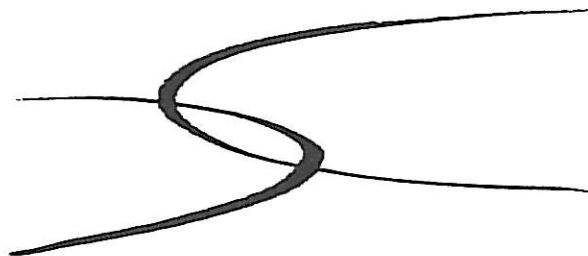


Danish Centre

for technical aids for rehabilitation and education



TESTING REPORT

MOBILE HOIST - ISO classification 12.36.03
in accordance with the European standard EN / ISO 10535:1998

Testing No.

00.13A

This page is page 1 of a total of 2 pages

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This report is not an approval of the product tested, but is merely a record of testing results for a
specific sample product

Product tested: **Faaborg Nordic Hoists**

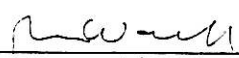
Product received d.: 08.05.2000

Testing notified by: Faaborg Rehab Technic
Fjellebrovej 75, V. Åby
DK - 5600 Faaborg
Tel. +45 62 61 50 53 Fax. +45 62 61 54 53

Person to contact: Torben K. Petersen

Product delivered by: The notifier

16.08.2000
DATE


testing executive: Bruno Wolff

Dept. of Mobility, quality assurance and testing
Gregersensvej
DK - 2630 Taastrup
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DANAK

Reg. nr. 347

SUMMARY OF THE TESTING

The sample product tested is a mobile hoist with a non-rigid body support unit. The hoist can be configured in three different versions distinguished by different loading and use. The manufacturer identifies the product / versions as follows:

- product name Nordic 165 / Nordic 135 / Nordic Stand Up
- serial no. (chassis) 694
- date of manufacture 4 – 2000

The testing was carried out in accordance with the following sections of the international standard EN ISO 10535 "Hoists for the transfer of disabled people – Requirements and test methods":

4 General requirements and test methods

5 Mobile hoists - Specific requirements and test methods

with the exception of 4.1.3: "Sound level", 4.3.2: "Electrical safety" and 4.3.18: "EMC".

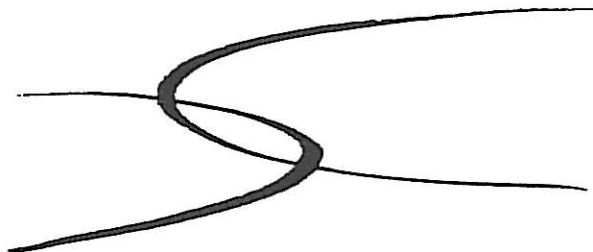
The detailed testing results are recorded in the "Testing Records" attached to this report.

The testing was carried out under normal indoor conditions.

The testing laboratory upon request can inform tolerances of measurements.

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TESTING RECORDS

MOBILE HOIST - ISO classification 12.36.03

in accordance with the European standard EN / ISO 10535:1998

Testing No.

00.13A

This page is page 1 of a total of 19 pages

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These records are not an approval of the product tested, but are merely a record of testing results for a specific sample product

The testing records are organised in conformity with the standard EN ISO 10535, i.e. section numbers in the records are similar to the corresponding requirements in the standard.

Not fulfilled requirements recorded are indicated by the use of underlined text. These requirements are listed and commented upon on the last page of this report.

DATE

Testing executive

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DANAK

Reg. nr. 347

DESCRIPTION OF THE PRODUCT

The sample product tested can be configured in three different versions distinguished by different loading and use. The manufacturer identifies the product / versions as follows:

- name of product Nordic 165 / Nordic 135 / Nordic Stand Up
- serial no. (chassis) 694
- date of manufactory 4 - 2000

The product is a mobile hoist with a non-rigid body support unit. The lifting function is electrical whereas the adjustment of the chassis width (V - geometry) is performed manually. By using different lifting arms and suitable auxiliary equipment, the hoist can be configured in three different versions as follows:

Version	Type	Max. load [kg]	Chassis length [mm]	Arm length p-p [mm]
Nordic 165	normal hoist	165	1065	825
Nordic 135	normal hoist	135	1065	870
Nordic Stand Up	raising aid	165	1065	/

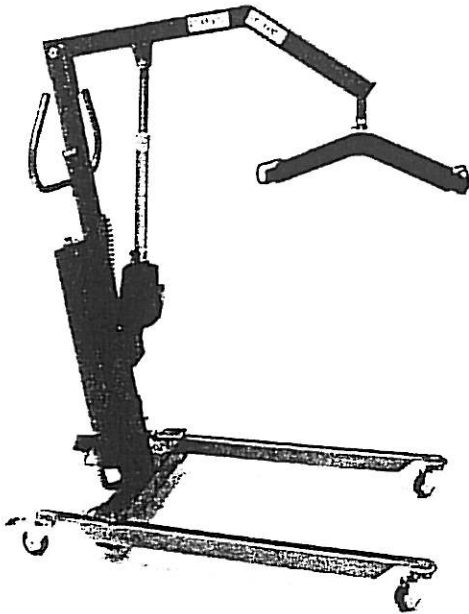
The mast with the lifting machinery remains the same for all versions. Where no specific version is mentioned in the report, the testing result will apply for all three versions.

The manufacturer provides three series of mobile hoists, where all hoists in the series shares the mast with the lifting machinery and the lifting arms. Different chassis basically distinguishes the three series as follows:

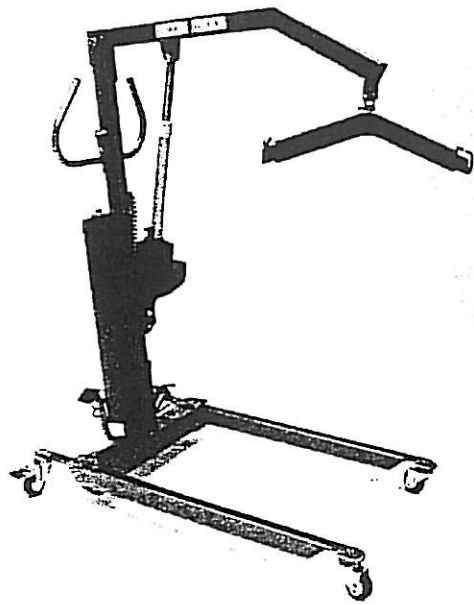
Series	Chassis	Testing report
Faaborg PL	Parallel geometry, asymmetric, electrically operated (2 different length)	00.11A
Faaborg VL	V - geometry, electrically operated	00.12A
Faaborg Nordic	V - geometry, manually operated	This report

Hence, it has been possible to transfer certain testing results from one report to the other and therefore, frequent references are made to the reports 00.11A and 00.12A.

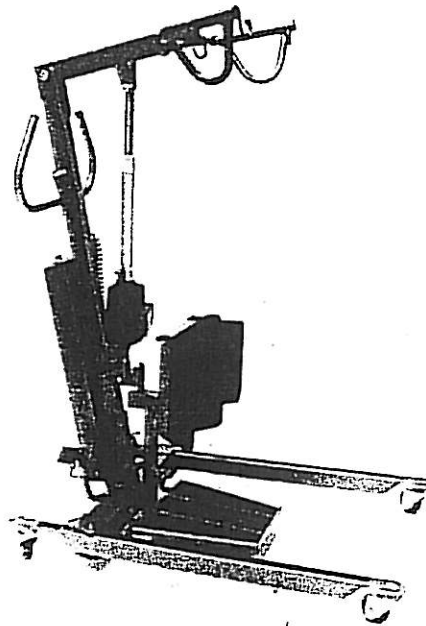
HMI - TESTING RECORDS - TESTING No. 00.13A



Faaborg Nordic 165



Faaborg Nordic 135



Faaborg Nordic Stand Up

TESTING RESULTS

GENERAL REQUIREMENTS

4.1.1	Risk analysis The requirements of prEN 1441 will apply	A risk analysis was not provided
4.1.2	Ergonomics: Grips and handles must suit the functional anatomy of the hands and be in accordance with the following: - the distance between any handle (those parts intended to be grabbed) requiring an operating force of more than 10 N and any construction part shall not be less than 35 mm - the distance between any pedal (those parts intended to be stepped on) shall not be less than 75 mm - the diameter of operating handles and knobs requiring an operating force of more than 10 N shall be between 19 mm and 43 mm - pedals shall be placed not more than 300 mm above the floor - operating controls used by hands shall be placed in the height of 800 mm to 1200 mm above the floor - handles for pushing or pulling shall be placed at a minimum height of 900 mm NOTE: Operating controls used by the lifted person may require other positions	Not applicable Not applicable Not applicable Not applicable The control box is handheld Height of driving handles = 1150 mm
4.1.3	Sound level:	The sound level is not included in the testing

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GENERAL SAFETY

4.3.1	Safe Working Load Every hoist shall be capable of lifting a disabled person of 120 kg mass excluding body support unit.	135 / 165 kg
4.3.2	Electrical safety	Electrical safety is not included in the testing
4.3.3	Fasteners: All load-bearing fasteners shall be either self-locking or shall be fitted with a locking device to prevent inadvertent detachment.	Loadbearing fasteners are locked.
4.3.4	Selftapping screws: Single use components (e.g. selftapping screws) shall not be used to secure any component that can be deemed to be load bearing. In addition they shall not be used for the assembly of any component(s) that is intended to be removed for the purpose of dismantling for transport or storage.	Selftapping screws are not used for the said purposes.
4.3.5	Handgrips: Handgrips shall be fixed in such a manner as to prevent inadvertent detachment (ref. testing method 4.4.5)	Not applicable.
4.3.6	Edges and corners: Unless a specific part of the function of the hoist, all accessible edges, corners and surfaces shall be smooth and have no burrs or sharp edges. All projections shall be avoided or be fitted with adequate protection to prevent damage or injury.	There are no specifically sharp edges or corners.
4.3.7	Correct assembly: It shall not be possible to assemble the hoist in a manner that effects the overall safety of the unit. If the device incorporates a mast, it shall be so located in relation to its base that it can only be assembled in the correct working position.	The hoist can not be assembled incorrectly without the use of tools.
4.3.8	Shearing and crushing: Protection against shearing, crushing, trapping and abrading shall be provided and be in accordance with the requirements of EN 292	<u>Between mast and actuator and mast head and lifting arm the distance can be less than 25 mm (ref. EN 12182).</u>

HMI - TESTING RECORDS - TESTING No. 00.13A

GENERAL SAFETY - CONTINUED

4.3.9	Limiting load on the disabled person: The hoist shall include in its design some means that will ensure that, when lowering, should the body support unit, spreader bar of lifting arm come into contact with the disabled person, the total load exposed on the disabled person shall not exceed the total mass of those parts.	The load on the disabled person is limited to the mass of the lifting arm:
4.3.10	When operated, the means provided in 4.3.9 shall not allow the hoist to become unsafe	The hoist does not become unsafe.
4.3.11	Accessibility of controls: All controls, electrical or mechanical, for lowering or raising the disabled person, shall be easily accessible and operable by the person using the hoist	All controls are easily accessible.
4.3.12	Emergency stop: Electrically operated hoists shall be provided with an emergency device, which is readily accessible and wired to isolate the power supply and to stop any electrically produced movement which could cause a safety hazard	There is an emergency stop on the battery box.
4.3.13	Battery warning device: On all battery powered hoists, to ensure that a full range lifting cycle with maximum load can be completed once started, a warning device shall be provided.	There is an optical and acoustical battery warning device.
4.3.14	Battery warning device: On all battery powered hoists a warning device shall be provided that indicate when the battery requires charging. When this device operates, there shall be sufficient power available to complete one (1) full lifting cycle	When activated, there is still more than one full lifting cycle with max. load (165 kg) available.
4.3.15	"Hold to run" controls: All controls shall be of the "hold to run" type	All controls are of the "hold to run" type.
4.3.16	Limiting the lifting force: Any hoist shall be designed in such a way so that it shall not lift more than 1.5 times the maximum load	- Nordic 165 and Nordic Stand UP can not lift more than 1.5 · 165 kg <u>Nordic 135 can lift more than 1.5 · 135 kg</u>
4.3.17	Safety device: Hoists shall be provided with a safety device that shall ensure that the disabled person does not fall in the event of a single fault condition of the lifting machinery	There is a safety nut in the lifting actuator.

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GENERAL SAFETY - CONTINUED

4.3.18	Flexible lifting devices: After the static test, according to 4.4.18, any flexible lifting device and associated joints shall show no sign of damage that will affect the function of the hoist as stated by the manufacturer	Not applicable.
4.3.19	Inadvertent detachment of slings etc.: A connection point shall be so designed that the body support unit shall not become inadvertently detached	The connection points are designed to prevent inadvertent detachment of the slings.
4.3.20	Protection against inadvertent falling from the body support unit Where necessary, all precautions shall be taken (e.g. by the fitting of a safety device) that protect the lifted person from inadvertently falling from / off the body support unit	The body support unit was not included in the testing.
4.3.21	Electrical safety:	Electrical safety is not included in the testing.
4.3.22	Connection points for body support units The connection points shall be smooth thus avoiding excessive wear of any connector	The connection points are smooth.

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PERFORMANCE

4.5.1	Field of application: The hoist shall be designed for the purpose of lifting, transporting and positioning a disabled person according to the field of application as stated by the manufacturer, and it shall be able to be operated by one person unless otherwise stated in the instructions for use. NOTE: When being used in the designated manner the hoist should enable the disabled person to be positioned in such a way as to minimise the need for attendant repositioning	The hoist is designed for lifting, transportation and positioning disabled persons and it will fulfil these purposes as defined by the manufacturer.
4.5.2	Cavities: Any cavities in which liquid could accumulate shall be self-draining	There are no cavities in which liquids may accumulate.
4.5.3	Stopping distance: When loaded with the maximum load, the CSP shall have a stopping distance of not more than 50 mm.	Distance measured < 10 [mm]
4.7.1	Rate of lifting and lowering when loaded: The velocity of lifting and lowering shall not exceed 0.15 m/s when loaded.	Ref. the table below.
4.7.2	Rate of lifting and lowering when unloaded: The lowering velocity when unloaded shall not exceed 0.25 m/s.	Ref. the table below:

Ref. 4.7.1 and 4.7.2: Rate in mm/s of lifting and lowering – measured on connection points

Version	LOADED		UNLOADED	
	Lifting	Lowering	Lifting	Lowering
Nordic 165	35	50	51	52
Nordic 135	38	52	52	53
Nordic Stand Up	29	40	33	31

HMI - TESTING RECORDS - TESTING No. 00.13A

PERFORMANCE - CONTINUED

4.9	Operating forces: The operating forces of those parts of the hoist that are designed to be operated by fingers, hands or feet shall not exceed the following figures: - operation by using a hand 105 N - operation by using a foot pedal 300 N - operation by using a knob 20 N - operation by using a push button 15 N	Operating forces are measured as indicated below: Not applicable App. 300 N - tested with 30 kg load Not applicable 3.3 N (ref. table below)
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APPLICATION	1	2	3	4	5	MEAN
Control box push button	3.7	2.9	3.5	3.0	3.5	3.3

HMI - TESTING RECORDS - TESTING No. 00.13A

4.12.1	Durability: After being tested in accordance with 4.13.2 the hoist shall function as intended when loaded with the maximum load and shall show no sign of permanent deformation or wear that may affect its function.	In the durability testing, the loading of the various construction elements will be equal to or less than the loading of the corresponding parts in the PL 165 version. Therefore, testing results can be transferred from report no. 00.11A.
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- MOBILE HOISTS - SPECIFIC REQUIREMENTS -

5.1 Static strength:

Loading and deformations are made as indicated in the table below. Permanent deformations of a few mm may reflect normal settings in bearings and wheels (deformations are recorded with 5 mm increments).

The static strength of the Nordic series is tested with the Nordic 165 version since calculations show that it will be the heaviest loaded of the three versions. I.e. there is the largest momentum with respect to the pivoting pin of the lifting arm and the mast foot (the longer lifting arm is tested statically as described in report no 00.11A).

Nordic 165

LOADING	deformation before load	deformation during load	deformation after load
• 125 % of max. load for 5 min. tilted 10° forwards	0 mm	40 mm	5 mm
• 125 % of max. load for 5 min. tilted 10° backwards	0 mm	25 mm	0 mm
• 125 % of max. load for 5 min. tilted 5° to the left	0 mm	30 mm	0 mm
• 125 % of max. load for 5 min. tilted 5° to the right	0 mm	25 mm	0 mm
• 150 % of max. load for 20 min. on a horizontal surface	0 mm	35 mm	0 mm

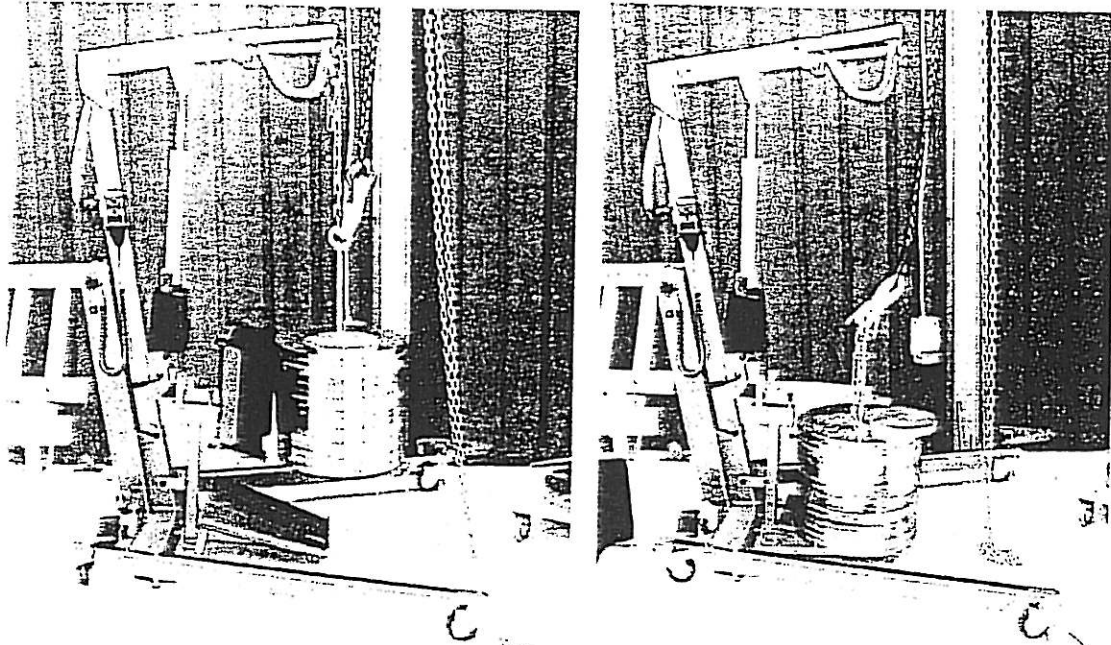
After the testing, there were no signs of deformations or wear that might affect the functioning and safety of the hoist.

Nordic Stand Up

The Stand Up version was loaded with 1.5 · 165 kg on the lifting arms and on the foot rest, respectively (ref. photo on the next page). When loaded, the foot rest touches the floor but returns to its original position when unloaded.

After the testing, there were no signs of deformations or wear that might affect the functioning and safety of the hoist.

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Testing static strength of lifting arm (left) and foot rest (right) for the Stand Up version

REQUIREMENTS:

After the static test as defined in 5.2 the hoist shall function as defined by the manufacturer. There shall be no deformation or wear that may affect its function.

HMI - TESTING RECORDS - TESTING No. 00.13A

5.3 Static stability:

Tipping angles are measured as indicated in the table below. Unless otherwise specified measurements are made with narrow chassis (figures are rounded to the nearest 0.5°):

Version Nordic 165

ADJUSTMENT OF HOIST	TIPANGLE Loaded	TIPANGLE Unloaded
Forward stability:		
• horizontal lifting arm, narrow chassis	13.0°	> 15.0°
• max. height, narrow chassis	15.0°	> 15.0°
• horizontal lifting arm, wide chassis	12.5°	> 15.0°
• max. height, wide chassis	14.0°	> 15.0°
Left side stability:		
• horizontal lifting arm	8.0°	> 15.0°
• max. height	6.0°	> 15.0°
Right side stability:		
• horizontal lifting arm	8.5°	> 15.0°
• max. height	6.5°	> 15.0°
Backward stability:		
• max. height	> 15.0°	> 15.0°

Version Nordic 135

ADJUSTMENT OF HOIST	TIPANGLE Loaded	TIPANGLE Unloaded
Forward stability:		
• horizontal lifting arm, narrow chassis	13.0°	> 15.0°
• max. height, narrow chassis	15.5°	> 15.0°
• horizontal lifting arm, wide chassis	12.0°	> 15.0°
• max. height, wide chassis	14.5°	> 15.0°
Left side stability:		
• horizontal lifting arm	10.0°	> 15.0°
• max. height	7.5°	> 15.0°
Right side stability:		
• horizontal lifting arm	9.5°	> 15.0°
• max. height	7.0°	> 15.0°
Backward stability:		
• max. height	> 15.0°	> 15.0°

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Version Nordic Stand Up

To test the PL Stand Up version, a simple dummy (photos in reports 00.11A and 00.12A) was used as proposed at the meeting in the standardisation group WG 3 under TC 293 November 27 – 28 1997 in Valencia. Testing results appears from the table below (tipping angles rounded to nearest 0.5°)

ADJUSTMENT OF HOIST	TIPANGLE Loaded	TIPANGLE Unloaded
Forward stability:		
• max. height, narrow chassis	> 15.0°	> 15.0°
• max. height, wide chassis	> 15.0°	> 15.0°
Left side stability:		
• max. height	8.5°	> 15.0°
Right side stability:		
• max. height	9.0°	> 15.0°
Backward stability:		
• max. height	> 15.0°	> 15.0°

REQUIREMENTS:

During the static stability test according to 5.4 both unloaded and loaded with the maximum load, the hoist shall not lose its equilibrium (balance) at the following angles:

- forwards and backwards direction 10° with the chassis in the intended travelling position
- forwards and backwards direction 7° with the chassis in the most adverse condition
- any other direction 5°

5.5 Immobilising devices:

When the hoist with its brakes activated is placed on a surface inclined 1° and loaded with its max. load, only insignificant movements can be observed.

REQUIREMENT:

An immobilising device (brake) shall be provided for mobile hoists to prevent inadvertent movement in any direction.

HMI - TESTING RECORDS - TESTING No. 00.13A

5.7 Operating forces:

Operating forces as measured in N are indicated in the scheme below:

Nordic 165

APPLICATION	1	2	3	4	5	MEAN
Starting forwards	120	85	105	90	110	102
Starting backwards	95	140	110	100	100	109
Driving forwards	40	40	45	40	40	41
Driving backwards	40	35	35	40	35	37

Operating forces for Nordic 135 will be less since the loading is considerably smaller. The hoist pulls somewhat sideways when driving.

Nordic Stand Up

APPLICATION	1	2	3	4	5	MEAN
Starting forwards	75	75	70	75	100	79
Starting backwards	120	80	75	85	70	86
Driving forwards	40	35	35	35	35	36
Driving backwards	45	45	45	40	45	44

REQUIREMENTS:

The maximum forces required for operating the hoist shall be as follows when loaded with the maximum load:

- starting 160 N
- driving (pushing/pulling) 85 N

SUPPLEMENTARY COMMENTS

NOTICE: The comments recorded on this page and the pages to follow are not a part of the accredited testing system.

The hoist in its different configurations is well made, the finish is fair and its functionality is in accordance with the description given by the manufacturer.

For the sample product tested, a few requirements in the standard EN 10535 were not totally fulfilled as commented upon below:

4.3.8	According to the standard EN 12182 "Technical aids for disabled persons – General requirements and testing methods" to avoid finger crushing, variable distances shall either be less than 6 mm or bigger than 25 mm. In the present case, however, since movements are relatively slow and the distance can be only a few mm below the 25 mm limit, the risk is assumed to be limited.
4.3.16	In certain configurations, the hoist is able to lift more than 1.5 times its max. load. With respect to safety, this requirement is of less importance for wheeled hoists than for stationary hoists.