

CLAIMS

1. Steel for seamless pipe having the following chemical composition consisting of in weight percent:

- 5 C: from 0.27 to 0.30 wt%,
Si: from 0.20 to 0.35 wt%,
Mn: from 0.80 to 0.90 wt%,
Cr: from 1.30 to 1.45 wt%,
Mo: from 0.65 to 0.75 wt%,
10 Ni: from 0.15 to 0.25 wt%,
Cu: max 0.25 wt%,
Al: from 0.015 to 0.035 wt%,
Ti: from 0,024 to 0.038 wt%,
N: max 0.012 wt%,
15 V: max 0.05 wt%
B: from 0.001 to 0.0025 wt%,
Nb: from 0.02 to 0.03 wt%,

wherein the balance of said steel being iron and unavoidable impurities from the industrial processing, and having a yield strength (Ys) of at least 862 MPa and an ultimate tensile strength (UTS),
20 wherein a ratio between the yield strength (Ys) and the ultimate tensile strength (UTs) is lower than 0.93.

2. Steel according to Claim 1, wherein the chemical composition consisting of in weight percent:

- 25 C: from 0.27 to 0.30 wt%,
Si: from 0.22 to 0.30 wt%,
Mn: from 0.80 to 0.85 wt%,
Cr: from 1.30 to 1.40 wt%,
30 Mo: from 0.65 to 0.70 wt%,
Ni: from 0.15 to 0.20 wt%,
Cu: from 0.10 to 0.20 wt%,
Al: from 0.017 to 0.030 wt%,
Ti: from 0,028 to 0.038 wt%,

N: from 0.001 to 0.010 wt%,
 V: from 0.001 to 0.020 wt%,
 B: from 0.0010 and 0.0018%,
 Nb: from 0.020 to 0.025 wt%,

5 wherein the balance of said steel being iron and unavoidable impurities from the industrial processing.

3. Steel according to Claim 1 or 2, wherein the ratio between the yield strength (Ys) and the ultimate yield strength (UTs) is lower
 10 than 0.9, preferably lower than 0.88.

4. Steel according to any one of claims 1 to 3, wherein the yield strength (Ys) is of at least 900 MPa, preferably of at least 930 MPa.

5. Steel according to any one of claims 1 to 3, wherein the
 15 ultimate tensile strength (UTs) is at least 950 MPa, preferably at least 1035 MPa.

6. Steel according to any of the preceding claims, wherein the steel has a toughness value according to ASTM E23 – Type A on a full size sample (10x10 mm) in the transverse direction at -40°C is at least:

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Yield strength (kSi)	Charpy test energy (J)
125-135 (included)	100
135 (excluded)-155	80

7. Steel according to any of the preceding claims, wherein the steel has a toughness value according to ASTM E23 – Type A on a full size sample (10x10 mm) in the transverse direction at -60°C is at least:

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Yield strength (kSi)	Charpy test energy (J)
125-135 (included)	80
135 (excluded)-155	64

8. Steel according to any of the preceding claims, wherein the composition satisfies the relation below between the nickel, chromium and manganese contents:

$$\Sigma (\text{Ni}, \text{Cr}, \text{Mn}) \geq 2.2$$

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9. Steel according to any of the preceding claims, wherein the composition satisfies the relation below between the nickel, chromium and manganese and silicium contents:

$$\Sigma (\text{Ni}, \text{Cr}, \text{Mn}, \text{Si}) \geq 2.4$$

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10. Steel according to any of the preceding claims, wherein its microstructure comprises at least 95% of martensite related to the entire microstructure, preferably 99% of martensite.

11. Method of production of steel seamless pipe comprising at least the following successive steps:

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(i) providing a steel having the chemical composition as defined according to any one of Claims 1 to 10,

(ii) hot forming the steel at a temperature ranging from 1100°C to 1300°C through a hot forming process to obtain a pipe, then

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(iii) heating up said pipe to an austenitizing temperature (AT) above or equal to 890°C and keeping said pipe at the austenitizing temperature (AT) during a time comprised between 5 and 30 minutes, followed by

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- cooling the pipe to a temperature of at most 100°C in order to obtain a quenched pipe, and

- heating up and holding said quenched pipe at a tempering temperature (TT) ranging from 580°C to 720°C and keeping said pipe at the tempering temperature (TT) during a tempering time, and then cooling said pipe to a temperature of at most 20°C, in order to obtain a quenched and tempered pipe,

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(iv) measuring the yield strength to ultimate tensile strength ratio and controlling that said ratio is lower than 0.93.

12. Seamless pipe made of steel according to any of the Claims 1 to 10.

13. Seamless pipe according to Claim 12, wherein the steel seamless pipe having a wall thickness which ranges from 38 to 78
5 millimeters.

14. Oil and gas accessory and/or mechanical component comprising at least a seamless pipe according to Claim 12 or 13.

15. Use of steel according to any one of Claims 1 to 10 in the manufacturing of an oil and gas accessory and/or a mechanical
10 component.