

Management of New Product Development

Assessment B

Developing the Design Brief

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Synopsis

Stage: 1.1

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This design brief will document all the core details acquired from research and development phase. This document will then act as a guideline for internal stakeholders which will outline the deliverables and scope of the project.

Through a Knowledge Transfer Partnership with a local university the company has identified an opportunity to extend the use of their chemical alcohol detector system technology to cover the detection of various virus infections, specifically those generated in the breath. The company can see a great potential in focusing to produce a device to detect Coronavirus due to the current global situation. The board does not see Coronavirus testing to go any time soon, however, to take advantage of the situation the product must be brought to market as soon as possible to maximise product exposure and potential. The product must be designed to be used by both clinical and personal requirements which can replace the dreaded swabbed-based methods of testing and make testing quicker, efficient, and much more user friendly.

Testing and trials in the laboratory have already proven the new system to be successful and is now ready to move forward. The company have also successfully prototyped the electronic and mechanical systems to go inside the product. Additionally, all necessary patent applications have been registered which puts the new product in a better position against its competitors.

Although this new device is using the existing technology, a completely new product design is required which should help differentiate the product on the market. The company has decided to approach a London-based design agency to come up with the Industrial Design of the device.

The potential of this device could be a global impact if executed correctly. The global market for COVID-19 diagnostic services is valued at \$60.3 billion in 2020. The market is estimated to grow from \$84.4 billion in 2021 to \$195.1 billion by 2027 (BCC Research, 2020). Replacing the dreaded swab-based method of testing which can often cause extreme discomfort to the user with a device that only needs a breath sample to detect Coronavirus could be revolutionary.

The COVID detector device must be intuitive, easy to understand, comfortable to hold with single hand operation, show accurate results, look aesthetically pleasing and be profitable for Lion Laboratories.

Each aspect in this design brief is in alphabetical order and does not represent the order of importance. This is a working document which will constantly be updated.

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01. Aesthetics

- Design concepts to be presented to the team i.e. Sales, Marketing, Production and others to get initial feedback before proceeding with final CAD
 - Significant changes should be reported and approved by team
- Shape or form
 - The shape must be in line with the current range of Lion Laboratories products (Lion Laboratories, 2022)
 - Freedom to explore shape and form also encouraged to modernise Lion Laboratories products
 - Clean and simple overall form
 - Must be inviting and intuitive to use
 - Consist of effective design signifiers and affordances (Interaction Design Foundation, 2021) to guide user on how to navigate and user the device
- Colour range
 - Must be in line with current Lion Laboratories' product colour range (Lion Laboratories, 2022)
 - Neutral colours such as white or light grey can be a starting point to signify cleanliness and is often used for medical products (Stipe, 2022)
 - Vibrant colour contrast can be used to support design signifiers and affordances to make it stand out
 - Different colour combinations can be offered to suit a large range of people
- Finish
 - The finish must be smooth to touch
 - No rough areas must be present
 - Injection moulded components must be well designed and must not contain sink marks especially on the A surfaces
 - Texture finish VDI must be considered carefully. A higher texture VDI may be seen as a hygiene issue
 - Manufacturing defects during injection moulding must be positioned carefully out of sight

02. Branding

- Logo
 - Lion Laboratories' logo must be present in the design (Lion Laboratories, 2022)
 - The logo must be carefully included in the design without disrupting the overall aesthetics
 - Must be visible and have enough contrast
 - Must be readable
- Company values
 - The company values must be reflected through the new product
 - The product must be recognisable to be part of the Lion Laboratories brand
- Product name
 - A final product name must be given to the device
 - The product name must follow Lion Laboratories' naming structure
- Packaging
 - [Click here for more information on packaging](#)

03. Circular Economy

- Design for disassembly
 - The device must be able to be disassembled at the end of its life span
 - Must be easily disassembled
 - No permanent fixing should be used
- Disposal and recycling
 - Use of recycled and recyclable materials must be used for the injection moulded components as much as possible
- Packaging
 - Use of eco materials that can be recyclable
 - [Click here for more information on packaging](#)

04. Company Constraints

- Assembly
 - If Lion Laboratories decide to adopt a similar strategy to their breathalyser products where they undertake in-house assembly, testing, and packing, then sufficient room must be guaranteed before committing
- Finding the right suppliers
 - Drive down manufacturing costs
 - Finding a supplier that has the capacity to handle high volumes in the region of 750,000 in the first year and 3 million per annum afterwards
- New product and new market
 - Unfamiliar territory can't be rushed and must be approached carefully
- Time
 - The product must be launched to the market as soon as possible
 - All stakeholders must work together towards a deadline which must also be communicated to external stakeholders
- Carbon footprint must be kept to a minimum
 - Carbon footprint data must be collected and presented to the board

05. Competition

- Existing products
 - Thorough analysis of competition and their products must be carried out
 - Check for relevant existing patents and design registrations
 - Review existing products to determine gap on the market
- Cost range
 - Competitor product cost must be analysed to determine where Lion Laboratories' new device can sit
- Competitor products to be bought and reverse engineered in-house to gain better knowledge

06. Customer

- Target market
 - The product must be designed to be used by both clinical and personal requirements
 - Hospitals, test centres, scientists, GP surgeries and other healthcare professionals
 - Must be desirable for target users
- Clinical
 - Target marketing in the health services industry
- Personal
 - Personal use
 - Intuitive and very easy to understand
 - Design to be reusable
 - Create consumables for return business

07. Disposal

- Return scheme
 - A scheme / service can be designed to collect used / old devices which can be recycled to create new devices
 - Encourage users to take part by providing incentives e.g. discounts, free products, charitable donations etc. (Huhn, 2022)
- Reuse
 - Reuse reclaimed materials and minimise waste going to land fill
- Electronics
 - Electronics must be disposed of separately in order to avoid it going to landfill (WRAP, 2022)
 - Must be able to be taken apart easily
 - Clear instruction and symbols must be present for the user

08. Documentation

- Manufacturing agreement
 - A manufacturing agreement document must be signed by all parties e.g. between Lion Laboratories & Injection Moulder for the injection moulded components
 - Transparency must be made
 - Protection against price fluctuations
 - Protection against damaged tooling
 - Protection against poor product and service
 - Lion Laboratories to own 100% of tooling
- Instruction manual
 - Instruction manual must be provided to guide the user on how to use and navigate the device
 - All buttons' function must be identified in the instruction manual
 - Charging guide
 - Maintenance

09. Environment

- Temperature range
 - Must be kept in an acceptable working environment between 0 and 38 degrees (EMS, 2018)
 - The product must not be exposed to extreme heat and/or cold
- Moisture
 - Condensation inside the device must be prevented
 - The device must be watertight sealed and waterproof to an acceptable level
 - A well-designed plastic casing should protect the device from moisture during storage, transport etc.
- Cleanliness
 - The product must be always kept clean to avoid any contamination
- Insects
 - No small gaps must be present for insects to access
- Degree of abuse
 - Must be designed to be highly durable and withstand general abuse

10. Ergonomics

- User interface
 - The device's screen must be informative, clear, and direct
 - Language barrier to be considered carefully
 - Use of iconography preferred
 - Feedback to the user required in the form of e.g. vibration, sound etc.
 - Must be responsive
- Grip
 - Increased grip on the back or sides of device to be tested
 - Will be carried by one hand and should be secure
 - Grippy material to be used
 - Overmoulding onto the plastic injection moulded components to be considered
- Control
 - Must allow for single handed operation
 - Function of the buttons must be clear to the user
 - Easy to understand controls
 - Instruction manual to be provided
 - Button spacing must be referred back to hand anthropometric data
- Storage
 - The device will be modular and should be easy to take apart
 - Carry case available for all accessories which should contain specific compartments
- Charging
 - Wireless charging to provide an effortless way of charging the device
 - Wireless charging standard must be provided
 - The device must charge consistently when the user places the device on the wireless charging standard regardless of the orientation, otherwise it should be stated in the user manual

11. Installation

- Mouthpiece
 - Disposal component
 - Only installation required
 - Clear instructions will be provided in the instruction guide

12. Intellectual Property

- Design registration
 - A design registration needs filing once the product has been completed
- Own Intellectual Property
 - Gain IP where possible

13. Life in Service

- Life span
 - The device must be in full working order as per the Performance section for at least 1 year
 - 1 year guarantee would be the goal to offer to the consumer
 - Any faulty devices should be replaced if necessary

14. Maintenance & Repair

- Reliability
 - The product must not fail during the guaranteed period
 - Features must work consistently throughout its life span
- Ease of repair
 - Low number of parts would not require repairing
 - Old device can be sent back to Lion Laboratories for a replacement device
 - Electronics would not be presented to the consumer as repairable due to complexity
- Maintenance
 - The device must be kept clean at all times
 - Product surface must be wipeable
 - Surface must withstand standard cleaning agents
 - A maintenance / cleaning kit can be sold separately

15. Manufacturing Facilities

- Subcontract manufacturing to reduce fixed costs
 - Less capital intensive for an unfamiliar product and market
- Electronics
 - To be sourced externally
 - China
 - Malaysia
 - Electronics contained in a single circuit board must be in fully assembled and tested form when delivered to the Carmarthen factory
- Mechanical elements
 - To be sourced externally
 - UK
 - Europe
 - Mechanical element of the detector to be delivered as a fully assembled unit
- Carmarthen factory
 - Final assembly to be done in the Carmarthen factory
 - Testing to be done in the Carmarthen factory
 - Packing to be done in the Carmarthen factory
 - Shipping to come from the Carmarthen factory
 - Sufficient storage required in the Carmarthen factory to hold stock
 - Quality control checks required
- Suppliers
 - Company CEO and Finance Director have jointly decided to seek alternative suppliers to those currently used for the breathalyser devices
 - Drive down manufacturing cost of existing products

16. Materials

- Plastic components
 - Mechanical element of the detector to be injection moulded
 - Common thermoplastics that can be used for injection moulding (Crotti, 2019)
 - Polyethylene
 - Polypropylene
 - Polymethyl methacrylate
 - Polyvinyl chloride
 - Polyamide
 - Acrylonitrile butadiene styrene (ABS)
 - Polycarbonate
 - Potential materials to be discussed with injection mould supplier to get expert opinion, application must be explained thoroughly
 - Arrange meeting with compounders to gain better understanding of material availability
 - Anti-bacterial properties required
 - Must withstand standard cleaning agents
- Tooling
 - Potential materials needs more investigating (SMLease Design, n.d.)
 - H13 mold steel
 - Stavax mold steel
 - Ramax heat treating tool steel
 - S7 mold steel
 - Stainless tool steel
 - Hardening or heat treating steel tool should be considered (SMLease Design, n.d.)

17. Packaging

- Transport
 - A form of packaging is required when transporting the product
 - The packaging must protect the device from getting damaged
 - The packaging must prevent any moisture getting into the device during transport
 - The packaging must not be excessively larger than the product
 - Standard pallet and euro pallet capacity must be calculated
- Branding
 - Packaging must be designed with Lion Laboratories branding (Lion Laboratories, 2022)
- Packaging design
 - Basic info to be provided on the packaging
 - Packaging design concepts to be reviewed by the board
- Sustainability
 - Packaging must be made of recycled material and must be fully recyclable
 - Still maintain high quality for better user experience
 - Must be easy to dispose

18. Patents & Trademarks

- Must not infringe any existing patents, trademarks etc.
- Should be investigated and researched before the design phase
 - Patent searches and registrations needs actioning as soon as possible

19. Performance

- Features
 - The device will detect if the user has Coronavirus by simply blowing into a mouthpiece
 - Must show test results accurately and quickly
 - Should have a digital screen display
 - Should have sound notifications for user feedback
 - Changeable mouthpiece
 - Carry case to be designed to hold accessories
 - Can be sold as extra
- Battery
 - Wireless charging must be a key feature
 - Must have a battery life of at least 8 hours total of continuous use
 - Battery saving system must be in place to put the device into sleep mode when not in use. Can also be manually turned off
 - Battery percentage must be visible to the user
 - Low power warning must be enabled when battery is below 20%
- Software
 - Design to be updatable via Wi-Fi to ensure the device has the latest up to date information
 - Report bugs, glitches, errors etc. back
 - Software version must be clearly visible to the user
 - Must be able to retrieve results which can be transferred directly to the NHS LIMS (Lydon, 2021) or other alternative laboratory information system
 - Can be connected to an app via Bluetooth
- Accuracy
 - Must be 99% accurate
 - Testing must be done to validate accuracy
- Speed
 - Turning on the device ready to be used must not take longer than 30 seconds
 - The user must blow on the device for approximately 4-5 seconds, similar to the existing breathalyser products (Breathalyser Direct, 2022)
 - The test result should be ready within 30 – 60 seconds after the user blows on the device
 - The device must be immediately ready for another testing after showing the results

20. Processes

- Electronics
 - To be sourced externally
 - To be tested before being sent to the Carmarthen Factory
- Injection moulding
 - Overmoulding could be an option to add a secondary material to the injection moulded part. The secondary material should enhance the product's grip
 - Anti-bacterial properties to be added to the plastic components
- Assembly
 - Assembly production line to be setup in the Carmarthen Factory to maximise efficiency
 - Structured assembly plan required

21. Product Cost

- Price
 - The device must sit within the £50-£100 selling price range to the general public, this needs to be confirmed during the focus group testing
 - A GP of at least 60% must be achieved
 - Competitor products to be reviewed and studied which should provide some cost patterns to help determine the target cost
 - Full BOM and breakdown cost must be completed and presented to the board
- Packaging
 - The packaging must not cost more than £2 per device

22. Product Lifespan

- Production
 - Projected to remain in production for atleast 5 years
 - Due to the high volume required, the injection moulding tooling must be inspected on a yearly basis to ensure that tooling is still up to standard
 - Tooling life span to be specified by the tool maker
 - Production volume stated in Quantity
- Product
 - Due to the nature of the product, the company would be happy to provide atleast 1 year warranty
 - After 1 year of use, the customer can continue to use the product out of warranty or return the product back to Lion Laboratories to get a discount for a new device
 - Consumables such as the mouthpiece must be replaced every 2-3 months for hygienic reasons
 - Battery life likely to be affected during it's life span

23. Project Budget Costs

- Development cost
 - Prototyping budget of £10k for low and high-fidelity prototypes
- Production cost
 - Injection mould tooling budget must be kept below £80k
 - Tooling must be made in the UK
 - Minimum of 3 quotes for the injection mould tooling required in order to benchmark accurately
- Design cost
 - Budget for the design agency designing the physical envelope of the device must not exceed £20k
- IP Protection cost
 - Meeting to be arranged with patent attorney to outline costs to obtain patents, design registrations, trademarks
 - IP Protection activities has a budget of £10k
- Labour
 - Labour cost per device must be calculated which includes assembly, packaging etc.
- Distribution
 - Warehousing, freight, import and/or export taxes to be calculated and added to the total cost

24. Prototyping

- Testing (What's been completed)
 - Recent prototype product testing has allowed the company to certification for the new virus detector from the various medical regulatory agencies
 - Electronic and mechanical systems have been successfully prototyped
- External shell
 - The London-based company designing the physical envelope of the product must produce prototypes that can be evaluated physically
 - Any low-fidelity prototypes must be presented to the Lion Laboratories team
- Feedback
 - A high-fidelity prototype must be produced to be tested with focus groups to get initial feedback on the new device
 - A final prototype must be completed and approved by the board before ordering tooling for injection moulding

25. Quality & Reliability

- Quality
 - The quality of the device and service must reflect the company's brand values
 - High quality standard must be met in terms of:
 - Aesthetics
 - Ergonomics
 - User interface
 - Test accuracy
 - Durability
- Reliability
 - Must work consistently within the given warranty and above
 - Results should be 100% reliable and dependable

26. Quantity

- Manufacturing volume
 - Likely to be batch or mass produced
 - The projected manufacturing volume for year 1 is 750,000
 - Followed by 3 million per annum afterwards
 - Yearly volume to be reassessed after the first year
 - Quantities sold per year to be reviewed after the first year
- Supplier
 - Must ensure that the chosen supplier would have the capacity to produce the volume mentioned above
 - Written agreement required from the supplier committing that they can fulfil the volume required
- Tooling
 - A higher quality and stronger tooling required to ensure tooling will last to produce quantity required
 - More info on the Material section

27. Safety

- Electronics must be protected from liquid, moisture etc. which can affect product's safety
- The device must be non-invasive to the user
- The device must be safe to be use when and during close to skin or face
- The product must not overheat

28. Shelf-life & Storage

- Storing the device in a warehouse must keep the original condition of the device
- Environment must be made to suit storing the device
- Quality control for devices that have been sitting for more than 6 months
- See 'Environment' for more information

29. Shipping & Distribution

- The device must survive typical shipping
- Pallet size
 - UK standard pallet size is 1200mm x 1000mm (Associated Pallets, 2022)
 - Euro pallet size is 1200mm x 800mm (Associated Pallets, 2022)
 - Pallet height limit for both UK standard and Euro pallet is 2200mm (Pallet Online, 2022)
- Overseas
 - Total shipping cost overseas must be calculated
 - Sea freight vs. air freight cost analysis to be completed for externally sourced components
 - Taxes and customs to be calculated
- Insurance must be in place

30. Size

- Handheld device
 - The product will be designed to be a handheld device
 - Hand anthropometric data between 5th and 95th percentile can help determine overall dimensions (Karn, 2015)
 - Anthropometric data can also be used to determine button sizes
 - Must be a size that can be held by one hand
- Screen
 - Must be readable
- Electronics
 - Internal electronics will highly influence the size of the outer shell
 - The electronics must be provided to the London based design agency
 - Dimensional drawings of the electronics can be supplied as an alternative

31. Social & Cultural

- Thorough market research required
- International market research
 - Culture
 - Trends
 - Pricing

32. Standards & Specifications

- The device must comply with all standards that are required within the country of purchase
- The product must conform to all industrial standards
- ISO Standards (NQA, 2022)
 - ISO 9001: The general standard for quality management
 - ISO 14001: Standard for environmental management system compliant
 - ISO 50001: Specific standardised system for energy management
 - ISO 27001: Contains tools that can help assess and manage cybersecurity risks
 - OHSAS 18001 / ISO 45001: Outlines requirements for occupational health and safety management systems
 - ISO 13485: Quality management systems specifically designed for medical device manufacturers
- British Standards
 - The product must comply with British Standards
- DDA Compliant
 - Disability Discrimination Act
 - The product must be designed to be inclusive to disabled people
- MDR Medical Device Regulation (BSI, 2022)
- CE Marking
 - The product must be assessed by the manufacturer and deemed to meet EU safety, health, and environmental protection requirements

33. Testing

- Before manufacture
 - Electronic components must be fully tested before designing the outer shell
 - A final prototype is required before going ahead with the injection moulded tooling
 - Ergonomics of the device must be tested with several focus groups
- After manufacture
 - Verify the quality of the product
 - Ensure all standards are met
 - Must comply with the PDS

34. Time scale

- A critical path plan will be created which will include step by step process and timescales
- Major deadlines displayed below (projected dates are to be confirmed)
- Design
 - London-based design agency must complete the design by 30th June 2022
 - Final prototype expected with the final design
 - Final refinements must be completed by 10th July 2022
 - All CAD files and manufacturing drawings for the injection moulded components must be completed by 14th July 2022
- Tooling
 - Tooling lead time to be confirmed with the tool maker
 - All CAD files and manufacturing drawings to be sent to the tool maker by 15th July 2022
 - DFM process with the supplier likely to take 1-2 weeks
 - Tooling can approximately take 3-4 months before receiving T1 sample
 - Tooling must be made in the UK to eliminate long freight lead times
 - Date of launch will be announced to the team once tooling is confirmed, likely to be beginning of December 2022
- Marketing
 - Marketing content must be prepared from November 2022
 - Raise social media awareness to the new upcoming product
 - Raise awareness on the website for the new upcoming product
 - Newsletters must inform new and existing customers regarding the new upcoming product

35. Weight

- Must not weigh more than 500g including electronics, batteries, mouthpiece and the rest of the components
 - Lion breathalysers weight range from 145g to 525g
 - COVID detector device should be of similar weight
 - Must be as light as possible for ergonomic purposes
- Pallet load capacity
 - Weight can affect overall pallet weight capacity and must be calculated when initial figures are available
 - UK standard pallet load capacity ranges from 750kg to 1250kg (Associated Pallets, 2022)
 - Euro pallet load capacity ranges from 750kg to 2500kg (Associated Pallets, 2022)

References

Associated Pallets, (2022). *Euro Pallets 1200 x 800mm*.

Available at: <https://associated-pallets.co.uk/product-category/used-wooden-pallets/euro-pallets-1200x800mm/>.

[Last accessed 26th May 2022].

Associated Pallets, (2022). *UK Standard Pallets 1200 x 1000mm*.

Available at: <https://associated-pallets.co.uk/product-category/used-wooden-pallets/uk-standard-pallets-1200x1000mm/#:~:text=The%20standard%20size%20UK%20is,the%20UK%20and%20for%20export>

[Last accessed 26th May 2022].

Associated Pallets, (2022). *What are the standard sizes of euro pallets?*

Available at: <https://associated-pallets.co.uk/blog/euro-pallets-history-common-types/#:~:text=Standard%20Sizes%20of%20Euro%20Pallets,-Different%20industries%20built&text=The%20two%20most%20numerous%20today,some%20logic%20to%20these%20sizes>.

[Last accessed 26th May 2022].

BCC Research, (2020). *COVID-19 Diagnostic Services: Global Markets*.

Available at: <https://www.bccresearch.com/market-research/medical-devices-and-surgical/covid-19-diagnostics-market-report.html>.

[Last accessed 26th May 2022].

Breathalyser Direct, (2022). *Lion 500/500P Breathalyser*.

Available at: https://www.breathalyserdirect.co.uk/Lion_Breathalyser_500.htm.

[Last accessed 25th May 2022].

BSI, (2022). *Medical Device Regulation (MDR)*.

Available at: <https://www.bsigroup.com/en-GB/medical-devices/our-services/MDR-Revision/>.

[Last accessed 27th May 2022].

Crotti, N. (2019). *These common thermoplastics are ideal for medical device injection molding*.

Available at: <https://www.medicaldesignandoutsourcing.com/these-common-thermoplastics-are-ideal-for-medical-device-injection-molding/>.

[Last accessed 26th May 2022].

EMS, (2018). *Does Cold Weather Hurt Electronic Devices?*

Available at: <https://www.myemssolutions.com/does-cold-weather-hurt-electronic-devices/#:~:text=You%20can%20protect%20your%20electronic,and%20100%20degree%20temperature%20range..>

[Last accessed 25th May 2022].

Huhn, J. (2022). *Customer Incentive Programs: How to Boost Customer Loyalty and Increase Revenue*.

Available at: <https://referralrock.com/blog/customer-incentive-program/>.

[Last accessed 25th May 2022].

Interaction Design Foundation, (2021). *Signifiers*.

Available at: [https://www.interaction-](https://www.interaction-design.org/literature/topics/signifiers#:~:text=Signifiers%20are%20perceptible%20cues%20that,help%20people%20perform%20appropriate%20tasks.)

[design.org/literature/topics/signifiers#:~:text=Signifiers%20are%20perceptible%20cues%20that,help%20people%20perform%20appropriate%20tasks.](https://www.interaction-design.org/literature/topics/signifiers#:~:text=Signifiers%20are%20perceptible%20cues%20that,help%20people%20perform%20appropriate%20tasks.)

[Last accessed 24th May 2022].

Karn, K.S. (2015). *Designing Handheld Devices That Don't Hurt*.

Available at: <https://www.bresslergroup.com/blog/handheld-devices-that-dont-hurt/>.

[Last accessed 26th May 2022].

Lion Laboratories, (2022). *Home Page*.

Available at: <https://www.lionlaboratories.com/>.

[Last accessed 24th May 2022].

Lydon, C. (2021). *NHS Wales Chooses Citadel Health for laboratory system*.

Available at: <https://www.digitalhealth.net/2021/10/nhs-wales-chooses-citadel-health-for-lims-system/>.

[Last accessed 25th May 2022].

NQA, (2022). *Medical Device Standards*.

Available at: <https://www.nqa.com/en-gb/certification/sectors/medical-devices-services.>

[Last accessed 27th May 2022].

Pallet Online, (2022). *UK Pallet Size Guide Standard & Oversized*.

Available at: [https://palletonline.co.uk/pallet-](https://palletonline.co.uk/pallet-size#:~:text=Full%20Pallet,same%20goes%20for%20Euro%20pallets.)

[size#:~:text=Full%20Pallet,same%20goes%20for%20Euro%20pallets.](https://palletonline.co.uk/pallet-size#:~:text=Full%20Pallet,same%20goes%20for%20Euro%20pallets.)

[Last accessed 26th May 2022].

SMLease Design, (n.d.). *How to choose the best Plastic Injection Mold Tool Material?*

Available at: <https://www.smlease.com/entries/plastic-design/best-tool-steel-for-injection-molding-tool-cavity/>.

[Last accessed 26th May 2022].

Stipe, D. (2022). *Choosing Medical Product Colors*.

Available at: [https://www.formamedicaldevicedesign.com/white-papers/choosing-medical-product-](https://www.formamedicaldevicedesign.com/white-papers/choosing-medical-product-colors/#:~:text=Neutral%20Colors&text=White%20and%20light%20gray%20are,much%20white%20can%20be%20overwhelming.)

[colors/#:~:text=Neutral%20Colors&text=White%20and%20light%20gray%20are,much%20white%20can%20be%20overwhelming.](https://www.formamedicaldevicedesign.com/white-papers/choosing-medical-product-colors/#:~:text=Neutral%20Colors&text=White%20and%20light%20gray%20are,much%20white%20can%20be%20overwhelming.)

[Last accessed 24th May 2022].

WRAP, (2022). *Electrical Items*.

Available at: <https://www.recyclenow.com/recycle-an-item/electrical-items.>

[Last accessed 24th May 2022].