•LERUP SSP°

HLA-A*69 Product Insert Page 1 of 12

101.435-06 – including *Taq* **polymerase**, IFU-01 **101.435-06u – without** *Taq* **polymerase**, IFU-02

Visit https://labproducts.caredx.com for "Instructions for Use" (IFU)

Lot No.: **3K7** Lot-specific information

Olerup SSP® HLA-A*69

Product number: 101.435-06 – including *Taq* polymerase

101.435-06u – without *Taq* polymerase

Lot number: 3K7

Expiry date: 2023-10-01

Number of tests: 6 Number of wells per test: 5+1

Storage - pre-aliquoted primers: dark at -20°C

PCR Master Mix: -20°C
 Adhesive PCR seals
 Product Insert
 RT

This Product Description is only valid for Lot No. 3K7.

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*69 LOT (0G8)

The HLA-A*69 kit is updated for new alleles to enable separation of:

- Null and Alternatively expressed alleles
- The product documentation has been updated for new alleles of IMGT 3.37.0

The HLA-A*69 specificity and interpretation tables have been updated for the HLA-A alleles described since the previous *Olerup* SSP® HLA-A*69 lot was made **(Lot No. 0G8)**.

The HLA-A*69 primer set is unchanged compared to the previous lot (Lot No. 0G8).

HLA-A*69

101.435-06 – including *Taq* **polymerase**, IFU-01 **101.435-06u – without** *Taq* **polymerase**, IFU-02

Visit https://labproducts.caredx.com for "Instructions for Use" (IFU)

Lot No.: **3K7** Lot-specific information

Well **6** contains <u>Negative Control primer pairs</u>, that will amplify a 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 products generated by the positive control primer pairs are 200 and 430 base pairs.

Length of PCR	105	200	105	80	75	80	85
product							
5'-primer ¹	164	340	440	45	45	43	36
	5'-CAC3'	^{5'} -Agg ^{3'}	⁵ '-TTA3'	⁵ '-Tgg ³ '	⁵ '-Tgg ³ '	⁵ '-Tgg ³ '	5'-TAC3'
							36
							^{5'} -TAT ^{3'}
3'-primer ²	231	2 nd I	507	59	58	57	47
•	⁵ '-TgC ³ '	^{5'} -AAA ^{3'}	^{5'} -TTg ^{3'}	5'-CTC ^{3'}	^{5'} -ggC ^{3'}	5'-CTC ^{3'}	5'-ACA3'
							48
							^{5'} -gCA ^{3'}
							48
							^{5'} -gCC ^{3'}
							52
							^{5'} -TgT ^{3'}
A *	+	+	+				
B*	+	+	+				
C*	+	+	+				
DRB1				+	+		
DRB3				+	+		
DRB5				+			
DQB1					+		
DPB1						+	
DQA1							+

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

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

OLERUP SSP

HLA-A*69 Product Insert 101.435-06 – including *Taq* polymerase, IFU-01

Page 3 of 12 Visit https://labproducts.caredx.com for

101.435-06u – without *Taq* polymerase, IFU-02 "Instructions for Use" (IFU)

Lot No.: **3K7** Lot-specific information

PRODUCT DESCRIPTION

HLA-A*69 SSP subtyping

CONTENT

The primer set contains 5'- and 3'-primers for identifying the HLA-A*69:01 to HLA-A*69:06 alleles.

PLATE LAYOUT

Each test consists of 6 PCR reactions in an 8 well cut PCR plate. Wells 7 to 8 are empty.

	1	2	3	4	5	NC	empty	empty
--	---	---	---	---	---	----	-------	-------

The 8 well cut PCR plate is marked with 'A69' in silver/gray ink.

Well No. 1 is marked with the Lot No. '3K7'.

Wells 1 to 5 – HLA-A*69 high resolution primers.

Well 6 – 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 heat-sealed with a PCR-compatible foil.

Please note: When removing each 8 well PCR plate, make sure that the remaining plates stay sealed. Use a scalpel or a similar instrument to carefully cut the foil between the plates.

INTERPRETATION

Due to the sharing of sequence motifs between HLA-A alleles non-HLA-A*69 alleles will be amplified by some primer mixes. For further details see Specificity Table.

UNIQUELY IDENTIFIED ALLELES

All the HLA-A*69 alleles, i.e. **A*69:01 to A*69:06**, recognized by the HLA Nomenclature Committee in July 2019^{1,2} will be amplified by the primers in the HLA-A*69 SSP kit³.

The HLA-A*69 kit enables separation of the confirmed HLA-A*69 alleles as listed in the IMGT/HLA database 3.30.0. An HLA allele is listed as confirmed by IMGT/HLA if it has been sequenced by more than a single laboratory or from multiple sources. Current allele confirmation status for HLA-A*69 alleles is listed below.

The HLA-A*69 kit also enables identification of many null and alternatively expressed alleles.



HLA-A*69 Product Insert Page 4 of 12
101.435-06 – including *Taq* polymerase, IFU-01 Visit https://labproducts.caredx.com for 101.435-06u – without *Taq* polymerase, IFU-02 "Instructions for Use" (IFU)

Lot No.: **3K7** Lot-specific information

¹HLA-A alleles listed on the IMGT/HLA web page 2019-July-10, release 3.37.0, 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.

³The HLA-A*69 primer set cannot separate the A*69:02, A*02:644 and the A*02:741 alleles. These alleles can be distinguished by the HLA-A low resolution kit and/or the HLA-A*02 high resolution kit.

ALLELE CONFIRMATION STATUS

Allele	Status ¹
A*69:01:01:01	Confirmed
A*69:01:01:02	Unconfirmed
A*69:01:02	Unconfirmed
A*69:02	Unconfirmed
A*69:03	Unconfirmed

¹Allele status "confirmed" or "unconfirmed" as listed on the IMGT/HLA web page 2017-October-27, release 3.30.0, <u>www.ebi.ac.uk/imgt/hla</u>.

RESOLUTION IN HOMO- AND HETEROZYGOTES

Results file with resolution in HLA-A*69 homo- and heterozygotes is available upon request.

OLERUP SSP°

HLA-A*69 Product Insert

101.435-06 – including *Taq* **polymerase**, IFU-01 Visit https://labproducts.caredx.com for **101.435-06u – without** *Taq* **polymerase**, IFU-02

Page 5 of 12 "Instructions for Use" (IFU)

Lot No.: 3K7

Lot-specific information

SPECIFICITY TABLE

HLA-A*69 SSP subtyping

Specificities and sizes of the PCR products of the 5+1 primer mixes used for HLA-A*69 SSP subtyping

Primer Mix	Size of spec. PCR product ¹	Size of control band ²	Amplified HLA- A*69 alleles ³	Other amplified HLA-Class I alleles
1	410 bp	800 bp	*69:01:01:01- 69:06	*02:55, 02:644, 02:741, 02:815
2 ⁴	100 bp	1070 bp	*69:01:01- 69:01:03, 69:03- 69:06	*01:194, 02:34-02:35:03, 02:56:01-02:56:02, 02:62, 02:78, 02:103, 02:580, 03:01:01:01-03:07:02, 03:09-03:29, 03:31, 03:33, 03:35, 03:37-03:40, 03:42-03:61, 03:64-03:87, 03:90-03:106, 03:109-03:151, 03:153-03:171, 03:173-03:175, 03:177-03:193, 03:195-03:197N, 03:199, 03:201-03:259, 03:261-03:262N, 03:264-03:272, 03:274-03:369, 11:12, 24:24, 24:290, 29:01:01:01-29:18, 29:21-29:29, 29:31-29:33, 29:35-29:47, 29:49-29:65, 29:67-29:73, 29:75-29:97, 29:99-29:105, 29:107-29:136, 30:01:01-30:01:12, 30:01:14-30:01:15, 30:08:01-30:08:02, 30:11:01-30:11:02, 30:14L-30:20, 30:23-30:26, 30:30, 30:35-30:43, 30:48-30:49, 30:52-30:56, 30:58-30:60, 30:62-30:63, 30:65, 30:71-30:75, 30:78N-30:79, 30:81-30:83, 30:86-30:89, 30:91-30:98, 30:102, 30:104, 30:106, 30:109-30:116, 30:118, 30:120, 30:122-30:123N, 30:126, 30:128-30:132N, 30:134-30:138, 30:141-30:143, 30:145N, 30:147-30:148, 30:154, 31:89, 31:115, 32:17, 33:125, 33:131, 34:09, 66:02, 66:12, 66:16, 66:21, 66:25-66:26Q, 66:34, 68:01:01:01-68:01:17, 68:01:19-68:02:15, 68:06-68:14, 68:16-68:19, 68:21:01-68:30, 68:32-68:71, 68:73-68:89, 68:91-68:92, 68:94N-68:96, 68:98-68:108, 68:110-68:179, 68:181N-68:205N, 68:207-68:211, 68:213N-68:221, 74:13
3	295 bp	1070 bp	*69:01:01:01-69:01:03, 69:03-69:06	*02:01:01:01-02:01:15, 02:01:17-02:01:19, 02:01:21-02:01:70, 02:01:72-02:01:81, 02:01:83-02:01:86, 02:01:88-02:01:109, 02:01:111-02:01:156, 02:01:158-02:01:168, 02:03:01-02:03:09, 02:06:01:01-02:06:28, 02:09:01:01-02:09:01:02, 02:11:01:01-02:13, 02:16, 02:19-02:22:02, 02:24:01-02:32N, 02:34-02:38, 02:40:01-02:46, 02:48-02:49, 02:51-02:52, 02:54-02:56:02, 02:59-02:62, 02:64:01-02:64:02, 02:66-02:72, 02:74:01-02:83N, 02:85-02:93:02, 02:95-02:97:02, 02:99:01-02:99:02, 02:101:01-02:101:02, 02:104-02:107, 02:109, 02:111, 02:113:01N-02:114, 02:116-02:121, 02:123-02:129, 02:131:01-02:134, 02:136-02:147, 02:149-02:151, 02:153:01-02:153:02, 02:158-02:171:02, 02:173-02:178, 02:181-02:185, 02:187-02:190, 02:192-02:193, 02:195-02:198, 02:200-02:206, 02:208, 02:210-02:221, 02:2230,

HLA-A*69 Product Insert

101.435-06 – including *Taq* polymerase, IFU-01 Visi
101.435-06u – without *Taq* polymerase, IFU-02

Page 6 of 12
Visit https://labproducts.caredx.com for "Instructions for Use" (IFU)

Lot No.: **3K7** Lot-specific information

02:233-02:241, 02:243:00; 02:246:00:2267, 02:266-02:260, 02:620-02:640:102, 02:266-02:267, 02:269-02:270, 02:272-02:281, 02:283-02:285, 02:287-02:299, 02:301N, 02:304-02:318, 02:331N, 02:332, 02:335-02:333, 02:336, 02:339-02:343, 02:347-02:349, 02:351-02:358, 02:339-02:343, 02:347-02:349, 02:351-02:358, 02:339-02:343, 02:347-02:372, 02:374-02:375, 02:377-02:397, 02:399-02:402, 02:404-02:407, 02:409-02:412, 02:414-02:402, 02:424-02:407, 02:409-02:412, 02:414-02:403, 02:436, 02:560N, 02		LOUNO SIXI		Lot-specific i	mormation
02:269-02:270, 02:272-02:281, 02:283-02:285, 02:287-02:299, 02:301N, 02:304-02:318, 02:321N-02:323, 02:325-02:333, 02:334-02:318, 02:321N-02:323, 02:325-02:333, 02:334-02:318, 02:321N-02:325-02:333, 02:335-02:343, 02:347-02:347, 02:348-02:347, 02:348-02:347-02:347, 02:348-02:455, 02:480-02:397, 02:399-02:402, 02:404-02:407, 02:409-02:412, 02:414-02:420, 02:422-02:425, 02:428, 02:430-02:431, 02:434-02:436, 02:438-02:448, 02:454-02:471, 02:475-02:476N, 02:479-02:483, 02:454-02:471, 02:475-02:476N, 02:479-02:483, 02:468-02:49N-02:491, 02:493-02:494, 02:497-02:498, 02:500Q-02:5110, 02:512-02:533, 02:518-02:525N, 02:528:01-02:530, 02:533-02:539, 02:542-02:543, 02:544, 02:547, 02:548-02:557, 02:559-02:564, 02:568-02:571, 02:573-02:574, 02:575-02:564, 02:568-02:567, 02:568-02:568, 0					02:233-02:241, 02:243:01-02:243:03, 02:246-02:254,
02:287-02:299, 02:301N, 02:304-02:318, 02:321N- 02:323, 02:325-02:333, 02:336, 02:339-02:343, 02:347-02:349, 02:351-02:358, 02:360-02:368, 02:370-02:372, 02:374-02:375, 02:377-02:397, 02:399-02:402, 02:404-02:407, 02:409-02:412, 02:414-02:420, 02:422-02:425, 02:428, 02:430- 02:431, 02:434-02:436, 02:438-02:448, 02:434- 02:471, 02:475-02:476N, 02:479-02:483, 02:485- 02:488, 02:490N-02:491, 02:493-02:484, 02:497- 02:498, 02:500Q-02:501N, 02:503-02:561N, 02:568- 02:510, 02:511, 02:514N-02:518N, 02:518-02:525N, 02:528:01-02:530, 02:533-02:539, 02:518-02:525N, 02:528:01-02:530, 02:533-02:539, 02:542-02:543, 02:568-02:571, 02:573-02:574, 02:576-02:564, 02:568-02:571, 02:573-02:574, 02:576-02:564, 02:568-02:671, 02:573-02:574, 02:576-02:564, 02:568-02:671, 02:573-02:574, 02:576-02:564, 02:568-02:6616, 02:6180-02:621, 02:623, 02:625, 02:627, 02:629, 02:632-02:635, 02:637-02:642, 02:645, 02:647-02:651, 02:654-02:666, 02:668- 02:663, 02:665-02:666, 02:661, 02:6180-02:669, 02:671- 02:675N, 02:677, 02:579, 02:681-02:709, 02:732- 02:773, 02:779, 02:786, 02:765, 02:767-02:770, 02:772- 02:777, 02:779, 02:786, 02:765, 02:767-02:770, 02:772- 02:777, 02:779, 02:786, 02:788N-02:789N, 02:789N- 02:88, 02:830-02:891, 02:884, 02:886,					02:256-02:260, 02:262-02:264:01:02, 02:266-02:267,
02:323, 02:325-02:333, 02:336, 02:339-02:343, 02:347-02:349, 02:351-02:358, 02:360-02:368, 02:370-02:372, 02:371-02:375, 02:377-02:397, 02:399-02:402, 02:404-02:407, 02:409-02:412, 02:414-02:420, 02:422-02:425, 02:428, 02:430-02:431, 02:434-02:430, 02:434-02:436, 02:438-02:448, 02:4454-02:447, 02:427-02:488, 02:4940-02:494, 02:485-02:488, 02:4900-02:5010, 02:508-02:510, 02:512, 02:514, 02:500-02:5010, 02:508-02:510, 02:512, 02:514, 02:557-02:558, 02:559-02:564, 02:568-02:571, 02:573-02:574, 02:576, 02:578-02:582, 02:584-02:585, 02:587, 02:588-02:590, 02:582-02:568, 02:567, 02:578-02:586, 02:568, 02:567, 02:568-02:661, 02:618-02:621, 02:625, 02:627, 02:629, 02:632-02:635, 02:637-02:642, 02:645, 02:685, 02:637-02:642, 02:645, 02:685, 02:667-02:661, 02:681-02:703, 02:711-02:716, 02:716-02:770, 02:772-02:773, 02:772-02:774, 02:774-02:770, 02:772-02:775, 02:777-02:779, 02:772-02:779, 02:779, 02:772-02:779, 02:779, 02:772-02:779, 02:779, 02:772-02:773, 02:789N, 02:508-02:609, 02:60					02:269-02:270, 02:272-02:281, 02:283-02:285,
02:347-02:349, 02:351-02:376, 02:376-02:388, 02:370-02:372, 02:374-02:375, 02:377-02:397, 02:399-02:402, 02:404-02:407, 02:409-02:412, 02:414-02:420, 02:422-02:425, 02:428, 02:430- 02:431, 02:434-02:436, 02:438-02:448, 02:454- 02:471, 02:475-02:476N, 02:479-02:483, 02:485- 02:488, 02:490N-02:491, 02:493-02:494, 02:495- 02:498, 02:500Q-02:501N, 02:503-02:506N, 02:508- 02:510, 02:512, 02:514N-02:516N, 02:518-02:525N, 02:528:01-02:530, 02:533-02:539, 02:542-02:543, 02:545, 02:547, 02:573-02:574, 02:576, 02:578- 02:582, 02:584-02:583, 02:600, 02:602-02:603, 02:562-02:616, 02:594-02:583, 02:689-02:590, 02:592, 02:594-02:583, 02:600, 02:602-02:603, 02:605Q-02:616, 02:647-02:651, 02:654, 02:658, 02:663, 02:665-02:666, 02:668-02:669, 02:671- 02:675N, 02:677, 02:679, 02:681-02:708, 02:771- 02:675N, 02:671, 02:679, 02:681-02:708, 02:711- 02:675N, 02:671, 02:678, 02:679, 02:681-02:708, 02:711- 02:675N, 02:677, 02:679, 02:681-02:708, 02:771- 02:675N, 02:677, 02:679, 02:681-02:708, 02:711- 02:675N, 02:677, 02:679, 02:681-02:708, 02:771- 02:675N, 02:679, 02:679, 02:681-02:708, 02:771- 02:675N, 02:679, 02:679, 02:681-02:708, 02:771- 02:675N, 02:679, 02:679, 02:679, 02:772-02:773, 02:789N, 02:792N- 02:828, 02:839, 02:841, 02:833-02:855, 02:827Q- 02:828, 02:839, 02:841, 02:833-02:854, 02:854, 02:856-02:858N, 02:860-02:866, 02:868-02:871N, 02:808-02:808, 02:808-02:808,					02:287-02:299, 02:301N, 02:304-02:318, 02:321N-
02:370-02:372, 02:374-02:375, 02:377-02:397, 02:399-02:402, 02:401-02:407, 02:409-02:412, 02:414-02:420, 02:422-02:425, 02:428, 02:430-02:431, 02:434-02:436, 02:438-02:448, 02:454-02:471, 02:475-02:4761, 02:479-02:483, 02:485-02:484, 02:490N-02:491, 02:493-02:494, 02:494-02:494, 02:494-02:494, 02:494-02:494, 02:494-02:540, 02:518-02:534-02:534, 02:518-02:524, 02:510, 02:512, 02:514N-02:516N, 02:518-02:524, 02:543, 02:545, 02:534-02:539, 02:542-02:543, 02:545, 02:547, 02:539-02:564, 02:568-02:571, 02:573-02:574, 02:576, 02:578-02:584, 02:568-02:571, 02:584-02:589, 02:590, 02:592, 02:594-02:598, 02:600, 02:602-02:603, 02:605-02:616, 02:6180-02:621, 02:623, 02:625, 02:635, 02:637-02:642, 02:645, 02:666, 02:668-02:669, 02:671-02:675, 02:679, 02:666, 02:668-02:668, 02:665-02:665, 02:665-02:665, 02:665-02:665, 02:665-02:665, 02:665-02:665, 02:665-02:665, 02:665-02:665, 02:665-02:665, 02:665-02:665, 02:665-02:665, 02:665-02:665, 02:665-02:665, 02:665-02:665, 02:665-02:665, 02:665-02:665, 02:665-02:666, 02:668-02:669, 02:671-02:675, 02:679, 02:679, 02:674-02:788, 02:771-02:776, 02:778-02:778, 02:772-02:778, 02:772-02:778, 02:772-02:778, 02:772-02:778, 02:772-02:779, 02:772-02:778, 02:642, 02:645, 02:665					02:323, 02:325-02:333, 02:336, 02:339-02:343,
02:399-02:402, 02:404-02:407, 02:408, 02:412, 02:414-02:425, 02:428, 02:430-02:417, 02:414-02:426, 02:425, 02:428, 02:430-02:431, 02:436, 02:438, 02:4488, 02:454-02:471, 02:475-02:476N, 02:479-02:483, 02:485-02:488, 02:490N-02:491, 02:493-02:494, 02:497-02:498, 02:500Q-02:501N, 02:503-02:506N, 02:503-02:508N, 02:508Q-02:508P, 02:508P, 02:5					02:347-02:349, 02:351-02:358, 02:360-02:368,
02:414-02:420, 02:422-02:425, 02:428, 02:430- 02:431, 02:434-02:436, 02:438-02:448, 02:454- 02:471, 02:475-02:476N, 02:479-02:483, 02:485- 02:488, 02:490N-02:491, 02:493-02:494, 02:497- 02:498, 02:500Q-02:501N, 02:503-02:506N, 02:508- 02:510, 02:514, 02:514, 02:557, 02:525N, 02:528:01-02:530, 02:533-02:539, 02:542-02:543, 02:545, 02:547, 02:573-02:574, 02:576, 02:578- 02:582, 02:584-02:585, 02:587, 02:589-02:564, 02:568-02:571, 02:573-02:574, 02:578- 02:582, 02:584-02:585, 02:587, 02:589-02:590, 02:592, 02:594-02:598, 02:600, 02:602-02:603, 02:605Q-02:616, 02:618-02:664, 02:668, 02:665, 02:665, 02:665, 02:665, 02:666, 02:668-02:669, 02:671- 02:675N, 02:677, 02:679, 02:681-02:708, 02:711- 02:716, 02:718-02:720, 02:722-02:730, 02:732- 02:777, 02:779-02:786, 02:788N-02:789N, 02:792N- 02:798, 02:800-02:803N, 02:805A-02:805N, 02:808- 02:816, 02:817-02:821, 02:823-02:825, 02:827Q- 02:828, 02:830-02:839, 02:841, 02:844-02:854, 02:856-02:858N, 02:801, 02:865-02:866, 02:6861-02:605, 02:856-02:865, 02:658-02:666, 02:668-02:668, 02:608-02:608, 02:816, 02:417-02:821, 02:823-02:825, 02:827Q- 02:828, 02:830-02:839, 02:841, 02:844-02:854, 02:856-02:858N, 02:800-02:866, 02:666, 02:661-02:605, 02:856-02:865, 02:656, 02:666, 02:666, 02:665, 02:656-02:658N, 02:803-02:866, 02:668-02:6871N, 02:873-02:737, 02:739, 03:342, 24:14:01:01- 24:14:01:04, 24:324, 29:22, 31:99, 33:22, 68:105 4 295 bp 1070 bp *69:02 *01:20, 01:66, 02:346, 02:427, 02:644, 02:741, 02:749, 11:288, 26:22, 66:09 5 225 bp 1070 bp *69:03 *02:12-02:13, 02:19, 02:27, 02:37-02:38, 02:44, 02:54, 02:142, 02:226N, 02:280, 02:417, 02:543, 02:630, 02:662, 02:723, 02:840, 10:288, 24:14:01:01- 24:14:01:04, 24:33, 24:324					02:370-02:372, 02:374-02:375, 02:377-02:397,
02:431, 02:434-02:436, 02:438-02:448, 02:454- 02:471, 02:475-02:476N, 02:479-02:483, 02:485- 02:488, 02:490N-02:491, 02:493-02:494, 02:497- 02:498, 02:500Q-02:501N, 02:503-02:506N, 02:508- 02:510, 02:512, 02:514N-02:516N, 02:518-02:525N, 02:528:01-02:530, 02:533-02:539, 02:542-02:543, 02:545, 02:549-02:557, 02:559-02:564, 02:568-02:571, 02:573-02:574, 02:578-02:589, 02:582, 02:584-02:585, 02:587, 02:589-02:564, 02:568-02:571, 02:573-02:574, 02:578-02:589, 02:592, 02:594-02:598, 02:600, 02:602-02:603, 02:605Q-02:616, 02:618Q-02:621, 02:623, 02:625, 02:627, 02:629, 02:632-02:635, 02:637-02:642, 02:645, 02:598, 02:601, 02:656, 02:668- 02:663, 02:665-02:666, 02:668-02:669, 02:671- 02:675N, 02:677, 02:679, 02:679, 02:6730, 02:732- 02:733, 02:735, 02:737-02:730, 02:732- 02:733, 02:735, 02:737-02:740, 02:742-02:748N, 02:750-02:763, 02:765, 02:767-02:770, 02:772- 02:777, 02:779-02:786, 02:788N-02:789N, 02:792N- 02:789, 02:803N, 02:805-02:808N, 02:808- 02:816, 02:819-02:821, 02:823-02:825, 02:827Q- 02:828, 02:830-02:839, 02:841, 02:844-02:854, 02:856-02:858N, 02:860-02:866, 02:868-02:871N, 02:873-02:877, 03:95, 03:343, 24:14:01:01- 24:14:01:04, 24:324, 29:22, 31:99, 33:22, 68:105 4					02:399-02:402, 02:404-02:407, 02:409-02:412,
02:471, 02:475-02:476N, 02:479-02:483, 02:485- 02:488, 02:490N-02:491, 02:493-02:494, 02:497- 02:498, 02:500Q-02:501N, 02:503-02:506N, 02:508- 02:510, 02:514, 02:514N-02:516N, 02:518-02:525N, 02:528:01-02:530, 02:533-02:539, 02:542-02:543, 02:545, 02:547, 02:549-02:557, 02:559-02:564, 02:568-02:571, 02:573-02:574, 02:576, 02:578- 02:582, 02:584-02:585, 02:587, 02:589-02:504, 02:568-02:571, 02:698, 02:600, 02:602-02:603, 02:605Q-02:616, 02:618Q-02:621, 02:623, 02:625, 02:627, 02:629, 02:632-02:635, 02:663, 02:665, 02:665-02:666, 02:668-02:669, 02:671- 02:675N, 02:677, 02:679, 02:681-02:708, 02:711- 02:716, 02:718-02:720, 02:722-02:730, 02:732- 02:733, 02:735, 02:737-02:740, 02:742-02:748N, 02:750-02:763, 02:763, 02:685N-02:808N, 02:808- 02:816, 02:819-02:821, 02:823-02:825, 02:827Q- 02:828, 02:830-02:839, 02:841, 02:844-02:854, 02:856-02:858N, 02:860-02:866, 02:688-02:681, 02:873-02:877, 03:95, 03:343, 24:14:01:01- 24:14:01:04, 24:324, 29:22, 31:99, 33:22, 68:105 4 295 bp 1070 bp *69:03 *02:12-02:13, 02:19, 02:27, 02:37-02:38, 02:44, 02:54, 02:2662, 02:723, 02:280, 02:417, 02:543, 02:630, 02:662, 02:723, 02:280, 02:417, 02:543, 02:630, 02:662, 02:723, 02:280, 02:417, 02:543, 02:630, 02:662, 02:723, 02:280, 02:432, 24:324					02:414-02:420, 02:422-02:425, 02:428, 02:430-
02:488, 02:490N-02:491, 02:493-02:494, 02:497- 02:498, 02:500Q-02:501N, 02:508- 02:510, 02:512, 02:514N-02:516N, 02:518-02:525N, 02:528:01-02:533, 02:533-02:539, 02:542-02:543, 02:528:01-02:530, 02:533-02:574, 02:559-02:564, 02:568-02:571, 02:574, 02:574, 02:576, 02:578- 02:582, 02:584-02:587, 02:587, 02:589-02:580, 02:592, 02:594-02:598, 02:600, 02:602-02:603, 02:605Q-02:616, 02:6180-02:621, 02:623, 02:625, 02:645, 02:646, 02:6180-02:621, 02:638, 02:665, 02:663, 02:665-02:666, 02:668, 02:668, 02:663, 02:665-02:666, 02:668-02:669, 02:671- 02:675N, 02:677, 02:679, 02:681-02:708, 02:711- 02:716, 02:718-02:720, 02:722-02:730, 02:732- 02:733, 02:735, 02:737-02:740, 02:742-02:748N, 02:750-02:763, 02:765, 02:768N, 02:779-02:770, 02:772- 02:777, 02:779-02:763, 02:805, 02:805, 02:808- 02:816, 02:819-02:821, 02:823-02:825, 02:827Q- 02:828, 02:830-02:839, 02:840, 02:844-02:854, 02:856-02:858N, 02:860-02:866, 02:688-02:6105 4 295 bp 1070 bp *69:02 *01:20, 01:66, 02:346, 02:427, 02:741, 02:749, 11:288, 26:22, 66:09 5 225 bp 1070 bp *69:03 *02:12-02:13, 02:19, 02:27, 02:37-02:38, 02:44, 02:54, 02:44:01:04, 24:324, 29:22, 31:99, 33:22, 68:105 4 295 bp 1070 bp *69:03 *02:12-02:13, 02:19, 02:27, 02:37-02:38, 02:44, 02:54, 02:44-01:04, 24:324, 29:22, 31:99, 33:22, 68:105					02:431, 02:434-02:436, 02:438-02:448, 02:454-
02:498, 02:500Q-02:501N, 02:503-02:506N, 02:508- 02:510, 02:512, 02:514N-02:516N, 02:518-02:525N, 02:528:01-02:530, 02:533-02:539, 02:542-02:543, 02:545, 02:547, 02:549-02:557, 02:559-02:564, 02:568-02:571, 02:573-02:574, 02:576, 02:578- 02:582, 02:584-02:585, 02:687, 02:589-02:590, 02:592, 02:594-02:598, 02:600, 02:602-02:603, 02:605Q-02:616, 02:618Q-02:621, 02:623, 02:625, 02:627, 02:629, 02:632-02:635, 02:637-02:642, 02:645, 02:647-02:661, 02:654, 02:668, 02:668- 02:663, 02:665-02:666, 02:668-02:669, 02:671- 02:675N, 02:677, 02:679, 02:679, 02:681-02:708, 02:711- 02:716, 02:718-02:720, 02:722-02:730, 02:732- 02:733, 02:735, 02:737-02:740, 02:742-02:748N, 02:750-02:763, 02:765, 02:768-02:769, 02:6870- 02:777, 02:779-02:786, 02:788N-02:789N, 02:792N- 02:798, 02:800-02:803N, 02:805Q-02:806N, 02:808- 02:816, 02:819-02:821, 02:823-02:825, 02:827Q- 02:828, 02:830-02:839, 02:841, 02:844-02:854, 02:856-02:856N, 02:860-02:866, 02:868-02:871N, 02:873-02:877, 03:95, 03:343, 24:14:01:01- 24:14:01:04, 24:324, 29:22, 31:99, 33:22, 68:105 *01:20, 01:66, 02:346, 02:427, 02:644, 02:741, 02:749, 11:288, 26:22, 66:09 *02:142, 02:226N, 02:280, 02:417, 02:543, 02:630, 02:662, 02:723, 02:840, 11:288, 24:14:01:01- 24:14:01:04, 24:93, 24:324					02:471, 02:475-02:476N, 02:479-02:483, 02:485-
02:510, 02:512, 02:514N-02:516N, 02:518-02:525N, 02:528:01-02:530, 02:533-02:539, 02:542-02:543, 02:545, 02:547, 02:549-02:557, 02:559-02:564, 02:568-02:571, 02:573-02:574, 02:578-02:578- 02:582, 02:584-02:585, 02:587, 02:589-02:590, 02:592, 02:594-02:598, 02:600, 02:602-02:603, 02:605Q-02:616, 02:618Q-02:621, 02:623, 02:625, 02:627, 02:629, 02:632-02:635, 02:637-02:642, 02:645, 02:667-02:661, 02:664, 02:666, 02:668- 02:663, 02:665-02:666, 02:668-02:669, 02:671- 02:675N, 02:677, 02:779-02:780, 02:722-02:730, 02:732- 02:733, 02:735, 02:737-02:740, 02:742-02:748N, 02:750-02:763, 02:765, 02:767-02:770, 02:772- 02:777, 02:779-02:786, 02:885N-02:89N, 02:808- 02:816, 02:819-02:821, 02:823-02:825, 02:8270- 02:828, 02:830-02:839, 02:841, 02:844-02:854, 02:856-02:858N, 02:860-02:866, 02:868-02:871N, 02:873-02:877, 03:95, 03:343, 24:14:01:01- 24:14:01:04, 24:324, 29:22, 31:99, 33:22, 68:105 1070 bp *69:02 *01:20, 01:66, 02:346, 02:427, 02:644, 02:741, 02:749, 11:288, 26:22, 66:09 5 225 bp 1070 bp *69:03 *02:120, 02:730, 02:230, 02:417, 02:543, 02:630, 02:662, 02:773, 02:280, 02:417, 02:543, 02:630, 02:662, 02:773, 02:280, 02:417, 02:543, 02:630, 02:662, 02:773, 02:840, 11:288, 24:14:01:01- 24:14:01:04, 24:39, 24:324					02:488, 02:490N-02:491, 02:493-02:494, 02:497-
02:510, 02:512, 02:514N-02:516N, 02:518-02:525N, 02:528:01-02:530, 02:533-02:539, 02:542-02:543, 02:545, 02:547, 02:549-02:557, 02:559-02:564, 02:568-02:571, 02:573-02:574, 02:578-02:578- 02:582, 02:584-02:585, 02:587, 02:589-02:590, 02:592, 02:594-02:598, 02:600, 02:602-02:603, 02:605Q-02:616, 02:618Q-02:621, 02:623, 02:625, 02:627, 02:629, 02:632-02:635, 02:637-02:642, 02:645, 02:667-02:661, 02:664, 02:666, 02:668- 02:663, 02:665-02:666, 02:668-02:669, 02:671- 02:675N, 02:677, 02:779-02:780, 02:722-02:730, 02:732- 02:733, 02:735, 02:737-02:740, 02:742-02:748N, 02:750-02:763, 02:765, 02:767-02:770, 02:772- 02:777, 02:779-02:786, 02:885N-02:89N, 02:808- 02:816, 02:819-02:821, 02:823-02:825, 02:8270- 02:828, 02:830-02:839, 02:841, 02:844-02:854, 02:856-02:858N, 02:860-02:866, 02:868-02:871N, 02:873-02:877, 03:95, 03:343, 24:14:01:01- 24:14:01:04, 24:324, 29:22, 31:99, 33:22, 68:105 1070 bp *69:02 *01:20, 01:66, 02:346, 02:427, 02:644, 02:741, 02:749, 11:288, 26:22, 66:09 5 225 bp 1070 bp *69:03 *02:120, 02:730, 02:230, 02:417, 02:543, 02:630, 02:662, 02:773, 02:280, 02:417, 02:543, 02:630, 02:662, 02:773, 02:280, 02:417, 02:543, 02:630, 02:662, 02:773, 02:840, 11:288, 24:14:01:01- 24:14:01:04, 24:39, 24:324					02:498, 02:500Q-02:501N, 02:503-02:506N, 02:508-
02:545, 02:547, 02:549-02:557, 02:559-02:564, 02:568-02:571, 02:573-02:574, 02:576, 02:578- 02:582, 02:584-02:585, 02:587, 02:589-02:590, 02:592, 02:594-02:598, 02:600, 02:602-02:603, 02:605Q-02:616, 02:618Q-02:621, 02:623, 02:625, 02:627, 02:629, 02:632-02:635, 02:637-02:642, 02:645, 02:647-02:651, 02:654, 02:656, 02:658- 02:663, 02:665-02:666, 02:668-02:669, 02:671- 02:675N, 02:677, 02:679, 02:681-02:730, 02:711- 02:716, 02:718-02:720, 02:722-02:730, 02:732- 02:733, 02:735, 02:737-02:740, 02:742-02:748N, 02:750-02:763, 02:765, 02:767-02:770, 02:772- 02:777, 02:779-02:7780, 02:788N-02:789N, 02:808- 02:816, 02:819-02:821, 02:823-02:825, 02:827Q- 02:828, 02:830-02:881, 02:823-02:825, 02:827Q- 02:828, 02:830-02:889, 02:841, 02:844-02:854, 02:856-02:858N, 02:860-02:866, 02:868-02:871N, 02:873-02:877, 03:95, 03:343, 24:14:01:01- 24:14:01:04, 24:324, 29:22, 31:99, 33:22, 68:105 *02:142, 02:226N, 02:280, 02:247, 02:644, 02:741, 02:749, 11:288, 26:22, 66:09 *02:142, 02:226N, 02:280, 02:2417, 02:543, 02:630, 02:662, 02:723, 02:840, 11:288, 24:14:01:01- 24:14:01:04, 24:93, 24:324					02:510, 02:512, 02:514N-02:516N, 02:518-02:525N,
02:545, 02:547, 02:549-02:557, 02:559-02:564, 02:568-02:571, 02:573-02:574, 02:576, 02:578- 02:582, 02:584-02:585, 02:587, 02:589-02:590, 02:592, 02:594-02:598, 02:600, 02:602-02:603, 02:605Q-02:616, 02:618Q-02:621, 02:623, 02:625, 02:627, 02:629, 02:632-02:635, 02:637-02:642, 02:645, 02:647-02:651, 02:654, 02:656, 02:658- 02:663, 02:665-02:666, 02:668-02:669, 02:671- 02:675N, 02:677, 02:679, 02:681-02:730, 02:711- 02:716, 02:718-02:720, 02:722-02:730, 02:732- 02:733, 02:735, 02:737-02:740, 02:742-02:748N, 02:750-02:763, 02:765, 02:767-02:770, 02:772- 02:777, 02:779-02:7780, 02:788N-02:789N, 02:808- 02:816, 02:819-02:821, 02:823-02:825, 02:827Q- 02:828, 02:830-02:881, 02:823-02:825, 02:827Q- 02:828, 02:830-02:889, 02:841, 02:844-02:854, 02:856-02:858N, 02:860-02:866, 02:868-02:871N, 02:873-02:877, 03:95, 03:343, 24:14:01:01- 24:14:01:04, 24:324, 29:22, 31:99, 33:22, 68:105 *02:142, 02:226N, 02:280, 02:247, 02:644, 02:741, 02:749, 11:288, 26:22, 66:09 *02:142, 02:226N, 02:280, 02:2417, 02:543, 02:630, 02:662, 02:723, 02:840, 11:288, 24:14:01:01- 24:14:01:04, 24:93, 24:324					02:528:01-02:530, 02:533-02:539, 02:542-02:543,
02:582, 02:584-02:585, 02:587, 02:589-02:590, 02:592, 02:594-02:598, 02:600, 02:602-02:603, 02:605Q-02:616, 02:618Q-02:635, 02:637-02:625, 02:627, 02:629, 02:632-02:635, 02:637-02:642, 02:645, 02:647-02:661, 02:664, 02:656, 02:668- 02:663, 02:665-02:666, 02:668-02:669, 02:671- 02:675N, 02:677, 02:679, 02:681-02:708, 02:711- 02:716, 02:718-02:720, 02:722-02:730, 02:732- 02:733, 02:735, 02:737-02:740, 02:742-02:748N, 02:750-02:763, 02:765, 02:767-02:770, 02:772- 02:777, 02:779-02:786, 02:788N-02:789N, 02:808- 02:816, 02:819-02:821, 02:823-02:825, 02:827Q- 02:828, 02:830-02:839, 02:841, 02:844-02:854, 02:856-02:858N, 02:860-02:866, 02:868-02:871N, 02:873-02:877, 03:95, 03:343, 24:14:01:01- 24:14:01:04, 24:324, 29:22, 31:99, 33:22, 68:105 *01:20, 01:66, 02:346, 02:427, 02:644, 02:741, 02:749, 11:288, 26:22, 66:09 *02:142, 02:226N, 02:280, 02:417, 02:543, 02:630, 02:622, 02:723, 02:840, 11:288, 24:14:01:01- 24:14:01:04, 24:93, 24:324					02:545, 02:547, 02:549-02:557, 02:559-02:564,
02:582, 02:584-02:585, 02:587, 02:589-02:590, 02:592, 02:594-02:598, 02:600, 02:602-02:603, 02:605Q-02:616, 02:618Q-02:635, 02:637-02:625, 02:627, 02:629, 02:632-02:635, 02:637-02:642, 02:645, 02:647-02:661, 02:664, 02:656, 02:668- 02:663, 02:665-02:666, 02:668-02:669, 02:671- 02:675N, 02:677, 02:679, 02:681-02:708, 02:711- 02:716, 02:718-02:720, 02:722-02:730, 02:732- 02:733, 02:735, 02:737-02:740, 02:742-02:748N, 02:750-02:763, 02:765, 02:767-02:770, 02:772- 02:777, 02:779-02:786, 02:788N-02:789N, 02:808- 02:816, 02:819-02:821, 02:823-02:825, 02:827Q- 02:828, 02:830-02:839, 02:841, 02:844-02:854, 02:856-02:858N, 02:860-02:866, 02:868-02:871N, 02:873-02:877, 03:95, 03:343, 24:14:01:01- 24:14:01:04, 24:324, 29:22, 31:99, 33:22, 68:105 *01:20, 01:66, 02:346, 02:427, 02:644, 02:741, 02:749, 11:288, 26:22, 66:09 *02:142, 02:226N, 02:280, 02:417, 02:543, 02:630, 02:622, 02:723, 02:840, 11:288, 24:14:01:01- 24:14:01:04, 24:93, 24:324					02:568-02:571, 02:573-02:574, 02:576, 02:578-
02:605Q-02:616, 02:618Q-02:621, 02:623, 02:625, 02:627, 02:627, 02:629, 02:632-02:635, 02:637-02:642, 02:645, 02:645, 02:6465, 02:656, 02:658-02:663, 02:665-02:666, 02:668-02:669, 02:671-02:675N, 02:677, 02:679, 02:681-02:708, 02:711-02:716, 02:718-02:720, 02:722-02:730, 02:732-02:733, 02:735, 02:735, 02:737-02:740, 02:742-02:748N, 02:750-02:763, 02:765, 02:767-02:770, 02:772-02:777, 02:779-02:786, 02:808-02:806N, 02:808-02:818, 02:800-02:803N, 02:805Q-02:806N, 02:808-02:818, 02:819-02:821, 02:823-02:825, 02:827Q-02:828, 02:830-02:839, 02:841, 02:844-02:854, 02:856-02:858N, 02:866-02:868-02:871N, 02:873-02:877, 03:95, 03:343, 24:14:01:01-24:14:01:04, 24:324, 29:22, 31:99, 33:22, 68:105 4 295 bp 1070 bp *69:02 *01:20, 01:66, 02:346, 02:427, 02:644, 02:741, 02:749, 11:288, 26:22, 66:09 5 225 bp 1070 bp *69:03 *02:12-02:13, 02:19, 02:27, 02:37-02:38, 02:44, 02:54, 02:142, 02:226N, 02:280, 02:417, 02:543, 02:630, 02:662, 02:723, 02:840, 11:288, 24:14:01:01-24:14:01:04, 24:93, 24:324					
02:627, 02:629, 02:632-02:635, 02:637-02:642, 02:645, 02:647-02:651, 02:654, 02:656, 02:658- 02:663, 02:665-02:666, 02:668-02:669, 02:671- 02:675N, 02:677, 02:679, 02:681-02:708, 02:711- 02:716, 02:718-02:720, 02:722-02:730, 02:732- 02:733, 02:735, 02:737-02:7740, 02:772-02:748N, 02:750-02:763, 02:765, 02:767-02:770, 02:772- 02:777, 02:779-02:786, 02:808N-02:808N, 02:808- 02:816, 02:819-02:821, 02:823-02:825, 02:827Q- 02:828, 02:830-02:839, 02:841, 02:844-02:854, 02:856-02:858N, 02:860-02:866, 02:868-02:871N, 02:873-02:877, 03:95, 03:343, 24:14:01:01- 24:14:01:04, 24:324, 29:22, 31:99, 33:22, 68:105 **01:20, 01:66, 02:346, 02:427, 02:644, 02:741, 02:749, 11:288, 26:22, 66:09 **02:12-02:13, 02:19, 02:27, 02:37-02:38, 02:44, 02:54, 02:142, 02:226N, 02:280, 02:417, 02:543, 02:630, 02:662, 02:723, 02:840, 11:288, 24:14:01:01- 24:14:01:04, 24:93, 24:324					02:592, 02:594-02:598, 02:600, 02:602-02:603,
02:645, 02:647-02:651, 02:654, 02:656, 02:658- 02:663, 02:665-02:666, 02:668-02:669, 02:671- 02:675N, 02:677, 02:679, 02:681-02:708, 02:711- 02:716, 02:718-02:720, 02:722-02:730, 02:732- 02:733, 02:735, 02:737-02:740, 02:742-02:748N, 02:750-02:763, 02:765, 02:767-02:770, 02:772- 02:777, 02:779-02:786, 02:788N-02:789N, 02:792N- 02:798, 02:800-02:803N, 02:805Q-02:805N, 02:808- 02:816, 02:819-02:821, 02:823-02:825, 02:827Q- 02:828, 02:830-02:839, 02:841, 02:844-02:854, 02:856-02:858N, 02:860-02:866, 02:868-02:871N, 02:873-02:877, 03:95, 03:343, 24:14:01:01- 24:14:01:04, 24:324, 29:22, 31:99, 33:22, 68:105 *01:20, 01:66, 02:346, 02:427, 02:644, 02:741, 02:749, 11:288, 26:22, 66:09 *02:142, 02:226N, 02:247, 02:37-02:38, 02:44, 02:54, 02:662, 02:723, 02:840, 11:288, 24:14:01:01- 24:14:01:04, 24:93, 24:324					02:605Q-02:616, 02:618Q-02:621, 02:623, 02:625,
02:663, 02:665-02:666, 02:668-02:669, 02:671- 02:675N, 02:677, 02:679, 02:681-02:708, 02:711- 02:716, 02:718-02:720, 02:722-02:730, 02:732- 02:733, 02:735, 02:737-02:740, 02:742-02:748N, 02:750-02:763, 02:765, 02:767-02:770, 02:772- 02:777, 02:779-02:786, 02:788N-02:789N, 02:792N- 02:798, 02:800-02:803N, 02:805Q-02:806N, 02:808- 02:816, 02:819-02:821, 02:823-02:825, 02:827Q- 02:828, 02:830-02:839, 02:841, 02:844-02:854, 02:856-02:858N, 02:860-02:866, 02:868-02:871N, 02:873-02:877, 03:95, 03:343, 24:14:01:01- 24:14:01:04, 24:324, 29:22, 31:99, 33:22, 68:105 4					02:627, 02:629, 02:632-02:635, 02:637-02:642,
02:675N, 02:677, 02:679, 02:681-02:708, 02:711- 02:716, 02:718-02:720, 02:722-02:730, 02:732- 02:733, 02:735, 02:737-02:740, 02:742-02:748N, 02:750-02:763, 02:765, 02:767-02:770, 02:772- 02:777, 02:779-02:786, 02:788N-02:789N, 02:792N- 02:798, 02:800-02:803N, 02:805Q-02:806N, 02:808- 02:816, 02:819-02:821, 02:823-02:825, 02:827Q- 02:828, 02:830-02:839, 02:841, 02:844-02:854, 02:856-02:858N, 02:860-02:866, 02:868-02:871N, 02:873-02:877, 03:95, 03:343, 24:14:01:01- 24:14:01:04, 24:324, 29:22, 31:99, 33:22, 68:105 4 295 bp 1070 bp *69:02 *01:20, 01:66, 02:346, 02:427, 02:644, 02:741, 02:749, 11:288, 26:22, 66:09 5 225 bp 1070 bp *69:03 *02:12-02:13, 02:19, 02:27, 02:37-02:38, 02:44, 02:54, 02:142, 02:226N, 02:280, 02:417, 02:543, 02:630, 02:662, 02:723, 02:840, 11:288, 24:14:01:01- 24:14:01:04, 24:93, 24:324					02:645, 02:647-02:651, 02:654, 02:656, 02:658-
02:716, 02:718-02:720, 02:722-02:730, 02:732- 02:733, 02:735, 02:737-02:740, 02:742-02:748N, 02:750-02:763, 02:765, 02:767-02:770, 02:772- 02:777, 02:779-02:786, 02:788N-02:789N, 02:792N- 02:798, 02:800-02:803N, 02:805Q-02:806N, 02:808- 02:816, 02:819-02:821, 02:823-02:825, 02:827Q- 02:828, 02:830-02:839, 02:841, 02:844-02:854, 02:856-02:858N, 02:860-02:866, 02:868-02:871N, 02:873-02:877, 03:95, 03:343, 24:14:01:01- 24:14:01:04, 24:324, 29:22, 31:99, 33:22, 68:105 4 295 bp 1070 bp *69:02 *01:20, 01:66, 02:346, 02:427, 02:644, 02:741, 02:749, 11:288, 26:22, 66:09 5 225 bp 1070 bp *69:03 *02:12-02:13, 02:19, 02:27, 02:37-02:38, 02:44, 02:54, 02:142, 02:226N, 02:280, 02:417, 02:543, 02:630, 02:662, 02:723, 02:840, 11:288, 24:14:01:01- 24:14:01:04, 24:93, 24:324					02:663, 02:665-02:666, 02:668-02:669, 02:671-
02:733, 02:735, 02:737-02:740, 02:742-02:748N, 02:750-02:763, 02:765, 02:767-02:770, 02:772- 02:777, 02:779-02:786, 02:788N-02:789N, 02:792N- 02:798, 02:800-02:803N, 02:805Q-02:806N, 02:808- 02:816, 02:819-02:821, 02:823-02:825, 02:827Q- 02:828, 02:830-02:839, 02:841, 02:844-02:854, 02:856-02:858N, 02:860-02:866, 02:868-02:871N, 02:873-02:877, 03:95, 03:343, 24:14:01:01- 24:14:01:04, 24:324, 29:22, 31:99, 33:22, 68:105 4					02:675N, 02:677, 02:679, 02:681-02:708, 02:711-
02:750-02:763, 02:765, 02:767-02:770, 02:772- 02:777, 02:779-02:786, 02:788N-02:789N, 02:792N- 02:798, 02:800-02:803N, 02:805Q-02:806N, 02:808- 02:816, 02:819-02:821, 02:823-02:825, 02:827Q- 02:828, 02:830-02:839, 02:841, 02:844-02:854, 02:856-02:858N, 02:860-02:866, 02:868-02:871N, 02:873-02:877, 03:95, 03:343, 24:14:01:01- 24:14:01:04, 24:324, 29:22, 31:99, 33:22, 68:105 4 295 bp 1070 bp *69:02 *01:20, 01:66, 02:346, 02:427, 02:644, 02:741, 02:749, 11:288, 26:22, 66:09 5 225 bp 1070 bp *69:03 *02:12-02:13, 02:19, 02:27, 02:37-02:38, 02:44, 02:54, 02:142, 02:226N, 02:280, 02:417, 02:543, 02:630, 02:662, 02:723, 02:840, 11:288, 24:14:01:01- 24:14:01:04, 24:93, 24:324					02:716, 02:718-02:720, 02:722-02:730, 02:732-
02:777, 02:779-02:786, 02:788N-02:789N, 02:792N- 02:798, 02:800-02:803N, 02:805Q-02:806N, 02:808- 02:816, 02:819-02:821, 02:823-02:825, 02:827Q- 02:828, 02:830-02:839, 02:841, 02:844-02:854, 02:856-02:858N, 02:860-02:866, 02:868-02:871N, 02:873-02:877, 03:95, 03:343, 24:14:01:01- 24:14:01:04, 24:324, 29:22, 31:99, 33:22, 68:105 4					02:733, 02:735, 02:737-02:740, 02:742-02:748N,
02:798, 02:800-02:803N, 02:805Q-02:806N, 02:808- 02:816, 02:819-02:821, 02:823-02:825, 02:827Q- 02:828, 02:830-02:839, 02:841, 02:844-02:854, 02:856-02:858N, 02:860-02:866, 02:868-02:871N, 02:873-02:877, 03:95, 03:343, 24:14:01:01- 24:14:01:04, 24:324, 29:22, 31:99, 33:22, 68:105 4 295 bp 1070 bp *69:02 *01:20, 01:66, 02:346, 02:427, 02:644, 02:741, 02:749, 11:288, 26:22, 66:09 5 225 bp 1070 bp *69:03 *02:12-02:13, 02:19, 02:27, 02:37-02:38, 02:44, 02:54, 02:142, 02:226N, 02:280, 02:417, 02:543, 02:630, 02:662, 02:723, 02:840, 11:288, 24:14:01:01- 24:14:01:04, 24:93, 24:324					02:750-02:763, 02:765, 02:767-02:770, 02:772-
02:816, 02:819-02:821, 02:823-02:825, 02:827Q-02:828, 02:830-02:839, 02:841, 02:844-02:854, 02:856-02:858N, 02:860-02:866, 02:868-02:871N, 02:873-02:877, 03:95, 03:343, 24:14:01:01-24:14:01:04, 24:324, 29:22, 31:99, 33:22, 68:105 4					02:777, 02:779-02:786, 02:788N-02:789N, 02:792N-
02:828, 02:830-02:839, 02:841, 02:844-02:854, 02:856-02:858N, 02:860-02:866, 02:868-02:871N, 02:873-02:877, 03:95, 03:343, 24:14:01:01- 24:14:01:04, 24:324, 29:22, 31:99, 33:22, 68:105 4					02:798, 02:800-02:803N, 02:805Q-02:806N, 02:808-
02:856-02:858N, 02:866-02:866, 02:868-02:871N, 02:873-02:877, 03:95, 03:343, 24:14:01:01- 24:14:01:04, 24:324, 29:22, 31:99, 33:22, 68:105 4					02:816, 02:819-02:821, 02:823-02:825, 02:827Q-
4 295 bp 1070 bp *69:02 *01:20, 01:66, 02:346, 02:427, 02:644, 02:741, 02:749, 11:288, 26:22, 66:09 5 225 bp 1070 bp *69:03 *02:12-02:13, 02:19, 02:27, 02:37-02:38, 02:44, 02:54, 02:142, 02:226N, 02:280, 02:417, 02:543, 02:630, 02:662, 02:723, 02:840, 11:288, 24:14:01:01-24:14:01:04, 24:93, 24:324					02:828, 02:830-02:839, 02:841, 02:844-02:854,
24:14:01:04, 24:324, 29:22, 31:99, 33:22, 68:105 4 295 bp 1070 bp *69:02 *01:20, 01:66, 02:346, 02:427, 02:644, 02:741, 02:749, 11:288, 26:22, 66:09 5 225 bp 1070 bp *69:03 *02:12-02:13, 02:19, 02:27, 02:37-02:38, 02:44, 02:54, 02:142, 02:226N, 02:280, 02:417, 02:543, 02:630, 02:662, 02:723, 02:840, 11:288, 24:14:01:01-24:14:01:04, 24:93, 24:324					02:856-02:858N, 02:860-02:866, 02:868-02:871N,
4 295 bp 1070 bp *69:02 *01:20, 01:66, 02:346, 02:427, 02:644, 02:741, 02:749, 11:288, 26:22, 66:09 5 225 bp 1070 bp *69:03 *02:12-02:13, 02:19, 02:27, 02:37-02:38, 02:44, 02:54, 02:142, 02:226N, 02:280, 02:417, 02:543, 02:630, 02:662, 02:723, 02:840, 11:288, 24:14:01:01-24:14:01:04, 24:93, 24:324					02:873-02:877, 03:95, 03:343, 24:14:01:01-
11:288, 26:22, 66:09 5					24:14:01:04, 24:324, 29:22, 31:99, 33:22, 68:105
5 225 bp 1070 bp *69:03 *02:12-02:13, 02:19, 02:27, 02:37-02:38, 02:44, 02:54, 02:142, 02:226N, 02:280, 02:417, 02:543, 02:630, 02:662, 02:723, 02:840, 11:288, 24:14:01:01-24:14:01:04, 24:93, 24:324	4	295 bp	1070 bp	*69:02	*01:20, 01:66, 02:346, 02:427, 02:644, 02:741, 02:749,
02:142, 02:226N, 02:280, 02:417, 02:543, 02:630, 02:662, 02:723, 02:840, 11:288, 24:14:01:01-24:14:01:04, 24:93, 24:324					11:288, 26:22, 66:09
02:662, 02:723, 02:840, 11:288, 24:14:01:01- 24:14:01:04, 24:93, 24:324	5	225 bp	1070 bp	*69:03	
24:14:01:04, 24:93, 24:324					
6 ⁵ Negative Control					
	6 ⁵				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-A*69 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 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,



•LERUP SSP°

HLA-A*69 Product Insert Page 7 of 12
101.435-06 – including *Taq* polymerase, IFU-01 Visit https://labproducts.caredx.com for 101.435-06u – without *Taq* polymerase, IFU-02 "Instructions for Use" (IFU)

Lot No.: **3K7** Lot-specific information

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.

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 6 contains a negative control, which will amplify a 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 products generated by the HGH positive control primer pair are 200 and 430 base pairs.

HLA-A*69

Product Insert

Page 8 of 12

101.435-06 – including *Taq* **polymerase**, IFU-01 **101.435-06u – without** *Taq* **polymerase**, IFU-02

Visit https://labproducts.caredx.com for "Instructions for Use" (IFU)

Lot No.: **3K7** Lot-specific information

PRIMER SPECIFICATION

Well No.	1	2	3	4	5
Length of spec.	410	100	295	295	225
PCR product					
Length of int.	800	1070	1070	1070	1070
pos. control ¹					
5'-primer(s) ²	261	282	341	341	355
	5' -AAC 3'	^{5'} -CAg ^{3'}	^{5'} -ggC ^{3'}	^{5'} -ggA ^{3'}	^{5'} -CCg ^{3'}
3'-primer(s) ³	391	341	355	355	539
	5' -CCA 3'	^{5'} -Cgg ^{3'}	^{5'} -gAC ^{3'}	^{5'} -gAC ^{3'}	^{5'} -TCT ^{3'}
Well No.	1	2	3	4	5

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.

Product Insert

HLA-A*69 101.435-06 – including *Taq* polymerase, IFU-01 Visit https://labproducts.caredx.com for 101.435-06u – without *Taq* polymerase, IFU-02 "Instructions for Use" (IFU)

Page 9 of 12

Lot No.: **3K7 Lot-specific information**

IHWC cell line	CELL LINE VALIDATION SHEET									
IHWC cell line										
IHWC cell line							\	Ne	<u> </u>	
IHWC cell line						1	2	3	4	5
1 9001 SA					Production No.:	201432801	201432802	201432803	201432804	201432805
1 9001 SA		IHV	/C cell line ¹	Α*	A*					
2 9280 LK707 *02:01	1					-	-	-	-	-
3	2			*02:01		-	-	+	-	-
5 9009 KAS011	3					-	-	-	-	-
5 9009 KAS011	4	9275	GU373	*30:01		-	+	-	-	-
6 9353 SM	5					-	-	-	-	-
7 9020 QBL					*26:03	-	-	+	-	-
8 9025 DEU *31:01 - <th< th=""><th></th><th></th><th></th><th></th><th></th><th>-</th><th>-</th><th>-</th><th>-</th><th>-</th></th<>						-	-	-	-	-
9 9026 YAR	8					-	-	-	-	-
10		9026	YAR			-	-	-	-	-
12	10	9107	LKT3			-	-	-	-	-
12	11	9051	PITOUT	*29:02		-	+	-	-	-
14 9071 OLGA *31:01 - <	12	9052	DBB			-	-	+	-	-
15 9075 DKB *24:02 - <t< th=""><td>13</td><td>9004</td><td>JESTHOM</td><td>*02:01</td><td></td><td>-</td><td>-</td><td>+</td><td>-</td><td>-</td></t<>	13	9004	JESTHOM	*02:01		-	-	+	-	-
15 9075 DKB *24:02 - <t< th=""><td>14</td><td>9071</td><td>OLGA</td><td></td><td></td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td></t<>	14	9071	OLGA			-	-	-	-	-
17 9282 CTM3953540 *03:01 *80:01 - + - <td>15</td> <td>9075</td> <td>DKB</td> <td>*24:02</td> <td></td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td>	15	9075	DKB	*24:02		-	-	-	-	-
18 9257 32367 *33:03 *74:01 -	16	9037	SWEIG007	*29:02		-	+	-	-	-
18 9257 32367 *33:03 *74:01 -	17	9282	CTM3953540	*03:01	*80:01	-	+	-	-	-
20 9059 SLE005 *02:01 - - + -	18	9257	32367		*74:01	-	-	-	-	-
21 9064 AMALA *02:17	19	9038	BM16	*02:01		-	-	+	-	-
22 9056 KOSE *02:01	20	9059	SLE005	*02:01		-	-	+	-	-
23 9124 IHL *02:01 *34:01 - + -	21	9064	AMALA	*02:17		-	-	-	-	-
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 *0	22	9056	KOSE	*02:01		-	-	-	-	-
25 9049 IBW9 *33:01	23	9124	IHL		*34:01	-	-	+	-	-
26 9285 WT49 *02:05	24	9035	JBUSH	*32:01		-	-	+	-	-
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 + -	25	9049	IBW9	*33:01		-	-	-	-	-
28 9320 BEL5GB *02:01 *29:02 - + + -	26	9285	WT49	*02:05		-	-	-	-	-
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	27	9191	CH1007	*24:10	*29:01	-	+	-	-	-
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	28	9320	BEL5GB	*02:01	*29:02	-	+	+	-	-
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 </th <td>29</td> <td>9050</td> <td>MOU</td> <td>*29:02</td> <td></td> <td>-</td> <td>+</td> <td>-</td> <td>-</td> <td>-</td>	29	9050	MOU	*29:02		-	+	-	-	-
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					*68:02	L-	+			-
33 9098 MT14B *31:01	31	9019	DUCAF	*30:02		-	-	-	-	-
34 9104 DHIF *31:01	32	9297	HAG			-	-	+	-	-
35 9302 SSTO *32:01	33	9098	MT14B	*31:01		-	-	-	-	-
36 9024 KT17 *02:06 *11:01 - + -	34	9104	DHIF	*31:01		-	-	-	-	-
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 + +	35	9302	SSTO	*32:01		-	-	-	-	-
38 9099 LZL *02:17	36	9024	KT17	*02:06	*11:01	-	-	+	-	-
39 9315 CML *01:01 *03:01 - + -	37	9065	HHKB	*03:01		-	+	-	-	-
40 9134 WHONP199 *02:07 *30:01 - + + - <td>38</td> <td>9099</td> <td>LZL</td> <td>*02:17</td> <td></td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td>	38	9099	LZL	*02:17		-	-	-	-	-
41 9055 H0301 *03:01 - + - 42 9066 TAB089 *02:07 + - - - + - 43 9076 T7526 *02:06 *02:07 + - <t< th=""><td></td><td></td><td></td><td></td><td></td><td>-</td><td>+</td><td>-</td><td>-</td><td>-</td></t<>						-	+	-	-	-
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 - + +		9134	WHONP199		*30:01	_	+	+	<u>-</u>	-
43 9076 T7526 *02:06 *02:07 - - + -		9055	H0301	*03:01		-	+	-	-	-
44 9057 TEM *66:01						-	-	+	-	-
45 9239 SHJO *23:01 *24:02 -					*02:07	-	-	+	-	-
46 9013 SCHU *03:01 - + - 47 9045 TUBO *02:16 *03:01 - + + -		9057	TEM	*66:01		-	-	-	-	-
47 9045 TUBO *02:16 *03:01 - + +	45			*23:01	*24:02	-	-	-	-	-
	46			*03:01		-	+	-	-	-
48 0303 TEP_ND *02:01 *11:01	47			*02:16	*03:01	-	+	+	-	-
9505 ILICIND 02.01 11.01 - - + -	48			*02:01	*11:01	-	-	+	-	-



HLA-A*69 Product Insert Page 10 of 12
101.435-06 – including *Taq* polymerase, IFU-01 Visit https://labproducts.caredx.com for 101.435-06u – without *Taq* polymerase, IFU-02 "Instructions for Use" (IFU)

Lot No.: **3K7** 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.

No DNAs carrying the alleles to be amplified by primer solution 4 were available.

The specificities of the primers in primer solution 4 were tested by separately adding one 5'-primer, respectively one 3'-primer.

●LERUP SSP

HLA-A*69 Product Insert Page 11 of 12
101.435-06 – including *Taq* polymerase, IFU-01 Visit https://labproducts.caredx.com for 101.435-06u – without *Taq* polymerase, IFU-02 "Instructions for Use" (IFU)

Lot No.: **3K7** Lot-specific information



•LERUP SSP°

HLA-A*69 Product Insert Page 12 of 12
101.435-06 – including *Taq* polymerase, IFU-01 Visit https://labproducts.caredx.com for 101.435-06u – without *Taq* polymerase, IFU-02 "Instructions for Use" (IFU)

Lot No.: **3K7** Lot-specific information

ADDRESSES:

Manufacturer:

Caredx AB, Franzengatan 5, SE-112 51 Stockholm, Sweden.

Tel: +46-8-508 939 00 Fax: +46-8-717 88 18

E-mail: orders-se@caredx.com

Web page: https://labproducts.caredx.com/

Distributed by:

CareDx GmbH, Löwengasse 47 / 6, AT-1030 Vienna, Austria.

Tel: +43-1-710 15 00 **Fax:** +43-1-710 15 00 10 **E-mail:** orders-at@caredx.com

Web page: https://labproducts.caredx.com/

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

Tel: 1-877-653-78171 **Fax:** 610-344-7989

E-mail: orders-us@caredx.com

Web page: https://labproducts.caredx.com/

For information on CareDx distributors worldwide, contact CareDx GmbH.