

**VITRIFIED PAVING BRICK: A
REVIEW OF PRESENT PRACTICE IN
THE MANUFACTURE TESTING
AND USES OF VITRIFIED PAVING
BRICK**

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649730056

Vitrified Paving Brick: A Review of Present Practice in the Manufacture Testing and Uses of Vitrified Paving Brick by H. A. Wheeler

Except for use in any review, the reproduction or utilisation of this work in whole or in part in any form by any electronic, mechanical or other means, now known or hereafter invented, including xerography, photocopying and recording, or in any information storage or retrieval system, is forbidden without the permission of the publisher, Trieste Publishing Pty Ltd, PO Box 1576 Collingwood, Victoria 3066 Australia.

All rights reserved.

Edited by Trieste Publishing Pty Ltd.
Cover @ 2017

This book is sold subject to the condition that it shall not, by way of trade or otherwise, be lent, re-sold, hired out, or otherwise circulated without the publisher's prior consent in any form or binding or cover other than that in which it is published and without a similar condition including this condition being imposed on the subsequent purchaser.

www.triestepublishing.com

H. A. WHEELER

**VITRIFIED PAVING BRICK: A
REVIEW OF PRESENT PRACTICE IN
THE MANUFACTURE TESTING
AND USES OF VITRIFIED PAVING
BRICK**

Vitrified Paving Brick

A Review of Present Practice in the Manufacture,
Testing and Uses of Vitrified
Paving Brick.

BY
H. A. WHEELER, E. M.,
FORMER CLAY SPECIALIST OF THE MISSOURI
GEOLOGICAL SURVEY.



INDIANAPOLIS, IND.,
T. A. RANDALL & CO., PUBLISHERS.

1910

**COPYRIGHTED,
1910,
BY T. A. RANDALL & CO.**

639 2187

175719

JUL -9 1913

SRC

W56

TABLE OF CONTENTS.

	PAGE
History of Paving Brick.....	7
Definition of Vitrified Brick.....	10
Clays Employed.....	14
Composition of Paving Brick Shales.....	17
Physical Properties of Clays.....	20
Manufacture of Paving Brick.....	23
Winning the Clay.....	24
Crushing.....	25
Screening.....	26
Pugging.....	26
Molding.....	27
Repressing.....	29
Drying.....	30
Burning.....	30
Physical Properties of Paving Brick.....	35
Color.....	35
Structure.....	35
Hardness.....	36
Porosity.....	37
Density.....	39
Crushing Strength.....	40
Cross Breaking Strength.....	41
Toughness.....	41
Methods of Testing Paving Brick.....	49
Eye Examination.....	49
Laboratory Tests.....	50
Density.....	51
Absorption.....	52
Crushing Strength.....	54
Cross Breaking.....	54
Hardness.....	55
Rattler Test.....	56
Evaluation of the Tests.....	58
Uniformity of Results.....	58
Uses of Vitrified Brick.....	63
Sewers.....	63
Buildings.....	63
Foundations.....	64
Sidewalks.....	64
— Street Paving.....	65
Chemical Purposes.....	65
Other Paving Materials.....	65

	PAGE
Macadam	66
Wood Pavements.....	67
Asphalt and Bitulithic.....	68
Granitoid	69
Cobble Stones.....	70
Stone Blocks.....	70
Comparison of Street Paving Materials	71
First Cost.....	71
Maintenance	72
Traction	75
Footing	76
Cleanliness	76
Noise	77
Repairs	77
Sanitary Value.....	78
Size of Brick.....	79
Foundation	80
Drumming	81
Durability of Paving Brick.....	82
Paving Statistics.....	84
Specifications for Brick Paving.....	86
Grading and Preparing the Roadbed for Superstructure	87
Intersection with Streets and Alleys.....	88
Cement	89
Sand and Limestone Screenings.....	90
Broken Stone or Washed Gravel.....	90
Concrete	91
Crushing	91
Vitrified Brick Wearing Surface.....	93
Guarantee	95
General Stipulations.....	99
Payments	103
N. P. B. M. A. Specifications.....	107
Grading	108
Curbing	109
Foundation	111
Sand Cushion.....	113
Brick	114
Bricklaying	115
Rolling and Tamping.....	116
Expansion Cushion.....	117
Filler	118

PREFACE.

Since the first edition of this booklet was published in 1895, the paving brick industry has developed into one of the large, firmly established industries of this country, while the merits of vitrified brick as a paving material are now so universally known that it has become the most popular of pavements for cities, towns and even counties.

After the industry got a successful foothold in 1885 there was such a rapid development during the following ten years and the demand and prices became so attractive that too many brickmakers rushed into the new and enticing field, for some were inadequately equipped to produce a good paver, or their clay was not suitable to make a durable paver, or, under the stimulus of growing markets and increasing prices they pursued the short-sighted policy of rushing out quantity, immaterial as to quality of the brick. In consequence, many poor brick were put on the market at a time when the public was not educated to distinguish between good, indifferent and bad brick—a paver was still only a paver to most consumers. There was also a woeful lack of harmony among city engineers as to what constituted a good paver, how to lay them and how to test them. The prompt work of the Testing Committee of the National Brickmakers' Association soon removed the latter confusion, while experience more slowly settled the former.

This setback, of which full advantage was taken by the competitors of brick, was not without its salutary effect, and since then the industry has been established on a more conservative, healthy basis. The small, imperfectly equipped plants have been succeeded by fewer but very much larger, well equipped factories that are under able business management, large stocks and usually several grades and sizes are carried, while the inexorable law of the "survival of the fittest" has eliminated those whose clays were not suitable.

The use of paving brick is now mainly a question of freight. The weight of 1,000 pavers is so large, from four to six tons, that a long haul greatly increases their cost. The use of brick is, therefore, largely confined within a moderate radius of where suitable clays occur. Thus, New England, with its great wealth and dense population, has used comparatively little brick on account of the excessive freight, while local macadam is usually good and cheap. The state of Ohio, on the contrary, with its great abundance of suitable clays, has scarcely a town of 500 that has not at least paved its main street with brick.

Vitrified brick is now exclusively employed in many of the larger cities for sewers, for which its exceptional hardness pre-eminently adapts it, while its use is steadily growing among our more advanced architects for the exterior of buildings, for under skillful handling it lends itself readily to picturesque effects which not only do not fade, but remain clean—a feature that is so rare in any other building material in our western cities.

Very recently a careful comparison was made in Indianapolis (see *CLAY-WORKS* August, 1909) of all the various paving materials to find the one most suitable for a speedway for automobiles. After elaborate tests, in which no expense was spared, it was found that vitrified brick was the best. The decision is too recent to have the great influence that it at least prognosticates for the industry. For, with the very rapid growth in the use of the automobile and its increase in power, the enormous mileage of macadamized roads that this popular machine has developed will largely give way to brick, for the modern automobile is found to rapidly wear and heavily cut into even well maintained macadam roads.

The writer takes this opportunity to express his thanks and appreciation to the many engineers who favored him with local data and their personal experience.

St. Louis, Oct. 11, 1909.

H. A. WHEELER.

HISTORY OF PAVING BRICK.

Brick for street paving has been in use for more than a century in Holland, where the absence of natural paving material developed a very durable quality of paving brick by mixing the fine river silt or mud with sand. The village of Moor, on the river Yssel, is especially famous for the excellence of its brick and the magnitude of its paving brick industry.

**Development
Abroad.**

To a much less extent and for a shorter period, they have been used in northern England, especially in Staffordshire and Leeds; under the name of "blue brick" and "terro-metallic ware," where their application is restricted more to stables, chemical works and similar places where a non-absorbent brick is desired. When the clay is not readily fusible, slag, mill cinder, or chalk dust is added in English practice to secure the fluxing or vitrification that is so essential in this class of brick.

Paving brick was first used in the United States at Charleston, W. Va., in 1870, a town of 12,000, where a small section was laid as an experiment. This proving satisfactory, a block of one of their principal streets was paved in 1873, in grading for which it was necessary to take up the small section laid in 1870. This is still in use, although laid on a poor foundation of boards, and while the street has been repeatedly torn up for laying pipe, etc., it is still in fair condition after thirty-five years' service. A sample of this brick kindly sent by the city engineer, Mr. W. A. Hogue, shows it to be a side-cut, repressed, hard burned building brick of high density,

**Development in
the United
States.**