General Description

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\*A/The Frigidaire All Refrigerator is/are appliances where the inside is cooler than the outside. (formal definition – term, class, distinguishing features) In other words,

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| is a popular household appliance that consists of a thermally insulated compartment and a heat pump (mechanical, electronic or chemical) that transfers heat from the inside of the fridge to its external environment so that the inside of the fridge is cooled to a temperature below the ambient temperature of the room.  <https://en.wikipedia.org/wiki/Refrigerator>  Introduction  Par # 1 |

\*The purpose of the Refrigerator is (purpose -- include who uses, for what purpose, in what context)

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| Refrigeration is an essential food storage technique in developed countries. The lower temperature lowers the reproduction rate of bacteria, so the refrigerator reduces the rate of spoilage. A refrigerator maintains a temperature a few degrees above the freezing point of water. Optimum temperature range for perishable food storage is 3 to 5 °C (37 to 41 °F).  <https://en.wikipedia.org/wiki/Refrigerator>  Introduction  Par #1 |

The etymology of the term/name Refrigerator is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (history/origin of the name)

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| refrigerator (n.) Look up refrigerator at Dictionary.com  1610s, "something that cools," agent noun from refrigerate. As "cabinet for keeping food cool," 1824, originally in the brewery trade, in place of earlier refrigeratory (c. 1600). The electric-powered household device was available from c. 1918.  <http://www.etymonline.com/>  <http://www.etymonline.com/index.php?term=refrigerator>  p1 |

The history of Refrigerator is/includes / \_\_\_\_\_\_\_\_\_\_\_\_\_ was developed\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (History of the mechanism)

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| The first cooling systems for food involved using ice. Artificial refrigeration began in the mid-1750s, and developed in the early 1800s. In 1834, the first working vapor-compression refrigeration system was built. The first commercial ice-making machine was invented in 1854. In 1913, refrigerators for home use were invented. In 1923 Frigidaire introduced the first self-contained unit. The introduction of Freon in the 1920s expanded the refrigerator market during the 1930s. Home freezers as separate compartments (larger than necessary just for ice cubes) were introduced in 1940. Frozen foods, previously a luxury item, became commonplace.  <https://en.wikipedia.org/wiki/Refrigerator>  Introduction  Par # 2 |

\*The operating principle of the Refrigerator is (operating principle general)

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| A vapor compression cycle is used in most household refrigerators, refrigerator–freezers and freezers. In this cycle, a circulating refrigerant such as [R134a](https://en.wikipedia.org/wiki/R134a) enters a compressor as low-pressure vapor at or slightly below the temperature of the refrigerator interior. The vapor is compressed and exits the compressor as high-pressure superheated vapor. The superheated vapor travels under pressure through coils or tubes that make up the *condenser*; the coils or tubes are passively cooled by exposure to air in the room. The condenser cools the vapor, which liquefies. As the refrigerant leaves the condenser, it is still under pressure but is now only slightly above room temperature. This liquid refrigerant is forced through a metering or throttling device, also known as an expansion valve (essentially a pin-hole sized constriction in the tubing) to an area of much lower pressure. The sudden decrease in pressure results in explosive-like flash evaporation of a portion (typically about half) of the liquid. The latent heat absorbed by this flash evaporation is drawn mostly from adjacent still-liquid refrigerant, a phenomenon known as *auto-refrigeration*. This cold and partially vaporized refrigerant continues through the coils or tubes of the evaporator unit. A fan blows air from the refrigerator or freezer compartment ("box air") across these coils or tubes and the refrigerant completely vaporizes, drawing further latent heat from the box air. This cooled air is returned to the refrigerator or freezer compartment, and so keeps the box air cold. Note that the cool air in the refrigerator or freezer is still warmer than the refrigerant in the evaporator. Refrigerant leaves the evaporator, now fully vaporized and slightly heated, and returns to the compressor inlet to continue the cycle.  <https://en.wikipedia.org/wiki/Refrigerator>  General technical explanation  Par #3 |

The Refrigerator is similar to (comparison of how it operates – maybe combined with previous paragraph)

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| Iceboxes had hollow walls that were lined with tin or zinc and packed with various insulating materials such as cork, sawdust, straw or seaweed. A large block of ice was held in a tray or compartment near the top of the box. Cold air circulated down and around storage compartments in the lower section. Some finer models had spigots for draining ice water from a catch pan or holding tank. In cheaper models a drip pan was placed under the box and had to be emptied at least daily. The user had to replenish the melted ice, normally by obtaining new ice from an [iceman](https://en.wikipedia.org/wiki/Iceman_(occupation)).  <https://en.wikipedia.org/wiki/Icebox>  Par #2  Design |

\*The Frigidaire All Refrigerator is \_\_\_\_\_\_\_\_\_\_ ( physical description -- color, shape, measurements, materials)

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| GENERAL SPECIFICATIONS   * Frost Free: Yes * Annual Energy (kWH): 318 * Annual Cost (.1065 / kWH): 47 * Condenser Type: Static * Leveling Legs: 4 * Shipping Weight (lbs): 190 * Product Weight (lbs): 174 * Made In USA: Yes * Power Type: Electric * Size: 17 Cu. Ft. * Installation Type: Free-Standing * Collection: Frigidaire   EXTERIOR SPECIFICATIONS   * Door Style: UltraSoft™ * Reversible Door: No * Name Badge: Frigidaire * Handle Design: Reach Through * Door Hinge Covers: White * Cabinet Finish: Textured * Cabinet Color: White * Front Rollers: Yes * Rear Rollers: No * Door Gasket: White * Door Closers: Yes   EXTERIOR DIMENSIONS   * Height: 67-11/16" * Width: 34" * Depth: 28-1/2" * Cabinet Height: 67-1/4" * Cabinet Height(w/ Covers: 67-11/16" * Case Width: 34" * Cabinet Depth: 25-1/2" * Cabinet Depth (w/ Door): 28-1/2" * Cabinet Depth (w/Handle): 32-1/4" * Depth(w/ 90° Door Open): 60-3/8"   CERTIFICATIONS & APPROVALS   * ENERGY STAR® Certified: No * CSA Certified: Yes * ADA Compliant: No   DOOR FINISH   * Exterior Specifications: Textured   ELECTRICAL SPECIFICATIONS   * Voltage Rating: 120V 60Hz * Amps @ 120 Volts: 5 * Minimum Circuit Required (Amps): 15A * Connected Load (kW Rating) @ 120V: 0.6 * Power Supply Connection Location: Right Rear Bottom   CONTROLS   * Controls: Mechanical Dial * Control Location: Interior * Supplemental Freeze: No   CAPACITIES   * Capacity (Cu. Ft.): 16.6 * Total Shelf Area (Sq. Ft.): 11.25   FRESH FOOD   * Door Ajar Alert: No * Temperature Alert: No * Power Failure Alert: No * Lighting Design: Incandescent * Lighting Levels: Bright Lighting * Cantilever Shelves: No * Adjustable Shelves: 4 Wire - White * Fixed Shelves: No * Fixed Door Racks: 5 Full-Width – White * Tilt-out Wire Door Bins: No * Dairy Compartment: No * Wine / Can Rack: No * Lower Storage Basket: No * Upper Storage Basket: No   <http://www.frigidaire.com/>  <http://www.frigidaire.com/Kitchen-Appliances/Refrigerators/Single-Door-Refrigerator/FFRU17B2QW/>  Specifications  Dec 8, 2016 |

The conditions required for its use include \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (required conditions – general)

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| • The power cord of the appliance is equipped with a three-prong grounding plug for your protection against electrical shock hazards. It must be plugged directly into a properly grounded three-prong receptacle, protected with a 15-amp time delay fuse or circuit breaker. The receptacle must be  installed in accordance with the local codes and ordinances. Consult a qualified electrician.  Receptacles protected by Ground Fault Circuit Interrupters (GFCI) are NOT RECOMMENDED.  Do NOT use an extension cord or adapter plug.  • If voltage varies by 10% or more, appliance performance may be affected. Operating the  unit with insufficient power can damage the compressor. Such damage is not covered  under the warranty. If you suspect your household voltage is high or low, consult  your power company for testing.  • To prevent the appliance from being turned  off accidentally, do not plug unit into an outlet controlled by a wall switch or pull cord.  • Do not pinch, knot, or bend power cord in any manner.  Frigidaire All about the Use & Care of your refrigerator A01063001(August 2014)  Page 3 |
| **Location**  Choose a place that is near a grounded electrical outlet. For the most efficient operation, the appliance should be located where surrounding temperatures will not exceed 110°F (43°C).  The Freeze Control Feature is designed to automatically maintain the selected interior  temperature within these boundaries. Allow space around the unit for good air  circulation. Leave a 3 inch (75 mm) space on all sides of the unit for adequate circulation.  Frigidaire All about the Use & Care of your refrigerator A01063001(August 2014)  Page 4 |
| **Automatic Freeze Control**  The Freeze Control Feature will maintain proper interior temperature even when the unit is placed in an area where the surrounding temperature drops down to 10° F (-12° C).  Frigidaire All about the Use & Care of your refrigerator A01063001(August 2014)  Page 8 |

The use of \_\_\_\_\_\_\_\_\_\_\_ is similar to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (comparison of conditions for use – maybe combined with previous paragraph)

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| **28 BASIC KITCHEN SAFETY TIPS**   1. Make sure all wires, cords and plugs on your appliances are not frayed and that the plugs have 3-prong grounded connections. This would include coffee makers, toasters, blenders, microwaves, mixers, etc. 2. Don’t use extension cords. You can obtain a junction box that has built-in GFI (ground fault interrupters). This will allow you extra plug in space and the GFI will kick in if there is a power shortage. Helps avoid water/electrical shock accidents. 3. Get rid of any appliance that is broken or damaged. New ones are very inexpensive these days. If a new one would bust your budget, try garage and tag sales (just make sure you’re not buying somebody else’s broken appliance). 4. Put a childproof lock not only on the cabinets with your medicines and cleaning supplies, but also your oven. 5. Don’t leave the kitchen with pots & pans cooking on the stove. Make sure to turn off burners as soon as you take the pot off. 6. Avoid wearing inappropriate clothing while cooking. That means loose sleeves and sweaters. 7. Keep dish towels, pot holders and oven mitts away from the stove. 8. Keep matches and lighters in high places where curious little hands can’t reach them. 9. If using candles in the kitchen, don’t leave the room (or home) while they’re burning. Make sure they are in a safe place and are in flame proof containers. 10. Check furniture, curtains, dish towels, etc. to be sure they are not blocking heaters or vents. 11. Keep a fire extinguisher in or near the kitchen, but not near the stove or the heater. 12. In case of a grease fire, salt and/or baking soda will help if you do not have a fire extinguisher. 13. Keep emergency numbers handy – 911 is easy to remember, but phone numbers to Poison Control might take longer. 14. Scalding is one of the most common injuries in the kitchen. Make sure to turn pot handles away from the front of the stove and away from little curious hands. 15. Scalding can occur from hot steam as well. Be careful when lifting lids from hot food (including opening that hot bag of microwave popcorn)! 16. Handling Knives: (a) Always cut away from your body when using a knife. It can slip and cut you, (b) Always use a cutting board, (c) Protect your counter tops, (d) Keep blades sharp, (e) Keep knives clean (including handle) – slippery handles can cause injuries, (f) Don’t put knives in a sink of soapy water – they may not be seen and accidents can occur, (g) Wash and dry carefully keeping sharp edge away from your hands, (h) Always lay them flat, never on the back or edge, (i) Don’t attempt to catch a knife as it falls – better it hits the floor than cut your hand, (j) Wash knives with warm soapy water after each use. 17. Be sure appliances are unplugged before touching sharp edges (blenders, can openers, mixers, etc.). 18. Never stick a fork in a toaster to retrieve trapped toast – you may get shocking results. 19. Always be sure the blender is unplugged before touching the blades. 20. Be careful about sharp edges: scissors, broken glass, potato peeler, etc. 21. Never ever, ever leave cooking foods unattended – not even for a minute. 22. Casualness causes casualties – don’t answer or talk on the phone while cooking – you can be distracted and injuries can result. 23. Kitchen safety tips 8Clean up spills immediately – wet floors are slippery when wet. 24. Keep the kitchen floor clear or toys and other items. 25. Be certain that walking areas are always clear of toys and other items. 26. Keep young children out of the kitchen while cooking. 27. Always use a step-stool to reach high places. 28. Kitchen safety tips 9Store cleaning supplies and all chemicals in a safe place. Use safety latches.   <http://www.straighten-up-now.com/kitchen-safety-tips.html> par 4 Plus Dec 13    Figure 1 Title  This picture shows the letter M in an Ariel bold font (name year, page # ). |

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Description and Function of Parts

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There are \_\_\_4\_\_\_ (number) main parts to a \_\_\_Refrigerator \_\_\_\_(mechanism). These include Compressor, Condenser, Expansion Valve and Evaporator. (list of parts).

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Part 1

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The \_\_\_\_\_\_\_\_\_\_\_\_\_ is \_\_\_\_\_\_\_\_\_\_\_\_ (formal definition) Its purpose is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (purpose – what it does in the cycle of operation and how it interacts with the other parts) . Physically, it is \_\_\_\_\_\_\_\_\_\_\_\_\_(physical description, color, shape, measurements, material, unique aspects)

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Part 2

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The \_\_\_\_\_\_\_\_\_\_\_\_\_ is \_\_\_\_\_\_\_\_\_\_\_\_ (formal definition) Its purpose is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (purpose) . Physically, it is \_\_\_\_\_\_\_\_\_\_\_\_\_(physical description, color, shape, measurements, unique aspects)

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Part 3

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The \_\_\_\_\_\_\_\_\_\_\_\_\_ is \_\_\_\_\_\_\_\_\_\_\_\_ (formal definition) Its purpose is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (purpose) . Physically, it is \_\_\_\_\_\_\_\_\_\_\_\_\_(physical description, color, shape, measurements, unique aspects)

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Operating Cycle

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The conditions necessary for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(mechanism to complete goal) are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (list conditions)

The operating cycle begins \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_( use each main part in order and take through one complete operating cycle. Break into paragraphs if there are several large chunks that become stages. ) At the end of one operating cycle \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(tell end product and what the next options are).

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| A vapor compression cycle is used in most household refrigerators, refrigerator–freezers and freezers. In this cycle, a circulating refrigerant such as [R134a](https://en.wikipedia.org/wiki/R134a)enters a compressor as low-pressure vapor at or slightly below the temperature of the refrigerator interior. The vapor is compressed and exits the compressor as high-pressure superheated vapor. The superheated vapor travels under pressure through coils or tubes that make up the *condenser*; the coils or tubes are passively cooled by exposure to air in the room. The condenser cools the vapor, which liquefies. As the refrigerant leaves the condenser, it is still under pressure but is now only slightly above room temperature. This liquid refrigerant is forced through a metering or throttling device, also known as an expansion valve (essentially a pin-hole sized constriction in the tubing) to an area of much lower pressure. The sudden decrease in pressure results in explosive-like flash evaporation of a portion (typically about half) of the liquid. The latent heat absorbed by this flash evaporation is drawn mostly from adjacent still-liquid refrigerant, a phenomenon known as *auto-refrigeration*. This cold and partially vaporized refrigerant continues through the coils or tubes of the evaporator unit. A fan blows air from the refrigerator or freezer compartment ("box air") across these coils or tubes and the refrigerant completely vaporizes, drawing further latent heat from the box air. This cooled air is returned to the refrigerator or freezer compartment, and so keeps the box air cold. Note that the cool air in the refrigerator or freezer is still warmer than the refrigerant in the evaporator. Refrigerant leaves the evaporator, now fully vaporized and slightly heated, and returns to the compressor inlet to continue the cycle.  <https://en.wikipedia.org/wiki/Icebox>  General Technical explanation  Par # 20    By This image has been created during "DensityDesign Integrated Course Final Synthesis Studio" at Polytechnic University of Milan, organized by DensityDesign Research Lab in 2015. Image is released under CC-BY-SA licence. Attribution goes to "Daniele De Pietri, DensityDesign Research Lab". - Own work, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=37081402 By This image has been created during "DensityDesign Integrated Course Final Synthesis Studio" at Polytechnic University of Milan, organized by DensityDesign Research Lab in 2015. Image is released under CC-BY-SA licence. Attribution goes to "Daniele De Pietri, DensityDesign Research Lab". - Own work, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=37081402 |

References

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