
**Performance guidelines for design
of concrete structures using fibre-
reinforced polymer (FRP) materials**

*Lignes directrices de performance pour la conception des structures
en béton utilisant des polymères renforcés de fibres (PRF)*

iTeh Standards
(<https://standards.itih.ai>)
Document Preview

[ISO 14484:2020](https://standards.itih.ai/catalog/standards/iso/924627b8-10f3-46b4-a472-edc668a491ec/iso-14484-2020)

<https://standards.itih.ai/catalog/standards/iso/924627b8-10f3-46b4-a472-edc668a491ec/iso-14484-2020>



iTeh Standards
(<https://standards.iteh.ai>)
Document Preview

[ISO 14484:2020](https://standards.iteh.ai/catalog/standards/iso/924627b8-10f3-46b4-a472-edc668a491ec/iso-14484-2020)

<https://standards.iteh.ai/catalog/standards/iso/924627b8-10f3-46b4-a472-edc668a491ec/iso-14484-2020>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2020

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

| | |
|--|-----------|
| Foreword | iv |
| Introduction | v |
| 1 Scope | 1 |
| 2 Normative references | 1 |
| 3 Terms and definitions | 1 |
| 4 Design basics | 2 |
| 4.1 General..... | 2 |
| 4.2 Design methodology..... | 2 |
| 5 Properties of materials | 2 |
| 5.1 Properties of concrete and steel..... | 2 |
| 5.2 Properties of FRP materials..... | 3 |
| 5.2.1 General..... | 3 |
| 5.2.2 FRP bars, grids, and plates..... | 3 |
| 5.2.3 FRP sheets..... | 3 |
| 5.2.4 Other FRP systems..... | 3 |
| 5.3 Resins..... | 3 |
| 6 Structural analysis | 3 |
| 7 Serviceability limit states | 4 |
| 7.1 General..... | 4 |
| 7.2 Calculation of stress and strain..... | 4 |
| 7.3 Cracking..... | 4 |
| 7.3.1 Allowable crack width..... | 4 |
| 7.3.2 Tension and flexural cracks..... | 4 |
| 7.3.3 Shear and torsion cracks..... | 4 |
| 7.4 Deflections..... | 4 |
| 8 Ultimate limit states | 5 |
| 8.1 General..... | 5 |
| 8.2 Axial and flexural capacity..... | 5 |
| 8.2.1 Axial strength and deformation capacity..... | 5 |
| 8.2.2 Flexural strength and deformation capacity..... | 5 |
| 8.3 Shear capacity..... | 5 |
| 8.3.1 Shear strength..... | 5 |
| 8.3.2 Punching shear strength..... | 5 |
| 8.3.3 Torsion..... | 6 |
| 8.4 Creep-rupture and fatigue..... | 6 |
| 9 General structural details | 6 |
| 9.1 FRP reinforcements/tendons..... | 6 |
| 9.1.1 Bent configurations..... | 6 |
| 9.1.2 Anchorages..... | 6 |
| 9.1.3 Splices..... | 6 |
| 9.2 Externally bonded FRP sheets/plates..... | 6 |
| 9.2.1 Anchorage of FRP sheets/plates..... | 6 |
| 9.2.2 Splice of FRP sheets/plates..... | 6 |
| 9.2.3 FRP sheets at rounded corners..... | 6 |
| 9.3 Near-surface mounted FRP reinforcement..... | 7 |
| 9.3.1 Dimension of grooves..... | 7 |
| 9.3.2 Anchorage of near-surface mounted FRP reinforcement..... | 7 |

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 71, *Concrete, reinforced concrete and pre-stressed concrete*, Subcommittee SC 6, *Non-traditional reinforcing materials for concrete structures*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

This second edition cancels and replaces the first edition (ISO 14484:2013), which has been technically revised. The main changes compared to the previous edition are as follows:

- the scope of the document now extends from concrete structures with the sole use of FRP materials to those with the combined use of FRP materials and steel reinforcement;
- the compressive strength of FRP materials is now allowed to be accounted for in design; and
- the creep-rupture and fatigue limit states of FRP materials have been specified.

Introduction

Continuous fibre-reinforced polymer (FRP) materials are widely applied to concrete structures. FRP materials have many advantages, such as a high strength/weight ratio and immunity to corrosion. FRP materials are available in a variety of geometries, including rod, grid, plate, sheet, strand, etc.

This document describes the general performance requirements for concrete structures with the use of FRP materials. This document is an umbrella document with general provisions and guidelines and lists the regional consensus guidelines/standards that are deemed to satisfy this document. Regional guidelines/standards are generally more prescriptive in nature and vary somewhat from region to region.

This document is intended to provide wide latitude in terms of general requirements for performance verification and assessment of concrete structures with the use of FRP materials. It is meant to be used in conjunction with sound engineering judgment.

iTeh Standards (<https://standards.itih.ai>) Document Preview

[ISO 14484:2020](https://standards.itih.ai/catalog/standards/iso/924627b8-10f3-46b4-a472-edc668a491ec/iso-14484-2020)

<https://standards.itih.ai/catalog/standards/iso/924627b8-10f3-46b4-a472-edc668a491ec/iso-14484-2020>

