

Cold drawn seamless tubes for heat exchangers and boilers



Tenaris produces cold drawn seamless tubes for heat exchangers and boilers. The tubes are manufactured in various steel grades: carbon, high or low alloyed, conforming to the relevant standards.



Quality System Certified
n. 110950

Cold drawn seamless tubes for heat exchangers and boilers

Product description and field of application

This catalogue defines the feasibility of the following products:

Part A

Straight cold drawn seamless tubes for:

- Heat exchangers.
- Air Coolers *
- Boilers.
- High and low temperature applications.

* Tubes suitable to be finned.

Part B

" U " bent cold drawn seamless tubes for:

- Heat exchangers
used in chemical, petrochemical and energy plants.

Order definition

Particulars

- Type of product
- execution standard
- steel grade
- heat treatment
- dimensions (O.D. x W.T.)
- length
- quantity
- type of surface protection
- packaging

Options

- a) special heat treatments
- b) different tolerances to those specified by the standards
- c) shorter or longer lengths than those indicated
- d) hydrostatic tests
- e) additional test and checks
- f) different forms of protection
- g) different certification
- h) additional marking or punched marking
- i) other types of packaging
- j) "U" bent tubes according to standards other than ASTM A 556
- k) heat treatment in the bent area
- l) different tolerances in the bent area from those required by ASTM A 556

Part A

Cold drawn seamless tubes for heat exchangers and boilers

1. Reference standard and steel grades

Straight tubes for heat exchangers and boilers are supplied in accordance with the product standards and steel grades detailed in table 1.

2. Delivery condition

Heat treated according to the respective standards.

Option a

The possibility to agree on special heat treatments is given.

3. Dimensions

Standard dimensions are given in the table on pages 4 - 5.

4. Dimensional tolerances

Dimensional tolerances for diameter, wall thickness and length according to the standards outlined in table 1 are followed.

Option b

Diameter, wall thickness and length tolerances other than those described in table 1 can be agreed upon.

5. Length

Tubes can be supplied in lengths of the following intervals indicated in the table below:

| LENGTH | | |
|------------------|-------------|-------------|
| OUTSIDE DIAMETER | MIN. LENGTH | MAX. LENGTH |
| ≥17.15 mm | 2.750 mm | 18.600 mm |
| ≤17.15 mm | 3.500 mm | 17.00 mm |

Upon agreement max length 25 m.

Maximum length doesn't take into consideration the means of transport; it depends on the dimensions and must be verified before ordering.

Option c

Different lengths from those described in the table can be agreed upon.

6. Checks and test

All the mechanical and technological tests stipulated in the cited standards are carried out.

Leak tightness test: electromagnetic test (Eddy Current).

Hydrostatic test is carried out only on request (option d).

Option d

Hydrostatic tests can be agreed upon, specifying the test pressure.

Option e

Additional tests and checks can be agreed upon.

7. Surface protection

Tubes for heat exchangers (shell & tube and air coolers) are supplied unprotected or with a temporary external oil protection to prevent rust if stored in a covered area. (Tenaris code: PT9).

Option f

Other types of protection can be agreed upon.

Tubes for boilers and for high and low temperature service, are supplied without any surface protection (unprotected).

8. Certification

The product is supplied with a 3.1 certificate, in compliance with EN 10204 and ISO 10474 3.1.B.

Option g

Certification according to 3.2 can be agreed upon at time of order. In the event that one of these certificates is requested, the customer must designate at time of order the inspection authority.

9. Identification and marking

Tube identification is made by indelible ink marking. The data prescribed by the product norms are continuously marked along the entire length of the tube.

Option h

Data in addition to that of the product norms can also be marked, on request. Identification can be punched on the tube, if requested.

10. Packaging

The tubes are packed in strapped bundles.

Option i

Other types of packaging can be agreed upon.

11. Minimum quantity supplied

To be agreed upon when placing the order, on the basis of the dimensions and steel grade.

12. Products approvals

Tenaris has been approved by various inspection bodies, for example TÜV - L.R. - ISPESL, etc.

Homologation TÜV: AD W 0 - TRD 100

STRAIGHT COLD DRAWN SEAMLESS TUBES FOR HEAT EXCHANGERS AND BOILERS

| OUTSIDE DIAMETER | | STANDARD DIMENSIONS BASED UPON AVERAGE WALL THICKNESS | | | | | | | | | | | | | | | | | | | | |
|------------------|-------|---|-------|-------|-------|-------|------|-------|------|-------|-------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|
| | | 1,24 | 1,50 | 1,65 | 1,82 | 2,00 | 2,11 | 2,20 | 2,32 | 2,42 | 2,64 | 2,77 | 2,90 | 3,05 | 3,20 | 3,40 | 3,52 | 3,74 | 3,85 | 4,19 | 4,40 | 4,62 |
| 12,7 | | | | | | | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | | | | | | | |
| 15,88 | | | | | | | | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | | | | | | | | | | |
| 19,05 | | | | | | | | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | | | | | | | |
| 21,3 | | | | | | | | | | | | | | | | | | | | | | |
| 22,22 | | | | | | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | | | | |
| 25,4 | | | | | | | | | | | | | | | | | | | | | | |
| 26,9 | | | | | | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | | | | | | |
| 31,75 | | | | | | | | | | | | | | | | | | | | | | |
| 33,7 | | | | | | | | | | | | | | | | | | | | | | |
| 34,93 | | | | | | | | | | | | | | | | | | | | | | |
| 38,1 | | | | | | | | | | | | | | | | | | | | | | |
| 41,28 | | | | | | | | | | | | | | | | | | | | | | |
| 44,45 | | | | | | | | | | | | | | | | | | | | | | |
| 47,63 | | | | | | | | | | | | | | | | | | | | | | |
| 48,3 | | | | | | | | | | | | | | | | | | | | | | |
| 50,8 | | | | | | | | | | | | | | | | | | | | | | |
| 53,98 | | | | | | | | | | | | | | | | | | | | | | |
| 57 | | | | | | | | | | | | | | | | | | | | | | |
| 57,15 | | | | | | | | | | | | | | | | | | | | | | |
| 60,33 | | | | | | | | | | | | | | | | | | | | | | |
| 63,5 | | | | | | | | | | | | | | | | | | | | | | |
| 69,85 | | | | | | | | | | | | | | | | | | | | | | |
| 70 | | | | | | | | | | | | | | | | | | | | | | |
| 76,2 | | | | | | | | | | | | | | | | | | | | | | |
| 82,55 | | | | | | | | | | | | | | | | | | | | | | |
| 88,9 | | | | | | | | | | | | | | | | | | | | | | |
| 95,25 | | | | | | | | | | | | | | | | | | | | | | |
| 101,60 | | | | | | | | | | | | | | | | | | | | | | |
| 107,95 | | | | | | | | | | | | | | | | | | | | | | |
| 114,30 | | | | | | | | | | | | | | | | | | | | | | |
| 120,65 | | | | | | | | | | | | | | | | | | | | | | |
| mm | 1,13 | 1,24 | 1,40 | 1,63 | 1,82 | 1,91 | | 2,11 | | 2,41 | 2,50 | | 2,77 | 2,88 | 3,05 | 3,17 | 3,43 | 3,52 | 3,81 | 3,96 | 4,19 | |
| | 0,044 | 0,049 | 0,055 | 0,064 | 0,072 | 0,075 | | 0,083 | | 0,095 | 0,098 | | 0,109 | 0,113 | 0,120 | 0,125 | 0,135 | 0,139 | 0,150 | 0,156 | 0,165 | |

GRADES T9, P9, STBA 26, S1 629-470

PARTICULAR DIMENSIONS AVAILABLE ON REQUEST FOR GRADES T9, P9, STBA 26, S1 629-470

| 5,06 | 5,24 | 5,59 | 6,16 | 6,71 | 7,10 | 7,26 | 7,62 | 7,81 | 8,36 | 8,80 | 9,02 | 9,46 | 10,01 | 10,56 | 11,11 | 11,77 | 12,32 | 12,77 | 13,32 | 13,97 | | |
|-------|-------|-------|-------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|
| | | | | | | | | | | | | | | | | | | | | | | 1/2 |
| | | | | | | | | | | | | | | | | | | | | | | 5/8 |
| | | | | | | | | | | | | | | | | | | | | | | 3/4 |
| | | | | | | | | | | | | | | | | | | | | | | 0,839 |
| | | | | | | | | | | | | | | | | | | | | | | 7/8 |
| | | | | | | | | | | | | | | | | | | | | | | 1 |
| | | | | | | | | | | | | | | | | | | | | | | 1,059 |
| | | | | | | | | | | | | | | | | | | | | | | 1 1/4 |
| | | | | | | | | | | | | | | | | | | | | | | 1,327 |
| | | | | | | | | | | | | | | | | | | | | | | 1 3/8 |
| | | | | | | | | | | | | | | | | | | | | | | 1 1/2 |
| | | | | | | | | | | | | | | | | | | | | | | 1 5/8 |
| | | | | | | | | | | | | | | | | | | | | | | 1 3/4 |
| | | | | | | | | | | | | | | | | | | | | | | 1 7/8 |
| | | | | | | | | | | | | | | | | | | | | | | 1,902 |
| | | | | | | | | | | | | | | | | | | | | | | 2 |
| | | | | | | | | | | | | | | | | | | | | | | 2 1/8 |
| | | | | | | | | | | | | | | | | | | | | | | 2 1/4 |
| | | | | | | | | | | | | | | | | | | | | | | 2 3/8 |
| | | | | | | | | | | | | | | | | | | | | | | 2 1/2 |
| | | | | | | | | | | | | | | | | | | | | | | 2 3/4 |
| | | | | | | | | | | | | | | | | | | | | | | 3 |
| | | | | | | | | | | | | | | | | | | | | | | 3 1/4 |
| | | | | | | | | | | | | | | | | | | | | | | 3 1/2 |
| | | | | | | | | | | | | | | | | | | | | | | 3 3/4 |
| | | | | | | | | | | | | | | | | | | | | | | 4 |
| | | | | | | | | | | | | | | | | | | | | | | 4 1/4 |
| | | | | | | | | | | | | | | | | | | | | | | 4 1/2 |
| | | | | | | | | | | | | | | | | | | | | | | 4 3/4 |
| 4,57 | 4,76 | 5,03 | 5,59 | | | 6,60 | 6,79 | 7,01 | 7,62 | 7,92 | 8,13 | 8,64 | 9,14 | 9,65 | 10,16 | 10,67 | 11,18 | 11,68 | 12,11 | 12,70 | | |
| 0.180 | 0.187 | 0.198 | 0.220 | | | 0.260 | 0.267 | 0.276 | 0.300 | 0.312 | 0.320 | 0.340 | 0.360 | 0.380 | 0.400 | 0.420 | 0.440 | 0.460 | 0.477 | 0.500 | inches | |

OUTSIDE DIAMETER

STANDARD DIMENSIONS BASED UPON MINIMUM WALL THICKNESS

Straight cold drawn seamless tubes for heat exchangers and boilers

REFERENCE STANDARDS AND STEEL GRADES

TABLE 1

| STANDARD | STEEL GRADE |
|---------------------------------|---|
| ASTM A 179 - ASME SA 179 Sez.II | LOW CARBON |
| ASTM A106 - ASME SA 106 Sez.II | Gr. A - B - C |
| ASTM A 192 - ASME SA 192 Sez.II | LOW CARBON |
| ASTM A 209 - ASME SA 209 Sez.II | Gr. T1- T1a - T1b |
| ASTM A210 - ASME SA210 Sez.II | Gr. A1 - C |
| ASTM A 213 - ASME SA 213 Sez.II | Gr. T2 - T5 - T9 - T11 - T12- T22 |
| ASTM A 333 - ASME SA 333 Sez.II | Gr. 1 - 3 - 6 |
| ASTM A 334 - ASME SA 334 Sez.II | Gr. 1 - 3 - 6 |
| ASTM A 335 - ASME SA 335 Sez.II | Gr. P1 - P2 - P5 - P9 - P11 - P12- P22 |
| ASTM A556 - ASME SA 556 Sez.II | Gr. A2 - B2 - C2 |
| JIS G 3461 | STB 340 - STB 410 - STB 510 |
| JIS G 3462 | STBA 12 - STBA 13 - STBA 20 - STBA 22 - STBA 23 - STBA 24 - STBA 25 - STBA 26 |

EUROPEAN STANDARDS, STEEL GRADE, EN CORRESPONDENCE WITH THE ABROGATED NATIONAL

| STANDARD | STEEL GRADE | STANDARD | STEEL GRADE | STANDARD | STEEL GRADE | STANDARD | STEEL GRADE | STANDARD | STEEL GRADE |
|------------|-------------|-----------|------------------|-----------|-------------|----------|-------------|-----------|-------------|
| EN 10216-1 | P195TR1 | | | | | | | | |
| EN 10216-1 | P195TR2* | | | | | | | | |
| EN 10216-1 | P235TR1 | UNI-663 | Fe 35.1- Fe 35.2 | | | | | | |
| EN 10216-1 | P235TR2* | | | | | | | | |
| EN 10216-1 | P265TR1 | UNI-663 | Fe 45.1- Fe45.2 | | | | | | |
| EN 10216-1 | P265TR2* | | | | | | | | |
| EN 10216-2 | P195GH | | | BS 3606 | 320 | | | | |
| EN 10216-2 | P235GH | DIN 17175 | St 35.8 | | | UNI 5462 | C14 | NFA 49215 | TU 37 C |
| EN 10216-2 | P265GH | DIN 17175 | St 45.8 | | | UNI 5462 | C18 | NFA 49215 | TU 48 C |
| EN 10216-2 | 20MnNb6 | | | | | | | | |
| EN 10216-2 | 16Mo3 | DIN 17175 | 15Mo3 | | | UNI 5462 | 16Mo5 | NFA 49215 | TU 15 D3 |
| EN 10216-2 | 8MoB54 | | | | | | | | |
| EN 10216-2 | 14MoV63 | | | | | | | | |
| EN 10216-2 | 10CrMo55 | | | BS 3606 | 621 | | | NFA 49215 | TU 10CD5.05 |
| EN 10216-2 | 13CrMo45 | DIN 17175 | 13CrMo44 | BS 3606 | 620 | UNI 5462 | 14CrMo3 | | |
| EN 10216-2 | 10CrMo910 | DIN 17175 | 10CrMo910 | BS 3606 | 622 | UNI 5462 | 12CrMo910 | NFA 49215 | TU 10CD9.10 |
| EN 10216-2 | 11CrMo910 | | | | | | | | |
| EN 10216-2 | 25CrMo4 | | | | | | | | |
| EN 10216-2 | X11CrMo5 | | | | | | | | |
| EN 10216-2 | X11CrMo9 | | | BS 3059-2 | 629-470 | | | | |
| EN 10216-3 | P275NL1 | DIN 17179 | TSIE 285 | | | | | | |
| EN 10216-3 | P275NL2 | DIN 17179 | ESIE 285 | | | | | | |
| EN 10216-3 | P355N | DIN 17179 | StE 355 | | | | | | |
| EN 10216-3 | P355NH | DIN 17179 | WStE 355 | | | | | | |
| EN 10216-3 | P355NL1 | DIN 17179 | TSIE 355 | | | | | | |
| EN 10216-3 | P355NL2 | DIN 17179 | ESIE 355 | | | | | | |
| EN 10216-4 | P215NL | DIN 17173 | TSt 35N | | | | | | |
| EN 10216-4 | 12Ni14** | DIN 17173 | 10Ni14 | | | | | | |

* Quality class TR2 is conform to PED

** Only on request

Part B

“U” bent cold drawn seamless tubes for heat exchangers in chemical, petrochemical and energy plants

1. Reference standards and steel grades

“U” bent tubes for heat exchangers can be supplied in accordance with the following norms and steel grades :

| REFERENCE STANDARDS AND STEEL GRADES | |
|--------------------------------------|------------------|
| NORM | STEEL GRADE |
| ASTM A 556 | Gr. A2 - B2 - C2 |
| ASME SA 556 Sect.II | Gr. A2 - B2 - C2 |

Option j

“U” Bent tubes in accordance with the standards detailed in table 1, part A can be requested.

Option k

The bent area can be subject to stress relieving heat treatment by joule effect in inert atmosphere.

- Minimum radius treated = 28 mm.
- Maximum radius treated = 750 mm.

2. Dimensions and lengths

Tubes with the following external diameters in mm can be bent a upon agreement: 15,8 - 16,0 - 17,0 - 18,0 - 19,05 - 20,0 - 21,3 - 25,4 - 26,7 - 31,8 -38,1.

The minimum feasible radius is :

1,5 x external diameter

The maximum feasible radius is 1500 mm.

3. Tolerances

Tolerances (diameter and wall thickness) according to ASTM A 556 or given in the standards detailed in table 1 point A are respected.

Bending tolerances.

The tolerances stipulated in ASTM A 556 are respected.

Option l

Minimum wall thickness tolerances in the bent area conforming to the TEMA standard "Class R heat exchangers" can be requested or in accordance with specific requests.

4. Checks and test

All the mechanical and technological tests stipulated in the cited standards are carried out.

Leak tightness test: electromagnetic test (Eddy Current) is performed on straight tubes. Hydrostatic test on bent tubes is performed only if expressly requested, specifying the test pressure (option d).

Option m

Additional tests and checks can be agreed upon.

5. Surface protection

“U” bent tubes for exchangers are supplied unprotected or with a temporary external oil protection to prevent from rust if stored in a covered area. (Tenaris code : PT9).

Option n

Other types of protection can be agreed upon.

6. Certification

The product is supplied with a 3.1. certificate, in compliance with EN 10204 and ISO 10474 3.1.B.

Option o

Certification according to 3.2 can be agreed upon at time of order. In the event that one of these certificates is requested, the customer must designate, at time of order, the inspection authority.

7. Identification and marking

Tube identification is by indelible ink marking. The data determined by the product norms are continuously marked along the entire length of the tube.

Option p

Data in addition to that of the product norms can also be marked on the tube, upon request.

8. Packaging

Suitable packaging should be agreed upon before ordering.

9. Minimum quantity supplied

To be agreed upon, at time of order, on the basis of dimensions and steel grade.

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