



FINAL DRAFT – PUBLIC DOMAIN  
Industry information pack

## Guide to malleable iron fittings

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## Typically asked questions with answers

### Q1: *What is a malleable iron fitting?*

A1: Malleable iron fittings have been subjected to a heat treatment process that gives them improved ductility and malleability over standard cast iron products. Malleable iron fittings can be supplied as either Whiteheart or Blackheart types, both of which perform similarly in service. Whiteheart irons have a microstructure consisting of ferrite at the surface with the main body comprising rosettes of temper carbon in a pearlite matrix. Blackheart irons have a microstructure of temper carbon in a ferrite matrix. Malleable iron pipe fittings are available in a range of forms such as straight couplings, tees, crosses, unions, branches, bends or elbows and can be supplied either self-colour (black) or galvanised.

### Q2: *What are malleable fittings used for?*

A2: Malleable iron fittings are normally used to make up threaded, or screwed and socketed joints, and probably represent one of the most recognised methods of joining gas or liquid pipework systems. They are typically used only with smaller bore tubes ( $\leq$ DN100). The seal and pressure integrity depends upon several factors: the labyrinth / mechanical seal created by the threads and associated compression between the threads surfaces when they are tightened; the type of threading profile (parallel or tapered) and the presence of a sealing compound, such as thread seal tape or a liquid or paste pipe sealant. Threaded joints are demountable and reusable and provide a heat free jointing method (no hot working permit required). When correctly made up they are suitable for use in high pressure applications.

### Q3: *Do all fittings behave the same way?*

A3: No, although Whiteheart or Blackheart malleable irons can both offer a similar service performance, each of these material types can be supplied in a range of different material grades not all of which have the same technical delivery conditions. Some grades may be softer, harder or more brittle than others, which means that they may not behave in the same way when in use. Certain grades may also be excluded from use in pressure applications, as per statements within the fitting's standards. That is why it's advisable to always check and confirm the actual material type, grade and properties before use.

**Q4: What standard are threaded malleable cast iron fittings typically supplied to?**

A4: BS EN10242: 1995 (+ amendments 2003) - Threaded pipe fittings in malleable cast iron. This standard specifies the requirements for the design and performance of threaded pipe fittings for general purpose use, including the transmission of fluids and gases up to the limits of pressure and temperature specified in the standard. For use in conditions outside the pressure and temperature limits given, the standard states that reference shall be made to the fitting manufacturer's performance data. Note, this standard is still classified as current, but as it was first published in September 1995, some associated standards referenced within BS EN10242 have since been updated.

**Q5: What are the malleable iron grades currently specified in BS EN10242?**

A5: The standard currently states that material grades used shall also be in accordance with the requirements of BS EN1562. The grades of materials currently given within BS EN10242 are:

- grades EN-GJMW-400-5 or EN-GJMW-350-4 for fittings in Whiteheart malleable iron;
- grades EN-GJMB-350-10 or EN-GJMB-300-6 for fittings in Blackheart malleable iron.

**Q6: What is BS EN1562 and why is it also relevant?**

A6: BS EN1562: 2019 Founding. Malleable cast irons. This standard is relevant as it specifies the mechanical properties and testing requirements that the various material grades within BS EN10242:1995 (+ amendments 2003) need to satisfy. It also defines which grades are excluded from pressure applications.

**Q7: Are these standards harmonised with any Regulations and/or Directives?**

A7: BS EN10242:1995 (+ amendments 2003) is technically not harmonised with the CPR (Construction Products Regulations); but the standard still refers to the old CPD (Construction Products Directive), allowing manufactures to still undertake independent testing and CE Marked their products to show that product validation has been undertaken. BS EN1562 is harmonised with the PED (Pressure Equipment Directive). As fittings are classified as a component of a pressure system, they cannot be CE Marked under the PED.

**Q8: Can BS EN10242 fittings be used within PED applications if they fall under the CPR?**

A8: Most malleable cast iron fittings can be used within applications covered by the PED, depending on the suitability of the material grade and operating temperature and pressure requirements being satisfied. The PED is a confusing Directive as, ideally, all components used within a pressure system should be supplied in accordance with a harmonised (BS EN) standard. Where there are no harmonised standards that products can be manufactured and supplied against, other standards or manufacturing data can be used to show that the products meet the essential requirements of the PED and hence are suitable for their intended application. Whilst technically BS EN10242 fittings are currently defined as being suitable for pressure applications, BS EN1562: 2019 has been amended to specifically define grades that should be used under the PED. This has meant that some grades, currently in BS EN10242, are no longer recommended for pressure use and will be withdrawn when the standard is next upgraded.

**Q9: What are the grades in BS EN10242 that BS EN1562 says are no longer suitable for pressure applications?**

A9: Of the 4 grades currently in BS EN10242, EN-GJMW-350-4 (Whiteheart) and EN-GJMB-300-6 (Blackheart) are not included in Table 3 of BS EN1562: 2019 which covers PED suitability. This will leave only two grades in BS EN10242, EN-GJMW-400-5 (Whiteheart) and EN-GJMB-350-10 (Blackheart) as being considered suitable for use under the PED in future. The use of EN-GJMB-300-6 is further complicated by BS EN 1562, Table 2, footnote B, which states that this grade shall not be used for any pressure application, even for pressure applications not covered by the European legislation for pressure equipment (i.e., the PED).

**Q10: Why is Grade EN-GJMB-300–6 now excluded when it has been used successfully for many decades?**

A10: Within the BS EN1562 standard it was considered that there was insufficient materials and testing data for this grade to confirm its suitability for pressure use. In the absence of this data, the relevant Standards Technical Committee felt that there was the possibility that the quality and performance of this grade could be inconsistent, and, as such, made the decision, without objection when proposed, to add the lack of pressure suitability statement and technically remove the use of grade EN-GJMB-300–6 from pressure applications. This amendment to BS EN1562 was initially made in 2012.

**Q11: *But what if some manufactures and suppliers are still using or supplying this grade?***

A11: Technically the grade is still shown within the current version of BS EN10242:1995 (+ amendments 2003) and is still able to be CE Marked under the CPR (Construction Products Regulations). BS EN10242 also states that for use in conditions outside the pressure and temperature limits specified, reference shall be made to the manufacturer. If the manufacture has independently validated and approved testing data showing the product is fit for purpose, in terms of satisfying pressure and temperature requirements, then EN-GJMB-300-6 could still be used. However, BS EN10242 and other associated standards are being updated, so this grade will be eventually phased out and manufacturers and suppliers will eventually have to stop offering it.

**Q12: *Is there not an issue with using this grade in projects ?***

A12: As per the response in Q11, if the manufacturer or supplier can provide supporting data, independently verified, confirming suitability for the required pressure and temperature requirements, then such fittings will be covered under SEP.

**Q13: *How do I ensure I get the fittings I want?***

A13: By ensuring that the malleable iron fitting type, grade and material properties are clearly defined within your specifications and ensuring that supporting product data and manufacturers guarantees are also supplied and reviewed to confirm that your requirements are satisfied in full.

**Q14: *All fittings look the same, how do I tell them apart?***

A14: According to BS EN10242, fittings must be marked with either a manufactures mark or logo on them, which should enable you to go back through the supply chain to confirm what you have.

**Q15: *What happens when the standards are updated, and I have stock or spare materials on projects?***

A15: When standards are updated, there is normally a transition period when changes are made. Anything placed on the market before and during the transitional period can still be used. Products may also still be deemed suitable for use if the manufacturer has product data, independently approved, as SEP can still apply in support of legacy material.

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## Suitability of Grade EN-GJMB-300–6 (5.4100) malleable cast iron (blackheart) under UK/European legislation:

When purchasing malleable cast iron fittings, it is important to understand the technical differences between products and the standards, legislation or regulations applicable, to ensure that only fittings of the 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. 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 with the appropriate technical statements.

This should allow users to approve and confirm the suitability of the product for its intended use. 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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