

# USER EXPERIENCE

ME30356 Reverse Engineering  
Callum Morrison  
VAX UCPESHV1



## STYLING

**COLOUR** has been used throughout the product to convey a strong brand identity, and elegance through the use of subtle, dark, colours and transparency offset by vibrant blue accent colour. The colours promote trust and integrity in the brand, and are aesthetically pleasing over competitors.

Q2CB9DA	Buttons Contact points Accents	<b>Primary Product Colour</b> Promotes trust, calmness and serenity. Inspires confidence in the product.
QF58426	Logo Recognisable Eye-catching	<b>Brand Colour</b> The colour of encouragement. Warm, exciting enthusiastic. Increases appeal.
Q727D83	Body Unimportant Main structure	<b>Secondary Product Colour</b> Neutral, sophisticated. Conveys power, control, and elegance.
Q000000	Reveals USPs Cyclone function Turbo Tool	<b>Transparency</b> Showcases technical elegance. See the product's effectiveness for yourself.

**PACKAGING** was fairly effective at containing the product, however some rattles were observed before opening. Branding and style is consistent and informative, and clearly represents the product inside.

- + Use of brand colours for **familiarity**
- + **Visual representation** of the product
- + Facts, figures, stats, and claims
- + **Glossy** colour print
- **Damage** to box
- **Cheap** corrugated card construction
- Designed in the **UK** but made in PRC *misleading for customers*

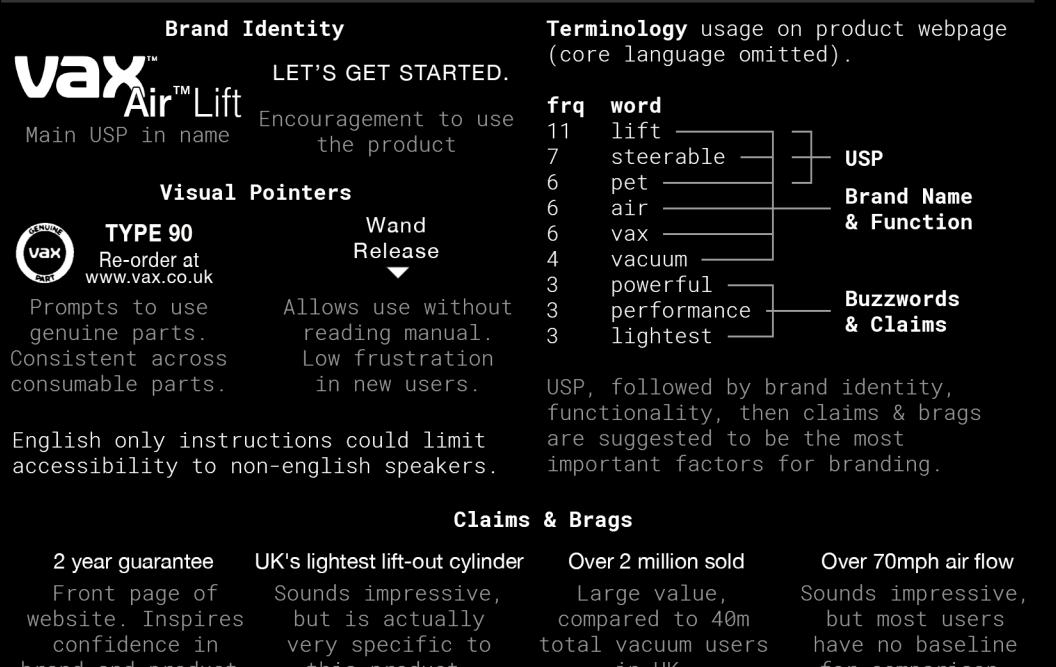
**SILHOUETTE** of this product suggests an alternative feature that may not be familiar to many users - the lift out mechanism, inspiring curiosity.



- Portable
- Cordless
- Lightweight
- Flexible
- Cylinder
- Corded
- Manoeuvrable
- Lightweight
- Upright
- Corded?
- Cumbersome
- Powerful
- Upright
- Detachable?
- Portable?

**Unanswered questions** may intrigue a user, leading them to further investigate. The product is **still recognisable as a vacuum**, despite the detachment mechanism.

**BRANDING** is consistently used throughout to promote the product's unique selling points, and to promote a consistent brand identity. Buzzwords and claims excite potential buyers, and new users are guided with infographics.



**CONTACT POINTS** are moderately high quality, buttons are hard wearing and stand out due to the use of accent colours, however feel cheap and somewhat flimsy. The handle has rubber contact points however is primarily PPE, leading to a mildly comfortable feel, and various holding positions.

Buttons	Handle	Power Cord
> Polypropylene	> Rubber	> BS 1363 plug
* Injection moulded	* Injection Moulded	+ 10m cord
+ Hard wearing	+ Soft feel	+ Fused plug
+ Cheap to make	+ Limits fatigue	+ Ground pin
+ Functional	+ Cheap to make	+ Easy to detach
+ Accent colour	+ Tough	- Loose in operation
- Loose in socket	+ Grippy	- Tedious to wind up
- Feels cheap	- Also made from PP	

**PHYSICAL QUALITY** was slightly worse than expected for a product of this cost. Some manufacturing defects contribute to a less than premium feel.

bad	SCORE	good
Damage	+++ + + + + + + -	Bad packaging, cost cutting, materials
Consistency	+++ + + + + + + -	Colour, branding, user interface
Rattles	+++ + + + + + - - -	Loose fitting components, damage
Tolerances	++ + - - - - - - -	Button feel, modular components, handle
Manufacture	++ + + + + + - - -	Injection moulding defects, sharp edges
Feel / Cost	++ + + + + + - - -	Contact points, weight, value

Overall the product was perceived as **good quality**. In user testing, one user suggested they would pay **£70 only** for the product (RRP £129.99). Cheap to make, injection moulded plastics did not contribute to a premium feeling product.

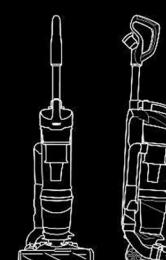
**Discolouration** was noted in some of the plastic pieces. **Chips** were noted in the rubber handle. Screws and rivets are **visible**, which is not preferred.

## THE PRODUCT

**VAX UCPESHV1** is a "high performance, multi cyclonic upright vacuum cleaner with UK's lightest lift-out cylinder" - product webpage.

### VAX Air™ Lift Steerable Pet Upright Vacuum Cleaner

Power	950W
Weight	6.2kg
Guarantee	2 Years
Cord	10m
Part No.	1-1-139288
RRP	£129.99
LxWxH	29x34x79cm



3in1 Tool



Turbo Tool

The above specification was taken from the product webpage, however the product manual has several discrepancies, including power (850W or 750W) & cord (9m).

Reviews: 4.3 4.7 4.3 4.5 4.5 5  
★★★★★ Vax Website | Argos | Google | Reevoo | John Lewis | Expert Reviews

## USE

**UNBOXING** is incredibly easy, done in a logical order, and promotes investigation of the manual (and safety information) and familiarisation with accessories before the user reaches the main product.

Open box - knife required > Warranty information useful after purchase

Instruction Manual > Loose accessories - '3in1' assembled so user understands

Cheap egg carton packaging > Handle > Vacuum - in HDPE bag > Empty box

**ASSEMBLY** is incredibly easy. Very little is required (only handle must be installed) before product is ready to use. Product could not easily be shipped in a less assembled state if more compact packaging was required.

- Mostly pre-assembled out of the box. Handle was missed by one user.
- After normal use disassembly (i.e. to empty and clean), reassembly is clear.
- Hard floor adaptor purpose not immediately obvious.
- No extra assembly required. Easy for many users to understand and use.

**FIRST USE** revealed a wide range of positives and negatives associated with various aspects of the product. Some minor annoyances were prevalent throughout, however overall the product was user friendly. Norman's "Seven principles for transforming difficult tasks into simple ones" is a good guideline to follow when analysing the simplicity of a product's first use. The manual is helpful, however not used in testing to emulate real world use.

To gain further insight, the product was given to three additional students. Their comments have been included in the below summary.

### Set Up

- Most users will have **prior experience** with a vacuum - and so will instantly understand the basic use - turn on, move over dirt, dirt will be sucked up.
- **Familiar symbols** used throughout (power, arrows) to convey meaning.
- Power cord found immediately, however upon detachment becomes loose and **obstructive**, commented on by all users. 'Cord hook' missed by all users.
- Power button similar to eject button. **Hard to find**; missed by some users. One user pressed lift-out detach button instead resulting in confusion.
- Power light **indicates vacuum state** (useful for deaf users).

### Upright Mode

- Reclining function realised, **base often 'stuck' to body** when inclined close to vertical, determined irritating by all users.
- In upright mode, **turning radius good** for some users, too large for one.
- Vacuum glides with little resistance over carpet and hard floor.
- Reclines far, but still **limited reach** under low furniture.
- Wide mouth; large areas can be cleaned quickly, when compared to alternative cylinder or portable vacuums also tested.
- **Heavy**. May be perceived as a sign of quality, also causes fatigue.
- Carpet mode toggles understood by some users, but not by all.
- Hard floor adaptor causes **shrill noise** when using on hard floors.

### Detached Mode

- Convenient in hard to access areas. Requires two hands to carry.
- When body placed down, **stability is limited**. Body fell repeatedly.
- Hose strangely balanced in use (due to suction), lightweight.
- Flexible hose is **very short** (1.7m) meaning body must be held nearby, becoming unwieldy in situations demanding detachment flexibility.
- Switching between detached and upright mode is easy, but more effort than having one mode capable of both (such as portable design).

### Accessories

- Turbo tool must be held **perfectly flat** for effective use.
- Testing on pet hair determined upholstery tool was just as effective.
- 3in1 tool stored on vacuum; this was lacking for turbo tool.
- Turbo tool makes loud noise but had no improved performance.

### Cleaning & Emptying

- Visible dirt in seals, may reduce aesthetics over use.
- One user found dirt container release immediately, some struggled to release the container. Likewise, opening the container was confusing. Instructions outlined cleaning, but not emptying.
- Efficient emptying mechanism. Large items including pet hair could easily get stuck in container requiring manual release.
- Turbo tool cleaning not tool-less, as suggested by manual.

### General Notes

- Very powerful, caused **slight damage** to low quality carpet.
- Deemed 'too complicated' by some users.
- Manual provided was **incorrect / out of date** in some areas.

**CONTINUED USE** despite limited time constraints revealed some further insight, including ease of storage and consistent performance. The cable was found to be a continual annoyance.

- + Easy to store due to upright nature - bottom heavy.
- + Suction appears to remain strong, even after extended use.
- Cable will wear due to tangling and catching on vacuum base.

## APPENDIX.



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## PERFORMANCE

**SUCTION POWER** was perceived to be incredibly good. Some quantitative analysis was performed, however with limited comparability to competitor products. Product was most effective on hard floors.

**950W**  
RATED POWER

- > Air Movement -> Suction
- > Heat & Noise
- > Control System

**100W is due to brush head motor - in detached mode this power is lost.**

**Brush head motor (active pickup) can be toggled separately from main power.**

Hard Floors	Hard Carpet	Soft Carpet
Test Procedure: 1. Image of test surface 2. Mean lightness (HSL)	Test Procedure: 1. Pet hair on carpet 2. Four vacuum passes	Test Procedure: 1. Dirt in carpet 2. Four vacuum passes
 <b>Very effective</b> , upright mode and active pickup on	 Both turbo tool and upholstery cleaner were ~75% effective at removing pet hair from tightly woven carpet.	 Vacuum collected approx 80% of dirt Remaining dirt could be retrieved with 3in1 adaptors; not suitable for large areas Extra long fibres could become lodged in active pickup rotor

**SPEED** of product use was calculated theoretically and measured practically. It was found that the product was awkward to manoeuvre, and the cable was consistently in the way, greatly reducing speed of vacuuming. Other factors such as time to wind up the cable after use were higher than competitors.

$$\text{Theoretical Max Rate} = \text{Mouth Width} \times \text{Mean Vacuum Velocity}$$

$$\text{Mouth Width} = 280 \text{ mm} \quad 0.28 \times 0.45 = 0.126 \text{ m}^2/\text{s}$$

$$\text{Mean Velocity} = 0.45 \text{ m/s} \quad = 7.9 \text{ s/m}^2$$

$$\text{Test Area} = 2 \text{ m}^2 \quad \text{Theoretical Clean Time} = 7.9 \times 2 = 15.8 \text{ s}$$

$$\text{Real life test area vacuum time was measured.} \quad \text{Actual Clean Time} = 70 \text{ s}$$

Actual clean time was **343% slower** than the theoretical minimum. This indicates that (in the test conditions), manoeuvring the vacuum took 54.2 seconds total.  
> Maximum turn angle = +/- 45°      > Minimum turn radius = 80cm

**Time to wind up cable after use = 35 seconds** (~5 seconds for Numatic Henry)

**SAFETY** is proved by following safety standards (e.g. BS IEC 60335-2-2:2019), and through safety testing was overall very safe. Safety info was very clear.

Exposed / Moving Parts	Heat
+ Narrow openings makes it hard to jam toes if vacuuming barefoot	* Motor noticeably hot after use
+ No damage sustained in testing	+ Overheat safety cut out
+ Turbo tool has small mouth, could cause pain if misused	
- Dirt container can be detached in use, exposing suction holes	
+ Two suction holes means: plugging one, routes airflow away from user	
	<b>Safety Information</b>
	+ First section in product manual
	+ Clear and simple safety points
	+ Safety tips throughout manual
	<b>Allergy</b>
	+ HEPA Filter
	- Not allergy certified
	- Emptying container can release dust into air
Exposed Electronics	
+ No exposed electronics without use of tools	

**NOISE** was very good for a product not advertised as low-noise. The volume was comparable to a SEBO low-noise product, or similar to loud air conditioning. Distinct whining can be heard, and the turbo tool greatly increases volume.

### Reference

40 dB - Urban Ambient  
50 dB - Conversation  
60 dB - Air con  
70 dB - Motorway

**57 dB**  
Ear Height

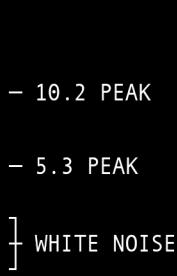
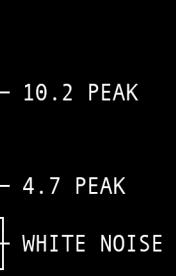
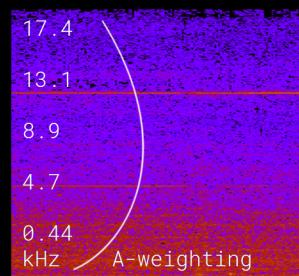
**65 dB**  
Turbo Tool

**70 dB**  
Body Motor

Comparable to SEBO AirBelt K3 Premium

### Spectral Analysis

Not all noise is equal - humans 'hear' some frequencies louder than others.



### Upright Mode

Strong peak amplitudes can be seen at various frequencies - this is the 'whine' heard while using the product. The white noise at lower frequencies represents the rest of the vacuum noise. Overall, the noise is very good for this product.

**MISUSE** was tested through vacuuming liquids (water in the test). It performed surprisingly well, as the liquid was effectively contained along with dirt and dust from normal use. As long as product was not used continuously on liquids, it is unlikely damage or other issues would arise.



- Manual **does not specify** use on liquid.
- Very effective at picking up water.
- Water safely contained in dirt chamber; motor is below so cannot get wet.
- Some minimal drips from container gaps.
- Water droplets hit filter but did not pass.

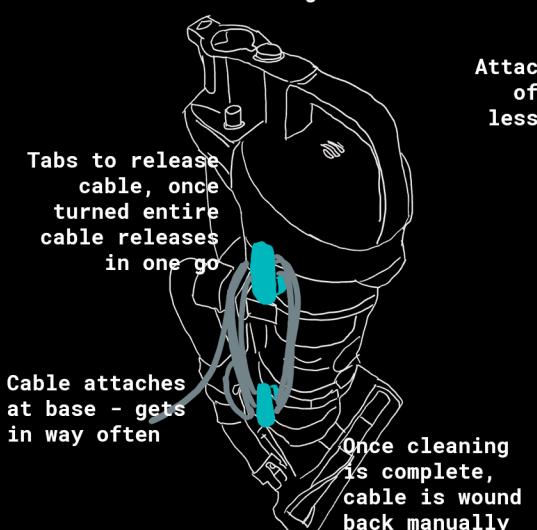
## IMPROVEMENTS

**CABLE.** The most significant issue with the product that was determined through testing was the power cable. All of the additional test users mentioned this multiple times while testing the product.

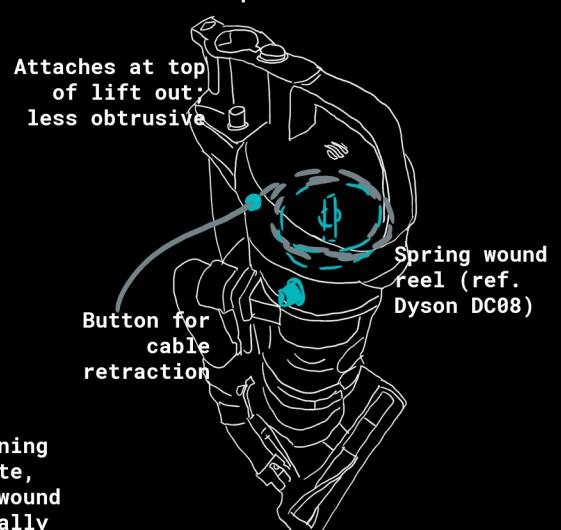
### Highlighted issues:

- Once detached, the cable would be loose on the floor, frequently in the way of where the user intended to vacuum.
- After cleaning, replacing the cable on the tabs would take >30s, whereas competitor products had solutions that took <5s (Numatic, Dyson).

### Current Design



### Improvements



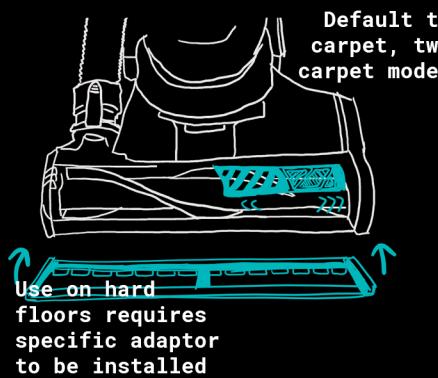
### FLOOR ADAPTOR.

One of the issues highlighted would affect some users much more than others. In order to use the product on hard floors (wood, tile) a 'hard floor adaptor' must be installed on the bottom of the unit. This must be done while the product is laying flat, and it must click in place. Some online reviews suggested that this component was flimsy and often broke.

### Highlighted issues:

- Hard floor adaptor fiddly and time consuming to install.
- Hard floor adaptor makes shrill noise when using on hard floors.

### Current Design

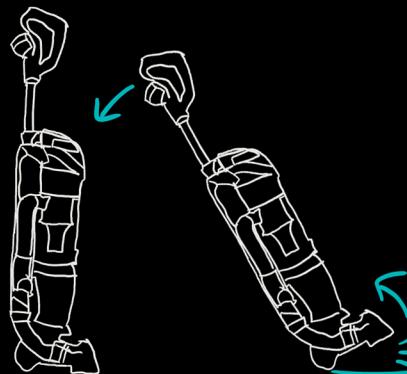


### Improvements



### MINOR IMPROVEMENTS.

There are a variety of small improvements which could be made to the product which would fix smaller annoyances. Although these issues are not enough to sway a purchase on their own, the combination of these issues could result in a user looking to a different brand in the future.



### Reclining feature:

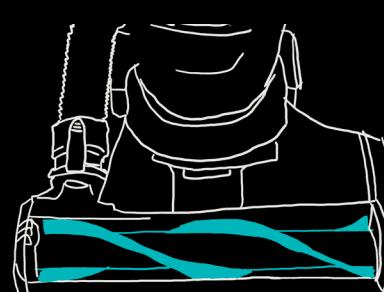
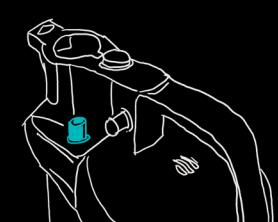
The vacuum reclines by pulling back on the handle. This is useful for getting under furniture or reaching further without the user moving. However, the body will 'stick' to the base, meaning a foot must be placed on the base to prevent it lifting from the ground. The manufacturer considered this by adding a 'footprint' sticker to the base, to prompt the user.

An improvement would be to remove this 'feature' entirely. The body can be stable when upright for storage without this sticking mechanism.

### Power button:

Several users had trouble locating the power button for the first time, and more significantly would continue to mistake other buttons for the power button.

To help this issue, the power button could be made a different colour, or obviously different size or shape, to the other three buttons on the body.



### Turbo button:

There is a dedicated button on the body of the vacuum which toggles the active pickup in the base of the unit. It took several uses before some users determined the function of this button. It is also easily confused for the power button.

This button should be removed completely - or it should be controlled electronically depending on safety and usage surface.

### Turning mechanism:

One test user commented that the machine was 'sometimes easy to turn, sometimes not'. This is likely due to the lack of steering in the product. When the body is tilted, the base turns to face +/- 45°, however the wheels stay straight.

When the unit is tilted, the wheels steer in the direction of the body unit, or each wheel should provide negative camber to aid with a more controlled, and tighter turning radii.