MPG No. 7.5.124 $m'm2'$ (mm'2' setting) [Type III, orthorhombic] [M tensor]

* Rank 0 tensor. * Rank 1 tensor.

$$\begin{bmatrix} M_x & 0 & 0 \end{bmatrix}$$

$$M_x = M^{(1)}_{px}$$

* Rank 2 tensor (s).

$$\begin{bmatrix} 0 & 0 & M_{xz} \\ 0 & 0 & 0 \\ M_{xz} & 0 & 0 \end{bmatrix}$$

$$M_{xz} = M^{(1)}_{dxz}$$

* Rank 2 tensor (a).

$$\begin{bmatrix} 0 & 0 & M_{xz} \\ 0 & 0 & 0 \\ -M_{xz} & 0 & 0 \end{bmatrix}$$

$$M_{xz} = -T^{(1)}_{py}$$

* Rank 3 tensor (s).

$$\begin{bmatrix} M_{xxx} & 0 & 0 \\ M_{yyx} & 0 & 0 \\ M_{zzx} & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & M_{zxz} \\ 0 & M_{xyy} & 0 \end{bmatrix}$$

$$M_{xxx} = 2M^{(1)}_{fax} + M^{(1)}_{px} + 2M^{(2)}_{px}$$
$$M_{yyx} = -M^{(1)}_{fax} + M^{(1)}_{fbx} + M^{(1)}_{px} - 2T^{(1)}_{dyz}$$
$$M_{zzx} = -M^{(1)}_{fax} - M^{(1)}_{fbx} + M^{(1)}_{px} + 2T^{(1)}_{dyz}$$
$$M_{zxz} = -M^{(1)}_{fax} - M^{(1)}_{fbx} + M^{(2)}_{px} - T^{(1)}_{dyz}$$
$$M_{xyy} = -M^{(1)}_{fax} + M^{(1)}_{fbx} + M^{(2)}_{px} + T^{(1)}_{dyz}$$

* Rank 3 tensor (a).

$$\begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & M_{zxz} \\ 0 & M_{xyy} & 0 \end{bmatrix}$$

$$M_{zxz} = M^{(3)}_{px} + T^{(2)}_{dyz}$$
$$M_{xyy} = -M^{(3)}_{px} + T^{(2)}_{dyz}$$

* Rank 4 tensor (sss).

$$\begin{bmatrix} 0 & 0 & 0 & 0 & M_{xxzx} & 0 \\ 0 & 0 & 0 & 0 & M_{yyzx} & 0 \\ 0 & 0 & 0 & 0 & M_{zzzx} & 0 \\ 0 & 0 & 0 & 0 & 0 & M_{yzxy} \\ M_{xxzx} & M_{yyzx} & M_{zzzx} & 0 & 0 & 0 \\ 0 & 0 & 0 & M_{yzxy} & 0 & 0 \end{bmatrix}$$

$$M_{xxzx} = M^{(1)}_{dxz} + 2M^{(2)}_{dxz} - M^{(1)}_{gay} - M^{(1)}_{gby}$$
$$M_{yyzx} = M^{(1)}_{dxz} + 2M^{(1)}_{gby}$$
$$M_{zzzx} = M^{(1)}_{dxz} + 2M^{(2)}_{dxz} + M^{(1)}_{gay} - M^{(1)}_{gby}$$
$$M_{yzxy} = M^{(2)}_{dxz} + 2M^{(1)}_{gby}$$

* Rank 4 tensor (ssa).

$$\begin{bmatrix} 0 & 0 & 0 & 0 & M_{xxzx} & 0 \\ 0 & 0 & 0 & 0 & M_{yyzx} & 0 \\ 0 & 0 & 0 & 0 & M_{zzzx} & 0 \\ 0 & 0 & 0 & 0 & 0 & M_{yzxy} \\ -M_{xxzx} & -M_{yyzx} & -M_{zzzx} & 0 & 0 & 0 \\ 0 & 0 & 0 & -M_{yzxy} & 0 & 0 \end{bmatrix}$$

$$M_{xxzx} = M^{(3)}_{dxz} + 2T^{(1)}_{fay} + 2T^{(1)}_{fby} - 2T^{(1)}_{py}$$
$$M_{yyzx} = M^{(3)}_{dxz} - 4T^{(1)}_{fby}$$
$$M_{zzzx} = M^{(3)}_{dxz} - 2T^{(1)}_{fay} + 2T^{(1)}_{fby} + 2T^{(1)}_{py}$$
$$M_{yzxy} = 4T^{(1)}_{fay} + T^{(1)}_{py}$$

* Rank 4 tensor (aas).

$$\begin{bmatrix} 0 & 0 & M_{yzxy} \\ 0 & 0 & 0 \\ M_{yzxy} & 0 & 0 \end{bmatrix}$$

$$M_{yzxy} = 2M^{(4)}_{dxz}$$

* Rank 4 tensor (aaa).

$$\begin{bmatrix} 0 & 0 & M_{yzxy} \\ 0 & 0 & 0 \\ -M_{yzxy} & 0 & 0 \end{bmatrix}$$

$$M_{yzxy} = T^{(2)}_{py}$$

* Rank 4 tensor (sa).

$$\begin{bmatrix} 0 & M_{xxzx} & 0 \\ 0 & M_{yyzx} & 0 \\ 0 & M_{zzzx} & 0 \\ 0 & 0 & M_{yzxy} \\ 0 & 0 & 0 \\ M_{xyyz} & 0 & 0 \end{bmatrix}$$

$$M_{xxzx} = 2M^{(5)}_{dxz} - T^{(2)}_{fay} - T^{(2)}_{fby} + T^{(3)}_{py}$$
$$M_{yyzx} = 2T^{(2)}_{fay} + T^{(3)}_{py} + 2T^{(4)}_{py}$$
$$M_{zzzx} = -2M^{(5)}_{dxz} - T^{(2)}_{fay} + T^{(2)}_{fby} + T^{(3)}_{py}$$
$$M_{yzxy} = M^{(5)}_{dxz} - T^{(2)}_{fay} + T^{(2)}_{fby} + T^{(4)}_{py}$$
$$M_{xyyz} = -M^{(5)}_{dxz} - T^{(2)}_{fay} - T^{(2)}_{fby} + T^{(4)}_{py}$$

* Rank 4 tensor (as).

$$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & M_{yzxy} \\ M_{zxxx} & M_{zxyy} & M_{zxzz} & 0 & 0 & 0 \\ 0 & 0 & 0 & M_{xyyz} & 0 & 0 \end{bmatrix}$$

$$M_{yzxy} = -M^{(6)}_{dxz} - T^{(3)}_{fay} - T^{(3)}_{fby} + T^{(6)}_{py}$$
$$M_{zxxx} = 2M^{(6)}_{dxz} - T^{(3)}_{fay} - T^{(3)}_{fby} + T^{(5)}_{py}$$
$$M_{zxyy} = 2T^{(3)}_{fay} + T^{(5)}_{py} + 2T^{(6)}_{py}$$
$$M_{zxzz} = -2M^{(6)}_{dxz} - T^{(3)}_{fay} + T^{(3)}_{fby} + T^{(5)}_{py}$$
$$M_{xyyz} = M^{(6)}_{dxz} - T^{(3)}_{fay} + T^{(3)}_{fby} + T^{(6)}_{py}$$

* Rank 4 tensor (s).

$$\begin{bmatrix} 0 & 0 & 0 & 0 & M_{xxzx} & 0 & 0 & M_{xxxz} & 0 \\ 0 & 0 & 0 & 0 & M_{yyzx} & 0 & 0 & M_{yyxz} & 0 \\ 0 & 0 & 0 & 0 & M_{zzzx} & 0 & 0 & M_{zzxz} & 0 \\ 0 & 0 & 0 & 0 & 0 & M_{yzxy} & 0 & 0 & M_{yzyx} \\ M_{zxxx} & M_{zxyy} & M_{zxzz} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & M_{xyyz} & 0 & 0 & M_{xyzy} & 0 & 0 \end{bmatrix}$$

$$M_{xxzx} = M^{(1)}_{dxz} + 2M^{(2)}_{dxz} + M^{(3)}_{dxz} + 2M^{(5)}_{dxz} - M^{(1)}_{gay} - M^{(1)}_{gby} + 2T^{(1)}_{fay} - T^{(2)}_{fay} + 2T^{(1)}_{fby} - T^{(2)}_{fby} - 2T^{(1)}_{py} + T^{(3)}_{py}$$
$$M_{xxxz} = M^{(1)}_{dxz} + 2M^{(2)}_{dxz} + M^{(3)}_{dxz} - 2M^{(5)}_{dxz} - M^{(1)}_{gay} - M^{(1)}_{gby} + 2T^{(1)}_{fay} + T^{(2)}_{fay} + 2T^{(1)}_{fby} + T^{(2)}_{fby} - 2T^{(1)}_{py} - T^{(3)}_{py}$$
$$M_{yyzx} = M^{(1)}_{dxz} + M^{(3)}_{dxz} + 2M^{(1)}_{gby} + 2T^{(2)}_{fay} - 4T^{(1)}_{fby} + T^{(3)}_{py} + 2T^{(4)}_{py}$$
$$M_{yyxz} = M^{(1)}_{dxz} + M^{(3)}_{dxz} + 2M^{(1)}_{gby} - 2T^{(2)}_{fay} - 4T^{(1)}_{fby} - T^{(3)}_{py} - 2T^{(4)}_{py}$$
$$M_{zzzx} = M^{(1)}_{dxz} + 2M^{(2)}_{dxz} + M^{(3)}_{dxz} - 2M^{(5)}_{dxz} + M^{(1)}_{gay} - M^{(1)}_{gby} - 2T^{(1)}_{fay} - T^{(2)}_{fay} + 2T^{(1)}_{fby} + T^{(2)}_{fby} + 2T^{(1)}_{py} + T^{(3)}_{py}$$
$$M_{zzxz} = M^{(1)}_{dxz} + 2M^{(2)}_{dxz} + M^{(3)}_{dxz} + 2M^{(5)}_{dxz} + M^{(1)}_{gay} - M^{(1)}_{gby} - 2T^{(1)}_{fay} + T^{(2)}_{fay} + 2T^{(1)}_{fby} - T^{(2)}_{fby} + 2T^{(1)}_{py} - T^{(3)}_{py}$$
$$M_{yzxy} = M^{(2)}_{dxz} + M^{(5)}_{dxz} + 2M^{(1)}_{gby} + 4T^{(1)}_{fay} - T^{(2)}_{fay} + T^{(2)}_{fby} + T^{(1)}_{py} + T^{(4)}_{py}$$
$$M_{yzyx} = M^{(2)}_{dxz} - M^{(5)}_{dxz} + 2M^{(1)}_{gby} + 4T^{(1)}_{fay} + T^{(2)}_{fay} - T^{(2)}_{fby} + T^{(1)}_{py} - T^{(4)}_{py}$$
$$M_{zxxx} = M^{(1)}_{dxz} + 2M^{(2)}_{dxz} - M^{(3)}_{dxz} - M^{(1)}_{gay} - M^{(1)}_{gby} - 2T^{(1)}_{fay} - 2T^{(1)}_{fby} + 2T^{(1)}_{py}$$
$$M_{zxyy} = M^{(1)}_{dxz} - M^{(3)}_{dxz} + 2M^{(1)}_{gby} + 4T^{(1)}_{fby}$$
$$M_{zxzz} = M^{(1)}_{dxz} + 2M^{(2)}_{dxz} - M^{(3)}_{dxz} + M^{(1)}_{gay} - M^{(1)}_{gby} + 2T^{(1)}_{fay} - 2T^{(1)}_{fby} - 2T^{(1)}_{py}$$
$$M_{xyyz} = M^{(2)}_{dxz} - M^{(5)}_{dxz} + 2M^{(1)}_{gby} - 4T^{(1)}_{fay} - T^{(2)}_{fay} - T^{(2)}_{fby} - T^{(1)}_{py} + T^{(4)}_{py}$$
$$M_{xyzy} = M^{(2)}_{dxz} + M^{(5)}_{dxz} + 2M^{(1)}_{gby} - 4T^{(1)}_{fay} + T^{(2)}_{fay} + T^{(2)}_{fby} - T^{(1)}_{py} - T^{(4)}_{py}$$

* Rank 4 tensor (a).

$$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 & M_{yzxy} & 0 & 0 & M_{yzyx} \\ M_{zxxx} & M_{zxyy} & M_{zxzz} & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & M_{xyyz} & 0 & 0 & M_{xyzy} & 0 & 0 \end{bmatrix}$$

$$M_{yzxy} = 2M^{(4)}_{dxz} - M^{(6)}_{dxz} - T^{(3)}_{fay} - T^{(3)}_{fby} + T^{(2)}_{py} + T^{(6)}_{py}$$
$$M_{yzyx} = -2M^{(4)}_{dxz} - M^{(6)}_{dxz} - T^{(3)}_{fay} - T^{(3)}_{fby} - T^{(2)}_{py} + T^{(6)}_{py}$$
$$M_{zxxx} = 2M^{(6)}_{dxz} - T^{(3)}_{fay} - T^{(3)}_{fby} + T^{(5)}_{py}$$
$$M_{zxyy} = 2T^{(3)}_{fay} + T^{(5)}_{py} + 2T^{(6)}_{py}$$
$$M_{zxzz} = -2M^{(6)}_{dxz} - T^{(3)}_{fay} + T^{(3)}_{fby} + T^{(5)}_{py}$$
$$M_{xyyz} = 2M^{(4)}_{dxz} + M^{(6)}_{dxz} - T^{(3)}_{fay} + T^{(3)}_{fby} - T^{(2)}_{py} + T^{(6)}_{py}$$
$$M_{xyzy} = -2M^{(4)}_{dxz} + M^{(6)}_{dxz} - T^{(3)}_{fay} + T^{(3)}_{fby} + T^{(2)}_{py} + T^{(6)}_{py}$$

* Rank 4 tensor (t).

$$\begin{bmatrix} 0 & 0 & M_{xxxz} \\ 0 & 0 & 0 \\ M_{zzzx} & 0 & 0 \\ M_{yyzx} & 0 & 0 \\ 0 & 0 & M_{zzxz} \\ 0 & 0 & 0 \\ 0 & 0 & 0 \\ M_{zxxx} & 0 & 0 \\ 0 & 0 & M_{xyyz} \\ 0 & M_{xyyz} + \frac{M_{zzxz}}{2} - \frac{M_{zzzx}}{2} & 0 \end{bmatrix}$$

$$\begin{aligned}
M_{xxxz} &= M_{dxz}^{(1)} + 2M_{dxz}^{(2)} + M_{dxz}^{(3)} - 2M_{dxz}^{(5)} - M_{gay}^{(1)} - M_{gby}^{(1)} \\
M_{zzzx} &= M_{dxz}^{(1)} + 2M_{dxz}^{(2)} + M_{dxz}^{(3)} - 2M_{dxz}^{(5)} + M_{gay}^{(1)} - M_{gby}^{(1)} \\
M_{yyzx} &= M_{dxz}^{(1)} + M_{dxz}^{(3)} + 2M_{gby}^{(1)} \\
M_{zzxz} &= M_{dxz}^{(1)} + 2M_{dxz}^{(2)} + M_{dxz}^{(3)} + 2M_{dxz}^{(5)} + M_{gay}^{(1)} - M_{gby}^{(1)} \\
M_{zxxx} &= M_{dxz}^{(1)} + 2M_{dxz}^{(2)} - M_{dxz}^{(3)} - M_{gay}^{(1)} - M_{gby}^{(1)} \\
M_{xyyz} &= M_{dxz}^{(2)} - M_{dxz}^{(5)} + 2M_{gby}^{(1)}
\end{aligned}$$