

$D_2^7$ 

No. 22

 $F\bar{2}\bar{2}\bar{2}$ 

Axes	Coordinates	Wyckoff positions										
		4a	4b	4c	4d	8e	8f	8g	8h	8i	8j	16k
<b>I Maximal translationengleiche subgroups</b>												
[2] C211 (5)	<b>a, b,</b> $x, y+z, 2z$ $\frac{1}{2}(-\mathbf{b}+\mathbf{c})$	2a	2a	2b	2b	2×2a	4c	4c	4c	4c	2×2b	2×4c
$\cong C121$	<b>b, -a,</b> $y+z, -x, 2z$ $\frac{1}{2}(-\mathbf{b}+\mathbf{c})$											
[2] C121 (5)	<b>a, b,</b> $x+z, y, 2z$ $\frac{1}{2}(-\mathbf{a}+\mathbf{c})$	2a	2a	2b	2b	4c	2×2a	4c	4c	2×2b	4c	2×4c
[2] A112 (5)	$\frac{1}{2}(\mathbf{a}-\mathbf{b}),$ $2x, x+y, z$ <b>b, c</b>	2a	2a	2b	2b	4c	4c	2×2a	2×2b	4c	4c	2×4c

**II Maximal klassengleiche subgroups**

## Loss of centring translations

[2] A222 (21)		2a; 2c	2b; 2d	4k	4k	4i; 4j	4e; 4f	4g; 4h	8l	8l	2×4k	2×8l
$\cong C222$	<b>b, c, a</b> $y, z, x$											
[2] A222 (21)	$x+\frac{1}{4}, y+\frac{1}{4}, z+\frac{1}{4}$ $\cong C222$ <b>b, c, a</b> $y+\frac{1}{4}, z+\frac{1}{4}, x+\frac{1}{4}$	4k	4k	2b; 2d	2a; 2c	2×4k	8l	8l	4g; 4h	4e; 4f	4i; 4j	2×8l
[2] B222 (21)		2a; 2c	2b; 2d	4k	4k	4g; 4h	4i; 4j	4e; 4f	8l	2×4k	8l	2×8l
$\cong C222$	<b>c, a, b</b> $z, x, y$											
[2] B222 (21)	$x+\frac{1}{4}, y+\frac{1}{4}, z+\frac{1}{4}$ $\cong C222$ <b>c, a, b</b> $z+\frac{1}{4}, x+\frac{1}{4}, y+\frac{1}{4}$	4k	4k	2b; 2d	2a; 2c	8l	2×4k	8l	4e; 4f	4i; 4j	4g; 4h	2×8l
[2] C222 (21)		2a; 2c	2b; 2d	4k	4k	4e; 4f	4g; 4h	4i; 4j	2×4k	8l	8l	2×8l
[2] C222 (21)	$x+\frac{1}{4}, y+\frac{1}{4}, z+\frac{1}{4}$	4k	4k	2b; 2d	2a; 2c	8l	8l	2×4k	4i; 4j	4g; 4h	4e; 4f	2×8l
[2] A2 <sub>1</sub> 22 (20)	$x, y+\frac{1}{4}, z$	4a	4a	4b	4b	8c	2×4a	8c	2×4b	8c	8c	2×8c
$\cong C222_1$	<b>b, c, a</b> $y+\frac{1}{4}, z, x$											
[2] A2 <sub>1</sub> 22 (20)	$x+\frac{1}{4}, y, z+\frac{1}{4}$ $\cong C222_1$ <b>b, c, a</b> $y, z+\frac{1}{4}, x+\frac{1}{4}$	4b	4b	4a	4a	8c	8c	2×4b	8c	2×4a	8c	2×8c
[2] B22 <sub>1</sub> 2 (20)	$x, y, z+\frac{1}{4}$ $\cong C222_1$ <b>c, a, b</b> $z+\frac{1}{4}, x, y$	4a	4a	4b	4b	8c	8c	2×4a	8c	8c	2×4b	2×8c
[2] B22 <sub>1</sub> 2 (20)	$x+\frac{1}{4}, y+\frac{1}{4}, z$ $\cong C222_1$ <b>c, a, b</b> $z, x+\frac{1}{4}, y+\frac{1}{4}$	4b	4b	4a	4a	2×4b	8c	8c	2×4a	8c	8c	2×8c
[2] C222 <sub>1</sub> (20)	$x+\frac{1}{4}, y, z$	4a	4a	4b	4b	2×4a	8c	8c	8c	2×4b	8c	2×8c
[2] C222 <sub>1</sub> (20)	$x, y+\frac{1}{4}, z+\frac{1}{4}$	4b	4b	4a	4a	8c	2×4b	8c	8c	8c	2×4a	2×8c

## Enlarged unit cell, isomorphic

[3] F222	<b>3a, b, c</b> $\frac{1}{3}x, y, z; \pm(\frac{1}{3}, 0, 0)$	4a; 8e	4b; 8e	4d; 8j	4c; 8j	3×8e	8f; 16k	8g; 16k	8h; 16k	8i; 16k	3×8j	3×16k
[p] F222	<b>p a, b, c</b> $\frac{1}{p}x, y, z; +(\frac{u}{p}, 0, 0)$ $p = \text{prime} > 2;$ $u = 1, \dots, p-1$	4a; $\frac{p-1}{2} \times 8e$	4b; $\frac{p-1}{2} \times 8e$	4c(d*); $\frac{p-1}{2} \times 8j$	4d(c*); $\frac{p-1}{2} \times 8j$	p×8e	8f; $\frac{p-1}{2} \times 16k$	8g; $\frac{p-1}{2} \times 16k$	8h; $\frac{p-1}{2} \times 16k$	8i; $\frac{p-1}{2} \times 16k$	p×8j	p×16k
[3] F222	<b>a, 3b, c</b> $x, \frac{1}{3}y, z; \pm(0, \frac{1}{3}, 0)$	4a; 8f	4b; 8f	4d; 8i	4c; 8i	8e; 16k	3×8f	8g; 16k	8h; 16k	3×8i	8j; 16k	3×16k
[p] F222	<b>a, pb, c</b> $x, \frac{1}{p}y, z; +(0, \frac{u}{p}, 0)$ $p = \text{prime} > 2;$ $u = 1, \dots, p-1$	4a; $\frac{p-1}{2} \times 8f$	4b; $\frac{p-1}{2} \times 8f$	4c(d*); $\frac{p-1}{2} \times 8i$	4d(c*); $\frac{p-1}{2} \times 8i$	p×8f	8g; $\frac{p-1}{2} \times 16k$	8h; $\frac{p-1}{2} \times 16k$	p×8i	8j;	p×16k	$\frac{p-1}{2} \times 16k$
[3] F222	<b>a, b, 3c</b> $x, y, \frac{1}{3}z; \pm(0, 0, \frac{1}{3})$	4a; 8g	4b; 8g	4d; 8h	4c; 8h	8e; 16k	8f; 16k	3×8g	3×8h	8i; 16k	8j; 16k	3×16k
[p] F222	<b>a, b, pc</b> $x, y, \frac{1}{p}z; +(0, 0, \frac{u}{p})$ $p = \text{prime} > 2;$ $u = 1, \dots, p-1$	4a; $\frac{p-1}{2} \times 8g$	4b; $\frac{p-1}{2} \times 8g$	4c(d*); $\frac{p-1}{2} \times 8h$	4d(c*); $\frac{p-1}{2} \times 8h$	8e; $\frac{p-1}{2} \times 16k$	8f; $\frac{p-1}{2} \times 16k$	p×8g	p×8h	8i;	8j;	p×16k

$$^* p = 4n - 1$$