

# Series SMS 3 Safety Pressure Mats

## Description & Operation

The maintenance-free series SMS 3 safety mat system is designed to safeguard personnel when entering a hazardous area around dangerous machinery. A person's presence is detected upon their stepping/walking on the mat. The interconnected safety controller (such as the AZR 31 R2, AZR 31 T2, or AZR 11 RT2) continuously monitors the integrity of the safety mat system, sending a "stop" signal to the machinery in the event of a system fault or pressure mat actuation.

When properly installed with the active edge profiles, a 100% mat actuation area is achieved... thus complying with the stringent requirements of EN 954-1 safety category 3.

## Construction & Principle of Operation

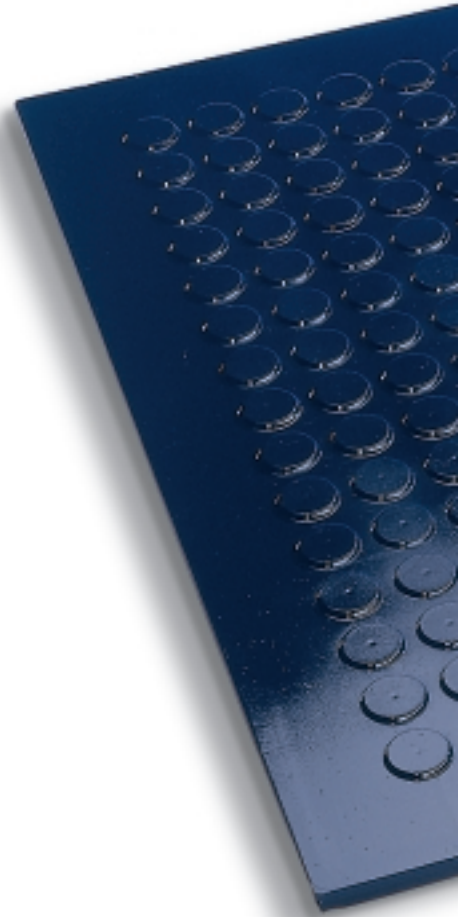
The series SMS 3 safety mat consists of two electrodes (steel plates) separated by an internal layer of compressible elastomeric insulating strips. The insulating strips are capped by a conductive u-shaped strip whose edges overhang the compressible insulator.

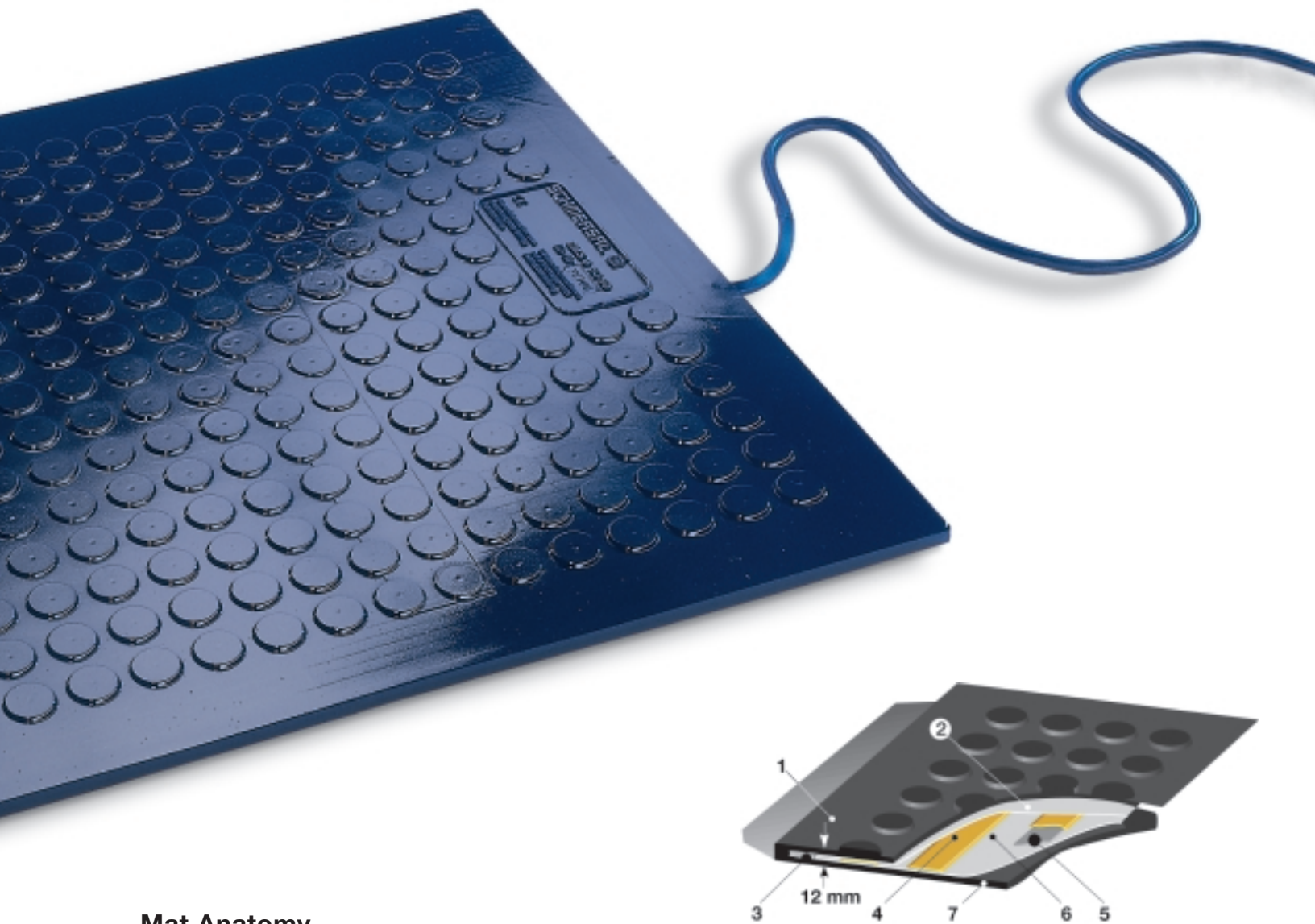
Upon the application of pressure (e.g. walking/stepping on the mat), the insulating strips compress allowing the conductive strip to close the normally-open circuit between the steel electrodes. This closure signal is detected by the system's safety controller whose safety output(s) sends a "stop" signal to the machinery being approached.



## Typical Applications

- Robotic work cells
- Laser welding/cutting equipment
- Packaging machinery
- Woodworking machinery
- Textile machinery
- Palletizing/stacking/shrink wrapping systems
- Paper converting machinery
- Material handling equipment
- Tube-bending equipment
- Assembly machinery
- Stamping equipment
- Printing machinery





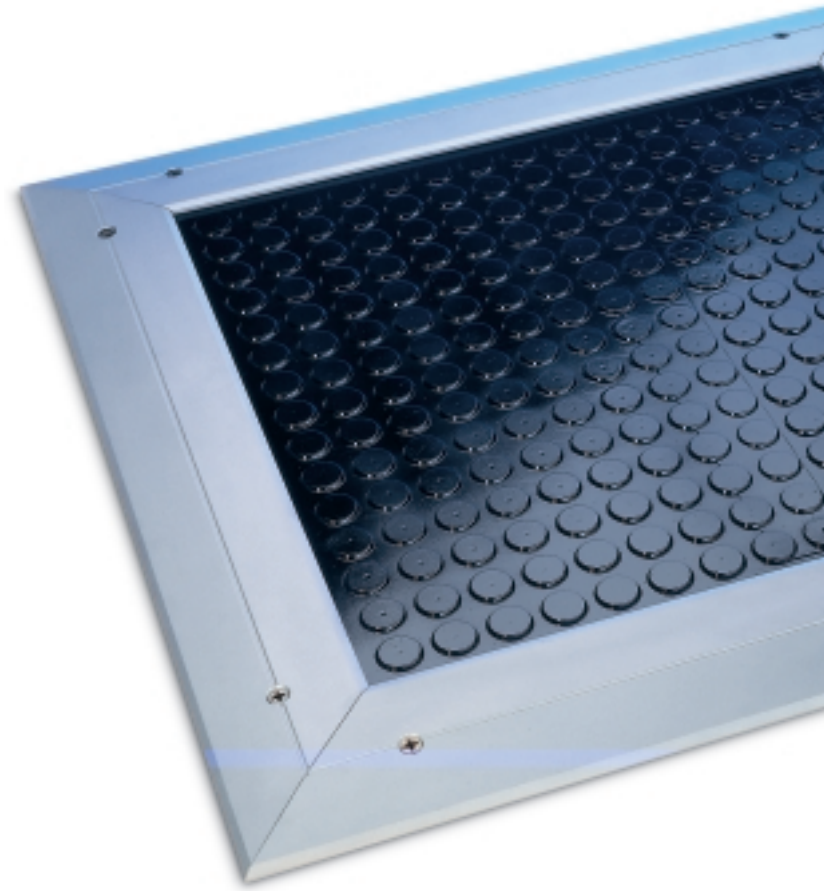
## Mat Anatomy

- 1 Non-slip safety mat surface
- 2 Upper electrode (24-gauge steel plate, hardened for optimum performance & durability)
- 3 Edge spacer
- 4 Conductive (u-shaped) contact strips
- 5 Compressible, elastomeric insulating strips
- 6 Lower electrode (24-gauge steel plate, hardened for optimum performance & durability)
- 7 Safety mat bottom surface

## Features & Benefits

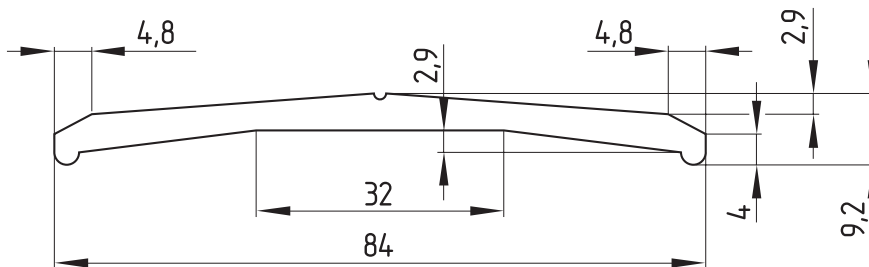
- 100% active mat area... active edge trim and insulating strip-contact design ensure actuation over entire mat surface
- High chemical resistance... mat material is tolerant to most acids, alcohols, aldehydes, caustics, solvents and oils found in an industrial environment
- Non-slip surface profile... unique surface geometry designed to enhance traction and minimize slippage
- Meets safety category 3 requirements of EN 954-1... suitable for most industrial applications
- Modular design... permits protection over a diversity of hazardous area shapes/sizes
- Easy-to-install... simple 4-wire connection (without need of a terminal resistor or additional base plate)
- Integral 6m cable... satisfies wiring requirements for a wide variety of applications
- Rugged IP67 design... with mechanical life expectancy of more than 5 million actuations
- Fully CE-compliant... third-party certified to EN1760-1
- Extended warranty... mats are warranted for 3 years from date of shipment

## Active Edge (SMS P-100)

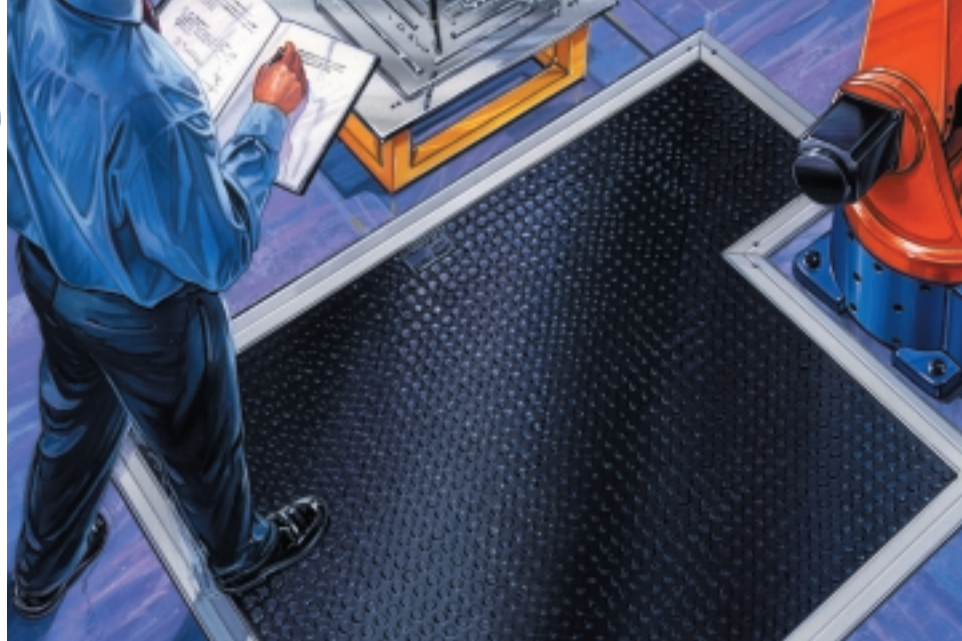


Schmersal's SMS P-100 active edge is an integral part of the SMS Series safety category 3 safety mat system. This unique, patented design ensures mat actuation when stepping on the edge profile... thus guaranteeing a 100% active mat area in single and multiple-mat installations.

***It is important to recognize that the active edge profile/trim plates are an integral component of the SMS 3 safety mat system. Consequently they must not be replaced by other components.***







CE

## Custom Shapes & Sizes

Schmersal's CE-compliant safety mats can be custom made in a wide range of shapes and sizes to suit your application requirements. We would be pleased to prepare a proposal and quotation for a cost-effective solution that satisfies your unique needs. Please call should you have a specific application challenge. *(Please see Page 6 for ordering information.)*

Specification	Technical Data
Conformance to Standards	EN 1760-1
Degree of Ingress Protection	IP 67 per IEC 60529
Response Time	≤ 30 ms (Single mat only)
Mechanical Life Expectancy	> 5 million operations
Maximum Load	2000 N/cm <sup>2</sup> (2,900 lbs/sq. in)
Active Area	100% Active Area (with SMS P-100 "Active Edge")
Surface Material	Mat: Vinyl Active Edge: Aluminum
Mat Thickness	12 mm (0.5 in)
Mat Weight	18 kg/m <sup>2</sup> (3.7 lbs/sq. ft)
Standard Cable Length <i>(Other lengths available. Please consult factory.)</i>	6 meters (19.7 ft)
Ambient Operating Temperature Range	+5°C to +50°C (+41°F to +122°F)
Storage Temperature	-20°C to +50°C (-4°F to +122°F)
Warranty Period	3 Years (from date of shipment)
Agency Approvals	CE-Compliant
Chemical Resistance <i>(Please consult factory for other chemical compatibility)</i>	Water: Excellent Mineral Acids: Good – Excellent Organic Acids: Good – Excellent Alcohols: Good Aldehydes: Good – Excellent Caustics: Good – Excellent Petroleum Solvents: Fair – Good Oils: Good

## Optional Features

### “Tru-Grit” Surface Finish... Provides added traction in wet/oily applications

SCHMERSAL’s “Tru-Grit” surface finish provides added traction in applications where mats are subject to liquids, oils and/or greases. These mats feature a non-skid, non-wearing granular material tightly bonded to the vinyl surface and capable of withstanding heavy pedestrian and vehicular traffic.



## Standard Safety Mat & Trim Kit Ordering Information

<b>Standard Sizes</b> <i>(Other sizes and non-rectangular shapes available. Please consult factory.)</i>	Model	Length x Width (Mat only, without trim kit)*	“Active Edge” Trim Kit (Must be ordered separately)*
	SMS 3 25-25	250 mm x 250 mm	SMS P 100-25-25
	SMS 3 25-50	250 mm x 500 mm	SMS P 100-25-50
	SMS 3 25-100	250 mm x 1000 mm	SMS P 100-25-100
	SMS 3 50-50	500 mm x 500 mm	SMS P 100-50-50
	SMS 3 50-100	500 mm x 1000 mm	SMS P 100-50-100
	SMS 3 50-150	500 mm x 1500 mm	SMS P 100-50-150
	SMS 3 75-75	750 mm x 750 mm	SMS P 100-75-75
	SMS 3 75-100	750 mm x 1000 mm	SMS P 100-75-100
	SMS 3 75-150	750 mm x 1500 mm	SMS P 100-75-150
	SMS 3 100-100	1000 mm x 1000 mm	SMS P 100-100-100
	SMS 3 100-150	1000 mm x 1500 mm	SMS P 100-100-150
	SMS 3 120-120	1200 mm x 1200 mm	SMS P 100-120-120
	SMS 3 120-150	1200 mm x 1500 mm	SMS P 100-120-150

**\*\*“Active Edge” trim kits are supplied mitered, drilled and countersunk. Each is supplied with stainless-steel mounting hardware. The user/installer is responsible for cutting a notch at their desired wire exit point at time of installation. Active Edge trim adds 50 mm to installed dimension on each side. For example, a 250 mm x 250 mm mat with Active Edge trim all around would have installed dimensions of 350 mm x 350 mm.**

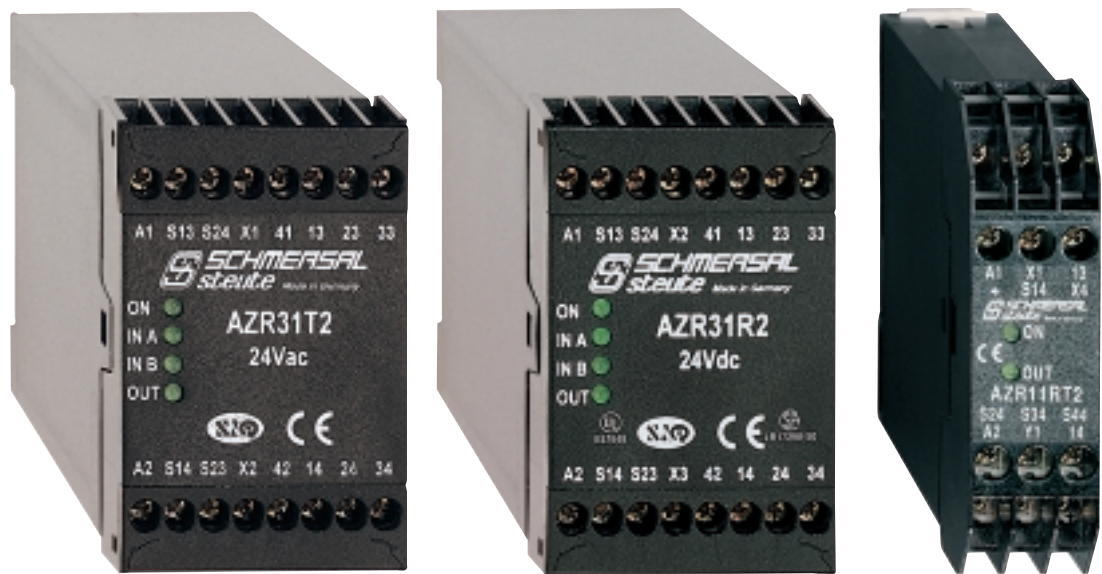
**Note: Safety mats and trim kits must be ordered with a compatible safety controller.**

*(Please see Page 7 for available safety controller models.)*

**Please advise factory if other than standard 6m cable is desired.**

# Compatible Safety Controllers (Safety Relay Modules)

The SMS 3 safety mat system includes a choice of three compatible safety controllers... one of which is required for each installation.



These choices are summarized in the chart below with complete technical specifications shown on Page 8.

Model Number	Type Reset (See Note 1)	Number of Safety Outputs	Available Signaling Output	Safety Controller Input Voltage
AZR31T2-24VAC	Automatic	3	1 N.C. (Voltage-free)	24VAC
AZR31T2-24VDC	Automatic	3	1 N.C. (Voltage-free)	24VDC
AZR31T2-110VAC	Automatic	3	1 N.C. (Voltage-free)	110VAC
AZR31R2-24VAC	Manual	3	1 N.C. (Voltage-free)	24VAC
AZR31R2-24VDC	Manual	3	1 N.C. (Voltage-free)	24VDC
AZR31R2-110VAC	Manual	3	1 N.C. (Voltage-free)	110VAC
AZR11RT2-24VDC	Automatic (user selectable)	1	1 N.O. (PNP-output)	24VDC

**Note 1:** Manual reset units require the presence of a discrete “trailing edge” signal (24V to 0V) to activate (reset) the safety outputs. A reset button must be provided.

Automatic reset units do not require a reset signal. These units automatically re-activate (reset) the safety outputs when pressure is removed from the mat and no other safety circuit faults exist. A discrete reset button may be used for increased safety.

Each of these DIN-rail mountable safety controllers are designed to monitor the integrity of the SMS 3 safety mat circuit. In the event of mat actuation or the occurrence of a fault in the circuit, the safety output(s) will be activated to stop the hazardous machinery. Detectable faults include:

- Open circuit in interconnection wiring
  - Short in the interconnection wiring
  - Fault in one or more of the controller’s safety relays
  - Welded contact in the controlled positive-guided motor contactor or control relay
- In addition, each unit features LED system status indicators to aid in installation and trouble shooting.

# Series SMS 3 Safety Controller Technical Specifications

Specification	Technical Data
Conformance to Standards	EN 60204-1, IEC60204-1, EN954-1, EN292-1, EN292-2, DIN VDE 0110-1, VDE 0113 Part 1
Housing Material	Polycarbonate
Mounting Arrangement	DIN-rail mounting according to DIN EN 50022
Housing Dimensions	AZR31: 73.2mm x 45mm x 121mm AZR11: 82mm x 22.5mm x 98.8mm
Degree of Ingress Protection	Terminals: IP20 Housing: IP40 (per IEC 60529)
Operating Voltage	24VAC $\pm$ 15% (AZR31) 24VDC $\pm$ 15% (AZR31 & AZR11) 110VAC $\pm$ 15% (AZR31) 230VAC $\pm$ 15% (AZR31... available on request)
Power Consumption	AZR31: <3W AZR11: <0.5W
Inputs	Channel A, B: Voltage-free contacts
Output Signals	AZR31: 3 enabling (safety) outputs (Two N.O. relay contacts in series) 1 signaling contact (Two N.C. relay contacts in parallel) AZR11: 1 enabling (safety) output (Two N.O. relay contacts in series) 1 signalling contact (PNP output, 15mA)
Switching Voltage/ Switching Power	AZR31: Max. 440 VAC, 1500 VA Max. 30VDC, 60W AZR11: Max. 250 VAC, 1000VA
Response Time	$\leq$ 15 ms
Signalling	AZR: 31: Green LEDs for control voltage, Channel A, channel B, Output AZR 11: Green LEDs for control voltage, Output
Ambient Operating Temperature Range	0°C to +50°C (+32°F to +122°F)
Storage Temperature Range	-25°C to +70°C (-13°F to +158°F)
Weight	AZR 31: Approx. 465 gm (1 lb) AZR 11: Approx. 150 gm (0.35 lb)
Agency Approvals	UL, CSA, CE-Compliant