



355

Launch of Grade 355 Tube

Franco Mordini
Chairman of the ASTPM Technical Committee

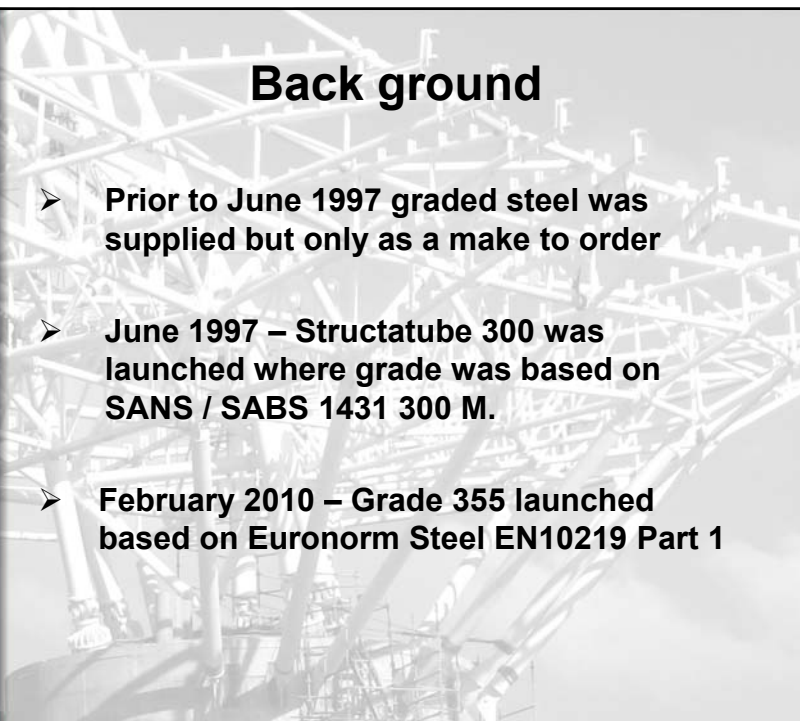
19 February 2010



The Association of
STEEL TUBE AND
PIPE MANUFACTURERS
of South Africa




stee
STEEL CONSTRUCTION
We speak fluent steel.




355

Back ground

- Prior to June 1997 graded steel was supplied but only as a make to order
- June 1997 – Structatube 300 was launched where grade was based on SANS / SABS 1431 300 M.
- February 2010 – Grade 355 launched based on Euronorm Steel EN10219 Part 1



The Association of
STEEL TUBE AND
PIPE MANUFACTURERS
of South Africa




stee
STEEL CONSTRUCTION
We speak fluent steel.

355


Grade 355 Structural Hollow Sections - Tube

Development work undertaken

- Ensure steel is ERW friendly – EN10219 Part 1
 - Fully Weldable
 - Galvanizable – Si Away from highly reactive areas
- Trials done with our suppliers
- Trials undertaken by the various manufacturers comprising Robor , Macsteel Tube and Pipe and Trident Sterling
- Steel grade now a standard
- Industry started buying grade 355 in October 2009



The Association of
STEEL TUBE AND
PIPE MANUFACTURERS
of South Africa




steel
STEEL CONSTRUCTION
We speak fluent steel.

355


Mechanical Properties

Yield Strength (MPa)	Ultimate Tensile (MPa)	Elongation
355	450	22%

C %	Mn %	P %	S %	Si %
max.	max.	max.	max.	
0.14	1.6	0.035	0.03	0.15 ≤ Si ≤ 0.25



The Association of
STEEL TUBE AND
PIPE MANUFACTURERS
of South Africa




steel
STEEL CONSTRUCTION
We speak fluent steel.


355

Benefits of Grade 355

- **New Tube will assist in making tubular products more competitive against other construction materials including concrete**
- **Grade 355 is an international grade**
- **Enhances benefit of Tube**
 - Structural efficiency in where in compression and torsion hence lighter solutions
 - Excellent torsional strength
 - Aesthetically pleasing solutions
 - Reduced wind resistance
 - Reduced paint areas
 - Can be concrete filled to increase strength and increase fire resistance rating



THE ASSOCIATION OF
STEEL TUBE AND
PIPE MANUFACTURERS
of South Africa




STEEL CONSTRUCTION
We speak fluent steel.


355

Table 1 : Relative Masses of struts

C _r = 800 kN		kL 3.0m			
	Profile	Radius of Gyration min (mm)	Mass Kg/m	Resistance C _r (kN)	Mass ratio
○	CHS 177.8 x 6.0	60.8	25.4	836	1.00
□	SHS 150.0 x 6.0	58.4	27.2	850	1.07
L	200 x 200 x 16 Angle	39.4	48.5	1140	1.91
⌋	150x90x12 Back-to-back Angles	38.7	43.2	833	1.70
+	100 x 100 x 10 Star Angles Strut	45.0	35.6	810	1.40
I	152x 152x37 Universal Column	38.7	37.0	860	1.46



THE ASSOCIATION OF
STEEL TUBE AND
PIPE MANUFACTURERS
of South Africa



STEEL CONSTRUCTION
We speak fluent steel.






Table 2 : Relative Torsional Strength

	Profile	J (10 ⁶ mm ⁴)	Mass	Mass ratio
○	CHS 88.9 x 4.0	1.93	8.38	1.0
□	SHS 75 x 5.0	1.77	11.1	1.3
L	200 x 200 x 24 Angle	1.80	71.1	8.5
⌋	533x210x122 I-Section	1.81	122.0	14.6
H	254x254x107 H-Section	1.75	107.0	12.8



The Association of
STEEL TUBE AND
PIPE MANUFACTURERS
of South Africa



STEEL CONSTRUCTION
We speak fluent steel.






Table 3 : Relative Paint areas

		mm ² /m	Area ratio
○	CHS 177.8 x 6.0	559	1.00
□	SHS 150.0 x 6.0	600	1.07
L	200 x 200 x 16 Angle	800	1.43
⌋	150 x 90 x 12 Back-to-back Angles	960	1.72
⊕	100 x 100 x 10 Star Angles Strut	800	1.43
⌋	152x152x37 Universal Column	912	1.63



The Association of
STEEL TUBE AND
PIPE MANUFACTURERS
of South Africa




STEEL CONSTRUCTION
We speak fluent steel.

355


Table 4 : Relative wind resistance

		C _f *		C _f x b	Wind resistance ratio
1 → ○	CHS 177.8 x 6.0	1	1.20	213	1.00
1 → □ ↘ 2	SHS 150.0 x 6.0	1	1.65	248	1.16
		2	1.60	339	1.59
1 → L ↘ 2	200 x 200 x 16 Angle	1	2.00	240	1.12
		2	1.80	509	2.39
1 → L ↘ 2	150 x 90 x 12 Back-to-back Angles	1	1.50	180	1.05
		2	1.60	384	1.35
1 → + ↘ 2	100 x 100 x 10 Star Angles Strut	1	1.75	420	1.64
		2	1.62	275	1.07
1 → I ↘ 2	152x152x37 Universal Column	1	2.10	319	1.50
		2	1.80	273	1.28

* Based on Tables 15 and 22 of the SABS 0160-1989.



The Association of
STEEL TUBE AND
PIPE MANUFACTURERS
of South Africa



steel
STEEL CONSTRUCTION
We speak fluent steel.

355

Other new developments

- **New technology**
 - Laser
 - Plasma
- **Making life a lot simpler**
- **Benefits**
 - Accuracy
 - Reliability
 - 2 D or 3 D cutting heads available
 - With 3D head weld preparation included



The Association of
STEEL TUBE AND
PIPE MANUFACTURERS
of South Africa



steel
STEEL CONSTRUCTION
We speak fluent steel.







AVAILABILITY OF 355MPa STEEL STRUCTURAL HOLLOW SECTIONS IN SOUTH AFRICA

Rounds										Rectangles										Squares												
Outside diameter (mm)	Wall thickness t (mm)										Size dxh (mm)	Wall thickness t (mm)										Size dxh (mm)	Wall thickness t (mm)									
	2.5	3	3.5	4	4.5	5	6	8	10	12		2.5	3	3.5	4	4.5	5	6	8	10	2.5		3	3.5	4	4.5	5	6	8	10		
48.3											50 x 25										38 x 38											
60.3											60 x 40										50 x 50											
63.5											76 x 38										60 x 60											
76.2											80 x 40										75 x 75											
88.9											76 x 50										80 x 80											
101.6											100 x 50										100 x 100											
114.3											120 x 60										120 x 120											
127.0											160 x 80										150 x 150											
139.7											200 x 100										175 x 175											
152.4											200 x 150										195 x 195											
165.1											250 x 100										220 x 220											
177.8											300 x 140										260 x 260											
193.7											320 x 200										285 x 285											
219.1											340 x 180																					
244.5																																
273.1																																
323.9																																
352.6																																
406.4																																
457.0																																
508.0																																