

# GALVANISED WIRES & STRANDS

F O R P O W E R S E C T O R

FINEST QUALITY HIGH CARBON W

STATE-OF-THE-ART FULLY AUTOMATIC PICKLING PLANT

METICULOUSLY PLANNED DIE DRAFT

THERMOMECHANICAL CONTROLS

PERFECT CURVATURE OF WIRING & WRAPING

LONG FIELD LIFE

GALVANISED IN LINE

 **usha martin**



The Wire and Wire Rope Division of Usha Beltron Ltd. is an integral part of the globally acclaimed Usha Martin Group, active in Steel Wires, Steel Wire Ropes; High Carbon, Alloy & Speciality Steel Wire Rods & Bars; Telecom Cables & Software; Oil Drilling Services and worldwide distribution of its products.

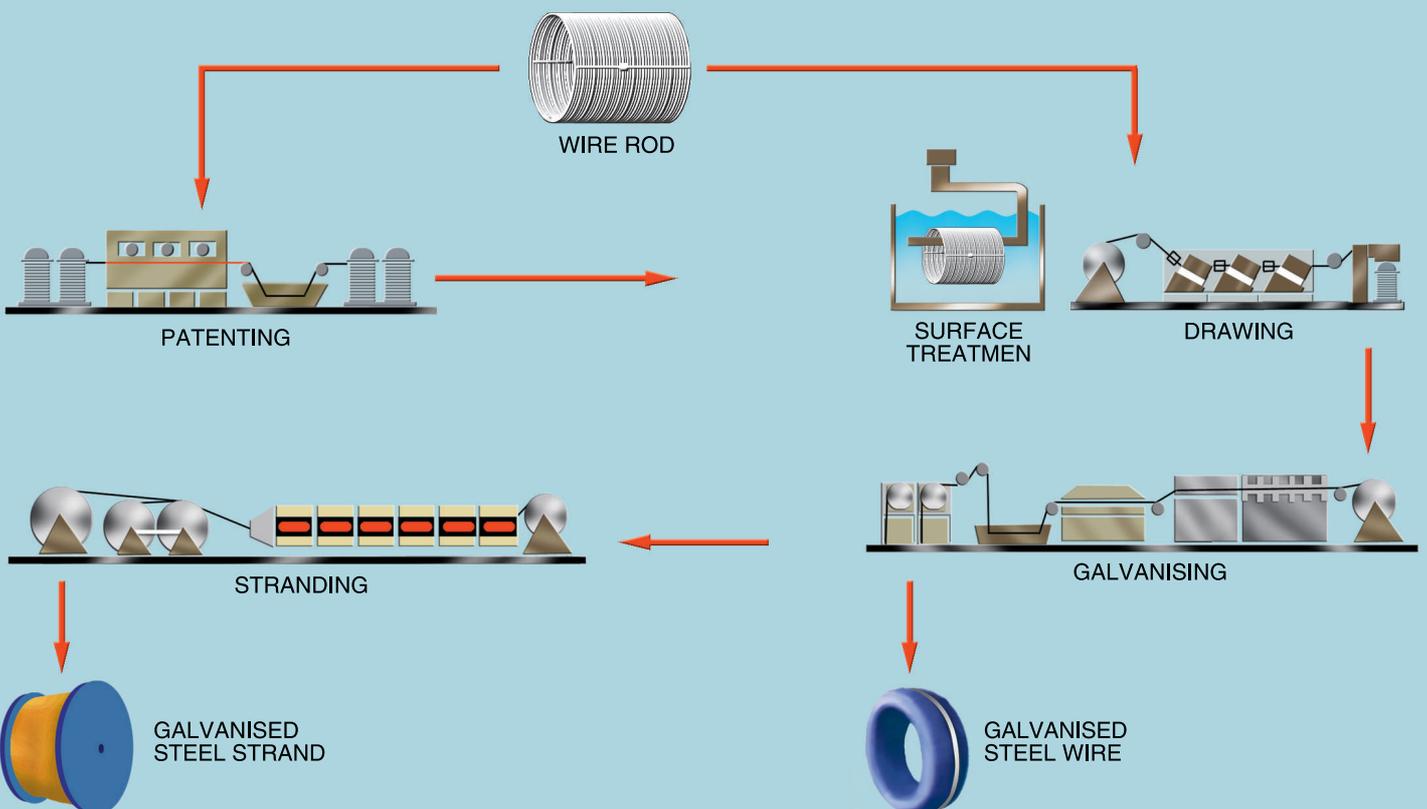
Our ACSR Core Wires & Strands help reinforce aluminium conductors in the Power sector worldwide.

These high tensile galvanised steel wires or strands are also used as earthing members for all overhead transmission lines. Also cables like XLPE, PVC, Power & Control cables etc.. require armouring with either round or formed mild steel galvanised wires.

Our wires/strands and earthwire strands are produced from the finest quality high carbon wire rods which are pickled and coated in a state-of-the-art, fully automatic

pickling plant. They are then cold drawn through meticulously planned die drafts and are finally patented and galvanised inline to produce a smooth surface. A uniform and adherent zinc coating ensures long field life under severe atmospheric conditions. The intricate thermomechanical controls in process technology ensure uniform tensile strength and guarantees torsion and elongation properties. Cable armouring formed wires are produced in rolling mills equipped with precision rollers to ensure perfect curvature and trouble-free wrapping of PVC over the armouring wires.

Behind our international manufacturing standards, are our dedicated machines and ever attentive team of experienced professionals. Together, they have made us renowned as a comprehensive, reliable and quality conscious solution provider to the Power sector.



# Galvanised Steel Core Wire for Aluminium Conductors (ACSR Wire)

**End Use :** Aluminium Conductors Steel Reinforced (for overhead power transmission)

**Specifications :** BS-4565, ASTM-B-498/88, IS-398/Part-2/96, IS-398/Part-5/92, Powergrid specification and as per customers' specification.

Size Range Nominal Diameter (mm)	Minimum UTS			Size Tolerance		Minimum Elongation % GL= 200mm	Minimum Torsion GL=100x Diameter
	BS-4565 (kg/mm <sup>2</sup> )	ASTM B-498 (kg/mm <sup>2</sup> )	IS-398 Part-2 (kg/mm <sup>2</sup> )	ASTM B-498 (mm)	IS-398 Part-2 (± mm)		
1.18-1.32	142.8	148	–	+0.038/ -0.025	–	4	18
1.33-1.55	142.8	148	142		0.03	4	18
1.56-1.80	142.8	148	142		0.03	4	18
1.81-2.24	142.8	148	134		0.04	4	18
2.25-2.72	134.7	144	134	+0.051/ -0.051	0.05	4	18
2.73-3.15	134.7	144	134		0.06	4	18
3.16-3.55	134.7	144	134	+0.076/-0.051	0.07	4	18
3.56-4.25	134.7	141	134	+0.102/ -0.076	0.08	4	18
4.26-5.00	134.7	141	–		–	4	18

Size Range Nominal Diameter (mm)	Minimum Zinc coating weight			Minimum no. of dips (minutes)	Coil Weight (kg)	Coil I.D. (inches)
	BS-4565 (g/m <sup>2</sup> )	ASTM B-498 (g/m <sup>2</sup> )	IS-398 Part-2 (g/m <sup>2</sup> )			
1.18-1.32	170	183	–	2.0	75-85	16/18"
1.33-1.55	180	183	190	2.0	75-85	16/18"
1.56-1.80	200	198	190	2.0	90-100	21/23"
1.81-2.24	215	214	210	2.0	125-135	21/23"
2.25-2.72	230	229	230	2.5	125-135	21/23"
2.73-3.15	240	244	240	3.0	130-140	21/23"
3.16-3.55	250	259	250	3.0	140-150 or 280-300	23/27"
3.56-4.25	260	274	275	3.0	140-150 or 280-300	27"
4.26-5.00	275	305	–	3.5	280-300	27"

**Note :**

- 1) Size tolerance as per British standard is ± 2% of wire nominal diameter. However, more restricted size tolerances as per specific customer's requirements can also be maintained.
- 2) The above mentioned values of UTS, Elongation, Torsion and Zinc Coating are before stranding. After stranding, these values are to be modified as below :
  - a) UTS to be reduced by 5%.
  - b) Elongation to be reduced to 3.5% minimum instead of 4%.
  - c) Torsion to be reduced to 16 instead of 18.
  - d) Zinc coating weight to be reduced by 5%.
- 3) We can also produce as per other international standards and/or as per specific customer's requirements.
- 4) We can also produce 2.54 mm and 3.53 mm wire for Bersimis and Moose Conductors respectively as per Powergrid specification.



Galvanising

**Packing :**



In coil form wrapped with polythene/hessian or polycoated hessian or as per Customer's Specification.

# Galvanised Steel Earthwire Strand/ Groundwire Strand/Core strand for Aluminium Conductors (ACSR Strand)

**End Use :** Earthwire for overhead transmission lines and core strands for aluminium conductors.

**Specifications :** BS-183; BS-215; ASTM-B-498; IS-2141/92; IS-12776; IS-398 Part-2; IS-398 Part-5; Powergrid specification and as per customers' specifications.

Construction No. of Wires/ Wire Diameter	Minimum Breaking Load of finished strand						
	Grade 480	Grade 700	Grade 1000	Grade 1100	Grade 1150	Grade 1300	Grade 1570
(mm)	(Grade indicates wire tensile grade in N/mm <sup>2</sup> )						
(kN)	(kN)	(kN)	(kN)	(kN)	(kN)	(kN)	(kN)
7/0.80	–	2.24	–	3.67	–	–	5.24
7/0.90	2.14	3.10	4.45	–	5.12	5.80	–
7/1.00	2.65	3.85	5.50	–	6.32	7.15	–
7/1.25	4.10	6.00	8.55	8.97	9.88	11.15	12.80
7/1.40	5.17	7.54	10.75	–	12.35	14.00	–
7/1.60	6.75	9.85	14.10	14.70	16.20	18.30	20.98
7/1.80	8.55	12.45	17.80	–	20.50	23.20	–
7/2.00	10.55	15.40	22.00	22.97	25.30	28.60	32.78
7/2.24	–	18.34	–	28.82	–	–	41.12
7/2.36	14.70	21.40	30.60	–	35.20	39.80	–
7/2.50	–	22.86	–	35.92	–	–	51.22
7/2.65	18.50	27.50	38.26	–	44.40	50.20	–
7/3.00	23.75	39.65	49.50	–	56.90	61.30	–
7/3.15	26.20	38.20	54.55	56.98	62.75	70.50	–
7/3.25	27.85	40.65	58.55	–	66.80	75.50	–
7/3.65	35.15	51.75	73.25	–	84.70	95.70	–
7/3.66	–	–	68.40	–	–	–	–
7/4.00	42.20	61.60	88.00	91.88	101.00	111.11	–
7/4.25	47.65	69.90	99.30	–	111.00	129.00	–
7/4.75	59.45	86.80	124.00	–	142.70	161.30	–
Elongation % on 600 mm GL	12	8	4	4	4	4	3



Le Four furnace for high quality patenting/galvanising



DSW furnace

Nominal Diameter of Element Wires	Diameter Tolerance	Minimum Zinc Coating Weight of single wire before stranding (After stranding the coating weight shall be reduced by 5%)			
		BS-183 / BS-215	IS-2141/IS-12776/ IS-398	Powergrid Specification	ASTM B-498
(mm)	(± mm)	(g/m <sup>2</sup> )	(g/m <sup>2</sup> )	(g/m <sup>2</sup> )	(g/m <sup>2</sup> )
0.80	0.03	–	140	–	–
0.90	0.04	140	150	–	–
1.00	0.04	150	150	–	–
1.25	0.04	170	160	–	–
1.40	0.04	180	180	–	183
1.60	0.06	200	190	–	198
1.80	0.06	200	200	–	198
2.00	0.06	215	210	–	214
2.24	0.06	–	210	–	214
2.36	0.06	230	230	–	229
2.50	0.06	–	230	–	229
2.65	0.06	230	230	–	244
3.00	0.06	240	240	–	244
3.15	0.06	240	240	290	259
3.25	0.07	250	250	–	259
3.65	0.07	260	260	–	274
3.66	0.07	–	260	290	274
4.00	0.10	260	275	–	274
4.25	0.10	260	275	–	274
4.75	0.10	275	275	–	305

**Note :**

- 1) We can also produce 19 wire strand in sizes 1.40 mm and above
- 2) Zinc coating weight and uniformity of coating :
  - a) For Strands as per BS-183 shall be as per BS-443
  - b) For Strands as per ASTM 498 shall be as per Class A coating
  - c) For Strands as per IS-398 Part-2 and Part-5 shall be as per IS-4826
- 3) Lay length is usually 12-18 times that of overall strand diameter or as per customers' specifications
- 4) Lay direction of outer wire layer is usually right hand or as specified by customer.
- 5) We can also produce as per other international standards and/or as per specific customer's requirements.

**Packing :**



Supplied as per customers' requirement in wooden reels or in coils as per BS-183



Seven wire stranding machine

# Mild Steel Round and Formed Wires for Armouring of Cables

**End Use :** Armouring of XLPE, PVC, Power and control cables for various voltage levels

**Specifications :** BS-1442, IS-3975/88, ASTM-A-411-I980 and as per customer's specifications

Nominal Wire Diameter (mm)	Diameter Tolerance (±)			Minimum UTS		Minimum Elongation 10% on GL	
	BS-1442	IS-3975	ASTM-A-411	BS-1442/ ASTM-A-411	IS-3975	BS-1442	IS-3975
	(mm)	(mm)	(mm)	(kg/mm <sup>2</sup> )	(kg/mm <sup>2</sup> )	(mm)	(mm)
0.70	–	0.04	–	–	–	–	125
0.90	0.025	0.05	–	35-49	31-51	90	125
1.25	0.035	0.05	–	35-49	31-51	125	125
1.40	–	0.06	–	35-49	31-51	–	125
1.60	0.045	0.08	–	35-49	31-51	160	125
1.65	–	–	0.08	35-49	–	–	–
2.00	0.050	0.08	–	35-49	31-51	200	250
2.11	–	–	0.08	35-49	–	–	–
2.50	0.065	0.10	–	35-49	31-51	250	250
2.77	–	–	0.10	35-49	–	–	–
3.15	0.080	0.12	–	35-49	31-51	250	250
3.40	–	–	0.10	35-49	–	–	–
4.00	0.100	0.12	–	35-49	31-51	250	250
4.19	–	–	0.10	35-49	–	–	–
CA formed 4.0x3.40x0.80	–	10%	–	–	31-51	–	250



State-of-the-art pickling plant



High speed wire drawing machine

Nominal Wire Diameter (mm)	Minimum Torsion No.			Minimum Zinc coating weightCoil			Coil Weight (kg)	I.D. (inch)
	GL=152mm ASTM-A-411	BS-1442/IS-3975		BS-1442	IS-3975	ASTM-A-411		
	Value	Value	GL(mm)	(g/m <sup>2</sup> )	(g/m <sup>2</sup> )	(g/m <sup>2</sup> )	(kg)	(inch)
0.70	–	43	75	–	60	–	10-20	12-13
0.90	–	33	75	150	75	–	15-25	12-13
1.25	–	24	75	200	90	–	40-60	16-18
1.40	–	43	150	–	90	–	50-70	21-22
1.60	–	37	150	230	95	–	50-70	21-22
1.65	14	–	–	–	–	150	50-70	21-22
2.00	–	30	150	240	105	–	100-110	21-22
2.11	14	–	–	–	–	180	100-110	21-23
2.50	–	24	150	260	110	–	100-110	21-23
2.77	14	–	–	–	–	240	100-110	21-23
3.15	–	19	150	275	120	–	100-110	21-23
3.40	10	–	–	–	–	240	100-110	21-23
4.00	–	15	150	290	135	–	100-110	21-23
4.19	10	–	–	–	–	270	100-110	21-23
CA Formed 4.0x3.40x0.80	–	NIL	NIL	–	110	–	70-100	21-23

**Note :**

- 1) Uniformity of Zinc coating as per various standards are as follows :
  - a) For wires as per BS-1442, uniformity as per BS-443
  - b) For wires as per IS-3975, uniformity as per IS-4826, Medium coating
  - c) For 4.0 x 3.40 x 0.80 as per IS-3975, uniformity 1.5 dips for face & 0.5 dips for edge
- 2) Resistivity  $14.5 \times 10^{-6}$  ohm-cm for all round wires and formed wires as per IS-3975
- 3) Resistivity  $13.8 \times 10^{-6}$  ohm-cm for all wires as per BS-1442
- 4) We can also produce as per other international standards and/or as per specific customer's requirements.
- 5) Higher coil weights can be supplied as per customers' requirement.

**Packing :**



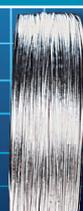
In coil form wrapped with polythene or polycoated hessian or as per Customers' Specification.



High speed wire drawing machine

**Some Prestigious Orders Executed include :**

Product details	Qty.	Client/Project
3.53 mm ACSR Core Wire	2000 MT	Powergrid for North Eastern Grid thru EMC Limited
2.21 mm ACSR Core Wire	250 MT	Powergrid 400kV Naptha-Jhakari Project thru Modern Malleables Ltd.
7/1.90 mm ACSR Strand	966 km	RMI Steels Ltd. for export to Iraq
7/3.66 mm Earthwire Strand	477 km	Powergrid Talcher II Project Pkg. D thru KEC Intl. Ltd.
7/3.66 mm Earthwire Strand	561 km	Powergrid Talcher II Project Pkg. C thru Jyoti Structures Ltd.
7/3.66 mm Earthwire Strand	610 km	Powergrid Talcher II Project Pkg. B thru Kalpataru P.T. Ltd.
7/3.66 mm Earthwire Strand	558 km	Powergrid Talcher II Project Pkg. E thru Hyundai Engg. Ltd.
7/3.66 mm Earthwire Strand	734 km	Powergrid Talcher II Project Pkg. A thru Hyundai Engg. Ltd.
Various sizes/constructions of Earth wire strand	530 MT	Bullivants Pty. Ltd., Australia
7/4.00 mm Earth wire strand	350 MT	Electricity Authority of Cyprus, Cyprus
19/2.16 mm Earth wire strand	1000 MT	Midal Cables Ltd., Bahrain
Various sizes/constructions of Earth wire strand	400 MT	Necks LB Material AB, Sweden





**HEAD OFFICE** : 2A, Shakespeare Sarani, Calcutta - 700071  
Phone : +91 (33) 282 3985/3924/8540/3446 Fax : +91 (33) 282 8504/2296  
e-mail : exports@ushamartin.co.in

**WORKS** : Tatisilwai, Ranchi - 835 103  
Phone : +91 (651) 520 241/242/243/244 Fax : +91 (651) 520 223

**DOMESTIC OFFICES**

**BANGALORE** : Phone : +91 (80) 2211314/2272814 Fax : +91 (80) 2273552  
e-mail : umibang@ushamartin.co.in

**CHENNAI** : Phone : +91 (44) 624 7392/7390 Fax : +91 (44) 624 7394

**CALCUTTA** : Phone : +91 (33) 282 0126 Fax : +91 (33) 282 9029  
e-mail : akapoor@ushamartin.co.in

**DELHI** : Phone : +91 (11) 331 5156/5157/5158/4908 Fax : +91 (11) 332 0723  
e-mail : uumdelhi@ushamartin.co.in

**MUMBAI** : Phone : +91 (22) 652 8477/6528/8483 Fax : +91 (22) 652 6774  
e-mail : mumbaiumi@ushamartin.co.in

We also have outlets at : Baroda, Chandigarh, Faridabad, Ghaziabad, Jaipur, Ludhiana, Nagpur, Pune

**INTERNATIONAL OFFICES**

**U.S.A.** : USHA MARTIN AMERICAS, INC  
Phone : +1 713 676 1800 Fax : +1 713 676 1166  
e-mail : umai@ushamartinus.com

**DENMARK** : USHA MARTIN SCANDINAVIA A/S  
Phone : +45 7022 5800 Fax : +45 7022 6900  
e-mail : wireropes@ushamartin.dk

**UNITED KINGDOM** : USHA MARTIN UK LIMITED  
Phone : +44 141 951 8801 Fax : +44 141951 8802  
e-mail : shyam@usha-martin-uk.demon.co.uk

**SOUTH AFRICA** : UMICOR AFRICA (PTY) LIMITED  
Phone : +27 11 626 1575/1586 Fax : +27 11 626 1588  
e-mail : nichans@mweb.co.za

We also have outlets at : Bangkok • Colombo • Dhaka • Dubai • Singapore • Ho Chi Minh City.