

101.701-24/06 – including *Taq* polymerase
101.701-24u/06u – without *Taq* polymerase

Visit www.caredx.com for
“Instructions for Use” (IFU)

Lot No.: **2S1**

Lot-specific information

Olerup SSP® HLA-A-B-DR SSP Combi Tray

Product number: 101.701-24/06 – including *Taq* pol.
101.701-24u/06u – without *Taq* pol.

Lot number: 2S1

Expiry date: 2027-06-01

Number of tests: 24 tests – Product No. 101.701-24/24u
6 tests – Product No. 101.701-06/06u

Number of wells per test: 95 +1

Storage - pre-aliquoted primers: dark, between -15°C and -25°C

- PCR Master Mix: between -15°C and -25°C
- Adhesive PCR seals RT

This Product Description is only valid for Lot No. 2S1.

Complete product documentation consists of generic Instructions for Use (IFU), lot specific Product Insert, Worksheet and Certificate.

**CHANGES COMPARED TO THE PREVIOUS OLERUP SSP®
HLA-A-B-DR SSP COMBI TRAY LOT (6R6)**

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. 6R6**). The kit design is based on IMGT/HLA database 3.52.0.

The A low primer set is unchanged compared to the previous lot (**Lot No. 6R6**).

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. 6R6**). The kit design is based on IMGT/HLA database 3.52.0.

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

| Well | 5'-primer | 3'-primer | rationale |
|------|-----------|-----------|--|
| 65 | Modified | - | 5'-primer modified improved specificity of HLA-specific primer pair. |

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. 6R6**). The kit design is based on IMGT/HLA database 3.52.0.

The DR low primer set is unchanged compared to the previous lot (**Lot No. 6R6**).



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Well **96** contains Negative Control primer pairs, that will amplify the majority of the Olerup SSP[®] HLA Class I, DRB, DQB1, DPB1 and DQA1 amplicons as well as all the amplicons generated by the control primer pairs matching the human growth hormone gene.

HLA-specific PCR product sizes range from 75 to 200 base pairs.

The PCR product generated by the positive control primer pair is 200 base pairs.

| Length of PCR product | 105 | 200 | 105 | 80 | 75 | 80 | 85 |
|------------------------------|----------------------|-------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| 5'-primer¹ | 164 | 340 | 440 | 45 | 45 | 43 | 36 |
| | 5'-CAC ^{3'} | 5'-Agg ^{3'} | 5'-TTA ^{3'} | 5'-Tgg ^{3'} | 5'-Tgg ^{3'} | 5'-Tgg ^{3'} | 5'-TAC ^{3'} |
| | | | | | | | 36 |
| | | | | | | | 5'-TAT ^{3'} |
| 3'-primer² | 231 | 2nd I | 507 | 59 | 58 | 57 | 47 |
| | 5'-TgC ^{3'} | 5'-AAA ^{3'} | 5'-TTg ^{3'} | 5'-CTC ^{3'} | 5'-ggC ^{3'} | 5'-CTC ^{3'} | 5'-ACA ^{3'} |
| | | | | | | | 48 |
| | | | | | | | 5'-gCA ^{3'} |
| | | | | | | | 48 |
| | | | | | | | 5'-gCC ^{3'} |
| | | | | | | | 52 |
| | | | | | | | 5'-TgT ^{3'} |
| A* | + | + | + | | | | |
| B* | + | + | + | | | | |
| C* | + | + | + | | | | |
| DRB1 | | | | + | + | | |
| DRB3 | | | | + | + | | |
| DRB5 | | | | + | | | |
| DQB1 | | | | | + | | |
| DPB1 | | | | | | + | |
| DQA1 | | | | | | | + |

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 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.

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.



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Lot-specific information

PRODUCT DESCRIPTION

HLA-A-B-DR SSP Combi Tray

CONTENT

The primer set contains 5'- and 3'-primers for grouping the HLA-A*01:01 to A*80:09N alleles into the corresponding serological groups A1 to A80.

The primer set contains 5'- and 3'-primers for grouping the B*07:02 to B*83:01 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*01:01 to DRB1*10:46 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 | NC |

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

Well No. 1 is marked with the Lot No. '2S1'.

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.

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

The PCR plates are 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 a few HLA-B and HLA-C alleles will be amplified by some primer mixes. For further details see Specificity Table.



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Lot-specific information

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 a few HLA-A and HLA-C alleles will be amplified by some primer mixes. For further details see Specificity Table.

Only HLA-DRB alleles will be amplified by the 23 wells of 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. For further details see Specificity Table.

UNIQUELY IDENTIFIED ALLELES

HLA-A

All alleles, i.e. **A*01:01 to A*80:09N**, recognized by the HLA Nomenclature Committee in April 2023^{1,2} 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 specificities³.

The HLA-A alleles will be grouped into their low-resolution groups, except that the following alleles give rise to identical amplification patterns:

| Alleles | Alleles |
|--|--|
| A*01:26, 01:136, 01:192, 01:380:01:01-01:380:01:02, A*11:94, 11:112, 11:211, 11:290, 11:326 A*01:28, 01:229, 01:299, A*11:282 | A*23:14:01-23:14:02, 23:104-23:105, A*24:24, 24:71, 24:315, 24:392, 24:527, 24:569 |
| A*01:43, A*11:271 A*01:427, A*36:02 | A*23:66, 23:99, 23:128, A*24:14:01:01-24:15, 24:51-24:53, 24:57, 24:64, 24:94, 24:114, 24:138, 24:188, 24:222N, 24:228, 24:291, 24:296, 24:304, 24:316, 24:324, 24:412, 24:481, 24:515, 24:574, B*53:72, C*04:01:03 A*25:78, A*26:57, A*66:15 |
| A*03:215, 03:225, 03:249, 03:322, 03:414, A*25:77 | A*26:92, A*66:42 |
| A*11:11, A*34:19 A*11:116, 11:140, 11:199:01-11:199:02, 11:222, A*66:23 A*11:325, A*24:555 | A*30:01:01:01-30:04:04, 30:06-30:07, 30:09:01:01-30:12:02, 30:14L-30:15, 30:17-30:20, 30:23-30:43, 30:45, 30:47-30:54, 30:56-30:88, 30:90-30:124, 30:126-30:139, 30:141-30:149, 30:151-30:162, 30:164-30:176, 30:178N-30:185, 30:187-30:209N, B*07:260, C*12:328 A*31:08, A*33:53 A*31:109, A*33:125, 33:131 |
| A*23:11N, A*31:29 | A*32:03:01:01-32:03:01:02, 32:38, 32:60, 32:71, 32:78, 32:80, 32:107, B*15:642 A*34:01:01:01-34:01:07, 34:05-34:06, 34:11-34:12, 34:14, 34:16-34:18, 34:23, 34:27, 66:40 |

HLA-B

All alleles, i.e. **B*07:02 to B*83:01**, recognized by the HLA Nomenclature Committee in April 2023^{1,2} will be amplified by the primers in the HLA-B low resolution primer set, **wells 25 to 72**. Most HLA-B alleles will be also grouped into their corresponding serological specificities.



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Lot-specific information

The HLA-B alleles will be grouped into the groups B*07:xx to B*83:xx, except that the following alleles give rise to identical amplification patterns:

| Alleles | Alleles |
|---|--|
| B*07:349, B*42:05:01-42:05:02 B*08:26:01-08:26:02, 08:50, 08:62, 08:85, 08:94, 08:242, 08:263, 08:265, 08:272, 08:299, B*42:07, 42:24, 42:26 | B*40:496, B*41:62 B*53:30, B*58:111 |
| B*13:35, 13:59, 13:71, 13:108, 13:140, B*44:135, 44:158, 44:184 | B*53:39, B*57:128, B*58:100 |
| B*14:08:01-14:08:02, 14:55, B*39:01:35, 39:30, 39:32-39:33, 39:47, 39:50, 39:74, 39:82, 39:102, 39:107, 39:112, 39:128, 39:136, 39:171, 39:174 | B*55:04, 55:08, 55:49, 55:86, B*56:01:05, 56:01:13, 56:15, 56:19N, 56:22, 56:88 |
| B*18:29, 18:72:01-18:72:03, 18:92, 18:175, B*35:01:55, 35:01:62, 35:32:01-35:32:03, 35:37, 35:53N, 35:64:01-35:64:02, 35:68:01-35:68:02, 35:99, 35:118-35:119, 35:174, 35:369, 35:409, 35:433, 35:523 | B*57:67:01, B*58:36 |

Notes on Bw assignment

The Bw4 and Bw6 status of HLA-B alleles is based on their serological type:

| | Serological Type |
|-----|---|
| Bw4 | B5, B5102, B5103, B13, B17, B27, B37, B38(16), B44(12), B47, B49(21), B51(5), B52(5), B53, B57(17), B58(17), B59, B63(15), B77(15) |
| Bw6 | B7, B703, B8, B14, B18, B22, B2708, B35, B39(16), B3901, B3902, B40, B4005, B41, B42, B45(12), B46, B48, B50(21), B54(22), B55(22), B56(22), B60(40), B61(40), B62(15), B64(14), B65(14), B67, B70, B71(70), B72(70), B73, B75(15), B76(15), B78, B81, B82 |

However, according to the HLA Dictionary³ there are several exceptions to these associations. This product contains reactions specific to the sequences that code for the Bw4 and Bw6 epitopes. A small number of alleles classified as Bw4 or Bw6 in the HLA Dictionary are not amplified neither by the Bw4 nor the Bw6 primer mix:

| Bw Reactivity | Allele |
|---------------|---|
| Bw6 | B*15:377Q, B*35:01:39, B*35:02:09, B*39:01:15 |

HLA-DRB

All the HLA-DRB1, -DRB3, -DRB4 and -DRB5 alleles, i.e. **DRB1*01:01:01 to DRB1*10:46, DRB3*01:01 to DRB3*03:62, DRB4*01:01 to DRB4*03:01N, DRB5*01:01 to DRB5*02:37**, recognized by the HLA Nomenclature Committee in April 2023^{1,2,4} 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 specificities³.

The HLA-DRB1, -DRB3, -DRB4 and -DRB5 alleles will be grouped into their low-resolution groups, except that the following alleles give rise to identical amplification patterns:



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| Alleles | Alleles |
|---|--|
| DRB1*03:126, DRB1*13:193 | DRB1*11:293, DRB1*13:45 |
| DRB1*08:09:02, DRB1*14:15 | DRB1*12:57, DRB3*02:111 |
| DRB1*08:20, DRB1*13:18, 13:47, 13:55, 13:158:01-13:158:02, 13:164, 13:232, 13:286 | DRB1*13:13, 13:119, 13:154, 13:156, DRB1*14:84, 14:116, 14:144 |
| DRB1*08:31, DRB1*11:05, 11:209 | DRB1*13:44, 13:86, 13:206, DRB1*14:183 |
| DRB1*08:41, 08:75, DRB1*11:67, 11:193:01-11:193:02 | DRB1*13:235, DRB1*14:98 |
| DRB1*11:264, DRB1*13:05:01:01-13:05:03, 13:07:01-13:07:02, 13:11:01-13:11:02, 13:14:01-13:14:03, 13:21:01:01-13:21:02, 13:42:01-13:42:02, 13:46, 13:49:01-13:50:03, 13:62, 13:100, 13:108, 13:132, 13:136, 13:150, 13:169, 13:189, 13:199, 13:203, 13:229, 13:246, 13:284, 13:302 | DRB1*13:314, DRB1*14:37 |

¹HLA-A, HLA-B and HLA-DRB alleles listed on the IMGT/HLA web page 2023-April-17, release 3.52.0, www.ebi.ac.uk/imgt/hla.

²Alleles that have been deleted from or renamed in the official WHO HLA Nomenclature up to and including the last IMGT/HLA database release can be retrieved from web page <http://hla.alleles.org/alleles/deleted.html>.

³Holdsworth, R Hurley, C K Marsh, S G E Lau, M Noreen, H J Kempenich, J H Setterholm, M Maiers, M: 'The HLA dictionary 2008 : a summary of HLA-A , -B , -C , -DRB1 / 3 / 4 / 5 , and -DQB1 alleles and their association with serologically defined HLA-A, -B, -C, -DR and -DQ antigens', Tissue Antigens, 2009, 73(2), pp. 95-170.

⁴The primers in this kit do not amplify the DRB5*01:131N allele.



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Lot-specific information
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 |
|-------------------------|---|-----------------------------------|---------------------------------------|--|
| 1⁵ | 120 bp, 145 bp, 225 bp | 800 bp | A1, A36 | *01:01:01:01-01:04:01:02N, 01:06-01:33, 01:35-01:431, 03:18, 03:135, 03:395, 11:94, 11:112, 11:211, 11:226, 11:271, 11:282, 11:290, 11:326, 25:59, 26:120, 31:200, 32:156, 36:01:01:01-36:13 |
| 2¹⁰ | 135 bp, 175 bp, 215 bp, 255 bp, 365 bp, 415 bp | 800 bp | A2, A19, A28, A203, A210 | *02:01:01:01-02:01:07, 02:01:09-02:01:15, 02:01:17-02:01:19, 02:01:21-02:01:81, 02:01:83-02:22:02, 02:24:01-02:35:01, 02:35:03-02:47, 02:49:01-02:77, 02:78 ^w , 02:79:01-02:97:02, 02:99:01-02:99:02, 02:101:01-02:128, 02:130-02:570:02, 02:572-02:643N, 02:645-02:828, 02:830:01-02:1099, 03:89:01, 30:13, 30:16, 30:22, 30:44, 30:46, B*35:01:60^w, B*58:01:24^w |
| 3^{6,11} | 205 bp, 235 bp | 1070 bp | A1, A3, A11, A31, A32, A34, A36 | *01:12, 01:19, 01:21, 01:126, 01:200, 01:244, 01:360, 01:427, 03:01:01:01-03:17:02, 03:19-03:74, 03:76-03:94, 03:96-03:134, 03:136-03:176, 03:178N-03:186, 03:188-03:193, 03:195-03:199, 03:201-03:214, 03:216-03:224, 03:226-03:248, 03:250-03:259, 03:261-03:321, 03:323N-03:342N, 03:344:01-03:346, 03:348-03:376, 03:378-03:413, 03:415-03:460, 11:03:01:01-11:03:01:02, 11:20, 11:25:01-11:25:03, 11:60, 11:130, 11:158, 11:175, 11:183, 11:209, 11:348, 11:366, 11:381, 24:92, 24:458, 24:551, 24:557, 31:03 ^w -31:04:02 ^w , 31:176 ^w , 31:179 ^w , 31:220 ^w , 32:04, 32:142, 33:49 ^w , 33:144 ^w , 33:179 ^w , 33:201 ^w , 34:02:01:01-34:04, 34:07-34:10N, 34:13, 34:15, 34:20-34:22, 34:24-34:26N, 34:28-34:30N, 36:02, 68:103:01-68:103:02, 74:23 |
| 4 | 190 bp | 800 bp | A1, A3, A11, A30, A36, A68 | *01:01:01:01-01:01:22, 01:01:24-01:01:47, 01:01:49-01:01:64, 01:01:67-01:01:78, 01:01:80-01:04:01:02N, 01:06-01:07, 01:09:01:01-01:11N, 01:13, 01:15N ^w , 01:16N-01:18N, 01:20-01:29, 01:31N-01:33, 01:35-01:78, 01:80-01:98, 01:100-01:144, 01:146, 01:148, 01:150-01:158, 01:160N-01:166, 01:168-01:177, 01:179N-01:199, 01:201-01:204, 01:206-01:207, 01:209-01:213, 01:215-01:227, 01:229-01:235, 01:237-01:243, 01:245-01:266:02, 01:268-01:270, 01:272-01:278, 01:280-01:313, 01:315-01:375, 01:377-01:390, 01:392-01:395, 01:397-01:402, 01:404-01:417N, 01:419-01:426, 01:428-01:431, 02:78, 02:169, 02:829, 03:12, 03:18, 03:88, 03:135, 11:01:01:01-11:27, 11:29-11:52Q, 11:54:01-11:444, 24:555, 25:43, 25:59, 26:19, 26:72, 26:184, |



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| | | | | 26:204:01:01-26:204:01:02, 29:67, 29:156, 30:08:01-30:08:02, 30:150, 32:64, 34:19, 36:04, 66:23, 68:13:01, 68:66:01-68:66:02, 68:134, 68:178, 74:19, C*03:365, C*12:131 |
| 5 | 160 bp, 335 bp, 505 bp | 1070 bp | A3, A9, A23, A24, A2403, A29, A31, A32 | *01:301Q, 03:15, 03:19, 03:30, 03:152, 03:273, 03:347, 11:139, 11:325, 23:01:01:01-23:68, 23:70-23:112, 23:114-23:130, 24:02:01:01-24:11N, 24:13:01-24:15, 24:17:01:01-24:64, 24:66-24:210, 24:212-24:470, 24:472-24:600, 25:81-25:82, 29:07, 29:49, 31:08, 31:29, 32:05, 32:79, 32:170, 33:19, 33:53, 33:187, 34:31, 68:249, B*53:72, C*04:01:03 |
| 6 | 135 bp, 200 bp | 800 bp | A9, A23, A24, A29, A80 | *23:01:01:01-23:56, 23:58-23:65, 23:67-23:68, 23:70-23:98, 23:100-23:112, 23:114-23:127, 23:129-23:130, 24:24, 24:71, 24:315, 24:392, 24:527, 24:569, 29:07, 29:49, 31:29, 31:85, 32:72, 32:170, 33:187, 80:01:01:01-80:09N, B*18:27 |
| 7 | 175 bp, 205 bp | 1070 bp | A2, A3, A9, A23, A24, A2403, A26 | *01:301Q, 02:17:02:01 ^w -02:17:04 ^w , 02:804, 03:347, 11:139, 23:14:01-23:14:02, 23:104-23:105, 24:02:01:01-24:11N, 24:13:01-24:13:03, 24:17:01:01-24:50, 24:54-24:56:02, 24:58-24:63, 24:66-24:91, 24:93, 24:95-24:113, 24:115-24:137, 24:139-24:187, 24:189-24:210, 24:212-24:221, 24:223-24:227, 24:229-24:290, 24:292-24:295, 24:297-24:303N, 24:305-24:315, 24:317-24:323N, 24:325-24:411, 24:413-24:457, 24:459:01-24:470, 24:472-24:480, 24:482-24:514N, 24:516-24:550, 24:552-24:554, 24:556N, 24:558-24:573, 24:575-24:600, 26:16, 30:163, 33:19, 33:119, 68:45, 68:117 |
| 8 | 165 bp, 200 bp | 800 bp | A2, A3, A10, A11, A25, A26, A28, A32, A34, A66, A68, A69 | *01:51, 01:344, 01:381, 02:55, 02:527, 02:582, 02:644, 02:741, 02:815, 03:24, 03:50, 11:10, 11:183, 11:191, 11:269, 25:01:01:01-25:16, 25:18-25:33, 25:35-25:45, 25:47-25:53, 25:55-25:58, 25:60-25:70, 25:72-25:76:02, 25:78-25:80, 25:84-25:85, 26:01:01:01-26:01:47, 26:01:49-26:03:01:02, 26:03:03-26:06, 26:08:01:01-26:15, 26:17-26:18, 26:20:01-26:43:02, 26:45-26:63, 26:65-26:71N, 26:73-26:88, 26:90-26:91, 26:93-26:176, 26:178-26:183, 26:185-26:206:02N, 26:208-26:232, 29:28, 32:15, 33:51, 34:01:01:01-34:18, 34:20-34:31, 66:01:01:01-66:22, 66:24-66:41, 66:43-66:47, 68:01:01:01-68:177, 68:179-68:249, 68:251N-68:300, 69:01:01:01-69:09 |
| g^{5,7} | 80 bp | 800 bp | A2, A3, A25, A32 | *01:298, 02:81, 02:124, 02:829, 25:01:01:01-25:45, 25:47-25:58, 25:60-25:76:02, 25:79-25:80, 25:83-25:85, 32:01:01:01-32:02, 32:04, 32:06-32:37, 32:39-32:59, 32:61-32:70, 32:72-32:77, 32:81-32:106:01:02, 32:108-32:174, B*07:81, B*08:52, B*18:67, B*38:41, B*38:67, B*49:67, B*51:185, B*53:05:01-53:05:02, B*53:16, B*53:33, B*57:01:38, B*57:60 |
| 10^{5,7,9} | 80 bp, 200 bp, 240 bp | 800 bp | A10, A26, A43 | *01:43, 01:51, 02:644, 11:17, 11:40, 11:223, 11:271, 25:59, 26:01:01:01-26:02:02, 26:04, 26:07:01-26:20:02, 26:22-26:29, 26:31-26:43:02, 26:45-26:56, |



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| | | | | 26:58-26:77, 26:79-26:91, 26:93-26:110, 26:112:01-26:176, 26:178-26:226, 26:228, 26:230N-26:232, 29:105, 29:164, 33:13, 33:48, 43:01-43:03, 68:84, 68:227 |
|-------------------------|---|---------------|---|---|
| 11⁵ | 80 bp, 175 bp, 500 bp | 1070 bp | A1, A9, A10, A11, A26, A31, A34, A66 | *01:13, 01:26, 01:28, 01:136, 01:176, 01:192, 01:229, 01:299, 01:380:01:01-01:380:01:02, 03:63, 03:88, 11:01:01:01-11:27, 11:29-11:52Q, 11:54:01-11:270, 11:272Q-11:444, 24:19, 24:44, 24:555, 26:03:01:01-26:03:01:02, 26:03:03, 26:06, 26:21, 26:78, 26:92, 26:111, 26:152, 26:177, 26:193, 26:229, 30:125, 30:140, 33:184, 34:01:01:01-34:08, 34:10N-34:31, 66:01:01:01-66:01:07, 66:04-66:11, 66:13-66:14, 66:17-66:20, 66:22-66:24, 66:27N, 66:29-66:33, 66:35-66:38, 66:40-66:42, 66:44-66:47, 68:271, 69:02, 74:30, 80:02 |
| 12⁵ | 125 bp, 160 bp, 190 bp | 800 bp | A1, A3, A10, A25, A26, A31, A34, A43, A66, A74 | *01:01:56, 01:361N, 02:309, 02:454, 03:01:19, 03:103:02, 11:11, 25:05-25:06, 26:09, 26:54, 26:91, 26:217, 26:229, 26:231, 31:03-31:04:02, 31:123, 34:01:01:01-34:31, 43:01-43:03, 66:02:01:01-66:03:01:03, 66:16, 66:19, 66:21, 66:25-66:26Q, 66:28N, 66:34, 66:39N-66:40, 66:43, 68:130:01, 68:294, 74:01:03 |
| 13⁹ | 180 bp, 225 bp | 1070 bp | A1, A2, A3, A10, A25, A26, A34, A43, A66 | *01:13, 01:176, 01:194, 02:34-02:35:03, 02:56:01-02:56:02, 02:62, 02:103, 02:135, 02:580, 02:741, 02:907, 03:01:01:01-03:01:22, 03:01:24-03:01:82, 03:01:84-03:01:93, 03:01:95-03:07:02, 03:09-03:11N, 03:13-03:31, 03:33-03:35, 03:37-03:40, 03:42-03:56:01:02, 03:58, 03:60-03:71, 03:73-03:87, 03:90-03:106, 03:109-03:110, 03:112-03:141, 03:143-03:151, 03:153-03:171, 03:174-03:175, 03:177, 03:179-03:193, 03:195-03:197:02N, 03:201-03:202, 03:204, 03:206-03:210, 03:212-03:218, 03:220-03:251, 03:253-03:259, 03:261-03:266N, 03:268-03:272, 03:274-03:329N, 03:331-03:381N, 03:383-03:397, 03:399-03:412, 03:414-03:428, 03:430-03:460, 11:116, 11:140, 11:199:01-11:199:03, 11:222, 25:01:01:01-25:05, 25:07-25:35, 25:37-25:42N, 25:44-25:49N, 25:51, 25:53-25:58, 25:60-25:64, 25:66-25:85, 26:01:01:01-26:01:78, 26:02:01 ^w -26:02:02 ^w , 26:03:01:01-26:03:01:02, 26:03:03, 26:05-26:08:03, 26:10-26:28, 26:29 ^w , 26:30-26:43:02, 26:45-26:48, 26:49 ^w , 26:50-26:74, 26:76-26:77, 26:79-26:90, 26:92-26:203, 26:206:01N-26:232, 30:55, 30:186, 31:24-31:25, 32:26:01-32:26:02, 32:152, 33:61, 33:190, 34:08, 43:01-43:03, 66:01:01:01-66:01:07, 66:04-66:09, 66:10 ^w , 66:11-66:15, 66:17-66:20, 66:22-66:24, 66:27N, 66:29-66:33, 66:35-66:38, 66:41-66:42, 66:44-66:47, 68:71, 69:07, 74:13, 74:37 |
| 14^{5,9} | 80 bp, 115 bp, 200 bp, 240 bp, 460 bp | 1070 bp | A26, A29, A31, A34, A36, A68 | *01:427, 02:237, 02:309, 02:454, 02:809, 02:927, 03:01:38, 03:95, 03:123:02, 03:171, 03:231:01, 03:343, 03:428, 11:130, 26:19, 26:22, 26:198, 29:01:01:01-29:175Q, 31:03-31:04:02, 31:123, 32:42, 34:04, 36:02, 66:09, 68:19, 68:130:02 |



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Lot-specific information

| Lot No. | Fragment Sizes | Reference Size | Alleles | SNPs |
|-------------------------------|--|----------------|--|--|
| 15^{5,10,11} | 90 bp, 135 bp, 205 bp | 1070 bp | A1, A30 | *01:13, 01:28, 01:176, 01:194, 01:229, 01:299, 03:43, 03:82, 03:186, 03:395, 11:113, 11:162, 11:282, 30:01:01:01-30:04:04, 30:06-30:20, 30:22- 30:209N, 31:35, B*07:260, C*12:328 |
| 16 | 145 bp, 165 bp, 240 bp, 380 bp, 410 bp | 1070 bp | A24, A31, A32 | *02:237, 02:809, 02:927, 03:95, 03:343, 11:306, 11:440, 23:11N, 24:586N, 29:14, 29:172, 31:01:02:01-31:220, 32:05, 32:79, 32:128, 33:53, 33:125, 33:131, 74:13, 74:44 |
| 17¹¹ | 140 bp, 180 bp, 240 bp, 260 bp | 1070 bp | A1, A2, A3, A25, A32, A74 | *01:07, 01:95, 01:289, 01:298, 03:32, 03:43, 03:82, 03:152, 03:186, 03:219, 03:273, 03:429, 23:64, 24:104, 24:243, 25:03, 25:30, 29:13, 29:39, 29:98, 30:89, 30:177, 31:21, 31:35, 32:01:01:01-32:174, 74:07, 74:33, 80:04, B*15:642 |
| 18 | 200 bp, 390 bp | 1070 bp | A24, A31, A32, A33, A68, A74 | *02:243:01-02:243:03, 02:929, 24:82, 26:177, 26:207, 29:48, 29:105, 29:164, 31:08, 31:109, 32:05, 32:15, 32:79, 32:93, 33:01:01:01-33:01:18, 33:03:01:01-33:37, 33:39-33:242, 68:29, 68:250, 74:04, 74:21, 74:43 |
| 19 | 370 bp | 800 bp | A2, A19, A68, A74 | *01:121, 02:65, 02:407, 02:449, 02:932, 03:246, 03:282, 11:07:02, 11:372, 68:25, 68:262, 74:01:01:01-74:44 |
| 20^{9,11,12} | 210 bp, 240 bp | 800 bp | A2, A25, A28, A68 | *02:34-02:35:03, 02:46, 02:48, 02:56:01-02:56:02, 02:62, 02:70, 02:78, 02:103, 02:129, 02:571, 02:580, 02:651, 02:741, 02:907, 02:1050, 02:1095, 11:199:03, 25:05, 25:59, 26:54, 26:122, 26:229, 68:01:01:01-68:217, 68:219-68:257, 68:259-68:300 |
| 21^{5,12} | 65 bp, 240 bp, 375 bp, 545 bp | 800 bp | A2, A26, A28, A32, A66, A68, A69 | *02:55, 02:149:01-02:149:02, 02:243:01-02:243:03, 02:309, 02:644, 02:741, 02:815, 02:842, 02:947, 23:57, 24:82, 25:30, 26:22, 26:177, 29:80, 29:155, 31:41, 32:06, 33:22, 66:06, 66:09, 68:08:02, 68:29, 68:105:01:01-68:105:01:02, 68:157, 68:250, 68:276Q, 69:01:01:01-69:09, 74:35 |
| 22^{5,8} | 85 bp, 240 bp, 400 bp | 800 bp | A2, A36 | *01:427, 02:34-02:35:03, 02:46, 02:48, 02:56:01- 02:56:02, 02:62, 02:70, 02:78, 02:103, 02:129, 02:571, 02:576, 02:580, 02:682, 02:741, 02:907, 02:1050, 02:1095, 03:187, 11:155, 11:199:03, 11:226, 29:174, 31:62, 34:22, 36:01:01:01-36:13, 68:11N, 68:41, 68:230, B*07:439, B*35:491, B*40:359, B*55:96, B*57:65, C*04:31, C*06:137, C*07:569, C*07:990, C*07:994 |
| 23^{5,9,10,13} | 80 bp, 160 bp, 240 bp, 495 bp | 800 bp | A2, A3, A24, A26, A28, A36, A68, A80 | *01:427, 02:55, 02:237, 02:671, 02:809, 02:927, 03:41, 03:63, 03:75, 03:88, 03:95, 03:177, 03:343, 03:347, 03:377, 03:382, 11:130, 24:18, 24:204, 24:213, 26:03:01:01-26:03:01:02, 26:03:03, 26:05- 26:06, 26:21, 26:30, 26:78, 26:111, 26:177, 26:227, 26:229, 33:24, 33:184, 36:02, 68:05, 68:15, 68:20, 68:109, 68:136, 68:255, 80:01:01:01-80:01:02, 80:03-80:09N, C*06:187 |
| 24^{10,11} | 360 bp, 445 bp | 1070 bp | A10, A26, A31, A66 | *02:135, 02:309, 02:454, 03:01:19, 03:103:02, 25:13, 25:46, 25:82-25:83, 26:07:01-26:07:02, 26:30, 26:65, 26:92, 31:04:01:01-31:04:02, 31:123, 34:09, 66:02:01:01-66:03:01:03, 66:12, 66:16, 66:21, |



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Lot-specific information

| |
|---|
| 66:25-66:26Q, 66:28N, 66:34, 66:39N, 66:42-66:43, 68:294, 74:01:03 |
|---|

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-A low resolution SSP typings.

When the primers in a primer mix can give rise to HLA-specific PCR products of more than one length this is indicated if the size difference is more than 20 base pairs. Size differences of 20 base pairs or less are not given. For high resolution SSP kits, the alleles listed are specified according to amplicon length. Nonspecific amplifications, i.e. a ladder or a smear of bands, may sometimes be seen. GC-rich primers have a higher tendency of giving rise to nonspecific amplifications than other primers.

PCR fragments longer than the control bands may sometimes be observed. Such bands should be disregarded and do not influence the interpretation of the SSP typings. PCR fragments migrating faster than the control bands, but slower than a 400 bp fragment may be seen in some gel read-outs. Such bands can be disregarded and do not influence the interpretation of the SSP typings. Some primers may give rise to primer oligomer artifacts. Sometimes this phenomenon is an inherent feature of the primer pair(s) of a primer mix. More often it is due to other factors such as too low amount of DNA in the PCR reactions, taking too long time in setting up the PCR reactions, working at elevated room temperature or using thermal cyclers that are not pre-heated.

²The internal positive control primer pairs amplify segments of the human growth hormone gene. The internal positive control bands are 1070 or 800 base pairs respectively, well distribution as outlined in the table. Well number 1 contains the shorter, 800 bp, internal positive control band. The well distribution of the internal controls can help in orientation of the kit on gel photo, as well as allow for 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 expert-assigned serological grouping in Tissue Antigens (2009) 73:95-170 and the serological grouping of the sequence-defined allele.

⁴For several HLA Class I alleles 1st and/or 4th exon(s) and beyond, as well as intron nucleotide sequences, are not available. In these instances it is not known whether some of the primers of the SSP sets are completely matched with the target sequences or not. Assumption is made that unknown sequences in these regions are conserved within allelic groups.

⁵HLA-specific PCR products shorter than 125 base pairs have a lower intensity and are less sharp than longer PCR products.

⁶Primer mix 3 may faintly amplify the A*30:04:01:01-30:04:04, 30:06, 30:09:01:01-30:09:01:02, 30:17, 30:29, 30:46, 30:77, 30:89-30:90, 30:99, 30:103, 30:105, 30:117, 30:139, 30:150, 30:155, 30:160 and 30:183 alleles.

⁷Primer mix 9 and 10 may weakly amplify the A*34 alleles.

⁸Primer mix 22 might faintly amplify most A*11 alleles.

⁹Primer mixes 10, 13, 14, 20 and 23 may have a tendency of giving rise to primer oligomer formation.

¹⁰Primer mixes 2, 15, 23 and 24 may give rise to a lower yield of HLA-specific PCR product than the other HLA-A low primer mixes.

¹¹Primer mixes 3, 15, 17, 20 and 24 may have tendencies of unspecific amplifications.

¹²Primer mixes 20 and 21 may generate a false positive band of about 560 base pairs. This band should be disregarded when interpreting HLA-A low resolution typings.

¹³In primer mix 23 the positive control band may be weaker than for other A-B-DR primer mixes.

Abbreviations

w: might be weakly amplified.



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Lot-specific information
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 ^{5,9} | 110 bp | 800 bp | 7, 703, 35, 40, 41, 42, 48, 61 | *07:02:01:01-07:02:05, 07:02:07-07:02:84, 07:02:86-07:18:02, 07:20-07:32, 07:34-07:39, 07:41-07:47, 07:49N-07:52, 07:54-07:59, 07:61-07:99, 07:101-07:121, 07:123-07:138, 07:140-07:163, 07:166-07:208, 07:210-07:222, 07:224-07:225, 07:227-07:234, 07:236-07:300, 07:302-07:342, 07:344-07:345, 07:347-07:358, 07:360Q-07:362, 07:364-07:385, 07:387, 07:389-07:406, 07:408-07:410, 07:412-07:419, 07:421-07:441, 07:443-07:467Q, 07:469N-07:478, 08:79:01-08:79:02, 08:156, 08:187, 13:174, 15:138, 15:230, 15:241, 15:297, 35:66, 37:07, 40:15-40:16:01:02, 40:23, 40:32, 40:98, 40:128, 40:136, 40:158, 40:183, 40:198, 40:231, 40:279, 40:355, 40:466, 41:08, 42:05:01-42:05:02, 44:150, 46:87, 48:05, 48:08, 48:15, C*02:23, C*03:260, C*04:77 |
| 26 | 215 bp | 1070 bp | 8, 44 | *08:01:01:01-08:05, 08:07-08:25, 08:27-08:49, 08:51-08:61, 08:63-08:64, 08:66-08:84, 08:86N-08:93, 08:95-08:122, 08:124-08:131, 08:133-08:225, 08:227, 08:229-08:238, 08:240-08:241, 08:243-08:262, 08:264, 08:266-08:271, 08:273-08:294, 08:296-08:298, 08:300Q-08:308, 13:93, 15:142, 15:180, 15:429, 35:218, 35:256, 37:62, 40:328, 44:49, 44:156, 49:25, 51:68, 51:176, 52:77, C*06:147 |
| 27 ⁹ | 140 bp, 235 bp | 1070 bp | 7, 8, 13, 15, 35, 4005, 44, 49, 61, 62, 77 | *07:20, 07:24, 07:60, 07:100, 07:131, 07:220, 07:223, 07:358, 07:464, 08:21, 08:25, 08:175, 13:01:01:01-13:04, 13:06-13:08, 13:10-13:23, 13:25-13:38, 13:40-13:57, 13:59-13:66, 13:68-13:96, 13:99-13:179, 15:07:01:01-15:07:03, 15:36 ^w , 15:45, 15:55, 15:68, 15:89:01 ^w -15:89:02 ^w , 15:126, 15:197:02, 15:207, 15:324, 15:329, 15:331, 15:360, 15:383, 15:405, 15:431, 15:450, 15:524, 15:661, 35:05:01:01-35:05:06, 35:16-35:17:05, 35:22:01:01-35:22:01:02, 35:30:01:01-35:30:01:02, 35:51:01-35:51:02, 35:58, 35:72, 35:89, 35:97, 35:113-35:114, 35:125, 35:164, 35:199, 35:232, 35:242, 35:318, 35:346, 35:368, 35:389, 35:416, 35:427N, 35:440, 35:459N, 35:472, 35:481, 35:498-35:499, 35:509, 35:519, 35:525, 35:541, 35:572, 35:576, 40:05:01:01-40:05:02, 40:71, 40:174, 40:496, 41:62, 44:08 ^w , 44:54, 44:57 ^w , 44:60, 44:106, 44:110, 44:135, 44:158, 44:184, 44:211, 44:213, 46:12, 51:64, 51:148, 53:14, 53:67, 55:51, 58:18, C*03:05:01:01-03:05:01:03, C*03:25, C*03:27, C*03:143, C*03:167, C*03:296:01-03:296:02, C*03:335, C*03:346, C*03:407, C*03:482, C*03:494, C*03:555 |
| 28 ^{5,6,7} | 105 bp, 140 bp, | 800 bp | 12, 13, 14, 15, 17, 18, | *07:68:01-07:68:03, 07:100, 07:218, 07:220, 07:237, 07:262:01-07:262:02, 07:424, 08:71, 08:118, 08:274, 08:296, |



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| 42^{7,8} | 140 bp | 1070 bp | 8, 18, 22, 35, 39, 78 | *07:65, 07:134, 07:400, 08:32, 08:133, 08:180, 08:239, 15:202, 15:239, 15:308, 15:376, 18:01:01:01-18:03:01:03, 18:04:01-18:08, 18:10-18:15, 18:17N-18:36, 18:38-18:47, 18:49-18:53, 18:55-18:65, 18:68-18:106Q, 18:108-18:124, 18:126-18:135:01:02, 18:137-18:177, 18:179-18:193, 18:196-18:231Q, 35:01:01:01-35:02:08, 35:02:10-35:18, 35:20:01-35:24:02, 35:27-35:43:01, 35:43:03-35:45, 35:48, 35:50-35:62, 35:64:01-35:72, 35:74-35:153, 35:155-35:197, 35:199-35:206, 35:208:01-35:209, 35:211-35:216N, 35:218-35:253, 35:255-35:270, 35:272-35:273, 35:275-35:310, 35:312-35:316, 35:318-35:360, 35:362-35:449, 35:451-35:470, 35:472-35:569, 35:571-35:578, 37:05, 37:11, 37:14, 37:29, 37:37, 37:67, 39:19:01-39:19:02, 39:186, 40:185, 40:209, 40:308, 40:350, 40:365, 45:22, 46:40:01-46:40:02, 55:130, 56:06, 56:45, 58:64, 78:01:01:02-78:10, C*07:1011 |
| 43^{5,9} | 55 bp, 245 bp, 390 bp, 415 bp | 1070 bp | 5, 15, 48, 60, 62, 63, 70, 71, 72, 75, 76, 77, 82 | *15:01:01:01-15:01:04, 15:01:06-15:21:01:02, 15:23-15:40:02, 15:42-15:58, 15:60-15:67, 15:69-15:99, 15:102-15:129, 15:131-15:179:02, 15:181N-15:235, 15:237-15:254, 15:256-15:505, 15:507-15:514, 15:516-15:545, 15:547-15:593, 15:595-15:633, 15:635-15:665, 40:12:01-40:12:02, 40:26, 40:40, 40:516, 44:02:68, 46:50, 51:367, 82:01:01:01-82:03, C*03:179, C*04:345, C*06:147, C*07:1059, C*12:301, C*14:61, C*16:85 |
| 44⁹ | 210 bp | 800 bp | 27, 37 | *07:27, 07:236, 07:273, 08:49, 08:126, 18:54, 18:195, 37:01:01:01-37:107, 38:17, C*07:302, C*07:929, C*07:941 |
| 45 | 170 bp | 800 bp | 16, 35, 38, 39, 3901, 3902, 67, 72 | *08:55, 15:69, 15:186, 15:449, 15:494, 18:168, 35:35, 35:276, 35:468, 35:471, 38:01:01:01-38:09, 38:11-38:21, 38:23-38:29, 38:31-38:35, 38:38-38:44, 38:46-38:49, 38:51, 38:53-38:62, 38:64, 38:66-38:69, 38:71-38:105, 38:107, 38:160-38:167, 38:169, 38:171-38:173Q, 39:01:01:01-39:01:01:29, 39:01:03:01-39:01:34, 39:01:36-39:20, 39:22-39:29, 39:31:01:01-39:31:01:02, 39:35, 39:37:01:01-39:42, 39:44-39:46, 39:48-39:49, 39:51-39:73, 39:75-39:81, 39:83:01-39:101, 39:103-39:106, 39:108-39:111, 39:113-39:127, 39:129-39:135, 39:137-39:155, 39:157N-39:168, 39:170, 39:172-39:173, 39:175N-39:195, 40:184, 40:424, 50:49, 51:101, 52:71, 52:84, 55:123, 58:20, 58:84, 67:01:01-67:07, C*15:51 |
| 46⁵ | 110 bp | 1070 bp | 38 | *14:93, 14:118, 27:07:04, 38:01:01:01-38:01:07, 38:01:09-38:01:14, 38:01:16-38:02:02:02, 38:02:04-38:03, 38:05, 38:08-38:24, 38:26-38:34N, 38:36-38:80N, 38:82-38:107, |



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| 47 | 395 bp | 1070 bp | 14, 16, 38, 39, 3901, 61, 64, 65 | 38:160-38:173Q, 44:03:59, 49:26, 51:01:68, 52:01:10, A*23:01:18, A*25:01:08 *07:69, 07:85:01-07:85:02, 07:180, 07:306, 08:65, 08:226, 08:228, 08:295, 14:01:01:01-14:01:07, 14:01:09-14:20, 14:22-14:41N, 14:43-14:48, 14:50-14:56, 14:58-14:72N, 14:74-14:116, 14:118-14:119, 38:01:01:01-38:02:11, 38:04- 38:05, 38:08-38:25, 38:27-38:53, 38:55Q-38:73, 38:75- 38:107, 38:160-38:165N, 38:167-38:173Q, 39:01:01:01- 39:01:01:29, 39:01:03:01-39:01:39, 39:03:01:01-39:07, 39:09:01:01-39:09:05, 39:11-39:12:01:02, 39:14:01:01- 39:15, 39:18-39:19:02, 39:22, 39:24:01-39:38Q, 39:40:01N- 39:48, 39:50-39:57, 39:59-39:62, 39:64-39:82, 39:84-39:87N, 39:90-39:95N, 39:97N-39:98, 39:100, 39:102-39:104, 39:106-39:109, 39:111-39:125, 39:127-39:130, 39:132- 39:142N, 39:144, 39:146N-39:153, 39:155-39:161N, 39:163, 39:165-39:169, 39:171-39:174, 39:176-39:179, 39:181- 39:183, 39:185, 39:187-39:188, 39:190-39:195, 40:75 [?] , 40:322 [?] , 40:517, 49:26 |
| 48 | 160 bp, 425 bp | 1070 bp | 7, 703, 8, 14, 15, 16, 21, 27, 39, 3901, 3902, 40, 41, 42, 45, 48, 50, 51, 54, 60, 61, 64, 65, 67, 70, 73, 81 | *07:02:01:01-07:02:05, 07:02:07-07:02:66, 07:02:68- 07:02:77, 07:02:79-07:02:81, 07:02:83-07:26, 07:28-07:35, 07:37:01-07:37:02, 07:39-07:64, 07:66-07:80, 07:82-07:148, 07:150-07:178, 07:181N-07:191, 07:193-07:194, 07:196- 07:218, 07:220-07:235, 07:237-07:256, 07:258-07:270, 07:272N, 07:274-07:447, 07:449-07:452, 07:454-07:475, 07:477-07:478, 08:01:01:01-08:01:03, 08:01:05-08:01:69, 08:04:01-08:05, 08:07-08:35, 08:37-08:51, 08:53:01-08:77, 08:79:01-08:116, 08:118-08:125, 08:127-08:130, 08:132- 08:135, 08:137-08:138, 08:140-08:228, 08:230-08:254, 08:256-08:266, 08:268-08:270Q, 08:272-08:288, 08:290- 08:308, 14:01:01:01-14:01:04, 14:01:06-14:01:12, 14:02:01:01-14:02:04, 14:02:06-14:02:07, 14:02:09-14:29, 14:31-14:76N, 14:78-14:92, 14:94-14:117, 14:119, 15:68, 15:180, 15:634, 27:14, 27:81, 27:130, 35:516, 35:534, 39:01:01:01-39:01:01:29, 39:01:03:01-39:06:04, 39:06:06- 39:20, 39:22-39:24:01, 39:24:03-39:103, 39:105-39:184, 39:186-39:188, 39:190-39:195, 40:01:01-40:01:04, 40:01:06- 40:01:82, 40:06:01:01-40:06:04:03, 40:06:06-40:07, 40:09 [?] , 40:14:01 [?] -40:14:02 [?] , 40:14:03, 40:15 [?] , 40:16:01:01- 40:16:01:02, 40:18 [?] , 40:22N-40:23, 40:24 [?] -40:25 [?] , 40:27:02 [?] , 40:28 [?] -40:29 [?] , 40:30-40:33, 40:34 [?] -40:35:02 [?] , 40:36 [?] , 40:38, 40:42-40:44, 40:45 [?] -40:46 [?] , 40:48, 40:49 [?] , 40:51-40:55, 40:56 [?] -40:58 [?] , 40:59-40:60, 40:61 [?] -40:63 [?] , 40:65 [?] , 40:66, 40:67 [?] -40:69 [?] , 40:70:01-40:70:02, 40:71 [?] , 40:72:01-40:75, 40:77, 40:79-40:80, 40:81 [?] -40:82 [?] , 40:83, 40:84 [?] -40:85 [?] , 40:86, 40:87:01 [?] -40:88 [?] , 40:91 [?] -40:92 [?] , 40:93, 40:95 [?] , 40:96, 40:98 [?] , 40:100 [?] -40:101 [?] , 40:102-40:103, 40:104 [?] -40:108 [?] , 40:109-40:110, 40:112 [?] , 40:113-40:114:01:02, 40:114:02 [?] - 40:116 [?] , 40:118N [?] , 40:121 [?] , 40:123 [?] , 40:124:01, 40:124:02 [?] - 40:125:01 [?] , 40:125:02-40:128, 40:130:01 [?] , 40:130:02- 40:131, 40:132 [?] -40:134 [?] , 40:136 [?] -40:137 [?] , 40:138-40:140, 40:141 [?] , 40:145 [?] , 40:146-40:148, 40:149 [?] , 40:150, 40:151 [?] , 40:152-40:153, 40:154 [?] , 40:155:01N-40:155:02N, 40:156 [?] , 40:158 [?] , 40:159-40:160:01, 40:160:02 [?] , 40:161-40:162, 40:163 [?] -40:164 [?] , 40:165, 40:166 [?] , 40:167-40:168, 40:169 [?] , |



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| 49¹¹ | 180 bp | 1070 bp | 15, 40, 44, 48, 60, 62, 71 | *15:116, 15:124, 15:352, 15:412, 15:507, 15:649, 27:125, 35:230, 35:331, 38:63, 40:01:01-40:01:06, 40:01:08- 40:01:17, 40:01:19-40:01:73, 40:01:75-40:01:76, 40:01:78- 40:01:82, 40:07, 40:10:01:01-40:10:02, 40:12:01-40:12:02, 40:21-40:23, 40:25, 40:30, 40:33-40:34, 40:36, 40:38, 40:42- 40:43, 40:46-40:49, 40:51-40:52, 40:54-40:55, 40:59-40:63, 40:65-40:67, 40:69, 40:73-40:74, 40:76, 40:79, 40:81, 40:84, 40:87:01-40:88, 40:92, 40:100-40:102, 40:106, 40:108, 40:112-40:114:02, 40:116-40:118N, 40:123-40:126, 40:128, 40:130:01-40:130:02, 40:132, 40:134-40:135, 40:137- 40:141, 40:146-40:147, 40:149-40:156, 40:160:01- 40:160:02, 40:163, 40:166, 40:168, 40:170-40:172, 40:175, 40:178-40:179, 40:182-40:183, 40:185-40:188, 40:191, 40:193-40:196, 40:198-40:199, 40:204, 40:207-40:208, 40:210, 40:212-40:213, 40:215-40:218, 40:221-40:223, 40:227-40:228, 40:231, 40:234-40:236, 40:238-40:242, 40:245:01-40:245:02, 40:247, 40:249-40:253, |
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| 51⁵ | 105 bp | 1070 bp | 7, 8, 22, 41, 42 | *07:04:01-07:04:02, 07:25, 07:146, 07:349, 08:01:01:01-08:01:24, 08:01:26-08:01:61, 08:01:63-08:05, 08:07-08:12:03, 08:14-08:19N, 08:21-08:24, 08:26:01-08:30N, 08:32-08:39, 08:41-08:54:02, 08:56:01-08:69, 08:71-08:78, 08:80-08:102, 08:104-08:112, 08:114-08:133, 08:135-08:142, 08:144-08:155, 08:157-08:168, 08:170, 08:172-08:174, 08:176-08:204, 08:206-08:254, 08:256-08:273, 08:275-08:280, 08:282-08:308, 35:87, 40:136, 40:231, 40:279, 41:01:01:01-41:08, 41:10-41:28, 41:30-41:31, 41:33-41:61, 41:63-41:79, 41:81, 42:01:01:01-42:02:02, 42:04-42:07, 42:09-42:18, 42:20-42:34, 44:166, 44:342, 55:20 |
| 52 | 325 bp | 800 bp | 7, 15, 22, 27, 2708, 35, 42, 45, 46, 54, 55, 56, 67, 73, 78, 81, 82 | *07:02:01:01-07:02:05, 07:02:07-07:02:97, 07:04:01-07:07:03, 07:09:01-07:15, 07:17-07:26, 07:28-07:31:02, 07:33:01-07:36, 07:39-07:46, 07:47 ^w , 07:48-07:49N, 07:51-07:68:03, 07:70-07:84, 07:86-07:179, 07:181N-07:206, 07:208-07:218, 07:220-07:227, 07:229:01-07:231N, 07:233-07:305, 07:307-07:399, 07:401-07:452, 07:454-07:478, 08:123, 08:132, 14:21, 14:57, 15:76, 15:101, 15:255, 15:509, 15:594, 27:01-27:11, 27:13:01-27:15, 27:17, 27:19:01:01-27:21:02, 27:24-27:28, 27:30-27:38, 27:40-27:58, 27:60-27:76, 27:78-27:91, 27:93-27:118, 27:120-27:128, 27:130-27:136, 27:138-27:152, 27:154-27:203, 27:205-27:214, 27:216-27:241, 27:243N-27:265, 35:76, 35:186, 35:229, 35:368, 35:561, 35:570, 37:60, 38:26, 40:166, 40:513, 42:01:01:01-42:02:02, 42:04-42:06, 42:08-42:10, 42:12-42:23, 42:25, 42:27-42:34, 44:90, 44:97, 44:356, 45:06, 46:01:01:01-46:01:41, 46:02 ^w , 46:03-46:40:02, 46:42-46:48, 46:50-46:98N, 54:01:01:01-54:29, 54:31-54:46, 55:01:01:01-55:05, 55:07-55:17, 55:19-55:77, 55:79-55:133, 56:01:01:01-56:16, 56:18-56:22, 56:24-56:32, 56:34-56:41, 56:43, 56:45-56:53, 56:55:01:02-56:66, 56:68-56:88, 56:90, 56:92-56:93, 67:01:01-67:07, 73:01:01:01-73:03, 81:01:01:01-81:10, 82:01:01:01-82:04, 83:01 |
| 53^{5,7} | 80 bp, 115 bp, 160 bp, 195 bp, 225 bp, 260 bp | 1070 bp | 12, 35, 37, 44, 45, 47, 48, 57 | *07:359, 08:49, 08:60, 08:76, 08:87, 08:129, 08:181, 08:213:01, 08:255, 15:578, 15:592, 27:127, 35:38, 35:45, 35:71, 35:115, 35:169, 35:260, 35:309, 35:452, 35:513N, 35:545, 37:01:01:01-37:01:07, 37:01:09, 37:01:11-37:01:31, 37:03N-37:06:02, 37:08, 37:10-37:38, 37:41-37:43, 37:45-37:50, 37:52-37:65, 37:67-37:82N, 37:84-37:93, 37:95-37:96, 37:98-37:107, 40:132, 40:178, 40:231, 40:279, 40:458, 40:523, 41:48, 42:13, 44:02:01:01-44:03:63, 44:03:65-44:14, |



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| 54 | 215 bp | 800 bp | 5, 8, 12, 17, 21, 22, 41, 42, 44, 45, 49, 51, 5102, 5103, 52, 53, 56, 62 | *08:09, 08:84, 08:254, 13:46, 13:154, 15:83:01:01-15:83:01:02, 41:01:01:01-41:01:08, 41:05-41:07, 41:09, 41:12, 41:14, 41:16-41:17, 41:20-41:22, 41:25-41:26, 41:28-41:30, 41:32-41:35, 41:37, 41:44, 41:50, 41:53-41:54, 41:56Q-41:57, 41:59-41:61, 41:64, 41:66-41:67, 41:70, 41:73, 41:75-41:79, 42:04, 44:06, 44:15:01:01-44:15:01:02, 44:18:01:01-44:18:01:02, 44:20, 44:100, 44:355, 45:01:01:01-45:25, 45:27-45:30, 49:03, 51:01:01:01-51:01:01:109, 51:01:03-51:01:08, 51:01:10-51:01:39, 51:01:41-51:02:01:04, 51:02:03-51:04:02, 51:06:01-51:06:03, 51:07:01, 51:08:01:01-51:09:01, 51:09:03-51:14, 51:16-51:24:05, 51:26-51:46, 51:48-51:53, 51:55-51:77, 51:79-51:88, 51:90-51:92:02, 51:94-51:102, 51:104:01-51:115, 51:117-51:118N, 51:120-51:131, 51:133-51:143, 51:145-51:147, 51:149N-51:175, 51:177-51:178N, 51:181-51:217, 51:219-51:225, 51:227-51:237:01, 51:238-51:336, 51:338-51:340, 51:342-51:381, 52:01:02:01-52:01:02:09, 52:01:04, 52:01:09, 52:01:40, 52:01:43, 52:01:47, 52:01:49, 52:02:01, 52:03, 52:06:01-52:06:02, 52:09:01, 52:10:03, 52:11:02, 52:19, 52:21:01, 52:31:02, 52:85, 52:97, 52:102, 52:104, 52:112, 53:01:13, 53:06, 55:20, 55:56, 56:13, 57:01:20, 58:08:01, A*23:01:14 |
| 55 ⁹ | 130 bp, 280 bp | 800 bp | 7, 17, 18, 22, 35, 37, 40, 46, 51, 53, 60, 62, 78 | *07:12, 07:14:01-07:14:02, 07:18:01-07:18:02, 07:137, 07:162-07:163, 07:199, 07:225, 07:227, 07:248, 07:350, 14:10, 14:102, 15:57 ^w , 15:289, 15:297, 15:318, 15:579, 15:645, 15:658, 18:22, 18:69, 18:105, 18:149-18:150, 18:204, 35:21, 35:24:01-35:24:02, 35:81, 35:96, 35:109, 35:157, 35:188, 35:190, 35:233, 35:287, 37:04:01-37:04:02, 40:28, 40:30, 40:34, 40:59, 40:137, 40:160:01-40:160:02, 44:150, 44:190, 44:203:01-44:203:02, 44:275, 44:290, 46:01:01:01-46:39, 46:41N-46:46, 46:48-46:71, 46:73-46:76, 46:78-46:85, 46:87-46:98N, 48:17, 51:04:01-51:04:02, 51:46, 51:56:01-51:56:03, 51:139, 51:227, 51:281, 51:310, 52:88, 53:02, 53:06, 53:28, 57:14:01-57:14:02, 58:09, 58:76, C*01:73, C*03:260, C*03:384, C*15:39, C*15:130, C*15:195 |
| 56 ⁵ | 90 bp, 410 bp | 1070 bp | 7, 15, 22, 27, 2708, 35, 47, 54, 55, 56, 78, 81, 82 | *07:65, 07:197, 07:209, 07:271, 15:342, 18:165, 27:01 ^w , 27:02:01:01-27:21:02, 27:23-27:152, 27:154-27:214, 27:216-27:265, 35:76, 35:186, 35:229, 35:368, 35:561, 35:570, 37:02, 37:60, 40:429, 44:90, 44:97, 44:356, 47:01:01:02-47:12, 48:26, 54:01:01:01-54:29, 54:31-54:46, 55:01:01:01-55:05, 55:07-55:17, 55:19-55:77, 55:79-55:133, 56:01:01:01-56:16, 56:18-56:22, 56:24-56:32, 56:34-56:41, 56:43, 56:45-56:53, 56:55:01:02-56:66, 56:69-56:88, 56:90, 56:92-56:93, 81:01:01:01-81:01:05, 81:05, 81:09-81:10, 82:01:01:01-82:04, 83:01, C*04:439, C*14:79 |



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| 57⁵ | 90 bp, 175 bp | 1070 bp | 15, 27, 35, 48, 60, 62, 75, 77, 81 | *07:174, 07:202, 07:222, 07:279, 07:409 ^w , 08:213:01-08:213:02, 13:36, 15:02:01:01-15:02:13, 15:08:01:01-15:08:02, 15:11:01-15:11:07, 15:13:01-15:13:03, 15:15:01:01-15:15:01:02, 15:21:01:01-15:21:01:02, 15:31:01:01-15:31:01:03, 15:44, 15:55, 15:76 ^w , 15:88-15:89:02, 15:112, 15:121, 15:139, 15:144, 15:148, 15:170, 15:189:01-15:189:02, 15:191, 15:194, 15:209N, 15:213-15:215, 15:223, 15:265, 15:283-15:284, 15:291, 15:297, 15:301-15:303, 15:305, 15:319, 15:325, 15:328, 15:330, 15:341, 15:345, 15:350, 15:357-15:358, 15:367, 15:374, 15:378, 15:384:01-15:384:02, 15:394, 15:399, 15:404, 15:418, 15:420, 15:425, 15:437-15:438, 15:454N, 15:460, 15:479, 15:486, 15:491, 15:495, 15:505, 15:508, 15:513, 15:537, 15:557, 15:567, 15:569, 15:574, 15:592, 15:596N, 15:615, 15:622-15:623, 15:627, 15:629-15:630, 15:637, 15:646, 15:648, 15:659, 15:662, 15:664-15:665, 27:24, 35:46, 35:311, 40:31, 40:45, 40:80, 48:01:01:01-48:01:11, 48:04:01:01-48:04:02, 48:06-48:07, 48:09, 48:11, 48:15-48:16, 48:18-48:20, 48:22, 48:24, 48:27-48:39, 48:41-48:56, 51:104:01-51:104:02, 56:39 ^w , 81:01:01:01-81:10 |
| 58⁵ | 55 bp, 100 bp, 145 bp, 395 bp, 430 bp | 1070 bp | 15, 27, 44, 48, 49, 52, 59, 60, 61, 62, 63 | *15:16:01:01-15:17:07, 15:24:01-15:24:02, 15:67, 15:87, 15:143, 15:152, 15:157, 15:162, 15:168, 15:177, 15:196, 15:208, 15:216, 15:222, 15:230, 15:254, 15:268, 15:273, 15:356, 15:361-15:362, 15:396, 15:403, 15:408, 15:411, 15:423-15:424, 15:442, 15:446, 15:500, 15:516, 15:523, 15:532, 15:546Q, 15:550, 15:555, 15:575N, 15:586, 15:602-15:603, 15:613, 15:619, 15:642, 15:644, 15:655, 27:02:01:01-27:02:04, 27:02:06, 27:30, 27:53, 27:57, 27:62, 27:65N, 27:75, 27:77, 27:83, 27:95, 27:102, 27:119, 27:126, 27:134, 27:163, 27:171-27:172, 27:176N, 27:181, 27:188, 27:197, 27:203, 27:213, 27:232, 27:236, 27:245-27:246N, 27:251, 37:34, 38:25, 40:13, 40:19, 40:61, 40:109, 40:117, 40:292, 40:340, 40:394, 41:46, 41:60, 44:18:01:01-44:18:01:02, 44:25, 44:50:01, 44:50:03, 44:95, 44:355, 48:18, 49:01:01:01-49:01:24, 49:03-49:14, 49:16-49:25, 49:27-49:69, 49:71-49:80, 51:112, 51:231, 51:310, 52:01:01:01-52:01:28, 52:01:30-52:19, 52:21:01-52:72, 52:74-52:113, 53:17:01-53:17:02, 53:28, 53:30, 53:39, 54:12, 55:103, 56:21, 56:42, 56:54, 56:65, 57:45, 57:51, 57:69, 57:128, 58:100, 58:111, 59:01:01:01-59:07, 59:09-59:12, A*24:309, A*32:39 |
| 59^{5,8} | 120 bp, 210 bp | 800 bp | 5, 13, 15, 17, 22, 35, 45, 49, 50, 51, 5102, 5103, 52, 55, 56, 62, 63, 78 | *07:78, 07:84, 07:429, 13:02:38, 13:16, 13:31 ^w , 13:48, 13:62, 13:128, 13:131 ^w , 13:145 ^w , 13:178, 14:37, 15:04:01:01 ^w -15:04:04 ^w , 15:16:01:01-15:16:05, 15:42, 15:67, 15:95, 15:137 ^w , 15:254, 15:293, 15:303 ^w , 15:310, 15:362, 15:408, 15:517, 15:531 ^w , 15:550, 15:602, 15:609 ^w , 15:613, 27:153, 35:265 ^w , 40:06:30, 40:95, 40:148, 40:161, 44:459, 46:32:01 ^w -46:32:02 ^w , 49:01:01:01-49:01:01:18, 49:01:03-49:10, 49:12-49:14, 49:16-49:44, 49:46, 49:48-49:60N, 49:62-49:80, 50:01:01:01-50:02:01:02, 50:04:01-50:11, 50:13-50:16, 50:18-50:22, 50:31-50:46, 50:47 ^w , 50:48, 50:50, 50:52-50:65, 50:67-50:69, 50:71-50:79, 51:01:01:01-51:03, 51:05:01:01-51:05:01:02, 51:07:01-51:08:04, 51:08:06-51:09:03, 51:11N-51:14, 51:16-51:24:05, 51:26-51:41N, |



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| 60 | 390 bp, 430 bp | 1070 bp | 5, 17, 27, 35, 44, 51, 5102, 5103, 52, 53, 57, 58, 61, 78 | *15:506, 18:33, 18:67, 18:136, 18:194:01:01-18:194:01:02, 27:02:01:01-27:02:06, 27:12:01:01-27:12:01:03, 27:16, 27:30, 27:53, 27:57, 27:62, 27:65N, 27:75, 27:77, 27:83, 27:92, 27:95, 27:102, 27:119, 27:126, 27:134, 27:153, 27:157, 27:163, 27:171-27:172, 27:176N, 27:181, 27:188, 27:197, 27:203, 27:213, 27:232, 27:236, 27:242, 27:245-27:246N, 27:251, 35:26, 35:82, 35:85, 35:135, 35:294, 35:471, 37:34, 37:57, 39:189, 40:13, 40:19, 40:75 [?] , 40:109 [?] , 40:292 [?] , 40:322 [?] , 40:340 [?] , 44:06, 44:25, 44:50:01, 44:50:03, 44:95, 44:263, 49:62, 51:01:01:01-51:01:39, 51:01:41-51:24:05, 51:26-51:46, 51:48-51:53, 51:55-51:77, 51:79-51:340, 51:342-51:366, 51:368-51:370, 51:372-51:381, 52:01:01:01-52:01:28, 52:01:30-52:19, 52:21:01-52:89N, 52:91-52:113, 53:01:01:01-53:01:17, 53:01:19-53:02, 53:04-53:08:02, 53:10, 53:14-53:30, 53:32-53:35, 53:37, 53:39-53:54, 53:56-53:66, 53:68-53:72, 57:01:01:01-57:04:02, 57:05-57:11, 57:13-57:167, 58:01:01:01-58:02:02, 58:04-58:16:02, 58:18-58:29, 58:31N-58:63, 58:65-58:107, 58:109-58:136, 58:138-58:143, 78:03 |
| 61 | 145 bp, 210 bp | 1070 bp | 7, 12, 21, 27, 2708, 35, 4005, 41, 45, 46, 47, 50, 60, 61, 73 | *07:133, 07:177, 08:102, 08:122, 08:155, 13:09, 13:39, 13:67, 14:48, 15:46, 15:53, 15:106, 15:143, 15:183, 15:212, 15:336, 15:345, 15:511, 15:525, 15:559, 18:48, 18:80, 18:102, 18:107, 27:08, 27:12:01:01-27:12:01:03, 27:18, 27:26, 27:33, 27:40, 27:42, 27:44, 27:89, 27:153, 27:165 ^w , 27:204:01:01-27:204:01:02, 27:242, 35:19, 35:47, 35:63, 35:84, 35:90, 35:150:01-35:150:02, 35:154, 35:184, 35:201, 35:217, 35:274, 35:317, 35:441, 35:450, 39:69, 40:01:01-40:11:02, 40:14:01-40:16:01:02, 40:18, 40:20:01:01-40:20:01:02, 40:22N-40:40, 40:42-40:46, 40:48-40:75, 40:77-40:95, 40:97-40:108, 40:111-40:116, 40:118N-40:136, 40:138-40:156, 40:158-40:187, 40:189-40:200, 40:202-40:291N, 40:293-40:339, 40:341-40:364, 40:366-40:393, 40:395-40:399N, 40:401-40:538, 41:01:01:01-41:04, 41:06-41:25, 41:27-41:45N, 41:47-41:59, 41:61-41:81, 44:09, 44:46:01-44:46:02, 44:75, 44:90, 44:129, 44:131, 44:254, 44:277, 44:356, 44:438N, 45:01:01:01-45:01:08, |



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| 70 ^{8,15} | 360 bp | 1070 bp | B ^w 4 | *07:27, 07:36, 07:38, 07:81, 07:149, 07:180, 07:219, 07:236, 07:273, 07:453, 08:02-08:03, 08:52, 08:78, 08:117, 08:126, 08:255, 08:271, 13:01:01:01-13:04, 13:06-13:08, 13:10-13:23, 13:25-13:38, 13:40-13:66, 13:68-13:179, 14:93, 14:118, 15:13:01-15:13:03, 15:16:01:01-15:17:07, 15:23-15:24:02, 15:36, 15:43, 15:67, 15:87, 15:89:01-15:89:02, 15:95, 15:115, 15:157, 15:162, 15:168, 15:177, 15:196, 15:208, 15:216, 15:222, 15:230, 15:254, 15:256, 15:268, 15:273, 15:339, 15:356, 15:361-15:362, 15:396, 15:403, 15:408, 15:411, 15:418, 15:423-15:424, 15:442, 15:446, 15:462, 15:500, 15:505, 15:516, 15:523, 15:532, 15:546Q, 15:550, 15:555, 15:575N, 15:586, 15:594, 15:602-15:603, 15:613, 15:619, 15:642, 15:644, 15:655, 18:09, 18:54, 18:67, 18:136, 18:194:01:01-18:195, 27:01-27:05:36, 27:05:38-27:07:06, 27:09-27:11, 27:13:01-27:17, 27:19:01:01-27:21:02, 27:23-27:25, 27:27-27:32, 27:34-27:39, 27:41, 27:43, 27:45-27:88, 27:90:01-27:152, 27:154-27:168, 27:170-27:203, 27:205-27:214, 27:216-27:241, 27:243N-27:259, 27:261N-27:265, 35:36, 35:329, 35:471, 37:01:01:01-37:04:02, 37:06:01-37:10, 37:12-37:36, 37:38-37:66, 37:68-37:95, 37:97-37:107, 38:01:01:01-38:107, 38:160-38:173Q, 40:13, 40:19, 40:47, 40:96, 40:109-40:110, 40:117, 40:157, 40:188, 40:201, 40:207, 40:246, 40:292, 40:340, 40:394, 41:46, 41:60, 44:02:01:01-44:08, 44:10-44:45, 44:47-44:74, 44:76-44:89, 44:91-44:128:02, 44:130, 44:132-44:245:02, 44:247-44:253, 44:255-44:276, 44:278-44:344, 44:346-44:355, 44:357-44:363, 44:365-44:373, 44:437, 44:439-44:457, 44:459-44:524, 44:526-44:546, 47:01:01:02-47:01:06, 47:03-47:12, 48:18, 48:56, 49:01:01:01-49:14, 49:16-49:20, 49:22-49:80, 51:01:01:01-51:24:05, 51:26-51:46, 51:48-51:381, 52:01:01:01-52:110N, 52:112-52:113, 53:01:01:01-53:72, 54:12, 55:90, 55:103, 55:121, 56:07, 56:21, 56:46, 56:65, 57:01:01:01-57:11, 57:13-57:167, 58:01:01:01-58:02:02, 58:04-58:29, 58:31N-58:63, 58:65-58:127, 58:129-58:143, 59:01:01:01-59:12 |
| 71 | 350 bp | 1070 bp | B ^w 6 | *07:02:01:01-07:02:05, 07:02:07-07:02:77, 07:02:79-07:26, 07:28-07:35, 07:37:01-07:37:02, 07:39-07:80, 07:82-07:148, 07:150-07:179, 07:181N-07:191, 07:193-07:218, 07:220-07:235, 07:237-07:272N, 07:274-07:452, 07:454-07:478, 08:01:01:01-08:01:69, 08:04:01-08:05, 08:07-08:51, 08:53:01-08:77, 08:79:01-08:116, 08:118-08:125, 08:127-08:130, 08:132-08:135, 08:137-08:138, 08:140-08:152, 08:154-08:156, 08:158-08:254, 08:256-08:270Q, |



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| 72 | 285 bp | 1070 bp | 7, 703, 8, 35, 40, 41, 42, 48, 53, 60, 61, 81 | *07:02:01:01-07:02:05, 07:02:07-07:02:38, 07:02:40-07:02:84, 07:02:86-07:06:05, 07:08:01-07:18:02, 07:20-07:32, 07:34-07:39, 07:41-07:52, 07:54-07:59, 07:61-07:76, 07:79-07:83, 07:85:01-07:99, 07:101-07:121, 07:123-07:138, 07:140-07:164, 07:166-07:192, 07:194-07:195, 07:199-07:213, 07:215-07:234, 07:236-07:238, 07:240-07:254, |



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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 HLA-specific PCR products of more than one length this is indicated if the size difference is more than 20 base pairs. Size differences of 20 base pairs or less are not given. For high resolution SSP kits, the alleles listed are specified according to amplicon length. Nonspecific amplifications, i.e. a ladder or a smear of bands, may sometimes be seen. GC-rich primers have a higher tendency of giving rise to nonspecific amplifications than other primers. PCR fragments longer than the control bands may sometimes be observed. Such bands should be disregarded and do not influence the interpretation of the SSP typings. PCR fragments migrating faster than the control bands, but slower than a 400 bp fragment may be seen in some gel read-outs. Such bands can be disregarded and do not influence the interpretation of the SSP typings. Some primers may give rise to primer oligomer artifacts. Sometimes this phenomenon is an inherent feature of the primer pair(s) of a primer mix. More often it is due to other factors such as too low amount of DNA in the PCR reactions, taking too long time in setting up the PCR reactions, working at elevated room temperature or using thermal cyclers that are not pre-heated.

²The internal positive control primer pairs amplify segments of the human growth hormone gene. The internal positive control bands are 1070 or 800 base pairs respectively, well distribution as outlined in the table. Well number 25 contains the shorter, 800 bp, internal positive control band. The well distribution of the internal controls can help in orientation of the kit on gel photo, as well as allow for 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 expert-assigned serological grouping in Tissue Antigens (2009) 73:95-170 and the serological grouping of the sequence-defined allele.

⁴For several HLA Class I alleles 1st and/or 4th exon(s) and beyond, as well as intron nucleotide sequences, are not available. In these instances it is not known whether some of the primers of the SSP sets are completely matched with the target sequences or not. Assumption is made that unknown sequences in these regions are conserved within allelic groups.

⁵HLA-specific PCR products shorter than 125 base pairs have a lower intensity and are less sharp than longer PCR products.

⁶Primer mix 28 may give rise to a lower yield of HLA-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.

⁷Primer mixes 28, 29, 33, 42, 53 and 63 may give rise to a lower yield of HLA-specific PCR product than the other HLA-B low resolution primer mixes.

⁸Primer mixes 32, 33, 38, 42, 59, 62, 65, 66 and 70 have tendencies of unspecific amplifications, most pronounced in primer mix 33.

⁹Primer mixes 25, 27, 43, 44, 50, 55 and 69 have a tendency giving rise to primer oligomer formation.



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

¹¹Many C*17 alleles may be faintly amplified by primer mix 49.

¹²Primer mix 67 may generate a false positive band of about 800 base pairs. This band should be disregarded when interpreting HLA-B low resolution typings.

¹³Primer mix 63 may give rise to a lower yield of B*54 alleles than the other B low primer mixes.

¹⁴Primer mix 63 may amplify B*44:05 samples.

¹⁵The Bw4-associated HLA-A specificities A9, A23, A24, A2403, A25 and A32 are not amplified by the primer pair in primer mix 70.

Abbreviations

w: might be weakly amplified.

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



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Lot-specific information
SPECIFICITY TABLE

Specificities and sizes of the PCR products of the 23+1 primer mixes used for DR low resolution SSP typing

| Primer Mix | Size of spec. PCR product ¹ | Size of control band ² | DR serology ³ | Amplified HLA-DRB alleles ^{4,5} |
|--------------------------|--|-----------------------------------|--------------------------|--|
| 73⁷ | 210 bp, 235 bp, 260 bp | 515 bp | 1 | *01:01:01:01-01:02:13, 01:04-01:38, 01:40N-01:98, 01:100-01:101, 01:103-01:111, 01:113-01:126, 01:128-01:143 |
| 74 | 200 bp | 430 bp | 1, 103 | *01:03:01:01-01:03:05, 01:39N, 01:42, 01:61, 01:89, 01:99, 01:102, 01:112, 01:127 |
| 75^{9,10} | 200 bp, 230 bp | 430 bp | 2, 15 | *15:01:01:01-15:216, 16:66 |
| 76 | 210 bp | 430 bp | 11, 16 | *11:30, 11:288, 12:57, 16:01:01:01-16:05:02, 16:07-16:73, DRB3*02:111 |
| 77^{5,6} | 75 bp, 205 bp | 515 bp | 3, 11, 13, 17, 18 | *03:01:01:01-03:11:01, 03:11:03-03:125, 03:127-03:207, 11:07:01-11:07:02, 11:27:02-11:27:03, 11:84:02-11:84:03, 11:103:01-11:103:02, 11:105, 11:107, 11:124:02-11:125, 11:136, 11:173, 13:33:01, 13:61:02, 13:94:01, 13:96:01, 14:38:02, 14:104, 14:111, 14:171, 15:25, 15:37:01, 15:57:02, 15:100, 15:104:01 |
| 78^{5,6} | 75 bp, 210 bp | 430 bp | 3, 6, 11, 13, 14, 17 | *03:01:01:01-03:01:23, 03:01:25-03:01:41, 03:04:01-03:06, 03:08-03:11:01, 03:11:03-03:16, 03:18-03:20, 03:22-03:23, 03:25:01-03:26, 03:28, 03:30-03:31, 03:33-03:34, 03:36-03:37, 03:43-03:48, 03:50-03:52:02, 03:54-03:68N, 03:70-03:73, 03:75-03:86, 03:89, 03:91-03:93, 03:95-03:96, 03:98-03:100:02, 03:104, 03:106-03:114, 03:116-03:118, 03:121-03:130, 03:132-03:149, 03:151-03:153, 03:156N-03:166, 03:168-03:170, 03:172, 03:174N-03:175, 03:177, 03:180-03:184, 03:186-03:187, 03:189N, 03:191-03:205, 03:207, 08:40, 08:92, 11:02:01:01-11:03:04, 11:11:01, 11:11:03, 11:14:01:01-11:14:02, 11:16:01:01-11:16:01:02, 11:20-11:21, 11:36, 11:40-11:41, 11:48, 11:59, 11:63:01-11:63:02, 11:65:01-11:65:02, 11:68, 11:70, 11:73, 11:76, 11:79-11:80, 11:83, 11:85-11:87, 11:93, 11:118:01-11:118:02, 11:122, 11:124:01-11:124:02, 11:127, 11:131-11:132, 11:135, 11:138-11:139, 11:142, 11:151, 11:153, 11:161, 11:168, 11:171, 11:176, 11:182, 11:184, 11:213, 11:229, 11:231, 11:233, 11:237, 11:241-11:242, 11:251, 11:256, 11:260, 11:270, 11:276, 11:290, 11:293, 11:301N, 11:309, 12:73, 13:01:01:01-13:02:01:14, 13:02:02 [?] , 13:02:03-13:04, 13:08, 13:10, 13:15-13:17, 13:19-13:20:01:03, 13:22:01:01-13:24:01:03, 13:27:01-13:29:01:02, 13:31-13:41, 13:43, 13:45, 13:48, 13:51-13:54, 13:57, 13:59, 13:61:01-13:61:02, 13:63-13:66:02, 13:68-13:76, 13:78-13:81, 13:83-13:85, 13:87-13:99, 13:101-13:102, 13:104-13:107, 13:109, 13:110 [?] , 13:111-13:117:01:02, 13:120-13:131, 13:133, 13:135, 13:137N-13:145, 13:147-13:149, 13:151-13:153, 13:155, 13:159, 13:162, 13:165-13:166, 13:167 [?] , 13:168, 13:170-13:180, 13:182-13:188, 13:190-13:191, 13:193-13:194, 13:196, 13:198, 13:200N-13:202, 13:204-13:205, 13:207-13:209, 13:212-13:219, 13:221, 13:223, 13:225-13:227, |



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| 79⁶ | 85 bp, 210 bp | 430 bp | 3, 6, 11, 13, 14, 1403, 18 | *03:02:01:01-03:03, 03:27, 03:29, 03:38, 03:53, 03:74, 03:88, 03:90, 03:102-03:103, 03:115, 03:119, 03:126, 03:131, 03:154, 03:167, 03:176-03:177, 03:179, 03:206, 11:13:01 ^w -11:13:02 ^w , 11:26, 11:34, 11:267, 13:15, 13:19, 13:26:01-13:26:02, 13:44, 13:53, 13:57, 13:85-13:86, 13:104, 13:193, 13:198, 13:206, 13:235, 14:02:01:01-14:03:02, 14:06:01-14:06:06, 14:09, 14:12:01-14:13, 14:17-14:21, 14:24, 14:27:01-14:27:02, 14:29-14:30, 14:32:01 ^w -14:32:02 ^w , 14:33, 14:40-14:41, 14:47-14:49, 14:51, 14:63, 14:65 ^w , 14:67, 14:77-14:78, 14:80-14:81, 14:83, 14:85, 14:89, 14:94, 14:98, 14:102, 14:106, 14:108-14:109, 14:115, 14:119, 14:121, 14:135, 14:146, 14:154, 14:156, 14:159-14:160, 14:165, 14:170, 14:174, 14:176-14:177, 14:179, 14:181, 14:183, 14:194-14:195N, 14:198, 14:200, 14:209, 14:212, 14:218, 14:221-14:223, 14:226, 14:239, 14:242:01-14:242:02, 14:252 |
| 80^{6,7,9} | 100 bp, 175 bp | 430 bp | 3, 4 | *04:01:01:01-04:05:11, 04:05:13-04:365, DRB3*02:190 |
| 81⁹ | 170 bp, 210 bp, 235 bp | 430 bp | 7, 13, 14 | *07:01:01:01-07:01:01:02, 07:01:01:04-07:01:31, 07:03-07:149N, 08:67, 08:92, 08:108, 10:11, 11:229, 11:270, 12:22, 12:73, 12:88, 13:17, 13:116, 13:175, 13:214, 14:50:01 |
| 82⁶ | 85 bp, 120 bp, 215 bp, 250 bp | 515 bp | 7, 8, 14 | *07:06, 08:01:01:01-08:01:02, 08:01:04-08:19, 08:21-08:30:03, 08:32-08:56, 08:58-08:66, 08:68:01-08:79, 08:81-08:97, 08:99-08:120, 11:67, 11:193:01-11:193:02, 12:16:01-12:16:03, 12:22, 12:39:01-12:39:02, 13:171:01, 13:197, 14:15, 14:68:01-14:68:02, 14:93 |
| 83⁶ | 85 bp, 100 bp, 135 bp, 160 bp, 190 bp | 430 bp | 3, 9, 11 | *03:08, 03:65, 03:140, 09:01:02:01-09:53, 11:07:01-11:07:02, 11:103:01-11:103:02, 11:105, 11:107, 11:125, 11:173, DRB3*01:42, DRB5*02:31, DRB5*02:34 |
| 84^{6,9} | 70 bp, 175 bp | 430 bp | 9, 10,11,13 | *03:76, 03:125, 03:174N, 09:53, 10:01:01:01, 10:01:01:03-10:46, 11:59, 11:80, 11:83, 11:87, 11:135, 11:142, 11:182, 13:27:01-13:27:02, 13:41, 13:71, 13:129, 13:176, 13:277, 13:326, 14:179 |
| 85⁶ | 100 bp, 175 bp | 430 bp | 3, 8, 11, 13, 14 | *03:08, 03:65, 03:140, 08:31, 08:41, 08:63, 08:75, 11:01:01:01, 11:01:01:03-11:11:01, 11:11:03-11:70, 11:72-11:263, 11:265-11:292, 11:294N-11:316 |
| 86⁶ | 90 bp, 110 bp | 430 bp | 12, 14 | *08:32, 08:53, 08:87, 12:01:01:01-12:56, 12:58-12:103, 14:52 |
| 87⁷ | 220 bp | 430 bp | 6, 8, 11, 13, 14, 1403 | *03:76, 03:125, 03:174N, 08:20-08:21, 11:01:01:01, 11:01:01:03-11:01:27, 11:01:28 [?] , 11:01:29-11:04:23, 11:06:01-11:06:03, 11:08:01-11:11:01, 11:11:03-11:12:03, 11:14:01:01-11:16:01:02, 11:18-11:21, 11:23:01-11:25, 11:27:01-11:33, 11:35-11:51, 11:54:01-11:54:02, 11:56-11:66:02, 11:68, 11:70, 11:72-11:81, 11:83-11:88, 11:90-11:97, 11:99-11:102:02, 11:106, 11:108-11:124:02, 11:126-11:135, 11:137-11:142, 11:144-11:158, 11:160-11:172, 11:174-11:192, 11:194:01-11:201, 11:203-11:208, 11:210-11:228, 11:230-11:260, |



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| 88⁷ | 195 bp, 225 bp | 430 bp | 6, 8, 11, 12, 13, 14 | *03:125, 08:01:01:01-08:01:02, 08:01:04-08:01:05, 08:01:07-08:02:05, 08:04:01:01-08:09:02, 08:11:01:01-08:11:01:02, 08:16-08:17, 08:20-08:22, 08:24:01-08:24:02, 08:26, 08:28, 08:31, 08:39, 08:41-08:44, 08:50, 08:52, 08:54-08:55, 08:57, 08:59, 08:64, 08:67, 08:70, 08:72-08:73, 08:75, 08:77-08:80, 08:82-08:90, 08:92-08:94, 08:96, 08:98-08:101, 08:103, 08:105-08:109, 08:111-08:114, 08:116-08:118, 08:120, 11:01:01:01, 11:01:01:03-11:01:17, 11:01:20-11:01:47, 11:02:01:01-11:04:20, 11:04:22-11:06:03, 11:09:01:01-11:11:01, 11:11:03-11:12:03, 11:14:01:01-11:16:01:02, 11:20-11:21, 11:23:01-11:25, 11:27:01-11:30, 11:32-11:33, 11:35-11:41, 11:43:01:01-11:44, 11:46:01-11:51, 11:54:01-11:56, 11:58:01-11:63:02, 11:65:01-11:70, 11:72, 11:74:01-11:78, 11:80-11:88, 11:90-11:97, 11:99-11:102:02, 11:106, 11:108-11:118:02, 11:120-11:124:02, 11:126-11:129, 11:133-11:135, 11:137-11:142, 11:144-11:152, 11:154-11:158, 11:160-11:172, 11:174-11:183, 11:185-11:190, 11:192-11:201, 11:203-11:247, 11:249-11:260, 11:262-11:265, 11:269-11:279, 11:281-11:282, 11:284-11:285, 11:287N-11:311, 11:313-11:316, 12:02:01:01-12:02:13, 12:13, 12:15-12:16:03, 12:18-12:21, 12:23, 12:26-12:27, 12:31N-12:33, 12:37, 12:42-12:45, 12:49-12:52, 12:55-12:57, 12:60N-12:61, 12:64-12:65, 12:67, 12:69, 12:71, 12:73-12:76, 12:78, 12:80-12:81, 12:85, 12:92-12:94, 12:97-12:98N, 12:100-12:101, 12:103, 13:01:01:01-13:02:01:14, 13:02:03-13:02:22, 13:04-13:05:03, 13:07:01-13:09, 13:11:01-13:11:02, 13:14:01-13:24:01:03, 13:26:01-13:29:01:02, 13:31-13:32, 13:34-13:36, 13:38-13:43, 13:45-13:55, 13:57, 13:59, 13:61:01-13:65, 13:67-13:76, 13:78-13:80, 13:83-13:84, 13:87, 13:91-13:93, 13:96:01-13:100, 13:102-13:109, 13:111-13:114, 13:116-13:117:01:02, 13:121, 13:123-13:132, 13:135-13:136, 13:138-13:150, 13:153, 13:155, 13:158:01-13:160, 13:162, 13:164-13:166, 13:168-13:169, 13:171:01-13:171:02, 13:173, 13:175, 13:177, 13:179, 13:182-13:187, 13:189-13:192, 13:195, 13:197-13:205, 13:207-13:215, 13:217-13:218, 13:221-13:223, 13:225-13:226, 13:229-13:230, 13:232-13:234, 13:236-13:252N, 13:254-13:288, 13:290-13:294, 13:296-13:298N, 13:300-13:316, 13:318, 13:320, 13:322N-13:328, 13:331-13:332, 13:334-13:336, 13:338-13:339, 14:15-14:16, 14:22, 14:24-14:25:02, 14:27:01-14:27:02, 14:37, 14:53, 14:73, 14:105, 14:128, 14:226, DRB3*02:111, DRB3*02:160 |



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| 89 ⁵ | 175 bp, 240 bp | 430 bp | 3, 4, 6, 8, 11, 13, 14, 1403,140 4, 17, 18 | *03:01:01:01-03:01:05, 03:01:07-03:01:08, 03:01:10-03:07:02, 03:09, 03:11:01, 03:11:03-03:41:02, 03:43-03:45, 03:47-03:63, 03:66-03:68N, 03:70-03:86, 03:88-03:91, 03:93-03:110, 03:112- 03:129, 03:131-03:139, 03:141-03:155, 03:157-03:161, 03:163- 03:172, 03:174N-03:188, 03:191-03:207, 08:09:02, 08:20, 11:03:04, 11:04:17, 11:13:01-11:13:02, 11:17, 11:149, 11:202, 11:264, 12:20, 13:01:01:01-13:01:40, 13:02:01:01-13:16:01:02, 13:18-13:42:02, 13:44, 13:46-13:66:02, 13:68-13:102, 13:104- 13:115, 13:117:01:01-13:121, 13:123-13:158:02, 13:161- 13:164, 13:166-13:170, 13:171:02-13:174, 13:176-13:178, 13:180-13:190, 13:192-13:194, 13:196, 13:198-13:213, 13:215- 13:216, 13:218-13:227, 13:229-13:247, 13:249N-13:298N, 13:300-13:339, 14:01:01:01-14:01:01:03, 14:01:02 [?] -14:01:04 [?] , 14:01:05-14:04:01:03, 14:04:02 [?] -14:04:03 [?] , 14:04:04-14:04:06, 14:04:09-14:21, 14:22 [?] , 14:23:01:01-14:23:01:03, 14:23:02 [?] , 14:23:03-14:24, 14:25:01 [?] -14:26 [?] , 14:27:01-14:27:02, 14:28 [?] , 14:29-14:30, 14:31 [?] -14:32:03 [?] , 14:33, 14:34 [?] -14:35 [?] , 14:36- 14:37, 14:38:01 [?] -14:39 [?] , 14:40-14:45, 14:47-14:48, 14:49 [?] - 14:50:02 [?] , 14:51, 14:52 [?] , 14:54:01:01-14:54:06, 14:54:08- 14:54:12, 14:55 [?] , 14:56-14:57, 14:58 [?] , 14:59, 14:60 [?] -14:62 [?] , 14:63-14:65, 14:67, 14:68:01 [?] -14:69 [?] , 14:70, 14:71 [?] -14:76 [?] , 14:77-14:78, 14:79 [?] , 14:80-14:85, 14:86 [?] -14:88 [?] , 14:89, 14:90 [?] , 14:91, 14:92N [?] -14:93 [?] , 14:94-14:96, 14:97 [?] , 14:98, 14:99 [?] , 14:100, 14:101 [?] , 14:102-14:103, 14:104 [?] -14:105 [?] , 14:106, 14:107 [?] , 14:108-14:109, 14:110 [?] , 14:111, 14:112 [?] -14:114 [?] , 14:115-14:116, 14:117 [?] -14:120 [?] , 14:121, 14:122 [?] , 14:123, 14:124 [?] -14:126:02 [?] , 14:127:01-14:127:02, 14:128 [?] -14:133 [?] , 14:134-14:137N, 14:138 [?] -14:140 [?] , 14:141, 14:142 [?] -14:143 [?] , 14:144, 14:145 [?] -14:151 [?] , 14:152N, 14:153 [?] , 14:154-14:156, 14:157 [?] -14:158 [?] , 14:159-14:162, 14:163 [?] -14:164 [?] , 14:165, 14:166N [?] , 14:167, 14:168 [?] , 14:169-14:171, 14:172 [?] -14:173 [?] , 14:174, 14:175 [?] , 14:176-14:177, 14:178 [?] , 14:179, 14:180 [?] , 14:181, 14:182 [?] , 14:183, 14:184 [?] -14:186 [?] , 14:187-14:188N, 14:189 [?] -14:190 [?] , 14:191-14:199, 14:201-14:202, 14:203 [?] , 14:204-14:207, 14:209-14:219, 14:220 [?] , 14:221, 14:222N [?] , 14:223-14:224, 14:225 [?] , 14:226-14:228, 14:229 [?] , 14:230- 14:247, 14:248 [?] , 14:249, 14:250 [?] -14:251 [?] , 14:252-14:253 |
| 90 ⁶ | 75 bp, 100 bp, 140 bp, 185 bp, 240 bp | 430 bp | 4, 6, 8,13, 14, 1404 | *04:62, 04:69, 04:73:01-04:73:02, 04:105:01-04:105:02, 04:122, 04:146, 04:162, 04:251, 04:284:01-04:284:02, 07:128, 08:08, 11:69, 11:82, 11:88, 11:293, 13:45, 13:197, 13:314, 14:01:01:01-14:01:02, 14:01:04-14:01:05, 14:04:01:01- 14:04:09, 14:07:01-14:07:03, 14:10:01:01-14:10:01:02, 14:16, 14:22, 14:25:01-14:26, 14:28, 14:31-14:32:03, 14:35, 14:37- 14:39, 14:49-14:50:02, 14:53-14:54:01:17, 14:54:03-14:55, 14:57-14:58, 14:60-14:62, 14:68:01-14:71, 14:73-14:76, 14:79, 14:82, 14:86-14:88, 14:90, 14:93, 14:99, 14:101, 14:104- 14:105, 14:107, 14:110-14:114, 14:117-14:120, 14:122, 14:124- 14:125, 14:128-14:129, 14:131, 14:137N-14:140, 14:142- 14:143, 14:145-14:147, 14:149-14:153, 14:157-14:158, 14:163- 14:164, 14:166N, 14:168 ^w , 14:171-14:173, 14:178, 14:180, 14:182, 14:184, 14:186, 14:189-14:192, 14:196-14:197N, 14:199, 14:201-14:205:01, 14:207-14:208, 14:210Q, 14:213- 14:217, 14:219-14:220, 14:224-14:225, 14:227-14:235, |



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| 91 ^{6,7,8} | 110 bp, 145 bp, 170 bp | 430 bp | 3, 4, 6, 9, 11, 13, 14, 1404 | *03:10, 03:126, 03:177, 04:211, 09:01:02:01-09:01:05, 09:01:07-09:02:02, 09:04-09:22, 09:24-09:28, 09:30-09:52N, 11:13:01-11:13:02, 11:17, 11:52, 11:202, 12:66, 12:96, 13:43, 13:159, 13:171:01, 13:179, 13:191, 13:193, 13:217, 14:01:01:01-14:02:10, 14:04:01:01-14:11:01:02, 14:13-14:14, 14:16-14:18, 14:19 ^w , 14:20, 14:21 ^w , 14:22-14:23:04, 14:26, 14:28-14:36, 14:38:01-14:39, 14:41, 14:43-14:52, 14:54:01:01-14:54:03, 14:54:04 ^w , 14:54:05-14:57, 14:59-14:62, 14:64-14:65, 14:68:01-14:68:02, 14:70-14:76, 14:79-14:83, 14:86-14:88, 14:90-14:97, 14:99-14:101, 14:103-14:108, 14:109 ^w , 14:110-14:114, 14:117-14:127:02, 14:129-14:134, 14:137N-14:140, 14:142-14:143, 14:145-14:155, 14:157-14:160, 14:162-14:173, 14:175-14:180, 14:182, 14:184-14:185, 14:187-14:207, 14:209-14:217, 14:219-14:221, 14:224-14:225, 14:227-14:238, 14:240-14:249, 14:251, 14:253, 15:27, 15:34, 15:54, 15:66:01-15:66:02, 15:122, 15:158, 15:187 |
| 92 ^{6,7,9} | 110 bp, 150 bp, 180 bp, 220 bp | 430 bp | 2, 3, 6, 8, 11, 13, 14, 1403, 1404, 16 | *03:10, 03:157, 08:03:11 ^w , 08:09:01-08:09:02, 08:20-08:21, 08:32, 08:35, 08:36:02, 08:53, 08:68:01 ^w , 08:70 ^w , 08:87 ^w , 11:13:01-11:13:02, 11:17, 11:23:01-11:23:02, 11:25, 11:31, 11:45, 11:52, 11:55, 11:64, 11:89, 11:96, 11:119, 11:148, 11:159, 11:202, 11:266, 11:283, 11:293, 11:312, 12:96, 13:13, 13:18, 13:43, 13:45, 13:47, 13:55, 13:119, 13:144, 13:146, 13:154, 13:156, 13:158:01-13:159, 13:164, 13:171:01, 13:179, 13:191, 13:197, 13:217, 13:232, 13:286, 13:331, 14:01:01:01-14:01:05, 14:03:01-14:05:05, 14:07:01-14:08, 14:10:01:01-14:12:02, 14:14-14:16, 14:18, 14:22-14:23:04, 14:25:01-14:28, 14:31-14:32:03, 14:34-14:36, 14:38:01-14:40, 14:42-14:45, 14:49-14:50:02, 14:53-14:65, 14:67-14:79, 14:81-14:82, 14:84-14:93, 14:95-14:97, 14:99-14:105, 14:107, 14:110-14:120, 14:122-14:140, 14:142-14:158, 14:160-14:164, 14:166N-14:169, 14:171-14:175, 14:178, 14:180-14:182, 14:184-14:193, 14:196-14:197N, 14:199-14:208, 14:210Q-14:211, 14:213-14:220, 14:222N-14:225, 14:227-14:241, 14:243-14:249, 14:251-14:253, 15:21 ^w , 15:158 ^w , 15:187 ^w , 16:04:01 ^w -16:04:02 ^w , 16:18 ^w , DRB3*02:131, DRB4*01:31 |
| 93 ^{5,6,7} | 80 bp, 110 bp, 160 bp, 190 bp, 240 bp | 515 bp | 12, 52 | *12:05, 12:15, 12:57, 14:141, DRB3*01:01:02:01-01:114, DRB3*02:01-02:191, DRB3*03:01:01:01-03:21, DRB3*03:23-03:62 |
| 94 ⁷ | 130 bp, 210 bp | 430 bp | 53 | *01:139, 10:19, 14:217, 15:141, DRB4*01:01:01:01, DRB4*01:01:01:03-01:172, DRB4*02:01N, DRB4*03:01N |
| 95 | 180 bp, 215 bp | 430 bp | 51 | DRB5*01:01:01:01-01:130, DRB5*01:132, DRB5*02:02:01-02:37 |
| 96 ¹¹ | - | - | - | Negative control |

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 subtypings. When the primers in a primer mix can give rise to HLA-specific PCR products of more than one length this is indicated if the size difference is more than 20 base pairs. Size differences of 20 base pairs or less are not given. For high resolution SSP kits, the alleles listed are specified according to amplicon length. Nonspecific amplifications, i.e. a ladder or a smear of bands, may



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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 and 90 to 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 inherent feature of the primer pair(s) of a primer mix. More often it is due to other factors such as too low amount of DNA in the PCR reactions, taking too long time in setting up the PCR reactions, working at elevated room temperature or using thermal cyclers that are not pre-heated.

²The internal positive control primer pairs amplify segments of the human growth hormone gene. The internal positive control bands are 430 or 515 base pairs respectively, well distribution as outlined in the table. Well number 73 contains the longer, 515 bp, internal positive control band. The well distribution of the internal controls can help in orientation of the kit on gel photo, as well as allow for kit identification. In the presence of a specific amplification the intensity of the control band often decreases. In the presence of a specific amplification the intensity of the control band often decreases.

³The serological split of all DRB1 alleles is not known. In this table we use the expert-assigned serological grouping in Tissue Antigens (2009) 73:95-170 and the serological grouping of the sequence-defined allele.

⁴For several DRB1 alleles 1st and/or 3rd exon(s) and beyond, as well as intron nucleotide sequences, are not available. In these instances it is not known whether some of the primers of the SSP sets are completely matched with the target sequences or not. Assumption is made that unknown sequences in these regions are conserved within allelic groups.

⁵Due to sharing of sequence motifs in codon 38 and 47, DRB3*01:14 will also be amplified in primer mixes 77, 78 and 89, and DRB3*01:23 and 02:32 in mix 77, in addition to primer mix 93.

⁶HLA-specific PCR products shorter than 125 base pairs have a lower intensity and are less sharp than longer PCR products.

⁷Primer mixes 73, 80, 87, 88 and 91 to 94 may have a tendency giving rise to primer oligomer formation.

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.

⁹Primer mixes 75, 80, 81, 84 and 92 may have tendencies of unspecific amplifications, most pronounced in primer mixes 75 and 81.

¹⁰In primer mix 75 the positive control band may be weaker than for other A-B-DR primer mixes.

¹¹The primers in this kit do not amplify the DRB5*01:131N allele.

¹²Primer mix 96 contains a negative control, which will amplify the majority of HLA amplicons as well as the amplicons generated by the control primer pairs matching the human growth hormone gene. HLA-specific PCR product sizes range from 75 to 200 base pairs and the PCR product generated by the HGH positive control primer pair is 200 base pairs.

Abbreviations

w: might be weakly amplified.

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



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HLA-A LOW PRIMER SPECIFICATION

| Well No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Length of spec. | 120 | 135 | 205 | 190 | 160 | 135 | 175 | 165 | 80 | 80 | 80 | 125 |
| PCR product | 145 | 175 | 235 | | 335 | 200 | 205 | 200 | | 200 | 175 | 160 |
| | | 225 | 215 | | 505 | | | | | 240 | 500 | 190 |
| | | | 255 | | | | | | | | | |
| | | | 365 | | | | | | | | | |
| | | | 415 | | | | | | | | | |
| Length of int. | 800 | 800 | 1070 | 800 | 1070 | 800 | 1070 | 800 | 800 | 800 | 1070 | 800 |
| pos. control ¹ | | | | | | | | | | | | |
| 5'-primer(s) ² | 98 | 48 | 359 | 98 | 144 | 176 | 98 | 98 | 257 | 98 | 301 | 103 |
| | 5'-CTT 3' | 5'-gCT 3' | 5'-gCA 3' | 5'-CTA 3' | 5'-gCC 3' | 5'-gCA 3' | 5'-CTC 3' | 5'-CTA 3' | 5'-Cgg 3' | 5'-CTA 3' | 5'-Cgg 3' | 5'-CCT 3' |
| | 103 | 78 | 363 | 413 | 317 | 368 | 368 | 102 | 259 | 261 | 302 | 415 |
| | 5'-CCT 3' | 5'-TCT 3' | 5'-ATA 3' | 5'-CCg 3' | 5'-gCT 3' | 5'-gTT 3' | 5'-gTT 3' | 5'-ACA 3' | 5'-AgA 3' | 5'-AAC 3' | 5'-ggA 3' | 5'-ggT 3' |
| | 123 | 106 | 363 | | | | | 413 | 261 | | 385 | 423 |
| | 5'-AgT 3' | 5'-CCA 3' | 5'-ATA 3' | | | | | 5'-CCg 3' | 5'-AAC 3' | | 5'-ggC 3' | 5'-gCT 3' |
| | 363 | 144 | | | | | | | 266 | | | |
| | 5'-ATA 3' | 5'-gCA 3' | | | | | | | 5'-ACg 3' | | | |
| | 363 | | | | | | | | | | | |
| | 5'-ATg 3' | | | | | | | | | | | |
| 3'-primer(s) ³ | 203 | 240 | 527 | 256 | 265 | 270 | 259 | 259 | 302 | 256 | 341 | 257 |
| | 5'-TCT 3' | 5'-ggA 3' | 5'-CCA 3' | 5'-CTg 3' | 5'-CCC 3' | 5'-ACA 3' | 5'-gTT 3' | 5'-gTT 3' | 5'-ggC 3' | 5'-CCA 3' | 5'-CgT 3' | 5'-gCA 3' |
| | 545 | 292 | 527 | 559 | 368 | 521 | 502 | 259 | 303 | 299 | 521 | 506 |
| | 5'-AgA 3' | 5'-gTg 3' | 5'-CCT 3' | 5'-CCg 3' | 5'-CAA 3' | 5'-ggg 3' | 5'-CTT 3' | 5'-gTT 3' | 5'-AgA 3' | 5'-TCg 3' | 5'-ggg 3' | 5'-TgT 3' |
| | | | 527 | | | 526 | 539 | 538 | | 300 | | 538 |
| | | | 5'-CCT 3' | | | 5'-CCg 3' | 5'-TCT 3' | 5'-CCA 3' | | 5'-TTT 3' | | 5'-CCg 3' |
| | | | 555 | | | 534 | | | | 308 | | 559 |
| | | | 5'-CCA 3' | | | 5'-CgT 3' | | | | 5'-TCT 3' | | 5'-CTC 3' |
| | | | 555 | | | | | | | | | 559 |
| | | | 5'-gCA 3' | | | | | | | | | 5'-CgT 3' |
| | | | | | | | | | | | | 559 |
| | | | | | | | | | | | | 5'-CgC 3' |
| | | | | | | | | | | | | 563 |
| | | | | | | | | | | | | 5'-CgA 3' |
| Well No. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |



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For *In Vitro* Diagnostic Use
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Date: July 2023, Rev. No: 00

101.701-24/06 – including *Taq* polymerase
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Lot No.: **2S1**

Lot-specific information

| Well No. | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|--|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------------|-----------|-----------|-----------|-----------|
| Length of spec. | 180 | 80 | 90 | 145 | 140 | 200 | 370 | 210 | 65 | 85 | 80 | 360 |
| PCR product | 225 | 115 | 135 | 165 | 180 | 390 | | 240 | 240 | 240 | 160 | 445 |
| | | 200 | 205 | 240 | 240 | | | | 375 | 400 | 240 | |
| | | 240 | | 380 | 260 | | | | 545 | | 495 | |
| | | 460 | | 410 | | | | | | | | |
| Length of int. pos. control ¹ | 1070 | 1070 | 1070 | 1070 | 1070 | 1070 | 800 | 800 | 800 | 800 | 800 | 1070 |
| 5'-primer(s) ² | 98 | 98 | 203 | 41 | 98 | 41 | 302 | 78 | 28 | 47 | 176 | 257 |
| | 5'-CTT 3' | 5'-CAC 3' | 5'-gAA 3' | 5'-CTT 3' | 5'-CTT 3' | 5'-CTT 3' | 5'-ggA 3' | 5'-TCT 3' | 5'-TCg 3' | 5'-g.T 3' | 5'-gCA 3' | 5'-Cgg 3' |
| | 414 | 219 | 362 | 160 | 180 | 98 | 302 | 106 | 261 | 78 | 261 | 341 |
| | 5'-CAg 3' | 5'-gCA 3' | 5'-ggT 3' | 5'-ACg 3' | 5'-TTT 3' | 5'-CAC 3' | 5'-ggA 3' | 5'-CCA 3' | 5'-AAC 3' | 5'-TCT 3' | 5'-AAC 3' | 5'-ggC 3' |
| | 423 | 238 | 363 | 355 | 203 | | 317 | 2 nd | 502 | 521 | 341 | |
| | 5'-gCT 3' | 5'-AgA 3' | 5'-ATA 3' | 5'-CCg 3' | 5'-gAA 3' | | 5'-gCg 3' | 5'-CCT 3' | 5'-CCC 3' | 5'-ggT 3' | 5'-ggA 3' | |
| | | 355 | 363 | | 418 | | | 2 nd | | 527 | 355 | |
| | | 5'-CCg 3' | 5'-ATA 3' | | 5'-AgC 3' | | | 5'-ggC 3' | | 5'-TgC 3' | 5'-CCC 3' | |
| | | 489 | 363 | | | | | | | | 362 | |
| | | 5'-gCA 3' | 5'-ATA 3' | | | | | | | | 5'-gAg 3' | |
| | | | 369 | | | | | | | | 362 | |
| | | | 5'-TAC 3' | | | | | | | | 5'-gAg 3' | |
| 3'-primer(s) ³ | 282 | 180 | 299 | 238 | 290 | 256 | 397 | 265 | 97 | 265 | 292 | 418 |
| | 5'-gAC 3' | 5'-TCA 3' | 5'-CCA 3' | 5'-CCT 3' | 5'-CAA 3' | 5'-CCC 3' | 5'-gAg 3' | 5'-CCC 3' | 5'-ggT 3' | 5'-CCC 3' | 5'-gTg 3' | 5'-gTC 3' |
| | 282 | 257 | 411 | 238 | 299 | 259 | | 282 | 355 | 282 | 292 | |
| | 5'-gAC 3' | 5'-gCA 3' | 5'-TCA 3' | 5'-CCT 3' | 5'-TCT 3' | 5'-gTT 3' | | 5'-gAC 3' | 5'-gAC 3' | 5'-gAC 3' | 5'-gTT 3' | |
| | 559 | 418 | 526 | 243 | 317 | 261 | | 282 | 524 | 282 | 299 | |
| | 5'-CCC 3' | 5'-gTC 3' | 5'-CCA 3' | 5'-TCA 3' | 5'-ggA 3' | 5'-gTg 3' | | 5'-gAC 3' | 5'-CAT 3' | 5'-gAC 3' | 5'-TCT 3' | |
| | 560 | 555 | | 265 | 555 | 265 | | 502 | | 570 | 555 | |
| | 5'-ACC 3' | 5'-CCA 3' | | 5'-CCC 3' | 5'-CCA 3' | 5'-CCC 3' | | 5'-CTT 3' | | 5'-CAC 3' | 5'-CCA 3' | |
| | | | | 282 | | 265 | | 506 | | | | |
| | | | | 5'-gAC 3' | | 5'-CCC 3' | | 5'-TgT 3' | | | | |
| | | | | 555 | | 265 | | | | | | |
| | | | | 5'-CCA 3' | | 5'-CCA 3' | | | | | | |
| Well No. | 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 internal positive control bands are 1070 or 800 base pairs respectively, well distribution as outlined in the table. Well number 1 contains the shorter, 800 bp, internal positive control band. The well distribution of the internal controls can help in orientation of the kit on gel photo, as well as allow for kit identification. In the presence of a specific amplification the intensity of the control band often decreases.

²The nucleotide position 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 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.



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For *In Vitro* Diagnostic Use
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101.701-24/06 – including *Taq* polymerase
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Lot No.: **2S1**

Lot-specific information

HLA-B LOW PRIMER SPECIFICATION

| Well No. | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 |
|---------------------------|------------|-----------|-----------|------------|------------|------------|-----------|-----------|-----------|------------|-----------|-------------------|
| Length of spec. | 110 | 215 | 140 | 105 | 185 | 190 | 290 | 165 | 165 | 180 | 100 | 280 |
| PCR product | | | 235 | 140 | 235 | | | 225 | 190 | | 195 | |
| | | | | 260 | | | | 285 | 390 | | | |
| | | | | | | | | 330 | | | | |
| Length of int. | 800 | 1070 | 1070 | 800 | 800 | 800 | 1070 | 1070 | 1070 | 800 | 1070 | 1070 |
| pos. control ¹ | | | | | | | | | | | | |
| 5'-primer(s) ² | 527 | 97 | 209 | 103 | 103 | 103 | 45 | 45 | 45 | 420 | 206 | 419 |
| | 5'-TgA 3' | 5'-TCg 3' | 5'-ggC 3' | 5'-CCg 3' | 5'-CCT 3' | 5'-CCg 3' | 5'-ggA 3' | 5'-ggA 3' | 5'-ggA 3' | 5'-TTA 3' | 5'-AgA 3' | 5'-gTC 3' |
| | 539 | | 363 | 103 | 103 | 418 | | 357 | 435 | | 412 | |
| | 5'-gCg 3' | | 5'-AgC 3' | 5'-CCg 3' | 5'-CCT 3' | 5'-Agg 3' | | 5'-Tgg 3' | 5'-AAA 3' | | 5'-ATA 3' | |
| | 540 | | 363 | 361 | 363 | | | 412 | | | 416 | |
| | 5'-gAC 3' | | 5'-AgC 3' | 5'-AgT 3' | 5'-AAT 3' | | | 5'-ATA 3' | | | 5'-CCg 3' | |
| | | | | 363 | | | | | | | 420 | |
| | | | | 5'-AgC 3' | | | | | | | 5'-TTA 3' | |
| | | | | | | | | | | | 420 | |
| | | | | | | | | | | | 5'-TTC 3' | |
| 3'-primer(s) ³ | 605 | 272 | 309 | 167 | 246 | 246 | 165 | 206 | 266 | 559 | 256 | 3 rd I |
| | 5'-gCT 3' | 5'-Tgg 3' | 5'-gTg 3' | 5'-ACA 3' | 5'-TAT 3' | 5'-TAT 3' | 5'-Tgg 3' | 5'-CCT 3' | 5'-TCC 3' | 5'-CTC 3' | 5'-CCC 3' | 5'-TAT 3' |
| | | 272 | 312 | 193 | 246 | 572 | | 538 | 559 | | 272 | |
| | | 5'-TgA 3' | 5'-gCC 3' | 5'-CgT 3' | 5'-TAT 3' | 5'-gCC 3' | | 5'-gTC 3' | 5'-CAg 3' | | 5'-Tgg 3' | |
| | | 272 | 559 | 193 | 559 | | | 603 | 583 | | 572 | |
| | | 5'-TgT 3' | 5'-CAg 3' | 5'-CgT 3' | 5'-CTC 3' | | | 5'-gTg 3' | 5'-gTg 3' | | 5'-gCg 3' | |
| | | | | 463 | | | | | | | | |
| | | | | 5'-gCT 3' | | | | | | | | |
| | | | | 583 | | | | | | | | |
| | | | | 5'-gTg 3' | | | | | | | | |
| Well No. | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 |



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Lot No.: **2S1**

Lot-specific information

| | | | | | | | | | | | | |
|--|-----------|------------|-----------|-----------|------------|-----------|-----------|------------|------------|-----------|-----------|-----------|
| Well No. | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 |
| Length of spec. | 195 | 105 | 115 | 80 | 100 | 140 | 55 | 210 | 170 | 110 | 395 | 160 |
| PCR product | | 395 | 150 | | 150 | | 245 | | | | | 425 |
| | | 435 | | | | | 390 | | | | | |
| | | | | | | | 415 | | | | | |
| Length of int. pos. control ¹ | 1070 | 800 | 1070 | 1070 | 800 | 1070 | 1070 | 800 | 800 | 1070 | 1070 | 1070 |
| 5'-primer(s) ² | 142 | 45 | 161 | 167 | 349 | 206 | 45 | 142 | 407 | 246 | 44 | 44 |
| | 5'-TCT 3' | 5'-ggA 3' | 5'-Cgg 3' | 5'-gCT 3' | 5'-CTT 3' | 5'-gAC 3' | 5'-ggA 3' | 5'-TCT 3' | 5'-gg 3' | 5'-gAA 3' | 5'-ggC 3' | 5'-ggC 3' |
| | 419 | 540 | | | 355 | | 368 | 368 | 409 | | | 357 |
| | 5'-gTC 3' | 5'-gAC 3' | | | 5'-TCA 3' | | 5'-gTT 3' | 5'-gTC 3' | 5'-ggC 3' | | | 5'-Tgg 3' |
| | | | | | | | 557 | | 409 | | | |
| | | | | | | | 5'-ggA 3' | | 5'-ggC 3' | | | |
| | | | | | | | | | 420 | | | |
| | | | | | | | | | 5'-TTA 3' | | | |
| 3'-primer(s) ³ | 301 | 272 | 234 | 204 | 412 | 301 | 259 | 311 | 544 | 317 | 272 | 302 |
| | 5'-gTC 3' | 5'-TgC 3' | 5'-TCT 3' | 5'-TCT 3' | 5'-gTT 3' | 5'-gCT 3' | 5'-gTT 3' | 5'-ggg 3' | 5'-ggT 3' | 5'-ggA 3' | 5'-TgC 3' | 5'-ggC 3' |
| | 301 | 272 | 272 | | 463 | 302 | 259 | 311 | | 320 | | 302 |
| | 5'-gTC 3' | 5'-TgT 3' | 5'-TgA 3' | | 5'-gCT 3' | 5'-ggC 3' | 5'-gTT 3' | 5'-ggg 3' | | 5'-AgT 3' | | 5'-ggT 3' |
| | 570 | 309 | 272 | | | 311 | 266 | 538 | | | | 477 |
| | 5'-CCg 3' | 5'-ATC 3' | 5'-Tgg 3' | | | 5'-ggT 3' | 5'-TCC 3' | 5'-gTC 3' | | | | 5'-gCg 3' |
| | 572 | 605 | | | | 312 | 272 | | | | | |
| | 5'-gCg 3' | 5'-gCT 3' | | | | 5'-AgT 3' | 5'-Tgg 3' | | | | | |
| | | | | | | | 292 | | | | | |
| | | | | | | | 5'-gTA 3' | | | | | |
| | | | | | | | 572 | | | | | |
| | | | | | | | 5'-gCg 3' | | | | | |
| Well No. | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 |

| | | | | | | | | | | | | |
|--|-----------|-----------|-----------|-------------------|-----------|------------|------------|-----------|-----------|-----------|------------|-----------|
| Well No. | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
| Length of spec. | 180 | 130 | 105 | 325 | 80 | 215 | 130 | 90 | 90 | 55 | 120 | 390 |
| PCR product | | 290 | | | 115 | | 280 | 410 | 175 | 100 | 210 | 430 |
| | | 465 | | | 160 | | | | | 145 | | |
| | | | | | 195 | | | | | 395 | | |
| | | | | | 225 | | | | | 430 | | |
| | | | | | 260 | | | | | | | |
| Length of int. pos. control ¹ | 1070 | 1070 | 1070 | 800 | 1070 | 800 | 800 | 1070 | 1070 | 1070 | 800 | 1070 |
| 5'-primer(s) ² | 355 | 72 | 540 | 1 st I | 355 | 141 | 209 | 41 | 209 | 48 | 357 | 49 |
| | 5'-TCA 3' | 5'-gCT 3' | 5'-gAC 3' | 5'-CAg 3' | 5'-TCA 3' | 5'-ATT 3' | 5'-ggC 3' | 5'-CTg 3' | 5'-ggC 3' | 5'-gCC 3' | 5'-Tgg 3' | 5'-CAg 3' |
| | 363 | 103 | | | 418 | 357 | 209 | 363 | 363 | 206 | | |
| | 5'-Agg 3' | 5'-CCT 3' | | | 5'-Agg 3' | 5'-Tgg 3' | 5'-ggg 3' | 5'-AAT 3' | 5'-AgC 3' | 5'-gAA 3' | | |
| | | 209 | | | 499 | | 355 | 368 | | 259 | | |
| | | 5'-ggC 3' | | | 5'-TCT 3' | | 5'-TCA 3' | 5'-gTT 3' | | 5'-ggg 3' | | |
| 3'-primer(s) ³ | 499 | 193 | 603 | 282 | 538 | 309 | 299 | 282 | 259 | 272 | 435 | 272 |
| | 5'-ggA 3' | 5'-CgT 3' | 5'-gTg 3' | 5'-gCC 3' | 5'-gTC 3' | 5'-ATC 3' | 5'-TCA 3' | 5'-gCC 3' | 5'-gTT 3' | 5'-TgT 3' | 5'-TCT 3' | 5'-TgC 3' |
| | | 193 | 603 | | 572 | 538 | 583 | 418 | 499 | 309 | 527 | 309 |
| | | 5'-TgT 3' | 5'-gTg 3' | | 5'-gCA 3' | 5'-gTC 3' | 5'-gTg 3' | 5'-gTC 3' | 5'-ggA 3' | 5'-ATC 3' | 5'-CCT 3' | 5'-ATC 3' |
| | | 387 | 605 | | 572 | | 605 | | | | | |
| | | 5'-TCg 3' | 5'-gCT 3' | | 5'-gCg 3' | | 5'-gCT 3' | | | | | |
| | | | | | 573 | | | | | | | |
| | | | | | 5'-AgT 3' | | | | | | | |
| Well No. | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |



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Lot No.: **2S1**

Lot-specific information

| Well No. | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 |
|--|-----------|-------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-------------------|-------------------|-----------|
| Length of spec. | 145 | 300 | 160 | 180 | 180 | 90 | 90 | 95 | 115 | 360 | 350 | 285 |
| PCR product | 210 | | 370 | 210 | 205 | 150 | | | 150 | | | |
| | | | | 240 | | 410 | | | | | | |
| Length of int. pos. control ¹ | 1070 | 1070 | 1070 | 1070 | 1070 | 800 | 1070 | 1070 | 1070 | 1070 | 1070 | 1070 |
| 5'-primer(s) ² | 142 | 1 st I | 15 | 141 | 97 | 15 | 207 | 206 | 165 | 1 st I | 1 st I | 355 |
| | 5'-TCA 3' | 5'-CAG 3' | 5'-gCA 3' | 5'-ATT 3' | 5'-TCg 3' | 5'-gCA 3' | 5'-ACC 3' | 5'-gAC 3' | 5'-ACC 3' | 5'-CAg 3' | 5'-CAg 3' | 5'-TCA 3' |
| | 206 | | 418 | 362 | 420 | 209 | 208 | | 463 | | | 363 |
| | 5'-gAA 3' | | 5'-Agg 3' | 5'-gAC 3' | 5'-TTA 3' | 5'-ggC 3' | 5'-CgT 3' | | 5'-TgA 3' | | | 5'-AgC 3' |
| | | | | 362 | | 209 | 209 | | | | | |
| | | | | 5'-ggT 3' | | 5'-ggA 3' | 5'-ggA 3' | | | | | |
| | | | | 420 | | 449 | 369 | | | | | |
| | | | | 5'-TTA 3' | | 5'-CCC 3' | 5'-TAC 3' | | | | | |
| | | | | | | | 369 | | | | | |
| | | | | | | | 5'-TAT 3' | | | | | |
| 3'-primer(s) ³ | 311 | 259 | 207 | 311 | 259 | 256 | 256 | 259 | 272 | 317 | 311 | 603 |
| | 5'-ggT 3' | 5'-CTC 3' | 5'-TCC 3' | 5'-ggT 3' | 5'-gTT 3' | 5'-CCC 3' | 5'-CCC 3' | 5'-gTT 3' | 5'-TgC 3' | 5'-ggA 3' | 5'-ggT 3' | 5'-gTg 3' |
| | | 259 | 226 | 559 | 559 | 259 | 256 | | 538 | 320 | | 605 |
| | | 5'-CTC 3' | 5'-CAC 3' | 5'-CgT 3' | 5'-CAG 3' | 5'-CTT 3' | 5'-CTC 3' | | 5'-CCA 3' | 5'-AgT 3' | | 5'-gCT 3' |
| | | 262 | 538 | | | 263 | 420 | | | | | |
| | | 5'-TgC 3' | 5'-gTC 3' | | | 5'-gTT 3' | 5'-gCT 3' | | | | | |
| | | | | | | 559 | | | | | | |
| | | | | | | 5'-CgT 3' | | | | | | |
| Well No. | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 |

¹The internal positive control primer pairs amplify segments of the human growth hormone gene. The internal positive control bands are 1070 or 800 base pairs respectively, well distribution as outlined in the table. Well number 25 contains the shorter, 800 bp, internal positive control band. The well distribution of the internal controls can help in orientation of the kit on gel photo, as well as allow for kit identification. In the presence of a specific amplification the intensity of the control band often decreases.

²The nucleotide position 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 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.



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Lot No.: **2S1**

Lot-specific information

DR LOW PRIMER SPECIFICATION

| Well No. | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 |
|---------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| Length of spec. | 210 | 200 | 200 | 210 | 75 | 75 | 85 | 100 | 170 | 85 | 85 | 70 |
| PCR product | 235 | | 230 | | 205 | 210 | 210 | 175 | 210 | 120 | 100 | 175 |
| | 260 | | | | | | | | 235 | 215 | 135 | |
| | | | | | | | | | | 250 | 160 | |
| | | | | | | | | | | | 190 | |
| Length of int. | 515 | 430 | 430 | 430 | 515 | 430 | 430 | 430 | 430 | 515 | 430 | 430 |
| pos. control ¹ | | | | | | | | | | | | |
| 5'-primer(s) ² | 11(119) 5'-gCT ^{3'} | 14(129) 5'-gAA ^{3'} | 12(121) 5'-CTg ^{3'} | 11(119) 5'-gCT ^{3'} | 13(125) 5'-gTC ^{3'} | 12(122) 5'-TAC ^{3'} | 13(125) 5'-gTC ^{3'} | 13(124) 5'-AAC ^{3'} | 11(118) 5'-AgA ^{3'} | 16(133) 5'-gTT ^{3'} | 26(165) 5'-TAT ^{3'} | 26(164) 5'-gTA ^{3'} |
| | 14(129) 5'-gAA ^{3'} | | 13(126) 5'-Agg ^{3'} | 13(126) 5'-Agg ^{3'} | 47(227) 5'-gTT ^{3'} | 13(125) 5'-gTC ^{3'} | | 13(125) 5'-ATA ^{3'} | 14(127) 5'-ATA ^{3'} | 16(133) 5'-gTT ^{3'} | 37(196) 5'-AgA ^{3'} | 31(178) 5'-gCg ^{3'} |
| | | | 13(126) 5'-AAG ^{3'} | 13(126) 5'-AAG ^{3'} | | 16(133) 5'-gTT ^{3'} | | 13(125) 5'-gTC ^{3'} | 14(127) 5'-ATA ^{3'} | 16(133) 5'-gCT ^{3'} | 58(261) 5'-gAg ^{3'} | |
| | | | 13(126) 5'-AgA ^{3'} | | | | | | 14(127) 5'-gTA ^{3'} | 60(265) 5'-AgT ^{3'} | | |
| | | | | | | | | | 16(133) 5'-gTT ^{3'} | | | |
| | | | | | | | | | 29(174) 5'-AgA ^{3'} | | | |
| | | | | | | | | | 31(178) 5'-gCg ^{3'} | | | |
| 3'-primer(s) ³ | 67(286) 5'-gAg ^{3'} | 67(286) 5'-gAT ^{3'} | 67(286) 5'-gAT ^{3'} | 67(286) 5'-gAA ^{3'} | 73(305) 5'-ggC ^{3'} | 26(164) 5'-ggT ^{3'} | 28(171) 5'-CTC ^{3'} | 33(184) 5'-gTg ^{3'} | 71(298) 5'-CTC ^{3'} | 74(307) 5'-CAg ^{3'} | 57(257) 5'-CgA ^{3'} | 38(200) 5'-gCg ^{3'} |
| | 67(286) 5'-gAg ^{3'} | 67(286) 5'-gAA ^{3'} | 67(286) 5'-gAT ^{3'} | 67(286) 5'-gAg ^{3'} | 73(305) 5'-ggC ^{3'} | 67(286) 5'-gAT ^{3'} | 70(295) 5'-CTg ^{3'} | 58(260) 5'-Cgg ^{3'} | 73(305) 5'-ggC ^{3'} | 86(344) 5'-CAC ^{3'} | 73(305) 5'-ggC ^{3'} | 72(303) 5'-gCA ^{3'} |
| | 67(286) 5'-gAT ^{3'} | 67(286) 5'-gAA ^{3'} | 67(286) 5'-gAT ^{3'} | 67(286) 5'-gAg ^{3'} | 73(305) 5'-ggC ^{3'} | 71(299) 5'-gCT ^{3'} | | | 77(317) 5'-AAT ^{3'} | | 78(319) 5'-CAC ^{3'} | 74(307) 5'-CgC ^{3'} |
| | 70(297) 5'-CTg ^{3'} | | 70(295) 5'-CTg ^{3'} | 70(296) 5'-TgT ^{3'} | 73(305) 5'-ggC ^{3'} | | | | 78(319) 5'-CAC ^{3'} | | | |
| | 71(299) 5'-gCg ^{3'} | | 70(295) 5'-Tg ^{3'} | 72(302) 5'-Cgg ^{3'} | 73(306) 5'-Tgg ^{3'} | | | | 78(319) 5'-CAA ^{3'} | | | |
| | 73(305) 5'-ggC ^{3'} | | 70(296) 5'-TCC ^{3'} | | 74(308) 5'-CCC ^{3'} | | | | 78(319) 5'-CgC ^{3'} | | | |
| | 77(317) 5'-AgT ^{3'} | | 71(299) 5'-gCg ^{3'} | | 75(310) 5'-CAA ^{3'} | | | | | | | |
| | 86(344) 5'-CCA ^{3'} | | 71(299) 5'-gCT ^{3'} | | 77(317) 5'-AgT ^{3'} | | | | | | | |
| | | | 72(301) 5'-Cg ^{3'} | | | | | | | | | |
| | | | 73(305) 5'-ggC ^{3'} | | | | | | | | | |
| | | | 77(317) 5'-AgT ^{3'} | | | | | | | | | |
| Well No. | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 |



0197

For *In Vitro* Diagnostic Use
MA123 v02 SSP PI Template
Date: July 2023, Rev. No: 00

101.701-24/06 – including *Taq* polymerase
101.701-24u/06u – without *Taq* polymerase

Visit www.caredx.com for
“Instructions for Use” (IFU)

Lot No.: **2S1**

Lot-specific information

| Well No. | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 |
|---|----------------------|----------------------|----------------------|----------------------|-----------------------|----------------------|----------------------|----------------------|----------------------|-----------------------|----------------------|
| Length of spec. | 100 | 90 | 220 | 195 | 175 | 75 | 110 | 110 | 80 | 130 | 180 |
| PCR product | 175 | 110 | | 225 | 240 | 100 | 145 | 150 | 110 | 210 | 215 |
| | | | | | | 140 | 170 | 180 | 160 | | |
| | | | | | | 185 | | 220 | 190 | | |
| | | | | | | 240 | | | 240 | | |
| Length of int. pos. control ¹ | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 430 | 515 | 430 | 430 |
| 5'-primer(s) ² | 13(125) 5'-gTC 3' | 13(124) 5'-Cgg 3' | 10(116) 5'-gCT 3' | 10(116) 5'-gCT 3' | 13(125) 5'-gTC 3' | 5(101) 5'-CAA 3' | 26(164) 5'-gTA 3' | 13(125) 5'-gTC 3' | 10(116) 5'-gCT 3' | 28(170) 5'-gAT 3' | 9(112) 5'-TgC 3' |
| | 16(133) 5'-gTC 3' | 16(133) 5'-gTT 3' | 12(122) 5'-TAT 3' | 12(122) 5'-TAT 3' | 13(125) 5'-gTg 3' | 37(197) 5'-gTT 3' | 34(189) 5'-CAg 3' | 34(189) 5'-CAg 3' | 10(116) 5'-gCT 3' | 28(170) 5'-gAg 3' | 13(125) 5'-gTA 3' |
| | 38(200) 5'-CgT 3' | | 13(125) 5'-gTC 3' | 12(123) 5'-ACA 3' | 114(429) 5'-CTg 3' | 37(197) 5'-gTA 3' | 34(189) 5'-CAg 3' | 37(196) 5'-AgC 3' | 11(119) 5'-gCT 3' | 105(401) 5'-AAA 3' | |
| | | | | 13(125) 5'-gTC 3' | | | 34(189) 5'-CCg 3' | | 38(199) 5'-TCC 3' | | |
| | | | | 13(125) 5'-gTg 3' | | | | | | | |
| | | | | 16(133) 5'-gTC 3' | | | | | | | |
| | | | | 16(133) 5'-gTT 3' | | | | | | | |
| 3'-primer(s) ³ | 58(260) 5'-CCT 3' | 28(171) 5'-CTC 3' | 70(295) 5'-gTC 3' | 67(286) 5'-gAA 3' | 58(260) 5'-Cgg 3' | 48(230) 5'-CCT 3' | 57(257) 5'-CAg 3' | 57(257) 5'-CAg 3' | 51(239) 5'-CCC 3' | 81(328) 5'-gTA 3' | 57(256) 5'-gTC 3' |
| | 58(260) 5'-CCT 3' | 30(175) 5'-gTg 3' | 71(299) 5'-gCT 3' | 71(298) 5'-CTC 3' | 58(260) 5'-CAg 3' | 57(257) 5'-CAg 3' | 70(295) 5'-CTg 3' | 60(265) 5'-gTg 3' | 57(256) 5'-gCT 3' | 87(346) 5'-CTC 3' | 57(256) 5'-gCT 3' |
| | 58(260) 5'-CCT 3' | 38(199) 5'-CAg 3' | 71(299) 5'-ACT 3' | 71(298) 5'-CgC 3' | 181(630) 5'-CTT 3' | 71(298) 5'-CgC 3' | 70(296) 5'-TCC 3' | 70(296) 5'-TCC 3' | 60(266) 5'-Agg 3' | 87(346) 5'-CTT 3' | 57(258) 5'-gCg 3' |
| | 58(261) 5'-TCT 3' | | 74(307) 5'-CgT 3' | | | | | 74(307) 5'-CAg 3' | 77(317) 5'-AAT 3' | 135(490) 5'-gCT 3' | 57(258) 5'-gCT 3' |
| | | | 78(319) 5'-CAC 3' | | | | | | | | 58(260) 5'-CCT 3' |
| | | | | | | | | | | | 70(296) 5'-TgT 3' |
| Well No. | 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 internal positive control bands are 430 or 515 base pairs respectively, well distribution as outlined in the table. Well number 73 contains the longer, 515 bp, internal positive control band. The well distribution of the internal controls can help in orientation of the kit on gel photo, as well as allow for kit identification. In the presence of a specific amplification the intensity of the control band often decreases.

²The nucleotide position 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 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.



0197

For *In Vitro* Diagnostic Use
MA123 v02 SSP PI Template
Date: July 2023, Rev. No: 00

101.701-24/06 – including *Taq* polymerase
 101.701-24u/06u – without *Taq* polymerase

Visit www.caredx.com for
 “Instructions for Use” (IFU)

Lot No.: **2S1**

Lot-specific information

| CELL LINE VALIDATION SHEET | | | | | | | | | | | | | | | | | | | | |
|--|-----------------------------|--------|--------|------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| HLA-A low resolution primer set ² | | | | | | | | | | | | | | | | | | | | |
| | | | | Well | | | | | | | | | | | | | | | | |
| | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | |
| | | | | Prod. No.: | 202135301 | 202348602 | 202135303 | 202348604 | 202348605 | 202348606 | 202348607 | 202348608 | 202348609 | 202348610 | 202348611 | 202348612 | 202348613 | 202348614 | 202348615 | 202348616 |
| | IHWC cell line ¹ | A* | A* | | | | | | | | | | | | | | | | | |
| 1 | 9001 SA | *24:02 | | - | - | - | - | + | - | + | - | - | - | - | - | - | - | - | - | - |
| 2 | 9280 LK707 | *02:01 | | - | + | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 3 | 9011 E4181324 | *01:01 | | + | - | - | + | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 4 | 9275 GU373 | *30:01 | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | + | - |
| 5 | 9009 KAS011 | *01:01 | | + | - | - | + | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 6 | 9353 SM | *02:01 | *26:03 | - | + | - | - | - | - | - | + | - | - | + | - | + | - | - | - | - |
| 7 | 9020 QBL | *26:01 | | - | - | - | - | - | - | - | + | - | + | - | - | + | - | - | - | - |
| 8 | 9025 DEU | *31:01 | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | + |
| 9 | 9026 YAR | *26:01 | | - | - | - | - | - | - | - | + | - | + | - | - | + | - | - | - | - |
| 10 | 9107 LKT3 | *24:02 | | - | - | - | - | + | - | + | - | - | - | - | - | - | - | - | - | - |
| 11 | 9051 PITOUT | *29:02 | | - | - | - | - | - | - | - | - | - | - | - | - | - | + | - | - | - |
| 12 | 9052 DBB | *02:01 | | - | + | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 13 | 9004 JESTHOM | *02:01 | | - | + | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 14 | 9071 OLGA | *31:01 | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | + |
| 15 | 9075 DKB | *24:02 | | - | - | - | - | + | - | + | - | - | - | - | - | - | - | - | - | - |
| 16 | 9037 SWEIG007 | *29:02 | | - | - | - | - | - | - | - | - | - | - | - | - | - | + | - | - | - |
| 17 | 9282 CTM3953540 | *03:01 | *80:01 | - | - | + | - | - | + | - | - | - | - | - | - | + | - | - | - | - |
| 18 | 9257 32367 | *33:03 | *74:01 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 19 | 9038 BM16 | *02:01 | | - | + | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 20 | 9059 SLE005 | *02:01 | | - | + | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 21 | 9064 AMALA | *02:17 | | - | + | - | - | - | - | W | - | - | - | - | - | - | - | - | - | - |
| 22 | 9056 KOSE | *02:01 | | - | + | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 23 | 9124 IHL | *02:01 | *34:01 | - | + | - | - | - | - | - | + | - | - | + | + | - | - | - | - | - |
| 24 | 9035 JBUSH | *32:01 | | - | - | - | - | - | - | - | - | + | - | - | - | - | - | - | - | - |
| 25 | 9049 IBW9 | *33:01 | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 26 | 9285 WT49 | *02:05 | | - | + | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 27 | 9191 CH1007 | *24:10 | *29:01 | - | - | - | - | + | - | + | - | - | - | - | - | - | + | - | - | - |
| 28 | 9320 BEL5GB | *02:01 | *29:02 | - | + | - | - | - | - | - | - | - | - | - | - | - | + | - | - | - |
| 29 | 9050 MOU | *29:02 | | - | - | - | - | - | - | - | - | - | - | - | - | - | + | - | - | - |
| 30 | 9021 RSH | *30:01 | *68:02 | - | - | - | - | - | - | - | + | - | - | - | - | - | - | - | + | - |
| 31 | 9019 DUCAF | *30:02 | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | + | - |
| 32 | 9297 HAG | *02:01 | | - | + | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 33 | 9098 MT14B | *31:01 | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | + |
| 34 | 9104 DHIF | *31:01 | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | + |
| 35 | 9302 SSTO | *32:01 | | - | - | - | - | - | - | - | - | + | - | - | - | - | - | - | - | - |
| 36 | 9024 KT17 | *02:06 | *11:01 | - | + | - | + | - | - | - | - | - | - | + | - | - | - | - | - | - |
| 37 | 9065 HHKB | *03:01 | | - | - | + | - | - | - | - | - | - | - | - | - | + | - | - | - | - |
| 38 | 9099 LZL | *02:17 | | - | + | - | - | - | - | W | - | - | - | - | - | - | - | - | - | - |
| 39 | 9315 CML | *01:01 | *03:01 | + | - | + | + | - | - | - | - | - | - | - | - | + | - | - | - | - |
| 40 | 9134 WHONP199 | *02:07 | *30:01 | - | + | - | - | - | - | - | - | - | - | - | - | - | - | - | + | - |
| 41 | 9055 H0301 | *03:01 | | - | - | + | - | - | - | - | - | - | - | - | - | + | - | - | - | - |
| 42 | 9066 TAB089 | *02:07 | | - | + | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 43 | 9076 T7526 | *02:06 | *02:07 | - | + | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 44 | 9057 TEM | *66:01 | | - | - | - | - | - | - | - | + | - | - | + | - | + | - | - | - | - |
| 45 | 9239 SHJO | *23:01 | *24:02 | - | - | - | - | + | + | + | - | - | - | - | - | - | - | - | - | - |
| 46 | 9013 SCHU | *03:01 | | - | - | + | - | - | - | - | - | - | - | - | - | + | - | - | - | - |
| 47 | 9045 TUBO | *02:16 | *03:01 | - | + | + | - | - | - | - | - | - | - | - | - | + | - | - | - | - |
| 48 | 9303 TER-ND | *02:01 | *11:01 | - | + | - | + | - | - | - | - | - | - | + | - | - | - | - | - | - |



0197

101.701-24/06 – including *Taq* polymerase
101.701-24u/06u – without *Taq* polymerase

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“Instructions for Use” (IFU)

Lot No.: **2S1**

Lot-specific information

| CELL LINE VALIDATION SHEET | | | | | | | | | | | | |
|--|-----------------------------|------------|--|------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| HLA-A low resolution primer set ² | | | | | | | | | | | | |
| | | | | Well | | | | | | | | |
| | | | | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | |
| | | | | Prod. No.: | 202353017 | 202348618 | 202348619 | 202348620 | 202348621 | 202348622 | 202351123 | 202348624 |
| | IHCW cell line ¹ | | | A* | A* | | | | | | | |
| 1 | 9001 | SA | | *24:02 | | - | - | - | - | - | - | - |
| 2 | 9280 | LK707 | | *02:01 | | - | - | - | - | - | - | - |
| 3 | 9011 | E4181324 | | *01:01 | | - | - | - | - | - | - | - |
| 4 | 9275 | GU373 | | *30:01 | | - | - | - | - | - | - | - |
| 5 | 9009 | KAS011 | | *01:01 | | - | - | - | - | - | - | - |
| 6 | 9353 | SM | | *02:01 | *26:03 | - | - | - | - | - | + | - |
| 7 | 9020 | QBL | | *26:01 | | - | - | - | - | - | - | - |
| 8 | 9025 | DEU | | *31:01 | | - | - | - | - | - | - | - |
| 9 | 9026 | YAR | | *26:01 | | - | - | - | - | - | - | - |
| 10 | 9107 | LKT3 | | *24:02 | | - | - | - | - | - | - | - |
| 11 | 9051 | PITOUT | | *29:02 | | - | - | - | - | - | - | - |
| 12 | 9052 | DBB | | *02:01 | | - | - | - | - | - | - | - |
| 13 | 9004 | JESTHOM | | *02:01 | | - | - | - | - | - | - | - |
| 14 | 9071 | OLGA | | *31:01 | | - | - | - | - | - | - | - |
| 15 | 9075 | DKB | | *24:02 | | - | - | - | - | - | - | - |
| 16 | 9037 | SWEIG007 | | *29:02 | | - | - | - | - | - | - | - |
| 17 | 9282 | CTM3953540 | | *03:01 | *80:01 | - | - | - | - | - | + | - |
| 18 | 9257 | 32367 | | *33:03 | *74:01 | - | + | + | - | - | - | - |
| 19 | 9038 | BM16 | | *02:01 | | - | - | - | - | - | - | - |
| 20 | 9059 | SLE005 | | *02:01 | | - | - | - | - | - | - | - |
| 21 | 9064 | AMALA | | *02:17 | | - | - | - | - | - | - | - |
| 22 | 9056 | KOSE | | *02:01 | | - | - | - | - | - | - | - |
| 23 | 9124 | IHL | | *02:01 | *34:01 | - | - | - | - | - | - | - |
| 24 | 9035 | JBUSH | | *32:01 | | + | - | - | - | - | - | - |
| 25 | 9049 | IBW9 | | *33:01 | | - | + | - | - | - | - | - |
| 26 | 9285 | WT49 | | *02:05 | | - | - | - | - | - | - | - |
| 27 | 9191 | CH1007 | | *24:10 | *29:01 | - | - | - | - | - | - | - |
| 28 | 9320 | BEL5GB | | *02:01 | *29:02 | - | - | - | - | - | - | - |
| 29 | 9050 | MOU | | *29:02 | | - | - | - | - | - | - | - |
| 30 | 9021 | RSH | | *30:01 | *68:02 | - | - | - | + | - | - | - |
| 31 | 9019 | DUCAF | | *30:02 | | - | - | - | - | - | - | - |
| 32 | 9297 | HAG | | *02:01 | | - | - | - | - | - | - | - |
| 33 | 9098 | MT14B | | *31:01 | | - | - | - | - | - | - | - |
| 34 | 9104 | DHIF | | *31:01 | | - | - | - | - | - | - | - |
| 35 | 9302 | SSTO | | *32:01 | | + | - | - | - | - | - | - |
| 36 | 9024 | KT17 | | *02:06 | *11:01 | - | - | - | - | - | - | - |
| 37 | 9065 | HHKB | | *03:01 | | - | - | - | - | - | - | - |
| 38 | 9099 | LZL | | *02:17 | | - | - | - | - | - | - | - |
| 39 | 9315 | CML | | *01:01 | *03:01 | - | - | - | - | - | - | - |
| 40 | 9134 | WHONP199 | | *02:07 | *30:01 | - | - | - | - | - | - | - |
| 41 | 9055 | H0301 | | *03:01 | | - | - | - | - | - | - | - |
| 42 | 9066 | TAB089 | | *02:07 | | - | - | - | - | - | - | - |
| 43 | 9076 | T7526 | | *02:06 | *02:07 | - | - | - | - | - | - | - |
| 44 | 9057 | TEM | | *66:01 | | - | - | - | - | - | - | - |
| 45 | 9239 | SHJO | | *23:01 | *24:02 | - | - | - | - | - | - | - |
| 46 | 9013 | SCHU | | *03:01 | | - | - | - | - | - | - | - |
| 47 | 9045 | TUBO | | *02:16 | *03:01 | - | - | - | - | - | - | - |
| 48 | 9303 | TER-ND | | *02:01 | *11:01 | - | - | - | - | - | - | - |



0197

For *In Vitro* Diagnostic Use
MA123 v02 SSP PI Template
Date: July 2023, Rev. No: 00

101.701-24/06 – including *Taq* polymerase
101.701-24u/06u – without *Taq* polymerase

Visit www.caredx.com for
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Lot No.: **2S1**

Lot-specific information

¹The provided cell line HLA specificities are retrieved from the <http://www.ihwg.org/hla> web site. The specificity of an individual cell line may thus be subject to change.

²The specificity of each primer solution in the kit has been tested against 48 well characterized cell line DNAs and where applicable, additional cell line DNAs.

One or more 5'- and 3'-primers in primer solutions 4, 5, 7, 8, 12, 14 to 17 and 20 to 23 were tested by separately adding one or more 3'-primers, and one or more 5'-primers respectively.

One or more 5'-primers in primer solutions 1, 2, 9, 13 and 24 were tested by separately adding one or two 3'-primers. One or more 3'-primers in primer solutions 3, 6, 10 and 18 were tested by separately adding one or two 5'-primers. In primer solutions 2, 3, 9, 11, 12, 15, 16, 20 and 22 one or two 5'-primers were not possible to be tested, and in primer solutions 3, 6, 8 to 10, 12, 13, 16 and 18 one or two 3'-primers were not possible to be tested.



0197

For *In Vitro* Diagnostic Use
MA123 v02 SSP PI Template
Date: July 2023, Rev. No: 00

101.701-24/06 – including *Taq* polymerase
101.701-24u/06u – without *Taq* polymerase

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Lot No.: **2S1**

Lot-specific information

| CELL LINE VALIDATION SHEET | | | | | | | | | | | | | | | | | | | |
|---|-----------------------------------|-----------|------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| HLA-B low resolution SSP kit² | | | | | | | | | | | | | | | | | | | |
| | | | Prod. No.: | Well | | | | | | | | | | | | | | | |
| | | | | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 |
| | | | | 202354117 | 202354118 | 202354119 | 202354120 | 202354121 | 202354122 | 202354123 | 202354124 | 202354125 | 202354126 | 202354127 | 202354128 | 202354129 | 202354130 | 202354131 | 202354132 |
| | IHWC cell line¹ | B* | | | | | | | | | | | | | | | | | |
| 1 | 9001 SA | *07:02 | | - | - | - | - | - | - | - | + | - | - | - | + | - | - | - | - |
| 2 | 9280 LK707 | *52:01 | *73:01 | - | - | - | - | - | - | - | + | - | - | - | + | - | - | - | - |
| 3 | 9011 E4181324 | *52:01 | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 4 | 9275 GU373 | *15:10 | *53:01 | + | - | + | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 5 | 9009 KAS011 | *37:01 | | + | - | - | + | - | - | - | - | - | - | - | - | + | - | - | - |
| 6 | 9353 SM | *39:01 | *51:01 | - | - | - | - | + | - | + | + | - | - | - | - | - | + | - | - |
| 7 | 9020 QBL | *18:01 | | - | + | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 8 | 9025 DEU | *35:01 | | + | + | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 9 | 9026 YAR | *38:01 | | - | - | - | - | + | + | + | - | - | - | - | - | - | - | - | - |
| 10 | 9107 LKT3 | *54:01 | | - | - | - | - | - | - | - | - | - | - | - | + | - | - | - | + |
| 11 | 9051 PITOUT | *44:03 | | + | - | - | - | - | - | - | - | - | - | - | - | + | - | - | - |
| 12 | 9052 DBB | *57:01 | | + | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 13 | 9004 JESTHOM | *27:05 | | - | - | - | - | - | - | - | - | - | - | - | + | - | - | - | + |
| 14 | 9071 OLGA | *15:01 | *15:20 | + | - | + | - | - | - | - | - | - | + | - | - | - | - | - | - |
| 15 | 9075 DKB | *40:01 | | - | - | - | - | - | - | - | + | + | - | - | - | - | - | - | - |
| 16 | 9037 SWEIG007 | *40:02 | | - | - | - | - | - | - | - | - | - | + | - | - | - | - | - | - |
| 17 | 9282 CTM3953540 | *08:01 | *55:01 | - | - | - | - | - | - | - | + | - | - | + | + | - | - | - | + |
| 18 | 9257 32367 | *14:01 | *56:01 | - | - | - | - | - | - | + | + | - | - | + | - | - | - | - | + |
| 19 | 9038 BM16 | *18:01 | | - | + | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 20 | 9059 SLE005 | *40:01 | | - | - | - | - | - | - | - | + | + | - | - | - | - | - | - | - |
| 21 | 9064 AMALA | *15:01 | | - | - | + | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 22 | 9056 KOSE | *35:03 | | + | + | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 23 | 9124 IHL | *40:02 | *56:02 | - | - | - | - | - | - | - | - | - | + | - | + | - | - | - | + |
| 24 | 9035 JBUSH | *38:01 | | - | - | - | - | + | + | + | - | - | - | - | - | - | - | - | - |
| 25 | 9049 IBW9 | *14:02 | | - | - | - | - | - | - | + | + | - | - | - | - | - | - | - | - |
| 26 | 9285 WT49 | *58:01 | | + | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 27 | 9191 CH1007 | *07:05 | *51:01 | - | - | - | - | - | - | - | + | - | - | - | + | - | + | - | - |
| 28 | 9320 BEL5GB | *44:02 | *44:03 | + | - | - | - | - | - | - | - | - | - | - | - | + | - | - | - |
| 29 | 9050 MOU | *44:03 | | + | - | - | - | - | - | - | - | - | - | - | - | + | - | - | - |
| 30 | 9021 RSH | *42:01 | | - | - | - | - | - | - | - | + | - | - | + | + | - | - | - | - |
| 31 | 9019 DUCAF | *18:01 | | - | + | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 32 | 9297 HAG | *41:02 | | - | - | - | - | - | - | - | + | - | - | + | - | - | - | - | - |
| 33 | 9098 MT14B | *40:01 | | - | - | - | - | - | - | - | + | + | - | - | - | - | - | - | - |
| 34 | 9104 DHIF | *38:01 | | - | - | - | - | + | + | + | - | - | - | - | - | - | - | - | - |
| 35 | 9302 SSTO | *44:02 | | + | - | - | - | - | - | - | - | - | - | - | - | + | - | - | - |
| 36 | 9024 KT17 | *15:01 | *35:01 | + | + | + | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 37 | 9065 HHKB | *07:02 | | - | - | - | - | - | - | - | + | - | - | - | + | - | - | - | - |
| 38 | 9099 LZL | *15:01 | | - | - | + | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 39 | 9315 CML | *08:01 | *27:05 | - | - | - | - | - | - | - | + | - | - | + | + | - | - | - | + |
| 40 | 9134 WHONP199 | *13:02 | *46:01 | - | - | - | - | - | - | - | - | - | - | - | + | - | - | - | + |
| 41 | 9055 H0301 | *14:02 | | - | - | - | - | - | - | + | + | - | - | - | - | - | - | - | - |
| 42 | 9066 TAB089 | *46:01 | | - | - | - | - | - | - | - | - | - | - | - | + | - | - | + | - |
| 43 | 9076 T7526 | *46:01 | | - | - | - | - | - | - | - | - | - | - | - | + | - | - | + | - |
| 44 | 9057 TEM | *38:01 | | - | - | - | - | + | + | + | - | - | - | - | - | - | - | - | - |
| 45 | 9239 SHJO | *42:01 | *50:01 | - | - | - | - | - | - | - | + | - | - | + | + | - | - | - | - |
| 46 | 9013 SCHU | *07:02 | | - | - | - | - | - | - | - | + | - | - | - | + | - | - | - | - |
| 47 | 9045 TUBO | *51:01 | | - | - | - | - | - | - | - | - | - | - | - | - | - | + | - | - |
| 48 | 9303 TER-ND | *35:01 | *44:03 | + | + | - | - | - | - | - | - | - | - | - | - | + | - | - | - |



0197

For *In Vitro* Diagnostic Use
MA123 v02 SSP PI Template
Date: July 2023, Rev. No: 00

101.701-24/06 – including *Taq* polymerase
101.701-24u/06u – without *Taq* polymerase

Visit www.caredx.com for
“Instructions for Use” (IFU)

Lot No.: **2S1**

Lot-specific information

| CELL LINE VALIDATION SHEET | | | | | | | | | | | | | | | | | | | |
|---|-----------------------------|--------|------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| HLA-B low resolution SSP kit ² | | | | | | | | | | | | | | | | | | | |
| | | | Prod. No.: | Well | | | | | | | | | | | | | | | |
| | | | | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 |
| | | | | 202354133 | 202354134 | 202354135 | 202354136 | 202354137 | 202354138 | 202354139 | 202354140 | 202354141 | 202354142 | 202354143 | 202354144 | 202354145 | 202354146 | 202354147 | 202354148 |
| | IHWC cell line ¹ | B* | | | | | | | | | | | | | | | | | |
| 1 | 9001 SA | *07:02 | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 2 | 9280 LK707 | *52:01 | *73:01 | - | + | + | + | - | + | - | - | - | - | - | - | + | + | + | - |
| 3 | 9011 E4181324 | *52:01 | | - | + | + | + | - | + | - | - | - | - | - | - | - | + | - | - |
| 4 | 9275 GU373 | *15:10 | *53:01 | - | - | - | + | - | - | - | - | - | - | - | + | - | + | + | - |
| 5 | 9009 KAS011 | *37:01 | | - | - | - | - | - | + | - | - | - | - | - | - | - | + | - | - |
| 6 | 9353 SM | *39:01 | *51:01 | - | - | + | + | - | - | - | - | - | - | - | + | - | + | + | - |
| 7 | 9020 QBL | *18:01 | | - | - | - | - | - | - | - | - | - | - | - | + | - | - | + | - |
| 8 | 9025 DEU | *35:01 | | - | - | - | - | - | - | - | - | - | - | - | + | - | - | + | - |
| 9 | 9026 YAR | *38:01 | | - | - | - | - | - | - | - | - | - | - | - | - | - | + | - | - |
| 10 | 9107 LKT3 | *54:01 | | - | - | - | - | - | - | + | + | - | - | - | - | - | - | + | - |
| 11 | 9051 PITOUT | *44:03 | | - | - | - | - | - | + | - | - | - | - | - | - | - | + | - | - |
| 12 | 9052 DBB | *57:01 | | - | - | - | + | - | - | - | - | - | + | - | - | - | + | - | - |
| 13 | 9004 JESTHOM | *27:05 | | - | - | - | - | - | + | - | - | - | - | - | - | - | + | - | - |
| 14 | 9071 OLGA | *15:01 | *15:20 | - | - | - | - | - | + | - | - | - | - | - | - | + | - | + | - |
| 15 | 9075 DKB | *40:01 | | - | - | - | - | + | + | - | - | - | - | - | - | - | - | + | - |
| 16 | 9037 SWEIG007 | *40:02 | | - | - | - | - | + | + | - | - | - | - | - | - | - | - | + | - |
| 17 | 9282 CTM3953540 | *08:01 | *55:01 | - | - | + | - | - | - | - | + | - | - | - | - | - | - | + | + |
| 18 | 9257 32367 | *14:01 | *56:01 | - | - | - | - | - | - | - | - | + | - | - | - | - | - | + | - |
| 19 | 9038 BM16 | *18:01 | | - | - | - | - | - | - | - | - | - | - | + | - | - | + | - | - |
| 20 | 9059 SLE005 | *40:01 | | - | - | - | - | + | + | - | - | - | - | - | - | - | - | + | - |
| 21 | 9064 AMALA | *15:01 | | - | - | - | - | - | + | - | - | - | - | - | - | + | - | + | - |
| 22 | 9056 KOSE | *35:03 | | - | - | - | - | - | - | - | - | - | - | - | + | - | - | + | - |
| 23 | 9124 IHL | *40:02 | *56:02 | - | - | - | - | + | + | - | - | + | - | + | - | - | - | + | - |
| 24 | 9035 JBUSH | *38:01 | | - | - | - | - | - | - | - | - | - | - | - | - | - | + | - | - |
| 25 | 9049 IBW9 | *14:02 | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | + | - |
| 26 | 9285 WT49 | *58:01 | | - | - | - | + | - | - | - | - | - | + | - | - | - | + | - | - |
| 27 | 9191 CH1007 | *07:05 | *51:01 | - | - | + | + | - | - | - | - | - | - | - | + | - | + | + | + |
| 28 | 9320 BEL5GB | *44:02 | *44:03 | - | - | - | - | - | + | + | - | - | - | - | - | - | + | - | - |
| 29 | 9050 MOU | *44:03 | | - | - | - | - | - | + | - | - | - | - | - | - | - | + | - | - |
| 30 | 9021 RSH | *42:01 | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | + | + |
| 31 | 9019 DUCAF | *18:01 | | - | - | - | - | - | - | - | - | - | - | - | + | - | - | + | - |
| 32 | 9297 HAG | *41:02 | | - | - | - | + | + | - | - | - | - | - | - | - | - | - | + | + |
| 33 | 9098 MT14B | *40:01 | | - | - | - | - | + | + | - | - | - | - | - | - | - | - | + | - |
| 34 | 9104 DHIF | *38:01 | | - | - | - | - | - | - | - | - | - | - | - | - | - | + | - | - |
| 35 | 9302 SSTO | *44:02 | | - | - | - | - | - | + | + | - | - | - | - | - | - | + | - | - |
| 36 | 9024 KT17 | *15:01 | *35:01 | - | - | - | - | - | + | - | - | - | - | - | + | + | - | + | - |
| 37 | 9065 HHKB | *07:02 | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | + | + |
| 38 | 9099 LZL | *15:01 | | - | - | - | - | - | + | - | - | - | - | - | - | + | - | + | - |
| 39 | 9315 CML | *08:01 | *27:05 | - | - | - | - | - | + | - | - | - | - | - | - | - | + | + | + |
| 40 | 9134 WHONP199 | *13:02 | *46:01 | - | - | - | - | - | + | - | - | - | - | - | - | + | + | + | - |
| 41 | 9055 H0301 | *14:02 | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | + | - |
| 42 | 9066 TAB089 | *46:01 | | - | - | - | - | - | - | - | - | - | - | - | - | + | - | + | - |
| 43 | 9076 T7526 | *46:01 | | - | - | - | - | - | - | - | - | - | - | - | - | + | - | + | - |
| 44 | 9057 TEM | *38:01 | | - | - | - | - | - | - | - | - | - | - | - | - | - | + | - | - |
| 45 | 9239 SHJO | *42:01 | *50:01 | - | - | + | - | + | + | - | - | + | - | - | - | - | + | + | + |
| 46 | 9013 SCHU | *07:02 | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | + | + |
| 47 | 9045 TUBO | *51:01 | | - | - | + | + | - | - | - | - | - | - | - | + | - | + | - | - |
| 48 | 9303 TER-ND | *35:01 | *44:03 | - | - | - | - | - | + | - | - | - | - | - | + | - | + | + | - |



0197

For *In Vitro* Diagnostic Use
MA123 v02 SSP PI Template
Date: July 2023, Rev. No: 00

101.701-24/06 – including *Taq* polymerase
101.701-24u/06u – without *Taq* polymerase

Visit www.caredx.com for
“Instructions for Use” (IFU)

Lot No.: **2S1**

Lot-specific information

¹The provided cell line HLA specificities are retrieved from the <http://www.ihwg.org/hla> web site. The specificity of an individual cell line may thus be subject to change.

²The specificity of each primer solution in the kit has been tested against 48 well characterized cell line DNAs and where applicable, additional cell line DNAs.

One or more 5'-primers and 3'-primers in primer solutions 27, 30, 35, 38, 43, 53, 55 and 64 to 66 were tested by separately adding one or two additional 3'-primers, and one or two additional 5'-primers respectively.

One or more 5'-primers in primer solutions 25, 45, 49, 50, 67 and 72 were tested by separately adding one or two additional 3'-primers. One or more 3'-primers in primer solutions 26, 28, 32, 37, 39, 42, 58 and 60 were tested by separately adding one, two or three additional 5'-primers.

In primer mixes 35, 41, 45, 55, 66 and 67 one or two 5'-primers were not possible to be tested, and in primer mixes 27, 46, 51, 53, 62, 63, 66 and 70 one or two 3'-primers were not possible to be tested.



0197

For *In Vitro* Diagnostic Use
MA123 v02 SSP PI Template
Date: July 2023, Rev. No: 00

101.701-24/06 – including *Taq* polymerase
101.701-24u/06u – without *Taq* polymerase

Visit www.caredx.com for
“Instructions for Use” (IFU)

Lot No.: **2S1**

Lot-specific information

| CELL LINE VALIDATION SHEET | | | | | | | | | | | | | | | | | | | | |
|---|-----------------|--------|--------|------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| DR low resolution primer set ² | | | | | | | | | | | | | | | | | | | | |
| | | | | Well | | | | | | | | | | | | | | | | |
| | | | | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | |
| | | | | Prod. No.: | 202243801 | 202243802 | 202243803 | 202243804 | 202243805 | 202243806 | 202243807 | 202243808 | 202135509 | 202243810 | 202243811 | 202243812 | 202243813 | 202243814 | 202243815 | 202243816 |
| IHCW cell line ¹ | | DRB1 | | | | | | | | | | | | | | | | | | |
| 1 | 9001 SA | *01:01 | | + | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| 2 | 9280 LK707 | *15:02 | *04:05 | - | - | + | - | - | - | - | - | + | - | - | - | - | - | - | - | |
| 3 | 9011 E4181324 | *15:02 | | - | - | + | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| 4 | 9275 GU373 | *03:01 | | - | - | - | - | + | + | - | - | - | - | - | - | - | - | - | - | |
| 5 | 9009 KAS011 | *16:01 | | - | - | - | + | - | - | - | - | - | - | - | - | - | - | - | - | |
| 6 | 9353 SM | *04:07 | *08:03 | - | - | - | - | - | - | - | - | + | - | + | - | - | - | - | - | |
| 7 | 9020 QBL | *03:01 | | - | - | - | - | + | + | - | - | - | - | - | - | - | - | - | - | |
| 8 | 9025 DEU | *04:01 | | - | - | - | - | - | - | - | - | + | - | - | - | - | - | - | - | |
| 9 | 9026 YAR | *04:02 | | - | - | - | - | - | - | - | - | + | - | - | - | - | - | - | - | |
| 10 | 9107 LKT3 | *04:05 | | - | - | - | - | - | - | - | - | + | - | - | - | - | - | - | - | |
| 11 | 9051 PITOUT | *07:01 | | - | - | - | - | - | - | - | - | - | + | - | - | - | - | - | - | |
| 12 | 9052 DBB | *07:01 | | - | - | - | - | - | - | - | - | - | + | - | - | - | - | - | - | |
| 13 | 9004 JESTHOM | *01:01 | | + | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| 14 | 9071 OLGA | *08:02 | | - | - | - | - | - | - | - | - | - | - | + | - | - | - | - | + | |
| 15 | 9075 DKB | *09:01 | | - | - | - | - | - | - | - | - | - | - | - | + | - | - | - | - | |
| 16 | 9037 SWEIG007 | *11:01 | | - | - | - | - | - | - | - | - | - | - | - | - | + | - | + | + | |
| 17 | 9282 CTM3953540 | *03:01 | *13:01 | - | - | - | - | + | + | - | - | - | - | - | - | - | - | + | + | |
| 18 | 9257 32367 | *09:01 | *11:01 | - | - | - | - | - | - | - | - | - | - | - | + | - | + | + | + | |
| 19 | 9038 BM16 | *12:01 | | - | - | - | - | - | - | - | - | - | - | - | - | - | + | - | - | |
| 20 | 9059 SLE005 | *13:02 | | - | - | - | - | - | + | - | - | - | - | - | - | - | - | + | + | |
| 21 | 9064 AMALA | *14:02 | | - | - | - | - | - | - | - | + | - | - | - | - | - | - | - | - | |
| 22 | 9056 KOSE | *13:02 | *14:54 | - | - | - | - | - | + | - | - | - | - | - | - | - | - | + | + | |
| 23 | 9124 IHL | *08:03 | *14:14 | - | - | - | - | - | - | - | - | - | - | + | - | - | - | - | - | |
| 24 | 9035 JBUSH | *11:01 | | - | - | - | - | - | - | - | - | - | - | - | - | + | - | + | + | |
| 25 | 9049 IBW9 | *07:01 | | - | - | - | - | - | - | - | - | - | + | - | - | - | - | - | - | |
| 26 | 9285 WT49 | *03:01 | | - | - | - | + | + | - | - | - | - | - | - | - | - | - | - | - | |
| 27 | 9191 CH1007 | *04:05 | *10:01 | - | - | - | - | - | - | - | - | + | - | - | - | + | - | - | - | |
| 28 | 9320 BEL5GB | *04:16 | *07:01 | - | - | - | - | - | - | - | - | + | + | - | - | - | - | - | - | |
| 29 | 9050 MOU | *07:01 | | - | - | - | - | - | - | - | - | - | + | - | - | - | - | - | - | |
| 30 | 9021 RSH | *03:02 | | - | - | - | - | + | - | + | - | - | - | - | - | - | - | - | - | |
| 31 | 9019 DUCAF | *03:01 | | - | - | - | - | + | + | - | - | - | - | - | - | - | - | - | - | |
| 32 | 9297 HAG | *13:03 | | - | - | - | - | - | + | - | - | - | - | - | - | - | - | + | - | |
| 33 | 9098 MT14B | *04:04 | | - | - | - | - | - | - | - | + | - | - | - | - | - | - | - | - | |
| 34 | 9104 DHIF | *11:01 | | - | - | - | - | - | - | - | - | - | - | - | - | + | - | + | + | |
| 35 | 9302 SSTO | *04:03 | | - | - | - | - | - | - | - | - | + | - | - | - | - | - | - | - | |
| 36 | 9024 KT17 | *04:03 | *04:06 | - | - | - | - | - | - | - | - | + | - | - | - | - | - | - | - | |
| 37 | 9065 HHKB | *13:01 | | - | - | - | - | - | + | - | - | - | - | - | - | - | - | + | + | |
| 38 | 9099 LZL | *14:02 | | - | - | - | - | - | - | + | - | - | - | - | - | - | - | - | - | |
| 39 | 9315 CML | *03:01 | *04:01 | - | - | - | - | + | + | - | + | - | - | - | - | - | - | - | - | |
| 40 | 9134 WHONP199 | *07:01 | *09:01 | - | - | - | - | - | - | - | - | - | + | - | + | - | - | - | - | |
| 41 | 9055 H0301 | *13:02 | | - | - | - | - | - | + | - | - | - | - | - | - | - | - | + | + | |
| 42 | 9066 TAB089 | *08:03 | | - | - | - | - | - | - | - | - | - | - | + | - | - | - | - | - | |
| 43 | 9076 T7526 | *09:01 | | - | - | - | - | - | - | - | - | - | - | - | + | - | - | - | - | |
| 44 | 9057 TEM | *14:01 | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| 45 | 9239 SHJO | *07:01 | | - | - | - | - | - | - | - | - | - | + | - | - | - | - | - | - | |
| 46 | 9013 SCHU | *15:01 | | - | - | + | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| 47 | 9045 TUBO | *11:04 | *12:01 | - | - | - | - | - | - | - | - | - | - | - | - | - | + | + | + | |
| 48 | 9303 TER-ND | *01:03 | | - | + | - | - | - | - | - | - | - | - | - | - | - | - | - | - | |



0197

101.701-24/06 – including *Taq* polymerase
101.701-24u/06u – without *Taq* polymerase

Visit www.caredx.com for
“Instructions for Use” (IFU)

Lot No.: **2S1**

Lot-specific information

| CELL LINE VALIDATION SHEET | | | | | | | | | | | |
|---|-----------------|--------|--------|-------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| DR low resolution primer set ² | | | | | | | | | | | |
| | | | | Well ³ | | | | | | | |
| | | | | 89 | 90 | 91 | 92 | 93 | 94 | 95 | |
| | | | | Prod. No.: | 202128517 | 202243818 | 202243819 | 202243820 | 202348129 | 202243830 | 202243831 |
| IHCW cell line ¹ | | DRB1 | | | | | | | | | |
| 1 | 9001 SA | *01:01 | | - | - | - | - | - | - | - | - |
| 2 | 9280 LK707 | *15:02 | *04:05 | - | - | - | - | - | - | + | + |
| 3 | 9011 E4181324 | *15:02 | | - | - | - | - | - | - | - | + |
| 4 | 9275 GU373 | *03:01 | | + | - | - | - | + | - | - | - |
| 5 | 9009 KAS011 | *16:01 | | - | - | - | - | - | - | - | + |
| 6 | 9353 SM | *04:07 | *08:03 | - | - | - | - | - | - | + | - |
| 7 | 9020 QBL | *03:01 | | + | - | - | - | + | - | - | - |
| 8 | 9025 DEU | *04:01 | | - | - | - | - | - | - | + | - |
| 9 | 9026 YAR | *04:02 | | - | - | - | - | - | - | + | - |
| 10 | 9107 LKT3 | *04:05 | | - | - | - | - | - | - | + | - |
| 11 | 9051 PITOUT | *07:01 | | - | - | - | - | - | - | + | - |
| 12 | 9052 DBB | *07:01 | | - | + | - | - | - | - | + | - |
| 13 | 9004 JESTHOM | *01:01 | | - | - | - | - | - | - | - | - |
| 14 | 9071 OLGA | *08:02 | | - | - | - | - | - | - | - | - |
| 15 | 9075 DKB | *09:01 | | - | - | + | - | - | + | - | - |
| 16 | 9037 SWEIG007 | *11:01 | | - | - | - | - | + | - | - | - |
| 17 | 9282 CTM3953540 | *03:01 | *13:01 | + | - | - | - | + | - | - | - |
| 18 | 9257 32367 | *09:01 | *11:01 | - | - | + | - | + | + | - | - |
| 19 | 9038 BM16 | *12:01 | | - | - | - | - | + | - | - | - |
| 20 | 9059 SLE005 | *13:02 | | + | - | - | - | + | - | - | - |
| 21 | 9064 AMALA | *14:02 | | + | - | + | - | + | - | - | - |
| 22 | 9056 KOSE | *13:02 | *14:54 | + | + | + | + | + | - | - | - |
| 23 | 9124 IHL | *08:03 | *14:14 | + | - | + | + | + | - | - | - |
| 24 | 9035 JBUSH | *11:01 | | - | - | - | - | + | - | - | - |
| 25 | 9049 IBW9 | *07:01 | | - | - | - | - | - | + | - | - |
| 26 | 9285 WT49 | *03:01 | | + | - | - | - | + | - | - | - |
| 27 | 9191 CH1007 | *04:05 | *10:01 | - | - | - | - | - | - | + | - |
| 28 | 9320 BEL5GB | *04:16 | *07:01 | - | - | - | - | - | - | + | - |
| 29 | 9050 MOU | *07:01 | | - | - | - | - | - | - | + | - |
| 30 | 9021 RSH | *03:02 | | + | - | - | - | + | - | - | - |
| 31 | 9019 DUCAF | *03:01 | | + | - | - | - | + | - | - | - |
| 32 | 9297 HAG | *13:03 | | + | - | - | - | + | - | - | - |
| 33 | 9098 MT14B | *04:04 | | - | - | - | - | - | + | - | - |
| 34 | 9104 DHIF | *11:01 | | - | - | - | - | + | - | - | - |
| 35 | 9302 SSTO | *04:03 | | - | - | - | - | - | - | + | - |
| 36 | 9024 KT17 | *04:03 | *04:06 | - | - | - | - | - | - | + | - |
| 37 | 9065 HHKB | *13:01 | | + | - | - | - | + | - | - | - |
| 38 | 9099 LZL | *14:02 | | + | - | + | - | + | - | - | - |
| 39 | 9315 CML | *03:01 | *04:01 | + | - | - | - | + | + | - | - |
| 40 | 9134 WHONP199 | *07:01 | *09:01 | - | - | + | - | - | + | - | - |
| 41 | 9055 H0301 | *13:02 | | + | - | - | - | + | - | - | - |
| 42 | 9066 TAB089 | *08:03 | | - | - | - | - | - | - | - | - |
| 43 | 9076 T7526 | *09:01 | | - | - | + | - | - | + | - | - |
| 44 | 9057 TEM | *14:01 | | + | + | + | + | + | - | - | - |
| 45 | 9239 SHJO | *07:01 | | - | - | - | - | - | - | + | - |
| 46 | 9013 SCHU | *15:01 | | - | - | - | - | - | - | - | + |
| 47 | 9045 TUBO | *11:04 | *12:01 | - | - | - | - | + | - | - | - |
| 48 | 9303 TER-ND | *01:03 | | - | - | - | - | - | - | - | - |



0197

For *In Vitro* Diagnostic Use
MA123 v02 SSP PI Template
Date: July 2023, Rev. No: 00

101.701-24/06 – including *Taq* polymerase
101.701-24u/06u – without *Taq* polymerase

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Lot No.: **2S1**

Lot-specific information

¹The provided cell line HLA specificities are retrieved from the <http://www.ihwg.org/hla> web site. The specificity of an individual cell line may thus be subject to change.

²The specificity of each primer solution in the kit has been tested against 48 well characterized cell line DNAs and where applicable, additional cell line DNAs.

³The DRB4*01:03:01:02N allele is amplified by primer mix 90 in the 9052 (DBB) cell line. One or more 5'- and 3'-primers in primer solutions 81, 83, 87 and 90 were tested by separately adding one 3'-primer, and one or three 5'-primers respectively.

One or more 5'-primers in primer solutions 76, 78, 84 and 88 were tested by separately adding one 3'-primer. One or more 3'-primers in primer solutions 73 to 75, 77, 92, 93 and 95 were tested by separately adding one or more 5'-primers.

One or more 5'-primers in primer solutions 73, 75, 76, 80 to 82, 85 to 89, 91, 92 and 94 were not possible to be tested. One or more 3'-primers in primer solutions 73 to 78, 81, 85, 87, 94 and 95 were not possible to be tested.



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For *In Vitro* Diagnostic Use
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101.701-24/06 – including *Taq* polymerase
101.701-24u/06u – without *Taq* polymerase

Visit www.caredx.com for
“Instructions for Use” (IFU)

Lot No.: **2S1**

Lot-specific information

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Tel: +46-8-508 939 00

Fax: +46-8-717 88 18

E-mail: orders-se@caredx.com

Web page: www.caredx.com

CareDx Lab Solutions Inc., 901 S. Bolmar St., Suite R, West Chester, PA 19382

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For information on CareDx distributors worldwide, contact **CareDx AB**.



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For *In Vitro* Diagnostic Use

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