, *04:26 = *04:26, *04:31 = *04:31, *04:42
+++-----	-++++-----	-----	-----	-----+--	-----	*04:10, *04:43 = *04:31, *04:43
+++-----	-++++-----	-----	-----	-----+--	-----	*04:10, *04:45 = *04:31, *04:45
+++-----	-++++-----	-----	-----	-----+--	-----	*04:10, *04:46 = *04:31, *04:46
+++-----	-++++-----	-----	-----	-----+--	-----	*04:10, *04:48 = *04:31, *04:48
+++-----	-++++-----	-----	-----	-----+--	-----	*04:10, *04:49 = *04:31, *04:49
+++-----	-++++-----	-----	-----	-----+--	-----	*04:10, *04:53 = *04:31, *04:53
+++-----	-++++-----	-----	-----	-----+--	-----	*04:10, *04:51 = *04:31, *04:51
+++-----	-++++-----	-----	-----	-----+--	-----	*04:10, *04:59Q = *04:31, *04:59Q
+++-----	-++++-----	-----	-----	-----+--	-----	*04:10, *04:65 = *04:31, *04:65
+++-----	-++++-----	-----	-----	-----+--	-----	*04:10, *04:61 = *04:31, *04:61
+++-----	-++++-----	-----	-----	-----+--	-----	*04:10, *04:62 = *04:31, *04:62
+++-----	-++++-----	-----	-----	-----+--	-----	*04:10, *04:63 = *04:31, *04:63
+++-----	-++++-----	-----	-----	-----+--	-----	*04:10, *04:57 = *04:31, *04:57
+++-----	-++++-----	-----	-----	-----+--	-----	*04:10, *04:74 = *04:31, *04:74
+++-----	-++++-----	-----	-----	-----+--	-----	*04:10, *04:73 = *04:31, *04:73
+++-----	-++++-----	-----	-----	-----+--	-----	*04:10, *04:83 = *04:31, *04:83
+++-----	-++++-----	-----	-----	-----+--	-----	*04:10, *04:79 = *04:31, *04:71 = *04:31, *04:79
+++-----	-++++-----	-----	-----	-----+--	-----	*04:10, *04:56 = *04:31, *04:56
+++-----	-++++-----	-----	-----	-----+--	-----	*04:10, *04:54 = *04:31, *04:54
+++-----	-++++-----	-----	-----	-----+--	-----	*04:10, *04:69 = *04:31, *04:69
+++-----	-++++-----	-----	-----	-----+--	-----	*04:10, *04:81 = *04:31, *04:81
+++-----	-++++-----	-----	-----	-----+--	-----	*04:10, *04:60 = *04:31, *04:60
+++-----	-++++-----	-----	-----	-----+--	-----	*04:10, *04:66 = *04:31, *04:66
+++-----	-++++-----	-----	-----	-----+--	-----	*04:10, *04:67 = *04:31, *04:67
+++-----	-++++-----	-----	-----	-----+--	-----	*04:10, *04:84 = *04:31, *04:84
+++-----	-++++-----	-----	-----	-----+--	-----	*04:01:01:01, *04:10 = *04:01:01:01, *04:31 =
						*04:01:10, *04:10 = *04:01:10, *04:31 = *04:10,
						*04:31 = *04:31, *04:31
+++-----	-++++-----	-----	-----	-----+--	-----	*04:01:10, *04:55 = *04:11, *04:52 = *04:33,
						*04:55 = *04:52, *04:55
+++-----	-++++-----	-----	-----	-----+--	-----	*04:01:10, *04:11 = *04:11, *04:33
+++-----	-++++-----	-----	-----	-----+--	-----	*04:12, *04:29 = *04:12, *04:33 = *04:29, *04:52
+++-----	-++++-----	-----	-----	-----+--	-----	*04:16, *04:29 = *04:16, *04:33 = *04:18, *04:29



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+++-----	---+---+	-----	-----	+-----	-----	= *04:18, *04:33
+++-----	---+---+	-----	-----	-----	-----	*04:29, *04:68 = *04:33, *04:68
+++-----	---+---+	-----	-----	-----	-----	*04:14, *04:29 = *04:14, *04:33 = *04:28, *04:29
+++-----	---+---+	---+-----	-----	-----	-----	= *04:28, *04:33
+++-----	---+---+	-----	-----	-----	-----	*04:29, *04:37 = *04:33, *04:37
+++-----	---+---+	-----	-----	-----	-----	*04:15:01, *04:29 = *04:15:01, *04:33
+++-----	---+---+	+-----	-----	-----	-----	*04:17, *04:29 = *04:17, *04:33
+++-----	---+---+	---+-----	-----	-----	-----	*04:19, 04:70, *04:29 = *04:19, 04:70, *04:33
+++-----	---+---+	---+-----	-----	-----	-----	*04:20, *04:29 = *04:20, *04:33
+++-----	---+---+	---+-----	-----	-----	-----	*04:15:02, *04:29 = *04:15:02, *04:33
+++-----	---+---+	---+-----	-----	-----	-----	*04:23, *04:29 = *04:23, *04:33
+++-----	---+---+	---+-----	-----	-----	-----	*04:24, *04:29 = *04:24, *04:33
+++-----	---+---+	-----	-----	-----	-----	*04:25, *04:29 = *04:25, *04:33
+++-----	---+---+	-----	-----	-----	-----	*04:26, *04:29 = *04:26, *04:33 = *04:29, *04:42
+++-----	---+---+	-----	-----	-----	-----	= *04:33, *04:42
+++-----	---+---+	-----	+-----	-----	-----	*04:29, *04:43 = *04:33, *04:43
+++-----	---+---+	-----	---+-----	-----	-----	*04:29, *04:45 = *04:33, *04:45
+++-----	---+---+	-----	---+-----	-----	-----	*04:29, *04:46 = *04:33, *04:46
+++-----	---+---+	-----	---+-----	-----	-----	*04:29, *04:48 = *04:33, *04:48
+++-----	---+---+	-----	-----	-----	-----	*04:29, *04:49 = *04:33, *04:49
+++-----	---+---+	-----	-----	-----	-----	*04:29, *04:53 = *04:33, *04:53
+++-----	---+---+	-----	-----	-----	-----	*04:29, *04:51 = *04:33, *04:51
+++-----	---+---+	-----	-----	-----	-----	*04:29, *04:59Q = *04:33, *04:59Q
+++-----	---+---+	-----	-----	-----	-----	*04:29, *04:65 = *04:33, *04:65
+++-----	---+---+	-----	-----	-----	-----	*04:29, *04:61 = *04:33, *04:61
+++-----	---+---+	-----	-----	-----	-----	*04:29, *04:62 = *04:33, *04:62
+++-----	---+---+	-----	-----	-----	-----	*04:29, *04:63 = *04:33, *04:63
+++-----	---+---+	-----	-----	-----	-----	*04:29, *04:57 = *04:33, *04:57
+++-----	---+---+	-----	-----	-----	-----	*04:29, *04:74 = *04:33, *04:74
+++-----	---+---+	-----	-----	-----	-----	*04:29, *04:73 = *04:33, *04:73
+++-----	---+---+	-----	-----	-----	-----	*04:29, *04:83 = *04:33, *04:83
+++-----	---+---+	-----	-----	-----	-----	*04:29, *04:71 = *04:29, *04:79 = *04:33, *04:71
+++-----	---+---+	-----	-----	-----	-----	= *04:33, *04:79
+++-----	---+---+	-----	-----	-----	-----	*04:29, *04:56 = *04:33, *04:56
+++-----	---+---+	-----	-----	-----	-----	*04:29, *04:54 = *04:33, *04:54
+++-----	---+---+	-----	-----	-----	-----	*04:29, *04:69 = *04:33, *04:69
+++-----	---+---+	-----	-----	-----	-----	*04:29, *04:81 = *04:33, *04:81
+++-----	---+---+	-----	-----	-----	-----	*04:29, *04:60 = *04:33, *04:60
+++-----	---+---+	-----	-----	-----	-----	*04:29, *04:66 = *04:33, *04:66
+++-----	---+---+	-----	-----	-----	-----	*04:29, *04:67 = *04:33, *04:67
+++-----	---+---+	-----	-----	-----	-----	*04:29, *04:84 = *04:33, *04:84
+++-----	---+---+	-----	-----	-----	-----	*04:01:01:01, *04:29 = *04:01:01:01, *04:33 =
+++-----	---+---+	-----	-----	-----	-----	*04:01:10, *04:29 = *04:29, *04:29 = *04:29,
+++-----	---+---+	-----	-----	-----	-----	*04:33
+++-----	---+---+	-----	-----	-----	-----	*04:12, *04:16 = *04:12, *04:18 = *04:16, *04:52
+++-----	---+---+	-----	-----	-----	-----	= *04:18, *04:52
+++-----	---+---+	-----	-----	-----	-----	*04:12, *04:68 = *04:52, *04:68
+++-----	---+---+	-----	-----	-----	-----	*04:12, *04:14 = *04:12, *04:28 = *04:14, *04:52
+++-----	---+---+	-----	-----	-----	-----	= *04:28, *04:52
+++-----	---+---+	---+-----	-----	-----	-----	*04:12, *04:37 = *04:37, *04:52
+++-----	---+---+	-----	-----	-----	-----	*04:12, *04:15:01 = *04:15:01, *04:52
+++-----	---+---+	+-----	-----	-----	-----	*04:12, *04:17 = *04:17, *04:52
+++-----	---+---+	---+-----	-----	-----	-----	*04:12, *04:19, 04:70 = *04:19, 04:70, *04:52
+++-----	---+---+	---+-----	-----	-----	-----	*04:12, *04:20 = *04:20, *04:52
+++-----	---+---+	---+-----	-----	-----	-----	*04:12, *04:15:02 = *04:15:02, *04:52
+++-----	---+---+	---+-----	-----	-----	-----	*04:12, *04:23 = *04:23, *04:52
+++-----	---+---+	---+-----	-----	-----	-----	*04:12, *04:24 = *04:24, *04:52
+++-----	---+---+	---+-----	-----	-----	-----	*04:12, *04:25 = *04:25, *04:52
+++-----	---+---+	-----	-----	-----	-----	*04:12, *04:26 = *04:12, *04:42 = *04:26, *04:52
+++-----	---+---+	-----	-----	-----	-----	= *04:42, *04:52
+++-----	---+---+	-----	+-----	-----	-----	*04:12, *04:43 = *04:43, *04:52
+++-----	---+---+	-----	---+-----	-----	-----	*04:12, *04:45 = *04:45, *04:52
+++-----	---+---+	-----	---+-----	-----	-----	*04:12, *04:46 = *04:46, *04:52
+++-----	---+---+	-----	---+-----	-----	-----	*04:12, *04:48 = *04:48, *04:52

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+++-----	---+-----	-----	-----+---	-----	-----	*04:12, *04:49 = *04:49, *04:52
+++-----	---+-----	-----	-----+---	-----	-----	*04:12, *04:53 = *04:52, *04:53
+++-----	---+-----	-----	-----+---	-----	-----	*04:12, *04:51 = *04:51, *04:52
+++-----	---+-----	-----	-----+---	-----	-----	*04:12, *04:59Q = *04:52, *04:59Q
+++-----	---+-----	-----	-----+---	-----	-----	*04:12, *04:65 = *04:52, *04:65
+++-----	---+-----	-----	-----+---	-----	-----	*04:12, *04:61 = *04:52, *04:61
+++-----	---+-----	-----	-----+---	-----	-----	*04:12, *04:62 = *04:52, *04:62
+++-----	---+-----	-----	-----+---	-----	-----	*04:12, *04:63 = *04:52, *04:63
+++-----	---+-----	-----	-----+---	-----	-----	*04:12, *04:57 = *04:52, *04:57
+++-----	---+-----	-----	-----+---	-----	-----	*04:12, *04:74 = *04:52, *04:74
+++-----	---+-----	-----	-----+---	-----	-----	*04:12, *04:73 = *04:52, *04:73
+++-----	---+-----	-----	-----+---	-----	-----	*04:12, *04:83 = *04:52, *04:83
+++-----	---+-----	-----	-----+---	-----	-----	*04:12, *04:71 = *04:12, *04:79 = *04:52, *04:71 = *04:52, *04:79
+++-----	---+-----	-----	-----+---	-----	-----	*04:12, *04:56 = *04:52, *04:56
+++-----	---+-----	-----	-----+---	-----	-----	*04:12, *04:54 = *04:52, *04:54
+++-----	---+-----	-----	-----+---	-----	-----	*04:12, *04:69 = *04:52, *04:69
+++-----	---+-----	-----	-----+---	-----	-----	*04:12, *04:81 = *04:52, *04:81
+++-----	---+-----	-----	-----+---	-----	-----	*04:12, *04:60 = *04:52, *04:60
+++-----	---+-----	-----	-----+---	-----	-----	*04:12, *04:66 = *04:52, *04:66
+++-----	---+-----	-----	-----+---	-----	-----	*04:12, *04:67 = *04:52, *04:67
+++-----	---+-----	-----	-----+---	-----	-----	*04:12, *04:84 = *04:52, *04:84
+++-----	---+-----	-----	-----+---	-----	-----	*04:01:01:01, *04:12 = *04:01:01:01, *04:52 = *04:01:10, *04:12 = *04:12, *04:12 = *04:12, *04:52
+++-----	---+-----	-----	-----+---	-----	-----	*04:16, *04:68 = *04:18, *04:68
+++-----	---+-----	-----	-----+---	-----	-----	*04:14, *04:16 = *04:14, *04:18 = *04:16, *04:28 = *04:18, *04:28
+++-----	---+-----	-----	-----+---	-----	-----	*04:16, *04:37 = *04:18, *04:37
+++-----	---+-----	-----	-----+---	-----	-----	*04:15:01, *04:16 = *04:15:01, *04:18
+++-----	---+-----	-----	-----+---	-----	-----	*04:16, *04:17 = *04:17, *04:18
+++-----	---+-----	-----	-----+---	-----	-----	*04:16, *04:19, 04:70 = *04:18, *04:19, 04:70
+++-----	---+-----	-----	-----+---	-----	-----	*04:16, *04:20 = *04:18, *04:20
+++-----	---+-----	-----	-----+---	-----	-----	*04:15:02, *04:16 = *04:15:02, *04:18
+++-----	---+-----	-----	-----+---	-----	-----	*04:16, *04:23 = *04:18, *04:23
+++-----	---+-----	-----	-----+---	-----	-----	*04:16, *04:24 = *04:18, *04:24
+++-----	---+-----	-----	-----+---	-----	-----	*04:16, *04:25 = *04:18, *04:25
+++-----	---+-----	-----	-----+---	-----	-----	*04:16, *04:26 = *04:18, *04:26 = *04:18, *04:42
+++-----	---+-----	-----	-----+---	-----	-----	*04:16, *04:43 = *04:18, *04:43
+++-----	---+-----	-----	-----+---	-----	-----	*04:16, *04:45 = *04:18, *04:45
+++-----	---+-----	-----	-----+---	-----	-----	*04:16, *04:46 = *04:18, *04:46
+++-----	---+-----	-----	-----+---	-----	-----	*04:16, *04:48 = *04:18, *04:48
+++-----	---+-----	-----	-----+---	-----	-----	*04:16, *04:49 = *04:18, *04:49
+++-----	---+-----	-----	-----+---	-----	-----	*04:16, *04:53 = *04:18, *04:53
+++-----	---+-----	-----	-----+---	-----	-----	*04:16, *04:51 = *04:18, *04:51
+++-----	---+-----	-----	-----+---	-----	-----	*04:16, *04:59Q = *04:18, *04:59Q
+++-----	---+-----	-----	-----+---	-----	-----	*04:16, *04:65 = *04:18, *04:65
+++-----	---+-----	-----	-----+---	-----	-----	*04:16, *04:61 = *04:18, *04:61
+++-----	---+-----	-----	-----+---	-----	-----	*04:16, *04:62 = *04:18, *04:62
+++-----	---+-----	-----	-----+---	-----	-----	*04:16, *04:63 = *04:18, *04:63
+++-----	---+-----	-----	-----+---	-----	-----	*04:16, *04:57 = *04:18, *04:57
+++-----	---+-----	-----	-----+---	-----	-----	*04:16, *04:74 = *04:18, *04:74
+++-----	---+-----	-----	-----+---	-----	-----	*04:16, *04:73 = *04:18, *04:73
+++-----	---+-----	-----	-----+---	-----	-----	*04:16, *04:83 = *04:18, *04:83
+++-----	---+-----	-----	-----+---	-----	-----	*04:16, *04:79 = *04:18, *04:71 = *04:18, *04:79
+++-----	---+-----	-----	-----+---	-----	-----	*04:16, *04:56 = *04:18, *04:56
+++-----	---+-----	-----	-----+---	-----	-----	*04:16, *04:54 = *04:18, *04:54
+++-----	---+-----	-----	-----+---	-----	-----	*04:16, *04:69 = *04:18, *04:69
+++-----	---+-----	-----	-----+---	-----	-----	*04:16, *04:81 = *04:18, *04:81
+++-----	---+-----	-----	-----+---	-----	-----	*04:16, *04:60 = *04:18, *04:60
+++-----	---+-----	-----	-----+---	-----	-----	*04:16, *04:66 = *04:18, *04:66
+++-----	---+-----	-----	-----+---	-----	-----	*04:16, *04:67 = *04:18, *04:67
+++-----	---+-----	-----	-----+---	-----	-----	*04:16, *04:84 = *04:18, *04:84
+++-----	---+-----	-----	-----+---	-----	-----	*04:01:01:01, *04:16 = *04:01:01:01, *04:18 =



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+++-----	--+-----+	--+-----	-----	-----	-----	*04:01:10, *04:16 = *04:01:10, *04:18 = *04:16, *04:18 = *04:18, *04:18
+++-----	--+-----+	--+-----	-----	-----	-----	*04:14, *04:37 = *04:28, *04:37
+++-----	--+-----+	--+-----	-----	-----	-----	*04:14, *04:15:01 = *04:15:01, *04:28
+++-----	--+-----+	+-----+	-----	-----	-----	*04:14, *04:17 = *04:17, *04:28
+++-----	--+-----+	+-----	-----	-----	-----	*04:14, *04:19, 04:70 = *04:19, 04:70, *04:28
+++-----	--+-----+	--+-----	-----	-----	-----	*04:14, *04:20 = *04:20, *04:28
+++-----	--+-----+	--+-----	-----	-----	-----	*04:14, *04:15:02 = *04:15:02, *04:28
+++-----	--+-----+	--+-----	-----	-----	-----	*04:14, *04:23 = *04:23, *04:28
+++-----	--+-----+	--+-----	-----	-----	-----	*04:14, *04:24 = *04:24, *04:28
+++-----	--+-----+	--+-----	-----	-----	-----	*04:14, *04:25 = *04:25, *04:28
+++-----	--+-----+	--+-----	-----	-----	-----	*04:26, *04:68 = *04:42, *04:68
+++-----	--+-----+	-----+	-----	-----	-----	*04:14, *04:26 = *04:14, *04:42 = *04:26, *04:28 = *04:28, *04:42
+++-----	--+-----+	-----	+-----	-----	-----	*04:14, *04:43 = *04:28, *04:43
+++-----	--+-----+	-----	+-----	-----	-----	*04:14, *04:45 = *04:28, *04:45
+++-----	--+-----+	-----	+-----	-----	-----	*04:14, *04:46 = *04:28, *04:46
+++-----	--+-----+	-----	+-----	-----	-----	*04:14, *04:48 = *04:28, *04:48
+++-----	--+-----+	-----	+-----	-----	-----	*04:14, *04:49 = *04:28, *04:49
+++-----	--+-----+	-----	+-----	-----	-----	*04:14, *04:53 = *04:28, *04:53
+++-----	--+-----+	-----	+-----	-----	-----	*04:14, *04:51 = *04:28, *04:51
+++-----	--+-----+	-----	+-----	-----	-----	*04:14, *04:59Q = *04:28, *04:59Q
+++-----	--+-----+	-----	+-----	-----	-----	*04:14, *04:65 = *04:28, *04:65
+++-----	--+-----+	-----	+-----	-----	-----	*04:68, *04:71 = *04:68, *04:79
+++-----	--+-----+	-----	+-----	-----	-----	*04:01:01:01, *04:68 = *04:01:10, *04:68 = *04:14, *04:61 = *04:28, *04:61 = *04:28, *04:68 = *04:61, *04:68
+++-----	--+-----+	-----	+-----	-----	-----	*04:14, *04:62 = *04:28, *04:62
+++-----	--+-----+	-----	+-----	-----	-----	*04:14, *04:63 = *04:28, *04:63
+++-----	--+-----+	-----	+-----	-----	-----	*04:14, *04:57 = *04:28, *04:57
+++-----	--+-----+	-----	+-----	-----	-----	*04:14, *04:74 = *04:28, *04:74
+++-----	--+-----+	-----	+-----	-----	-----	*04:14, *04:73 = *04:28, *04:73
+++-----	--+-----+	-----	+-----	-----	-----	*04:14, *04:83 = *04:28, *04:83
+++-----	--+-----+	-----	+-----	-----	-----	*04:14, *04:71 = *04:14, *04:79 = *04:28, *04:71 = *04:28, *04:79
+++-----	--+-----+	-----	+-----	-----	-----	*04:14, *04:56 = *04:28, *04:56
+++-----	--+-----+	-----	+-----	-----	-----	*04:14, *04:54 = *04:28, *04:54
+++-----	--+-----+	-----	+-----	-----	-----	*04:14, *04:69 = *04:28, *04:69
+++-----	--+-----+	-----	+-----	-----	-----	*04:14, *04:81 = *04:28, *04:81
+++-----	--+-----+	-----	+-----	-----	-----	*04:14, *04:60 = *04:28, *04:60
+++-----	--+-----+	-----	+-----	-----	-----	*04:14, *04:66 = *04:28, *04:66
+++-----	--+-----+	-----	+-----	-----	-----	*04:14, *04:67 = *04:28, *04:67
+++-----	--+-----+	-----	+-----	-----	-----	*04:14, *04:84 = *04:28, *04:84
+++-----	--+-----+	-----	+-----	-----	-----	*04:01:01:01, *04:14 = *04:01:01:01, *04:28 = *04:01:10, *04:14 = *04:01:10, *04:28 = *04:14, *04:28 = *04:28, *04:28
+++-----	--+-----+	-----	+-----	-----	-----	*04:26, *04:37 = *04:37, *04:42
+++-----	--+-----+	-----	+-----	-----	-----	*04:37, *04:71 = *04:37, *04:79
+++-----	--+-----+	-----	+-----	-----	-----	*04:01:01:01, *04:37 = *04:01:10, *04:37 = *04:15:01, *04:20 = *04:15:01, *04:37 = *04:20, *04:37 = *04:37, *04:37
+++-----	--+-----+	-----	+-----	-----	-----	*04:15:01, *04:26 = *04:15:01, *04:42
+++-----	--+-----+	-----	+-----	-----	-----	*04:15:01, *04:71 = *04:15:01, *04:79
+++-----	--+-----+	-----	+-----	-----	-----	*04:01:01:01, *04:15:01 = *04:01:10, *04:15:01 = *04:15:01, *04:15:01
+++-----	--+-----+	-----	+-----	-----	-----	*04:17, *04:26 = *04:17, *04:42
+++-----	--+-----+	-----	+-----	-----	-----	*04:17, *04:71 = *04:17, *04:79
+++-----	--+-----+	-----	+-----	-----	-----	*04:01:01:01, *04:17 = *04:01:10, *04:17 = *04:15:02, *04:17 = *04:17, *04:17
+++-----	--+-----+	-----	+-----	-----	-----	*04:19, 04:70, *04:26 = *04:19, 04:70, *04:42
+++-----	--+-----+	-----	+-----	-----	-----	*04:19, 04:70, *04:71 = *04:19, 04:70, *04:79
+++-----	--+-----+	-----	+-----	-----	-----	*04:01:01:01, *04:19, 04:70 = *04:01:10, *04:19, 04:70 = *04:19, 04:70, *04:19, 04:70
+++-----	--+-----+	-----	+-----	-----	-----	*04:20, *04:26 = *04:20, *04:42



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+++-----	---+-----	---+-----	-----	-----+	-----	*04:20, *04:71 = *04:20, *04:79
+++-----	---+-----	---+-----	-----	-----	-----	*04:01:01:01, *04:20 = *04:01:10, *04:20 = *04:20, *04:20
+++-----	---+-----	---+-----	-----	-----	-----	*04:15:02, *04:26 = *04:15:02, *04:42
+++-----	---+-----	---+-----	-----	-----	-----	*04:15:02, *04:71 = *04:15:02, *04:79
+++-----	---+-----	---+-----	-----	-----	-----	*04:01:01:01, *04:15:02 = *04:01:10, *04:15:02 = *04:15:02, *04:15:02
+++-----	---+-----	---+-----	-----	-----	-----	*04:23, *04:26 = *04:23, *04:42
+++-----	---+-----	---+-----	-----	-----	-----	*04:23, *04:71 = *04:23, *04:79
+++-----	---+-----	---+-----	-----	-----	-----	*04:01:01:01, *04:23 = *04:01:10, *04:23 = *04:23, *04:23
+++-----	---+-----	---+-----	-----	-----	-----	*04:24, *04:26 = *04:24, *04:42
+++-----	---+-----	---+-----	-----	-----	-----	*04:24, *04:71 = *04:24, *04:79
+++-----	---+-----	---+-----	-----	-----	-----	*04:01:01:01, *04:24 = *04:01:10, *04:24 = *04:24, *04:24
+++-----	---+-----	---+-----	-----	-----	-----	*04:25, *04:26 = *04:25, *04:42
+++-----	---+-----	---+-----	-----	-----	-----	*04:25, *04:71 = *04:25, *04:79
+++-----	---+-----	---+-----	-----	-----	-----	*04:01:01:01, *04:25 = *04:01:10, *04:25 = *04:25, *04:25
+++-----	---+-----	---+-----	-----	-----	-----	*04:26, *04:43 = *04:42, *04:43
+++-----	---+-----	---+-----	-----	-----	-----	*04:26, *04:45 = *04:42, *04:45
+++-----	---+-----	---+-----	-----	-----	-----	*04:26, *04:46 = *04:42, *04:46
+++-----	---+-----	---+-----	-----	-----	-----	*04:26, *04:48 = *04:42, *04:48
+++-----	---+-----	---+-----	-----	-----	-----	*04:26, *04:49 = *04:42, *04:49
+++-----	---+-----	---+-----	-----	-----	-----	*04:26, *04:53 = *04:42, *04:53
+++-----	---+-----	---+-----	-----	-----	-----	*04:26, *04:51 = *04:42, *04:51
+++-----	---+-----	---+-----	-----	-----	-----	*04:26, *04:59Q = *04:42, *04:59Q
+++-----	---+-----	---+-----	-----	-----	-----	*04:26, *04:65 = *04:42, *04:65
+++-----	---+-----	---+-----	-----	-----	-----	*04:26, *04:61 = *04:42, *04:61
+++-----	---+-----	---+-----	-----	-----	-----	*04:26, *04:62 = *04:42, *04:62
+++-----	---+-----	---+-----	-----	-----	-----	*04:26, *04:63 = *04:42, *04:63
+++-----	---+-----	---+-----	-----	-----	-----	*04:26, *04:57 = *04:42, *04:57
+++-----	---+-----	---+-----	-----	-----	-----	*04:26, *04:74 = *04:42, *04:74
+++-----	---+-----	---+-----	-----	-----	-----	*04:26, *04:73 = *04:42, *04:73
+++-----	---+-----	---+-----	-----	-----	-----	*04:26, *04:83 = *04:42, *04:83
+++-----	---+-----	---+-----	-----	-----	-----	*04:26, *04:71 = *04:26, *04:79 = *04:42, *04:79
+++-----	---+-----	---+-----	-----	-----	-----	*04:26, *04:56 = *04:42, *04:56
+++-----	---+-----	---+-----	-----	-----	-----	*04:26, *04:54 = *04:42, *04:54
+++-----	---+-----	---+-----	-----	-----	-----	*04:26, *04:69 = *04:42, *04:69
+++-----	---+-----	---+-----	-----	-----	-----	*04:26, *04:81 = *04:42, *04:81
+++-----	---+-----	---+-----	-----	-----	-----	*04:26, *04:60 = *04:42, *04:60
+++-----	---+-----	---+-----	-----	-----	-----	*04:26, *04:66 = *04:42, *04:66
+++-----	---+-----	---+-----	-----	-----	-----	*04:26, *04:67 = *04:42, *04:67
+++-----	---+-----	---+-----	-----	-----	-----	*04:26, *04:84 = *04:42, *04:84
+++-----	---+-----	---+-----	-----	-----	-----	*04:01:01:01, *04:26 = *04:01:01:01, *04:42 = *04:01:10, *04:26 = *04:01:10, *04:42 = *04:26, *04:26 = *04:26, *04:42
+++-----	---+-----	---+-----	-----	-----	-----	*04:43, *04:71 = *04:43, *04:79
+++-----	---+-----	---+-----	-----	-----	-----	*04:01:01:01, *04:43 = *04:01:10, *04:43 = *04:43, *04:43
+++-----	---+-----	---+-----	-----	-----	-----	*04:45, *04:71 = *04:45, *04:79
+++-----	---+-----	---+-----	-----	-----	-----	*04:01:01:01, *04:45 = *04:01:10, *04:45 = *04:45, *04:45
+++-----	---+-----	---+-----	-----	-----	-----	*04:46, *04:71 = *04:46, *04:79
+++-----	---+-----	---+-----	-----	-----	-----	*04:01:01:01, *04:46 = *04:01:10, *04:46 = *04:46, *04:46
+++-----	---+-----	---+-----	-----	-----	-----	*04:48, *04:71 = *04:48, *04:79
+++-----	---+-----	---+-----	-----	-----	-----	*04:01:01:01, *04:48 = *04:01:10, *04:48 = *04:48, *04:48
+++-----	---+-----	---+-----	-----	-----	-----	*04:49, *04:71 = *04:49, *04:79
+++-----	---+-----	---+-----	-----	-----	-----	*04:01:01:01, *04:49 = *04:01:10, *04:49 = *04:49, *04:49
+++-----	---+-----	---+-----	-----	-----	-----	*04:53, *04:71 = *04:53, *04:79
+++-----	---+-----	---+-----	-----	-----	-----	*04:01:01:01, *04:53 = *04:01:10, *04:53 =



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*04:53, *04:53
+++----- -+----- ----- -+----- -+----- -+----- *04:51, *04:71 = *04:51, *04:79
+++----- -+----- ----- -+----- -+----- -+----- *04:01:01:01, *04:51 = *04:01:10, *04:51 =
*04:51, *04:51
+++----- -+----- ----- -+----- -+----- -+----- *04:59Q, *04:71 = *04:59Q, *04:79
+++----- -+----- ----- -+----- -+----- -+----- *04:01:01:01, *04:59Q = *04:01:10, *04:59Q =
*04:59Q, *04:59Q
+++----- -+----- ----- -+----- -+----- -+----- *04:65, *04:71 = *04:65, *04:79
+++----- -+----- ----- -+----- -+----- -+----- *04:01:01:01, *04:65 = *04:01:10, *04:65 =
*04:65, *04:65
+++----- -+----- ----- -+----- -+----- -+----- *04:61, *04:71 = *04:61, *04:79
+++----- -+----- ----- -+----- -+----- -+----- *04:01:01:01, *04:61 = *04:01:10, *04:61 =
*04:61, *04:61
+++----- -+----- ----- -+----- -+----- -+----- *04:62, *04:71 = *04:62, *04:79
+++----- -+----- ----- -+----- -+----- -+----- *04:01:01:01, *04:62 = *04:01:10, *04:62 =
*04:62, *04:62
+++----- -+----- ----- -+----- -+----- -+----- *04:57, *04:74 = *04:63, *04:74 = *04:63, *04:83
+++----- -+----- ----- -+----- -+----- -+----- *04:63, *04:71 = *04:63, *04:79
+++----- -+----- ----- -+----- -+----- -+----- *04:01:01:01, *04:63 = *04:01:10, *04:63 =
*04:57, *04:63 = *04:57, *04:73 = *04:63, *04:63
= *04:63, *04:73
+++----- -+----- ----- -+----- -+----- -+----- *04:57, *04:71 = *04:57, *04:79
+++----- -+----- ----- -+----- -+----- -+----- *04:01:01:01, *04:57 = *04:01:10, *04:57 =
*04:57, *04:57
+++----- -+----- ----- -+----- -+----- -+----- *04:71, *04:74 = *04:74, *04:79
+++----- -+----- ----- -+----- -+----- -+----- *04:01:01:01, *04:74 = *04:01:10, *04:74 =
*04:73, *04:74 = *04:73, *04:83 = *04:74, *04:74
= *04:74, *04:83
+++----- -+----- ----- -+----- -+----- -+----- *04:71, *04:73 = *04:73, *04:79
+++----- -+----- ----- -+----- -+----- -+----- *04:01:01:01, *04:73 = *04:01:10, *04:73 =
*04:73, *04:73
+++----- -+----- ----- -+----- -+----- -+----- *04:71, *04:83 = *04:79, *04:83
+++----- -+----- ----- -+----- -+----- -+----- *04:01:01:01, *04:83 = *04:01:10, *04:83 =
*04:83, *04:83
+++----- -+----- ----- -+----- -+----- -+----- *04:56, *04:71 = *04:56, *04:79
+++----- -+----- ----- -+----- -+----- -+----- *04:54, *04:71 = *04:54, *04:79
+++----- -+----- ----- -+----- -+----- -+----- *04:69, *04:71 = *04:69, *04:79
+++----- -+----- ----- -+----- -+----- -+----- *04:71, *04:81 = *04:79, *04:81
+++----- -+----- ----- -+----- -+----- -+----- *04:60, *04:71 = *04:60, *04:79
+++----- -+----- ----- -+----- -+----- -+----- *04:66, *04:71 = *04:66, *04:79
+++----- -+----- ----- -+----- -+----- -+----- *04:67, *04:71 = *04:67, *04:79
+++----- -+----- ----- -+----- -+----- -+----- *04:71, *04:84 = *04:79, *04:84
+++----- -+----- ----- -+----- -+----- -+----- *04:01:01:01, *04:71 = *04:01:01:01, *04:79 =
*04:01:10, *04:71 = *04:01:10, *04:79 = *04:71,
*04:79 = *04:79, *04:79
+++----- -+----- ----- -+----- -+----- -+----- *04:01:01:01, *04:56 = *04:01:10, *04:56 =
*04:56, *04:56
+++----- -+----- ----- -+----- -+----- -+----- *04:01:01:01, *04:54 = *04:01:10, *04:54 =
*04:54, *04:54
+++----- -+----- ----- -+----- -+----- -+----- *04:01:01:01, *04:69 = *04:01:10, *04:69 =
*04:69, *04:69
+++----- -+----- ----- -+----- -+----- -+----- *04:01:01:01, *04:81 = *04:01:10, *04:81 =
*04:81, *04:81
+++----- -+----- ----- -+----- -+----- -+----- *04:01:01:01, *04:60 = *04:01:10, *04:60 =
*04:60, *04:60
+++----- -+----- ----- -+----- -+----- -+----- *04:01:01:01, *04:66 = *04:01:10, *04:66 =
*04:66, *04:66
+++----- -+----- ----- -+----- -+----- -+----- *04:01:01:01, *04:67 = *04:01:10, *04:67 =
*04:67, *04:67
+++----- -+----- ----- -+----- -+----- -+----- *04:01:01:01, *04:84 = *04:01:10, *04:84 =
*04:84, *04:84
+++----- -+----- ----- -+----- -+----- -+----- *04:01:01:01, *04:01:01:01 = *04:01:01:01,
*04:01:10
+++----- -+----- ----- -+----- -+----- -+----- *04:01:10, *04:33 = *04:33, *04:33



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+++-----	-----+	-----	-----	-----	-----	*04:01:10, *04:52 = *04:52, *04:52
+++++--	-----	-----	-----	-----	-----	*04:06, *04:07 = *04:06, *04:27
+++--+-	-----	+-----	-----	-----	-----	*04:07, *04:80 = *04:27, *04:80
+++++--	-----	-----	-----	-----	-----	*04:03, *04:07 = *04:03, *04:27
+++++--	-----	-----	-----	-----	-----	*04:07, *04:16 = *04:16, *04:27
+++++--	-----	-----	-----	-----	-----	*04:07, *04:42 = *04:27, *04:42
+++++--	-----	-----	-----	-----	-----	*04:07, *04:07 = *04:07, *04:27
+++++--	-----	-----	-----	-----	-----	*04:06, *04:11 = *04:06, *04:36
+++++--	-----	+-----	-----	-----	-----	*04:11, *04:80 = *04:36, *04:80
+++++--	-----	-----	-----	-----	-----	*04:03, *04:11 = *04:03, *04:36
+++++--	-----	-----	-----	-----	-----	*04:10, *04:55 = *04:36, *04:55
+++++--	-----	-----	-----	-----	-----	*04:11, *04:16 = *04:16, *04:36
+++++--	-----	-----	-----	-----	-----	*04:11, *04:42 = *04:36, *04:42
+++++--	-----	-----	-----	-----	-----	*04:11, *04:71 = *04:36, *04:71
+++++--	-----	-----	-----	-----	-----	*04:10, *04:11 = *04:10, *04:36 = *04:11, *04:36 = *04:36, *04:36
+++++--	-----	-----	-----	-----	-----	*04:11, *04:55 = *04:55, *04:55
+++++--	-----	+-----	-----	-----	-----	*04:03, *04:80 = *04:80, *04:80
+++++--	-----	-----	-----	-----	-----	*04:04:01, *04:34 = *04:34, *04:34
+++++--	-----	-----	-----	-----	-----	*04:14, *04:58 = *04:58, *04:68
+++++--	-----	-----	-----	-----	-----	*04:13, *04:14 = *04:13, *04:68
+++++--	-----	-----	-----	-----	-----	*04:04:01, *04:58 = *04:13, *04:58 = *04:58, *04:58
+++++--	-----	-----	-----	-----	-----	*04:04:01, *04:13 = *04:13, *04:13
+++++--	-----	-----	-----	-----	-----	*04:14, *04:68 = *04:68, *04:68

*04:01:01:01 = *04:01:01:01-04:01:09, 04:01:11-04:01:22 and 04:01:24-04:01:26

*04:01:10 = *04:01:10 and 04:01:23

*04:04:01 = *04:04:01-04:04:02

*04:15:01 = *04:15:01 and 04:15:03

*04:15:02 = *04:15:02, 04:44 and 04:47

*04:23 = *04:23, 04:38 and 04:39

*04:25 = *04:25, 04:40 and 04:41

*04:46 = *04:46 and 04:50

*04:48 = *04:48 and 04:75

*04:56 = *04:56 and 04:64

*04:59Q = *04:59Q and 04:78

*04:62 = *04:62 and 04:76

*04:65 = *04:65 and 04:72

*04:69 = *04:69 and 04:82

SPECIFICITY TABLE

HLA-C*04 SSP subtyping

Specificities and sizes of the PCR products of the 47 primer mixes used for HLA-C*04 SSP subtyping

Primer Mix	Size of spec. PCR product ¹	Size of control band ²	Amplified HLA-C*04 alleles ³	Other amplified HLA Class I alleles ⁴
1	250 bp	800 bp	*04:01:01:01-04:01:26, 04:03, 04:05, 04:07-04:12, 04:15:01-04:18, 04:19 ^w , 04:20, 04:23-04:33, 04:35-04:57, 04:59Q-04:67, 04:69-04:84	*01:02:01-01:21, 01:23-01:34, 01:36-01:51, 02:02:01-02:02:03, 02:02:05-02:02:17, 02:04-02:15, 02:17, 02:19-02:40, 02:42-02:47, 05:01:01:01-05:01:15, 05:03-05:10, 05:12-05:16, 05:18-05:26, 05:28-05:50, 05:52-05:53, 06:02:01:01-06:02:01:02, 06:02:03-06:03, 06:05-06:39, 06:41-06:58, 08:02:01-08:02:05, 08:05, 08:07, 08:12, 08:15:01-08:15:02, 08:17-08:19, 08:23, 08:25, 08:27-08:35, 08:37, 08:43, 08:45, 12:02:01-12:13, 12:15-12:17, 12:21-12:51, 14:02:01-14:05, 14:07N-14:14, 14:16-14:29, 15:08, 16:04:01, 16:29, 18:01-18:04
2	220 bp	1070 bp	*04:01:01:01-04:01:26, 04:04:01-04:05, 04:07-04:09N, 04:12 ^w , 04:13-04:15:03, 04:17-04:20, 04:23-04:35, 04:37-04:41, 04:43-04:54, 04:56-04:70, 04:72-04:79, 04:81-04:84	*07:64
3	145 bp	1070 bp	*04:01:01:01-04:01:26, 04:04:01-04:05, 04:08-04:15:03, 04:17-04:20, 04:23-04:26, 04:28-04:41, 04:43-04:79, 04:81-04:84	
4	210 bp	1070 bp	*04:03, 04:06, 04:80	*02:12

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5	250 bp	1070 bp	*04:04:01-04:04:02, 04:06, 04:13, 04:34, 04:58	*01:22, 01:35, 02:03, 02:16:01- 02:16:02, 02:18, 05:11, 05:17, 05:27, 06:04, 08:01:01- 08:01:04, 08:03:01-08:04, 08:06, 08:08-08:11, 08:13- 08:14, 08:16, 08:20-08:22, 08:24, 08:26N, 08:36N, 08:38- 08:42, 08:44, 08:46, 12:14:01- 12:14:02, 12:18, 12:20, 14:06, 14:15, 15:02:01-15:07, 15:09- 15:13, 15:15-15:24, 15:26- 15:48, 17:01:01:01-17:08, B*58:02
6⁵	95 bp	1070 bp	*04:05	
7⁶	145 bp	1070 bp	*04:07, 04:27, 04:32, 04:77	*03:34, 07:64, 14:25, 15:36, 18:03
8	270 bp	1070 bp	*04:08, 04:34	*01:35, 05:27, 05:39, 08:41, 14:20, 15:15, 17:07, B*58:02
9^{5,8}	110 bp, 180 bp, 220 bp	1070 bp	*04:09N, 04:30, 04:35	
10⁹	195 bp, 220 bp	1070 bp	*04:10-04:11, 04:31, 04:36, 04:55	*15:36
11	180 bp	1070 bp	*04:01:01:01- 04:01:09, 04:01:11- 04:01:22, 04:01:24- 04:01:26, 04:03- 04:10, 04:12-04:20, 04:23-04:26, 04:28- 04:32, 04:34-04:51, 04:53-04:54, 04:56- 04:84	*05:25, 05:42, 06:05, 07:02:09, 08:28, 12:28, 15:25, 16:26
12^{5,10}	125 bp, 165 bp	1070 bp	*04:11, 04:29, 04:33, 04:36, 04:55	*07:125
13¹¹	225 bp, 270 bp	1070 bp	*04:12, 04:52, 04:55	
14¹²	155 bp, 190 bp	1070 bp	*04:13, 04:16, 04:18, 04:58	*07:08, 07:108
15	180 bp	1070 bp	*04:14, 04:28, 04:68	A*24:96, 24:146
16⁵	130 bp	1070 bp	*04:15:01, 04:15:03, 04:37	*03:05, 03:25, 03:27, 14:09
17	320 bp	1070 bp	*04:17, 04:80	*01:50
18^{5,13}	125 bp, 225 bp	1070 bp	*04:19, 04:70	

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19 ^{5,14}	120 bp, 155 bp	1070 bp	*04:20, 04:35, 04:37	
20 ¹⁵	165 bp, 250 bp, 545 bp	1070 bp	*04:15:02, 04:17, 04:44, 04:47	*15:36
21 ^{5,6,16}	85 bp, 145 bp, 240 bp	1070 bp	*04:23, 04:38-04:39	
22 ⁵	130 bp	1070 bp	*04:24	
23 ^{5,17}	85 bp, 145 bp, 215 bp	1070 bp	*04:25, 04:40-04:41	
24 ⁶	170 bp	1070 bp	*04:26, 04:30, 04:42	*07:125
25	190 bp	1070 bp	*04:43	
26 ⁷	215 bp	800 bp	*04:45	
27 ^{5,18}	125 bp, 285 bp	800 bp	*04:46, 04:50	
28 ^{5,19}	120 bp, 215 bp	1070 bp	*04:48, 04:75	
29	185 bp	1070 bp	*04:49	
30 ⁵	75 bp	1070 bp	*04:53	*05:49, B*07:90
31	180 bp	1070 bp	*04:51	
32 ^{5,20}	105 bp, 235 bp, 275 bp	1070 bp	*04:59Q, 04:77- 04:78	B*40:100
33 ^{5,21}	80 bp, 180 bp	1070 bp	*04:58, 04:65, 04:72	*07:08, 07:108, B*40:100
34	200 bp	1070 bp	*04:13, 04:58, 04:61, 04:68	*07:08, 07:108
35 ^{5,22}	85 bp, 175 bp	1070 bp	*04:62, 04:76	
36 ⁵	115 bp	1070 bp	*04:57, 04:63	
37 ^{5,23}	110 bp, 135 bp	1070 bp	*04:63, 04:73-04:74	
38 ^{5,24}	105 bp, 135 bp	1070 bp	*04:74, 04:83	
39 ²⁵	145 bp, 330 bp	1070 bp	*04:71, 04:79	*01:21
40 ²⁶	140 bp, 270 bp	800 bp	*04:56, 04:64	
41	280 bp	1070 bp	*04:54	*01:04, 14:02:01-14:25, 14:27- 14:29
42 ^{5,7}	85 bp	1070 bp	*04:69	*16:12
43 ⁷	170 bp	1070 bp	*04:81	

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44	135 bp	1070 bp	*04:60
45	135 bp	1070 bp	*04:66
46	300 bp	1070 bp	*04:67
47⁷	185 bp	1070 bp	*04:84

¹Alleles 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*04 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*04 subtyping.

In addition, wells number 26, 27 and 40 contains 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.

³The C*04:15:02, C*04:44 and C*04:47 alleles can be distinguished by the different sizes of the specific PCR products generated by primer mix 20.

The C*04:23, C*04:38 and C*04:39 alleles can be distinguished by the different sizes of the specific PCR products generated by primer mix 21.

The C*04:25, C*04:40 and C*04:41 alleles can be distinguished by the different sizes of the specific PCR products generated by primer mix 23.

The C*04:46 and C*04:50 alleles can be distinguished by the different sizes of the specific PCR products generated by primer mix 27.

The C*04:48 and C*04:75 alleles can be distinguished by the different sizes of the specific PCR products generated by primer mix 28.

The C*04:56 and C*04:64 alleles can be distinguished by the different sizes of the specific PCR products generated by primer mix 40.

The C*04:59Q and C*04:78 alleles can be distinguished by the different sizes of the specific PCR products generated by primer mix 32.

The C*04:62 and C*04:76 alleles can be distinguished by the different sizes of the specific PCR products generated by primer mix 35.

The C*04:65 and C*04:72 alleles can be distinguished by the different sizes of the specific PCR products generated by primer mix 33.

⁴Due to the sharing of sequence motifs between HLA-C alleles some non-HLA-C*04 alleles will be amplified by primer mixes 1, 2, 4, 5, 7, 8, 10 to 12, 14, 16, 17, 20, 24, 30, 33, 34, 39, 41 and 42. In addition, the A*24:96 and A*24:146 alleles will be amplified by primer mix 15, the B*58:02 allele will be amplified by primer mixes 5 and 8, the B*07:90 allele will be amplified by primer mix 30 and the B*40:100 allele will be amplified by primer mixes 32 and 33.

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

⁶The primers in primer mixes 7, 21 and 24 may give rise to primer oligomer formation.

⁷Primer mixes 26, 42, 43 and 47 may have tendencies of unspecific amplification.

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⁸Primer mix 9: Specific PCR fragment of 110 bp in the C*04:35 allele. Specific PCR fragment of 180 bp in the C*04:30 allele. Specific PCR fragment of 220 bp in the C*04:09N allele.

⁹Primer mix 10: Specific PCR fragment of 195 bp in the C*04:31 allele. Specific PCR fragment of 220 bp in the C*04:10, 04:11, 04:36 and 04:55 and in the C*15:36 alleles.

¹⁰Primer mix 12: Specific PCR fragment of 125 bp in the C*04:29, 04:36 and 04:55 and the C*07:125 alleles. Specific PCR fragment of 165 bp in the C*04:33 allele. Specific PCR fragment of 125 and 165 bp in the C*04:11 allele.

¹¹Primer mix 13: Specific PCR fragment of 225 bp in the C*04:12 allele. Specific PCR fragment of 270 bp in the C*04:52 and 04:55 alleles.

¹²Primer mix 14: Specific PCR fragment of 155 bp in the C*04:16 allele. Specific PCR fragment of 190 bp in the C*04:13, 04:18 and 04:58 and the C*07:08 and 07:108 alleles.

¹³Primer mix 18: Specific PCR fragment of 125 bp in the C*04:70 allele. Specific PCR fragment of 225 bp in the C*04:19 allele.

¹⁴Primer mix 19: Specific PCR fragment of 120 bp in the C*04:35 and 04:37 alleles. Specific PCR fragment of 155 bp in the C*04:20 allele.

¹⁵Primer mix 20: Specific PCR fragment of 165 bp in the C*04:44 allele. Specific PCR fragment of 250 bp in the C*04:47 allele. Specific PCR fragment of 545 bp in the C*04:15:02 and 04:17 and the C*15:36 alleles.

¹⁶Primer mix 21: Specific PCR fragment of 85 bp in the C*04:23 allele. Specific PCR fragment of 145 bp in the C*04:38 allele. Specific PCR fragment of 240 bp in the C*04:39 allele.

¹⁷Primer mix 23: Specific PCR fragment of 85 bp in the C*04:25 allele. Specific PCR fragment of 145 bp in the C*04:40 allele. Specific PCR fragment of 215 bp in the C*04:41 allele.

¹⁸Primer mix 27: Specific PCR fragment of 125 bp in the C*04:50 allele. Specific PCR fragment of 285 bp in the C*04:46 allele.

¹⁹Primer mix 28: Specific PCR fragment of 120 bp in the C*04:75 allele. Specific PCR fragment of 215 bp in the C*04:48 allele.

²⁰Primer mix 32: Specific PCR fragment of 105 bp in the C*04:78 allele. Specific PCR fragment of 235 bp in the C*04:59Q allele. Specific PCR fragment of 275 bp in the C*04:77 and in the B*40:100 alleles.

²¹Primer mix 33: Specific PCR fragment of 80 bp in the C*04:72 allele. Specific PCR fragment of 180 bp in the C*04:58 and 04:65 and the C*07:08 and 07:108 and in the B*40:100 alleles.

²²Primer mix 35: Specific PCR fragment of 85 bp in the C*04:62 allele. Specific PCR fragment of 175 bp in the C*04:76 allele.

²³Primer mix 37: Specific PCR fragment of 110 bp in the C*04:63 and 04:73 alleles. Specific PCR fragment of 135 bp in the C*04:74 allele.

²⁴Primer mix 38: Specific PCR fragment of 105 bp in the C*04:83 allele. Specific PCR fragment of 135 bp in the C*04:74 allele.

²⁵Primer mix 39: Specific PCR fragment of 145 bp in the C*04:71 and the C*01:21 alleles. Specific PCR fragment of 330 bp in the C*04:79 allele.

²⁶Primer mix 40: Specific PCR fragment of 140 bp in the C*04:56 allele. Specific PCR fragment of 270 bp in the C*04:64 allele.

‘w’, may be weakly amplified.

INTERPRETATION TABLE																								
HLA-C*04 SSP subtyping																								
Amplification patterns of the C*04:01 to C*04:84 alleles																								
	Well ¹⁴																							
	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.	250	220	145	210	250	95	145	270	110	195	180	125	225	155	180	130	320	125	120	165	85	130	85	170
PCR product(s)									180	220	180	165	270	190	180	130		225	155	250	145		145	170
Length of int.	800	1070	1070	1070	1070	1070	1070	1070	1070	1070	1070	1070	1070	1070	1070	1070	1070	1070	1070	1070	1070	1070	1070	1070
pos. control ¹																								
5'-primer(s) ²	2nd I	112	112	118	2nd I	98	112	2nd I	391	112	201	218	112	105	412	368	379	228	347	112	368	127	172	89
	5'-CCA 3'	5'-CCT 3'	5'-CCT 3'	5'-CCA 3'	5'-CCA 3'	5'-CTC 3'	5'-CCT 3'	5'-CCA 3'	5'-ACC 3'	5'-CCT 3'	5'-CCA 3'	5'-ggA 3'	5'-CCT 3'	5'-gCT 3'	5'-ATA 3'	5'-gTg 3'	5'-ACg 3'	5'-ATg 3'	5'-gTA 3'	5'-CCT 3'	5'-gTT 3'	5'-ggA 3'	5'-TCC 3'	5'-gAT 3'
							459		1018	368				368	697	369		368	368				355	97
							5'-gAT 3'		5'-gTg 3'	5'-gTT 3'				5'-gTT 3'	5'-TCC 3'	5'-TAC 3'			5'-gTg 3'				670	1018
																		391					5'-CCg 3'	5'-gTg 3'
3'-primer(s) ³	539	289	218	289	539	154	218	559	459	289	341	302	295	218	539	459	3rd I	312	459	238	412	218	218	218
	5'-TCC 3'	5'-AgC 3'	5'-gCT 3'	5'-AgC 3'	5'-TCA 3'	5'-CAG 3'	5'-gCg 3'	5'-CAG 3'	5'-AgA 3'	5'-AgT 3'	5'-CgT 3'	5'-ggC 3'	5'-TCC 3'	5'-gCT 3'	5'-TCT 3'	5'-AgA 3'	5'-ACg 3'	5'-AgT 3'	5'-AgA 3'	5'-CCA 3'	5'-gTC 3'	5'-gCT 3'	5'-gCT 3'	5'-gCT 3'
		289		289			559		1052	521	341	341	343	514	846			550		319	472		459	1052
		5'-AgC 3'		5'-AgC 3'			5'-CTC 3'		5'-Tgg 3'	5'-ggA 3'	5'-Cgg 3'	5'-T 3'	5'-CTT 3'	5'-CAC 3'			5'-CAT 3'	5'-CAT 3'	5'-gCT 3'	5'-ggC 3'	5'-CTg 3'	5'-AgA 3'	5'-Tgg 3'	
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
HLA-C allele ⁴																								



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Length of spec.	250	220	145	210	250	95	145	270	110	180	195	180	125	225	155	180	130	320	125	120	165	85	130	85	170
PCR product(s)																									
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	
HLA-C allele ⁴																									
*04:01:01:01-04:01:09, 04:01:11-04:01:22, 04:01:24- 04:01:26, 04:82 ¹⁵	1	2	3									11													
*04:01:10, 04:01:23	1	2	3																						
*04:03	1			4								11													
*04:04:01-04:04:02		2	3		5							11													
*04:05	1	2	3			6						11													
*04:06				4	5							11													
*04:07	1	2					7					11													
*04:08	1	2	3					8				11													
*04:09N	1	2	3						9			11													
*04:10	1		3							10	11														
*04:11	1		3							10		12													
*04:12	1	w	3									11	13												
*04:13		2	3		5							11		14											
*04:14		2	3									11			15										
*04:15:01, 04:15:03	1	2	3									11				16									
*04:15:02, 04:44, 04:47 ⁵	1	2	3									11									20				
*04:16	1											11		14											
*04:17	1	2	3									11					17				20				
*04:18	1	2	3									11		14											
*04:19	w	2	3									11							18						
*04:20	1	2	3									11								19					
*04:23, 04:38-04:39 ⁶	1	2	3									11										21			
*04:24	1	2	3									11											22		
*04:25, 04:40-04:41 ⁷	1	2	3									11												23	
*04:26	1	2	3									11												24	
*04:27	1	2					7																		
*04:28	1	2	3									11			15										
*04:29	1	2	3									11	12												
*04:30	1	2	3						9		11													24	
*04:31	1	2	3							10	11														
*04:32	1	2	3				7					11													
*04:33	1	2	3										12												
*04:34		2	3		5			8				11													
*04:35	1	2	3						9		11									19					
*04:36	1		3							10	11	12													
*04:37	1	2	3									11				16				19					
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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190	215	285	215	185	75	180	275	235	105	80	200	85	115	110	105	145	140	280	85	170	135	135	300	185	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	Well No.			
																										HLA-C allele ⁴
																										*04:01:01:01-04:01:09, 04:01:11-04:01:22, 04:01:24- 04:01:26, 04:82 ¹⁵
																										*04:01:10, 04:01:23
																										*04:03
																										*04:04:01-04:04:02
																										*04:05
																										*04:06
																										*04:07
																										*04:08
																										*04:09N
																										*04:10
																										*04:11
																										*04:12
																										*04:13
																										*04:14
																										*04:15:01, 04:15:03
																										*04:15:02, 04:44, 04:47 ⁵
																										*04:16
																										*04:17
																										*04:18
																										*04:19
																										*04:20
																										*04:23, 04:38-04:39 ⁶
																										*04:24
																										*04:25, 04:40-04:41 ⁷
																										*04:26
																										*04:27
																										*04:28
																										*04:29
																										*04:30
																										*04:31
																										*04:32
																										*04:33
																										*04:34
																										*04:35
																										*04:36
																										*04:37
25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	Well No.			

Lot No.: **12M**

Lot-specific information

www.olerup-ssp.com

Length of spec.	250	220	145	210	250	95	145	270	250	180	110	195	180	125	225	155	180	130	320	125	120	165	85	130	85	170	
PCR product(s)											220	180	220	165	270	190				225	155	250	145			145	
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	23	24	24
*04:42	1										11																24
*04:43	1	2	3								11																
*04:45	1	2	3								11																
*04:46, 04:50 ⁸	1	2	3								11																
*04:48, 04:75 ⁹	1	2	3								11																
*04:49	1	2	3								11																
*04:51	1	2	3								11																
*04:52	1	2	3										13														
*04:53	1	2	3								11																
*04:54	1	2	3								11																
*04:55	1		3							10		12	13														
*04:56, 04:64 ¹⁰	1	2	3								11																
*04:57	1	2	3								11																
*04:58		2	3		5						11		14														
*04:59Q, 04:78 ¹¹	1	2	3								11																
*04:60	1	2	3								11																
*04:61	1	2	3								11																
*04:62, 04:76 ¹²	1	2	3								11																
*04:63	1	2	3								11																
*04:65, 04:72 ¹³	1	2	3								11																
*04:66	1	2	3								11																
*04:67	1	2	3								11																
*04:68		2	3								11		15														
*04:69	1	2	3								11																
*04:70	1	2	3								11										18						
*04:71	1		3								11																
*04:73	1	2	3								11																
*04:74	1	2	3								11																
*04:77	1	2	3				7				11																
*04:79	1	2	3								11																
*04:80	1			4							11										17						
*04:81	1	2	3								11																
*04:83	1	2	3								11																
*04:84	1	2	3								11																
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	23	24	24

Lot No.: **12M**

Lot-specific information

www.olerup-ssp.com

190	215	125	120	185	75	180	105	80	200	85	115	110	105	145	140	280	85	170	135	135	300	185	Length of spec.	PCR product(s)
		285	215				275	180		175		135	135	330	270		525							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		
																								*04:42
25																								*04:43
	26																							*04:45
		27																						*04:46, 04:50 ⁸
			28																					*04:48, 04:75 ⁹
				29																				*04:49
					31																			*04:51
						30																		*04:52
																41								*04:53
																								*04:54
																								*04:55
															40									*04:56, 04:64 ¹⁰
											36													*04:57
								33	34															*04:58
							32																	*04:59Q, 04:78 ¹¹
																			44					*04:60
									34															*04:61
										35														*04:62, 04:76 ¹²
											36	37												*04:63
								33																*04:65, 04:72 ¹³
																				45				*04:66
																					46			*04:67
									34															*04:68
																	42							*04:69, 04:82 ¹⁴
																								*04:70
														39										*04:71
												37												*04:73
												37	38											*04:74
							32																	*04:77
														39										*04:79
																								*04:80
																			43					*04:81
												38												*04:83
																						47		*04:84
25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47		Well No.

Lot No.: **12M**

Lot-specific information

www.olerup-ssp.com

Length of spec.	250	220	145	210	250	95	145	270	110	195	180	125	225	155	180	130	320	125	120	165	85	130	85	170
PCR product(s)									180	220		165	270	190				225	155	250	145		145	
Well No.	1	2	3	4	5	6	7	8	220											545	240		215	
*01:02:01-01:03, 01:05-01:20, 01:23-01:34, 01:36-01:49, 01:51, 02:02:01-02:02:03, 02:02:05-02:02:17, 02:04-02:11, 02:13-02:15, 02:17, 02:19-02:40, 02:42-02:47, 05:01:01:01-05:01:15, 05:03-05:10, 05:12-05:16, 05:18-05:24, 05:26, 05:28-05:38, 05:40-05:41, 05:43-05:48N, 05:50, 05:52-05:53, 06:02:01:01-06:02:01:02, 06:02:03-06:03, 06:06-06:39, 06:41-06:58, 08:02:01-08:02:05, 08:05, 08:07, 08:12, 08:15:01-08:15:02, 08:17-08:19, 08:23, 08:25, 08:27, 08:29-08:35, 08:37, 08:43, 08:45, 12:02:01-12:13, 12:15-12:17, 12:21-12:27, 12:29-12:51, 14:26, 15:08, 16:04:01, 16:29, 18:01-18:02, 18:04	1																							
*01:04, 14:02:01-14:05, 14:07N-14:08, 14:10-14:14, 14:16-14:19, 14:21N-14:24, 14:27-14:29	1																							
*01:21	1																							
*01:22, 02:03, 02:16:01-02:16:02, 02:18, 05:11, 05:17, 06:04, 08:01:01-08:01:04, 08:03:01-08:04, 08:06, 08:08-08:11, 08:13-08:14, 08:16, 08:20-08:22, 08:24, 08:26N, 08:36N, 08:38-08:40, 08:42, 08:44, 08:46, 12:14:01-12:14:02, 12:18, 12:20, 15:02:01-15:07, 15:09-15:13, 15:16-15:24, 15:26-15:35, 15:37-15:48, 17:01:01:01-17:06, 17:08					5																			
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.: **12M**

Lot-specific information

www.olerup-ssp.com

190	215	285	215	185	75	180	275	235	105	180	80	200	85	175	115	135	110	105	135	145	270	140	280	85	170	135	135	300	185	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	Well No.								
																															*01:02:01-01:03, 01:05-01:20, 01:23-01:34, 01:36-01:49, 01:51, 02:02:01-02:02:03, 02:02:05-02:02:17, 02:04-02:11, 02:13-02:15, 02:17, 02:19-02:40, 02:42-02:47, 05:01:01:01-05:01:15, 05:03-05:10, 05:12-05:16, 05:18-05:24, 05:26, 05:28-05:38, 05:40-05:41, 05:43-05:48N, 05:50, 05:52-05:53, 06:02:01:01-06:02:01:02, 06:02:03-06:03, 06:06-06:39, 06:41-06:58, 08:02:01-08:02:05, 08:05, 08:07, 08:12, 08:15:01-08:15:02, 08:17-08:19, 08:23, 08:25, 08:27, 08:29-08:35, 08:37, 08:43, 08:45, 12:02:01-12:13, 12:15-12:17, 12:21-12:27, 12:29-12:51, 14:26, 15:08, 16:04:01, 16:29, 18:01-18:02, 18:04
																41															*01:04, 14:02:01-14:05, 14:07N-14:08, 14:10-14:14, 14:16-14:19, 14:21N-14:24, 14:27-14:29
														39																	*01:21
																															*01:22, 02:03, 02:16:01-02:16:02, 02:18, 05:11, 05:17, 06:04, 08:01:01-08:01:04, 08:03:01-08:04, 08:06, 08:08-08:11, 08:13-08:14, 08:16, 08:20-08:22, 08:24, 08:26N, 08:36N, 08:38-08:40, 08:42, 08:44, 08:46, 12:14:01-12:14:02, 12:18, 12:20, 15:02:01-15:07, 15:09-15:13, 15:16-15:24, 15:26-15:35, 15:37-15:48, 17:01:01:01-17:06, 17:08
25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	Well No.								



Lot No.: **12M**

Lot-specific information

www.olerup-ssp.com

Length of spec.	250	220	145	210	250	95	145	270	110	195	180	125	225	155	180	130	320	125	120	165	85	130	85	170
PCR product(s)									180	220		165	270	190				225	155	250	145		145	
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
*01:35, 05:27, 08:41, 15:15, 17:07, B*58:02					5			8																
*01:50	1																17							
*02:12	1			4																				
*03:05, 03:25, 03:27																16								
*03:34							7																	
*05:25, 05:42, 06:05, 08:28, 12:28	1										11													
*05:39	1							8																
*05:49	1																							
*07:02:09, 15:25, 16:26											11													
*07:08, 07:108														14										
*07:64		2					7																	
*07:125												12												24
*14:06, 14:15					5																			
*14:09	1															16								
*14:20	1							8																
*14:25	1						7																	
*15:36					5	7			10											20				
*16:12																								
*18:03	1						7																	
A*24:96, A*24:146															15									
B*07:90																								
B*40:100																								
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

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*04 subtyping. .

In addition, wells number 26 and 27 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 2nd, 3rd, 4th, 5th or 6th, exon or in the 2nd and 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 2nd, 3rd, 4th, 6th or 7th exon or in the 3rd intron, 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 Cw*0402 allele has been shown to be identical to C*04:01:01:01. The nucleotide sequence of the Cw*0421 allele has been renamed C*04:15:02.

The nucleotide sequence of the Cw*0422 allele has been shown to be identical to C*04:21.

Lot No.: **12M**

Lot-specific information

www.olerup-ssp.com

190	215	285	215	185	75	180	275	235	180	200	85	115	110	105	145	140	280	85	170	135	135	300	185	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	Well No.	
																								*01:35, 05:27, 08:41, 15:15, 17:07, B*58:02
																								*01:50
																								*02:12
																								*03:05, 03:25, 03:27
																								*03:34
																								*05:25, 05:42, 06:05, 08:28, 12:28
																								*05:39
																								*05:49
																								*07:02:09, 15:25, 16:26
																								*07:08, 07:108
																								*07:64
																								*07:125
																								*14:06, 14:15
																								*14:09
																								*14:20
																								*14:25
																								*15:36
																								*16:12
																								*18:03
																								A*24:96, A*24:146
																								B*07:90
																								B*40:100
																								HLA-C allele ⁴
25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	Well No.	

⁵The C*04:15:02, C*04:44 and C*04:47 alleles can be distinguished by the different sizes of the specific PCR products generated by primer mix 20.

⁶The C*04:23, C*04:38 and C*04:39 alleles can be distinguished by the different sizes of the specific PCR products generated by primer mix 21.

⁷The C*04:25, C*04:40 and C*04:41 alleles can be distinguished by the different sizes of the specific PCR products generated by primer mix 23.

⁸The C*04:46 and C*04:50 alleles can be distinguished by the different sizes of the specific PCR products generated by primer mix 27.

⁹The C*04:48 and C*04:75 alleles can be distinguished by the different sizes of the specific PCR products generated by primer mix 28.

¹⁰The C*04:56 and C*04:64 alleles can be distinguished by the different sizes of the specific PCR products generated by primer mix 40.

¹¹The C*04:59Q and C*04:78 alleles can be distinguished by the different sizes of the specific PCR products generated by primer mix 32.

¹²The C*04:62 and C*04:76 alleles can be distinguished by the different sizes of the specific PCR products generated by primer mix 35.

¹³The C*04:65 and C*04:72 alleles can be distinguished by the different sizes of the specific PCR products generated by primer mix 33.

¹⁴Primer mix 9: Specific PCR fragment of 110 bp in the C*04:35 allele. Specific PCR fragment of 180 bp in the C*04:30 allele. Specific PCR fragment of 220 bp in the C*04:09N allele.

Lot No.: **12M**

Lot-specific information

www.olerup-ssp.com

Primer mix 10: Specific PCR fragment of 195 bp in the C*04:31 allele. Specific PCR fragment of 220 bp in the C*04:10, 04:11, 04:36 and 04:55 and in the C*15:36 alleles.

Primer mix 12: Specific PCR fragment of 125 bp in the C*04:29, 04:36 and 04:55 and the C*07:125 alleles. Specific PCR fragment of 165 bp in the C*04:33 allele. Specific PCR fragment of 125 and 165 bp in the C*04:11 allele.

Primer mix 13: Specific PCR fragment of 225 bp in the C*04:12 allele. Specific PCR fragment of 270 bp in the C*04:52 and 04:55 alleles.

Primer mix 14: Specific PCR fragment of 155 bp in the C*04:16 allele. Specific PCR fragment of 190 bp in the C*04:13, 04:18 and 04:58 and the C*07:08 and 07:108 alleles.

Primer mix 18: Specific PCR fragment of 125 bp in the C*04:70 allele. Specific PCR fragment of 225 bp in the C*04:19 allele.

Primer mix 19: Specific PCR fragment of 120 bp in the C*04:35 and 04:37 alleles. Specific PCR fragment of 155 bp in the C*04:20 allele.

Primer mix 20: Specific PCR fragment of 165 bp in the C*04:44 allele. Specific PCR fragment of 250 bp in the C*04:47 allele. Specific PCR fragment of 545 bp in the C*04:15:02 and 04:17 and the C*15:36 alleles.

Primer mix 21: Specific PCR fragment of 85 bp in the C*04:23 allele. Specific PCR fragment of 145 bp in the C*04:38 allele. Specific PCR fragment of 240 bp in the C*04:39 allele.

Primer mix 23: Specific PCR fragment of 85 bp in the C*04:25 allele. Specific PCR fragment of 145 bp in the C*04:40 allele. Specific PCR fragment of 215 bp in the C*04:41 allele.

Primer mix 27: Specific PCR fragment of 125 bp in the C*04:50 allele. Specific PCR fragment of 285 bp in the C*04:46 allele.

Primer mix 28: Specific PCR fragment of 120 bp in the C*04:75 allele. Specific PCR fragment of 215 bp in the C*04:48 allele.

Primer mix 32: Specific PCR fragment of 105 bp in the C*04:78 allele. Specific PCR fragment of 235 bp in the C*04:59Q allele. Specific PCR fragment of 275 bp in the C*04:77 and in the B*40:100 alleles.

Primer mix 33: Specific PCR fragment of 80 bp in the C*04:72 allele. Specific PCR fragment of 180 bp in the C*04:58 and 04:65 and the C*07:08 and 07:108 and in the B*40:100 alleles.

Primer mix 35: Specific PCR fragment of 85 bp in the C*04:62 allele. Specific PCR fragment of 175 bp in the C*04:76 allele.

Primer mix 37: Specific PCR fragment of 110 bp in the C*04:63 and 04:73 alleles. Specific PCR fragment of 135 bp in the C*04:74 allele.

Primer mix 38: Specific PCR fragment of 105 bp in the C*04:83 allele. Specific PCR fragment of 135 bp in the C*04:74 allele.

Primer mix 39: Specific PCR fragment of 145 bp in the C*04:71 and the C*01:21 alleles. Specific PCR fragment of 330 bp in the C*04:79 allele.

Primer mix 40: Specific PCR fragment of 140 bp in the C*04:56 allele. Specific PCR fragment of 270 bp in the C*04:64 allele.

¹⁵Primer mix 42 does not amplify the C*04:82 allele. Thus, this lot of the HLA-C*04 subtyping kit cannot distinguish the C*04:01:01:01-04:01:09, 04:01:11-04:01:22, 04:01:24-04:01:27 and 04:01:29-04:01:37 alleles and the C*04:82 allele.

‘w’, may be weakly amplified.

CELL LINE VALIDATION SHEET																				
HLA-C*04 SSP subtyping kit																				
				Well																
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
				Prod. No.:	201070201	201070202	201070203	201070204	201070205	201070206	201070207	201070208	201070209	201070210	201070211	201070212	201070213	201185314	201070215	201070216
IHC 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*04 SSP subtyping kit																				
				Well																
				17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	
				Prod. No.:	201186317	201186318	201070219	201070220	201070221	201070222	201070223	201070224	201070225	201070226	201070227	201186328	201070229	201070230	201070231	201186332
IHCW 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*04 SSP subtyping kit																			
				Well															
				33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	
				Prod. No.:	201185333	201185334	201185335	201185336	201185337	201185338	201185339	201185340	201185341	201185342	201185343	201185344	201185345	201185346	201185347
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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

CERTIFICATE OF ANALYSIS

Olerup SSP® HLA-C*04 SSP

Product number: 101.612-12u – without *Taq* polymerase
Lot number: 12M
Expiry date: 2013-November-01
Number of tests: 12
Number of wells per test: 47

Well specifications:

Well No.	Production No.	Well No.	Production No.	Well No.	Production No.
1	2010-702-01	17	2011-853-17	33	2011-853-33
2	2010-702-02	18	2011-853-18	34	2011-853-34
3	2010-702-03	19	2010-702-19	35	2011-853-35
4	2010-702-04	20	2010-702-20	36	2011-853-36
5	2010-702-05	21	2010-702-21	37	2011-853-37
6	2010-702-06	22	2010-702-22	38	2011-853-38
7	2010-702-07	23	2010-702-23	39	2011-853-39
8	2010-702-08	24	2010-702-24	40	2011-853-40
9	2010-702-09	25	2010-702-25	41	2011-853-41
10	2010-702-10	26	2010-702-26	42	2011-853-42
11	2010-702-11	27	2010-702-27	43	2011-853-43
12	2010-702-12	28	2011-853-28	44	2011-853-44
13	2010-702-13	29	2010-702-29	45	2011-853-45
14	2011-853-14	30	2010-702-30	46	2011-853-46
15	2010-702-15	31	2010-702-31	47	2011-853-47
16	2010-702-16	32	2011-853-32		

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

No DNAs carrying the alleles to be amplified by primer solutions 6, 8, 10, 12, 13, 15, 17 to 40 and 42 to 47 were available. The specificity of the primers in primer solutions 8, 10, 12, 13, 15, 17, 18 to 21, 24, 28, 32 to 34, 39 and 42 were tested by separately adding one additional 5'-primer, respectively one additional 3'-primer. In primer solutions 6, 25 to 27, 29, 35, 40 and 43 it was only possible to test the 5'-primers, the 3'-primers were not possible to test. In primer solutions 22, 23, 30, 31, 36 to 38 and 44 to 47 it was only possible to test the 3'-primers, the 5'-primers were not possible to test. In primer solutions 9, 15, 18, 19, 24, 28 and 42 one or two of the 5'-primers were not possible to test, and in primer solutions 9, 10, 13, 14, 18, 20, 21, 24, 28, 32, 33 and 39 one or two of the 3'-primers were not possible to test. Additional primers in primer solutions 7, 9, 14 and 16 were tested by separately adding one 5'-primer and/or one 3'-primer.

Lot No.: **12M**

Lot-specific information

www.olerup-ssp.com

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

Date of approval: 2011-July-15

Approved by:

Production Quality Control

Lot No.: **12M**

Lot-specific information

www.olerup-ssp.com

Declaration of Conformity

Product name: *Olerup* SSP® HLA-C*04
Product number: 101.612-12u
Lot number: 12M

Intended use: HLA-C*04 high resolution histocompatibility testing

Manufacturer: *Olerup* SSP AB
Franzengatan 5
SE-112 51 Stockholm, 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, Franzengatan 5, SE-112 51 Stockholm, Sweden.

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

Stockholm, Sweden
2012-July-20

Åsa Olausson
Production Quality Control

Lot No.: **12M**

Lot-specific information

www.olerup-ssp.com

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Fax: +46-8-717 88 18

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Tel: +43-1-710 15 00

Fax: +43-1-710 15 00 10

E-mail: support-at@olerup.com

Web page: <http://www.olerup.com>

Olerup Inc., 901 S. Bolmar St., Suite R, West Chester, PA 19382

Tel: 1-877-OLERUP1

Fax: 610-344-7989

E-mail: info.us@olerup.com

Web page: <http://www.olerup.com>

For information on *Olerup* SSP distributors worldwide, contact **Olerup GmbH**.