

Olerup SSP® HLA-A-B-DR SSP Combi Tray

Product number:	101.701-24/06 – including <i>Taq</i> pol.
Lot number:	61F
Expiry date:	2011-February-01
Number of tests:	24 tests – Product No. 101.701-24 6 tests – Product No. 101.702-06
Number of wells per test:	95 +1
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. 61F.

CHANGES COMPARED TO THE PREVIOUS OLERUP SSP® HLA-A-B-DR SSP COMBI TRAY LOT

The **HLA-A low resolution** specificity and interpretation tables have been updated for the HLA-A alleles described since the previous *Olerup SSP® HLA-A-B-DR SSP Combi Tray* lot was made (**Lot No. 98E**).

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

Well	5'-primer	3'-primer	rationale
15	Added	Added	Primers added for the A*3026 and A*3028 alleles.
17	Added	Added	Primer pair added for improved resolution.
18	-	Added	Primer added for the A*3321 allele.
20		Modified	Primer modified to increase specificity.

The **HLA-B low resolution** specificity and interpretation tables have been updated for the HLA-B alleles described since the previous *Olerup SSP® HLA-A-B-DR SSP Combi Tray* lot was made (**Lot No. 98E**).

The HLA-B low resolution primer set is unchanged compared to the previous lot.

The **HLA-DR low resolution** specificity and interpretation tables have been updated for the HLA-DRB alleles described since the previous *Olerup SSP® HLA-A-B-DR SSP Combi Tray* lot was made (**Lot No. 98E**).

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

Well	5'-primer	3'-primer	rationale
95	-	Exchange	Primer exchanged to avoid co-amplification of the DRB1*0905 allele.

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Well 96 contains Negative Control primer pairs, that will amplify more than 95% of the *Olerup SSP® HLA Class I, DRB, DQB1 and DPB1 amplicons* as well as the amplicons generated by control primer pairs.

PCR product sizes range from 75 to 430 base pairs.
The PCR product generated by the control primer pair is 430 base pairs.

Length of PCR product	105	200	105	80	75	80
5'-primer¹	164	340	440	45	45	43
	5'-CAC ^{3'}	5'-Agg ^{3'}	5'-TTA ^{3'}	5'-Tg g ^{3'}	5'-Tg g ^{3'}	5'-Tg g ^{3'}
3'-primer²	231	2nd I	507	59	58	57
	5'-TgC ^{3'}	5'-AAA ^{3'}	5'-TTg ^{3'}	5'-CTC ^{3'}	5'-ggC ^{3'}	5'-CTC ^{3'}
A*	+	+	+			
B*	+	+	+			
Cw*	+	+	+			
DRB1				+	+	
DRB3				+	+	
DRB5				+		
DQB1						+
DPB1						+

¹The nucleotide position for HLA class I genes and the codon for HLA class II genes, in the 2nd or 3rd exon, matching the specificity-determining 3'-end of the primer is given. Nucleotide and codonnumbering as on the www.ebi.ac.uk/imgt/hla web site. The sequence of the 3 terminal nucleotides of the primer is given.

²The nucleotide position for HLA class I genes and the codon for HLA class II genes, in the 2nd or 3rd exon or the 2nd intron, matching the specificity-determining 3'-end of the primer is given in the anti-sense direction. Nucleotide and codon numbering as on the www.ebi.ac.uk/imgt/hla web site. The sequence of the 3 terminal nucleotides of the primer is given.

PRODUCT DESCRIPTION

HLA-A-B-DR SSP Combi Tray

CONTENT

The primer set contains 5'- and 3'-primers for grouping the HLA-A*0101 to A*8001 alleles into the corresponding serological groups A1 to A80.

The primer set contains 5'- and 3'-primers for grouping the B*0702 to B*8301 alleles into the corresponding serological groups B7 to B81 as well as primer pairs for recognizing the Bw4 and Bw6 sequence motifs.

The primer set contains 5'- and 3'-primers for grouping the DRB1*0101 to DRB1*1003 alleles into the corresponding serological groups DR1 to DR18 as well as primer pairs for recognizing the DRB3, DRB4 and DRB5 groups of alleles.

PLATE LAYOUT

Each test consists of 96 PCR reactions in a 96 well PCR plate.

1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32
33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56
57	58	59	60	61	62	63	64
65	66	67	68	69	70	71	72
73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88
89	90	91	92	93	94	95	ctrl

Wells 1 to 24 – HLA-A low resolution primers.

Wells 25 to 72 – HLA-B low resolution primers.

Wells 73 to 95 – HLA-DR low resolution primers.

Well 96 – Negative Control.

The 96 well PCR plate is marked with 'A-B-DR' in silver/gray ink.

Well No. 1 is marked with the Lot No. '61F'.

The PCR plates are covered with a PCR-compatible foil.

INTERPRETATION

Only HLA-A alleles will be amplified by the 24 wells of the HLA-A low resolution primer set, **wells 1 to 24**, except that primer mix 6 will amplify the B*1827 allele. Thus, the interpretation of HLA-A low resolution is only influenced by this HLA-B allele and not by other HLA Class I genes.

Only HLA-B alleles will be amplified by the 48 wells of the HLA-B low resolution, primer set, **wells 25 to 72**, except that the A*3028 will be amplified by primer mix 66, that the Cw*0206 allele will be weakly amplified by primer mixes 34 and 67, that the Cw*0223 allele will be amplified by primer mix 25, that the HLA-Cw*0305, 0325 and 0327 alleles will be amplified by primer mix 27, that the Cw*0746 allele will be amplified by primer mix 32, and that the Cw*150204 allele will amplified by

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primer mix 64. Thus, the interpretation of HLA-B low resolution typings is only influenced by this HLA-A allele and seven HLA-Cw alleles and not by other alleles of other HLA class I genes.

Only HLA-DRB alleles will be amplified by the 23 wells the DR low resolution primer set, **wells 73 to 95**. Thus, the interpretation of DR low resolution typings is not influenced by other HLA class II genes.

UNIQUELY IDENTIFIED ALLELES

All the HLA-A alleles, i.e. **A*0101 to A*8001**, recognized by the HLA Nomenclature Committee in January 2009¹ will be amplified by the primers in the HLA-A low resolution primer set, **wells 1 to 24**. The HLA-A alleles will be grouped into their corresponding serological specificities².

All the HLA-B alleles, i.e. **B*0702 to B*8301**, recognized by the HLA Nomenclature Committee in January 2009¹ will be amplified by the primers in the HLA-B low resolution primer set, **wells 25 to 72**. The HLA-B alleles will be grouped into their corresponding serological specificities³.

All the HLA-DRB1, -DRB3, -DRB4⁴ and -DRB5 alleles, i.e. **DRB1*010101 to 1003, DRB3*010101 to DRB3*0303, DRB4*01010101 to DRB4*0107, DRB5*010101 to DRB5*0205**, recognized by the HLA Nomenclature Committee in January 2009² will be amplified by the primers in the DR low resolution primer set, **wells 73 to 95**. The HLA-DRB alleles will be grouped into their corresponding serological specificities⁵.

¹HLA-A, HLA-B and HLA-DRB alleles listed on the IMGT/HLA web page 2009-January-16, release 2.24.0, www.ebi.ac.uk/imgt/hla.

²The A*0318 and A*2619 alleles will give rise to identical amplification patterns. These two alleles can be separated by the respective high resolution SSP primer sets.

The A*2314, A*2405, A*241302 and A*2424 alleles will give rise to identical amplification patterns. These four alleles can be separated by the respective high resolution SSP primer sets.

³The B*0826 and the B*4207 alleles give rise to identical amplification patterns with the HLA-B low resolution primer set. These alleles can be separated by the respective high resolution primer sets.

The B*1408 and the B*3925N, B*3930 and B*3932 to 3934 alleles give rise to identical amplification patterns with the HLA-B low resolution primer set. These alleles can be separated by the respective high resolution primer sets.

The B*1829 and the B*3523, B*3537, B*3553N, B*3564, B*3566 and B*356801-356802 alleles give rise to identical amplification patterns with the HLA-B low resolution primer set. These alleles can be separated by the respective high resolution primer sets.

The B*5504, B*5508, B*5513, B*5527 and the B*5615, B*5619N and B*5622 give rise to identical amplification patterns with the HLA-B low resolution primer set. These alleles can be separated by the respective high resolution primer sets.

The B*5523, B*5532 and the B*5618 give rise to identical amplification patterns with the HLA-B low resolution primer set. These alleles can be separated by the respective high resolution primer sets.

⁴The DRB4*0201N and DRB4*0301N null alleles will not be amplified by the DR low resolution primer set.

⁵The DRB1*0809, DRB1*0821 and DRB4*1415 alleles yield identical amplification patterns except for the specific PCR product yielded by the DRB3 gene in linkage disequilibrium with the DRB1*1415 allele.

The DRB1*0820, DRB1*1318, DRB1*1347 and DRB1*1355 alleles yield identical amplification patterns except for the specific PCR product yielded by the DRB3 gene in linkage disequilibrium with the DRB1*1318, DRB1*1347 and DRB1*1355 alleles.

The DRB1*0831 and DRB1*1167 alleles yield identical amplification patterns except for the specific PCR product yielded by the DRB3 gene in linkage disequilibrium with the DRB1*1167 allele.

SPECIFICITY TABLE

HLA-A low resolution primer set

Specificities and sizes of the PCR products of the 24 primer mixes used for HLA-A low resolution SSP typing

Primer Mix	Size of spec. PCR product ¹	Size of control band ²	HLA-A serology ³	Amplified HLA-A alleles ^{4,11,12}
1 ⁵	120, 145 bp	800 bp	A1, A36	01010101-0104N, 0106-0133, 3601-3604
2 ⁶	135, 200, 255 bp	1070 bp	A2	02010101-020115, 020117-020119, 020121-0222, 0224-023501, 023503-0247, 0249-0297, 0299, 9201-9221, 9223-9228, 9230-9256
3 ⁷	205, 235 bp	1070 bp	A1, A3, A11, A24, A32, A34, A36	0112, 0119, 0121, 03010101-0317, 0319-0346, 1125, 2492, 3204, 3402-3404, 3407, 3408, 3602
4 ⁷	190 bp	800 bp	A1, A2, A3, A11, A26, A30, A36	01010101-0104N, 0106, 0107, 0109-0111N, 0113, 0116N-0118N, 0120-0129, 0131N-0133, 0278, 0312, 0318, 110101-1127, 1129-1140, 2619, 3008, 3604
5	160, 535 bp	800 bp	A3, A23, A24, A31, A32	0330, 2301-2319Q, 24020101-2411N, 241301-2415, 2417-2464, 2466-2488, 2490N-2497, 3108, 3205, 3213
6	165, 200 bp	800 bp	A2, A23, A24, A29, A80	9222, 2301-2319Q, 2405, 241302, 2424, 2907, 8001, B*1827
7	175, 205 bp	1070 bp	A2, A23, A24, A26, A33, A68	021701-021702 ^{weakly} , 2314, 24020101-2411N, 241301-241302, 2417-2450, 2454-2456, 2458-2463, 2466-2491, 2493, 2495-2497, 2616, 3319, 6845
8 ⁷	165, 200 bp	800 bp	A2, A3, A11, A25, A26, A32, A34, A66, A68, A69	0255, 0324, 1110, 250101-2508, 260101-2606, 2608-2615, 2617, 2618, 2620-2637, 3215, 340101-3408, 6601-6608, 680101-6846, 6901
9 ⁵	75 bp	800 bp	A25, A32	250101-2508, 320101-3202, 3204, 3206-3218

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10⁵	85 bp	1070 bp	A2, A26, A33	9246, 260101-2602, 2604, 260701-2618, 2620, 2622-2629, 2632-2637, 3313
11^{5,7,8}	80, 175, 500 bp	1070 bp	A1, A11, A24, A26, A31, A34, A66	0113, 0128, 110101-1127, 1129-1140, 2419, 2444, 2603, 2606, 2621, 3103, 340101-3408, 6601, 6604-6608
12	185 bp	800 bp	A11, A25, A26, A31, A34, A43, A66	1111, 2506, 2609, 3103, 3104, 340101-3408, 4301, 6602, 6603
13⁷	175, 225 bp	1070 bp	A1, A2, A3, A25, A26, A34, A43, A66, A74	0113, 0234-023503, 025601- 025602, 0262, 9203, 9235, 03010101-0307, 0309-0311N, 0313-0331, 0333-0335, 0337- 0340, 0342-0346, 250101-2505, 2507, 2508, 260101-260107, 2602 ^{weakly} , 2603, 2605-2608, 2610-2633, 2635-2637, 3408, 4301, 6601, 6604-6608, 7413
14	200, 240 bp	1070 bp	A29, A33	29010101-2919, 3313
15⁵	90, 135, 205 bp	1070 bp	A1, A3, A30	0113, 0128, 0343, 300101-3004, 3006-3020, 3022-3025, 3027N
16	370, 400 bp	1070 bp	A31, A32	2914, 310102-3124, 3205
17	150, 180 bp	1070 bp	A29, A32	2913, 320101-3203, 3205-3218
18	200 bp	1070 bp	A33, A68	3301, 330301-3320, 3322, 3323, 6829
19	160, 200 bp	800 bp	A29, A74	2919, 7401-7413
20⁹	155, 240 bp	800 bp	A2, A210, A24, A25, A30, A68	0210, 0234-023503, 0239, 0246, 0248, 0250, 0252, 025601- 025602, 0262, 0270, 0273, 0278, 0293, 0295, 9203, 9210, 9214, 9217, 9222, 9229, 9256, 2494, 2505, 3008, 680101-6846
21	240, 375 bp	800 bp	A2, A24, A26, A68, A69	0255, 2482, 2622, 3322, 6829, 6901
22^{5,10}	85, 240 bp	800 bp	A2, A30, A36	0234-023503, 0246, 0248, 025601-025602, 0262, 0270, 0278, 9203, 9229, 3008, 3601- 3604
23⁵	75, 160 bp	800 bp	A2, A26, A68, A80	0255, 2603, 2605, 2606, 2621, 2630, 6805, 6815, 6820, 8001

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24	360 bp	1070 bp	A1, A3, A11, A33, A36, A74, A80	01010101-0104N, 0106, 0108- 0129, 0131N-0133, 0341, 110101-1111, 1113-1117, 1119- 1127, 1129-1140, 3313, 3601- 3604, 7410, 8001
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¹ Alleles are assigned by the presence of specific PCR product(s). However, the sizes of the specific PCR products may be helpful in the interpretation of HLA-A low resolution 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 length 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 inherit 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-A low resolution typing.

In addition, wells number 4, 5, 6, 8, 9, 11, 12, 19 to 23 contain the primer pair giving rise to the shorter, 800 bp, internal positive control band in order to allow kit identification.

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

³The serological reactivity of all HLA-A alleles is not known. In this table we use the information in the HLA Dictionary 2004 on the www.ebi.ac.uk/imgt/hla web site and the information available at the www.worldmarrow.org web site and have also inferred the serological grouping from the naming of the sequence-defined allele.

⁴For several HLA-A alleles only partial 1st exon nucleotide sequences are available. We assume that unknown sequences are conserved within allelic groups.

Nucleotide sequence information is available for only exons 2 and 3 of many HLA Class I alleles and for only exon 2 of many HLA Class II alleles and not for other exons or for the introns of these alleles. We assume that unknown sequences in these exons and in the introns are conserved within loci and within allelic groups.

⁵Specific PCR fragments shorter than 125 base pairs have a lower intensity and are less sharp than longer PCR bands.

⁶The primer pairs in vial 2 will in most samples give rise to two specific PCR fragments.

⁷Primer mixes 3, 4, 8, 11 and 13 may give rise to nonspecific amplifications.

⁶The primer pairs in vial 11 will in most samples give rise to two to three specific PCR fragments.

⁹Primer mix 20 may give rise to nonspecific amplifications.

¹⁰Primer mix 22 might faintly amplify most A*11 alleles.

¹¹The A*0318 and A*2619 alleles will give rise to identical amplification patterns. These two alleles can be separated by the respective high resolution SSP primer sets.

The A*2314, A*2405, A*241302 and A*2424 alleles will give rise to identical amplification patterns. These four alleles can be separated by the respective high resolution SSP primer sets.

¹²Primer mix 6 will amplify the B*1827 allele.

'w', might be weakly amplified.

SPECIFICITY TABLE

HLA-B low resolution primer set

Specificities and sizes of the PCR products of the 48 primer mixes used for HLA-B low resolution SSP typing

Primer Mix	Size of spec. PCR product ¹	Size of control band ²	HLA-B serol. ³	Amplified HLA-B alleles ⁴
25 ^{5,6}	110 bp	800 bp	7, 15, 37, 40, 41, 42, 48	070201-071802, 0720-0732, 0734- 0739, 0741-0747, 0749N, 0750, 0752, 0754-0759, 0761-0768, 9538, 3707, 4015, 4016, 4023, 4032, 4108, 420501-420502, 4805, 4808, 4815, Cw*0223
26	215 bp	1070 bp	8, 15, 44	080101-0825, 0827-0838, 9542, 4449
27 ^{5,7}	140, 235 bp	1070 bp	7, 8, 13, 15, 35, 40, 4005, 44, 46, 53, 57, 58	0720, 0724, 0760, 0821, 0825, 1301-1304, 1306-1308Q, 1310- 1323, 150106-150108, 1507, 152702-152703, 1536 ^{weakly} , 1545, 1555, 1568, 1589 ^{weakly} , 9526, 9535- 9537, 9539-9542, 9544-9550, 3505, 3516, 3517, 3522, 3530, 3551, 3558, 3572, 3589, 4005, 4071, 4408 ^{weakly} , 4454, 4457 ^{weakly} , 4460, 4611- 4617, 5314, 5714, 5715, 5717-5719, 5818, Cw*0305, Cw*0325, Cw*0327
28 ⁸	130, 265 bp	1070 bp	13, 14, 15, 35, 40, 41, 44, 45, 47, 49, 50	1301-1304, 1306-1313, 1315-1323, 1401-1404, 1407N, 1409, 1546, 1553, 9506, 3547, 3563, 400101- 400106, 4007, 4010, 401401-4016, 4022N, 4023, 4025, 4030-4034, 4036, 4038, 4042, 4043, 4045, 4047-4049, 4051-4055, 4058-4063, 4065-4067, 4069, 407201-4073, 4076, 4077, 4079-4081, 4084, 4087, 4088, 4092, 4101-4108, 44020101-4405, 4409-4439, 4441- 4443, 4445-4456N, 4458N-4465, 4501-4509, 47010101-4705, 490101-4902, 4904, 4905, 5001, 5002, 5004
29 ⁹	185, 235	1070 bp	14, 16, 27,	1401, 1407N, 1408, 2701-270402,

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	bp		37, 38, 39, 47, 64, 67	270502-2706, 2708-2710, 2712, 2713, 2716-2718, 2720, 2723, 2726, 2727, 2729, 2731, 2735- 2737, 2739-2742, 2744, 2745, 3702, 380101-3803, 3807-3817, 39010101-39010102L, 390103- 390201, 3903, 3905-390602, 3907 [?] , 3908, 3909, 3911, 3914, 3915, 3918, 391902, 3922, 3924- 3944, 3946, 4704, 4705, 670101
30⁹	185 bp	800 bp	14, 35, 38, 39, 65	140201-140602, 1409, 3526, 3805, 3904, 3907 [?]
31	290 bp	1070 bp	15, 62, 63, 75, 76, 77, 46	15010101-150103, 150106-150107, 1502, 1504-1508, 151101-1515, 15170101-151702, 1519-1521, 1524-152701, 152703, 1528, 1530- 1536, 1538-1540, 1542-1546, 1548, 1550, 1555-1558, 1560, 1563, 1565, 1566, 1568, 1570, 1571, 1573, 1575-1579N, 1581-1589, 1592, 1594N, 1596, 1597, 9501, 9502, 9504-9507, 9509-9513, 9516-9518, 9520-9522, 9525, 9526, 9528, 9529, 9535-9550, 460101- 4618
32	165, 220, 330 bp	1070 bp	8, 15, 35, 37, 40, 41, 42, 44, 45, 51, 56, 57, 70, 71, 72	080101-0805, 0808N-0812, 0815- 0819N, 0821-0824, 0826, 0827, 0829-0836, 0838, 1503, 1509, 1510, 1518, 1523, 1529, 1537, 1546, 1547, 1549, 1551-1554, 1561, 1562, 1564, 1568, 1569, 1572, 1574, 1580, 1583, 1590, 1591, 1593, 1598, 1599, 9503, 9506, 9508, 9514, 9515, 9519, 9523, 9524, 9527, 9531-9534, 9543, 9551, 3587, 3712, 4012, 4101-410302, 4105-4108, 4201, 4202, 4204-4208, 4414, 4415, 4418, 4420, 4462, 4501-4509, 5108, 5120, 5136, 5144N, 5613, 5709, 8201, 8202, Cw*0746
33^{5,9,10}	165, 390 bp	800 bp	15, 35, 40, 44, 51, 52, 56, 58, 62, 63, 70, 78	150102, 1509, 1516-151702, 1567, 1595, 350402, 4026, 4028, 4462, 510101-510103, 510105-510203, 5103-510902, 5111N, 5112, 511302, 5114, 5117-5120, 5122, 5123, 5126-5130, 5132, 5133,

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				5137-5141N, 5143, 5144N, 5146, 5148-5161, 5163, 520101-5207, 5209-5213, 560501-5606, 5621, 5808, 7801-7806
34⁹	180, 395 bp	800 bp	13, 15, 40, 55, 62, 70, 71, 72, 75	1301-130204, 1307N-1309, 1311, 1314-1320, 1322, 1323, 1509, 1510, 1518, 1521, 1523, 1537, 1544, 1551, 1552, 1566, 1572, 1580, 1590, 1593, 1599, 9508, 9514, 9515, 9519, 9524, 9533, 9534, 4048, 5522, 5524, Cw*0206 ^{weakly}
35^{5,6}	105, 195 bp	1070 bp	7, 8, 15, 27, 38, 39, 40, 44, 45, 48, 55, 72	0727, 0750, 0804, 0817, 1503, 1547, 1549, 1554, 1561, 1562, 1564, 1568, 1569, 1591, 1598, 9503, 9523, 9527, 9531, 9532, 9551, 2718, 2729, 3803, 390201- 390202, 3908, 391301-391302, 3923, 3939, 4012, 4046, 4410, 4415, 4418, 4440, 4444, 4501, 4505-4507, 480101-4805, 4807- 4819, 5002, 5518, 8201, 8202
36	275 bp	1070 bp	7, 8, 13, 15, 18, 27, 35, 39, 40, 42, 44, 46, 48, 49, 51, 53, 54, 55, 56, 57, 58, 62, 63, 70, 71, 72, 75, 76, 77	0709, 0711, 0717, 0828, 0835, 0837, 1304, 1310, 15010101- 150104, 150106-1508, 151101- 1516, 1518-1521, 1523-1529, 1531-1536, 1538-1540, 1543, 1544, 1546, 1547, 1549-1557, 1560-1562, 1564-1572, 1574-1576, 1578-1582, 1584, 1585, 1587-1589, 1591-1598, 9501-9529, 9531, 9532, 9534-9536, 9538-9549N, 180101-1815, 1817N- 1825, 1827-1832, 2741, 350101- 350107, 3505, 3507-350803, 3510, 3511, 351401-3517, 3519-3521, 3523-3530, 3532, 3535, 3537, 3540N-3543, 3545-3554, 3557, 3558, 3561-3564, 3566-3569, 3571, 3572, 3576-3580, 3582, 3586, 3589-3594, 3907, 3943, 4003, 4020, 4038, 4052, 4059, 4060, 4209, 4417, 4443, 4509, 460101- 4610, 4612-4617, 4802, 4814, 4904, 4905, 5137, 5145, 5163, 530101-5303, 5305, 5306, 5308- 5316, 5406, 5409, 5414, 5514, 5523, 5532, 5603, 5609, 5618, 570101-570103, 5706, 5708, 5710,

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					5711, 5713-5716, 5718, 5719, 580101-5802, 5804-5807, 5809- 5819
37	195 bp	1070 bp	15, 35, 37, 38, 44, 45, 58, 76		1512, 1514, 1519, 1591, 9531, 3545, 3571, 370101-3709, 3712, 3713, 3817, 4417, 4443, 4509, 4617, 5807
38⁶	105, 435	1070 bp	7, 15, 41, 42, 59, 62, 63, 77		0704, 0725, 1513, 1516-151702, 1523, 1524, 1567, 1587, 1595, 4108, 420501-420502
39⁶	115 bp	1070 bp	18		180101-1815, 1817N-1828, 1830- 1832
40⁶	80 bp	1070 bp	27, 40, 44		2701-270402, 270502-2721, 2723- 2745, 4046, 4093, 4440, 4444
41	150 bp	1070 bp	13, 15, 18, 27, 35, 37, 39, 40, 44, 48, 51, 53, 55, 56, 57, 58, 62, 75, 77		1301, 1306, 1307N, 1312, 1313, 1317, 1320, 1322, 1323, 1502, 1513, 1520, 1521, 1525, 1536, 1544, 1562, 1577, 1580, 1585, 1588, 1589, 9506, 9512, 9521, 9539, 9544, 1822, 2719, 2730, 350101-350403, 3506-350803, 3510-3517, 3519-3521, 3523-3530, 3533-3536, 3538-3542, 3545-3550, 3552, 3554-3557, 3559, 3561-3563, 3565Q, 3569-3571, 3574, 3576- 3578, 3580-3585, 3590-3594, 370101-370104, 3703N-3706, 3708, 3710, 3711, 3713, 3942, 4028, 44020101-4414, 4416, 4417, 4419N, 4421-4430, 4432-4440, 4442-4446, 4448-4452N, 4455- 446402, 4802, 5104, 5142, 5146, 5156, 530101-5313, 5315, 5316, 5514, 5609, 5611, 5612, 570101- 5710, 5712, 5714-5719, 580101- 580102, 5804, 5805, 5809-5815, 5817N, 5819, 8301
42	135 bp	1070 bp	7, 8, 18, 35, 37, 39, 56, 78		0765, 0832, 180101-1808, 1810- 1815, 1817N-1832, 350101-3518, 352001-3524, 3528-3545, 3548, 3550-3555, 3557-3562, 3564-3572, 3774-3594, 3590-3594, 3711, 3714, 391901-391902, 5606, 7801-7805
43^{5,6}	245, 400 bp	1070 bp	15, 62, 63, 70, 71, 72, 75, 76, 77, 40, 44		15010101-150104, 150106-1521, 1523-1540, 1542-1558, 1560-1599, 9501-9529, 9531-9551, 4012, 4410, 8201, 8202

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44^{5,9,11}	205 bp	800 bp	7, 8, 15, 18, 37, 38	0727, 0802, 9515, 1809, 370101- 3704, 3705 ^{weakly} , 3706-3710, 3712, 3713, 380201-3804, 3808, 3815, 3817
45	170 bp	800 bp	15, 35, 38, 39, 67	1569, 9536, 3535, 380101-3809, 3811-3817, 39010101-39010102L, 390103-3920, 3922-3924, 3926- 3929, 3931, 3935, 3937-3942, 3944-3946, 5820, 670101-6702
46⁶	110 bp	1070 bp	38	380101-3803, 3805, 3808-3817
47	400 bp	1070 bp	14, 38, 39, 64, 65	1401-1409, 380101-380202, 3804, 3805, 3808-3817, 39010101- 39010102L, 390103-390106, 3903- 3907, 3909, 3911, 3912, 3914, 3915, 3918-391902, 3922, 3924- 3938Q, 3940N, 3941, 3944-3946
48	430 bp	1070 bp	7, 8, 14, 39, 40, 41, 42, 45, 48, 50, 60, 64, 65, 67, 73	070201-0726, 0728-0735, 0737, 0739-0764, 0766-0768, 080101- 080106, 0804-0835, 0837, 0838, 1401-1409, 39010101-39010102L, 390103-3920, 3922-3946, 400101- 400106, 4007, 4009-4011 [?] , 401401-4016 [?] , 4018 [?] , 4021 [?] , 4022N [?] , 4023, 4024-4038 [?] , 4040 [?] , 4042-4046 [?] , 4048-4050 [?] , 4051, 4052-4058 [?] , 4059, 4060, 4061- 4069 [?] , 4071 [?] , 407201 [?] , 407202, 4073-4076 [?] , 4077, 4078 [?] , 4079, 4080-4088 [?] , 4090-4093 [?] , 4101- 4108, 4201, 4202, 4204-4209, 4501-4509, 480101-4817, 4819, 5001, 5002, 5004, 670101-6702, 7301, 8102
49^{5,11}	175 bp	1070 bp	15, 40, 44, 46, 48, 60	9516, 9524, 400101-400106, 4007, 4010, 4012, 4021-4023, 4025, 4033, 4036, 4038, 4042, 4043, 4046-4049, 4051, 4052, 4054, 4055, 4060-4063, 4065-4067, 4069, 4073, 4074, 4076, 4079, 4081, 4084, 4087, 4088, 4092, 4431, 4606, 480301-480302
50	130 bp	1070 bp	40, 61	400201-400602, 4008, 4009, 4011, 4013, 4018-4020, 4024, 4026-4029, 4035, 4037, 4039, 4040, 4044, 4050, 4056, 4057, 4064, 4068, 4070, 4071, 4074, 4075, 4078, 4082, 4085, 4086, 4089-4091, 4094

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51^{5,6}	110 bp	1070 bp	7, 8, 35, 41, 42, 55	0704, 0719, 0725, 080101-0805, 0807-0812, 0814-0819N, 0821- 0824, 0826-0838, 3587, 4101-4108, 4201, 4202, 4204-4207, 4209, 5520
52	325 bp	1070 bp	7, 15, 27, 35, 42, 45, 46, 54, 55, 56, 67, 73, 81	070201-070207, 0704-0707, 0709- 0712, 0713 ^{weakly} , 0714, 0715 ^{weakly} , 0717-0726, 0728-0731, 0733-0736, 0739-0749N, 0751-0768, 1576, 9501, 2701-270402, 270502-2711, 2713-2715, 2717, 2719-2721, 2724-2728, 2730-2738, 2740-2745, 3576, 4201, 4202, 4204-4206, 4208, 4209, 4506, 460101-460102, 4602 ^{weakly} , 4603-4618, 5401-5417, 550101-5505, 5507-5517, 5519- 5534, 5601-5616, 5618-5622, 5624, 670101-670102, 6702 ^{weakly} , 7301, 8101-8104N, 8201, 8202, 8301
53^{6,12}	110, 195, 225, 260 bp	1070 bp	35, 37, 44, 47, 51, 57	3538, 3545, 3571, 370101-370104, 3703N-3706, 3708, 3710-3713, 44020101-4414, 4416, 4417, 4419N-4436, 4438-4463, 4465, 5142, 5707, 5709, 8301
54	215 bp	800 bp	8, 12, 15, 41, 42, 44, 45, 51, 52, 53, 55, 56, 58	0809, 1583, 4101, 4105-4107, 4204, 4406, 4415, 4418, 4420, 4501-4509, 510101, 510103- 510108, 510201, 510203-5104, 5106-510901, 5110-5114, 5116- 512402, 5126-5146, 5148, 5149, 5151-5153, 5155-5163, 520102, 520104-5203, 520601-520602, 5209, 5306, 5520, 5613, 5808
55	130, 270 bp	1070 bp	18, 35, 37, 40, 46, 51, 53, 57, 58	1822, 3521, 3524, 3581, 3704, 4028, 460101-4618, 5104, 5146, 5156, 5302, 5306, 5714, 5809
56⁶	90, 410 bp	1070 bp	7, 27, 35, 47, 54, 55, 56, 81	0765, 2702-270402, 270502-2711, 2713-2715, 2717, 2719-2721, 2724-2728, 2730-2738, 2740-2745, 3576, 47010101-4703, 5401-5417, 550101-5505, 5507-5517, 5519- 5534, 5601-5616, 5618-5622, 5624, 8101, 8201, 8202, 8301
57⁶	90, 175 bp	1070 bp	15, 27, 35, 40, 48, 62, 75, 77, 81	1502, 1508, 151101-151103, 1513, 1515, 1521, 1531, 1544, 1555, 1588, 1589, 9512, 9521, 9539, 9544, 9548, 2724, 3546, 4031, 4045, 4080, 480101-480102, 4804,

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				4806, 4807, 4809, 4811, 4815, 4816, 4818, 4819, 8101-8104N
58	145 bp	1070 bp	40, 44, 49	4013, 4019, 4418, 4425, 4450, 490101-490102, 4904, 4905
59⁶	120, 210 bp	800 bp	13, 15, 45, 49, 50, 51, 52, 55, 56, 58, 62, 63, 78	1316, 1504 ^{weakly} , 1516, 1542, 1567, 1595, 9537, 490101, 4902-4905, 5001, 5002, 5004, 510101-5103, 5105, 5107-510902, 5111N-5114, 5116-152402, 5126-5141N, 5143, 5144N, 5148-5155, 5157, 5158, 5160, 5161, 5163, 520101-5214, 550101-550104, 5503, 5505, 5509, 5511, 5515, 5517, 5521, 5524, 5525, 5528, 5529, 5531, 5533, 560501-5606, 5621, 5808, 7801- 7806
60	430 bp	1070 bp	27, 40, 44, 45, 51, 52, 53, 57, 58, 59	2702, 2730, 4013, 4019, 4406, 4425, 4450, 510101-512402, 5126- 5146, 5148, 5149, 5151-5153, 5155, 5158-5163, 520101-5212, 530101-5302, 5304-5308, 5310, 5314-5316, 570101-5711, 5713- 5716, 5718, 5719, 580101-5802, 5804-5816, 5820, 5902
61	145 bp	1070 bp	15, 35, 40, 41, 44, 45, 47, 50, 72	1546, 1553, 9506, 9543, 3519, 3547, 3563, 400101-4011, 401401- 4016, 4018, 4020, 4022N-4040, 4042-4045, 4048-4075, 4077-4092, 4094, 4101-4104, 4105 [?] , 4106- 4108, 4409, 4446, 4501-4509, 4702, 5001, 5002, 5004
62⁹	300 bp	1070 bp	7, 8, 13, 15, 18, 27, 35, 37, 38, 39, 40, 41, 44, 45, 46, 47, 48, 49, 50, 52, 55, 57, 58, 62, 72, 76, 78	0754, 0817, 0838, 1301-1304, 1306, 1308Q-1323, 15010101- 150104, 150106-150108, 1503- 1507, 1512, 1514, 1519, 1520, 1524-152703, 1530, 1532-1536, 1538-1540, 1542, 1543, 1545-1550, 1553, 1554, 1556-1558, 1560-1563, 1565, 1566, 1568-1571, 1573-1575, 1577-1579N, 1581-1587, 1591, 1592, 1594N, 1596-1598, 9502- 9507, 9509-9511N, 9513, 9516- 9518, 9522, 9523, 9525-9529, 9531, 9532, 9535-9538, 9540-9542, 9545-9547, 9550, 9551, 1812, 2701-270402, 270502-2721, 2724- 2745, 3510, 3513, 3516, 3528, 3563, 3569, 3580, 370101-3707,

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				3709-3714, 3803, 3804, 390201- 390202, 3908, 391301-391302, 3922, 3923, 400101-4007, 4009- 4016, 4018-4024, 4026-4040, 4042-4067, 4070-4094, 4101-4108, 44020101-4405, 4407-4411, 4413- 4465, 4501-4505, 4507-4509, 4610-4618, 47010101-4705, 480101-4805, 4807-4815, 4817- 4819, 490101-4905, 5001, 5002, 5004, 520101-5214, 5518, 5534, 5712-5719, 580102, 5815-5820, 7805, 7806
63	160, 215 bp	1070 bp	15, 37, 44, 54	150104, 370104, 4094, 44020101- 440205, 4406, 4408, 4409, 4411, 4412, 4416, 4419N-4424, 4427, 4433, 4434, 4441, 4444, 4448, 4449, 4451-4453, 4455, 4459, 4463, 5401-5417, 8301
64 ⁹	180, 210 bp	1070 bp	7, 13, 15, 18, 35, 39, 40, 45, 54, 55, 56, 59, 78	0765, 1306, 1542, 1586, 1804, 3560, 3917, 4058, 4508, 4618, 5401, 5402, 5405N, 5407, 5408N, 5410, 5412, 5413, 5416, 5417, 550101-5503, 5505, 5507, 5510- 5512, 5515, 5516, 5518, 5519, 5521, 5525, 5526, 5529-5531, 5533, 5534, 560501, 5606, 5610, 5623, 5901, 7801, 780202, 7803, Cw*150204
65 ¹³	180 bp	1070 bp	13, 15, 40, 44, 45, 46, 49, 50, 51, 54, 56	1303, 1573, 4071, 4410, 4415, 4418, 4501, 4504-4507, 4611, 490101-4903, 5001, 5002, 5004, 5115, 5162, 5403, 5601, 5602, 5604, 5607, 5608, 5613, 5614, 5616, 5617, 5620, 5624, 5904, 8201, 8202
66 ⁶	90, 240 bp	800 bp	55, 57	4618, 5514, 570101-5715, 5717- 5719, A*3028
67 ^{6,14}	90 bp	1070 bp	13, 15, 39, 40, 56, 58	1311, 1573, 3917, 4048, 4071, 5162, 5602, 5604, 5610, 580101- 5802, 5804-5820, Cw*0206weakly
68 ⁶	95 bp	1070 bp	7, 8, 18, 35, 37, 38, 39, 44, 51, 52, 53, 78	0765, 0832, 180101-1811, 1813- 1815, 1817N-1832, 350101- 350902, 3511, 3512, 351401-3515, 3517, 3518, 352001-3524, 3527, 3529-3545, 3548, 3550-3562,

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				3564-356802, 3570-3572, 3574- 3579, 3581-3594, 3708, 3806, 3807, 391901-391902, 4406, 510101-512402, 5126-5146, 5148- 5163, 530101-5316, 7801-7804
69^{5,6}	115, 150 bp	1070 bp	15, 18, 27, 35, 39, 46, 54, 55, 56, 62, 73, 75, 76	15010101-150104, 150106-150108, 1504, 1507, 1508, 151101-1512, 1514, 1515, 1519, 1524, 1526N- 1528, 1530, 1532, 1534, 1535, 1538, 1543, 1545, 1546, 1550, 1553, 1554, 1556-1558, 1560, 1563, 1566, 1568, 1570, 1571, 1573, 1575-1577, 1579N, 1581, 1582, 1585, 1587, 1592, 1594N, 1596, 1597, 9501, 9502, 9504, 9505, 9509-9511N, 9513, 9517, 9518, 9520, 9522, 9525, 9526, 9528, 9529, 9535, 9537, 9540, 9542-9549N, 1819, 2725, 351401- 351402, 3543, 3544, 3562, 3567, 3579, 3586, 3918, 3936, 460101- 4602, 4604, 4605, 4607N, 4609, 4610, 4612, 4614-4617, 5161, 5406, 5521, 5603, 7301
70	360 bp	1070 bp	Bw4 ¹⁶	
71	355 bp	1070 bp	Bw6	
72⁵	290 bp	800 bp	7, 8, 35, 37, 40, 41, 42, 48, 53, 81	070201-0706, 0708-0732, 0734- 0741, 0743-0752, 0754-0759, 0761- 0768, 080101-0808N, 0810, 0811, 0813-0815, 0817-0830N, 0832- 0838, 3566, 3587, 3707, 4015, 4016, 4030-4032, 4034, 4045, 4059, 4080, 4102, 4104, 4201, 4202, 420501- 4207, 4209, 480101-480102, 4805- 4812, 4814-4819, 5315, 8101-8104N

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-B low resolution 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 length 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 inherit feature of the primer pair(s) of a primer mix. More often it is due to other factors such as too low

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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-B low resolution typing.

In addition, wells number 30, 33, 34, 44, 45, 54, 59, 66 and 72 contain the primer pair giving rise to the shorter, 800 bp, internal positive control band in order to allow kit identification.

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

³The serological reactivity of all HLA-B alleles is not known. In this table we use the information in the HLA Dictionary 2004 on the www.ebi.ac.uk/imgt/hla web site and the information available at the www.worldmarrow.org web site and have also inferred the serological grouping from the naming of the sequence-defined allele.

⁴Nucleotide sequence information is available for only exons 2 and 3 of many HLA Class I alleles and for only exon 2 of many HLA Class II alleles and not for other exons or for the introns of these alleles. We assume that unknown sequences in these exons and in the introns are conserved within loci and within allelic groups.

The B*0826 and the B*4207 alleles give rise to identical amplification patterns with the HLA-B low resolution primer set. These alleles can be separated by the respective high resolution primer sets.

The B*1408 and the B*3925N, B*3930 and B*3932 to 3934 alleles give rise to identical amplification patterns with the HLA-B low resolution primer set. These alleles can be separated by the respective high resolution primer sets.

The B*1829 and the B*3523, B*3537, B*3553N, B*3564, B*3566 and B*356801-356802 alleles give rise to identical amplification patterns with the HLA-B low resolution primer set. These alleles can be separated by the respective high resolution primer sets.

The B*5504, B*5508, B*5513, B*5527 and the B*5615, B*5619N and B*5622 give rise to identical amplification patterns wih the HLA-B low resolution primer set. These alleles can be separated by the respective high resolution primer sets.

The B*5523, B*5532 and the B*5618 give rise to identical amplification patterns wih the HLA-B low resolution primer set. These alleles can be separated by the respective high resolution primer sets.

⁵Primer mixes 25, 27, 33, 35, 43, 44, 49, 51, 69 and 72 may give rise to a primer oligomer artifact.

⁶Specific PCR fragments shorter than 125 base pairs have a lower intensity and are less sharp than longer PCR bands.

⁷Primer mix 27 will amplify the Cw*0305, Cw*0325 and Cw*0327 alleles.

⁸Primer mix 28 may yield less specific PCR product than the other HLA-B low resolution primer mixes in B*40, B*41, B*45, B*49 and B*50 alleles.

⁹Primer mixes 29, 30, 33, 34, 44, 62 and 64 have a higher tendency than other primer mixes to give rise to nonspecific amplifications.

¹⁰The B*57 and B*58 alleles might be faintly amplified by primer mix 33.

¹¹The Cw*1701 to Cw*1704 alleles might be faintly amplified by primer mix 49.

¹²Primer mix 53 might generate a false band of about 500 base pairs. This band should be disregarded when interpreting HLA-B low resolution typings.

¹³The Cw*0312 allele might be faintly amplified by primer mix 65.

¹⁴Primer mix 67 will amplify the Cw*0206 allele.

¹⁵The Bw4-associated HLA-A specificities A23, A24, A2403, A25 and A32 are not amplified by the primer pair in primer mix 70.

'?', nucleotide sequence information not available for the primer matching sequence.

SPECIFICITY TABLE

Specificities and sizes of the PCR products of the 23 primer mixes used for DR low resolution SSP typing

Primer Mix	Size of spec. PCR product¹	Size of control band²	DR serology³	Amplified HLA-DRB⁴ alleles
73	205 bp	515 bp	1	010101-010205, 0104-0120
74	195 bp	430 bp	103	0103
75⁶	215, 260 bp	430 bp	15	15010101-1531
76	210 bp	430 bp	16	160101-160502, 1607-1613N
77	220 bp	430 bp	3, 17, 18, 11	03010101-0340, 1107, 1153
78^{5,6}	80, 210 bp	430 bp	3, 17, 11, 13, 14	03010101-030106, 0304- 0306, 0308-0316, 0318-0320, 0322, 0323, 0325, 0326, 0328, 0330, 0331, 0333, 0334, 0336, 0337, 110201-1103, 111101- 111102, 111401-111402, 1116, 1120, 1121, 1136, 1140, 1141, 1148, 1159, 1163, 116501-116502, 1168, 1170, 130101-1304, 1308, 1310, 1315-1317, 1319, 1320, 1322- 1324, 1327-1329, 1331-1341, 1343, 1345, 1348, 1351-1354, 1357, 1359, 1361, 1363-1366, 1368-1376, 1378-1381, 1383- 1385, 1387, 1416, 1419, 1421, 1482
79^{5,6}	80, 210 bp	430 bp	3, 18, 11, 13, 14	030201-0303, 0327, 0329, 0338, 111301-111302 ^{weakly} , 1126, 1134, 1315, 1319, 1326, 1344, 1353, 1357, 1385, 1386, 1402-140302, 1406, 1409, 1412, 1413, 1417-1421, 1424, 1427, 1429, 1430, 143201- 143202 ^{weakly} , 1433, 1440, 1441, 1447-1449, 1451, 1463, 1465 ^{weakly} , 1467, 1477, 1478, 1480, 1481, 1483
80^{5,6,7}	100, 175	430 bp	4	040101-0478

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bp					
81	205, 230 bp	430 bp	7, 13, 14		07010101-070103, 0703-0716, 1317, 1450
82^{5,6}	165, 215, 250 bp	515 bp	8, 11, 12, 14		080101-080203, 080302-0819, 0821-0836, 1167, 1204, 1216, 1411, 1415, 1468
83⁵	85, 130, 180 bp	430 bp	3, 9, 11		0308, 090102-0908, 1107, 1153
84	205 bp	430 bp	10		100101-1003
85⁵	100, 170 bp	430 bp	11, 3, 8		0308, 0831, 110101-1170
86⁵	85, 105 bp	430 bp	12, 8		0832, 120101-120204, 120302-1218
87	210 bp	430 bp	13, 8, 11, 14		0820, 110101-110404, 110601- 110602, 110801-111202, 111401-1116, 1118-1121, 1123-1125, 112701-1133, 1135-1151, 115401-115402, 1156-1166, 1168, 1170 130101-1308, 1310-1316, 1318-1343, 1345-1385, 1387 140301-140302, 1412, 1416, 1419, 1421, 1422, 1425, 1427, 1440, 1453, 1463, 1467, 1469, 1474, 1477, 1478
88⁶	195, 210 bp	430 bp	13, 8, 11, 12, 14		080101-080203, 080401- 0809, 0811, 0816, 0817, 0820- 0822, 0824, 0826, 0828, 0831, 110101-110602, 1109- 111202, 111401-1116, 1120, 1121, 1123-1125, 112701- 1130, 1132, 1133, 1135-1141, 1143, 1144, 1146-1151, 115401-1156, 1158-1163, 116501-1170, 120201-120204, 1213, 1215, 1216, 1218, 130101-130201, 130203, 1304-130502, 130701-1309, 131101-131102, 131401- 1324, 1326-1329, 1331, 1332, 1334-1336, 1338-1343, 1345-

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				1355, 1357, 1359, 1361-1365, 1367-1376, 1378-1380, 1383, 1384, 1387 1415, 1416, 1422, 1424, 1425, 1427, 1437, 1453, 1473
89	175 bp	430 bp	3, 8, 13, 14	03010101-0307, 0309, 0311- 0340, 0820, 130101-1316, 1318-1342, 1344, 1346-1366, 1368-1387, 1402-140302, 140501-1406, 1409, 1412-1414, 1417-1421, 142301, 1424, 1427, 1429, 1430, 1433, 1436, 1437, 1440- 1445, 1447, 1448, 1451, 1456, 1459, 1463-1465, 1467, 1477, 1478, 1480, 1481, 1483
90⁵⁻⁷	100, 140 bp	430 bp	14, 4, 8, 13	0462, 0469, 0473, 0808, 1169, 1345, 140101-140102, 1404, 140701- 140702, 1410, 1416, 1422, 1425, 1426, 1428, 1431- 143202, 1435, 1437-1439, 1449, 1450, 1453-1455, 1457, 1458, 1460-1462, 1468-1471, 1473-1476, 1479, 1482
91^{5-7,8}	110, 135, 170 bp	515 bp	14, 3, 9, 11, 12, 13, 15	0308, 0310, 090102-090202, 0904-0908, 110404, 1109-111002, 111202-111302, 1116, 1117, 1120, 1122, 1140, 1146, 1152, 1158, 1159, 1204, 1343, 140101-1402, 1404-1411, 1413, 1414, 1416-142302, 1426, 1428-1436, 1438, 1439, 1441, 1443-1452, 1454-1457, 1459-1462, 1464, 1465, 1468, 1470-1476, 1479-1483 1527
92⁵⁻⁷	110, 175, 225 bp	430 bp	14, 3, 8, 11, 13, 15, 16	0310, 0809, 0820, 0821, 0832, 0835, 111301-111302, 1117, 1123, 1125, 1131, 1145, 1152, 1155,

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				1164, 1313, 1318, 1343, 1345, 1347, 1355, 140101-140103, 140301- 140503, 140701-1408, 1410- 1412, 1414-1416, 1418, 1422- 142302, 1425-1428, 1431- 143202, 1434-1436, 1438- 1440, 1442-1445, 1449, 1450, 1453-1465, 1467-1479, 1481, 1482, 1521 ^{weakly} , 1604 ^{weakly}
93	230 bp	430 bp	52	DRB3*01010201-0113, 0201- 0224, 030101-0303
94 ⁹	215 bp	430 bp	53	DRB4*01010101-0107
95	175 bp	430 bp	51	DRB5*010101-0113, 0202- 0205

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 DR low resolution 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 length 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, e.g. the primers in wells 75, 80, 90, 91 and 92.

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 inherit 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 430 base pairs, for most wells, or a band of 515 base pairs, for some wells.

Well number 73 contains the primer pair giving rise to the longer, 515 bp, internal positive control band in order to help in the correct orientation of the DR low resolution typing.

In addition, wells number 82 and 91 contain the primer pair giving rise to the longer, 515 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 serological reactivity of all DRB alleles is not known. In this table we use the information in the HLA Dictionary 2004 on the www.ebi.ac.uk/imgt/hla web site and the information available at the www.worldmarrow.org web site and have also inferred the serological grouping from the naming of the sequence-defined allele.

⁴For several DRB alleles only partial second exon nucleotide sequences are available. In these instances it is not known whether some of the primers of the SSP set are completely matched with the target sequences or not. We assume that unknown sequences in the first hyperpolymorphic

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region of the second exon of DRB alleles are conserved within allelic groups and that unknown sequences of codons 87 to 92 are identical with the DRB1*0101 consensus sequence.

Nucleotide sequence information is available for only exons 2 and 3 of many HLA Class I alleles and for only exon 2 of many HLA Class II alleles and not for other exons or for the introns of these alleles. We assume that unknown sequences in these exons and in the introns are conserved within loci and within allelic groups.

The DRB1*0809, DRB1*0821 and DRB4*1415 alleles yield identical amplification patterns except for the specific PCR product yielded by the DRB3 gene in linkage disequilibrium with the DRB1*1415 allele.

The DRB1*0820, DRB1*1318, DRB1*1347 and DRB1*1355 alleles yield identical amplification patterns except for the specific PCR product yielded by the DRB3 gene in linkage disequilibrium with the DRB1*1318, DRB1*1347 and DRB1*1355 alleles.

The DRB1*0831 and DRB1*1167 alleles yield identical amplification patterns except for the specific PCR product yielded by the DRB3 gene in linkage disequilibrium with the DRB1*1167 allele.

⁵Specific PCR fragments shorter than 125 base pairs have a lower intensity and are less sharp than longer PCR bands.

⁶Individual alleles can give rise to two differently sized specific PCR fragments in these primer mixes.

⁷These primer mixes may give rise to nonspecific amplifications.

⁸Primer mix 91 has a tendency of primer oligomer formation and also has an intense primer cloud due to the high number of primers present in the primer mix.

⁹The DRB4*01030102N allele is amplified by the primer pair in well No. 94, whereas the DRB4*0201N and DRB4*0301N null alleles are not amplified by this primer pair.

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INTERPRETATION TABLE

HLA-A low resolution SSP typing

Amplification patterns of the A*0101 to A*8001 alleles

		Well ⁶																								
		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.		120	135	205	190	160	165	175	165	75	85	80	185	175	200	90	370	150	200	160	155	240	85	75	360	
PCR product(s)		145	200	235		535	200	205	200				175		225	240		200	240	375	240	160				
Length of int.			800																							1070
pos. control ¹																										
5'-primer(s) ²		98	78	363	98	144	106	413	98	266	257	302	103													341
		123	106			317	176	368	102	266	261	385	423	98	98	98	203	41								
		144																								
		144																								
3'-primer(s) ³		203	240	527	256	265	256	259	259	302	299	341	257	423	98	98	203	41								1070
		292	570	570	570	570	570	570	570	521	521	521	521	521	98	98	1070									
		555	555	555	555	555	555	555	555	559	559	559	559	559	98	98	363	41								
															98	98	180									
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-A allele ⁴	ser ⁵																									
*01010101-0104N, 0106, 0109-0111N, 0116N-0118N, 0120, 0122N-0127N, 0129, 0131N-0133	A1, null	1			4																					24
*0107	-	1			4																					
*0108, 0114, 0115N	1	1																								24
*0112, 0119	-	1		3																						24
*0113	-	1		4																						24
*0121	-	1		3	4																					24
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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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
*0128	-	1		4							11				15									24	
*0130	-	1																							
*02010101-020115, 020117-020119, 020121- 0209, 0211-0216, 0218- 0222, 0224-0233, 0236- 0238, 0240-0245, 0247, 0249, 0251, 0253N, 0254, 0257-0261, 0263- 0269, 0271, 0272, 027401-0277, 0279- 0292, 0294N, 0296, 0297, 0299, 9201, 9202, 9204-9209, 9211- 9213N, 9215, 9216, 9218-9221, 9223-9228, 9230-9234, 9236-9245, 9247-9255	A2, A203	2																							
*0210, 0239, 0250, 0252, 0273, 0293, 0295, 9210, 9214, 9217, 9256	A210	2																				20			
*021701-021702	A2	2				w																			
*0234, 023501, 023503, 025601-025602, 0262, 9203	-	2													13						20		22		
*023502	-														13						20		22		
*0246, 0270	-	2																			20		22		
*0248, 9229	-																				20		22		
*0255	-	2							8														21		23
*0278	-	2	4																		20		22		
*9222	-					6																20			
*9235	-	2														13									
*9246	-	2								10															
*03010101-0307, 0309- 0311N, 0313-0317, 0319- 0323, 0325-0329, 0331, 0333-0335, 0337-0340, 0342, 0344-0346	A3			3												13									
*0308, 0332, 0336N	-		3																						
*0312	-		3	4																					
*0318, 2619 ⁷	-			4												13									
*0324	-		3					8								13									
*0330	-		3		5											13									
*0341	-		3																						24
*0343	-		3													13	15								
*110101-1109, 1113- 1117, 1119-112402, 1126, 1127, 1129-1140	A11			4							11													24	
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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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
*1110	-				4				8			11													24
*1111	-				4							11	12												24
*1112, 1118	-				4							11													
*1125	-			3	4							11													24
*2301-2313, 2315-2319Q	A23					5	6																		
*2314, 2405, 241302, 2424 ⁸	-					5	6	7																	
*24020101-2404, 2406-2411N, 241301, 2417, 2418, 2420-2423, 2425-2443, 2445N-2450, 2454-2456, 2458-2463, 2466-2481, 2483N-2488, 2490, 2491, 2493, 2495-2497	A24					5		7																	
*2414, 2415, 2451-2453, 2457, 2464	A24					5																			
*2419, 2444	-					5		7				11													
*2482	-					5		7																	21
*2489	-							7																	
*2492	-			3		5																			
*2494	-					5																			20
*250101-2504, 2507, 2508	A25								8	9				13											
*2505	-								8	9				13											20
*2506	-								8	9	12														
*260101-260107, 2608, 2610-2615, 2617, 2618, 2620, 2623-2629, 2632, 2633, 2635-2637	A26, null								8		10			13											
*2602	A26								8		10		w												
*2603, 2606, 2621	A26								8		11		13												23
*2604, 2634	A26								8		10														
*2605, 2630	A26								8				13												23
*260701-260702	A26										10		13												
*2609	A26								8		10	12													
*2616	-								7		10		13												
*2622	-								8		10		13											21	
*2631	-								8			13													
*29010101-2906, 2908N-2912, 2915-2918	A29																	14							
*2907	-								6									14							
*2913	-																	14			17				
*2914	-																	14	16						
*2919	-																	14			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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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	
*300101-3004, 3006, 3007, 3009-3020, 3022- 3025, 3027N	A30															15										
*3008	-				4											15				20		22				
*310102-3102, 3105- 3107, 3109-3124	A31																16									
*3103	-										11	12				16										
*3104	A31											12				16										
*3108	-					5										16										
*320101-3202, 3206- 3212, 3214, 3216-3218	A32									9								17								
*3203	-																	17								
*3204	A3		3							9																
*3205	-					5											16	17								
*3213	-					5				9								17								
*3215	-								8	9								17								
*3301, 330301-3312, 3314-3318, 3320, 3323	A33																		18							
*3313	-									10						14			18						24	
*3319	-							7											18							
*3322	-																		18		21					
*340101-340102, 3405, 3406	A34								8		11	12														
*3402-3404, 3407	-			3					8		11	12														
*3408	-		3						8		11	12	13													
*3601, 3603	A36	1																				22	24			
*3602	-	1	3																			22	24			
*3604	-	1		4																		22	24			
*4301	A43									12	13															
*6601, 6604-6608	A66								8		11	13														
*6602, 6603	A66								8		12															
*680101-6804, 6806- 6814, 6816-6819, 6821- 6828, 6830-6844, 6846	A68									8											20					
*6805, 6815, 6820	-									8										20		23				
*6829	-									8									18	20	21					
*6845	-							7	8										20							
*6901	A69									8											21					
*7401-7409, 7411, 7412N	A74																			19						
*7410	-																		19						24	
*7413	-														13				19							
*8001	A80							6																23	24	
HLA-A allele ⁴	ser 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	
B*1827								6																		
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-A low resolution SSP typing.

In addition, wells number 4, 5, 6, 8, 9, 11, 12, 19 to 23 contain the primer pair giving rise to the shorter, 800 bp, internal positive control band in order to allow kit identification.

²The nucleotide position, in the 1st, 2nd or 3rd exon, 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, or 3rd exon, 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 sequence of the A*0105N has been shown to be identical to A*0104N.

The A*020116 allele has been renamed to A*9234.

The A*020120 has been renamed to A*020118.

The sequence of the A*0223 allele has been shown to be identical to A*0222.

The sequence of the A*0298 allele has been shown to be identical to A*0296.

The A*1128 allele has been renamed to A*111502.

The sequence of the A*2401 allele has been shown to be in error.

The sequence of the A*2412 allele has been shown to be identical to A*2408.

The A*2416 allele has been renamed to A*3108.

The A*2465 allele has been renamed to A*241302.

The sequence of the A*3005 allele has been shown to be identical to A*3004.

The A*3021 allele has been renamed to A*301102.

The sequence of the A*31011 allele has been shown to be identical to A*310102.

The sequence of the A*3302 allele has been shown to be identical to A*3303.

⁵The serological reactivity of all HLA-A alleles is not known. In this table we use the information in the HLA Dictionary 2004 on the www.ebi.ac.uk/imgt/hla web site and the information available at the www.worldmarrow.org web site and have also inferred the serological grouping from the naming of the sequence-defined allele.

⁶The primer pairs in vials 2 and 11 will in most samples give rise to two specific PCR fragments.

⁷The A*0318 and A*2619 alleles will give rise to identical amplification patterns. These two alleles can be separated by the respective high resolution SSP primer sets.

⁸The A*2314, A*2405, A*2424 and A*2465 alleles will give rise to identical amplification patterns. These two alleles can be separated by the respective high resolution SSP primer sets.
'w', may be weakly amplified.

INTERPRETATION TABLE

HLA-B low resolution SSP

Amplification patterns of the B*0702 to B*8301 alleles⁶

		Well																										
		25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48			
Length of spec.		110	215	140	130	185	185	290	165	165	180	105	275	195	105	115	80	150	135	245	205	170	110	400	430			
PCR product(s)				235	265	235			220	390	395	195				435				400								
Length of int.								330																				
pos. control ¹																												
5'-primer(s) ²																												
		527																										
		540	5'-gAC ³	5'-TgA ³	800																							
			540	5'-Tgg ³	1070																							
				5'-AgC ³	363	5'-ggC ³	209	1070																				
					5'-AgT ³	361	5'-CCg ³	103	1070																			
						5'-AA ³	363	5'-CCT ³	103	1070																		
							357	5'-Tgg ³	45	1070																		
								412	5'-AAA ³	435	5'-ggA ³	45	1070															
									5'-TTA ³	420	5'-ggA ³	45	1070															
										5'-TTA ³	420	5'-AgA ³	206	419	1070													
											5'-gtc ³	419	5'-gtc ³	142	1070													
											5'-CAG ³	559	5'-TCC ³	266	272	272	272	3rd	301	309	234	204	463	302	259	301		
											5'-CTC ³	559	5'-TgC ³	266	272	272	272	3rd	301	309	234	204	463	302	259	301		
											5'-gCg ³	572	5'-Tgg ³	412	5'-TAT ³	412	5'-TAT ³	412	5'-TAT ³	412	5'-TAT ³	412	5'-TAT ³	412	5'-TAT ³	412		
												572	5'-C-Cg ³	570	5'-gTC ³	605	5'-ATC ³	605	5'-TCT ³	605								
													5'-gCg ³	572	5'-gTC ³	570	5'-ATC ³	605	5'-TCT ³	605								
														572	5'-gCg ³	572	5'-Tgg ³	292	5'-gTA ³	572	5'-gCg ³	572						
Well No.		25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48			
HLA-B allele ⁴	ser. ⁵																											
*070201-070207, 070501-0706, 0710, 0712, 0714, 071801- 071802, 0721-0723, 0726, 0728-0731, 0734, 0735, 0739, 0741, 0743-0747, 0749N, 0752, 0755- 0759, 0761-0764, 0766- 0768	B7	25																								48		

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									71	72	B7, B703	*0703, 0708, 0716, 0732, 0737
51	52								71	72	B7	*0704, 0725
	52								71		B7	*0707, 0742
	52								71	72	B7	*0709, 0711, 0717
	w								71	72	-	*0713, 0715
51	52								71	72	-	*0719
	52								71	72	-	*0720, 0724
									70	72	-	*0727
	52								71		-	*0733, 0753
	52								70	72	-	*0736
									70	72	-	*0738
	52								71	72	-	*0740, 0748, 0751
									71	72	-	*0750
	52				62				71	72	-	*0754
	52								71		-	*0760
	52		56			64		68	71	72	-	*0765
51									71	72	B8, Null	*080101-080106, 0805, 0808N, 0810, 0811, 0815, 0818, 0819N, 0822-0824, 0827, 0829, 0830N, 0833, 0834
51									70	72	B8	*0802
51									70	72	B8	*0803
51									71	72	-	*0804
									71	72	B8	*0806, 0813, 0820
51									71	72	-	*0807, 0814
51	54								71		-	*0809
51									71		-	*0812, 0816, 0831
51					62				71	72		*0817
51									71	72	-	*0821
									71	72	-	*0825
51									71	72	-	*0826, 4207
51									71	72	-	*0828, 0837
51								68	71	72	-	*0832
51									71	72	-	*0835
51									71	72	-	*0836
51					62				71	72		*0838
						62			70		B13	*1301, 1317, 1320, 1322, 1323
						62			70		B13	*130201-130204, 1308Q, 1315, 1318, 1319
						62	65		70		-	*1303
						62			70		-	*1304, 1310

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*1306	-	27	28							41		
*1307N	Null		27	28			34			41		
*1309	-			28			34					
*1311	-			27	28		34					
*1312, 1313	-			27	28					41		
*1314	-			27			34					
*1316	-			27	28			34				
*1321	-			27	28							
*1401, 1407N	B64			28	29							47 48
*140201-1404, 1409	B65			28	30							47 48
*1405-140602	-				30							47 48
*1408, 3925N, 3930, 3932-3934	-				29							47 48
*15010101- 15010102N, 150103, 1526N, 152701, 1532, 1534, 1535, 1538, 1550, 1556, 1557, 1560, 1570, 1571, 1575, 1579N, 1581, 1582, 1592, 1594N, 1596, 1597, 9502, 9504, 9505, 9509- 9511N, 9513, 9517, 9518, 9522, 9525, 9528, 9529	B62, Null, B15				31		36			43		
*150102	B62					31	33	36			43	
*150104	B62						36			43		
*150106-150107, 1507, 152703, 9526, 9535, 9540, 9545-9547	B62		27		31			36			43	
*150108, 152702			27				36			43		
*1502, 1588, 9512, 9521	B75				31			36		41	43	
*1503, 1547, 1549, 1561, 1598, 9503, 9523, 9527, 9532	B72					32		35 36			43	
*1504					31			36			43	
*1505, 1506, 1533, 1539, 1540, 1565, 1578, 1584, 9507	B62, B15				31			36			43	
*1508, 151101-151103, 1515	B75				31			36			43	
*1509	B70					32	33 34				43	
*1510, 1537, 1590, 1599, 9533	B71					32	34				43	

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			62	64			70		-	*1306
							70		Null	*1307N
			62				71		-	*1309
				62		67	70		-	*1311
			62				70		-	*1312, 1313
				62			70		-	*1314
		59	62				70		-	*1316
			62				70		-	*1321
							71		B64	*1401, 1407N
							71		B65	*140201-1404, 1409
							71		-	*1405-140602
							71		-	*1408, 3925N, 3930, 3932-3934
				62						*15010101- 15010102N, 150103, 1526N, 152701, 1532, 1534, 1535, 1538, 1550, 1556, 1557, 1560, 1570, 1571, 1575, 1579N, 1581, 1582, 1592, 1594N, 1596, 1597, 9502, 9504, 9505, 9509- 9511N, 9513, 9517, 9518, 9522, 9525, 9528, 9529
					62			69	71	B62, Null, B15
				62			69	71	B62	*150102
				62	63		69	71	B62	*150104
					62		69	71	B62	*150106-150107, 1507, 152703, 9526, 9535, 9540, 9545-9547
					62		69	71		*150108, 152702
		57						71	B75	*1502, 1588, 9512, 9521
					62			71	B72	*1503, 1547, 1549, 1561, 1598, 9503, 9523, 9527, 9532
			w	62			69	71		*1504
				62				71	B62, B15	*1505, 1506, 1533, 1539, 1540, 1565, 1578, 1584, 9507
			57				69	71	B75	*1508, 151101-151103, 1515
								71	B70	*1509
								71	B71	*1510, 1537, 1590, 1599, 9533

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*1512, 1514, 1519	B76		31		36	37		43		
*1513	B77		31		36	38		41	43	
*1516, 1567, 1595	B63		33	36	38			43		
*15170101-151702	B63		31	33		38			43	
*1518, 1551, 1552, 1572, 1593, 9508, 9514, 9519, 9534	B71		32	34	36			43		
*1520, 1525	B62		31		36			41	43	
*1521, 1544	B75		31	34	36			41	43	
*1523	-		32	34	36	38			43	
*1524, 1587	B62		31		36	38		43		
*1528, 9520	B15		31		36			43		
*1529	B15		32		36			43		
*1530, 1558, 1563	B62, B15		31					43		
*1531	B75		31		36			43		
*1536	-	w	31		36			41	43	
*1542	-		31					43		
*1543	-		31		36			43		
*1545	B62	27	31					43		
*1546	B72	28	31	32		36			43	
*1548	B62		31					43		
*1553	-	28		32		36			43	
*1554	-		32		35	36			43	
*1555	-	27		31		36			43	
*1562	-		32		35	36		41	43	
*1564	-		32		35	36			43	
*1566	-		31		34	36			43	
*1568	-	27		31	32		35	36		
*1569	-		32		35	36			43	45
*1573	-		31						43	
*1574	-		32		36				43	
*1576, 9501	-			31		36			43	
*1577	-			31					41	43
*1580	-			32	34	36			41	43
*1583	-			31	32				43	
*1585	-			31		36			41	43
*1586	-			31					43	
*1589	-	w		31		36			41	43
*1591, 9531	-			32		35	36	37		43
*9506	-	28		31	32		36		41	43
*9515	-			32		34	36			43
*9516	-			31		36			43	
*9524	-			32	34	36			43	
*9536	-	27		31		36			43	45
*9537	-	27		31					43	

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				62			69	71	B76	*1512, 1514, 1519
		57		59			70		B77	*1513
							70		B63	*1516, 1567, 1595
							70		B63	*15170101-151702
								71	B71	*1518, 1551, 1552, 1572, 1593, 9508, 9514, 9519, 9534
				62				71	B62	*1520, 1525
		57						71	B75	*1521, 1544
							70		-	*1523
				62			69	70	B62	*1524, 1587
							69	71	B15	*1528, 9520
				62				71	B15	*1529
		57					69	71	B62, B15	*1530, 1558, 1563
				62				71	B75	*1531
					62			70		-
			59	62	64			71		*1536
				62			69	70		-
				62			69	71	B62	*1545
				61	62		69	71	B72	*1546
				62				71	B62	*1548
				61	62		69	71		-
				62			69	71		*1553
		57						71		-
				62				71		*1555
					62					-
							69	71		*1562
								71		-
								71		*1564
					62		69	71		-
							69	71		*1566
					62		69	71		-
							69	71		*1568
								71		-
					62					*1569
						62	65	67	69	71
										-
										*1573
								71		-
					62					*1574
52								69	71	
								69	71	-
								69	71	-
									71	-
		54			62				71	-
								69	71	-
					62				71	-
								69	71	-
			57					70		-
								71		-
					62					*1589
										*1591, 9531
					61	62				*9506
								70		-
								71		*9515
49					62				71	
49								71		-
					62				71	-
								71		*9516
									71	-
									71	*9524
					59	62				*9536
							69	71		*9537

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*9538	-	25			31		36			43		
*9539	-		27		31		36			41	43	
*9541	-		27		31		36				43	
*9542	-		26 27		31		36				43	
*9543	-				31 32		36				43	
*9544	-		27		31		36			41	43	
*9548	-		27		31		36				43	
*9549N	-		27		31		36				43	
*9550	-		27		31						43	
*9551	-				32	35				43		
*180101-1803, 1805-1808, 1810, 1811, 1813, 1815, 1817N, 1818, 1820, 1821, 1823N-1825, 1827, 1828, 1830, 1832	B18						36		39		42	
*1804	-						36		39	42		
*1809	-						36		39		44	
*1812	-						36		39	42		
*1819	-						36		39	42		
*1822	-						36		39	41 42		
*1826	-								39	42		
*1829, 3532, 3537, 3553N, 3564, 356801-356802							36			42		
*2701	B27				29					40		
*2702	B27				29					40		
*2703-270402, 270502-2706, 2709, 2710, 2713, 2717, 2720, 2727, 2731, 2735-2737, 2745	B27				29					40		
*2707, 2711, 2714, 2715, 2721, 2728, 2732, 2734, 2738, 2743	B27									40		
*2708, 2726, 2740, 2742, 2744	B2708				29					40		
*2712	-				29					40		
*2716, 2739	-				29					40		
*2718	-				29		35			40		
*2719	-									40	41	
*2723	-				29					40		
*2724	-									40		
*2725	-									40		
*2729	-				29		35			40		
*2730	-									40	41	

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				62				71		-	*9538
			57					71		-	*9539
				62				71		-	*9541
				62			69	71		-	*9542
				61			69	71		-	*9543
			57				69	71		-	*9544
			57				69	71		-	*9548
				62			69	71		-	*9549N
				62				71			*9550
				62				71			*9551
							68		71	B18	*180101-1803, 1805-1808, 1810, 1811, 1813, 1815, 1817N, 1818, 1820, 1821, 1823N-1825, 1827, 1828, 1830, 1832
					64		68	71		-	*1804
							68	70		-	*1809
				62				71		-	*1812
							68	69	71	-	*1819
			55				68		71	-	*1822
							68		71	-	*1826
							68		71		*1829, 3532, 3537, 3553N, 3564, 356801-356802
	52			62				70		B27	*2701
	52		56	60	62			70		B27	*2702
		52	56		62			70		B27	*2703-270402, 270502-2706, 2709, 2710, 2713, 2717, 2720, 2727, 2731, 2735-2737, 2745
		52	56		62			70		B27	*2707, 2711, 2714, 2715, 2721, 2728, 2732, 2734, 2738, 2743
		52	56		62			71		B2708	*2708, 2726, 2740, 2742, 2744
				62				71			*2712
				62				70			*2716, 2739
				62				71			*2718
		52	56	62			70				*2719
		52	56	57	62			70			*2723
		52	56		62			69	70		*2724
		52	56		62			70			*2725
		52	56		62			70			*2729
		52	56	60	62			70			*2730

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*2733	-									40			
*2741	-			29			36			40			
*350101-350107, 3507- 350803, 3511, 3515, 352001-352002, 3523, 3529, 3540N-3542, 3548, 3550, 3552, 3554, 3557, 3561, 3577, 3578, 3582, 3590- 3594	B35						36			41	42		
*350201-350401, 350403, 3506, 3512, 3533, 3534, 3536, 3539, 3555, 3559, 3565Q, 3570, 3574, 3583-3585	B35									41	42		
*350402	-					33				41	42		
*3505, 3551, 3558, 3572	B35		27				36			42			
*350901-350902, 3518, 3531, 3575, 3588	B35									42			
*3510, 3528, 3569, 3580	-						36			41	42		
*3513	B35									41	42		
*351401-351402, 3562	B35						36			41	42		
*3516	-		27				36			41	42		
*3517, 3530	B35		27				36			41	42		
*3519	B35						36			41			
*3521, 3524	-						36			41	42		
*3522	-		27							42			
*3525, 3549	-						36			41			
*3526	-				30			36		41			
*3527	B35						36			41			
*3535	-						36			41	42		45
*3538	-									41	42		
*3543, 3567, 3579, 3586	B35						36			42			
*3544	-									42			
*3545, 3571	-						36	37		41	42		
*3546	-							36		41			
*3547	-		28					36		41			
*3556	-									41			
*3560	-									42			
*3563	-		28					36		41			
*3566	-							36		42			
3576	-							36		41	42		

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52	56	62	71	-	*2733
52	56	62	70	-	*2741
			68	71	B35 *350101-350107, 3507- 350803, 3511, 3515, 352001-352002, 3523, 3529, 3540N-3542, 3548, 3550, 3552, 3554, 3557, 3561, 3577, 3578, 3582, 3590 3594
			68	71	B35 *350201-350401, 350403, 3506, 3512, 3533, 3534, 3536, 3539, 3555, 3559, 3565Q, 3570, 3574, 3583-3585
			68	71	- *350402
			68	71	B35 *3505, 3551, 3558, 3572
			68	71	B35 *350901-350902, 3518, 3531, 3575, 3588
		62	71	-	*3510, 3528, 3569, 3580
		62	71	B35	*3513
			68 69 71	B35	*351401-351402, 3562
		62	71	-	*3516
			68 71	B35	*3517, 3530
		61	71	B35	*3519
55			68 71	-	*3521, 3524
			68 71	-	*3522
			71	-	*3525, 3549
			71	-	*3526
			68 71	B35	*3527
			68 71	-	*3535
53			68 71	-	*3538
			68 69 71	B35	*3543, 3567, 3579, 3586
			68 69 71	-	*3544
53			68 71	-	*3545, 3571
	57		71	-	*3546
		61	71	-	*3547
			68 71	-	*3556
		64	71	-	*3560
		61 62	71	-	*3563
			68 71 72	-	*3566
52	56		68 71	-	3576

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*3581	-								41	42				
*3587	-				32					42				
*370101-370103, 3703N, 3706, 3713	B37, Null							37		41	44			
*370104	-							37		41	44			
*3702	-			29				37			44			
*3704	-							37		41	44			
*3705	-							37		41	w			
*3707	-	25						37			44			
*3708	-							37		41	44			
*3709	-							37			44			
*3710	-									41	44			
*3711	-									41	42			
*3712	-				32			37			44			
*3714	-										42			
*380101-380102, 3809, 3811-3814, 3816	B38			29							45	46	47	
*380201-380202, 3808, 3815	B38			29							44	45	46	47
*3803	B16			29			35				44	45	46	
*3804	-										44	45	47	
*3805	-			30							45	46	47	
*3806	-											45		
*3807	-			29							45			
*3810	-			29								46	47	
*3817	-			29				37			44	45	46	47
*39010101-39010102L, 390103-390106, 3903, 3905-390602, 3909, 3911, 3914, 3915, 3924, 3926-3929, 3931, 3935, 3937, 3938Q, 3940N, 3941, 3944, 3946	B3901, B39			29							45	47	48	
*390201, 3908	B3902, B39			29			35				45		48	
*390202, 391301- 391302, 3923	B3902, B39						35				45		48	
*3904	B39			30							45	47	48	
*3907	-		?	?			36				45	47	48	
*3910, 3916, 3920	B39										45		48	
*3912, 3945	-										45	47	48	
*3917	-										45		48	
*3918	-			29							45	47	48	
*391901	-				29					42		45	47	48
*391902	-									42		45	47	48

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		55			68	71	-	*3581
51					68	71 72	-	*3587
	53			62		70	B37, Null	*370101-370103, 3703N, 3706, 3713
	53			62 63		70	-	*370104
				62		70	-	*3702
	53	55		62		70	-	*3704
	53			62		71	-	*3705
				62		70 72	-	*3707
	53				68	70	-	*3708
				62		70	-	*3709
	53			62		70	-	*3710
	53			62		71	-	*3711
	53			62		70	-	*3712
				62		70 71	-	*3714
						70	B38	*380101-380102, 3809, 3811-3814, 3816
						70	B38	*380201-380202, 3808, 3815
				62		70	B16	*3803
				62		70	-	*3804
						70	-	*3805
					68	70	-	*3806
					68	70	-	*3807
						70	-	*3810
						70	-	*3817
						71	B3901, B39	*39010101-39010102L, 390103-390106, 3903, 3905-390602, 3909, 3911, 3914, 3915, 3924, 3926-3929, 3931, 3935, 3937, 3938Q, 3940N, 3941, 3944, 3946
				62		71	B3902, B39	*390201, 3908
				62		71	B3902, B39	*390202, 391301- 391302, 3923
						71	B39	*3904
						71	-	*3907
						71	B39	*3910, 3916, 3920
						71	-	*3912, 3945
				64	67	71	-	*3917
						69 71	-	*3918
					68	71	-	*391901
					68	71	-	*391902

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*3922	-			29						45	47	48
*3936	-			29							47	48
*3939	-			29			35				45	48
*3942	-			29					41		45	48
*3943	-			29			36					48
*400101-400106, 4007, 4051, 4079	B60, B40		28									48
*400201-400203, 4004, 40060101-400602, 4039, 4070, 4089	B61, B40											
*4003, 4020	B40					36						
*4005	B4005		27									
*4008	-											
*4009, 4011, 4018, 4024, 4027, 4029, 4035, 4037, 4040, 4044, 4050, 4056, 4057, 4064, 4075, 4078, 4082, 4085, 4086, 4090, 4091	B61, B40											?
*4010, 4022N, 4033, 4036, 4042, 4043, 4049, 4054, 4055, 4061 4063, 4065-4067, 4073, 4081, 4084, 4087, 4088, 4092	Null, B40, B60		28									?
*4012	-					32		35			43	
*4013, 4019	-											
*401401-401403, 4053, 407201	-			28								?
*4015, 4016, 4032	B61	25	28									?
*4021	-											?
*4023	-	25	28									48
*4025, 4069	-			28								?
*4026	B21					33						?
*4028	-					33			41			?
*4030, 4034	-		28									?
*4031, 4045, 4080	-			28								?
*4038, 4052	-			28			36					?
*4046	-						35		40			?
*4047	-		28									
*4048	-			28			34					?
*4058	-			28								?
*4059	-			28				36				48
*4060	-			28				36				48
*4068	-											?

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				62				71	-	*3922
						69	71		-	*3936
							71		-	*3939
							71		-	*3942
							71		-	*3943
49				61 62				71	B60, B40	*400101-400106, 4007, 4051, 4079
50				61 62				71	B61, B40	*400201-400203, 4004, 40060101-400602, 4039, 4070, 4089
50				61 62				71	B40	*4003, 4020
50				61 62				71	B4005	*4005
50				61				71	-	*4008
50				61 62				71	B61, B40	*4009, 4011, 4018, 4024, 4027, 4029, 4035, 4037, 4040, 4044, 4050, 4056, 4057, 4064, 4075, 4078, 4082, 4085, 4086, 4090, 4091
49				61 62				71	Null, B40, B60	*4010, 4022N, 4033, 4036, 4042, 4043, 4049, 4054, 4055, 4061 4063, 4065-4067, 4073, 4081, 4084, 4087, 4088, 4092
49				62				71	-	*4012
50			58 60	62			70		-	*4013, 4019
				61 62				71	-	*401401-401403, 4053, 407201
				61 62				71 72	B61	*4015, 4016, 4032
49				62				71	-	*4021
49				61 62				71	-	*4023
49				61				71	-	*4025, 4069
50				61 62				71	B21	*4026
50			55	61 62				71	-	*4028
				61 62				71 72	-	*4030, 4034
			57	61 62				71 72	-	*4031, 4045, 4080
49				61 62				71	-	*4038, 4052
49				62				71	-	*4046
49				62				70	-	*4047
49				61 62		67		71	-	*4048
				61 62	64			71	-	*4058
				61 62				71 72	-	*4059
49				61 62				71	-	*4060
50				61				71	-	*4068

General “Instructions for Use”

IFU-01 Rev. No. 00 can be downloaded from

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*4071	-	27								?
*407202, 4077	-		28							48
*4074	-									?
*4076	-		28							?
*4083	-									?
*4093	-					35		40		?
*4094	-									
*4101, 4106, 4107	B41		28		32					48
*4102	B41		28		32					48
*410301-410302	B41		28		32					48
*4104	-		28							48
*4105	-		28		32					48
*4108	-	25	28		32		38			48
*4201, 4202, 4206	B42				32					48
*4204	-				32					48
*420501-420502	-	25			32		38			48
*4208	-				32					48
*4209	-						36			48
*44020101-440205, 4411, 4416, 4419N, 4421-4424, 4427, 4433, 4434, 4448, 4451, 4452N, 4455, 4459, 4463	B44, B47, Null		28						41	
*440301-4405, 4413, 4426, 442801-4430, 4432, 4435, 4436, 4438, 4439, 4442, 4445, 4456N, 4458N, 4461N	B44		28						41	
*4406	B44								41	
*4407									41	
*4408	B44	w							41	
*4409	B12		28						41	
*4410	-		28			35			41	43
*4412	-		28						41	
*4414	-		28		32				41	
*4415	-		28		32	35				
*4417, 4443	-		28			36	37		41	
*4418	-		28		32	35				
*4420	-		28		32					
*4425, 4450	-		28						41	
*4431	-		28							
*4437, 446401-446402	-		28						41	
*4440	-					35		40	41	
*4441, 4453	-		28							

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50			61 62	65 67	71	-	*4071
			61 62		71	-	*407202, 4077
49 50			61 62		71	-	*4074
49			62			-	*4076
			61 62		71	-	*4083
			62		71		*4093
50			61 62 63		71		*4094
	51	54	61 62		71	B41	*4101, 4106, 4107
	51		61 62		71 72	B41	*4102
	51		61 62		71	B41	*410301-410302
	51		61 62		71 72	-	*4104
	51	54	? 62		71	-	*4105
	51		61 62		71	-	*4108
	51 52				71 72	B42	*4201, 4202, 4206
	51 52	54			71	-	*4204
	51 52				71 72	-	*420501-420502
	52				71	-	*4208
	51 52				71 72	-	*4209
	53		62 63		70	B44, B47, Null	*44020101-440205, 4411, 4416, 4419N, 4421-4424, 4427, 4433, 4434, 4448, 4451, 4452N, 4455, 4459, 4463
	53		62		70	B44	*440301-4405, 4413, 4426, 442801-4430, 4432, 4435, 4436, 4438, 4439, 4442, 4445, 4456N, 4458N, 4461N
	53 54		60	63	68 70	B44	*4406
	53		62		70		*4407
	53		62 63		70	B44	*4408
	53		61 62 63		71	B12	*4409
	53		62	65	70	-	*4410
	53		63		70	-	*4412
	53		62		70	-	*4414
	54		62	65	70	-	*4415
	53		62		70	-	*4417, 4443
	54	58	62	65	70	-	*4418
	53 54		62 63		70	-	*4420
	53	58 60	62		70	-	*4425, 4450
49	53		62		70	-	*4431
			62		70	-	*4437, 446401-446402
	53		62		70	-	*4440
	53		62 63		70	-	*4441, 4453

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*4444	-				35		40	41		
*4446	-		28					41		
*4447, 4465	-		28							
*4449	-	26	28					41		
*4454	-	27	28							
*4457	-		w					41		
*4460	-		27	28				41		
*4462	-		28		32	33		41		
*4501, 4505, 4507	B45		28		32	35				48
*4502, 4503	-		28		32					48
*4504	-		28		32					48
*4506	-		28		32	35				48
*4508	-		28		32					48
*4509	-		28		32		36	37		48
*460101-460102, 4604, 4605, 4607N, 4609	B46			31		36				
*4602	-				31		36			
*4603, 4608	-				31		36			
*4606	-				31		36			
*4610	-				31	36				
*4611	-		27		31					
*4612, 4614-4616	-		27		31		36			
*4613	-		27		31		36			
*4617	-		27		31		36	37		
*4618	-				31					
*47010101-47010102	B47		28							
*4702	-		28							
*4703	-		28							
*4704, 4705	-		28	29						
*480101-480102, 4807, 4809, 4811, 4819	B48				35					48
*4802	-					35	36			48
*480301-480302	B48					35				48
*4804	B48					35				48
*4805, 4808	B48	25				35				48
*4806	-									48
*4810, 4812, 4817	-					35				48
*4813	-					35				48
*4814	-					35	36			48
*4815	-	25				35				48
*4816	-					35				48
*4818	-					35				
*490101	B49		28							
*490102	-		28							
*4902	-		28							
*4903	-									

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	53			62 63		70	-	*4444
	53			61 62		71	-	*4446
	53			62		70	-	*4447, 4465
	53			62 63		70	-	*4449
	53			62		70	-	*4454
	53			62		70	-	*4457
	53			62		70	-	*4460
	53			62		70	-	*4462
	54			61 62	65	71	B45	*4501, 4505, 4507
	54			61 62		71	-	*4502, 4503
	54			61 62	65	71	-	*4504
52	54			61	65	71	-	*4506
	54			61 62	64	71	-	*4508
	54			61 62		71	-	*4509
52	55					69 71	B46	*460101-460102, 4604, 4605, 4607N, 4609
w	55					69 71	-	*4602
52	55					71	-	*4603, 4608
49	52	55				71	-	*4606
	52	55		62		69 71	-	*4610
	52	55		62	65	71	-	*4611
	52	55		62		69 71	-	*4612, 4614-4616
	52	55		62		71	-	*4613
	52	55		62		69 71	-	*4617
	52	55		62	64	66	71	*4618
	56			62		70	B47	*47010101-47010102
	56			61 62		71	-	*4702
	56			62		70 w	-	*4703
				62		70	-	*4704, 4705
		57		62		71 72	B48	*480101-480102, 4807, 4809, 4811, 4819
49				62		71	-	*4802
		57		62		71	B48	*480301-480302
				62		71 72	B48	*4804
		57				71 72	B48	*4805, 4808
				62		71 72	-	*4806
				62		71 72	B48	*4810, 4812, 4817
				62		71	-	*4813
				62		71 72	-	*4814
		57		62		71 72	-	*4815
		57				71 72	-	*4816
		57		62		70 72	-	*4818
			58 59	62	65	70	B49	*490101
			58	62	65	70		*490102
			59	62	65	70	-	*4902
			59	62	65	70	-	*4903

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*4904, 4905	-	28		36			
*5001, 5004	B50	28					48
*5002	B45	28		35			48
*510101, 510103, 510105-510108, 510201, 510203, 5103, 5107, 510901, 5111N, 5112, 511302, 5114, 5117-5119, 5122, 5123, 5126-5130, 5132, 5133, 5138- 5141N, 5143, 5148, 5149, 5151-5153, 5155, 5158, 5160	B51, B5102, B5103, Null			33			
*510102, 510109, 510202, 5105, 510902	B51			33			
*510104, 511301, 5116, 5121, 512401- 512402, 5131, 5134, 5135	B51, B52						
*5104, 5146	B51			33			41
*5106, 5159	B51			33			
*5108, 5120, 5144N	B51		32	33			
*5110	-						
*5115	-						
*5136	-			32			
*5137, 5163	-			33	36		
*5142	-						41
*5145	-				36		
*5150, 5154	-			33			
*5156	-			33			41
*5157	-			33			
*5161	-			33			
*5162	-						
*520101, 520103, 5204, 5205, 5207, 5210 5212	B52			33			
*520102, 520104-5203, 520601-520602, 5209	B52			33			
*5208	-						
*5213				33			
*5214	-						
*530101-530104, 5305, 5308, 5310, 5316	B53			36			41
*5302	B53			36			41

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		58	59	62				70	-	*4904, 4905	
			59	61	62		65		71	B50	*5001, 5004
			59	61	62		65		71	B45	*5002
		54		59	60			68	70	B51, B5102, B5103, Null	*510101, 510103, 510105-510108, 510201, 510203, 5103, 5107, 510901, 5111N, 5112, 511302, 5114, 5117-5119, 5122, 5123, 5126-5130, 5132, 5133, 5138- 5141N, 5143, 5148, 5149, 5151-5153, 5155, 5158, 5160
			59	60				68	70	B51	*510102, 510109, 510202, 5105, 510902
		54		59	60			68	70	B51, B52	*510104, 511301, 5116, 5121, 512401- 512402, 5131, 5134, 5135
		54	55		60			68	70	B51	*5104, 5146
		54		60				68	70	B51	*5106, 5159
		54		59	60			68	70	B51	*5108, 5120, 5144N
		54		60				68	70	-	*5110
			60				65	68	70	-	*5115
		54		59	60			68	70	-	*5136
		54		59	60			68	70	-	*5137, 5163
		53	54		60			68	70	-	*5142
		54		60				68	70	-	*5145
			59					68	70	-	*5150, 5154
		54	55					68	70	-	*5156
		54		59				68	70	-	*5157
		54		59	60			68	69	70	-
		54		60			65	67	68	70	-
			55		60						*5161
											*5162
			59	60	62				70	B52	*520101, 520103, 5204, 5205, 5207, 5210 5212
		54		59	60	62			70	B52	*520102, 520104-5203, 520601-520602, 5209
			59	60	62				70	-	*5208
			59		62				70		*5213
			59		62				70	-	*5214
				60				68	70	B53	*530101-530104, 5305, 5308, 5310, 5316
			55		60			68	70	B53	*5302

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*5303, 5309, 5311- 5313	-						36			41			
*5304, 5307	-									41			
*5306	B53							36			41		
*5314	-		27					36					
*5315	-							36			41		
*5401, 5402, 5405N, 5407, 5408N, 5410, 5413, 5416, 5417	B54												
*5403	-												
*5404, 5411, 5415	-												
*5406	-							36					
*5409, 5414	-							36					
*5412	-												
*550101-550104, 5503, 5505, 5511, 5515, 5525, 5529, 5531, 5533	B55												
*550201-550203, 5507, 5510, 5512, 5516, 5519, 5526, 5530	B54, B55												
*5504, 5508, 5513, 5527, 5615, 5619N, 5622	B55												
*5509, 5517, 5528	-												
*5514	-							36			41		
*5518	-							35					
*5520	-												
*5521	-												
*5522	-							34					
*5523, 5532, 5618	-							36					
*5524	-							34					
*5534	-												
*5601, 5608, 5614, 5616, 5620, 5624	B56												
*5602, 5604	B56												
*5603	B22							36					
*560501	-							33					
*560502	-							33					
*5606	B78							33			42		
*5607	-												
*5609	-								36		41		
*5610	-												
*5611, 5612	-										41		
*5613	-							32					
*5617	-												
*5621	-							33					

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							68	70		-	*5303, 5309, 5311-5313
			60				68	70		-	*5304, 5307
	54	55		60			68	70		B53	*5306
			60				68	70		-	*5314
			60				68	70	72	-	*5315
52		56			63	64			71	B54	*5401, 5402, 5405N, 5407, 5408N, 5410, 5413, 5416, 5417
52		56			63	65			71	-	*5403
52		56			63				71	-	*5404, 5411, 5415
52		56			63			69	71	-	*5406
52		56			63				71	-	*5409, 5414
52		56			63	64			70	-	*5412
52		56	59		64				71	B55	*550101-550104, 5503, 5505, 5511, 5515, 5525, 5529, 5531, 5533
52		56			64				71	B54, B55	*550201-550203, 5507, 5510, 5512, 5516, 5519, 5526, 5530
52		56							71	B55	*5504, 5508, 5513, 5527, 5615, 5619N, 5622
52		56	59						71	-	*5509, 5517, 5528
52		56				66			71	-	*5514
51	52	54	56						71	-	*5518
52		56	59		64			69	71	-	*5520
52		56	59		64				71	-	*5521
52		56							71	-	*5522
52		56							71	-	*5523, 5532, 5618
52		56	59						71	-	*5524
52		56			62	64			71		*5534
52		56				65			71	B56	*5601, 5608, 5614, 5616, 5620, 5624
52		56				65	67		71	B56	*5602, 5604
52		56					69	71		B22	*5603
52		56	59		64				71	-	*560501
52		56	59						71	-	*560502
52		56	59		64				71	B78	*5606
52		56				65		70		-	*5607
52		56							71	-	*5609
52		56			64	67			71	-	*5610
52		56							71	-	*5611, 5612
52	54	56				65			71	-	*5613
52		56				65			71	-	*5617
52		56	59						70	-	*5621

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					64				71	-	*5623		
				60		66		70		B57	*570101-570103, 5706, 5708, 5710		
				60		66		70		B57	*5702-5705		
	53			60		66		70		-	*5707		
	53			60		66		70		-	*5709		
				60		66		70		-	*5711		
				62		66		71		-	*5712		
				60	62	66		70		-	*5713		
		55		60	62	66		70		-	*5714		
				60	62	66		70		-	*5715, 5718, 5719		
				60	62			70		-	*5716		
				62		66		70		-	*5717		
				60		67		70		B58	*580101, 5804, 5805, 5810N-5814		
				60	62	67		70		-	*580102, 5815		
				60		67		70		B58	*5802, 5806		
				60		67		70		-	*5807		
	54			59	60	67		70		-	*5808		
	55			60		67		70		-	*5809		
				60	62	67		70		-	*5816		
					62	67		70			*5817N, 5819		
					62	67		70			*5818		
					60	62	67	70			*5820		
					64			70		B59	*5901		
					60			70		-	*5902		
								70		-	*5903		
						65		70			*5904		
	52								71	B67	*670101		
	52								71	B67	*670102		
	w								71	-	*6702		
	52							69	71	B73	*7301		
				59		64		68	71	B78	*7801, 780202, 7803		
				59			68	71		B78	*780201, 7804		
				59	62			71		-	*7805		
				59	62			71			*7806		
	52		56	57					71	72	B81	*8101	
	52			57					71	72	-	*8102	
	52			57					71	72	-	*8103, 8104N	
	52		56			65		71		-	*8201, 8202		
	52	53	56			63			71		-	*8301	
49	50	51	52	53	54	55	56	57	58	59	60	ser. ⁵	HLA-B allele ⁴
													Well No.

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A*3028																								
Cw*0206																								
Cw*0223		25																						
Cw*0305, 0325, 0327			27																					
Cw*0746								32																
Cw*150204																								
Well No.	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48

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-B low resolution typing.

In addition, wells number 30, 33, 34, 44, 45, 54, 59, 66 and 72 contain the primer pair giving rise to the shorter, 800 bp, internal positive control band in order to allow kit identification.

²The nucleotide position, in the 1st, 2nd or 3rd exon or in the 1st 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, or 3rd exon or the 1st or 3rd introns, 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 sequence of the B*0701 allele has been shown to be in error.

The sequence of the B*1305 allele has been shown to be identical to B*1304.

The B*1522 allele has been renamed B*3543.

The sequence of the B*1541 allele has been shown to be identical to B*1539.

The B*1559 allele has been renamed B*3544.

The sequence of the B*1816 allele has been shown to be identical to B*1814.

The sequence of the B*27051 allele has been shown to be identical to B*270502.

The sequence of the B*2722 allele has been shown to be identical to the corrected B*2706 sequence.

The B*3573 allele has been renamed B*350803.

The sequence of the B*39012 allele has been shown to be identical to B*390101.

The sequence of the B*3921 allele has been shown to be identical to B*3924.

The sequence of the B*4017 allele has been shown to be identical to B*4016.

The sequence of the B*4041 allele has been shown to be identical to B*4040.

The sequence of the B*4203 allele has been shown to be in error.

The sequence of the B*4401 allele has been shown to be identical to B*4402.

The sequence of the B*5003 allele has been shown to be identical to B*5002.

The sequence of the B*5125 allele has been shown to be identical to B*5122.

The B*5147 allele has been renamed B*510902.

The sequence of the B*5506 allele has been shown to be identical to B*5504.

The sequence of the B*5803 allele has never been assigned.

The B*7901 allele has been renamed B*1518.

The B*9530 allele has been renamed B*152702.

The B*0826 and the B*4207 alleles give rise to identical amplification patterns with the HLA-B low resolution primer set. These alleles can be separated by the respective high resolution primer sets.

The B*1408 and the B*3925N, B*3930 and B*3932 to 3934 alleles give rise to identical amplification patterns with the HLA-B low resolution primer set. These alleles can be separated by the respective high resolution primer sets.

The B*1829 and the B*3523, B*3537, B*3553N, B*3564, B*3566 and B*356801-356802 alleles give rise to identical amplification patterns with the HLA-B low resolution primer set. These alleles can be separated by the respective high resolution primer sets.

The B*5504, B*5508, B*5513, B*5527 and the B*5615, B*5619N and B*5622 give rise to identical amplification patterns with the HLA-B low resolution primer set. These alleles can be separated by the respective high resolution primer sets.

The B*5523, B*5532 and the B*5618 give rise to identical amplification patterns with the HLA-B low resolution primer set. These alleles can be separated by the respective high resolution primer sets.

⁵The serological reactivity of all HLA-B alleles is not known. In this table we use the information in the HLA Dictionary 2004 on the www.ebi.ac.uk/imgt/hla web site and the information available at the www.worldmarrow.org web site and have also inferred the serological grouping from the naming of the sequence-defined allele.

'ser', serological HLA specificity.

'w' might be weakly amplified.

'?': nucleotide sequence information not available for the primer matching sequence.

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Lot-specific information

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INTERPRETATION TABLE
DR low resolution SSP typing
Amplification patterns of the DRB1*0101 to DRB1*1003 alleles

		Well																						
		73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
Length of spec.		205	195	215	210	220	80	80	100	205	165	85	205	100	85	210	195	175	100	110	110	230	215	175
PCR product(s)					260				210	210	175	230	215	130		170	105		210	140	135	175		
Length of int. pos control ¹																	250	180			170	225		
5'-primer(s) ²																								
3'-primer(s) ³		67	71	5'-gAg ^{3'}	67	67	5'-gAT ^{3'}	70	67	5'-gAA ^{3'}	73	26	5'-gGT ^{3'}	16	5'-gTC ^{3'}	13	5'-gTC ^{3'}							
Well No.	DR	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
DRB1 allele ⁴	ser ⁵																							
*010101-010205, 0104-0120	1	73																						
*0103	103		74																					
*03010101-030106, 0304-0306, 0309, 0311-0316, 0318-0320, 0322, 0323, 0325, 0326, 0328, 0330, 0331, 0333, 0334, 0336, 0337	17						77	78										89						
Well No.		73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

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Well No.		73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95				
*030201-0303, 0327, 0329, 0338	18					77	79										89											
*0307, 0317, 0321, 0324, 0332, 0335, 0339, 0340	-					77											89											
*0308	-					77	78				83		85					91										
*0310	-					77	78										91	92										
*040101-0461, 0463-0468, 0470-0472, 0474-0478	4								80																			
*0462, 0469, 0473	-								80								90											
*07010101-070103, 0703- 0716	7									81																		
*080101-080203, 080401- 0807, 0811, 0816, 0817, 0822, 0824, 0826, 0828	8										82						88											
*080302, 0810, 0812- 0815, 0818, 0819, 0823, 0825, 0827, 0829, 0830, 0833, 0834, 0836	8										82																	
*0808	-									82						88		90										
*0809, 0821, 1415	8									82						88			92									
*0820, 1318, 1347, 1355	8,13															87	88	89	92									
*0831, 1167	-									82			85			88												
*0832	-									82			86						92									
*0835	-									82									92									
*090102-090202, 0904- 0908	9										83								91									
*0903	9										83																	
*100101-1003	10											84																
*110101-110107, 110401- 110403, 110601-110602, 111201, 1115, 1124, 112701-1130, 1132, 1133, 1135, 1137-1139, 1143, 1144, 1147, 1149-1151, 115401-115402, 1156, 1160-1162, 1166	11																85	87	88									
*110201-1103, 111101- 111102, 111401-111402, 1121, 1136, 1141, 1148, 1163, 116501-116502, 1168, 1170	11								78							85	87	88										
*110404, 1109-111002, 111202, 1146, 1158	11															85	87	88			91							
*1105	11															85	88											
Well No.		73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95				

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Well No.		73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	
*1107, 1153	-					77				83		85													
*110801-110802, 1118-111902, 1142, 1157	11													85	87										
*111301-111302	11							w						85						91	92				
*1116, 1120, 1140, 1159	-						78							85	87	88			91						
*1117, 1152	11													85					91	92					
*1122	-													85					91						
*1123, 1125	11													85	87	88			92						
*1126, 1134	11							79						85											
*1131, 1145, 1164	-													85	87				92						
*1155	-													85	88				92						
*1169	-													85		88		90							
*120101-120102, 120302, 1205-1212, 1214, 1217	12														86										
*120201-120204, 1213, 1215, 1218	12														86	88									
*1204	-									82				86					91						
*1216	-									82				86	88										
*130101-130201, 130203, 1304, 1308, 1316, 1320, 1322-1324, 1327-1329, 1331, 1332, 1334-1336, 1338-1341, 1348, 1351, 1352, 1354, 1359, 1361, 1363-1365, 1368-1376, 1378-1380, 1383, 1384, 1387	13						78								87	88	89								
*130202, 130301-130302, 1310, 1333, 1337, 1366, 1381	13							78							87	89									
*130501-130502, 130701-130702, 131101-131102, 131401-131403, 1321, 1342, 1346, 1349-135002, 1362	13														87	88	89								
*1306, 1312, 1325, 1330, 1356, 1358, 1360, 1377, 1382	13														87	89									
*1309	13															88	89								
*1313	-															87	89		92						
*1315, 1319, 1353, 1357	-						78	79							87	88	89								
*1317	13							78		81							88								
*1326	-							79							87	88	89								
*1343	-							78							87	88			91	92					
Well No.		73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	

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Well No.		73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
*1344, 1386	-						79										89							
*1345	-						78									87	88		90		92			
*1367	-															87	88							
*1385	-						78	79							87		89							
*140101-140102, 1404, 140701-140702, 1410, 1426, 1428, 1431, 1435, 1438, 1439, 1454, 1455, 1457, 1460-1462, 1470, 1471, 1475, 1476, 1479	14																		90	91	92			
*140103, 1408, 142302, 1434, 1472	-																		91	92				
*1402, 1406, 1409, 1413, 1417, 1420, 1429, 1430, 1433, 1441, 1447, 1448, 1451, 1480, 1483	14							79										89		91				
*140301-140302, 1412, 1440, 1463, 1467, 1477, 1478	14							79								87		89		92				
*140501-140503, 1414, 142301, 1436, 1443-1445, 1456, 1459, 1464	14																	89	91	92				
*1411	-									82									91	92				
*1416	6						78									87	88		90	91	92			
*1418, 1481	-							79										89		91	92			
*1419, 1421	-						78	79								87		89		91				
*1422	-															87	88		90	91	92			
*1424	-							79								88	89							
*1425, 1453	-															87	88		90		92			
*1427	14							79								87	88		89		92			
*143201-143202	-							w										90	91	92				
*1437	-															88	89	90						
*1442	-															89			92					
*1446, 1452	-																	91						
*1449	-							79										90	91	92				
*1450	-								81									90	91	92				
*1458	-																	90		92				
*1465	-							w										89	26	27				
*1468	-									82								90	91	92				
*1469	-															87		90		92				
*1473	-															88		90	91	92				
*1474	-															87		90	91	92				
*1482	-							78										90	91	92				
Well No.		73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95

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Well No.		73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	
*15010101-1520, 1522-1526, 1528-1531	15			75																					
*1521	-			75																w					
*1527	-			75															91						
*160101-1603, 160501-160502, 1607-1613N	16				76																				
*1604	16			76																w					
Well No.		73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	
DRB1 allele ⁴	ser ⁵																								
DRB3*01010201-0113, 0201-0224, 030101-0303	52																						93		
DRB4*01010101-0107	53																						94		
DRB5*010101-0113, 0202-0205	51																							95	
Well No.	ser ⁵	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	

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 430 base pairs, for most wells, or a band of 515 base pairs, for some wells.

Well number 73 contains the primer pair giving rise to the longer, 515 bp, internal positive control band in order to help in the correct orientation of the DR low resolution typing.

In addition, wells number 82 and 91 contain the primer pair giving rise to the longer, 515 bp, internal positive control band in order to allow kit identification.

²The codon, in the 2nd exon, matching the specificity-determining 3'-end of the primer is given. Codon numbering as on the www.ebi.ac.uk/imgt/hla web site. The sequence of the 3 terminal nucleotides of the primer is given. Empty spaces indicate codon boundaries.

³The codon, in the 2nd exon, matching the specificity-determining 3'-end of the primer is given in the anti-sense direction. Codon numbering as on the www.ebi.ac.uk/imgt/hla web site. The sequence of the 3 terminal nucleotides of the primer is given. Empty spaces indicate codon boundaries.

⁴The DRB1*0809, DRB1*0821 and DRB4*1415 alleles yield identical amplification patterns except for the specific PCR product yielded by the DRB3 gene in linkage disequilibrium with the DRB1*1415 allele.

The DRB1*0820, DRB1*1318, DRB1*1347 and DRB1*1355 alleles yield identical amplification patterns except for the specific PCR product yielded by the DRB3 gene in linkage disequilibrium with the DRB1*1318, DRB1*1347 and DRB1*1355 alleles.

The DRB1*0831 and DRB1*1167 alleles yield identical amplification patterns except for the specific PCR product yielded by the DRB3 gene in linkage disequilibrium with the DRB1*1167 allele.

The sequence of the DRB1*0702 allele has been shown to be identical to DRB1*070101.

The sequence of the DRB1*08031 allele has been shown to be identical to DRB1*080302.

The sequence of the DRB1*09011 allele has been shown to be identical to DRB1*090102.

The sequence of the DRB1*12031 allele has been shown to be identical to DRB1*1201.

The sequence of the DRB1*1466 allele has been shown to be identical to DRB1*142302.

The sequence of the DRB1*1606 allele has been shown to be identical to DRB1*1605.

The sequence of the DRB3*010101 allele has been shown to be identical to DRB3*01010201.

The DRB4*0101102N allele has been renamed DRB4*01030102N.

The sequence of the DRB5*0201 allele has been shown to be identical to DRB5*0202.

⁵The serological reactivity of all DRB alleles is not known. In this table we use the information in the HLA Dictionary 2004 on the www.ebi.ac.uk/imgt/hla web site and the information available at the www.worldmarrow.org web site and have also inferred the serological grouping from the naming of the sequence-defined allele.

'ser', serological HLA specificity.

'w', may be weakly amplified. 'f', may be faintly amplified.

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Lot-specific information

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CELL LINE VALIDATION SHEET																		
HLA-A low resolution primer set																		
	IHWC cell line	A*	A*	Well														
				1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	9001	SA	*2402	-	-	-	-	+	-	+	-	-	-	-	-	-	-	-
2	9280	LK707	*0201	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
3	9011	E4181324	*0101	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-
4	9275	GU373	*3001	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+
5	9009	KAS011	*0101	+	-	-	+	-	-	-	-	-	-	-	-	-	-	-
6	9353	SM	*0201	*2603	-	+	-	-	-	-	+	-	-	+	-	+	-	-
7	9020	QBL	*2601	-	-	-	-	-	-	+	-	+	-	+	-	+	-	-
8	9007	DEM	*0201	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
9	9026	YAR	*2601	-	-	-	-	-	-	+	-	+	-	+	-	-	-	-
10	9107	LKT3	*2402	-	-	-	-	+	-	+	-	-	-	-	-	-	-	-
11	9051	PITOUT	*2902	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
12	9052	DBB	*0201	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
13	9067	BTB	*0201	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
14	9071	OLGA	*3101	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	9075	DKB	*2402	-	-	-	-	+	-	+	-	-	-	-	-	-	-	-
16	9037	SWEIG007	*2902	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
17	9008	WILJON	*2501	-	-	-	-	-	-	+	+	-	-	-	-	-	-	-
18	9257	32367	*3303	*7401	-	-	-	-	-	-	-	-	-	-	-	-	-	-
19	9038	BM16	*0201	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
20	9059	SLE005	*0201	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
21	9064	AMALA	*0217	-	+	-	-	-	-	W	-	-	-	-	-	-	-	-
22	9056	KOSE	*0201	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
23	9124	IHL	*0201	*3401	-	+	-	-	-	-	+	-	-	+	+	-	-	-
24	9035	JBUSH	*3201	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-
25	9049	IBW9	*3301	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26	9285	WT49	*0205	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
27	9191	CH1007	*2410	*2901	-	-	-	-	+	-	+	-	-	-	-	+	-	-
28	9320	BEL5GB	*0201	*2902	-	+	-	-	-	-	-	-	-	-	-	+	-	-
29	9050	MOU	*2902	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-
30	9021	RSH	*3001	*6802	-	-	-	-	-	-	+	-	-	-	-	-	+	+
31	9019	DUCAF	*3002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
32	9297	HAG	*0201	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
33	9098	MT14B	*3101	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
34	9104	DHIF	*3101	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
35	9302	SSTO	*3201	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-
36	9024	KT17	*0206	*1101	-	+	-	+	-	-	-	-	-	+	-	-	-	-
37	9065	HHKB	*0301	-	-	+	-	-	-	-	-	-	-	-	+	-	-	-
38	9099	LZL	*0217	-	+	-	-	-	-	W	-	-	-	-	-	-	-	-
39	9315	CML	*0101	*0301	+	-	+	+	-	-	-	-	-	-	+	-	-	-
40	9134	WHONP199	*0207	*3001	-	+	-	-	-	-	-	-	-	-	-	-	+	+
41	9055	H0301	*0301	-	-	+	-	-	-	-	-	-	-	-	-	+	-	-
42	9066	TAB089	*0207	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
43	9076	T7526	*0207	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
44	9057	TEM	*6601	-	-	-	-	-	-	+	-	-	-	+	-	+	-	-
45	9239	SHJO	*2301	*2402	-	-	-	-	+	+	+	-	-	-	-	-	-	-
46	9013	SCHU	*0301	-	-	+	-	-	-	-	-	-	-	-	+	-	-	-
47	9045	TUBO	*0216	*0301	-	+	+	-	-	-	-	-	-	-	-	+	-	-
48	9303	TER-ND	*0201	*1101	-	+	-	+	-	-	-	-	-	+	-	-	-	-

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CELL LINE VALIDATION SHEET										
HLA-A low resolution primer set										
	IHWC cell line	A*	Well							
			17	18	19	20	21	22	23	24
			200855017	200855018	200855019	200855020	200855021	200855022	200855023	200855024
1	9001	SA	*2402	-	-	-	-	-	-	-
2	9280	LK707	*0201	-	-	-	-	-	-	-
3	9011	E4181324	*0101	-	-	-	-	-	-	+
4	9275	GU373	*3001	-	-	-	-	-	-	-
5	9009	KAS011	*0101	-	-	-	-	-	-	+
6	9353	SM	*0201	*2603	-	-	-	-	+	-
7	9020	QBL	*2601	-	-	-	-	-	-	-
8	9007	DEM	*0201	-	-	-	-	-	-	-
9	9026	YAR	*2601	-	-	-	-	-	-	-
10	9107	LKT3	*2402	-	-	-	-	-	-	-
11	9051	PITOUT	*2902	-	-	-	-	-	-	-
12	9052	DBB	*0201	-	-	-	-	-	-	-
13	9067	BTB	*0201	-	-	-	-	-	-	-
14	9071	OLGA	*3101	-	-	-	-	-	-	-
15	9075	DKB	*2402	-	-	-	-	-	-	-
16	9037	SWEIG007	*2902	-	-	-	-	-	-	-
17	9008	WILJON	*2501	-	-	-	-	-	-	-
18	9257	32367	*3303	*7401	-	+	+	-	-	-
19	9038	BM16	*0201	-	-	-	-	-	-	-
20	9059	SLE005	*0201	-	-	-	-	-	-	-
21	9064	AMALA	*0217	-	-	-	-	-	-	-
22	9056	KOSE	*0201	-	-	-	-	-	-	-
23	9124	IHL	*0201	*3401	-	-	-	-	-	-
24	9035	JBUSH	*3201	-	+	-	-	-	-	-
25	9049	IBW9	*3301	-	+	-	-	-	-	-
26	9285	WT49	*0205	-	-	-	-	-	-	-
27	9191	CH1007	*2410	*2901	-	-	-	-	-	-
28	9320	BEL5GB	*0201	*2902	-	-	-	-	-	-
29	9050	MOU	*2902	-	-	-	-	-	-	-
30	9021	RSH	*3001	*6802	-	-	-	+	-	-
31	9019	DUCAF	*3002	-	-	-	-	-	-	-
32	9297	HAG	*0201	-	-	-	-	-	-	-
33	9098	MT14B	*3101	-	-	-	-	-	-	-
34	9104	DHIF	*3101	-	-	-	-	-	-	-
35	9302	SSTO	*3201	-	+	-	-	-	-	-
36	9024	KT17	*0206	*1101	-	-	-	-	-	+
37	9065	HHKB	*0301	-	-	-	-	-	-	-
38	9099	LZL	*0217	-	-	-	-	-	-	-
39	9315	CML	*0101	*0301	-	-	-	-	-	+
40	9134	WHONP199	*0207	*3001	-	-	-	-	-	-
41	9055	H0301	*0301	-	-	-	-	-	-	-
42	9066	TAB089	*0207	-	-	-	-	-	-	-
43	9076	T7526	*0207	-	-	-	-	-	-	-
44	9057	TEM	*6601	-	-	-	-	-	-	-
45	9239	SHJO	*2301	*2402	-	-	-	-	-	-
46	9013	SCHU	*0301	-	-	-	-	-	-	-
47	9045	TUBO	*0216	*0301	-	-	-	-	-	-
48	9303	TER-ND	*0201	*1101	-	-	-	-	-	+

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Lot-specific information

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		CELL LINE VALIDATION SHEET																		
		HLA-B low resolution SSP kit																		
		Prod. No.:	Well																	
			25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40		
			2008480101	2008480102	2008480103	2008480104	2008480105	2008480106	2008480107	2008480108	2008480109	2008480110	2008480111	2008480112	2008480113	2008480114	2008480115	2008480116		
		IHWG cell line	B*																	
1	9001	SA	*0702	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
2	9280	LK707	*5201	*7301	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	
3	9011	E4181324	*52011		-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	
4	9275	GU373	*1510	*5301	-	-	-	-	-	-	+	-	+	-	+	-	-	-	-	
5	9009	KAS011	*3701		-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	
6	9353	SM	*3901	*5101	-	-	-	+	-	-	+	-	-	-	-	-	-	-	-	
7	9020	QBL	*1801		-	-	-	-	-	-	-	-	-	-	+	-	-	+	-	
8	9007	DEM	*5701		-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	
9	9026	YAR	*3801		-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	
10	9107	LKT3	*5401		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
11	9051	PITOUT	*4403		-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	
12	9052	DBB	*5701		-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	
13	9067	BTB	*2705		-	-	-	+	-	-	-	-	-	-	-	-	-	+	-	
14	9071	OLGA	*1501	*1520	-	-	-	-	+	-	-	-	-	-	+	-	-	-	-	
15	9075	DKB	*4001		-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	
16	9037	SWEIG007	*4002		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
17	9008	WILJON	*1801		-	-	-	-	-	-	-	-	-	-	+	-	+	-	-	
18	9257	32367	*1401	*5601	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	
19	9038	BM16	*1801		-	-	-	-	-	-	-	-	-	-	+	-	-	+	-	
20	9059	SLE005	*4001		-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	
21	9064	AMALA	*1501		-	-	-	-	+	-	-	-	-	-	-	+	-	-	-	
22	9056	KOSE	*3503		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
23	9124	IHL	*4002	*5602	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
24	9035	JBUSH	*3801		-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	
25	9049	IBW9	*1402		-	-	+	-	+	-	-	-	-	-	-	-	-	-	-	
26	9285	WT49	*5801		-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	
27	9191	CH1007	*0705	*5101	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-	
28	9320	BEL5GB	*4402	*4403	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	
29	9050	MOU	*4403		-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	
30	9021	RSH	*4201		-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	
31	9019	DUCAF	*1801		-	-	-	-	-	-	-	-	-	-	-	+	-	-	+	
32	9297	HAG	*4102		-	-	-	+	-	-	+	-	-	-	-	-	-	-	-	
33	9098	MT14B	*4001		-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	
34	9104	DHIF	*3801		-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	
35	9302	SSTO	*4402		-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	
36	9024	KT17	*1501	*3501	-	-	-	-	-	+	-	-	-	-	+	-	-	-	-	
37	9065	HHKB	*0702		+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
38	9099	LZL	*1501		-	-	-	-	-	+	-	-	-	-	+	-	-	-	-	
39	9315	CML	*0801	*2705	-	+	-	-	+	-	+	-	-	-	-	-	-	-	+	
40	9134	WHONP199	*1302	*4601	-	-	+	+	-	-	+	-	-	+	-	+	-	-	-	
41	9055	H0301	*1402		-	-	-	+	-	+	-	-	-	-	-	-	-	-	-	
42	9066	TAB089	*4601		-	-	-	-	-	+	-	-	-	-	+	-	-	-	-	
43	9076	T7526	*4601		-	-	-	-	-	+	-	-	-	-	+	-	-	-	-	
44	9057	TEM	*3801		-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	
45	9239	SHJO	*4201	*5001	-	-	-	+	-	-	+	-	-	-	-	-	-	-	-	
46	9013	SCHU	*0702		+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
47	9045	TUBO	*5101		-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	
48	9303	TER-ND	*3501	*4403	-	-	-	+	-	-	-	-	-	-	+	-	-	-	-	

Lot No.: 61F

Lot-specific information

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Lot No.: 61F

Lot-specific information

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Cell Line Validation Sheet																			
HLA-B low resolution SSP kit																			
				Prod. No.:	Well														
					57	58	59	60	61	62	63	64	65	66	67	68	69	70	71
1	9001	SA	*0702		-	-	-	-	-	-	-	-	-	-	-	-	-	+	+
2	9280	LK707	*5201	*7301	-	-	+	+	-	+	-	-	-	-	-	-	-	+	-
3	9011	E4181324	*52011		-	-	+	+	-	+	-	-	-	-	-	+	+	+	-
4	9275	GU373	*1510	*5301	-	-	-	+	-	-	-	-	-	-	-	+	-	+	+
5	9009	KAS011	*3701		-	-	-	-	-	+	-	-	-	-	-	-	-	+	-
6	9353	SM	*3901	*5101	-	-	+	+	-	-	-	-	-	-	-	+	-	+	+
7	9020	QBL	*1801		-	-	-	-	-	-	-	-	-	-	-	+	-	+	-
8	9007	DEM	*5701		-	-	-	+	-	-	-	-	-	-	-	+	-	+	-
9	9026	YAR	*3801		-	-	-	-	-	-	-	-	-	-	-	-	+	-	-
10	9107	LKT3	*5401		-	-	-	-	-	-	+	+	-	-	-	-	-	+	-
11	9051	PITOUT	*4403		-	-	-	-	-	+	-	-	-	-	-	-	-	+	-
12	9052	DBB	*5701		-	-	-	+	-	-	-	-	-	-	-	+	-	+	-
13	9067	BTB	*2705		-	-	-	-	-	+	-	-	-	-	-	-	-	+	-
14	9071	OLGA	*1501	*1520	-	-	-	-	-	+	-	-	-	-	-	-	+	-	+
15	9075	DKB	*4001		-	-	-	-	+	+	-	-	-	-	-	-	-	+	-
16	9037	SWEIG007	*4002		-	-	-	-	+	+	-	-	-	-	-	-	-	+	-
17	9008	WILJON	*1801		-	-	-	-	-	-	-	-	-	-	-	+	-	+	-
18	9257	32367	*1401	*5601	-	-	-	-	-	-	-	-	-	-	+	-	-	+	-
19	9038	BM16	*1801		-	-	-	-	-	-	-	-	-	-	-	+	-	+	-
20	9059	SLE005	*4001		-	-	-	-	+	+	-	-	-	-	-	-	-	+	-
21	9064	AMALA	*1501		-	-	-	-	-	+	-	-	-	-	-	-	-	+	-
22	9056	KOSE	*3503		-	-	-	-	-	-	-	-	-	-	-	-	+	-	+
23	9124	IHL	*4002	*5602	-	-	-	-	+	+	-	-	+	-	-	-	-	+	-
24	9035	JBUSH	*3801		-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
25	9049	IBW9	*1402		-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
26	9285	WT49	*5801		-	-	-	+	-	-	-	-	-	-	-	+	-	+	-
27	9191	CH1007	*0705	*5101	-	-	+	+	-	-	-	-	-	-	-	+	-	+	+
28	9320	BEL5GB	*4402	*4403	-	-	-	-	-	+	+	-	-	-	-	-	-	+	-
29	9050	MOU	*4403		-	-	-	-	+	-	-	-	-	-	-	-	-	+	-
30	9021	RSH	*4201		-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
31	9019	DUCAF	*1801		-	-	-	-	-	-	-	-	-	-	-	-	+	-	+
32	9297	HAG	*4102		-	-	-	-	+	+	-	-	-	-	-	-	-	+	-
33	9098	MT14B	*4001		-	-	-	-	+	+	-	-	-	-	-	-	-	+	-
34	9104	DHIF	*3801		-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
35	9302	SSTO	*4402		-	-	-	-	-	+	+	-	-	-	-	-	-	+	-
36	9024	KT17	*1501	*3501	-	-	-	-	-	+	-	-	-	-	-	-	+	-	+
37	9065	HHKB	*0702		-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
38	9099	LZL	*1501		-	-	-	-	-	+	-	-	-	-	-	-	+	-	+
39	9315	CML	*0801	*2705	-	-	-	-	+	-	-	-	-	-	-	-	+	+	+
40	9134	WHONP199	*1302	*4601	-	-	-	-	+	-	-	-	-	-	-	-	+	+	+
41	9055	H0301	*1402		-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
42	9066	TAB089	*4601		-	-	-	-	-	-	-	-	-	-	-	-	+	-	+
43	9076	T7526	*4601		-	-	-	-	-	-	-	-	-	-	-	-	+	-	+
44	9057	TEM	*3801		-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
45	9239	SHJO	*4201	*5001	-	-	+	-	+	+	-	-	+	-	-	-	-	+	+
46	9013	SCHU	*0702		-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
47	9045	TUBO	*5101		-	-	+	+	-	-	-	-	-	-	-	-	+	-	+
48	9303	TER-ND	*3501	*4403	-	-	-	-	-	+	-	-	-	-	-	-	+	-	+

Lot No.: 61F

Lot-specific information

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Lot No.: 61F

Lot-specific information

www.qiagen.com/goto/HLA

CELL LINE VALIDATION SHEET			Well							
			Prod. No.:	89	90	91	92	93	94	95
IHWC cell line			DRB1							
1	9001	SA	*0101	-	-	-	-	-	-	-
2	9280	LK707	*1502	*0405	-	-	-	-	+	+
3	9011	E4181324	*1502		-	-	-	-	-	+
4	9275	GU373	*0301		+	-	-	+	-	-
5	9009	KAS011	*1601		-	-	-	-	-	+
6	9353	SM	*0407	*0803	-	-	-	-	+	-
7	9020	QBL	*0301		+	-	-	+	-	-
8	9007	DEM	*0401	*1602	-	-	-	-	+	+
9	9026	YAR	*0402		-	-	-	-	+	-
10	9107	LKT3	*0405		-	-	-	-	+	-
11	9051	PITOUT	*0701		-	-	-	-	+	-
12	9052	DBB	*0701		-	-	-	-	+	-
13	9067	BTB	*0801		-	-	-	-	-	-
14	9071	OLGA	*0802		-	-	-	-	-	-
15	9075	DKB	*0901		-	-	+	-	+	-
16	9037	SWEIG007	*1101		-	-	-	+	-	-
17	9008	WILJON	*1501		-	-	-	-	-	+
18	9257	32367	*0901	*1101	-	-	+	-	+	+
19	9038	BM16	*1201		-	-	-	+	-	-
20	9059	SLE005	*1302		+	-	-	-	+	-
21	9064	AMALA	*1402		+	-	+	-	+	-
22	9056	KOSE	*1302	*1401	+	+	+	+	+	-
23	9124	IHL	*0803	*1414	+	-	+	+	-	-
24	9035	JBUSH	*1101		-	-	-	+	-	-
25	9049	IBW9	*0701		-	-	-	-	+	-
26	9285	WT49	*0301		+	-	-	-	+	-
27	9191	CH1007	*0405	*1001	-	-	-	-	+	-
28	9320	BEL5GB	*0416	*0701	-	-	-	-	+	-
29	9050	MOU	*0701		-	-	-	-	+	-
30	9021	RSH	*0302		+	-	-	-	+	-
31	9019	DUCAF	*0301		+	-	-	-	+	-
32	9297	HAG	*1303		+	-	-	-	+	-
33	9098	MT14B	*0404		-	-	-	-	+	-
34	9104	DHIF	*1101		-	-	-	-	+	-
35	9302	SSTO	*0403		-	-	-	-	+	-
36	9024	KT17	*0403	*0406	-	-	-	-	+	-
37	9065	HHKB	*1301		+	-	-	-	+	-
38	9099	LZL	*1402		+	-	+	-	+	-
39	9315	CML	*0301	*0401	+	-	-	-	+	-
40	9134	WHONP199	*0701	*0901	-	-	+	-	+	-
41	9055	H0301	*1302		+	-	-	-	+	-
42	9066	TAB089	*0803		-	-	-	-	-	-
43	9076	T7526	*0901		-	-	+	-	-	+
44	9057	TEM	*1401		-	+	+	+	-	-
45	9239	SHJO	*0701		-	-	-	-	+	-
46	9013	SCHU	*1501		-	-	-	-	-	+
47	9045	TUBO	*1104	*1201	-	-	-	-	+	-
48	9303	TER-ND	*0103		-	-	-	-	-	-

Lot No.: 61F

Lot-specific information

CERTIFICATE OF ANALYSIS

Olerup SSP® HLA-A-B-DR SSP Combi Tray

Product number: 101.701-24/06 – including *Taq* pol.
Lot number: 61F
Expiry date: 2011-February-01
Number of tests: 24 tests – Product No. 101.701-24/24
6 tests – Product No. 101.702-06/06
Number of wells per test: 95 + 1

Well specifications:

Well No.	Production No.	Well No.	Production No.	Well No.	Production No.
1	2008-550-01	9	2008-550-09	17	2008-550-17
2	2008-550-02	10	2008-550-10	18	2008-550-18
3	2008-550-03	11	2008-550-11	19	2008-550-29
4	2008-550-04	12	2008-550-12	20	2008-550-20
5	2008-550-05	13	2008-550-13	21	2008-550-21
6	2008-550-06	14	2008-550-14	22	2008-550-22
7	2008-550-07	15	2008-550-15	23	2008-550-23
8	2008-550-08	16	2008-550-16	24	2008-550-24

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

Additional 5'-primers in primer solutions 8 and 10 were tested by separately adding one 3'-primer. Additional 3'-primers in primer solutions 3, 4, 8, 14, 16, 18, 19 and 23 were tested by separately adding one 5'-primer. Additional 5'- and 3'-primers in primer solutions 5, 7, 12 and 22 were tested by separately adding one 3'-primer, respectively one 5'-primer.

Well No.	Production No.	Well No.	Production No.	Well No.	Production No.
25	2008-480-01	41	2008-480-17	57	2008-480-33
26	2008-480-02	42	2008-480-18	58	2008-480-34
27	2008-480-03	43	2008-480-19	59	2008-480-35
28	2008-480-04	44	2008-480-20	60	2008-480-36
29	2008-480-05	45	2008-480-21	61	2008-480-37
30	2008-480-06	46	2008-480-22	62	2008-480-38
31	2008-480-07	47	2008-480-23	63	2008-480-39
32	2008-480-08	48	2008-480-24	64	2008-480-40
33	2008-480-09	49	2008-480-25	65	2008-480-41
34	2008-480-10	50	2008-480-26	66	2008-480-42
35	2008-480-11	51	2008-480-27	67	2008-480-43
36	2008-480-12	52	2008-480-28	68	2008-480-44
37	2008-480-13	53	2008-480-29	69	2008-480-45
38	2008-480-14	54	2008-480-30	70	2008-480-47
39	2008-480-15	55	2008-480-31	71	2008-480-48
40	2008-480-16	56	2008-480-32	72	2008-480-48

Lot No.: 61F

Lot-specific information www.qiagen.com/goto/HLA

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

Additional 5'-primers and 3'-primers in primer solutions 26, 27, 32, 34, 35, 38, 43, 44, 55, 64, 66, 67 and 69 were tested by separately adding one additional 3'-primer, respectively one additional 5'-primer. Additional 3'-primers in primer solutions 37, 48, 53 and 59 were tested by separately adding one additional 5'-primer. Additional 5'-primers in primer solutions 45 and 53 were tested by separately adding one additional 3'-primer.

Well No.	Production No.	Well No.	Production No.	Well No.	Production No.
73	2008-502-01	81	2008-502-09	89	2008-502-17
74	2008-502-02	82	2008-502-10	90	2008-502-41
75	2008-502-03	83	2008-502-11	91	2008-502-19
76	2008-502-04	84	2008-502-12	92	2008-502-20
77	2008-502-05	85	2008-502-13	93	2008-502-21
78	2008-502-06	86	2008-502-14	94	2008-502-22
79	2008-502-07	87	2008-502-15	95	2008-570-23
80	2008-502-08	88	2008-502-16		

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

The reactivities of one additional 3'-primer in primer solution 75, one additional 3'-primer in primer solution 76, one additional 5'-primer in primer solution 78, one additional 3'-primer in primer solution 81, one additional primer pair in primer solutions 80, 81 and 83, two additional 5'-primers in primer solution 85, one additional primer pair in primer solution 90, one additional 3'-primer in primer solution 91 and one additional 3'-primer in primer solution 92 were tested by separately adding another 5'-primer or 3'-primer. One of the 5'-primers in primer solution 82 and one of the 5'-primers in primer solution 85 were not possible to test.

The negative control primer pairs, **Production No. 2008-417-01**, can detect contamination with PCR products diluted 10⁻⁷.

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

Date of approval: 2009-May-25

Approved by:

Quality Control, Supervisor

Declaration of Conformity

Product name: Olerup SSP® HLA-A-B-DRD SSP Combi Tray

Product number: 101.701-24/06

Lot number: 61F

Intended use: HLA-A, HLA-B and HLA-C low resolution histo-compatibility testing

Manufacturer: Olerup SSP AB
Hasselstigen 1
SE-133 33 Saltsjöbaden, Sweden
Phone: +46-8-717 88 27
Fax: +46-8-717 88 18

We, Olerup SSP AB, hereby declare that this product, to which this Declaration of Conformity relates is in conformity with the following Standard(s) and other normative document(s) ISO 9001:2000 and ISO 13485:2003, following the provisions of the 98/79/EC Directive on *in vitro* diagnostic medical devices, Annex II List B, conformity assessed using Annex IV, as transposed into the national laws of the Member States of the European Union.

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

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

Notified Body: Lloyd's Register Quality Assurance Limited, Hiramford, Middlemarch Office Village, Siskin Drive, Coventry CV3 4FJ, United Kingdom.
(Notified Body number: 0088.)

Saltsjöbaden, Sweden
2009-May-09

Olle Olerup
Managing Director

**HLA-A-B-DR SSP Combi Tray
101.701-24/06 – including Taq polymerase**

Product Insert

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General "Instructions for Use"

IFU-01 Rev. No. 00 can be downloaded from

Lot No.: 61F

Lot-specific information

[**www.qiagen.com/goto/HLA**](http://www.qiagen.com/goto/HLA)

May 2009
Rev. No.: 01



For *In Vitro* Diagnostic Use

Lot No.: 61F

Lot-specific information

www.qiagen.com/goto/HLA

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