

|                                     | Newtoniarrak   | Potentzia legea  | Bingham plastikoak   | Herschel-Bulkley jariakinak   |
|-------------------------------------|--|--|--|---|
| Reynolds zenbakia                   | $Re = \frac{\rho \bar{u} D}{\mu}$  | $Re_G = \frac{D^n u^{2-n} \rho}{K 8^{n-1}} \left( \frac{4n}{3n+1} \right)^n$   | $Re_B = \frac{u D \rho}{\mu}$  | $Re_G = \frac{D^n u^{2-n} \rho}{K 8^{n-1}} \left( \frac{4n}{3n+1} \right)^n$  |
| Emari laminarra edo zurrunbilotsua? | Re < 2100; Laminar<br>2100 < Re < 4000;<br>Trantsizioa<br>4000 < Re < 10000; Ia<br>zurrunbilotsua.<br>Re > 10000; Zurrunbilotsua | $Re_{G(kritikoa)} = \frac{6464n}{(1+3n)^2 \left( \frac{1}{2+n} \right)^{(2+n)/(1+n)}}$   | $Re_{B(kritikoa)} = \frac{He}{8m_c} \left( 1 - \frac{4m_c}{3} + \frac{m_c^4}{r} \right)$ | $He = \frac{D^2 \rho}{K} \left( \frac{\sigma_0}{K} \right)^{\left( \frac{2}{n} - 1 \right)}$  |
| Abiadura profilak                   | $u(r) = \frac{\Delta P R^2}{4\mu L} \left[ 1 - \left( \frac{r}{R} \right)^2 \right]$   | $u(r) = \left( \frac{\Delta P}{2LK} \right)^{1/n} \left( \frac{n}{n+1} \right) \left( R^{\frac{n+1}{n}} - r^{\frac{n+1}{n}} \right)$ | $u = \frac{1}{\mu} \left[ \frac{\Delta P}{4L} (R^2 - r^2) - \sigma_0 (R - r) \right]$    | $u = \frac{2L}{\Delta P (b+1) K^b} \left[ (\sigma_w - \sigma_0)^{b+1} - r \Delta P 2L - \sigma_0 b + 1 \right]$   |
| Emari bolumentrikoa                 | $Q = \frac{\pi R^4 \Delta P}{8\mu L}$  | $Q = \pi \left( \frac{n}{3n+1} \right) \left( \frac{\Delta P}{2LK} \right)^{1/n} R^{\frac{3n+1}{n}}$                                 | $Q = \frac{\pi R^3 \sigma_w}{4\mu} \left( 1 - \frac{4}{3}m + \frac{1}{3}m^4 \right)$     | $Q = \pi R^3 \frac{(\sigma_w - \sigma_0)^{m+1}}{\sigma_w^3 K^m} \left[ \frac{(\sigma_w - \sigma_0)^2}{m+3} + 2\sigma_0(\sigma_w - \sigma_0) 2m + 2 + \sigma_0 2m + 1 \right]$ |
| Batazbesteko abiadura               | $\bar{u} = \frac{\Delta P R^2}{8\mu L}$  | $\bar{u} = \left( \frac{n}{3n+1} \right) \left( \frac{\Delta P}{2LK} \right)^{1/n} R^{\frac{n+1}{n}}$                                | $\bar{u} = \frac{Q}{A} = \frac{4Q}{\pi D^2}$   | $\bar{u} = \frac{\dot{V}}{A} = \frac{4\dot{Q}}{\pi D^2}$  |
| f (laminarra)                       | $f = \frac{16}{Re}$  | $f = \frac{16}{Re_G}$  | $\frac{1}{Re_B} = \frac{f}{16} - \frac{He}{6(Re_B)^2} + \frac{(He)^4}{3f(Re_B)^8}$       | $f = \frac{16}{\psi Re_G}$  |
| f (zurrunbilotsua)                  | Moody-ren diagrama   | Dodge eta Metzner-en diagrama  | Hedstrom-en diagrama   | Herschel-Bulkley (n=0,2) eta (n=0,5)  |