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Hugoniot model for Fe from L260

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In this document, we provide the Hugoniot for iron from LEOS table L260. The Hugoniot pressures are supplied for temperatures between 290.1 and 1.16×10^9 Kelvin and densities of 7.877 and 31.70 g/cc. This EOS model was developed by the quotidian EOS methodology, which is a widely used and robust method for producing tabular EOS data.[1, 2] Table lists the included quantities and units of those data.

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Table : Hugoniot model for Fe based on L260

Density (kg/m^3)	Temperature (Kelvin)	Pressure (Pa)
7.877000e+03	2.901112e+02	-1.642355e+03
9.052019e+03	3.382610e+02	2.111105e+10
9.221097e+03	3.944023e+02	2.605076e+10
9.358511e+03	4.598613e+02	3.068843e+10
9.486614e+03	5.361847e+02	3.548734e+10
9.612911e+03	6.251754e+02	4.064130e+10
9.741494e+03	7.289359e+02	4.629058e+10
9.875398e+03	8.499176e+02	5.256953e+10
1.001765e+04	9.909786e+02	5.963708e+10
1.016599e+04	1.155452e+03	6.752738e+10
1.031879e+04	1.347222e+03	7.628555e+10
1.047624e+04	1.570821e+03	8.598768e+10
1.063881e+04	1.831531e+03	9.673360e+10
1.080689e+04	2.135510e+03	1.086293e+11
1.098079e+04	2.489941e+03	1.217709e+11
1.116364e+04	2.903198e+03	1.365233e+11
1.136058e+04	3.385042e+03	1.535716e+11
1.156421e+04	3.946858e+03	1.723187e+11
1.176842e+04	4.601920e+03	1.919973e+11
1.198849e+04	5.365701e+03	2.145816e+11
1.222612e+04	6.256248e+03	2.406736e+11
1.247019e+04	7.294599e+03	2.686506e+11
1.272423e+04	8.505286e+03	2.987656e+11
1.300068e+04	9.916911e+03	3.335503e+11
1.330037e+04	1.156282e+04	3.737596e+11
1.362172e+04	1.348191e+04	4.195285e+11
1.396810e+04	1.571950e+04	4.725684e+11
1.434083e+04	1.832847e+04	5.343008e+11
1.474115e+04	2.137046e+04	6.064303e+11
1.517033e+04	2.491732e+04	6.910601e+11
1.563002e+04	2.905285e+04	7.909225e+11
1.612196e+04	3.387476e+04	9.093890e+11
1.664939e+04	3.949696e+04	1.050739e+12
1.721588e+04	4.605228e+04	1.220398e+12
1.782337e+04	5.369559e+04	1.424894e+12
1.847334e+04	6.260746e+04	1.672395e+12
1.916721e+04	7.299844e+04	1.973250e+12
1.990559e+04	8.511401e+04	2.340314e+12
2.068756e+04	9.924040e+04	2.789536e+12
2.151047e+04	1.157114e+05	3.340562e+12
2.237050e+04	1.349160e+05	4.017798e+12

Density (kg/m^3)	Temperature (Kelvin)	Pressure (Pa)
2.326287e+04	1.573080e+05	4.851750e+12
2.418221e+04	1.834165e+05	5.880149e+12
2.512208e+04	2.138582e+05	7.149499e+12
2.607618e+04	2.493523e+05	8.717585e+12
2.703875e+04	2.907374e+05	1.065632e+13
2.800358e+04	3.389911e+05	1.305466e+13
2.896410e+04	3.952536e+05	1.602256e+13
2.991339e+04	4.608539e+05	1.969534e+13
3.084421e+04	5.373419e+05	2.424113e+13
3.174966e+04	6.265247e+05	2.986801e+13
3.262303e+04	7.305092e+05	3.683203e+13
3.345833e+04	8.517520e+05	4.544941e+13
3.425022e+04	9.931175e+05	5.611013e+13
3.499367e+04	1.157945e+06	6.929292e+13
3.568368e+04	1.350130e+06	8.558415e+13
3.631671e+04	1.574211e+06	1.057048e+14
3.688948e+04	1.835484e+06	1.305296e+14
3.739858e+04	2.140119e+06	1.611143e+14
3.784208e+04	2.495316e+06	1.987321e+14
3.821822e+04	2.909464e+06	2.449018e+14
3.852550e+04	3.392348e+06	3.014177e+14
3.876314e+04	3.955377e+06	3.703812e+14
3.893074e+04	4.611852e+06	4.542238e+14
3.902823e+04	5.377283e+06	5.557111e+14
3.905621e+04	6.269752e+06	6.779436e+14
3.901647e+04	7.310344e+06	8.243609e+14
3.891160e+04	8.523644e+06	9.986998e+14
3.874562e+04	9.938315e+06	1.204982e+15
3.852188e+04	1.158778e+07	1.447495e+15
3.824472e+04	1.351101e+07	1.730783e+15
3.792059e+04	1.575343e+07	2.059770e+15
3.755717e+04	1.836803e+07	2.440028e+15
3.716352e+04	2.141658e+07	2.877941e+15
3.675023e+04	2.497110e+07	3.381141e+15
3.632761e+04	2.911556e+07	3.958940e+15
3.590523e+04	3.394787e+07	4.622532e+15
3.549197e+04	3.958221e+07	5.385525e+15
3.509427e+04	4.615168e+07	6.264148e+15
3.471731e+04	5.381149e+07	7.277664e+15

Density (kg/m^3)	Temperature (Kelvin)	Pressure (Pa)
3.436506e+04	6.274259e+07	8.448933e+15
3.403979e+04	7.315600e+07	9.804760e+15
3.374244e+04	8.529772e+07	1.137646e+16
3.347311e+04	9.945460e+07	1.320069e+16
3.323089e+04	1.159611e+08	1.532009e+16
3.301436e+04	1.352072e+08	1.778430e+16
3.282187e+04	1.576476e+08	2.065127e+16
3.265154e+04	1.838124e+08	2.398843e+16
3.250134e+04	2.143198e+08	2.787430e+16
3.236937e+04	2.498905e+08	3.240046e+16
3.225372e+04	2.913649e+08	3.767358e+16
3.215263e+04	3.397228e+08	4.381797e+16
3.206449e+04	3.961067e+08	5.097859e+16
3.198779e+04	4.618486e+08	5.932440e+16
3.192116e+04	5.385017e+08	6.905234e+16
3.186338e+04	6.278770e+08	8.039199e+16
3.181334e+04	7.320859e+08	9.361103e+16
3.177006e+04	8.535904e+08	1.090215e+17
3.173265e+04	9.952610e+08	1.269871e+17
3.170039e+04	1.160445e+09	1.479323e+17

References

[1] D. Young and E. Corey, J. Appl. Phys. **78**, 3748 (1995).

[2] R. More, K. Warren, D. Young, and G. Zimmerman, Phys. Fluids **31**, 3059 (1988).