



PRODUCT DESIGN BRIEF

VIRUMETER 1000

DATE: 22ND SEPTEMBER 2023

Prepared by: Joanne James
NPD and Innovations Manager

Registered Office: Analyser Hill, Welshpool, UNITED KINGDOM | tigerindustries.com

Registered Number 1234567 in England and Wales.

Copyright © Tiger Industries Limited. All rights reserved. Copyright date is the date of this document

TIGER INDUSTRIES - CONFIDENTIAL INFORMATION

**CONTENTS**

CONTENTS	ii
FIGURES.....	iii
Assessment B Developing the Design Brief L7	1
1 Synopsis.....	1
2 The Product Design Brief.....	1
3 Aesthetics	1
4 Branding	2
5 Company Constraints	2
6 Competition.....	2
7 Customer	2
8 Circular Economy	2
9 Documentation.....	3
10 Environment.....	3
11 Ergonomics	4
12 Intellectual Property.....	4
13 Legal	4
14 Life in service	4
15 Materials	5
16 Manufacturing facilities	5
17 Market constraints.....	5
18 Maintenance and repair.....	6
19 Shipping and Packaging	6
20 Performance.....	6
21 Politics.....	7
22 Processes	7
23 Prototyping	7
24 Product cost.....	7
25 Product life span	7
26 Quality	8
27 Quantity	8
28 Reliability	8



29 Safety 8

30 Size 8

31 Shelf life and storage 9

32 Standards and specifications 9

33 Testing.....9

34 Timescale.....9

35 Weight 1

FIGURES

Figure 1: Project Schedule..... 1



REFERENCES

Serial	Title	Issue
1	Lion Laboratories website: https://www.lionlaboratories.com/	
2	HSE Manual handling at work: A brief guide	01/20 INDG143(rev4)
3	Sulapac website: https://www.sulapac.com/	
4	Smile Plastics website: https://smile-plastics.com/	



ASSESSMENT B DEVELOPING THE DESIGN BRIEF L7

1 Synopsis

In light of the recent Coronavirus pandemic, we at Tiger Industries have identified a potential new product line that we want to pursue in this New Product Development Project.

Working with the local university we have identified an opportunity to extend the chemical alcohol detector system which is at the heart of our breathalyser products to cover the detection of other organic materials, including those generated in the breath as a result of various virus infections.

The likely markets have been explored and we see great potential in developing a new product line starting first with the 'VIRUMETER 1000' that can meet both clinical and personal requirements for such virus detection.

A new product design will be required due to the nature of the changes to the detector system that means that our existing breathalyser products cannot be employed as the basis for the product.

It is envisaged that the VIRUMETER 1000 will be the first to launch from this exciting new product range and will lead the way to a roadmap of complementing products to meet various market needs.

Leading on from our existing expertise in global markets such as law enforcement and prisons, the first market of focus for the VIRUMETER 1000 will be for mass use, in prisons, schools and entertainment venues. This is seen as the most viable market sector based on our existing experience and provides a low risk transition to virus detection.

The purpose of this document is to align all stakeholders across Tiger Industries with the necessary information to bring the VIRUMETER 1000 into existence and brief all managers with the various touch points where your input or insight will be required or appreciated.

2 The Product Design Brief

The following sections bring an analysis of the elements and architecture of the VIRUMETER 1000 that need to be considered.

Use the table of contents to skip to the relevant sections.

3 Aesthetics

The aesthetic of the VIRUMETER 1000 needs to inspire confidence to the user that the equipment is safe, reliable and a world leading virus detector.

As a handheld device it should look robust and simple to use.

It should look in keeping with our other products to instil brand confidence and loyalty.

As a new product line, we have the opportunity to introduce new colours and styling, but it should still be recognised as a Tiger Industries product.

Cross reference to Section 4 'Branding'.



4 **Branding**

As with our current range of breath alcohol sensors, the Tiger branding must be visible on all units, instantly recognised from our logo on the control panel for the user.

The intention will be to register the trademark 'VIRUMETER' and this name should also be displayed on the control panel with TM or [®] after successful registration.

Cross reference to Section 5 'Aesthetics'.

5 **Company Constraints**

Total project costs will be monitored against the schedule and reported monthly.
Approved budget is allocation for each work packaged.

Cross reference to Section 36 'Timescale'.

Project risk will be managed and every quarter, the project will be reviewed to ensure it is still viable.

It may be assumed that 50% of labour resource will be reallocated from our breathalyser line, but 50% of labour will need to be recruited.

6 **Competition**

We are not aware of any similar products already in the market and have a patent pending for the invention, although a number research studies have been conducted. We believe we have the necessary expertise to bring the VIRUMETER 1000 to the market and with a patent ensure success for years to come.

7 **Customer**

The VIRUMETER 1000 will be for mass use, in prisons, schools and entertainment venues.

Customers will want quick and reliable test results, to get through 100's of test subjects at a time.

Test subjects will blow into the device and therefore hygiene and sanitisation will be a key requirement.

8 **Circular Economy**

In order to make the product hygienic, a 'disposable' mouth piece will be required per test subject. However, this poses an environmental problem that can potentially be solved by circular economy.

We need to consider what the mouthpiece will be made of and investigate opportunities to team up with a contractor who can either reprocess or sanitise the mouthpiece through a return service.

Mouth pieces can then be sold back to the customers.

Cross reference to Section 15 'Materials'.



9 Documentation

A user manual will be required to be included in each box, as well as information regarding return for calibration and ordering of mouth pieces.

A Certificate of Design will be required to demonstrate compliance to the necessary regulations.

10 Environment

The VIRUMETER 1000 will need to be designed for the environment it will be subjected to for its whole life cycle. This includes manufacture, assembly, transport, storage, and use.

10.1 Temperature

- a. During transportation and storage, if travelling globally, it is likely that the VIRUMETER 1000 might see a temperature range -46°C to $+71^{\circ}\text{C}$ where the product must survive but not necessarily be operational. Designers may consider a sleep mode to preserve battery life.
- b. If intended to be used outside, it is expected that operating temperature will range from -21°C to $+49^{\circ}\text{C}$ in the extreme, but can be limited to indoor (or doorway) likely temperatures of -5°C to $+40^{\circ}\text{C}$ in line with our other products.
- c. Designers may consider a heated sample port for more accurate readings in colder climates, similar to our other products.

10.2 Transport vibration

- a. The VIRUMETER 1000 will be transported by air, sea, rail and road and will therefore need to be subjected to appropriate shock and vibration testing, including rapid decompression testing for air transportability.

10.3 Water ingress and corrosion

- a. It is likely that the VIRUMETER 1000 will be used outside or in doorways. Therefore the unit must be water and corrosion resistant.

10.4 Sand and dust

- a. It is not envisaged that the VIRUMETER 1000 will be subject to extremely sandy or dusty environments.



11 Ergonomics

The VIRUMETER 1000 must be operable with one hand, from either the left or right side. The handle should be tactile and comfortable for a range of adult operators.

It should be operable with a gloved hand, this may be for hygiene reasons and/or for cold.

The results must be displayed for the result is clear and obvious in order to minimise time between tests.

The removal and replacement of mouth pieces must be quick and easy, again, with gloved hands.

12 Intellectual Property

The new system has been trialled successfully in the laboratory and the necessary patent applications have been registered.

The intention will be to register the trademark 'VIRUMETER' as the family of products associated with virus detection.

As we wait for our trademark to be registered and our patent to be granted we must make sure that details of the design or intention are not disclosed outside of Tiger Industries.

Cross reference to Section 4 'Branding' and Section 13 'Legal'.

13 Legal

As we will be first to market with the VIRUMETER range of products, and we have a patent pending as well as registered trademarks, we will need to work closely with our lawyers to ensure we protect our rights and ensure there is no infringement that may lead to competitors gaining any foothold in the market.

14 Life in service

Similar to our breath analyser products, a typical product could remain in service for up to 20 years.

However, it is likely that new and different strains of viruses will be prominent each year and the composition of the virus detection will be required to be updated in line with new viruses.

A calibration and recertification service can be considered that will offer an upgrade to the latest virus strains and detection each year. This will ensure long service revenue linked to initial procurement.

Cross reference to Section 25 'Product life span' and Section 31 'Shelf life and storage'.



15 Materials

The Company CEO and Finance Director have jointly decided to seek alternative suppliers to those currently used, partly as a means of seeing if we might, as a result, be able to drive down the manufacturing costs of our existing products.

We should investigate the use of recycled plastic or sustainable materials, such as Sulapac (<https://www.sulapac.com/>) or Smile Plastics (<https://smile-plastics.com/>).

16 Manufacturing facilities

We have decided to adopt a similar strategy to what we use for our current range of breathalyser products, i.e. sourcing the electronics and mechanical elements of the product externally, and undertaking final assembly, testing, packing and shipping in house.

The mechanical element of the detector (basically the breath sample capture system) will be fabricated from injection moulded parts. We have not yet decided whether to source this element as a fully assembled unit (as we do for our breathalyser products), or whether to source the mouldings separately and assemble the unit in house.

Preliminary research has indicated that China or Malaysia remains the most favourable source of electronic circuit boards - and that the UK or Europe would, for now, be seen as the favoured source for the moulded parts.

The projected manufacturing volumes are 750,000 in the first year, and 3 million per annum afterwards.

The current assembly area in Welshpool is considered adequate for the initial volumes in the first year, but assuming the product launch is successful a plan will be required to grow our manufacturing facilities to allow growth to 3 million per annum.

Potential solutions could be:

- a. Outsourcing all or some of the final assembly, testing, packing and shipping.
- b. Extend manufacturing facility on current site, perhaps by moving into existing under-utilised areas.
- c. Procuring additional factory space on the Welshpool Industrial Site.

17 Market constraints

From our breathalyser sales, we are already familiar with the prison service and can utilise our existing contacts to promote the VIRUMETER 1000 and gather market intelligence to help us determine the right price and validate our assumptions on volume. They will be our launch customer and we can offer them the chance to influence the design and performance in turn for being first to buy.

Schools and entertainment venues are a new market for us. This is potentially risky although the market analysis has been conducted.

We should check school policy is consistent in different countries and look for trends in school demographic.



Entertainment venues will have the least obliging test subjects who won't want to queue and be tested. We will need to ensure the test method is as easy and non-invasive as possible.

18 Maintenance and repair

We do not want our customers to attempt maintenance or repair on our products as we will be offering a calibration and recertification service.

The casing should be designed to make this impossible for the user so that any obvious attempt will effect the warrentee.

Cross reference to Section 14 'Life in Service'.

19 Shipping and Packaging

There will be multiple packing requirements:

- a. Goods inwards – manufactured parts will arrive at Tiger Industries in approved packaging, suitable to batch size and shipping method. Batch size should minimise shipping costs and providing ease of storage in terms of stacking.
- b. Shipping to distributors - The projected manufacturing volumes are 750,000 in the first year, and 3 million per annum afterwards. It will be required to use distributors to ship units around the world. Assembled units will be packaged in their carry cases, within Tiger Industries branded boxes. Each box will be stacked on pallets in batches of 20, assuming 100 units are shipped per day in the first year ramping up to 8000 units per day thereafter.
- c. Distribution to users – assembled units will be packaged in their carry cases, within Tiger Industries branded boxes. Transport packaging must protect the product from environmental hazards and to ensure the product arrives at the customers in a good state.
- d. Use – the VIRUMETER 1000 will come in a hand held carry case, that can also provide protection from general in use transportation and storage.

20 Performance

The VIRUMETER 1000 will be a hand held device that is used to quickly and reliably test large numbers of people for infectious virus.

Power up time at 20 °C to be no more than 4 seconds.

It is envisaged that an operator (be it a prison warden, teacher, or doorman) will operate the device. Holding it at arms reach to the test subject.

The test subject will blow through a 'disposable' mouth piece. The term 'disposable' is used to suggest one use per test subject. See circular economy section for re-use service.



The unit will provide a test result within 10 seconds and this will be a visual indicator on the device. This could be via a display screen or simple LED indicator.

Once switched on, unit will be reset between each test in no more than 2 seconds. This could be linked to the removing and replacing of the mouthpiece.

The key for this product launch is producing rapid reliable testing of large groups of people.

For this 1000 series product launch there will be no data logging or printable records. Therefore no blue tooth connectivity is required.

Additional attributes will be release in future 2000 and 3000 series.

21 Politics

The requirement for this product will be closely linked to political policy regarding pandemic and virus control.

22 Processes

Procurement of materials will be through the 'just in time' model, ensuring limited inventory is held.

The assembly and manufacturing processes should be analysed for efficiency and manufacturing facilities and tooling will be designed to grow to facilitate the expected annual volumes of 750,000 in the first year, and 3 million per annum afterwards.

23 Prototyping

We have successfully bench type prototyped the electronic and mechanical systems which form the new product and will be engaging a London-based company to design the 'physical envelope' and appearance of the new Virus Detector.

It is recommended that 3D prototypes of the 'physical envelope' are produced for presentation and subsequent approval by Tiger Industries.

24 Product cost

Product cost should be minimised through design. Always choose low cost materials and production processes, so long as they do the job.

The product is functional rather than geared to 'look good'. Target product cost to be no more than £100 per unit.

After sales service is likely to provide the biggest revenue, through recertification and our mouthpiece return service.

25 Product life span

We need to ensure that this product is quick to reach the market, while our customers are still concerned with virus transmission. If we are too late, we could miss our window where the requirement is no longer needed.



The product life span will be dependent on need and is linked to the likelihood of pandemics now and in the future.

On going research will be required to identify what viruses are prominent now, and what is likely to hit us in the future.

26 **Quality**

Quality inspections will be built in to the manufacturing process for all critical features.

Good inwards batch testing will be required for electrical and mechanical subcontracted components.

Final assembly will require batch testing to ensure quality and reliability is consistent throughout the batch.

27 **Quantity**

The projected manufacturing volumes are 750,000 in the first year, and 3 million per annum afterwards.

28 **Reliability**

Electrical products in the UK are legally required to give a 6 months parts and labour warranty, but Tiger Industries will offer 12 months.

The VIRUMETER 1000 should be suitable to at least 5000 breath tests before a battery is required to be changed.

29 **Safety**

It is essential that the VIRUMETER 1000 is safe to use as a product, but also safe in terms of virus exposure to the operator and also the test subject.

We can utilise the side exhaust system we have in our other products that minimise the operators exposure to exhaled breath.

It would be advantageous if a replaceable filter could be included to eliminate virus particles from exhaled breath.

No hazardous or toxic materials will be used in the production of the VIRUMETER 1000.

Battery(s) must not contain mercury or carbon zinc. Radioactive materials are prohibited, including Tritium. Power Sources Centre of Excellence (PSCOE) Preferred Battery List 2014.

30 **Size**

The VIRUMETER 1000 is a handheld device and as such needs to incorporate a handle/grip that can be lifted and held at arm's reach for the duration of the test.

Cross reference to Section 41 'Weight'.



31 Shelf life and storage

The batteries will have a defined shelf life and must be recorded against serial number for configuration control. Batteries will be replaced during service returns at intervals of 5 years.

The chemical composition of the virus detection compound will have a shelf life of 2 years, and will require replacement after that time.

32 Standards and specifications

On the basis of the prototype product testing, Tiger Industries have already gained certification for the VIRUMETER 1000 from the various medical device regulatory agencies.

33 Testing

Prototype testing has already been completed, but qualification testing will be required to ensure the product meets its design specification.

Batch testing will be required prior to dispatch to ensure the level of virus detection is accurate and reliable.

Recertification and upgrade will be required annually and retest at this time will ensure the detector is registering the new upgraded virus strains.

34 Timescale

We need a product launch as quickly as possible while the market still has a requirement.

Target product launch in May 2024 and first sales in October 2024.

Top level schedule is outlined in figure 1.

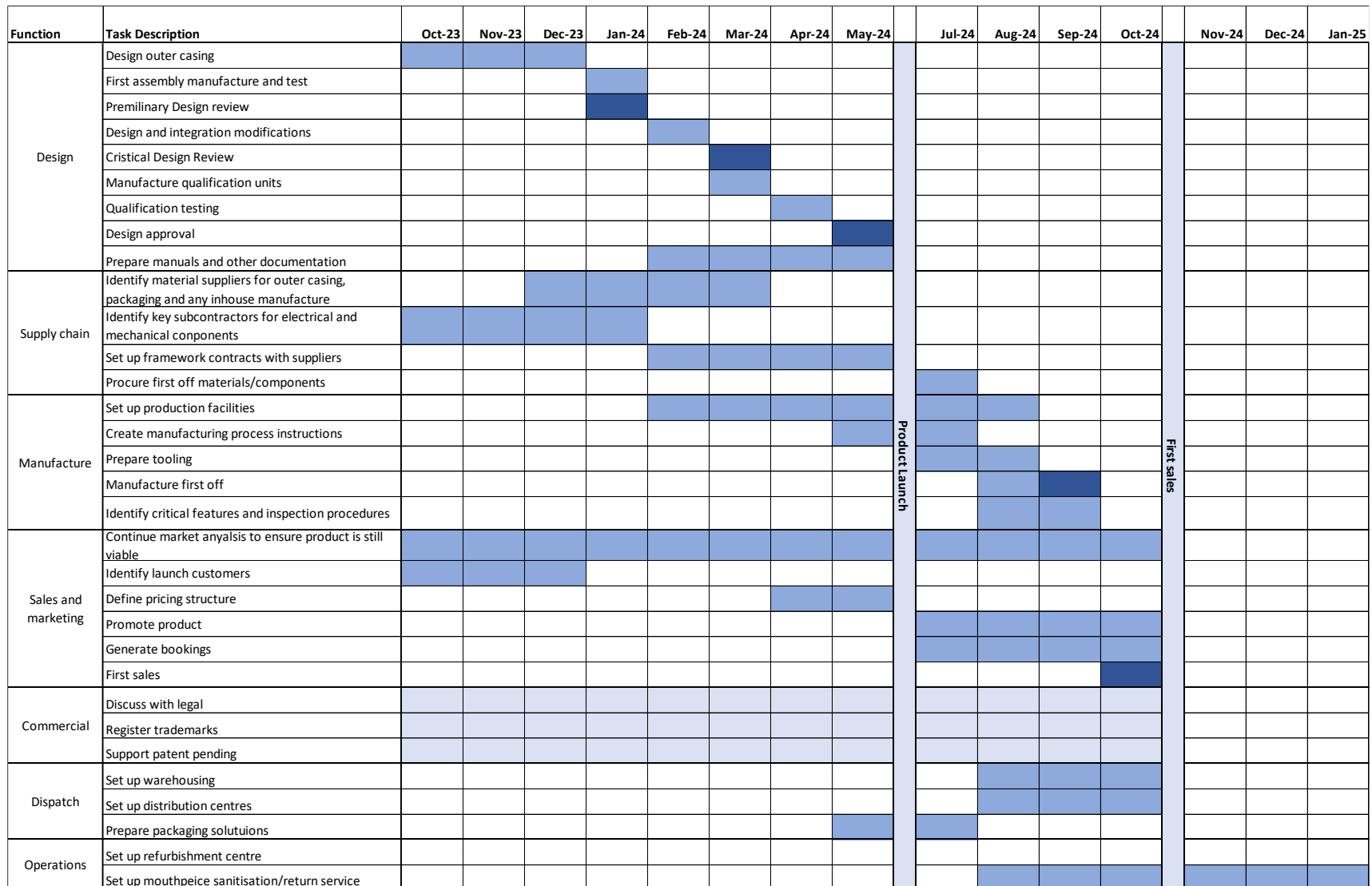


Figure 1: Project Schedule



35 Weight

The VIRUMETER 1000 is a handheld device, and can either be used by the operator, or given to the test subject to use themselves.

If used by the operator it will need to be fairly lightweight so that it can be held at arms reach for the duration of the test, and then used again for the next test subject.

The Health and Safety Executive Manual Handling at Work guide suggests a maximum of 3 kg for a women and 5 kg for a man when grasped with both hands. This is expected to be at least half this for one arm, taking the maximum weight to 1.5kg. However, to be held in position for the duration of the test, and then conducting multiple tests in a 1 hour time period, this is expected to be much less.

Using one arm held in position for up to 1 minute this is anticipated to be in the region of 500 - 600 g.

If used by the test subject and then handed back to the operator, the weight can be increased as the load is closer to the body and can be held in two hands.

However, minimising weight would still be an advantage.

Cross reference to Section 34 'Size'.