

# 1.6

## 1 Ex-protected hand and machine lamps HL/ML

(Zone 1, 2, 21, 22)

### Mains powered and still flexible

These powerful explosion-protected hand lamps with fluorescent lamps and LEDs were developed especially for use during inspection and maintenance work in hazardous areas. Typical applications are found, for example in the chemical industry, offshore, in the automotive sector, in the aircraft industry or in shipyards. Due to their small size and high light output, these rugged lights are especially suited for lighting in tight

spaces, the interior of machinery, silos, etc. wherever a reliable portable light source is required. With the appropriate accessories (optional) the machine lights can also be used, for example, for lighting sampling ports or as tube gauge lights or they can easily be mounted on railing pipes.

### Light technology

All hand and machine lamps feature a protective polycarbonate tube with reflector. They are available as single and twin

two-pin fluorescent lamp versions with integrated electronic ballast (EVG) as well as in LED technology. The outstanding features of the white LED technology are the insensitivity to shock and vibration, as well as the enormous longevity that makes a lamp change over the lifetime of the LED hand lamp superfluous.

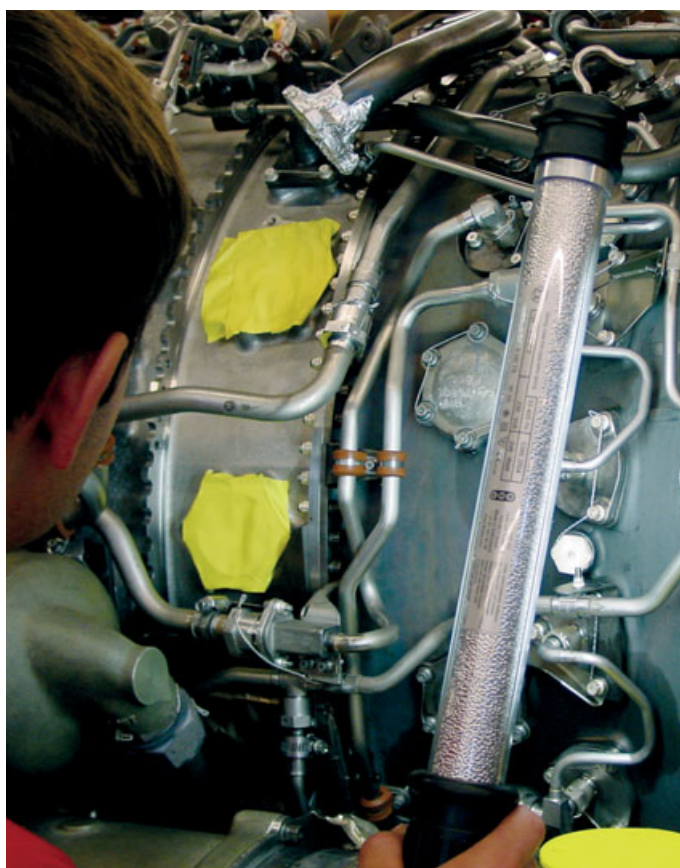
### Application

Because they are small in size and, at the same time, have a high light output and the high degree of protection IP 68, these rugged lights are particularly suitable for sewage treatment plants where flooding is possible, and wherever a reliable, robust and portable light source is required. The hand and machine lamps are used in engineering, printing machines, in the petrochemical and process industries as well as in the food industry (dusts). They are also suitable for temporary installations where maintenance,

alteration and maintenance work are carried out in facilities in the oil and gas industry, for plant construction, in shipyards, or during the cleaning of tanks. Thanks to the special accessories, the lamps can be mounted by clamps on pipes (railing in the chemical and oil rigs) or with magnets directly to the machine housing or tank walls. At petrol stations, machine lamps can be installed in the illuminated ram protection around fuel pumps. Explosion-protected hand and machine lamps contribute to the operational safety during the construction of airplanes as well as during maintenance work in shipyards work. Here various people are at work in confined spaces in the cargo hold or in the cabin, cleaning parts with solvents, painting or preserving surfaces. During maintenance, the area surrounding the aircraft hull is normally declared as Zone 2, while empty and vented tanks are normally declared as Zone 1.

### Features

- Single and twin-lamp versions from 6 W to 58 W or with LED-technique from 6 W to 36 W
- Rated voltage ranges 24/230 V AC/DC
- With electronic ballast
- Robust protective tube made of polycarbonate
- Suited for use in explosive gas and dust atmospheres
- High degree of protection IP68





### Safe handling

For applications where, in accordance with the installation regulations, personal protection is required, hand lamps for low voltages or in the "TR" version with an integrated isolation transformer in the supply line or with a residual current circuit breaker with a rated tripping current of 10 mA are available. These protective devices in explosion-protected design can be placed in the immediate vicinity of the lamps or beside the sockets. The hand lamp has a ribbed neoprene rubber handle with a trumpet-shaped cable gland

made of metal and a neoprene rubber end cap with attachment hook for hanging up the light in the workplace. The end caps of the machine lamps are also made of durable neoprene rubber. The machine lamps are mounted directly on the machine using suitable clamps. Optionally, all hand and machine lamps can also be fitted with an eXLink connector for the quick and easy disconnection of the power cord at the lamp.



## Ordering details Hand lamps

Type	Lamp power	Voltage	Lamp cap	Luminous flux	Dimensions			Weight	Order No.
					A	Ø B	Ø C		
HL43d LED6 460	6 W LED	85 - 264 V AC; 120 - 370 V DC	-	315 lm	640 mm	66 mm	43 mm	1.5 kg	<b>1 1700 000 107</b>
HL43d LED6 460	6 W LED	24 - 50 V AC/DC	-	315 lm	640 mm	66 mm	43 mm	1.5 kg	<b>1 1700 000 004</b>
HL43d LED6 460	6 W LED	12 - 24 V DC	-	315 lm	640 mm	66 mm	43 mm	1.5 kg	<b>1 1700 000 003</b>
HL43d LED6 460 TR	6 W LED	230 V / 24 V AC (isolating trans- former TR)	-	315 lm	640 mm	66 mm	43 mm	2.7 kg	<b>1 1700 000 223</b>
HL43d 6 383	1 x 6 W	230 V AC/DC	G5	215 lm	563 mm	66 mm	43 mm	1.4 kg	<b>1 1700 000 200</b>
HL43d 8 460	1 x 8 W	230 V AC/DC	G5	448 lm	640 mm	66 mm	43 mm	1.5 kg	<b>1 1700 000 201</b>
HL43d 6/2 383	2 x 6 W	230 V AC/DC	G5	430 lm	563 mm	66 mm	43 mm	1.5 kg	<b>1 1700 000 205</b>
HL43d 8/2 460	2 x 8 W	230 V AC/DC	G5	896 lm	640 mm	66 mm	43 mm	1.6 kg	<b>1 1700 000 206</b>
HL43d 13 690	1 x 13 W	230 V AC/DC	G5	949 lm	870 mm	66 mm	43 mm	1.7 kg	<b>1 1700 000 202</b>
HL43d 6 383	1 x 6 W	24 V AC/DC	G5	215 lm	563 mm	66 mm	43 mm	1.4 kg	<b>1 1700 000 000</b>
HL43d 8 460	1 x 8 W	24 V AC/DC	G5	448 lm	640 mm	66 mm	43 mm	1.5 kg	<b>1 1700 000 001</b>
HL43d 6/2 383	2 x 6 W	24 V AC/DC	G5	430 lm	563 mm	66 mm	43 mm	1.5 kg	<b>1 1700 000 005</b>
HL43d 8/2 460	2 x 8 W	24 V AC/DC	G5	896 lm	640 mm	66 mm	43 mm	1.6 kg	<b>1 1700 000 006</b>
HL43d 8 460 TR	1 x 8 W	230 V / 24 V AC (isolating trans- former TR)	G5	448 lm	640 mm	66 mm	43 mm	2.7 kg	<b>1 1700 000 221</b>
HL43d 8/2 460 TR	2 x 8 W	230 V / 24 V AC (isolating trans- former TR)	G5	896 lm	640 mm	66 mm	43 mm	2.7 kg	<b>1 1700 000 226</b>



## Ordering details Machine lamps























Type	Lamp power	Voltage	Lamp cap	Luminous flux	Dimensions			Weight	Order No.
					A	Ø B	Ø C		
ML43d LED6 460	6 W LED	85 - 264 V AC; 120 - 370 V DC	-	315 lm	581 mm	66 mm	43 mm	3.4 kg	<b>1 1700 000 113</b>
ML43d LED6 460	6 W LED	24 - 50 V AC/DC	-	315 lm	581 mm	66 mm	43 mm	1.5 kg	<b>1 1700 000 013</b>
ML43d LED6 460	6 W LED	12 - 24 V DC	-	315 lm	581 mm	66 mm	43 mm	1.5 kg	<b>1 1700 000 012</b>
ML60d LED22 1175	22 W LED	85 - 264 V AC; 120 - 370 V DC	-	2460 lm	1296 mm	82 mm	60 mm	3.9 kg	<b>1 1700 000 523</b>
ML60d LED15 870	15 W LED	85 - 264 V AC; 120 - 370 V DC	-	1296 lm	991 mm	82 mm	60 mm	3.8 kg	<b>1 1700 000 522</b>
ML60d LED25 1480	25 W LED	85 - 264 V AC; 120 - 370 V DC	-	3348 lm	1601 mm	82 mm	60 mm	4.0 kg	<b>1 1700 000 520</b>
ML60d LED36 1780	36 W LED	85 - 264 V AC; 120 - 370 V DC	-	5220 lm	1901 mm	82 mm	60 mm	4.1 kg	<b>1 1700 000 521</b>
ML43d 6 383	1 x 6 W	230 V AC/DC	G5	215 lm	504 mm	66 mm	43 mm	1.4 kg	<b>1 1700 000 210</b>
ML43d 8 460	1 x 8 W	230 V AC/DC	G5	448 lm	581 mm	66 mm	43 mm	1.5 kg	<b>1 1700 000 211</b>
ML43d 13 690	1 x 13 W	230 V AC/DC	G5	949 lm	811 mm	66 mm	43 mm	1.7 kg	<b>1 1700 000 212</b>
ML43d 6/2 383	2 x 6 W	230 V AC/DC	G5	430 lm	504 mm	66 mm	43 mm	1.5 kg	<b>1 1700 000 215</b>
ML43d 8/2 460	2 x 8 W	230 V AC/DC	G5	896 lm	581 mm	66 mm	43 mm	1.6 kg	<b>1 1700 000 216</b>
ML50d 13/2 690	2 x 13 W	230 V AC/DC	G13	1892 lm	811 mm	72 mm	60 mm	2.4 kg	<b>1 1700 000 217</b>
ML43d 6 383	1 x 6 W	24 V AC/DC	G5	215 lm	504 mm	66 mm	43 mm	1.4 kg	<b>1 1700 000 010</b>
ML43d 8 460	1 x 8 W	24 V AC/DC	G5	448 lm	581 mm	66 mm	43 mm	1.5 kg	<b>1 1700 000 011</b>
ML43d 6/2 383	2 x 6 W	24 V AC/DC	G5	430 lm	504 mm	66 mm	43 mm	1.5 kg	<b>1 1700 000 015</b>
ML43d 8/2 460	2 x 8 W	24 V AC/DC	G5	896 lm	581 mm	66 mm	43 mm	1.6 kg	<b>1 1700 000 016</b>
ML50d 13/2 690 TR	2 x 13 W	230 V / 24 V AC (isolating transformer TR)	G13	1898 lm	811 mm	72 mm	50 mm	2.4 kg	<b>1 1700 000 237</b>
ML60d 18 870	1 x 18 W	110 - 240 V AC/DC	G13	1296 lm	991 mm	72 mm	50 mm	2.4 kg	<b>1 1700 000 510</b>
ML 70d 18 522 (PL)	1 x 18 W TC-L	110 - 240 V AC/DC	2G11	1200 lm	643 mm	92 mm	70 mm	2.2 kg	<b>1 1700 000 517</b>
ML 70d 24 617 (PL)	1 x 24 W TC-L	110 - 240 V AC/DC	2G11	1800 lm	738 mm	92 mm	70 mm	2.8 kg	<b>1 1700 000 516</b>
ML60d 30 1175	1 x 30 W	110 - 240 V AC/DC	G13	2460 lm	1296 mm	72 mm	50 mm	2.4 kg	<b>1 1700 000 511</b>
ML 60d 36 1480	1 x 36 W	110 - 240 V AC/DC	G13	3348 lm	1601 mm	72 mm	50 mm	2.8 kg	<b>1 1700 000 512</b>
ML 70d 36 713 (PL)	1 x 36 W TC-L	110 - 240 V AC/DC	2G11	2900 lm	834 mm	92 mm	70 mm	3.4 kg	<b>1 1700 000 515</b>
ML 70d 55 833 (PL)	1 x 55 W TC-L	110 - 240 V AC/DC	2G11	4780 lm	954 mm	92 mm	70 mm	3.8 kg	<b>1 1700 000 514</b>
ML60d 18 918	1 x 18 W	24 - 50 V AC/DC	G13	1296 lm	1041 mm	72 mm	50 mm	2.4 kg	<b>1 1700 000 310</b>
ML70d 18 570 (PL)	1 x 18 W TC-L	24 - 50 V AC/DC	2G11	1200 lm	691 mm	92 mm	70 mm	2.2 kg	<b>1 1700 000 317</b>
ML70d 24 665 (PL)	1 x 24 W TC-L	24 - 50 V AC/DC	2G11	1800 lm	786 mm	92 mm	70 mm	2.8 kg	<b>1 1700 000 316</b>
ML 60d 30 1223	1 x 30 W	24 - 50 V AC/DC	G13	2460 lm	1346 mm	72 mm	50 mm	2.4 kg	<b>1 1700 000 311</b>
ML60d 36 1528	1 x 36 W	24 - 50 V AC/DC	G13	3348 lm	1651 mm	82 mm	60 mm	2.8 kg	<b>1 1700 000 312</b>
ML70d 36 761 (PL)	1 x 36 W TC-L	24 - 50 V AC/DC	2G11	2900 lm	882 mm	92 mm	70 mm	3.4 kg	<b>1 1700 000 315</b>
ML70d 55 881 (PL)	1 x 55 W TC-L	24 - 50 V AC/DC	2G11	4780 lm	1002 mm	92 mm	70 mm	3.8 kg	<b>1 1700 000 314</b>

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## Accessories

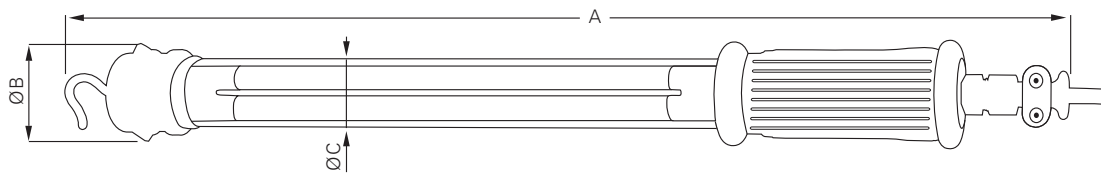
HL 43 d / ML 43 d / ML 50/60/70 d / ML 43/60 LED

### Accessories

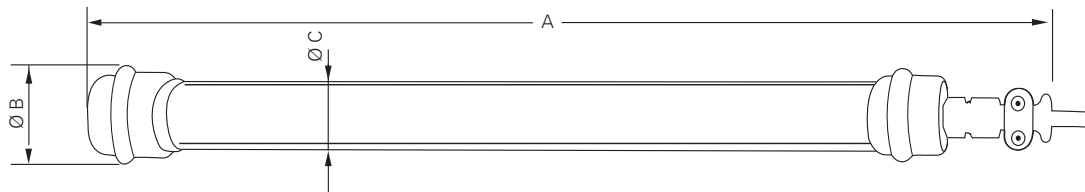
Type	Scope of delivery	Height in mm	Weight kg	Diameter mm	Order unit	Order No.
 Clamp	KFV 3	265	0.26	Ø 40	1	<b>1 1700 000 900</b>
 Clamp	KFV 4	280	0.26	Ø 50	1	<b>1 1700 000 901</b>
 Permanent magnet (adhesion 100 N) <sup>1)</sup>	PM 1	130	0.21	Ø 50	1	<b>1 1700 000 911</b>
 Permanent magnet (adhesion 500 N) <sup>1)</sup>	PM 2	190	0.68	Ø 40	1	<b>1 1700 000 915</b>
 Permanent magnet (adhesion 500 N) <sup>1)</sup>	PM 2	205	0.68	Ø 50	1	<b>1 1700 000 916</b>
 Permanent magnet (adhesion 500 N) <sup>1)</sup>	PM 2	215	0.68	Ø 60	1	<b>1 1700 000 918</b>
 Permanent magnet (adhesion 500 N) <sup>1)</sup>	PM 2	225	0.68	Ø 70	1	<b>1 1700 000 919</b>
 Permanent magnet (adhesion 500 N) <sup>1)</sup>	PM 2	235	0.68	Ø 80	1	<b>1 1700 000 920</b>
 Suspension hook with ball joint	KH 4	183	0.115	Ø 50	1	<b>1 1700 000 921</b>
 Suspension hook with ball joint	KH 6	195	0.120	Ø 60	1	<b>1 1700 000 923</b>
 Suspension hook with ball joint	KH 7	205	0.123	Ø 70	1	<b>1 1700 000 924</b>
 Suspension hook with ball joint	KH 8	215	0.127	Ø 80	1	<b>1 1700 000 925</b>
 Spring clip	FE 3	62	0.02	Ø 40	1	<b>1 1700 000 930</b>
 Spring clip	FE 4	78	0.02	Ø 50	1	<b>1 1700 000 931</b>
 Luminaire key 30-50 mm	SCH 2				1	<b>1 1700 000 940</b>
 Eye bolt with ball joint M5 stainless steel	RS 4	58	0.034		1	<b>1 1700 000 950</b>
 Plastic pipe clamp	CILC 63	115		Ø 63 - 71	1	<b>1 1700 000 960</b>
 Plastic pipe clamp	CILC 71	124		Ø 71 - 80	1	<b>1 1700 000 961</b>
 Plastic pipe clamp	CILC 80	136		Ø 80 - 90	1	<b>1 1700 000 962</b>
 Fixing clip	BS 70		0.012	Ø 70	1	<b>1 1700 000 951</b>

<sup>1)</sup> Note: dispatch only by sea freight or road freight!

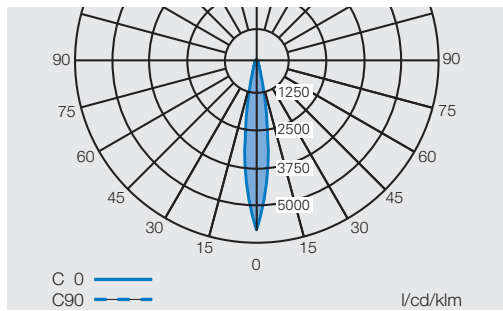
## HL



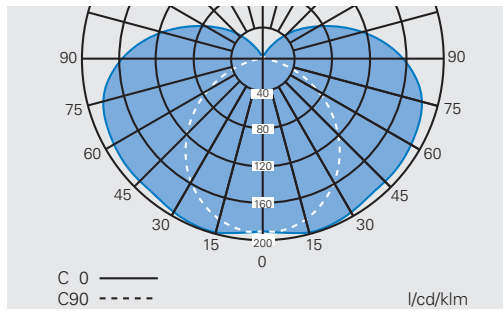
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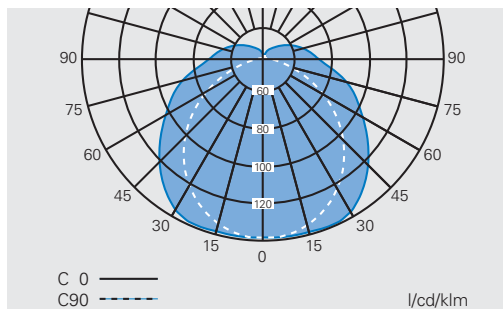
## Polar curve HL/ML ... LED



## Polar curve HL/ML single lamp



## Polar curve HL/ML (TC-L-Lamp) twin lamp

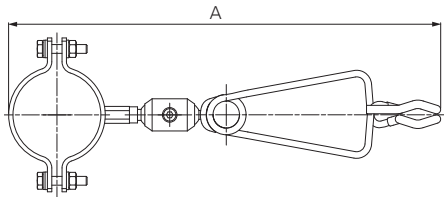


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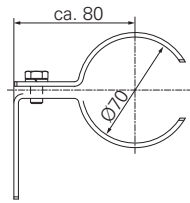
## Dimension drawing

Accessories

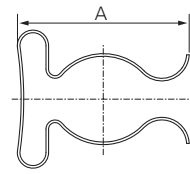
KFV...



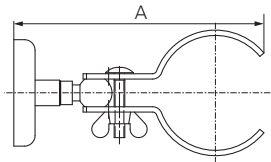
BS 70



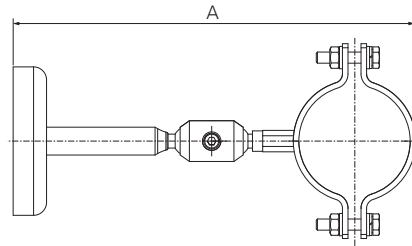
FE...



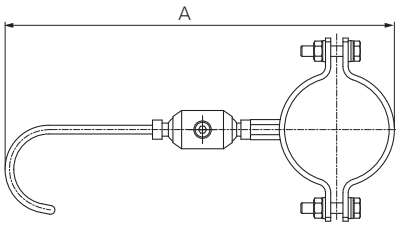
PM 1



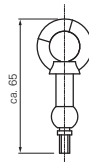
PM 2



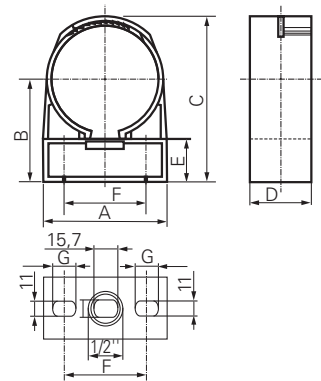
KH...



RS4



CLIC





### Technical data

	HL 43 d / ML 43 d	ML 50/60/70 d	ML 43/60 LED
EC-Type Examination Certificate	BVS 14 ATEX E 106 X	BVS 14 ATEX E 106 X	BVS 14 ATEX E 106 X
IECEX Certificate of Conformity	IECEX BVS 14.0068X	IECEX BVS 14.0068X	IECEX BVS 14.0068X
Marking accd. to 94/9/EC	⊕ II 2 G Ex d IIC T5 Gb ⊕ II 2 D Ex tb IIIC T95 °C Db	⊕ II 2 G Ex d IIC T5 Gb ⊕ II 2 D Ex tb IIIC T95 °C Db	⊕ II 2 G Ex d IIC T5 Gb ⊕ II 2 D Ex tb IIIC T95 °C Db
Marking accd. to IECEx	Ex d IIC T5 Gb Ex t IIIC T95°C Db	Ex d IIC T5 Gb Ex t IIIC IP68 T95°C Db	Ex d IIC T5 Gb Ex t IIIC IP68 T95°C Db
Permissible ambient temperature	-20 °C up to +40 °C (PL-lamps) -20 °C up to +60 °C	-20 °C up to +60 °C	-20 °C up to +60 °C
Rated voltage	<sup>2)</sup>	<sup>2)</sup>	<sup>2)</sup>
Power	max. 13 W <sup>2)</sup>	max. 58 W <sup>2)</sup>	max. 36 W <sup>2)</sup>
Power factor cos	> 0.95	> 0.95	> 0.95
Circuit	EVG integrated	EVG integrated	EVG integrated
Protection class	I bzw. III	I	I
Standard cable length	5 m cable 3 x 1 mm <sup>2</sup> without plug <sup>1)</sup>		
Lamp / Illuminant	T5 <sup>2)</sup>	T8/TC-L <sup>2)</sup>	LED <sup>2)</sup>
Rated luminous flux	<sup>2)</sup>	<sup>2)</sup>	<sup>2)</sup>
Lamp cap	G5	2G11 (PL-lamps) / G13 (18 - 58 W)	—
Dimensions	<sup>2)</sup>	<sup>2)</sup>	<sup>2)</sup>
Degree of protection accd. to EN 60529	IP68 <sup>3)</sup>	IP68 <sup>3)</sup>	IP68 <sup>3)</sup>
Protection tube	Polycarbonate	Polycarbonate	Polycarbonate

<sup>1)</sup> Plug on request, optional with eXLink® coupler

<sup>2)</sup> see ordering details

<sup>3)</sup> 2.5 m for 24 h