

BMTFA

Industry information pack
Version 2

Guide to dual certified carbon steel tubes



Pack disclaimer: A guide to dual certified carbon steel tubes

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Typically asked questions with answers

Q1: *What is a dual certified or dual standard tube?*

A1: A dual certified or dual standard tube is a product that has been manufactured and documented in accordance with more than one technical tube standard.

Q2: *Why would you do this?*

A2: Some building services pipework applications require the tube to be supplied in accordance with both the Construction Products Regulations (CPR) and the Pressure Equipment Directive (PED). There isn't a single tube standard that covers both, so referring to more than one standard is required.

Q3: *Does this make a difference to the tube?*

A3: Yes, as there will need to be a tighter control of the steel chemistry, mechanical properties and additional product testing undertaken by the tube manufacturer to comply with the multiple specifications.

Q4: *What are the tube standards that are typically used?*

A4: Dual tube products are typically to BS EN10255 (for the CPR and CE marking) and EN10217 (for the PED). EN10217 shows that the tube has also been made by a **Welded** production route, **Seamless** tubes would be supplied to BS EN10216.

Q5: *Are there different Parts to BS EN10217 and BS EN10216?*

A5: Yes, and this is very important to understand, BS EN10217 and 10216 are typically supplied as either Part 1 or Part 2 (although other parts exist for other product offerings – but these are not covered within this guidance document). The Part 1 offering is technically only suitable for ambient temperature use (max 50 degC), whereas Part 2 is suitable for high temperatures (max design temperature = 400 degC for welded and 450degC for seamless) – you should always check with the tube manufacturer's data for confirmation as other additional tests may have been undertaken to enhance capability. The tubes actual characteristics can also be shown by the **Technical Quality Designations**.

Q6: What are Technical Quality Designations?

A6: Within BS EN 10217 Part 1 and Part 2, there exists Technical Quality Designations to be used alongside the steel grade; for BS EN10217 Part 1 these are **TR1** and **TR2**, for Part 2 it's **GH**. These define the tube characteristics and can also confirm the production route and the application suitability. (The examples refer to 195MPa grades but could equally apply to 235 and 265MPa grades).

For example:

- BS EN10217 Part 1, Grade P195TR1 = this shows that the tube is P = Pressure, the min yield of the tube = 195MPa, and the **TR1** designation = typically a **cold-formed tube**, supplied as welded, with a max operating temp of 50 degC (ambient). TR1 grades are not suitable for applications under the PED.
- BS EN10217 Part 1, Grade P195TR2 = this shows that the tube is also P = Pressure, and the min yield of the tube is also = 195MPa, and the TR2 designation which still has a max operating temp of 50 degC. Not all TR2 products are suitable for applications under the PED, only those produced from normalised-rolled strip. TR2 tubes made from hot rolled coil ARE NOT COVERED UNDER THE PED so it's important to carefully read and correctly apply the standard.
- BS EN10217 Part 2 Grade P195GH = this shows that the tube is again P = Pressure, and the min yield of the tube again = 195MPa, but the **GH** designation = a **hot-finished tube** which has been heat treated at a sufficiently high temperature to relieve internal stresses and fully remove the weld Heat Affected Zone (HAZ). BS EN10217 Part 2 is intended for both ambient and elevated temperature applications and defines additional testing protocols to demonstrate tube suitability. All GH products are suitable for applications under the PED, where applicable.

Please refer to Tables 1 and 2 for additional clarification.

Table 1: Guide to dual certified / dual standard welded carbon steel building services products

Standard	BS EN10255 / 10217-1:2019 TR1 Part 1-TR1	BS EN10255 / 10217-2:2019 GH Part 2-GH
Technical Delivery Condition	COLD-FORMED	HOT-FINISHED
Min design temp range (degC)	5	-10
Max design temp range (degC)	50	400 (for Welded HFW tube)
Temp classification	Ambient (A)	High Temp (HT) or Elevated Temp (ET)
Max pressure	70 bar	70 bar
PED compliance	No	Yes
CPR CE (UKCA) compliance	Yes – if supplied with BS EN10255 and AVCP3&4 DOP – See Table 2	Yes – if supplied with BS EN10255 and AVCP3&4 DOP – See Table 2

Table 2: Guide to legacy and replacement standards, grade and quality designations

Old legacy standard	Replacement Standard	Manufacturing Type	Delivery Condition	Grade Options	Quality Designation	Application Temperature Suitability	Harmonisation CPR	Harmonisation PED
BS1387	BS EN10255	Welded (W)	Cold-formed	S195 S235 (prEN)	G, GT	Ambient 5degC up to 50degC max	UKCA/CE Marked AVCP 3 (fuel, air, gas) & 4 (water)	Not unless multi-standard with relevant part and quality designation of BS EN10217/16
		Seamless (S)	Hot-finished					
API 5L	API / BS EN ISO3183	Welded (W)	Cold-formed	B	PSL1	Ambient 5degC up to 50degC max	Not unless multi-standard with BS EN10255	No - not covered under the PED
		Seamless (S)	Hot-finished		PSL2	Low & Elevated -10 to 400degC (W) or 450degC (S) – Note 1		Not unless multi-standard
BS3601	BS EN10217-1	Welded (W)	Cold-formed TR1	TR1	Ambient 5degC up to 50degC max	TR1 - not covered under the PED		
			TR2 (heat treated)	TR2		Yes, but ambient applications		
	BS EN10216-1	Seamless (S)	Hot-finished	TR1		TR1 - not covered under the PED		
				TR2		TR2 – if material is correct, but ambient applications		
BS3602	BS EN10217-2	Welded (W)	Hot-finished	P195 P236 P265	GH	Low & Elevated -10 to 400degC (W) or 450degC (S) – Note 1	Yes, for low and elevated temperature applications	
	BS EN10216-2	Seamless (S)	Hot-finished					

Q7: From Table 1, why are TR1 products not suitable for applications under the PED?

A7: On the 20th April 2021, the old version of BS EN10217 Part 1:2002 was officially withdrawn and the new Part 1:2019 version became the only current Part 1 standard for the industry to use. Within this new version, it clearly states that cold-formed TR1 products are no longer suitable for use under the PED. This is because TR1 grades do not automatically meet the essential requirements of the PED in respect of ageing (determined by the chemical composition) or ductility/toughness (specified as minimum Charpy impact requirements).

Q8: Are BS EN10217-1:2002 TR1 tubes made before 20th April still suitable under the PED?

A8: Yes, when standards get updated or are changed there is a Transitional Period and Coexistence Period. The new BS EN10217 standards were launched in 2019, but the older 2002 version did not become officially withdrawn until the 20th April 2021 – this is known as the Transitional Period. Any material already manufactured, or that is currently within the supply chain, or has been placed on the market, or that is about to be used or has been used still complies with the PED through being produced to the 2002 version of the standard; this is the Coexistence Period.

Q9: So, are BS EN10217-1:2002 TR1 tubes in old projects that are being used in current projects still ok under the PED?

A9: Yes, material previously installed is still covered. Material made pre-20th April 2021 is still covered. Any material placed on the market or within the supply chain is still covered. Only, new material produced to BS EN10217:2019 TR1 after 20 April is no longer covered, but the industry will see older material eventually being used up and new material take its place within the supply chain. However, it is important to note that Part 1 tubes are only intended for ambient temperature use, so, depending on the application temperature, a Part 2 tube may have been required.

Q10: Why can TR2 and GH tubes be used under the PED?

A10: These tubes have different coil type, steel chemistry, manufacturing and testing requirements. Therefore, they do meet the essential requirements of the PED in respect of ageing (determined by the chemical composition) or ductility/toughness (specified as minimum Charpy Impact requirements). Also, due to additional testing requirements Part 2 (GH) grades are suitable for low, ambient, high as well as elevated temperature use, whereas technically a Part 1 TR2 tube is only suitable for ambient (50 degC max) temperatures.

Q11: Are all TR2 tubes suitable for applications under the PED?

A11: No, only TR2 tubes that are normalised-rolled, full body normalised or made from normalised-rolled strip that is Weld Line Normalised or Annealed (WLA) are covered. TR2 tubes produced from hot-rolled coil that is then Weld Line Normalised or Annealed (WLA) are not covered as they are seen as not meeting the essential requirements of the PED. So not all TR2 tubes are the same.

Q12: Can a TR1 tube be retested or recertified as a TR2 or GH tube?

A12: No, a TR1 tube can never be recertified as a TR2 or GH tube, as TR1 tubes are **cold-formed** and supplied “as welded”; TR2 tubes undergo some heating stress relief. GH tubes are **hot-finished**. They are all different in their performance and suitability for use due to their different manufacturing, testing and validation processes.

Q13: Are hot-finished tubes different to hot-formed ones?

A13: No, they can be considered to be the same – technically, it's down to the actual hot production route used – in all cases the Heat Affected Zone (HAZ) / weld seam is fully removed.

Q14: When does the PED apply?

A14: Unfortunately, the PED can be a complicated and confusing document, however, any pressure or pipework application using BS EN10217 tube which is above 0.5bar operating pressure may come under the PED requirements, although these may also be size and pressure dependant. There are some application exceptions set out in the UK Pressure Equipment (Safety) Regulations Guidelines (2021), but because building services can include a wide range of different applications, temperatures and pressures, for safety and compliance reasons, and as a result of the Grenfell disaster, and the anticipated forthcoming tightening up of UK product regulations and compliance, it is now advisable to treat all building services applications as potentially falling under the PED. However, please see **Annex A** of this pack for additional information.

Q15: *What happens when multiple sizes of tubes are used in a pipework system?*

A15: Annex A shows that some smaller sizes of tubes at varying pressures do not fall within the PED. However, if these sizes are used in a pipework system in combination with larger sizes that do fall under the PED, the regulations state that the PED will apply to the **system** in its entirety. In such cases, these smaller sizes **will also need to comply** with the essential requirements of the PED.

Q16: *What happens if I use a non-PED tube within a PED application?*

A16: There is a possible compliance issue, which could prevent the CE marking of the system and/or sign-off of the project and which could lead to consequential issues if there was a safety or performance issue identified. It may also lead to incorrect tube having to be removed from projects or having to be covered under additional supplier guarantees.

Q17: *Why within pipework systems can fittings that are not covered under the PED still be used with the tubes?*

A17: There are now some harmonised standards for threaded malleable iron fittings under the PED (Note: **there are only certain grades permitted**). Most other types of fittings are not currently covered. However, it is stressed within UK Regulations that all materials that are used must meet the essential safety requirements for the pressure and temperatures involved. Therefore, it is down to the manufacturers to consistently demonstrate product suitability, this can be done through SEP, supported by additional product testing.

Q18: *What is the requirement for tube or applications that do not fall under the PED or for products where there are not standards in place to enable CE marking.*

A18: If the tube size or application is not covered under the PED, or there is no associated product harmonised standard to enable CE marking, then SEP (Sound Engineering Practice) is used to demonstrate that the tube is suitable for the intended pressure and temperature application. However, ideally, temperature suitability for a particular application must still be demonstrated by use of an appropriate code or standard that demonstrates product suitability. This need not be a BS or EN standard, but should be in accordance with recognised industry guidance. **Therefore, even for SEP, it is recommended that appropriate industry documented guidance be followed (ref Annex A for additional details).**

Q19: Are tubes and fittings produced to PED harmonised standards CE marked ?

A19: No, tubes supplied to BS EN10217, and any PED fittings are considered a component of the piping system, so can't be CE marked under the PED. However, confirming that the tubes and fittings are compliant under the PED may be a requirement by the end-user to assist them in CE marking the finished and complete system. The product manufacturer will also have to undergo a Specific Materials Assessment to demonstrate that they can produce material suitable for PED use. This typically involves a regular third-party audit.

Q20: Why do I see CE Marks on such tubes and fittings then?

A20: These tubes are dual certified with BS EN10255, and this standard is harmonised with the CPR (Construction Products Regulations). Under the CPR, the tube or fittings is classified as a product, not a component and must therefore be CE Marked. It is important to understand that the CE Mark is to the CPR and not the PED.

Q21: What is the difference between the BS EN10255 CE Conformity System Marks - AVCP 3 and AVCP 4?

A21: AVCP 3 covers tube suitability for Water, Fuel, Air and Gas and must be independently validated through testing by an official type approval body on behalf of the tube manufacturer. AVCP 4 covers suitability only for water and can be self-certified by the tube manufacturer. In both cases, however, a DOP (Declaration of Performance) shall be readily available to confirm what the tube is CE Marked to, by showing the intended use, AVCP type and approval details. In addition, the CE Mark should be clearly shown on the tube or accompanying documentation. Such products now also need to show the new UKCA Marking for use within the UK market.

ANNEX A – When the PED applies (note: project specifications/different application/client requirements may apply)

T6: GROUP 1 GASES & VAPOUR: PED applies to all pipes \geq DN25 and pressures \geq 0.5 bar.

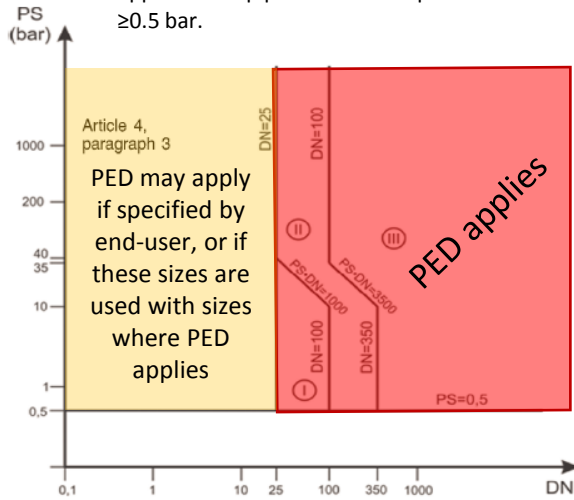


Table 6

Piping referred to in Article 4(1)(c)(i), first indent

T7: GROUP 2 GASES & VAPOUR: PED applies to all pipes \geq DN32 and pressures \geq 31.25 bar. Below this pressure, PED applies when $PS \times DN \geq 1000$

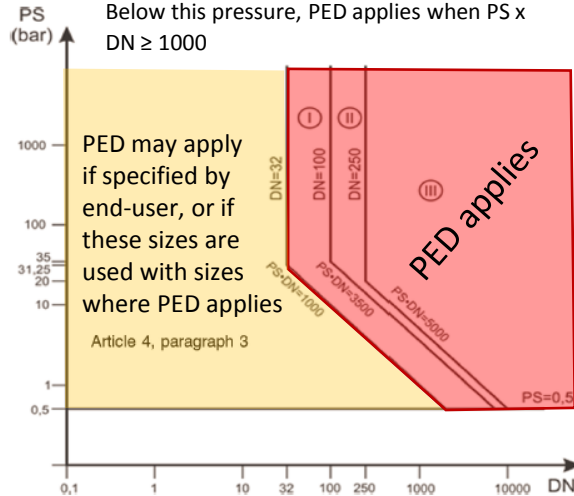


Table 7

Piping referred to in Article 4(1)(c)(i), second indent

T8: GROUP 1 LIQUIDS: PED applies to all pipes \geq DN25 and pressures \geq 80 bar. Below this pressure, PED applies when $PS \times DN \geq 2000$

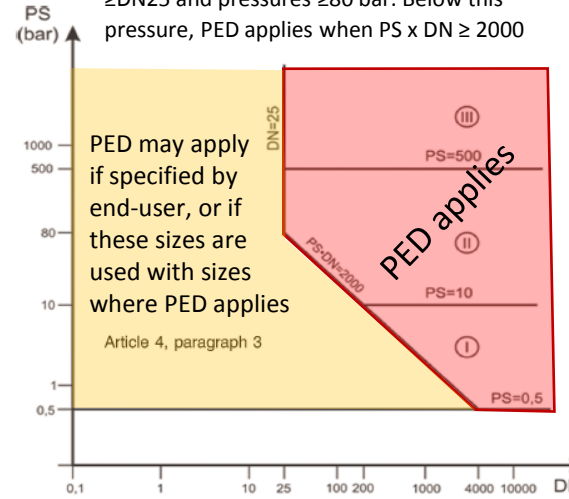


Table 8

Piping referred to in Article 4(1)(c)(ii), first indent

T9: GROUP 2 LIQUIDS: PED applies to all pipes \geq DN200 and pressures \geq 25 bar. Below this pressure, PED applies when $PS \times DN \geq 5000$

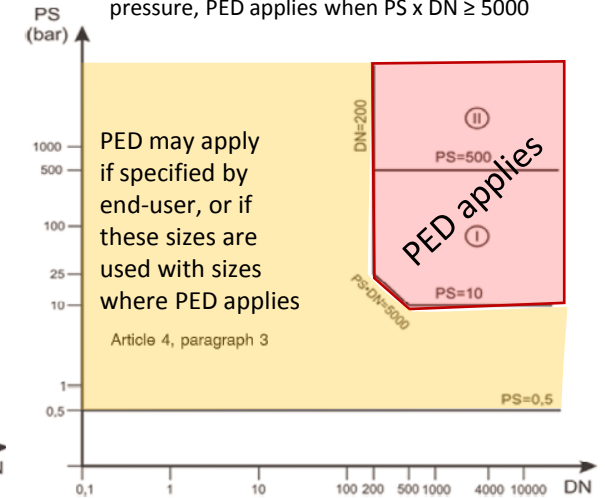
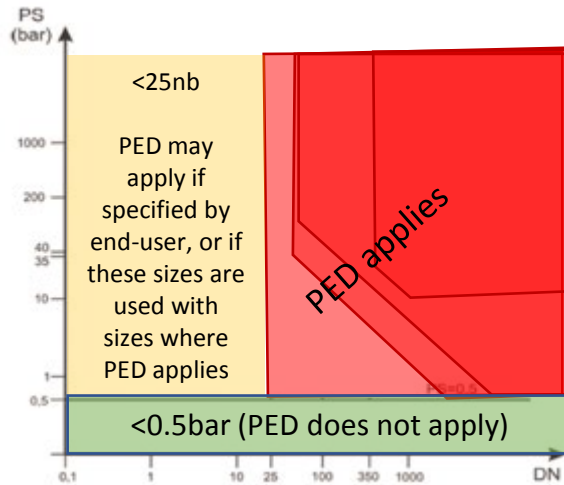


Table 9

Piping referred to in Article 4(1)(c)(ii), second indent



PED applicable zones layered on top of each other for reference



- Irrespective of the PED guidance on tube dimensions, suitable national or industry standards appropriate to the application operating temperature (and pressure) must be employed, even for SEP (buff areas above).
- From the UK PED guidance documents it appears that only tubes smaller than 25nb and applications below 0.5 bar fall outside the general PED requirements for gas and liquids. Other sizes may also fall outside, unless specified by an end-user, or if these sizes are used with sizes where PED applies.
- However, there remains the need to demonstrate that such products are still suitable for use at the pressure / temperature within their intended application.
- For all other sizes, and because we can't always fully understand where or how such tubes will be used, the safest option is always to consider the PED as applying. Unless you know the final intended application/product statements or tube markings etc are supplied for a particular end use only.

PED fluid categories

Group 1 – Dangerous Fluids (can be gas, vapour or liquid):

Flammable, highly flammable, toxic, very toxic, corrosive, oxidizing, explosive

- Gas or Vapour Refer to T6 (Annex A)
- Liquid Refer to T8 (Annex A)

Group 2 – Inert Fluids (can be gas, vapour or liquid):

All fluids not included in Group 1 above

- Inert Gas or Vapour Refer to T7 (Annex A)
- Non-Dangerous Liquid Refer to T9 (Annex A)

Important to note:

- **Although steam is classified as a Category 2 vapour, additional requirements also apply to steam generating systems.**
- **Appropriate standards must be employed for elevated and low temperature applications.**
- **Customer specifications may be “catch all” and include compliance requirements for sizes not strictly within PED requirements.**
- **Please remember that requirements under the PED will also apply to other metals such as cast iron, stainless and copper.**
- **Even when products are supplied outside of the PED under SEP, the supplier will have to demonstrate that appropriate industry practices have been applied and followed.**

Other supporting information

SEP

Guideline I-01

Pressure Equipment Directive PED 2014/68/EU Commission's Working Group "Pressure"

Guideline related to: Article 4 paragraph 3

Question	What is to be understood by "sound engineering practice"?
Answer	Sound engineering practice" means, without prejudice to Article 5, paragraph 1, that such pressure equipment is designed taking into account all relevant factors influencing its safety. Furthermore, such equipment is manufactured, verified and delivered with instructions for use in order to ensure its safety during its intended life, when used in foreseeable or reasonably foreseeable conditions. The manufacturer is responsible for the application of sound engineering practice.

Accepted by Working Party Guidelines (WPG) on:	01/07/2015
Accepted by Working Group Pressure (WGP) on:	08/01/2016

- Under SEP suitable product standards appropriate to the application operating temperature (and pressure) must be employed in combination with recognised documented industry guidance.

Pipework systems

Guideline B-28

Pressure Equipment Directive PED 2014/68/EU Commission's Working Group "Pressure"

Guideline related to: Article 2 (3), Article 4 paragraph 1 (c) and Annex II

Question	How shall a "piping" (as defined in Article 2 (3)), comprising pipes with different DN's, be classified?
Answer	For such a piping the maximum DN used shall be the basis for the classification.
Note [x]	The term a "piping" as used above means an item of pressure equipment, and not an "assembly" as defined in Article 2 (6).

Accepted by Working Party Guidelines (WPG) on:	14/10/2015
Accepted by Working Group Pressure (WGP) on:	08/01/2016

- For connected pipework of different sizes, the largest OD in the system shall be used for the basis of PED classification.

BMTFA MEMBERS DISCLAIMER STATEMENT

Suitability of dual-certified carbon steel tubes under UK/European legislation:

From the 20th April 2021, unlike BS EN10217-1 TR2 Grades and BS EN10217-2 GH Grades, all BS EN10217-1 TR1 Grades are no longer acceptable for use in applications under the Pressure Equipment Directive (PED -2014/68/EU) (“the Directive”), which was implemented into UK law by the Pressure Equipment (Safety) Regulations 2016.

This is because TR1 grades do not meet the essential requirements of that Directive in respect of ageing (determined by the chemical composition) or ductility (specified as minimum Charpy impact requirements). Therefore, when purchasing pipework, it is important to understand the technical differences between products and the applicable standards, legislation, or regulations being applied. This will help to ensure that steel tubes of appropriate type, grade and technical delivery conditions and standards are specified or selected for the application(s) concerned.

This includes the user ensuring the suitability of the products for the operating pressure and temperature ranges required. In addition, BSEN10255 products are only deemed suitable for fuel, air and gas applications if supplied CE/UKCA Marked to conformity system AVCP 3 with supporting documentation.

We encourage our members to undertake appropriate due diligence to ensure that any additional manufacturer’s product claims, above and beyond those listed within the relevant standard(s) are supported by the appropriate technical statements for the user to approve in order to confirm suitability. This is particularly relevant with regards to products supplied to Manufacturers Specifications, which may be outside the scope of the primary product standard.

BMTFA is a trade association, and we are unable to provide any kind of endorsement or recommendation regarding products that are currently available for use on the market. If in doubt, consider the following to inform your decision making:

- Product Integrity - Ensure the accurate provision and use of manufacturer product information and it is fit for use.
- Product Information - Badges of conformity can assist you make complicated decisions more quickly and safely. However, they are only as good as the testing and approval system upon which they rely. That testing and approval system must be robust, transparent and trusted

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