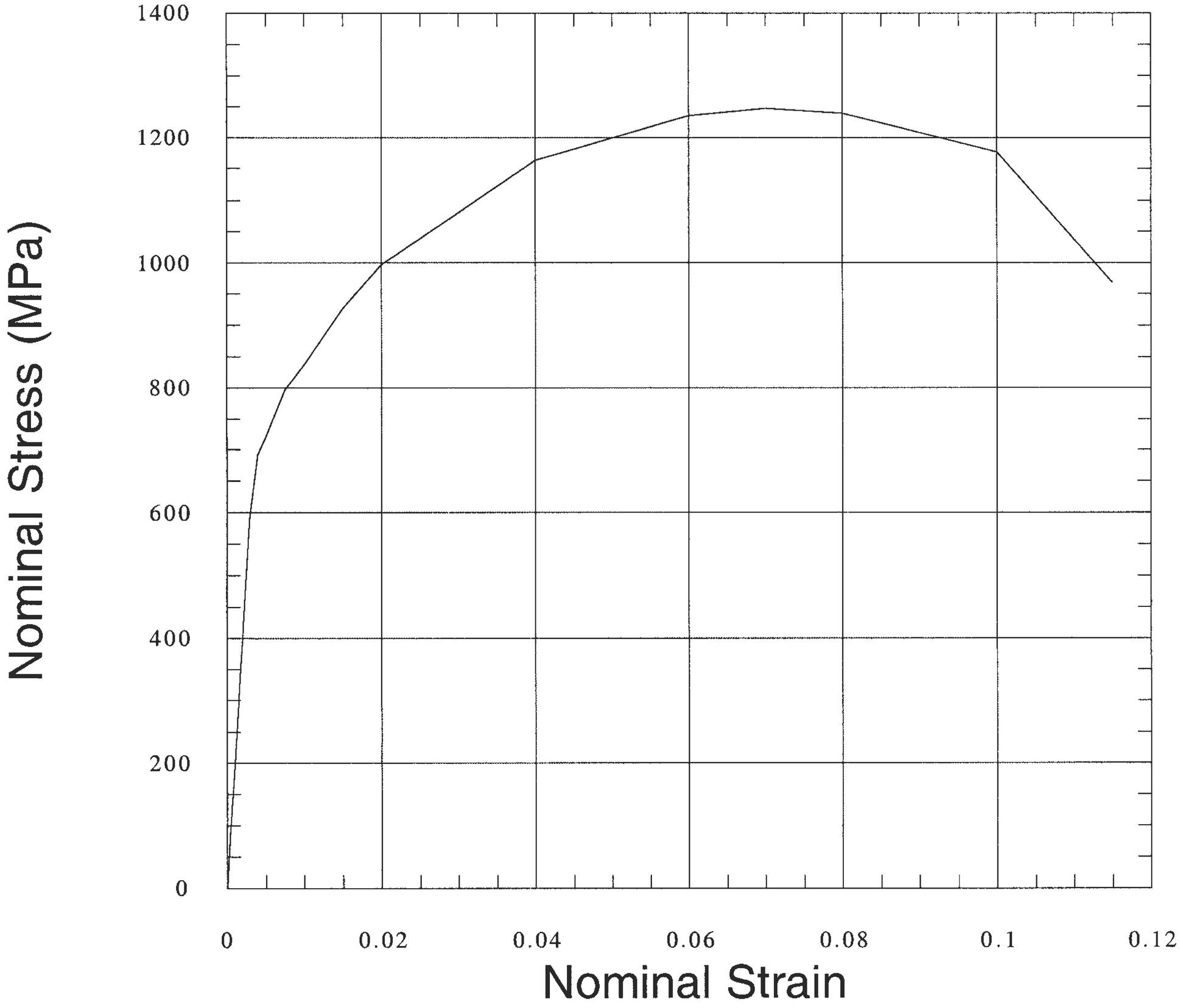
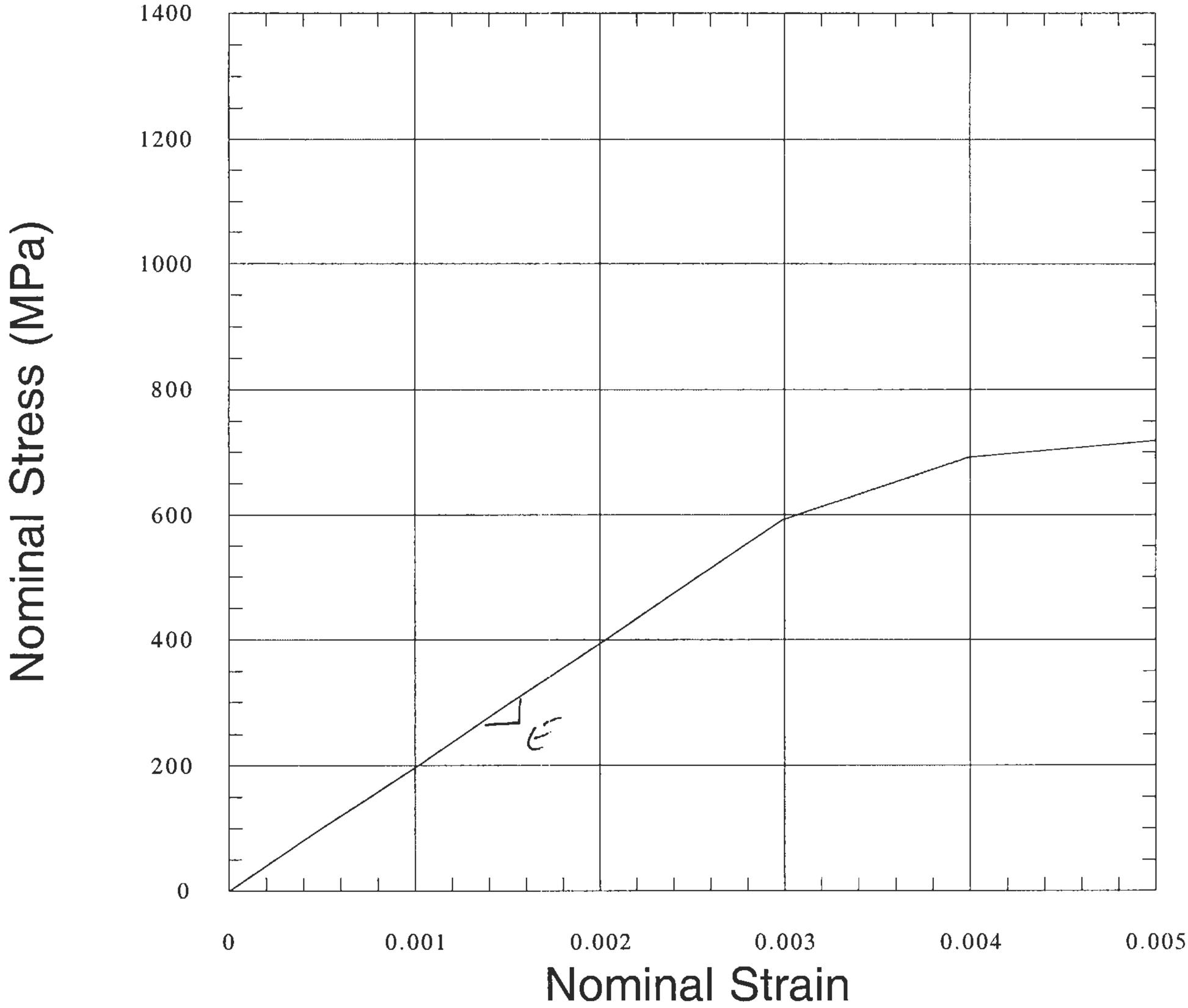
M16 a)


M16 Data
Nominal Stress (MPa)
1400
1200
1000
800
600
400
200
0
0
0.02
0.04
0.06
0.08
0.1
0.12
Nominal Strain

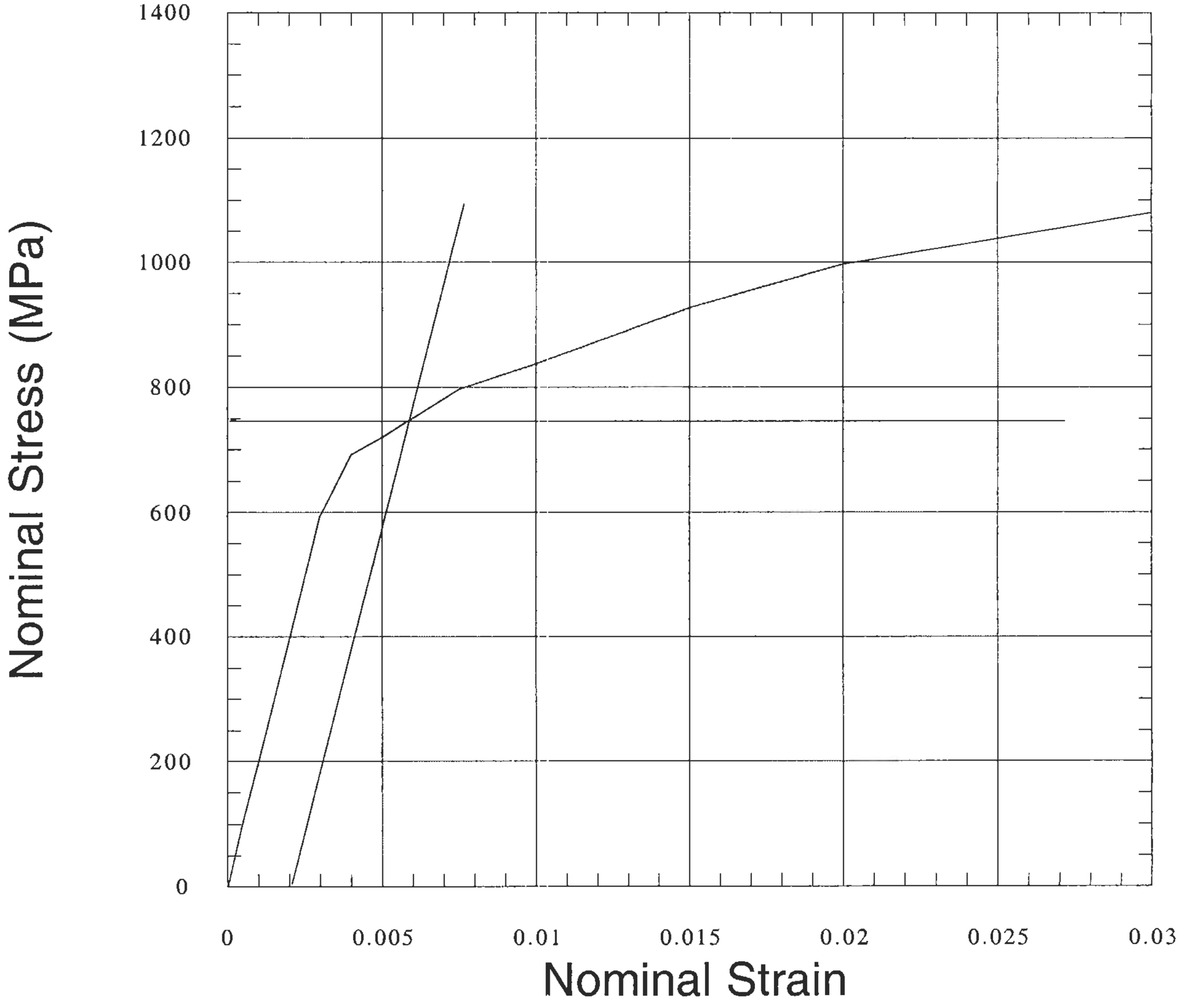
M16 b) $E = \frac{\sigma}{\varepsilon} = \frac{400 \times 10^6}{0.002} = 200\ GPa.$ ∈

M16 Data



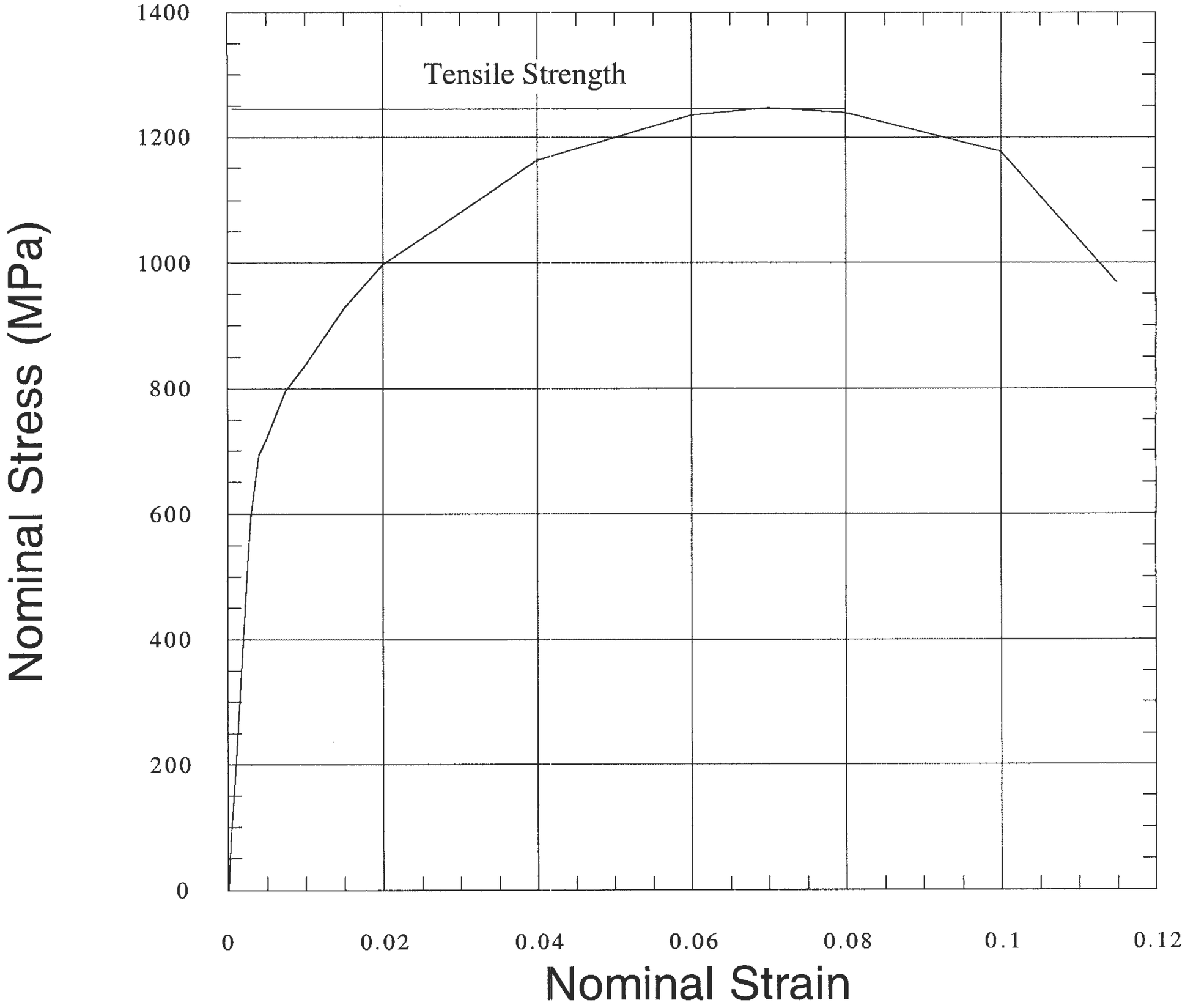
M16 c) 0.2% offset σ_y = 750 MPa.

M16 Data



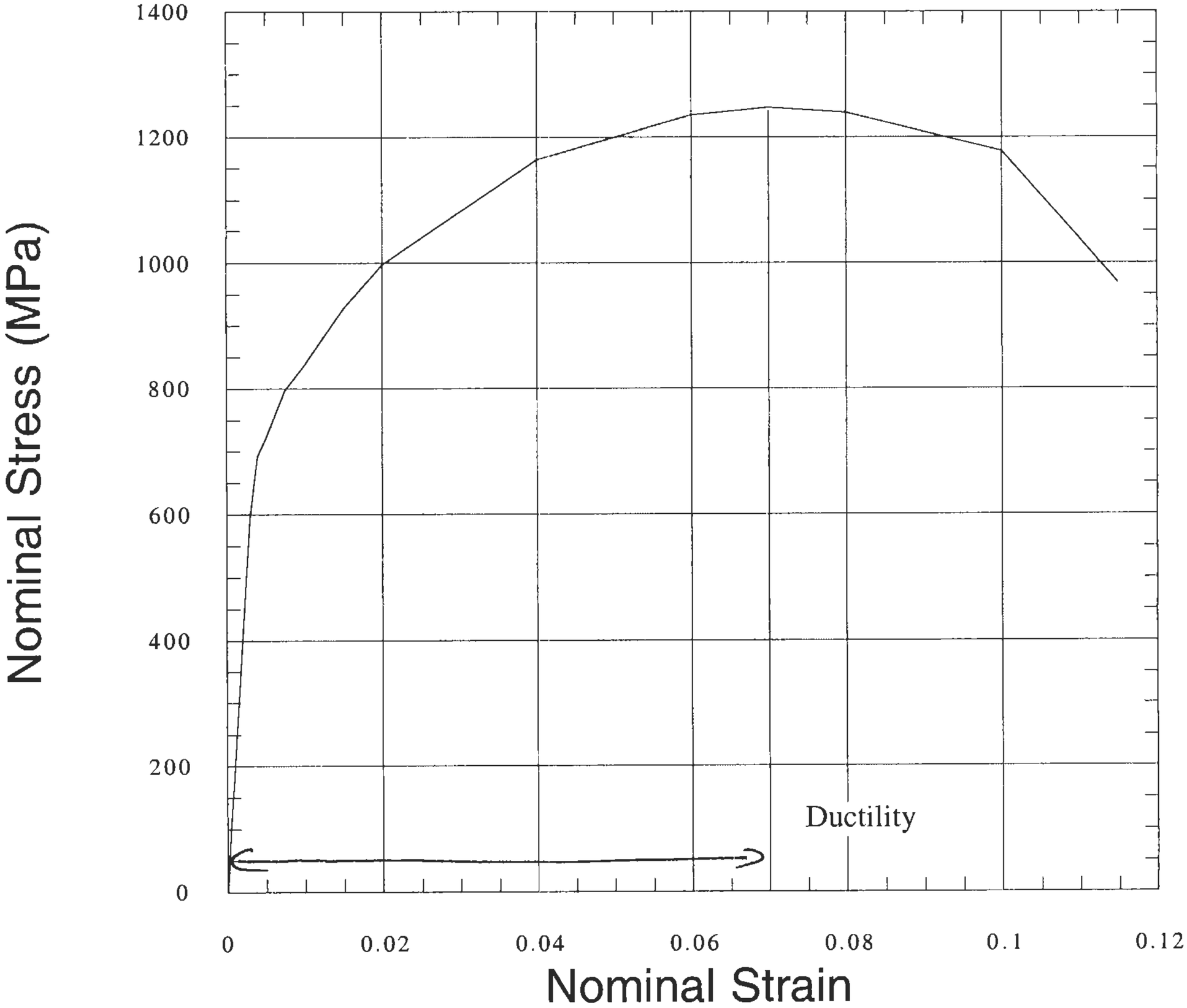
M16 d) Tensile strength = 1250 MPa. ∈

M16 Data



M16 e) Ductility = 0.07 = 7%

M16 Data

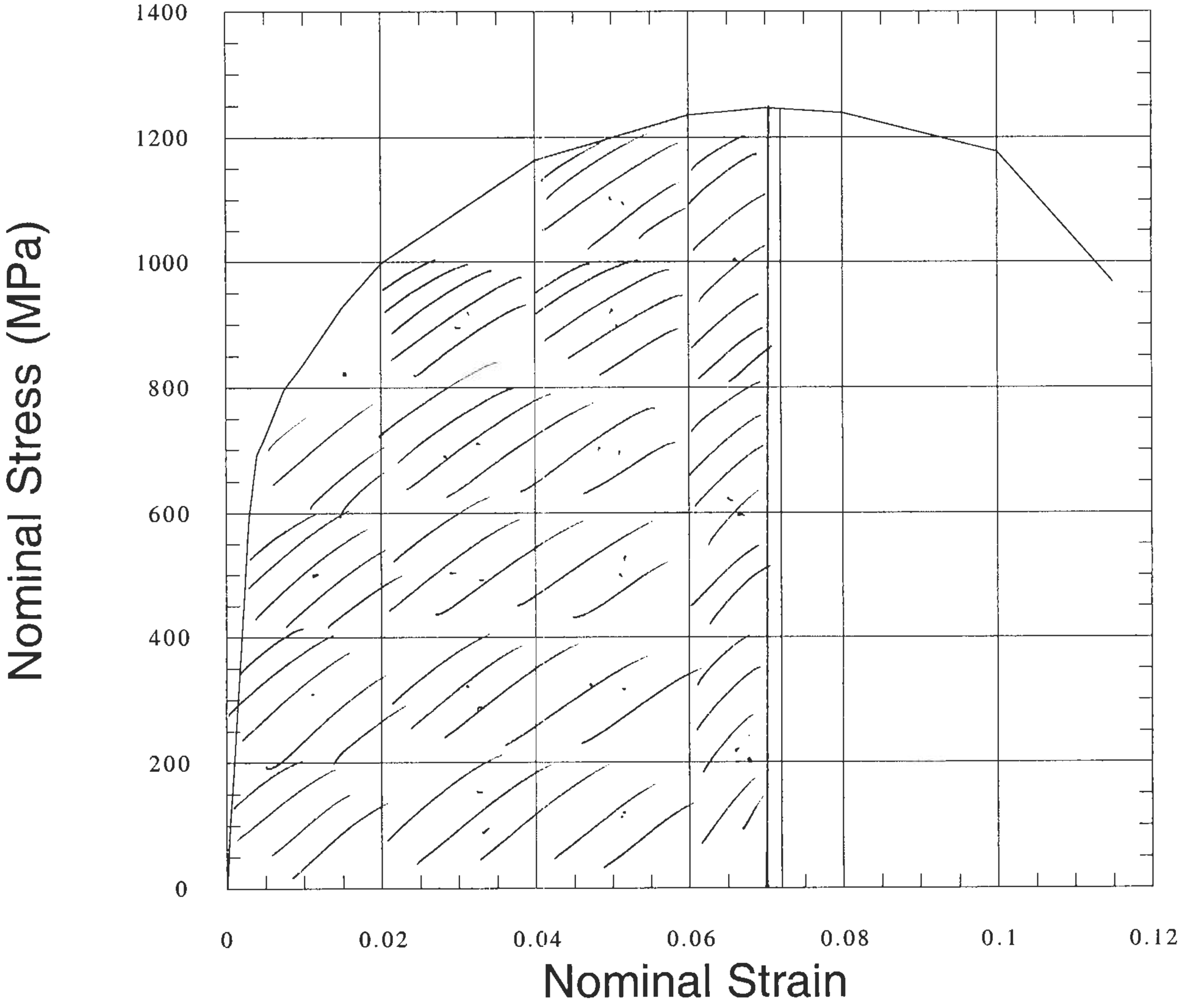


M16 f) $18\frac{1}{2}$ Squares; $0.02 \times 200\,MPa = 4\,MJ/m^3$

$\therefore$ Total energy $= 4\times10^{6} \times 50.8\times10^{-3} \times \pi \times (6.4\times10^{-3})^2$

$= 264\,J.$ ∈

M16 Data



Approx $18\frac{1}{2}$ 0.02×200 MPa squares