



**Thomas Dudley Foundry**

Complete casting solutions

**THE ESSENTIAL GUIDE  
TO UTILITY CASTINGS,  
ACCESS COVERS AND GRATES**

## **PURCHASING, SPECIFYING AND SUPPLYING THE RIGHT PRODUCTS**

**Minimising whole life costs by selecting the correct castings for every application.**

Selecting utility castings can be surprisingly challenging. In order to do so, buyers, specifiers, stockists and contractors have to navigate the potential minefield that is presented by the variety of products, specifications and third-party standards.

As with many other construction products, unit price is obviously an important factor. But more important are quality, suitability and total cost of ownership (TCO). To further complicate matters, higher quality products are not always the most expensive available and conversely, inferior products are not necessarily the cheapest.

One thing though is certain:

When all factors are taken into consideration, selecting a correctly specified casting almost always saves money in the long run.

This Essential Guide cuts through the confusion, giving you everything you need to make informed decisions and select access covers, gully gratings, channel gratings and kerb drainage castings more effectively.



Thomas Dudley covers and grates comply fully with British Standards. We will also test your existing castings free of charge so that you can see how they perform compared with our products undergoing the same tests.

To request to have your existing castings tested, please visit [www.dudleyfoundryproducts.co.uk](http://www.dudleyfoundryproducts.co.uk) and complete our simple form.

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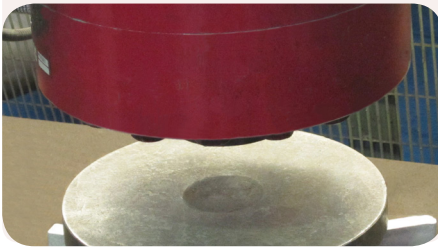
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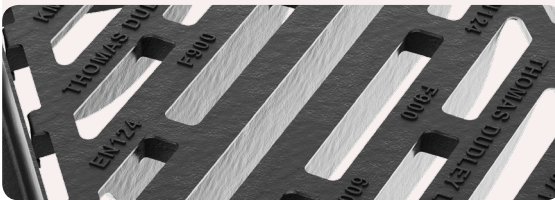
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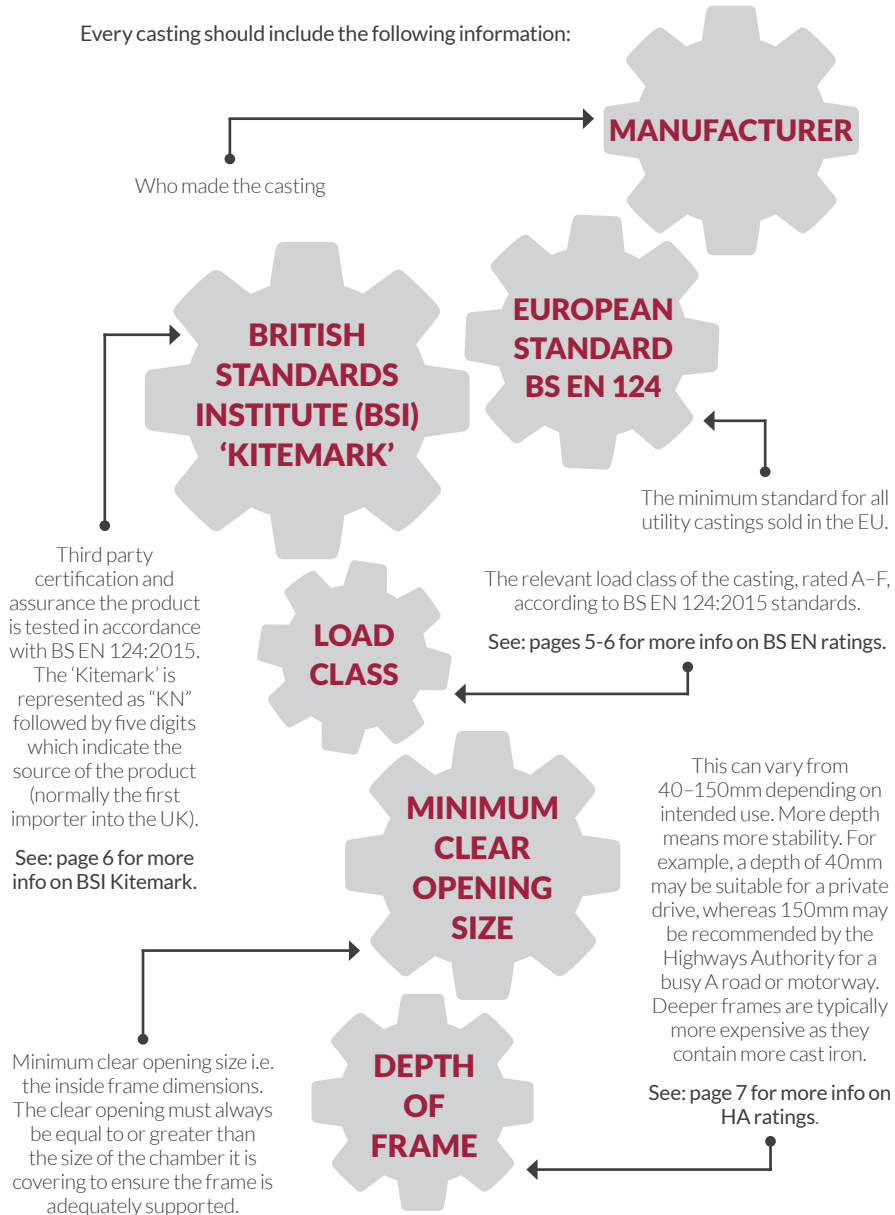
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## THE MARKINGS ON CASTINGS AND WHAT THEY MEAN

Every casting should include the following information:



## STANDARDS AND LOAD CLASSES

There are three main third party standards which apply to utility castings and determine key criteria, such as load bearing ability.

These are:

Level 1. European Standard BS EN 124

Level 2. British Standards Institute (BSI) 'Kitemark'

Level 3. Highways Authority Advice Note HA 104/09

### EUROPEAN STANDARD BS EN 124

Access covers and gully grates installed in the UK should meet the requirements of the European Standard BS EN 124.

This standard divides access covers and gully grates into a number of classes by static test load. It also categorises the various places where they may be installed from Group 1, the least demanding environment, through to Group 6, the most demanding. It provides guidance on the minimum class to be used against each installation group.

- These standards apply to all situations, on and off-load and to all materials
- Products designed to BS EN 124 are grouped and classified depending on their place of installation
- It is the responsibility of the engineer to ensure that the correct product is specified
- The appropriate class of manhole top or gully top to be used depends upon the place of installation
- The selection of the appropriate class is the responsibility of the designer
- Where there is any doubt the stronger class should be selected

## EUROPEAN STANDARD BS EN 124 CLASSES

### Group 1: Minimum Class A15

Access covers and gratings capable of withstanding a 15kN test load.

For use in areas where only pedestrians have access.

### Group 2: Minimum Class B125

Access covers and gratings capable of withstanding a 125kN test load.

For use in car parks and pedestrian areas where only occasional vehicular access is likely.

### Group 3: Minimum Class C250

Access covers and gratings capable of withstanding a 250kN test load.

For use in car parks, forecourts, industrial sites and areas with slow moving traffic also in highway locations up to 500mm from the kerb and up to 200mm into the verge, excluding motorways.

### Group 4: Minimum Class D400

Access covers and gratings capable of withstanding a 400kN test load.

For use in areas where cars and lorries have access, including carriageways, hard shoulders and pedestrian areas.

### Group 5: Minimum Class E600

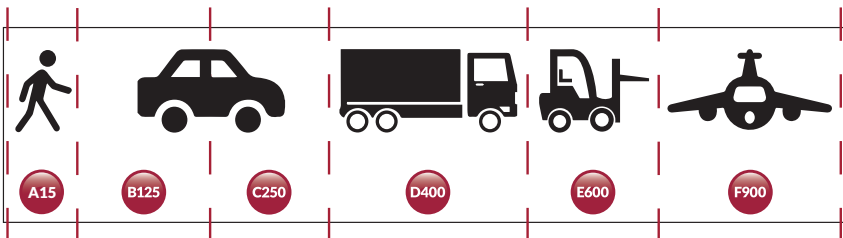
Access covers and gratings capable of withstanding a 600kN test load.

For use in areas where high wheel loads are imposed such as loading areas, docks or aircraft pavements.

### Group 6: Minimum Class F900

Access covers and gratings capable of withstanding a 900kN test load.

For use in areas where particularly high wheel loads are imposed such as aircraft pavements.



## BSI KITEMARK CERTIFICATION

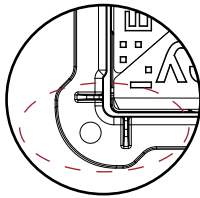
The BSI Kitemark BS 7903:1997 applies to 'Group 4: Minimum Class D400' and above products, as defined by EN 124 (see page 6). As a guide, the BSI standard is around 10% higher than BS EN 124.

## HIGHWAYS AUTHORITY ADVICE NOTE HA 104/09

The Highways Authority provides additional guidelines for road chamber top and gully top installations in trunk roads and motorways. These more rigorous requirements are intended to meet the demands of heavily trafficked areas and high tonnage commercial vehicles. The requirements include:

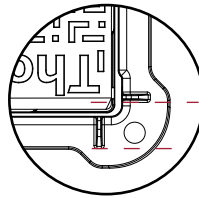
- Group 6: Minimum Class F900 (as per EN 124)
- 150mm depth

Though a product may be specified to comply with HA guidelines, the guidelines come in the form of an Advisory Note and are not enforced as a standard.



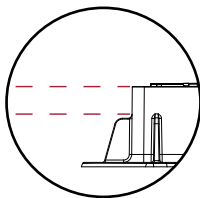
**1**

The bearing pressure of the frame must not be greater than  $2.1\text{N/mm}^2$ .



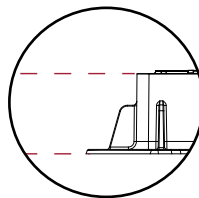
**2**

The Flange should be at least **5mm thick** and **50-120mm wide**



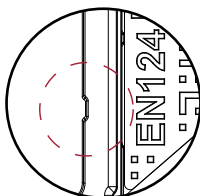
**3**

Gussets must be below the top of the frame by at least **25mm** and should conform to BS7903.



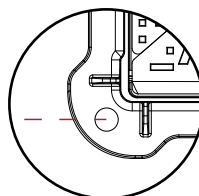
**4**

Frames fitted in trunk roads and motorways should be at least **150mm deep**.



**5**

Balanced lifting must be incorporated into frames which are heavier than **15Kg**.



**6**

Frames should allow for a higher level of mortar adhesion.

## GOING BEYOND STANDARDS

**Q. Are third party standards the last word on quality?**

A. No - third party standards are the minimum benchmark.

Third party standards do not test optimally for all relevant factors and there remains a significant difference in quality and value between compliant castings depending on choice of manufacturer and specific range.

**Q. What are the limitations of BS EN 124:2015?**

A. The BS EN 124:2015 standard provides a general guide to product stability and sets out test load parameters for the various classes of products in terms of static load tests.

It does not provide specific information on dynamic loads imposed by the wide variety of traffic conditions found on modern road systems. A truly informed specification must look beyond the standard to determine if the chosen product is fit for purpose.

*Does your supplier offer a free technical advisory service to ensure castings are suitable for their intended application?*

**Q. Have castings been corner tested?**

A. Many castings are primarily load tested on the centre pad. This is the area of the product which is most resilient. However, during use, most failures occur in the corners. Choosing products which have been corner tested gives you the peace of mind they are able to withstand the real life demands of the road.

*Does your supplier corner test products in the UK as standard?*





**Q. When are high intensity castings required?**

A. Some manufacturers employ proprietary systems ranking castings according to different levels of intensity. These are typically arranged as below:

Low intensity (L): Suitable only for private use e.g. private driveways.

Low intensity castings are often sold within an 'Estate Range'.

- Normal intensity (N): Equivalent to BS EN 124 or higher
- High intensity (H): In line with Highways Authority guidance, as per HA 104/09

'Estate Ranges' are cheaper than standard ranges but typically have much lower weight tolerance and are only suitable for limited applications.

High intensity products are recommended or required for the following environments:

- 1. Dual carriageways.** Higher speeds of traffic naturally increases the dynamic impact loading on castings. So too can heavy braking zones towards traffic lights and roundabouts.
- 2. Traffic lights.** Acceleration, deceleration and turning all increase the stress on ironwork.
- 3. Roundabouts.** Turning vehicles increases movement and torque between cover/grate and frame and ultimately increase the stress.
- 4. Changes of load scenarios.** Areas such as conversion to bus routes, one way, traffic calming, road maintenance, temporary use of central reservation/hard shoulders can apply directional (and clipping point) volume, and acceleration and deceleration stresses that are not envisaged by the original specification.

Products are designed for different levels of intensity and names vary by manufacturer, so always check to ensure you have selected a product designed to withstand a higher intensity of traffic.

*To ensure complete transparency and reliability, all castings designed for D400 loadings and above should be high intensity and not offer low or medium intensity ranges.*

## WHY WEIGHT MATTERS

### Q. Are lighter castings less strong?

A. Not if they meet the approved standards.

In fact, lighter castings are typically better engineered and stronger by weight than heavier castings. Always choose the lightest casting that fully complies with the required standards.

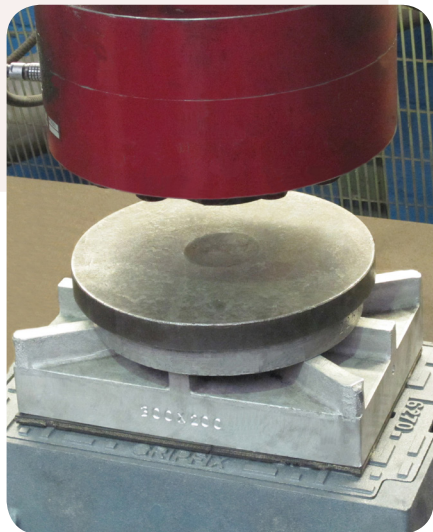
### Q. Are lighter, higher quality castings more expensive?

A. Higher quality castings are frequently more cost-effective than lower quality options. This is due to:

**Lower unit cost.** Raw materials account for the majority of casting cost. Higher quality products are designed to be more efficient and use less metal. Poorly designed products can use up to 50% more metal to reach the minimum requirements.

**More efficient installation.** Lighter castings reduce installation time and enable individuals to install more castings without assistance, reducing labour costs.

**Faster distribution.** Lighter castings dramatically reduce transport costs. More products can be transported on the same vehicle, significantly reducing the amount of trips and fuel required. This also helps to reduce emissions.



## CHOOSING A COVER

### Q. Cover or grate?

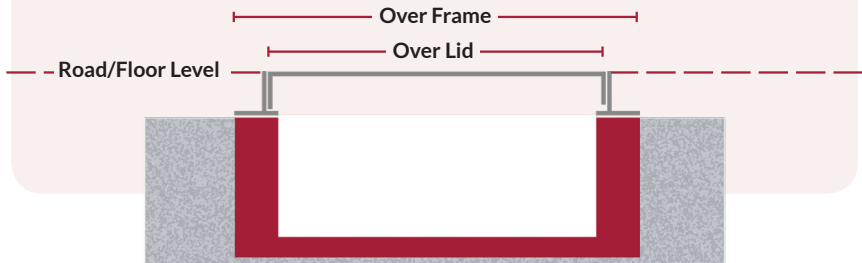
A. In a nutshell, covers protect access and prevent water entering but grates actually take water in.

### Q. What's the minimum clear opening?

A. The minimum clear opening should be equal to or greater than the size of the chamber it is covering to ensure the frame is adequately supported.

### Q. What's the required depth?

A. More depth means more stability. For example, a depth of 40mm may be suitable for a private drive, whereas 150mm may be recommended by the Highways Authority for a busy A road or motorway. Deeper frames are typically more expensive as they are comprised of more material.



**Q. 'Drop in' or three-point suspension?**

A. The stability of a casting is determined by how it makes contact with the ground. More contact points reduce lateral shift and increase the grip with the bedding mortar. This reduces noise and the risk of damage to the surrounding area.

DROP IN	THREE POINT SUSPENSION
<p>A single piece casting that can be dropped into place.</p>	<p>A casting comprised of two triangular parts, providing a total of six contact points to increase contact with bedding/fixing material and ensure enhanced stability and noise reduction. Ideal for populated areas where noise pollution is a concern.</p>
<p>PROS</p> <ul style="list-style-type: none"> <li>• Cheapest type of casting</li> </ul>	<p>PROS</p> <ul style="list-style-type: none"> <li>• Stable under traffic</li> <li>• Minimal noise</li> <li>• Reduces risk of damage to surrounding area</li> </ul>
<p>CONS</p> <ul style="list-style-type: none"> <li>• Noisy in traffic</li> <li>• Less secure</li> <li>• Higher risk of damage to surrounding area</li> </ul>	<p>CONS</p> <ul style="list-style-type: none"> <li>• Must be split in two</li> </ul>



**Q. How heavy are the castings?**

A. Weight can be deceptive. A 40Kg casting could have drag weight of 80Kg. Consider whether a two-man lift is required.

Hinged castings reduce the risk of injury that can arise from the static lifting of ironwork (see below).

*A supplier's castings should be typically 30% lighter than imported equivalents but comply fully with British Standards.*

**Q. Hinged or non-hinged?**

A. Hinges can make installation safer and maintenance easier, although castings with hinges are cheaper and easier to install for lighter variants.

NON-HINGED	HINGED
Castings without hinges are easy to install, but only when light enough e.g. 50Kg.	Hinged castings are easier to operate once installed and offer improved health and safety.
<p>PROS</p> <ul style="list-style-type: none"> <li>• Easy to install</li> <li>• Cheaper</li> </ul>	<p>PROS</p> <ul style="list-style-type: none"> <li>• Ease of access/maintenance (one person can lift out)</li> <li>• Minimal noise</li> <li>• Safer to operate</li> </ul>
<p>CONS</p> <ul style="list-style-type: none"> <li>• Only suitable for lighter products</li> </ul>	<p>CONS</p> <ul style="list-style-type: none"> <li>• More expensive</li> </ul>

## REMOVABLE HINGES

Removable hinges offer the best of both worlds. They can be separated while laying the frame to streamline installation, although are typically more expensive.

**Q. Does the hinge mechanism need to withstand erosion?**

A. Some hinge mechanisms comprise a nut and bolt which extends above the frame and can become eroded when the tarmac above is damaged. To avoid this problem, choose a hinge mechanism with a pin arrangement that sits flush with the outside of the frame.

**Q. Does the hinge open wide enough?**

A. Some hinges are only designed to open by 90–110 degrees. Just a slight knock could cause them to close and cause serious injury during installation or maintenance.

To increase safety, choose hinges that open back to 120 degrees minimum.

**Q. Do you need to control bad odours?**

A. If yes, opt for closed keys. If not, save money on open key castings.

<b>CLOSED KEY</b>	<b>OPEN KEY</b>
Highly recommended for sewage, domestic use and areas with little ventilation. Double seals provide a further level of protection.	Ideal for fresh water drainage—avoid for sewerage!
<b>PROS</b> <ul style="list-style-type: none"><li>• Stops bad odours escaping</li><li>• Prevents water ingress</li><li>• More secure</li></ul>	<b>PROS</b> <ul style="list-style-type: none"><li>• Cheaper</li></ul>
<b>CONS</b> <ul style="list-style-type: none"><li>• More expensive</li></ul>	<b>CONS</b> <ul style="list-style-type: none"><li>• Lets odours escape</li></ul>

## CHOOSING A GRATE

Factors detailed within pages 11 -14 apply to grates, with the following additional considerations:

### Q. High capacity or low capacity?

A. **High capacity.** Grates with wide and/or multiple openings designed to manage maximum flow of surface water run off.

**Low capacity.** Grates with fewer and/or more narrow openings designed to manage moderate flow.

### Q. Are the openings safe for road users?

A. Openings should be perpendicular to the flow of traffic—not parallel— to reduce the risk of cycle wheels becoming trapped. Grates should have an arrow to indicate the correct alignment.

Grates designed for pedestrian areas have small holes (5 x 5mm) to prevent stilettos falling in. Beware: some manufacturers sell grates with openings that have narrow widths but longer lengths e.g. 5mm x 420mm. These are less safe than 5 x 5mm openings.

### Q. Profiled grating?

A. V profile grates are designed for use on the V shaped concrete barriers on motorways.

It's necessary to match dished concrete drainage systems and increasingly V profile drainage systems at side and central reservations of major highways.

Always refer to the manufacturer's installation guide before fitting a grate or cover.

## OTHER CASTING CONSIDERATIONS

### Q. How do you reduce risk of theft?

A. As metal prices increase so does the risk of theft. Drop in castings are less secure but easier to replace because they do not require re-excavation. Castings which have been fully installed are harder to steal but also more difficult to replace.

Use bolts, pins and/or turnbuckle locks as required to make castings more secure.

### Q. How do you extend the life of castings?

A. Castings last for a long time when correctly specified, installed and maintained. To support maintenance, ensure ease of access and treat rust to prevent locked units becoming inaccessible.

## SELECTING THE RIGHT SUPPLIER

### Q. Where should I source castings from?

A. Many castings used in the UK are sourced from the EU or Asia. The EU typically offers fast access to high quality castings, slightly higher unit costs and better service. Asia offers lower unit cost but quality can vary and distribution times and costs can sometimes outweigh initial savings.

UK/EU	ASIA
<p>PROS</p> <ul style="list-style-type: none"><li>• Shorter lead times</li><li>• Better comms</li><li>• Better quality</li></ul>	<p>PROS</p> <ul style="list-style-type: none"><li>• Unit cost can be cheaper</li></ul>
<p>CONS</p> <ul style="list-style-type: none"><li>• Unit cost can be more expensive</li></ul>	<p>CONS</p> <ul style="list-style-type: none"><li>• Longer lead times</li><li>• Distribution can outweigh initial savings</li><li>• Difficult comms</li><li>• Harder to rectify issues</li></ul>

### Q. Can your supplier deliver a consistent supply?

A. Ensure your supplier can deliver quantities to support stocking or installation requirements. Agreeing a steady supply of products as required, rather than large batches, enables you to free up more storage space and reduce warehousing costs.





**Q. Does your supplier design and manufacture castings in-house?**

A. Suppliers who have in-house design, patternmaking and manufacturing capabilities have greater control over the entire process, costs and delivery timeframes than those who have to outsource.

**Q. Does your supplier undertake casting testing?**

A. It is important to ensure that your suppliers are able to offer assured casting integrity. Manufacturers who are genuinely committed to quality will carry out testing in accordance with EN 124 2015 / Part 2.

**Q. Do they carry out any fit for purpose testing?**

A. The key to testing is to establish whether castings are robust enough to withstand common causes of failure in real life situations. It is worth asking whether suppliers are able to simulate realistic installation conditions and test complete castings including into the corners for point and dynamic load stability.

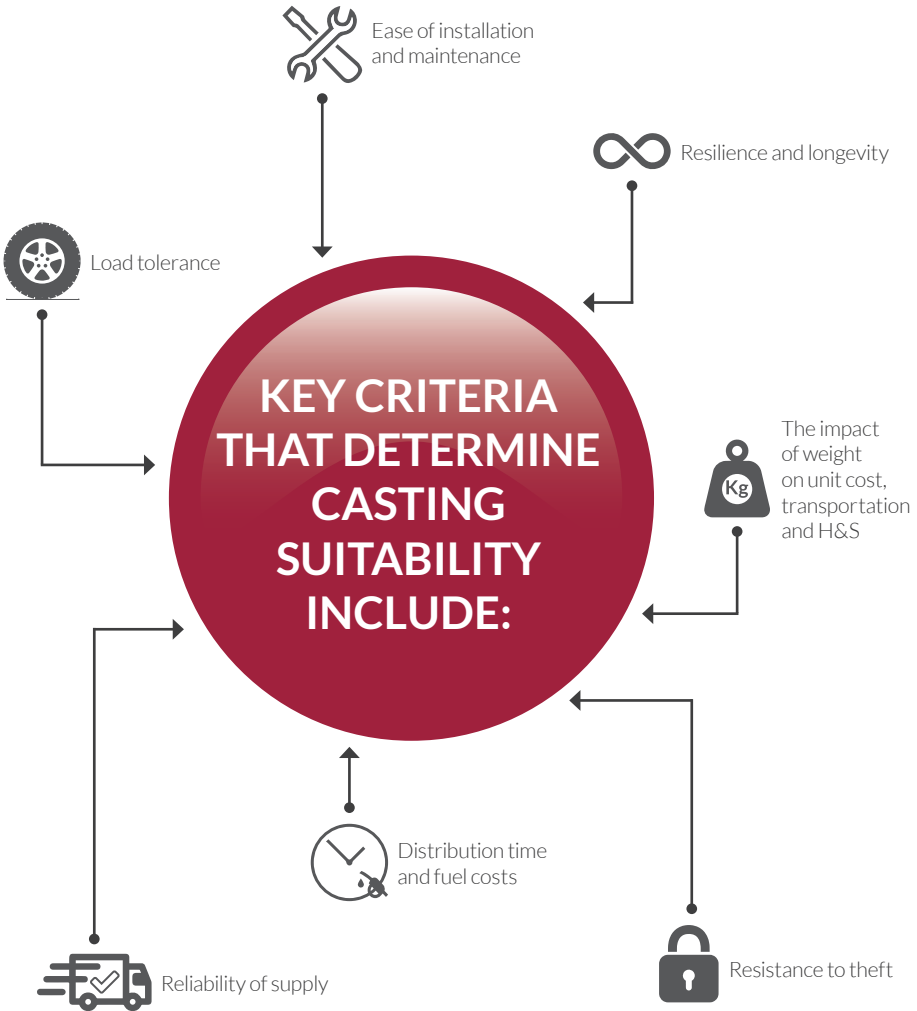
**Q. Do they supply D400 loading products and above as being HA compliant as standard?**

A. Castings that are HA compliant provide the reassurance of knowing that they should be fit for any intensity of traffic.

**Q. Are they experienced in delivering full life cycle cost savings?**

A. Casting design combined with supplier expertise can help to minimise whole life costs. Manufacturers should be able to demonstrate the capability to design and engineer castings to the most exacting standards that are simple to install, extremely durable and quick and simply to replace.

## CASTING CHECKLIST



## THOMAS DUDLEY CASTINGS

The success of Thomas Dudley has been built upon the ability to deliver outstanding service by working with our customers.

We design, engineer and manufacture castings in the UK and are a quality accredited organisation. The unrivalled expertise that we have gained enables us to provide the complete solution, whatever your requirements.

Benefits delivered by Thomas Dudley:

- We design, cut our own patterns and manufacture materials in the UK
- At the time of going to print we are one of only three manufacturers worldwide that has facilities and machinery to test fully to EN 124 2015 / Part 2
- We undertake FEA analysis to simulate real world installations and test in corners for load stability
- Our D400 loading products and above are HA104 compliant as standard and come with a range of patented features -

1. D400 covers are -

- a. Fully solid flanged
- b. Supplied with large corner radius to ensure higher load bearing capacity
- c. Hinged to 135 degrees and lift out at 90 degrees
- d. One man lift across virtually all sizes

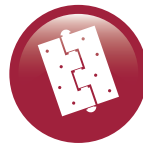
2. D400 grates are -

- a. As points a,b and d above
- b. Fitted with interference hinges for increased stability in use and safety in operation

For details on our complete castings range, please visit:  
[www.dudleyfoundryproducts.co.uk](http://www.dudleyfoundryproducts.co.uk)



UK  
Manufacturing



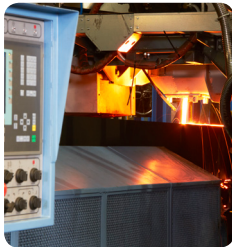
Interference  
hinge



Hinged to  
135° for added  
safety

# UNRIVALLED QUALITY EXCEPTIONAL SERVICE

Thomas Dudley is committed to providing unrivalled casting solutions underpinned by exceptional service. We are proud to remain a family owned business that is driven by the same values as when we started our business in 1920. As a result, we are able to forge long term relationships with each and every customer.



## ENQUIRIES

Please call **0121 530 7000** or email [foundrysales@thomasdudley.co.uk](mailto:foundrysales@thomasdudley.co.uk)



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