

101.702-24/06 – including *Taq* polymerase
101.702-24u/06u – without *Taq* polymerase

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

Lot No.: **2V7**

Lot-specific information

Olerup SSP® HLA-A-B-C SSP Combi Tray

Product number: 101.702-24/06 – including *Taq* pol.
101.702-24u/06u – without *Taq* pol.
Lot number: 2V7
Expiry date: 2029-04-01
Number of tests: 24 tests – Product No. 101.702-24/24u
6 tests – Product No. 101.702-06/06u
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. 2V7.

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-C SSP COMBI TRAY LOT (1V3)

The **HLA-A low resolution** primer set, specificity and interpretation tables have been updated for the HLA-A alleles described since the previous *Olerup* SSP® HLA-A-B-C SSP Combi Tray lot was made (**Lot No. 1V3**). The kit design is based on IMGT/HLA database 3.59.0.

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

Well	5'-primer	3'-primer	rationale
17	Modified	-	5'-primer modified for improved HLA-specific amplification.

The **HLA-B low resolution** primer set, specificity and interpretation tables have been updated for the HLA-B alleles described since the previous *Olerup* SSP® HLA-A-B-C SSP Combi Tray lot was made (**Lot No. 1V3**). The kit design is based on IMGT/HLA database 3.59.0.

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



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The **HLA-C low resolution** primer set, specificity and interpretation tables have been updated for the HLA-C alleles described since the previous *Olerup* SSP® HLA-A-B-C SSP Combi Tray lot was made (**Lot No. 1V3**). The kit design is based on IMGT/HLA database 3.59.0.

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



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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'-CAC3'	5'-Agg3'	5'-TTA3'	5'-Tgg3'	5'-Tgg3'	5'-Tgg3'	5'-TAC3'
							36
							5'-TAT3'
3'-primer²	231	2nd I	507	59	58	57	47
	5'-TgC3'	5'-AAA3'	5'-TTg3'	5'-CTC3'	5'-ggC3'	5'-CTC3'	5'-ACA3'
							48
							5'-gCA3'
							48
							5'-gCC3'
							52
							5'-TgT3'
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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PRODUCT DESCRIPTION

HLA-A-B-C SSP Combi Tray

CONTENT

The primer set contains 5'- and 3'-primers for grouping the HLA-A*01:01 to A*80:10 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 HLA-C*01:02 to C*18:22 alleles into the groups C*01:xx to C*18:xx.

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-C' in silver/gray ink.

Well No. 1 is marked with the Lot No. '2V7'.

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

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

Wells 73 to 95 – HLA-C 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-C alleles will be amplified by the 23 wells of the HLA-C low resolution primer set, **wells 73 to 95**, except that a few HLA-A and HLA-B alleles will be amplified by some primer mixes.

For further details see Specificity Table.

UNIQUELY IDENTIFIED ALLELES

HLA-A

All alleles, i.e. **A*01:01 to A*80:10**, recognized by the HLA Nomenclature Committee in January 2025^{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 specificities^{3,4}.

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

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*23:14:01-23:14:02, 23:104-23:105, 23:141, A*24:24, 24:71, 24:315, 24:392, 24:527, 24:569
A*01:28, 01:229, 01:299, A*11:282	A*23:66, 23:99, 23:128, 23:137, 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, 24:610, B*51:421, B*53:72, C*04:01:03
A*01:43, A*11:271	A*25:78, A*26:57, A*66:15
A*01:427, A*36:02	A*26:92, A*66:42
A*01:464, A*36:04	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, 30:187-30:237, B*07:260, C*12:328
A*03:215, 03:225, 03:249, 03:322, 03:414, 03:468, A*25:77, 25:89	A*31:08, A*33:53
A*11:11, A*34:19	A*31:109, A*33:125, 33:131, 33:249
A*11:116, 11:140, 11:199:01-11:199:02, 11:222, A*66:23	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*11:325, A*24:555	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, A*66:40
A*23:11N, A*31:29	A*34:34, A*66:02:01:01-66:03:01:03, 66:16, 66:21, 66:25-66:26Q, 66:28N, 66:34, 66:39N, 66:43, 66:48

HLA-B

All alleles, i.e. **B*07:02 to B*83:01**, recognized by the HLA Nomenclature Committee in January 2025^{1,2} will be amplified by the primers in the HLA-B low resolution primer set, **wells 25 to 72**. The HLA-B alleles will be grouped into the groups B*07:xx to B*83:xx. Most HLA-B alleles will also be grouped according to their serological specificities³.

Notes on Bw assignment

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



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	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

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

B*07:04:01-07:04:02, 07:25, 07:146, A*42:39	B*40:496, B*41:62
B*07:209, B*81:11	B*53:30, B*58:111
B*07:349, B*42:05:01-42:05:02	B*53:39, B*57:128, B*58:100
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, 08:324, B*42:01:07, 42:07, 42:24, 42:26	B*54:49N, B*55:01:07, 55:02:01:01-55:02:10, 55:02:12-55:02:16, 55:07, 55:10, 55:12-55:13, 55:16, 55:19, 55:26-55:27, 55:30, 55:35, 55:37, 55:39, 55:41-55:43, 55:46-55:48, 55:50, 55:57, 55:61-55:63, 55:65, 55:67, 55:69-55:72, 55:77, 55:80-55:83N, 55:88-55:89N, 55:96, 55:107, 55:112, 55:117N, 55:120, 55:128-55:129, 55:131-55:133, 55:137-55:138, 55:140, 55:142
B*13:35, 13:59, 13:71, 13:108, 13:140, B*44:135, 44:158, 44:184	B*55:04, 55:08, 55:49, 55:86, B*56:01:05, 56:01:13, 56:15, 56:19N, 56:22, 56:88, 56:99
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*57:01:23, 57:01:45, 57:36, 57:89, 57:109, B*58:154
B*15:712, B*58:01:03, 58:01:16, 58:16:01-58:16:02, 58:26, 58:46, 58:61, 58:121-58:122, 58:127	B*57:67:01, B*58:36
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, 35:611	

HLA-C

All the HLA-C alleles, i.e. **C*01:02 to C*18:22**, recognized by the HLA Nomenclature Committee in January 2025^{1,2} will be amplified by the primers in the HLA-C low resolution primer set, **wells 73 to 95**. The HLA-C alleles will be grouped into the C*01:xx to C*18:xx groups³.

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



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C*01:125, 01:218, C*14:58	C*12:02:29, 12:49, 12:123, 12:381, B*18:01:42, B*57:01:24
C*01:169:02, C*03:94:01-03:94:02	C*12:03:34:01-12:03:34:02, B*15:510, B*35:475
C*03:16, 03:536:01-03:536:02, B*46:77	C*14:06, 14:08-14:09, 14:28:01-14:28:02, 14:63, 14:105Q, 14:150, 14:163, A*29:86, A*30:62, A*31:187, A*33:63, B*07:499, B*08:249, 08:306, B*18:64, B*35:183, 35:252, 35:502, B*39:114, 39:140, B*40:138, B*41:59
C*05:206, C*17:05	C*14:110, 14:147, B*07:239, B*14:03, B*14:112, B*14:138
C*12:02:14-12:02:15, 12:02:19, 12:02:30, 12:02:32, 12:02:34, 12:02:37, 12:02:40, 12:02:50, 12:18:02, 12:85:02, 12:222, 12:224, B*67:02:01-67:02:01:02	

¹HLA-A, HLA-B and HLA-C alleles listed on the IMGT/HLA web page 2025-January-15, release 3.59.0, 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 A*31:234 allele.



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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 ^{4,5}
1⁵	120 bp, 145 bp, 225 bp	800 bp	1, 36	*01:01:01:01-01:04:01:02N, 01:06-01:33, 01:35-01:478, 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, 36:01:01:01-36:15
2	135 bp, 175 bp, 215 bp, 255 bp, 365 bp, 415 bp	800 bp	2, 203, 210, 19, 28,	*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, 02:830:01-02:1206, 03:89:01, 30:13, 30:16, 30:22, 30:44, 30:46, B*15:01:83^w , B*35:01:60^w , B*58:01:24^w
3^{6, 12}	205 bp, 235 bp	1070 bp	1, 3, 11, 31, 32, 34, 36	*01:12, 01:19, 01:21, 01:126, 01:200, 01:244, 01:360, 01:427, 01:466, 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, 03:415-03:467, 03:469-03:504N, 11:03:01:01-11:03:01:02, 11:20, 11:25:01-11:25:03, 11:60, 11:130, 11:158, 11:175, 11:209, 11:348, 11:366:01-11:366:02, 11:381, 11:478, 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, 34:32-34:33, 36:02, 68:103:01-68:103:02, 74:23
4	190 bp	800 bp	1, 3, 11, 30, 36, 68	*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, 01:01:80-01:01:156, 01:01:158-01:04:01:02N, 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, 01:428-01:438, 01:440-01:465, 01:467-01:478, 02:78, 02:169,



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				02:829, 03:12, 03:18, 03:88, 03:135, 03:485, 11:01:01:01-11:27, 11:29-11:52Q, 11:54:01-11:486, 24:555, 25:43, 25:59, 26:19, 26:72, 26:184, 26:204:01:01-26:204:01:02, 29:67:01, 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*12:131
5	160 bp, 335 bp, 505 bp	1070 bp	3, 9, 23, 24, 2403, 29, 31, 32	*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, 23:114-23:149, 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, 24:472-24:648, 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*51:421, B*53:72, C*04:01:03
6^{7,9}	135 bp, 200 bp	800 bp	9, 23, 24, 29, 80	*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, 23:129-23:136, 23:138-23:149, 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, 80:01:01:01-80:10, B*18:27
7¹²	175 bp, 205 bp	1070 bp	2, 3, 9, 23, 24, 2403, 26	*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, 23:141, 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, 24:575-24:609, 24:611-24:648, 26:16, 30:163, 33:19, 33:119, 33:243, 68:45, 68:117, 68:322
8	165 bp, 200 bp	800 bp	2, 3, 10, 11, 25, 26, 28, 32, 34, 66, 68, 69	*01:51, 01:344, 01:381, 02:55, 02:527, 02:582, 02:644, 02:741, 02:815, 03:24, 03:50, 03:475, 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, 25:84-25:88, 25:90-25:94, 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, 26:208-26:253, 29:28, 29:176, 29:185, 32:15, 33:51, 34:01:01:01-34:18, 34:20-34:34, 66:01:01:01-66:22, 66:24-66:41, 66:43-66:49, 68:01:01:01-68:177, 68:179-68:249, 68:251N-68:326, 69:01:01:01-69:09
9^{5,8,9}	80 bp	800 bp	2, 3, 25, 32	*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, 25:83-25:88, 25:90-25:94, 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, 32:108-32:191Q,



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10^{5,9}	80 bp, 200 bp, 240 bp	800 bp	10, 26, 43	*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, 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-26:253, 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	1, 9, 10, 11, 26, 34, 66	*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-11:486, 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-34:33, 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, 66:49, 68:271, 69:02, 74:30, 80:02
12⁵	125 bp, 160 bp, 190 bp	800 bp	3, 10, 25, 26, 31, 34, 43, 66	*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, 26:251Q, 31:03-31:04:02, 31:123, 34:01:01:01-34:02:07, 34:03-34:34, 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, 66:48, 68:130:01, 68:294, 74:01:03
13⁹	180 bp, 225 bp	1070 bp	1, 2, 3, 10, 25, 26, 34, 43, 66	*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, 02:1171, 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, 03:09-03:11:02N, 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, 03:430-03:462, 03:464Q-03:478, 03:480-03:497, 03:499-03:504N, 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, 25:66-25:94, 26:01:01:01-26:01:86, 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-26:250:01:02, 26:252N-26:253, 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,



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14^{5,9}	80 bp, 115 bp, 200 bp, 240 bp, 460 bp	1070 bp	3, 26, 29, 31, 34, 36, 68	*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, 29:01:01:01-29:200N, 31:03-31:04:02, 31:123, 32:42, 34:04, 36:02, 66:09, 68:19, 68:130:02
15^{5,11,12}	90 bp, 135 bp, 205 bp	1070 bp	1, 30	*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- 30:237, 31:35, B*07:260, C*12:328
16	145 bp, 165 bp, 240 bp, 380 bp, 410 bp	1070 bp	24, 31, 32	*02:237, 02:809, 02:927, 03:95, 03:343, 11:306, 11:440, 23:11N, 24:586N, 24:646, 29:14, 29:172, 31:01:02:01-31:233, 31:235, 32:05, 32:79, 32:128, 33:53, 33:125, 33:131, 33:249, 74:13, 74:44
17¹²	140 bp, 180 bp, 240 bp, 260 bp	1070 bp	1, 3, 25, 32, 74	*01:07, 01:95, 01:289, 01:298, 03:32, 03:43, 03:82, 03:152, 03:186, 03:219, 03:273, 03:429, 03:479, 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- 32:191Q, 74:07, 74:33, 74:48, 80:04, B*15:642
18	200 bp, 390 bp	1070 bp	24, 31, 32, 33, 68, 74	*02:243:01-02:243:03, 02:929, 24:82, 24:646, 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- 33:01:22, 33:03:01:01-33:37, 33:39-33:276, 68:29, 68:250, 74:04, 74:21, 74:43
19	370 bp	800 bp	2, 19, 68, 74	*01:121, 02:65, 02:407, 02:449, 02:932, 03:246, 03:282, 11:07:02, 11:372, 68:25, 68:262, 74:01:01:01-74:52
20^{9,12}	210 bp, 240 bp	800 bp	2, 25, 28, 68	*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, 02:1171, 11:199:03, 25:05, 25:59, 25:88, 26:54, 26:122, 26:229, 68:01:01:01-68:01:66, 68:01:68- 68:217, 68:219-68:257, 68:259-68:326
21⁵	65 bp, 240 bp, 375 bp, 545 bp	800 bp	2, 23, 24, 26, 28, 32, 66, 68, 69	*02:55, 02:149:01-02:149:02, 02:243:01-02:243:03, 02:309, 02:644, 02:741, 02:815, 02:842, 02:947:01- 02:947:02, 23:57, 24:82, 25:30, 26:22, 26:177, 29:80, 29:155, 31:41, 32:06, 33:22, 33:252, 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^{5,10,12}	85 bp, 240 bp, 400 bp	800 bp	2, 23, 34 36, 68	*01:427, 01:464, 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, 02:1171, 03:187, 11:155, 11:199:03, 11:226, 29:174, 31:62, 34:22, 36:01:01:01-36:15, 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}	80 bp, 160 bp, 240 bp, 495 bp	800 bp	2, 3, 24, 26, 28, 36, 68, 80	*01:427, 01:466, 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,



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24^{11,12}	360 bp, 445 bp	1070 bp	10, 26, 31, 66	*02:135, 02:309, 02:454, 03:01:19, 03:103:02, 24:609, 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, 34:34, 66:02:01:01-66:03:01:03, 66:12, 66:16, 66:21, 66:25-66:26Q, 66:28N, 66:34, 66:39N, 66:42-66:43, 66:48, 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, 30:183, 30:212 and 30:230 alleles.

⁷Primer mix 6 may give rise to a lower yield of A*23 alleles than the other A low primer mixes.

⁸Primer mix 9 may weakly amplify the A*34 alleles.

⁹Primer mixes 6, 9, 10, 13, 14, 20 and 23 have a tendency to giving rise to primer oligomer formation.

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

¹¹Primer mixes 15 and 24 may give rise to a lower yield of HLA-specific PCR product than the other HLA-A low primer mixes.

¹²Primer mixes 3, 7, 15, 17, 20, 22 and 24 may have tendencies of unspecific amplifications.

Abbreviations

w: might be weakly amplified.



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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-07:484, 07:486-07:494, 07:496-07:501, 07:503-07:506, 07:508-07:521, 07:523-07:525, 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, 40:542, 40:575, 41:08, 42:05:01-42:05:02, 42:39, 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-08:323Q, 08:325-08:332, 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
27⁹	140 bp, 235 bp	1070 bp	7, 8, 13, 15, 35, 4005, 44, 49, 50, 61, 62, 77	*07:20, 07:24, 07:60, 07:100, 07:131, 07:220, 07:223, 07:358, 07:464, 07:485, 08:21, 08:25, 08:175, 13:01:01:01-13:02:39, 13:02:41-13:04, 13:06-13:08, 13:10-13:23, 13:25-13:38, 13:40-13:57, 13:59-13:66, 13:68-13:96, 13:99-13:182, 13:184-13:203, 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, 15:668, 15:673, 15:700, 35:05:01:01-35:05:07, 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, 55:141, 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, C*03:643N



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56⁵	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, 07:489, 15:342, 18:165, 18:240-18:241, 27:01 ^w , 27:02:01:01-27:21:02, 27:23-27:152, 27:154-27:214, 27:216-27:287N, 35:76, 35:186, 35:229, 35:368, 35:561, 35:570, 37:02, 37:60, 40:429, 44:90, 44:97, 44:356, 47:01:01:02-47:13, 48:26, 54:01:01:01-54:29, 54:31- 54:50, 55:01:01:01-55:05, 55:07-55:17, 55:19-55:77, 55:79- 55:133, 55:135-55:142, 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, 56:92-56:102, 58:151, 81:01:01:01- 81:01:05, 81:05, 81:09-81:16, 82:01:01:01-82:04, 83:01, C*04:439, C*14:79
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, 15:02:01:01-15:02:16, 15:08:01:01-15:08:02, 15:11:01-15:11:08, 15:13:01-15:13:03, 15:15:01:01-15:15:02, 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, 15:674, 15:681-15:682, 15:687, 15:699, 15:710, 15:723- 15:724, 27:24, 35:46, 35:311, 35:583, 40:31, 40:45, 40:80, 48:01:01:01-48:01:11, 48:01:13-48:01:14, 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, 48:58-48:65, 48:67, 51:104:01-51:104:02, 56:39 ^w , 81:01:01:01-81:10, 81:12-81:16
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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.



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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, 38 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 33, 42, 52 and 62 and 65 may have tendencies of unspecific amplifications, most pronounced in primer mix 33.

⁹Primer mixes 25, 27, 38, 41, 42, 43, 44, 50, 52, 58, 67 and 69 have a tendency to giving rise to primer oligomer formation.

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

¹¹The C*17:01 to C*17:04 alleles might 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.

¹⁴The Bw4-associated HLA-A specificities A9, A23, A24, A2403, A25 and A32 are not amplified by the primer pair in primer mix 70.

¹⁵In primer mix 29 the positive control band may be weaker than for other HLA-B low resolution primer mixes.

Abbreviations

w: might be weakly amplified.

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



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SPECIFICITY TABLE

HLA-C low resolution SSP typing

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

Primer Mix	Size of spec. PCR product ¹	Size of control band ²	Amplified HLA class I alleles ³
73⁴	90 bp, 150 bp, 210 bp	800 bp	*01:02:01:01-01:284, 03:58, 03:86, 03:94:01-03:94:02, 03:416, 04:37, 04:71, 04:436N, 05:85, 05:107, 05:200, 05:241, 06:204, 07:316, 07:338, 07:579, 07:1121, 12:215, 14:45, 14:58, 15:102, 15:104, 15:290, B*15:539, B*37:116, B*39:76, B*39:225, B*54:18
74⁵	130 bp, 200 bp, 270 bp, 300 bp	800 bp	*01:10, 01:43, 02:02:01-02:02:03, 02:02:06-02:40:02, 02:42-02:43:01, 02:44-02:57, 02:59-02:196, 02:198-02:253N, 04:32:01-01-04:32:01:02, 04:77, 04:265, 04:357, 04:406, 04:447, 05:105, 05:200, 05:206, 06:08, 07:101, 07:148, 07:161, 07:583, 07:1122, 08:31, 08:185, 08:246, 08:252, 08:268, 08:289, 12:119, 12:198, 14:25, 15:42, 15:111, 15:201, 16:29, 16:50, 17:01:01-02-17:06, 17:08-17:16:02, 17:18-17:22, 17:24-17:32, 17:34-17:82, 18:03
75¹²	250 bp, 280 bp	800 bp	*01:48, 01:169:02, 02:02:01-02:02:03, 02:02:06-02:40:02, 02:42-02:86, 02:88-02:106, 02:108-02:133, 02:135N-02:151, 02:153-02:166, 02:168-02:240Q, 02:242-02:253N, 03:02:01-03:02:35, 03:04:01-01-03:10:02, 03:14-03:17:02, 03:19, 03:23N-03:29, 03:32:01-01-03:38:02, 03:40:01-03:42:02, 03:44-03:48, 03:51, 03:54, 03:57:01-03:57:02, 03:60, 03:63-03:64:01, 03:65, 03:70-03:74, 03:77-03:78, 03:80:01-03:80:02, 03:82, 03:84, 03:87:01-03:87:02, 03:89-03:95, 03:98, 03:100-03:101, 03:104-03:111, 03:113:01-03:115:02, 03:117-03:118, 03:121N, 03:123, 03:125:01-03:125:02, 03:128-03:131, 03:132:02, 03:134-03:140:01:02, 03:143, 03:145-03:149, 03:153-03:157, 03:159, 03:162-03:164, 03:166, 03:169Q-03:170, 03:172-03:174, 03:178-03:181, 03:183-03:184:02, 03:186:01-03:186:02, 03:190-03:191, 03:193-03:194, 03:197-03:201N, 03:208N-03:213, 03:215-03:216, 03:218-03:219, 03:221-03:222, 03:224N-03:226, 03:232-03:236, 03:238-03:240, 03:244Q-03:250, 03:252, 03:255-03:261, 03:263:01-03:266, 03:269-03:270, 03:277N-03:283, 03:286-03:287:02, 03:292-03:294, 03:296:01-03:303, 03:305-03:306, 03:309:01-03:311, 03:313-03:315, 03:317-03:318N, 03:322-03:323N, 03:326, 03:328-03:335, 03:337-03:338, 03:340, 03:342-03:343, 03:347-03:350, 03:353-03:355, 03:358-03:359, 03:361-03:362, 03:365-03:366N, 03:368-03:369, 03:371, 03:373, 03:376, 03:379, 03:381-03:382, 03:384-03:388, 03:390-03:394, 03:396:01N-03:397, 03:399-03:412, 03:415, 03:417, 03:419-03:420, 03:423-03:426, 03:429, 03:431, 03:434-03:435, 03:437, 03:439, 03:441-03:443, 03:445N-03:446N, 03:448Q-03:449N, 03:452-03:456, 03:458-03:459, 03:462N-03:470N, 03:473, 03:475, 03:478, 03:480:01-03:480:02, 03:482-03:489, 03:491:01-03:494, 03:496-03:502Q, 03:505, 03:508N, 03:510N-03:513, 03:518, 03:521-03:523, 03:525-03:526, 03:531N-03:532, 03:536:01-03:536:02, 03:538-03:539, 03:543-03:544,



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76^{4,6}	85 bp, 170 bp, 210 bp, 275 bp	1070 bp	*01:67, 01:122, 01:131, 03:02:01-03:03:51, 03:03:53-03:04:06, 03:04:08-03:11:02, 03:13:01:01-03:15, 03:17:01-03:40:04, 03:42:01-03:57:02, 03:59-03:79, 03:80:02-03:85, 03:87:01-03:93, 03:95-03:98, 03:100-03:112, 03:114-03:150, 03:152-03:164, 03:166-03:250, 03:252-03:259, 03:261-03:266, 03:268-03:285, 03:287:01-03:292, 03:294-03:383, 03:385-03:434, 03:436-03:450, 03:452-03:511N, 03:513-03:533, 03:537-03:539, 03:541-03:589, 03:592-03:606, 03:608-03:657, 03:659N-03:703, 04:201:02, 04:212, 07:133:01, 07:242, 07:330:01, 07:748, 15:218, B*15:96, B*35:537, B*44:274
77	280 bp	800 bp	*03:03:01:01-03:03:20, 03:03:22-03:03:50, 03:03:52-03:03:71, 03:11:01-03:11:02, 03:13:01:01-03:13:02, 03:18:02-03:18:03, 03:20N-03:22Q, 03:30-03:31, 03:43:01-03:43:02, 03:49-03:50, 03:52-03:53, 03:55-03:56, 03:58-03:59, 03:61-03:62, 03:66, 03:67 ^w , 03:68-03:69, 03:75-03:76, 03:79, 03:81, 03:83, 03:85-03:86, 03:88, 03:96:01-03:97, 03:102-03:103, 03:112, 03:116:01-03:116:02, 03:119:01-03:120, 03:122, 03:124, 03:126-03:127, 03:132:01, 03:133, 03:141-03:142, 03:150-03:152, 03:158, 03:160-03:161, 03:165:01-03:165:02, 03:167-03:168, 03:171, 03:175-03:177, 03:185, 03:187-03:189N, 03:192, 03:196, 03:202-03:207, 03:214, 03:217, 03:220, 03:223, 03:227-03:230, 03:237, 03:241-03:243, 03:251, 03:253-03:254, 03:262, 03:267-03:268, 03:271-03:276, 03:284-03:285, 03:288-03:291, 03:295 ^w , 03:304, 03:307-03:308, 03:312, 03:316N, 03:319-03:321, 03:324-03:325, 03:327, 03:336, 03:339, 03:341, 03:345-03:346, 03:351-03:352, 03:356-03:357, 03:360, 03:363N-03:364, 03:367, 03:370, 03:372:01-03:372:02, 03:374-03:375, 03:377N-03:378, 03:380N,



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78¹²	135 bp, 330 bp	800 bp	*02:02:01-02:02:03, 02:02:06-02:02:12, 02:02:14-02:02:25, 02:02:27-02:02:28, 02:02:30-02:02:20, 02:22-02:25Q, 02:27:01-02:38:02N, 02:40:01-02:40:02, 02:42-02:44, 02:46-02:86, 02:88-02:100, 02:101 ^w , 02:102-02:106, 02:108-02:133, 02:135N-02:151, 02:153-02:166, 02:168-02:188, 02:190, 02:192N-02:223N, 02:225-02:240Q, 02:242-02:253N, 03:231, 04:01:01:01-04:01:01:29, 04:01:01:31-04:01:27, 04:01:29-04:01:60, 04:01:62, 04:01:64, 04:01:66-04:01:168, 04:03:01:01-04:03:08, 04:03:10-04:07:01, 04:08-04:15:03, 04:17-04:20, 04:23-04:41, 04:43-04:102, 04:104-04:139, 04:141-04:195, 04:197-04:212, 04:214-04:219, 04:221-04:235, 04:237-04:303, 04:305N-04:310, 04:312-04:350N, 04:352-04:521, 04:523, 04:525-04:538, 05:26, 05:78:01-05:78:02, 07:01:74, 07:02:09, 07:125:01-07:125:02, 07:356, 07:531, 07:583, 07:723, 07:1010, 08:163, 08:183, 08:252, 08:289, 12:269, 12:349, 15:11, 15:36, 15:118, 16:34, 16:121, 16:150
79	170 bp, 390 bp, 445 bp	1070 bp	*02:94, 02:241, 04:129, 05:01:01:01-05:01:84, 05:03-05:244N, 05:246-05:306, 06:05, 06:67, 06:359N, 08:10, 12:21, 12:33, 15:107, 15:178, 16:40, 16:53, 16:110, 16:113, 17:05
80^{4,12}	125 bp, 355 bp	800 bp	*01:02:49, 01:90, 01:101-01:102, 01:113, 01:136, 01:145:01N, 01:146:01-01:146:02, 01:233, 02:06:01-02:06:02, 02:23, 02:36:01-02:36:02, 02:47, 02:111, 03:04:98, 04:23, 04:100, 04:108, 04:178, 04:335, 04:422, 04:539, 05:01:56, 05:22:01-05:22:02, 05:132, 05:215, 05:241, 05:252, 05:289, 06:02:01:01-06:02:01:103, 06:02:03-06:02:38:02, 06:02:40-06:02:71, 06:02:73-06:02:101, 06:02:103-06:02:109, 06:02:111-06:16N, 06:18-06:31, 06:33-06:44:01, 06:45-06:76:01, 06:77-06:93, 06:96-06:98, 06:100-06:132:01, 06:133-06:179, 06:181-06:235, 06:237-06:243, 06:245-06:328, 06:330-06:334, 06:336Q-06:347N, 06:349-06:375, 06:377-06:399, 08:83, 08:108, 08:113, 08:207:01, 12:02:11, 12:02:35, 12:03:09, 12:03:26, 12:03:66, 12:15, 12:113, 12:208, 12:298, 12:309, 14:26, 15:02:01:01-15:03, 15:05:01:01-15:05:07, 15:05:09-15:13:03, 15:15-15:19, 15:21-15:23:02, 15:26-15:29, 15:31-15:39, 15:41-15:64, 15:67-15:75, 15:78:01-15:101, 15:103-15:189N, 15:191-15:210, 15:212-15:221, 15:223-15:235Q, 15:237-15:245, 15:247N-15:253Q, 15:255-15:259, 15:261-15:283, 15:285-15:291N, 16:01:16, 16:20, 16:109, 16:169, 17:70, B*58:02:01:01-58:02:04
81⁷	245 bp, 425 bp	800 bp	*07:01:01:01-07:01:02:16, 07:01:04-07:33N, 07:35-07:294, 07:296-07:1173, 08:252, 08:289, 12:181, 12:349, 14:121



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82^{4,8,12}	110 bp, 165 bp, 390 bp	800 bp	*01:43, 02:87, 03:280, 03:530, 07:101, 07:148, 07:161, 07:583, 07:1122, 08:01:01:01-08:01:07, 08:01:09-08:63, 08:65-08:295, 08:296 ^w , 08:297-08:300, 12:127, 12:203, 16:139
83	155 bp, 255 bp, 340 bp	1070 bp	*01:14, 01:59, 01:118, 01:186, 02:02:01-02:02:03, 02:02:06- 02:40:02, 02:42-02:86, 02:88-02:253N, 03:04:101, 03:07:01:01- 03:07:03, 03:15, 03:45, 03:130, 03:140:01:01-03:140:01:02, 03:163, 03:231, 03:243, 03:248, 03:268, 03:297, 03:308, 03:461, 04:01:01:01-04:01:01:29, 04:01:01:31-04:01:168, 04:03:01:01- 04:20, 04:23-04:539, 05:01:01:01-05:01:84, 05:03-05:128N, 05:130-05:244N, 05:246-05:306, 06:02:01:01-06:02:01:103, 06:02:03-06:02:11, 06:02:13-06:02:64, 06:02:66-06:10, 06:12- 06:51, 06:53:01-06:121, 06:123, 06:125-06:146, 06:148-06:216, 06:218-06:247, 06:249-06:251, 06:253-06:279, 06:281N-06:399, 07:07, 07:09, 07:49, 07:53, 07:76:01-07:76:02, 07:125:01- 07:125:02, 07:210, 07:216, 07:238, 07:247, 07:315, 07:328, 07:356, 07:403, 07:406, 07:531, 07:598, 07:932, 07:1010, 07:1119, 07:1124, 08:10, 12:04:01-12:05:02, 12:09, 12:21, 12:33, 12:41, 12:54, 12:60, 12:146, 12:188, 12:194, 12:353, 12:362, 12:401, 12:404, 14:04, 14:12, 14:49, 14:64, 14:77, 14:90, 14:108, 14:140, 15:02:01:01-15:05:07, 15:05:09-15:05:10, 15:05:13- 15:06:03, 15:08:01-15:13:03, 15:15-15:19, 15:22-15:24, 15:26- 15:42, 15:44:01-15:70, 15:72-15:115N, 15:117-15:143, 15:145N- 15:243Q, 15:245-15:247N, 15:249-15:291N, 16:01:01:01- 16:02:24, 16:06-16:09, 16:11-16:28, 16:30N-16:32, 16:34, 16:36- 16:39:02, 16:41, 16:43-16:44, 16:46-16:52, 16:54, 16:56-16:60, 16:62-16:65, 16:69-16:77N, 16:79-16:81, 16:83-16:108, 16:111- 16:123N, 16:125-16:148, 16:151-16:168, 16:170-16:181, 16:183- 16:187, 16:189-16:198, 16:200-16:202, 16:204-16:217, 16:219N- 16:225, 17:01:01:02-17:21, 17:23-17:61, 17:63-17:82, 18:01:01:01-18:22, A*24:174, B*57:129
84^{4,10}	100 bp, 155 bp, 220 bp	800 bp	*01:02:18, 01:04, 01:21, 02:02:44, 06:02:38:01-06:02:38:02, 06:76:02, 07:940:01, 12:02:01-12:02:13, 12:02:16-12:02:18, 12:02:20-12:02:29, 12:02:31, 12:02:33, 12:02:35-12:02:36, 12:02:38-12:02:39, 12:02:41-12:02:49, 12:02:51-12:03:01:73, 12:03:03-12:03:07, 12:03:09-12:03:15, 12:03:17-12:03:19, 12:03:21-12:03:29, 12:03:31-12:03:33, 12:03:35-12:03:93, 12:04:02:01-12:04:02:02, 12:05:01-12:08, 12:10:01-12:13:01:02, 12:14:02-12:18:01, 12:19-12:24:01, 12:25, 12:27-12:32, 12:34- 12:58, 12:60-12:85:01, 12:86-12:143, 12:145-12:180, 12:182- 12:184, 12:186-12:195:02, 12:196-12:199:01, 12:200-12:207, 12:209-12:221, 12:223, 12:225-12:232N, 12:234-12:297, 12:300- 12:308, 12:310-12:396, 12:398-12:430, 14:02:08, 14:02:21, 14:03:05, 16:01:17, 16:02:13, 16:15:02, B*18:01:42, B*57:01:24
85^{4,10}	120 bp, 250 bp	800 bp	*01:21, 01:215, 02:02:68, 02:12, 02:49, 02:55:01-02:55:02, 02:115, 04:01:01:01-04:01:01:29, 04:01:01:31-04:01:168, 04:03:01:01-04:03:08, 04:03:10-04:07:01, 04:08-04:09L, 04:12- 04:20, 04:23-04:35:02, 04:37-04:54:02, 04:56-04:152, 04:154- 04:168, 04:170N-04:191N, 04:193, 04:195-04:209, 04:211- 04:213, 04:216-04:226, 04:228-04:248, 04:250-04:277, 04:279N ^w , 04:280-04:298, 04:300N-04:346, 04:348-04:413, 04:415-04:538, 05:42, 05:46:01:01-05:46:01:02, 05:112, 06:02:72, 06:76:02, 06:335, 07:01:74, 07:02:09, 07:125:01- 07:125:02, 07:356, 07:531, 07:583, 07:723, 08:05, 08:21, 08:25, 08:137, 08:278, 12:02:01-12:02:10, 12:02:12-12:02:27, 12:02:28 ^w , 12:02:30-12:03:03, 12:03:05-12:03:08,



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86^{11,13,14}	160 bp, 210 bp	800 bp	*01:04, 01:09:01-01:09:02, 01:160, 01:244, 02:05:01-02:05:03, 02:17, 04:42:01-04:42:02, 04:220, 04:360, 04:477, 04:496, 06:02:01:01-06:02:01:103, 06:02:03-06:02:15, 06:02:17-06:02:42, 06:02:44-06:03:02, 06:07-06:13, 06:15-06:34:02, 06:36-06:39, 06:41-06:71, 06:73-06:78, 06:80, 06:82-06:100, 06:102:01- 06:122, 06:124-06:126, 06:128N-06:135, 06:137-06:142, 06:145- 06:152N, 06:154-06:196, 06:198-06:202, 06:205-06:263N, 06:265-06:270, 06:272-06:303, 06:305-06:316N, 06:318- 06:357N, 06:359N-06:399, 07:31:01-07:31:02, 07:125:01- 07:125:02, 07:177, 07:356, 07:514:01-07:514:02, 07:531, 07:1010, 12:03:01:01-12:03:46, 12:03:48-12:07, 12:11- 12:13:01:02, 12:15, 12:19, 12:23, 12:25-12:26, 12:28-12:29, 12:31:01-12:35, 12:37-12:39N, 12:42Q-12:43, 12:45-12:48, 12:50-12:55, 12:57:01-12:63, 12:65-12:66, 12:70-12:71, 12:75- 12:79, 12:81-12:82, 12:87-12:95, 12:97-12:102, 12:107-12:111, 12:113, 12:115-12:116, 12:119-12:122, 12:125, 12:129, 12:131, 12:133, 12:135, 12:138-12:141, 12:143-12:144, 12:147, 12:149- 12:150, 12:152, 12:154, 12:156-12:160, 12:163, 12:165, 12:167, 12:170-12:174, 12:176, 12:178, 12:180, 12:182, 12:184-12:187, 12:189-12:192, 12:194-12:195:03, 12:197, 12:199:01-12:199:02, 12:201-12:203, 12:205-12:206, 12:209-12:211, 12:213, 12:215- 12:216, 12:218, 12:220, 12:223, 12:225, 12:227, 12:229-12:230, 12:232N, 12:235, 12:237-12:238, 12:242, 12:244-12:246, 12:248- 12:249, 12:253-12:254, 12:256-12:257, 12:259-12:260:02, 12:262, 12:264-12:267, 12:269, 12:271-12:274:01N, 12:276- 12:278, 12:282-12:284, 12:286, 12:288-12:293, 12:295N, 12:297, 12:300-12:302, 12:305-12:306, 12:310-12:314, 12:316-12:326, 12:328, 12:330Q-12:334, 12:337, 12:339-12:343N, 12:345N- 12:350, 12:352-12:358, 12:360-12:361, 12:364-12:370, 12:372- 12:380, 12:382, 12:384-12:386, 12:389-12:390, 12:393Q-12:395, 12:398, 12:400-12:405, 12:407-12:410, 12:412-12:415, 12:418, 12:421N, 12:423, 12:427-12:428N, 12:430, 14:15-14:16, 14:87, 16:04:01:01-16:04:01:03, 16:04:03-16:04:05, 16:29, 16:33, 16:35, 16:42, 16:48, 16:55, 16:61, 16:66, 16:78, 16:82, 16:91, 16:109, 16:124, 16:149-16:150, 16:182, 16:203, 16:218, B*15:510, B*35:475, B*46:84
87^{12,14}	130 bp, 255 bp, 555 bp	1070 bp	*01:02:68, 01:02:71, 01:168-01:169:02, 02:02:01-02:02:03, 02:02:06-02:13, 02:15-02:26:03, 02:28-02:40:02, 02:42-02:64, 02:66-02:86, 02:88-02:106, 02:108-02:114, 02:116-02:130, 02:132-02:163, 02:165N-02:186, 02:188-02:253N, 03:07:01:01- 03:07:03, 03:10:01, 03:15, 03:29, 03:45, 03:58, 03:86,



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88^{11,12,14}	160 bp, 260 bp, 445 bp	1070 bp	*01:67, 01:122, 01:125, 01:177, 01:218, 03:155, 03:231, 03:351, 03:557, 04:11, 04:29, 04:36, 04:55, 04:114, 04:172, 06:359N, 07:64, 07:293, 07:402:01-07:402:02, 07:519, 07:1144, 08:74, 08:95, 08:163, 08:183, 08:251, 12:55, 12:269, 14:02:01-01-14:11, 14:13-14:48, 14:50-14:107, 14:109, 14:111-14:146, 14:148N-14:168, 16:40, 16:53, 16:110, 16:113, 16:150, 16:170, A*29:86, A*30:62, A*31:187, A*33:63, B*07:499, B*08:249, B*08:306, B*18:64, B*35:183, B*35:252, B*35:502, B*39:114, B*39:140, B*40:138, B*41:59
89^{4,9}	110 bp, 325 bp	800 bp	*01:90, 01:101-01:102, 01:113, 01:116, 02:06:01-02:06:02, 02:23, 02:36:01-02:36:02, 02:68, 03:81, 03:175, 03:199, 03:245, 03:317, 03:388, 03:665, 03:674, 04:108, 04:112, 04:169, 04:178, 04:422, 05:36, 05:132, 05:215, 05:238, 06:89, 06:224, 07:01:74, 07:123:01-07:123:02, 07:173, 07:294, 07:626, 07:725, 07:775, 07:850, 08:113, 12:08, 12:15, 12:81, 12:113, 12:188, 12:208, 12:282, 12:287, 12:309, 14:92, 15:02:01-01-15:05:07, 15:05:09-15:13:03, 15:15-15:19, 15:21-15:24, 15:26-15:291N, 16:20, 16:64, 16:70, 16:87, 16:109, 16:169, 16:212
90^{11,14}	180 bp, 210 bp, 240 bp	1070 bp	*01:160, 02:13, 02:18, 02:33, 02:49, 02:75, 02:115, 02:180, 03:03:64, 04:01:01-01-04:01:01:29, 04:01:01:31-04:01:22, 04:01:24-04:01:73, 04:01:74 ^w , 04:01:75-04:01:168, 04:03:01-01-04:03:08, 04:03:10-04:07:01, 04:08-04:10, 04:12-04:20, 04:23-04:32:01:02, 04:34-04:106, 04:108-04:115N, 04:117-04:129, 04:131-04:166:01, 04:166:03-04:168, 04:170N-04:171, 04:173N-04:230, 04:232-04:282, 04:284-04:413, 04:415-04:538, 05:17, 05:25, 05:42, 05:55, 05:68, 05:76, 05:79, 05:115, 05:134, 05:143, 06:02:72, 06:05, 06:31, 06:76:02, 06:118, 06:379, 07:01:74, 07:02:09, 07:31:01-07:31:02, 07:125:02, 07:154, 07:177,



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91¹⁰	225 bp, 250 bp, 290 bp	800 bp	*01:60, 02:40:01-02:40:02, 02:180, 04:58, 04:160:01-04:160:02, 04:368, 04:447, 04:480, 05:23, 05:62, 05:134, 05:143, 05:146, 05:151, 05:163, 05:206, 06:118, 08:07, 08:47, 08:104, 08:142, 08:185, 08:188, 12:14:01-12:14:02, 12:92, 12:176, 12:371, 14:17, 15:25, 15:65, 15:201, 17:01:01:02-17:82
92	215 bp, 420 bp	800 bp	*01:02:01:01-01:20, 01:22-01:284, 03:58, 03:86, 03:94:01-03:94:02, 04:37, 04:230, 04:263, 04:397, 04:432, 04:442, 04:510, 05:16, 05:85, 05:107, 05:241, 06:05-06:06:01:02, 06:17, 06:31, 06:79N, 06:204, 06:271, 07:07, 07:09, 07:39-07:40, 07:49, 07:76:01-07:76:02, 07:177, 07:210, 07:238, 07:247, 07:315, 07:328, 07:335, 07:403, 07:406, 07:563, 07:598, 07:975:01-07:975:02, 07:993:01-07:993:02, 07:1059, 07:1119, 07:1124, 07:1136, 08:12:01:01-08:12:01:02, 08:252, 08:289, 12:09, 12:24:01-12:24:02, 12:176, 12:333, 14:02:01:01-14:05, 14:07N, 14:10-14:14, 14:17-14:27, 14:29-14:52, 14:55-14:62, 14:64-14:76, 14:78-14:86, 14:88-14:89, 14:91, 14:93N-14:104, 14:106-14:149, 14:151-14:162, 14:164-14:168, 15:102, 15:290, 16:04:01:01-16:04:01:03, 16:04:03-16:04:05, 16:29, 16:33, 16:42, 16:53, 16:55, 16:61, 16:66, 16:68, 16:78, 16:82, 16:88, 16:91, 16:109, 16:124, 16:149-16:150, 16:182, 16:203, 16:218, 18:01:01:01-18:22, B*07:239, B*14:03, B*14:112, B*14:138, B*58:02:02
93	325 bp, 380 bp	1070 bp	*01:03:01-01:03:03, 01:24, 01:34, 01:49:01-01:50, 01:55, 01:78, 01:131, 01:176, 02:22, 02:62, 02:118, 02:197, 03:03:01-01-03:04:114, 03:06:01-01-03:11:02, 03:14, 03:18:01-03:24, 03:26:01-03:26:02, 03:28-03:32:01:02, 03:34, 03:37:01-03:59, 03:61-03:70, 03:72-03:83, 03:85, 03:87:01-03:88, 03:90-03:93, 03:96:01-03:96:02, 03:98, 03:100-03:107, 03:109, 03:111-03:120, 03:122-03:131, 03:133-03:134, 03:136-03:138, 03:140:01:01-03:145, 03:147-03:153, 03:155-03:166, 03:168, 03:170-03:176, 03:179-03:189N, 03:191-03:193, 03:195-03:196, 03:202-03:215, 03:217-03:220, 03:223, 03:227-03:237, 03:239-03:244Q, 03:246-03:247, 03:250-03:257, 03:259-03:261, 03:262 [?] , 03:263:01-03:263:03, 03:265N-03:270, 03:272-03:291, 03:293-03:295,



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95¹²	160 bp, 230 bp	1070 bp	*01:215, 04:14, 04:42:01-04:42:02, 04:68, 04:220, 05:112, 06:02:01:01-06:02:01:103, 06:02:03-06:02:120, 06:04:01-06:44:01, 06:45-06:75, 06:78-06:131, 06:133-06:399, 07:01:01:01-07:01:02:16, 07:01:04-07:01:40, 07:01:41 ^w , 07:01:42-07:01:92, 07:01:94-07:02:07, 07:02:09-07:02:28, 07:02:30-07:02:40, 07:02:41 ^w , 07:02:42-07:02:90, 07:02:92-07:25, 07:27:01-07:32N, 07:35-07:38:02, 07:41-07:63, 07:65-07:91, 07:93:01-07:95, 07:97-07:138, 07:140:01-07:151, 07:153:01-07:155, 07:157-07:176, 07:178-07:209, 07:211-07:222, 07:223 ^w , 07:224-07:237, 07:239-07:245, 07:247-07:266, 07:268-07:294, 07:297-07:313, 07:315-07:316, 07:318-07:321, 07:323-07:334, 07:336-07:350N, 07:352-07:401, 07:403-07:404, 07:405:02-07:414, 07:415 ^w -07:416 ^w , 07:417-07:448, 07:450:01-07:492, 07:494Q-07:516, 07:518-07:577, 07:579-07:582Q, 07:584-07:713Q, 07:715:01-07:722, 07:725-07:755, 07:757-07:820N, 07:822-07:844, 07:846:01-07:869, 07:871-07:890, 07:892-07:893, 07:895-07:935, 07:937-07:969, 07:971-07:974Q, 07:976-07:988, 07:990-07:992, 07:994-07:1044N, 07:1045 ^w , 07:1046-07:1055, 07:1057-07:1058, 07:1060, 07:1062N-07:1118, 07:1120N, 07:1122-07:1135, 07:1137-07:1173, 12:16:01-12:16:02, 12:147, 12:195:01-12:195:03, 12:217, 14:90, 15:75, 16:01:01:01-16:02:24, 16:06-16:28, 16:30N-16:32, 16:34, 16:36-16:39:02, 16:41, 16:43-16:47, 16:49:01-16:52, 16:54, 16:56-16:60, 16:62-16:65, 16:67, 16:69-16:77N, 16:79-16:81, 16:83-16:87, 16:89N-16:90, 16:92-16:102, 16:104-16:108, 16:111-16:123N, 16:125-16:139, 16:141-16:148, 16:151-16:181, 16:183-16:198, 16:200-16:202, 16:204-16:217, 16:219N-16:225, 17:20, 18:01:01:01-18:08, 18:10-18:16, 18:18-18:22, A*24:64, A*24:96, A*24:106, A*24:174, B*08:16, B*08:123, B*08:145, B*44:347, B*44:527, B*50:76, B*57:129
96⁵	-	-	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 HLA-C 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



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MA123 v02 SSP PI Template
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Lot No.: 2V7

Lot-specific information

table. Well number 73 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.

³For 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.

⁴HLA-specific PCR products shorter than 125 base pairs have a lower intensity and are less sharp than longer PCR products.

⁵Primer mix 74 will for most C*02 alleles give rise to two specific PCR fragments.

⁶Primer mix 76 will for most C*03 alleles give rise to two specific PCR fragments.

⁷Primer mix 81 will for most C*07 alleles give rise to two specific PCR fragments.

⁸Primer mix 82 will for most C*08 alleles give rise to multiple specific PCR fragments.

⁹Primer mix 89 will for most C*15 alleles give rise to two specific PCR fragments.

¹⁰Primer mixes 84, 85 and 91 may have tendencies of unspecific amplifications.

¹¹Primer mixes 86, 88 and 90 have a tendency to giving rise to primer oligomer formation.

¹²Primer mixes 75, 78, 80, 82, 87, 88, 94 and 95 may give rise to a lower yield of HLA-specific PCR fragments than the other HLA-C low resolution primer mixes.

¹³Primer mix 86 might faintly amplify most C*01 and the C*14 alleles.

¹⁴In primer mixes 86, 87, 88 and 90 the positive control band may be weaker than for other HLA-C low resolution primer mixes.

¹⁵Primer 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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Lot-specific information

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	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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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 I	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 I		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
MA123 v02 SSP PI Template
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Lot No.: **2V7**

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. PCR product	110	215	140	105	185	190	290	165	165	180	100	280
			235	140	235			225	190		195	
				260				285	390			
								330				
Length of int. pos. control ¹	800	1070	1070	800	800	800	1070	1070	1070	800	1070	1070
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.: **2V7**

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.	1070	800	1070	1070	800	1070	1070	800	800	1070	1070	1070
pos. control ¹												
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.	1070	1070	1070	800	1070	800	800	1070	1070	1070	800	1070
pos. control ¹												
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.: **2V7**

Lot-specific information

Well No.	61	62	63	64	65	66	67	68	69	70	71	72
Length of spec. PCR product	145	300	160	180	180	90	90	95	115	360	350	285
	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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For *In Vitro* Diagnostic Use
MA123 v02 SSP PI Template
Date: June 2025, Rev. No: 00

101.702-24/06 – including *Taq* polymerase
101.702-24u/06u – without *Taq* polymerase

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

Lot No.: **2V7**

Lot-specific information

HLA-C LOW PRIMER SPECIFICATION

Well No.	73	74	75	76	77	78	79	80	81	82	83	84
Length of spec.	90	130	250	85	280	135	170	125	245	110	155	100
PCR product	150	200	280	170		330	390	355	425	165	255	155
	210	270		210			445			390	340	220
		300		275								
Length of int.	800	800	800	1070	800	800	1070	800	800	800	1070	800
pos. control ¹												
5'-primer(s) ²	89	47	105	98	105	47	1 st I	28	47	1 st I	1 st I	361
	5'-gAA 3'	5'-Agg 3'	5'-gCT 3'	5'-CTT 3'	5'-gCT 3'	5'-Agg 3'	5'-CgA 3'	5'-TCA 3'	5'-Agg 3'	5'-CgA 3'	5'-CgA 3'	5'-AgT 3'
	89	89	134	355		112	176	2 nd I	648	176	419	419
	5'-gAA 3'	5'-gAA 3'	5'-CCA 3'	5'-TCA 3'		5'-CCT 3'	5'-gCA 3'	5'-CCA 3'	5'-CAC 3'	5'-gCA 3'	5'-gTC 3'	5'-gTC 3'
	89	2 nd I		419		118	527			527		
	5'-gAA 3'	5'-CCA 3'		5'-gTC 3'		5'-CCA 3'	5'-TgA 3'			5'-TAC 3'		
	98	703		459								
	5'-CTT 3'	5'-CTA 3'		5'-gAT 3'								
	368											
	5'-gTg 3'											
3'-primer(s) ³	142	176	343	142	343	201	302	213	302	302	118	474
	5'-TgA 3'	5'-ACT 3'	5'-C 3'	5'-TgA 3'	5'-T 3'	5'-CTT 3'	5'-ggT 3'	5'-Cgg 3'	5'-ggC 3'	5'-ggC 3'	5'-gCT 3'	5'-gCA 3'
	201	559	343	589		218	307	409	853	595	218	477
	5'-CTT 3'	5'-CTC 3'	5'-g 3'	5'-CTT 3'		5'-gCT 3'	5'-CCA 3'	5'-ATg 3'	5'-CAT 3'	5'-CCC 3'	5'-gCT 3'	5'-gCA 3'
	201	861					3 rd I	412			302	538
	5'-CTC 3'	5'-TCg 3'					5'-gCA 3'	5'-gTC 3'			5'-ggT 3'	5'-gCA 3'
	538							420			304	
	5'-CCg 3'							5'-gCT 3'			5'-CAA 3'	
											539	
											5'-TCT 3'	
Well No.	73	74	75	76	77	78	79	80	81	82	83	84



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For *In Vitro* Diagnostic Use
MA123 v02 SSP PI Template
Date: June 2025, Rev. No: 00

101.702-24/06 – including *Taq* polymerase
101.702-24u/06u – without *Taq* polymerase

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Lot No.: **2V7**

Lot-specific information

Well No.	85	86	87	88	89	90	91	92	93	94	95
Length of spec.	120	160	130	160	110	180	225	215	325	135	160
PCR product	250	210	255	260	325	210	250	420	380		230
			555	445		240	290				
Length of int.	800	800	1070	1070	800	1070	800	800	1070	800	1070
pos. control ¹											
5'-primer(s) ²	201	97	98	85	201	201	2 nd I	47	355	105	97
	5'-CCA 3'	5'-TCg 3'	5'-CTA 3'	5'-CCg 3'	5'-CCA 3'	5'-CCA 3'	5'-CCA 3'	5'-Agg 3'	5'-TCA 3'	5'-gCT 3'	5'-TCg 3'
	218	361	368	98	409	2 nd I		117	412	112	97
	5'-ggA 3'	5'-AgT 3'	5'-gTg 3'	5'-CTC 3'	5'-ggC 3'	5'-CCA 3'		5'-CCT 3'	5'-ATA 3'	5'-CCT 3'	5'-TTg 3'
	2 nd I			98		361		361		459	361
	5'-CCA 3'			5'-CTT 3'		5'-AgT 3'		5'-AgT 3'		5'-gAT 3'	5'-AgT 3'
				98							418
				5'-CAC 3'							5'-Agg 3'
				194							419
				5'-CgT 3'							5'-gTC 3'
				527							419
				5'-TgA 3'							5'-gTT 3'
3'-primer(s) ³	289	218	312	311	270	341	512	289	3 rd I	201	213
	5'-AgC 3'	5'-gCT 3'	5'-AgT 3'	5'-ggT 3'	5'-TAg 3'	5'-CgT 3'	5'-CCA 3'	5'-AgT 3'	5'-CTC 3'	5'-CTC 3'	5'-Cgg 3'
	289	527	312	317	3 rd I	343	538	302		559	289
	5'-AgC 3'	5'-CCg 3'	5'-AgT 3'	5'-CgT 3'	5'-CTC 3'	5'-T 3'	5'-gTC 3'	5'-ggT 3'		5'-CTC 3'	5'-AgC 3'
	291	538	361	3 rd I		343	580	527			289
	5'-TCg 3'	5'-CCA 3'	5'-CCA 3'	5'-gCA 3'		5'-g 3'	5'-TCC 3'	5'-CCg 3'			5'-AgC 3'
	539	538	459			527		538			539
	5'-TCT 3'	5'-gCA 3'	5'-AgA 3'			5'-CCg 3'		5'-CCg 3'			5'-TCT 3'
						527		540			
						5'-CCg 3'		5'-CTT 3'			
						527					
						5'-CCg 3'					
						527					
						5'-CCg 3'					
						530					
						5'-CCA 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 1070 or 800 base pairs respectively, well distribution as outlined in the table. Well number 73 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.



0197

For *In Vitro* Diagnostic Use
MA123 v02 SSP PI Template
Date: June 2025, Rev. No: 00

101.702-24/06 – including *Taq* polymerase
101.702-24u/06u – without *Taq* polymerase

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Lot No.: **2V7**

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.:	202461201	202461202	202461203	202461204	202461205	202461206	202461207	202461208	202461209	202461210	202461211	202461212	202461213	202461214	202461215	202461216
	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		-	+	-	+	-	-	-	-	-	-	+	-	-	-	-	-

101.702-24/06 – including *Taq* polymerase
101.702-24u/06u – without *Taq* polymerase

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Lot No.: **2V7**

Lot-specific information

CELL LINE VALIDATION SHEET																				
HLA-A low resolution primer set ²																				
					Prod. No.:	Well														
						17	18	19	20	21	22	23	24							
						2025634	17	2024612	18	2024612	19	2024612	20	2024612	21	2025635	23	2024612	24	
	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			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
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		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-



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For *In Vitro* Diagnostic Use
MA123 v02 SSP PI Template
Date: June 2025, Rev. No: 00

101.702-24/06 – including *Taq* polymerase
101.702-24u/06u – without *Taq* polymerase

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Lot No.: **2V7**

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, 20 and 22 one or two 5'-primers were not possible to be tested, and in primer solutions 3, 6, 8, 9, 10, 12, 13, 16 and 18 one or two 3'-primers were not possible to be tested.



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For *In Vitro* Diagnostic Use
MA123 v02 SSP PI Template
Date: June 2025, Rev. No: 00

101.702-24/06 – including *Taq* polymerase
101.702-24u/06u – without *Taq* polymerase

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Lot No.: **2V7**

Lot-specific information

CELL LINE VALIDATION SHEET																					
HLA-B low resolution SSP kit ²																					
					Prod. No.:	Well															
						25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
						202461301	202461802	202461303	202461304	202461305	202461306	202461307	202461308	202461309	202461310	202461311	202461312	202461313	202461314	202461315	202461316
	IHCW 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		-	-	-	+	-	-	-	-	-	-	-	+	-	-		

101.702-24/06 – including *Taq* polymerase
101.702-24u/06u – without *Taq* polymerase

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Lot No.: **2V7**

Lot-specific information

HLA-B low resolution SSP kit ²																					
				Well																	
				41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56		
				202461317	202461318	202461319	202461320	202461321	202461322	202461323	202461324	202461325	202461326	202461327	202461328	202461329	202461330	202461331	202461332		
Prod. No.:																					
IHC 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	+	+	-	-	-	-	-	-	-	-	-	-	+	-	-	-	



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For *In Vitro* Diagnostic Use
MA123 v02 SSP PI Template
Date: June 2025, Rev. No: 00

101.702-24/06 – including *Taq* polymerase
101.702-24u/06u – without *Taq* polymerase

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“Instructions for Use” (IFU)

Lot No.: **2V7**

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		
						202461333	202461334	202461835	202461336	202461337	202461338	202461339	202461340	202461341	202461342	202461343	202461344	202461345	202461346	202461347	202461348		
	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		-	-	-	-	-	+	-	-	-	-	-	-	+	-	+	+	-	



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For *In Vitro* Diagnostic Use
MA123 v02 SSP PI Template
Date: June 2025, Rev. No: 00

101.702-24/06 – including *Taq* polymerase
101.702-24u/06u – without *Taq* polymerase

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Lot No.: **2V7**

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, 64, 65 and 66 were tested by separately adding one or two additional 3'-primers, and one or two additional 5'-primers respectively. 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. 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.

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.



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For *In Vitro* Diagnostic Use
MA123 v02 SSP PI Template
Date: June 2025, Rev. No: 00

101.702-24/06 – including *Taq* polymerase
101.702-24u/06u – without *Taq* polymerase

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

Lot No.: **2V7**

Lot-specific information

CELL LINE VALIDATION SHEET																	
HLA-C low resolution SSP primer set ²																	
										Well							
										73	74	75	76	77	78	79	80
										81	82	83	84	85	86	87	88
Prod. No.:										202563701	202563702	202563703	202563704	202563705	202563706	202563707	202563708
										202563709	202563710	202563711	202563712	202563713	202563714	202133915	202563716
IHC cell line ¹				C*													
1	9001	SA		*07:02		-	-	-	-	-	-	-	-	-	-	-	-
2	9280	LK707		*07:01	*15:05	-	-	+	-	-	-	-	+	+	-	-	-
3	9011	E4181324		*12:02		-	-	-	-	-	-	-	-	+	-	-	-
4	9275	GU373		*03:04	*04:01	-	-	+	+	-	+	-	-	+	-	+	-
5	9009	KAS011		*06:02		-	-	-	-	-	-	-	+	-	-	+	-
6	9353	SM		*03:04	*07:02	-	-	+	+	-	-	-	-	+	-	-	-
7	9020	QBL		*05:01		-	-	-	-	-	+	-	-	+	-	-	+
8	9007	DEM		*04:01		-	-	-	-	-	+	-	-	+	-	-	-
9	9026	YAR		*12:03		-	-	-	-	-	-	-	-	+	+	+	-
10	9107	LKT3		*01:02		+	-	-	-	-	-	-	-	-	-	-	-
11	9051	PITOUT		*16:01		-	-	-	-	-	-	-	-	+	-	-	-
12	9052	DBB		*06:02		-	-	-	-	-	-	+	-	+	-	+	-
13	9004	JESTHOM		*01:02		+	-	-	-	-	-	-	-	-	-	-	-
14	9071	OLGA		*01:02	*03:04	+	-	+	+	-	-	-	-	-	-	-	-
15	9075	DKB		*03:04		-	-	+	+	-	-	-	-	-	-	-	-
16	9037	SWEIG007		*02:02		-	+	+	-	-	+	-	-	-	-	+	-
17	9282	CTM3953540		*03:03	*07:01	-	-	-	+	+	-	-	-	+	-	-	-
18	9257	32367		*01:02	*07:05	+	-	-	-	-	-	-	-	+	-	-	-
19	9038	BM16		*07:01		-	-	-	-	-	-	-	-	+	-	-	-
20	9059	SLE005		*03:04		-	-	+	+	-	-	-	-	-	-	-	-
21	9064	AMALA		*03:03		-	-	-	+	+	-	-	-	-	-	-	-
22	9056	KOSE		*12:03		-	-	-	-	-	-	-	-	-	+	+	+
23	9124	IHL		*01:02	*15:02	+	-	+	-	-	-	-	+	-	-	+	-
24	9035	JBUSH		*12:03		-	-	-	-	-	-	-	-	-	+	+	+
25	9049	IBW9		*08:02		-	-	-	-	-	-	-	-	+	-	-	-
26	9285	WT49		*07:01		-	-	-	-	-	-	-	-	+	-	-	-
27	9191	CH1007		*07:04	*15:29	-	-	+	-	-	-	-	+	+	-	-	+
28	9320	BEL5GB		*05:01	*16:01	-	-	-	-	-	-	+	-	-	+	-	+
29	9050	MOU		*16:01		-	-	-	-	-	-	-	-	+	-	+	-
30	9021	RSH		*17:01		-	+	-	-	-	-	-	-	-	+	-	-
31	9019	DUCAF		*05:01		-	-	-	-	-	-	+	-	-	+	-	+
32	9297	HAG		*17:01	*17:03	-	+	-	-	-	-	-	-	-	+	-	-
33	9098	MT14B		*03:04		-	-	+	+	-	-	-	-	-	-	-	-
34	9104	DHIF		*12:03		-	-	-	-	-	-	-	-	-	+	+	+
35	9302	SSTO		*05:01		-	-	-	-	-	-	+	-	-	-	-	+
36	9024	KT17		*03:03	*04:01	-	-	-	+	+	+	-	-	-	+	-	-
37	9065	HHKB		*07:02		-	-	-	-	-	-	-	-	+	-	-	-
38	9099	LZL		*03:03		-	-	-	+	+	-	-	-	-	-	-	-
39	9315	CML		*02:02	*07:01	-	+	+	-	-	+	-	-	+	-	-	+
40	9134	WHONP199		*01:02	*06:02	+	-	-	-	-	-	+	-	-	+	-	-
41	9055	H0301		*08:02		-	-	-	-	-	-	-	-	+	-	-	-
42	9066	TAB089		*01:02		+	-	-	-	-	-	-	-	-	-	-	-
43	9076	T7526		*01:02	*08:01	+	-	-	-	-	-	-	-	+	-	-	-
44	9057	TEM		*12:03		-	-	-	-	-	-	-	-	-	-	-	-
45	9239	SHJO		*06:02	*17:01	-	+	-	-	-	-	-	+	-	-	+	+
46	9013	SCHU		*07:02		-	-	-	-	-	-	-	-	+	-	-	-
47	9045	TUBO		*07:04	*15:02	-	-	+	-	-	-	+	+	-	-	-	+
48	9303	TER-ND		*04:01	*16:01	-	-	-	-	-	+	-	-	-	+	-	-



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Lot No.: **2V7**

Lot-specific information

CELL LINE VALIDATION SHEET												
HLA-C low resolution SSP primer set ²												
					Prod. No.:	Well						
						89	90	91	92	93	94	95
						202563717	202563718	202563719	202563720	202563721	202563722	202133923
	IHCW cell line ¹		C*									
1	9001	SA	*07:02			-	-	-	-	-	-	+
2	9280	LK707	*07:01	*15:05		+	-	-	-	+	-	+
3	9011	E4181324	*12:02			-	-	-	-	-	-	-
4	9275	GU373	*03:04	*04:01		-	+	-	-	+	+	-
5	9009	KAS011	*06:02			-	-	-	-	-	-	+
6	9353	SM	*03:04	*07:02		-	-	-	-	+	+	+
7	9020	QBL	*05:01			-	-	-	-	+	-	-
8	9007	DEM	*04:01			-	+	-	-	+	-	-
9	9026	YAR	*12:03			-	-	-	-	-	-	-
10	9107	LKT3	*01:02			-	-	-	+	-	-	-
11	9051	PITOUT	*16:01			-	+	-	-	-	-	+
12	9052	DBB	*06:02			-	-	-	-	-	-	+
13	9004	JESTHOM	*01:02			-	-	-	+	-	-	-
14	9071	OLGA	*01:02	*03:04		-	-	-	+	+	+	-
15	9075	DKB	*03:04			-	-	-	-	+	+	-
16	9037	SWEIG007	*02:02			-	-	-	-	-	-	-
17	9282	CTM3953540	*03:03	*07:01		-	-	-	-	+	+	+
18	9257	32367	*01:02	*07:05		-	-	-	+	-	-	+
19	9038	BM16	*07:01			-	-	-	-	-	-	+
20	9059	SLE005	*03:04			-	-	-	-	+	+	-
21	9064	AMALA	*03:03			-	-	-	-	+	+	-
22	9056	KOSE	*12:03			-	-	-	-	-	-	-
23	9124	IHL	*01:02	*15:02		+	-	-	+	+	-	-
24	9035	JBUSH	*12:03			-	-	-	-	-	-	-
25	9049	IBW9	*08:02			-	-	-	-	+	-	-
26	9285	WT49	*07:01			-	-	-	-	-	-	+
27	9191	CH1007	*07:04	*15:29		+	-	-	-	+	-	+
28	9320	BEL5GB	*05:01	*16:01		-	+	-	-	+	-	+
29	9050	MOU	*16:01			-	+	-	-	-	-	+
30	9021	RSH	*17:01			-	-	+	-	+	-	-
31	9019	DUCAF	*05:01			-	-	-	-	+	-	-
32	9297	HAG	*17:01	*17:03		-	-	+	-	+	-	-
33	9098	MT14B	*03:04			-	-	-	-	+	+	-
34	9104	DHIF	*12:03			-	-	-	-	-	-	-
35	9302	SSTO	*05:01			-	-	-	-	+	-	-
36	9024	KT17	*03:03	*04:01		-	+	-	-	+	+	-
37	9065	HHKB	*07:02			-	-	-	-	-	-	+
38	9099	LZL	*03:03			-	-	-	-	+	+	-
39	9315	CML	*02:02	*07:01		-	-	-	-	-	-	+
40	9134	WHONP199	*01:02	*06:02		-	-	-	+	-	-	+
41	9055	H0301	*08:02			-	-	-	-	+	-	-
42	9066	TAB089	*01:02			-	-	-	+	-	-	-
43	9076	T7526	*01:02	*08:01		-	+	-	+	+	-	-
44	9057	TEM	*12:03			-	-	-	-	-	-	-
45	9239	SHJO	*06:02	*17:01		-	-	+	-	+	-	+
46	9013	SCHU	*07:02			-	-	-	-	-	-	+
47	9045	TUBO	*07:04	*15:02		+	-	-	-	+	-	+
48	9303	TER-ND	*04:01	*16:01		-	+	-	-	+	-	+



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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 73, 74, 76, 79, 86 to 88, 92 and 94 were tested by separately adding one, two or three additional 3'-primers, and one or two additional 5'-primers respectively. One or more 3'-primers in primer solutions 80, 83, 90 and 91 were tested by separately adding one or two additional 5'-primers. One or more 5'-primers in primer solutions 78, 85 and 95 were tested by separately adding one, two or three additional 3'-primers.

In primer solutions 73, 88 and 95 one or more 5'-primers were not possible to be tested, and in primer solutions 75, 79, 83 to 88, 90 and 92 one or more 3'-primers were not possible to be tested.



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Lot No.: **2V7**

Lot-specific information

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Fax: +46-8-717 88 18

E-mail: orders-se@caredx.com

Web page: www.caredx.com

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E-mail: orders-us@caredx.com

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



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