1.2. Printed symbols for conventional centring types

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1.2.1. Printed symbols for the conventional centring types of one-, two- and three-dimensional cells

For 'reflection conditions', see Tables 2.2.13.1 and 2.2.13.3. For the new centring symbol *S*, see Note (iii) below.

Printed symbol	Centring type of cell	Number of lattice points per cell	Coordinates of lattice points within cell
One dimension			
∕	Primitive	1	0
Two dimensions			
p	Primitive	1	0, 0
c	Centred	2	0, 0; $\frac{1}{2}, \frac{1}{2}$
*h**	Hexagonally centred	3	0, 0; $\frac{2}{3}, \frac{1}{3}, \frac{1}{3}; \frac{1}{3}, \frac{2}{3}$
Three dimensions			
P	Primitive	1	0, 0, 0
C	*C*-face centred	2	0, 0, 0; $\frac{1}{2}, \frac{1}{2}$, 0
A	*A*-face centred	2	0, 0, 0; 0, $\frac{1}{2}, \frac{1}{2}$
B	*B*-face centred	2	0, 0, 0; $\frac{1}{2}$, 0, $\frac{1}{2}$
I	Body centred	2	0, 0, 0; $\frac{1}{2}, \frac{1}{2}, \frac{1}{2}$
F	All-face centred	4	0, 0, 0; $\frac{1}{2}, \frac{1}{2}$, 0; 0, $\frac{1}{2}, \frac{1}{2}$; $\frac{1}{2}$, 0, $\frac{1}{2}$
R†	Rhombohedrally centred (description with 'hexagonal axes')	3	0, 0, 0; $\frac{2}{3}, \frac{1}{3}, \frac{1}{3}$; $\frac{1}{3}, \frac{2}{3}, \frac{2}{3}$ ('obverse setting')
			0, 0, 0; $\frac{1}{3}, \frac{2}{3}, \frac{1}{3}$; $\frac{2}{3}, \frac{1}{3}, \frac{2}{3}$ ('reverse setting')
	Primitive (description with 'rhombohedral axes')	1	0, 0, 0
H‡	Hexagonally centred	3	0, 0, 0; $\frac{2}{3}, \frac{1}{3}$, 0; $\frac{1}{3}, \frac{2}{3}$, 0

* The two-dimensional triple hexagonal cell *h* is an alternative description of the hexagonal plane net, as illustrated in Fig. 5.1.3.8. It is not used for systematic plane-group description in this volume; it is introduced, however, in the sub- and supergroup entries of the plane-group tables (Part 6). Plane-group symbols for the *h* cell are listed in Chapter 4.2. Transformation matrices are contained in Table 5.1.3.1.

† In the space-group tables (Part 7), as well as in *IT* (1935) and *IT* (1952) [for reference notation, see footnote on first page of Chapter 2.1], the seven rhombohedral *R* space groups are presented with two descriptions, one based on *hexagonal axes* (triple cell), one on *rhombohedral axes* (primitive cell). In the present volume, as well as in *IT* (1952), the *obverse* setting of the triple hexagonal cell *R* is used. Note that in *IT* (1935) the *reverse* setting was employed. The two settings are related by a rotation of the hexagonal cell with respect to the rhombohedral lattice around a threefold axis, involving a rotation angle of 60°, 180° or 300° (*cf.* Fig. 5.1.3.6). Further details may be found in Chapter 2.1, Section 4.3.5 and Chapter 9.1. Transformation matrices are contained in Table 5.1.3.1.

‡ The triple hexagonal cell *H* is an alternative description of the hexagonal Bravais lattice, as illustrated in Fig. 5.1.3.8. It was used for systematic space-group description in *IT* (1935), but replaced by *P* in *IT* (1952). In the space-group tables of this volume (Part 7), it is only used in the sub- and supergroup entries (*cf.* Section 2.2.15). Space-group symbols for the *H* cell are listed in Section 4.3.5. Transformation matrices are contained in Table 5.1.3.1.

1.2.2. Notes on centred cells

(i) The centring type of a cell may change with a change of the basis vectors; in particular, a primitive cell may become a centred cell and *vice versa.* Examples of relevant transformation matrices are contained in Table 5.1.3.1.

(ii) Section 1.2.1 contains only those conventional centring symbols which occur in the Hermann–Mauguin space-group symbols. There exist, of course, further kinds of centred cells which are unconventional; an interesting example is provided by the triple rhombohedral *D* cell, described in Section 4.3.5.3.

(iii) For the use of the letter *S* as a new general, setting-independent 'centring symbol' for monoclinic and orthorhombic Bravais lattices see Chapter 2.1, especially Table 2.1.2.1, and de Wolff *et al.* (1985).

(iv) Symbols for crystal families and Bravais lattices in one, two and three dimensions are listed in Table 2.1.2.1 and are explained in the *Nomenclature Report* by de Wolff *et al.* (1985).

references