RFCS-Project: „JoinTec“

High-Frequency-Inductive (HFI) longitudinally welded Linepipe, X60

1. Ø508.0 × 8.8 mm
2. Ø114.3 × 5.0 mm

Ø508.0 × 8.8 mm

- Specifications according to API 5L (PSL 2):
  - geometrical properties:
    - tolerance of wall thickness *t*
      - +1.716 mm, -0.704 mm
    - ovality *ov* (tolerance of diameter d_a)
      - pipe body +3.81 mm, -1.27 mm
      - pipe ends +2.4 mm, -0.8 mm
  - mechanical-technological properties:
    - yield strength $R_{t0.5}$
      - minimum: 414 MPa
      - maximum: 565 MPa
    - tensile strength R_m
      - minimum: 517 MPa
      - maximum: 758 MPa
    - Charpy-impact energy at 0 °C
      - minimum: 27 J (average value for set of three full-size specimens)
- Actual values:
  - grade X60 (L415MB, 1.8973)
  - mechanical-technological properties:
    - **base material**, transverse
      - **yield strength $R_{t0.5}$**
        - test temperature: +20 °C
        - average value: 481 MPa
        - minimum: 451 MPa
        - maximum: 528 MPa
        - standard deviation: 19.38
        - amount of values: 68
      - **tensile strength R_m**
        - test temperature: +20 °C
        - average value: 606 MPa
        - minimum: 576 MPa
        - maximum: 643 MPa
        - standard deviation: 16.36
        - amount of values: 68
      - **elongation A_5**
        - test temperature: +20 °C
        - average value: 27.0 %
        - minimum: 23.0 %
        - maximum: 32.5 %
        - standard deviation: 1.93
        - amount of values: 68
      - **Charpy-impact energy**
        - test temperature: 0 °C
        - Specimen size: Charpy-V ½
        - average value: 95 J
        - minimum: 72 J

        - maximum: 126 J
        - standard deviation: 8.66
        - amount of values: 135
    - **weld**, transverse
        - **tensile strength R_m**
            - test temperature: +20 °C
            - average value: 584 MPa
            - minimum: 529 MPa
            - maximum: 657 MPa
            - standard deviation: 22.68
            - amount of values: 68
        - **Charpy-impact energy**
            - test temperature: 0 °C
            - Specimen size: Charpy-V ½
            - average value: 104 J
            - minimum: 24 J
            - maximum: 190 J
            - standard deviation: 17.56
            - amount of values: 135
- non-coated pipes
    - pipe length: 18,000 mm
- MD-PE coated pipes
    - with Epoxy-Primer and Mapec®-coating acc. to DIN 30670
    - pipe length: 18,000 mm

Ø114.3 × 5.0 mm

- Specifications according to API 5L (PSL 2):
  - geometrical properties:
    - tolerance of wall thickness *t*
      - +0.75 mm, -0.625 mm
    - ovality *ov* (tolerance of diameter d_a)
      - pipe body +0.857 mm, -0.857 mm
      - pipe ends +1.6 mm, -0.4 mm
  - mechanical-technological properties:
    - yield strength $R_{t0.5}$
      - minimum: 414 MPa
      - maximum: 565 MPa
    - tensile strength R_m
      - minimum: 517 MPa
      - maximum: 758 MPa
    - Charpy-impact energy at 0 °C
      - minimum: 27 J (average value for set of three specimens)
- Actual values:
  - grade X60 (R 60 NB / 6)
  - mechanical-technological properties:
    - **base material**, longitudinal
      - **yield strength $R_{t0.5}$**
        - test temperature: +20 °C
        - single value: 560 MPa
      - **tensile strength R_m**
        - test temperature: +20 °C
        - single value: 661 MPa
      - **elongation A_5**
        - test temperature: +20 °C
        - single value: 24.0 %
      - **Charpy-impact energy**
        - test temperature: 0 °C
        - Specimen size: Charpy-V ½
        - average value: 87 J
  - non-coated pipes
    - pipe length: 12,000 mm