REPORT:

AISI 304 TENSILE TEST

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1. Documentation of selected test conditions

The reference documentation is ISO 6892-1:2009 A2:

- Where "A" defines the adoption of method A, test based on strain rate control;
- Where "2" defines the deformation rate used.

2. Identification of the test piece

Group: Conserva, Olivieri, Pagliara, Patanè and Rutigliani

3. Equipment

The sample material of interest is AISI 304.

4. Type of test piece

Sample according to ISO 6892:

Type of product: Sheets - Plates – Flats (Table 2)

Thickness: 3mm

See Annexes B-D

Dimensions of test piece: Table B.1

Tolerances on shape and machining tolerances: Table B.2

5. Test control method

The strain rate control method is used rather than the load control method to avoid any problems in the plastic field due to the decrease of the resistant section of the specimen.

To control the deformation we will use a fictitious deformation rate:

$$V_c = L_c * \dot{e}_{Lc}$$

$\dot{e}_{Lc}$ is the estimated strain rate over the parallel length;

L_c is the parallel length;

V_c constant crasshead separation rate;

range 2: $\dot{e}_{Lc}$ = 0,000 25 s-1• with a relative tolerance of ±20%

6. Results

Resistance to extension in plastic field ($R_{p0,2}$): stress at which the plastic deformation is equal to 0,2%.

Determination of the test resistance at *13.1 ISO* 6892-1:2009

$$R_{p0,2} = 584 \text{ Mpa (ER 1)}$$
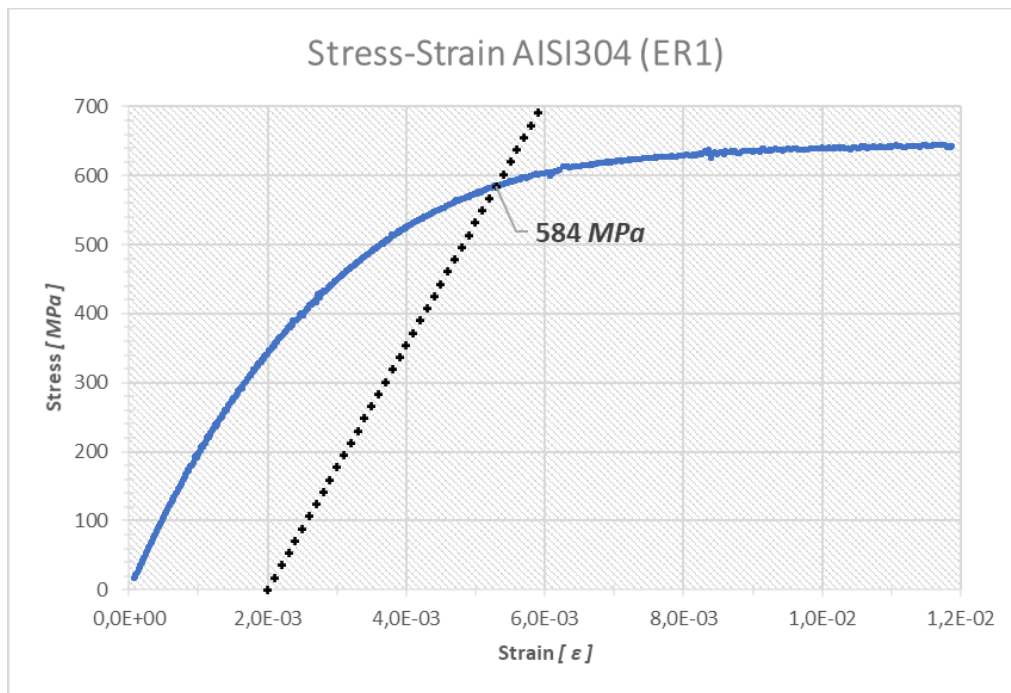
$$R_{p0,2} = 575 \text{ Mpa (ER 2)}$$

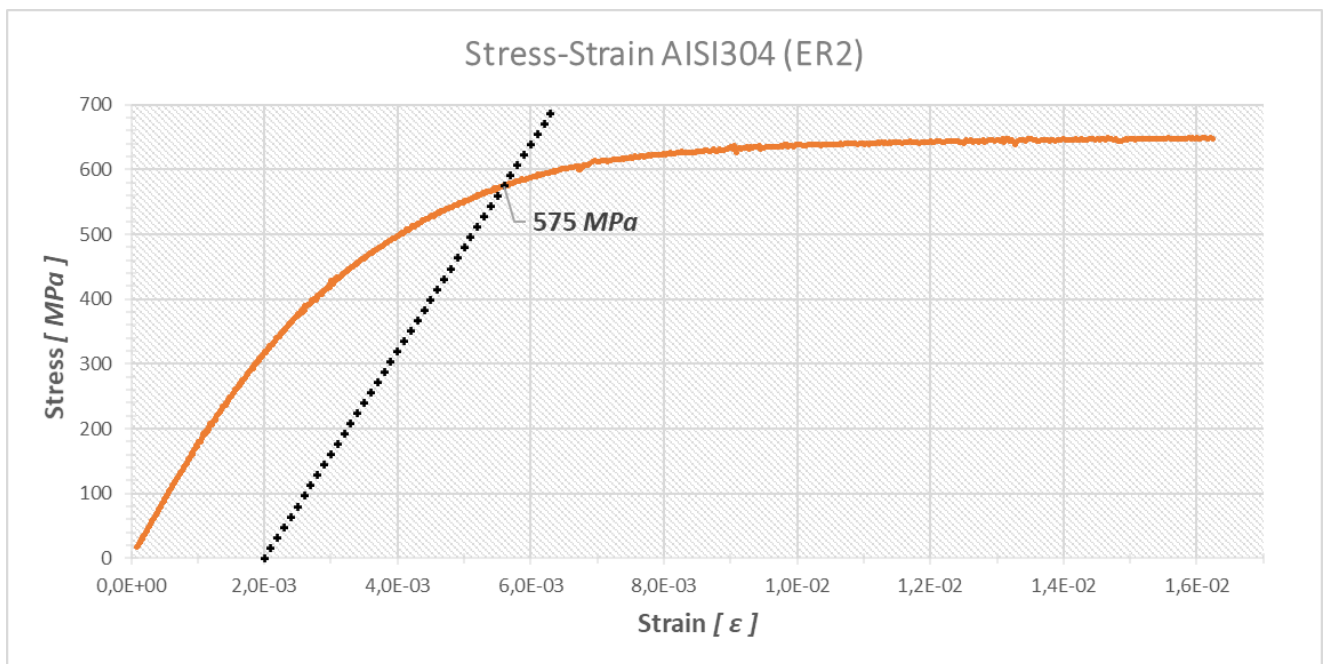*Figura 1 - Stress-Strain curve AISI304 from ER 1*

Figura 2 - Stress-Strain curve AISI304 from ER 2

Measurement of curve slope in the stretch: the use of the following guidelines, such as A.4.7 of ISO 6892:

- Linear regression in the linear section;
- Lower limit: -10% of $R_{p0,2}$;
- Upper limit: -50 % of $R_{p0,2}$;

$$E = 177GPa \text{ (ER 1)}$$

$$E = 160GPa \text{ (ER 2)}$$

Figura 3 - Slope of the elastic range of the stress-strain curve

Stress-Strain AISI 304 ER 1 vs. ER 2

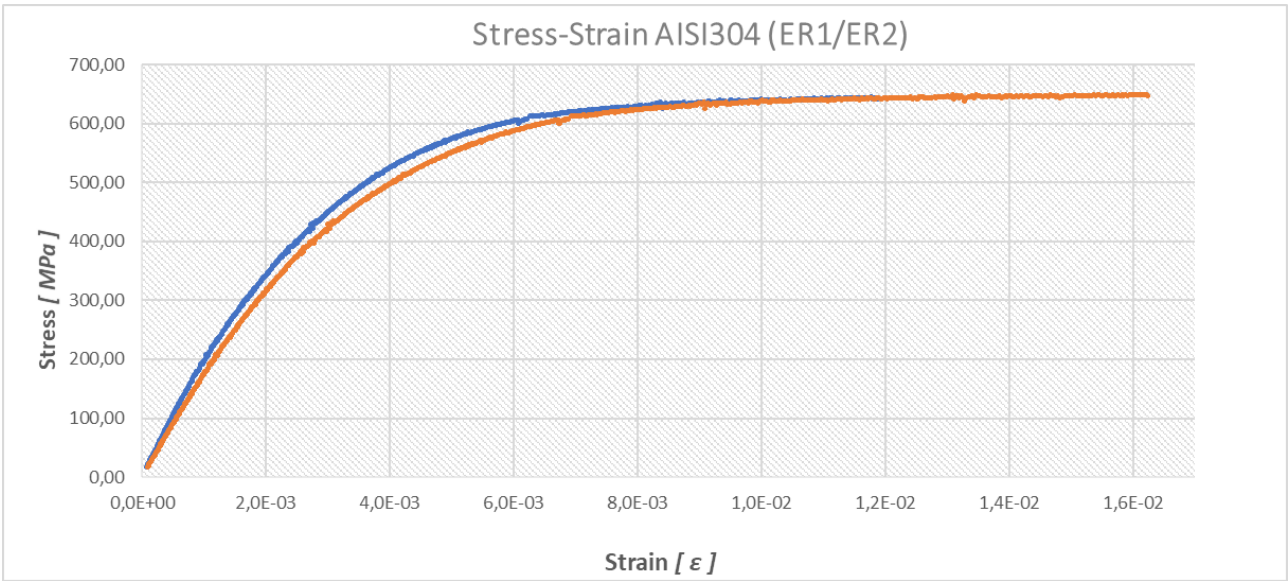Below, in a single graph, the curves obtained with the two strain gauges:

Figura 4 - Stress-Strain AISI 304 ER 1 vs. ER 2