NEOTISS
HIGH PERFORMANCE TUBE

NEOTISS

A spirit of excellence

NEOTISS is the world leader in premium welded tubular solutions, serving all demanding markets. Our greatest pride and responsibility is to meet and exceed customer expectations.
« Beyond the tube » translates our desire to offer every client the best solution beyond specifications with tailored products and services.

NEOTISS

Quality and safety

We provide the highest level of quality and safety. This level is guaranteed by our stringent control procedures and unchallenged technical experience. Every tube leaving our facilities is controlled, safe and traceable. Our best testimony of product quality is our long list of references worldwide.

Innovation

Our innovation teams develop ambitious innovation and research programs to enhance the performance of our tubes in the toughest environments.

Premium at heart

Our offer is based on an exclusive relationship and dialogue with our clients : every order is tailored to meet all its requirements. Our premium offers include a variety of specifications and services all along the value chain.

Close to market

You can rely on our local sales force and our worldwide factory network in 4 countries on 3 continents.

Markets

Tubes for every application

We supply high performance welded tubes for various markets from power generation (nuclear, thermal and renewable), desalination, petrochemical & chemical, process applications to automotive or aerospace.
Our tubes are notably used in Condensers, high-pressure and low-pressure FeedWater Heaters as well as MSRs (Moisture Separator Steam Reheaters), EGR Cooler or SCR systems.

Tough, reliable and durable

NEOTISS has extended its expertise to high-performance products for the harshest environments. We can provide tubes that sustain seawater, brackish water or corrosive products with outstanding durability and reliability.

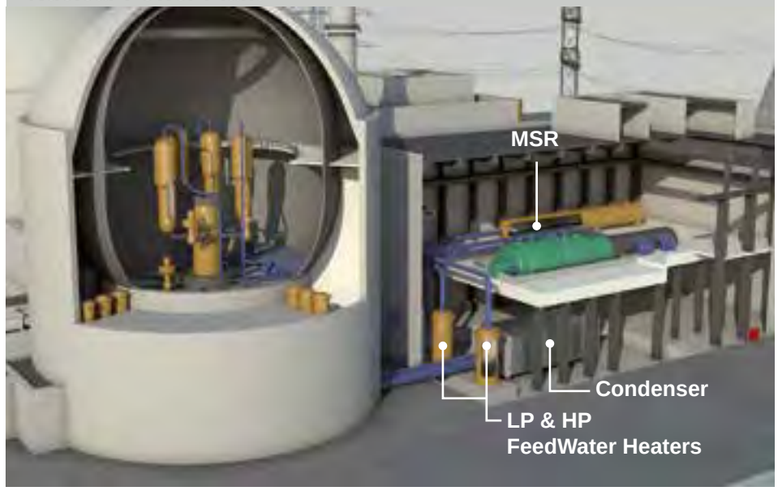
Wherever you need high performance thin welded tubes, NEOTISS can deliver

Power Plants

We deliver technologically advanced tubes guaranteeing the best dimensional and metallurgical characteristics for Nuclear Power Plants, Thermal Power Plants, Renewable Energy Power Plants (Geothermal, Concentrating Solar Power, and Ocean Thermal Energy Conversion).

More than
500
power plants delivered

Nuclear Power Plant



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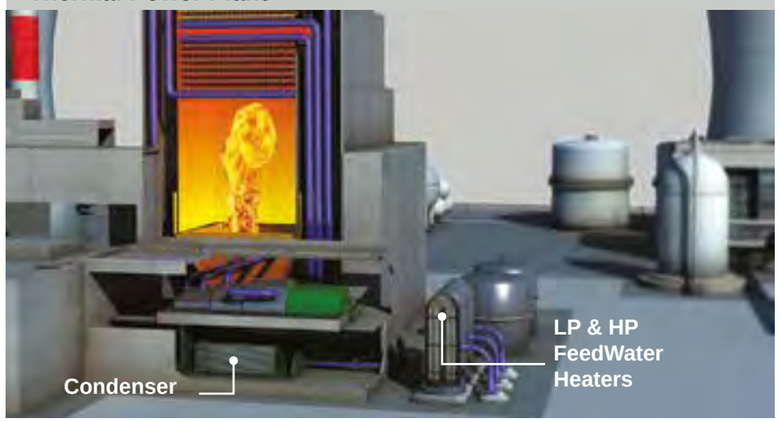
Thermal Power Plant



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Desalination

As a leader in large titanium projects, NEOTISS is there to serve the Desalination market and its requirements.

More than
100
desalination plants delivered

Petrochemical & Chemical and Other Process Applications

These applications require tubes able to resist corrosive and high-temperature operating environments. At NEOTISS, we tailor products for the most challenging applications in the world with a wide range of grades and dimensions.

More than
20
LNG trains delivered

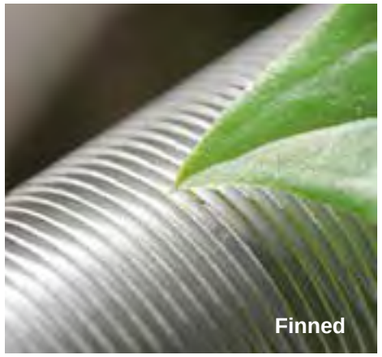
Automotive

Our Automotive tubes are designed and selected by automotive equipment manufacturers in particular for EGR coolers and SCR systems. We are able to mass-produce at a PPM level.

More than
9 million
cars equipped

Aerospace

The Aerospace market uses demanding applications with very tight requirements such as hydraulic lines or ducting systems.



Products

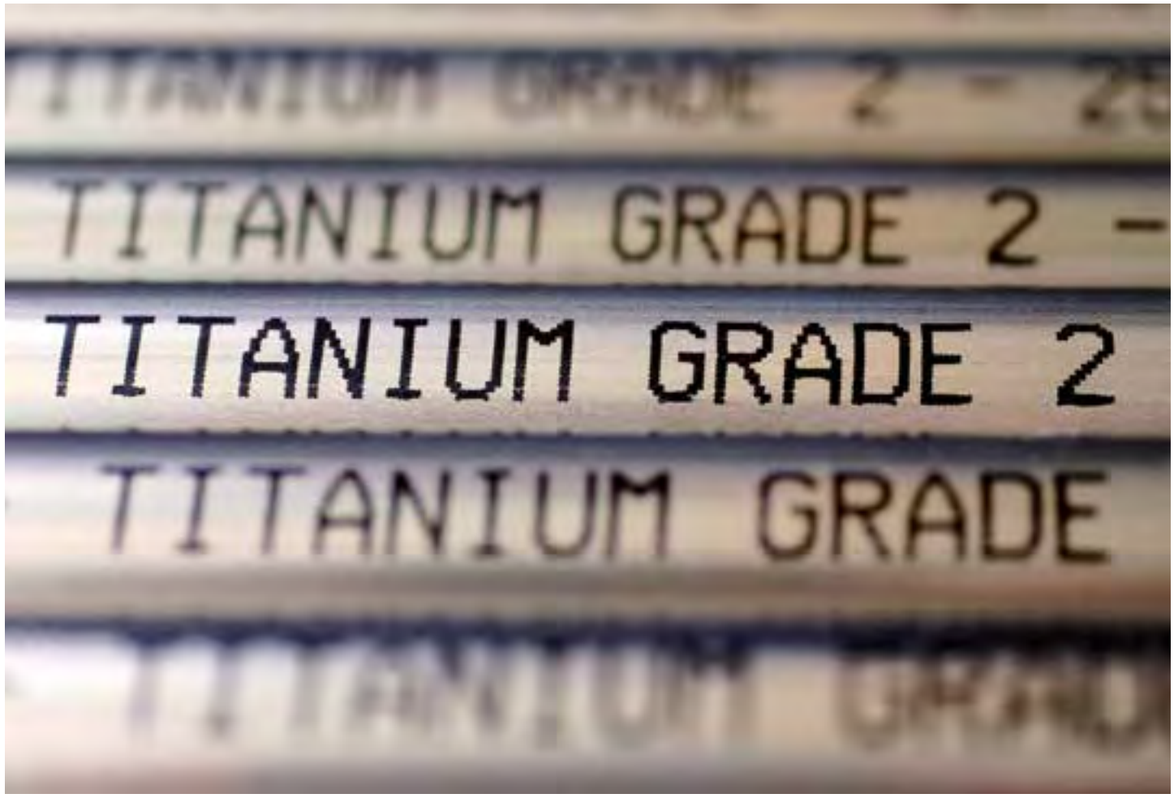
Welded tubes, tailored to your needs

NEOTISS provides a wide range of grades and sizes: titanium, austenitic stainless steel, ferritic stainless steel (TP439 used for MSR and FWH HP), duplex, super stainless steel and other specific high alloys grades. Our tubes can be straight or U-bent and smooth or with enhanced surface (corrugated, low finned, helix, and inner ribbed). We can also produce different shapes from round, oblong, or square to rectangular tubes. Each order is unique and every tube delivered has been defined, designed, produced, inspected and packaged.

The weld : a proven reliability

Tube welding technology guarantees the best dimensional characteristics for your tubes. The thickness is constant and high performance thin walls are possible. The diameter and weld bead thickness are always under control as well as every metallurgical characteristic.

Premium titanium & stainless steel welded tubes



Titanium

The superior solution

Titanium is the most efficient and cost-effective material for an increasing number of applications. It offers unmatched corrosion resistance combined with high mechanical properties.
Moreover, our titanium welded tubes can be manufactured in very thin-wall gauges saving both on cost and weight.

Titanium experts

World leader in titanium tubes, NEOTISS has the experience and expertise to bring the highest level of technical assistance, to help integrate titanium tubes with our customers' design. In addition we have secured access to superior titanium strip, with a capacity to meet the needs of the market.

Proven reliability
Zero corrosion

Manufacturing process

Expert manufacturing process

Tube mill strip is uncoiled and fed through a multiple stand forming mill which shapes the strip into a tube. The tube is welded without filler metal in an inert atmosphere using a non-consumable tungsten electrode (T.I.G. welding) or laser technology. Dimensional properties are achieved when the as-welded tube passes through a final, multi-stage sizing mill. Mechanical and thermal stresses are relieved by in-line induction heating under inert atmosphere. Afterwards, the tube is straightened, 100% Eddy Current (EC) tested, line marked, then automatically cut. Finished tube ends are deburred. The product is subsequently dimensionally inspected, tested through NDT controls (pneumatic testing, EC inspection and Ultrasonic Testing) and packaged to customer specification.

Excellence in every plant

Our manufacturing process is designed to guarantee the highest level of quality and safety for tubes, in accordance with customer specifications, and beyond. We believe in constantly improving our factories and production methods. Our equipment is state-of-the-art and we implement stringent maintenance procedures to ensure the highest quality of every tube coming off of our lines. Every NEOTISS factory shares the same values and practices, ensuring the same excellence everywhere, both in the production process and plant management.

Industry Leader in Finning Complex Metals

Fins are formed on bare tubes using a cold forming process. No metal is added or removed during finning operations. After finning, the tubes can be bright annealed and tested (Eddy Current, Hydrostatic). The low-profile fins increase the tube heat transfer area up to three times compared to a similar length bare tube. The stability and precision of our process is what makes our brands NEOTISS™ HPT Finned Tubes & NEOTISS™ MSR Tubes industry leaders.

Over 30 state-of-the-art welding lines in the world

Process control

Mastering the process control

With over 40 years of experience and continuous progress NEOTISS masters the entire welding process and provides the highest level of quality and safety in the market.

Non Destructive Testing (NDT)

NDT is at the heart of our quality process and is the result of an unmatched experience of welded tubing solutions. NEOTISS has always been a pioneer in NDT and provides high-end controls including ultrasonic, Eddy Current, pneumatic and hydraulic testings.

Leaders in ultrasonic testing

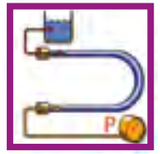
NEOTISS was the first company in the world to develop ultrasonic testing on welded tubes, as early as in 1977, exceeding the ASTM B 338 standard that only required Eddy Current inspection. Thanks to our research team, we have improved the ultrasonic testing on welded tubes and can offer it as standard for all demanding customers.

EDDY CURENT TESTING

ULTRASONIC TESTING

PNEUMATIC TESTING AIR/ AIR

PNEUMATIC TESTING AIR-UNDER WATER



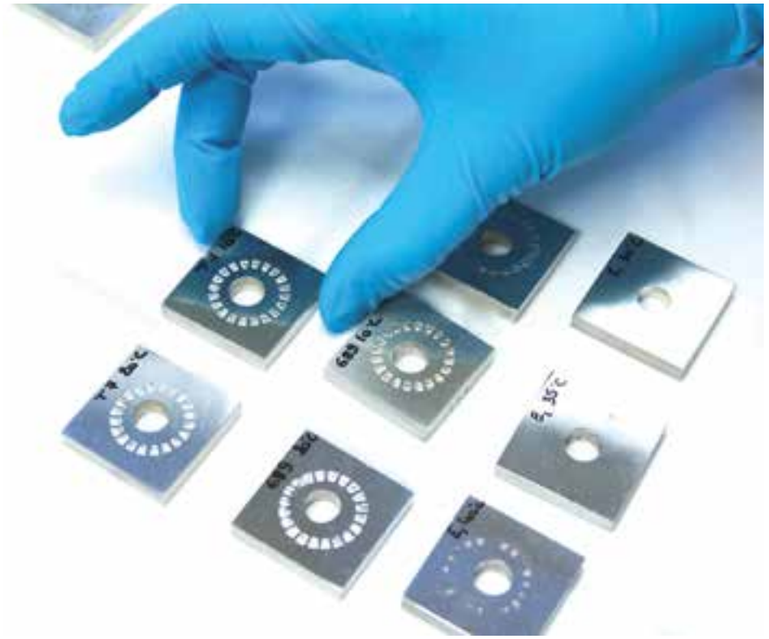
HYDRAULIC TESTING

Helium Test

NEOTISS developed the first in-line fully automatic helium leak test to control the integrity of its tubes. This leak testing method offers higher sensitivity and reliability to reduce the gap of detection between the final leak tests performed on heat exchangers and the standard leak test performed on tubes.

HÉLIUM

Certified quality and safety



NEOTISS dedicated resources

1
Integrated research center at the cutting edge of technology

10
Research and technical support managers

5
Technical partnerships with customers

Innovation

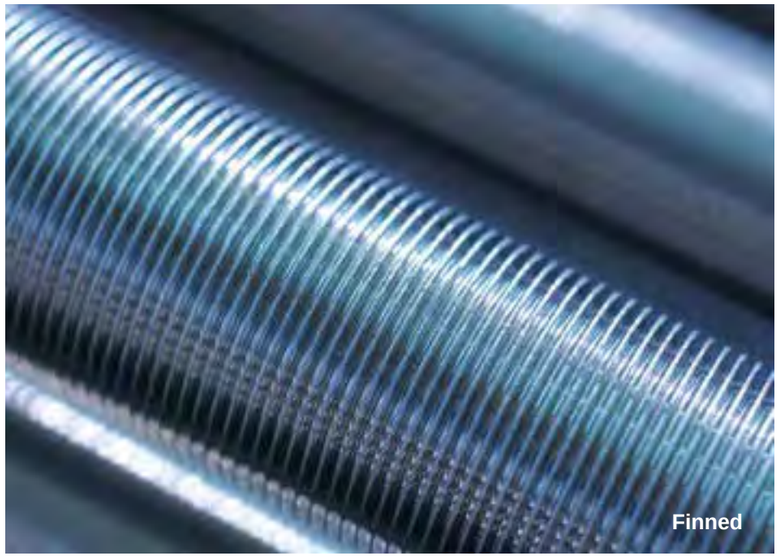
The power of NEOTISS research

NEOTISS endeavors to develop research and create innovative solutions for its customers with its own research center based in France.

Our Innovation teams deploy extensive research programs in two directions:

- ➔ To enhance the performance and longevity of our tubes in the toughest environments.
- ➔ To optimize the production process, including non destructive testing methods and premium packaging solutions.

We seek to design and produce uniquely tailored products for the most demanding applications in the world. Our most qualified engineers and experts are here for you : feel free to share your technical challenge with us!



Increase your performance
Lower your costs
Save energy

Heat exchange enhancement

Seeking optimal performance for a better cost of ownership

NEOTISS constantly develops its technology to procure thinner wall and enhanced surface tube. Finning and corrugation improve heat transfer and lower cost and size of the heat exchanger.

We provide for example NEOTISS™ MSR Tubes, ferritic finned tubes specially designed for MSR units. The ferritic material, TP439 is best suited for the high temperature in the MSR. Tube surface area is increased by 3x as a result of the finning process.

We also provide NEOTISS™ HPT Finned Tubes, a finned tubular solution which yields numerous benefits for shell and tube heat exchangers including reduced size and cost for new equipment, increased performance of existing equipment, and availability in corrosion resistant materials such as titanium and duplex stainless steel.

NEOTISS™ Helix Tubes

We developed a new generation of condenser tubes maximizing heat transfer performance by at least 40% versus smooth tubes[1]. The patented helix design is a longitudinal deformation generating turbulences within the fluid, reducing the boundary layer thermal resistance and therefore increasing the overall heat transfer of the tube. NEOTISS™ Helix Tubes can be a competitive solution for new projects (condenser of reduced size and cost) or a performance solution for retrofit projects (debottlenecking).

[1]Based on measurements performed on our pilot condenser

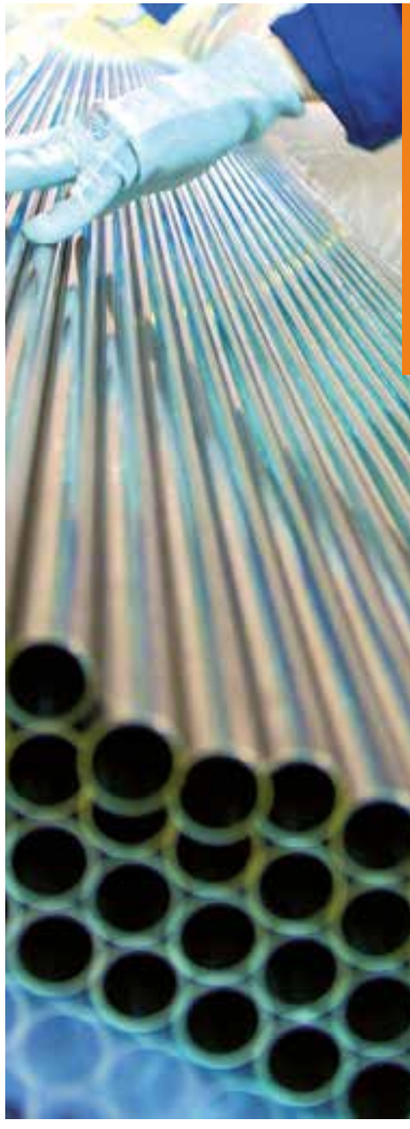
Premium service

Creative solutions

Client proximity is our pride. NEOTISS assists its customers in a creative way to support their most critical projects. We can help design a project and recommend the most adapted technical specifications and best available services. For example, we can offer exclusive services through long-term agreements and collaborative planning: secure price and availability of raw material, optimize logistics or deliver production flexibility. In other instances, for your most demanding projects (long tubes, stringent transport and storage conditions or specific tube installation), we can develop and produce customized packaging solutions.
Our ultimate goal is to deliver you the best service to lower your total cost of ownership.

Exclusive NEOTISS™ Pack Solution offer

On-site operations are tricky and involve a great number of teams and operators. We can make your life easier: ask about our on-site services. We can ease and secure deliveries and supervise handling, tubing and retubing operations. NEOTISS can bring you unmatched on-site assistance for optimal quality. Our services are tailored to your every specific need.



Optimized logistics
Packaging solutions
On site technical assistance

Typical standards and materials

	Standards			Applications					Typical chemical requirements in % according to ASTM								Tubing Typical Tensile requirements (min)		
	ASTM / grade (UNS N°)	Closest EN /*DIN / registered trademark grade	Neotiss	Feedwater Heaters	Condensers	Desalination	Process	Automotive	C	Mn	Si	Cr	Mo	Ni	Cu	Others	TS MPa ksi	YS 0,2 MPa ksi	El %
	STAINLESS STEELS																		
Ferritic	A 240 (S43940/S43932)	1.4509	441					X	≤0.03	≤1	≤1	17.5 18.5	–	–	–	Ti: 0.1/0.6 0.3 + 3xC≤Cb	430 62	250 36	18
	A 240 TP 444 (S44400)	1.4521	444					X	≤0.025	≤1	≤1	17.5 19.5	1.75 2.5	≤1	–	N ≤ 0.035 0.2+4(C+N)≤Ti+Cb≤0.80	415 60	275 40	20
	A 268 - A 803 TP 439 (S43035)	1.4510	439	X	X	X	X	X	≤0.07	≤1	≤1	17 19	–	≤0.5	–	Al < 0.15 N≤0.04 0.2+4(C+N)≤Ti≤1.10	415 60	205 30	20
	A 268 - A 803 (S44735)	1.4592 AL 29-4C®		X	X	X	X		≤0.03	≤1	≤1	28 30	3.6 4.2	≤1	–	N<0.045 Cb+Ti : 0.2/1 6(C+N)≤Ti+Cb	515 75	415 60	18
Duplex	A 789 - A 790 (S32101)	1.4162 LDX 2101®		X	X				≤0.04	4 6	≤1	21 22	0.10 0.80	1.35 1.70	0.10 0.80	0.20 ≤ N ≤ 0.25	700 101	530 77	30
	A 789 - A 790 (S32304)	1.4362	2304	X	X				≤0.03	≤2.5	≤1	21.5 24.5	0.05 0.6	3 5.5	0.05 0.6	0.05 ≤ N ≤ 0.20	600 (4) 87 (4)	400 (5) 58 (5)	25
	A 789 - A 790 (S32003)	AL 2003®		X	X				≤0.03	≤2	≤1	19.5 22.5	1.5 2	3 4	–	0.14 ≤ N ≤ 0.20	690 100	485 70	25
	A 789 - A 790 (S31803)	(SEW 400) 1.4462	22-05	X	X		X		≤0.03	≤2	≤1	21 23	2.5 3.5	4.5 6.5	–	0.08 ≤ N ≤ 0.20	620 90	450 65	25
	A 789 - A 790 (S32750)	1.4410	25-07		X				≤0.03	≤1.2	≤0.8	24 26	3.0 5.0	6.0 8.0	≤0.5	0.24 ≤ N ≤ 0.32	800 116	550 80	15
Austenitic	A 240 TP 301LN (S30153)	1.4318	301 LN					X	≤0.03	≤2	≤1	16 18	–	6 8	–	0.07 ≤ N ≤ 0.20	550 80	240 35	45
	A 249 - A 688 TP 304 (S30400)	1.4301	304	X	X			X	≤0.08	≤2	≤1	18 20	–	8 11	–	–	515 75	205 30	35
	A 249 - A 688 TP 304 L (S30403)	1.4306 1.4307	304 L	X	X		X	X	≤0.03	≤2	≤1	18 20	–	8 12	–	–	485 70	170 25	35
	A 249 - A 688 TP 304LN (S30453)	1.4311	304 LN	X					≤0.03	≤2	≤1	18 20	–	8 11	–	0.10 ≤ N ≤ 0.16	515 75	205 30	35
	A 249 - A 688 TP 316 (S31600)	1.4401	316	X	X		X	X	≤0.08	≤2	≤1	16 18	2 3	10 14	–	–	515 75	205 30	35
	A 249 - A 688 TP 316 L (S31603)	1.4404 (1.4435)	316 L	X	X		X	X	≤0.03	≤2	≤1	16 18	2 3	10 14	–	–	485 70	170 25	35
	A 312 TP 316 Ti (S31635)	1.4571	316 Ti	X				X	≤0.08	≤2	≤0.75	16 18	2 3	10 14	–	5(C+N)≤Ti≤0.7 N≤0.10	515 75	205 30	35
	A 249 TP 317 L (S31703)	1.4438	317 L		X				≤0.03	≤2	≤1	18 20	3 4	11 15	–	–	515 75	205 30	35
	A 249 TP 321 (S32100)	1.4541	321	X				X	≤0.08	≤2	≤1	17 19	–	9 12	–	5(C+N)≤Ti≤0.7 N≤0.10	515 75	205 30	35
	A 249 TP 317LMN (S31726)	1.4439	4439		X				≤0.03	≤2	≤1	17 20	4 5	14.5 17.5	–	0.10 ≤ N ≤ 0.20	550 80	240 35	35
	A 249 (N08904)	1.4539	904 L		X		X	X	≤0.02	≤2	≤1	19 23	4 5	23 28	1 2	–	490 71	215 31	35
	A 249 (S31254)	1.4547 254 SMO®			X				≤0.02	≤1	≤0.8	19.5 20.5	6 6.5	17.5 18.5	0.5 1	0.18 ≤ N ≤ 0.25	675 98	310 45	35
	TITANIUM ALLOYS								C	N	H	Fe	O	Other elements	Titanium				
	B 338 GR.1	3.7025*	Ti gr.1		X	X			≤0.08	≤0.03	≤0.015	≤0.20	≤0.18	EACH < 0.10 TOTAL < 0.40	rem.	240 35	138 20	24
	B 338 GR.2	3.7035*	Ti gr.2		X	X	X		≤0.08	≤0.03	≤0.015	≤0.30	≤0.25		rem.	345 50	275 40	20
	B 338 GR.3	3.7055*	Ti gr.3				X		≤0.08	≤0.05	≤0.015	≤0.30	≤0.35		rem.	450 65	380 55	18
	B 338 GR.7	3.7225*	Ti gr.7				X		≤0.08	≤0.03	≤0.015	≤0.30	≤0.25	0.12≤Pd≤0.25	rem.	345 50	275 40	20
	B 338 GR.9	_	Ti gr.9						≤0.08	≤0.03	≤0.015	≤0.25	≤0.15	2.5≤Al≤3.5 2≤V≤3	rem.	620 (3) 90	483 70	15
	B 338 GR.12	3.7105*	Ti gr.12				X		≤0.08	≤0.03	≤0.015	≤0.30	≤0.25	0.2≤Mo≤0.4 0.6≤Ni≤0.9	rem.	483 70	345 50	18
	B 338 GR.16	_	Ti gr.16				X		≤0.08	≤0.03	≤0.015	≤0.30	≤0.25	0.04≤Pd≤0.08	rem.	345 50	275 40	20
	NICKEL ALLOYS								Ni	Cr	Mo	Fe	W	Co	Ti	Others			
	B 704 N06625	2.4856	625				X		>58	20 23	8 10	≤5	_	≤1.0	≤0.4	C ≤ 0.10; Mn ≤ 0.50; Si ≤ 0.5; P ≤ 0.015; S ≤ 0.015; Al ≤ 0.4; 3.15 ≤ Cb+Ta ≤ 4.15	825 120	415 60	30
	B 704 N08825	2.4858	825				X		38 46	19.5 23.5	2.5 3.5	>22	–	–	0.6 1.2	C ≤ 0.05; Mn ≤ 1.0; Si ≤ 0.5; S ≤ 0.03; Al ≤ 0.2; 1.5 ≤ Cu ≤ 3.0	586 85	240 35	30
	B 626 N10276	2.4819	C276				X		rem.	14.5 16.5	15 17	4.0 7.0	3.0 4.5	≤2.5	–	C ≤ 0.015; Mn ≤ 1.0; Si ≤ 0.08; P ≤ 0.04; S ≤ 0.03; V ≤ 0.35	690 100	283 41	40
	B 626 N06022	1.0402	C22				X		rem.	20 22.5	12.5 14.5	2.0 6.0	2.5 3.5	≤2.5	–	C ≤ 0.015; Mn ≤ 0.5; Si ≤ 0.08; P ≤ 0.02; S ≤ 0.02; V ≤ 0.35	690 100	310 45	45
	B 626 N06059	2.4605	59				X		rem.	22 24	15 16.5	≤1.5	–	≤0.3	–	C ≤ 0.01; Mn ≤ 0.5; Si ≤ 0,01; P ≤ 0.015; S ≤ 0.01; Cu ≤ 0.01; 0.1 < Al ≤ 0.4;	690 100	310 45	45

Typical Yield strength 0.2 at high temperature (min) - MPa-ksi				Thermal conductivity W/(m °C) - BTU/(h.ft °F)					Density	Coefficient of expansion 10⁻⁶/°C (20 °C→) - 10⁻⁶/°F (68 °F→)				Young modulus (tensile) 10³ MPa - 10³ ksi				
100 °C 212 °F	200 °C 392 °F	300 °C 572 °F	400 °C 752 °F	20 °C 68 °F	100 °C 212 °F	200 °C 392 °F	300 °C 572 °F	400 °C 752 °F	kg / dm³ lb / in³	100 °C 212 °F	200 °C 392 °F	300 °C 572 °F	400 °C 752 °F	20 °C 68 °F	100 °C 212 °F	200 °C 392 °F	300 °C 572 °F	400 °C 752 °F
–	–	–	–	25 14.5	–	–	–	–	7.7 0.28	–	11 6.1	–	11.5 6.3	220 31.9	–	–	–	–
–	–	–	–	23 13.2	–	–	–	–	7.7 0.28	–	10.8 6	–	11.6 6.3	220 31.9	–	–	–	–
260 38	235 34.5	210 31	185 24.7	24 14	24.2 14.1	24.8 14.3	25 14.5	25.3 14.6	7.73 0.28	10.2 5.7	10.4 5.8	10.8 6	11.4 6.3	201 29.2	196 28.5	189 27.3	181 26.2	174 25.1
420 60.9	345 50.1	310 45.0	300 43.5	17 9.9	17.7 10.2	18.5 10.7	19.3 11.2	–	7.67 0.27	9.4 5.2	9.7 5.4	–	10.4 5.8	207 30	–	–	–	–
380 55.1	330 47.9	300 43.5	–	15 8.8	16 9.4	17 10	18 10.6	–	7.7 0.28	3.5 7.5	14 7.7	14.5 8						
330 47.9	280 40.6	–	–	15 8.8	16 9.4	17 10	18 10.6	–	7.7 0.28									
450 65	386 56	386 56	–	16 9.4	17 10	18 10.6	19 11	–	7.7 0.28									
360 52.1	320 46.3	–	–	16 9.4	17 10	18 10.6	19 11	20 11.8	7.8 0.28	13 7.2	13.5 7.5	14 7.7	–	200 29	194 28.1	186 27	180 26.1	–
480 69.6	420 60.9	–	–	14 8.2	15 8.8	16 9.4	18 10.5	20 11.8	7.8 0.28									
265 38.4	185 26.8	170 25	–	15 8.8	16.2 9.4	17.4 10	19.3 11.3	20 11.8		16 8.9	16.5 9.2	17 9.4	17.5 9.7					
157 22.8	127 18.4	110 15.9	98 14.2	15 8.8	16.2 9.4	17.9 10.5	19.3 11.3	20 11.8										
150 21.5	120 17.5	100 14.5	90 13	14.9 8.6	16.2 9.4	17.9 10.5	19.3 11.3	20 11.8		16.8 9.3	17.3 9.6	17.6 9.8	17.9 9.9					
210 29.4	160 23.2	140 20.3	130 18.8	15 8.8	16.2 9.4	17.4 10	19.3 11.3	20 11.8										
176 25.7	148 21.5	132 19.1	123 17.8	13.6 7.7	14.6 8.4	16.3 9.4	18 10.4	19.4 11.2		16.5 9.2	16.8 9.3	17 9.4	17.2 9.6					
170 24.5	140 20	120 17.5	110 16	13.6 7.7	14.6 8.4	16.3 9.4	18 10.4	19.4 11.2	7.97 0.29					200 29	190 27.5	183 26.5	175 25.4	169 24.5
185 26.8	167 24.2	145 21	135 19.6	13.4 7.7	14.6 8.4	16.3 9.4	18 10.4	19.4 11.2		16.8 9.3	17.3 9.6	17.6 9.8	17.9 9.9					
170 24.5	146 21.1	127 18.4	118 17.1	73.5 7.9	–	–	–	–										
180 26	160 23	140 20.5	125 18	14 8.1	15.2 8.8	17.1 9.9	18.2 10.5	20 11.6										
255 37	210 30.4	190 27.5	175 25.4	15 8.8	–	–	–	–		16.5 9.1	17.5 9.7	17.5 9.7	18.5 10.2					
210 29.4	175 25.5	140 21	135 19.5	13 7.5	15 8.5	16 9.2	–	–	8.05 0.29	15.2 8.4	16.1 8.9	16.8 9.3	17.2 9.5	195 28.3	190 27.5	180 26.1	–	–
230 33.4	190 27.6	230 33.4	230 33.4	13.5 7.9	–	–	–	–	7.97 0.29	16.8 9.3	17.3 9.6	17.6 9.8	17.9 9.9	200 29	190 27.5	183 26.5	175 25.4	169 24.5
158.7 23	96.6 14	55.2 8	41.4 6	22 12.7	20.7 12	19.9 11.5	19.4 11.2	19.4 11.2										
262.2 38	172.5 25	124.2 18	96.6 14	22 12.7	20.7 12	19.9 11.5	19.4 11.2	19.4 11.2										
345 50	213.9 31	144.9 21	124.2 18	20.8 12	19.1 11	–	–	–		8.5 4.75	8.8 4.9	9.1 5.05	9.4 5.2	107 15.5	103 15	97 14	88 12.8	–
262.2 38	172.5 25	124.2 18	96.6 14	22 12.7	20.7 12	19.9 11.5	19.4 11.2	19.4 11.2	4.5 0.163									
531.3 77	434.7 63	379.5 55	345 50	7.6 4.4	8.3 4.8	–	–	–		9.3 4.9	9.5 5.0	9.7 5.1	9.9 5.2	103 15.0	–	–	–	–
414 60	324.3 47	269.1 39	234.6 34	22.8 13.2	21.2 12.3	–	–	–		9.5 5.3	–	–	9.9 5.5	103 15.0	–	–	–	–
262.2 38	172.5 25	124.2 18	96.6 14	22 12.7	20.7 12	19.9 11.5	19.4 11.2	19.4 11.2		8.5 4.75	8.8 4.9	9.1 5.05	9.4 5.2	107 15.5	103 15	97 14	88 12.8	–
397 58	377 55	358 52	343 50	9.8 5.7	10.9 6.3	12.4 7.2	13.9 8.0	15.4 8.9	8.44 0.305	12.8 7.11	13.2 7.33	13.3 7.39	13.5 7.5	207 30	202 29	197 29	191 28	186 27
220 32	201 30	186 27	177 26	-	12.4 7.2	14 8.1	15.5 9.0	17 9.8	8.14 0.294	13.9 7.72	14.4 8	14.7 8.17	15.1 8.39	193 28	189 27	184 27	179 26	173 25
255 37	222 32	196 28	180 26	-	11.2 6.5	12.9 7.5	14.7 8.5	16.5 9.5	8.87 0.320	11.4 6.33	12 6.67	12.6 7	13.1 7.28	205 30	201 29	195 28	190 28	184 27
274 40	238 35	214 31	200 29	9.7 5.6	11.1 6.4	13.3 7.7	15.5 9.0	17.4 10.1	8.69 0.314	12.4 6.89	12.4 6.89	12.6 7	13 7.22	206 30	201 29	196 28	191 28	185 27
276 40	248 36	225 33	202 29	10.4 6.0	12.1 7.0	13.7 7.9	15.3 8.8	17 9.8	8.6 0.311	11.8 6.56	12.2 6.78	12.5 6.94	12.7 7.06	210 30	205 30	200 29	194 28	189 27

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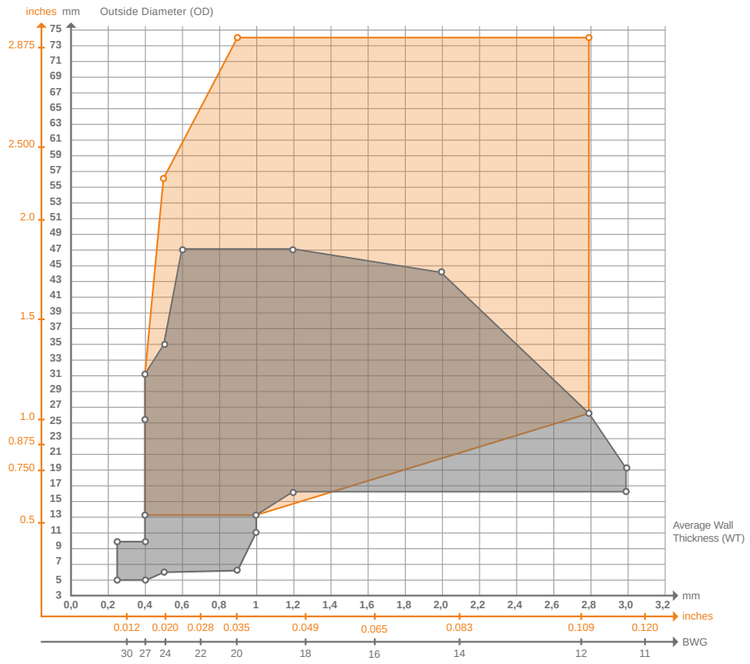
(1) Oil and gas applications, (2) Mechanical applications, (3) Annealed, (4) 690 MPa (100 ksi) if OD ≤ 25 mm (1 in.), (5) 450 MPa (65 ksi) if OD ≤ 25 mm (1 in.)

Other nickel alloys are available upon request

Titanium and Stainless Steel Welded Tubes

Diameter and wall thickness capabilities



Titanium Alloys

12.7 mm ≤ OD ≤ 73 mm (0.5") (2.875")

0.4 mm ≤ WT ≤ 2.77 mm (0.015") (0.11")

Stainless Steels

12.7mm ≤ OD ≤ 46.2 mm (0.5") (1.82")

0.4 mm ≤ WT ≤ 3.05 mm (0.015") (0.12")

Titanium Alloys

Stainless Steels

Other dimensions can be considered upon request

Length and Bending Capabilities

MAXIMUM AVAILABLE LENGTH	BENDING CAPABILITIES R min	BENDING CAPABILITIES R max	TUBE OUT-OF-ROUNDNESS IN THE BENT PART
For straight tubes: 25 m - 82 ft	1.5 OD for 7.5 < OD/WT < 30	1 150 mm (U-shapes: 960 mm)	8 % maxi for R ≥ 100 mm 10 % maxi for 2 x OD ≤ R < 100 m
For bent tubes : Developed: 42 m - 151 ft Straight leg: 22 m - 72 ft	**OD x (0.17 OD/WT - 3.5) for 30 < OD/WT < 38**		**12 % maxi for 1.5 x OD < R < 2 x OD**

Titanium U-bent tubes can be considered upon request.

OD: Outside Diameter

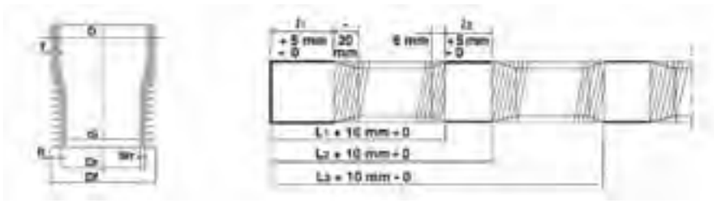
WT: Average Wall Thickness

R: Bending Radius

NEOTISS™ MSR Tubes Integrally Finned Welded Tubes Grades 439 L

NEOTISS™ MSR Tubes 19 ± 1.0 FINS / INCH Height of fin h: 1.5 mm - 0.059 in ± 10%
Thickness at 1/2 height: 0.366 mm - 0.014 in ± 10%

Plain section			Finned section - Mean values									
D	T	Mean weight	Df	Dr	Wr	Wr min	Se Outer surface	Sp Projected surface	Di	Internal cross section	Si Internal surface	Se / Si	Mean weight
mm in.	mm in.	(kg / m) (lbs / ft)	mm in.	mm in.	mm in.	mm in.	(m2 / m) (sq.ft / ft)	(m2 / m) (sq.ft / ft)	mm in.	(mm2) (sq. in.)	(m2 / m) (sq.ft / ft)		(kg / m) (lbs / ft)
19.050. 750	**1.65/1.75 .065/.069**	**0.695 .467**	**19.05 .750**	**16.05 .632**	**1.16 .046**	**1.05 .041**	**0.158 .518**	**0.0173 .056**	**13.95 .549**	**152.8 .2368**	**0.044 .144**	**3.62**	**0.581 .390**



NEOTISS™ MSR Tubes 27 ± 1.0 FINS / INCH Height of fin h: 1.27 mm - 0.050 in ± 10%
Thickness at 1/2 height: 0.292 mm - 0.011 in ± 10%

Plain section			Finned section - Mean values									
D	T	Mean weight	Df	Dr	Wr	Wr min	Se Outer surface	Sp Projected surface	Di	Internal cross section	Si Internal surface	Se / Si	Mean weight
mm in.	mm in.	(kg / m) (lbs / ft)	mm in.	mm in.	mm in.	mm in.	(m2 / m) (sq.ft / ft)	(m2 / m) (sq.ft / ft)	mm in.	(mm2) (sq. in.)	(m2 / m) (sq.ft / ft)		(kg / m) (lbs / ft)
19.050. 750	**1.65/1.75 .065/.069**	**0.695 .467**	**19.05 .750**	**16.51 .650**	**1.11 .044**	**1.06 .042**	**0.186 .610**	**0.0173 .057**	**14.33 .564**	**161.3 .2500**	**0.045 .148**	**4.14**	**0.580 .390**
22.22 .874	**1.83 .072**	**0.904 .610**	**22.22 .874**	**19.68 .774**	**1.24 .048**	**1.20 .047**	**0.222 .728**	**0.021 .069**	**17.20 .677**	**232 .359**	**0.054 .177**	**4.06**	**0.754 .509**

Other dimensions and profiles can be manufactured upon request.

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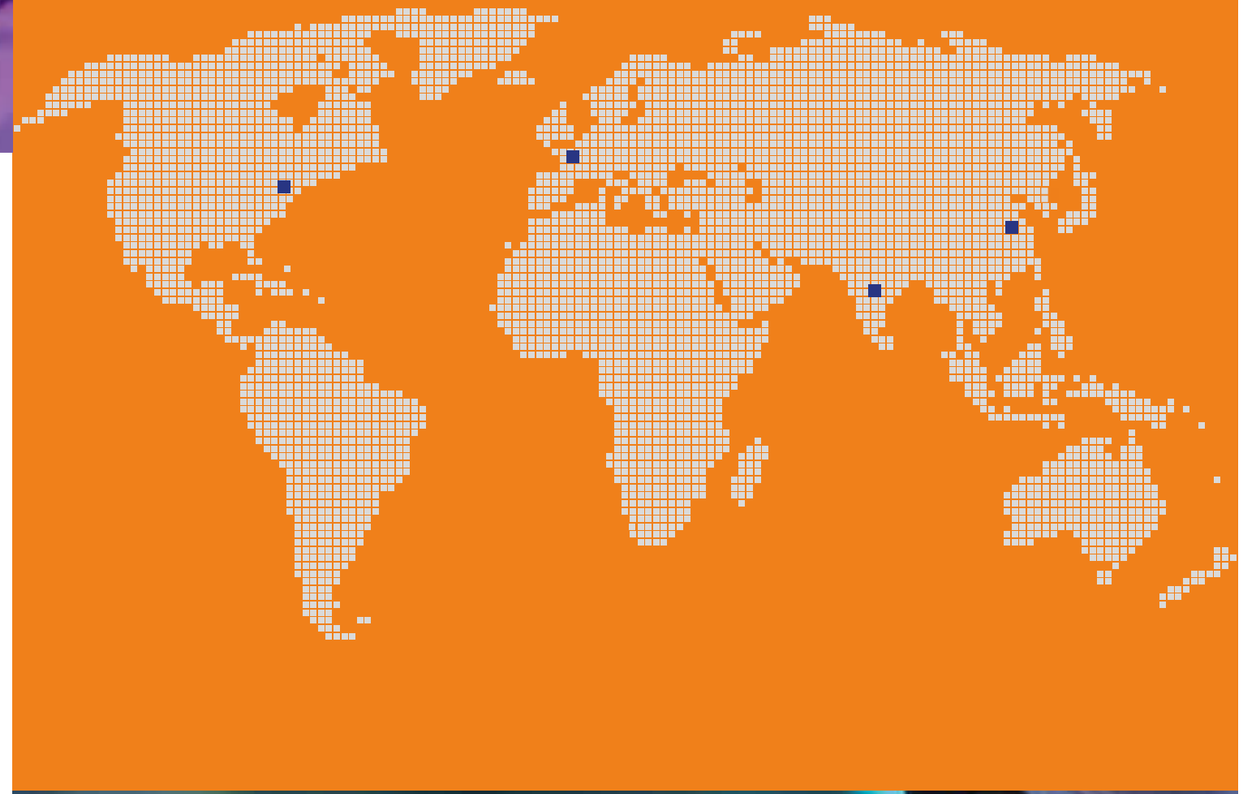
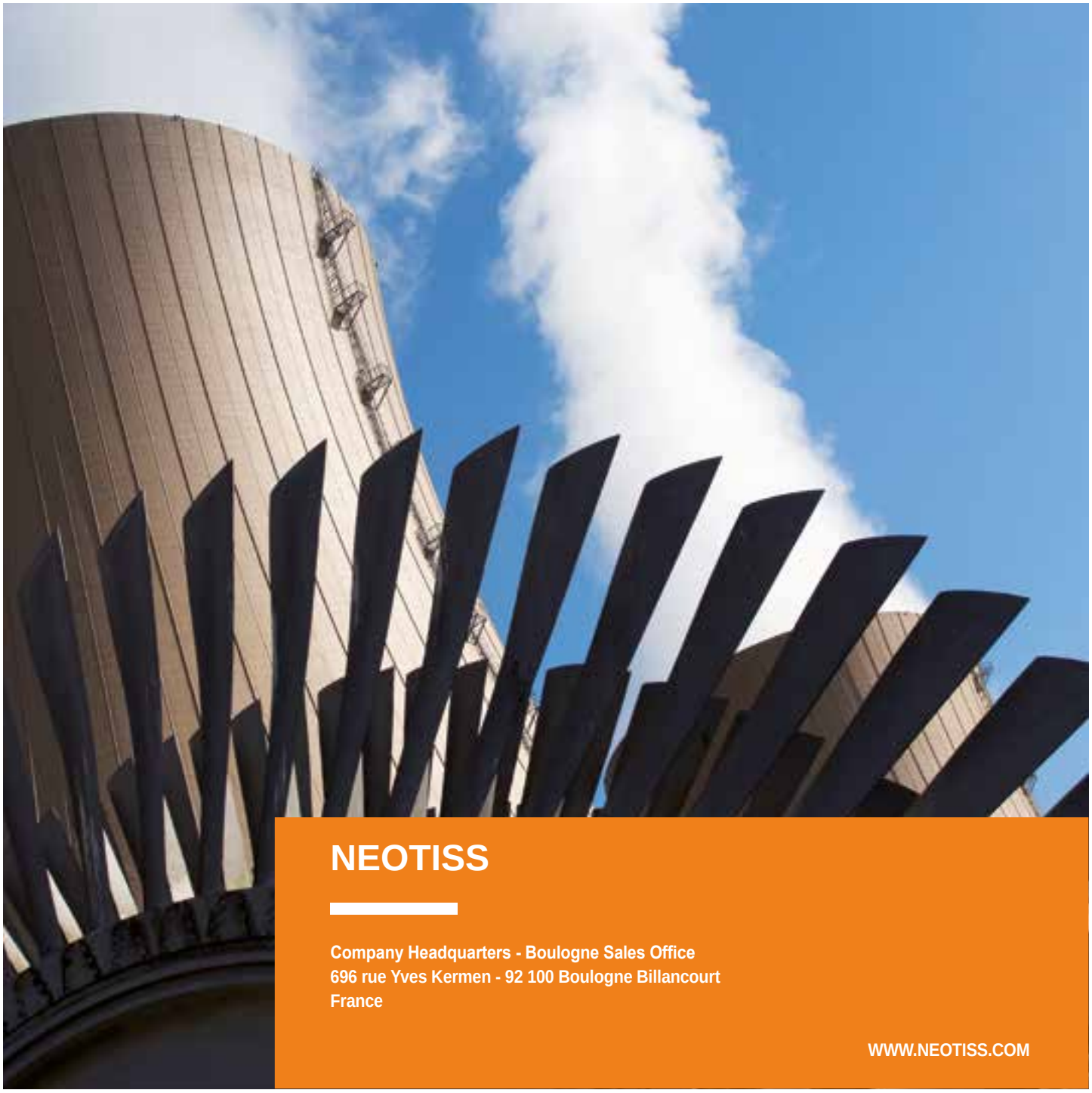
International Presence





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