



TESTING OF GREY CAST IRON



Student:

Year:

Date:

Teacher:

Program:

- Grey cast iron
- Test methods for grey cast iron (tensile test, flexure test and compression test)
- Young's modulus of grey cast iron

Tested material:

According to EN 1561: **EN-GJL-200**, where: **G** → casting, **J** → cast iron, **L** → shape of graphite (a three-dimensional flake), **200** → tensile strength $R_m = 200 \text{ MPa}$ ($200 \text{ N}\cdot\text{mm}^{-2}$)

1) TENSILE TEST (ČSN 42 0330)

Task: Proceed tensile test of grey cast iron. Use round testing specimen and determine the tensile strength of material.

Determination of measured quantity:

Measured and calculated values: (d_0 , F_m and R_m)

2) COMPRESSION TEST

Compression test is not standardised. Practically this test is performed only then, if the material will be stress in compression.

Task: Perform and evaluate compression test. Determine the compression strength R_{mt} of cast iron.

Testing apparatus:

Determination of measured quantity:

Measured and calculated values (d_0 , F_{mt} , R_{mt}):

3) FLEXURE TEST (ČSN 42 0361)

Determine the flexure test of cast iron on round testing specimen.

Tasks:

- (a) Determine the flexure strength R_{m0}
- (b) Determine two values of modulus of elasticity E_1 and E_2 [MPa] from flexure test

Flexure test:

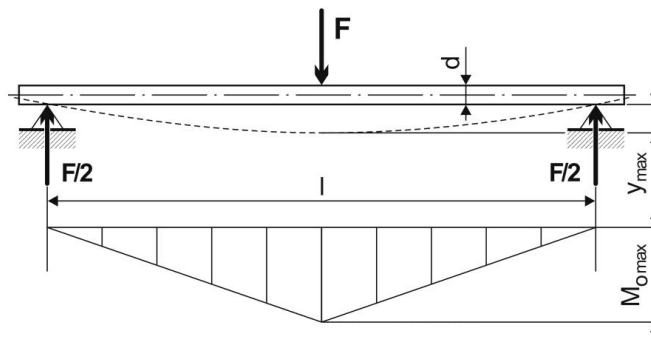


Fig. 1: Ordering of flexure test of cast iron

Determination of measured quantity:

Measured and calculated values: (M_{0max} , W_0 and R_{m0})

Determination of two values of modulus of elasticity E_1 and E_2 :

$$y = \frac{F \cdot l^3}{48 \cdot E \cdot I} \text{ [mm]} \rightarrow E \text{ [MPa]}$$

$$E = \frac{\Delta F}{\Delta y} \cdot \frac{l^3}{48 \cdot I} \text{ [MPa]}$$

$$I = \frac{\pi d^4}{64} \text{ [mm}^4\text{]}$$

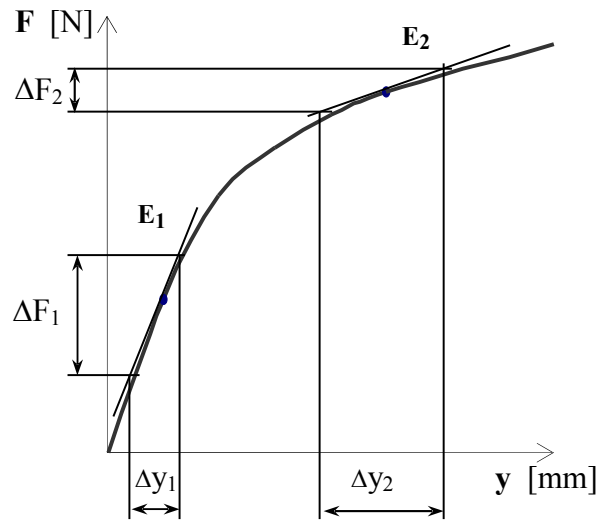


Fig. 2: Working diagram of flexure test of cast iron

Measured and calculated values: (E, I)

TABLE 1: Measured data

F [kN]	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
y [mm]																			

Conclusion: