101.704-48/12 – including *Taq* pol., IFU-01
101.704-48u/12u – without *Taq* pol., IFU-02

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Lot No.: 19Y **Lot-specific information**

Olerup SSP® DQ-DR SSP Combi Tray

Product number:	**101.704-48/12 – including *Taq* pol.** **101.704-48u/12u – without *Taq* pol.**
Lot number:	**19Y**
Expiry date:	**2017-September-01**
Number of tests:	**48 tests – Product No. 101.704-48/48u** **12 tests – Product No. 101.704-12/12u**
Number of wells per test:	**44 + 1**
Storage - pre-aliquoted primers:	**dark at -20ºC**
- PCR Master Mix:	**-20ºC**
- Adhesive PCR seals	**RT**
- Product Insert	**RT**

This Product Description is only valid for Lot No. 19Y.

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

CHANGES COMPARED TO THE PREVIOUS *OLERUP* SSP® DQ-DR SSP COMBI TRAY LOT (78V)

The format of the Product Insert and Worksheet have been changed.

The DQ-DR kit has been redesigned and improved with regards to allelic detection and discrimination and facilitated interpretation.

Five wells have been added to DQ low, wells **9 to 13**.
Eight wells have been added to DR low, wells **38 to 45**.

The DQ low resolution specificity and interpretation tables have been updated for the HLA-DQB1 alleles described since the previous *Olerup* SSP® DQ-DR Combi Tray lot was made **(Lot No. 78V)**. The kit design is based on IMGT/HLA database 3.18.0.

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

Well	5'-primer	3'-primer	rationale
2	-	Added	3'-primer added for the DQB1*06:01:13 allele.
5	Added	-	5'-primer added for the DQB1*03:02:16 allele.
7	Moved	Moved	Primer pair moved to well 12 for improved redundancy of the DQ3 serologic group of alleles.

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9	New	New	New primer pair for improved resolution of DQB1*04 alleles, strength of control band has been optimized.
10	New	New	New primer pair for increased redundancy and resolution the DQB1*05 alleles.
11	New	New	New primer pair for improved resolution of the DQ8 serologic group of alleles.
12	Added	Added	Primer pair added from well 7.
13	New	New	New primer pair added for improved redundancy of the DQB1*06 alleles.

The DR low resolution specificity and interpretation tables have been updated for the HLA-DRB1 alleles described since the previous *Olerup* SSP® DQ-DR Combi Tray lot was made **(Lot No. 78V)**. The kit design is based on IMGT/HLA database 3.18.0.

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

Well	5'-primer	3'-primer	rationale
17	-	Exchanged	3'-primer exchanged for improved HLA-specific amplification.
18	-	Added	3'-primer added for the DRB1*03:95 allele.
19	-	Added	3'-primer added for the DRB1*13:193 allele.
23	Added	-	5'-primer added for the DRB1*08:01:06 allele.
24	Added	-	5'-primer added for the DRB1*09:23 allele.
34	Added	-	5'-primers added for the DRB1*08:01:06 and DRB1*08:57 alleles.
45	-	-	Updated negative control.

Change in revision R01 compared to R00:
1. Primer mix 18 does not amplify the DRB1*03:11:01, *03:97, *11:53 and *15:100 alleles. This has been corrected in the Specificity and Interpretation Tables.
Change in revision R02 compared to R01:
1. Primer mix 35 does not amplify the DRB1*08:14 allele. This has been corrected in the Specificity and Interpretation Tables.
Change in revision R03 compared to R02:
1. Due to sharing of sequence motifs in codon 38 and 47, DRB3*01:14 will also be amplified in primer mixes 18, 19 and 30 and DRB3*01:23 in mix 18, in addition to primer mix 42.
2. The DRB1*13:02:02 allele is amplified in primer mix 19.
The Specificity and Interpretation Tables have been changed.

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Well **45** contains Negative Control primer pairs, that will amplify more than 95% 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 430 base pairs.

Length of PCR product	**105**	**200**	**105**	**80**	**75**	**80**	**85**
5'-primer[1]	**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'-primer[2]	**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							**+**

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

[2]The 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

DQ-DR SSP Combi Tray

CONTENT

The primer set contains 5'- and 3'-primers for grouping the DQB1 alleles in to the serological groups DQ2 to DQ9.
The primer set contains 5'- and 3'-primers for grouping the DRB1*01:01 to DRB1*10:07 alleles into the corresponding serological groups DR1 to DR18 as well as primer pairs for recognizing the DRB3, DRB4 and DRB5 groups of alleles.

Please note that DQB1 amplifications usually are somewhat less pronounced than e.g. DRB and DQA1 amplifications even when using the same DNA preparation and exactly the same experimental procedures.

PLATE LAYOUT

Each test consists of 45 PCR reactions in a 48 well cut PCR plate. Wells 46 to 48 are empty.

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

The 48 well cut PCR plate is marked with 'DQ-DR'.
Well No. 1 is marked with the Lot No. '19Y' in silver/gray ink.
Wells 1 to 13 – DQ low resolution primers.
Wells 14 to 44 – DR low resolution primers.
Well 45 – Negative Control (NC).
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.
Please note: When removing each 48 well PCR plate, make sure that the remaining plates stay covered. Use a scalpel or a similar instrument to carefully cut the foil between the plates.

INTERPRETATION

Only the DQB1 alleles will be amplified by the 13 wells of the DQ low resolution primer set, **wells 1 to 13**. Thus, the interpretation of DQ low resolution typings is not influenced the DQB2 and DQB3 genes.
Only HLA-DRB alleles will be amplified by the 31 wells of the DR low resolution primer set, **wells 14 to 44**. Thus, the interpretation of DR low resolution typings is not influenced by other HLA class II genes.

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UNIQUELY IDENTIFIED ALLELES

All the DQB1 alleles, i.e. **DQB1*05:01 to 05:86, DQB1*06:01 to 06:166, DQB1*02:01 to 02:48, DQB1*03:01 to 03:165 and DQB1*04:01 to 04:25N**, recognized by the HLA Nomenclature Committee in October 2014[1,2] will be amplified by the primers in the DQ low resolution SSP primer set, **wells 1 to 13**. The DQB1 alleles will be grouped into their corresponding serological specificities[3], i.e.:

DQ5(1) =	DQB1*05:01:01-05:05
DQ6(1) =	DQB1*06:01:01-06:44
DQ2 =	DQB1*02:01:01-02:05
DQ3 =	DQB1*03:06, 03:10, 03:14
DQ7(3) =	DQB1*03:01:01-03:01:06, 03:04, 03:09, 03:13, 03:16, 03:19
DQ8(3) =	DQB1*03:02:01-03:02:05, 03:05:01-03:05:04, 03:07-03:08, 03:11, 03:18
DQ9(3) =	DQB1*03:03:02:01-03:03:04, 03:12, 03:15, 03:17, 03:20
DQ4 =	DQB1*04:01-04:02

[1]DQB1 alleles listed on the IMGT/HLA web page 2014-October-10, release 3.18.0, www.ebi.ac.uk/imgt/hla.
[2]Alleles 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.
[3]The serological split of the DQB1*05:05 to 05:86 alleles, the DQB1*06:06 to 06:07, 06:10, 06:13, 06:15-06:24 and 06:27 to 06:166 alleles, the DQB1*02:04-02:48 alleles, the DQB1*03:07-03:09 and 03:11 to 03:165 alleles and the DQB1:04:0301-04:25 alleles is not known. In this table we have used the expert-assigned serological grouping in Tissue Antigens (2009) 73:95-170, and also inferred the serological grouping from the naming of the sequence-defined allele.

All the HLA-DRB1, -DRB3, -DRB4[1] and –DRB5 alleles, i.e. **DRB1*01:01 to 10:07, DRB3*01:01 to DRB3*03:03, DRB4*01:01 to DRB4*01:08 and DRB5*01:01 to DRB5*02:06**, recognized by the HLA Nomenclature Committee in October 2014[2,3] will be amplified by the primers in the DR low resolution SSP kit. The HLA-DRB alleles will be grouped into their corresponding serological specificities[4,5].

[1]The DRB4*02:01N and DRB4*03:01N null alleles will not be amplified by the DR low resolution primer set.
[2]DRB alleles listed on the IMGT/HLA web page 2014-October-10, release 3.18.0, www.ebi.ac.uk/imgt/hla.
[3]Alleles 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.
[4]The serological split of all DRB1 alleles is not known. In this table we use the expert-assigned serological grouping in Tissue Antigens (2009) 73:95-170 and the serological grouping of the sequence-defined allele.
[5]The DRB1*03:76 and the DRB1*13:176 alleles yield identical amplification patterns with the DR low resolution primer set. These alleles can be separated by the respective high resolution primer sets.
The DRB1*03:11:01 and DRB1*13:02:02 alleles yield identical amplification patterns with the DR low resolution primer set. These alleles can be separated by the respective high resolution primer sets.

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SPECIFICITY TABLE

DQ low resolution primer set

Specificities and sizes of the PCR products of the 13 primer mixes of the DQ low resolution primer set

Primer Mix	Size of spec. PCR product[1]	Size of control band[2]	DQ serology[3]	Amplified DQB1 alleles[4]
1	135 bp, 230 bp	**515 bp**	5	*05:01:01:01-05:59, 05:61-05:81, 05:83-05:86
2[9]	135 bp, 185 bp, 220 bp, 270 bp	**515 bp**	1, 5, 6	*06:01:01-06:145, 06:147-06:166
3	210 bp	430 bp	2	*02:01:01-02:48
4[6]	220 bp	**515 bp**	3, 7	*03:01:01:01-03:01:25, 03:04:01-03:04:02, 03:09-03:10:02, 03:13-03:14:02, 03:16, 03:19, 03:21-03:22, 03:24, 03:27-03:29, 03:35-03:36, 03:42, 03:44, 03:46-03:60, 03:69, 03:71, 03:73, 03:75-03:77, 03:80, 03:82-03:84N, 03:92-03:94, 03:101-03:103, 03:108, 03:114-03:116, 03:118N-03:122, 03:127-03:131, 03:133-03:135, 03:138-03:140, 03:142-03:144, 03:147-03:148, 03:150, 03:152, 03:157-03:160, 03:162-03:165
5[6]	130 bp, 220 bp	**515 bp**	6, 8	*03:02:01-03:02:17, 03:05:01-03:05:04, 03:07-03:08, 03:11, 03:18, 03:32, 03:37, 03:45, 03:61, 03:63-03:64, 03:66N-03:68, 03:70, 03:85, 03:104, 03:106-03:107, 03:125, 03:132, 03:146, 03:153, 03:161, 06:29, 06:123, 06:139
6[6,7]	135 bp	**515 bp**	2, 3, 6, 9	*02:03, 03:03:02:01-03:03:13, 03:06, 03:12, 03:15, 03:20, 03:25-03:26, 03:30-03:31, 03:33-03:34, 03:38-03:41, 03:43, 03:65, 03:74, 03:79, 03:86-03:91Q, 03:95N-03:99Q, 03:104-03:105, 03:111-03:113, 03:117, 03:123-03:124, 03:126, 03:136-03:137, 03:141, 03:145, 03:149, 03:155-03:156, 04:03:01-04:03:02, 06:03:10, 06:51:01, 06:66, 06:96
7[5,7]	85 bp	**515 bp**	3, 7, 8, 9	*03:01:01:01-03:01:06, 03:01:08-03:05:04, 03:07, 03:09-03:24, 03:26-03:57, 03:59-03:64, 03:66N-03:103, 03:105-03:106, 03:108-03:136, 03:138-03:165
8[6,9]	160 bp, 205 bp	430 bp	4	*03:132, 04:01:01-04:02:07, 04:03:01-04:25N

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9	225 bp	430 bp	4	*04:01:01-04:03:02, 04:06-04:21, 04:22[w], 04:23, 04:25N
10	215 bp	430 bp	5	*05:01:01:01-05:03:09, 05:03:11-05:03:16, 05:05:01-05:33, 05:35-05:43, 05:45-05:51, 05:53, 05:55-05:71, 05:74-05:76, 05:78-05:86
11	185 bp	430 bp	8, 9	*03:03:11, 03:05:01, 03:05:03, 03:17:01, 03:61, 03:72, 03:100
12[6]	185 bp	430 bp	3, 4, 7, 8, 9,	*03:01:01:01-03:01:01:03, 03:01:03-03:01:07, 03:01:09-03:02:02, 03:02:04-03:02:12, 03:02:14-03:03:02:03, 03:03:04-03:04:02, 03:05:03-03:17:01, 03:18-03:19, 03:21-03:22, 03:24-03:36, 03:38-03:60, 03:62-03:71, 03:74, 03:76-03:98, 03:101-03:103, 03:106-03:108, 03:110-03:111, 03:113-03:117, 03:119-03:131, 03:133-03:153, 03:155, 03:157-03:161, 03:163-03:165, 04:01:03
13[8]	185 bp	**515 bp**	6	*04:10, 06:02:01-06:02:22, 06:14:01-06:16, 06:19:01-06:20, 06:23-06:24, 06:33, 06:37, 06:46-06:50, 06:51:02, 06:68, 06:70-06:84, 06:95, 06:97, 06:107, 06:109, 06:111-06:117, 06:122, 06:124-06:127, 06:136-06:138, 06:146-06:147, 06:150-06:152, 06:156, 06:159, 06:161-06:163, 06:166

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

[2]The internal positive control primer pairs amplify segments of the human growth hormone gene. The internal positive control bands are 430 or 515 base pairs respectively, well distribution as outlined in the table. Well number 1 contains the longer, 515 bp, internal positive control band. The well distribution of the internal controls can help in orientation of the kit on gel photo, as well as allow for kit identification. In the presence of a specific amplification the intensity of the control band often decreases. In the presence of a specific amplification the intensity of the control band often decreases.

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[3]The serological reactivity of all DQ 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. The DQB1*03:10 allele has been assigned type DQ7 by NMDP.

[4]For several DQB1 alleles 1st and/or 3rd exon(s) and beyond, as well as intron nucleotide sequences, are not available. In these instances it is not known whether some of the primers of the SSP sets are completely matched with the target sequences or not. Assumption is made that unknown sequences in these regions are conserved within allelic groups.

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

[6]Primer mixes 4 to 6, 8 and 12 may give rise to a lower yield of HLA-specific PCR product than the other DQ low primer mixes.

[7]Primer mix 6 and 7 may have a tendency to giving rise to primer oligomer formation.

[8]Primer mix 13 may have a tendency of unspecific amplification.

[9]The primer pairs in wells 2 and 8 will in some samples give rise to two HLA-specific PCR fragments.

'w', may be weakly amplified.

Lot No.: 19Y **Lot-specific information**

SPECIFICITY TABLE

DR low resolution primer set

Specificities and sizes of the PCR products of the 31+1 primer mixes of the DR low resolution primer set

Primer Mix	Size of spec. PCR product[1]	Size of control band[2]	DR serology[3]	Amplified HLA-DRB alleles[4]
14[6,8]	210 bp, 235 bp, 260 bp	**515 bp**	1	*01:01:01-01:02:10, 01:04-01:38, 01:40N-01:65
15	200 bp	430 bp	1, 103	*01:03, 01:39N, 01:42, 01:61
16[8,11]	210 bp, 230 bp	430 bp	2, 15	*15:01:01:01-15:114, 15:115N^{w}
17[11]	210 bp	430 bp	16	*16:01:01-16:05:02, 16:07-16:24
18[5,6,7]	120 bp, 220 bp	430 bp	3, 11, 17, 18,	*03:01:01:01-03:10, 03:12-03:75, 03:77-03:96, 03:98-03:115, 11:07, 11:103, 11:105, 11:107, 11:125, 15:25
19[5,6,7]	75 bp, 210 bp	430 bp	3, 6, 11, 13, 14, 17	*03:01:01:01-03:01:23, 03:04:01-03:06, 03:08-03:16, 03:18-03:20, 03:22-03:23, 03:25-03:26, 03:28, 03:30-03:31, 03:33-03:34, 03:36-03:37, 03:43-03:48, 03:50-03:52, 03:54-03:68N, 03:70-03:73, 03:75-03:86, 03:89, 03:91-03:93, 03:95-03:96, 03:98-03:100:02, 03:104, 03:106-03:110, 03:112-03:114, 08:40, 11:02:01-11:03, 11:11:01-11:11:03, 11:14:01-11:14:02, 11:16, 11:20-11:21, 11:36, 11:40-11:41, 11:48, 11:59, 11:63:01-11:63:02, 11:65:01-11:65:02, 11:68, 11:70, 11:73, 11:76, 11:79-11:80, 11:83, 11:85-11:87, 11:93, 11:118, 11:122, 11:124, 11:127, 11:131-11:132, 11:135, 11:138-11:139, 11:142, 11:151, 11:153, 11:161, 11:168, 11:171, 13:01:01-13:04, 13:08, 13:10, 13:15-13:17, 13:19-13:20, 13:22-13:24, 13:27-13:29, 13:31-13:41, 13:43, 13:45, 13:48, 13:51-13:54, 13:57, 13:59, 13:61:01-13:61:02, 13:63-13:66:02, 13:68-13:76, 13:78-13:81, 13:83-13:85, 13:87-13:99, 13:101-13:102, 13:104-13:107, 13:109, 13:111-13:117, 13:120-13:131, 13:133, 13:135, 13:137N-13:145, 13:147-13:149, 13:151-13:153, 13:155, 13:159, 13:162, 13:165-13:168, 13:170-13:180, 13:182, 13:184-13:188, 13:190-13:191, 13:193, 14:16, 14:19, 14:21, 14:45, 14:82, 14:95, 14:109, 14:120, 14:122, 14:132, 14:137N, 14:152N
20[5,6]	85 bp, 210 bp	430 bp	3, 6, 11, 13, 14, 1403, 18	*03:02:01-03:03, 03:27, 03:29, 03:38, 03:53, 03:74, 03:88, 03:90, 03:102-03:103, 03:115, 11:13:01^{w}-11:13:02^{w}, 11:26, 11:34, 13:15, 13:19, 13:26:01-13:26:02, 13:44, 13:53, 13:57, 13:85-13:86, 13:104, 13:193, 14:02:01-14:03:02, 14:06:01-14:06:03, 14:09, 14:12:01-14:13, 14:17-14:21, 14:24, 14:27, 14:29-14:30, 14:32:01^{w}-14:32:02^{w}, 14:33, 14:40-14:41, 14:47-14:49, 14:51, 14:63, 14:65^{w}, 14:67, 14:77-14:78, 14:80-14:81, 14:83, 14:85, 14:89, 14:94, 14:98, 14:102, 14:106, 14:108-14:109, 14:115, 14:119, 14:121, 14:135, 14:146, 14:154, 14:156, 14:159

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21[5,6,8]	100 bp, 175 bp	430 bp	3, 4	*04:01:01-04:05:11, 04:05:13-04:186N
22[11]	235 bp	430 bp	7	*07:01:01:01-07:01:08, 07:03-07:35
23[6]	170 bp, 215 bp, 250 bp	**515 bp**	8, 11, 12, 14	*08:01:01-08:19, 08:21-08:56, 08:58-08:60N, 11:67, 12:04, 12:16:01-12:16:03, 12:22, 12:39, 12:49, 14:11, 14:15, 14:68:01, 14:93, 14:148
24[5,6]	90 bp, 135 bp, 165 bp 190 bp	430 bp	3, 9, 11	*03:08, 03:65, 03:112, 09:01:02-09:24, 11:07, 11:103, 11:105, 11:107, 11:125
25	180 bp	430 bp	10, 11, 13	*03:76, 10:01:01-10:07, 11:59, 11:80, 11:83, 11:87, 11:135, 11:142, 13:27, 13:41, 13:71, 13:129, 13:176
26[5,6]	100 bp, 170 bp	430 bp	3, 8, 11, 13, 14	*03:08, 03:65, 08:31, 08:41, 11:01:01-11:70, 11:72-11:171
27[5]	90 bp, 110 bp	430 bp	12	*08:32, 08:53, 12:01:01-12:51
28[6,8]	220 bp	430 bp	6, 8, 11, 13, 14, 1403	*03:76, 08:20-08:21, 11:01:01-11:04:11, 11:06:01-11:06:03, 11:08:01-11:12:02, 11:14:01-11:16, 11:18-11:21, 11:23:01-11:25, 11:27:01-11:33, 11:35-11:51, 11:54:01-11:54:02, 11:56-11:66, 11:68, 11:70, 11:72-11:81, 11:83-11:88, 11:90-11:97, 11:99-11:102:02, 11:106, 11:108-11:124, 11:126-11:135, 11:137-11:142, 11:144-11:158, 11:160-11:171, 13:01:01-13:02:01, 13:02:03-13:08, 13:10-13:16, 13:18-13:43, 13:45-13:85, 13:87-13:115, 13:117-13:128, 13:130-13:145, 13:147-13:166, 13:168-13:174, 13:176-13:182, 13:184-13:191, 14:03:01-14:03:02, 14:12:01-14:12:02, 14:16, 14:19, 14:21-14:22, 14:25, 14:27, 14:40, 14:53, 14:63, 14:67, 14:69, 14:74, 14:77-14:78, 14:84-14:85, 14:98, 14:102, 14:105, 14:109, 14:115-14:116, 14:128, 14:135, 14:137N, 14:144, 14:156, **DRB3*02:27**
29[6,8]	200 bp, 225 bp	430 bp	6, 8, 11, 12, 13, 14	*08:01:01-08:01:05, 08:02:01-08:02:04, 08:04:01-08:09, 08:11, 08:16-08:17, 08:20-08:22, 08:24, 08:26, 08:28, 08:31, 08:39, 08:41-08:44, 08:50, 08:52, 08:54-08:55, 08:57, 08:59, 11:01:01-11:01:17, 11:01:20-11:06:03, 11:09-11:12:02, 11:14:01-11:16, 11:20-11:21, 11:23:01-11:25, 11:27:01-11:30, 11:32-11:33, 11:35-11:41, 11:43-11:44, 11:46:01-11:51, 11:54:01-11:56, 11:58:01-11:63:02, 11:65:01-11:70, 11:72, 11:74:01-11:78, 11:80-11:88, 11:90-11:97, 11:99-11:102:02, 11:106, 11:108-11:118, 11:120-11:124, 11:126-11:129, 11:133-11:135, 11:137-11:142, 11:144-11:152, 11:154-11:158, 11:160-11:171, 12:02:01-12:02:06, 12:13, 12:15-12:16:03, 12:18-12:21, 12:23, 12:26-12:27, 12:31N-12:33, 12:37, 12:42-12:45, 12:49-12:51, 13:01:01-13:02:01, 13:02:03-13:02:10, 13:04-13:05:02, 13:07:01-13:09, 13:11:01-13:11:02, 13:14:01-13:24, 13:26:01-13:29, 13:31-13:32, 13:34-13:36, 13:38-13:43, 13:45-13:55, 13:57, 13:59, 13:61:01-13:65, 13:67-13:76, 13:78-13:80, 13:83-13:84, 13:87, 13:91-13:93, 13:96:01-13:100, 13:102-13:109, 13:111-13:114, 13:116-13:117, 13:121, 13:123-13:132, 13:135-13:136, 13:138-13:150, 13:153, 13:155, 13:158-13:160, 13:162, 13:164-13:166, 13:168-13:169, 13:171:01, 13:173, 13:175, 13:177, 13:179, 13:182, 13:184-13:187, 13:189-13:192, 14:15-14:16, 14:22,

				14:24-14:25, 14:27, 14:37, 14:53, 14:73, 14:105, 14:128
30[7]	175 bp	430 bp	3, 6, 11, 13, 14, 1403, 17, 18	*03:01:01:01-03:07, 03:09, 03:11:01-03:41, 03:43-03:45, 03:47-03:63, 03:66-03:68N, 03:70-03:86, 03:88-03:91, 03:93-03:110, 03:112-03:115, 08:20, 13:01:01-13:16, 13:18-13:42, 13:44, 13:46-13:66:02, 13:68-13:102, 13:104-13:115, 13:117-13:121, 13:123-13:158, 13:161-13:164, 13:166-13:170, 13:172-13:174, 13:176-13:178, 13:180-13:182, 13:184-13:190, 13:192-13:193, 14:02:01-14:03:02, 14:05:01-14:06:03, 14:09, 14:12:01-14:14, 14:17-14:21, 14:23:01, 14:23:03-14:24, 14:27, 14:29-14:30, 14:33, 14:36-14:37, 14:40-14:45, 14:47-14:48, 14:51, 14:56, 14:59, 14:63-14:65, 14:67, 14:77-14:78, 14:80-14:81, 14:83-14:85, 14:89, 14:91, 14:94-14:96, 14:98, 14:100, 14:102-14:103, 14:106, 14:108-14:109, 14:115-14:116, 14:121, 14:123, 14:127:01-14:127:02, 14:134-14:136, 14:144, 14:154-14:156, 14:159
31[5,6]	100 bp, 150 bp, 195 bp, 240 bp	430 bp	4, 6, 8, 13, 14, 1404	*04:62, 04:69, 04:73, 04:105:01-04:105:02, 04:122, 04:146, 08:08, 11:69, 11:82, 13:45, 14:01:01-14:01:02, 14:01:04, 14:04:01, 14:07:01-14:07:02, 14:10, 14:16, 14:22, 14:25-14:26, 14:28, 14:31-14:32:03, 14:35, 14:37-14:39, 14:49-14:50, 14:53-14:54:01, 14:54:03-14:55, 14:57-14:58, 14:60-14:62, 14:68:01-14:71, 14:73-14:76, 14:79, 14:82, 14:86-14:88, 14:90, 14:93, 14:99, 14:101, 14:104-14:105, 14:107, 14:110-14:114, 14:117-14:120, 14:122, 14:124-14:125, 14:128-14:129, 14:131, 14:137N-14:140, 14:142-14:143, 14:145-14:147, 14:149-14:153, 14:157-14:158, **DRB4*01:03:01:02N**
32[5,6,9]	110 bp, 145 bp, 170 bp	430 bp	3, 6, 9, 11, 13, 14, 1404	*03:10, 09:01:02-09:01:05, 09:01:07-09:02:02, 09:04-09:22, 09:24, 11:13:01-11:13:02, 11:17, 11:52, 13:43, 13:159, 13:171:01, 13:179, 13:191, 13:193, 14:01:01-14:02:02, 14:04:01-14:11, 14:13-14:14, 14:16-14:18, 14:19[w], 14:20, 14:21[w], 14:22-14:23:04, 14:26, 14:28-14:36, 14:38:01-14:39, 14:41, 14:43-14:52, 14:54:01-14:54:03, 14:54:04[w], 14:54:05-14:57, 14:59-14:62, 14:64-14:65, 14:68:01, 14:70-14:76, 14:79-14:83, 14:86-14:88, 14:90-14:97, 14:99-14:101, 14:103-14:108, 14:109[w], 14:110-14:114, 14:117-14:127:02, 14:129-14:134, 14:137N-14:140, 14:142-14:143, 14:145-14:155, 14:157-14:159, 15:27, 15:34, 15:66:01-15:66:02
33[5,6,8]	110 bp, 150 bp, 180 bp 220 bp	430 bp	2, 3, 4, 6, 8, 11,13, 14, 1403, 1404, 16	*03:10, 08:09, 08:20-08:21, 08:32, 08:35, 08:36:02, 08:53, 11:13:01-11:13:02, 11:17, 11:23:01-11:23:02, 11:25, 11:31, 11:45, 11:52, 11:55, 11:64, 11:89, 11:96, 11:119, 11:148, 11:159, 13:13, 13:18, 13:43, 13:45, 13:47, 13:55, 13:119, 13:144, 13:146, 13:154, 13:156, 13:158-13:159, 13:164, 13:171:01, 13:179, 13:191, 14:01:01-14:01:04, 14:03:01-14:05:04, 14:07:01-14:08, 14:10-14:12:02, 14:14-14:16, 14:18, 14:22-14:23:04, 14:25-14:28, 14:31-14:32:03, 14:34-14:36, 14:38:01-14:40, 14:42-14:45, 14:49-14:50, 14:53-14:65, 14:67-14:79, 14:81-14:82, 14:84-14:93, 14:95-14:97, 14:99-14:105, 14:107, 14:110-14:120, 14:122-14:140, 14:142-14:158, 15:21[w], 16:04[w], 16:18[w]
34	170 bp	430 bp	8, 12, 13, 14	*03:92, 08:01:01-08:04:05, 08:04:07-08:06, 08:09-08:10, 08:12-08:14, 08:16-08:18, 08:21-08:24, 08:26-08:30:03, 08:32-08:33, 08:35-08:40, 08:42-08:51, 08:53-08:60N, 12:09, 12:46, 12:48[w], 13:17, 13:116, 13:175, 14:15,

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				14:52, 14:126:01
35[5,6,8]	75 bp 175 bp 265 bp	430 bp	2, 4, 8, 11, 13, 14	*04:12, 04:18, 04:25, 04:58, 08:04:01, 08:04:02[w]-08:04:03[w], 08:04:04-08:04:07, 08:06, 08:10, 08:12, 08:20, 08:22, 08:28, 08:54, 08:59, 11:25, 11:67, 11:119, 13:18, 13:144, 13:156, 13:164, 14:12:01-14:12:02, 14:15, 14:78, 14:84, 14:156, 15:21
36	135 bp	430 bp	8, 12, 13	*03:92, 08:17, 08:28, 08:37, 08:45, 11:67, 12:01:01-12:20, 12:22-12:37, 12:39-12:41, 12:43-12:51, 13:17, 13:175, 14:138
37	180 bp	430 bp	3 ,6, 11, 13, 14	*03:12, 13:03:01-13:04, 13:12:01-13:13, 13:21:01-13:21:02, 13:30, 13:32-13:33:03, 13:38, 13:48-13:49, 13:55, 13:58, 13:65-13:66:02, 13:75, 13:81, 13:88-13:90, 13:93-13:95, 13:101, 13:108, 13:115, 13:118, 13:120, 13:122, 13:133-13:134, 13:139, 13:151-13:152, 13:154, 13:161, 13:164, 13:167, 13:169, 13:174, 13:188, 14:13, 14:63, 14:65, 14:78, 14:85, **DRB5*01:08N**
38	150 bp	430 bp	2, 4, 6, 11, 13	*11:16, 11:20, 11:40, 11:59, 11:63:02, 11:118, 11:122, 13:01:01-13:02:01, 13:02:03-13:02:10, 13:08, 13:15-13:16, 13:19-13:20, 13:27-13:29, 13:31-13:32, 13:34-13:36, 13:39-13:41, 13:43, 13:51-13:53, 13:57, 13:59, 13:61:01-13:61:02, 13:63-13:65, 13:67-13:69, 13:71-13:74, 13:76, 13:78-13:80, 13:83-13:84, 13:87, 13:91-13:93, 13:96:01-13:97:01, 13:98-13:99, 13:102-13:107, 13:109, 13:111-13:114, 13:117, 13:121, 13:123-13:128, 13:130-13:131, 13:135, 13:138-13:143, 13:145, 13:147-13:148, 13:153, 13:155, 13:159-13:160, 13:165-13:166, 13:168, 13:171:01, 13:173, 13:175, 13:177, 13:179, 13:182-13:187, 13:190-13:191, 14:16, 14:57, 15:10
39	145 bp	430 bp	3, 6, 11, 13, 14, 17	*03:01:01:01-03:01:22, 03:04:01-03:05:03, 03:07-03:16, 03:18-03:25, 03:28-03:30, 03:32-03:34, 03:36-03:37, 03:39-03:40, 03:43-03:52, 03:54-03:59, 03:61-03:68N, 03:70-03:73, 03:76-03:79, 03:81, 03:83-03:84, 03:86, 03:89, 03:91, 03:93-03:101, 03:104-03:110, 03:112-03:114, 11:01:01-11:01:06, 11:01:08-11:04:11, 11:06:01-11:16, 11:18-11:21, 11:23:01-11:29, 11:31-11:36, 11:38-11:40, 11:42-11:47, 11:49:01-11:49:02, 11:51, 11:53-11:55, 11:57-11:66, 11:68-11:70, 11:72-11:82, 11:84:01-11:87, 11:89-11:103, 11:105-11:106, 11:108-11:144, 11:146-11:148, 11:150-11:169N, 13:01:01-13:01:08, 13:01:10-13:02:10, 13:04-13:06, 13:09-13:11:02, 13:14:01-13:16, 13:18, 13:20-13:25, 13:27-13:31, 13:34, 13:39, 13:41-13:46, 13:50:01-13:52, 13:54, 13:56-13:57, 13:59, 13:61:01-13:64, 13:66:01-13:66:02, 13:68-13:69, 13:71, 13:73-13:75, 13:77-13:80, 13:82-13:83, 13:86-13:87, 13:91-13:93, 13:96:01-13:100, 13:102, 13:104-13:107, 13:109-13:114, 13:117, 13:119, 13:121, 13:123-13:132, 13:136-13:148, 13:150, 13:153-13:158, 13:162-13:163, 13:165-13:166, 13:168-13:173, 13:176, 13:178-13:179, 13:181, 13:184-13:187, 13:190, 13:192-13:193, 14:17, 14:21, 14:30, 14:33, 14:35, 14:42, 14:53, 14:64-14:65, 14:72, 14:95, 14:128, 14:132, 14:134
40[6]	145 bp 210 bp 235 bp	430 bp	6, 8, 11, 13, 14, 1403, 1404	*08:09, 08:20-08:21, 08:35, 11:13:01-11:13:02, 11:17, 11:23:01-11:23:02, 11:25, 11:45, 11:52, 11:55, 11:64, 11:89, 11:119, 11:149, 11:159, 13:08, 13:13, 13:18, 13:47, 13:55, 13:119, 13:144, 13:146, 13:154, 13:156, 13:158, 13:164, 14:01:01-14:01:04, 14:02:02[?],

				14:03:01-14:05:04, 14:07:01-14:08, 14:09[?], 14:10-14:12:02, 14:14-14:15, 14:16[?], 14:18, 14:19[?]-14:20[?], 14:22[?], 14:23:01-14:23:04, 14:25[?], 14:26-14:28, 14:29[?]-14:30[?], 14:31-14:32:02, 14:33[?], 14:34-14:36, 14:37[?], 14:38:01-14:40, 14:41[?], 14:42-14:45, 14:47[?]-14:49[?], 14:50, 14:51[?]-14:53[?], 14:54:01-14:65, 14:67-14:68:01, 14:69[?], 14:70-14:72, 14:73[?]-14:74[?], 14:75, 14:76[?], 14:77-14:78, 14:79[?]-14:80[?], 14:81-14:82, 14:83[?], 14:84-14:93, 14:94[?], 14:95-14:97, 14:98[?], 14:99-14:103, 14:104[?]-14:109[?], 14:110, 14:111[?], 14:112-14:118, 14:119[?], 14:120, 14:121[?], 14:122-14:127:02, 14:128[?], 14:129-14:145, 14:146[?], 14:147-14:158, 14:159[?]
41	140 bp	430 bp	6, 13, 14	*03:76, 13:10, 13:85, 13:120, 13:170, 13:176, 13:178, 13:193, 14:02:01-14:02:02, 14:06:01-14:06:03, 14:09, 14:13, 14:17, 14:19, 14:21, 14:29-14:30, 14:33, 14:46-14:48, 14:51-14:52, 14:80, 14:83, 14:106, 14:108-14:109, 14:121
42[6]	160 bp 240 bp	430 bp	52	*14:141, **DRB3*01:01:02:01-01:15, DRB3*02:01-02:29N, DRB3*03:01:01-03:03**
43[8,10]	215 bp	430 bp	53	**DRB4*01:01:01:01-01:08**
44	175 bp	430 bp	51	**DRB5*01:01:01-01:15, DRB5*02:02-02:06**
45[12]	-	-	-	**Negative Control**

[1]Alleles are assigned by the presence of specific PCR product(s). However, the sizes of the specific PCR products may be helpful in the interpretation of DR low resolution SSP subtypings.
When the primers in a primer mix can give rise to HLA-specific PCR products of more than one length this is indicated if the size difference is more than 20 base pairs. Size differences of 20 base pairs or less are not given. For high resolution SSP kits, the alleles listed are specified according to amplicon length.
Nonspecific amplifications, i.e. a ladder or a smear of bands, may sometimes be seen. GC-rich primers have a higher tendency of giving rise to nonspecific amplifications than other primers, e.g. the primers in wells 11, 26, 27 and 28.
PCR fragments longer than the control bands may sometimes be observed. Such bands should be disregarded and do not influence the interpretation of the SSP typings.
PCR fragments migrating faster than the control bands, but slower than a 400 bp fragment may be seen in some gel read-outs. Such bands can be disregarded and do not influence the interpretation of the SSP typings.
Some primers may give rise to primer oligomer artifacts. Sometimes this phenomenon is an inherit feature of the primer pair(s) of a primer mix. More often it is due to other factors such as too low amount of DNA in the PCR reactions, taking too long time in setting up the PCR reactions, working at elevated room temperature or using thermal cyclers that are not pre-heated.

[2]The internal positive control primer pairs amplify segments of the human growth hormone gene. The internal positive control bands are 430 or 515 base pairs respectively, well distribution as outlined in the table. Well number 14 contains the longer, 515 bp, internal positive control band. The well distribution of the internal controls can help in orientation of the kit on gel photo, as well as allow for kit identification. In the presence of a specific amplification the intensity of the control band often decreases. In the presence of a specific amplification the intensity of the control band often decreases.

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

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

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

101.704-48/12 – including *Taq* pol., IFU-01
101.704-48u/12u – without *Taq* pol., IFU-02

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[6]Individual alleles can give to rise to two differently sized specific PCR fragments in primer mixes 14, 18 to 21, 23, 24, 26, 29, 31 to 33, 35, 40 and 42.

[7]Due to sharing of sequence motifs in codon 38 and 47, DRB3*01:14 will also be amplified in primer mixes 18, 19 and 30, and DRB3*01:23 in primer mix 18 in addition to primer mix 42.

[8]Primer mixes 14, 16, 21, 28, 29, 33, 35 and 43 may have a tendency to giving rise to primer oligomer formation.

[9]Primer mix 32 has a tendency of giving rise to primer oligomer formation and also has an intense primer cloud due to the high number of primers present in the primer mix.

[10]The DRB4*01:03:01:02N allele is amplified by primer mix 43, whereas the DRB4*02:01N and DRB4*03:01N null alleles are not amplified by this primer pair.

[11]Primer mixes 16, 17 and 22 may have a tendency of unspecific amplification.

[12]Primer mix 45 contains a negative control, which will amplify more than 95% 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 430 base pairs.

'w', might be weakly amplified.

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

101.704-48/12 – including *Taq* pol., IFU-01
101.704-48u/12u – without *Taq* pol., IFU-02

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Lot No.: 19Y **Lot-specific information**

DQ LOW PRIMER SPECIFICATION

Well No.	1	2	3	4	5	6	7	8	9	10	11	12	13
Length of spec.	135	135	210	220	130	135	85	160	225	215	185	185	185
PCR product	230	185			220			205					
		220											
		270											
Length of int. pos. control[1]	515	515	430	515	515	515	515	430	430	430	430	430	515
5'-primer(s)[2]	25(170)	9(122)	29(184)	26(173)	28(179)	26(173)	71(309)	23(164)	9(122)	29(184)	21(159)	38(210)	9(122)
	5' -gCA 3'	5' -gTT 3'	5' -gAg 3'	5' -TTA 3'	5' -gAC 3'	5' -TCT 3'	5' -ACC 3'	5' -gCT 3'	5' -gTT 3'	5' -gAC 3'	5' -ACC 3'	5' -gCA 3'	5' -gTT 3'
	26(173)	24(169)	30(185)		28(179)		71(309)	38(210)					
	5' -ggg 3'	5' -TgT 3'	5' -AAg 3'		5' -gAC 3'		5' -ACC 3'	5' -gCg 3'					
		26(173)			28(179)								
		5' -TTA 3'			5' -gAC 3'								
		26(173)											
		5' -TCT 3'											
3'-primer(s)[3]	57(266)	57(266)	86(353)	86(353)	57(266)	57(266)	86(353)	77(327)	69(304)	87(356)	69(304)	86(353)	57(266)
	5' -CAA 3'	5' -CAA 3'	5' -gCT 3'	5' -gCT 3'	5' -Cgg 3'	5' -CgT 3'	5' -gCT 3'	5' -ACg 3'	5' -CTC 3'	5' -ggT 3'	5' -CCT 3'	5' -gCT 3'	5' -CAT 3'
	87(356)	86(353)		86(354)	57(266)		86(354)						58(270)
	5' -ggT 3'	5' -ACg 3'		5' -AgT 3'	5' -CAg 3'		5' -AgT 3'						5' -TCC 3'
	87(356)	86(353)			57(266)		86(355)						
	5' -ggT 3'	5' -ACC 3'			5' -Cgg 3'		5' -gAC 3'						
	88(361)	86(354)			87(356)		87(358)						
	5' -CCT 3'	5' -TAT 3'			5' -ggg 3'		5' -gCC 3'						
		86(354)											
		5' -AAA 3'											
		86(354)											
		5' -AAg 3'											
		86(354)											
		5' -AAT 3'											
Well No.	1	2	3	4	5	6	7	8	9	10	11	12	13

[1]The internal positive control primer pairs amplify segments of the human growth hormone gene. The internal positive control bands are 430 or 515 base pairs respectively, well distribution as outlined in the table. Well number 1 contains the longer, 515 bp, internal positive control band. The well distribution of the internal controls can help in orientation of the kit on gel photo, as well as allow for kit identification. In the presence of a specific amplification the intensity of the control band often decreases.

[2]The 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.

[3]The 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.

101.704-48/12 – including *Taq* pol., IFU-01
101.704-48u/12u – without *Taq* pol., IFU-02

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Lot No.: 19Y **Lot-specific information**

DR LOW PRIMER SPECIFICATION

Well No.	14	15	16	17	18	19	20	21	22	23	24	25
Length of spec.	210	200	210	210	120	75	85	100	235	170	90	180
PCR product	235		230		220	210	210	175		215	135	
	260									250	165	
											190	
Length of int.	515	430	430	430	430	430	430	430	430	515	430	430
pos. control[1]												
5'-primer(s)[2]	12(124)	14(129)	13(126)	13(126)	13(125)	13(125)	13(125)	13(125)	13(127)	15(133)	26(165)	26(164)
	5' -A.T 3'	5' -gAA 3'	5' -Agg 3'	5' -Agg 3'	5' -gTC 3'	5' -gTC 3'	5' -gTC 3'	5' -ACA 3'	5' -ATA 3'	5' -gTT 3'	5' -TAT 3'	5' -gTA 3'
	14(129)		13(126)	13(126)	47(227)	15(133)		13(125)	13(127)	15(133)	36(196)	30(178)
	5' -gAA 3'		5' -AAg 3'	5' -AAg 3'	5' -gTT 3'	5' -gTT 3'		5' -ACC 3'	5' -ATA 3'	5' -gTT 3'	5' -AgA 3'	5' -gCg 3'
			13(126)					13(125)	13(127)	15(133)	58(261)	
			5' -AgA 3'					5' -ATA 3'	5' -gTA 3'	5' -gCT 3'	5' -gAg 3'	
								13(125)				
								5' -gTC 3'				
3'-primer(s)[3]	66(286)	66(286)	66(286)	66(286)	73(305)	26(164)	28(171)	32(184)	77(319)	58(260)	57(257)	73(307)
	5' -gAg 3'	5' -gAT 3'	5' -gAT 3'	5' -gAA 3'	5' -ggC 3'	5' -ggT 3'	5' -CTC 3'	5' -gTg 3'	5' -CAC 3'	5' -CCT 3'	5' -CgA 3'	5' -CgC 3'
	66(286)		69(295)	66(286)	73(305)	66(286)	69(295)	58(260)	77(319)	73(307)	73(305)	
	5' -gAg 3'		5' -CTg 3'	5' -gAg 3'	5' -ggC 3'	5' -gAT 3'	5' -CTg 3'	5' -Cgg 3'	5' -gTA 3'	5' -CAg 3'	5' -ggC 3'	
	66(286)		69(295)	70(296)	73(305)	71(299)			77(319)	86(344)	77(319)	
	5' -gAT 3'		5' -.Tg 3'	5' -TgT 3'	5' -ggC 3'	5' -gCT 3'			5' -CAA 3'	5' -CAC 3'	5' -CAC 3'	
	70(297)		70(298)	71(301)	74(308)							
	5' -CTg 3'		5' -CgC 3'	5' -ggC 3'	5' -CCC 3'							
	71(299)		71(299)		74(310)							
	5' -gCg 3'		5' -gCT 3'		5' -CAA 3'							
	77(317)		73(305)									
	5' -AgT 3'		5' -ggC 3'									
	86(344)		77(317)									
	5' -CCA 3'		5' -AgT 3'									
Well No.	14	15	16	17	18	19	20	21	22	23	24	25

Well No.	26	27	28	29	30	31	32	33	34	35	36	37
Length of spec.	100	90	220	200	175	100	110	110	170	75	135	180
PCR product	170	110		225		150	145	150		175		
						195	170	180		265		
						240		220				
Length of int.	430	430	430	430	430	430	430	430	430	430	430	430
pos. control[1]												
5'-primer(s)[2]	13(125)	12(124)	10(116)	10(116)	13(125)	1st I	26(164)	13(125)	13(125)	12(122)	15(133)	13(125)
	5' -gTC 3'	5' -Cgg 3'	5' -gCT 3'	5' -gCT 3'	5' -gTC 3'	5' -CAA 3'	5' -gTA 3'	5' -gTC 3'	5' -ggg 3'	5' -TAg 3'	5' -gTT 3'	5' -gTC 3'
	15(133)	15(133)	12(122)	12(122)		37(197)	34(189)	34(189)	15(133)	74(308)		107(409)
	5' -gTC 3'	5' -gTT 3'	5' -TAT 3'	5' -TAT 3'		5' -gTT 3'	5' -CAg 3'	5' -CAg 3'	5' -gTT 3'	5' -CCT 3'		5' -AgA 3'
	38(200)		13(125)	13(125)		37(197)		36(196)	15(133)			
	5' -CgT 3'		5' -gTC 3'	5' -gTC 3'		5' -gTA 3'		5' -AgC 3'	5' -gCT 3'			
				15(133)								
				5' -gTT 3'								
				15(133)								
				5' -gTC 3'								
3'-primer(s)[3]	58(260)	29(175)	69(295)	66(286)	58(260)	42(213)	57(257)	57(257)	56(256)	56(256)	47(227)	56(256)
	5' -CCT 3'	5' -gTg 3'	5' -gTC 3'	5' -gAA 3'	5' -Cgg 3'	5' -TCA 3'	5' -CAg 3'	5' -CAg 3'	5' -gCT 3'	5' -gCT 3'	5' -ggA 3'	5' -gCT 3'
	58(260)	37(199)	71(299)	70(298)	58(260)	57(257)	69(295)	59(265)	57(257)	86(344)		159(565)
	5' -CCT 3'	5' -CAg 3'	5' -gCT 3'	5' -CgC 3'	5' -CAg 3'	5' -CAg 3'	5' -CTg 3'	5' -gTg 3'	5' -CAT 3'	5' -CCA 3'		5' -CAT 3'
	58(260)		71(299)	70(298)		70(298)	70(296)	70(296)	57(257)			
	5' -CCT 3'		5' -ACT 3'	5' -CTC 3'		5' -CgC 3'	5' -TCC 3'	5' -TCC 3'	5' -CAT 3'			
								73(307)				
								5' -CAg 3'				
Well No.	26	27	28	29	30	31	32	33	34	35	36	37

CE 0088

101.704-48/12 – including *Taq* pol., IFU-01
101.704-48u/12u – without *Taq* pol., IFU-02

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Lot No.: 19Y **Lot-specific information**

Well No.	38	39	40	41	42	43	44
Length of spec.	150	145	145	140	160	215	175
PCR product			210		240		
			235				
Length of int.	430	430	430	430	430	430	430
pos. control[1]							
5'-primer(s)[2]	34(189)	13(125)	13(125)	36(196)	10(116)	28(170)	13(125)
	5' -CAg 3'	5' -gTC 3'	5' -gTC 3'	5' -AgA 3'	5' -gCT 3'	5' -gAT 3'	5' -gTA 3'
	34(189)		37(197)		10(116)		
	5' -CAg 3'		5' -gTT 3'		5' -gCT 3'		
			114(429)		37(199)		
			5' -CTg 3'		5' -TCC 3'		
3'-primer(s)[3]	70(298)	47(227)	70(296)	69(295)	51(239)	86(346)	57(258)
	5' -CTC 3'	5' -ggA 3'	5' -TCC 3'	5' -CTg 3'	5' -CCC 3'	5' -CTC 3'	5' -gCg 3'
		47(229)	73(307)	70(298)	77(317)	86(346)	58(260)
		5' -CCA 3'	5' -CAg 3'	5' -CTT 3'	5' -AAT 3'	5' -CTT 3'	5' -CCT 3'
			181(630)				
			5' -CTT 3'				
Well No.	38	39	40	41	42	43	44

[1]The internal positive control primer pairs amplify segments of the human growth hormone gene. The internal positive control bands are 430 or 515 base pairs respectively, well distribution as outlined in the table. Well number 14 contains the longer, 515 bp, internal positive control band. The well distribution of the internal controls can help in orientation of the kit on gel photo, as well as allow for kit identification. In the presence of a specific amplification the intensity of the control band often decreases.

[2]The 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.

[3]The 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.

101.704-48/12 – including *Taq* pol., IFU-01
101.704-48u/12u – without *Taq* pol., IFU-02

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Lot No.: 19Y **Lot-specific information**

CELL LINE VALIDATION SHEET

DQ low resolution primer set[2]

					Well												
					1	2	3	4	5	6	7	8	9	10	11	12	13
				Production No.	201548901	201548902	201548903	201548904	201548905	201548906	201548907	201548908	201548909	201548910	201548911	201548912	201548913
	IHWC cell line[1]		DQB1														
1	9001	SA	*05:01		+	-	-	-	-	-	-	-	-	+	-	-	-
2	9280	LK707	*06:01	*02:02	-	+	+	-	-	-	-	-	-	-	-	-	-
3	9011	E4181324	*06:01		-	+	-	-	-	-	-	-	-	-	-	-	-
4	9275	GU373	*02:01		-	-	+	-	-	-	-	-	-	-	-	-	-
5	9009	KAS011	*05:02		+	-	-	-	-	-	-	-	-	-	-	-	-
6	9353	SM	*03:02	*06:01	-	+	-	-	+	-	+	-	-	-	-	+	-
7	9020	QBL	*02:01		-	-	+	-	-	-	-	-	-	-	-	-	-
8	9025	DEU	*03:01		-	-	-	+	-	-	+	-	-	-	-	+	-
9	9026	YAR	*03:02		-	-	-	-	+	-	+	-	-	-	-	+	-
10	9107	LKT3	*04:01		-	-	-	-	-	-	-	+	+	-	-	-	-
11	9051	PITOUT	*02:02		-	-	+	-	-	-	-	-	-	-	-	-	-
12	9052	DBB	*03:03		-	-	-	-	-	+	+	-	-	-	+	+	-
13	9004	JESTHOM	*05:01		+	-	-	-	-	-	-	-	-	+	-	-	-
14	9071	OLGA	*04:02		-	-	-	-	-	-	-	+	+	-	-	-	-
15	9075	DKB	*03:03		-	-	-	-	-	+	+	-	-	-	-	+	-
16	9037	SWEIG007	*03:01		-	-	-	+	-	-	+	-	-	-	-	-	-
17	9282	CTM 3953540	*02:01	*06:03	-	+	+	-	-	-	-	-	-	-	-	-	-
18	9257	32367	*06:02	*02:02	-	+	+	-	-	-	-	-	-	-	-	-	+
19	9038	BM16	*03:01		-	-	-	+	-	-	+	-	-	-	-	+	-
20	9059	SLE005	*06:04		-	+	-	-	-	-	-	-	-	-	-	-	-
21	9064	AMALA	*03:01		-	-	-	+	-	-	+	-	-	-	-	+	-
22	9056	KOSE	*05:03	*06:04	+	+	-	-	-	-	-	-	-	+	-	-	-
23	9124	IHL	*05:03	*06:01	+	+	-	-	-	-	-	-	-	+	-	-	-
24	9035	JBUSH	*03:01		-	-	-	+	-	-	+	-	-	-	-	+	-
25	9049	IBW9	*02:02		-	-	+	-	-	-	-	-	-	-	-	-	-
26	9285	WT49	*02:01		-	-	+	-	-	-	-	-	-	-	-	-	-
27	9191	CH1007	*04:01	*05:01	+	-	-	-	-	-	-	+	+	+	-	-	-
28	9320	BEL5GB	*02:02	*03:01	-	-	+	+	-	-	+	-	-	-	-	-	-
29	9050	MOU	*02:02		-	-	+	-	-	-	-	-	-	-	-	-	-
30	9021	RSH	*04:02		-	-	-	-	-	-	-	+	+	-	-	-	-
31	9019	DUCAF	*02:01		-	-	+	-	-	-	-	-	-	-	-	-	-
32	9297	HAG	*03:01		-	-	-	+	-	-	+	-	-	-	-	+	-
33	9098	MT14B	*03:02		-	-	-	-	+	-	+	-	-	-	-	+	-
34	9104	DHIF	*03:01		-	-	-	+	-	-	+	-	-	-	-	+	-
35	9302	SSTO	*03:05		-	-	-	-	+	-	+	-	-	-	+	+	-
36	9024	KT17	*03:02		-	-	-	-	+	-	+	-	-	-	-	+	-
37	9065	HHKB	*06:03		-	+	-	-	-	-	-	-	-	-	-	-	-
38	9099	LZL	*03:01		-	-	-	+	-	-	+	-	-	-	-	-	-
39	9315	CML	*02:01	*03:01	-	-	+	+	-	-	+	-	-	-	-	+	-
40	9134	WHONP199	*02:02	*03:03	-	-	+	-	-	+	+	-	-	-	+	-	-
41	9055	H0301	*06:09		-	+	-	-	-	-	-	-	-	-	-	-	-
42	9066	TAB089	*06:01		-	+	-	-	-	-	-	-	-	-	-	-	-
43	9076	T7526	*03:03		-	-	-	-	-	+	+	-	-	-	+	+	-
44	9057	TEM	*05:03		+	-	-	-	-	-	-	-	-	+	-	-	-
45	9239	SHJO	*02:02		-	-	+	-	-	-	-	-	-	-	-	-	-
46	9013	SCHU	*06:02		-	+	-	-	-	-	-	-	-	-	-	-	+
47	9045	TUBO	*03:01		-	-	-	+	-	-	+	-	-	-	-	+	-
48	9303	TER-ND	*05:01		+	-	-	-	-	-	-	-	-	+	-	-	-

101.704-48/12 – including *Taq* pol., IFU-01
101.704-48u/12u – without *Taq* pol., IFU-02

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Lot No.: 19Y **Lot-specific information**

CELL LINE VALIDATION SHEET

DR low resolution primer set[2]

					Well															
					14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
				Prod. No.:	201440101	201440102	201550203	201550204	201439405	201550206	201440107	201440108	201550209	201439410	201550211	201440112	201440113	201440114	201440115	201550216
	IHWC cell line[1]		DRB1																	
1	9001	SA	*01:01		+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	9280	LK707	*15:02	*04:05	-	-	+	-	-	-	-	+	-	-	-	-	-	-	-	-
3	9011	E4181324	*15:02		-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
4	9275	GU373	*03:01		-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-
5	9009	KAS011	*16:01		-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-
6	9353	SM	*04:07	*08:03	-	-	-	-	-	-	-	+	-	+	-	-	-	-	-	-
7	9020	QBL	*03:01		-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-
8	9025	DEU	*04:01		-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
9	9026	YAR	*04:02		-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
10	9107	LKT3	*04:05		-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
11	9051	PITOUT	*07:01		-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-
12	9052	DBB	*07:01		-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-
13	9004	JESTHOM	*01:01		+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	9071	OLGA	*08:02		-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	+
15	9075	DKB	*09:01		-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-
16	9037	SWEIG007	*11:01		-	-	-	-	-	-	-	-	-	-	-	-	+	-	+	+
17	9282	CTM3953540	*03:01	*13:01	-	-	-	-	+	+	-	-	-	-	-	-	-	-	+	+
18	9257	32367	*09:01	*11:01	-	-	-	-	-	-	-	-	-	-	+	-	+	-	+	+
19	9038	BM16	*12:01		-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-
20	9059	SLE005	*13:02		-	-	-	-	-	+	-	-	-	-	-	-	-	-	+	+
21	9064	AMALA	*14:02		-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-
22	9056	KOSE	*13:02	*14:54	-	-	-	-	-	+	-	-	-	-	-	-	-	-	+	+
23	9124	IHL	*08:03	*14:14	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-
24	9035	JBUSH	*11:01		-	-	-	-	-	-	-	-	-	-	-	-	+	-	+	+
25	9049	IBW9	*07:01		-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-
26	9285	WT49	*03:01		-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-
27	9191	CH1007	*04:05	*10:01	-	-	-	-	-	-	-	+	-	-	-	+	-	-	-	-
28	9320	BEL5GB	*04:16	*07:01	-	-	-	-	-	-	-	+	+	-	-	-	-	-	-	-
29	9050	MOU	*07:01		-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-
30	9021	RSH	*03:02		-	-	-	-	+	-	+	-	-	-	-	-	-	-	-	-
31	9019	DUCAF	*03:01		-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-
32	9297	HAG	*13:03		-	-	-	-	-	+	-	-	-	-	-	-	-	-	+	-
33	9098	MT14B	*04:04		-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
34	9104	DHIF	*11:01		-	-	-	-	-	-	-	-	-	-	-	-	+	-	+	+
35	9302	SSTO	*04:03		-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
36	9024	KT17	*04:03	*04:06	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-
37	9065	HHKB	*13:01		-	-	-	-	-	+	-	-	-	-	-	-	-	-	+	+
38	9099	LZL	*14:02		-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-
39	9315	CML	*03:01	*04:01	-	-	-	-	+	+	-	+	-	-	-	-	-	-	-	-
40	9134	WHONP199	*07:01	*09:01	-	-	-	-	-	-	-	-	+	-	+	-	-	-	-	-
41	9055	H0301	*13:02		-	-	-	-	-	+	-	-	-	-	-	-	-	-	+	+
42	9066	TAB089	*08:03		-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-
43	9076	T7526	*09:01		-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-
44	9057	TEM	*14:01		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
45	9239	SHJO	*07:01		-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-
46	9013	SCHU	*15:01		-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-
47	9045	TUBO	*11:04	*12:01	-	-	-	-	-	-	-	-	-	-	-	-	+	+	+	+
48	9303	TER-ND	*01:03		-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-

101.704-48/12 – including *Taq* pol., IFU-01
101.704-48u/12u – without *Taq* pol., IFU-02

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Lot No.: 19Y **Lot-specific information**

CELL LINE VALIDATION SHEET

DR low resolution primer set[1]

					Well													
					30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
				Prod. No.:	201550217	201440118	201550219	201550220	201550221	201549222	201550223	201549224	201549225	201550226	201550227	201549228	201440129	201440130	201440131
	IHWC cell line		DRB1																
1	9001	SA	*01:01		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	9280	LK707	*15:02	*04:05	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+
3	9011	E4181324	*15:02		-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
4	9275	GU373	*03:01		+	-	-	-	-	-	-	-	-	+	-	-	+	-	-
5	9009	KAS011	*16:01		-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
6	9353	SM	*04:07	*08:03	-	-	-	-	+	-	-	-	-	-	-	-	-	+	-
7	9020	QBL	*03:01		+	-	-	-	-	-	-	-	-	+	-	-	+	-	-
8	9025	DEU	*04:01		-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
9	9026	YAR	*04:02		-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
10	9107	LKT3	*04:05		-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
11	9051	PITOUT	*07:01		-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
12	9052	DBB	*07:01		-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
13	9004	JESTHOM	*01:01		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	9071	OLGA	*08:02		-	-	-	-	+	-	-	-	-	-	-	-	-	-	-
15	9075	DKB	*09:01		-	-	+	-	-	-	-	-	-	-	-	-	-	+	-
16	9037	SWEIG007	*11:01		-	-	-	-	-	-	-	-	-	+	-	-	+	-	-
17	9282	CTM3953540	*03:01	*13:01	+	-	-	-	-	-	-	-	+	+	-	-	+	-	-
18	9257	32367	*09:01	*11:01	-	-	+	-	-	-	-	-	-	+	-	-	+	+	-
19	9038	BM16	*12:01		-	-	-	-	-	-	+	-	-	-	-	-	+	-	-
20	9059	SLE005	*13:02		+	-	-	-	-	-	-	-	+	+	-	-	+	-	-
21	9064	AMALA	*14:02		+	-	+	-	-	-	-	-	-	-	-	+	+	-	-
22	9056	KOSE	*13:02	*14:54	+	+	+	+	-	-	-	-	+	+	+	-	+	-	-
23	9124	IHL	*08:03	*14:14	+	-	+	+	+	-	-	-	-	-	+	-	+	-	-
24	9035	JBUSH	*11:01		-	-	-	-	-	-	-	-	-	+	-	-	+	-	-
25	9049	IBW9	*07:01		-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
26	9285	WT49	*03:01		+	-	-	-	-	-	-	-	-	+	-	-	+	-	-
27	9191	CH1007	*04:05	*10:01	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
28	9320	BEL5GB	*04:16	*07:01	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
29	9050	MOU	*07:01		-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
30	9021	RSH	*03:02		+	-	-	-	-	-	-	-	-	-	-	-	+	-	-
31	9019	DUCAF	*03:01		+	-	-	-	-	-	-	-	-	+	-	-	+	-	-
32	9297	HAG	*13:03		+	-	-	-	-	-	-	+	-	-	-	-	+	-	-
33	9098	MT14B	*04:04		-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
34	9104	DHIF	*11:01		-	-	-	-	-	-	-	-	-	+	-	-	+	-	-
35	9302	SSTO	*04:03		-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
36	9024	KT17	*04:03	*04:06	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
37	9065	HHKB	*13:01		+	-	-	-	-	-	-	-	+	+	-	-	+	-	-
38	9099	LZL	*14:02		+	-	+	-	-	-	-	-	-	-	-	+	+	-	-
39	9315	CML	*03:01	*04:01	+	-	-	-	-	-	-	-	-	+	-	-	+	+	-
40	9134	WHONP199	*07:01	*09:01	-	-	+	-	-	-	-	-	-	-	-	-	-	+	-
41	9055	H0301	*13:02		+	-	-	-	-	-	-	-	+	+	-	-	+	-	-
42	9066	TAB089	*08:03		-	-	-	-	+	-	-	-	-	-	-	-	-	-	-
43	9076	T7526	*09:01		-	-	+	-	-	-	-	-	-	-	-	-	-	+	-
44	9057	TEM	*14:01		-	+	+	+	-	-	-	+	-	-	+	-	+	-	-
45	9239	SHJO	*07:01		-	-	-	-	-	-	-	-	-	-	-	-	-	+	-
46	9013	SCHU	*15:01		-	-	-	-	-	-	-	-	-	-	-	-	-	-	+
47	9045	TUBO	*11:04	*12:01	-	-	-	-	-	-	+	-	-	+	-	-	+	-	-
48	9303	TER-ND	*01:03		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

[1]The 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.

101.704-48/12 – including *Taq* pol., IFU-01
101.704-48u/12u – without *Taq* pol., IFU-02

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Lot No.: 19Y **Lot-specific information**

[2]The 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 5'-primer and one or more 3'primers in primer solution 2, 24, 31 and 40 were tested by separately adding additional 5'-primers or 3'-primers.
One or more additional 3'-primers in primer solution 1, 14, 16, 17, 22, 23, 33 and 35 were tested by separately adding another 5'-primer.
One 5'-primer in primer solutions 7, 19, 25, 28 and 29 was tested by separately adding additional 3'-primers.
In primer solutions 1, 2, 4, 5, 7, 13, 14, 16 to 19, 22, 26, 28, 34, 39 and 43 one or more 3'-primers were not possible to test, and in primer solutions 1 to 3, 5, 14, 16, 17, 21 to 23, 26 to 29, 33 to 35 and 40 one or more 5'-primers were not possible to test.

101.704-48/12 – including *Taq* pol., IFU-01
101.704-48u/12u – without *Taq* pol., IFU-02

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Lot No.: 19Y **Lot-specific information**

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