

---

---

**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)*



Reference number  
ISO 14484:2013(E)



**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2013

All rights reserved. Unless otherwise specified, 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  
Case postale 56 • CH-1211 Geneva 20  
Tel. + 41 22 749 01 11  
Fax + 41 22 749 09 47  
E-mail [copyright@iso.org](mailto:copyright@iso.org)  
Web [www.iso.org](http://www.iso.org)

Published in Switzerland

# Contents

Page

|                                            |           |
|--------------------------------------------|-----------|
| <b>Foreword</b>                            | <b>iv</b> |
| <b>Introduction</b>                        | <b>v</b>  |
| <b>1 Scope</b>                             | <b>1</b>  |
| <b>2 Normative references</b>              | <b>1</b>  |
| <b>3 Terms and definitions</b>             | <b>1</b>  |
| <b>4 Design basics</b>                     | <b>2</b>  |
| 4.1 General                                | 2         |
| 4.2 Design methodology                     | 2         |
| <b>5 Properties of materials</b>           | <b>2</b>  |
| 5.1 Properties of concrete and steel       | 2         |
| 5.2 Properties of FRP materials            | 2         |
| 5.3 Resins                                 | 3         |
| <b>6 Structural analysis</b>               | <b>3</b>  |
| <b>7 Serviceability limit states</b>       | <b>3</b>  |
| 7.1 General                                | 3         |
| 7.2 Calculation of stress and strain       | 3         |
| 7.3 Cracking                               | 4         |
| 7.4 Deflections                            | 4         |
| <b>8 Ultimate limit states</b>             | <b>4</b>  |
| 8.1 General                                | 4         |
| 8.2 Axial and flexural capacity            | 4         |
| 8.3 Shear capacity                         | 5         |
| <b>9 General structural details</b>        | <b>5</b>  |
| 9.1 FRP reinforcements/tendons             | 5         |
| 9.2 Externally bonded FRP sheets/plates    | 6         |
| 9.3 Near-surface mounted FRP reinforcement | 6         |