

ISO/TR 24679-5:2023-07 (E)

Fire safety engineering - Performance of structures in fire - Part 5: Example of a timber building in Canada

| | Contents | Page |
|---|----------|------|
| Foreword | | iv |
| Introduction | | v |
| 1 Scope | | 1 |
| 2 Normative references | | 1 |
| 3 Terms and definitions | | 1 |
| 4 Design strategy for fire safety of structures | | 2 |
| 4.1 General design process for fire safety of structures | | 2 |
| 4.2 Practical design process for fire safety of structures | | 2 |
| 5 Quantification of the performance of structures in fire | | 2 |
| 5.1 Step 1: Scope of the project for fire safety of structures | | 2 |
| 5.1.1 Built-environment characteristics | | 2 |
| 5.1.2 Fuel loads | | 6 |
| 5.1.3 Mechanical actions | | 8 |
| 5.2 Step 2: Identifying objectives, functional requirements and performance criteria for fire safety of structures | | 8 |
| 5.2.1 Objectives and functional requirements for fire safety of structures | | 8 |
| 5.2.2 Performance criteria for fire safety of structures | | 9 |
| 5.3 Step 3: Trial design plan for fire safety of structures | | 10 |
| 5.4 Step 4: Design fire scenarios and design fires (thermal actions) | | 10 |
| 5.4.1 General | | 10 |
| 5.4.2 Design fire scenarios | | 11 |
| 5.4.3 Design fires (thermal actions) | | 12 |
| 5.5 Step 5: Thermal response of the structure | | 34 |
| 5.5.1 Charring of timber | | 34 |
| 5.5.2 Description of the thermal properties | | 37 |
| 5.5.3 Scenario 3 | | 38 |
| 5.5.4 Temperature beyond the char layer | | 50 |
| 5.6 Step 6: Mechanical response of the structure | | 51 |
| 5.6.1 Description of the mechanical properties | | 52 |
| 5.6.2 Scenario 3 - Beam B1 | | 52 |
| 5.6.3 Scenario 3 - Column C2 | | 56 |
| 5.7 Step 7: Assessment against the fire safety objectives | | 60 |
| 5.7.1 Beam B1 | | 60 |
| 5.7.2 Column C2 | | 60 |
| 5.8 Documentation of the design for fire safety of structures | | 61 |
| 5.9 Factors and influences to be considered in the quantification process | | 61 |
| 5.9.1 Material properties | | 61 |
| 5.9.2 Effect of continuity and restraint (interaction between elements and materials) | | 62 |
| 5.9.3 Use of test results | | 62 |
| 5.9.4 Fire spread routes | | 62 |
| 6 Guidance on use of engineering methods | | 62 |
| 6.1 Using calculation methods | | 62 |
| 6.2 Using experimental methods | | 62 |
| 6.3 Using engineering judgment | | 62 |
| Bibliography | | 64 |