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NBS REPORT

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Progress Report
April 1 - June 30, 1953

P. R. Achenbach
C. W. Phillips
Heating and Air Conditioning Section
Building Technology Division

OFFICE OF THE QUARTERMASTER GENERAL



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PROGRESS REPORT

TESTS OF REFRIGERATION AND MISCELLANEOUS EQUIPMENT

April 1 - June 30, 1953

OFFICE OF THE QUARTERMASTER GENERAL

Federal Specification AA-R-211c.

At the request of the Office of The Quartermaster General, preliminary work was begun for a revision of the above specification. A letter was sent to all members of the industry, requesting them to submit specifications and other pertinent information on their products. Replies to this letter are now arriving at the Bureau.

Hydraulic Drives.

A preliminary investigation was begun in preparation for a project to develop a prototype hydraulic drive for use with the Quartermaster portable refrigerating equipment. After a conference with representatives of the Office of The Quartermaster General, however, it was decided to cancel the project for the time being.

Longstreth Compressor Tests.

A prototype radial refrigerating compressor was tested to determine its capacity at various operating conditions. Tests were made on the secondary refrigerant calorimeter. A series of tests was made by varying the speed of the compressor from 800 rpm to 2300 rpm in steps, and holding suction and discharge pressures constant. The capacity of the compressor under these conditions ranged from approximately 1600 BTU/hr to approximately 4200 BTU/hr for the low and high speeds, respectively. A second series of tests was made by varying the suction pressure from 4.5 psig to 37 psig in steps, and by holding

REPORT

OF THE COMMISSIONERS OF THE LAND OFFICE

IN THE YEAR 1901

IN THE DISTRICT OF

THE DISTRICT OF

At the request of the Council of the District of
the Commission has been directed to make a
survey of the land in the District of
and to report on the results of the survey.
The Commission has the honor to acknowledge the
cooperation of the Council of the District of

THE DISTRICT OF

A preliminary investigation was made to determine the
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discharge pressure and speed constant (1750 rpm). Under these conditions, the compressor capacity ranged from approximately 3100 BTU/hr at the low suction pressure to approximately 13,200 BTU/hr at the high suction pressure. Because of vibration problems, the compressor could not be run at speeds higher than 2300 rpm; however, the mounting of the compressor is being changed now, and it is expected to make tests at speeds up to 4000 rpm.

Thermo-King Plug-type unit model K-10.

This unit was prepared for tests by providing some of the thermocouples and checking the unit out for operation. Tests of the unit are expected to be made during the next reporting period for a range of engine speeds and a range of fan speeds.

1 1/3 ton plug-type Refrigerating Units.

At the request of the Office of The Quartermaster General, a series of tests to determine the capacity of two 1 1/3 ton plug-type refrigerating units at varying engine speeds, and at conditions of 0°F refrigerator temperature and 110°F ambient temperature was continued during this quarter. The two units used for this test were a Thermo-King, Model Q150, and a Carrier unit, Model E731. Engine speeds for these tests were adjusted from 1000 rpm to 3000 rpm in steps of 300 rpm. The Carrier unit evaporator fan was a constant-speed fan, and was driven by a D. C. motor drawing power from the 24-volt battery used for the gasoline engine. At an engine speed of 1000 rpm, the Carrier unit had a capacity of approximately 3000 BTU/hr. The capacity increased steadily as the engine speed was increased, reaching a peak capacity of approximately 4300 BTU/hr at an engine speed of 2700 rpm. At 3000 rpm engine speed, the capacity decreased to approximately 3000

BTU/hr. No further tests were made with this unit.

The Thermo-King unit, Model 41X, also driven by gasoline engine, had the evaporator and condenser fans driven by the same belt drive that operated the compressor so that as designed, the fan speed was proportional to the compressor speed. The capacity varied from 4000 BTU/hr at 1800 rpm engine speed, 4500 BTU/hr at 2100 rpm engine speed, to 5000 BTU/hr at 3000 rpm engine speed.

Another series of tests was run in which the fans were operated at constant speed. At engine speeds varying from 1800 rpm to 3000 rpm, the fans were operated at speeds varying from 500 rpm to 2100 rpm. At 2100 rpm engine speed, the capacity of the unit varied from 4400 BTU/hr at 500 rpm fan speed, 5250 BTU/hr at 1800 rpm fan speed to 6200 BTU/hr at 2100 rpm fan speed. Similar curves were observed at other engine speeds. These observations indicated that further study of optimum fan speeds is desirable.

Drifree Dehydrator

Tests of the proprietary dehydrator employing calcium carbide to determine capacity, drying rate and hazards were completed during the preceding quarter. Comparison of the electric hygrometer method of determining moisture content of refrigerant with the P_2O_5 method was completed during this quarter. The first draft of the report of these tests has been completed and review of this draft has been started.

Refrigerator Door Tests

Frames have been prepared for the four warehouse-type refrigerator doors to be tested and a warehouse has been selected for these tests.

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Trailer Air Distribution

Test facilities for the series of tests proposed for determining the most suitable air distribution in refrigerated trailers have been prepared in Bldg. 35 and the first Test Trailer has been installed.

Defrost Tests

Test facilities for the tests of the defrosting system for the Model 8451 gasoline-driven 10,000 BTU/hr plug-type refrigerating unit have been prepared adjacent to Building 4 and calibration of the heat loss of the test warehouses has been completed.

Gasoline Lanterns

Tests were begun on four standard Army gasoline lanterns to determine causes and possible remedies for excessive mantle breakage. Studies were made of several kinds of deflecting devices to prevent liquid gasoline from striking the bottom of the mantle during the lighting process. These studies were also to include comparisons of lantern performance when the generators were packed with steel wool and glass wool twine.

Near the end of the reporting period two Coleman inverted lanterns were received for studies of their performance in ambient temperatures ranging from -45 F to 135 F with special attention to the functioning of the pressure relief device. These tests were given higher priority than those on the standard lanterns requiring that the earlier tests be interrupted.

STAPLES

