

ANSI/PCI 128-19
**SPECIFICATION FOR
GLASS-FIBER-REINFORCED
CONCRETE PANELS**

ANSI/PCI 128-19
**SPECIFICATION FOR
GLASS-FIBER-REINFORCED
CONCRETE PANELS**

Copyright © 2019
By Precast/Prestressed Concrete Institute
First printing, 2019

Substantial effort has been made to ensure that all data and information in this standard are accurate. However, PCI cannot accept responsibility for any errors or oversights in the use of materials or in the preparation of engineering plans. This standard is intended for use by professional personnel competent to evaluate the significance and limitations of its contents and able to accept responsibility for the application of the material it contains. Special conditions on a project may require more specific evaluation and practical engineering judgement.

Print book ISBN 978-1-7335488-0-9
Ebook ISBN 978-1-7335488-1-6

All rights reserved. This standard or any part thereof may not be reproduced in any form without the written permission of the Precast/Prestressed Concrete Institute.

Publisher's Cataloging-In-Publication Data
(Prepared by The Donohue Group, Inc.)

Names: Precast/Prestressed Concrete Institute, issuing body, publisher.
Title: Specification for glass-fiber-reinforced concrete panels.
Description: [Chicago, Illinois] : Precast/Prestressed Concrete Institute, [2019] | "ANSI/PCI 128-19." | "A PCI Standard." | Includes index.
Identifiers: ISBN 9781733548809 (print) | ISBN 9781733548816 (ebook)
Subjects: LCSH: Concrete panels--Specifications. | Fiber-reinforced concrete--Specifications. | Glass fibers--Specifications.
Classification: LCC TA683.5.P35 S64 2019 (print) | LCC TA683.5.P35 (ebook) | DDC 624.183414--dc23

Printed in U.S.A.

ANSI/PCI 128-19

**SPECIFICATION FOR
GLASS-FIBER-REINFORCED
CONCRETE PANELS**

FOREWORD

This standard provides minimum requirements for the design, manufacture, and installation of glass-fiber-reinforced concrete (GFRC) panels. The primary emphasis is on thin-walled alkali-resistant (AR) GFRC architectural cladding panels with a steel-frame support structure made by the spray-up process in controlled factory conditions.

This standard also includes minimum requirements for GFRC panels manufactured using the premix process in controlled factory conditions.

The potential of using GFRC systems was recognized during the developmental work on glass-fiber-reinforced plastics carried out in the 1940s. Early experience indicated that portland cement composites made with unprotected E-glass fiber (conventional glass-fiber reinforcement used in plastics) were subject to alkaline attack. Because of this fact, a special AR glass-fiber product was developed.

Following the successful development of AR glass fibers in the late 1960s, test programs were undertaken to determine the properties of portland cement and AR glass-fiber composites. AR glass fibers have been used in GFRC panels in the United States since the early 1970s.

The PCI GFRC Certification Committee developed this standard. Members of the PCI GFRC Certification Committee Task Group working on this standard were:

Task Group for PCI 128-19

Edward S. Knowles, PE, FPCI, Chair

Sidney Freedman, FPCI, FACI

Ray A. McCann, SE, FPCI, FACI

W. Michael Paris, PE

John Jones, B.Eng., FACI

Edwin A. McDougle, PE, FPCI

Bradley G. Williams, PE

James A. Lee

PREFACE

This standard was developed following the protocols required by the PCI Group Operations Manual. The provisions were balloted in the PCI Glass Fiber Reinforced Concrete Panels Committee. Review and comments by the PCI Technical Activities Council (TAC) followed and resulted in substantive changes to the standard. These changes were returned to TAC and accepted. The standard was then submitted to the PCI Standards Committee, where additional review and balloting took place. The membership of that committee is balanced according to the accreditation rules of the American National Standards Institute (ANSI). In addition, a public review period was provided, and public comments were resolved through the PCI Standards Committee. The entire process is a consensus process involving PCI members, nonmembers of PCI, and the general public.

Table of Contents

Chapter 1 – General

1.1 Scope 1
1.2 Definitions..... 1
1.3 Notation..... 3
1.4 Reference standards 3

Chapter 2 – Materials

2.1 General 5
2.2 Facing and backing 5
 2.2.1 Cement 5
 2.2.2 Facing materials 5
 2.2.3 Sand for backing 5
 2.2.4 Mixing water 5
 2.2.5 Admixtures and curing agents..... 5
2.3 Reinforcement 5
 2.3.1 Alkali-resistant glass fiber..... 5
2.4 Panel frame and hardware 6
 2.4.1 Panel frame 6
 2.4.2 Anchors and inserts..... 6
 2.4.3 Connection hardware 6
2.5 Welding..... 6
2.6 Coatings 6

Chapter 3 – Design

3.1 General 7
3.2 Design loads..... 7
3.3 Skin design..... 7
3.4 Panel frame design..... 8
3.5 Connection, anchor, and insert design..... 8
3.6 Joints..... 8

Chapter 4—Manufacturing

- 4.1 Glass-fiber-reinforced concrete panel manufacture9
- 4.2 Molds.....9
- 4.3 Proportioning.....9
- 4.4 Mist coat.....9
- 4.5 Placement of facing.....9
- 4.6 Spray-up of backing.....9
- 4.7 Panel frame10
- 4.8 Curing10
 - 4.8.1 Polymer admixture curing10
 - 4.8.2 Moist curing.....10

Chapter 5—Quality Control

- 5.1 General11

Chapter 6—Installation

- 6.1 General13
- 6.2 Connections13

Chapter 7—Premix Glass-Fiber-Reinforced Concrete

- 7.1 General15
- 7.2 Design.....15
- 7.3 Manufacturing15
- 7.4 Quality control15

- Commentary on Specification for Glass-Fiber-Reinforced Concrete Panels.....C-1**

Index