

# ISO 10535:2021-10 (E)

## Assistive products - Hoists for the transfer of persons - Requirements and test methods

---

Contents		Page
Foreword .....		vii
Introduction .....		viii
1	Scope .....	1
2	Normative references .....	1
3	Terms and definitions .....	2
4	General requirements and test methods .....	8
4.1	General requirements .....	8
4.1.1	Risk management .....	8
4.1.2	Ergonomic factors .....	8
4.1.3	Noise and vibration .....	8
4.1.4	Safety of moving and folding parts .....	9
4.1.5	Prevention of traps for parts of the human body .....	10
4.1.6	V-shaped openings .....	11
4.2	General test methods .....	11
4.2.1	Test conditions .....	11
4.2.2	Apparatus .....	11
4.2.3	Permissible errors of test equipment .....	12
4.2.4	Test report .....	12
4.2.5	Safety and performance requirements .....	16
4.2.6	Test methods for general safety requirements .....	19
4.3	Requirements for body-support units .....	22
4.4	Central suspension point .....	22
4.4.1	Requirements for central suspension point .....	22
4.4.2	Test method for the central suspension point .....	22
4.5	Spreader bar .....	22
4.5.1	Requirements for spreader bar .....	22
4.5.2	Test methods for the spreader bar .....	23
4.6	Performance .....	23
4.6.1	Requirements for performance .....	23
4.6.2	Test methods for performance .....	23
4.7	Rate of movements of the hoist .....	24
4.7.1	Requirements for rate of lifting and lowering .....	24
4.7.2	Test methods for rate of lifting and lowering .....	24
4.7.3	Requirements for rate of powered horizontal movement .....	24
4.7.4	Test methods for rate of powered horizontal movement .....	24
4.8	Operating forces/torques .....	24
4.8.1	Requirements for operating forces/torques .....	24
4.8.2	Test methods for operating forces/torques .....	25
4.9	Durability .....	25
4.9.1	Requirements for durability .....	25
4.9.2	Test methods for durability .....	25
4.10	Hydraulic components .....	27
4.10.1	Requirements for hydraulic components .....	27
4.10.2	Test methods for hydraulic components .....	28
4.11	Pneumatic components .....	28
4.11.1	Requirements for pneumatic components .....	28

4.11.2	Test methods for pneumatic components .....	28
4.12	Machine washable hoists .....	29
4.12.1	Requirements for machine washable hoists .....	29
4.12.2	Test methods for machine washable hoists .....	29
4.13	Requirement for information supplied by the manufacturer .....	30
4.13.1	General .....	30
4.13.2	Instructions for use .....	30
4.13.3	Labelling .....	32
5	Mobilehoists--Specificrequirementsandtestmethods .....	37
5.1	General requirements .....	37
5.2	Static strength .....	37
5.2.1	Requirements for static strength .....	37
5.2.2	Test methods for static strength .....	37
5.3	Static stability .....	38
5.3.1	Requirements for static stability .....	38
5.3.2	Test methods for static stability .....	38
5.4	Immobilizing device (brakes) .....	38
5.4.1	Requirements for immobilizing device (brakes) .....	38
5.4.2	Test methods for immobilizing device (brakes) .....	38
5.5	Moving forces .....	39
5.5.1	Requirements for moving forces .....	39
5.5.2	Test methods for moving forces .....	39
5.6	Requirement for information supplied by the manufacturer .....	40
5.6.1	Pre-sale information .....	40
6	Mobilehoistsfortransferringapersoninstandingposition--Specificrequirements and test methods .....	41
6.1	General requirements .....	41
6.2	Static strength .....	41
6.2.1	Requirements for static strength .....	41
6.2.2	Test method for static strength .....	41
6.3	Static stability .....	41
6.3.1	Requirements for static stability .....	41
6.3.2	Test methods for static stability .....	42
6.4	Immobilizing device (brakes) .....	43
6.4.1	Requirements for immobilizing device (brakes) .....	43
6.4.2	Test methods for immobilizing device (brakes) .....	43
6.5	Moving forces .....	43
6.5.1	Requirements for moving forces .....	43
6.5.2	Test methods for moving forces .....	43
6.6	Durability .....	43
6.6.1	Requirements for durability .....	43
6.6.2	Test methods for durability .....	43
6.7	Requirement for information supplied by the manufacturer .....	44
6.7.1	Pre-sale information .....	44
7	Stationaryhoists--Specificrequirementsandtestmethods .....	44
7.1	General requirements .....	44
7.2	Specific safety requirements .....	45
7.2.1	Requirements for specific safety requirements .....	45
7.2.2	Test methods for specific safety requirements .....	45
7.3	Static strength (free-standing stationary hoists only) .....	45
7.3.1	Requirements for static strength (free-standing stationary hoists only) .....	45
7.3.2	Test methods for static strength (free-standing stationary hoists only) .....	45
7.4	Static stability (free-standing stationary hoists only) .....	46
7.4.1	Requirements for static stability (free-standing stationary hoists only) .....	46
7.4.2	Test methods for static stability (free-standing stationary hoists only) .....	46
7.5	Static strength for all other stationary hoists .....	47
7.5.1	Requirements for static strength for all other stationary hoists .....	47
7.5.2	Test methods for static strength for all other stationary hoists .....	47

7.6	Requirement for information supplied by the manufacturer .....	47
7.6.1	User information .....	47
8	<b>Non-rigid body-support units--Specific requirements and test methods .....</b>	<b>47</b>
8.1	General requirements .....	47
8.2	Requirements for material and seams of the non-rigid body-support unit .....	47
8.3	Test methods for non-rigid body-support unit .....	48
8.3.1	Test methods for non-rigid body-support unit designed to be laundered .....	48
8.3.2	Test method for durability for non-rigid body-support unit .....	48
8.4	Requirement for information supplied by the manufacturer .....	48
8.4.1	Pre-sale information .....	48
8.4.2	User information .....	48
8.4.3	Labelling .....	49
9	<b>Rigid body-support units--Specific requirements and test methods .....</b>	<b>49</b>
9.1	General requirements .....	49
9.2	Requirements for backrest .....	50
9.3	Requirements and test methods for durability .....	50
9.4	Requirement for information supplied by the manufacturer .....	50
9.4.1	User information .....	50
9.4.2	Labelling .....	50
10	<b>Bathtub hoists--Specific requirements and test methods .....</b>	<b>51</b>
10.1	General requirements .....	51
10.1.1	General .....	51
10.1.2	Risk analysis .....	51
10.1.3	Ergonomic factors .....	51
10.1.4	Noise .....	51
10.1.5	Safety of moving and folding parts .....	51
10.1.6	Prevention of traps for parts of the human body .....	51
10.1.7	V-shaped openings .....	51
10.2	General test methods .....	52
10.2.1	Test conditions .....	52
10.2.2	Test equipment .....	52
10.2.3	Permissible errors of test equipment .....	52
10.2.4	Test report .....	52
10.3	Safety requirements .....	52
10.3.1	General safety requirements .....	52
10.3.2	Test methods for general safety requirements .....	52
10.4	Body-support units .....	53
10.5	Spreader bar .....	53
10.6	Performance .....	53
10.7	Rate of movements of the hoist .....	53
10.8	Operating forces/torques .....	53
10.9	Durability .....	53
10.9.1	Requirements for durability .....	53
10.9.2	Test methods for durability .....	53
10.10	Static strength and stability .....	54
10.10.1	Requirements for static strength and stability .....	54
10.10.2	Test methods for static strength and stability .....	54
10.11	Hydraulic components .....	54
10.12	Pneumatic components .....	55
10.13	Specific safety requirements .....	55
10.13.1	Requirements for specific safety requirements .....	55
10.13.2	Test methods for specific safety requirements .....	55
10.14	Non-rigid body-support units .....	55

<b>10.15</b>	<b>Rigid body-support units -- Requirements .....</b>	<b>55</b>
<b>10.16</b>	<b>Requirement for information supplied by the manufacturer .....</b>	<b>55</b>
<b>10.16.1</b>	<b>General .....</b>	<b>55</b>
<b>10.16.2</b>	<b>Instructions for use .....</b>	<b>55</b>
<b>10.16.3</b>	<b>Labelling .....</b>	<b>55</b>
<b>Annex A (informative)</b>	<b>Rationale for specific safety requirements .....</b>	<b>56</b>
<b>Annex B (informative)</b>	<b>Periodic inspection and maintenance .....</b>	<b>58</b>
<b>Annex C (informative)</b>	<b>Compatibility of hoist/spreader bar/body-support units .....</b>	<b>61</b>
<b>Annex D (informative)</b>	<b>Guidelines for colour coding for size of non-rigid body-support units .....</b>	<b>74</b>
<b>Bibliography</b>	<b>.....</b>	<b>75</b>