THE ESSENTIAL GUIDE TO USING AESTHETICALLY STUNNING DIECASTINGS THAT ENHANCE THE HUMAN INTERACTION WITH YOUR PRODUCTS

ENHANCING THE HUMAN INTERACTION WITH YOUR PRODUCTS

As competition intensifies within most industry sectors, manufacturers are increasingly seeking ways in which they can differentiate products and brands within their chosen markets.

One approach, that has been successfully exploited by the automotive industry, is to focus on components that provide the interface between products and the ultimate end user.

Parts such as handles, valves, controls and even board game pieces are continually touched and can play an invaluable role in determining how products and brands are viewed.

This Essential Guide provides OEMs with an introduction to how they can use aesthetically stunning diecastings to their advantage in order to deliver a better user experience.

Established in the 1930's and based in Tipton, in the heart of the West Midlands, MDL specialises in zinc diecasting and the manufacturing of components for sectors that require a variety of high specification finishes.

Every part is hand finished to the standards that our customers expect to see and touch and our vision is to remain the UK's market-leading manufacturer of hand finished diecast components within our chosen markets.

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ENHANCING THE HUMAN INTERACTION

Two characteristics of components can be used to enhance the human interaction with a finished product namely look and feel.

Within these, there are a number of additional factors and the checklist below can be used to help provide manufacturers with ideas about how they can approach the challenge of enhancing finished assembled products.

COMPONENT CHARACTERISTIC	THINGS TO BE CONSIDERED
Look	• How can the parts that end users see and touch be improved aesthetically?
	• Do your existing parts have visible moulding or flash lines and can improvements be made if these imperfections were removed?
	• Can different coloured components be used to add the finishing touch to brand new products, freshen up existing ranges or launch limited edition offerings?
	• Would intricate, high definition or enamelled branded name badges help to bring finished assembled products to life?
	• Can components be used to differentiate product offerings – could you use common product shells or bodies but add better quality components onto higher end ranges to provide tiered products targeting different market segments?

Feel	• How user friendly are your current components and can they be improved ergonomically to make them easier and more pleasing to use?
	• Can component weight be increased without raising unit costs to add greater perceived quality and solidity?
	• Can components be more highly polished than they are currently so that they are smoother to touch?
	• If your current components carry chrome plating, powder coating or any other specialist finishes, are these finishes perfect or could the surface quality and consistency be enhanced?

INCREASING PERCEIVED PRODUCT QUALITY

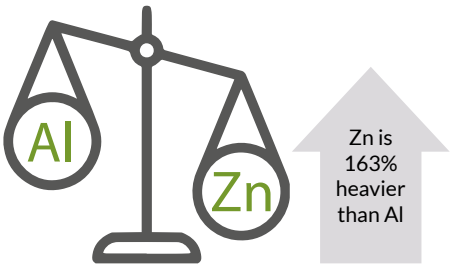
Small changes in component design, manufacturing and finishing can significantly impact upon the perceived quality of an OEM product or appliance. The surprising thing here too is that unit costs need not necessarily increase if materials and other efficiencies are explored.

Component weight

Perceived quality can increase with component weight. Handles, levers, rails, knobs and other parts that are touched or activated by an end user can be made from heavier materials to convey the impression of strength, solidity and quality.

Zinc for example is nearly two times heavier than aluminium and can be used to manufacture highly intricate components.

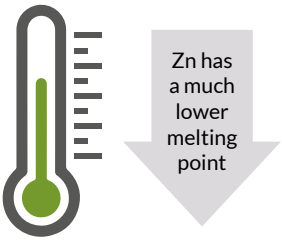
MATERIAL	DENSITY (Kg PER CUBIC METRE)
Magnesium	1,738
Aluminium	2,712
Titanium	4,500
Zinc	7,135
Stainless Steel	7,480 - 8,000
Iron	7,850
Brass (casting)	8,400 - 8,700
Copper	8,940



Component surface

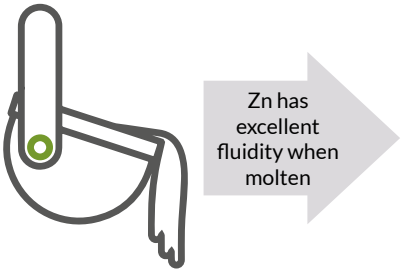
Zinc diecastings have an extremely responsive surface that allows the adherence of a multitude of finishes. The much lower melting point compared with other materials creates a diecasting surface that is unpitted and one that can be very easily polished and plated, allowing a perfect finish to be quickly and cost-effectively achieved.

	MELTING POINT	
MATERIAL	**DEGREES C**	**DEGREES F**
Zinc	419.5	787
Magnesium	650	1200
Aluminium	660	1220
Yellow Brass	930	1710
Grey Cast Iron	1127 - 1204	2060 - 2200



Component consistency

Where multiple components such as handles and valves may appear next to each other on a finished OEM product, it is essential to optimise component consistency. Materials such as zinc have excellent fluidity when molten which helps to ensure good in tool flow. As a result, component consistency and ultimately quality can be maintained.



SELECTING THE CORRECT COMPONENT MATERIAL

Materials that are widely used in diecasting include zinc, aluminium and magnesium. When deciding on which material to use for a component, it is important to carefully consider the application along with the required strength and surface finish.

ZINC

- The best choice for thin walled castings and for manufacturing to tight tolerances
- Recognised as offering the greatest mouldability
- A heavy material that can give additional perceived quality
- Ideal for a wide range of casting sizes even very small, highly detailed parts
- Range of alloys available offering different costs, mouldability and performance
- Lower melting point and better fluidity
- High strength and corrosion resistant
- Smoothest surface finish

Three commonly used zinc grades are Z2, Z3 and Z5 with Z3 covering the vast majority of applications.

PROPERTY	Z2	Z3	Z5
Tensile Strength	397 MPa	268 MPa	331 MPa
Yield Strength	361 MPa	208 MPa	295 MPa
Impact Strength	38J	46J	52J
Shear Strength	317 MPa	214 MPa	262 MPa
Density	6,800 Kg per cbm	6,700 Kg per cbm	7,700 Kg per cbm
Hardness	130 Brinell	97 Brinell	91 Brinell
Thermal Conductivity	105 W/mK	113 W/mK	109 W/mK

ALUMINIUM

- The most commonly used diecasting material
- Lightweight
- Strong
- High strength and corrosion resistant
- Range of alloys available offering different costs, mouldability and performance
- Easy to machine
- Cost effective

MAGNESIUM

- Very lightweight
- Strong
- Excellent corrosion and temperature resistance
- Range of alloys available offering different costs, mouldability and performance
- Easy to machine
- Quicker ejection rate than aluminium

WHY ZINC?

- The quality of off-tool zinc diecastings is such that no finishing is required other than drilling, tapping and polishing. This enables the costs and time associated with dressing components in other materials to be removed from the manufacturing process
- Zinc components have a very smooth surface and readily accept a wide range of finishes including chrome plating, copper plating, powder coating and wet paint coating
- The fluidity of molten zinc allows intricately designed and thin walled components to be manufactured with greater precision and consistency
- The tooling used to produce zinc diecastings has an exceptionally long working life which helps to spread costs over a greater volume of components in order to minimise unit costs
- With environmentally responsible sourcing becoming an increasingly important issue for many organisations, it is reassuring to know that zinc is simple to recycle and has a lower melting point than some other metallic materials so consumes less energy
- Zinc has good inherent strength and proven durability so is ideal for use in applications where components provide the interface between a product or appliance and the end user. The heavier weight of zinc diecastings also enables them to convey a feeling of quality every time they are touched
- Dimensionally Zinc has a nominal shrinkage rate and therefore can be used directly on assemblies where all other diecast materials require additional machining to meet the tolerance

SELECTING THE RIGHT DIECASTING METHOD

High Pressure Diecasting:

PROS	CASTING TOLERANCE	PRODUCTION
• Excellent component surface quality • Can accurately produce intricate, thin walled castings • Tooling is costly but typically has a very long working life • Molten metal enters the die very quickly under pressure maintaining temperature and repeatability • Unlike low pressure and gravity diecasting, components produced via high pressure machines are of such high quality off tool that they require no additional machining	• Exceptional accuracy and minimum wall thickness of 0.8mm	• Medium and high volume

Low Pressure Diecasting:

PROS	CASTING TOLERANCE	PRODUCTION
• Excellent component surface quality • Can accurately produce intricate, thin walled castings • Tooling has a long working life • Molten metal enters the die under pressure maintaining temperature and repeatability	• Good accuracy and minimum wall thickness of 3mm	• Low and medium volume

Gravity Diecasting

PROS	CASTING TOLERANCE	PRODUCTION
• Can be used to produce components in zinc, copper, aluminium, cast iron and other materials • Die can be easily accessed, cleaned and maintained	• Good accuracy and minimum wall thickness of 3mm	• Low and medium volume

SELECTING THE RIGHT SUPPLIER

Q. Where should I source diecastings from?

A. Many diecastings used in the UK are sourced from the EU or Asia. The EU has traditionally offered fast access to high quality castings, slightly higher unit costs and better service. Whilst the common perception has been that Asia offers lower unit costs, this is no longer the case. The commodity price of zinc alloy has risen globally in recent years and coupled with the Dollar exchange rate and freight / duty taxation, diecasting pricing is now comparable with the UK and EU.

UK/EU	ASIA
PROS • Better quality • Better communications • Pricing parity with Asia • Shorter lead time • Superior service	PROS • Unit cost can be cheaper for very high volume orders
CONS • Unit cost can be more expensive for very high volume orders	CONS • Inferior quality • Longer lead time • Difficult communications • Less responsive • Harder to rectify issues • Payment required in advance

Q. Can your supplier deliver a consistent supply?

A. Ensure your supplier can deliver quantities to support your production 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. Can your supplier provide the complete solution?

A. Ensure your supplier can provide as much or as little engineering input as is required. It is also worth confirming if they can work with you at every stage of a project from design and development to manufacturing, finishing, bespoke assembly, warehousing and delivery.

Q. Can your supplier support new product development?

A. Ask suppliers if they have:

- The ability to work from existing component designs and help configure completely new designs
- CAD/CAM capabilities
- Rapid prototyping abilities
- Experience in Design for Manufacture to help optimise production quality whilst minimising costs.

Q. Can your supplier provide cost-effective tooling?

A. Tooling can represent a significant proportion of any new diecasting project costs so identifying suppliers who can demonstrate a proven ability to provide cost-effective solutions can help you get the most from any budget.

One of the key questions to ask is whether diecasting manufacturers have their own in-house tool making capabilities. Those that do are better placed to carefully control the entire process for you along with associated timescales and costs.

Q. Can your supplier provide engineering support and Design for Manufacture and Assembly?

A. It is well worth looking at diecasting suppliers who can also provide any engineering support that you may need now or in the future. Manufacturers can add considerable value by dovetailing with your own in-house design teams to evaluate component designs from a very early stage in the development process.

Design for Manufacture and Assembly methodologies can also help to perfect component configurations in order to optimise production and assembly so that both are made as simple and efficient as possible.

Q. How does the supplier finish products?

A. Ask suppliers what processes they use to finish diecastings. If you require high quality mirror like chrome plated finishes, then opt for suppliers who can demonstrate the skill required to polish parts and electroplating capabilities.

Q. Can your supplier provide assembly and packing solutions?

A. Assembly and packing can be extremely beneficial. Here, look for suppliers who can assembly diecastings with other components in order to deliver sub-assemblies that can be integrated with larger finished products and also those who can pack parts to your individual specifications.

MDL ZINC DIECASTINGS

WHAT WE DO

At MDL, we produce aesthetically stunning diecastings for the home, medical and leisure sectors.

We pay meticulous attention to detail throughout our manufacturing process in order to add the finishing touch. The quality of our high-pressure diecasting is also underpinned by state-of-the-art design and development technologies, access to market-leading finishing processes and a customer-driven ethos that you'd expect from a family business with over 80 years experience.

HOW WE DO IT

MDL understands what it takes to produce components with an exceptional surface finish.

We also have the expertise to produce zinc diecast components that will flawlessly accept powder coating, wet paint coating, chrome plating, copper plating and other finishes. Finally, our attention to detail is unsurpassed and dictates the way in which every product is lovingly hand finished and assembled.

As such, we are able to deliver components that consistently improve the way in which end users interact with our customers products.

OUR DIECASTING MANUFACTURING CAPABILITIES

MDL is committed to manufacturing in the UK and produces diecastings at our factory in the West Midlands. We have also developed a uniquely flexible approach that enables us to continually exceed customer expectations.

- 9 High pressure diecasting machines (80 tonne – 120 tonne pressure)
- Diecastings up to 900g in weight
- Multi cavity tools producing 200 – 1,600 parts per hour
- Bespoke process with innovative, purpose built plant and equipment which provide the perfect production platform for the diecastings that we manufacture

For details on our complete diecasting solutions, please visit

www.mcdonald-diecasting.co.uk

UNRIVALLED QUALITY
EXCEPTIONAL SERVICE

MDL is committed to providing unrivalled diecasting 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 company in the 1930's. As a result, we are able to forge long term relationships with each and every customer.

ENQUIRIES

Please call **0121 520 1177** or email **info@mcdonald-diecasting.co.uk**

MDL
McDonald Diecasting Ltd
THE FINISHING TOUCH

McDonald Diecasting Ltd. Coneygre Industrial Estate, Tipton, West Midlands DY4 8XP
0121 520 1177 info@mcdonald-diecasting.co.uk
www.mcdonald-diecasting.co.uk @MDL1930 McDonald Diecasting Ltd

bsi. ISO 9001 Quality Management