TATA STEEL

TATA

Inflow and Inflow Plus

General purpose pressure and industrial conveyance solutions

Contents

INFLOW AND INFLOW PLUS

An exclusive range of UK manufactured multi-certified pressure tube products to meet the specific needs and expectations of end-users

- **Inflow** and **Inflow Plus** products bring a fresh approach to HFI (High Frequency Induction) welded pressure tube, offering a convenient range of multi-certified options.
- **Inflow** and **Inflow Plus** cover the key pressure standards, regulations and legislative requirements, ensuring suitability for a wide range of pressure applications.
- **Inflow Plus** HFI welded tubes are generally equivalent to and designed to be interchangeable with seamless tubes of similar strength levels.
- **Inflow** and **Inflow Plus** tube products are manufactured in the UK at our tube sites in Corby (≤OD193.7mm) and Hartlepool ≥OD219.1mm).
- **Inflow** is a Cold-formed Dual Certified (CDC) tube, in accordance with both EN 10217-1 and EN 10219, providing customers with the flexibility to service both pressure and general engineering market applications at ambient temperatures.
- **Inflow Plus** is a normalised tube (Corby size range) or is produced from normalised strip post-Weld Line Annealed (WLA) (Hartlepool size range); primarily in accordance with EN 10217-2 grade P235GH; or for added end user confidence and improved pressure integrity to EN 10217-3 grade P355NH. Both products are suitable for use between -20°C and 400°C.
- **Inflow Plus 235** Boiler* is dedicated for boiler tube applications, and undergoes additional product testing activities for added confidence. Aligned with DIN1628 & 17177, these products are also generally equivalent to DIN1630 and DIN17175 seamless grades. Please specify 'boiler option' at time of order.
- **Inflow Plus 235** is also available with a low temperature (-40°C) option. Please specify 'low temperature option' at time of order.

Inflow CDC

Cold-formed Dual Certified (CDC)
HFI pressure and general engineering tube

- Primary standard EN 10217-1 Grade P235TR1
- EN 10219 Grade S235JRH

Primary grade
P235TR1

Inflow Plus 235

Multi-certified HFI tube
for general purpose pressure and
industrial conveyance solutions

- Primary standard EN 10217-2 Grade P235GH TC1
- Generally equivalent to seamless ASTM A106 Grade B & EN 10216-2
- Aligned with BS3059-2, BS3602, DIN1626, ASTM A53 where applicable
- Fully aligned with PED-97/23/EC, AD 2000 W4
- **Boiler option** also covers DIN1628 & 17177 (DIN1630 & DIN17175)

Primary grade
P235GH/TC1

Inflow Plus 355

High strength multi-certified HFI tube
for general purpose pressure and
industrial conveyance solutions

- Primary standard EN 10217-3 Grade P355NH TC1
- Aligned with DIN1626 and DIN17179 where applicable
- Fine grain steel for high strength requirements
- Specific compositional delivery conditions.
- Improved wear resistance
- Enhanced ductility
- Fully aligned with PED-97/23/EC, AD 2000 W4

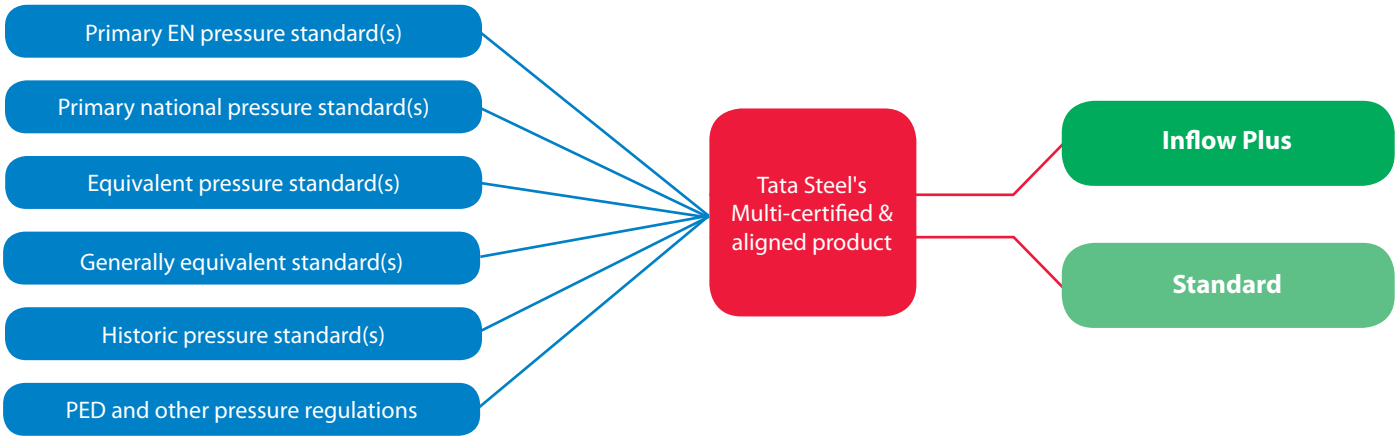
Primary grade
P355NH/ TC1

DEDICATED MULTI-CERTIFIED PRESSURE PRODUCTS

Rationalised offering delivering flexibility and convenience

Multiple options that can confuse or restrict flexibility

Our simplified tube offering for convenience and flexibility, suitable for a wide range of pressure applications



Inflow and **inflow Plus** products are manufactured from specifically selected fully killed, high quality hot rolled coil supplied from our steel works in Port Talbot, Wales, delivering product consistency and full traceability.

Inflow and **Inflow Plus** products are multi-certified, or aligned to applicable or generally equivalent standards to provide maximum application flexibility.

Tata Steel has obtained independently verified welder approvals, welding procedure approvals and quality management system approvals for their HFI tube to ensure that **Inflow Plus** tube products are completely suitable for all categories of pressure equipment under the PED (97/23/EC).

These approvals further confirm the ability of **Inflow Plus** to be used in place of equivalent hot-finished seamless tubes of similar strength levels.

Inflow Plus elevated temperature mechanical properties are guaranteed to 400°C. Low temperature properties are demonstrated via impact tests at -20°C. An option of -40°C is available on P235 grades - please specify at time of order, refer to page 14.

For boiler applications, an **Inflow Plus** 'Boiler Option' is available providing additional manufacturing control, testing and inspection for added confidence and comes with additional alignment with related boiler tube standards. Please specify at time of order.

Key characteristics

Product brands		Inflow		
Sub-brands		Inflow CDC	Inflow Plus 235	Inflow Plus 355
Delivery condition & size range	Cold Hot WLA (Weld Line Anneal)	OD139.7 - 508.0mm N/A N/A	N/A OD17.2 - 193.7mm OD219.1 - 508.0mm	N/A OD17.2 - 193.7mm OD219.1 - 508.0mm
Main targeted application		General purpose pressure and industrial conveyance		
		Cold-formed Dual Certified (CDC) pressure & general engineering	Elevated temp industrial pressure	High strength, elevated temp industrial pressure
Primary grade/min yield strength MPa		235	235	355
Tensile strength MPa		360-500	360-500	490-650
Elongation (longitudinal min) %		25	25	22
Standard temperature range (°C)		Ambient	-20 to 400	-20 to 400
Low temp option (request at time of order)		ref #	-40	ref #
Seamless substitute		No	Yes	Yes

Standards and regulations

	Standard	Grade	Type	Inflow		
Standards & grades	EN 10217-1	P235TR1	W	Primary standard		
		P235TR2	W			
	EN 10217-2	P235GH/TC1	W		Primary standard	
	EN 10217-3	P355NH/TC1	W			Primary standard
	EN 10219-1/2	S235JRH	W			
Regulations	Pressure Equipment Directive (PED)			Partial compliance	Full compliance	Full compliance
	AD 2000 Merkblatt W 4			Not compliant	Full compliance	Full compliance
	CE Marking Construction Products Directive (CPD)			CAT 2+ (EN 10219 only)	N/A	N/A

Generally equivalent offering

	Standard	Grade	Type	Inflow		
Generally equivalent standards & grades	ASTM A106	Grade B	S			
	ASTM A53	Grade B	W/S			
	EN10216-2	P235GH/TC1	S			
	EN 10216-3	P355NH/TC1	S			
	BS 3059-2	360 (min. tensile)	W/S		*Boiler product only	
	BS 3601	360 (min. tensile)	W/S			
	BS 3602	360 (min. tensile)	W/S			
	DIN 1626	St37.0N/G	W		G for ≥OD219.1mm	
		St52.0N/G	W			G for ≥OD219.1mm
	DIN 1628	St37.4	W		*Boiler product only	
		ST52.4	W			
	DIN 1629	St37.0N	S			
		St52.0N	S			
	DIN 1630	St37.4	S		*Boiler product only	
		St52.4	S			
	DIN 17175	St35.8	S		*Boiler product only	
	DIN 17177	St37.8	W		*Boiler product only	
	DIN 17178	WStE355	W			
	DIN 17179	WStE355	S			

Key: W = Welded
S = Seamless
# It may be possible to demonstrate lower temperature properties if full application is known, please contact one of our account managers to discuss your requirements.
* Boiler option only - to be specified at time of order

FEATURES AND BENEFITS

Dedicated conveyance products with maximum flexibility

Inflow CDC

Product offering

- Cold-formed Dual Certified (CDC) HFI pressure and general engineering tube
- HFI welded pressure tube to EN 10217-1 Grade P235
- Quality designation TR1
- PED (97/23/EC) - Pressure Equipment Directive Test Category 1 or SEP applications only#
- General engineering tube to EN 10219 Grade S235
- Quality designation JRH – room temperature impact properties guaranteed
- Generally equivalent to BS3601
- ID weld bead treated

Certification & testing

- Supplied with 2.2 test report to EN 10204
- Weld seam ultrasonically tested as standard (V=1.0)
- Pressure tightness demonstrated via full body eddy current testing for sizes ≤OD193.7mm
- Pressure tightness demonstrated by hydrostatic testing for sizes ≥OD219.1mm

Supply options

- Supplied with plain ends as standard (deburred)
- Supplied self-colour as standard
- Varnish option for sizes ≥OD219.1mm
- Galvanised option for sizes ≤OD193.7mm

= refer to relevant datasheet(s)

Inflow Plus 235

Product offering

- Multi-certified, HFI elevated temperature industrial pressure tube for general purpose and industrial conveyance solutions
- Fully weldable
- Fully killed steel for improved ductility
- HFI welded pressure tube to EN 10217-2 Grade P235GH
- Quality designation TC1 supplied as standard
- Quality designation TC2 option for sizes ≥OD219.1mm
- **Inflow Plus 235** provides full PED compliance and is suitable for pressure equipment and assemblies in PED categories I, II, III or IV, and is aligned with AD2000 Merkblatt W4
- GH grade for elevated temperature use ≤400°C
- Low temperature suitability (-20°C longitudinal Charpy impact tests)
- Lower temperature option of -40°C available upon request, at time of order
- **Inflow Plus 235** also fully satisfies the requirements of EN 10217-1 & EN 10216-1 Grade P235 Quality designation TR2
- Multi-certified satisfying the mechanical properties of grades in numerous other industry referenced standards, e.g. DIN1626 St37.0N/G, BS3601/2 Grade 360 & ASTM A53 Grade B where applicable
- Suitable substitute for equivalent seamless tube grades e.g. ASTM A106 Grade B, EN 10216-2 Grade P235GH & DIN1629 St37.0N
- Generally equivalent to BS3059-2 Grade 360, DIN1628 St37.4, DIN1630 St37.4, DIN17175 St35.8 & DIN 17177 St37.8 when specifying **Inflow Plus** Boiler at time of order
- **Inflow Plus 235** HFI welded pressure tubes have OD and ID weld beads fully removed

Certification & testing

- Supplied with 3.1 inspection certification to EN 10204
- Hot-finished: full body normalised as standard for Corby sizes ≤OD193.7mm. Normalised strip and Weld Line Annealed (WLA) as standard for Hartlepool sizes ≥OD219.1mm
- For Corby sizes ≤OD193.7mm, the weld seam is both ultrasonically tested (V=1.0) and eddy current tested as standard
- Pressure tightness demonstrated via additional full body eddy current testing for sizes ≤OD193.7mm. For sizes ≥OD219.1mm pressure tightness is demonstrated by hydrostatic testing

Supply options

- Self-colour as standard (varnish option for sizes ≥OD219.1mm)
- Plain ends as standard - ends free from burrs
- Bevelled ends available (bevel protection / protective caps available for selected sizes on request)
- Standard supply fixed lengths of 6.0 & 12.0m (-0+150mm for sizes ≤OD193.7mm, -0+250mm for sizes ≥OD219.1mm)
- Pre-grooved, paint and cut to length options available for selected plain end products in the Corby size range#
- Product marking for identification and traceability (where applicable)

Inflow Plus 355

Product offering

- High strength, HFI elevated temperature industrial pressure tube for general purpose and industrial conveyance solutions
- Fully weldable
- Fully killed steel produced to fine grain practice for enhanced ductility
- HFI welded pressure tube to EN 10217-3 Grade P355NH
- Quality designation TC1 supplied as standard
- Quality designation TC2 option for sizes ≥OD219.1mm
- **Inflow Plus 355** provides full PED compliance being suitable for equipment in PED categories I, II, III or IV, also aligned with AD2000 Merkblatt W4
- NH grade for elevated temperature use ≤400°C
- Low temperature suitability (-20°C longitudinal Charpy impact tests)
- Multi-certified satisfying the mechanical properties of grades in other industry referenced standards, e.g. DIN1626 St52.0N/G, DIN1628 St52.4 and DIN17178 WSt E 355
- Suitable substitute for equivalent hot-finished fine grain seamless tube grades e.g. DIN1629 St52.0N, DIN1630 St52.4, & DIN17179 WSt E355
- **Inflow Plus 355** HFI welded pressure tubes have OD and ID weld beads fully removed
- **Inflow Plus 355** delivers improved mechanical property performance compared to **Inflow Plus 235**
- **Inflow Plus 355** has higher yield strength and elevated temperature proof stress values plus a superior range of tensile properties
- Due to the superior mechanical properties of **Inflow Plus 355**, the same pressure integrity as for **Inflow Plus 235** can be obtained with thinner walls
- The associated weight savings will enable a reduction in supporting load bearing structures, hangers and brackets etc
- Increased wear resistance – providing improved service life for applications where this is a consideration

Certification & testing

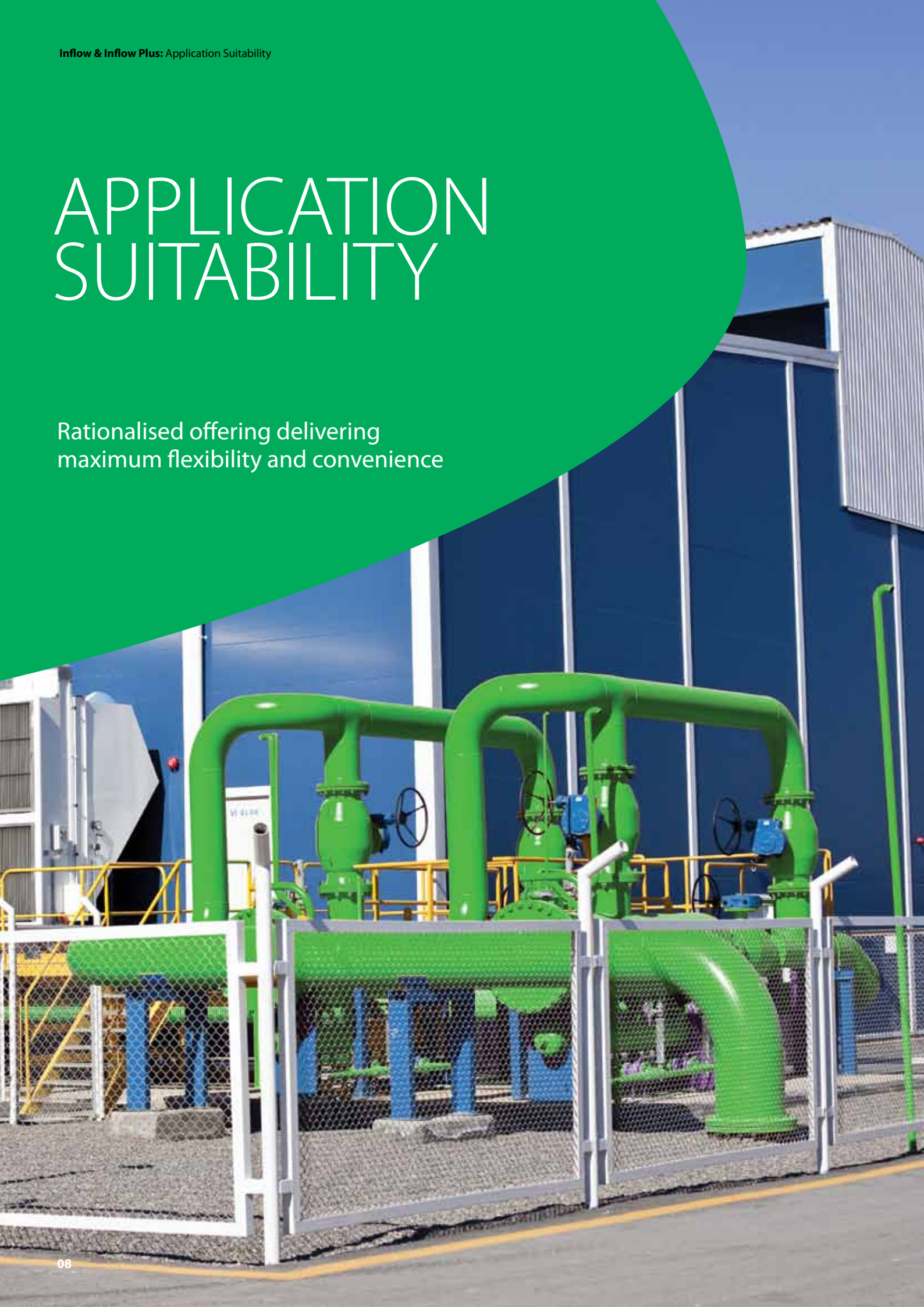
- Supplied with 3.1 inspection certification to EN 10204
- Hot-finished: full body normalised as standard for Corby sizes ≤OD193.7mm). Normalised strip Weld Line Annealed (WLA) for Hartlepool sizes ≥OD219.1mm as standard
- For Corby sizes ≤OD193.7mm, the weld seam is both ultrasonically tested (V=1.0) and also eddy current tested as standard
- Pressure tightness demonstrated via additional full body eddy current testing for diameters for sizes ≤OD193.7mm. For sizes ≥OD219.1mm pressure tightness is demonstrated by hydrostatic testing

Supply option

- Self-colour as standard (varnish option for sizes ≥OD219.1mm)
- Plain ends as standard - ends free from burrs
- Bevelled ends available (bevel protection / protective caps available for selected sizes on request)
- Standard supply fixed lengths of 6.0 & 12.0m (-0+150mm for sizes ≤OD193.7mm, -0+250mm for sizes ≥OD219.1mm)
- Cut to length options for selected plain end products#
- Pre-grooved, paint and cut to length options available for selected plain end products in the Corby size range#
- Product marking for identification and traceability (where applicable)

APPLICATION SUITABILITY

Rationalised offering delivering maximum flexibility and convenience



Inflow and Inflow Plus products are suitable for a wide range of conveyance and pressure applications. Key examples are listed below. Note: tube application suitability may be related to the jointing system used, maintenance practices and inspection methodologies employed.

Inflow CDC is a cold-formed product and is only suited for ambient temperature conveyance. Due to the nature of EN10217-1, no elevated temperature material property data is provided.

Therefore, for elevated temperature use, we would always recommend **Inflow Plus** products to EN10217-2 or 3 that have specified elevated temperature mechanical properties ensuring suitability. Alternatively, our **Install® Plus** dual certified (EN10255 & EN10217) conveyance products may also be considered for appropriate applications up to 300°C (please refer to our **Install® Plus** data sheets for full details).

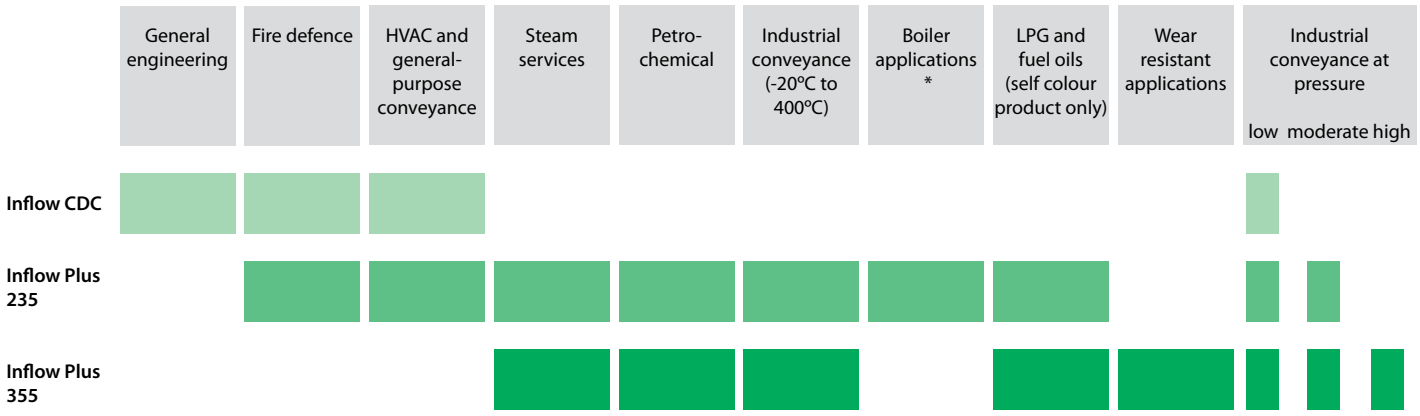
The uniform stress free fine grain structure of our **Inflow Plus** products provide improved ductility, so are more suited to applications where bending or manipulation is required.

Inflow Plus HFI welded tubes (to EN 10217) have the same steel numbers and hence the same basic composition and property requirements as comparable seamless tubes (to EN 10216). Further demonstrating full compatibility and inter-changeability.

HFI welded tube can be used as a replacement for seamless, or substituted for similar hot-finished seamless applications. More details regarding welded vs. seamless can be found on page 11 of this brochure.

For pressure applications, suggested maximum operating pressures at ambient and elevated temperatures are provided on pages 16 to 23 of this brochure.

Due to the varied nature of the industries and applications that our products can service, it is very difficult to show suitability for all possible cases. For confirmation of product suitability Tata Steel has Customer Technical Service experts who can be contacted for advice.



* specify **Inflow Plus** Boiler option at time of order

HOT vs COLD

Our hot stretch reduced manufacturing process, supported by other heat treatment capabilities, produces stress relieved tubes that deliver true application benefits

Inflow Plus products, either fully normalised or supplied from normalised rolled coil and post Weld Line Annealed (WLA), have a uniform homogeneous microstructure and very low levels of residual stress.

Inflow Plus products deliver consistent mechanical performance, and will show no significant loss of structural integrity as a result of subsequent localised heating/welding/hot bending.

The uniform stress relieved fine grain structure of **Inflow Plus** products provides better ductility than a cold-formed tube, where the grains are larger and more elongated.

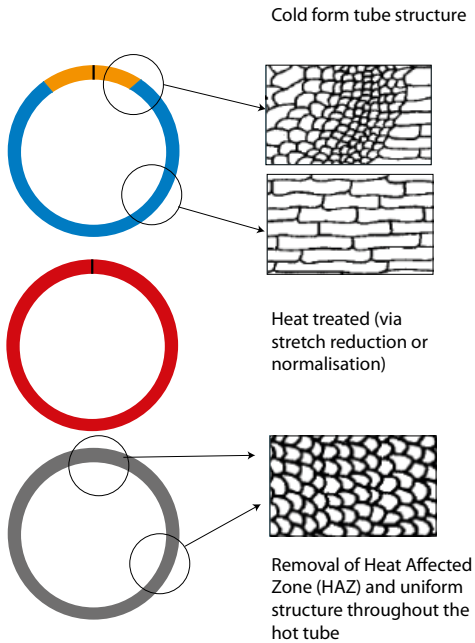
Inflow Plus products are therefore able to withstand significantly more manipulation (bending, flaring, flanging or grooving etc) than cold-formed alternatives, which do not have the advantage of being stress free.

Inflow Plus tube is generally equivalent to and provides the same fine grain uniform homogeneous microstructure and mechanical properties of comparable hot-finished seamless alternatives

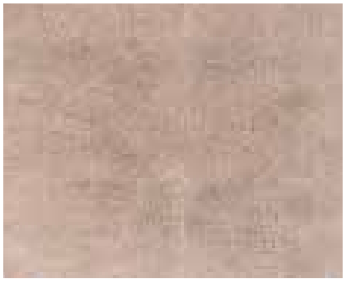
Inflow Plus products have consistent properties, providing predictable and repeatable behaviour in service.

The residual stress levels in cold-formed tubular products mean that cracking is always a possibility during subsequent cold working or other manipulation. **Inflow Plus** products do not suffer from this problem.

Tests also show that Tata Steel hot-finished products can provide improved resistance to corrosion and can contribute to an extended life expectancy when in service.



Cold-formed tube micrograph: inconsistent structure with pockets of stress and variations in mechanical properties



Hot-finished tube micrograph: stress free, consistent and uniform fine microstructure

WELDED vs SEAMLESS

Inflow Plus High Frequency Induction (HFI) welded tubes are an ideal substitute for comparable hot-finished seamless products

Inflow Plus HFI welded products are generally equivalent to hot-finished seamless tube products, including those to EN10216-2, P235GH, ASTM A106 Grade B, ASTM A53 Grade B and common DIN 1629 grades.

Inflow Plus HFI welded tubes (to EN 10217) have the same steel numbers and hence the same basic composition and property requirements as seamless tubes (to EN 10216), further demonstrating full compatibility and inter-changeability.

Inflow Plus HFI welded tubes have consistent wall thickness through tight control of strip gauge and alignment. This ensures that **Inflow Plus** products have pressure ratings equal to or superior to seamless, which may suffer from uneven pressure distribution as a result of wall thickness variation.

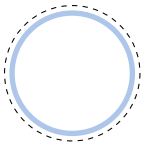
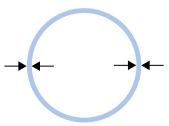
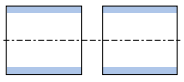
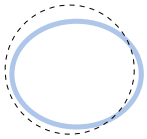
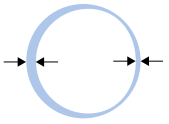
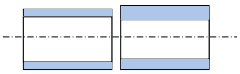
Inflow Plus HFI welded products have significant benefits when aligning pipe lengths for butt-welding due to their more consistent ovality and ease of end matching compared with seamless.

Inflow Plus HFI welded products provide, as standard, tighter tolerances on fixed lengths compared to equivalent hot-finished seamless alternatives, providing significant benefits with planning, costing and handling.

For Inflow Plus HFI welded pressure products the internal weld seam is removed in accordance with the relevant international standards, ensuring clear, optimised tube bores for conveyance applications.

The weld seams of **Inflow Plus** products are double tested (EC and Ultrasonic) and tube bodies additionally tested via eddy current or hydro testing for additional security.

Tata Steel also has tube production welding approvals in place to demonstrate suitability for applications under the PED.

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

WELD SEAM INTEGRITY

Structurally sound with complete confidence

Rigorous testing

- As part of our robust in-house quality manufacturing processes we conduct both Non-Destructive (NDT) and Destructive Testing (DT) of our tube products to provide assured confidence in weld seam integrity.
- **Inflow** and **Inflow Plus** tube weld seams are ultrasonically tested (V=1.0) as standard.
- For Corby sizes ≤OD193.7mm, **Inflow** and **Inflow Plus** tube weld seams are also eddy current tested as standard.
- Tata Steel also has tube production welding approvals in place to demonstrate suitability for applications under the PED.

Additional in-house testing

- Samples of our tube products are also periodically taken from the manufacturing process for metallurgical examination to ensure full product integrity and undergo flattening and drift expansion tests (these are robust destructive tests that are in excess of the requirements of the manufacturing standards, but undertaken as part of our own in-house quality process).
- This testing clearly demonstrates the structural integrity of the weld seam and its ability to withstand excessive force, and also shows that the weld seam is of an equivalent (or greater) strength than the rest of the tube body, dispelling an incorrectly held belief that the weld seam is a weak point on HFI welded tube products - this is simply not the case.

Weld bead treatment

- For **Inflow CDC** tubes, the Internal Diameter (ID) weld bead is treated to comply with the height requirements of EN 10217-1
- For **Inflow Plus** tubes, the ID weld bead is fully trimmed and removed, providing a clear, unrestricted tube bore, again dispelling another incorrectly held belief that the internal weld bead is always left in place on welded products.
- All products are provided externally trimmed.

PRODUCT TESTING

All **Inflow** & **Inflow Plus** products undergo a stringent test regime to ensure full compliance with the relevant product supply standards. In addition, we also carry out regular supplementary testing as part of our robust in-house manufacturing quality process.

- **Inflow** products have guaranteed Charpy impact values at room temperature, demonstrating suitability for ambient temperature use.
- Weldline EC (Eddy Current) and Ultrasonic (US) Non Destructive Testing (NDT) plus full body EC NDT undertaken as standard on all Corby I**nflow** and **Inflow Plus** products (≤OD193.7mm) to demonstrate tube pressure integrity.
- Weldline US NDT and hydro testing undertaken as standard on all Hartlepool **Inflow** and **Inflow Plus** products (≥OD219.1mm) to demonstrate tube pressure integrity.
- As well as standard mechanical testing (tensile and impacts), **Inflow** and **Inflow Plus** products also undergo regular flattening and drift expansion tests and weldline metallographic examinations during manufacturing to confirm product integrity.
- **Inflow Plus** products have guaranteed Charpy impact values at –20°C, demonstrating suitability for low temperature applications.
- **Inflow Plus** Low Temperature (LT) option available upon request, at time of order, utilising historic Charpy impact values at –40°C, demonstrating suitability for lower temperature applications.
- **Inflow Plus** yield properties are valid up to and including 400°C, demonstrating suitability for elevated temperature applications.
- **Inflow Plus Boiler** products must be specified at time of ordering, and undergo additional checks during manufacturing to provide enhanced confidence of product suitability.
- As part of Tata Steel Europe we have access to numerous technical experts and testing capabilities to support our products. Please contact us to discuss any specific testing requirements.

ADDED VALUE FINISHING

By arrangement, our **Inflow Plus** products can be supplied with a range of different end and surface finishes to suit your application needs.

The following can be supplied, if requested at time of order:

- Bevelled ends - bevel protection or end caps available on selected sizes.
- Special bevel angles - available on selected sizes and lengths. Please contact us to discuss your specific requirements.
- Pre-grooved (rolled grooved) options - available on selected Corby sizes.
- Exact cut to length tolerances - available on selected sizes and lengths.
- Varnish options available on sizes ≥OD219.1mm.
- Hot dipped galvanised coating - available on selected Corby sizes.
- Painted or powder coated options - available on selected Corby sizes.
- Polymer coating options (PP, 3-layer PE) or epoxy coatings - available on selected sizes.

We have a range of different end and surface options available with our **Inflow** and **Inflow Plus** tubes. In addition, various options regarding marking, certification, packing and bundle configurations may also be available. Cost extras may apply. Please contact one of our account managers to discuss your specific requirements in full.

GENERIC PRODUCT DATA

Using fully traceable, high quality, fully killed steel produced by Tata Steel Europe, **Inflow Plus** products deliver consistent pressure performance across a range of key sizes to satisfy your application needs.

Calculated suggested maximum design pressures for generic size offerings are shown below

Inflow Plus 235 - generic availability and theoretical suggested maximum operating pressures at ambient temperature (21°C).
For **Inflow** See note 1 on page 23

OD (mm)			wall thickness (mm)																						
Series 1	Series 2	Series 3	2.00	2.30	2.60	**2.90**	3.00	**3.20**	**3.60**	3.90	**4.00**	4.25	**4.50**	4.78	**5.00**	5.40	5.50	5.60	6.00	6.30	6.35	6.40	7.00	7.10
17.2			260	299	338	377	390	416																
21.3			210	242	273	305	315	336																
26.9			166	191	216	241	250	266	299	324	333	353	374											
	31.8			162	183	204	211	225	253	274	281	299	317											
33.7				153	173	193	199	212	239	259	266	282	299											
	38.0			135	153	171	177	188	212	230	235	250	265											
42.4				121	137	153	158	169	190	206	211	224	237	252	264									
		44.5		116	131	146	151	161	181	196	201	214	226	240	251									
48.3				107	120	134	139	148	167	181	185	197	208	221	232	250	255	259	278	292				
	51.0			101	114	127	132	140	158	171	175	177	197	210	219	237	241	246	263	276				
	57.0			90	102	114	118	126	141	153	157	167	177	188	196	212	216	220	235	247				
60.3				85	96	108	111	119	134	145	148	158	167	177	186	200	204	208	223	234	236	237	260	263
	63.5				92	102	106	113	127	137	141	150	159	168	176	190	194	197	211	222	224	225	247	250
	70.0				83	93	96	102	115	125	128	136	144	153	160	173	176	179	192	201	203	205	224	227
76.1					76	85	88	94	106	115	118	125	132	141	147	159	162	165	176	185	187	188	206	209
		82.5						87	98	106	108	115	122	130	136	146	149	152	163	171	172	174	190	193
88.9								81	91	98	101	107	113	120	126	136	138	141	151	159	160	161	176	179
	101.6						66	70	79	86	88	94	99	105	110	119	121	123	132	139	140	141	154	156
		108.0					62	66	75	81	83	88	93	99	104	112	114	116	124	131	132	133	145	147
114.3							59	63	70	76	78	83	88	94	98	106	108	110	117	123	124	125	137	139
	127.0						53	56	63	69	70	75	79	84	88	95	97	99	106	111	112	113	123	125
	133.0						50	54	61	66	67	71	76	80	84	91	93	94	101	106	107	108	118	119
139.7							48	51	58	62	64	68	72	77	80	86	88	90	96	101	102	102	112	114
		141.3							57	62	63	67	71	76	79	85	87	89	95	100	101	101	111	112
		152.4									59	62	66	70	73	79	81	82	88	92	93	94	103	104
		159.0									56	60	63	67	70	76	77	79	84	89	89	90	98	100
168.3											53	56	60	64	66	72	73	74	80	84	84	85	93	94
		177.8											57	60	63	68	69	70	75	79	80	81	88	89
		193.7											52	55	58	62	64	65	69	73	73	74	81	82
219.1													46	49	51	55	56	57	61	64	65	65	71	72
		244.5													46	49	50	51	55	58	58	59	64	65
273.0															41	44	45	46	49	52	52	52	57	58
323.9															35	37	38	39	41	44	44	44	48	49
355.6															31	34	35	35	38	40	40	40	44	45
406.4															28	30	30	31	33	35	35	35	39	39
457.0															24	26	27	27	29	31	31	31	34	35
508.0																		25	26	28	28	28	31	31

Note: All sizes in **bold** are standard sizes

wall thickness (mm)																				OD(mm)		
7.50	7.60	7.80	7.90	**8.00**	8.20	8.40	8.60	8.80	9.00	9.30	9.50	**10.00**	10.30	11.00	**12.50**	12.70	14.20	14.30	15.10	**16.00**	Series 1	Series 2	Series 3
																					17.2		
																					21.3		
																					26.9		
																						31.8	
																					33.7		
																						38.0	
																					42.4		
																							44.5
																					48.3		
																						51.0	
																						57.0	
																					60.3		
																						63.5	
																						70.0	
																					76.1		
																							82.5
189	191	196	199	201																	**88.9**		
165	167	172	174	176	181	185	189	194														101.6	
155	157	162	164	166	170	174	178	182	186	193	197	207											108.0
147	149	153	155	157	160	164	168	172	176	182	186	196	202	215	245						**114.3**		
132	134	137	139	141	144	148	151	155	159	164	167	176	181	194	220							127.0	
126	128	131	133	135	138	141	145	148	151	156	160	168	173	185	210							133.0	
120	122	125	127	128	131	135	138	141	144	149	152	160	165	176	200						**139.7**		
119	120	123	125	127	130	133	136	139	142	147	150	158	163	174	198								141.3
110	112	115	116	117	120	123	126	129	132	137	139	147	151	161	183								152.4
106	107	110	111	113	115	118	121	124	127	131	134	141	145	155	176								159.0
100	101	104	105	106	109	112	114	117	120	124	126	133	137	146	166	169					**168.3**		
94	96	98	99	101	103	106	108	111	113	117	120	126	130	138	157	160							177.8
87	88	90	91	92	95	97	99	102	104	107	110	115	119	127	144	147							193.7
77	78	80	81	82	84	86	88	90	92	95	97	102	105	112	128	130	145	146	154	163	**219.1**		
69	70	71	72	73	75	77	79	81	82	85	87	92	94	101	114	116	130	131	138	146			244.5
61	62	64	65	66	67	69	70	72	74	76	78	82	84	90	102	104	116	117	124	131	**273.0**		
52	52	54	55	55	57	58	59	61	62	64	66	69	71	76	86	88	98	99	104	111	**323.9**		
47	48	49	50	50	52	53	54	55	57	59	60	63	65	69	79	80	89	90	95	101	**355.6**		
41	42	43	43	44	45	46	47	48	50	51	52	55	57	61	69	70	78	79	83	88	**406.4**		
37	37	38	39	39	40	41	42	43	44	46	47	49	50	54	61	62	70	70	74	78	**457.0**		
33	33	34	35	35	36	37	38	39	40	41	42	44	45	48	55	56	63	63	66	70	**508.0**		

Inflow Plus 235 - generic availability and theoretical maximum operating pressures at 400ºC.
See note 1 on page 23

OD (mm)			wall thickness (mm)																						
Series 1	Series 2	Series 3	2.00	2.30	2.60	**2.90**	3.00	**3.20**	**3.60**	3.90	**4.00**	4.25	**4.50**	4.78	**5.00**	5.40	5.50	5.60	6.00	6.30	6.35	6.40	7.00	7.10
17.2			122	140	158	177	183	195																
21.3			98	113	128	143	147	157																
26.9			78	90	101	113	117	125	140	152	156	165	175											
	31.8			76	86	95	99	105	119	128	132	140	148											
33.7				71	81	90	93	99	112	121	124	132	140											
	38.0			63	72	80	83	88	99	107	110	117	124											
42.4				57	64	72	74	79	89	96	99	105	111	118	123									
		44.5		54	61	68	71	75	85	92	94	100	106	112	118									
48.3				50	56	63	65	69	78	85	87	92	98	104	108	117	119	121	130	137				
	51.0			47	53	60	62	66	74	80	82	87	92	98	103	111	113	115	123	129				
	57.0			42	48	53	55	59	66	72	73	78	83	88	92	99	101	103	110	116				
60.3				40	45	50	52	56	63	68	69	74	78	83	87	94	96	97	104	109	110	111	122	123
	63.5				43	48	49	53	59	64	66	70	74	79	82	89	91	92	99	104	105	106	115	117
	70.0				39	43	45	48	54	58	60	64	67	72	75	81	82	84	90	94	95	96	105	106
76.1					36	40	41	44	50	54	55	58	62	66	69	74	76	77	83	87	87	88	96	98
		82.5						41	46	50	51	54	57	61	63	69	70	71	76	80	81	81	89	90
88.9								38	42	46	47	50	53	56	59	64	65	66	71	74	75	75	82	84
	101.6						31	33	37	40	41	44	46	49	52	56	57	58	62	65	65	66	72	73
		108.0					29	31	35	38	39	41	44	46	48	52	53	54	58	61	62	62	68	69
114.3							27	29	33	36	37	39	41	44	46	49	50	51	55	58	58	59	64	65
	127.0						25	26	30	32	33	35	37	39	41	45	45	46	49	52	52	53	58	59
	133.0						24	25	28	31	31	33	35	38	39	43	43	44	47	50	50	50	55	56
139.7							22	24	27	29	30	32	34	36	37	40	41	42	45	47	48	48	52	53
		141.3							27	29	30	31	33	35	37	40	41	42	44	47	47	47	52	53
		152.4									27	29	31	33	34	37	38	38	41	43	44	44	48	49
		159.0									26	28	30	31	33	36	36	37	40	41	42	42	46	47
168.3											25	26	28	30	31	34	34	35	37	39	40	40	44	44
		177.8											27	28	29	32	32	33	35	37	37	38	41	42
		193.7											24	26	27	29	30	30	32	34	34	35	38	38
219.1													22	23	24	26	26	27	29	30	30	31	33	34
		244.5													21	23	24	24	26	27	27	27	30	30
273.0															19	21	21	21	23	24	24	25	27	27
323.9															16	17	18	18	19	20	21	21	23	23
355.6															15	16	16	16	18	19	19	19	21	21
406.4															13	14	14	14	15	16	16	16	18	18
457.0															11	12	13	13	14	14	15	15	16	16
508.0																		12	12	13	13	13	14	15

Note: All sizes in **bold** are standard sizes

wall thickness (mm)																				OD(mm)		
7.50	7.60	7.80	7.90	**8.00**	8.20	8.40	8.60	8.80	9.00	9.30	9.50	**10.00**	10.30	11.00	**12.50**	12.70	14.20	14.30	15.10	**16.00**	Series 1	Series 2	Series 3
																					17.2		
																					21.3		
																					26.9		
																						31.8	
																					33.7		
																						38.0	
																					42.4		
																							44.5
																					48.3		
																						51.0	
																						57.0	
																					60.3		
																						63.5	
																						70.0	
																					76.1		
																							82.5
88	90	92	93	94																	**88.9**		
77	78	80	81	82	85	87	89	91														101.6	
73	74	76	77	78	80	81	83	85	87	90	92	97											108.0
69	70	71	72	73	75	77	79	81	82	85	87	92	94	101	115						**114.3**		
62	63	64	65	66	68	69	71	73	74	77	78	82	85	91	103							127.0	
59	60	61	62	63	65	66	68	69	71	73	75	79	81	87	98							133.0	
56	57	58	59	60	61	63	64	66	67	70	71	75	77	82	94						**139.7**		
56	56	58	59	59	61	62	64	65	67	69	70	74	76	82	93								141.3
52	52	54	54	55	56	58	59	60	62	64	65	69	71	76	86								152.4
49	50	51	52	53	54	55	57	58	59	61	63	66	68	72	82								159.0
47	47	49	49	50	51	52	54	55	56	58	59	62	64	68	78	79					**168.3**		
44	45	46	47	47	48	49	51	52	53	55	56	59	61	65	74	75							177.8
41	41	42	43	43	44	45	46	48	49	50	51	54	56	59	68	69							193.7
36	36	37	38	38	39	40	41	42	43	44	45	48	49	53	60	61	68	68	72	76	**219.1**		
32	33	33	34	34	35	36	37	38	39	40	41	43	44	47	54	54	61	61	65	69			244.5
29	29	30	30	31	31	32	33	34	35	36	36	38	40	42	48	49	54	55	58	61	**273.0**		
24	25	25	26	26	27	27	28	28	29	30	31	32	33	36	40	41	46	46	49	52	**323.9**		
22	22	23	23	24	24	25	25	26	27	27	28	29	30	32	37	37	42	42	44	47	**355.6**		
19	20	20	20	21	21	22	22	23	23	24	24	26	27	28	32	33	37	37	39	41	**406.4**		
17	17	18	18	18	19	19	20	20	21	21	22	23	24	25	29	29	33	33	35	37	**457.0**		
15	16	16	16	16	17	17	18	18	19	19	20	21	21	23	26	26	29	29	31	33	**508.0**		

Inflow Plus 355 - generic availability and theoretical suggested maximum operating pressure at ambient temperature (21°C).
See note 1 on page 23

OD (mm)			wall thickness (mm)																						
Series 1	Series 2	Series 3	2.00	2.30	2.60	**2.90**	3.00	**3.20**	**3.60**	3.90	**4.00**	4.25	**4.50**	4.78	**5.00**	5.40	5.50	5.60	6.00	6.30	6.35	6.40	7.00	7.10
17.2			386	444	502	560	579	618																
21.3			312	358	405	452	468	499																
26.9			247	284	321	358	370	395	444	481	494	524	555											
	31.8			240	271	303	313	334	376	407	418	444	470											
33.7				227	256	286	295	315	355	384	394	419	443											
	38.0			201	227	253	262	280	314	341	349	371	393											
42.4				180	204	227	235	251	282	305	313	333	352	374	391									
		44.5		172	194	216	224	239	269	291	298	317	336	357	373									
48.3				158	179	199	206	220	247	268	275	292	309	328	344	371	378	385	412	433				
	51.0			150	169	189	195	208	234	254	260	277	293	311	325	351	358	364	391	410				
	57.0			134	151	169	175	186	210	227	233	247	262	278	291	314	320	326	349	367				
60.3				127	143	160	165	176	198	215	220	234	248	263	275	297	303	308	330	347	350	352	385	391
	63.5				136	152	157	167	188	204	209	222	235	250	261	282	287	293	314	329	332	335	366	371
	70.0				123	138	142	152	171	185	190	202	213	227	237	256	261	266	285	299	301	303	332	337
76.1					113	126	131	140	157	170	174	185	196	208	218	236	240	244	262	275	277	279	305	310
		82.5						129	145	157	161	171	181	192	201	217	221	225	241	253	255	257	282	286
88.9								119	134	146	149	159	168	178	187	202	205	209	224	235	237	239	261	265
	101.6						98	105	118	127	131	139	147	156	163	176	180	183	196	206	207	209	229	232
		108.0					92	98	111	120	123	131	138	147	154	166	169	172	184	194	195	197	215	218
114.3							87	93	105	113	116	123	131	139	145	157	160	163	174	183	184	186	203	206
	127.0						78	84	94	102	105	111	118	125	131	141	144	146	157	165	166	167	183	186
	133.0						75	80	90	97	100	106	112	119	125	135	137	140	150	157	158	160	175	177
139.7							71	76	86	93	95	101	107	114	119	128	131	133	143	150	151	152	166	169
		141.3							85	92	94	100	106	112	117	127	129	132	141	148	149	150	164	167
		152.4									87	93	98	104	109	118	120	122	131	137	138	139	152	155
		159.0									84	89	94	100	104	113	115	117	125	132	133	134	146	148
168.3											79	84	89	94	99	107	108	110	118	124	125	126	138	140
		177.8											84	89	93	101	103	105	112	118	119	119	131	133
		193.7											77	82	86	93	94	96	103	108	109	110	120	122
219.1													68	72	76	82	83	85	91	95	96	97	106	108
		244.5													68	73	75	76	81	86	86	87	95	96
273.0															61	66	67	68	73	77	77	78	85	86
323.9															51	55	56	57	61	65	65	66	72	73
355.6															47	50	51	52	56	59	59	60	65	66
406.4															41	44	45	46	49	51	52	52	57	58
457.0															36	39	40	41	44	46	46	46	51	52
508.0																		37	39	41	41	42	46	46

Note: All sizes in **bold** are standard sizes

wall thickness (mm)																				OD(mm)		
7.50	7.60	7.80	7.90	**8.00**	8.20	8.40	8.60	8.80	9.00	9.30	9.50	**10.00**	10.30	11.00	**12.50**	12.70	14.20	14.30	15.10	**16.00**	Series 1	Series 2	Series 3
																					17.2		
																					21.3		
																					26.9		
																						31.8	
																					33.7		
																						38.0	
																					42.4		
																							44.5
																					48.3		
																						51.0	
																						57.0	
																					60.3		
																						63.5	
																						70.0	
																					76.1		
																							82.5
280	284	291	295	299																	**88.9**		
245	248	255	258	261	268	274	281	287														101.6	
231	234	240	243	246	252	258	264	270	277	286	292	307											108.0
218	221	227	229	232	238	244	250	256	261	270	276	290	299	319	363						**114.3**		
196	199	204	206	209	214	220	225	230	235	243	248	261	269	287	327							127.0	
187	190	195	197	200	205	210	215	220	225	232	237	250	257	275	312							133.0	
178	181	185	188	190	195	200	204	209	214	221	226	238	245	261	297						**139.7**		
176	179	183	186	188	193	197	202	207	211	218	223	235	242	258	294								141.3
163	166	170	172	174	179	183	187	192	196	203	207	218	224	240	272								152.4
157	159	163	165	167	171	175	180	184	188	194	198	209	215	230	261								159.0
148	150	154	156	158	162	166	170	174	178	183	187	197	203	217	247	250					**168.3**		
140	142	146	147	149	153	157	161	164	168	174	177	187	192	205	233	237							177.8
129	130	134	135	137	141	144	147	151	154	159	163	171	177	188	214	218							193.7
114	115	118	120	121	124	127	130	133	136	141	144	151	156	167	189	192	215	217	229	242	**219.1**		
102	103	106	107	109	111	114	117	119	122	126	129	136	140	149	170	172	193	194	205	217			244.5
91	92	95	96	97	100	102	105	107	109	113	116	122	125	134	152	154	173	174	184	195	**273.0**		
77	78	80	81	82	84	86	88	90	92	95	97	102	106	113	128	130	146	147	155	164	**323.9**		
70	71	73	74	75	77	78	80	82	84	87	89	93	96	103	117	119	133	133	141	149	**355.6**		
61	62	64	65	65	67	69	70	72	74	76	78	82	84	90	102	104	116	117	123	131	**406.4**		
54	55	57	57	58	60	61	62	64	65	68	69	73	75	80	91	92	103	104	110	116	**457.0**		
49	50	51	52	52	54	55	56	57	59	61	62	65	67	72	82	83	93	93	99	105	**508.0**		

Inflow Plus 355 - generic availability and theoretical suggested maximum operating pressure at 400ºC.
See note 1 on page 23

OD (mm)			wall thickness (mm)																							
Series 1	Series 2	Series 3	2.00	2.30	2.60	**2.90**	3.00	**3.20**	**3.60**	3.90	**4.00**	4.25	**4.50**	4.78	**5.00**	5.40	5.50	5.60	6.00	6.30	6.35	6.40	7.00	7.10
17.2			182	209	236	263	272	291																
21.3			147	169	191	213	220	235																
26.9			116	134	151	168	174	186	209	226	232	247	261											
	31.8			113	128	142	147	157	177	191	196	209	221											
33.7				107	120	134	139	148	167	181	185	197	209											
	38.0			95	107	119	123	131	148	160	164	175	185											
42.4				85	96	107	110	118	133	144	147	157	166	176	184									
		44.5		81	91	102	105	112	126	137	140	149	158	168	175									
48.3				74	84	94	97	103	116	126	129	137	145	155	162	175	178	181	194	204				
	51.0			70	80	89	92	98	110	119	122	130	138	146	153	165	168	171	184	193				
	57.0			63	71	79	82	88	99	107	110	116	123	131	137	148	151	153	164	173				
60.3				60	67	75	78	83	93	101	104	110	117	124	129	140	142	145	155	163	164	166	181	184
	63.5				64	71	74	79	89	96	98	105	111	118	123	133	135	138	148	155	156	157	172	175
	70.0				58	65	67	71	80	87	89	95	100	107	112	120	123	125	134	141	142	143	156	158
76.1					53	60	62	66	74	80	82	87	92	98	103	111	113	115	123	129	130	131	144	146
		82.5						61	68	74	76	80	85	90	95	102	104	106	114	119	120	121	132	134
88.9								56	63	69	70	75	79	84	88	95	97	98	105	111	112	112	123	125
	101.6						46	49	55	60	61	65	69	73	77	83	85	86	92	97	98	98	108	109
		108.0					43	46	52	56	58	61	65	69	72	78	80	81	87	91	92	93	101	103
114.3							41	44	49	53	55	58	61	65	68	74	75	77	82	86	87	87	96	97
	127.0						37	39	44	48	49	52	55	59	61	66	68	69	74	77	78	79	86	87
	133.0						35	38	42	46	47	50	53	56	59	63	65	66	70	74	75	75	82	83
139.7							34	36	40	44	45	48	50	53	56	60	61	63	67	70	71	72	78	79
		141.3							40	43	44	47	50	53	55	60	61	62	66	70	70	71	77	78
		152.4									41	44	46	49	51	55	56	57	61	65	65	66	72	73
		159.0									39	42	44	47	49	53	54	55	59	62	62	63	69	70
168.3											37	39	42	44	46	50	51	52	56	58	59	59	65	66
		177.8											40	42	44	47	48	49	53	55	56	56	61	62
		193.7											36	39	40	44	44	45	48	51	51	52	56	57
219.1													32	34	36	38	39	40	43	45	45	46	50	51
		244.5													32	34	35	36	38	40	41	41	45	45
273.0															29	31	31	32	34	36	36	37	40	41
323.9															24	26	27	27	29	30	31	31	34	34
355.6															22	24	24	25	26	28	28	28	31	31
406.4															19	21	21	22	23	24	24	25	27	27
457.0															17	18	19	19	21	22	22	22	24	24
508.0																		17	18	19	20	20	22	22

Note: All sizes in **bold** are standard sizes

Generic Dimensions:

- Sizes shown demonstrate our generic capabilities - however, not all sizes are standard, available or are produced regularly. Other sizes may also exist. For confirmation of regular sizes and availability please contact one of our dedicated account managers to discuss your requirements in full.

wall thickness (mm)																				OD(mm)		
7.50	7.60	7.80	7.90	**8.00**	8.20	8.40	8.60	8.80	9.00	9.30	9.50	**10.00**	10.30	11.00	**12.50**	12.70	14.20	14.30	15.10	**16.00**	Series 1	Series 2	Series 3
																					17.2		
																					21.3		
																					26.9		
																						31.8	
																					33.7		
																						38.0	
																					42.4		
																							44.5
																					48.3		
																						51.0	
																						57.0	
																					60.3		
																						63.5	
																						70.0	
																					76.1		
																							82.5
132	133	137	139	141																	**88.9**		
115	117	120	121	123	126	129	132	135														101.6	
108	110	113	114	116	119	121	124	127	130	134	137	145											108.0
102	104	107	108	109	112	115	117	120	123	127	130	137	141	150	171						**114.3**		
92	93	96	97	98	101	103	106	108	111	114	117	123	127	135	154							127.0	
88	89	92	93	94	96	99	101	103	106	109	112	117	121	129	147							133.0	
84	85	87	88	89	92	94	96	98	101	104	106	112	115	123	140						**139.7**		
83	84	86	87	88	91	93	95	97	99	103	105	111	114	122	138								141.3
77	78	80	81	82	84	86	88	90	92	95	97	102	106	113	128								152.4
74	75	77	78	79	81	82	84	86	88	91	93	98	101	108	123								159.0
70	71	72	73	74	76	78	80	82	84	86	88	93	96	102	116	118					**168.3**		
66	67	69	69	70	72	74	76	77	79	82	83	88	90	97	110	112							177.8
60	61	63	64	64	66	68	69	71	73	75	77	81	83	89	101	102							193.7
53	54	56	56	57	58	60	61	63	64	66	68	71	73	78	89	91	101	102	108	114	**219.1**		
48	49	50	50	51	52	54	55	56	57	59	61	64	66	70	80	81	91	91	96	102			244.5
43	43	45	45	46	47	48	49	50	51	53	54	57	59	63	71	73	81	82	86	92	**273.0**		
36	37	38	38	39	40	40	41	42	43	45	46	48	50	53	60	61	68	69	73	77	**323.9**		
33	33	34	35	35	36	37	38	39	40	41	42	44	45	48	55	56	62	63	66	70	**355.6**		
29	29	30	30	31	32	32	33	34	35	36	37	38	40	42	48	49	55	55	58	61	**406.4**		
26	26	27	27	27	28	29	29	30	31	32	32	34	35	38	43	43	49	49	52	55	**457.0**		
23	23	24	24	25	25	26	26	27	28	29	29	31	32	34	38	39	44	44	46	49	**508.0**		

Note 1 - Pressure ratings:

- Pressure ratings are governed by tube size, wall tickness , the jointing system and the fittings employed, whether jointing products or compounds are applied, the installation technique used, local service and support conditions, and maintenance practices etc.
- Accordingly, it is **not** practical to lay down precise limits for recommended design pressures, so the information provided is for guidance only.
- All piping systems should be designed in accordance with appropriate established standards or design codes.
- Ratings are for the tube only, but may be applied to systems utilising correctly undertaken butt-welded joints in accordance with the latest established standards or design codes.
- For **Inflow CDC** products the suggested maximum design pressure is 80% of the stated **Inflow Plus 235** values at ambient temperature.

THE COMPLETE SOLUTION

Tata Steel now provides a complete package of conveyance tube products to meet all your application needs

Inflow and **Inflow Plus** new additions to the conveyance and pressure tube product family specifically developed to provide improved visibility of product options and application suitability.

Our family of branded products enables customers and end users to select the most suitable high quality tube option to meet their needs and expectations.

Install® Plus
Based on EN 10255
with multi-cert options

Primary grade P235

Inflow Plus
Based on EN 10217-2/3
with multi-cert options
(including seamless equivalents)
Primary grade P235GH & P355NH

Inline Plus
Based on EN10208-2 / API 5L X52
with multi-cert options
(including seamless equivalents)
Primary grade L360NB/MB

Install®
EN 10255

Primary grade S195T

Inflow
EN 10217-1 and EN 10219-1/2
(CDC - Cold Dual Cert)

Primary grade P235TR1

Inline
Based on EN 10217-2 / EN 10208-1 /
API 5 LB with multi-cert options
(including seamless equivalents)
Primary grade P265GH

Building and engineering services solutions

General purpose pressure and industrial conveyance solutions

Specialist building and engineering services - industrial, process and line-pipe solutions

MAXIMUM FLEXIBILITY

Inflow and **Inflow Plus** provides a range of multi-certified options, aligned with the relevant pressure directives and regulations

Multi-certified to cover the mechanical properties over a range of pressure standards, regulations and legislative requirements, providing a convenient range of options, and ensuring suitability, whatever the market being serviced.

Product (Note 1)	Principal standard	Multi-certified / aligned or generally equivalent standards	Pressure application suitability PED 97/23/EC	AD2000 W4
Inflow CDC	EN 10217-1 P235TR1	EN 10219 (S235 JRH) BS 3601 (Grade 360)	Limited compliance Test Category (TC) I (or SEP)	No
Inflow Plus 235	EN 10217-2 P235GH	EN 10217-1 (P235TR2), BS3601 (Grade 360), BS 3602 (Grade 360) DIN 1626 (St37.0N/G) & 1629 (St37.0N), ASTM A106 Grade B (Note 2) ASTM A53 Grade B (Note 2) **Inflow Plus** Boiler product (Note 3) BS 3059-2 (Grade 360), DIN 1628 (St37.4), DIN 1630 (St37.4), DIN 17175 (St35.8), DIN 17177 (St37.8) **Inflow Plus** Low Temperature (LT) as per **Inflow Plus** P235 but with historic impact data at -40ºC (long. pipe body) (Note 4)	Full compliance All pressure categories Test Category (TC) I, II, III, IV	Yes
Inflow Plus 355	EN 10217-3 P355NH	DIN 1626 (St52.0N/G), DIN 1628 (St52.4), DIN 1629 (St52.0N), DIN 1630 (St52.4), DIN 17178 (WStE355), DIN 17179 (WStE355)	Full compliance All pressure categories Test Category (TC) I, II, III, IV	Yes

Notes:

1. For full product descriptions reference Tubes document TST41:PDF:UK:03/2012.

2. Except min UTS (Tata Steel selected coil provides 360MPa min UTS instead of 415MPa for alignment with EN standards and improved ductility).

3. **Inflow Plus** 'Boiler option' - please specify at time of order if tubes are being used for boiler applications, as additional checks / alternative flow routes are undertaken during manufacturing to provide enhanced confidence of product suitability.

4. Inflow Plus 235 Low Temperature (LT) (-40ºC)—please specify at time of order for this option.

Reference

Standards and grades	EN 10255	Non-alloy steel tubes suitable for welding and threading - Technical delivery conditions
	EN 10217-1	Welded steel tubes for pressure purposes - Technical delivery conditions - Part 1: Non-alloy steel tubes with specified room temperature properties
	EN 10217-2	Welded steel tubes for pressure purposes - Technical delivery conditions - Part 2: Electric welded non-alloy and alloy steel tubes with specified elevated temperature properties
	EN 10217-3	Welded steel tubes for pressure purposes - Technical delivery conditions - Part 3: Alloy fine grain steel tubes
	EN 10208-2	Steep pipes for pipelines for combustible fluids - Technical delivery conditions - Part 2: Pipes of requirement class B
	ISO 3183	ISO3183:2007 Petroleum and natural gas industries - Steel pipe for pipeline transportation systems
	API 5L	Specification for Line Pipe - ANSI/API SPECIFICATION 5L - FORTY-FOURTH EDITION, OCTOBER 2007
	EN 10219-1/2	Cold formed welded structural hollow sections of non-alloy and find grain steel - Part 1: Technical delivery conditions; Part 2: Tolerances, dimensions and sectional properties
Generally equivalent standards and grades	ASTM A106	Standard specification for - Seamless carbon steel pipe for high-temperature service
	ASTM A53	Standard specification for - Pipe, steel, black and hot-dipped, zinc-coated, welded and seamless
	EN 10216-2	Seamless steel tubes for pressure purposes - Technical delivery conditions - Part 2: Non-alloy and alloy steel tubes with specified elevated temperature properties
	EN 10217-3	Seamless steel tubes for pressure purposes - Technical delivery conditions - Part 3: Alloy fine grain steel tubes
	EN 10208-1	Steel pipes for pipelines for combustible fluids - Technical delivery conditions - Part 1: Pipes of requirement class A
	BS 3059-2	Steel boiler and superheater tubes - Part 2: Specification for carbon, alloy and austenitic stainless steel tubes with specified elevated temperature properties
	BS 3601	Specification for carbon steel pipes and tubes with specified room temperature properties for pressure purposes
	BS 3602	Steel pipes and tubes for pressure purposes - Carbon and carbon manganese steel with specified elevated temperature properties - Part 1: Specification for seamless and electric resistance welded tubes
	DIN 1626	Welded circular tubes of non-alloy steels with special quality requirements - Technical delivery conditions
	DIN 1628	Welded circular tubes of non-alloy steels with very high quality requirements - Technical delivery conditions
	DIN 1629	Seamless circular tubes of non-alloy steels with special quality requirements - Technical delivery conditions
	DIN 1630	Seamless circular tubes of non-alloy steels with very high quality requirements - Technical delivery conditions
	DIN 17175	Seamless tubes of heat resisting steels
	DIN 17177	Electric pressure (resistance or induction) welded steel tues for elevated temperature service - Technical delivery conditions
	DIN 17178	Welded circular tubes of fine grain steels with special quality requirements - Technical delivery conditions
	DIN 17179	Seamless circular tubes of fine grain steels with special quality requirements - Technical delivery conditions
Regulations	PED	Directive 97/23/EC of the European Parliament and of the Council of 29 May 1997 on the approximation of the laws of the Member States concerning pressure equipment
	AD 2000 Merkblatt W4	Materials for pressure vessels, piping and accessories - Tubes made from non-alloy and alloy steels

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