TATA

TATA STEEL

TATA STEEL GLOBAL WIRES BUSINESS



STRANDS FOR PRE-STRESSING OF CONCRETE



TATA STEEL

Established in 1907, Tata Steel is among the top ten global steel companies with a crude steel production capacity of over 28 million tonnes per annum (mtpa). A Fortune 500 company, the Tata Steel Group is the world's second most geographically diversified steel producer, employing over 80,000 people across five continents in nearly 50 countries. The Group's vision is to be the world's steel industry benchmark in Value Creation and Corporate Citizenship through the excellence of its people, its innovative approach and overall conduct. Underpinning the vision is a performance culture committed to aspirational targets, safety and social responsibility, continuous improvement, openness and transparency.

TATA STEEL GLOBAL WIRES BUSINESS

With manufacturing facilities in India, Thailand and Sri Lanka, and a global sales network, this Group is among the Top Wire Manufacturers in the world. It manufactures a variety of wires for the Automobile, Construction, Power and General Engineering industries, in single and stranded forms.

Highlights

• Fully integrated manufacturing facilities from Iron Ore Mining to Steel Wires • A wealth of expertise and experience in wire drawing, with the latest manufacturing facilities • Equipped to meet exacting specifications of customers • Established products across India, Thailand, China, Sri Lanka, USA, Europe, Australia and Middle East • Backed by a strong R&D set-up.



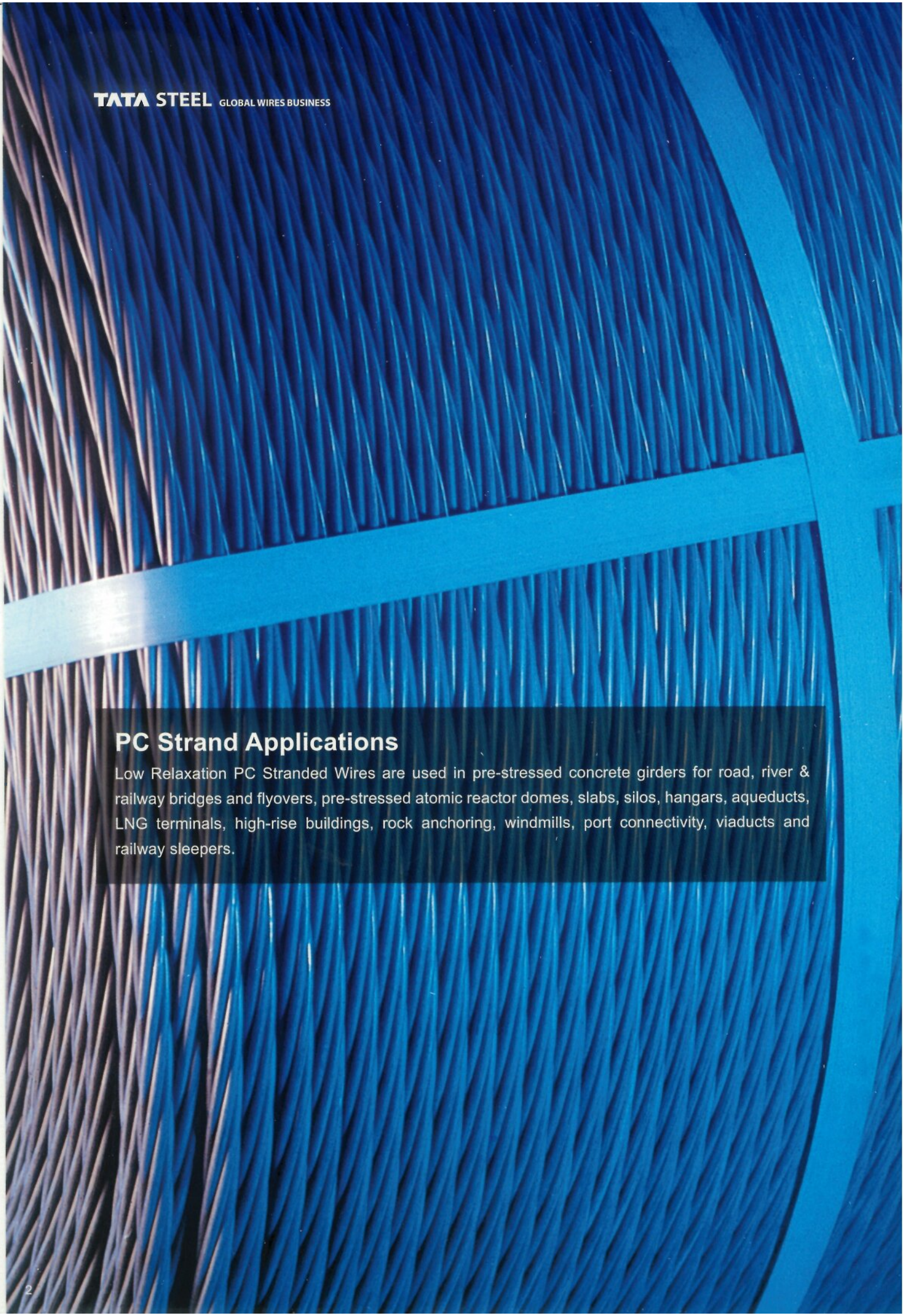
TATA STEEL GLOBAL WIRES - INDIA

Tata Steel Global Wires - India is the country's leading producer of Steel Wires and one of the largest in Asia. It is also a leader in the international wire industry, well-established in Europe, USA, Middle East, and Australia. The Company has fully integrated manufacturing cycles, from sourcing of raw materials to in-house steel making and wire rod rolling facilities. This has led to a comprehensive extension of technology support to all the wire units in its fold at Tarapur, Indore and Jamshedpur. All the units of operation adhere to strict quality parameters and are ISO certified. It manufactures a wide range of wires catering to the needs of various industry segments such as automobile, infrastructure, power and general engineering.

Low Relaxation Pre-stressed Concrete (LRPC) Strands and Pre-stressed Concrete (PC) Wires cater to the infrastructure segment requirements for building bridges, dams and many other large structures. The products are well-established in the entire country in the construction, fencing and farming sectors, and the brand TATA WIRON is well-accepted by consumers.

In India, the unit has set up a world-class manufacturing facility at Tarapur and has also been the sole supplier of pre-stressed concrete strands used in the construction of pre-cast segments for the 4.7 kms, 8-lane-cable-stayed Bandra-Worli Sea Link at Mumbai, India, as well as many other flagship infrastructure projects across the world.





PC Strand Applications

Low Relaxation PC Stranded Wires are used in pre-stressed concrete girders for road, river & railway bridges and flyovers, pre-stressed atomic reactor domes, slabs, silos, hangars, aqueducts, LNG terminals, high-rise buildings, rock anchoring, windmills, port connectivity, viaducts and railway sleepers.

What is meant by 'Low Relaxation'?

Pre-stressed steel strand, when stressed and embedded in concrete, loses the applied stress exponentially as time passes. The loss of stress is called 'Stress Relaxation' and is one of the important factors in the design of pre-stressed concrete structures. If the assumed relaxation in stress can be reduced, then many advantages can be expected.

'Low Relaxation' wire and strand exhibit a relaxation loss not greater than 2.5% after 1,000 hrs at 20°C (68°F) when initially loaded to 70% of the specified minimum breaking strength, as compared with 5% for 'Normal Relaxation' of stress-relieved wire and strand. TATA Wiron Low Relaxation Strands are treated by the 'stabilizing' process, which is the most widely accepted method throughout the world. This is also known as 'hot stretching' because the steel is subjected to a stress-relieving temperature while it is under tension.

The use of Low Relaxation Strand is well-established in developed countries, However, its use in India was restricted until the 1990's due to restricted availability of strands. With this world-class technology now available in India, design and construction engineers can reap the benefits of this critical material, on a wider scale.

Advantages of Low Relaxation Strand

- Less stress loss at ambient and elevated temperatures.
- Increased limit of proportionality and close tolerances on unit mass to length ratio.
- Uniform stress-strain relationship, higher breaking loads and proof stress loads.
- Higher effective force in the tendon, due to lower relaxation losses of the pre-stressing steel. Saving in the number of anchorages, ducts, sheaths, wedges, as well as labour costs, etc.
- Saving in concrete, due to possible reduction in the size of the structure, which in turn, results in lighter structures.
- Failure of strand, on site, is substantially mitigated as each point of strand is tested online during manufacturing. Quality problems, if any, are detected during the manufacturing process itself, thereby offering a highly reliable product.
- The hot-stretching process during manufacturing ensures that the strand is nearly straight. Thus, extra post-straightening treatment is not required.
- Lower relaxation property of wire allows saving in steel as a lesser quantity is used.
- Consistency of physical properties and coil characteristics with uniform winding.
- Higher fatigue and corrosion resistance.
- Selection of wire rods of specified chemistry and quality.

QUALITY ASSURANCE

Adhering to our philosophy of making and bringing quality products to customers, we at Tata Steel take care of our products right from sourcing the iron ore. We select raw material from our own mines and steel-making facilities to ensure integrity and quality of the products. Our pre-stressing strand producing plants are certified with ISO 9001:2008 for our quality management systems and our testing laboratory is NABL-accredited for ISO/IEC 17025. BIS has granted us IS 14268:2005 for producing pre-stressing strands. We manufacture pre-stressing strands as per BS 5896, ASTM A 416/A 416 M, AS/NZS 4672 and EN 10138-3. The standard sizes we produce are 3/8 inch, ½ inch and 0.5 inch.

- Own steel making & wire rod rolling to meet specific chemistry and quality requirements
- Selection of wire rods of specified chemistry and quality
- Quality checks at every stage of production
- In-house relaxation testing facility
- Strands have been successfully tested at independent laboratories for fatigue under dynamic loads and for tensile properties at sub-zero temperatures

APPROVALS

Our PC strand undergoes the following tests at EMPA Switzerland:

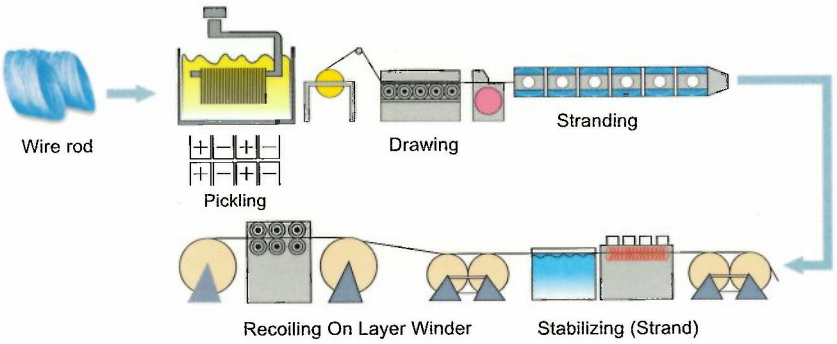
• Cryogenic tensile test at -165°C • Fatigue Test • One-Pin test.

Accreditation of lab testing facilities by NABL India, which is recognised by NATA of Australia.

Certified to ISO 9001:2008 standards.

Tata Steel Wire Division operates multiple plants for the manufacture of Pre-stressed Concrete Strand, using the latest technology.

MANUFACTURING PROCESS



Technological Features of Manufacturing Process

- State-of-the-art, fully automated pickling plant equipped with German technology
- Latest generation vertical rod welding manufacture
- SCADA controlled stabilizing line

STANDARDS

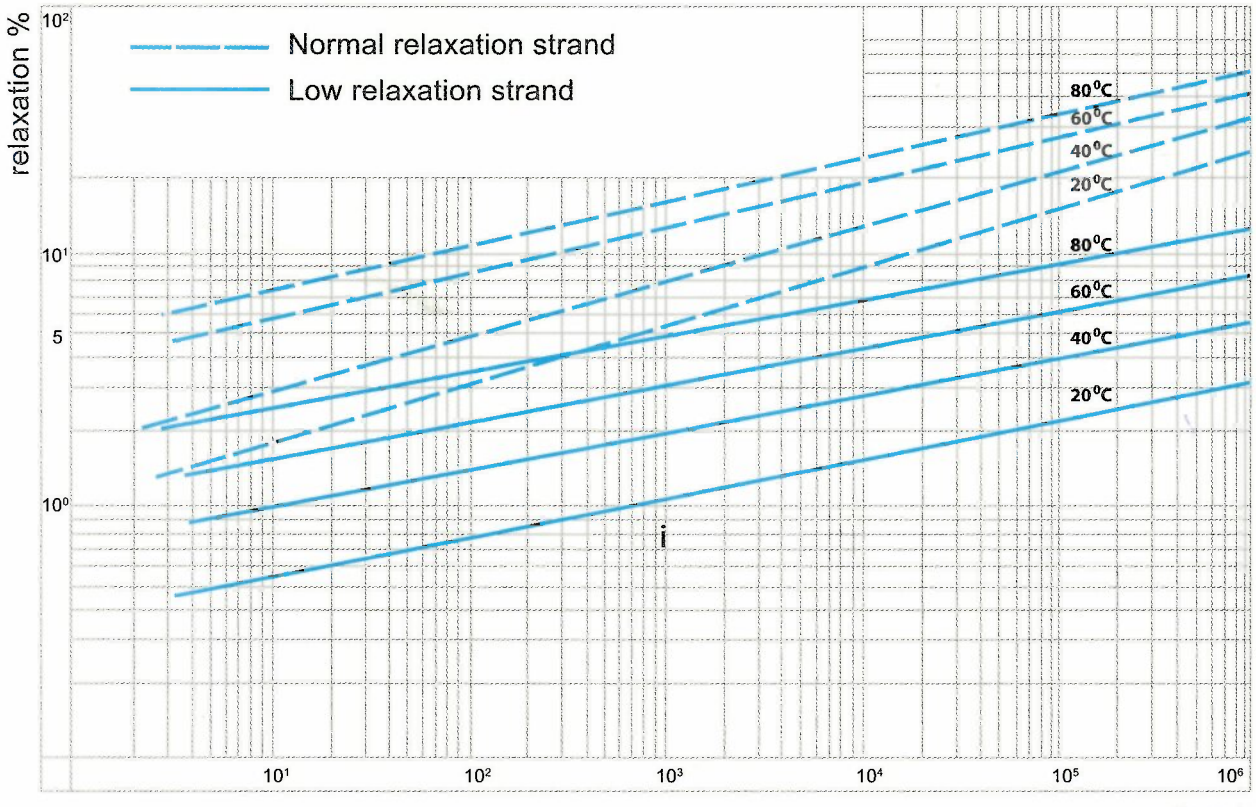
International Specification	Indian Specification
ASTM A 416	IS 14268 (Low Relaxation Strand)
BS 5896	IS 6006 (Normal Relaxation Strand)
JIS 3536	
AS 1311	
EN 10138:3:2000	

Any other International Specifications and as per customer requirements

Strand sizes most commonly made

9.3mm	12.5mm	15.24mm
9.6mm	12.7mm	15.7mm
11.3mm	12.9mm	16mm

TYPICAL RELAXATION CURVE



Relaxation Values for Normal & Low Relaxation Strand at different temperatures
(Initial stress = 0.70 x Specified Characteristic Strength)

INTERNATIONAL STANDARDS

INDIAN STANDARDS

Standard		Nominal Diameter	Diameter Tolerance	Nominal Area	Unit Weight	Weight Tolerance	Pitch	Minimum Breaking Load	Minimum Yield Load			Minimum Elongation	Straightness	1,000-hr. Relaxation (% Max.)		MOE
	Grade		mm	mm2	kg/ 1000m	%	Times of Diameter	kN	0.1%	kN 0.2%	1.0%	%		70%	80%	Gpa or kN/mm2
		9.5	+/-0.4	51.6	405	-	12-16	89	-	-	80.1	3.5		2.5	-	
	Class 1	11.1	+/-0.4	69.7	548	-	12-16	120.1	-	-	108.1	3.5		2.5	-	
		12.7	+/-0.4	92.9	730	-	12-16	160.1	-	-	144.1	3.5	Arc height	2.5	-	
IS		15.2	+/-0.4	139.4	1094	-	12-16	240.2	-	-	216.2	3.5	shall be no greater	2.5	-	185 - 205
14268 1995	Class 2	9.5	+/-0.4	54.8	432	-	12-16	102.3	-	-	92.1	3.5	than 25 mm for	2.5	-	
		11.1	+/-0.4	74.2	582	-	12-16	137.9	-	-	124.1	3.5	gauge length 1 m	2.5	-	
		12.7	+/-0.4	98.7	775	-	12-16	183.7	-	-	165.3	3.5		2.5	-	
		15.2	+/-0.4	140	1102	-	12-16	260.7	-	-	234.5	3.5		2.5	-	

AUSTRALIAN / NEW ZEALAND STANDARDS

Standard		Nominal Diameter	Diameter Tolerance	Nominal Area	Unit Weight	Weight Tolerance	Pitch	Minimum Breaking Load	Minimum Yield Load			Minimum Elongation	Straightness	1,000-hr. Relaxation (% Max.)		MOE
	Grade		mm	mm2	kg/ 1000m	%	Times of Diameter	kN	0.1%	kN 0.2%	1.0%	%		70%	80%	Gpa or kN/mm2
	1720	9.30	-	51.60	405.00	+4/-2	12-18	88.8	72.8	75.4	-	3.5		-	3.5 (B)	
	1850	9.50	-	55.00	432.00	+4/-2	12-18	102.0	83.6	86.6	-	3.5		-	3.5 (B)	
	1870	11.10	-	73.90	580.00	+4/-2	12-18	138.0	113.0	117.0	-	3.5		-	3.5 (B)	
	1720	12.40	-	92.90	729.00	+4/-2	12-18	160.0	131.0	136.0	-	3.5		-	3.5 (B)	
AS/NZS	1870	12.70	-	98.70	774.0	+4/-2	12-18	184.0	151.0	156.0	-	3.5		-	3.5 (B)	185 - 205
	1840	12.90	-	100.00	785.0	+4/-2	12-18	186.0	158.0	165.0	-	3.5		-	3.5 (B)	
4672 - 2007	1750	15.20	-	143.00	1122.0	+4/-2	12-18	250.0	205.0	212.0	-	3.5		-	3.5 (B)	
	1830	15.20	-	143.00	1122.0	+4/-2	12-18	261.0	214.0	222.0	-	3.5	Arc height	-	3.5 (B)	
	1780	18.00	-	190.00	1492.0	+4/-2	12-18	338.0	277.0	287.0	-	3.5	shall be no greater	-	3.5 (B)	
	1830	18.00	-	190.00	1492.0	+4/-2	12-18	353.0	289.0	300.0	-	3.5	than 25 mm for	-	3.5 (B)	
		9.30	+/-0.4	55	430	-	12-16	102	-	86.7	-	3.5	gauge length 1 m	2.5	-	
AS	Super	10.9	+/-0.4	75	590	-	12-16	138	-	117.3	-	3.5		2.5	-	
1311-1987		12.7	+/-0.4	100	785	-	12-16	184	-	156.4	-	3.5		2.5	-	185 - 205
		15.2	+/-0.4	143	1125	-	12-16	250	-	212.5	-	3.5		2.5	-	

AMERICAN SPECIFICATIONS

Standard		Nominal Diameter	Diameter Tolerance	Nominal Area	Unit Weight	Weight Tolerance	Pitch	Minimum Breaking Load	Minimum Yield Load			Minimum Elongation	Straightness	1,000-hr. Relaxation (% Max.)		MOE
	Grade		mm	mm2	kg/ 1000m	%	Times of Diameter	kN	0.1%	kN 0.2%	1.0%	%		70%	80%	Gpa or kN/mm2
		9.50	+/-0.4	51.60	405.0	-	12-16	89.0	-	-	80.1	3.5		-	3.5 (B)	
	1 725	11.10	+/-0.4	69.70	548.0	-	12-16	120.1	-	-	108.1	3.5		-	3.5 (B)	
		12.70	+/-0.4	92.90	730.0	-	12-16	160.1	-	-	144.1	3.5		-	3.5 (B)	
ASTM		15.20	+/-0.4	139.40	1094.0	-	12-16	240.2	-	-	216.2	3.5		-	3.5 (B)	
A416 - 2010		9.53	+0.65/-0.15	54.80	432.0	-	12-16	102.3	-	-	92.1	3.5		-	3.5 (B)	
(Round		11.11	+0.65/-0.15	74.20	582.0	-	12-16	137.9	-	-	124.1	3.5		-	3.5 (B)	
Strand)	1 860	12.70	+0.65/-0.15	98.70	775.0	-	12-16	183.7	-	-	165.3	3.5		-	3.5 (B)	
		15.24	+0.65/-0.15	140.00	1102.0	-	12-16	260.7	-	-	234.6	3.5		-	3.5 (B)	
		15.75	+0.65/-0.15	149.20	1173.0	-	12-16	277.4	-	-	249.7	3.5		-	3.5 (B)	

BRITISH SPECIFICATIONS

Standard		Grade	Nominal Diameter	Diameter Tolerance	Nominal Area	Unit Weight	Weight Tolerance	Pitch	Minimum Breaking Load	Minimum Yield Load kN 0.1%	kN 0.2%	kN 1.0%	Minimum Elongation	Straightness	1,000-hr. Relaxation (% Max.) 70%	80%	MOE
				mm	mm2	kg/ 1000m	%	Times of Diameter	kN				%				Gpa or kN/mm2
BS 5896 - 1980	Standard	1 770	9.30	+0.3/-0.15	52.00	408.0	+4/-2	12-18	92.0	78.0	-	81.0	3.5		-	4.5 (A)	
		1 860	9.30	+0.3/-0.15	52.00	408.0	+4/-2	12-18	97.0	82.0	-	85.0	3.5		-	4.5 (A)	
		1 770	11.00	+0.3/-0.15	71.00	557.0	+4/-2	12-18	125.0	106.0	-	110.0	3.5		-	4.5 (A)	
		1 770	12.50	+0.4/-0.2	93.00	730.0	+4/-2	12-18	164.0	139.0	-	144.0	3.5		-	4.5 (A)	
		1 860	12.50	+0.4/-0.2	93.00	730.0	+4/-2	12-18	173.0	147.0	-	152.0	3.5		-	4.5 (A)	
		1 670	15.20	+0.4/-0.2	139.00	1090.0	+4/-2	12-18	232	197	-	204	3.5	Arc height	-	4.5 (A)	
	Super	1 860	15.20	+0.4/-0.2	139.00	1090.0	+4/-2	12-18	259.0	220.0	-	228.0	3.5	shall be no	-	4.5 (A)	185 - 205
		1 670	15.20	+0.4/-0.2	139.00	1090.0	+4/-2	12-18	232.0	197.0	-	204.0	3.5	greater than	-	4.5 (A)	
		1 860	9.60	+0.3/-0.15	55.00	432.0	+4/-2	12-18	102.0	87.0	-	90.0	3.5	25 mm	-	4.5 (A)	
		1 860	11.30	+0.3/-0.15	75.00	590.0	+4/-2	12-18	139.0	118.0	-	122.0	3.5	for gauge	-	4.5 (A)	
		1 860	12.90	+0.4/-0.2	100.00	785.0	+4/-2	12-18	186.0	158.0	-	163.0	3.5	length 1 m	-	4.5 (A)	
		1 770	15.70	+0.4/-0.2	150.00	1,180.0	+4/-2	12-18	265.0	225.0	-	233.0	3.5		-	4.5 (A)	
		1 860	15.70	+0.4/-0.2	150.00	1,180.0	+4/-2	12-18	279.0	237.0	-	246.0	3.5		-	4.5 (A)	
BS 5896 -2012		Y1670S7	15.20	-	139.0	1,086.0	+2/-2	14-18	232- 267	204.0	-	-	3.5		-	4.5(A), 2.5(A)	
		Y1700S7G	18.00	-	223.0	1,742.0	+2/-2	14-18	379- 436	334.0	-	-	3.5		-	4.5(A), 2.5(A)	
		Y1770S7	9.30	-	52.0	406.1	+2/-2	14-18	92- 106	81.0	-	-	3.5		-	4.5(A), 2.5(A)	
		Y1770S7	11.00	-	70.0	546.7	+2/-2	14-18	124- 143	109.0	-	-	3.5		-	4.5(A), 2.5(A)	
		Y1770S7	12.50	-	93.0	726.3	+2/-2	14-18	165- 190	145.0	-	-	3.5		-	4.5(A), 2.5(A)	
		Y1770S7	15.70	-	150.0	1,172.0	+2/-2	14-18	266- 306	234.0	-	-	3.5	Straightness	-	4.5(A), 2.5(A)	
		Y1820S7G	15.20	-	165.0	1,289.0	+2/-2	14-18	300- 345	264.0	-	-	3.5	shall be no	-	4.5(A), 2.5(A)	
		Y1860S7	8.00	-	38.0	296.8	+2/-2	14-18	70.7- 81.3	62.2	-	-	3.5	greater than	-	4.5(A), 2.5(A)	195
		Y1860S7	9.30	-	52.0	406.1	+2/-2	14-18	96.7- 111	85.1	-	-	3.5	25 mm on	-	4.5(A), 2.5(A)	
		Y1860S7	9.60	-	55.0	429.6	+2/-2	14-18	102- 117	89.8	-	-	3.5	base line 1 m	-	4.5(A), 2.5(A)	
		Y1860S7	11.30	-	75.0	585.8	+2/-2	14-18	140- 161	123.0	-	-	3.5		-	4.5(A), 2.5(A)	
		Y1860S7	12.50	-	93.0	726.3	+2/-2	14-18	173- 199	152.0	-	-	3.5		-	4.5(A), 2.5(A)	
		Y1860S7	12.90	-	100.0	781.0	+2/-2	14-18	186- 214	164.0	-	-	3.5		-	4.5(A), 2.5(A)	
		Y1860S7	15.20	-	139.0	1,086.0	+2/-2	14-18	259- 298	228.0	-	-	3.5		-	4.5(A), 2.5(A)	
		Y1860S7	15.70	-	150.0	1,172.0	+2/-2	14-18	279- 321	246.0	-	-	3.5		-	4.5(A), 2.5(A)	
		Y1860S7G	12.70	-	112.0	874.7	+2/-2	14-18	208- 239	183.0	-	-	3.5		-	4.5(A), 2.5(A)	

EUROPEAN STANDARDS

Standard	Grade	Nominal Diameter	Diameter Tolerance	Nominal Area	Unit Weight	Weight Tolerance	Pitch	Minimum Breaking Load	Minimum Yield Load kN 0.1%	kN 0.2%	kN 1.0%	Minimum Elongation	Straightness	1,000-hr. Relaxation (% Max.) 70%	80%	MOE
			mm	mm2	kg/ 1000m	%	Times of Diameter	kN				%				Gpa or kN/mm2
														Initial Load (70%)		
prEN 10138 - 2009		9.30	-	52.0	406.1	+2/-2	14-18	92.0 - 106.0	81.0	-	-	3.5		-	4.5(A), 2.5(A)	
		11.00	-	70.0	546.7	+2/-2	14-18	124.0-143.0	109.0	-	-	3.5		-	4.5(A), 2.5(A)	
	Y1770S7	12.50	-	93.0	726.3	+2/-2	14-18	165.0-190.0	145.0	-	-	3.5		-	4.5(A), 2.5(A)	
		15.20	-	139.0	1,086.0	+2/-2	14-18	246.0-283.0	216.0	-	-	3.5	Arc height	-	4.5(A), 2.5(A)	
		15.70	-	150.0	1,172.0	+2/-2	14-18	266.0-306.0	234.0	-	-	3.5	shall be no	-	4.5(A), 2.5(A)	
		9.30	-	52.0	406.1	+2/-2	14-18	96.7-111.0	85.1	-	-	3.5	greater than	-	4.5(A), 2.5(A)	May be
		9.60	-	55.0	429.6	+2/-2	14-18	102.0-117.0	89.8	-	-	3.5	25 mm for	-	4.5(A), 2.5(A)	taken to
		11.30	-	75.0	585.8	+2/-2	14-18	140.0-161.0	123.0	-	-	3.5	gauge	-	4.5(A), 2.5(A)	be
		12.50	-	93.0	726.3	+2/-2	14-18	173.0-199.0	152.0	-	-	3.5	length 1 m	-	4.5(A), 2.5(A)	195 GPa
	Y1860S7	12.90	-	100.0	781.0	+2/-2	14-18	186.0-214.0	164.0	-	-	3.5		-	4.5(A), 2.5(A)	(kN/mm2)
		15.20	-	139.0	1,086.0	+2/-2	14-18	259.0-298.0	228.0	-	-	3.5		-	4.5(A), 2.5(A)	
		15.70	-	150.0	1,172.0	+2/-2	14-18	279.0-321.0	246.0	-	-	3.5		-	4.5(A), 2.5(A)	
	Y1860S7G	12.70	-	112.0	874.7	+2/-2	14-18	208.0-239.0	183.0	-	-	3.5		-	4.5 (A), 2.5(A)	
	Y1860S7G	15.20	-	165.0	1,289.0	+2/-2	14-18	307.0-353.0	270.0	-	-	3.5		-	4.5 (A), 2.5(A)	
	Y1820S7G	15.20	-	165.0	1,289.0	+2/-2	14-18	300.0-345.0	264.0	-	-	3.5		-	4.5 (A), 2.5(A)	

Certificates

We manufacture strands under the most stringent process controls. Measuring the strand properties accurately needs strict adherence to the test procedures. We have adopted the ISO 17025 standard of Laboratory Quality Management system and our test lab has been accredited by NABL since 2005.


CERTIFICATE OF
PRODUCT CONFORMITY


CERTIFICATE OF
PRODUCT CONFORMITY


DUBAI CENTRAL LABORATORY DEPARTMENT
DCL PRODUCT CONFORMITY CERTIFICATION SCHEME

SCOPE OF CERTIFICATION


DUBAI CENTRAL LABORATORY DEPARTMENT
DCL PRODUCT CONFORMITY CERTIFICATION SCHEME

SCOPE OF CERTIFICATION

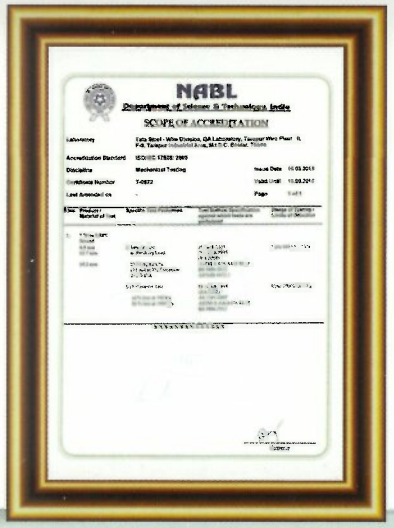


CERTIFICATE TUV NORD

Management system as per
DIN EN ISO 9001 : 2008

TATA STEEL LTD.
WIRE DIVISION-TWP-02
Plot No. A9, MIDC Tarapur Industrial Area,
Tarapur, Tal. Palghar, Dist. Thane – 401 506,
India

Manufacture and Supply of Steel Wires including GI and LRPC Steel Wires



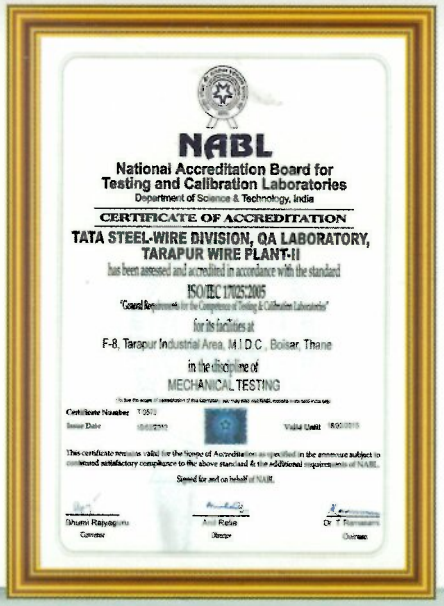
NABL
Department of Science & Technology, India
SCOPE OF ACCREDITATION



ATTACHMENT TO LICENCE NO. CM/L-

ENDORSEMENT NO. 21 Dated 09/07/2015

(G.K. BAKSHI)
SCIENTIST 'E'



NABL
National Accreditation Board for
Testing and Calibration Laboratories
Department of Science & Technology, India
CERTIFICATE OF ACCREDITATION
TATA STEEL-WIRE DIVISION, QA LABORATORY,
TARAPUR WIRE PLANT-II
has been assessed and accredited in accordance with the standard
ISO/IEC 17025:2005
"General Requirements for the Competence of Testing & Calibration Laboratories"
for its facilities at
F-8, Tarapur Industrial Area, M.I.D.C., Boisar, Thane
in the discipline of
MECHANICAL TESTING

Certificate Number T-0570

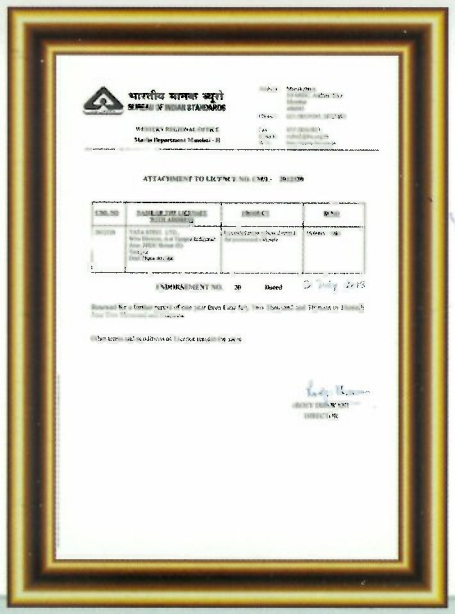
This certificate remains valid for the scope of Accreditation as specified in the annexure subject to continued satisfactory compliance to the above standard & the additional requirements of NABL.

Signed for and on behalf of NABL

Dhurmi Rajyaguru
Convener

Anil Relia
Member

Dr. T. Ramasami
Chairman



ATTACHMENT TO LICENCE NO. CM/L -

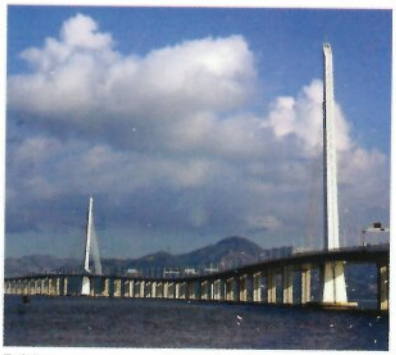
ENDORSEMENT NO. 20 Dated 2 July 2015

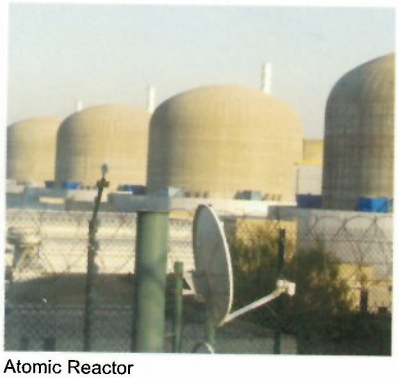
MULTIPLE APPLICATIONS

PC strands are used in pre-stressed concrete girders for road, river & railway bridges and flyovers, pre-stressed atomic reactor domes, slabs, silos, hangars, aqueducts, high-rise buildings, viaducts and railway sleepers.


Windmill


Flyover

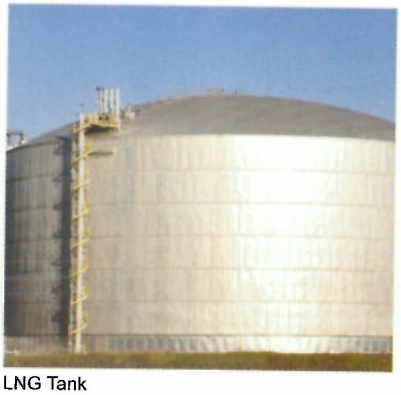

Bridge


Atomic Reactor


Metro Bridge

Advantages:

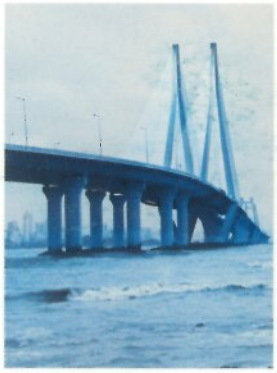
- Up to 10% reduction in steel requirement is possible
- Less number of anchorages, sheathings, wedges and labour, resulting in reduction of project cost
- Reduction in concrete requirement due to reduced size of structural members
- Thermo-mechanical processing, eliminating necessity of extra post straightening treatment


LNG Tank


Building & Rock Anchoring


Cement Silo

MEGA PROJECTS


Bandra-Worli Sea Link


Mumbai Monorail


Dubai Metro Rail

- **Atomic Power Plants:** Kota, Kaiga and Tarapur
- **Metro Rail Projects:** Delhi, Bangalore, Mumbai, Kolkata, Hyderabad, Chennai, Jaipur
- **LNG Tanks:** Dabhol, Dahej, Kochi
- **Cable Stay Bridges:** Bandra-Worli Sea Link - Mumbai, Naini - UP
- **IT Parks:** TCS - Nagpur, Hyderabad, Pune, Chennai, Kochi, Bangalore; Infosys - Pune
- **Flyovers:** JJ Flyover - Mumbai, Hebbal Flyover - Bangalore, PV Narasimha Rao Expressway - Hyderabad
- **Bridges:** Godavari Bridge, Sone Bridge, Ganga Bridge
- **Monorail:** Mumbai
- **Shopping Malls:** Dubai City Center; Mall of the Emirates, Midriff City Center - Dubai, Mall of Qatar, Qatar Foundation, Al Ain School - UAE; Windsor Manor Building - Dubai, Al Badar Warehouses, Industrial Area
- **Hotels:** Al Raha Beach Residential - Abu Dhabi
- **Housing Complexes:** Cultural Village Phase-I - Dubai, Motor City Dubai, The Villa Phase-II & The Villa Phase-III, Dubai Land - Dubai, The Views, Emirates Golf Club, Al Falah Community Development - Abu Dhabi
- **Flyovers/Highways:** Dubai Airport Tunnel, LRT Project - Dubai, North Road Corridor Project
- **Towers:** Atlantis Royal Tower - Dubai, Emirates Crown Tower - Dubai, Al Mazaya Icon Tower - Dubai, Business Central Towers - Dubai


IT Park


Mall of the Emirates


Al Raha Beach Residential, Abu Dhabi


ANZ Arena, Melbourne


Emirates Golf Club, Dubai


Atlantis Royal Tower, Dubai


Dubai Airport Tunnel

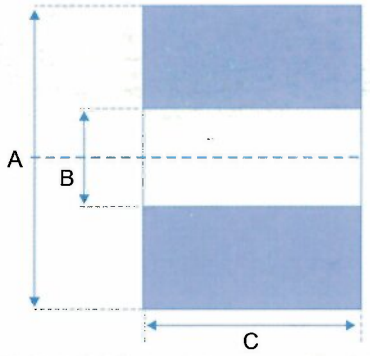

LNG Tank at Dahej Port

DIMENSIONS OF REELESS COIL

Tata Wiron Low Relaxation PC Strand can be supplied in dry or oiled condition as per the customer's requirement. Oil used can be easily washed with plain water at site before stressing and grouting operations.

PC strands are supplied in cheese coil from 1MT to 3.5 MT as per the customer's need. These coils are suitably strapped for compactness and, depending on the customer's requirement, are packed or palletised.

The starting end of the strand is separately identified and can be easily located in the coil.



Position of Coil as per customer specification



Nominal Diameter Strand (inches)	A Outside Diameter (inches)	B Inside Diameter (inches)	C Width (inches)	Approximate Length per pack (feet) of (Correspond to coil weight of 2.5 to 3.5 MT)
3/8	59 max.	31 min.	30 max	22,000
7/16				16,000
½				12,000
0.6				8,600







STORAGE AND HANDLING AT SITE

It is important to emphasize that proper care be taken during storage and use of strands at site.

Failure to observe simple precautions against damage and corrosion can cause severe repercussions at later stages.

Tata Wiron strands are available in both dry and oiled conditions.

Oiled Condition: Water soluble oil is used to protect the strand during storage, which can be easily washed away with water during use.

Dry Condition: VCI paper (Rust Preventive) and polyethylene are used to protect the strand. However, if the strand is stored onsite for a long period, then precautions should be taken through some form of external protection to avoid the risk of corrosion or localised pitting.

Recommended procedure for proper storage and handling at site

- Strands should be unloaded under a shed or cover as far as possible.
- For short term storage outdoors, coils should be stacked on timber support covered with a waterproof sheet. Care should be taken to ensure air circulation to avoid condensation. For long term storage outside, in addition to the above precautions, it is advisable to keep a small bag of vapour phase inhibitor.
- Steel cutting should be effected with abrasive disc cutters or shears. Using flame cutters or exposing steel to sources of heat can alter the micro structure and change the properties/ characteristics of steel.

Pull Direction

Place strand pack in strand cage so the arrow pull direction faces the opening.

Space Considerations

a. There should be NO SPACE between strand pack and frame of strand cage prior to cutting the steel straps.

b. When there is space, insert spacers (such as wooden boards) prior to cutting banding straps.

Note: Excessive expansion of the pack may cause entangling of strand.



PC Strand Wire is coiled under high tension. Ensure adequate safety measures while uncoiling.

Tata Steel Global Wires Division is committed to protecting the environment. Any suggestions from our customers to help us do so are welcome.