

Matrixes of DL-43HD

Stiffness Matrix

$$\begin{pmatrix} C_{11} & C_{12} & C_{13} & 0 & 0 & 0 \\ C_{12} & C_{11} & C_{13} & 0 & 0 & 0 \\ C_{13} & C_{13} & C_{33} & 0 & 0 & 0 \\ 0 & 0 & 0 & C_{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & C_{55} & 0 \\ 0 & 0 & 0 & 0 & 0 & C_{66} \end{pmatrix}^E = \begin{pmatrix} 16.6 & 9.8 & 9.5 & 0 & 0 & 0 \\ 9.8 & 16.6 & 9.5 & 0 & 0 & 0 \\ 9.5 & 9.5 & 13.3 & 0 & 0 & 0 \\ 0 & 0 & 0 & 3.1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 3.1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 3.4 \end{pmatrix}^E 10^{10} N/m^2$$

$$\begin{pmatrix} C_{11} & C_{12} & C_{13} & 0 & 0 & 0 \\ C_{12} & C_{11} & C_{13} & 0 & 0 & 0 \\ C_{13} & C_{13} & C_{33} & 0 & 0 & 0 \\ 0 & 0 & 0 & C_{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & C_{55} & 0 \\ 0 & 0 & 0 & 0 & 0 & C_{66} \end{pmatrix}^D = \begin{pmatrix} 17.0 & 10.2 & 8.1 & 0 & 0 & 0 \\ 10.2 & 17.0 & 8.1 & 0 & 0 & 0 \\ 8.1 & 8.1 & 17.1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 5.6 & 0 & 0 \\ 0 & 0 & 0 & 0 & 5.6 & 0 \\ 0 & 0 & 0 & 0 & 0 & 3.4 \end{pmatrix}^D 10^{10} N/m^2$$

Elastic Matrix

$$\begin{pmatrix} S_{11} & S_{12} & S_{13} & 0 & 0 & 0 \\ S_{12} & S_{11} & S_{13} & 0 & 0 & 0 \\ S_{13} & S_{13} & S_{33} & 0 & 0 & 0 \\ 0 & 0 & 0 & S_{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & S_{55} & 0 \\ 0 & 0 & 0 & 0 & 0 & S_{66} \end{pmatrix}^E = \begin{pmatrix} 11.2 & -3.5 & -5.5 & 0 & 0 & 0 \\ -3.5 & 11.2 & -5.5 & 0 & 0 & 0 \\ -5.5 & -5.5 & 15.4 & 0 & 0 & 0 \\ 0 & 0 & 0 & 31.8 & 0 & 0 \\ 0 & 0 & 0 & 0 & 31.8 & 0 \\ 0 & 0 & 0 & 0 & 0 & 29.4 \end{pmatrix}^E 10^{-12} m^2/N$$

$$\begin{pmatrix} S_{11} & S_{12} & S_{13} & 0 & 0 & 0 \\ S_{12} & S_{11} & S_{13} & 0 & 0 & 0 \\ S_{13} & S_{13} & S_{33} & 0 & 0 & 0 \\ 0 & 0 & 0 & S_{44} & 0 & 0 \\ 0 & 0 & 0 & 0 & S_{55} & 0 \\ 0 & 0 & 0 & 0 & 0 & S_{66} \end{pmatrix}^D = \begin{pmatrix} 9.9 & -4.8 & -2.4 & 0 & 0 & 0 \\ -4.8 & 9.9 & -2.4 & 0 & 0 & 0 \\ -2.4 & -2.4 & 8.1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 17.9 & 0 & 0 \\ 0 & 0 & 0 & 0 & 17.9 & 0 \\ 0 & 0 & 0 & 0 & 0 & 29.4 \end{pmatrix}^D 10^{-12} m^2/N$$

Matrix of Clamp Dielectric Constant

$$\begin{pmatrix} \epsilon_{11} & 0 & 0 \\ 0 & \epsilon_{11} & 0 \\ 0 & 0 & \epsilon_{33} \end{pmatrix}^s = \begin{pmatrix} 852 & 0 & 0 \\ 0 & 852 & 0 \\ 0 & 0 & 615 \end{pmatrix}^s$$

Matrix of Free Dielectric Constant

$$\begin{pmatrix} \epsilon_{11} & 0 & 0 \\ 0 & \epsilon_{11} & 0 \\ 0 & 0 & \epsilon_{33} \end{pmatrix}^t = \begin{pmatrix} 1510 & 0 & 0 \\ 0 & 1510 & 0 \\ 0 & 0 & 1250 \end{pmatrix}^t$$

Piezoelectric Constant Matrixes

$$\begin{pmatrix} 0 & 0 & 0 & 0 & d_{15} & 0 \\ 0 & 0 & 0 & d_{24} & 0 & 0 \\ d_{31} & d_{31} & d_{33} & 0 & 0 & 0 \end{pmatrix} = \begin{pmatrix} 0 & 0 & 0 & 0 & 430 & 0 \\ 0 & 0 & 0 & 430 & 0 & 0 \\ -120 & -120 & 285 & 0 & 0 & 0 \end{pmatrix} 10^{-12} C/N$$

$$\begin{pmatrix} 0 & 0 & 0 & 0 & g_{15} & 0 \\ 0 & 0 & 0 & g_{24} & 0 & 0 \\ g_{31} & g_{31} & g_{33} & 0 & 0 & 0 \end{pmatrix} = \begin{pmatrix} 0 & 0 & 0 & 0 & 32.0 & 0 \\ 0 & 0 & 0 & 32.0 & 0 & 0 \\ -11.0 & -11.0 & 26.0 & 0 & 0 & 0 \end{pmatrix} 10^{-3} Vm/N$$

$$\begin{pmatrix} 0 & 0 & 0 & 0 & e_{15} & 0 \\ 0 & 0 & 0 & e_{24} & 0 & 0 \\ e_{31} & e_{31} & e_{33} & 0 & 0 & 0 \end{pmatrix} = \begin{pmatrix} 0 & 0 & 0 & 0 & 13.3 & 0 \\ 0 & 0 & 0 & 13.3 & 0 & 0 \\ -4.6 & -4.6 & 15.1 & 0 & 0 & 0 \end{pmatrix} C/m^2$$

$$\begin{pmatrix} 0 & 0 & 0 & 0 & h_{15} & 0 \\ 0 & 0 & 0 & h_{24} & 0 & 0 \\ h_{31} & h_{31} & h_{33} & 0 & 0 & 0 \end{pmatrix} = \begin{pmatrix} 0 & 0 & 0 & 0 & 17.9 & 0 \\ 0 & 0 & 0 & 17.9 & 0 & 0 \\ -8.9 & -8.9 & 26.6 & 0 & 0 & 0 \end{pmatrix} 10^8 V/m$$