

UNITED STATES DEPARTMENT OF COMMERCE  
NATIONAL BUREAU OF STANDARDS  
WASHINGTON, D. C.Letter  
Circular  
LC-502F

August 18, 1937

## INVESTIGATION OF LOW-COST FLOOR COVERINGS

In line with the proposed research program on building materials suitable for low-cost housing construction explained in Letter Circular LC-502, it is proposed to conduct an investigation of the important properties of floor coverings and their suitability for the type of occupancy under consideration, along the following lines:

1. A survey of existing installations of various types of floor coverings, in and around Washington, will be made to obtain information as to what are the important properties of floor coverings and most prevalent causes of failure and dissatisfaction. In this survey it is hoped to secure specific data on the type and condition of the sub-floor, the condition and length of service of the floor covering, the method of installation and adhesive used, the extent and nature of maintenance, the type of occupancy and nature of exposure to which the floor covering is subjected, and any other experiences encountered by the contractor or by the occupant relative to the quality and performance of the floor covering.

2. A laboratory study will be conducted of types of floor coverings appropriate to low-cost housing. This will include the exposure of floor coverings to light, heat and moisture. Determination of moisture content, measurement of expansion or contraction, measurements for buckling and curling, and indentation and recovery determinations for resilience will be made at various stages of exposure, together with other physical tests appropriate to each type of floor covering. The investigation of any other physical properties which the above survey may show to be important and the development of appropriate testing methods will be included in this study.

3. Methods of installation and maintenance<sup>1</sup> will be investiga-

---

1

The Care of Floors. NBS Letter Circular LC388

---

ted with the view to improving the quality and increasing the life of floors. In connection with the study of floor coverings it is considered advisable to include a study of adhesives, as poor bonding appears to be one of the chief sources of failure in many floor installations. This study will cover adhesives for use in installations where the sub-floor has ground contact as well as for installations where the sub-floor has air space beneath it. Included in this study will be the development of testing methods and requirements for adhesives along with exposure tests of bonded floor coverings.

4. A performance test of appropriate floor coverings and adhesives is to be made in the Bureau's floor testing chamber employing a modification of the equipment previously used in connection with an investigation of industrial-type floors for the Public Works Branch of the Procurement Division.<sup>2</sup> A report showing the results obtained in

---

2

Performance Test of Floor Covering Materials. NBS Letter Circular LC484.

---

this investigation is being prepared for publication and will be available shortly. The floor testing chamber consists of a concrete circular track 4 feet wide and approximately 40 feet in diameter. The circular track is divided by metal thresholds into 20 test spaces in which are installed the different sub-floors and floor coverings. The test equipment employed in the investigation referred to above consisted essentially of two loaded platform trucks propelled around the track at a speed of approximately 2 miles per hour by a wheel 4 feet in diameter which is shod with eight wooden blocks covered with leather. The principal modifications for the present investigation are to use only one truck, which is connected directly to the walking wheel used as a source of motive power, and to place on the front of the truck a loaded swivel wheel castor and a loaded drag comparable to a ball or dome castor. The floor coverings are to be bonded to either cement or wood sub-floors and with each of two or more different types of adhesives. The results of the performance tests are to be determined by general appearance as recorded by photographs, by indentation and wear measurements as given by a depth gage, and by measurements of the amount of expansion or contraction and displacement.

The available information and literature on the relative quality and suitability of different floor coverings for various occupancies are somewhat limited. While there are specifications covering many of the floor coverings, they deal principally with the quality of each type of floor covering and not with the relative quality or outstanding features of the various types, which is of direct interest to the consumer in selecting a floor covering to meet his particular flooring problem. In the present investigation it is proposed to study 1/8" asphalt tile, 1/8" pressed fiber board, 1/8" and 1/16" linoleum, felt base floor covering, and such strip or block wood floors as may fall in this price class. There is also need for additional information on adhesives and the relative merits of different methods of installations.

Considerable work has been done at the Bureau from time to time in connection with the study of some particular property of a floor covering and in connection with the preparation and revision of Federal Specifications for floor coverings. The following is a short resume of this work with appropriate references to the available literature:

An instrument for measuring the abrasive resistance of textile carpets has been developed<sup>3</sup> and a study of carpets made.<sup>4</sup>

---

<sup>3</sup> Schiefer and Best. Carpet wear testing machine. BS J. Research 6, 927 (1931) RP315.

<sup>4</sup> Schiefer and Cleveland, Wear of carpets, BS J. Research 12, 155 (1934) RP640.

---

The resilience of textile carpets has been measured by an instrument known as a "Compressometer".<sup>5</sup>

---

<sup>5</sup> H. F. Schiefer. "Compressometer", BS J. Research 10, 705 (1933) RP561.

---

McBurney as a research associate of the Asphalt and Mastic Tile Association conducted an investigation of asphalt tile and developed a new instrument for measuring resistance to indentation.<sup>6</sup> The in-

---

<sup>6</sup> J. W. McBurney, Indentation of Asphalt Tile, Proc. A.S.T.M. 1934.

---

vestigation of asphalt tile was conducted principally on tile of 3/16 inch thickness and there is need for additional information on tile of 1/8 inch thickness which has become more and more popular in the last few years.

The following is a list of Federal Specifications and National Bureau of Standards Letter Circulars on floor coverings. The Federal Specifications may be purchased for 5 cents each, from the Superintendent of Documents, Government Printing Office, Washington, D. C. The Letter Circulars may be obtained without cost from the National Bureau of Standards, Washington, D. C.

Federal Specifications

Title	Symbol
Linoleum; Battleship	LLL-L-351
Linoleum; Plain, Inlaid and Printed	LLL-L-361
Tile; Asphalt	SS-T-306
Floor-Coverings; Rubber Sheet	ZZ-F-461
Matting; Rubber	ZZ-M-71
*Tile; Cork	LLL-T-306
*Carpet; Cork	LLL-C-96

\*In process of preparation.

Carpets and Rugs; Axminster  
Carpets and Rugs; Velvet, Plain  
Carpets and Rugs; Wilton  
Rugs; American-Oriental (Washed)

DDD-C-51  
DDD-C-61a  
DDD-C-71a  
DDD-R-751

National Bureau of Standards Letter Circulars

Rubber Floor Tile  
Acid-Proof Coatings for Concrete Surfaces

LC-270  
LC-42