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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

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Welded steel tubes for high-pressure hydraulic lines of construction machinery

工程机械高压油管用焊接钢管

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7.1 Steel grades and chemical composition

7.1.1 The steel grade and chemical composition (smelting composition) shall conform to the provisions of Table

1.Additional specifications may be added upon negotiation between the supplier and the buyer, and as specified in the contract. Add the non-primary elements listed in Table 1 or other elements besides those listed.

7.1.2 Upon the buyer's request, and after consultation between the supplier and the buyer, and as specified in the contract, other brands or chemical compositions not listed in Table 1 may be supplied. Steel pipe.

7.1.3 The chemical composition of the steel pipes shall be accepted according to the smelting composition. If the buyer requests a finished product analysis, this should be specified in the contract. The finished steel pipes shall be... The permissible deviation of chemical composition shall comply with the provisions of GB/T 222.

7.1.4 The carbon equivalent (CEV) of the steel pipe shall not exceed 0.45%. The carbon equivalent shall be calculated from the smelting analysis composition according to formula (1), and the calculation result shall be... This should be stated in the quality certificate.

CEV=C Mn/6 (Cr Mo V)/5 (Ni Cu)/15 (1)

7.2 Mechanical Properties

7.2.1 Stretching The room temperature longitudinal tensile mechanical properties of the steel pipes in the delivery condition shall conform to the requirements of Table 2.

7.2.2 Hardness

7.2.2.1 Steel pipes shall undergo Vickers hardness testing, and the hardness values shall conform to the specifications in Table

3.The test location for the hardness specimen shall include the cross section of the specimen. The test locations for the base material, weld, and heat-affected zone are shown in Figure

1.When the wall thickness is less than

4.0 mm, the circumferential centerline of the specimen does not need to be measured. hardness.

7.2.2.2 Other hardness test methods and maximum hardness value requirements may be negotiated and specified according to the requirements of the buyer.

7.3 Destructive Hydraulics As required by the buyer and agreed upon by both parties, and as specified in the contract, the steel pipes may undergo destructive hydraulic testing. During the test, the minimum sample size... The length should be 6 times the nominal outer diameter of the steel pipe. No leakage should occur during the test until the pipe bursts. The pressure at the time of bursting should not be less than the pressure calculated according to the nominal outer diameter. The burst pressure is calculated using equation (2).

7.4 Process Performance

7.4.1 Flattening The steel pipe shall undergo a flattening test. The length of the flattened specimen shall not be less than 100 mm, and the weld seams of two specimens in a set shall be located at the same location as the weld seam. The force is applied at 90° and 0° positions. During the test, the sample is pressed until the distance between the two plates is 2/3 of the nominal outer diameter of grade HP510Y. When the HP590Y is pressed to 3/4 of its nominal outer diameter, the specimen should not show cracks or splits; when the specimen is pressed to 1/3 of its nominal outer diameter, the distance between the two plates should be 1/3 or 1/4 of the nominal outer diameter. When the nominal wall thickness is 5 times (whichever is greater), no cracks or fissures should appear in areas other than the weld; continue flattening until the specimen breaks. Or, the opposite pipe walls should be in contact with each other, and during the entire flattening process, there should be no delamination or incomplete welds.

7.4.2 Bending As requested by the buyer, and after consultation between the supplier and the buyer, and as specified in the contract, the steel pipes may undergo a bending test. The bending test should not involve any filler material. The bending radius is

2.5 times the nominal outer diameter of the steel pipe, and the bending angle is 90°. The welds of a set of two samples should be located on the inner side of the bending direction, respectively. Sides and outer sides. After the test, the steel pipe should not show cracks or splits.

7.4.3 Flaring As required by the buyer, and after consultation between the supplier and the buyer, it is stipulated in the contract that the steel pipes can undergo a flaring test, the test requirements of which shall be negotiated by both parties. Sure.

7.5 Non-metallic inclusions Steel pipes shall be inspected for non-metallic inclusions. The non-metallic inclusions in steel pipes shall be graded according to Method A in GB/T 10561-2023, where A, The fine and coarse levels of inclusions B, C, and D should each be no greater than level 2.0.

7.6 Grain size The actual grain size of the steel pipe should be grade 8 or finer.

7.7 Band-like tissue As required by the buyer, and after consultation between the supplier and the buyer, it is specified in the contract that the steel pipes can undergo banded structure testing, and their qualification level should not exceed [a certain value]. Level 3.

7.8 Decarburization layer As required by the buyer, and after consultation between the supplier and the buyer, it is specified in the contract that the steel pipe can undergo decarburization layer depth testing, and the total decarburization layer depth on the outer surface is [specified]. The thickness should not exceed

0.20 mm, and the total decarburization layer depth on the inner surface should not exceed

0.10 mm.

7.9 Non-destructive testing Each steel pipe should undergo eddy current testing and ultrasonic testing along its entire length. The acceptance level for eddy current testing should conform to E1H in GB/T 7735. The ultrasonic testing acceptance level shall comply with the requirements of U2 in GB/T 5777.

7.10 Surface Quality

7.10.1 The inner and outer surfaces of the steel pipe shall be smooth and free from defects such as cracks, scabs, folds, delamination, and lap welds. The outer surface shall be free of defects per square centimeter. The number of local dents should not exceed two; the depth of dents, scratches, and minor scratches should not exceed

0.05 mm, and should not affect the deviation of the steel pipe wall thickness. The minimum allowable wall thickness; the length of scratches and minor grooves should not exceed 10

mm.

7.10.2 Defects on the inner and outer surfaces of the steel pipe can be removed using appropriate methods. After cleaning, the actual wall thickness of the steel pipe should not be less than the wall thickness deviation. The minimum allowed value.

7.10.3 The surface roughness (Ra) of the steel pipe shall not exceed 3.2 μm. This shall be determined according to the buyer's requirements, after consultation between the supplier and the buyer, and specified in the contract. Other roughness requirements can be specified.

7.10.4 For cold-worked steel pipes, the inner and outer surfaces are permitted to have a layer of lubricating oil adhering to the surface from the manufacturing process, but there should be no solid layer present. Lubricating layer.

7.10.5 The inner and outer surfaces of heat-treated steel pipes shall not have an oxide film layer that would affect surface inspection.

7.11.1 Outer Diameter and Wall Thickness

7.11.1.1 Unless otherwise specified in the contract, steel pipes shall be delivered according to their nominal outer diameter (D) and nominal wall thickness (S). Upon the buyer's request and with the consent of both the supplier and the buyer... By negotiation, steel pipes may be delivered according to nominal outer diameter and nominal inner diameter (d) or other dimensional specifications.

7.11.1.2 The nominal outer diameter and nominal wall thickness of the steel pipe shall conform to the provisions of GB/T 17395.Based on the buyer's requirements and after consultation between the supplier and the buyer, We can supply steel pipes of sizes other than those specified in GB/T 17395.

7.11.1.3 The permissible deviations of the outer diameter and wall thickness of the steel pipe shall conform to the provisions of Table

4.Based on the requirements of the purchaser, and after consultation between the supplier and the purchaser, and as specified in the contract... It is noted that steel pipes with allowable deviations other than those specified in Table 4 can be supplied.

7.11.2 Length

7.11.2.1 Typical Length The standard length of steel pipes is 3000mm to 12000mm. The standard length can be delivered after negotiation between the supplier and the buyer, and specified in the contract. Steel pipes of other dimensions.

7.11.2.2 Standard and multiple lengths As required by the buyer, and after consultation between the supplier and the buyer, and as specified in the contract, steel pipes can be delivered in fixed lengths or multiples thereof. The fixed length of the steel pipes and... The