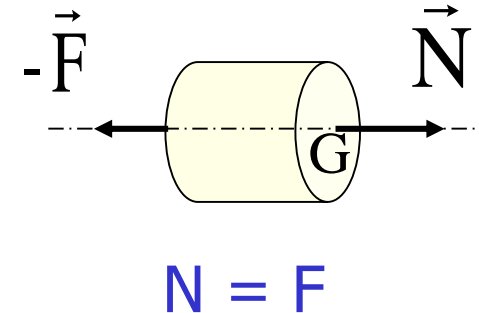
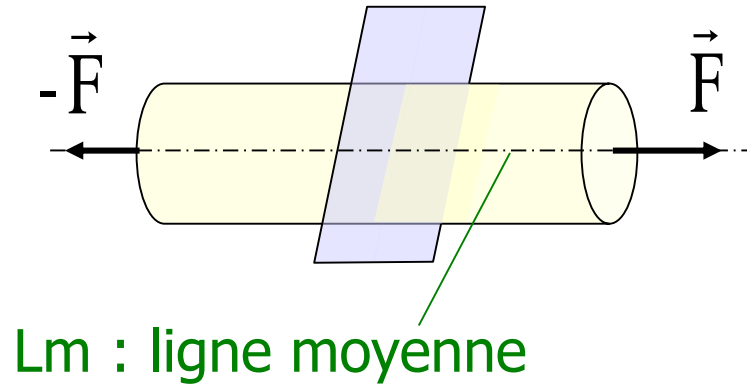


S72-9 - Traction

Définition :



Contrainte normale :

$$\sigma = \lim_{\Delta S_i \rightarrow 0} \left(\frac{\Delta f_i}{\Delta S_i} \right)$$

$$\sigma = \frac{N}{S}$$

$$\sigma_{\max} = \frac{N}{S} \leq R_{pe} = \frac{R_e}{s}$$

S72-9 - Traction

Déformation :

Allongement relatif (sans unité) : $\varepsilon = \frac{\Delta L}{L_0} = \frac{\Delta X}{X_0}$

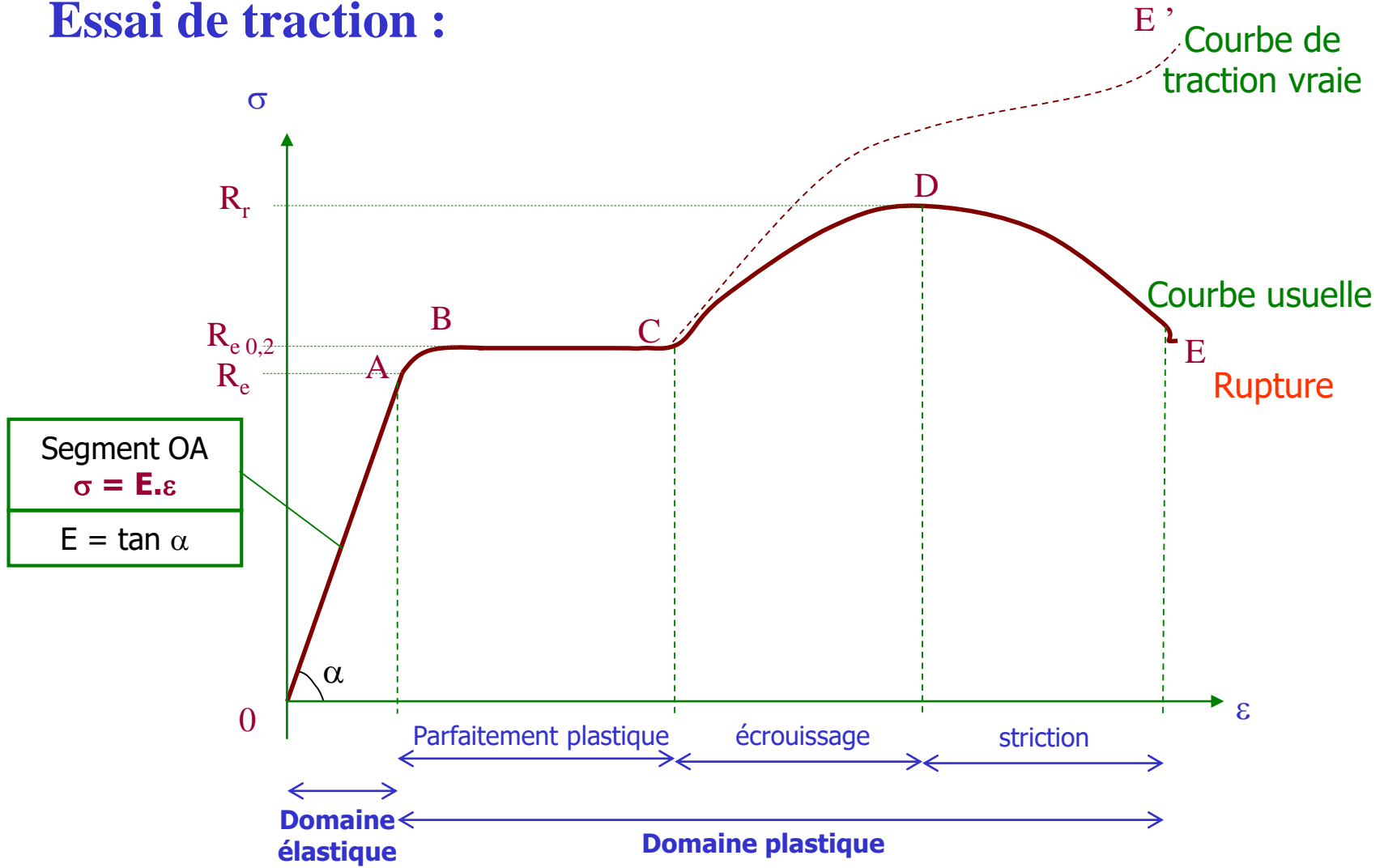
Coefficient de Poisson : $\nu = -\frac{\varepsilon_d}{\varepsilon_L} = -\frac{\text{déformation latérale}}{\text{déformation axiale}}$

Loi de Hooke : $\sigma = E \times \varepsilon$

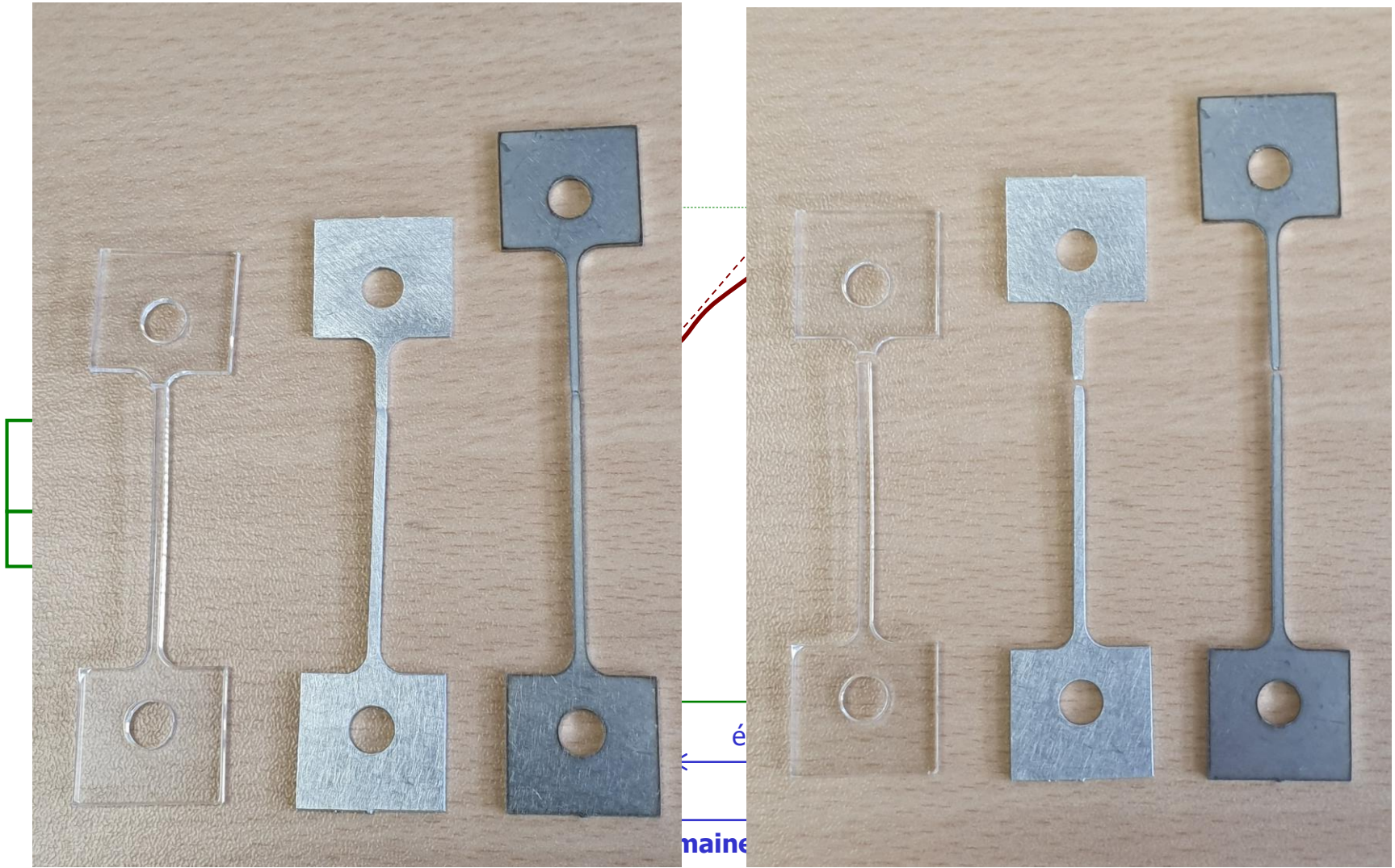
ordres de grandeur: pour un acier $E = 210\ 000\ \text{Mpa}$
pour un aluminium $E = 70\ 000\ \text{MPa}$

S72-9 - Traction

Essai de traction :

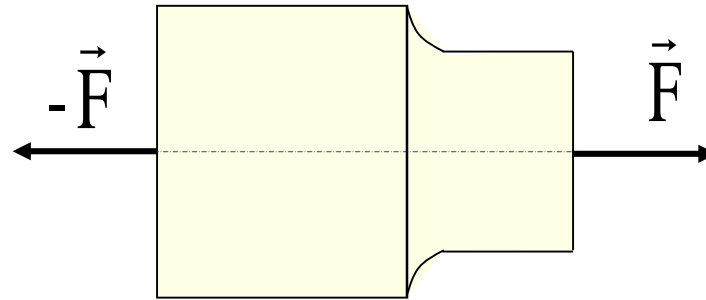


S72-9 - Traction

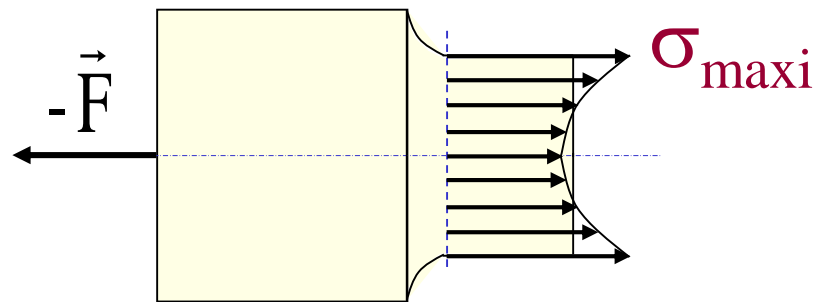


Concentration de contrainte :

Chargement :



Contrainte :

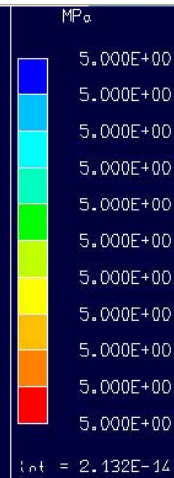
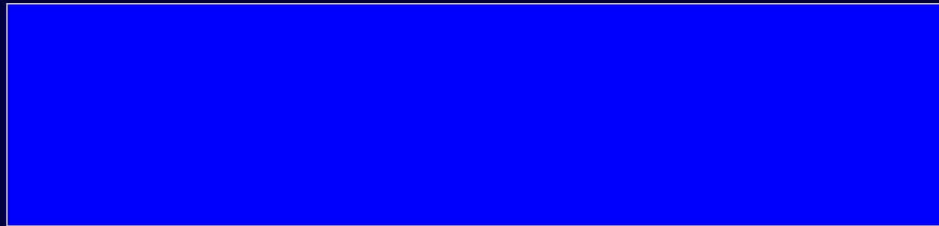


$$\sigma_{\text{maxi}} = K_T \sigma_0 \quad \text{avec} \quad \sigma_0 = F/S$$

S72-9 - Traction

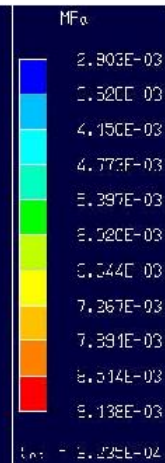
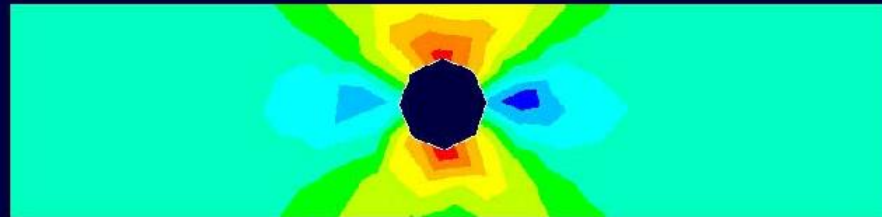
Essai de traction

*Poutre encastrée à gauche,
charge répartie à droite de 100N/mm.*

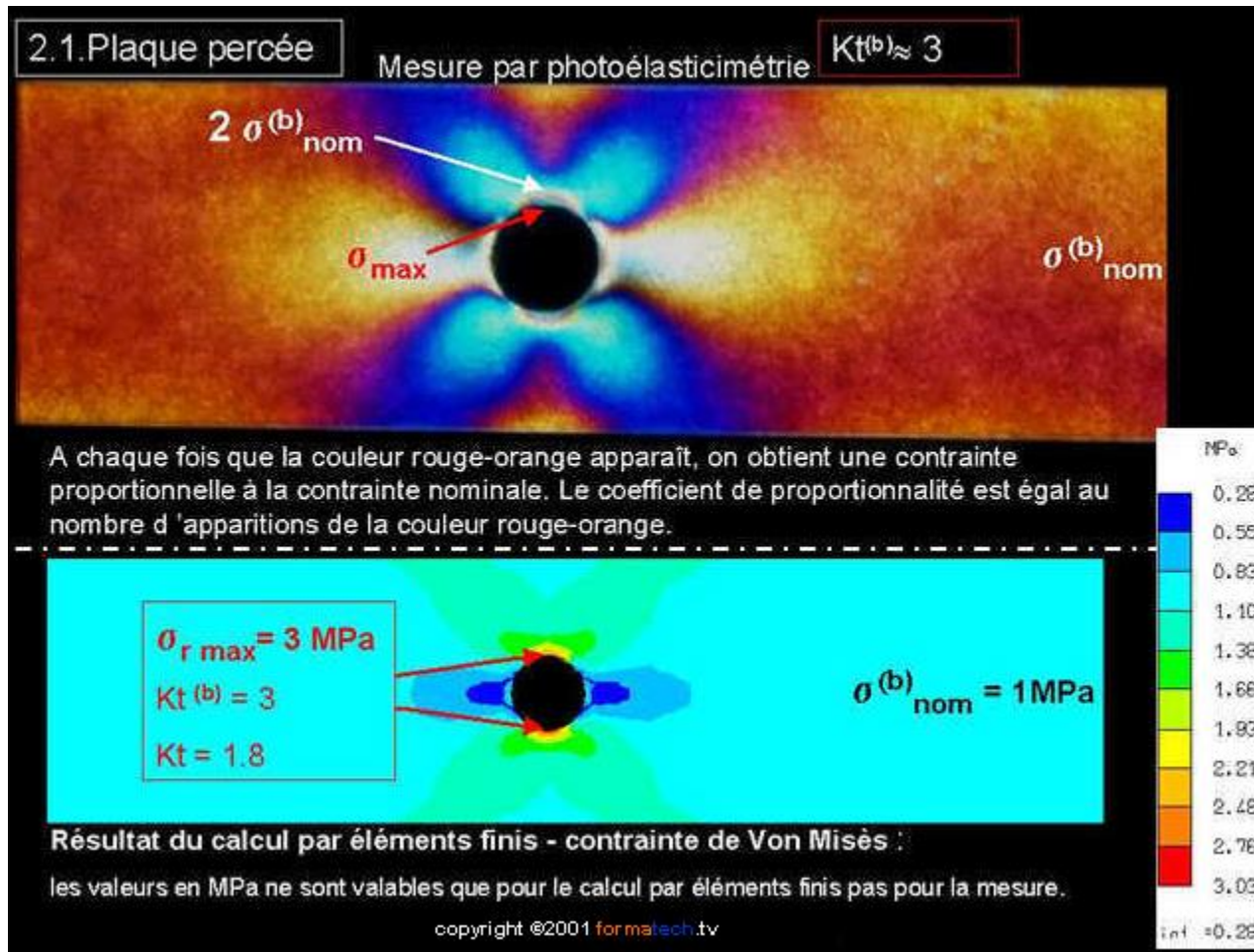


Essai de traction

Poutre percée



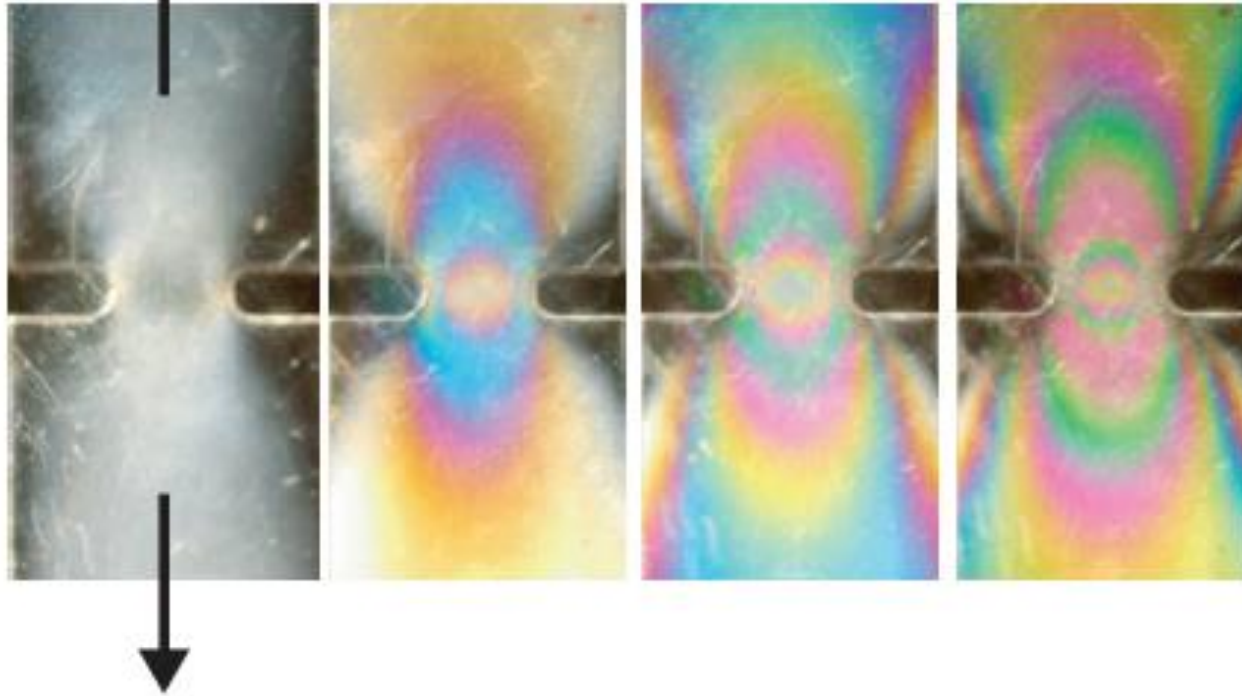
S72-9 - Traction



S72-9 - Traction

De gauche à droite :

effort de traction croissant



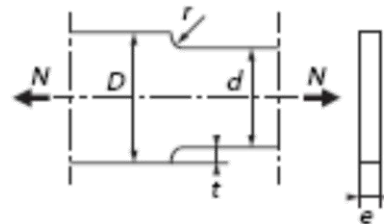
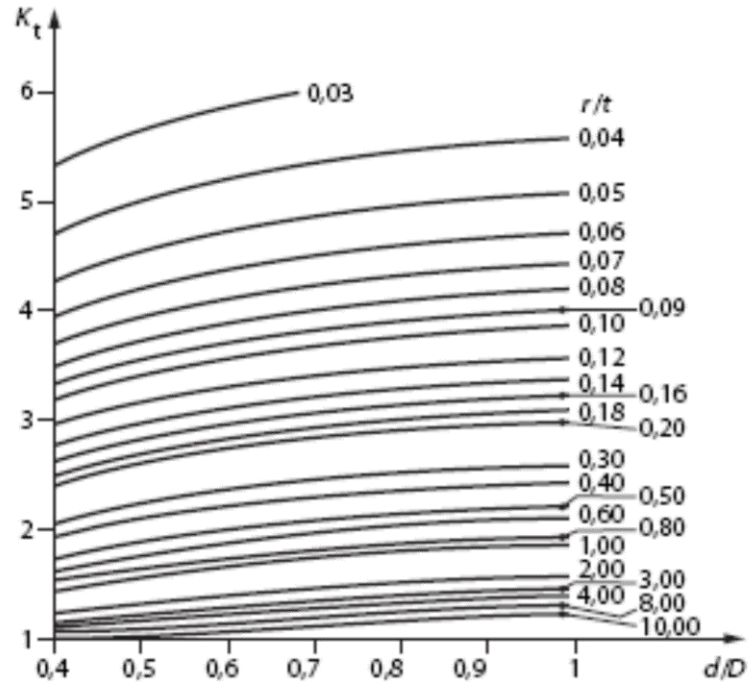
Barreau entaillé soumis à une contrainte de traction croissante

S72-9 - Traction

Coefficient de concentration de contrainte

$$\sigma_{\max i} = K_t \cdot \sigma_0$$

$$\text{avec } \sigma_0 = \frac{F}{S} = \frac{N}{S}$$



$$\sigma_{\text{nom}} = \frac{N}{ed}$$

S72-9 - Traction

Coefficient de concentration de contrainte

Calcul de Kt

| | | |
|----------------|------|-----------------|
| F | 60 | N |
| S | 60 | mm ² |
| C | 9 | mm |
| r | 1,5 | mm |
| σ_{nom} | 1,00 | MPa |
| Kt | 2,22 | |
| σ_{max} | 2,22 | MPa |

Coefficient de concentration de contraintes Kt :

$$K_t = \frac{\sigma_{r \max}}{\sigma_{nom}} = 1 + \alpha \left(\frac{c}{r} \right)^{0.5}$$

F : force (N)

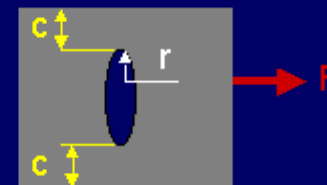
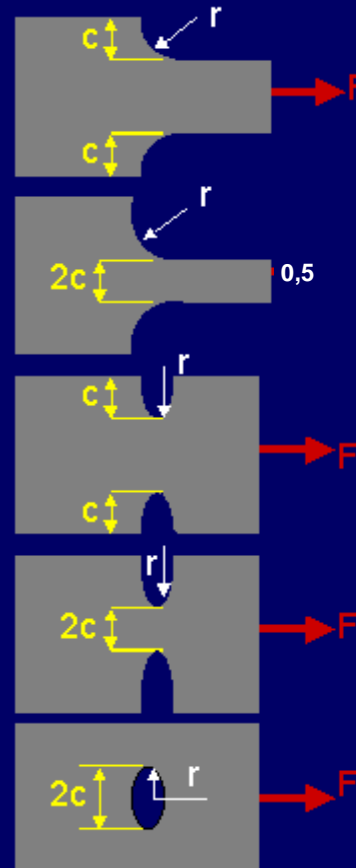
S_{min} : section minimum (mm²)

$\sigma_{nom} = F / S_{min}$ (MPa)

r : rayon de courbure (mm)

c : dimension caractéristique (mm)

$\alpha = 2$ en traction



S72-9 - Traction

Concentration de contrainte : Abaques

