Rev. 0419

# INOX VISION

Electro-welded
Stainless steel tubes

**"No market is too far away for our knowledge, passion and spirit of innovation."**

## GLOBAL PLAYER

The strength of **a unique global sales network** along with a manufacturing plant in Italy and sales headquarters in Germany

## CUSTOMER ORIENTED

Focus on **customers as the heart** of the business.
**Tailor made** solutions developed to meet specific needs

## INNOVATIVE

An innovative **research center** and customized **IT solutions** for process, product and service innovation

## RELIABLE

**Customers requirements, our every day commitment.**
A dedicated **cross-functional team** for each customer

## PASSIONATE

The experience, competence and passion of **our workforce**

ACCIAI SPECIALI TERNI | TUBI TERNI

1. OUR VALUES

2. OUR PRODUCT PORTFOLIO

3. OUR SERVICES

4. OUR MANUFACTURING CYCLE

# INOX VISION

Electro-welded
Stainless steel tubes

ACCIAI
SPECIALI
TERNI

TUBI
TERNI

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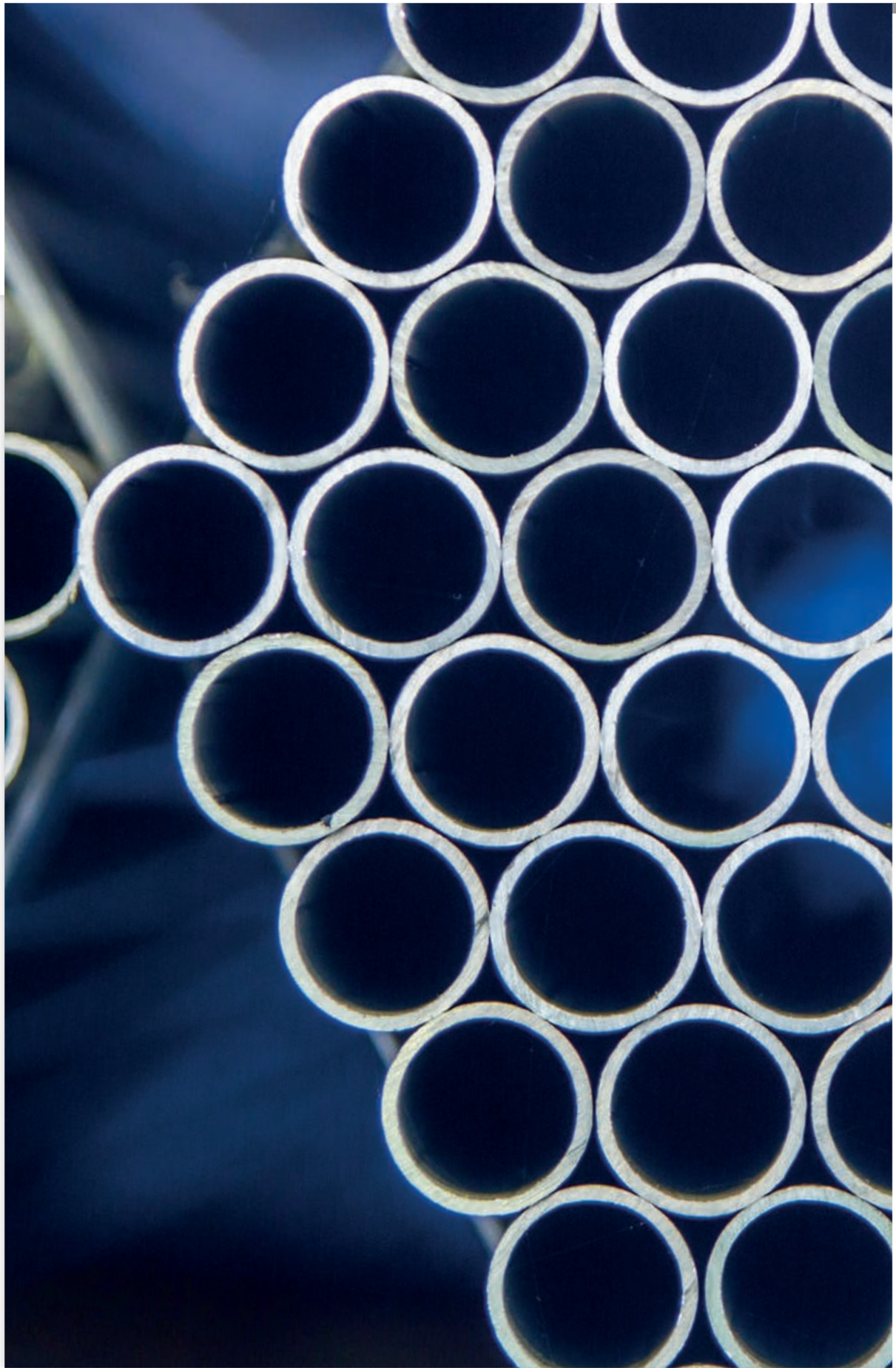
TUBI TERNI

# DRIVEN BY INNOVATION, CHALLENGING THE FUTURE

We are an integral part of a pioneering multinational company manufacturing electro-welded stainless steel tubes.
We develop and encourage innovation and work with the awareness of being a world leader in this market segment.
Our market leadership has been achieved through our steadily increasing customer-oriented service, the passion of our salesforce and technical assistance that daily follows and monitors our worldwide customers needs.
Our global vision, customer focus, and innovative manufacturing cycle have taken us far in becoming one of the world's leading tube manufactures.



# THE STRENGTH OF A GLOBAL VISION

We are a pioneering company with an integrated manufacturing cycle.

Tubes production is one of the excellences of Acciai Speciali Terni, a company that is a world leader in the production of stainless steel flat products and electro-welded stainless steel tubes within a single integrated manufacturing plant.
The tube manufacturing facility extends for over 45,000 square meters (of which 26,000 square meters are roofed), encompassing the excellence of a company that invests in research, technological and manufacturing innovations along with state of the art equipment, exporting Italian know-how throughout the world.
Our competitive advantage is to concentrate our production in one single manufacturing site – located in the center of Italy. The service network and sales force provides market closeness to its primary customers throughout Europe.
Acciai Speciali Terni is an integral part of thyssenkrupp, a highly diversified industrial group with traditional strengths in materials and a growing share of capital goods and business services.

**800,000,000 meters of tubes** manufactured in 20 years, over twenty complete laps around the world

# OUR PRODUCT PORTFOLIO

A complete product range offered to key sectors of our economy.

Manufacturing and process innovation, combined with a wide product range, are the two levers that have positioned our company to be a market reference point in a multitude of industry sectors and in particular for the automotive industry.
The always ongoing cooperation with Centro Sviluppo Materiali, allows us to maintain our highest quality standards consistent and in harmony with the most stringent market and regulatory standards.
The tubes are welded longitudinally by an electric arc without adding any weld material (TIG. GTAW) or by high-frequency induction welding (HF) or by laser welding.
The external and internal weld bead is then removed.
Our production lines can indifferently weld stainless steels of the 300 and 400 series, with a wide variety of thicknesses and diameters for any lengths that may be required by our customers and always respecting our standards of excellence in quality and services.
Our superior craftsmanship has in few years positioned our company as a market leader in the exhaust system industry.

# AUTOMOTIVE, CONSTRUCTION AND INDUSTRIAL APPLICATIONS ARE THE FIELDS THAT SHARE OUR COMMON VIEW TOWARDS THE FUTURE.

# STAINLESS STEEL GRADES FOR TUBES MANUFACTURING

Quality is the constant and main value in all of our manufacturing cycle and includes research and implementation of the best austenitic and ferritic stainless steels for the most important and widespread market applications.

| | | FERRITIC | | | | | |
|---|---|---|---|---|---|---|---|
| | | FERRO CHROME | FERRO CHROME STABILIZED | | | FERRO CHROME STABILIZED SUPER FERRITIC | FERRO CHROME MOLYBDENUM |
| ACCIAI SPECIALI TERNI | | STR 12 | 409 LI | 439 M | 441 LI | 470 LI | 4513 |
| EN 10088-2 | | 1.4003 | 1.4512 | 1.4510 | 1.4509 | 1.4613 | 1.4513 |
| TYPICAL COMPOSITION | C | 0.02 | 0.01 | 0.02 | 0.02 | 0.01 | 0.02 |
| | Cr | 11.3 | 11.5 | 17.7 | 18.2 | 24.0 | 16.3 |
| | Ni | 0.5 | - | - | - | - | - |
| | Mo | - | - | - | - | - | 1,2 |
| | Others | - | Ti | Ti, Nb | Ti, Nb | Ti, Nb | Ti |
| MECHANICAL PROPERTIES AT 20 °C - TYPICAL VALUES | 0.2% Yield Strength Mpa | 320 | 250 | 280 | 300 | 330 | 300 |
| | Rm tensile Strength MPa | 500 | 420 | 450 | 470 | 490 | 470 |
| | Elongation A% $A_{80}$ (thickness <3mm) $A_5$ (thickness ≥3mm) | 23 | 32 | 28 | 30 | 30 | 28 |
| CORROSION RESISTANCE | General | ∘ | ∘ | + | + | +++ | ++ |
| | Pitting | ∘ | + | + | ++ | +++ | ++ |
| | SCC | + | + | ++ | ++ | +++ | ++ |
| | Heat resistence | ∘ | ++ | ++ | +++ | +++ | + |
| COLD FORMABILITY | | + | ++ | ++ | ++ | ++ | ++ |
| WELDABILITY | | ++ | +++ | +++ | +++ | +++ | +++ |

| | | AUSTENITIC | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | FERRO CHROME NICKEL | | | FERRO CHROME NICKEL MOLYBDENUM | | | HEAT RESISTANT |
| ACCIAI SPECIALI TERNI | | 304 | 304 DL | 321 | 316 | 316 L | 316 Ti | 4828 |
| EN 10088-2 | | 1.4301 | 1.4307 | 1.4541 | 1.4401 | 1.4404 | 1.4571 | 1.4828 |
| TYPICAL COMPOSITION | C | 0.04 | 0.025 | 0.05 | 0.06 | 0.03 | 0.05 | 0.05 |
| | Cr | 18.2 | 18.2 | 17.3 | 16.7 | 16.7 | 16.7 | 19.3 |
| | Ni | 8.1 | 8.1 | 9.1 | 10.6 | 10.3 | 10.6 | 11.1 |
| | Mo | - | - | - | 2,1 | 2,1 | 2,1 | - |
| | Others | - | - | Ti | - | - | Ti | Si |
| MECHANICAL PROPERTIES AT 20 °C - TYPICAL VALUES | 0.2% Yield Strength Mpa | 270 | 250 | 250 | 300 | 270 | 270 | 290 |
| | Rm tensile Strength MPa | 650 | 630 | 590 | 610 | 580 | 580 | 640 |
| | Elongation A% $A_{80}$ (thickness <3mm) $A_5$ (thickness ≥3mm) | 54 | 54 | 57 | 50 | 52 | 55 | 55 |
| CORROSION RESISTANCE | General | ++ | ++ | +++ | +++ | +++ | +++ | +++ |
| | Pitting | ++ | ++ | +++ | +++ | +++ | +++ | ++ |
| | SCC | ∘ | ∘ | ∘ | ∘ | ∘ | ∘ | ∘ |
| | Heat resistence | ++ | ++ | +++ | ++ | ++ | ++ | +++ |
| COLD FORMABILITY | | ++ | ++ | +++ | ++ | +++ | +++ | + |
| WELDABILITY | | +++ | ++++ | +++ | +++ | ++++ | ++++ | +++ |

The above table reports the main stainless steels produced and traded by Acciai Speciali Terni for tubes production

The above mentioned figures, which refer to 1 mm CR, 2B finish, are approximate; they can vary according to thickness and finishing

∘ Not applicable/not required
+ Acceptable
++ Good
+++ Excellent
++++ Superior performance

# EXHAUST SYSTEMS TUBES

The most important European automotive brands have chosen our stainless steel tubes for high quality, performance and wide product range available along with tailor-made solutions.

## Product Range of Round Tubes

### AUSTENITIC GRADES

| DIAMETER FROM 8 TO 34 mm | THICKNESS (mm) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.5 | 0.6 | 0.7 | 0.8 | 1.0 | 1.2 | 1.5 | 1.6 | 1.7 | 1.8 | 2.0 |
| | THEORETICAL WEIGHTS kg/m | | | | | | | | | | |
| 8 | 0.094 | 0.111 | 0.128 | 0.144 | 0.175 | 0.204 | 0.244 | | | | |
| 10 | 0.119 | 0.141 | 0.163 | 0.184 | 0.225 | 0.264 | 0.319 | | | | |
| 12 | 0.144 | 0.171 | 0.198 | 0.224 | 0.275 | 0.324 | 0.394 | | | | |
| 13 | 0.156 | 0.186 | 0.216 | 0.244 | 0.300 | 0.355 | 0.432 | | | | |
| 14 | 0.169 | 0.201 | 0.233 | 0.264 | 0.326 | 0.385 | 0.469 | 0.497 | 0.524 | | |
| 15 | 0.182 | 0.216 | 0.251 | 0.284 | 0.351 | 0.415 | 0.507 | 0.537 | 0.566 | | |
| 15.88 | 0.193 | 0.230 | 0.266 | 0.302 | 0.373 | 0.441 | 0.540 | 0.572 | 0.604 | | |
| 16 | 0.194 | 0.231 | 0.268 | 0.304 | 0.376 | 0.445 | 0.545 | 0.577 | 0.609 | | |
| 17.4 | 0.212 | 0.252 | 0.293 | 0.333 | 0.411 | 0.487 | 0.597 | 0.633 | 0.668 | | |
| 18 | 0.219 | 0.261 | 0.303 | 0.345 | 0.426 | 0.505 | 0.620 | 0.657 | 0.694 | | |
| 19 | 0.232 | 0.276 | 0.321 | 0.365 | 0.451 | 0.535 | 0.657 | 0.697 | 0.736 | 0.775 | 0.851 |
| 19.05 | 0.232 | 0.277 | 0.322 | 0.366 | 0.452 | 0.536 | 0.659 | 0.699 | 0.739 | 0.777 | 0.854 |
| 20 | 0.244 | 0.291 | 0.338 | 0.385 | 0.476 | 0.565 | 0.695 | 0.737 | 0.779 | 0.820 | 0.901 |
| 21.3 | 0.260 | 0.311 | 0.361 | 0.411 | 0.508 | 0.604 | 0.744 | 0.789 | 0.834 | 0.879 | 0.966 |
| 21.8 | 0.267 | 0.318 | 0.370 | 0.421 | 0.521 | 0.619 | 0.762 | 0.809 | 0.856 | 0.901 | 0.992 |
| 22 | 0.269 | 0.321 | 0.373 | 0.425 | 0.526 | 0.625 | 0.770 | 0.817 | 0.864 | 0.910 | 1.002 |
| 22.22 | 0.272 | 0.325 | 0.377 | 0.429 | 0.531 | 0.632 | 0.778 | 0.826 | 0.873 | 0.920 | 1.013 |
| 23 | 0.282 | 0.337 | 0.391 | 0.445 | 0.551 | 0.655 | 0.807 | 0.857 | 0.907 | 0.955 | 1.052 |
| 24 | 0.294 | 0.352 | 0.408 | 0.465 | 0.576 | 0.685 | 0.845 | 0.897 | 0.949 | 1.001 | 1.102 |
| 25 | 0.307 | 0.367 | 0.426 | 0.485 | 0.601 | 0.715 | 0.883 | 0.937 | 0.992 | 1.046 | 1.152 |
| 25.4 | 0.312 | 0.373 | 0.433 | 0.493 | 0.611 | 0.727 | 0.898 | 0.953 | 1.009 | 1.064 | 1.172 |
| 26.9 | 0.331 | 0.395 | 0.459 | 0.523 | 0.648 | 0.772 | 0.954 | 1.014 | 1.073 | 1.131 | 1.247 |
| 27 | 0.332 | 0.397 | 0.461 | 0.525 | 0.651 | 0.775 | 0.958 | 1.018 | 1.077 | 1.136 | 1.252 |
| 28 | 0.344 | 0.412 | 0.478 | 0.545 | 0.676 | 0.805 | 0.995 | 1.058 | 1.119 | 1.181 | 1.302 |
| 28.7 | 0.353 | 0.422 | 0.491 | 0.559 | 0.694 | 0.826 | 1.022 | 1.086 | 1.149 | 1.212 | 1.337 |
| 29 | 0.357 | 0.427 | 0.496 | 0.565 | 0.701 | 0.835 | 1.033 | 1.098 | 1.162 | 1.226 | 1.352 |
| 30 | 0.369 | 0.442 | 0.514 | 0.585 | 0.726 | 0.865 | 1.070 | 1.138 | 1.205 | 1.271 | 1.402 |
| 31.75 | 0.391 | 0.468 | 0.544 | 0.620 | 0.770 | 0.918 | 1.136 | 1.208 | 1.279 | 1.350 | 1.490 |
| 32 | 0.394 | 0.472 | 0.549 | 0.625 | 0.776 | 0.925 | 1.146 | 1.218 | 1.290 | 1.361 | 1.502 |
| 33 | 0.407 | 0.487 | 0.566 | 0.645 | 0.801 | 0.955 | 1.183 | 1.258 | 1.332 | 1.406 | 1.552 |
| 34 | 0.419 | 0.502 | 0.584 | 0.665 | 0.826 | 0.986 | 1.221 | 1.298 | 1.375 | 1.451 | 1.602 |

| DIAMETER FROM 35 TO 127 mm | THICKNESS (mm) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.5 | 0.6 | 0.7 | 0.8 | 1.0 | 1.2 | 1.5 | 1.6 | 1.7 | 1.8 | 2.0 |
| | THEORETICAL WEIGHTS kg/m | | | | | | | | | | |
| 35 | 0.432 | 0.517 | 0.601 | 0.685 | 0.851 | 1.016 | 1.258 | 1.338 | 1.417 | 1.496 | 1.653 |
| 38 | 0.469 | 0.562 | 0.654 | 0.745 | 0.926 | 1.106 | 1.371 | 1.458 | 1.545 | 1.632 | 1.803 |
| 38.1 | 0.471 | 0.563 | 0.656 | 0.747 | 0.929 | 1.109 | 1.375 | 1.462 | 1.549 | 1.636 | 1.808 |
| 39 | 0.482 | 0.577 | 0.671 | 0.765 | 0.951 | 1.136 | 1.408 | 1.498 | 1.588 | 1.677 | 1.853 |
| 40 | 0.495 | 0.592 | 0.689 | 0.785 | 0.977 | 1.166 | 1.446 | 1.538 | 1.630 | 1.722 | 1.903 |
| 42.4 | 0.525 | 0.628 | 0.731 | 0.833 | 1.037 | 1.238 | 1.536 | 1.635 | 1.732 | 1.830 | 2.023 |
| 43 | 0.532 | 0.637 | 0.741 | 0.845 | 1.052 | 1.256 | 1.559 | 1.659 | 1.758 | 1.857 | 2.053 |
| 44.4 | 0.550 | 0.658 | 0.766 | 0.873 | 1.087 | 1.298 | 1.611 | 1.715 | 1.818 | 1.920 | 2.123 |
| 44.45 | 0.550 | 0.659 | 0.767 | 0.874 | 1.088 | 1.300 | 1.613 | 1.717 | 1.820 | 1.922 | 2.126 |
| 45 | 0.557 | 0.667 | 0.776 | 0.885 | 1.102 | 1.316 | 1.634 | 1.739 | 1.843 | 1.947 | 2.153 |
| 48.3 | 0.598 | 0.717 | 0.834 | 0.951 | 1.184 | 1.415 | 1.758 | 1.871 | 1.984 | 2.096 | 2.319 |
| 50 | 0.620 | 0.742 | 0.864 | 0.986 | 1.227 | 1.466 | 1.822 | 1.939 | 2.056 | 2.172 | 2.404 |
| 50.8 | 0.630 | 0.754 | 0.878 | 1.002 | 1.247 | 1.490 | 1.852 | 1.971 | 2.090 | 2.208 | 2.444 |
| 51 | | | | 1.006 | 1.252 | 1.496 | 1.859 | 1.979 | 2.098 | 2.217 | 2.454 |
| 52 | | | | 1.026 | 1.277 | 1.526 | 1.897 | 2.019 | 2.141 | 2.262 | 2.504 |
| 53 | | | | 1.046 | 1.302 | 1.556 | 1.934 | 2.059 | 2.184 | 2.308 | 2.554 |
| 54 | | | | 1.066 | 1.327 | 1.586 | 1.972 | 2.099 | 2.226 | 2.353 | 2.604 |
| 55 | | | | 1.086 | 1.352 | 1.616 | 2.009 | 2.139 | 2.269 | 2.398 | 2.654 |
| 60 | | | | 1.186 | 1.477 | 1.767 | 2.197 | 2.340 | 2.482 | 2.623 | 2.904 |
| 60.3 | | | | | 1.485 | 1.776 | 2.208 | 2.352 | 2.494 | 2.637 | 2.919 |
| 63.5 | | | | | 1.565 | 1.872 | 2.329 | 2.480 | 2.631 | 2.781 | 3.080 |
| 65 | | | | 1.286 | 1.602 | 1.917 | 2.385 | 2.540 | 2.694 | 2.848 | 3.155 |
| 70 | | | | 1.386 | 1.728 | 2.067 | 2.573 | 2.740 | 2.907 | 3.074 | 3.405 |
| 75 | | | | | 1.853 | 2.217 | 2.761 | 2.941 | 3.120 | 3.299 | 3.656 |
| 76.1 | | | | | 1.880 | 2.250 | 2.802 | 2.985 | 3.167 | 3.349 | 3.711 |
| 80 | | | | 1.586 | 1.978 | 2.368 | 2.948 | 3.141 | 3.333 | 3.524 | 3.906 |
| 88.9 | | | | | 2.201 | 2.635 | 3.283 | 3.497 | 3.712 | 3.926 | 4.352 |
| 101.6 | | | | | 2.519 | 3.017 | 3.760 | 4.006 | 4.252 | 4.498 | 4.988 |
| 114.3 | | | | | 2.837 | 3.398 | 4.237 | 4.515 | 4.793 | 5.070 | 5.624 |
| 120 | | | | | 2.980 | 3.569 | 4.451 | 4.743 | 5.036 | 5.327 | 5.909 |
| 127 | | | | | 3.155 | 3.780 | 4.714 | 5.024 | 5.333 | 5.643 | 6.260 |

Thickness of 2.5 mm are also available upon request

SURFACE FINISH: mill finish

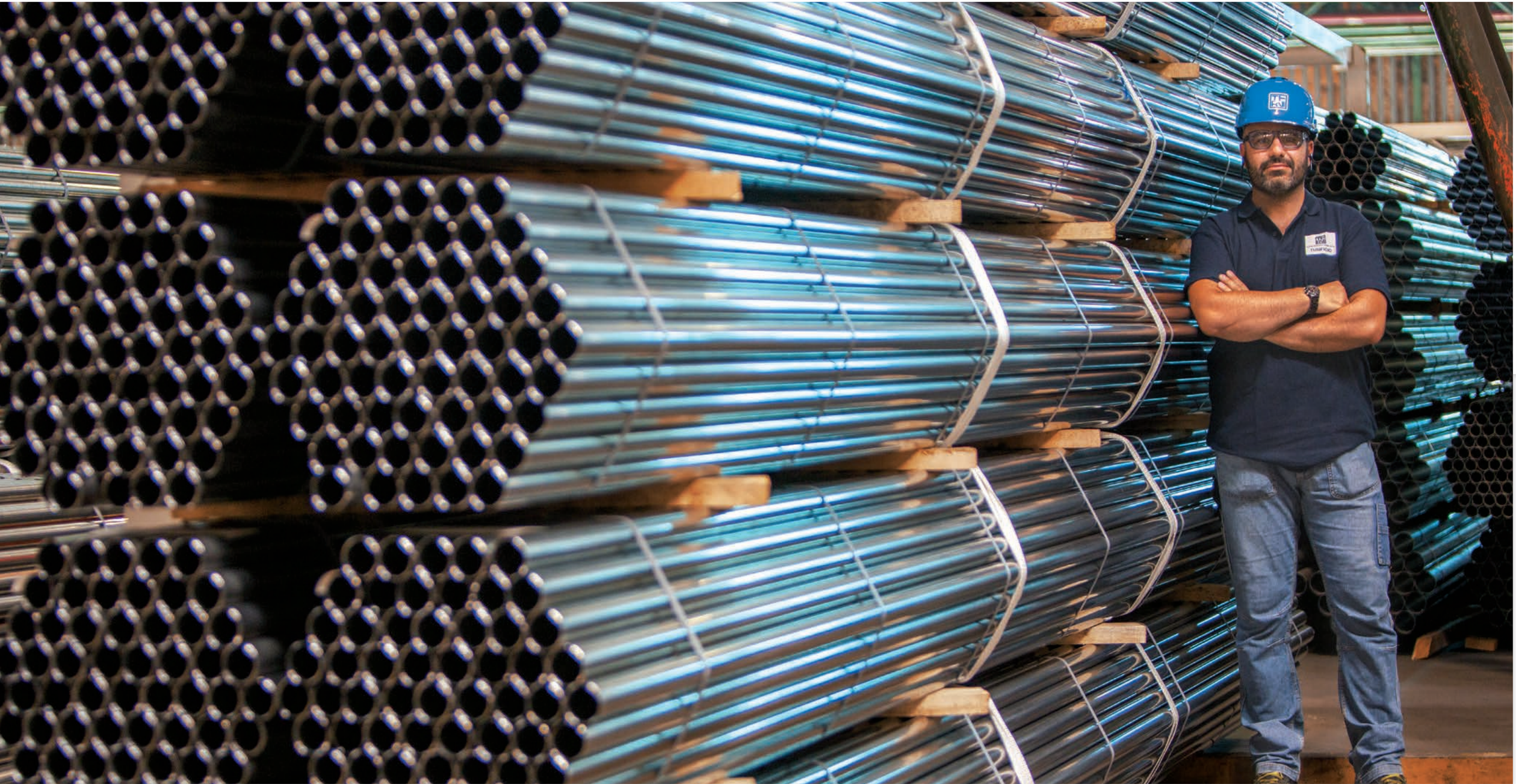


## Product Range of Round Tubes

### FERRITIC GRADES

| DIAMETER | THICKNESS (mm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 0.8 | 1.0 | 1.2 | 1.5 | 1.8 | 2.0 | 2.5 | 3.0 |
| | THEORETICAL WEIGHTS kg/m | | | | | | | |
| 25 | | 0.595 | 0.708 | 0.874 | 1.036 | 1.141 | | |
| 25.4 | | 0.605 | 0.720 | 0.889 | 1.054 | 1.161 | | |
| 26.9 | | 0.642 | 0.765 | 0.945 | 1.121 | 1.235 | | |
| 27 | | 0.645 | 0.768 | 0.949 | 1.125 | 1.240 | | |
| 32 | 0.619 | 0.769 | 0.917 | 1.135 | 1.348 | 1.488 | | |
| 33 | 0.639 | 0.794 | 0.946 | 1.172 | 1.393 | 1.538 | | |
| 34 | 0.659 | 0.818 | 0.976 | 1.209 | 1.438 | 1.587 | | |
| 35 | 0.679 | 0.843 | 1.006 | 1.246 | 1.482 | 1.637 | | |
| 38 | 0.738 | 0.918 | 1.095 | 1.358 | 1.616 | 1.786 | | |
| 38.1 | 0.740 | 0.920 | 1.098 | 1.362 | 1.621 | 1.791 | | |
| 39 | 0.758 | 0.943 | 1.125 | 1.395 | 1.661 | 1.835 | | |
| 40 | 0.778 | 0.967 | 1.155 | 1.432 | 1.705 | 1.885 | | |
| 42.4 | 0.825 | 1.027 | 1.226 | 1.522 | 1.813 | 2.004 | 2.474 | |
| 43 | 0.837 | 1.042 | 1.244 | 1.544 | 1.839 | 2.034 | 2.511 | |
| 44.45 | 0.866 | 1.078 | 1.287 | 1.598 | 1.904 | 2.106 | 2.601 | |
| 45 | 0.877 | 1.091 | 1.304 | 1.618 | 1.929 | 2.133 | 2.635 | |
| 48.3 | 0.943 | 1.173 | 1.402 | 1.741 | 2.076 | 2.297 | 2.840 | |
| 50 | 0.976 | 1.215 | 1.452 | 1.804 | 2.152 | 2.381 | 2.945 | |
| 50.8 | 0.992 | 1.235 | 1.476 | 1.834 | 2.188 | 2.421 | 2.995 | |
| 51 | 0.996 | 1.240 | 1.482 | 1.842 | 2.197 | 2.431 | 3.007 | |
| 52 | 1.016 | 1.265 | 1.512 | 1.879 | 2.241 | 2.480 | 3.069 | |
| 53 | 1.036 | 1.290 | 1.542 | 1.916 | 2.286 | 2.530 | 3.131 | |
| 54 | 1.056 | 1.315 | 1.572 | 1.953 | 2.330 | 2.580 | 3.193 | |
| 55 | 1.075 | 1.339 | 1.601 | 1.990 | 2.375 | 2.629 | 3.255 | |
| 60 | 1.175 | 1.463 | 1.750 | 2.176 | 2.598 | 2.877 | 3.565 | |
| 60.3 | | 1.471 | 1.759 | 2.188 | 2.612 | 2.892 | 3.584 | |
| 63 | | 1.538 | 1.839 | 2.288 | 2.732 | 3.026 | 3.751 | |
| 63.5 | | 1.550 | 1.854 | 2.307 | 2.755 | 3.051 | 3.782 | |
| 65 | | 1.587 | 1.899 | 2.362 | 2.822 | 3.125 | 3.875 | |
| 70 | | 1.711 | 2.048 | 2.549 | 3.045 | 3.373 | 4.185 | |
| 75 | | 1.835 | 2.197 | 2.735 | 3.268 | 3.621 | 4.496 | |
| 76.2 | | 1.865 | 2.232 | 2.779 | 3.322 | 3.681 | 4.570 | |
| 80 | | | 2.345 | 2.921 | 3.491 | 3.869 | 4.806 | |
| 88.9 | | | 2.610 | 3.252 | | 4.311 | 5.357 | 6.392 |
| 101.6 | | | 2.988 | 3.724 | | 4.941 | 6.145 | 7.337 |
| 114.3 | | | 3.366 | 4.197 | | 5.571 | 6.932 | 8.282 |
| 120 | | | 3.536 | 4.409 | | 5.853 | 7.286 | 8.706 |
| 127 | | | 3.744 | 4.669 | | 6.201 | 7.720 | 9.227 |

SURFACE FINISH: mill finish



# ORNAMENTAL AND DECORATIVE TUBES

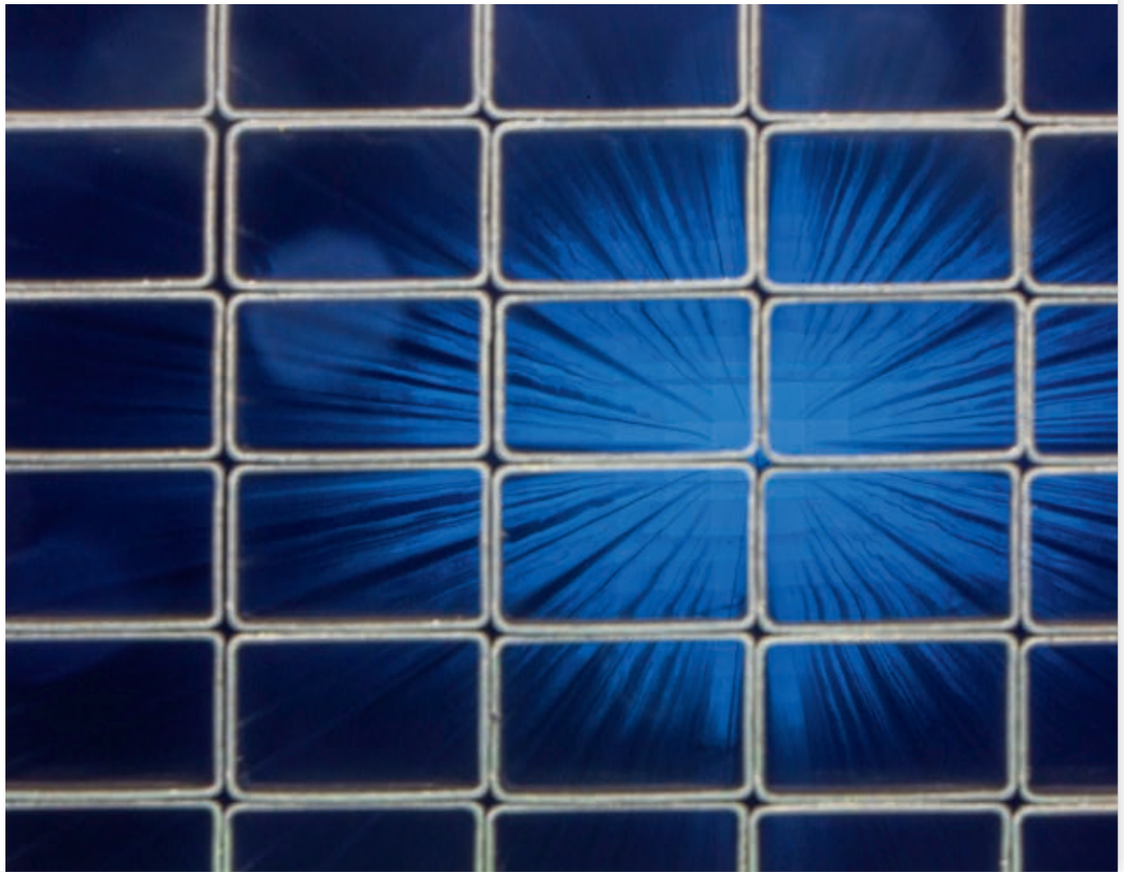
## RECTANGULAR TUBES

| SECTION (mm) | THICKNESS (mm) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1.0 | 1.2 | 1.5 | 2.0 | 2.5 | 3.0 | 4.0 |
| | THEORETICAL WEIGHTS kg/m | | | | | | |
| 30x20 | 0.772 | 0.921 | 1.140 | 1.495 | | | |
| 40x20 | 0.932 | 1.112 | 1.379 | 1.813 | | | |
| 40x30 | 1.091 | 1.303 | 1.618 | 2.132 | | | |
| 50x25 | 1.171 | 1.399 | 1.737 | 2.292 | | | |
| 50x30 | | | 1.857 | 2.451 | | | |
| 50x40 | | | 2.096 | 2.770 | | | |
| 60x30 | | | 2.096 | 2.770 | | 4.080 | |
| 60x40 | | | 2.335 | 3.089 | | 4.558 | |
| 60x50 | | | | 3.408 | 4.229 | 5.038 | |
| 80x30 | | | | 3.408 | 4.229 | 5.038 | |
| 80x40 | | | 2.813 | 3.726 | | 5.515 | |
| 80x60 | | | 3.291 | 4.364 | | 6.471 | |
| 100x40 | | | 3.291 | 4.364 | | 6.471 | |
| 100x50 | | | 3.531 | 4.683 | | 6.949 | |
| 100x60 | | | 3.770 | 5.001 | | 7.427 | |
| 120x40 | | | 3.770 | 5.001 | 6.223 | 7.427 | |
| 120x60 | | | 4.248 | 5.639 | | 8.384 | |
| 120x80 | | | | 6.277 | | 9.340 | 12.354 |
| 140x80 | | | | 6.914 | | 10.247 | 13.629 |
| 150x50 | | | | 6.277 | | 9.340 | 12.354 |
| 150x100 | | | | 7.871 | | 11.731 | 15.542 |
| 160x80 | | | | 7.552 | | 11.253 | 14.905 |

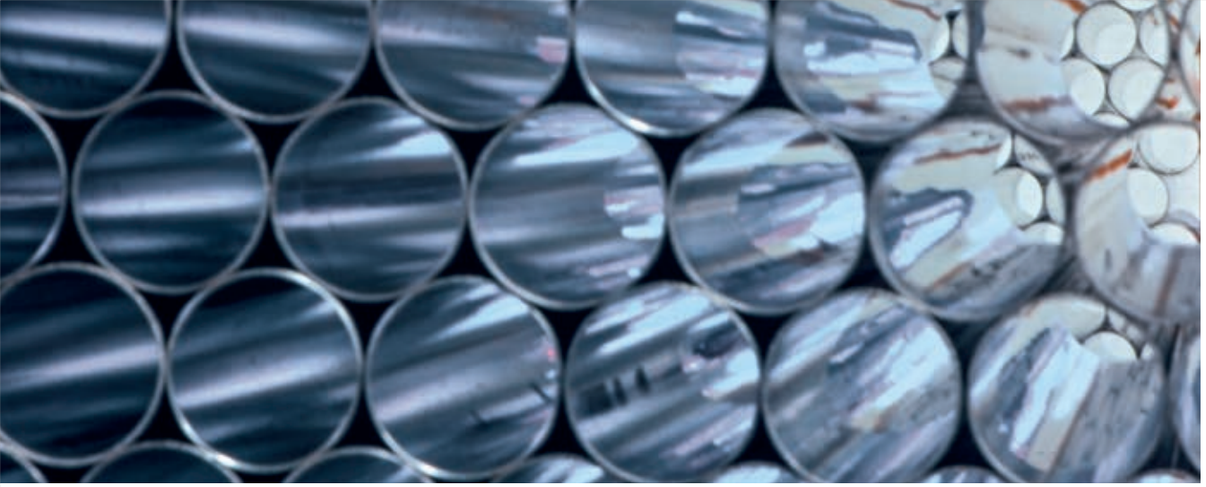
Thickness of 2.5 mm are also available upon request

## SQUARE TUBES

| SECTION (mm) | THICKNESS (mm) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1.0 | 1.2 | 1.5 | 2.0 | 2.5 | 3.0 | 4.0 |
| | THEORETICAL WEIGHTS kg/m | | | | | | |
| 20x20 | 0.613 | 0.729 | 0.900 | 1.176 | | | |
| 25x25 | 0.772 | 0.921 | 1.140 | 1.495 | | | |
| 30x30 | 0.932 | 0.112 | 1.379 | 1.813 | | 2.645 | |
| 35x35 | 1.091 | 1.303 | 1.618 | 2.132 | | 3.124 | |
| 40x40 | 1.250 | 1.494 | 1.857 | 2.451 | | 3.602 | |
| 50x50 | | | 2.335 | 3.089 | | 4.558 | |
| 60x60 | | | | 3.726 | | 5.515 | |
| 80x80 | | | | 5.001 | | 7.427 | |
| 100x100 | | | | | | 9.340 | 12.354 |
| 120x120 | | | | | | 11.253 | 14.905 |



SURFACE FINISHES: brushed, polished and mirror polished



## ROUND TUBES*

| DIAMETER FROM 8 TO 34 mm | THICKNESS (mm) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.5 | 0.6 | 0.7 | 0.8 | 1.0 | 1.2 | 1.5 | 1.6 | 1.7 | 1.8 | 2.0 |
| | THEORETICAL WEIGHTS kg/m | | | | | | | | | | |
| 8 | 0.094 | 0.111 | 0.128 | 0.144 | 0.175 | 0.204 | 0.244 | | | | |
| 10 | 0.119 | 0.141 | 0.163 | 0.184 | 0.225 | 0.264 | 0.319 | | | | |
| 12 | 0.144 | 0.171 | 0.198 | 0.224 | 0.275 | 0.324 | 0.394 | | | | |
| 13 | 0.156 | 0.186 | 0.216 | 0.244 | 0.300 | 0.355 | 0.432 | | | | |
| 14 | 0.169 | 0.201 | 0.233 | 0.264 | 0.326 | 0.385 | 0.469 | 0.497 | 0.524 | | |
| 15 | 0.182 | 0.216 | 0.251 | 0.284 | 0.351 | 0.415 | 0.507 | 0.537 | 0.566 | | |
| 15.88 | 0.193 | 0.230 | 0.266 | 0.302 | 0.373 | 0.441 | 0.540 | 0.572 | 0.604 | | |
| 16 | 0.194 | 0.231 | 0.268 | 0.304 | 0.376 | 0.445 | 0.545 | 0.577 | 0.609 | | |
| 17.4 | 0.212 | 0.252 | 0.293 | 0.333 | 0.411 | 0.487 | 0.597 | 0.633 | 0.668 | | |
| 18 | 0.219 | 0.261 | 0.303 | 0.345 | 0.426 | 0.505 | 0.620 | 0.657 | 0.694 | | |
| 19 | 0.232 | 0.276 | 0.321 | 0.365 | 0.451 | 0.535 | 0.657 | 0.697 | 0.736 | 0.775 | 0.851 |
| 19.05 | 0.232 | 0.277 | 0.322 | 0.366 | 0.452 | 0.536 | 0.659 | 0.699 | 0.739 | 0.777 | 0.854 |
| 20 | 0.244 | 0.291 | 0.338 | 0.385 | 0.476 | 0.565 | 0.695 | 0.737 | 0.779 | 0.820 | 0.901 |
| 21.3 | 0.260 | 0.311 | 0.361 | 0.411 | 0.508 | 0.604 | 0.744 | 0.789 | 0.834 | 0.879 | 0.966 |
| 21.8 | 0.267 | 0.318 | 0.370 | 0.421 | 0.521 | 0.619 | 0.762 | 0.809 | 0.856 | 0.901 | 0.992 |
| 22 | 0.269 | 0.321 | 0.373 | 0.425 | 0.526 | 0.625 | 0.770 | 0.817 | 0.864 | 0.910 | 1.002 |
| 22.22 | 0.272 | 0.325 | 0.377 | 0.429 | 0.531 | 0.632 | 0.778 | 0.826 | 0.873 | 0.920 | 1.013 |
| 23 | 0.282 | 0.337 | 0.391 | 0.445 | 0.551 | 0.655 | 0.807 | 0.857 | 0.907 | 0.955 | 1.052 |
| 24 | 0.294 | 0.352 | 0.408 | 0.465 | 0.576 | 0.685 | 0.845 | 0.897 | 0.949 | 1.001 | 1.102 |
| 25 | 0.307 | 0.367 | 0.426 | 0.485 | 0.601 | 0.715 | 0.883 | 0.937 | 0.992 | 1.046 | 1.152 |
| 25.4 | 0.312 | 0.373 | 0.433 | 0.493 | 0.611 | 0.727 | 0.898 | 0.953 | 1.009 | 1.064 | 1.172 |
| 26.9 | 0.331 | 0.395 | 0.459 | 0.523 | 0.648 | 0.772 | 0.954 | 1.014 | 1.073 | 1.131 | 1.247 |
| 27 | 0.332 | 0.397 | 0.461 | 0.525 | 0.651 | 0.775 | 0.958 | 1.018 | 1.077 | 1.136 | 1.252 |
| 28 | 0.344 | 0.412 | 0.478 | 0.545 | 0.676 | 0.805 | 0.995 | 1.058 | 1.119 | 1.181 | 1.302 |
| 28.7 | 0.353 | 0.422 | 0.491 | 0.559 | 0.694 | 0.826 | 1.022 | 1.086 | 1.149 | 1.212 | 1.337 |
| 29 | 0.357 | 0.427 | 0.496 | 0.565 | 0.701 | 0.835 | 1.033 | 1.098 | 1.162 | 1.226 | 1.352 |
| 30 | 0.369 | 0.442 | 0.514 | 0.585 | 0.726 | 0.865 | 1.070 | 1.138 | 1.205 | 1.271 | 1.402 |
| 31.75 | 0.391 | 0.468 | 0.544 | 0.620 | 0.770 | 0.918 | 1.136 | 1.208 | 1.279 | 1.350 | 1.490 |
| 32 | 0.394 | 0.472 | 0.549 | 0.625 | 0.776 | 0.925 | 1.146 | 1.218 | 1.290 | 1.361 | 1.502 |
| 33 | 0.407 | 0.487 | 0.566 | 0.645 | 0.801 | 0.955 | 1.183 | 1.258 | 1.332 | 1.406 | 1.552 |
| 34 | 0.419 | 0.502 | 0.584 | 0.665 | 0.826 | 0.986 | 1.221 | 1.298 | 1.375 | 1.451 | 1.602 |

* Austenitic grades

| DIAMETER FROM 35 TO 127 mm | THICKNESS (mm) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.5 | 0.6 | 0.7 | 0.8 | 1.0 | 1.2 | 1.5 | 1.6 | 1.7 | 1.8 | 2.0 |
| | THEORETICAL WEIGHTS kg/m | | | | | | | | | | |
| 35 | 0.432 | 0.517 | 0.601 | 0.685 | 0.851 | 1.016 | 1.258 | 1.338 | 1.417 | 1.496 | 1.653 |
| 38 | 0.469 | 0.562 | 0.654 | 0.745 | 0.926 | 1.106 | 1.371 | 1.458 | 1.545 | 1.632 | 1.803 |
| 38.1 | 0.471 | 0.563 | 0.656 | 0.747 | 0.929 | 1.109 | 1.375 | 1.462 | 1.549 | 1.636 | 1.808 |
| 39 | 0.482 | 0.577 | 0.671 | 0.765 | 0.951 | 1.136 | 1.408 | 1.498 | 1.588 | 1.677 | 1.853 |
| 40 | 0.495 | 0.592 | 0.689 | 0.785 | 0.977 | 1.166 | 1.446 | 1.538 | 1.630 | 1.722 | 1.903 |
| 42.4 | 0.525 | 0.628 | 0.731 | 0.833 | 1.037 | 1.238 | 1.536 | 1.635 | 1.732 | 1.830 | 2.023 |
| 43 | 0.532 | 0.637 | 0.741 | 0.845 | 1.052 | 1.256 | 1.559 | 1.659 | 1.758 | 1.857 | 2.053 |
| 44.4 | 0.550 | 0.658 | 0.766 | 0.873 | 1.087 | 1.298 | 1.611 | 1.715 | 1.818 | 1.920 | 2.123 |
| 44.45 | 0.550 | 0.659 | 0.767 | 0.874 | 1.088 | 1.300 | 1.613 | 1.717 | 1.820 | 1.922 | 2.126 |
| 45 | 0.557 | 0.667 | 0.776 | 0.885 | 1.102 | 1.316 | 1.634 | 1.739 | 1.843 | 1.947 | 2.153 |
| 48.3 | 0.598 | 0.717 | 0.834 | 0.951 | 1.184 | 1.415 | 1.758 | 1.871 | 1.984 | 2.096 | 2.319 |
| 50 | 0.620 | 0.742 | 0.864 | 0.986 | 1.227 | 1.466 | 1.822 | 1.939 | 2.056 | 2.172 | 2.404 |
| 50.8 | 0.630 | 0.754 | 0.878 | 1.002 | 1.247 | 1.490 | 1.852 | 1.971 | 2.090 | 2.208 | 2.444 |
| 51 | | | | 1.006 | 1.252 | 1.496 | 1.859 | 1.979 | 2.098 | 2.217 | 2.454 |
| 52 | | | | 1.026 | 1.277 | 1.526 | 1.897 | 2.019 | 2.141 | 2.262 | 2.504 |
| 53 | | | | 1.046 | 1.302 | 1.556 | 1.934 | 2.059 | 2.184 | 2.308 | 2.554 |
| 54 | | | | 1.066 | 1.327 | 1.586 | 1.972 | 2.099 | 2.226 | 2.353 | 2.604 |
| 55 | | | | 1.086 | 1.352 | 1.616 | 2.009 | 2.139 | 2.269 | 2.398 | 2.654 |
| 60 | | | | 1.186 | 1.477 | 1.767 | 2.197 | 2.340 | 2.482 | 2.623 | 2.904 |
| 60.3 | | | | | 1.485 | 1.776 | 2.208 | 2.352 | 2.494 | 2.637 | 2.919 |
| 63.5 | | | | | 1.565 | 1.872 | 2.329 | 2.480 | 2.631 | 2.781 | 3.080 |
| 65 | | | | 1.286 | 1.602 | 1.917 | 2.385 | 2.540 | 2.694 | 2.848 | 3.155 |
| 70 | | | | 1.386 | 1.728 | 2.067 | 2.573 | 2.740 | 2.907 | 3.074 | 3.405 |
| 75 | | | | | 1.853 | 2.217 | 2.761 | 2.941 | 3.120 | 3.299 | 3.656 |
| 76.1 | | | | | 1.880 | 2.250 | 2.802 | 2.985 | 3.167 | 3.349 | 3.711 |
| 80 | | | | 1.586 | 1.978 | 2.368 | 2.948 | 3.141 | 3.333 | 3.524 | 3.906 |
| 88.9 | | | | | 2.201 | 2.635 | 3.283 | 3.497 | 3.712 | 3.926 | 4.352 |
| 101.6 | | | | | 2.519 | 3.017 | 3.760 | 4.006 | 4.252 | 4.498 | 4.988 |
| 114.3 | | | | | 2.837 | 3.398 | 4.237 | 4.515 | 4.793 | 5.070 | 5.624 |
| 120 | | | | | 2.980 | 3.569 | 4.451 | 4.743 | 5.036 | 5.327 | 5.909 |
| 127 | | | | | 3.155 | 3.780 | 4.714 | 5.024 | 5.333 | 5.643 | 6.260 |

Thickness of 2.5 mm are also available upon request

SURFACE FINISHES: brushed, polished and mirror polished

# STRUCTURAL TUBES (STR 12 – EN 1.4003)

## RECTANGULAR TUBES

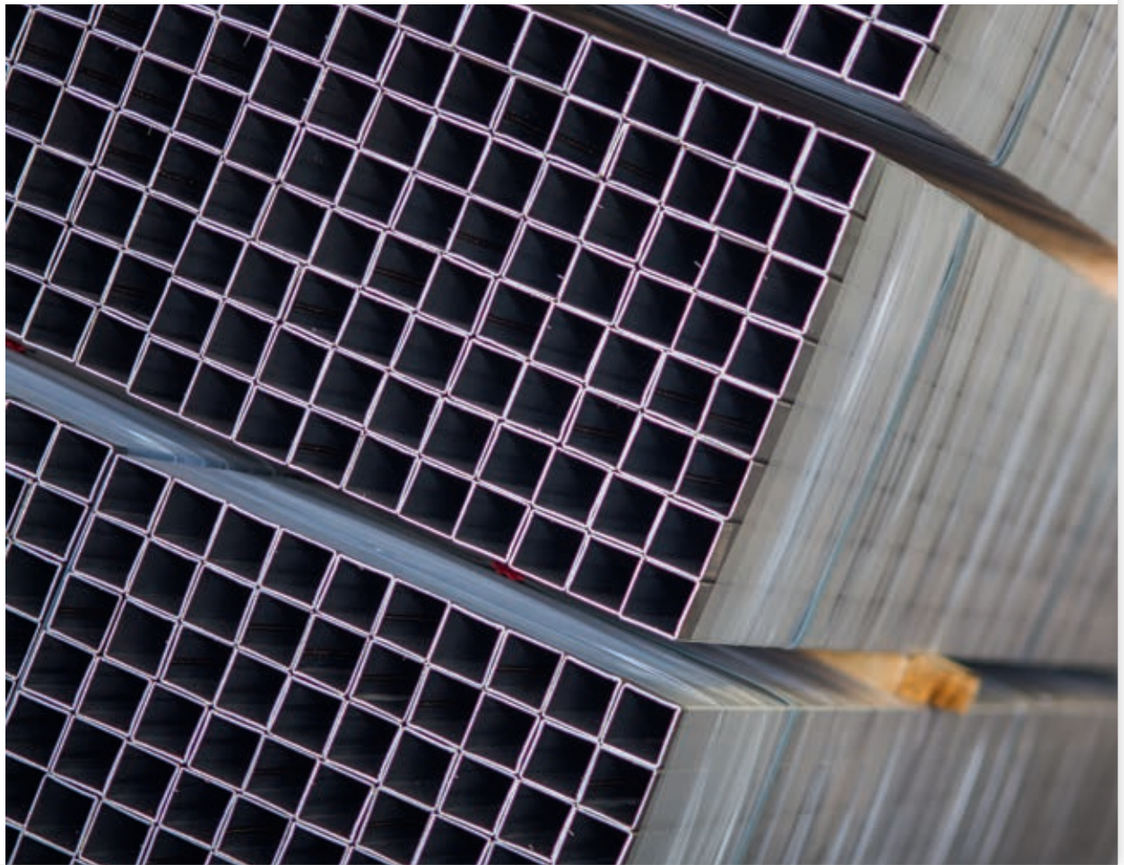
| SECTION (mm) | 1,00 | 1,20 | 1,50 | 2,00 | 2,50 | 3,00 |
|---|---|---|---|---|---|---|
| | THEORETICAL WEIGHTS kg/m | | | | | |
| 30x20 | 0,749 | 0,893 | 1,105 | 1,450 | | |
| 40x20 | 0,904 | 1,079 | 1,337 | 1,759 | | |
| 40x30 | 1,058 | 1,264 | 1,569 | 2,068 | | |
| 50x25 | 1,136 | 1,357 | 1,685 | 2,223 | | |
| 50x30 | | | 1,802 | 2,378 | | |
| 50x40 | | | 2,034 | 2,687 | | |
| 60x30 | | | 2,034 | 2,687 | | |
| 60x40 | | | 2,266 | 2,996 | 3,715 | 4,422 |
| 60x50 | | | | 3,306 | 4,102 | 4,886 |
| 80x30 | | | | 3,306 | 4,102 | 4,886 |
| 80x40 | | | 3,615 | 4,489 | | 5,350 |
| 80x60 | | | 3,194 | 4,234 | | 6,278 |
| 100x40 | | | 3,194 | 4,234 | | 6,278 |
| 100x50 | | | 3,426 | 4,543 | | 6,742 |
| 100x60 | | | 3,658 | 4,853 | | 7,206 |
| 120x40 | | | 3,658 | 4,853 | 6,035 | 7,206 |
| 120x60 | | | 4,122 | 5,471 | | 8,134 |
| 120x80 | | | | 6,090 | | 9,062 |
| 140x80 | | | | 6,709 | | 9,990 |
| 150x50 | | | | 6,090 | | 9,062 |
| 150x100 | | | | 7,637 | | 11,382 |
| 160x80 | | | | 7,327 | | 10,918 |

Thickness of 2.5 mm are also available upon request

SURFACE FINISH: mill finish

## SQUARE TUBES

| SECTION | 1,00 | 1,20 | 1,50 | 2,00 | 2,50 | 3,00 |
|---|---|---|---|---|---|---|
| | THEORETICAL WEIGHTS KG/M | | | | | |
| 20x20 | 0,594 | 0,707 | 0,873 | 1,140 | | |
| 25x25 | 0,749 | 0,893 | 1,105 | 1,45 | | |
| 30x30 | 0,904 | 1,079 | 1,337 | 1,759 | | 2,566 |
| 35x35 | 1,058 | 1,264 | 1,569 | 2,068 | | 3,03 |
| 40x40 | 1,213 | 1,45 | 1,802 | 2,378 | 2,942 | 3,494 |
| 50x50 | | | 2,266 | 2,996 | | 4,422 |
| 60x60 | | | | 3,615 | | 5,35 |
| 80x80 | | | | 4,853 | | 7,206 |
| 100x100 | | | | | | 9,062 |
| 120x120 | | | | | | 10,918 |



# INDUSTRIAL TUBES

## ROUND TUBES *

| DIAMETER FROM 8 TO 34 mm | THICKNESS (mm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 0.5 | 0.6 | 0.7 | 0.8 | 1.0 | 1.2 | 1.5 | 2.0 |
| | THEORETICAL WEIGHTS kg/m | | | | | | | |
| 8 | 0.094 | 0.111 | 0.128 | 0.144 | 0.175 | 0.204 | 0.244 | |
| 10 | 0.119 | 0.141 | 0.163 | 0.184 | 0.225 | 0.264 | 0.319 | |
| 12 | 0.144 | 0.171 | 0.198 | 0.224 | 0.275 | 0.324 | 0.394 | |
| 13 | 0.156 | 0.186 | 0.216 | 0.244 | 0.300 | 0.355 | 0.432 | |
| 14 | 0.169 | 0.201 | 0.233 | 0.264 | 0.326 | 0.385 | 0.469 | |
| 15 | 0.182 | 0.216 | 0.251 | 0.284 | 0.351 | 0.415 | 0.507 | |
| 15.88 | 0.193 | 0.230 | 0.266 | 0.302 | 0.373 | 0.441 | 0.540 | |
| 16 | 0.194 | 0.231 | 0.268 | 0.304 | 0.376 | 0.445 | 0.545 | |
| 17.4 | 0.212 | 0.252 | 0.293 | 0.333 | 0.411 | 0.487 | 0.597 | |
| 18 | 0.219 | 0.261 | 0.303 | 0.345 | 0.426 | 0.505 | 0.620 | |
| 19 | 0.232 | 0.276 | 0.321 | 0.365 | 0.451 | 0.535 | 0.657 | 0.851 |
| 19.05 | 0.232 | 0.277 | 0.322 | 0.366 | 0.452 | 0.536 | 0.659 | 0.854 |
| 20 | 0.244 | 0.291 | 0.338 | 0.385 | 0.476 | 0.565 | 0.695 | 0.901 |
| 21.3 | 0.260 | 0.311 | 0.361 | 0.411 | 0.508 | 0.604 | 0.744 | 0.966 |
| 21.8 | 0.267 | 0.318 | 0.370 | 0.421 | 0.521 | 0.619 | 0.762 | 0.992 |
| 22 | 0.269 | 0.321 | 0.373 | 0.425 | 0.526 | 0.625 | 0.770 | 1.002 |
| 22.22 | 0.272 | 0.325 | 0.377 | 0.429 | 0.531 | 0.632 | 0.778 | 1.013 |
| 23 | 0.282 | 0.337 | 0.391 | 0.445 | 0.551 | 0.655 | 0.807 | 1.052 |
| 24 | 0.294 | 0.352 | 0.408 | 0.465 | 0.576 | 0.685 | 0.845 | 1.102 |
| 25 | 0.307 | 0.367 | 0.426 | 0.485 | 0.601 | 0.715 | 0.883 | 1.152 |
| 25.4 | 0.312 | 0.373 | 0.433 | 0.493 | 0.611 | 0.727 | 0.898 | 1.172 |
| 26.9 | 0.331 | 0.395 | 0.459 | 0.523 | 0.648 | 0.772 | 0.954 | 1.247 |
| 27 | 0.332 | 0.397 | 0.461 | 0.525 | 0.651 | 0.775 | 0.958 | 1.252 |
| 28 | 0.344 | 0.412 | 0.478 | 0.545 | 0.676 | 0.805 | 0.995 | 1.302 |
| 28.7 | 0.353 | 0.422 | 0.491 | 0.559 | 0.694 | 0.826 | 1.022 | 1.337 |
| 29 | 0.357 | 0.427 | 0.496 | 0.565 | 0.701 | 0.835 | 1.033 | 1.352 |
| 30 | 0.369 | 0.442 | 0.514 | 0.585 | 0.726 | 0.865 | 1.070 | 1.402 |
| 31.75 | 0.391 | 0.468 | 0.544 | 0.620 | 0.770 | 0.918 | 1.136 | 1.490 |
| 32 | 0.394 | 0.472 | 0.549 | 0.625 | 0.776 | 0.925 | 1.146 | 1.502 |
| 33 | 0.407 | 0.487 | 0.566 | 0.645 | 0.801 | 0.955 | 1.183 | 1.552 |
| 34 | 0.419 | 0.502 | 0.584 | 0.665 | 0.826 | 0.986 | 1.221 | 1.602 |

| DIAMETER FROM 35 TO 127 mm | THICKNESS (mm) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 0.5 | 0.6 | 0.7 | 0.8 | 1.0 | 1.2 | 1.5 | 2.0 |
| | THEORETICAL WEIGHTS kg/m | | | | | | | |
| 35 | 0.432 | 0.517 | 0.601 | 0.685 | 0.851 | 1.016 | 1.258 | 1.653 |
| 38 | 0.469 | 0.562 | 0.654 | 0.745 | 0.926 | 1.106 | 1.371 | 1.803 |
| 38.1 | 0.471 | 0.563 | 0.656 | 0.747 | 0.929 | 1.109 | 1.375 | 1.808 |
| 39 | 0.482 | 0.577 | 0.671 | 0.765 | 0.951 | 1.136 | 1.408 | 1.853 |
| 40 | 0.495 | 0.592 | 0.689 | 0.785 | 0.977 | 1.166 | 1.446 | 1.903 |
| 42.4 | 0.525 | 0.628 | 0.731 | 0.833 | 1.037 | 1.238 | 1.536 | 2.023 |
| 43 | 0.532 | 0.637 | 0.741 | 0.845 | 1.052 | 1.256 | 1.559 | 2.053 |
| 44.4 | 0.550 | 0.658 | 0.766 | 0.873 | 1.087 | 1.298 | 1.611 | 2.123 |
| 44.45 | 0.550 | 0.659 | 0.767 | 0.874 | 1.088 | 1.300 | 1.613 | 2.126 |
| 45 | 0.557 | 0.667 | 0.776 | 0.885 | 1.102 | 1.316 | 1.634 | 2.153 |
| 48.3 | 0.598 | 0.717 | 0.834 | 0.951 | 1.184 | 1.415 | 1.758 | 2.319 |
| 50 | 0.620 | 0.742 | 0.864 | 0.986 | 1.227 | 1.466 | 1.822 | 2.404 |
| 50.8 | 0.630 | 0.754 | 0.878 | 1.002 | 1.247 | 1.490 | 1.852 | 2.444 |
| 51 | | | | 1.006 | 1.252 | 1.496 | 1.859 | 2.454 |
| 52 | | | | 1.026 | 1.277 | 1.526 | 1.897 | 2.504 |
| 53 | | | | 1.046 | 1.302 | 1.556 | 1.934 | 2.554 |
| 54 | | | | 1.066 | 1.327 | 1.586 | 1.972 | 2.604 |
| 55 | | | | 1.086 | 1.352 | 1.616 | 2.009 | 2.654 |
| 60 | | | | 1.186 | 1.477 | 1.767 | 2.197 | 2.904 |
| 60.3 | | | | | 1.485 | 1.776 | 2.208 | 2.919 |
| 63.5 | | | | | 1.565 | 1.872 | 2.329 | 3.080 |
| 65 | | | | | 1.602 | 1.917 | 2.385 | 3.155 |
| 70 | | | | | 1.728 | 2.067 | 2.573 | 3.405 |
| 75 | | | | | 1.853 | 2.217 | 2.761 | 3.656 |
| 76.1 | | | | | 1.880 | 2.250 | 2.802 | 3.711 |
| 80 | | | | | | 2.368 | 2.948 | 3.906 |
| 88.9 | | | | | | 2.635 | 3.283 | 4.352 |
| 101.6 | | | | | | 3.017 | 3.760 | 4.988 |
| 114.3 | | | | | | 3.398 | 4.237 | 5.624 |
| 120 | | | | | | 3.569 | 4.451 | 5.909 |
| 127 | | | | | | 3.780 | 4.714 | 6.260 |

Thickness of 2.5 mm are also available upon request

* Austenitic grades

SURFACE FINISH: mill finish

# GENERAL TOLERANCES

| DIMENSIONAL TOLERANCES FOR ROUND COMMERCIAL-LENGTH TUBES | | | |
|---|---|---|---|
| | GUARANTEED VALUES | TYPICAL VALUES | NOTES |
| **Thickness** | +/- 10% with min ± 0,2 | +1 / - 7% | |
| **Diameter** | +/- 0,75% with ± 0,3 | + 0,10 / - 0,20 mm | |
| **Length** | - 0 / + 50 mm | - 0 / + 50 mm | |
| **Internal bead** | - 0 / +10% max 0,20 mm | max 0,10 mm | |
| **Linearity** | 2,0 mm/m | 1,0 mm/m | |

| DIMENSIONAL TOLERANCES FOR FIX-LENGTH TUBES | | | |
|---|---|---|---|
| | GUARANTEED VALUES | TYPICAL VALUES | NOTES |
| **Length** | - 0 / + 1 mm | 0,50 mm | upon request +/- 0,5 mm |
| **Ovality on the cut** | 0,60 mm | 0,30 - 0,40 mm | $D_{max}$ - $D_{min}$ (*) at 1 D from cut end |

| DIMENSIONAL TOLERANCES ORNAMENTAL TUBES | |
|---|---|
| **Thickness** | ± 10% |
| **Dimensions base and height** | ± 0,50 % |
| **Length** | - 0 + 50 mm |
| **Thickness of the weld bead** | - 0 / +10% of the thickness; max 0,20 mm |
| **Linearity** | ≤ 2,0 mm per meter |
| **Torsion** | ≤ 2,0 mm for the first meter then 0,5 mm for the following |
| **Radius of the corners** | 1,2 x T +/- 20% (thickness ≤ 2,0 mm)<br>2,0 x T +/- 20% (thickness > 2,0 mm) |
| **Burr** | max 1,0 mm per thickness ≥ 2,5 mm<br>max 0,2 mm per thickness < 2,5 mm |

T = Thickness

# PERFORMANCES

## Ferritic grades

| MECHANICAL PROPERTIES OF THE TUBES | | | | |
|---|---|---|---|---|
| | | REFERENCE NORMS | GUARANTEED | TYPICAL |
| **AISI 409 LI<br>W 1.4512** | Rp02 (MPa) | > 210 | > 205 | 330 |
| | Rm (MPa) | > 380 | 400÷500 | 420 |
| | A5 (%) | > 25 | > 30 | 36÷38 |
| **AISI 441<br>W 1.4509<br>AISI 439<br>W 1.4510 etal.** | Rp02 (MPa) | > 230 | > 300 | 380 |
| | Rm (MPa) | > 420 | > 450 | 490 |
| | A5 (%) | > 20 | > 28 | 32÷34 |
| **W 1.4003** | Rp02 (MPa) | > 280 | > 300 | 350 |
| | Rm (MPa) | > 450 | > 450 | 480 |
| | A5 (%) | > 20 | > 20 | 22 |

| TECHNOLOGICAL TEST ON THE EXHAUST SYSTEM TUBE AISI 409 LI / W 1.4512 | | | |
|---|---|---|---|
| | REFERENCE NORMS | GUARANTEED | TYPICAL |
| **Flattening test** | 2xT + 16 mm | 2xT + 16 mm | 2xT |
| **Cone expansion** | 30% | 30% | 30% |
| **Radial expansion** | - | 20% | 30% |

T = Thickness

## Austenitic grades

| MECHANICAL PROPERTIES OF THE ROUND TUBES | | | |
|---|---|---|---|
| | REFERENCE NORMS | GUARANTEED | TYPICAL |
| **Rp02 (MPa)** | > 200 | > 300 | 400 |
| **Rm (MPa)** | > 500 | > 550 | 600 |
| **A5 (%)** | > 40 | > 40 | 50÷55 |
| **Hv 5** | < 220 | < 220 | < 220 |

| TECHNOLOGICAL TEST ON THE TUBES | | | |
|---|---|---|---|
| | REFERENCE NORMS | GUARANTEED | TYPICAL |
| **Flattening test** | 2xT + 16 mm | 2xT | 2xT |
| **Cone expansion** | 40% | 40% | 50% |
| **Radial expansion** | - | 30% | 33 - 35% |

T = Thickness

# TECHNICAL FEATURES

## TECHNICAL REFERENCES STANDARDS

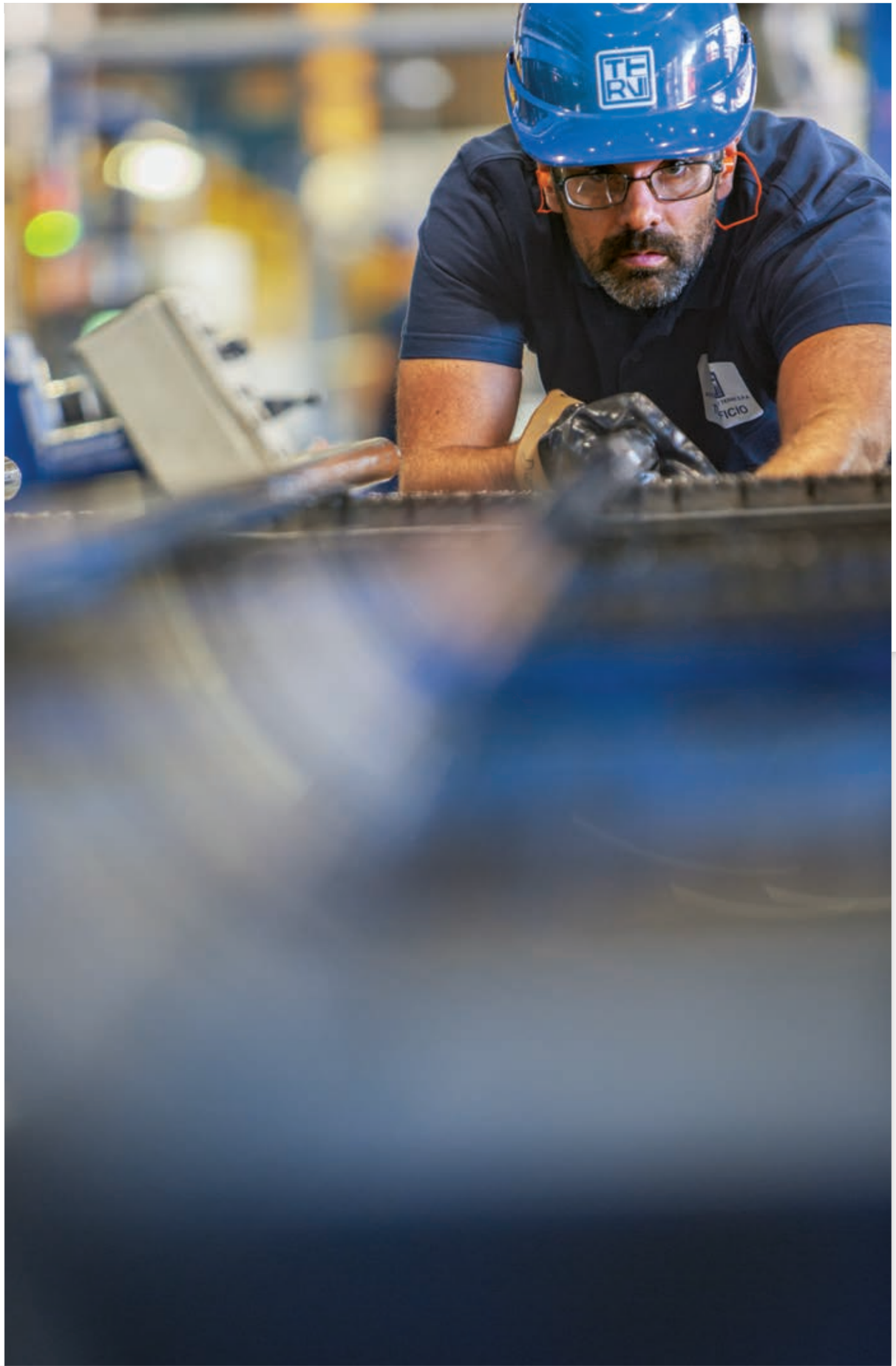
ISO 9001: Quality System Standards
ISO 14001 Environmental System Standards
OH SAS 18001 Safety system standards
IATF 16949: SQ automotive sector standards
EN 10204: Test certificates for stainless steel products
EN 10088: Chemical composition standards for stainless steel
EN 10028-7: Flat products made of steel for pressure purpose, stainless Steels
EN 10095: Chemical composition and Mechanical properties standards for stainless steel EN ISO 1127: Dimensional standards and tolerances

## MANUFACTURING STANDARDS

EN 10296-2
EN 10217-7
AD 2000 - Merkblatt W0
ASTM: A554, A791, A450
NFA: 49647
EN 10217-7

## QUALITY CONTROL STANDARDS

EN 10002, 10246
ASTM A426
EN ISO 6892-1, 8492, 8493, 10893



# 45,000 SQUARE METERS AND THE PASSION OF A LABOUR FORCE MADE OF ABOUT 160 PEOPLE.

# OUR SERVICES

On time quality services are core values always at work.

Product innovation is functional to customer needs and works in parallel with quality and punctuality.
These values are the building blocks of our philosophy applied to our entire manufacturing cycle.
The final product, shipped directly or delivered to a warehouse close to our end customer, is promptly made available at any particular request.
This customer support, helps us to reach our eight times per day just-in-time client delivery and consignment goal.
This flexibility helps our customers shorten their supply chains and inventory requirements, thus achieving a reduction in costs and improved efficiency.
Each customer can follow and personally feel our manufacturing workflow by connecting to our highly advanced IT system panel and visually monitor step by step all our manufacturing phases from their office: from placing the order to the manufacturing of the goods and ending with the packaging and delivery of the finished material to their final destination.

**Over 40 warehouses and depots located throughout Europe**

**Thanks to a password everything is under control**

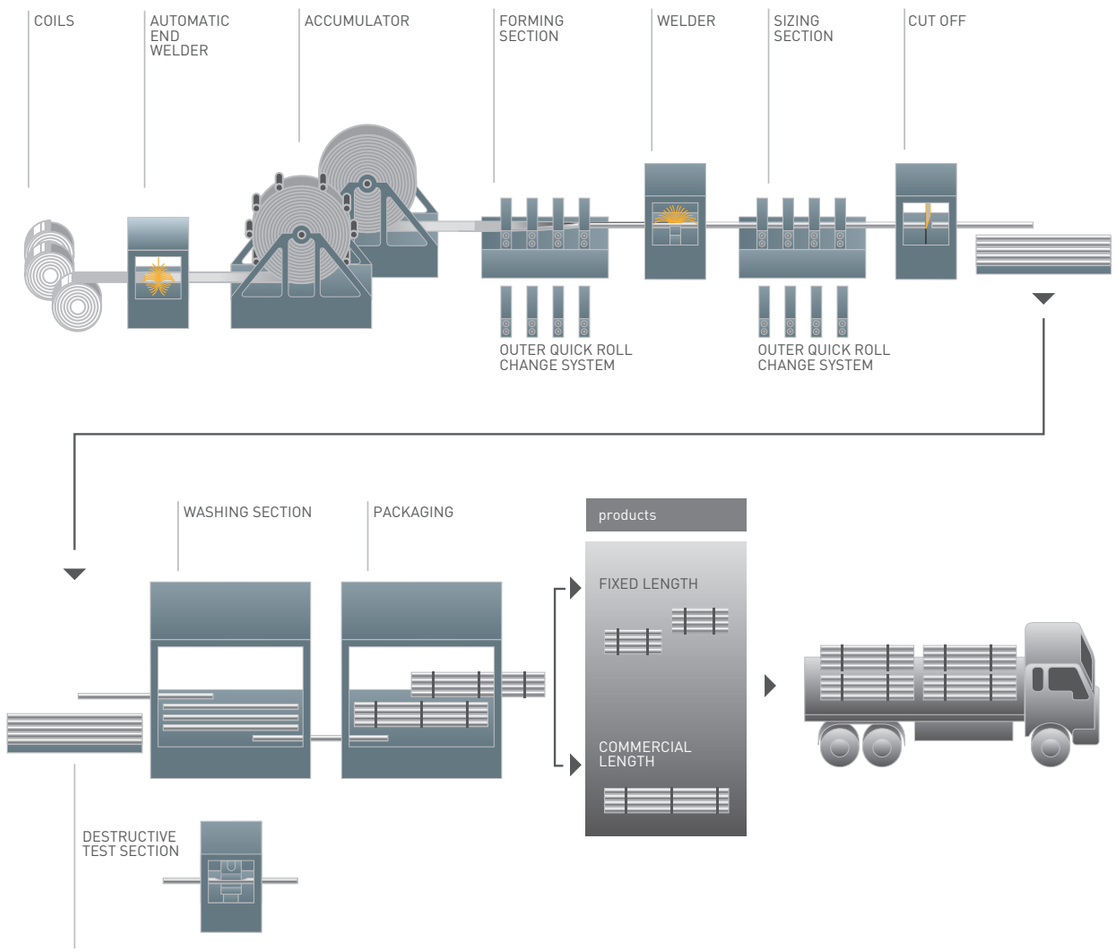
# OUR SAFETY, ENVIRONMENTAL AND QUALITY MANAGEMENT SYSTEM

Tubes production follows an organized workflow under Quality Management Systems certified by third-party entities such as Det Norske Veritas for ISO 9001 since 1995, subsequently in accordance with QS 9000 and ISO TS 16949. Additionally the QMS was certified for Safety and Environmental Systems as for OH SAS 18001 and ISO 14001. Currently, electro-welded tubes production has a certified quality system according to ISO 9001 (CERT - 00358-95 - AQROM - SINCERT) and IATF 16949 (CERT - 06420-2004 - AQ - HOU- IATF).
These certifications cover the workflow organization for the production of tubes for both ornamental use and the automotive industry.
For specific applications, tubes production has obtained TÜV certification according to AD 2000 Merkblatt W0 and in compliance to PED 97/23 / EC.
Pursuing continuous improvements in the manufacturing process and of the product, tubes production is oriented to a six sigma approach extensively aligned and embedded in the more complex structure of the six sigma of the group.

# OUR MANUFACTURING CYCLE

The manufacturing cycle of electro-welded stainless steel tubes is fully integrated with stainless steel flat products within the Acciai Speciali Terni industrial plant.
The smooth, flexible and integrated organization, always at the forefront and oriented towards constant innovation, provides our customers and market needs with timely responses wherever they may be found and located.

# ORDER TRACKING SYSTEM: OUR CUSTOMERS WILL ALWAYS HAVE CONTROL OVER ORDER FLOW AND DELIVERY OVERVIEW.



**ELECTRO-WELDED**
**STAINLESS STEEL TUBES**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