TATA STEEL

TATA

Install® Plus 235 & Inline™ 265

Hot-Part-2 PED & high temperature carbon steel tubes
for building & industrial services

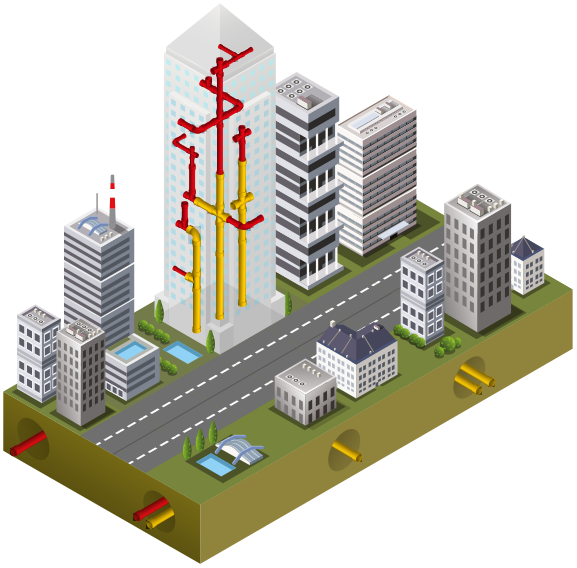
Not all tubes are the same

It is vital that the correct pipework is used within projects to reduce the risk of failure or compliance issues.

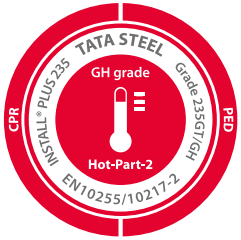
- Unlike our UK made Hot-Part-2 brands, commodity imported alternatives, such as cold-formed TR1 or TR2 tubes, may be cheaper, but can suffer from a range of technical, installation and performance issues.

- Also, they **are not suitable** for use at temperatures >50°C, and **may not comply** under the PED (Pressure Equipment Directive), CPR (Construction Products Regulations) or the UKCA.

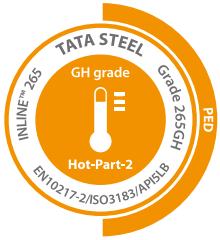
Building
and industrial services



- Tata Steel's Hot-Part-2 carbon steel tubes have been specifically developed for use in a wide range of above and below ground applications.
- They are suitable for high and elevated temperature use and comply with the PED, unlike BS EN10217-1 TR1 and TR2 alternatives, which are only suitable for a max 50°C and may not satisfy the essential requirement of the Directive.



For sizes:
15nb (1/2") OD21.3mm to
150nb (6") OD165.1mm
Design temp -20 to 300°C



For sizes:
Up to and including
500nb (20") OD508mm
Design temp -20 to 400°C

Hot-Part-2 manufacturing

Advantages of hot-finished (Part-2 GH grade) tubes

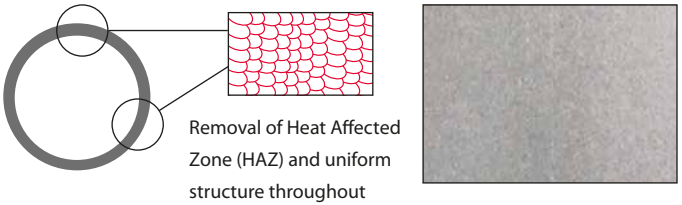
Our hot-finished tubes have no Heat Affected Zone (HAZ), this is removed during hot-manufacturing, resulting in a superior product having:

- An ordered and consistent microstructure
- No internal stress that can promote cracking
- Consistent and reliable mechanical properties
- Improved structural integrity and ductility
- Improved and consistent toughness
- Higher pressure integrity
- Greater factor of safety
- No loss of strength during additional welding or heating
- Improved performance against corrosion
- Ability to be bent to tighter radii without splitting, creasing or collapsing

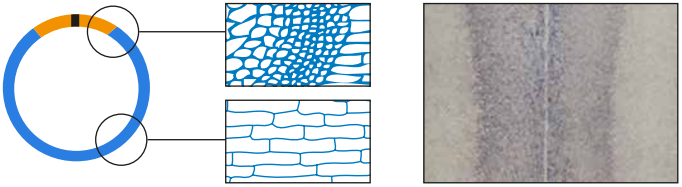
Disadvantages of cold-formed (Part-1 TR1 grade) tubes

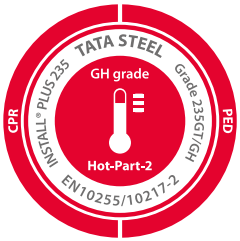
Cold-formed tubes contain a Heat Affected Zone (HAZ) around the weld-seam, this is an area of weakness, in addition cold-formed tubes also have:

- An inconsistent microstructure
- Pockets of stress that can promote cracking
- Inconsistencies in mechanical properties and strength
- Poorer toughness than the tube body
- Increased risk of splitting
- Poorer pressure integrity
- Reduced performance against corrosion
- Poorer bending abilities
- A maximum application temperature of 50°C
- No compliance with the PED (cold Part-1-TR1 tubes do not meet the essential technical requirements of the Directive)



Removal of Heat Affected Zone (HAZ) and uniform structure throughout the hot tube



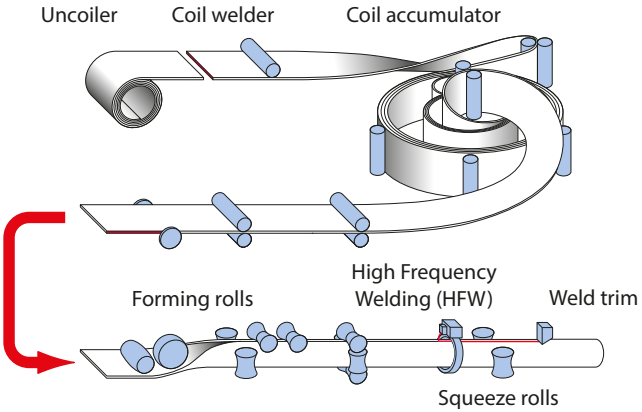


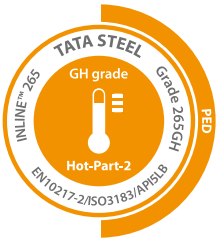
For sizes:

15nb (1/2") OD21.3mm to

150nb (6") OD165.1mm

Design temp -20 to 300°C





For sizes:

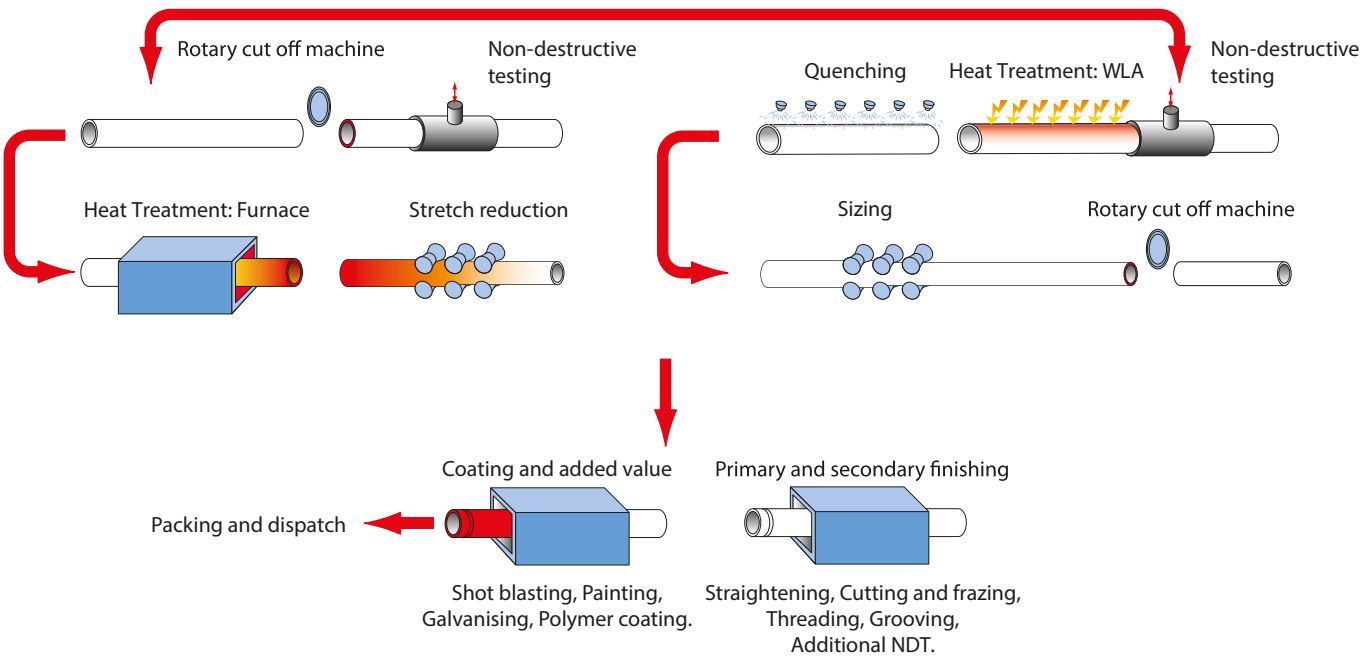
Up to and including

500nb (20") OD508mm

Design temp -20 to 400°C

Corby route Install® Plus 235

Hartlepool route Inline™ 265



Install Plus® 235

For sizes up to and including 150nb (6") OD165.1mm

Multi-standard:
BS EN10255 / 10217-2

Steel grade
S/P235GT/GH

GH = Get Hot

- Replacement to the withdrawn BS1387.
- Medium and Heavy weight.
- 6.4m and 3.2m lengths as standard.
- Ends: Screwed and socketed, plain ends or grooved.
- Finish: Red painted or galvanised.
- High and elevated temperature use (design temp. -20 to 300°C)
- Fully CE Marked CPR CAT 3 & 4 for fuel, air, gas and water.
- Satisfies the essential requirements of the PED.

Install® Plus 235 application guidance

	Install® Plus 235		Carbon Steel Press Fit		Cold-formed TR1
Applications	**ID Self Colour**	**ID galvanised**	**ID Self Colour**	**ID Galvanised**	**ID Self Colour**
Heating systems (>50°C) - open	Yes	No	No	No	No
Heating systems (>50°C) - closed	Yes	No	Yes	No	No
Chilled water systems - open	Yes	Yes	No	No	No if PED applies
Chilled water systems - closed	Yes	Yes	Yes	Yes	No if PED applies
Air conditioning	Yes	Yes	Yes	Yes	No if PED applies
Fire sprinkler systems	Yes	Yes	No	Yes**	No if PED applies
Steam services	Yes	No	No	No	No
Natural gas	Yes	Yes	No	No	No if PED applies
LPG	Yes	No	No	No	No if PED applies
Fuel oils	Yes	No	No	No	No if PED applies
Compressed air	No	Yes	No	Yes	Yes
CPR Compliance (EN10255)	Yes		No		Check with supplier
PED Conformity (EN10217-2:2019)	Yes		No		No
CE marked (EN10255)	Yes		No		Check with supplier
Pressure ratings	# See below pressure table		16 bar max*		Check with supplier
Size range (OD)	21.3 to 165.1 mm		12 to 108 mm*		21.3 to 165.1mm
Operating temp	-20 to 300°C as standard, -40°C by special agreement		Check with supplier		5 to 50°C

Depending on wall thickness and joint * Typical values obtained from public domain data **Wet systems only.

Install® Plus 235 product and pressure data*

Tube size			(A) Suggested maximum design (bar) for screwed and socketed joints. Correctly made-up using suitable appropriate jointing compounds						(B) Suggested maximum design pressure (bar) for tube or full penetration butt-welded joints. Butt-welded joints prepared in accordance with current best practice (based on S235GT/P235GH mechanical properties)							
			Water -20 up to 100°C		Compressed air		Steam to 220°C		-20 to 60°C		100°C max		150°C max		300°C max	
OD	Nominal bore (NB)		Tube weight (M = Medium, H = Heavy)						Tube weight (M = Medium, H = Heavy)							
mm	mm	inch	M	H	M	H	M	H	M	H	M	H	M	H	M	H
21.3	15	½	80	100	70	90	20	22	233	270	190	234	182	225	128	158
26.9	20	¾	75	90	65	80	20	22	186	215	152	187	146	179	103	126
33.7	25	1	70	85	60	75	20	22	172	215	149	186	143	179	101	126
42.4	32	1¼	55	70	50	65	19	21	137	171	119	148	114	143	80	100
48.3	40	1½	45	60	40	55	19	21	120	150	104	130	100	125	71	88
60.3	50	2	40	55	35	50	17	19	109	136	94	118	91	113	64	80
76.1	65	2½	35	45	30	40	17	19	86	108	75	93	72	90	51	63
88.9	80	3	30	40	25	35	17	19	82	103	71	89	68	85	48	60
114.3	100	4	25	35	20	30	15	17	72	86	62	75	60	72	42	51
139.7	125	5	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	65	70	57	61	54	59	38	41
165.1	150	6	N/A*	N/A*	N/A*	N/A*	N/A*	N/A*	55	60	48	52	46	50	32	35

*Pressure data for guidance only - and will be a function of the jointing system used. S&S joints may be restricted for some applications. We do not offer 5 and 6" S&S.

Inline™ 265

For sizes up to and including 500nb (20”) OD508.0mm

Multi-standard:
BS EN10217-2 /
ISO3183 / API5LB

Steel grade
P265GH
GH = Get Hot

- Fully weldable and traceable steel.
- Available in a range of key industrial sizes and wall thicknesses.
- Satisfies both PSL1 and PSL 2 of API5L Grade B as standard.
- Ends: Plain end or bevelled.
- Finish: Varnished or self- coloured (other coatings may be available) - please check.
- High and elevated temperature use (design temp. -20 to 400°C).
- Satisfies the essential requirements of the PED.

Inline™ 265 application guidance

Applications	Inline™ 265	Comparable seamless (GH)	Cold-formed or seamless (TR1)
Low pressure gas (≤ 16 bar)	Yes	Yes	No if PED applies or >50°C
Specialist industrial HVAC	Yes	Yes	No if PED applies or >50°C
Steam services	Yes	Yes	No
Petro-chemical	Yes	Yes	No if PED applies or >50°C
Process plant	Yes	Yes	No if PED applies or >50°C
LPG & fuel oils (self colour only)	Yes	Yes	No if PED applies or >50°C
On-shore gas/line pipe (Not Annex 'M'*)	Yes	Yes	No if PED applies or >50°C
Industrial conveyance	Yes	Yes	No if PED applies or >50°C
Suggested max. design temperature	400°C	450°C	50°C
Consistent ovality	Yes	No	No
Consistent wall thickness	Yes	No	No
Consistent end-matching	Yes	No	No
Fixed lengths as standard	Yes	No	No

* For ISO3183 Annex 'M' please contact the Tubes Technical Helpline for details on availability.

Inline™ 265 product and pressure data

OD (mm) (NB) (inches)	Thickness (mm)	Designation		Mass (kg/m)	Mass (kg/m)	Recommended Maximum Design Pressure (bar)	
		Strength	Schedule	(DRY)	(WET)	Ambient Temp	Elevated Temp 400°C
60.3 (50) (2")	3.9	STD	40	5.4	184.5	148	69
88.9 (80) (3")	5.5	STD	40	11.3	88.4	142	66
114.3 (100) (4")	6.0	STD	40	16.0	62.4	121	56
168.3 (150) (6")	7.1	STD	40	28.2	35.4	97	45
219.1 (200) (8")	6.4		20	33.6	29.8	65	32
	8.2	STD	40	42.7	23.5	85	40
273.0 (250) (10")	6.4		20	42.1	23.8	52	25
	9.3	STD	40	60.5	16.5	77	37
323.9 (300) (12")	6.4		20	50.1	20.0	44	21
	9.5	STD		73.7	13.6	66	32
355.6 (350) (14″)	7.9		20	67.7	14.8	50	24
	9.5	STD	30	81.1	12.3	60	29
406.4 (400) (16″)	7.9		20	77.6	12.9	44	21
	9.5	STD	30	93.0	10.8	53	25
457.1 (450) (18″)	7.9		20	87.5	11.4	39	19
	9.5	STD		104.8	9.5	47	23
508.0 (500) (20″)	9.5	STD	20	116.8	8.6	42	20

Only key sizes shown – other sizes are available, please refer to the main Inline™ technical brochure, or contact the us for full details.

Product offering for Install® Plus 235

Thread size	Specified Outside Diameter		Thickness (mm)									
R (inch)	OD (mm)	NB	2.0	2.3	2.6	2.9	3.2	3.6	4.0	4.5	5.0	5.4
½	21.3	15			Medium		Heavy					
¾	26.9	20			Medium		Heavy					
1	33.7	25					Medium		Heavy			
1 ¼	42.4	32					Medium		Heavy			
1 ½	48.3	40					Medium		Heavy			
2	60.3	50						Medium		Heavy		
2 ½	76.1	65						Medium		Heavy		
3	88.9	80							Medium		Heavy	
4	114.3	100								Medium		Heavy
5	139.7	125									Medium	Heavy
6	165.1	150									Medium	Heavy

How to order: By brand, please ask for TATA STEEL'S INSTALL® PLUS 235 HOT-FINISHED, MULTI-STANDARD TUBE, GRADE S/P235GT/GH (GET HOT), CE-CPR-CAT3&4 or by specification BS EN10255/10217-2 GRADE S/P235GT/GH (GET HOT), CPR-CAT3&4, UK Made.

Product offering for Inline™ 265

Thread size	Specified Outside Diameter		Thickness (mm)								
R (inch)	OD (mm)	NB	3.9	5.5	6.0	6.4	7.1	7.9	8.2	9.3	9.5
2	60.3	50.0	STD Sch40								
3	88.9	80.0		STD Sch40							
4	114.3	100.0			STD Sch40						
6	168.3	150.0					STD Sch40				
8	219.1	200.0				Sch20			Sch40		
10	273.0	250.0				Sch20				STD Sch40	
12	323.9	300.0				Sch20					STD
14	355.6	350.0						Sch20			STD Sch30
16	406.4	400.0						Sch20			STD Sch30
18	457.0	450.0						Sch20			STD
20	508.0	500.0									STD Sch20

STD = Standard Weight, Sch = Schedule, Other sizes may be available unpon request.

How to order: By brand, please ask for TATA STEEL'S INLINE™ 265 HOT-FINISHED, MULTI-STANDARD TUBE, GRADE P265GH (GET HOT) & API5LB or by specification BS EN10217-2/ISO3183/API5L GRADE P265GH (GET HOT)/L245/B, UK Made.

Install® Plus 235 - Medium weight wall - Tube weights

NB	OD (mm)	Wall thickness (mm)	DRY tube (plain end, self-colour/red-painted) (kg/m)	WET tube (plain end, self-colour/ red-painted) & water) (kg/m)
15	21.3	2.6	1.2	1.4
20	26.9	2.6	1.6	1.9
25	33.7	3.2	2.4	3
32	42.4	3.2	3.1	4.1
40	48.3	3.2	3.6	5
50	60.3	3.6	5	7.2
65	76.1	3.6	6.4	10.2
80	88.9	4	8.4	13.5
100	114.9	4.5	12.2	21
125	139.7	5	16.6	29.8
150	165.1	5	19.7	38.6

Install® Plus 235 - Heavy weight wall - Tube weights

NB	OD (mm)	Wall thickness (mm)	DRY tube (plain end, self-colour/red-painted) (kg/m)	WET tube (plain end, self-colour/ red-painted) & water) (kg/m)
15	21.3	3.2	1.4	1.6
20	26.9	3.2	1.9	2.2
25	33.7	4	2.9	3.5
32	42.4	4	3.8	4.7
40	48.3	4	4.4	5.7
50	60.3	4.5	6.2	8.3
65	76.1	4.5	7.9	11.5
80	88.9	5	10.3	15.2
100	114.9	5.4	14.5	23
125	139.7	5.4	17.9	31
150	165.1	5.4	21.3	40

All calculations are based on nominal figures / dimensions for OD and T.

Weights for plain end, self-colour/painted only in kg/m. No hangers or fittings included.

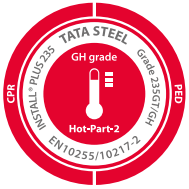
We would strongly recommend that an additional factor of safety is applied by end-users.

Hot-Part-2
vs. Cold-Part-1

Our Hot-Part-2 tubes are technically superior to cold-formed alternatives, which are not suitable for use at temperatures >50°C, and do not comply under the PED (Pressure Equipment Directive).

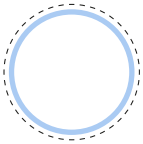
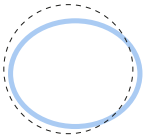
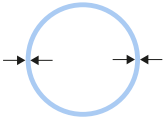
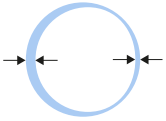
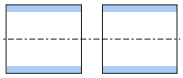
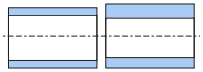
Top 10 key points

	Hot	Cold
Is the HAZ (Heat Affected Zone) removed	Yes	No
Is the weld seam stress free as a result of heat treatment	Yes	No
Is the tube more ductile, allowing for better bending, threading etc.	Yes	No
Can I be sure of consistent mechanical properties	Yes	No
Can I satisfy higher application temperatures above 50°C	Yes	No
Is the tube also tested for lower temperature applications	Yes	No
Are mechanical properties consistent when re-welding the tube	Yes	No
Does the tube satisfy the essential requirements of the PED	Yes	No
Is the tube UK manufactured and fully traceable	Yes	No
Is the tube more resistance to corrosion	Yes	No



Welded
vs. seamless

Install® Plus 235 and Inline™ 265 Hot-Part-2 welded tubes are an ideal cost-effective substitute for comparable seamless products, and deliver a range of technical advantages.

	Advantages of HFW Welded	Disadvantages of Seamless
Ovality	 Consistent roundness	 Out of roundness
Wall	 Consistent thickness	 Inconsistent thickness
End matching	 Consistent	 Inconsistent
Length tolerances	 Fixed length as standard (mm)	 Random length as standard (mm)

Technical support

Dedicated team of experts

- Our UK based experts are available to assist you on application and product suitability.
- We offer a free specification review service and have various CPD's and training packs covering **tube specifications, hot vs cold, the risk of stainless steel and galvanic corrosion, welded vs seamless** etc.
- We are actively involved with improving pipework awareness through university collaborations (BISPA), and Trade Association activities (BMTFA and BESA). Please contact us for more details.

BISPA
Building & Industrial Services Pipework Academy

BESA
BUILDING ENGINEERING SERVICES ASSOCIATION

BMTFA

Additional supporting product data

		Install® Plus 235		Inline™ 265	
Technical delivery condition		**Hot-finished**		**Hot-finished**	
Delivery condition and size range	Hot (Full Body Normalised)	OD 21.3 - 165.1 mm		OD60.3 - 168.3 mm	
	WLA (Weld Line Annealed)	For OD219.1 - 323.9 mm see Inline™ 265		OD219.1 - 508.0 mm	
Main targeted application		Building, engineering and industrial services		Specialist building, engineering and industrial services	
Ideal applications		HVAC, M&E, fire defence, general industrial conveyance		Process plant, industrial conveyance and linepipe oil & gas (gas ≤16 bar only)	
Main product specification standards		BS EN10255 / BS EN10217-2		API5L Grade B / BS EN10217-2 / ISO3183	
Primary grade / min. yield strength MPa		235		265~	
Tensile strength MPa		360-500		415-570	
Elongation (longitudinal min.) %		25		23	
Design temperature range (°C) #		-20 to 300		-20 to 400	
Seamless substitute		Yes		Yes	
Primary manufacturing standard and grade		BS EN10255	S235GT	BS EN10217-2	P265GH/TC1
Other standards and grades that our hot-finished tubes also cover Please refer to the Tubes technical support document TST41 for full details of our offering, technical delivery conditionsand products statements		BS EN10255	S195T & S195GT	BS EN10217-1 (Note 1)	P265TR1 & TR2
		BS EN10217-1 (Note 1)	P195TR1 & TR2	API 5L	Grade B PSL 1 & 2 (BN/BM)
			P235TR1 & TR2		X-grades - contact us to discuss
		BS EN10217-2	P195GH/TC1	ISO3183	L245
			P235GH/TC1	prEN10255 (OD219.1 - 323.9 mm)*	S235GT
Generally equivalent offering Please refer to the Tubes technical support document TST41 for full details of our offering, technical delivery conditionsand products statements		BS1387	S195	EN10208-1	L235GA (grade and composition)
		NF EN10255	S195 (G)T & S235(G)T		L245GA (grade and composition)
		EN10208-1	L235GA (grade and composition	ASTM A53	Grade B
		ASTM A53	Grade A	ASTM A106	Grade B
		ASTM A106	Grade A	ASTM A106	Grade C
		EN10216-1	P195TR1 & P235TR2	EN10216-2	P265GH/TC1
		EN10216-2	P195GH/TC1 & P235GH	EN10216-2	P195GH/TC1 & P235GH
Test certification (Per EN10214)		2.2 Test report (on request)		3.1 Test certificate	
PED 2014/68/EU QA System LRQA Approval 0002229		Full compliance (TC1)		Full compliance (TC1-4)	
CE marking CPR (Construction Products Regulations)		CAT 3 & 4 fuel, air, gas and water		N/A	

~ Min yield 290MPa for ≥OD219.1mm

Lower temperatures may be possible – contact one of our technical experts to discuss

* Only for sizes aligned with prEN EN10255 S235GT

Alignment with other standards may be possible – contact one of our technical experts to discuss your requirements in full

Note 1: Our GH / Hot-finished tubes can also be certified to BS EN10217-1, but a Part 1 / cold-formed tube cannot be a GH (Get Hot) grade.

www.tatasteelconstruction.com/hotvscold

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Tata Steel UK Limited is registered in England under number 05957565 with registered office at 18 Grosvenor Place, London, SW1X 7HS.

Language English TST87:1000:UK:07/2021