LIQ Laboratório Industrial da Qualidade	**REGISTO DE ENSAIO** **TEST REGISTER**	Modelo de registo: LE131-4.d

EN 131-4
Ladders – Part 4: Single or multiple hinge-point ladders

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Adress.....:	Rua dos Sobrais, nº 655 Zona Industrial Sul – Apartado 70 3885-307 CORTEGAÇA, OVAR
Manufacture.....:	FERRAL – José Luís & Cª. Lda.
Adress.....:	Rua dos Sobrais, nº 655 Zona Industrial Sul – Apartado 70 3885-307 CORTEGAÇA, OVAR
Standard.....:	EN 131-4:2020 EN 131-1: 2015 + EN 131-2:2010+A2:2017 + EN 131-3:2018
Tested appliance .....:	Multiple hinge-joint ladder
Trade Mark.....:	FERRAL
Model/Type reference .....:	MULTIUSOS 4X3
Ratings.....:	Total length: 3460 mm (12 rungs); 3 hinge-joints; Rung: 30X30X1,2 mm; Profile: 60X22X1,3 mm.
Observations.....:	

Possible test case verdicts:

- The case does not apply to the test object : N/A
- Test object does meet the requirement : P
- Test object does not meet the requirement : F
- Not verified : ---

General remarks:

1) The test results presented in this report relate only to the object tested. 2) This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory. 3) "(See appended table)" refers to a table appended to the report. 4) "(See remark #)" refers to a remark appended to the report. 5) "(###/###)" refers to the internal code of testing equipment.

Testing

Date of receipt of test item ..... : 2022-07-28

Date of begin of test item ..... : 2022-08-15

Date of end of test item ..... : 2022-08-30

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Clause	Requirement + Test	Result - Remark	Verdict

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4	**FUNCTIONAL SIZES**		
4.1	General		
	Dimensions are given in EN-131-1.		P
	If these ladders can be used as leaning ladders, then functional dimensions for leaning ladders shall apply.	(See appended Table 2.1)	P
	If these ladders can be used as standing ladders the functional dimensions for two-piece combination shall apply.	(See appended Table 2.2)	P
	The inner width b1 shall be measured as shown in figure 10.		P
4.2	Hinged ladders in “platform position”		
	If the decking component fits within the stiles the gap shall be no more than 5 mm (see figure 11).		P
	If the decking component fits across the stiles, the overhang shall be no more than 25 mm on each side.		P
	The platform shall be centred at ± 10 mm in relation to the longitudinal axis of the ladder.		P
	Where decking components consist of multiple elements, they shall be assembled such that a person cannot fall through them.		P
4.3	Hinged ladders in “stand-off” position		
	Functional dimensions for “stand-off” position.		N/A
5	**REQUIREMENTS**		
5.1	General		
	The requirements are based upon a maximum total load of 150 kg.		P
	Hinge-joint ladders are determined to be used by one person at a time.		P
5.2	Decking component		
	If the multiple hinge ladder can be used in a platform position, the decking component shall be delivered with the product.		P
	The decking component shall be secured against unintentional movement and shall have a durable slip resistant working surface.		P
	It shall be designed so as to be unable to slip and tilt on the ladder.		P
5.3	Ladder hinged in the longitudinal direction		
	All hinges should be locked in the position of use except for the centre hinge in the standing ladder position, which may be unlocked.		P
	The storage position (folded) is not required to be lockable.		P
6	**TEST METHODS**		
6.1	General		
	General provisions, see EN 131-2.		P
	After each of the tests specified in Annex A, the ladder shall remain functional with no fracture or visible cracks.		P
	The ladders shall sustain the load without ultimate failure.		P
	Permanent deformation is permitted.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	After the test, fold the ladder completely to its storage/transportation position and open it again completely. During this movement the locking system shall function without any interference.		P
	After the test, the hinges/locking systems shall remain functional in all positions.		P
6.2	Tests method for hinge ladders		
6.2.1	Principle		
	All the ladders conforming to Clause 3 shall comply with all tests and requirements specified in Annex A.		P
6.2.2	Strength test for ladders with hinges in longitudinal direction		
	The test shall be carried out on the complete ladder.		P
	The test shall be carried out on the maximum extended ladder according to the manufacturer's instruction.	L = 3060 mm (A15/002)	P
	Lateral or pole type stabilizers shall not be deployed in this test if the design permits the ladder to be used with the lateral or pole type stabilizers removed or temporarily adjusted as permitted by EN 131-1:2015+A1:2019, 4.2.1, General.		P
	Where the ascendable side cannot be determined by the construction of the product the ladder shall be test twice. For the second test the ladder shall be rotated 180◦ about the longitudinal axis. For the test of the second side a new ladder shall be used.		P
	Erect the ladder in its position of use at the maximum extension.		P
	Leaning ladders shall be erected at (65±0,5)◦ (measured at vertical height of 1 m) with the top resting against a smooth vertical surface and with the base of the ladder restrained where it makes contact with the ground to prevent it slipping.	(A15/002; A11/003)	P
	The test load F in figure 13 from table 3 shall be applied to the rung or tread nearest the centre of the ladder and at a point 50mm from the inside of one stile and distributed over a 100 mm of the length of the rung or tread for a period of 1 min.	F = 2250 N (A22/007; D21/033)	P
	Care should be taken to apply the load smoothly.		P
	Where the test ladder includes a base stabilizer bar then clearance under both stiles of the ladder of a minimum 10 mm shall exist throughout the test, e.g. putting distance pads under the feet.		P
	On completion of the test remove the load and inspect the ladder.		P
	The locking mechanism shall work correctly.		P
	The ladder shall remain upright and not break.		P
	Permanent deformation is only acceptable providing the ladder remains fully functional and it does not impar the fitness for use, or safety, of the ladder.		P
6.2.3	Additional strength test for ladders with more than one pair of hinges in longitudinal direction		
	For all ladders with more than one pair of hinges the following will also apply: Lateral or pole type stabilizers shall not be deployed in this test if the design permits the ladder to be used with the lateral or pole type stabilizers removed or temporarily adjusted as permitted by EN 131-1:2015+A1:2019, 4.2.1, General.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Where the ascendable side cannot be determined by the construction of the product the ladder shall be test twice. For the second test the ladder shall be rotated 180◦ about the longitudinal axis. For the test of the second side a new ladder shall be used.		P
	Erect the ladder in its position of use at the maximum extension.	L = 3060 mm (A15/002)	P
	Leaning ladders shall be erected at (65±0,5)◦ (measured at vertical height of 1 m) with the top resting against a smooth vertical surface and with the base of the ladder restrained where it makes contact with the ground to prevent it from slipping.	(A15/002; A11/003)	P
	The test load F in figure 14 from table 13 shall be applied to the rung or tread nearest the centre of the ladder and at a point 50mm from the inside of one stile and distributed over a 100 mm of the length of the rung or tread for a period of 1 min.	F = 2250 N (A22/007; D21/033)	P
	For the second test the ladder shall be rotated 180◦ about the longitudinal axis.		P
	Care should be taken to apply the load smoothly.		P
	The locking mechanism shall work correctly.		P
	The ladder shall remain upright and not break.		P
	Permanent deformation is only acceptable providing the ladder remains fully functional and it does not impar the fitness for use, or safety, of the ladder.		P
6.2.4	Cyclic test of hinge point		
	These tests are conducted on all hinge joints types with an automatic locking device.		---
	To test their operation, hinge joints (lateral and longitudinal hinge joint ladders) shall withstand the cyclic tests.		---
	The pair of hinge joints to be tested shall be fitted in a ladder or part of a ladder with a minimum of two rungs on both sides of the hinges (see figure 13) shall be subjected to a series of 4000 cycles from the closed position to the fully open position.		---
	The hinge point shall be locked and unlocked in each of its positions during the course of each cycle at the normal utilization speed.		---
	No oil shall be added to the hinge joints during the tests.		---
	For a ladder which has different types of hinge with different locking positions, each hinge type shall fulfil this test and requirements.		---
	Automatic locking function shall operate with no manual intervention for a duration of 4000 cycles.		---
6.2.5	Test of the ladder in the platform position		
6.2.5.1	General		
	The tests shall be conducted on the complete assembly of decking components with the ladder in the platform position.		P
6.2.5.2	Strength test of the decking component		
	Establish the position of the load point for the test in the most unfavourable position (between two rungs) for bending of the decking component.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Place the ladder in the platform position with the horizontal part supported by rollers underneath two adjacent rungs, on the underside of stiles, so that the feet shall not be in contact with the ground.		P
	The rollers shall be cylindrical with diameters between 25 mm and 100 mm and one shall be free to rotate the other shall be fixed.		P
	Install the decking components in accordance with the manufacturer's instructions.		P
	Apply a pre-load F of 100 N as shown in figure 15 to the load point, distributed over a 200 mm x 200 mm rigid steel plate for a period of 1 min. The weight of the plate is included in the pre-load. Care should be taken to apply the load smoothly.	(A02/002; A22/007)	P
	Remove the pre-load and establish an origin for measurement, on the underside of the decking component, underneath the centre of the load point.		P
	Apply the test load F of 1471 N to the load point distributed over a 200 mm x 200 mm rigid steel plate. The weight of the plate is included in the test load. Care should be taken to apply the load smoothly.	(A02/002; A22/007)	P
	After 1 min, measure the deformation of the decking component under load.		P
	Remove the load and after 1 min measure the residual deformation.		P
	Deformation under load shall be less than or equal to 1 % of the decking component(s) length or width.		P
	Residual deformation shall be less than or equal to 0,1 % of the decking component(s) length or width.		P
	Where there are more than one decking components and they vary in design or in the way they are supported then repeat the test on each decking component.		P
6.2.5.3	Strength test for the ladder and decking components in the platform position		
	With the ladder in the platform position, install the decking components in accordance with the manufacturer's instructions.		P
	Position a 200 mm x 200 mm rigid steel plate at the centre of the platform's longitudinal axis with one of its edges aligned against one edge of the decking component.		P
	The test load non-professional ladders is 2250 N. The weight of the plate is included in the test load.	(A02/002)	P
	The test load professional ladders is 2700 N. The weight of the plate is included in the test load.		N/A
	Apply the test load, distributed over the steel plate, for a period of 1 min.	(A22/007)	P
	After the test, ladder shall remain functional with no fracture or visible cracks.		P
	The ladders shall sustain the load without ultimate failure.		P
	Permanent deformation is permitted.		P
	After the test, fold the ladder completely to its storage/transportation position and open it again completely. During this movement the locking system shall function without any interference.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	After the test, the hinges/locking systems shall remain functional in all positions.		P
6.2.5.4	Stability test if the ladders in the platform position		
	With the ladder in the platform position, install the decking components in accordance with the manufacturer's instructions.		P
	Apply a load of 750 N distributed over a 200 mm x 200 mm rigid steel plate at the centre of the platform's longitudinal axis with one of its edges aligned against one edge of the decking component.		P
	The plate shall be centre in the longitudinal direction of the decking component (see figure 16).		P
	A horizontal test force F of 300 N shall be applied to the platform level with its upper surface and in the most unfavourable direction and position.		P
	With the test force applied, the ladder shall not overturn.	The feet lift off the ground but the ladder don't overturn.	P
6.2.5.5	Test of decking component sliding		
	With the ladder in the platform position, install the decking components in accordance with the manufacturer's instructions.		P
	Establish origins for measurement of longitudinal and lateral movement of the decking component when subjected to the test load.		P
	A horizontal test load of 300 N shall be applied to one edge of the decking component in the direction of its longitudinal axis for a period of 1 min.	(A22/007; D21/033)	P
	Remove the test load and inspect the decking component for longitudinal movement.		P
	Repeat the test with the test load applied to the opposite edge and in the opposite longitudinal direction.		P
	Repeat the test above but apply the test load in the direction of the decking components lateral axis and inspect the decking components for lateral movement.		P
	Where there are more than one decking components, and they vary in design or in the way they are supported, then repeat the test on each decking component.		P
	When examined for movement, the decking component shall not have moved more than 5 mm in relation to the origins for measurement.	d= 5 mm	P
	When examined for movement, the decking component shall continue to meet the dimensional requirements for decking components specified in 4.2.		P
6.2.6	Cyclic test of hinge joints for lateral hinge ladders		
	All the ladders with hinge joints shall be subjected to a series of folding and unfolding operations allowing the resistance of the hinge joints to be tested.		N/A
	A series of 4000 cycles from working positions to storage position shall be carried out at the normal utilization speed.		N/A
	No oil shall be added during the tests.		N/A
	After the test, ladder shall remain functional with no fracture or visible cracks.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	The ladders shall sustain the load without ultimate failure.		N/A
	Permanent deformation is permitted.		N/A
	After the test, fold the ladder completely to its storage/transportation position and open it again completely. During this movement the locking system shall function without any interference.		N/A
6.2.7	Capacity to pass from storage positions to working position in lateral direction		
	The test shall be carried out on the complete ladder.		P
	The purpose of the test is to verify that the ladder cannot be used in a dangerous inverted condition.		P
	Place the ladder in the working position in accordance with the manufacturer's instructions but in a vertical position.		P
	Then inverter the ladder so that its top is resting on a hard and horizontal supporting surface (see figure 18).		P
	Apply the test load F of 150 N distributed over a length of 100 mm at the centre of the ladders rung or tread nearest to the horizontal supporting surface.		P
	With the test load applied the ladder shall not remain in a working position in accordance with the manufacturer's instructions.		P
	No rupturing of parts shall be observed.		P
	If the ladder is equipped with an automatic locking system, it shall be locked and unlocked in each of its extreme positions during the course of each cycle. In this case, the automatic locking function shall operate at the end of the test.		P
---	Test according EN 131-2		
5.2	Strength test for all ladders		
	The test shall be carried out on the complete ladder (see figure 10).	L= 3060 mm (A15/002)	P
	In the case of an extending ladder, the test shall be carried out with the ladder fully extended.		N/A
	In the case of a combination ladder, the test shall be carried out with the ladder fully extended in all of its usable configurations.		N/A
	In the case of standing ladders, the test shall be carried out with the ladder fully extended in the position of use.		N/A
	In the case of sectional ladders, the test shall be carried out with the ladder at full length with all permitted pieces.		N/A
	Where the ascendable side of the ladder cannot be determined by the construction of the product, it shall be tested twice.		N/A
	For the test on the second side a new ladder shall be used.		N/A
	Prior to carrying out the test on the second side of the new ladder, it shall be subjected to all of the preceding tests in the test sequence given in Table A.1.		N/A
	Ladders with separately extending stiles shall be tested with their stiles in the least favourable position.		N/A
	Lateral or pole type stabilizers shall not be deployed in this test if the design permits the ladder to be used with the lateral or pole type stabilizers removed or temporarily adjusted as permitted by EN 131-1:2015, 4.2.1, General.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Erect the ladder in its position of use at the maximum extension, at (65 ± 0,5)°.	(A11/003)	P
	The top shall rest against a smooth vertical surface and with the base of the ladder shall be restain where it makes contact with the ground to prevent it slipping.		P
	The test load *F* shall be applied to the rung or tread nearest the centre of the ladder and at a point 50 mm from the inside of one stile and distributed over a 100 mm of the length of the rung or tread for a period of 1 min.	(A22/007)	P
	Apply a test load of 2250 N for non-professional ladders.	(D21/033)	P
	Apply a test load of 2700 N for professional ladders.		N/A
	Where the test ladder includes a base stabilizer bar then clearance under both stiles of the ladder of a minimum 10 mm shall exist throughout the test.		P
	The ladder shall remain functional with no fracture or visible cracks.		P
	The ladder shall sustain the load without ultimate failure.		P
	Permanent deformation shall be allowed.		P
	The ladder shall remain functional with no fracture or visible cracks.		P
	The ladder shall sustain the load without ultimate failure.		P
	Permanent deformation shall be allowed.		P
5.3	Bending test of the stiles		
	The test shall be carried out on the complete ladder.		P
	In the case of extending ladders and combination ladders the test shall be carried out on the complete extended ladder.		N/A
	Sectional ladders shall be tested at full length with all permitted pieces.		N/A
	The test shall be carried out without supporting legs if not permanently fixed to the ladder.		P
	Where the ascendable side cannot be determined by the construction of the product, the ladder shall be tested twice. For the second test the ladder shall be rotated 180° about the longitudinal axis.		P
	Where it is a multiple part combination ladder, the ladder shall be tested twice. For the second test the ladder shall be rotated 180° about the longitudinal axis.		N/A
	The test load shall be slowly applied in the middle of the ladder equally to both stiles over a width of 100 mm.	*L* = 3060 mm (A15/002)	P
	A pre-load of 100 N shall be applied for the duration of one min.	(A02/002)	P
	The position of the ladder after removal of the pre-load is the origin for the measurement.		P
	A test load *F* of 750 N shall be applied vertically on the centre of the ladder for a duration of at least 1 min.	(A02/002; A11/004)	P
	Deflection measured (f)	f_{meas} = 45,79 mm (I01/23)	P
	Maximum permissible deflection (f_{max}):		
	- Length ≤ 5 m, $f_{max} = 5 \times L^2 \times 10^{-6}$ (mm)	f_{max} = 46,82 mm	P

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	- Length > 5 m e ≤ 12 m, f_{max} = 0,043 x *L* - 90 (mm)		N/A
	- Length > 12 m, f_{max} = 0,06 x *L* -294 (mm)		N/A
5.4	Lateral deflection test of the ladder		
	This test shall be conducted on all one-piece ladders as well as on each ascendable part of multiple piece ladders.		P
	The test shall be conducted also on the supporting-legs of standing rung- or step-ladders.		P
	The ladder shall be placed in the lateral position.		P
	A pre-load of 100 N shall be applied for the duration of one min to the lower stile equidistant from the supports.	L = 3060 mm (A15/002; A02/002; A11/004)	P
	The position of the ladder after removal of the pre-load is the origin for the measurement.		P
	A load *F* of 250 N shall be applied to the lower stile equidistant from the supports.	(A02/002; A11/004)	P
	The deflection is measured equidistant from the supports 1 min after loading.	f_{meas} = 8,32 mm (I01/23)	P
	Thereby the maximum permissible deflection *f*max as a function of the distance *l* between the supports shall be f_{max} = 0,005 x *L* (mm).	f_{max} = 15,3 mm	P
5.5	Bottom stile ends test		
	Place the ladder laterally, with the longitudinal axis of the ladder in the horizontal position.		N/A
	The lower stile is to be fixed to the support so that the stile ends overhang the supporting surface		N/A
	If the rungs/steps are bolted, riveted, or similarly fixed to the stile the edge of the support shall be in line with the bottom lower edge of the assembling hole.		N/A
	If the rungs/steps are fixed to the stile without the stile being penetrated the edge of the support shall be in line with the lower edge of the rung/step.		N/A
	If the ladder has a bar type stabilizer then this test is not carried out.		P
	A rigid load block 50 mm wide is placed with its end up to and parallel with the end of the stile.		N/A
	A vertical force *F* of 1 100 N is placed in the middle of the load block and is maintained for one min.		N/A
	The permanent deflection after removal of the test load together with any damages are noted.		N/A
	The test is repeated on the lower stile without turning the ladder.		N/A
	The permanent deflection *f* in each test shall not exceed 2 mm.		N/A
	Neither fracture nor visible cracks are allowed.		N/A
	This test shall also be performed on supporting legs.		N/A
5.6	Vertical load on rungs, steps and platforms		
5.6.1	General		

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Clause	Requirement + Test	Result - Remark	Verdict
	A pre-load *F* of 200 N shall be applied for the duration of one min.	(A02/002; A11/004)	P
	The position of the rung/step/platform after removal of the pre-load is the origin for measurement.		P
5.6.2	Rungs and steps		
	In the position of use of the ladder a test load *F* of 2 600 N shall be applied vertically on the mid-point of the weakest rung or step of any design evenly distributed over a width of 100 mm and a depth equal to the rung/step and for the duration of one min.	(A02/002; A11/004)	P
	Inner width b_1 measured underneath the tested step.	b_1 = 283,11 mm (D04/002)	P
	Maximum permanent deformation after removal of the test-load shall be: fmax ≤ 0,5% X b_1.	f_{max} = 1,42 mm f_{meas} = 0,2 mm (A22/002)	P
5.6.3	Platform		
	The platform shall be tested at two positions, in the centre and at a corner of the front edge.		N/A
	With the ladder positioned as in use, a test load *F* of 2 600 N, uniformly distributed over an area of 100 mm × 100 mm shall be applied for the duration of one min.		N/A
	Inner width *b*1 shall be measured from above the platform parallel to the rungs or steps at the point where the load has been applied.		N/A
	The maximum permanent deformation after removal of each test load shall be: fmax ≤ 0,5% X b_1.		N/A
	The requirement after the second test shall be that no permanent deformation greater than 0,5 % of *b*1 is visible at the connection between platform and stile measured from the underside.		N/A
5.7	Torsion test of rungs and steps		
	A torque *M* of 50 Nm shall be applied on the midpoint of the rung or step via a 100 mm wide clamping device. The torque shall be applied alternately 10 times in clockwise and 10 times in counter-clockwise direction for a period of 10 s each.		P
	During testing there shall be no relative movement in the connection between stile and rung/step.		P
	After the test a permanent deformation shall be 1° at maximum with a tolerance of ± 0,2°.	0 ° (A11/003)	P
5.8	Test of opening restraints and hinges of standing ladders		
5.8.1	General		
	Each leg of the ladder in the working position is placed on a platform provided with multidirectional rollers.		P
	The effects of friction, from both the rollers and floor surface, shall be negligible. The test is to be conducted on a clean, smooth finish concrete floor.		P
	After removal of the test loads of the tests according to 5.8.2 to 5.8.4 no visible permanent deformation shall occur on the hinge joints, opening restraint devices and their attachments.		P

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	The ladder shall not show any visible damages such as cracks, indentations, etc.		P
	Permanent deformation is acceptable only if it does not impair the fitness for use of the ladder.		P
5.8.2	Bilaterally ascendable ladder		
	The test load *F* of 2 600 N is divided into two loads of 1300 N, distributed over two plates each 100 mm long with a width at least equal to the surface of the rung or step to be applied to the uppermost rung or step as close as possible to the stiles for a duration of 1 min.	(A02/002; A22/007)	P
	This test is then repeated on the other leg.		N/A
5.8.3	Standing ladder with platform		
	The test load *F* of 2 600 N is divided into two loads of 1 300 N, distributed over two plates that are each 100 mm × 100 mm to be applied to front edge of the platform as close as possible to the stiles for a duration of 1 min.		N/A
	This test is then repeated on the rear edge of the platform.		N/A
5.8.4	Unilaterally ascendable ladder		
	The test load *F* of 2 600 N is divided into two loads of 1 300 N, distributed over two plates each 100 mm long with a width at least equal to the surface of the rung or step to be applied to the uppermost rung or step of the ascending leg as close as possible to the stiles for a duration of 1 min.		N/A
5.9	Test for ladder rung/step hooks of extending ladders and combination ladders		
	The ladder is extended by at least one rung/step distance and placed in a vertical position.		P
	A uniformly distributed test load *F* of 3500 N shall be applied vertically to the upper part of the ladder for a period of 1 min.	(A02/002; A22/007)	P
	After removal of the test load, there shall be no permanent deformation which impairs the fitness for use of the ladder.		P
5.11	Feet pull test		
5.11.1	For ladder feet made of one part		
	Fix the ladder. Attach a fixing to the centre of a ladder foot. The force is to be applied in a direction most likely to separate the foot from the stile.		N/A
	A load of 150 N shall be applied for 1 min.		N/A
	After the test, the foot shall remain functional and show a separation from the stile of less than or equal to 4 mm.		N/A
5.11.2	For feet made of one part on stabilizer bars supplied by the ladder manufacturer		
	Prevent the ladder from moving by placing stops around one pair of feet.		P
	Apply the force to a free foot in the position and direction most likely to separate the foot from the stabilizer bar.		P
	A load of 150 N shall be applied for 1 min.	(A11/002)	P
	After the test, the foot shall remain functional and show a movement from its original position of less than or equal to 4 mm.	d = 1 mm (I01/23)	P
5.11.3	For ladder feet and feet of stabilizer bars made of more than one part		
	The relevant test in 5.11.1 or 5.11.2 shall be performed.		N/A

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	Additionally, the section of the foot that generates resistance to movement relative to the ground shall have a load of 150 N applied for 1 min in a location and direction that is likely to be the most critical, as determined by the tester.		N/A
	After the test, there shall be no indication of separation between the different parts of the foot.		N/A
	If the sections of the ladder foot that provide the friction between the ladder and the ground are loosened or lost, this shall be clearly visible when the ladder is in the position of use.		N/A
	The sections of the ladder foot that are designed to provide the friction between the ladder and the ground shall be the only part of the foot in contact with the ground under user or test load with in the position of use.		N/A
	This part of the ladder foot, even when worn, shall not be capable of being pushed inside the upper part of the foot when the ladder is in the position of use.		N/A
5.12	Test on hand-/kneerails		
5.12.2	Side handrail		
	Set up the ladder in its position of use and at its fully extended length in accordance with the manufacturer's instructions		N/A
	Place a stop to prevent movement of the foot of the stile to which the handrail being tested is attached. Apply a static load *F* of 400 N over a 100 mm pad to the centre of the rung or tread nearest the centre of the extended ladder.		N/A
	Maintain this load in position for the duration of the tests. Apply each test force according to Table 3 sufficiently slowly to eliminate any dynamic effects.		N/A
	Apply each force 10 times and maintain it for 5 s each time.		N/A
	Apply outward forces A, B and C in two directions (perpendicular and parallel to the plane of the ladder) and downward force D parallel to the plane of the ladder.		N/A
	Apply the forces given in Table 3 at the positions shown in Figure 25 and apply the outward forces A, B and C also at any other point on the handrail which due to its design is likely to cause failure.		N/A
	Apply each force separately.		N/A
	Upon completion of the tests there shall be no failure of handrail fixings		N/A
	A The permanent deformation at the points of application of load shall not exceed 15 mm.		N/A
	The distance between the stile and the handrail during the test shall not be less than 15 mm.		N/A
5.15	Torsion test for standing ladders		
	The test shall be carried out on all standing ladders and all combination ladders in standing ladder mode.		P
	The test shall be carried out with the standing ladder in the position of use on a flat, smooth and level floor.		P
	One stile of the front section shall be secured to locate the ladder.		P
	Mark the floor adjacent to the other stile to form a datum for measurement.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	A rigid steel load bar is secured to the front face of the ladder at the level of the topmost rung or step or in the case of a platform ladder, at the level of the platform.		P
	The load bar shall project sideways 0,5 m horizontally from the centre line of ladder and on the opposite side of the ladder to the clamp.	(A15/002)	P
	A vertical load *F*1 of 736 N uniformly distributed, is applied to topmost rung or step or the platform of the ladder.	(A02/002)	P
	A horizontal load *F*2 of 137 N shall be applied to the end of the load bar towards the rear of the ladder perpendicular to the bar and parallel to the ground.	(D04/001)	P
	The front stile of the ladders that is not clamped to the floor shall not move more than 25 mm from its datum position whilst the horizontal load is applied.	d = 0 mm (A15/002)	P
5.17	Durability test for standing ladders		
5.17.1	General		
	This test is for standing ladders or any ladder that can be used as a standing ladder.		P
	The test has criteria of 10000 cycles for non-professional class and 50000 cycles for professional class and this test to be a conditioning test before the test of opening restraints and hinges of standing ladders.	Non-professional class: 10000 cycles.	P
5.17.2	Principle		
	The standing ladder is placed in position of use on the testing surface with the 4 standing ladder stiles constrained to a fixed part by elastic rope/tape to prevent excessive progressive movement of the standing ladder-		P
	Two equal loads *P*1 and *P*2 are applied to the standing ladder by testing apparatus following a well-defined load versus time law of cycles: one load is applied to the topmost rung/step/platform and the other one is applied to the rung/step in the middle of the ascending leg.		P
	The load application shall continue until the defined load value is no longer maintained by the thrust device or until to the collapse of standing ladder or until the defined number of cycles for each class has been achieved.		P
5.17.4	Test condition - Ambient condition		
	The ambient temperature shall be (20 ± 5) °C before testing and remain within this temperature range during the test.		P
5.17.5	Test requirements		
	The load shall be applied to achieve the pattern of loading as shown in Figure 34.		P
5.17.6	Test procedure		
a)	verify that no defects are present on the standing ladder;		P
b)	place the standing ladder in its position of use at its maximum extension with opening restraints engaged on the test surface with one of the rear feet positioned on the 20 mm thick flat raised element, in order to simulate an uneven surface (see Figure 30);		P

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Clause	Requirement + Test	Result - Remark	Verdict
c)	determine the rung/step at the position located horizontally from the mid-point of *l*2 on the ascending leg. If no rung/step is suitably positioned, then select the closest rung/step above this location;		P
d)	place one pad/cylinder (P2) on the rung/step determined in (c) so that its centreline is (70 ± 5) mm from the inside face of the stile corresponding to the side of the ladder where the rear foot is positioned on the 20 mm thick raised element (see Figures 32 and 33);		P
e)	adjust the pad/cylinder so that it is vertical distance to the rung/step surface is (5 ± 2) mm (see Figures 32 and 33);		P
f)	place the second pad/cylinder (P1) on the top rung/step/platform so that its centreline is (70 ± 5) mm from the inside face of the opposite stile to P2 and adjust it so that the vertical distance from the pad/cylinder to the rung/step surface is (5 ± 2) mm (see Figures 32 and 33);		P
g)	constrain each of the 4 ladder stiles to a fixed element (e.g.by elastic ropes, tapes) to prevent excessive progressive movement of the ladder;		P
h)	verify that each pad/cylinder is separately capable of exerting the test load of (1 500 ± 50) N;	(A18/002; D04/001)	P
i)	start the test as per the test load sequence described in 5.17.5;		P
j)	the load application shall continue until: 1) the defined load value of (1500 ± 50) N is not maintained by the thrust device (ladder collapse), or 2) the rupture of the standing ladder, or 3) the number of cycles required by the class has been reached without collapse or rupture of the standing ladder; 4) the maximum number of cycles of the test step is registered.		P
5.18	Base slip test for leaning ladders		
5.18.1	Ladders to be tested		
	All leaning ladders or ladders that may be used as a leaning ladder shall be tested in accordance with Table 5.		P
	Where the ascendable side cannot be determined, the test shall be repeated.		P
	For the second test the ladder shall be rotated 180° about its longitudinal axis.		P
	Optionally, a second ladder may be used.		P
	Where ladders have stabilizing devices they should be deployed in this test the way the manufacturer designed.		P
	In the case of combination ladders that may be used as a leaning ladder, they shall be tested as a leaning ladder.		P
	The feet of the ladder shall be new.		P
	The surface supporting the base of the ladder shall be a sheet of float glass conforming to the requirements of EN 572-2. The glass shall be of a suitable thickness to support the weight of the ladder.		P
	The surface supporting the upper end of the ladder shall be firm and smooth stainless steel, smooth glass or smooth high pressure laminate.		P

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Clause	Requirement + Test	Result - Remark	Verdict
5.18.3	Test procedure		
	The ladder shall be positioned at an angle of 75° or the maximum angle up to 75° permitted by the design.		P
	Its feet shall be on the float glass base and with the top of the ladder resting against the upper supporting surface.		P
	Confirm the angle of the ladder is correct by measuring it with an inclinometer accurate to within ± 0,5° positioned on the stiles and adjacent to the base of the ladder.		P
	The base of the ladder shall be restrained to prevent outward movement.		P
	A datum shall be established at the base of the ladder as the origin of measurement for outward movement of the feet of the ladder.		P
	The air temperature shall be measured within 100 mm measured horizontally from the ladder feet and at a height no greater than 10 mm from the float glass surface supporting the base of the ladder. The surface temperature of the float glass supporting the base of the ladder, the ladder feet and the air temperature surrounding the feet shall be (20 ± 2) °C before the testing and shall remain within this range during the testing.		P
	A vertical downwards test load of 1 471 N shall be applied to the midpoint of the fourth rung down from the top of the ladder	(A22/007; D21/033)	P
	The feet of the ladder shall be allowed to settle for a period of 2 min.		P
	The restraint preventing outward movement of the base of the ladder shall then be removed.		P
	After a period of 1 min the restraint preventing outward movement of the ladder shall be replaced.	(A22/007)	P
	Measure any outward movement of the ladder feet relative to datum established for the origin of measurement.		P
	Repeat the test procedure 4 times.		P
5.18.4	Test requirement		
	The ladder feet shall not move outwards more than 40 mm with respect to the origin for measurement.	d_1=0 mm d_2=0 mm d_3=0 mm d_4=0 mm	P
5.19	Strength test for lateral type stabilizers on leaning ladders which are in the plane of the ladder		
5.19.1	Test Procedure		N/A
	Position the ladder against a supporting vertical surface at an angle α of (75 ± 0,5)°.		N/A
	The supporting surface at the base of the ladder shall be smooth and level.		N/A
	Fix or block the ladder at the bottom end of the stiles to prevent outward movement during the test.		N/A
	Apply a vertical test load F of 1 471 N, through a point on a loading device which is attached to the rung/tread, 100 mm outside of the stile of the ladder and level with the first rung of the ladder above the uppermost connection point between the ladder and the stabilizer for a duration of 1 min.		N/A
	Remove the test load.		N/A
5.19.2	Test requirement		

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Clause	Requirement + Test	Result - Remark	Verdict
	After removal of the test load the ladder, stabilizers and their connections shall remain functional with no fracture or visible cracks.		N/A
5.20	Strength test for pole type stabilizers on leaning ladders which are not in the plane of the ladder		
5.20.1	Test procedure		
	Position the ladder in a tripod configuration on a smooth and level supporting surface at an angle α of (75 ± 0,5)° with its upper end unsupported.		N/A
	Extending ladders shall be set in the closed position.		N/A
	Fix or block the ladder and the poles at the bottom end to prevent movement during the test.		N/A
	Apply a vertical downwards test load *F* of 1471 N to a rigid block 100 mm wide, positioned centrally on the first rung of the ladder below the uppermost connection point between the ladder and the stabilizer for a duration of 1 min.		N/A
	Remove the test load.		N/A
5.20.2	Test requirement		
	After removal of the test load the ladder, stabilizers and their connections shall remain functional with no fracture or visible cracks.		N/A
5.21	Torsion test for leaning ladders		
5.21.1	Test Procedure		
	The test shall be carried out on the complete ladder.		P
	In the case of extending ladders and combination ladders the test shall be carried out on the complete extended ladder.		N/A
	Sectional ladders shall be tested at full length with all permitted pieces.		N/A
	Where the ascendable side of the ladder cannot be determined by construction of the product it shall be tested twice.		P
	For the test on the second side a new ladder shall be used.		P
	Prior to carrying out the test on the second side of the new ladder, it shall be subjected to all of the preceding tests in the test sequence given in Table A.1		P
	The ladder shall be placed horizontally with the climbing face uppermost on supports situated 200 mm from each end of the ladder. The supports shall be cylindrical with diameters between 25 mm and 100 mm and one shall be free to rotate about its longitudinal axis and the other shall be fixed.		P
	Measure the clear span between the supports. This is regarded as the test span for the purpose of this test.		P
	Apply a preload of 491 N, vertically, at the middle of the ladder, distributed over 50 mm for a duration of 30 s, so that the stiles are loaded equally.	(A02/002; A22/007)	P
	Remove this load and establish a datum.		P
	Then apply a test load of 638 N, to the centre point of one stile distributed over 50 mm.	(A02/002; A22/007)	P
	After a period of not less than 30 s from the application of the full test load, by any convenient means, measure the vertical deflection at the centre of the effective span of both stiles from the established datum.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Test Requirement		
	When tested in accordance with 5.21.1, the difference between the deflections of the two stiles shall meet the following equation: $f_1 - f_2 \leq 0{,}07b_u$	f1 = 39,1 mm f2 = 30,3 mm bu = 326 mm 8,7 ≤ 22,8 (I01/23; D04/004)	P
6	Marking and user instructions		
	Ladders should be marked with the relevant parts of EN 131 to which they fully comply and the year of revision(s).		P
	The marking shall be in accordance with EN 131-3.		P
	Marking shall be durable. The durability of the marking shall be checked by inspection and by rubbing the marking lightly, first for 15 s with a cloth soaked in water and then for 15 s with a cloth soaked in petroleum spirit.	(A22/007)	P
	There shall be no reduction in legibility at the conclusion of the test.		P
	Adhesive labels, where used, shall not have worked loose or become curled at the edges.		P
	User instructions in accordance with EN 131-3 shall be provided.		P
7	Certification		
	This standard may be a basis for a certification.		N/A
ANEXO B	A-deviations		
	A-deviation for Italy		N/A
	A-deviation for The Netherlands		N/A
	A-deviation for Sweden		N/A
7	**MARKING**		
	Ladders shall meet the marking requirements of EN 131-3.		P
	Marking shall comply with the requirements for durability according to EN 131-2.		P
8	**USER INSTRUCTIONS**		
	User instruction in accordance with EN 131-3 shall be provided.		P
	For hinge ladder according to Clause 3, the following information shall be stated in the user manual or on the ladder.		P
	When the hinge ladder is used as access equipment for a higher level, the ladder has to be secured against unintentional sideways sliding.		P
---	Verifications from EN 131-3		
4	**PROVISION OF SAFETY MARKING AND USER INSTRUCTIONS**		
	The producer shall be responsible for the content of the safety marking and user instructions and the provision of the instructions for each ladder.		P
	The safety marking and user instructions shall be in the language of the country where the ladder is originally placed on the market.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	The user instruction shall indicate that it shall be read before using the ladder.		P
	The distributor shall ensure that the safety marking and user instructions are provided for each ladder and that the user instructions are provided in the official languages of the country where the ladder is placed on the market.		P
6	**MARKING AND USER INSTRUCTION**		
6.1	General		
	All marking detailed under Clause 6 shall be fixed permanently, according to EN 131-2, to the ladder surface.		P
	The user instruction shall list the items to be inspected and checked - the minimum list of items is shown in Annex A.		P
	The user instruction shall be supplied with the ladder and should be made available on the producer's website also.		P
	The user instruction shall include identity and address of the producer and/or distributor including website address.		P
	User instructions shall repeat all safety markings which are on the ladder.		P
	The maximum number of safety signs should be reduced to a number that users are able to identify and comply with when using the ladder.		P
6.2	Basic marking on the ladder		
	Basic marking information may be given in the form of safety signs or text.		P
	The marking shall include:		P
a)	identity and address of the producer and/or distributor including website address for information about the ladder;		P
b)	type of ladder and possible modes of use (description of the type, number and length of the parts, maximum length of ladder in use, maximum standing height measured in position of use according to the recommendation of the manufacturer);		P
c)	classification of use “professional” or “non-professional” as specified in EN 131-2;	Non-professional	P
d)	number of the general standard EN 131 or if a dedicated standard exists (e.g. a multi-hinge ladder according to EN 131-4) the number of this standard (e.g. EN 131-4).;		P
e)	month and year of production and/or serial number (may also be stamped);	01-09-2022	P
f)	weight of the ladder (in kg) and maximal total load (in kg);	Weight = 14,94 kg Maximum total load = 150 kg	P
g)	insulation, if any.		N/A
	Information a), b), c) and f) shall also appear on the packaging or be otherwise clearly visible to the consumer before the purchase.		P
6.3	Safety marking and user instructions		
6.3.1	General		
	The basic safety marking shall be attached to all ladders and ladder parts which can be used separately as an easily viewed symbol.		P
	The marking to indicate the top most rung/step that shall be used for standing on, shall be placed:		

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Clause	Requirement + Test	Result - Remark	Verdict

	on the stile of the ladder adjacent to or on the last /allowed; or			N/A
	on the first /not allowed rung/step; or			N/A
	on the label for safety marking.			P
	The user instructions shall be written in the official languages of the country where the ladder is placed on the market in accordance with EN 82079-1.			P
6.3.3	Basic safety marking and user instructions for all ladders			
	Item/Text	Requirement		Verdict
		Safety marking	User instruction	
1	Warning, fall from the ladder. This warning sign shall appear on each marking on the ladder at the first place.	☒	☒	P
2	Refer to instruction manual/booklet	☒	☒	P
3	Inspect the ladder after delivery. Before every use visually check the ladder is not damaged and is safe to use. Do not use a damaged ladder.	☒	☒	P
4	Maximum total load	☒	☒	P
5	Do not use the ladder on a unlevel or unfirm base.	☒	☒	P
6	Do not overreach.	☒	☒	P
7	Do not erect ladder on contaminated ground.	☐	☒	P
8	Maximum number of users	☒	☒	P
9	Do not ascend or descend unless you are facing the ladder.	☐	☒	P
10	Keep a secure grip on the ladder when ascending and descending. Maintain a handhold whilst working from a ladder or take additional safety precautions if you cannot.	☐	☒	P
11	Avoid work that imposes a sideways load on ladders, such as side-on drilling through solid materials.	☐	☒	P
12	Do not carry equipment which is heavy or difficult to handle while using a ladder.	☐	☒	P
13	Do not wear unsuitable footwear when climbing a ladder.	☐	☒	P
14	Do not use the ladder if you are not fit enough. Certain medical conditions or medication, alcohol or drug abuse could make ladder use unsafe.	☐	☒	P
15	Do not spend long periods on a ladder without regular breaks (tiredness is a risk).	☐	☒	P
16	Prevent damage of the ladder when transporting e.g. by fastening and, ensure they are suitably placed to prevent damage.	☐	☒	P
17	Ensure the ladder is suitable for the task.	☐	☒	P
18	Do not use the ladder if contaminated, e.g. with wet paint, mud, oil or snow.	☐	☒	P
19	Do not use the ladder outside in adverse weather conditions, such as strong wind.	☐	☒	P
20	For professional use a risk assessment shall be carried out respecting the legislation in the country of use.	☐	☒	P

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Clause	Item/Text	Requirements	Verdict

21	When positioning the ladder take into account risk of collision with the ladder e.g. from pedestrians, vehicles or doors. Secure doors (not fire exits) and windows where possible in the work area.	☐	☒	P
22	Warning, electricity hazard. Identify any electrical risks in the work area, such as overhead lines or other exposed electrical equipment and do not use the ladder where electrical risks occur.	☐	☒	P
23	Use non-conductive ladders for unavoidable live electrical work.	☐	☒	P
24	Do not use the ladder as a bridge.	☐	☒	P
25	Do not modify the ladder design.	☐	☒	P
26	Do not move a ladder while standing on it.	☐	☒	P
27	For outdoor use caution to the wind.	☐	☒	P
28	If a ladder is delivered with stabilizer bars and these bars should be fixed by the user before the first use this shall be described on the ladder and in the user instruction.	☒	☒	P
29	Ladder for domestic use.	☒	☒	P
30	Ladder for professional use.	☒	☒	N/A
6.3.4	Leaning ladders – Additional requirements			
	Item/text	Safety marking	User instruction	
1	Leaning ladders with rungs shall be used at the correct angle.	☒	☒	P
2	Leaning ladders with steps shall be used that the steps are in a horizontal position.	☒	☒	N/A
3	Ladders used for access to a higher level shall be extended at least 1 m above the landing point and secured, if necessary.	☒	☒	P
4	Only use the ladder in the direction as indicated, only if necessary due to design of ladder.	☒	☒	N/A
5	Do not lean the ladder against unsuitable surfaces.	☒	☒	P
6	Ladder shall never be moved from the top.	☐	☒	P
7	Do not stand on the top three steps/rungs of a leaning ladder. For telescopic ladders the last metre shall not be used (see 6.3.9).	☒	☒	P
6.3.5	Standing ladders – Additional requirements			
	Item/text	Safety marking	User instruction	
1	Do not step off the side of standing ladder onto another surface.	☒	☒	P
2	Open the ladder fully before use.	☒	☒	P
3	Use the ladder with restraint devices engaged only.	☐	☒	P
4	Standing ladders shall not be used as a leaning ladder unless it is designed to do so.	☐	☒	P
5	Do not stand on the top two steps/rungs of a standing ladder without a platform and a hand/knee rail.	☒	☒	P
6	Any horizontal surface which looks like a platform on a standing ladder that is not designed for standing on (e.g. a plastic work tray) shall be clearly indicated on that surface, (only if necessary due to design of ladder).	☒	☒	N/A
6.3.6	Combination ladders – Additional requirements			

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Clause	Item/Text	Requirements	Verdict

	Item/Text	Safety marking	User instruction	
1	Do not climb above the rung or tread recommended by the producer, of a combination ladder used in the standing ladder position, with extending ladder at the top (see Figure 3) or in the stairway position – to be indicated on the rung.	☒	☒	N/A
	Alternatively, the rungs or treads not to be used may be indicated on the ladder – to be indicated on the ladder.	☒	☒	N/A
2	Locking devices shall be checked and be fully secured before use if not operated automatically.	☒	☒	N/A
	The minimum requirement shall always be: Do not climb above the top four steps/rungs.			N/A
	When the safety marking is indicated on the rung, the minimum height of these symbols shall be 15 mm and the minimum width shall be 30 mm.			N/A
6.3.7	Extending ladders – Additional requirements			
	Item/Text	Safety marking	User instruction	
1	Locking devices shall be checked and be fully secured before use if not operated automatically.	☒	☒	N/A
2	The loose end of the rope shall be tied to the ladder (only if necessary due to design of ladder).	☒	☒	N/A
6.3.8	Single or multi-hinge joint ladders – Additional requirements			
	Item/Text	Safety marking	User instruction	
1	Single or multiple joint ladders should be unfolded/folded when lying on the ground and not in its use position.	☐	☒	P
2	If the ladder is used as a platform, only deckings recommended by the ladder producer shall be used. The decking shall be secured before use (only if necessary due to design of ladder).	☒	☒	P
3	Prohibited positions (see EN 131–4:2007, Clause 7): M-position, upside-down position (only if necessary due to design of ladder).	☐	☒	P
4	Max. load of platform in scaffold position (see EN 131–4:2007, Clause 7) declared by the manufacturer (120 kg to 150 kg) (only if necessary due to design of ladder).	☒	☒	P
5	Ensure that the hinges are locked.	☒	☒	P
	Where a single or multi-hinge joint ladder is designed to be used as a leaning ladder, the safety marking and user instructions shall comply with the requirements of 6.3.4.			P
	Where a single or multi-hinge joint ladder is designed to be used as a standing ladder, the safety marking and user instructions shall comply with 6.3.5.			P
7	**REPAIR, MAINTENANCE AND STORAGE**			
	Repairs and maintenance shall be carried out by a competent person and be in accordance with the producer's instructions.			P
	For repair and replacement of parts, e.g. feet, if necessary contact the producer or distributor.			P
	Ladders should be stored in accordance with the producer's instructions.			P
	Ladders made of or using thermoplastic, thermosetting plastic and reinforced plastic materials should be stored out of direct sunlight.			P

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Clause	Item/Text	Requirements	Verdict
	Ladders made of wood should be stored in a dry place and shall not be coated with opaque and vapour-tight paints.		P
ANEX C	A-deviations		
	A-deviation for Sweden		N/A
	A-deviation for The Netherlands		N/A
	A-deviation for France		N/A

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TEST PLAN + FUNCTIONAL SIZES TABLES

TEST PLAN

Table 1 – Test plan

STANDARD	Sample/ Clause	MULTIUSOS 4X3
EN 131-1	4.1	☒
	4.2	☐
	4.3	☐
EN 131-4	6.2.2	☒
	6.2.3	☒
	6.2.4	☐
	6.2.5	☒
	6.2.6	☐
	6.2.7	☒
EN 131-2	5.2	☒
	5.3	☒
	5.4	☒
	5.5	☐
	5.6	☒
	5.7	☒
	5.8	☒
	5.9	☐
	5.11	☒
	5.12	☐
	5.15	☒
	5.17	☒
	5.18	☒
	5.21	☒
	6	☒

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TEST PLAN + FUNCTIONAL SIZES TABLES

FUNCTIONAL DIMENSIONS:

Table 2.1 - Functional dimensions for leaning position

LEANING POSITION MODEL: MULTIUSOS 4X3				
STILES	INTERIOR [mm]	--	--	VERDICT
t	22,3	--	22,3	---
DIMENSIONS	MINIMUM [mm]	MAXIMUM [mm]	MEASURED [mm]	VERDICT
b1	280	---	283,1	P
b2	673,8	---	675	P
DIMENSIONS	MINIMUM [mm]	MAXIMUM [mm]	MEASURED [mm]	VERDICT
l1	---	---	3460	N/A
l2	---	---	3285	N/A
l3	139,5	294,0	175	P
l4 top	139,5	294,0	205	P
l4 base	139,5	294,0	205	P
l5	230	300,0	280	P
Equipments: I01/22; A15/002; D04/002				

Table 2.2 - Functional dimensions for standing position

STANDING POSITION MODEL: MULTIUSOS 4X3				
STILES	ACCESS [mm]	--	--	VERDICT
t	22,3	--	--	---
DIMENSIONS	MINIMUM [mm]	MAXIMUM [mm]	MEASURED [mm]	VEREDICT
b1	280	---	283,1	P
b2	577,55	---	675	P
DIMENSIONS	MINIMUM [mm]	MAXIMUM [mm]	MEASURED [mm]	VERDICT
l3	140	295	130	F
l4	140	295	272	P
l5	230	300	279	P
l8	---	---	1665	---
ANGLES	MINIMUM [°]	MAXIMUM [°]	MEASURED [°]	VERDICT
αacc	65	75	73,1	P
ß	65	75	73	P
Equipments: I01/22; A15/002; D04/002; A11/003				

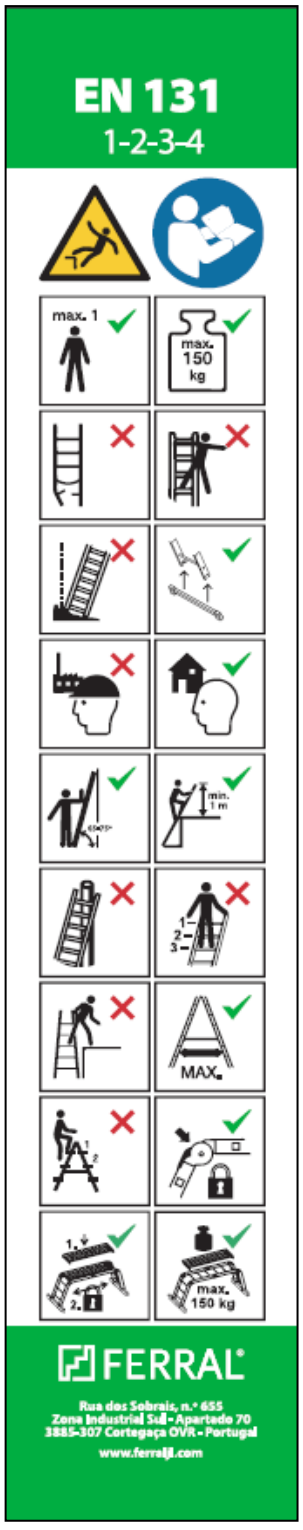
Table 2.3 - Functional dimensions for plataform position

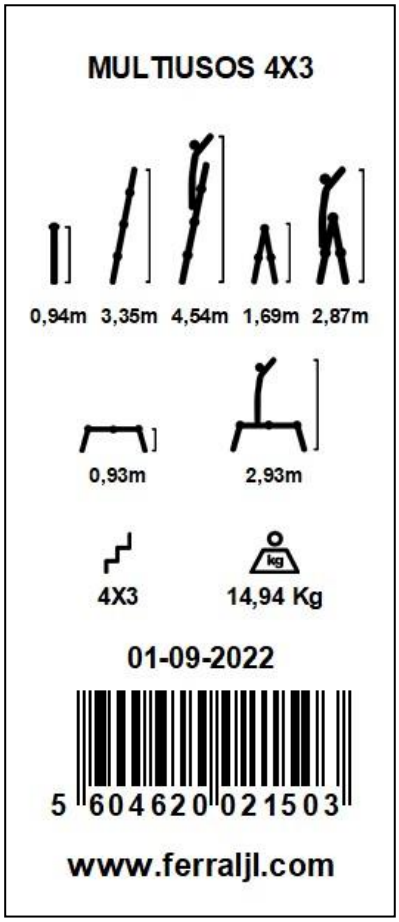
PLATFORM POSITION MODEL: MULTIUSOS 4X3				
DIMENSIONS	MINIMUM [mm]	MAXIMUM [mm]	MEASURED [mm]	VERDICT
h3	---	1000	900	P
l10	---	50	0	P
ANGLES	MINIMUM [°]	MAXIMUM [°]	MEASURED [°]	VERDICT
α^a	65	75	73,3	P
α^b	65	70	---	---
Equipments: I01/22; A15/002; D04/002; A11/003				

FIGURES

MARKING PLATES

MODEL:





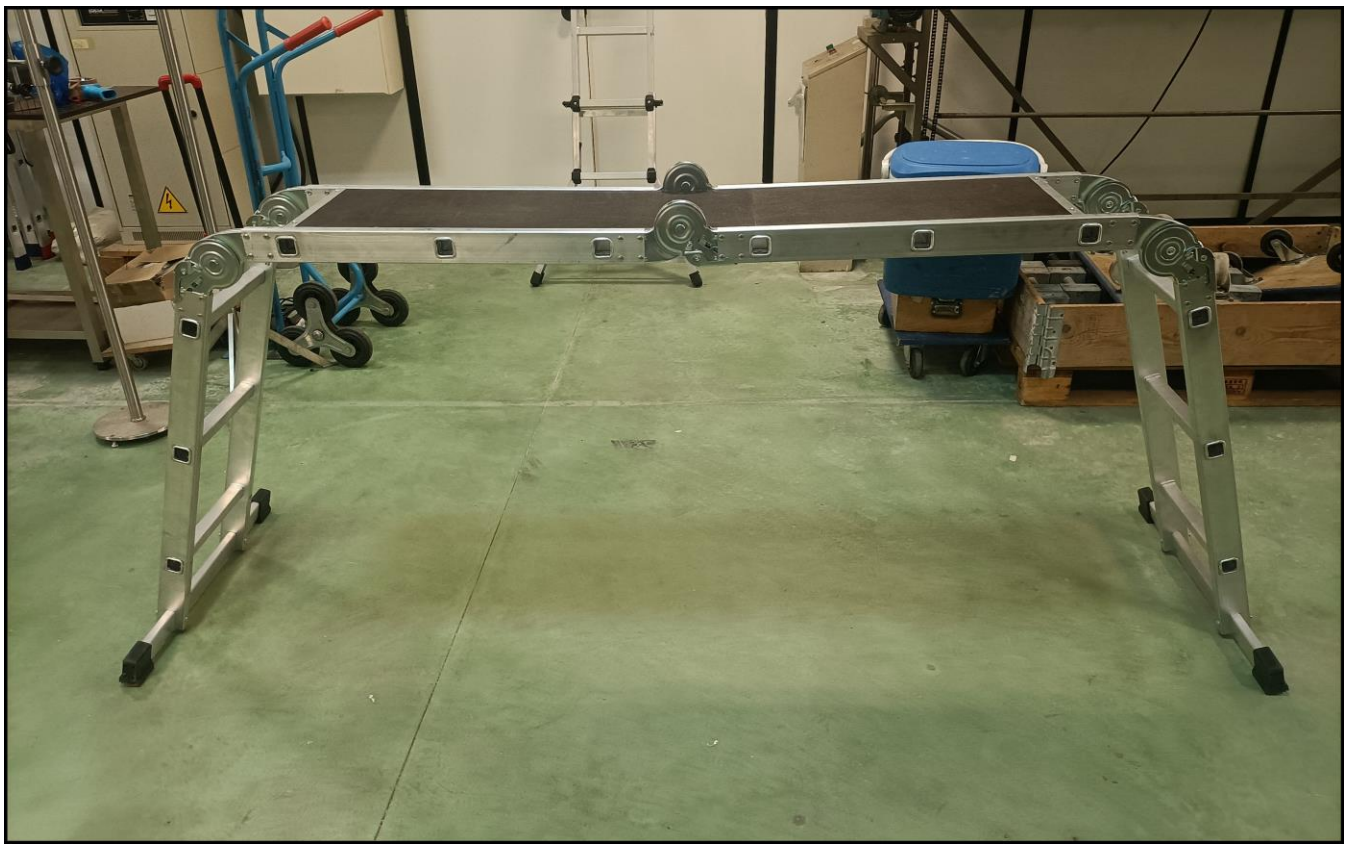
FIGURES



FIGURES

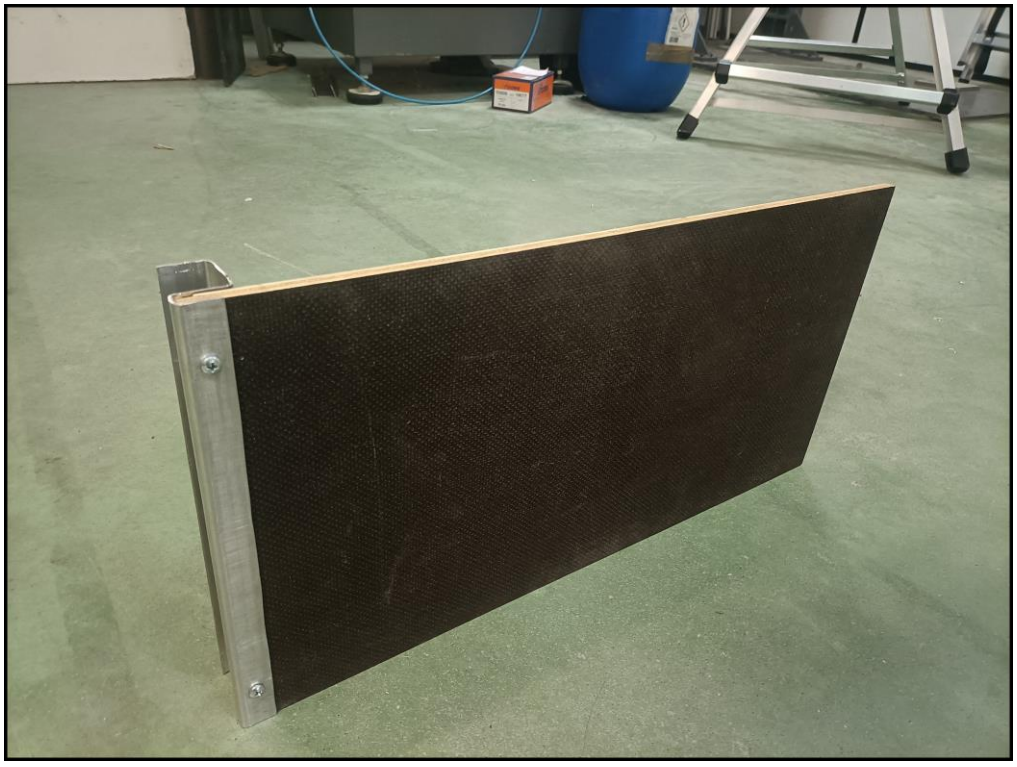


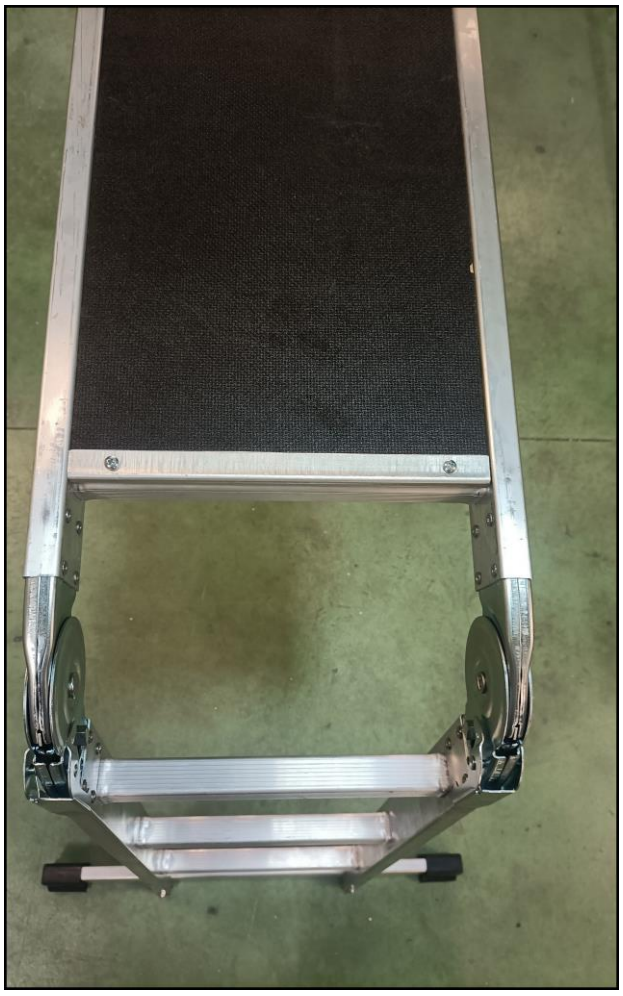
FIGURES



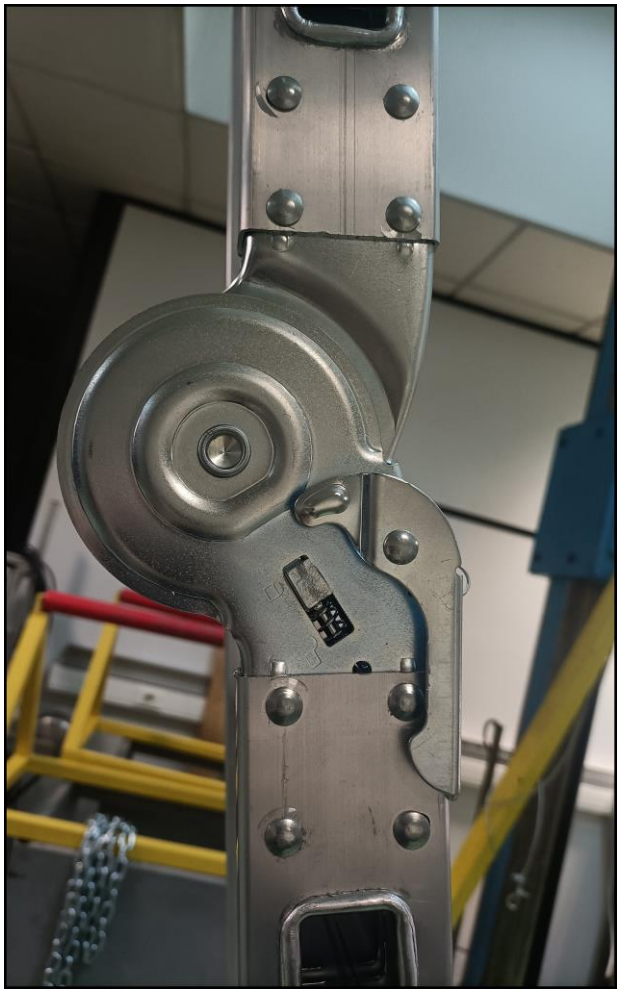


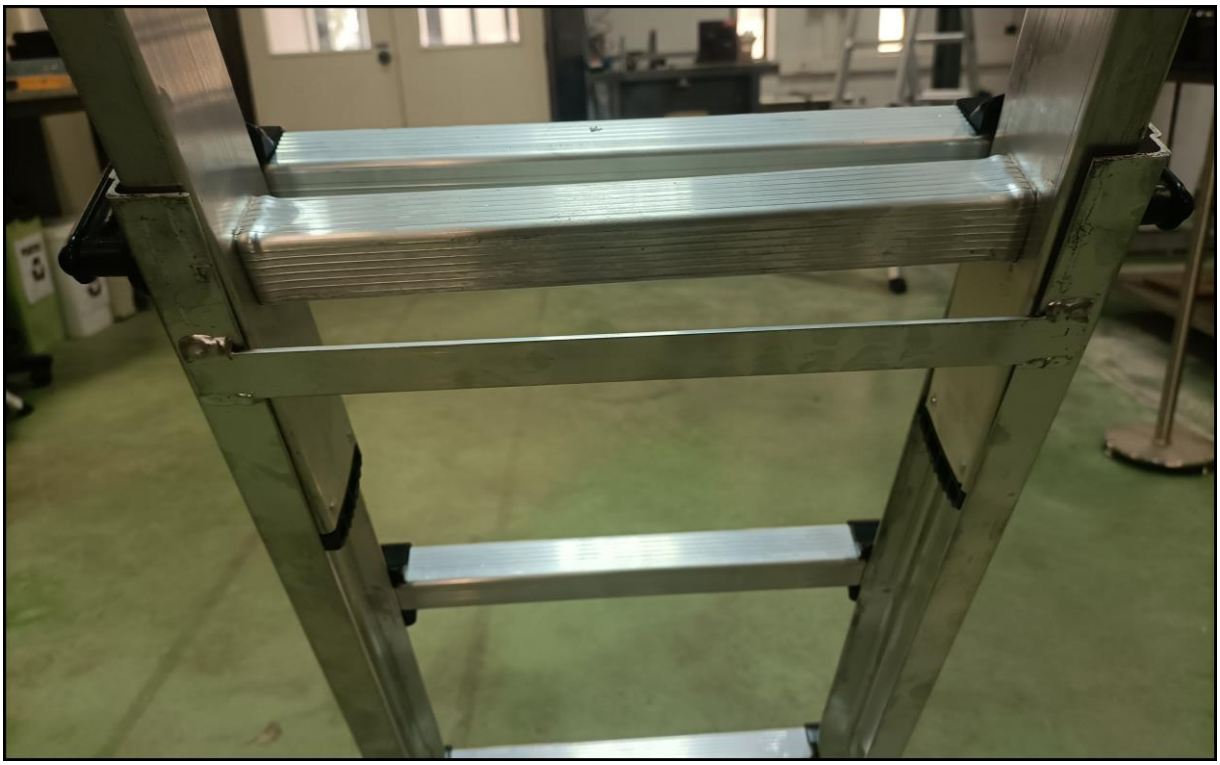
FIGURES





FIGURES





FIGURES

