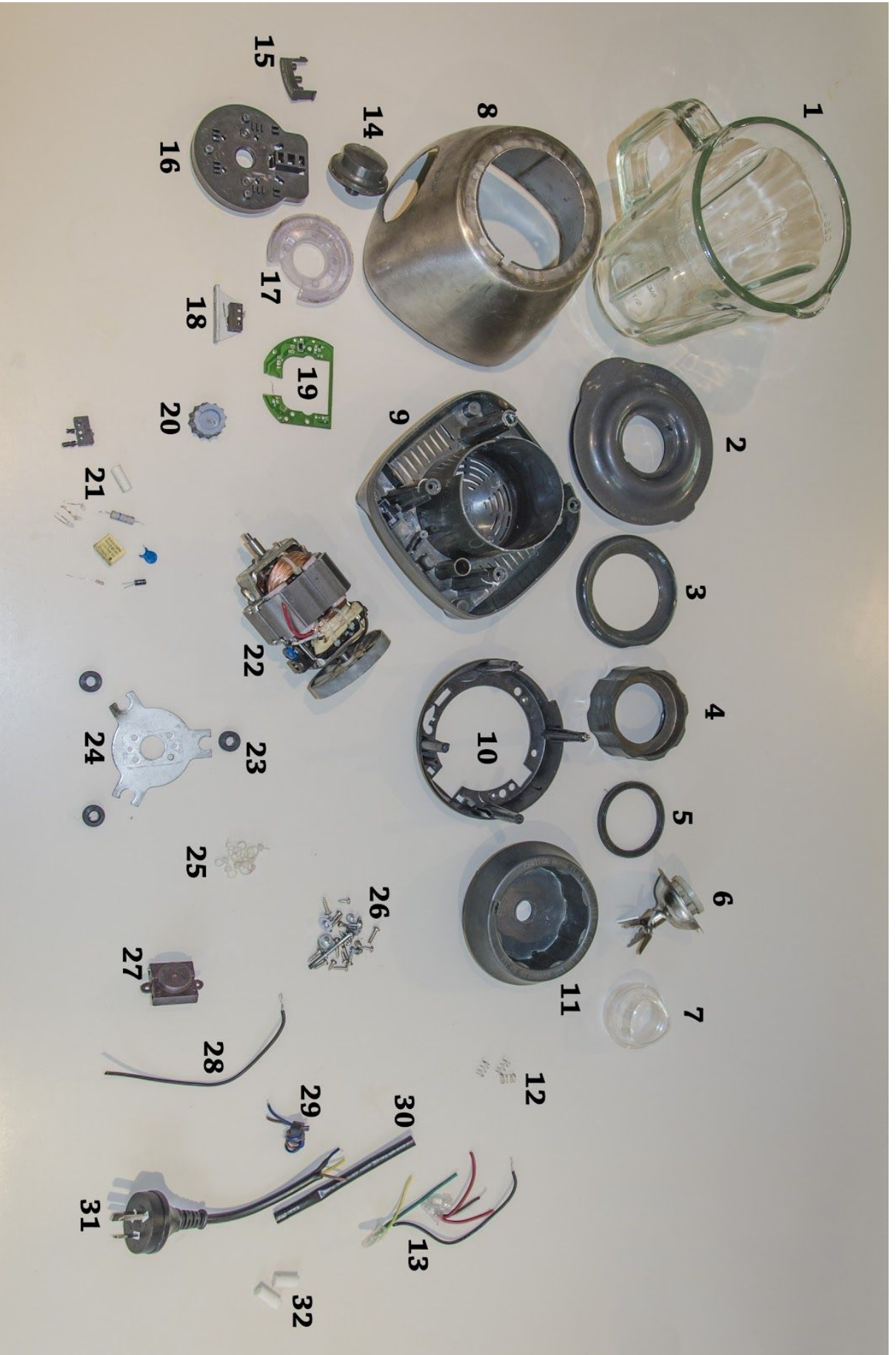


MEM30007A Select Common Engineering Materials

Product Study



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1. Glass Jug - Manufactured from soda-lime glass which is mainly comprised of silica sand, calcium oxide and lime. The product was machine blow-moulded at a temperature over 1000 C. It was then transferred to a second oven to be cooled down slowly to prevent cracking due to stress build-up. The bottom of the jug appears to have been machined off in order to achieve a very flat surface for the rubber seal. The jug could have also been manufactured from polycarbonate.

2. Lid- Injection molded low Density Polyethylene. Flexible and tough. Easily scratched with a fingernail. HDPE could also be used but wouldn't be as flexible.

3. Jug base ring - Coded PP. Injection molded polypropylene. Pretty tough and flexible, not easily scratched.

4. Jug base screw - Coded ABS. Injection molded acrylonitrile butadiene styrene. Feels quite tough.

5. Rubber gasket - Cut out from a sheet. Probably silicone rubber as it is most widely used in contact with food.

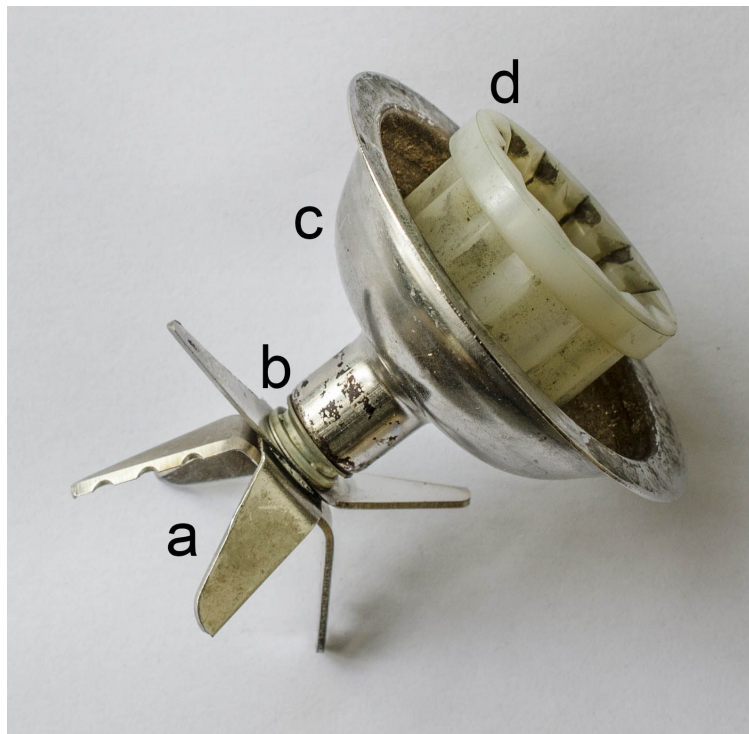
6a. Blade assembly - Bent and machined from stainless steel. Non-magnetic and shiny. Needs to be corrosion resistant.

6b. Blade gasket - Clear silicone rubber.

6c. Blade mount - Stainless steel. Cold-pressed from a sheet.

6d. Coupling - Nylon. Needs to be very tough to transfer the torque from the motor to the blade assembly. The part was injection molded.

6e. Blade spindle - Stainless steel.



7. Fill cap. Styrene-acrylonitrile resin. Injection moulded. It has greater thermal resistance than polystyrene which could have also been used for this part.

8. Steel Casing - Drawn from a stainless steel sheet as two separate parts then welded together. The outside of the part was subsequently polished and screw holes as well as the

control knob cut-out have been machined out. Polycarbonate could have also been used for this part.

9. Motor base - Injection molded ABS.

10. Motor support frame - Injection molded polypropylene. ABS could have also been used.

11. Jug holder - Injection molded polypropylene. The screw holes were then threaded.

12. Compression springs. Cold-wound (room temperature) from high-carbon steel wire, usually using a CNC machine in high volume production. Then the spring is heat treated to relieve the stress build-up and allow it to maintain its shape. Other materials that could have been used include: chrome silicon, chrome vanadium, and stainless steel.

13. Crimp Caps - Injection molded nylon. Inside there's a tin plated copper ring that's crimped to provide a connection. The connector ring is cut from a sheet.

14. Control knob - Injection molded ABS.

15. Control button - Injection molded ABS.

16. Control panel mount - Injection molded polypropylene.

17. Speed indicator - Injection molded polycarbonate.

18. Safety switch - Zinc plated mild steel manufactured from sheet metal. The switch housing is ABS.

19. Circuit board - Fiberglass sheet has been coated with epoxy resin. Copper tape pressed onto the board is used to connect the contact points and solder holds the various components.

20. Rubber Gear - natural rubber molded over a threaded stainless steel frame that has been manufactured from sheet metal. Nitrile rubber could have also been used.

21a. 47K Ω resistor - Carbon film wound around ceramic core encased in epoxy resin or another insulating material. Tin-plated copper wires attached to each end.

21b. Resistor cover - Heat resistant fiberglass.

21c. Capacitor - two metal plates separated by a dielectric (ceramic, plastic, air etc)

22. The motor - Carbon steel frame pressed from sheet metal. Copper coils. Injection molded nylon fan.

23. Shock absorbers - Nitrile rubber.

24. Top mount - mild steel. Cut from a sheet.

25. Cable ties - Injection molded nylon.

26. Screws - Manufactured from annealed medium carbon steel wire. The heads are cold formed by a series of dies. The thread is then pressed into the screws. The components are then heated and oil quenched to harden them. The last step involves zinc plating.

27. Dial switch - ABS casing (injection molded as two separate parts) and copper contact points.

28. Cables - A bunch of copper wires with a flexible polyvinyl chloride (PVC) extruded around them as an insulator.

29. Ferrite ring - Made of iron oxide (rust) alloyed with other metals. Filters electro-magnetic interference as well as radio frequency interference.

30. Heatshrink - Extruded PVC tube used to protect the cord.

31. Plug - Tough polymer casing - injection molded. Contact pins are brass.