

GENERAL DESIGN CHECKLIST

For each issue or life cycle stage consider appropriate design objectives or attributes, and whether these have been met or adequately considered.

No	Design considerations	Y	N	N/A	Comments
A	ENVIRONMENTAL CONCERNS/ISSUES				
1	Are the environmental aspects/impacts of the component/assembly or design judged to be significant (ie of actual/potential concern) by virtue of a) Regulatory requirements b) Customer requirements c) Environmental load (eg quantity, toxicity, energy consumption) d) Other Considering i) Materials sourcing ii) Manufacture and distribution iii) Use iv) End-of-life				
2	Are the WEEE Directives potentially relevant? a) Relevant appliance applications b) Relevant hazardous substances c) Plastic parts weigh more than 25grams? (require materials coding) a) The component/assembly creates other problems for 'end of life' disassembly, recovery, recycling or disposal? (Is disassembly easy? Are materials recyclable)				
B	SYSTEM DESIGN				
	Have the following been considered?				
1	Design for simplicity - o reduced complexity of enclosures and assemblies. - o Fewer parts. - o Multifunctional parts eg single fastener. - o Using common parts in different designs.				
2	Design of multifunctional products - o Parallel (several purposes.for same product) - o Sequential (product retired to secondary use)				

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	ENVIRONMENTAL CONCERNS/ISSUES				
3	Design for source reduction (reduced mass) - o Reduction of physical dimension. - o Lighter weight materials. - o Thinner enclosures. - o Reduced mass of key components. - o Reduced weight or complexity of packaging. - o Electronic documentation.				
4	Design for longevity - o Is longevity feasible? - o Does durability mean denser materials and compromise disassembly and recovery?				
C	MATERIALS SOURCING				
1	Are recycled materials specified where possible? - o For product materials - o For packaging Is this economically and technically feasible?				
2	Are scarce resources avoided?				
3	Are materials from environmentally responsible raw material conversion, manufacturing processes or suppliers?				
4	Are hazardous materials minimised/avoided?				
D	MANUFACTURING AND DISTRIBUTION				
1	Is the component/assembly designed for energy conservation - o In manufacture - o In distribution logistics				
2	Is the component/assembly designed for waste minimisation in manufacture Are usable containers used?				
3	Is the component/assembly designed to minimise the following in the manufacturing process - o Air and water pollution - o Water use - o Materials use - o Other environmental effects				

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E	USE. Is the product designed for:				
1	Minimum power consumption in use?				
2	Minimum packaging?				
3	Minimum consumable use?				
3	Minimum waste consumables in use (eg batteries)?				
4	Serviceability (replacement of parts without disposing of whole assembly or equipment)				
5	Longevity ?				
6	Durability ? Does durability mean denser materials and compromise disassembly and recovery				
7	Accident prevention				
F	END-OF-LIFE: Design for re-use, disassembly and recycling				
1	Is component recovery feasible? Is there a market? If so, has design for disassembly and component recovery been considered, including a) Design for non-destructive removal b) Design for speedy diagnosis and refurbishment c) Design for closed loop manufacturing d) Design for use in secondary applications				
2	Is material recovery feasible or required? See 4.1 for list of what will have to be removed under the WEEE directive. - Is there a market for the material? - Is there separation and recycling technology and infrastructure? - Is there any other requirement for material separation (eg removal of hazardous materials before disposal)? If so has design for disassembly, separability and material recovery been considered, wherever possible and without compromising safety and performance?				

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F	END-OF-LIFE:				
3	Have the following been specified/achieved? a) Materials - Material combinations compatible for recycling. - Use of recyclable materials. - Grouping hazardous or non recyclable components. - Aluminium in preference to steel. 'Commonly used' rather than 'exotic' materials. - Thermoplastics in preference to thermosetting				

	materials. (e.g. rubber, GRP, CF composites) ○ Use of compatible polymers. (eg PC & ABS) ○ Use of integral finishes and labels. b) Assembly/ disassembly methods ○ Is the component/ assembly designed for ease of assembly and for separability? ○ Simple component mechanism & orientation ○ Provision for grasping parts. ○ Use of screws in preference to rivets. ○ 'Snap fit' or spring clips in preference to threaded fasteners where possible. ○ Common fasteners. ○ Fastening points accessible, visible and clearly marked. ○ Use of standard screwheads. ○ Screws which are in contact with mouldings easy to get at. ○ Use of alternative bonding methods. ○ Use of detachable leads and push in plugs rather than solder. ○ Value parts easily accessible? ○ Moulded-in inserts of compatible materials. ○ Where incompatible materials have been used, inserts easily broken off? ○ Assemblies and components removable with a standard tool? ○ 'Break out' points designed into mouldings? c) Information ○ Material coding symbols moulded into plastic parts in accordance with ISO 11469. ○ Type & grade of cast materials moulded or stamped on items as appropriate, & located such that subsequently not machined off? ○ Non-toxic substances in preference to toxic. ○ Toxic substances labelled. ○ Integral finishes and labels. ○ Stamping, engraving, moulding, etc in preference to labelling. ○ Dismantling instructions/ information to customers, equipment producers, recyclers.				
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F	END-OF-LIFE:				
4	Have the following been minimised? ○ Component count ○ Material mass ○ Number of different materials ○ Non-recyclable materials ○ Number of connection points ○ Number of fasteners ○ Number of fastener variations ○ Fasteners of materials compatible with parts				

	connected ○ Screw connections? ○ Numbers and types of screws ○ Adhesives and welds between components which may be separated or between incompatible materials				
5	Have the following been avoided ? ○ Mechanisms which complicate assembly/disassembly ○ Moulded-in metal inserts/parts in plastics ○ Nuts and bolts ○ Deep access holes for screws ○ Dissimilar metal inserts in aluminium ○ Adhesives incompatible with the parts being joined ○ Thermosetting materials ○ Painted parts ○ Use of labels on recyclable items ○ Adhesive-backed foams				