

Explosionproof fluorescent hand and machine lamps

The small dimensions of explosionproof fluorescent hand and machine lamps have proven to be an advantage in illuminating cramped spaces and machines in the chemical, petrochemical and process industries. Fluorescent lamps are also installed in machines in the printing, food and process industries. They are used for prolonged maintenance and inspection work and in temporary installations in oil and gas industry plants, in chemical engineering and rebuilding projects, for maintenance work in the aircraft industry, in shipyards and in tank cleaning operations. Their small dimensions permit installation on tubular railings in chemical plants and on offshore oil rigs.

Explosionproof fluorescent hand and machine lamps can be permanently installed in Zones 1 and 2 as defined in EN 60 079-10 (gas explosion hazard) or in Zones 21 and 22 as defined in EN 61241-10 (dust explosion hazard). The hand and machine lamp is designed for use in Gas Group IIC potentially explosive atmospheres with protection by flameproof enclosure 'd', and for use in areas where combustible dusts may be present with protection by enclosure 'tD'. The temperature class is generally T5 but with a maximum surface temperature of 95 °C where dusts may be present. With few exceptions, the hand and machine lamps can be used for an extended ambient temperature range from –20 °C to +60 °C (in special cases –20 to +40 °C). They meet the basic safety and health requirements as per Directive 94/9/EC for the design and construction of devices used according to their intended purpose in potentially explosive atmospheres.

Hand lamp HL43d with isolating transformer 230/24 VAC



Figure: Aircraft maintenance

In tight spaces and vessels or silos fabricated in conductive materials (e.g. metals), the installation rules require that special care be taken to prevent injury to persons. For these installations, explosionproof fluorescent lamps are available that work with a low voltage, isolating transformers or residual current devices having a rated tripping current of 10 mA. Explosionproof versions of these protective devices can be placed in the immediate vicinity of the lamps or socket outlets.

Explosionproof fluorescent hand and machine lamps with an outer diameter of 43 mm can be equipped with 6, 2·6, 8, 2·8 and 13 watt fluorescent long-life tubes. The lamps have an integrated electronic ballast for 24 or 230 V AC/DC operation (36, 42, 115 or 127 V AC/DC on request).

Explosionproof fluorescent machine lamps with an outer diameter of 50, 60 and 70 mm can be equipped with 18, 30, 36 and 58 watt fluorescent long-life tubes. Besides the normal fluorescent tubes, 18, 24, 30, 36 and 55 watt PL (long-life) versions are also used. Explosionproof machine lamps have an integrated electronic ballast for universal voltage operation. Two different series cover both direct and alternating voltage ranges from 24 to 50 V ±20% and 110 to 240 V ±10%.

ZONE 1 | ZONE 2 | ZONE 21 | ZONE 22 |

Explosionproof Fluorescent Hand and Machine Lamps with Electronic Ballast

Technical Data	
Marking to 94/9/EC	ⓘ II 2G ⓘ II 2D
Type of protection (Gas)	Ex d IIC T5
Type of protection (Dust)	Ex tD A21 IP68 95°C
EC Type Examination Certificate	BVS 07 ATEX E 164 X
IECEX Scheme	IECEX BVS 08.0014 X
Protection degree to EN 60529	IP 68 (2.5 m for 24 hours)
Enclosure material	Polycarbonate/Aluminum (special version polycarbonate/stainless steel 1.4404)
Standard cable length	5 m cable 3 · 1 mm² without plug. Price add-ons: change to cable length or Ex plug including assembly.
Admissible ambient temperature	–20 °C bis/à/to +40 °C (Standard) –20 °C bis/à/to +60 °C
Manufacture	made in Switzerland

24 V AC/DC, 50-400 Hz (Standard)

Item No.	Type	FI-tubes	Luminous efficiency in Lumen	Measurements in mm			Total weight
				A	B	C	
Hand Lamps							
77-HL43106-24-105	HL43d 6 383	1 · 6 Watt	215	563	66	43	ca. 1.4 kg
77-HL43206-24-105	HL43d 6/2 383	2 · 6 Watt	430	563	66	43	ca. 1.5 kg
77-HL43108-24-105	HL43d 8 460	1 · 8 Watt	448	640	66	43	ca. 1.5 kg
77-HL43208-24-105	HL43d 8/2 460	2 · 8 Watt	896	640	66	43	ca. 1.6 kg
77-HL43108-2424-105-TR	HL43 8 460 TR	1 · 8 Watt	448	640	66	43	ca. 2,7 kg
77-HL43208-2424-105-TR	HL43 8/2 460 TR	2 · 8 Watt	896	640	66	43	ca. 2.8 kg
Machine Lamps							
77-ML43106-24-105	ML43d 6 383	1 · 6 Watt	215	504	66	43	ca. 1.4 kg
77-ML43206-24-105	ML43d 6/2 383	2 · 6 Watt	430	504	66	43	ca. 1.5 kg
77-ML43108-24-105	ML43d 8 460	1 · 8 Watt	448	581	66	43	ca. 1.5 kg
77-ML43208-24-105	ML43d 8/2 460	2 · 8 Watt	896	581	66	43	ca. 1.6 kg



ZONE 1 | ZONE 2 | ZONE 21 | ZONE 22 |

230 V AC/DC, 50-400 Hz (Standard)

Item No.	Type	FI-tubes	Luminous efficiency in Lumen	Measurements in mm			Total weight
				A	B	C	
Hand Lamps							
77-HL43106-230-105	HL43d 6 383	1 · 6 Watt	215	563	66	43	ca. 1.4 kg
77-HL43206-230-105	HL43d 6/2 383	2 · 6 Watt	430	563	66	43	ca. 1.5 kg
77-HL43108-230-105	HL43d 8 460	1 · 8 Watt	448	640	66	43	ca. 1.5 kg
77-HL43208-230-105	HL43d 8/2 460	2 · 8 Watt	896	640	66	43	ca. 1.6 kg
77-HL43113-230-105	HL43d 13 690	1 · 13 Watt	949	870	66	43	ca. 1.7 kg
77-HL43108-23024-105-TR	HL43d 8 460 TR	1 · 8 Watt	448	640	66	43	ca. 2.7 kg
77-HL43208-23024-105-TR	HL43d 8/2 460 TR	2 · 8 Watt	896	640	66	43	ca. 2.8 kg
Machine Lamps							
77-ML43106-230-105	ML43d 6 383	1 · 6 Watt	215	504	66	43	ca. 1.4 kg
77-ML43206-230-105	ML43d 6/2 383	2 · 6 Watt	430	504	66	43	ca. 1.5 kg
77-ML43108-230-105	ML43d 8 460	1 · 8 Watt	448	581	66	43	ca. 1.5 kg
77-ML43208-230-105	ML43d 8/2 460	2 · 8 Watt	896	581	66	43	ca. 1.6 kg
77-ML43113-230-105	ML43d 13 690	1 · 13 Watt	949	811	66	43	ca. 1.7 kg

24-50 V AC/DC, 50-400 Hz (Standard)

Item No.	Type	FI-tubes	Luminous efficiency in Lumen	Measurements in mm			Total weight
				A	B	C	
Machine Lamps							
77-ML50118-2450-105	ML 50d 18 920	1 · 18 Watt	1296	1041	72	50	ca. 2.4 kg
77-ML50130-2450-105	ML 50d 30 1225	1 · 30 Watt	2460	1346	72	50	ca. 2.4 kg
77-ML60118-2450-105	ML 60d 18 920	1 · 18 Watt	1296	1041	82	60	ca. 2.5 kg
77-ML60130-2450-105	ML 60d 30 1225	1 · 30 Watt	2460	1346	82	60	ca. 2.5 kg
77-ML60136-2450-105	ML 60d 36 1530	1 · 36 Watt	3348	1651	82	60	ca. 2.8 kg
77-ML60158-2450-105	ML 60d 58 1830	1 · 58 Watt	5220	1951	82	60	ca. 3.2 kg
77-ML70118-2450-105	ML 70d 18 570 (PL)	1 · 18 Watt	1200	691	92	70	ca. 2.2 kg
77-ML70124-2450-105	ML 70d 24 665 (PL)	1 · 24 Watt	1800	786	92	70	ca. 2.8 kg
77-ML70136-2450-105	ML 70d 36 761 (PL)	1 · 36 Watt	2900	882	92	70	ca. 3.4 kg
77-ML70155-2450-105	ML 70d 55 881 (PL)	1 · 55 Watt	4780	1002	92	70	ca. 3.8 kg

110-240 V AC/DC, 50-400 Hz (Standard)

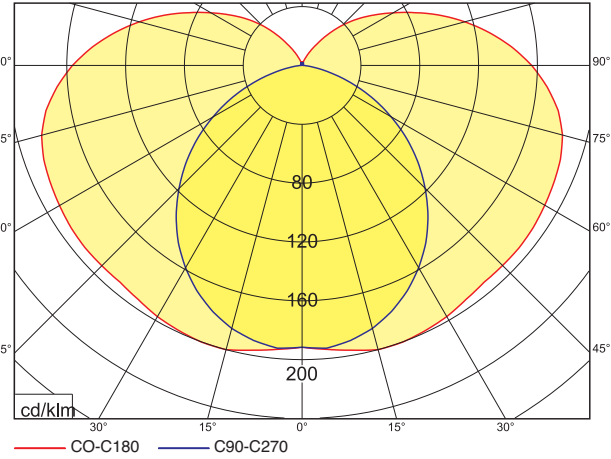
Item No.	Type	FI-tubes	Luminous efficiency in/en/in Lumen	Measurements in mm			Total weight
				A	B	C	
Machine Lamps							
77-ML50118-110240-105	ML 50d 18 870	1 · 18 Watt	1296	991	72	50	ca. 2.4 kg
77-ML50130-110240-105	ML 50d 30 1175	1 · 30 Watt	2460	1296	72	50	ca. 2.4 kg
77-ML60118-110240-105	ML 60d 18 870	1 · 18 Watt	1296	991	82	60	ca. 2.5 kg
77-ML60130-110240-105	ML 60d 30 1175	1 · 30 Watt	2460	1296	82	60	ca. 2.5 kg
77-ML60136-110240-105	ML 60d 36 1480	1 · 36 Watt	3348	1601	82	60	ca. 2.8 kg
77-ML60158-110240-105	ML 60d 58 1780	1 · 58 Watt	5220	1901	82	60	ca. 3.2 kg
77-ML70118-110240-105	ML 70d 18 522 (PL)	1 · 18 Watt	1200	643	92	70	ca. 2.2 kg
77-ML70124-110240-105	ML 70d 24 617 (PL)	1 · 24 Watt	1800	738	92	70	ca. 2.8 kg
77-ML70136-110240-105	ML 70d 36 713 (PL)	1 · 36 Watt	2900	834	92	70	ca. 3.4 kg
77-ML70155-110240-105	ML 70d 55 833 (PL)	1 · 55 Watt	4780	954	92	70	ca. 3.8 kg



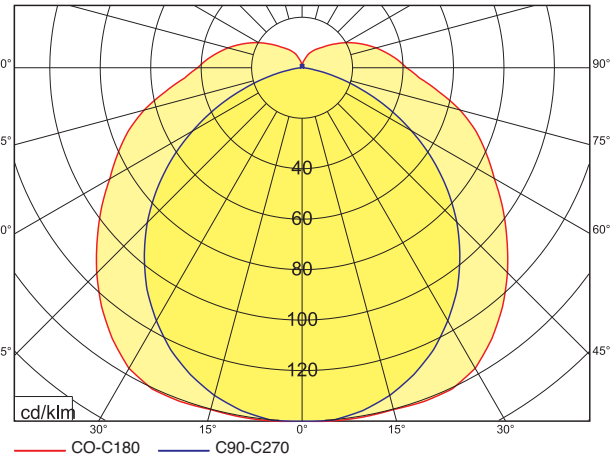
The AC frequency can vary from 50 to 400 Hz $\pm 10\%$, which ensures their suitability for use with normal power supply systems in permanent installations and workshops as well as with temporary site generators. Their ballasts have a state-of-the-art microprocessor that has been specially developed for monitoring fluorescent lamps. This microprocessor ensures comprehensive monitoring of a wide range of parameters such as preheat and operating frequency, undervoltage and power factor as well as continuous monitoring of temperature, current, voltage and end of life (EOL). If, for example, no tube has been fitted or there is a break in the wiring to the cathodes, the lamp either cannot be started or is immediately switched off.

The transparent protective sheath is made of impact-resistant polycarbonate (Makrolon 1143) and has a built-in reflector. All hand and machine lamps have IP68 ingress protection (tested at a depth of 2.5 m for 24 hours). Special attachments enable the lamp to be clamped on pipes or secured by magnets directly to a machine housing or tank wall.

Light distribution curves



Single tube (light output ratio: 80 %)



Double-bulb (light output ratio: 62.3 %)



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