MPG No. 8.8.127 $m'm'm$ (m'mm' setting) [Type III, orthorhombic] [T tensor]

* Rank 0 tensor. * Rank 1 tensor. * Rank 2 tensor (s).

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

$$T_{xz} = T^{(1)}_{dxz}$$

* Rank 2 tensor (a).

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

$$T_{xz} = -M^{(1)}_{py}$$

* Rank 3 tensor (s). * Rank 3 tensor (a). * Rank 4 tensor (sss).

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

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

* Rank 4 tensor (ssa).

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

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

* Rank 4 tensor (aas).

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

$$T_{yzxy} = 2T^{(4)}_{dxz}$$

* Rank 4 tensor (aaa).

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

$$T_{yzxy} = M_{py}^{(2)}$$

* Rank 4 tensor (sa).

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

$$\begin{aligned}
T_{xxzx} &= -M_{fay}^{(2)} - M_{fby}^{(2)} + M_{py}^{(3)} + 2T_{dxz}^{(5)} \\
T_{yyzx} &= 2M_{fay}^{(2)} + M_{py}^{(3)} + 2M_{py}^{(4)} \\
T_{zzzx} &= -M_{fay}^{(2)} + M_{fby}^{(2)} + M_{py}^{(3)} - 2T_{dxz}^{(5)} \\
T_{yzxy} &= -M_{fay}^{(2)} + M_{fby}^{(2)} + M_{py}^{(4)} + T_{dxz}^{(5)} \\
T_{xyyz} &= -M_{fay}^{(2)} - M_{fby}^{(2)} + M_{py}^{(4)} - T_{dxz}^{(5)}
\end{aligned}$$

* Rank 4 tensor (as).

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

$$\begin{aligned}
T_{yzxy} &= -M_{fay}^{(3)} - M_{fby}^{(3)} + M_{py}^{(6)} - T_{dxz}^{(6)} \\
T_{zxxx} &= -M_{fay}^{(3)} - M_{fby}^{(3)} + M_{py}^{(5)} + 2T_{dxz}^{(6)} \\
T_{zxyy} &= 2M_{fay}^{(3)} + M_{py}^{(5)} + 2M_{py}^{(6)} \\
T_{zxzz} &= -M_{fay}^{(3)} + M_{fby}^{(3)} + M_{py}^{(5)} - 2T_{dxz}^{(6)} \\
T_{xyyz} &= -M_{fay}^{(3)} + M_{fby}^{(3)} + M_{py}^{(6)} + T_{dxz}^{(6)}
\end{aligned}$$

* Rank 4 tensor (s).

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

$$\begin{aligned}
T_{xxzx} &= 2M_{fay}^{(1)} - M_{fay}^{(2)} + 2M_{fby}^{(1)} - M_{fby}^{(2)} - 2M_{py}^{(1)} + M_{py}^{(3)} + T_{dxz}^{(1)} + 2T_{dxz}^{(2)} + T_{dxz}^{(3)} + 2T_{dxz}^{(5)} - T_{gay}^{(1)} - T_{gby}^{(1)} \\
T_{xxxz} &= 2M_{fay}^{(1)} + M_{fay}^{(2)} + 2M_{fby}^{(1)} + M_{fby}^{(2)} - 2M_{py}^{(1)} - M_{py}^{(3)} + T_{dxz}^{(1)} + 2T_{dxz}^{(2)} + T_{dxz}^{(3)} - 2T_{dxz}^{(5)} - T_{gay}^{(1)} - T_{gby}^{(1)} \\
T_{yyzx} &= 2M_{fay}^{(2)} - 4M_{fby}^{(1)} + M_{py}^{(3)} + 2M_{py}^{(4)} + T_{dxz}^{(1)} + T_{dxz}^{(3)} + 2T_{gby}^{(1)} \\
T_{yyxz} &= -2M_{fay}^{(2)} - 4M_{fby}^{(1)} - M_{py}^{(3)} - 2M_{py}^{(4)} + T_{dxz}^{(1)} + T_{dxz}^{(3)} + 2T_{gby}^{(1)} \\
T_{zzzx} &= -2M_{fay}^{(1)} - M_{fay}^{(2)} + 2M_{fby}^{(1)} + M_{fby}^{(2)} + 2M_{py}^{(1)} + M_{py}^{(3)} + T_{dxz}^{(1)} + 2T_{dxz}^{(2)} + T_{dxz}^{(3)} - 2T_{dxz}^{(5)} + T_{gay}^{(1)} - T_{gby}^{(1)} \\
T_{zzxz} &= -2M_{fay}^{(1)} + M_{fay}^{(2)} + 2M_{fby}^{(1)} - M_{fby}^{(2)} + 2M_{py}^{(1)} - M_{py}^{(3)} + T_{dxz}^{(1)} + 2T_{dxz}^{(2)} + T_{dxz}^{(3)} + 2T_{dxz}^{(5)} + T_{gay}^{(1)} - T_{gby}^{(1)} \\
T_{yzxy} &= 4M_{fay}^{(1)} - M_{fay}^{(2)} + M_{fby}^{(2)} + M_{py}^{(1)} + M_{py}^{(4)} + T_{dxz}^{(2)} + T_{dxz}^{(5)} + 2T_{gby}^{(1)} \\
T_{yzyx} &= 4M_{fay}^{(1)} + M_{fay}^{(2)} - M_{fby}^{(2)} + M_{py}^{(1)} - M_{py}^{(4)} + T_{dxz}^{(2)} - T_{dxz}^{(5)} + 2T_{gby}^{(1)} \\
T_{zxxx} &= -2M_{fay}^{(1)} - 2M_{fby}^{(1)} + 2M_{py}^{(1)} + T_{dxz}^{(1)} + 2T_{dxz}^{(2)} - T_{dxz}^{(3)} - T_{gay}^{(1)} - T_{gby}^{(1)} \\
T_{zxyy} &= 4M_{fby}^{(1)} + T_{dxz}^{(1)} - T_{dxz}^{(3)} + 2T_{gby}^{(1)} \\
T_{zxzz} &= 2M_{fay}^{(1)} - 2M_{fby}^{(1)} - 2M_{py}^{(1)} + T_{dxz}^{(1)} + 2T_{dxz}^{(2)} - T_{dxz}^{(3)} + T_{gay}^{(1)} - T_{gby}^{(1)} \\
T_{xyyz} &= -4M_{fay}^{(1)} - M_{fay}^{(2)} - M_{fby}^{(2)} - M_{py}^{(1)} + M_{py}^{(4)} + T_{dxz}^{(2)} - T_{dxz}^{(5)} + 2T_{gby}^{(1)} \\
T_{xyzy} &= -4M_{fay}^{(1)} + M_{fay}^{(2)} + M_{fby}^{(2)} - M_{py}^{(1)} - M_{py}^{(4)} + T_{dxz}^{(2)} + T_{dxz}^{(5)} + 2T_{gby}^{(1)}
\end{aligned}$$

* Rank 4 tensor (a).

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

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

* Rank 4 tensor (t).

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

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