

# DIN EN 12159:2024-11 (E)

## Builders hoists for persons and materials with vertically guided cages

---

| <b>Contents</b>         |  | <b>Page</b> |
|-------------------------|--|-------------|
| European foreword ..... |  | 4           |
| Introduction .....      |  | 5           |
| <b>1</b>                | <b>Scope .....</b>   | <b>6</b>    |
| <b>2</b>                | <b>Normative references .....</b>  | <b>7</b>    |
| <b>3</b>                | <b>Terms and definitions .....</b>   | <b>9</b>    |
| <b>4</b>                | <b>Safety requirements and/or protective/risk reduction measures .....</b> | <b>11</b>   |
| 4.1                     | Design considerations .....  | 11          |
| 4.2                     | Load combinations and calculations .....                                   | 11          |
| 4.2.1                   | General .....  | 11          |
| 4.2.2                   | Calculation of structure .....   | 11          |
| 4.2.3                   | Proof calculation .....  | 16          |
| 4.2.4                   | Limit states .....   | 17          |
| 4.2.5                   | Proof of competence .....  | 17          |
| 4.2.6                   | Methods for the proof of competence .....                                  | 18          |
| 4.2.7                   | Stability .....  | 20          |
| 4.2.8                   | Fatigue stress analysis of drive and braking system components .....       | 21          |
| 4.3                     | Base frame .....   | 21          |
| 4.4                     | Mast, ties and buffers .....   | 22          |
| 4.4.1                   | Guide structures and masts .....   | 22          |
| 4.4.2                   | Mast ties .....  | 22          |
| 4.4.3                   | Buffers .....  | 22          |
| 4.5                     | Hoistway protection and landing access .....                               | 22          |
| 4.5.1                   | General .....  | 22          |
| 4.5.2                   | Hoist base enclosure .....   | 23          |
| 4.5.3                   | Landing access .....   | 23          |
| 4.5.4                   | Full height gates (see Figure 5) .....                                     | 24          |
| 4.5.5                   | Reduced height gates (see Figure 6 and Figure 7) .....                     | 25          |
| 4.5.6                   | Materials for enclosure and guarding .....                                 | 27          |
| 4.5.7                   | Landing gate locking devices .....   | 28          |
| 4.5.8                   | Clearances .....   | 29          |
| 4.6                     | Cage .....   | 30          |
| 4.6.1                   | General requirements .....   | 30          |
| 4.6.2                   | Overspeed safety devices against falling of the cage .....                 | 32          |
| 4.6.3                   | Overload detection device .....  | 33          |
| 4.7                     | Drive unit .....   | 33          |
| 4.7.1                   | General provisions .....   | 33          |
| 4.7.2                   | Protection and accessibility .....   | 34          |
| 4.7.3                   | Rack and pinion drive .....  | 34          |
| 4.7.4                   | Braking system .....   | 37          |
| 4.8                     | Electric installations and appliances .....                                | 38          |
| 4.8.1                   | General .....  | 38          |
| 4.8.2                   | Protection against electric faults .....                                   | 38          |
| 4.8.3                   | Protection against the effects of external influences .....                | 39          |
| 4.8.4                   | Electric wiring .....  | 39          |
| 4.8.5                   | Contactors, relay-contactors .....   | 39          |
| 4.8.6                   | Electrical safety devices .....  | 39          |
| 4.8.7                   | Safety contacts .....  | 41          |

|                        |   |    |
|------------------------|---|----|
| 4.8.8                  | Lighting .....  | 41 |
| 4.9                    | Control and limiting devices .....  | 41 |
| 4.9.1                  | General .....   | 41 |
| 4.9.2                  | Travel limit switches .....   | 41 |
| 4.9.3                  | Erection accessories .....  | 42 |
| 4.9.4                  | Stopping devices .....  | 42 |
| 4.9.5                  | Stopping the hoist .....  | 42 |
| 4.9.6                  | Control modes .....   | 42 |
| 4.10                   | Breakdown conditions .....  | 44 |
| 4.10.1                 | Alarm device .....  | 44 |
| 4.10.2                 | Emergency escape .....  | 44 |
| 4.10.3                 | Emergency operation by a competent person .....   | 44 |
| 5                      | Verification of safety requirements and/or protective/risk reduction measures .....   | 44 |
| 5.1                    | Verification of design .....  | 44 |
| 5.2                    | Verification tests .....  | 47 |
| 5.2.1                  | Introduction .....  | 47 |
| 5.2.2                  | Locking devices for cage and landing gates .....  | 48 |
| 5.2.3                  | Overspeed safety device and overspeed governors .....   | 49 |
| 5.2.4                  | Energy accumulation type buffers with buffered return movement and energy<br>dissipation buffers .....                          | 50 |
| 5.3                    | Verification tests on each hoist before first use .....   | 50 |
| 6                      | Information for use .....   | 51 |
| 6.1                    | Instruction handbook .....  | 51 |
| 6.1.1                  | Comprehensive information .....   | 51 |
| 6.1.2                  | of the instruction handbook .....   | 51 |
| 6.2                    | Markings .....  | 56 |
| 6.2.1                  | General .....   | 56 |
| 6.2.2                  | Rating plate .....  | 56 |
| 6.2.3                  | Mast or guide section identification label .....  | 56 |
| 6.2.4                  | Basic user information label .....  | 56 |
| 6.2.5                  | Label in the cage .....   | 57 |
| 6.2.6                  | Label on the roof .....   | 57 |
| 6.2.7                  | Label at ground level .....   | 57 |
| 6.2.8                  | Label at overspeed safety device and/or overspeed governors .....   | 57 |
| 6.2.9                  | Drive motor label .....   | 57 |
| 6.2.10                 | Marking of control elements .....   | 57 |
| Annex A (informative)  | European storm wind map .....   | 58 |
| Annex B (normative)    | Electrical safety devices .....   | 60 |
| Annex C (informative)  | List of significant hazards .....   | 62 |
| Annex ZA (informative) | Relationship between this European Standard and the essential<br>requirements of Directive 2006/42/EC aimed to be covered ..... | 64 |
| Bibliography           | .....   | 68 |