

Olerup SSP[®] DRB1*13

Product number:	101.116-24u/03u – without <i>Taq</i> pol.
Lot number:	03G
Expiry date:	2011-July 01
Number of tests:	24 tests – Product No. 101.116-24u 3 tests – Product No. 101.116-03u
Number of wells per test:	32
Storage - pre-aliquoted primers:	dark at -20°C
- PCR Master Mix:	-20°C
- Adhesive PCR seals	RT
- Product Insert	RT

This Product Description is only valid for Lot No. 03G.

**CHANGES COMPARED TO THE PREVIOUS *OLERUP SSP[®]*
DRB1*13 LOT**

The DRB1*13 specificity and interpretation tables have been updated for the DRB alleles described since the previous *Olerup SSP[®]* DRB1*13 lot was made (**Lot No. 82E**).

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

Well	5'-primer	3'-primer	rationale
16	Added	-	Primer added for increased amplification of the DRB1*1369 allele.
18	-	Added	Primer added for the DRB1*1387 allele.
19	-	Added	Primer added for the DRB1*1387 allele.
27	-	Added	Primer added for increased amplification of the DRB1*1380 allele.

Change in revision R01 compared to R00:

1. The DRB1*1310 and 1381 alleles are amplified in primer mix 30. This has been corrected in the specificity and interpretation tables.

PRODUCT DESCRIPTION

DRB1*13 SSP subtyping

CONTENT

The primer set contains 5'- and 3'-primers for identifying the DRB1*1301 to DRB1*1388 alleles.

PLATE LAYOUT

Each test consists of 32 PCR reactions in a 32 well cut PCR plate.

1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32

The 32 well cut PCR plate is marked with ‘DRB1*13’ in silver/gray ink.

Well No. 1 is marked with the Lot No ‘03G’.

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

Please note: When removing each 32 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

The interpretation of DRB1*13 PCR-SSP subtypings will be influenced by all DRB1*03 alleles, five DRB1*04 alleles, five DRB1*08 alleles, most DRB1*11 alleles, the DRB1*12 alleles, most DRB1*14 alleles, most DRB1*15 alleles and the DRB1*1608 allele when present on the other haplotype. In addition, the DRB3*0108, DRB3*0206 and DRB3*0220 alleles will be amplified by primer mix 7.

UNIQUELY IDENTIFIED ALLELES

All the phenotypically different DRB1*13 alleles, i.e. **DRB1*1301 to DRB1*1388**, recognized by the HLA Nomenclature Committee in May 2009¹ will give rise to unique amplification patterns by the primers in the DRB1*13 subtyping kit.

The DRB1*13 subtyping kit cannot distinguish the DRB1*130101 and 130102 alleles, the DRB1*130201 and 130203 alleles, the DRB1*130301 and 130302 alleles, DRB1*130501 and 130502, the DRB1*130701 and 130702, the DRB1*131401 to 131403 alleles and the DRB1*135001 and 135002 alleles.

¹HLA-A alleles listed on the IMGT/HLA web page 2009-May-11, release 2.25.2, www.ebi.ac.uk/imgt/hla.

RESOLUTION IN HOMO- AND HETEROZYGOTES

The 88 DRB1*13 alleles give rise to 90 different amplification patterns, DRB1*130101-130102 and 130103, DRB1*130201/130203 and 130202 having different amplification patterns. These can be combined in 4095 homozygous and heterozygous combinations. 1416 of these genotypes do not give rise to unique amplification patterns. The different lengths of the specific PCR products in lanes 15, 17 to 20, 22 to 24, 31 and 32 were not considered in these calculations.

+++++--+ +---+--+ -+----- +---+--+ 1358,1363 = 1363,1381
+++++--+ +---+--+ -+----- +---+--+ 1336,1355 = 1347,1365 = 1355,1365
+++++--+ +---+--+ -+----- +---+--+ 1331,1349 = 1346,1365
+++++--+ +---+--+ -+----- +---+--+ 1302,1349 = 1314,1365 = 1321,1336
= 1321,1365
+++++--+ +---+--+ -+----- +---+--+ 1307,1365 = 1336,1349 = 1349,1365
+++++--+ +---+--+ -+----- +---+--+ 1350,1365 = 1362,1365
+++++--+ +---+--+ -+----- +---+--+ 1349,1387 = 1351,1355 = 1355,1387
+++++--+ +---+--+ -+----- +---+--+ 1301,1355 = 1349,1361 = 1355,1361
+++++--+ +---+--+ -+----- +---+--+ 1332,1347 = 1332,1355 = 1340,1355
+++++--+ +---+--+ -+----- +---+--+ 1314,1332 = 1321,1332 = 1321,1340
+++++--+ +---+--+ -+----- +---+--+ 1307,1332 = 1332,1349 = 1340,1349
+++++--+ +---+--+ -+----- +---+--+ 1321,1335 = 1321,1379
+++++--+ +---+--+ -+----- +---+--+ 1324,1333 = 1333,1375
+++++--+ +---+--+ -+----- +---+--+ 1304,1347 = 1304,1355 = 1313,1324
= 1313,1375 = 1322,1355
+++++--+ +---+--+ -+----- +---+--+ 1347,1348 = 1348,1355 = 1355,1370
+++++--+ +---+--+ -+----- +---+--+ 1303,1324 = 1303,1375 = 1337,1375
+++++--+ +---+--+ -+----- +---+--+ 1304,1307 = 1304,1349 = 1312,1324
= 1312,1375 = 1322,1349
+++++--+ +---+--+ -+----- +---+--+ 1314,1348 = 1321,1348 = 1321,1370
= 1348,1362
+++++--+ +---+--+ -+----- +---+--+ 1307,1348 = 1348,1349 = 1349,1370
+++++--+ +---+--+ -+----- +---+--+ 1324,1366 = 1366,1375
+++++--+ +---+--+ -+----- +---+--+ 1304,1314 = 1304,1321 = 1304,1362
= 1321,1322 = 1324,1330 =
1330,1375 = 1375,1382
+++++--+ +---+--+ -+----- +---+--+ 1338,1347 = 1338,1355
+++++--+ +---+--+ -+----- +---+--+ 1314,1338 = 1321,1338 = 1323,1349
= 1338,1362
+++++--+ +---+--+ -+----- +---+--+ 1307,1338 = 1338,1349
+++++--+ +---+--+ -+----- +---+--+ 1354,1358 = 1354,1381
+++++--+ +---+--+ -+----- +---+--+ 1324,1358 = 1324,1381 = 1358,1375
= 1375,1381
+++++--+ +---+--+ -+----- +---+--+ 1326,1358 = 1326,1381
+++++--+ +---+--+ -+----- +---+--+ 1326,1330 = 1326,1366
+++++--+ +---+--+ -+----- +---+--+ 1303,1326 = 1312,1326 = 1326,1333
+++++--+ +---+--+ -+----- +---+--+ 1312,1318 = 1313,1318 = 1313,1342
+++++--+ +---+--+ -+----- +---+--+ 1347,1381 = 1355,1381
+++++--+ +---+--+ -+----- +---+--+ 1314,1381 = 1321,1381 = 1362,1381
+++++--+ +---+--+ -+----- +---+--+ 1307,1381 = 1349,1381
+++++--+ +---+--+ -+----- +---+--+ 1347,1358 = 1355,1358
+++++--+ +---+--+ -+----- +---+--+ 1314,1358 = 1321,1358 = 1358,1362
+++++--+ +---+--+ -+----- +---+--+ 1307,1358 = 1349,1358
+++++--+ +---+--+ -+----- +---+--+ 1333,1347 = 1333,1355
+++++--+ +---+--+ -+----- +---+--+ 1314,1333 = 1321,1333 = 1333,1362
+++++--+ +---+--+ -+----- +---+--+ 1307,1333 = 1333,1349
+++++--+ +---+--+ -+----- +---+--+ 1347,1366 = 1355,1366
+++++--+ +---+--+ -+----- +---+--+ 1303,1347 = 1303,1355 = 1337,1355

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+++++--- +---+--- ----- +-+-----+ 1303,1314 = 1303,1321 = 1303,1362
= 1307,1366 = 1321,1337 =
1349,1366
+++++--- +---+--- ----- +-----+ 1303,1307 = 1303,1349 = 1337,1349
+++++--- +---+--- ----- +-+-----+ 1314,1366 = 1321,1366 = 1362,1366
+++++--- +---+--- -+----- +-+----- 1313,1314 = 1313,1321 = 1313,1362
= 1330,1347 = 1330,1355 =
1355,1382
+++++--- +---+--- -+----- +----- 1307,1313 = 1312,1347 = 1312,1355
= 1313,1347 = 1313,1349 =
1313,1355
+++++--- +---+--- ----- +-+----- 1307,1330 = 1312,1314 = 1312,1321
= 1312,1362 = 1330,1349 =
1349,1382
+++++--- +---+--- ----- +----- 1307,1312 = 1312,1349
+++++--- +----- ----- +-+----- 1314,1330 = 1321,1330 = 1321,1382
= 1330,1362
++++-+-+ +-+---+--- ----- +-+---+--- 1324,1365 = 1336,1375 = 1365,1375
++++-+-+ -+-+---+--- ----- +-+---+--- 1324,1332 = 1332,1375 = 1340,1375
++++-+-+ -+-+---+--- ----- +-+---+--- 1335,1375 = 1375,1379
++++-+-+ -+-+---+--- ----- +-+---+--- 1301,1375 = 1369,1375
++++-+-+ +-+---+--- ----- +-+---+--- 1324,1338 = 1338,1375
++++-+-+ -+-+---+--- ----- +-+---+--- 1308,1375 = 1375,1384
++++-+-+ -+-+---+--- ----- +-+---+--- 1324,1348 = 1348,1375 = 1370,1375
++++-+-+ -+-+---+--- ----- +-+---+--- 1352,1375 = 1375,1383
++++-+-+ -+-+---+--- ----- +-+---+--- 1304,1324 = 1304,1375 = 1322,1375
++++-+-+ +-+---+--- +-----+--- -+-+---+--- 130103,1326 = 1326,1328
++++-+-+ +-+---+--- +-----+--- -+-+---+--- 1301,1326 = 1326,1380
++++-+-+ +-+---+--- +-----+--- -+-+---+--- 1305,1335 = 1305,1379
++++-+-+ +-+---+--- +-----+--- -+-+---+--- 1335,1350 = 1350,1379
++++-+-+ +-+---+--- +-----+--- -+-+---+--- 1302,1342 = 1306,1363
++++-+-+ +-+---+--- +-----+--- -+-+---+--- 1316,1326 = 1326,1374
++++-+-+ +-+---+--- +-----+--- +-+---+--- 1307,1331 = 1336,1346
++++-+-+ +-+---+--- +-----+--- +-+---+--- 1302,1307 = 1314,1336
++++-+-+ +-+---+--- +-----+--- --+---+--- 1336,1350 = 1336,1362
++++-+-+ +-+---+--- --+---+--- -+-+---+--- 1305,1316 = 1305,1374
++++-+-+ +-+---+--- --+---+--- --+---+--- 1316,1350 = 1350,1374 = 1362,1374
++++-+-+ +-+---+--- --+---+--- --+---+--- 1350,1373 = 1362,1373
++++-+-+ +-+---+--- --+---+--- --+---+--- 1341,1350 = 1341,1362
++++-+-+ +-+---+--- --+---+--- +-+---+--- 1302,1346 = 1314,1331 = 1331,1346
++++-+-+ +-+---+--- --+---+--- --+---+--- 1331,1350 = 1331,1362
++++-+-+ +-+---+--- --+---+--- --+---+--- 1334,1350 = 1334,1362
++++-+-+ +-+---+--- --+---+--- --+---+--- 1339,1350 = 1339,1362
++++-+-+ +-+---+--- --+---+--- --+---+--- 1302,1350 = 1302,1362
++++-+-+ +-+---+--- +-----+--- --+---+--- 130202,1350 = 130202,1362
++++-+-+ +-+---+--- -+-+---+--- +-+---+--- 1307,1387 = 1347,1351 = 1347,1387
++++-+-+ +-+---+--- -+-+---+--- +-+---+--- 1301,1347 = 1307,1361 = 1347,1361
++++-+-+ +-+---+--- +-----+--- +-+---+--- 1335,1346 = 1346,1379
++++-+-+ +-+---+--- +-----+--- +-+---+--- 1314,1335 = 1314,1379
++++-+-+ +-+---+--- +-----+--- --+---+--- 1335,1362 = 1362,1379
++++-+-+ -+-+---+--- +-----+--- +-+---+--- 1324,1377 = 1354,1377
++++-+-+ -+-+---+--- -+-+---+--- -+-+---+--- 1318,1351 = 1318,1387 = 1342,1387
++++-+-+ -+-+---+--- -+-+---+--- -+-+---+--- 1318,1335 = 1318,1379
++++-+-+ -+-+---+--- -+-+---+--- -+-+---+--- 1301,1318 = 1318,1361 = 1342,1361
++++-+-+ -+-+---+--- +-----+--- +-+---+--- 1311,1335 = 1311,1379
++++-+-+ -+-+---+--- +-----+--- -+-+---+--- 1335,1342 = 1342,1379
++++-+-+ +-+---+--- +-----+--- +-+---+--- 1314,1319 = 1319,1362
++++-+-+ +-+---+--- +-----+--- +-+---+--- 1314,1376 = 1362,1376
++++-+-+ +-+---+--- +-----+--- +-+---+--- 1314,1372 = 1362,1372

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+++---+ +---++-+ ----- +---+---+ 1308,1314 = 1308,1362
+++---+ +---++-+ ----- +---+---+ 1314,1370 = 1362,1370
+++---+ +---++-+ ----- +---+---+ 1314,1384 = 1362,1384
+++---+ +---++-+ ----- +---+---+ 1314,1357 = 1357,1362
+++---+ +---++-+ ----- +---+---+ 1314,1383 = 1362,1383
+++---+ +---++-+ ----- +---+---+ 1314,1322 = 1322,1362 = 1324,1382
+++---+ +---++-+ ----- +---+---+ 1314,1368 = 1346,1352 = 1346,1368
+++---+ +---++-+ ----- +---+---+ 1314,1352 = 1352,1362
+++---+ +---++-+ ----- +---+---+ 1314,1345 = 1345,1362
+++---+ +---++-+ ----- +---+---+ 1314,1323 = 1323,1362
+++---+ +---++-+ +----- -+++---+ 1306,1326 = 1310,1326
+++---+ +---++-+ ----- -+++---+ 1350,1385 = 1362,1385
+++---+ +---++-+ +----- +---+---+ 1314,1377 = 1346,1377
+++---+ +---++-+ ----- +---+---+ 1314,1337 = 1337,1362
+++---+ +---++-+ ----- +---+---+ 1314,1382 = 1362,1382
+++---+ +---++-+ ----- +---+---+ 1335,1363 = 1363,1379
+++---+ +---++-+ ----- +---+---+ 1308,1363 = 1363,1370
+++---+ +---++-+ +----- +---+---+ 1302,1354 = 1331,1354 = 1339,1354
+++---+ +---++-+ ----- +---+---+ 1322,1363 = 1363,1383
+++---+ +---++-+ +----- -+++---+ 1316,1363 = 1363,1374
+++---+ +---++-+ +----- +---+---+ 1301,1354 = 1335,1354 = 1354,1369 = 1354,1379
+++---+ +---++-+ +----- +---+---+ 1324,1335 = 1324,1379
+++---+ +---++-+ +----- +---+---+ 1301,1324 = 1324,1369
+++---+ +---++-+ +----- +---+---+ 1308,1354 = 1354,1384
+++---+ +---++-+ +----- +---+---+ 1308,1324 = 1324,1384
+++---+ +---++-+ +----- +---+---+ 1352,1354 = 1354,1368 = 1354,1383
+++---+ +---++-+ +----- +---+---+ 1324,1352 = 1324,1383
+++---+ +---++-+ +----- +---+---+ 1329,1358 = 1329,1381
+++---+ +---++-+ +----- +---+---+ 1358,1374 = 1374,1381
+++---+ +---++-+ +----- +---+---+ 1358,1373 = 1373,1381
+++---+ +---++-+ +----- +---+---+ 1341,1358 = 1341,1381
+++---+ +---++-+ +----- +---+---+ 1331,1358 = 1331,1381
+++---+ +---++-+ +----- +---+---+ 1334,1358 = 1334,1381
+++---+ +---++-+ +----- +---+---+ 1339,1358 = 1339,1381
+++---+ +---++-+ +----- +---+---+ 1302,1358 = 1302,1381
+++---+ +---++-+ +----- +---+---+ 1336,1358 = 1336,1381 = 1358,1365 = 1365,1381
+++---+ +---++-+ +----- +---+---+ 130202,1358 = 130202,1381
+++---+ +---++-+ +----- +---+---+ 1302,1388 = 1303,1329
+++---+ +---++-+ +----- +---+---+ 1312,1329 = 1325,1365
+++---+ +---++-+ +----- +---+---+ 1336,1388 = 1365,1388
+++---+ +---++-+ +----- +---+---+ 1333,1336 = 1333,1365
+++---+ +---++-+ +----- +---+---+ 1313,1336 = 1313,1365
+++---+ +---++-+ +----- +---+---+ 1302,1303 = 1336,1366 = 1365,1366
+++---+ +---++-+ +----- +---+---+ 1302,1312 = 1330,1336 = 1330,1365 = 1365,1382
+++---+ +---++-+ +----- +---+---+ 1303,1336 = 1303,1365 = 1337,1365
+++---+ +---++-+ +----- +---+---+ 1312,1336 = 1312,1365
+++---+ +---++-+ +----- +---+---+ 130202,1303 = 130202,1312
+++---+ +---++-+ +----- +---+---+ 130202,1330 = 130202,1366
+++---+ +---++-+ +----- +---+---+ 1303,1371 = 1327,1388
+++---+ +---++-+ +----- +---+---+ 1303,1378 = 1379,1388
+++---+ +---++-+ +----- +---+---+ 1303,1343 = 1359,1388
+++---+ +---++-+ +----- +---+---+ 1301,1388 = 1303,1320
+++---+ +---++-+ +----- +---+---+ 1332,1388 = 1340,1388
+++---+ +---++-+ +----- +---+---+ 1303,1309 = 1309,1388
+++---+ +---++-+ +----- +---+---+ 1303,1315 = 1315,1333
+++---+ +---++-+ +----- +---+---+ 1303,1353 = 1333,1353

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++++++	++++++	-----	+-----	1332,1333 = 1333,1340
++++++	++++++	-+-----	+-----	1312,1387 = 1313,1351 = 1313,1387
++++++	++++++	-+-----	+-----	1301,1313 = 1312,1361 = 1313,1361
++++++	++++++	-+-----	+-----	1313,1332 = 1313,1340
++++++	++++++	-----	+-----	1332,1366 = 1340,1366
++++++	++++++	-----	+-----	1330,1332 = 1330,1340 = 1332,1382
++++++	++++++	-----	+-----	1303,1332 = 1303,1340 = 1332,1337
++++++	++++++	-----	+-----	1312,1332 = 1312,1340
++++++	++++++	-----	+-----	1335,1366 = 1366,1379
++++++	++++++	-----	+-----	1330,1335 = 1330,1379
++++++	++++++	-----	+-----	1358,1371 = 1371,1381
++++++	++++++	-----	+-----	1358,1378 = 1378,1381
++++++	++++++	-----	+-----	1343,1358 = 1343,1381
++++++	++++++	-----	+-----	1320,1358 = 1320,1381
++++++	++++++	-----	+-----	1358,1369 = 1369,1381
++++++	++++++	-----	+-----	1315,1358 = 1315,1381
++++++	++++++	-----	+-----	1353,1358 = 1353,1381
++++++	++++++	-----	+-----	1328,1358 = 1328,1381
++++++	++++++	-----	+-----	1358,1380 = 1380,1381
++++++	++++++	-----	+-----	1358,1387 = 1381,1387
++++++	++++++	-----	+-----	1358,1361 = 1361,1381
++++++	++++++	-----	+-----	1351,1358 = 1351,1381
++++++	++++++	-----	+-----	1327,1358 = 1327,1381
++++++	++++++	-----	+-----	130103,1358 = 130103,1381
++++++	++++++	-----	+-----	1358,1379 = 1379,1381
++++++	++++++	-----	+-----	1335,1358 = 1335,1381
++++++	++++++	-----	+-----	1358,1359 = 1359,1381
++++++	++++++	-----	+-----	1301,1358 = 1301,1381
++++++	++++++	-----	+-----	1332,1358 = 1332,1381 = 1340,1358 = 1340,1381
++++++	++++++	-----	+-----	1304,1388 = 1322,1388
++++++	++++++	-----	+-----	1348,1388 = 1370,1388
++++++	++++++	-----	+-----	1303,1357 = 1333,1357
++++++	++++++	-----	+-----	1303,1319 = 1319,1333
++++++	++++++	-----	+-----	1304,1333 = 1322,1333
++++++	++++++	-----	+-----	1333,1348 = 1333,1370
++++++	++++++	-----	+-----	1304,1313 = 1313,1322
++++++	++++++	-----	+-----	1313,1348 = 1313,1370
++++++	++++++	-----	+-----	1303,1304 = 1303,1322 = 1304,1337
++++++	++++++	-----	+-----	1304,1312 = 1312,1322
++++++	++++++	-----	+-----	1348,1366 = 1366,1370
++++++	++++++	-----	+-----	1330,1348 = 1330,1370 = 1348,1382
++++++	++++++	-----	+-----	1345,1358 = 1345,1381
++++++	++++++	-----	+-----	1323,1358 = 1323,1381
++++++	++++++	-----	+-----	1303,1348 = 1303,1370 = 1337,1348
++++++	++++++	-----	+-----	1312,1348 = 1312,1370
++++++	++++++	-----	+-----	1338,1358 = 1338,1381
++++++	++++++	-----	+-----	1304,1366 = 1322,1366
++++++	++++++	-----	+-----	1304,1330 = 1304,1382 = 1322,1330
++++++	++++++	-----	+-----	1303,1323 = 1338,1366
++++++	++++++	-----	+-----	1312,1323 = 1330,1338 = 1338,1382
++++++	++++++	-----	+-----	1303,1338 = 1337,1338
++++++	++++++	-----	+-----	1357,1358 = 1357,1381
++++++	++++++	-----	+-----	1319,1358 = 1319,1381
++++++	++++++	-----	+-----	1358,1364 = 1364,1381
++++++	++++++	-----	+-----	1358,1376 = 1376,1381
++++++	++++++	-----	+-----	1358,1383 = 1381,1383
++++++	++++++	-----	+-----	1358,1372 = 1372,1381
++++++	++++++	-----	+-----	1308,1358 = 1308,1381

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+++++--	-+----+	-----	+--+--+	1304,1358 = 1304,1381 = 1322,1358 = 1322,1381
+++++--	-+----+	-----	+-----+	1348,1358 = 1348,1381 = 1358,1370 = 1370,1381
+++++--	-+----+	-----	+-----+	1316,1358 = 1316,1381
+++++--	-+----+	-----	+-----+	1358,1368 = 1368,1381
+++++--	-+----+	-----	+--+--+	1352,1358 = 1352,1381
+++++--	-+----+	-----	+-----+	1358,1384 = 1381,1384
+++++--	-+----+	-----	+-----+	1358,1385 = 1381,1385
+++++--	-+----+	-----	+--+--+	1330,1385 = 1366,1385
+++++--	-+----+	-----	+-----+	1303,1385 = 1312,1385 = 1333,1385
+++++--	-+----+	-----	+-----+	1306,1388 = 1310,1388
+++++--	-+----+	-----	+-----+	1306,1333 = 1310,1333
+++++--	-+----+	-----	+-----+	1303,1377 = 1312,1377
+++++--	-+----+	-----	+--+--+	1303,1306 = 1303,1310 = 1310,1312
+++++--	-+----+	-----	+--+--+	1330,1377 = 1366,1377
+++++--	-+----+	-----	+--+--+	1306,1366 = 1310,1330 = 1310,1366
+++++--	-+----+	-----	+--+--+	1358,1377 = 1377,1381
+++++--	-+----+	-----	+--+--+	1306,1381 = 1310,1358 = 1310,1381
+++++--	-+----+	-----	+-----+	1358,1360 = 1360,1381
+++++--	-+----+	-----	+-----+	1358,1388 = 1381,1388
+++++--	-+----+	-----	+-----+	1333,1358 = 1333,1381
+++++--	-+----+	-----	+--+--+	1330,1381 = 1358,1366 = 1366,1381 = 1381,1382
+++++--	-+----+	-----	+-----+	1303,1358 = 1303,1381 = 1312,1381 = 1337,1358 = 1337,1381
+++++--	-+----+	-----	+--+--+	1330,1358 = 1358,1382
+++++--	-+----+	-----	+--+--+	1330,1360 = 1360,1366
+++++--	-+----+	-----	+-----+	1303,1360 = 1312,1360
+++++--	-+----+	-----	+--+--+	1303,1325 = 1330,1388 = 1366,1388 = 1382,1388
+++++--	-+----+	-----	+-----+	1303,1388 = 1312,1388 = 1337,1388
+++++--	-+----+	-----	+--+--+	1303,1386 = 1330,1333 = 1333,1366 = 1333,1382 = 1333,1386
+++++--	-+----+	-----	+-----+	1303,1333 = 1312,1333 = 1333,1333 = 1333,1337
+++++--	-+----+	-----	+-----+	1303,1313 = 1313,1337
+++++--	-+----+	-----	+--+--+	1303,1330 = 1303,1366 = 1303,1382 = 1312,1366 = 1330,1337 = 1337,1366
+++++--	-+----+	-----	+-----+	1303,1303 = 1303,1312 = 1303,1337 = 1312,1337
+++++--	-+----+	-----	+--+--+	1330,1366 = 1366,1366 = 1366,1382
+++++--	-+----+	-----	+--+--+	1313,1330 = 1313,1382
+++++--	-+----+	-----	+--+--+	1312,1313 = 1313,1313
+++++--	-+----+	-----	+--+--+	1312,1330 = 1312,1382
+++++--	-+----+	-----	+--+--+	1330,1330 = 1330,1382
+++++--	-+----+	-----	+-----+	1358,1381 = 1381,1381
+++++--	-+----+	-----	+-----+	1332,1336 = 1332,1365 = 1340,1365
+++++--	-+----+	-----	+--+--+	1304,1336 = 1304,1365 = 1322,1365 = 1365,1383
+++++--	-+----+	-----	+-----+	1308,1365 = 1336,1348 = 1348,1365 = 1365,1370
+++++--	-+----+	-----	+--+--+	1302,1338 = 1323,1365
+++++--	-+----+	-----	+-----+	1336,1338 = 1338,1365
+++++--	-+----+	-----	+-----+	1316,1365 = 1365,1374
+++++--	-+----+	-----	+-----+	1336,1365 = 1365,1365
+++++--	-+----+	-----	+--+--+	1301,1338 = 1338,1369
+++++--	-+----+	-----	+-----+	1332,1338 = 1338,1340

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++-+-+--+	-++++-+--	-----	--+-+---	1309,1332 = 1320,1332
++-+-+--+	-+-----+	-----	+-----+	1304,1353 = 1315,1348 = 1332,1357
++-+-+--+	-+-----+	-----	+-----+	1319,1332 = 1348,1353
++-+-+--+	-+-----+	-----	+-----+	1301,1348 = 1304,1332 = 1304,1340 = 1322,1332 = 1332,1383 = 1348,1369
++-+-+--+	-+-----+	-----	+-----+	1308,1332 = 1332,1348 = 1332,1370 = 1340,1348
++-+-+--+	-+-----+	-----	+-----+	1332,1332 = 1332,1340
++-+-+--+	-+-----+	-----	+-----+	1304,1335 = 1304,1379
++-+-+--+	-+-----+	-----	+-----+	1301,1304 = 1304,1369
++-+-+--+	-+-----+	-----	+-----+	1338,1352 = 1338,1383
++-+-+--+	-+-----+	-----	+-----+	1308,1338 = 1338,1384
++-+-+--+	-+-----+	-----	+-----+	1304,1338 = 1322,1338
++-+-+--+	-+-----+	-----	+-----+	1338,1348 = 1338,1370
++-+-+--+	-+-----+	-----	+-----+	1304,1319 = 1348,1357
++-+-+--+	-+-----+	-----	+-----+	1304,1376 = 1348,1364
++-+-+--+	-+-----+	-----	+-----+	1304,1308 = 1304,1384 = 1348,1352 = 1348,1383
++-+-+--+	-+-----+	-----	+-----+	1308,1348 = 1348,1384
++-+-+--+	-+-----+	-----	+-----+	1304,1348 = 1304,1370 = 1322,1348
++-+-+--+	-+-----+	-----	+-----+	1348,1348 = 1348,1370
++-+-+--+	-+-----+	-----	+-----+	1304,1352 = 1304,1383
++-+-+--+	-+-----+	-----	+-----+	1304,1304 = 1304,1322
++-+-+--+	-+-----+	-----	+-----+	1335,1356 = 1356,1379
++-+-+--+	-+-----+	-----	+-----+	1301,1385 = 1315,1385
++-+-+--+	-+-----+	-----	+-----+	1340,1385 = 1353,1385
++-+-+--+	-+-----+	-----	+-----+	1302,1377 = 1331,1377 = 1339,1377
++-+-+--+	-+-----+	-----	+-----+	130202,1306 = 130202,1310
++-+-+--+	-+-----+	-----	+-----+	1357,1385 = 1383,1385
++-+-+--+	-+-----+	-----	+-----+	1308,1385 = 1319,1385
++-+-+--+	-+-----+	-----	+-----+	1316,1356 = 1356,1374
++-+-+--+	-+-----+	-----	+-----+	1302,1325 = 1329,1382
++-+-+--+	-+-----+	-----	+-----+	1316,1385 = 1374,1385
++-+-+--+	-+-----+	-----	+-----+	130103,1360 = 1328,1360
++-+-+--+	-+-----+	-----	+-----+	1301,1360 = 1360,1380
++-+-+--+	-+-----+	-----	+-----+	1325,1327 = 1371,1382
++-+-+--+	-+-----+	-----	+-----+	1325,1335 = 1325,1379 = 1378,1382
++-+-+--+	-+-----+	-----	+-----+	1325,1359 = 1343,1382
++-+-+--+	-+-----+	-----	+-----+	1301,1325 = 1320,1382
++-+-+--+	-+-----+	-----	+-----+	1309,1325 = 1309,1382
++-+-+--+	-+-----+	-----	+-----+	1353,1382 = 1353,1386
++-+-+--+	-+-----+	-----	+-----+	1335,1386 = 1379,1386
++-+-+--+	-+-----+	-----	+-----+	1315,1382 = 1315,1386
++-+-+--+	-+-----+	-----	+-----+	1335,1382 = 1379,1382
++-+-+--+	-+-----+	-----	+-----+	1320,1377 = 1377,1378
++-+-+--+	-+-----+	-----	+-----+	1306,1384 = 1340,1344
++-+-+--+	-+-----+	-----	+-----+	1306,1383 = 1344,1369
++-+-+--+	-+-----+	-----	+-----+	130103,1377 = 1328,1377
++-+-+--+	-+-----+	-----	+-----+	1301,1377 = 1335,1377 = 1368,1377 = 1377,1379 = 1377,1380
++-+-+--+	-+-----+	-----	+-----+	1335,1344 = 1344,1379
++-+-+--+	-+-----+	-----	+-----+	1310,1335 = 1310,1379
++-+-+--+	-+-----+	-----	+-----+	1306,1335 = 1306,1379
++-+-+--+	-+-----+	-----	+-----+	1301,1344 = 1306,1352
++-+-+--+	-+-----+	-----	+-----+	1319,1382 = 1319,1386
++-+-+--+	-+-----+	-----	+-----+	1357,1382 = 1357,1386
++-+-+--+	-+-----+	-----	+-----+	1306,1385 = 1310,1385
++-+-+--+	-+-----+	-----	+-----+	1382,1385 = 1385,1386

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+++++---- +----- +----+---+ 1306,1360 = 1310,1360
+++++---- +----+---+ ----- +----+---+ 1306,1337 = 1310,1337
+++++---- -+---+---+ +-----+--+ ---+---+---+ 1306,1377 = 1310,1377 = 1377,1377
+++++---- -+---+---+ ----- ---+---+---+ 1306,1310 = 1310,1310
+++++---- +-----+---+ ---+---+---+ ---+---+---+ 1320,1374 = 1329,1351
+++++---- +-----+---+ ---+---+---+ ---+---+---+ 1339,1371 = 1341,1378
+++++---- +-----+---+ ---+---+---+ ---+---+---+ 1302,1371 = 1320,1341 = 1327,1329
= 1341,1371
+++++---- +-----+---+ -----+---+ ---+---+---+ 130103,1329 = 1320,1334
+++++---- +-----+---+ -----+---+ ---+---+---+ 1302,1378 = 1320,1339 = 1329,1335
= 1329,1379 = 1339,1378
+++++---- +-----+---+ ----- ---+---+---+ 1302,1343 = 1329,1359
+++++---- +-----+---+ ----- ---+---+---+ 1301,1329 = 1302,1320
+++++---- +-----+---+ ----- ---+---+---+ 1302,1309 = 1309,1329
+++++---- +----+---+ +-----+---+ ---+---+---+ 130103,130202 = 130202,1328
+++++---- +----+---+ +-----+---+ ---+---+---+ 1302,1328 = 1328,1334 = 1334,1380
+++++---- +----+---+ +-----+---+ ---+---+---+ 130202,1335 = 130202,1379
+++++---- +----+---+ +-----+---+ ---+---+---+ 1301,130202 = 130202,1380
+++++---- +----+---+ -+---+---+ ---+---+---+ 1302,1387 = 1361,1374 = 1374,1387
+++++---- +----+---+ -+---+---+ ---+---+---+ 1327,1374 = 1341,1351
+++++---- +----+---+ -+---+---+ ---+---+---+ 130103,1374 = 1334,1351
+++++---- +----+---+ -+---+---+ ---+---+---+ 1335,1374 = 1339,1351 = 1374,1379
+++++---- +----+---+ -+---+---+ ---+---+---+ 1301,1374 = 1302,1351 = 1351,1374
+++++---- +----+---+ -+---+---+ ---+---+---+ 1335,1373 = 1373,1379
+++++---- +----+---+ -+---+---+ ---+---+---+ 130103,1341 = 1327,1334
+++++---- +----+---+ -+---+---+ ---+---+---+ 1327,1339 = 1335,1341 = 1341,1379
+++++---- +----+---+ -+---+---+ ---+---+---+ 1301,1341 = 1302,1327 = 1327,1341
+++++---- +----+---+ -+---+---+ ---+---+---+ 1331,1335 = 1331,1379
+++++---- +----+---+ -+---+---+ ---+---+---+ 130103,1339 = 1334,1335 =
1334,1379
+++++---- +----+---+ -+---+---+ ---+---+---+ 1301,1334 = 130103,1302 =
130103,1334
+++++---- +----+---+ -+---+---+ ---+---+---+ 1301,1339 = 1302,1335 = 1302,1379
= 1335,1339 = 1339,1379
+++++---+ +-----+---+ ----- +----+---+---+ 1308,1329 = 1329,1370
+++++---+ +-----+---+ ----- +----+---+---+ 1322,1329 = 1329,1383
+++++---+ +-----+---+ -+---+---+ +----+---+---+ 1308,1374 = 1370,1374
+++++---+ +-----+---+ -+---+---+ +----+---+---+ 1308,1373 = 1370,1373
+++++---+ +-----+---+ -+---+---+ +----+---+---+ 1308,1341 = 1341,1370
+++++---+ +-----+---+ -+---+---+ +----+---+---+ 1308,1331 = 1331,1370
+++++---+ +-----+---+ -+---+---+ +----+---+---+ 1302,1376 = 1308,1334 = 1334,1370
= 1334,1376
+++++---+ +-----+---+ -----+---+ +----+---+---+ 1308,1339 = 1339,1370
+++++---+ +-----+---+ -----+---+ +----+---+---+ 1322,1336 = 1336,1383
+++++---+ +-----+---+ -----+---+ +----+---+---+ 1302,1308 = 1302,1370
+++++---+ +-----+---+ -----+---+ +----+---+---+ 1308,1336 = 1336,1370
+++++---+ +-----+---+ -+---+---+ +----+---+---+ 1322,1374 = 1374,1383
+++++---+ +-----+---+ -+---+---+ +----+---+---+ 1322,1373 = 1373,1383
+++++---+ +-----+---+ -+---+---+ +----+---+---+ 1322,1341 = 1341,1383
+++++---+ +-----+---+ -+---+---+ +----+---+---+ 1322,1331 = 1331,1383
+++++---+ +-----+---+ -+---+---+ +----+---+---+ 1322,1334 = 1334,1383
+++++---+ +-----+---+ -+---+---+ ---+---+---+ 1302,1364 = 1334,1364
+++++---+ +-----+---+ -+---+---+ +----+---+---+ 1322,1339 = 1339,1383
+++++---+ +-----+---+ -+---+---+ +----+---+---+ 1302,1322 = 1302,1383
+++++---+ +-----+---+ -+---+---+ ---+---+---+ 1302,1368 = 1331,1368
+++++---+ +-----+---+ -+---+---+ ---+---+---+ 1316,1329 = 1329,1374
+++++---+ +-----+---+ -+---+---+ ---+---+---+ 1316,1336 = 1336,1374
+++++---+ +-----+---+ -+---+---+ +----+---+---+ 1323,1367 = 1323,1373
+++++---+ +-----+---+ -+---+---+ ---+---+---+ 1302,1317 = 1317,1373

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+++++--+ -++++--+ -----+ ---+--+ 1335,1343 = 1343,1379 = 1359,1378
+++++--+ -++++--+ -----+ ---+--+ 1301,1378 = 1309,1335 = 1309,1378
= 1309,1379 = 1320,1335 =
1320,1379 = 1335,1378 = 1378,1379
+++++--+ -++++--+ -----+ +++++--+ 1309,1352 = 1320,1352
+++++--+ -++++--+ -----+ -++++--+ 1301,1343 = 1309,1343 = 1309,1359
= 1320,1359 = 1343,1359
+++++--+ -++++--+ -----+ ---+--+ 1301,1309 = 1301,1320 = 1309,1320
+++++--+ -++++--+ -----+ +++++--+ 130103,1319 = 1315,1376
+++++--+ -++++--+ -----+ +++++--+ 1315,1372 = 1319,1359
+++++--+ -++++--+ -----+ +++++--+ 1301,1319 = 1308,1315 = 1315,1319
= 1315,1370 = 1319,1369 =
1322,1353 = 1340,1357 = 1353,1357
= 1353,1383
+++++--+ -++++--+ -----+ +----+--+ 1308,1353 = 1319,1340 = 1319,1353
= 1353,1370
+++++--+ -++++--+ +-----+ +----+--+ 1308,1328 = 1328,1370 = 1328,1376
= 1376,1380
+++++--+ -++++--+ +-----+ +----+--+ 1308,1380 = 1370,1380
+++++--+ -++++--+ -+-----+ +----+--+ 1308,1387 = 1370,1387
+++++--+ -++++--+ -+-----+ +----+--+ 1308,1361 = 1361,1370
+++++--+ -++++--+ ---+-----+ +----+--+ 1308,1351 = 1351,1370
+++++--+ -++++--+ -----+ +----+--+ 1308,1327 = 1327,1370
+++++--+ -++++--+ -----+ +----+--+ 130103,1372 = 1359,1376
+++++--+ -++++--+ -----+ +----+--+ 1301,1376 = 130103,1308 =
130103,1370 = 130103,1376 =
1369,1376
+++++--+ -++++--+ -----+ +----+--+ 1308,1379 = 1370,1379
+++++--+ -++++--+ -----+ +----+--+ 1308,1335 = 1335,1370
+++++--+ -++++--+ -----+ +----+--+ 1301,1372 = 1308,1359 = 1359,1370
= 1359,1372 = 1369,1372
+++++--+ -++++--+ -----+ +----+--+ 1301,1308 = 1301,1370 = 1308,1369
= 1322,1340 = 1340,1383 =
1369,1370 = 1369,1384
+++++--+ -++++--+ -----+ +----+--+ 1308,1340 = 1340,1370
+++++--+ -++++--+ -----+ +----+--+ 1315,1384 = 1352,1353
+++++--+ -++++--+ -----+ -++++--+ 1301,1353 = 1315,1340 = 1315,1353
+++++--+ -++++--+ -----+ -++++--+ 1340,1353 = 1353,1353
+++++--+ -++++--+ -----+ +----+--+ 1301,1384 = 1340,1352
+++++--+ -++++--+ -----+ +----+--+ 1335,1357 = 1357,1379
+++++--+ -++++--+ -----+ +----+--+ 1301,1357 = 1315,1322 = 1315,1357
= 1315,1383 = 1357,1369
+++++--+ -++++--+ +-----+ +----+--+ 1322,1328 = 1328,1383
+++++--+ -++++--+ +-----+ -++++--+ 1328,1364 = 1328,1369 = 1364,1380
+++++--+ -++++--+ +-----+ +----+--+ 1322,1380 = 1380,1383
+++++--+ -++++--+ -+-----+ +----+--+ 1322,1387 = 1383,1387
+++++--+ -++++--+ -+-----+ +----+--+ 1322,1361 = 1361,1383
+++++--+ -++++--+ -+-----+ +----+--+ 1322,1351 = 1351,1383
+++++--+ -++++--+ ---+-----+ -++++--+ 1316,1369 = 1351,1369
+++++--+ -++++--+ ---+-----+ -++++--+ 1301,1317 = 1317,1369
+++++--+ -++++--+ ---+-----+ +----+--+ 1322,1327 = 1327,1383
+++++--+ -++++--+ -----+ +----+--+ 1335,1364 = 1364,1379
+++++--+ -++++--+ -----+ +----+--+ 130103,1322 = 130103,1383
+++++--+ -++++--+ -----+ -++++--+ 1301,1364 = 130103,1364 =
130103,1369 = 1364,1369
+++++--+ -++++--+ -----+ +----+--+ 1322,1335 = 1322,1379 = 1335,1383
= 1379,1383
+++++--+ -++++--+ -----+ -++++--+ 1335,1369 = 1369,1379
+++++--+ -++++--+ -----+ +----+--+ 1322,1359 = 1359,1383

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+++++ -+-+ -+----- +--+ 1301,1322 = 1301,1383 = 1322,1369
= 1352,1369 = 1369,1383
+++++ -+-+ -+----- -++- 1301,1369 = 1369,1369
+++++ -+-+ -+----- -++++ 1315,1316 = 1315,1351
+++++ -+-+ -+----- +----- 1315,1335 = 1315,1379
+++++ -+-+ -+----- -++++ 1301,1315 = 1315,1315
+++++ -+-+ -+-+ -+----- -++- 1316,1328 = 1328,1351
+++++ -+-+ -+-+ -+----- -++- 1316,1380 = 1351,1380
+++++ -+-+ -+-+ -+----- -++- 1328,1335 = 1328,1379
+++++ -+-+ -+-+ -+----- -++- 1301,1328 = 130103,1328 =
130103,1380 = 1328,1328 =
1328,1380
+++++ -+-+ -+----- -++- 1335,1380 = 1379,1380
+++++ -+-+ -+----- -++++ 1301,1380 = 1380,1380
+++++ -+-+ -+-+ -+----- -++- 1335,1387 = 1379,1387
+++++ -+-+ -+-+ -+----- -++- 1301,1387 = 1316,1361 = 1316,1387
= 1351,1361 = 1351,1387 =
1361,1387 = 1387,1387
+++++ -+-+ -+-+ -+----- -++- 1335,1361 = 1361,1379
+++++ -+-+ -+-+ -+----- -++- 1301,1361 = 1361,1361
+++++ -+-+ -+-+ -+----- -++++ 1316,1327 = 1327,1351
+++++ -+-+ -+-+ -+----- -++++ 130103,1316 = 130103,1351
+++++ -+-+ -+-+ -+----- -++++ 1316,1335 = 1316,1379 = 1335,1351
= 1351,1379
+++++ -+-+ -+-+ -+----- -++- 1316,1359 = 1351,1359
+++++ -+-+ -+-+ -+----- -++- 1301,1316 = 1301,1351 = 1316,1351
= 1351,1351
+++++ -+-+ -+-+ -+----- -++- 1327,1335 = 1327,1379
+++++ -+-+ -+-+ -+----- -++++ 1301,1327 = 1327,1327
+++++ -+-+ -+-+ -+----- -++++ 1335,1368 = 1368,1379
+++++ -+-+ -+-+ -+----- -++++ 130103,1335 = 130103,1379
+++++ -+-+ -+-+ -+----- -++++ 1301,130103 = 130103,130103
+++++ -+-+ -+-+ -+----- +--+ 1335,1352 = 1352,1379
+++++ -+-+ -+-+ -+----- -++- 1335,1359 = 1359,1379
+++++ -+-+ -+-+ -+----- -++- 1301,1335 = 1301,1379 = 1335,1379
= 1379,1379
+++++ -+-+ -+-+ -+----- -++- 1301,1359 = 1359,1359
+++++ -+-+ -+-+ -+----- +--+ 1308,1345 = 1323,1372 = 1345,1372
= 1345,1384
+++++ -+-+ -+-+ -+----- +--+ 1308,1323 = 1323,1384
+++++ -+-+ -+-+ -+----- +--+ 1345,1352 = 1345,1383
+++++ -+-+ -+-+ -+----- +--+ 1323,1352 = 1323,1383
+++++ -+-+ -+-+ -+----- +--+ 1319,1364 = 1357,1376
+++++ -+-+ -+-+ -+----- +--+ 1308,1357 = 1319,1322 = 1319,1352
= 1319,1357 = 1319,1383 =
1357,1370 = 1357,1384
+++++ -+-+ -+-+ -+----- +--+ 1308,1319 = 1319,1319 = 1319,1370
= 1319,1384
+++++ -+-+ -+-+ -+----- +--+ 1308,1316 = 1316,1370
+++++ -+-+ -+-+ -+----- +--+ 1308,1317 = 1317,1384
+++++ -+-+ -+-+ -+----- +--+ 1308,1368 = 1368,1370
+++++ -+-+ -+-+ -+----- +--+ 1308,1364 = 1322,1376 = 1352,1376
= 1364,1370 = 1364,1376 =
1364,1384 = 1376,1383
+++++ -+-+ -+-+ -+----- +--+ 1308,1376 = 1370,1376 = 1376,1376
= 1376,1384
+++++ -+-+ -+-+ -+----- +--+ 1322,1372 = 1352,1372 = 1372,1383

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+++++--- -+++++--- ----- +---+--- 1308,1322 = 1308,1352 = 1308,1383
= 1322,1384 = 1352,1370 =
1370,1383 = 1383,1384
+++++--- -+++++--- ----- +-----+ 1308,1372 = 1370,1372 = 1372,1372
= 1372,1384
+++++--- -+++++--- ----- +-----+ 1308,1308 = 1308,1370 = 1308,1384
= 1370,1384
+++++--- -+++++--- ----- +-----+ 1322,1357 = 1352,1357 = 1357,1357
= 1357,1383
+++++--- -+++++--- --+----- +---+--- 1316,1322 = 1316,1383
+++++--- -+++++--- ---+----- +---+--- 1317,1352 = 1317,1383
+++++--- -+++++--- -----+--- +-----+ 1322,1368 = 1368,1383
+++++--- -+++++--- -----+--- +-----+ 1322,1364 = 1352,1364 = 1364,1383
+++++--- -+++++--- ----- +-----+ 1322,1352 = 1322,1383 = 1352,1383
= 1383,1383
+++++--- ++++++--- ----- +---+--- 1324,1388 = 1375,1388
+++++--- ++++++--- -+----- +---+--- 1324,1355 = 1347,1375 = 1355,1375
+++++--- ++++++--- ----- +---+--- 1307,1375 = 1324,1349 = 1349,1375
+++++--- ++++++--- ----- +---+--- 1314,1375 = 1321,1324 = 1321,1375
= 1362,1375
+++++--- -+++++--- ----- +-----+ 1311,1375 = 1344,1375
+++++--- +-----+ +-----+ +-----+ 1318,1349 = 1318,1355 = 1342,1355
+++++--- +-----+ -+----- +-----+ 1311,1355 = 1344,1355
+++++--- +-----+ ----- +-----+ 1311,1349 = 1344,1349
+++++--- +-----+ ----- +-----+ 1311,1321 = 1321,1344
+++++--- +-----+ -+----- +-----+ 1347,1388 = 1355,1388
+++++--- +-----+ ----- +-----+ 1314,1388 = 1321,1388 = 1362,1388
+++++--- +-----+ ----- +-----+ 1307,1388 = 1349,1388
+++++--- +-----+ -+----- +-----+ 1314,1355 = 1321,1347 = 1321,1355
= 1355,1362
+++++--- +-----+ -+----- +-----+ 1307,1355 = 1347,1349 = 1347,1355
= 1349,1355 = 1355,1355
+++++--- +-----+ ----- +-----+ 1307,1321 = 1314,1349 = 1321,1349
= 1349,1362
+++++--- +-----+ ----- +-----+ 1307,1349 = 1349,1349
+++++--- +-----+ ----- +-----+ 1314,1321 = 1321,1321 = 1321,1362
+++++--- -+++++--- ----- +-----+ 1324,1375 = 1375,1375
+++++--- +-----+ +-----+ +-----+ 1311,1363 = 1344,1363
+++++--- +-----+ ----- -+-----+ 1305,1329 = 1356,1363
+++++--- +-----+ ----- --+-----+ 1329,1350 = 1329,1362
+++++--- +-----+ ----- -+-----+ 1305,1363 = 1350,1363 = 1362,1363
+++++--- +-----+ -----+--- +-----+ 1314,1354 = 1346,1354 = 1354,1362
+++++--- +-----+ -----+--- +-----+ 1314,1324 = 1324,1362
+++++--- -+++++--- -----+--- +-----+ 1311,1354 = 1344,1354
+++++--- -+++++--- ----- +-----+ 1311,1324 = 1324,1344
+++++--- +-----+ +-----+ -+-----+ 1305,1318 = 1318,1350
+++++--- +-----+ ----- -+-----+ 1305,1342 = 1342,1350
+++++--- +-----+ +-----+ +-----+ 1311,1326 = 1326,1344
+++++--- +-----+ ----- +-----+ 1305,1311 = 1305,1344
+++++--- +-----+ ----- +-----+ 1311,1350 = 1344,1350
+++++--- +-----+ ----- +-----+ 1314,1356 = 1325,1350
+++++--- +-----+ ----- --+-----+ 1350,1356 = 1356,1362
+++++--- +-----+ +-----+ +-----+ 1314,1326 = 1326,1386
+++++--- +-----+ +-----+ -+-----+ 1305,1326 = 1326,1350 = 1326,1362
+++++--- +-----+ -----+--- --+-----+ 1350,1367 = 1362,1367
+++++--- +-----+ ----- -+-----+ 1305,1305 = 1305,1350 = 1305,1362
+++++--- +-----+ ----- --+-----+ 1350,1350 = 1350,1362
+++++--- +-----+ -+-----+ +-----+ 1307,1318 = 1318,1347 = 1342,1347
+++++--- +-----+ -+-----+ +-----+ 1311,1318 = 1318,1344

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+-+-+--+	-+-----	-+-----	-+++-----	1318, 1318 = 1318, 1342
+-+-+--+	-+-----	-----	++++-----	1311, 1342 = 1342, 1344
+-+-+---	++-+-----	-+-----	+---+-----	1311, 1347 = 1344, 1347
+-+-+---	++-+-----	-----	+---+-----	1307, 1311 = 1307, 1344
+-+-+---	++-----	-----+--	++++-----	1311, 1346 = 1344, 1346
+-+-+---	++-----	-----	+---+-----	1311, 1314 = 1311, 1362 = 1314, 1344 = 1344, 1362
+-+-+---	+---+-----	+-----	+--+-----+	1314, 1360 = 1360, 1362
+-+-+---	+--+-----	-----	+--+-----	1314, 1325 = 1325, 1362
+-+-+---	+---+-----	-+-----	+--+-----	1314, 1347 = 1347, 1362
+-+-+---	+---+-----	-+-----	+---+-----	1307, 1347 = 1347, 1347
+-+-+---	+---+-----	-----	+--+-----	1307, 1314 = 1307, 1362
+-+-+---	+-----+--	-----	+--+-----	1314, 1386 = 1362, 1386
+-+-+---	+-----	-----+--	+--+-----	1314, 1346 = 1346, 1346 = 1346, 1362
+-+-+---	+-----	-----	+--+-----	1314, 1314 = 1314, 1362
+-+-+---	-+-----	-----	+--+-----	1311, 1311 = 1311, 1344
+-+-+--+	-+++--+--	-----+--	+---+---	1320, 1354 = 1354, 1378
+-+-+---	-+--+---	-----+--	+---+---	1324, 1354 = 1354, 1354
+-----+--	-+++--+--	-----+--	---+--+---	1320, 1371 = 1371, 1371
+-----+--	-+++--+--	-----+--	---+--+---	1320, 1378 = 1378, 1378

1301 = 130101 and 130102
1302 = 130201 and 130203
1303 = 130301 and 130302
1305 = 130501 and 130502
1307 = 130701 and 130702
1311 = 131101 and 131102
1314 = 131401 to 131403
1350 = 135001 and 135002

SPECIFICITY TABLE

DRB1*13 SSP subtyping

Specificities and sizes of the PCR products of the 32 primer mixes used for DRB1*13 SSP subtyping

Primer Mix	Size of spec. PCR product ¹	Size of contr. band ²	Amplified DRB1*13 alleles ³	Other amplified DRB alleles ^{3,4}
1	175 bp	515 bp	130101-1316, 1318-1342, 1344, 1346- 1366, 1368-1388	03010101-030105, 030201-0307, 0309, 0311- 0341, 0820, 1402-140302, 140501-1406, 1409, 1412- 1414, 1417-1421, 142301, 142302 ^w , 1424, 1427, 1429, 1430, 1433, 1436, 1437, 1440-1445, 1447, 1448, 1451, 1456, 1459, 1463-1465, 1467, 1477, 1478, 1480, 1481, 1483- 1485
2 ⁵	200 bp	430 bp	130101-1304, 1306, 1308- 1310, 1312, 1313, 1315, 1316, 1319, 1322, 1323, 1327, 1328, 1330-1341, 1345, 1348, 1351-1353, 1357-1359, 1361, 1364- 1366, 1368- 1370, 1372, 1373, 1374 ^w , 1376, 1377, 1379-1385, 1387	110201, 110202, 111401, 111402, 1116, 1118-1121, 1131, 1145, 1148, 116501, 116502, 1170, 1416, 1424, 1437, 1463, 1467, 1478
3	200 bp	430 bp	130501, 130502, 130701, 130702, 131101, 131102, 131401-131403, 1318, 1321, 1324, 1326, 1342, 1346, 1347, 1349-	0820, 110101-110107, 1103-110404, 110601, 110602, 1109-111202, 1115, 1123-1125, 112701- 1129, 1132, 1133, 1135, 1137-1141, 1143, 1144, 1146, 1147, 1149-1151, 115401-1156, 1158-1163,

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			135002, 1354, 1355, 1362, 1363, 1375	1166, 1172, 1422, 1425, 1427, 1453
4	170 bp	430 bp	130301-1304, 1312, 1313, 1321, 1330, 1332, 1333, 1338, 1348, 1349, 1355, 1358, 1365, 1366, 1375, 1381, 1388	0312, 1413, 1463, 1465, 1478, 1485
5	220 bp	430 bp	130301, 130302, 130501-130702, 1310-131403, 1318, 1321, 1325, 1326, 1330, 1333, 1337, 1342, 1344, 1346, 1347, 1349- 135002, 1355, 1356, 1358, 1360, 1362, 1366, 1377, 1381, 1382, 1385, 1386, 1388	0820, 110101-110107, 110401-110404, 110601, 110602, 110801-111002, 111201-111302, 1115, 1117-111902, 1123-1129, 1131-1135, 1137-1139, 1142-1147, 1149, 1150, 1152, 115401-1158, 1160- 1162, 1164, 1166, 1172, 140101-140302, 140501- 1409, 1412-1414, 1417- 142302, 1425-1427, 1429, 1430, 143201-1436, 1438- 1445, 1447-1449, 1451, 1453-1455, 1458-1460, 1462-1465, 1467, 1469, 1470, 1472, 1474, 1475, 1477, 1478, 1480-1485
6	215 bp	515 bp	130101-130203, 1304, 1308, 1309, 1315, 1316, 1319, 1320, 1322- 1324, 1327- 1329, 1331, 1332, 1334- 1336, 1338- 1341, 1343, 1345, 1348, 1351-1354, 1357, 1359, 1361, 1363- 1365, 1368- 1376, 1378- 1380, 1383, 1384, 1387	110201-1103, 111101, 111102, 111401, 111402, 1116, 1120, 1121, 1136, 1140, 1141, 1148, 1155, 1159, 1163, 116501, 116502, 1168-1170, 1416, 1424, 1437

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7⁷	190 bp	430 bp	130201-130203, 130501, 130502, 1326, 1329, 1331, 1334, 1336, 1339, 1341, 135001 ^w , 135002, 1356, 1363, 1365, 1367, 1373, 1374, 1385	030201, 030202, 030501, 030502, 0309, 0314, 0327, 0329, 0338, 1109, 1120, 1128 ^w , 1402-140302, 1409, 1413, 1419, 1424, 1427, 1430, 1446-1448, 1451, 1463, 1467, 1485, 1608, DRB3*0108, DRB3*0206, 0220
8⁷	190 bp	430 bp	130101-130103, 1306, 1309, 1310, 1315, 1318, 1320, 1327, 1328, 1332, 1335, 1340, 1342, 1343, 1351, 1353, 1359, 1361, 1369, 1371, 1377- 1380, 1387	03010101-030106, 0303, 0306-0308, 0310-031302, 0315, 0316, 0318-0320, 0322-0324, 0326, 0328, 0332-0334, 0336, 0337, 0339, 1116, 1140, 1158, 1159, 1406, 1412, 1417, 1418, 1421, 1429, 1433, 1452, 1459, 1464, 1478, 1480, 1481, 1483, 1532
9	260 bp	430 bp	130201-130302, 130501, 130502, 130701, 130702, 1312-131403, 1321, 1323, 1325, 1326, 1329-1331, 1333, 1334, 1336-1339, 1341, 1345- 1347, 1349- 135002, 1355, 1356, 1360, 1362, 1363, 1365, 1366, 1373, 1374, 1382, 1385, 1386, 1388	030201, 030202, 030501, 030502, 0309, 0314, 0317, 0327, 0329, 0335, 0338, 0340, 0341, 110101- 110107, 110801-111202, 111401-1115, 111901- 1120, 1123, 1124, 1126- 1129, 1131-1133, 1137, 1139, 1145, 1149, 1151, 1153, 1161, 1162, 1164, 1166, 1168, 1169, 1172, 1402-140302, 140701, 140702, 1409, 1413, 1414, 1419, 1422, 1424, 1425, 1427, 1430, 1436, 1440- 1442, 144401, 144402, 1447-1449, 1451, 1453, 1463, 1467, 1469, 1477, 1485
10	260 bp	430 bp	130101-130103, 1304, 1306, 1308-131102, 1315, 1318- 1320, 1322, 1324, 1327,	03010101-030106, 0303, 0304, 0306-0308, 0310- 031302, 0315, 0316, 0318- 0326, 0328, 0330-0334, 0336, 0337, 0339, 0820, 110201-110404, 110601-

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			1328, 1332, 1335, 1340, 1342-1344, 1348, 1351- 1354, 1357- 1359, 1361, 1364, 1368- 1372, 1375- 1381, 1383, 1384, 1387	1107, 111301, 111302, 1116-1118, 1121, 1125, 1134-1136, 1138, 1140- 1144, 1146-1148, 1150, 1152, 115401-1160, 1163, 116501, 116502, 1170, 140101-140103, 140501- 1406, 1408, 1412, 1416- 1418, 1420, 1421, 142301, 142302, 1426, 1429, 143201-1435, 1437-1439, 1443, 1445, 1454-1456, 1458-1460, 1462, 1464, 1465, 1470, 1472, 1474, 1475, 1478, 1480-1484
11⁷	205 bp	430 bp	1309, 1320, 1325, 1329, 1343, 1356, 1360, 1371, 1378, 1388	110801, 110802, 1136, 1142, 1157, 1164, 1168, 1169, 140301, 140302, 1412, 1424, 1437, 1440, 1469, 1474, 1477, 1484, 1485
12	215 bp	430 bp	130101-1304, 1308, 1310, 1315, 1316, 1319, 1320, 1322-1324, 1326-1329, 1331-1341, 1343, 1345, 1348, 1351- 1354, 1357, 1359-1361, 1363-1366, 1368-1381, 1383-1385, 1387, 1388	110103, 110201-1103, 111101, 111102, 111401, 111402, 1116, 111902- 1121, 1136, 1140, 1141, 1148, 1159, 1163, 116501, 116502, 1168, 1170, 1416, 1419, 1421
13	145 bp	515 bp	130301, 130302, 130701-1308, 1312, 1313, 1319, 1326, 1332, 1333, 1336-1338, 1340, 1347- 1349, 1353, 1355, 1358, 1360, 1365, 1370, 1372, 1376, 1381,	030201-0303, 0306, 0317, 0326, 0327, 0331, 0335, 0338, 0341, 0820, 1117, 1137, 1141, 1148, 1150, 1152, 1156, 140101- 140301, 140501-1409, 1412-1414, 1416, 1418- 1420, 1422-1427, 1429, 143201, 143202, 1434, 1436-1441, 1443-1445, 1447-1449, 1451, 1454- 1456, 1458-1460, 1462,

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			1384, 1385, 1388	1463, 1467, 1469, 1470, 1474, 1475, 1477, 1478, 1480-1485
14⁸	145 bp	430 bp	1304, 1308, 1317, 1319, 1322-1324, 1338, 1345, 1348, 1354, 1357, 1364, 1369, 1370, 1372, 1375, 1376, 1383	0402, 0414, 0437, 110201- 1103, 111101, 111102, 111401, 111402, 1121, 1136, 1141, 1148, 1163, 116501, 116502, 1168, 1170, 1416, 1457, 1510
15^{6,10}	85, 235 bp	515 bp	1315, 1319, 1326, 1333, 1353, 1357, 1385, 1386	03010101, 03010102, 030103-031301, 0316, 0318-0323, 0325-0334, 0336-0341, 1107, 112702, 1402-140302, 1406, 1412, 1413, 1418-1420, 1424, 1427, 1429, 1440, 1441, 1447-1449, 1451, 1463, 1467, 1477, 1478, 1481, 1483, 1485
16⁷	150 bp	430 bp	130101-130201, 130203, 1308, 1315, 1316, 1319, 1320, 1327-1329, 1331, 1332, 1334-1336, 1339-1341, 1343, 1351- 1353, 1357, 1359, 1361, 1363-1365, 1367-1369, 1371-1374, 1376, 1378- 1380, 1383, 1384, 1387	1116, 1120, 1140, 1159, 1416, 1457, 1510
17¹¹	145, 220, 255 bp	430 bp	130202, 1326, 1328, 1360, 1377, 1380	0316, 110103, 111902
18^{6,12}	110, 230 bp	430 bp	1313, 1318, 1347, 1355, 1361, 1387	030102, 030202, 031302, 0317, 0324, 0327, 0335, 0820, 1123, 1125, 112701, 1145, 1155, 1164, 140301, 140302, 1412, 1427, 1438,

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				1440, 1447, 1455, 1463, 1467, 1477, 1478, 1484, 1485
19 ^{6,8,13}	110, 150, 205, 260 bp	430 bp	1316, 1351, 1374, 1387	
20 ^{8,9,14}	180, 205, 225 bp	515 bp	1317, 1367, 1373	
21 ⁹	175 bp	430 bp	1327, 1341, 1371	1159
22 ^{6,15}	110, 175 bp	430 bp	1331, 1346, 1354, 1368, 1377	0338, 1124, 1448
23 ^{6,16}	115, 235, 255 bp	430 bp	130103, 1328, 1334, 1364, 1376	110105, 110403, 110602, 111301, 111302, 1117, 1152, 115401, 140101, 140103, 140501, 140502, 140701-1408, 1414, 1418, 142301, 142302, 1426, 143202, 1434-1436, 1439, 1441-144401, 1445, 1454- 1456, 1458-1460, 1462, 1464, 1465, 1470, 1472, 1477, 1482
24 ¹⁷	145, 180 bp	430 bp	1335, 1339, 1354, 1377-1379	031301, 031302, 0338, 1448, 1464
25 ⁶	110 bp	430 bp	130301-1304, 130701-1308, 131101-131403, 1319, 1321- 1325, 1330, 1333, 1337, 1338, 1344- 1349, 1352, 1354, 1355, 1357, 1358, 1360, 1366, 1370, 1372, 1375, 1376, 1381-1384, 1386, 1388	0304, 0317, 0321, 0325, 0330, 0331, 0335, 0340, 0341, 0820, 110101- 110404, 110601-110802, 111001-111402, 1117- 111902, 1121, 1123, 1125- 112702, 1129, 1131-1139, 1141-1143, 1145-1148, 1151-1157, 1160-1166, 1168-1170, 1172, 140101- 140103, 140501-140503, 140701-1408, 1414, 1416, 1420, 1422-142302, 1425, 1426, 143201, 143202, 1434-1440, 1442-1445, 1449, 1453-1456, 1458, 1460, 1462, 1465, 1469, 1470, 1472, 1474, 1475, 1482, 1484
26	145 bp	515 bp	130501, 130502, 1318, 1326,	0809, 0821, 1109-111002, 1140, 1146, 1159, 1162,

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27	145 bp	515 bp	1342, 1363 130101-130203, 1304-1306, 1309-131102, 131401-1316, 1318, 1320- 1325, 1327- 1331, 1334, 1339, 1341- 1346, 135001- 1352, 1354, 1356, 1357, 1359, 1361- 1364, 1366, 1368, 1369, 1371, 1373- 1375, 1377- 1380, 1382, 1383, 1386, 1387	1415, 1422, 1427, 1473 03010101-030106, 0304- 030502, 0307-0316, 0318- 0325, 0328-0330, 0332- 0334, 0336, 0337, 0339, 0340, 110101-110106, 110201-110404, 110601- 1116, 1118-1121, 1123- 1129, 1131-1136, 1138- 1140, 1142-1147, 1149, 1151, 1153-1155, 1157- 1166, 1168-1170, 1172, 1417, 1421, 1430, 1433, 1435, 1442, 1453, 1464, 1465, 1472
28	160 bp	430 bp	130101-130103, 1304, 1306, 1309-131102, 1315, 1317, 1318, 1320, 1322, 1324, 1327, 1328, 1335, 1342- 1344, 1351, 1352, 1354, 1357, 1359, 1361, 1364, 1368, 1369, 1371, 1375, 1377-1380, 1383, 1387	03010101-030106, 0304, 0307, 0308, 0310-031302, 0315, 0316, 0318-0325, 0328, 0330, 0332-0334, 0336, 0337, 0339, 0442, 0459, 0828, 110201- 110404, 110601-1107, 111301, 111302, 1116, 1118, 1121, 1125, 1134- 1136, 1138, 1140, 1142- 1144, 1146, 1147, 115401- 1155, 1157-1160, 1163, 116501, 116502, 1167, 1170, 120101-1210, 1212- 1215, 1217-1219, 1417, 1421, 1433, 1435, 1464, 1465, 1472, 15010101- 150106, 15030101-1506, 1509, 1510, 1512, 1513, 1516-1518, 1520-1525, 1528, 1532
29⁹	155 bp	430 bp	1315, 1319, 1353, 1357, 1385	0832, 120101, 120102, 120302-1206, 1208-1211, 1214, 1217, 1463, 1467, 1478

30⁶	85 bp	515 bp	130101-130103, 1304, 1308, 1310, 1315, 1317, 1319, 1320, 1322, 1324, 1327, 1328, 1332, 1335, 1340, 1343, 1348, 1351-1354, 1357, 1359, 1361, 1364, 1368-1372, 1375, 1376, 1378-1381, 1383, 1384, 1387	0402, 0437, 110201-1103, 1116, 1121, 1136, 1140, 1141, 1148, 1155, 1159, 1163, 116501, 116502, 1170, 1416, 1457, 1510
31^{6,9,18}	75, 170, 205 bp	430 bp	1343, 1345, 1359, 1372	1416
32¹⁹	220, 255 bp	430 bp	130202, 130301, 130302, 1310, 1326, 1333, 1337, 1358, 1360, 1366, 1377, 1381, 1385, 1388	0320, 110103, 110601, 110602, 111902, 1121, 1147, 1157, 1419, 1421, 1429

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 DRB1*13 SSP typings.

When the primers in a primer mix can give rise to specific PCR products of more than one length this is indicated if the size difference is 20 base pairs or more. Size differences shorter than 20 base pairs are not given. For high resolution SSP kits the respective length of the specific PCR product(s) of the alleles amplified by these primer mixes are given.

Nonspecific amplifications, i.e. a ladder or a smear of bands, may sometimes be seen. GC-rich primers have a higher tendency of giving rise to nonspecific amplifications than other primers.

PCR fragments longer than the control bands may sometimes be observed. Such bands should be disregarded and do not influence the interpretation of the SSP typings.

PCR fragments migrating faster than the control bands, but slower than a 400 bp fragment may be seen in some gel read-outs. Such bands can be disregarded and do not influence the interpretation of the SSP typings.

Some primers may give rise to primer oligomer artifacts. Sometimes this phenomenon is an inherent feature of the primer pair(s) of a primer mix. More often it is due to other factors such as too low amount of DNA in the PCR reactions, taking too long time in setting up the PCR reactions, working at elevated room temperature or using thermal cyclers that are not pre-heated.

²The internal positive control primer pairs amplify segments of the human growth hormone gene. The two different control primer pairs give rise to either an internal positive control band of 430 base pairs, for most wells, or a band of 515 base pairs, for some wells.

Well number 1 contains the primer pair giving rise to the longer, 515 bp, internal positive control band in order to help in the correct orientation of the DRB1*13 subtyping.

In addition, wells number 6, 13, 15, 20, 26, 27 and 30 contain the primer pair giving rise to the longer, 515 bp, internal positive control band in order to allow kit identification.

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

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³For several DRB alleles only partial second exon nucleotide sequences are available. In these instances it is not known whether some of the primers of the SSP sets are completely matched with the target sequences or not. We assume that unknown sequences in the first hyperpolymorphic region of the second exon of DRB alleles are conserved within allelic groups and that unknown sequences of codons 87 to 92 are identical with the DRB1*0101 consensus sequence.

⁴Due to the sharing of sequence motifs within the DR52 group of DRB1 alleles, all DRB1*03 alleles, as well as most DRB1*11 and DRB1*14 alleles are amplified by some of the DRB1*13 primer mixes. In addition, five DRB1*04 alleles, five DRB1*08 alleles, the DRB1*12 alleles, most DRB1*15 allele, the DRB1*1608 and the DRB3*0108, the DRB3*0206 and DRB3*0220 alleles are amplified by one or a few of the DRB1*13 primer mixes.

⁵Primer mix 2 may faintly amplify the DRB1*1329 allele.

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

⁷Primer mixes 7, 8, 11 and 16 may yield somewhat less intense specific PCR fragments than the other DRB1*13 primer mixes. Most pronounced for primer mix 11.

⁸Primer mixes 14, 19 and 20 may give rise to nonspecific amplifications, most pronounced in primer mix 19.

⁹Primer mixes 20, 21, 29 and 31 have a tendency of giving rise to a primer oligomer artefact, most pronounced in primer mix 31.

¹⁰Primer mix 15: 85 bp fragment in the DRB1*1315, 1319, 1326, 1353, 1357, 1385, 1386 and the 030202, 0327, 1402-140302, 1406, 1412, 1413, 1418-1420, 1424, 1427, 1429, 1440, 1441, 1447-1449, 1451, 1463, 1467, 1477, 1478, 1481, 1483 and 1485 alleles.

235 bp fragment in the DRB1*1333 and the 03010101-03010102, 030103-030104, 0304-0313, 0316, 0318-0323, 0325, 0326, 0328, 0330-0334, 0336, 0336, 0337, 0339-0341, 1107 and 112702 alleles. 85 and 235 bp fragments in DRB1*030201, 0303 and 0329, 0338 alleles, due to primer competition both specific PCR fragments may not be visible.

¹¹Primer mix 17: 145 bp fragment in the DRB1*1380 and the 0316 alleles. 220 bp fragment in the DRB1*130202, 1326, 1360, 1377 the 110103 and 111902 alleles. 255 bp fragment in the DRB1*1328 allele.

¹²Primer mix 18: 110 bp fragment in the DRB1*1387 allele. 230 bp fragment in the DRB1*1313, 1318, 1347, 1355, 1361 and 030102, 030202-031302, 0317, 0324, 0327, 0335, 0820, 1123, 1125, 112701, 1145, 1155, 1164, 140301, 140302, 1412, 1427, 1438, 1440, 1447, 1455, 1463, 1467, 1477, 1478, 1484 and 1485 alleles.

¹³Primer mix 19: 110 bp fragment in the DRB1*1387 allele. 150 bp fragment in the DRB1*1351 allele. 205 bp fragment in the DRB1*1374 allele. 260 bp fragment in the DRB1*1316 allele.

¹⁴Primer mix 20: 180 bp fragment in the DRB1*1317 allele. 205 bp fragment in the DRB1*1373 allele. 225 bp fragment in the DRB1*1367 allele.

¹⁵Primer mix 22: 110 bp fragment in the DRB1*1368 and the 1124 alleles. 175 bp fragment in the DRB1*1331, 1346, 1354, 1377, 0338 and 1448 alleles.

¹⁶Primer mix 23: 115 bp fragment in the DRB1*1334, 1364 and the 1441 and 1477 alleles. 235 bp fragment in the DRB1*130103, 1376 and the 110105, 110403, 110602, 111301-111302, 1117, 1152, 115401, 140101, 140103, 140501-140502, 140701-1408, 1414, 1418, 142301-142302, 1426, 143202, 1434-1436, 1439, 1442-144401, 1445, 1454-1456, 1458-1460, 1462, 1464, 1465, 1470, 1472 and 1482 alleles. 255 bp fragment in the DRB1*1328 allele.

¹⁷Primer mix 24: 145 bp fragment in the DRB1*1335 allele. 180 bp fragment in the DRB1*1339, 1354, 1377 to 1379 and the 031301-031302, 0338, 1448 and 1464 alleles.

¹⁸Primer mix 31: Specific PCR fragment of 75 bp in the DRB1*1343, 1345 and the 1416 alleles. Specific PCR fragment of 170 bp in the DRB1*1359 allele. Specific PCR fragment of 205 bp in the DRB1*1372 allele.

¹⁹Primer mix 32: 220 bp fragment in the DRB1*130202-130302, 1310, 1326, 1333, 1337, 1360, 1366, 1377, 1385, 1388 and the 110103, 111902, 1419 and 1421 alleles. 255 bp fragment in the DRB1*1358 and the 0320, 110601-110602, 1121, 1147, 1157 and 1429 alleles. 220 and 255 bp fragment in the DRB1*1381 allele.

'w', may be weakly amplified.

INTERPRETATION TABLE

DRB1*13 SSP subtyping

Amplification patterns of the DRB1*1301 to *1388 alleles

	Well ⁴															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Length of spec.	175	200	200	170	220	215	190	190	260	260	205	215	145	145	85	150
PCR product															235	
Length of int. pos. control ¹	515	430	430	430	430	515	430	430	430	430	430	430	515	430	515	430
5'-primer(s) ²	13(125)	13(125)	13(125)	13(125)	13(125)	13(125)	37(196)	37(196)	13(125)	13(125)	13(125)	13(125)	13(125)	32(181)	13(125)	34(189)
	5'-gTC 35'-gTC 35'-gTC 35'-gTC 35'-gTC 35'-gTC 35'-AgA 35'-AgA 35'-gTC 35'-gTC 35'-gTC 35'-gTC 35'-gTC 35'-TCT 35'-gTC 35'-CAg 3															
							37(196)							34(189)		34(189)
							5'-AgA 3'							5'-CAA 3'		5'-CAg 3'
														37(197)		
														5'-gTT 3'		
3'-primer(s) ³	58(260)	67(286)	67(286)	57(256)	71(298)	71(298)	86(344)	86(344)	86(344)	86(344)	67(286)	71(299)	47(227)	71(298)	28(171)	71(298)
	5'-Cgg 35'-gAT 35'-gAA 35'-gCT 35'-CTT 35'-CTC 35'-CAC 35'-CCA 35'-CAC 35'-CCA 35'-gAg 35'-gCT 35'-ggT 35'-CTC 35'-CTC 35'-CTC 35'-CTC															
	58(260)	67(286)	67(286)		71(298)	71(298)					67(286)	72(303)			77(317)	
	5'-CAg 35'-gAT 35'-gAA 3' 5'-CCT 35'-CgC 3' 5'-gAg 35'-gCg 3' 5'-AgT 3'															
		67(286)			74(307)						71(299)					
		5'-gAT 3'			5'-CAg 3'						5'-gCg 3'					
Well No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
DRB1 allele																
*130101, 130102	1	2				6		8		10		12				16
*130103	1	2				6		8		10		12				16
*130201, 130203	1	2				6	7		9			12				16
*130202	1	2				6	7		9			12				
*130301, 130302	1	2		4	5				9			12	13			
*1304	1	2		4		6				10		12		14		
*130501, 130502	1		3		5		7		9							
*130701, 130702	1		3		5				9				13			
*1308	1	2				6				10		12	13	14		16
Well No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Well ⁴																
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	
145	110	110	180	175	110	115	145	110	145	145	160	155	85	75	220	Length of spec.
220	230	150	205		175	235	180							170	255	PCR product
255		205	225			255								205		
		260														
430	430	430	515	430	430	430	430	430	515	515	430	430	515	430	430	Length of int. pos. control ¹
13(125)	13(125)	13(125)	10(116)	26(164)	13(125)	13(125)	13(125)	13(125)	32(181)	13(125)	47(227)	28(171)	71(299)	16(135)	13(125)	5'-primer(s) ²
5'-gTC 3'	5'-gTC 3'	5'-gTC 3'	5'-gCT 3'	5'-gTA 3'	5'-gTC 3'	5'-gTC 3'	5'-gTC 3'	5'-gTC 3'	5'-TCC 3'	5'-gTC 3'	5'-gTT 3'	5'-gAg 3'	5'-CgA 3'	5'-CAA 3'	5'-gTC 3'	
			16(133)									28(171)		27(167)		
			5'-gTT 3'									5'-gAg 3'		5'-CCA 3'		
			25(161)											60(265)		
			5'-gCT 3'											5'-AgC 3'		
48(229)	37(196)	37(196)	71(299)	71(299)	37(196)	38(199)	48(230)	37(196)	67(286)	47(227)	86(344)	67(286)	86(344)	71(298)	71(298)	3'-primer(s) ³
5'-CCA 3'	5'-gAT 3'	5'-gAT 3'	5'-gCT 3'	5'-gCT 3'	5'-gTC 3'	5'-CAg 3'	5'-CCA 3'	5'-gAA 3'	5'-gAA 3'	5'-ggA 3'	5'-CCA 3'	5'-gAT 3'	5'-CCA 3'	5'-CTC 3'	5'-CTT 3'	
72(303)	74(307)	50(235)			57(257)	78(321)	60(266)	37(196)	67(286)	48(229)		67(286)			72(303)	
5'-gCg 3'	5'-CAg 3'	5'-CAA 3'			5'-CgA 3'	5'-CAA 3'	5'-Agg 3'	5'-gTA 3'	5'-gAA 3'	5'-CCA 3'		5'-gAT 3'			5'-gCg 3'	
84(337)	77(318)	68(290)				84(337)		37(196)							85(341)	
5'-CCg 3'	5'-TAA 3'	5'-CCC 3'				5'-CCg 3'		5'-ggA 3'							5'-CAg 3'	
		86(344)														
		5'-CAT 3'														
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	Well No.
																DRB1 allele
										27	28		30			*130101, 130102
						23				27	28		30			*130103
										27						*130201, 130203
17										27					32	*130202
								25							32	*130301, 130302
								25		27	28		30			*1304
									26	27						*130501, 130502
								25								*130701, 130702
								25					30			*1308
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	Well No.

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Length of spec. PCR product	175	200	200	170	220	215	190	190	260	260	205	215	145	145	85	150
															235	
Well No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
*1306	1	2			5			8		10						
*1309	1	2				6		8		10	11					
*1310	1	2			5			8		10		12				
*131101, 131102	1		3		5					10						
*1312	1	2		4	5				9				13			
*1313	1	2		4	5				9				13			
*131401-131403	1		3		5				9							
*1315	1	2				6		8		10		12			15	16
*1316	1	2				6						12				16
*1317														14		
*1318	1		3		5			8		10						
*1319	1	2				6				10		12	13	14	15	16
*1320	1					6		8		10	11	12				16
*1321	1		3	4	5				9							
*1322	1	2				6				10		12		14		
*1323	1	2				6			9			12		14		
*1324	1		3			6				10		12		14		
*1325	1				5				9		11					
*1326	1		3		5		7		9			12	13		15	
*1327	1	2				6		8		10		12				16
*1328	1	2				6		8		10		12				16
*1329	1					6	7		9		11	12				16
*1330	1	2		4	5				9							
*1331	1	2				6	7		9			12				16
*1332	1	2		4		6		8		10		12	13			16
*1333	1	2		4	5				9			12	13		15	
*1334	1	2				6	7		9			12				16
*1335	1	2				6		8		10		12				16
*1336	1	2				6	7		9			12	13			16
*1337	1	2			5				9			12	13			
*1338	1	2		4		6			9			12	13	14		
*1339	1	2				6	7		9			12				16
*1340	1	2				6		8		10		12	13			16
*1341	1	2				6	7		9			12				16
*1342	1		3		5			8		10						
*1343						6		8		10	11	12				16
*1344	1				5					10						
Well No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

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145	110	110	180	175	110	115	145	110	145	145	160	155	85	75	220	Length of spec. PCR product
220	230	150	205		175	235	180							170	255	
255		205	225			255								205		
		260														
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	Well No.
										27	28					*1306
										27	28					*1309
										27	28		30		32	*1310
								25		27	28					*131101, 131102
								25								*1312
	18							25								*1313
								25		27						*131401-131403
										27	28	29	30			*1315
		19								27						*1316
			20								28		30			*1317
	18								26	27	28					*1318
								25				29	30			*1319
										27	28		30			*1320
								25		27						*1321
								25		27	28		30			*1322
								25		27						*1323
								25		27	28		30			*1324
								25		27						*1325
17									26						32	*1326
				21						27	28		30			*1327
17						23				27	28		30			*1328
										27						*1329
								25		27						*1330
				22						27						*1331
													30			*1332
								25							32	*1333
						23				27						*1334
							24				28		30			*1335
																*1336
								25							32	*1337
								25								*1338
							24			27						*1339
													30			*1340
				21						27						*1341
									26	27	28					*1342
										27	28		30	31		*1343
								25		27	28					*1344
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	Well No.

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Length of spec. PCR product	175	200	200	170	220	215	190	190	260	260	205	215	145	145	85	150
															235	
Well No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
*1345		2				6			9			12		14		
*1346	1		3		5				9							
*1347	1		3		5				9				13			
*1348	1	2		4		6				10		12	13	14		
*1349	1		3	4	5				9				13			
*135001	1		3		5		w		9							
*135002	1		3		5		7		9							
*1351	1	2				6		8		10		12				16
*1352	1	2				6				10		12				16
*1353	1	2				6		8		10		12	13		15	16
*1354	1		3			6				10		12		14		
*1355	1		3	4	5				9				13			
*1356	1				5		7		9		11					
*1357	1	2				6				10		12		14	15	16
*1358	1	2		4	5					10			13			
*1359	1	2				6		8		10		12				16
*1360	1				5				9		11	12	13			
*1361	1	2				6		8		10		12				16
*1362	1		3		5				9							
*1363	1		3			6	7		9			12				16
*1364	1	2				6				10		12		14		16
*1365	1	2		4		6	7		9			12	13			16
*1366	1	2		4	5				9			12				
*1367							7									16
*1368	1	2				6				10		12				16
*1369	1	2				6		8		10		12		14		16
*1370	1	2				6				10		12	13	14		
*1371	1					6		8		10	11	12				16
*1372	1	2				6				10		12	13	14		16
*1373	1	2				6	7		9			12				16
*1374	1	w				6	7		9			12				16
*1375	1		3	4		6				10		12		14		
*1376	1	2				6				10		12	13	14		16
*1377	1	2			5			8		10		12				
*1378	1					6		8		10	11	12				16
*1379	1	2				6		8		10		12				16
*1380	1	2				6		8		10		12				16
Well No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

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145	110	110	180	175	110	115	145	110	145	145	160	155	85	75	220	Length of spec. PCR product
220	230	150	205		175	235	180							170	255	
255		205	225			255								205		
		260														
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	Well No.
								25		27				31		*1345
					22			25		27						*1346
	18							25								*1347
								25					30			*1348
								25								*1349
										27						*135001
										27						*135002
	19									27	28		30			*1351
								25		27	28		30			*1352
												29	30			*1353
					22		24	25		27	28		30			*1354
	18							25								*1355
										27						*1356
								25		27	28	29	30			*1357
								25							32	*1358
										27	28		30	31		*1359
17								25							32	*1360
	18									27	28		30			*1361
										27						*1362
									26	27						*1363
					23					27	28		30			*1364
																*1365
								25		27					32	*1366
			20													*1367
					22					27	28		30			*1368
										27	28		30			*1369
								25					30			*1370
				21						27	28		30			*1371
								25					30	31		*1372
			20							27						*1373
		19								27						*1374
								25		27	28		30			*1375
					23			25					30			*1376
17					22		24			27	28				32	*1377
							24			27	28		30			*1378
							24			27	28		30			*1379
17										27	28		30			*1380
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	Well No.

Lot No.: **03G**

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Length of spec. PCR product	175	200	200	170	220	215	190	190	260	260	205	215	145	145	85	150
															235	
Well No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
*1381	1	2		4	5					10		12	13			
*1382	1	2			5				9							
*1383	1	2				6				10		12		14		16
*1384	1	2				6				10		12	13			16
*1385	1	2			5		7		9			12	13		15	
*1386	1				5				9						15	
*1387	1	2				6		8		10		12				16
*1388	1			4	5				9		11	12	13			
*03010101, 03010102, 030103-030105, 0307, 0311, 0318, 0319, 0322, 0323, 0328, 0332-0334, 0336, 0337, 0339	1							8		10					15	
*030102, 0324	1							8		10						
*030106, 0308, 0310								8		10					15	
*030201	1						7		9				13		15	
*030202, 0327	1						7		9				13		15	
*0303, 0306, 0326	1							8		10			13		15	
*0304, 0321, 0325, 0330	1									10					15	
*030501, 030502, 0309, 0329	1						7		9						15	
*0312	1			4				8		10					15	
*031301	1							8		10					15	
*031302	1							8		10						
*0314	1						7		9							
*0315	1							8		10						
*0316	1							8		10					15	
*0317, 0335	1								9				13			
*0320	1							8		10					15	
*0331	1									10			13		15	
*0338	1						7		9				13		15	
*0340	1								9						15	
*0341	1								9				13		15	
Well No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Lot No.: **03G**

Lot-specific information

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145	110	110	180	175	110	115	145	110	145	145	160	155	85	75	220	Length of spec. PCR product
220	230	150	205		175	235	180							170	255	
255		205	225			255								205		
		260														
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	Well No.
								25					30		32	*1381
								25		27						*1382
								25		27	28		30			*1383
								25					30			*1384
												29			32	*1385
								25		27						*1386
	18	19								27	28		30			*1387
								25							32	*1388
										27	28					*030101, 03010102, 030103-030105, 0307, 0311, 0318, 0319, 0322, 0323, 0328, 0332-0334, 0336, 0337, 0339
	18									27	28					*030102, 0324
										27	28					*030106, 0308, 0310
																*030201
	18															*030202, 0327
																*0303, 0306, 0326
								25		27	28					*0304, 0321, 0325, 0330
										27						*030501, 030502, 0309, 0329
										27	28					*0312
							24			27	28					*031301
	18						24			27	28					*031302
										27						*0314
										27	28					*0315
17										27	28					*0316
	18							25								*0317, 0335
										27	28				32	*0320
								25								*0331
				22			24									*0338
								25		27						*0340
								25								*0341
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	Well No.

Length of spec.	175	200	200	170	220	215	190	190	260	260	205	215	145	145	85	150
PCR product															85	150
Well No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
*0402, 0437														14		
*0414														14		
*0442, 0459, 0828, 1167, 120201- 120204, 1207, 1212, 1213, 1215, 1218, 1219, 15010101-150106, 15030101-1506, 1509, 1512, 1513, 1516-1518, 1520- 1525, 1528																
*0809, 0821, 1415, 1473																
*0820	1		3		5					10			13			
*0832, 1211																
*110101, 110102, 110104, 110106, 111201, 111202, 1129, 1132, 1133, 1139, 1161, 1166, 1172, 1453			3		5				9							
*110103			3		5				9		12					
*110105			3		5				9							
*110107			3		5				9							
*110201, 110202, 116501, 116502, 1170		2				6				10		12		14		
*1103, 1163			3		6				10		12		14			
*110401, 110402, 110404, 1135, 1138, 1143, 115402, 1160			3		5					10						
*110403, 115401			3		5					10						
*110601, 1147			3		5					10						
*110602			3		5					10						
*1107										10					15	
Well No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Lot No.: **03G**

Lot-specific information

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145	110	110	180	175	110	115	145	110	145	145	160	155	85	75	220	Length of spec. PCR product
220	230	150	205		175	235	180							170	255	
255		205	225			255								205		
		260														
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	Well No.
													30			*0402, 0437
																*0414
											28					*0442, 0459, 0828, 1167, 120201- 120204, 1207, 1212, 1213, 1215, 1218, 1219, 15010101-150106, 15030101-1506, 1509, 1512, 1513, 1516-1518, 1520- 1525, 1528
								26								*0809, 0821, 1415, 1473
	18							25								*0820
												29				*0832, 1211
								25		27						*110101, 110102, 110104, 110106, 111201, 111202, 1129, 1132, 1133, 1139, 1161, 1166, 1172, 1453
17								25		27					32	*110103
						23		25		27						*110105
								25								*110107
								25		27	28		30			*110201, 110202, 116501, 116502, 1170
								25		27	28		30			*1103, 1163
								25		27	28					*110401, 110402, 110404, 1135, 1138, 1143, 115402, 1160
						23		25		27	28					*110403, 115401
								25		27	28				32	*110601, 1147
						23		25		27	28				32	*110602
								25		27	28					*1107
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	Well No.

Length of spec.	175	200	200	170	220	215	190	190	260	260	205	215	145	145	85	150
PCR product															235	
Well No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
*110801, 110802					5				9		11					
*1109			3		5		7		9							
*111001, 111002, 1162			3		5				9							
*111101, 111102			3			6			9			12		14		
*111301, 111302, 1435, 1472					5					10						
*111401, 111402		2				6			9			12		14		
*1115, 1149			3		5				9							
*1116		2				6		8		10		12				16
*1117, 1152, 140101, 140103, 1408, 1426, 143202, 1434, 1439, 1454, 1458, 1460, 1462, 1470, 1482					5					10			13			
*1118		2			5					10						
*111901, 1131		2			5				9							
*111902		2			5				9			12				
*1120		2				6	7		9			12				16
*1121		2				6				10		12		14		
*1123, 112701			3		5				9							
*1124			3		5				9							
*1125			3		5					10						
*1126					5				9							
*112702			3		5				9						15	
*1128			3		5		w		9							
*1134					5					10						
*1136						6				10	11	12		14		
*1137, 1425			3		5				9				13			
*1140			3			6		8		10		12				16
*1141			3			6				10		12	13	14		
*1142					5					10	11					
*1144			3		5					10						
*1145		2			5				9							
*1146			3		5					10						
Well No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Lot No.: **03G**

Lot-specific information

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145	110	110	180	175	110	115	145	110	145	145	160	155	85	75	220	Length of spec. PCR product
220	230	150	205		175	235	180							170	255	
255		205	225			255								205		
		260														
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	Well No.
								25		27						*110801, 110802
									26	27						*1109
								25	26	27						*111001, 111002, 1162
								25		27						*111101, 111102
					23			25		27	28					*111301, 111302, 1435, 1472
								25		27						*111401, 111402
										27						*1115, 1149
										27	28		30			*1116
						23		25								*1117, 1152, 140101, 140103, 1408, 1426, 143202, 1434, 1439, 1454, 1458, 1460, 1462, 1470, 1482
								25		27	28					*1118
								25		27						*111901, 1131
17								25		27					32	*111902
										27						*1120
								25		27	28		30		32	*1121
	18							25		27						*1123, 112701
					22					27						*1124
	18							25		27	28					*1125
								25		27						*1126
								25		27						*112702
										27						*1128
								25		27	28					*1134
								25		27	28		30			*1136
								25								*1137, 1425
									26	27	28		30			*1140
								25					30			*1141
								25		27	28					*1142
										27	28					*1144
	18							25		27						*1145
								25	26	27	28					*1146
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	Well No.

Length of spec.	175	200	200	170	220	215	190	190	260	260	205	215	145	145	85	150
PCR product															235	
Well No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
*1148		2				6				10		12	13	14		
*1150			3		5					10			13			
*1151			3						9							
*1153									9							
*1155			3		5	6				10						
*1156			3		5					10			13			
*1157					5					10	11					
*1158			3		5			8		10						
*1159			3			6		8		10		12				16
*1164					5				9		11					
*1168						6			9		11	12		14		
*1169						6			9		11					
*120101, 120102, 120302-1206, 1208- 1210, 1214, 1217 *140102, 143201, 1475					5					10			13			
*1402, 1451	1				5		7		9				13		15	
*140301	1				5		7		9		11		13		15	
*140302	1				5		7		9		11				15	
*140501, 140502, 142301, 1443, 1445	1				5					10			13			
*140503	1				5					10			13			
*1406, 1481, 1483	1				5			8		10			13		15	
*140701, 140702					5				9				13			
*1409	1				5		7		9				13			
*1412	1				5			8		10	11		13		15	
*1413	1			4	5		7		9				13		15	
*1414, 1436, 144401	1				5				9				13			
*1416		2				6				10		12	13	14		16
*1417, 1433	1				5			8		10						
*1418	1				5			8		10			13		15	
*1419	1				5		7		9			12	13		15	
*1420	1				5					10			13		15	
*1421	1				5			8		10		12				
Well No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Lot No.: **03G**

Lot-specific information

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145	110	110	180	175	110	115	145	110	145	145	160	155	85	75	220	Length of spec. PCR product
220	230	150	205		175	235	180							170	255	
255		205	225			255								205		
		260														
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	Well No.
								25					30			*1148
																*1150
								25		27						*1151
								25		27						*1153
	18							25		27	28		30			*1155
								25								*1156
								25		27	28				32	*1157
										27	28					*1158
				21					26	27	28		30			*1159
	18							25		27						*1164
								25		27						*1168
								25		27						*1169
											28	29				*120101, 120102, 120302-1206, 1208 1210, 1214, 1217
								25								*140102, 143201, 1475
																*1402, 1451
	18															*140301
	18															*140302
						23		25								*140501, 140502, 142301, 1443, 1445
								25								*140503
																*1406, 1481, 1483
						23		25								*140701, 140702
																*1409
	18															*1412
																*1413
						23		25								*1414, 1436, 144401
								25					30	31		*1416
										27	28					*1417, 1433
						23										*1418
															32	*1419
								25								*1420
										27	28				32	*1421
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	Well No.

Length of spec.	175	200	200	170	220	215	190	190	260	260	205	215	145	145	85	150
PCR product															235	
Well No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
*1422			3		5				9				13			
*142302	w				5					10			13			
*1424	1	2				6	7		9		11		13		15	
*1427	1		3		5		7		9				13		15	
*1429	1				5			8		10			13		15	
*1430	1				5		7		9							
*1437	1	2				6				10	11		13			
*1438					5					10			13			
*1440	1				5				9		11		13		15	
*1441	1				5				9				13		15	
*1442	1				5				9							
*144402	1				5				9				13			
*1446, 1608, DRB3*0108, DRB3*0206, 0220							7									
*1447	1				5		7		9				13		15	
*1448	1				5		7		9				13		15	
*1449					5				9				13		15	
*1452								8								
*1455					5					10			13			
*1456	1									10			13			
*1457														14		16
*1459	1				5			8		10			13			
*1463	1	2		4	5		7		9				13		15	
*1464	1				5			8		10						
*1465	1			4	5					10						
*1467	1	2			5		7		9				13		15	
*1469					5				9		11		13			
*1474					5					10	11		13			
*1477	1				5				9		11		13		15	
*1478	1	2		4	5			8		10			13		15	
*1480	1				5			8		10			13			
*1484	1				5					10	11		13			
*1485	1			4	5		7		9		11		13		15	
*1510														14		16
*1532								8								
Well No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Lot No.: **03G**

Lot-specific information

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145	110	110	180	175	110	115	145	110	145	145	160	155	85	75	220	Length of spec. PCR product
220	230	150	205		175	235	180							170	255	
255		205	225			255								205		
		260														
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	Well No.
								25	26							*1422
						23		25								*142302
																*1424
	18								26							*1427
															32	*1429
										27						*1430
								25								*1437
	18							25								*1438
	18							25								*1440
						23										*1441
						23		25		27						*1442
								25								*144402
	18															*1446, 1608, DRB3*0108, DRB3*0206, 0220
					22		24									*1447
								25								*1448
																*1449
																*1452
	18					23		25								*1455
						23		25								*1456
													30			*1457
						23										*1459
	18											29				*1463
						23	24			27	28					*1464
						23		25		27	28					*1465
	18											29				*1467
								25								*1469
								25								*1474
	18					23										*1477
	18											29				*1478
																*1480
	18							25								*1484
	18															*1485
										28			30			*1510
										28						*1532
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	Well No.

Lot No.: **03G**

Lot-specific information

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¹The internal positive control primer pairs amplify segments of the human growth hormone gene. The two different control primer pairs give rise to either an internal positive control band of 430 base pairs, for most wells, or a band of 515 base pairs, for some wells.

Well number 1 contains the primer pair giving rise to the longer, 515 bp, internal positive control band in order to help in the correct orientation of the DRB1*13 subtyping.

In addition, wells number 6, 13, 15, 20, 26, 27 and 30 contain the primer pair giving rise to the longer, 515 bp, internal positive control band in order to allow kit identification.

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

²The codon, in the 2nd exon, and in parenthesis the nucleotide, matching the specificity-determining 3'-end of the primer is given. Codon and 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 codon, in the 2nd exon, and in parenthesis the nucleotide, matching the specificity-determining 3'-end of the primer is given in the anti-sense direction. Codon and 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.

⁴Primer mix 15: 85 bp fragment in the DRB1*1315, 1319, 1326, 1353, 1357, 1385, 1386 and the 030202, 0327, 1402-140302, 1406, 1412, 1413, 1418-1420, 1424, 1427, 1429, 1440, 1441, 1447-1449, 1451, 1463, 1467, 1477, 1478, 1481, 1483 and 1485 alleles.

235 bp fragment in the DRB1*1333 and the 03010101-03010102, 030103-030104, 0304-0313, 0316, 0318-0323, 0325, 0326, 0328, 0330-0334, 0336, 0336, 0337, 0339-0341, 1107 and 112702 alleles. 85 and 235 bp fragments in DRB1*030201, 0303 and 0329, 0338 alleles, due to primer competition both specific PCR fragments may not be visible.

Primer mix 17: 145 bp fragment in the DRB1*1380 and the 0316 alleles. 220 bp fragment in the DRB1*130202, 1326, 1360, 1377 the 110103 and 111902 alleles. 255 bp fragment in the DRB1*1328 allele.

Primer mix 18: 110 bp fragment in the DRB1*1387 allele. 230 bp fragment in the DRB1*1313, 1318, 1347, 1355, 1361 and 030102, 030202-031302, 0317, 0324, 0327, 0335, 0820, 1123, 1125, 112701, 1145, 1155, 1164, 140301, 140302, 1412, 1427, 1438, 1440, 1447, 1455, 1463, 1467, 1477, 1478, 1484 and 1485 alleles.

Primer mix 19: 110 bp fragment in the DRB1*1387 allele. 150 bp fragment in the DRB1*1351 allele. 205 bp fragment in the DRB1*1374 allele. 260 bp fragment in the DRB1*1316 allele.

Primer mix 20: 180 bp fragment in the DRB1*1317 allele. 205 bp fragment in the DRB1*1373 allele. 225 bp fragment in the DRB1*1367 allele.

Primer mix 22: 110 bp fragment in the DRB1*1368 and the 1124 alleles. 175 bp fragment in the DRB1*1331, 1346, 1354, 1377, 0338 and 1448 alleles.

Primer mix 23: 115 bp fragment in the DRB1*1334, 1364 and the 1441 and 1477 alleles. 235 bp fragment in the DRB1*130103, 1376 and the 110105, 110403, 110602, 111301-111302, 1117, 1152, 115401, 140101, 140103, 140501-140502, 140701-1408, 1414, 1418, 142301-142302, 1426, 143202, 1434-1436, 1439, 1442-144401, 1445, 1454-1456, 1458-1460, 1462, 1464, 1465, 1470, 1472 and 1482 alleles. 255 bp fragment in the DRB1*1328 allele.

Primer mix 24: 145 bp fragment in the DRB1*1335 allele. 180 bp fragment in the DRB1*1339, 1354, 1377 to 1379 and the 031301-031302, 0338, 1448 and 1464 alleles.

Primer mix 31: Specific PCR fragment of 75 bp in the DRB1*1343, 1345 and the 1416 alleles. Specific PCR fragment of 170 bp in the DRB1*1359 allele. Specific PCR fragment of 205 bp in the DRB1*1372 allele.

Primer mix 32: 220 bp fragment in the DRB1*130202-130302, 1310, 1326, 1333, 1337, 1360, 1366, 1377, 1385, 1388 and the 110103, 111902, 1419 and 1421 alleles. 255 bp fragment in the DRB1*1358 and the 0320, 110601-110602, 1121, 1147, 1157 and 1429 alleles. 220 and 255 bp fragment in the DRB1*1381 allele.

'w', may be weakly amplified.

CELL LINE VALIDATION SHEET																				
DRB1*13 SSP subtyping kit																				
				Prod. No.:	Well															
					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
					200622401	200961202	200622403	200622404	200622405	200622406	200622407	200622408	200622409	200622410	200848611	200622412	200622413	200961214	200622415	200961216
	IHWC cell line		DRB1																	
1	9001 SA		*0101		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	9280 LK707		*1502	*0405	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	9011 E4181324		*1502		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	9275 GU373		*0301		+	-	-	-	-	-	-	+	-	+	-	-	-	-	+	-
5	9009 KAS011		*1601		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	9353 SM		*0407	*0803	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	9020 QBL		*0301		+	-	-	-	-	-	-	+	-	+	-	-	-	-	+	-
8	9025 DEU		*0401		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	9026 YAR		*0402		-	-	-	-	-	-	-	-	-	-	-	-	-	f	-	-
10	9107 LKT3		*0405		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	9051 PTTOUT		*0701		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	9052 DBB		*0701		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13	9004 JESTHOM		*0101		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	9071 OLGA		*0802		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	9075 DKB		*0901		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	9037 SWEIG007		*1101		-	-	+	-	+	-	-	-	+	-	-	-	-	-	-	-
17	9282 CTM3953540		*0301	*1301	+	+	-	-	-	+	-	+	-	+	-	+	-	-	+	+
18	9257 32367		*0901	*1101	-	-	+	-	+	-	-	-	+	-	-	-	-	-	-	-
19	9038 BM16		*1201		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	9059 SLE005		*1302		+	+	-	-	-	+	+	-	+	-	-	+	-	-	-	+
21	9064 AMALA		*1402		+	-	-	-	+	-	+	-	+	-	-	-	+	-	+	-
22	9056 KOSE		*1302	*1401	+	+	-	-	+	+	+	-	+	+	-	+	+	-	-	+
23	9124 IHL		*0803	*1414	+	-	-	-	+	-	-	-	+	-	-	-	+	-	-	-
24	9035 JBUSH		*1101		-	-	+	-	+	-	-	-	+	-	-	-	-	-	-	-
25	9049 IBW9		*0701		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26	9285 WT49		*0301		+	-	-	-	-	-	-	+	-	+	-	-	-	-	+	-
27	9191 CH1007		*0405	*1001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28	9320 BEL5GB		*0416	*0701	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	9050 MOU		*0701		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30	9021 RSH		*0302		+	-	-	-	-	-	+	-	+	-	-	-	+	-	+	-
31	9019 DUCAF		*0301		+	-	-	-	-	-	-	+	-	+	-	-	-	-	+	-
32	9297 HAG		*1303		+	+	-	+	+	-	-	-	+	-	-	+	+	-	-	-
33	9098 MT14B		*0404		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
34	9104 DHIF		*1101		-	-	+	-	+	-	-	-	+	-	-	-	-	-	-	-
35	9302 SSTO		*0403		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	9024 KT17		*0403	*0406	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
37	9065 HHKB		*1301		+	+	-	-	-	+	-	+	-	+	-	+	-	-	-	+
38	9099 LZL		*1402		+	-	-	-	+	-	+	-	+	-	-	-	+	-	+	-
39	9315 CML		*0301	*0401	+	-	-	-	-	-	-	+	-	+	-	-	-	-	+	-
40	9134 WHONP199		*0701	*0901	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
41	9055 H0301		*1302		+	+	-	-	-	+	+	-	+	-	-	+	-	-	-	+
42	9066 TAB089		*0803		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43	9076 T7526		*0901		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
44	9057 TEM		*1401		-	-	-	-	+	-	-	-	-	+	-	-	+	-	-	-
45	9239 SHJO		*0701		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46	9013 SCHU		*1501		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
47	9045 TUBO		*1104	*1201	-	-	+	-	+	-	-	-	-	+	-	-	-	-	-	-
48	9303 TER-ND		*0103		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

CELL LINE VALIDATION SHEET																				
DRB1*13 SSP subtyping kit																				
				Well																
				17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	
				Prod. No.:	200848617	200961218	200961219	200734720	200734721	200622422	200734723	200622424	200622425	200848626	200961227	200622428	200622429	200622430	200961231	200622432
	IHWC cell line		DRB1																	
1	9001 SA		*0101		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	9280 LK707		*1502	*0405	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	9011 E4181324		*1502		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	9275 GU373		*0301		-	-	-	-	-	-	-	-	-	-	+	+	-	-	-	-
5	9009 KAS011		*1601		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	9353 SM		*0407	*0803	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7	9020 QBL		*0301		-	-	-	-	-	-	-	-	-	-	+	+	-	-	-	-
8	9025 DEU		*0401		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	9026 YAR		*0402		-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-
10	9107 LKT3		*0405		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	9051 PITOUT		*0701		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12	9052 DBB		*0701		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13	9004 JESTHOM		*0101		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
14	9071 OLGA		*0802		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15	9075 DKB		*0901		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
16	9037 SWEIG007		*1101		-	-	-	-	-	-	-	-	+	-	+	-	-	-	-	-
17	9282 CTM3953540		*0301	*1301	-	-	-	-	-	-	-	-	-	+	+	-	-	+	-	-
18	9257 32367		*0901	*1101	-	-	-	-	-	-	-	-	+	-	+	-	-	-	-	-
19	9038 BM16		*1201		-	-	-	-	-	-	-	-	-	-	-	+	+	-	-	-
20	9059 SLE005		*1302		-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-
21	9064 AMALA		*1402		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
22	9056 KOSE		*1302	*1401	-	-	-	-	-	-	+	-	+	-	+	-	-	-	-	-
23	9124 IHL		*0803	*1414	-	-	-	-	-	-	+	-	+	-	-	-	-	-	-	-
24	9035 JBUSH		*1101		-	-	-	-	-	-	-	-	+	-	+	-	-	-	-	-
25	9049 IBW9		*0701		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
26	9285 WT49		*0301		-	-	-	-	-	-	-	-	-	-	+	+	-	-	-	-
27	9191 CH1007		*0405	*1001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
28	9320 BEL5GB		*0416	*0701	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
29	9050 MOU		*0701		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30	9021 RSH		*0302		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31	9019 DUCAF		*0301		-	-	-	-	-	-	-	-	-	-	+	+	-	-	-	-
32	9297 HAG		*1303		-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	+
33	9098 MT14B		*0404		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
34	9104 DHIF		*1101		-	-	-	-	-	-	-	-	+	-	+	-	-	-	-	-
35	9302 SSTO		*0403		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	9024 KT17		*0403	*0406	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
37	9065 HHKB		*1301		-	-	-	-	-	-	-	-	-	-	+	+	-	+	-	-
38	9099 LZL		*1402		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
39	9315 CML		*0301	*0401	-	-	-	-	-	-	-	-	-	-	+	+	-	-	-	-
40	9134 WHONP199		*0701	*0901	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
41	9055 H0301		*1302		-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-
42	9066 TAB089		*0803		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
43	9076 T7526		*0901		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
44	9057 TEM		*1401		-	-	-	-	-	-	+	-	+	-	-	-	-	-	-	-
45	9239 SHJO		*0701		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
46	9013 SCHU		*1501		-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-
47	9045 TUBO		*1104	*1201	-	-	-	-	-	-	-	-	+	-	+	+	+	-	-	-
48	9303 TER-ND		*0103		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

CERTIFICATE OF ANALYSIS**Olerup SSP[®] DRB1*13 SSP**

Product number: 101.116-24u/03u – without *Taq* pol.
Lot number: 03G
Expiry date: 2011-July-01
Number of tests: 24 tests – Product No. 101.116-24u
 3 tests – Product No. 101.116-03u
Number of wells per test: 32

Well specifications:

Well No.	Production No.	Well No.	Production No.	Well No.	Production No.
1	2006-224-01	13	2006-224-13	25	2006-224-25
2	2009-612-02	14	2009-612-14	26	2008-486-26
3	2006-224-03	15	2005-224-15	27	2009-612-27
4	2006-224-04	16	2009-612-16	28	2006-224-28
5	2006-224-05	17	2008-486-17	29	2006-224-29
6	2006-224-06	18	2009-612-18	30	2006-224-30
7	2006-224-07	19	2009-612-19	31	2009-612-31
8	2006-224-08	20	2007-347-20	32	2006-224-32
9	2006-224-09	21	2007-347-21		
10	2006-224-10	22	2006-224-22		
11	2008-486-11	23	2007-347-23		
12	2006-224-12	24	2006-224-24		

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

No DNAs carrying the alleles to be amplified by primer solutions 11, 17 to 21, 24, 31 and 32 were available. The specificities of the primers in primer solution 11, 17, 18, 20, 21, 24 and 31 were tested by separately adding one additional 5'-primer or one additional 3'-primer, respectively. In primer solution 19 it was only possible to test the 5'-primer, the 3'-primers were not possible to test. In primer solution 7, 26 and 31 one of the 5'-primers was not possible to test. One or more of the 3'-primers in primer solutions 17, 18, 22, 23, 24 and 27 were not possible to test.

Additional 3'-primers in primer solutions 2, 5, 6, 12 and 32 were tested by separately adding one 5'-primer. One additional 5'-primer in primer solution 14 was tested by separately adding one 3'-primer.

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

Date of approval: 2011-October-24

Approved by:

Quality Control, Supervisor

Lot No.: **03G**

Lot-specific information

www.olerup.com

Declaration of Conformity

Product name: *Olerup* SSP® DRB1*13**Product number:** 101.116-24u/03u**Lot number:** 03G**Intended use:** DRB1*13 high resolution histocompatibility testing**Manufacturer:** *Olerup* SSP AB
Franzengatan 5
SE-112 51 Stockholm, Sweden
Phone: +46-8-717 88 27
Fax: +46-8-717 88 18

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

The Technical Documentation File is maintained at *Olerup* SSP AB, Franzengatan 5, SE-112 51 Stockholm, Sweden.

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

Saltsjöbaden, Sweden
2011-October-24

Ann-Cathrin Jareman
Head of QA and Regulatory Affairs

Lot No.: **03G**

Lot-specific information

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