



## CONICAL COLUMNS ERW

▶ from hot rolled steel

AN ITALIAN INNOVATIVE TECHNOLOGY

# A NEW ERA



# COMPARISON AND ADVANTAGES

The conical columns ERW from hot rolled steel sheet disclose important advantages compared to the traditional conical columns employed up to now.

## TECHNOLOGICAL INNOVATION

COLUMNS EMPLOYED UP TO NOW		A NEW ERA
HSP Conical column	SAW-MAG conical column	ERW conical column
60's technology	80's technology	new technology

## AESTHETIC

Comparing the external surface of the finished product we highlight the aesthetic advantage.

Columns that can be seen in public areas



## SAVING OF RESOURCES

Comparing the weigh of the colums with similar performances, we highlight that less material is needed.

Example of a columns length 8,8m

kg87 (8800x127x3,6x60)	kg91 (8800x148x60x4)	kg74 (8800x127x60x3,6)
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## STRUCTURAL RESISTANCE

Comparing the quality of the employed steel we highlight the structural advantage.

Steel quality declared by the manufacturers

S275 snerv. 275 N/mmq	S235 snerv. 235 N/mmq	S355 snerv. 355 N/mmq
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## PRODUCTIVE FLEXIBILITY

Comparing the materials and the machinery needed to manufacture the product, we highlight our productive flexibility.

Data from the manufacturer's catalogue

employing of commercial tubes with standardised measures as per standard steel grade S275JO	taper ration 10 mm/m; thickness 3 or 4mm; steel grade S235	taper ration from 8 up to 15mm thickness for 3 to 4mm and intermediate steel grade S355, S275, S235
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## RESPECT FOR ENVIRONMENT

Comparing the production processes, we highlight the reduction of the working phases needed to manufacture the product having consequently a reduction of the CO2 emissions in the environment .

EMPLOYED MATERIAL

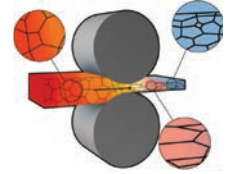
HSP CONICAL COLUMN

SAW-MAG CONICAL COLUMN

ERW CONICAL COLUMN

The three compared processes employ the same basic material: **HOT ROLLED STEEL SHEET**

In the hot rolling process, the steel sheet is heated to reach the plastic deformation temperature, then is worked out between rollers couple until the required thickness is reached. The original structure of the plate molten and coarse-grained is disaggregated and replaced by a thinner one having better toughness and ductility. The plastic deformation due to the crushing, causes the reduction of the thickness and a consequent increasing of the length. The original plate becomes too long to be handled as a flat item, so it is rolled up into a reel so-called "coils".



WORK 1

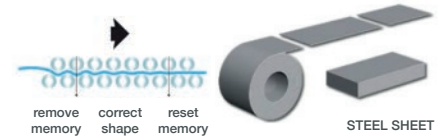
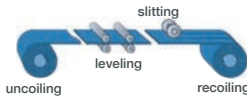
cutting coils with tailor-made measures

levelling and cutting of the coils into rectangles having tailor-made length

levelling and cutting of the coils into rectangles having tailor-made length

The coils is opened by means of an unwinder and the material going through some rollers, undergoes some alternate plastic deformation in order to remove the internal stresses until it becomes perfectly flat. Then it is longitudinally cut in order to obtain the plate of the needed width.

Coils is opened by means of an unwinder and the material going through some rollers, undergoes some alternate plastic deformations in order to remove the internal stresses until it becomes perfectly flat. Then it is cross-cut in order to obtain plates of the needed length.



WORK 2

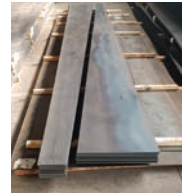
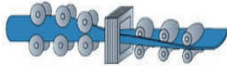
forming of the cylindrical tubular profile

cutting of the steel sheet into trapezium

cutting of the steel sheet into trapezium

In the molding process of the cylindrical tubular profile, the plate is arranged on an unwinder, levelled and subsequently "U" shaped and then closed like an "O" by means of some molding rollers.

The rectangular steel sheet, having needed thickness and length, is cut into trapezium in order to obtain the conical profile.



WORK 3

length-wise fusion without filler material ERW method

molding of the conical profile

molding of the conical profile

The welding process of the profiled steel sheet consists in heating the two hems up to the melting temperature by means of high frequency electricity, then the tube is pressed by means of rollers obtaining the junction of the hems. The extra metal formed during the pressing welding process is completely hot removed.

The steel sheet trapezium is bent on a purpose made mold with conical profile.



WORK 4

cutting of the tube to tailor-made length

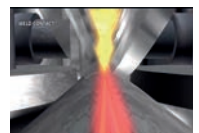
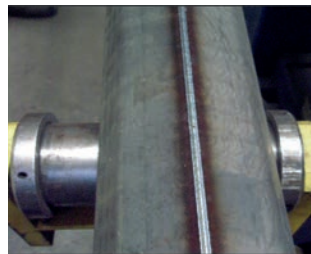
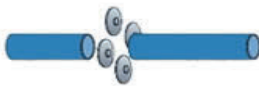
external longitudinal welding with filler material SAW or MAG method

length-wise fusion without filler material ERW method

After welding, the tube is tailor-made cut to the requested length.

The bent conical profile is closed joining the longitudinal edge with electric longitudinal welding submerged arc with filler support material SAW or MAG method.

The bent conical profile is closed joining the longitudinal edge with ERW method which consists in heating the two hems up to the melting temperature by means of high frequency electricity, then the tube is pressed by means of rollers obtaining the junction of the hems. The extra metal formed during the pressing welding process is completely hot removed.



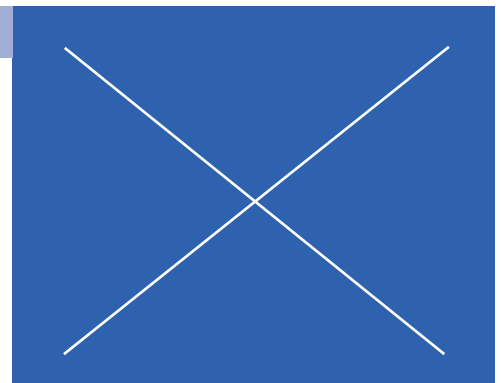
WORK 5

conical shaping of the tube by means of hot pressorotation

possible smoothing of the longitudinal welding if any

The tube having diameter, thickness and length needed, is heated to a temperature of 700° by means of electric induction, then it is slowly deformed by hot pressorotation, carrying the material inside the column to modify the geometry and obtain the conical profile.

Removal of the external welding seam by grinding.



## DESCRIPTION

Conical columns with circular section made of hot rolled steel sheet obtained by molding of a steel plate trapezium on purpose made mold in order to give a perfect circular shape. The bent conical profile is closed joining the longitudinal hem by die casting; the hems to be joined are heated up to the melting temperature, by means of high frequency electricity passage, then the profile is pressed by means of rollers obtaining the fusion of the hems. The extra metal generated during the pressure welding process is completely hot removed, obtaining a smooth profile. The die casting process ERW (electrical resistance welding), consists in autogenous welding where the material composes the part to be joined, guaranteeing the total continuity on the material characteristics.

## MATERIAL

The steel that can be employed can be steel grade S355, S275 or S235 having characteristics as per standard EN10025 according to the structural needs.

### S355

breaking point from 470 to 630 N/sqmm  
yield strength: 355 N/sqmm

### S275

breaking point from 410 to 560 N/sqmm  
yield strength: 275 N/sqmm

### S235

breaking point from 360 to 510 N/sqmm  
yield strength: 235 N/sqmm

## WORKS

Works can be customised according to the drawing, such as, base plate, opening with flush type door obtained by cutting, drilling, threading, welded details, bending, etc.

## PROTECTION

Protection against corrosion by means of hot dip galvanization obtained with the following cycle: degreasing, pickling, washing, fluxing, pre heating, hot dip galvanization in melted zinc bath at 440÷450°, with minimum percentage of zinc into the bath 98.5%.

Coating obtained according to UNI EN ISO 1461 with minimum thickness 55 microns and average 70 microns.

External painting, if any, with colour from our colour card, rough effect, obtained with thermosetting powders cycle including: cleaning from zinc coating burs; smoothing of the surfaces by means of a light mechanic device; cleaning of the surfaces in order to eliminate grease or dirty and create a good adherence base; application by means of electrostatic spray of polyester powder suitable for galvanized surfaces for outside installation, polymerization into oven at constant temperature of approx. 200°, package for each column, by banding with tissue 100% polyester, (no pluriball), in order to avoid damages during the handling phase.

Characteristics of the obtained coat:

Cycle C4DUPLICATE = cathodic protection double coat, average film thickness 130 microns (70 galv+60 top coat)

Cycle C5 Plus = cathodic protection + barrier effect average film thickness 190 micron, (70 galv+ 60+60 primer and top coat)

Resistance to mechanical test ISO1519, ISO2409, ISO1520, STM D2794, ISO2815

Resistance to chemical test ISO9227, ISO6270, ISO3231, EN2260-1, ISO2810, ISO11341-1; ISO11507

## MARKING

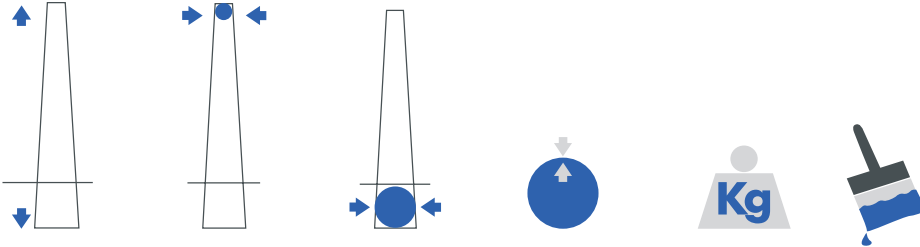
The columns will be CE marked according to the standard in force (DPR246/93, 89/106/CEE; 93/68/CEE).

If employed in public lighting, the label on each column quotes: standard reference EN40-5, manufacturer's identification, certificate number of the authorization to the mark CE CPD P029, year of marking, product code, and contract reference number.

If employed in other structural fields, according to the CE are manufactured according to EN 1090 execution class ECX2, certificate issued by third party according to European directive UE 305/2011. The marking, on each column quotes, standard reference EN 1090, manufacturer's identification, certificate number of the authorisation to mark CE 0475-CPR 15, year of marking, product code, contract number.

# DIMENSIONS

Tolerances on dimensions UNI EN 40/2 - UNI EN 10051



length mm	diameter on top mm	base diameter mm	thickness mm	weight galva- nised kg	painting surface smq	standard pro- duction S355JO	standard pro- duction S235JR	production on demand steel grade at choice		
4000	60	89	3,2	29	0,94	X		X		
		92	3	23	0,96		X	X		
		100		24	1,01		X	X		
		116		26	1,11			X		
	75	107		27	1,14			X		
		115		29	1,19			X		
		131		31	1,29			X		
		122		32	1,33			X		
	90	130		33	1,38			X		
		146	36	1,48			X			
		4500	60	89	3,2	27	1,05	X		X
				96	3	26	1,10		X	X
105	28			1,17			X	X		
123	31			1,29				X		
75	111		31	1,31				X		
	120		33	1,38				X		
	138		36	1,51				X		
	126		37	1,53				X		
90	135		38	1,59				X		
	153		41	1,72			X			
	5000		60	102	3,2	32	1,27	X		X
				100	3	30	1,26		X	X
110		32		1,34			X	X		
130		36		1,49				X		
75		115	36	1,49				X		
		125	38	1,57				X		
		145	42	1,73				X		
		130	42	1,73				X		
90		140	44	1,81				X		
		160	47	1,96			X			
		5500	60	102	3,2	35	1,40	X		X
				104	3	34	1,42		X	X
115	36			1,51			X	X		
137	41			1,70				X		
75	119		40	1,68				X		
	130		43	1,77				X		
	152		47	1,96				X		
	134		47	1,94				X		
90	145		49	2,03				X		
	167		54	2,22			X			
	6000		60	114	3,4	44	1,64	X		X
				108	3	38	1,58		X	X
120		41		1,70			X	X		
144		46		1,92				X		
75		123	45	1,87				X		
		135	48	1,98				X		
		159	53	2,21				X		
		138	52	2,15				X		
90		150	55	2,26				X		
		174	60	2,49			X			

length	diameter on top	base diameter	thickness	weight galvani- sed kg	painting surface	prod.S355JO	prod. S235JR	production on demand	
6800	60	114	3,4	50	1,86	X		X	
		127	3,6	57	2,00	X		X	
		114	3	44	1,86			X	
		128		48	2,01		X	X	
		155		55	2,30			X	
		114	4	59	1,86			X	
	128	63		2,01		X	X		
	155	73		2,30			X		
	75	3	129	3	52	2,18			X
			143		56	2,33			X
			170		63	2,62			X
		129	4	69	2,18			X	
		143		74	2,33			X	
		170		84	2,62			X	
	90	3	144	3	60	2,50			X
			158		64	2,65			X
			185		71	2,94			X
		144	4	80	2,50			X	
158		85		2,65			X		
185		94		2,94			X		
7800	60	127	3,6	65	2,29	X		X	
		122	3	53	2,23			X	
		138		58	2,43		X	X	
		169		68	2,81			X	
		122	4	70	2,23			X	
		138		77	2,43		X	X	
	169	89		2,81			X		
	75	3	137	3	63	2,60			X
			153		67	2,79			X
			184		77	3,18			X
		137	4	83	2,60			X	
		153		89	2,79			X	
		184		101	3,18			X	
	90	3	152	3	72	2,97			X
			168		76	3,16			X
			199		86	3,54			X
		152	4	95	2,97			X	
		168		101	3,16			X	
199		114		3,54			X		
8800	60	127	3,6	74	2,58	X		X	
		139	3,8	83	2,75	X		X	
		130	3	63	2,63			X	
		148		69	2,88		X	X	
		183		81	3,36			X	
		130	4	83	2,63			X	
	148	91		2,88		X	X		
	183	107		3,36			X		
	75	3	145	3	73	3,05			X
			163		79	3,29			X
			198		91	3,78			X
		145	4	97	3,05			X	
		163		105	3,29			X	
		198		121	3,78			X	
	90	3	160	3	84	3,46			X
			178		90	3,70			X
			213		102	4,19			X
		160	4	110	3,46			X	
178		118		3,70			X		
213		135		4,19			X		
9800	60	139	3,8	92	3,06	X		X	
		138	3	73	3,05			X	
		158		81	3,36		X	X	
		197		96	3,96			X	
		138	4	97	3,05			X	
		158		107	3,36		X	X	
	197	126		3,96			X		
	75	3	153	3	85	3,52			X
			173		92	3,82			X
			212		107	4,42			X
		153	4	112	3,52			X	
		173		122	3,82			X	
		212		142	4,42			X	
	90	3	168	3	96	3,98			X
			188		104	4,28			X
			227		118	4,88			X
		168	4	127	3,98			X	
		188		137	4,28			X	
227		157		4,88			X		

length	diameter on top	base diameter	thickness	weight galvani- sed kg	painting surface	prod.S355JO	prod. S235JR	production on demand
10800	60	152	4	114	3,60	X		X
		146	3	84	3,50			X
		168		93	3,87		X	X
		211		111	4,60			X
		146	4	111	3,50			X
		168		123	3,87		X	X
	211	147		4,60			X	
	75	161	3	97	4,01			X
		183		106	4,38			X
		226		124	5,11			X
		161	4	128	4,01			X
		183		140	4,38			X
		226		164	5,11			X
	90	176	3	109	4,52			X
		198		118	4,89			X
		241		136	5,62			X
		176	4	145	4,52			X
		198		157	4,89			X
241		181		5,62			X	
11800	60	152	4	125	3,93	X		X
		154	3	96	3,97			X
		178		106	4,41		X	X
		225		128	5,29			X
		154	4	126	3,97			X
		178		141	4,41		X	X
	225	169		5,29			X	
	75	169	3	109	4,53			X
		193		120	4,97			X
		240		142	5,84			X
		169	4	144	4,53			X
		193		159	4,97			X
		240		188	5,84			X
	90	184	3	123	5,09			X
		208		134	5,52			X
		255		155	6,40			X
		184	4	163	5,09			X
		208		177	5,52			X
255		206		6,40			X	
12800	60	168	4	146	4,58	X		X
		162	3	108	4,47			X
		188		120	4,99		X	X
		239		146	6,02			X
		162	4	142	4,47			X
		188		159	4,99		X	X
	239	193		6,02			X	
	75	177	3	123	5,07			X
		203		135	5,59			X
		254		161	6,62			X
		177	4	162	5,07			X
		203		179	5,59			X
		254		213	6,62			X
	90	192	3	137	5,68			X
		218		150	6,19			X
		269		176	7,22			X
		192	4	182	5,68			X
		218		199	6,19			X
269		233		7,22			X	
14000	60	164	4	156	4,8			X
		190		175	5,4			X
		242		214	6,5			X
	75	260	238	7,2			X	
	90	270	257	7,8			X	
15000	60	172	4	173	5,3			X
		200		195	6,0			X
		256		239	7,3			X
	75	270	262	8,0			X	
16000	60	180	4	191	5,9			X
		210		216	6,6			X
		270		266	8,1			X

Other dimensions can be realised on demand according to the following dimensional restrictions:  
maximum length in one section 12,8m; 16m in 2 overlapped sections.  
Taper ratio from 8 up to 15 mm/m; Maximum base diameter 280mm; minimum d. on top 60mm  
steel thickness from 3 to 4mm.



This innovation is the result of a constant activity of research and development which makes **Pali Campion** a market leader in the forefront of technology.

Pali Campion boasts of more than 10-year experience in the steel columns field.

*Since the beginning we are linked to research and innovation.*

*We started years ago as “craftsman”, our commitment is always turned towards the development.*

*We believe and invest in technological innovation, in order to supply solution having better performances and grant a constantly growing quality.*



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ISO9001 – IT5358IGQ9810



ISO14001 – IT278513



OHSAS18001 – IT278931UK



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ISTITUTO ITALIANO DELLA SALDATURA

EN1090 – 0475CPR15



EN40 – 1608CPRP029



ISO3834 – IT464



Centro di trasformazione 1836/11