

Data sheet P 650

Revision 3

1. CHEMICAL COMPOSITION

„P650“ is a special nonmagnetic, austenitic Mn-Cr-Mo-N-steel with a high pitting corrosion resistance, specifically developed for oilfield applications.

| C | Mn | Cr | Mo | Ni | N |
|-----------|-------------|-------------|-----------|-----------|-----------|
| max. 0,06 | 19,50-20,50 | 18,00-19,00 | 1,70-2,00 | 3,00-4,50 | 0,55-0,65 |

2. MECHANICAL PROPERTIES

Following mechanical properties (tested at room temperature) are achieved by a special cold-working process over the full length of the collar:

| | | | |
|--|---|------------|------------------------|
| Yield Strength (min.): | OD up to 9 ¹ / ₄ " | 140 ksi | 965 N/mm ² |
| 0,2%-offset method | OD 9 ¹ / ₂ " and larger | 130 ksi | 900 N/mm ² |
| Tensile Strength (min.): | | 150 ksi | 1035 N/mm ² |
| Elongation (min.): | | 20% | 20% |
| Reduction of area (min.): | | 50% | 50% |
| Impact energy (min.): | | 60 ft.lb | 82 J |
| Endurance Strength / N=10 ⁷ (min.): | | 60 ksi | 414 N/mm ² |
| Hardness Brinell: | | 330-430 HB | 330-430 HB |

3. MAGNETIC PROPERTIES

Relative permeability: ≤ 1,005.

4. CORROSION RESISTANCE

- **Transgranular SCC:** Prevented by special surface treatments (Hammer peening, roller burnishing, shot peening).
- **Intergranular SCC:** The occurrence of material sensitization is prevented by quenching after warmforging. Each collar is tested according to ASTM A 262, Pract.A and E, last edition.
- **Pitting Corrosion:** Due to a high chromium-, molybdenum- and nitrogen contents a high resistance to pitting corrosion is given.

5. NON-DESTRUCTIVE TESTING

- **Magnetic inspection:** Drill collars are 100% tested by a proprietary probe-testing process using a Förster Magnetomat 1.782. ("Hot Spot"-test). Magnetic permeability of each collar is certified with the printout of probe-testing.
- **Ultrasonic inspection:** Each collar is ultrasonically inspected over 100% of the volume according to ASTM E 114, last edition as a minimum level.

P650 Non-Magnetic Drill Collars meet all requirements of API Spec. 7.1, last edition.
All tests are carried out according to ASTM-Standards, last editions.
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