

Washing Machines

Buying Specification Guides for Durability and Repair

Fundamental Good Practice

Avoids Repair:

- Basic fault diagnostics advice to be available in the user's instruction booklet and on-line
- Items requiring user access for replacement or cleaning (such as filters, detergent drawers, external hose connections), should be easily accessible and removable/replaceable without the need for tools.
- The machine should be of robust construction to avoid mechanical damage in useⁱ. You can make your products more resistant to damage by specifying that:
 - Function-critical parts (such as on-off switches, selector dials and filters) are in strong housings or away from exposed areas and corners.
 - Door catches and handles are robust to ensure durability and resist fatigue in operation.
 - Round corners are designed on external mouldings – to avoid sharp corners which can be weak.
 - Casings are made of strong, impact-resistant polymers such as ABS or PCABS or HIPS that withstand knocks.
 - Steel casing, electrical connectors, internal frame parts and bolts are treated for corrosion resistance to prevent corrosion in the event of leaks.
 - Doors, detergent holders, dials and filter covers are treated to be scratch-resistant for longer life.
 - Premium grade steel is used for the motor armature, shafts and bearings to provide durability and help avoid repair or replacement.
 - Drum bearing units are heavy duty and sealed to help ensure longer life.
- The machine should be of robust electrical design to avoid failure in useⁱⁱ. This can be achieved by specifying that:
 - Electrical connectors are vibration and corrosion-resistant and removable.
 - Motors are fitted with anti-vibration systems that give stability and durability (high-cost models only).
 - Energy use is minimised to extend component and circuit life by generating less heat.
 - High temperature components and circuits are adequately spaced and cooled by heat sinks.
 - Electrical components such as control boards are placed away from potential water leaks.
 - Surface mount solder should be used where possible on printed circuit boards.
 - Key components on the power and control boards are protected from power supply faults.
 - Standard memory chips can be replaced and are self-programming.

Facilitates Repair:

- Machine repair manual and exploded parts diagrams should be available on the brand or manufacturer's websiteⁱⁱⁱ (free of charge).
- All major components (motor, pump, drum, control boards) should be easily accessible without the need to remove other parts for access – such as back panels fixed with one access screw.
- Key components to be repairable through replacement (such as motors that have replaceable brushes).
- All parts to be clearly listed on the manufacturer's website with relevant pricing and information on parts stockists.
- All spare parts to be available for at least 10 years¹ following the end of model production^{iv}.
- Spare parts and sub-assemblies to be reasonably priced to facilitate repair outside of warranty^v.
- All major repairable or replaceable components to be easily accessible^{vi} by repairers (such as selector dials, internal filters, motors, catches, seals, hoses, drive belt and shaft).

Other Desirable Features

Avoids Repair:

- All steel parts to be treated to prevent corrosion for the expected life of the product.
- All electronic components should be located away from, or fully protected from, potential water leaks.
- Non-critical component failure should not lead to machine failure (e.g. failure of LCD display).
- Brushless induction motors should be specified as they typically offer a longer lifetime than alternative units.
- Heavy duty bearings should be used in motors and drums to ensure long life.

Facilitates Repair and Recycling:

- Fault codes should be displayed on machines (either on the screen or by LED lights) and fault codes and diagnosis available in the user manual and on-line.
- Spare parts to be standardised where possible across a given product range or series².
- Product warranty period should be at least 2 years for medium-cost models (rrp £350 - 500) and at least 5 years for high-cost models (rrp >£500) and should favour repair over replacement and cover parts and labour³.
- Single polymer plastic (e.g. HIPS) or single polymer combination (PCABS) should be used for all polymer casing parts⁴.

¹ The UK Sale of Goods Act (SOGA) offers protection against faulty goods when the manufacturer's guarantee has expired and states that goods must last a "reasonable time" which can be claimed anything up to six years from the date of purchase. 12 years availability of spares is specified under the EU Eco-label for washing machines. 10 years is considered reasonable to reflect the typical lifetime of most washing machines.

² It is likely that standardisation of parts will lead to economies of scale in manufacture, lower parts prices and less stock to be carried by repair organisations.

³ Guarantees of 2 years including parts and labour are available for some medium-cost machines. 10 year guarantees are available for some high-cost machines including parts and labour.

⁴ Single polymer casings facilitate recycling at end of life.

Expected Life

The table below can be used to compare the repair benefits of different models where lifetime information on key components is available from manufacturers. Data on key parts testing can be entered in numbers of hours used or number of operations. Information on the test method used should ideally be provided by manufacturers.

Expected Component Rated Life

Product model	Motor (no. wash cycles)	Bearing (no. wash cycles)	Pump (no. wash cycles)	Programme selector dial (no. wash cycles)	Door seal (no. wash cycles)	Other key components
A						
B						
C						
D						

Further information about other testing undertaken can be obtained from manufacturers, for example impact, drop, vibration, corrosion, temperature or humidity as appropriate.

Endnotes: further detail

ⁱ As a guide function-critical parts such as on-off switches, mode selector dials and filters, should be in strong housings or in protected locations. Door catches and handles should be robust to ensure long life and resist fatigue in operation. Loaded areas and components experiencing stress concentrations such as sharp corners on mouldings should be eliminated where possible through design such as corner radii. Polymers used on external casing parts should be robust engineering materials such as ABS (acrylonitrile butadiene styrene) or PCABS (poly-carbonate ABS blend). Nuts, bolts, electrical connectors, clips and unpainted internal structural parts should be fully corrosion resistant (galvanized or stainless steel). External steel casing should be corrosion resistant (appropriate galvanizing, paint or powder coating). Areas prone to scratching (door area, detergent tray, filter holder, control panel) should be scratch-resistant surface treated. Premium grade steel should be used in the motor armature shafts and bearings. The drum bearing should be an appropriate heavy duty sealed unit to ensure long life.

ⁱⁱ As a guide electrical connectors should be vibration-resistant, corrosion-resistant and removable (e.g. by lockable spade or flanged-tongue connectors, ring terminals with spring washers). Energy use should be minimised to extend component and circuit life by reducing thermal degradation. High temperature components and circuits should be adequately spaced and cooled by heat sinks. Heat sinks should be riveted as well as soldered to prevent joint damage. Electrical components (particularly control boards) should be placed away from and protected against water damage. Surface mount solder technology should be used where possible on printed circuit boards. Key components on the power and control boards should be electrically protected from power supply faults. Any standard memory chips should be replaceable and self-programming. Motors should be fitted with an anti-vibration system for stability and durability (high-cost models only).

ⁱⁱⁱ Section 17 of the WEEE Regulations requires instructions for product repair are to be provided by the manufacturer within one year of being placed on the market.

^{iv} Spare parts are those more likely to fail in normal use and need replacing. These include hoses, door seals, door latches, detergent trays, motors, pumps, bearings and control boards. Parts which typically exceed the life of the product are not to be considered as spare parts.

^v To facilitate cost-effective repair, replacing the drum assembly parts or motor should be no more than 40% of the cost of an equivalent new machine, and other spare parts no more than 25% of the cost of the new machine.

^{vi} As a minimum providing simple and easy to access panels to key components, minimising screw numbers, e.g. through use of lugs and slots, using standard screw heads (no more than three head sizes) using easily removable electrical connectors (clip or screw) rather than soldered or crimped joints where access is required. Self-tapping screws, irreversible snap-fits or adhesives should be avoided where access is required. Fixing points for main access screws should be minimal and allow numerous access cycles (e.g. by brass threaded mounts). Tamper-proofing (such as plastic covers or labels) should only be used to ensure authorised repair under warranty and should not inhibit other repairs outside of warranty.

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