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RAILWAY REFRIGERATOR CARS

Types of Refrigerator Cars; Types of Protective Services; Refrigeration, Mechanical Protective, Ventilation, Heater, and Special Services; Sources of Refrigeration; Water Ice and Salt, Mechanical, and Other Sources; Refrigerator Car Design and Construction; Conventional Freight Car Features; Insulation; Ice Bunkers and Ice Tanks; Air Circulation; Supplemental Refrigerator Car Equipment; Air Circulating Fans; Heaters and Heater Fuels; Temperature Indicating Devices; Mechanical Refrigeration Equipment; Power and Drive; Refrigeration Components; Controls and Accessory Equipment

THE development of refrigerator car service by the railroad industry and private refrigerator car lines during the past 100 years has been an important factor in establishing the present nationwide system of distributing perishables. It has brought about a great expansion of markets for all kinds of fresh fruits and vegetables, meats and other perishables by providing year-round transportation protection over distances up to 3000 miles from such widely scattered growing areas as California, Washington, Texas, Florida and Maine.

While the first refrigerator car fleet consisted of 30 insulated box cars in 1857, there are now approximately 114,000 refrigerator cars of all types in service. The number of general service refrigerator cars designed for fresh fruits and vegetables is over 82,000 and includes many all-purpose mechanical refrigerator cars which also handle frozen foods. The remainder of the refrigerator car fleet consists of cars specifically designed for either frozen foods, passenger train express service, solid carbon dioxide, quarters of dressed beef and other packing house products, or for those commodities which may require the protection afforded by an insulated car but do not need additional cooling in transit.

The total movement of perishable foods and beverages in railroad refrigerator cars within the U. S. during 1960 amounted to one and one-third million carloads or over 31 million tons. Of these carloads, fresh fruits and vegetables account for nearly 38 percent; various types of food products in cans and packages, not frozen, 32 percent; meats and edible packing house products, 16 percent; wines, liquors and other beverages, 7 percent; frozen foods, 4 percent; dairy products, 2 percent; and other perishables, 1 percent. The railroad industry also transports perishables in their piggy-back service. Some of the refrigerated trailers and containers used in this service are owned and operated by the railroad industry. For information on this type of equipment and service see Chapter 55.

TYPES OF REFRIGERATOR CARS

The various types of railway cars are classified, defined, and given designating letters by the Association of American Railroads.¹ Refrigerator cars are designated as Class R cars; except those equipped for passenger train service come under Class B (Passenger Equipment Cars) and those designed for transporting solid carbon dioxide come under Class I (Special Cars). The first letter of the designating letters for cars indicates the class.

With Class R cars, the second designating letter indicates the type of cooling equipment installed. The letter S indicates top or end ice bunkers, A indicates brine tanks, P indicates mechanical refrigeration, and B indicates no equipment for cooling is provided. The letter L is added to the designating letters if the car is equipped with an adjustable loading or stowing device, and the letter M is added if the car is equipped

with beef rails. (Beef rails are overhead rails, usually of wood with a protective metal strip, running lengthwise of the car that support the hooks on which are hung quarters of dressed beef.) The AAR definitions and letter designations for the various types of refrigerator cars are as follows:

RS—Bunker Refrigerator. A fully insulated car equipped with ice bunkers. Designed primarily for use of chunk ice and with or without means of ventilation. (Ice bunkers usually located at the ends of the cars but may be located over the loading area.) Fig. 1 shows a typical ice bunker car.

BSM—Bunker Refrigerator, similar to an RS car but equipped with beef rails.

RA—Brine Tank Refrigerator. A car equipped with insulation and brine tanks. Designed primarily for the combined use of crushed ice and salt, and usually without ventilating devices. Used chiefly for meats and packing-house products.

RAM—Brine Tank Refrigerator, similar to an RA car but equipped with beef rails.

RB—Beverage, ice, water or vinegar refrigerator, similar in design to an RS car except that it is not equipped with ice bunkers, and with or without ventilating devices.

RBL—A car similar in construction to an RB car, but equipped in addition with adjustable loading or stowing device.

RP—Mechanical Refrigerator. A fully insulated car with or without means of ventilation and provided with mechanical refrigeration equipment for furnishing protection against heat, cold or both.

RPM—Mechanical Refrigerator, similar to RP but equipped with beef rails.

RPL—Mechanical Refrigerator, similar to RP but equipped in addition with adjustable loading or stowing device.

LRC—A heavily insulated car, with or without ventilation, with or without hatches, and with or without gravity conveyors for loading and unloading. May have cross partitions forming compartments. Designed primarily for the transportation of solid carbon dioxide.

EP—Refrigerator Express. An insulated car constructed and equipped for passenger train service, with or without means of ventilation and provided with refrigerating apparatus.

BR—Refrigerator Express. An insulated car constructed and equipped for passenger train service, having ice bunkers or ice boxes. Designed primarily for use of chunk ice with means of ventilation and suitable to carry any perishable commodity requiring refrigeration or ventilation.

BS—Refrigerator Express. An insulated car constructed and equipped for passenger train service, and having brine tanks. Designed primarily for the combined use of crushed ice and salt, and usually without ventilating devices. Used chiefly for meats and packing-house products.

Information on the number and ownership of the various types of freight and passenger express refrigerator cars is given in Table 1.

TYPES OF PROTECTIVE SERVICES

Providing year-round rail transportation protection for perishables is a complex problem since refrigerator cars are exposed to outdoor air conditions which vary from summer desert temperatures to the very low winter temperatures that occur in Canada and the northern United States, and since