

This file contains a description of **type II primitive groups<sup>1</sup> action** on symmetric designs with up to 2500 points.

A design is denoted by  $Dv[n]$ .  $n$  indicates the position of a design in our list "Dv" (see file "SymDesv") of obtained designs with  $v$  points.

The notation  $Dv[n] \in k^0$ ,  $k=2, \dots, 11$  means that design  $Dv[n]$  belongs to the class  $k^0$ <sup>2</sup> of symmetric designs with almost simple primitive full automorphism group.

The action of primitive groups on  $Dv[n]$  we present by a 3-row table, each column of which is appointed to one group acting on the design.

The first row reads identification numbers of the groups in the GAP-library of primitive groups; group rank is in the third row.

The division of groups into different cohorts is indicated by double vertical line. The full automorphism group occupies the last column of the table.

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(15, 7, 3) : D15[1] =  $PG(3, 2)$

2	3	1	4
$A_6$	$S_6 = PSp_4(2)$	$A_7$	$A_8 = PSL_4(2)$
3	3	2	2

(21, 5, 1) : D21[1] =  $PG(2, 4)$

4	5	6	7
$PSL_3(4)$	$PSL_3(4).2$	$PSL_3(4).3$	$PSL_3(4).S_3$
2	2	2	2

(35, 17, 8) : D35[1]  $\in 6^0$ ; Hadamard design with  $n = 9$

3	4	1	2
$A_7$	$S_7$	$A_8$	$S_8$
4	4	3	3

(36, 15, 6) : D36[1]  $\in 7^0$ ; Menon design with  $t = 3$

6	7
$PSU_3(3)$	$PSU_3(3).2$
4	3

(36, 15, 6) : D36[2]  $\in 3^0$ ; Menon design with  $t = 3$

8	9
$PSp_4(3)$	$PSp_4(3).2$
3	3

<sup>1</sup>In the sense of: M.W. Liebeck, C.E. Praeger and J. Saxl, *On the O'Nan-Scott theorem for finite primitive permutation groups*, J. Austral. Math. Soc. (Series A) **44** (1988), 389-396.

<sup>2</sup>In the sense of: S. BraiĆ, A. Golemac, J. MandiĆ and T. VuĉiĉiĆ, *Primitive symmetric designs with up to 2500 points*, preprint, submitted to JCD.

(40, 13, 4) : D40[1] = PG(3, 3)

1	2	5	6
$PSp_4(3)$	$PSp_4(3).2$	$PSL_4(3)$	$PSL_4(3).2$
3	3	2	2

(40, 13, 4) : D40[2]  $\in 2^0$ )

3	4
$PSp_4(3)$	$PSp_4(3).2$
3	3

(45, 12, 3) : D45[1]  $\in 4^0$ )

4	5
$PSp_4(3)$	$PSp_4(3).2$
3	3

(56, 11, 2) : D56[1]  $\in 8^0$ )

1	2	3	4	5
$PSL_3(4)$	$PSL_3(4).2$	$PSL_3(4).2$	$PSL_3(4).2$	$PSL_3(4).2^2$
3	3	3	3	3

(57, 8, 1) : D57[1] = PG(2, 7)

2	3
$PSL_3(7)$	$PSL_3(7).3$
2	2

(63, 31, 15) : D63[1] = PG(5, 2)

3	4	5	6
$PSU_3(3)$	$PSU_3(3).2$	$PSp_6(2)$	$PSL_6(2)$
5	4	3	2

(63, 31, 15) : D63[2]  $\in 5^0$ )

1	2
$PSU_3(3)$	$PSU_3(3).2 = G_2(2)$
4	4

(85, 21, 5) : D85[1] = PG(3, 4)

1	2	3	4
$PSp_4(4)$	$PSp_4(4).2$	$PSL_4(4)$	$PSL_4(4).2$
3	3	2	2

(91, 10, 1) : D91[1] = PG(2, 9)

7	8
$PSL_3(9)$	$PSL_3(9).2$
2	2

(133, 12, 1) : D133[1] = PG(2, 11)

1
$PSL_3(11)$
2

(144, 66, 30) : D144[1]  $\in 9^0$ ; Menon design with  $t = 6$

3	4
$M_{12}$	$M_{12}.2$
5	4

(144, 66, 30) : D144[2]  $\in 10^0$ ; Menon design with  $t = 6$

5
$M_{12}.2$
4

(156, 31, 6) : D156[1] = PG(3, 5)

1	2	5	6	7
$PSp_4(5)$	$PSp_4(5).2$	$PSL_4(5)$	$PSL_4(5).2$	$PSL_4(5).4$
3	3	2	2	2

(156, 31, 6) : D156[2]  $\in 2^0$

3	4
$PSp_4(5)$	$PSp_4(5).2$
3	3

(176, 50, 14) : D176[1]  $\in 11^0$

3	4
$M_{22}$	$HS$
3	2

(183, 14, 1) : D183[1] = PG(2, 13)

1	2
$PSL_3(13)$	$PSL_3(13).3$
2	2

$AutD183[1]$  is not in the record.

(255, 127, 63) : D255[1] =  $PG(7, 2)$

1	2
$PSp_8(2)$	$PSL_8(2)$
3	2

(273, 17, 1) : D273[1] =  $PG(2, 16)$

1	2	3	4	5	6
$PSL_3(16)$	$PSL_3(16).2$	$PSL_3(16).3$	$PSL_3(16).4$	$PSL_3(16).6$	$PSL_3(16).(3.4)$
2	2	2	2	2	2

$AutD273[1]$  is not in the record.

(341, 85, 21) : D341[1] =  $PG(4, 4)$

1	2
$PSL_5(4)$	$PSL_5(4).2$
2	2

$AutD341[1]$  is not in the record.

(351, 126, 45) : D351[1]  $\in 3^0$

7	5	6
$G_2(3)$	$P\Omega_7(3)$	$P\Omega_7(3).2$
3	3	3

(364, 121, 40) : D364[1] =  $PG(5, 3)$

1	2	8	9
$PSp_6(3)$	$PSp_6(3).2$	$PSL_6(3)$	$PSL_6(3).2$
3	3	2	2

(364, 121, 40) : D364[2]  $\in 2^0$

5	3	4
$G_2(3)$	$P\Omega_7(3)$	$P\Omega_7(3).2$
4	3	3

(378, 117, 36) : D378[1]  $\in 4^0$

7	5	6
$G_2(3)$	$P\Omega_7(3)$	$P\Omega_7(3).2$
4	3	3

(381, 20, 1) : D381[1] =  $PG(2, 19)$

1	2
$PSL_3(19)$	$PSL_3(19).3$
2	2

$AutD381[1]$  is not in the record.

(400, 57, 8) : D400[1] =  $PG(3, 7)$

1	2	5	6
$PSp_4(7)$	$PSp_4(7).2$	$PSL_4(7)$	$PSL_4(7).2$
3	3	2	2

(400, 57, 8) : D400[2]  $\in 2^0$

3	4
$PSp_4(7)$	$PSp_4(7).2$
3	3

(511, 255, 127) : D511[1] =  $PG(8, 2)$

1
$PSL_9(2)$
2

$AutD511[1]$  is not in the record.

(553, 24, 1) : D553[1] =  $PG(2, 23)$

1
$PSL_3(23)$
2

$AutD553[1]$  is not in the record.

(585, 73, 9) : D585[1] =  $PG(3, 8)$

1	2	5	6
$PSp_4(8)$	$PSp_4(8).3$	$PSL_4(8)$	$PSL_4(8).3$
3	3	2	2

(651, 26, 1) : D651[1] =  $PG(2, 25)$

2	3	4	5
$PSL_3(25)$	$PSL_3(25).2$	$PSL_3(25).3$	$PSL_3(25).S_3$
2	2	2	2

$AutD651[1]$  is not in the record.

(781, 156, 31) : D781[1] =  $PG(4, 5)$

1
$PSL_5(5)$
2

$AutD781[1]$  is not in the record.

(820, 91, 10) : D820[1] =  $PG(3, 9)$

3	4	5	6	7	12	13	14
$PSp_4(9)$	$PSp_4(9).2$	$PSp_4(9).2$	$PSp_4(9).2$	$PSp_4(9).2^2$	$PSL_4(9)$	$PSL_4(9).2$	$PSL_4(9).2$
3	3	3	3	3	2	2	2

15	16	17	18	19
$PSL_4(9).2$	$PSL_4(9).2^2$	$PSL_4(9).4$	$PSL_4(9).2^2$	$PSL_4(9).D8$
2	2	2	2	2

(820, 91, 10) : D820[2]  $\in 2^0$

8	9	22	23	24
$PSp_4(9)$	$PSp_4(9).2$	$PSp_4(9).2$	$PSp_4(9).2$	$PSp_4(9).2^2$
3	3	3	3	3

(871, 30, 1) : D871[1] =  $PG(2, 29)$

1
$PSL_3(29)$
2

$AutD871[1]$  is not in the record.

(993, 32, 1) : D993[1] =  $PG(2, 31)$

1	2
$PSL_3(31)$	$PSL_3(31).3$
2	2

$AutD993[1]$  is not in the record.

(1023, 511, 255) : D1023[1] =  $PG(9, 2)$

1	2
$PSp_{10}(2)$	$PSL_{10}(2)$
3	2

$AutD1023[1]$  is not in the record.

(1057, 33, 1) : D1057[1] =  $PG(2, 32)$

1	2
$PSL_3(32)$	$PSL_3(32).5$
2	2

$AutD1057[1]$  is not in the record.

(1365, 341, 85) : D1365[1] =  $PG(5, 4)$

1	3	7	8	9	10	11	12
$G_2(4)$	$G_2(4).2$	$PSp_6(4)$	$PSp_6(4).2$	$PSL_6(4)$	$PSL_6(4).2$	$PSL_6(4).3$	$PSL_6(4).S_3$
4	4	3	3	2	2	2	2

(1365, 341, 85) : D1365[2]  $\in 5^0$

2	4
$G_2(4)$	$G_2(4).2$
4	4

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(1407, 38, 1) : D1407[1] =  $PG(2, 37)$

1	2
$PSL_3(37)$	$PSL_3(37).3$
2	2

$AutD1407[1]$  is not in the record.

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(1464, 133, 12) : D1464[1] =  $PG(3, 11)$

2	4	5	6
$PSp_4(11)$	$PSp_4(11).2$	$PSL_4(11)$	$PSL_4(11).2$
3	3	2	2

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(1464, 133, 12) : D1464[2]  $\in 2^0$

1	3
$PSp_4(11)$	$PSp_4(11).2$
3	3

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(1893, 44, 1) : D1893[1] =  $PG(2, 43)$

1	2
$PSL_3(43)$	$PSL_3(43).3$
2	2

$AutD1893[1]$  is not in the record.

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(2047, 1023, 511) : D2047[1] =  $PG(10, 2)$

1
$PSL_{11}(2)$
2

$AutD2047[1]$  is not in the record.

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(2257, 48, 1) : D2257[1] =  $PG(2, 47)$

1
$PSL_3(47)$
2

$AutD2257[1]$  is not in the record.

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(2380, 183, 14) : D2380[1] =  $PG(3, 13)$

1	3	7	8	9
$PSp_4(13)$	$PSp_4(13).2$	$PSL_4(13)$	$PSL_4(13).2$	$PSL_4(13).4$
3	3	2	2	2

(2380, 183, 14) : D2380[2]  $\in 2^0$

2	4
$PSp_4(13)$	$PSp_4(13).2$
3	3

(2451, 50, 1) : D2451[1] =  $PG(2, 49)$

1	2	3	4
$PSL_3(49)$	$PSL_3(49).2$	$PSL_3(49).3$	$PSL_3(49).6$
2	2	2	2

$AutD2451[1]$  is not in the record.