



SAFETY MATS

Safety mats are devices which are used to guard the actual floor area around a dangerous area. They can be used to provide primary guarding, where other types of guarding may be inflexible or impractical, and also to provide secondary guarding ie. they can be used in conjunction with an interlocked fence or light curtain to protect awkwardly shaped machines. In essence, a safety mat offers increased guarding flexibility as it can be used both to detect an operator entering a dangerous area and also to provide presence-sensing of operators for as long as they remain inside a dangerous area.

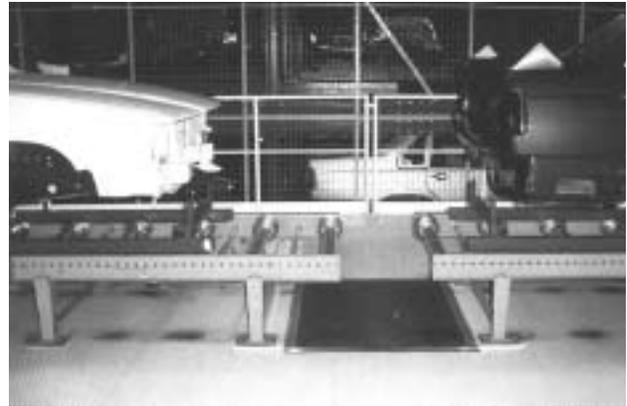
A safety mat operates when pressure (usually from an operator's foot) is applied to the mat surface. This results in a signal being sent to the safety mat controller which in turn will send a stop signal to the machine control system. The dimensions and positioning of the mats should be in accordance with the guidelines given in EN999.

Tapeswitch is in the unique position of manufacturing safety mats with two different technologies. The CKP, Armormat and DPM mats use Tapeswitch ribbon switch technology whereas the LMI mat uses parallel steel plate technology. Each technology has its own advantages giving Tapeswitch a range of safety mats ideal for all applications.

CKP/S1	Standard heavy-duty construction
Armormat	Impact-resistant construction
DPM	Very heavy-duty diamond plate mat
LMI	Moulded parallel steel plate mat

The only manufacturer of mats that has the opportunity to offer two technologies each having it's own unique benefits.

- ▶ Different Mats
- ▶ Different Technologies
- ▶ Different Applications



- ▶ EC Type Certification
- ▶ Third Party Verification to EN1760-1, EN954-1 Cat 3
- ▶ IP67 Option
- ▶ Failsafe System with cross monitored control unit
- ▶ Custom Logos
- ▶ Custom Shapes
- ▶ Impact Resistant
- ▶ Different colours available
- ▶ UL approved



SAFETY MATS



FEATURES/BENEFITS - POINTS TO CONSIDER

	LMI	CKP, ARMORMAT
Waterproof	Yes, IP67. Moulded product, will prevent water intrusion.	Yes, IP65
Activation Force	<150N (15Kg) 80mm test piece.	<300N (30Kg) 80mm test piece.
Colour	Many, including black, brown, grey, white, yellow, custom.	Two available, black or yellow.
Colours Per Mat	3 per mat. 2 per mat is standard.	1 per mat is standard.
Shapes	Diverse, many shapes available.	Rectangular, cut-outs, special.
Tooling Charge for Special Shapes	Yes.	No.
Surface Patterns	Coin or button. Diamond plate, ribbed options, smooth, custom.	Ribbed.
Customer Logos	Yes, Company Logo in any colour or combination of colours, moulded directly into any mat you choose.	No.
Replacement	All parallel plate manufacturers.	Tapeswitch/all others.
Edging	Ramped, square, framed, stepped. Aluminium edge trim available.	Square. Aluminium edge trim available.
Chemical Resistance	Excellent to water, ethyl alcohol, sodium chloride, sulphuric acid, hydrochloric acid. Fair for acetic acid, ASTM 1 oil, gasoline.	Excellent to water, mild acids and bases, alcohols, gasoline and many solvents unless submerged or in continuous contact.
Controllers	A variety of Tapeswitch controllers is available.	A variety of Tapeswitch controllers is available.

APPLICATION SPECIFIC - BEST CHOICE

Transit	LMI	Coloured Mats	LMI
Industrial Safety	CKP or LMI	Two or more colours/mat	LMI
Wet Locations	LMI	Lips/Edging	LMI
Level Floor	LMI	4-Wire Fail Safe	CKP or LMI
Uneven Floor	CKP	Parallel Plate Replacement	LMI
High Personnel Traffic	LMI	Custom Logos	LMI
Equipment Traffic	CKP or DPM	Square or Rectangular Cutouts	CKP or LMI
Long Continuous Mat	CKP	Special Shaped Cutouts	LMI
Multi-Zone Mats	CKP or LMI	Special Shaped Mats	LMI

This list represents the “Best Choice”. This does not mean the other technology cannot be used.

SEPARATION DISTANCE

When a mat is being used to provide primary guarding i.e. it is used as a trip device, it is necessary to ensure that the dimensions of the sensor are such that the machine is brought to rest before a person can reach the dangerous parts. If a mat is being used in a secondary guarding capacity, it is necessary to ensure that the dangerous area between the primary guarding device and the machine is completely protected. It should not be possible for a person to be in or stand in this area without standing on the mat.

The safety mat should therefore be dimensioned such that the nearest point at which a person could first touch the mat is at a sufficient distance from the dangerous parts to prevent the person reaching them before they have stopped.

In order to determine the position of the front edge of the active zone, it is necessary to consider the stopping performance of the machine. From the instant that a person's foot touches the mat to the instant that dangerous motion actually ceases is called the overall system response time, T, which is given by the following calculation:

$$T = t_1 + t_2$$

where t_1 = the maximum response time of the safety device between the actuation of the sensor and the generation of the stop signal
 = 30ms (measured according to DIN V 31006-1)

where t_2 = the response time of the machine between receiving a stop signal from the safety device and the dangerous parts coming to rest.

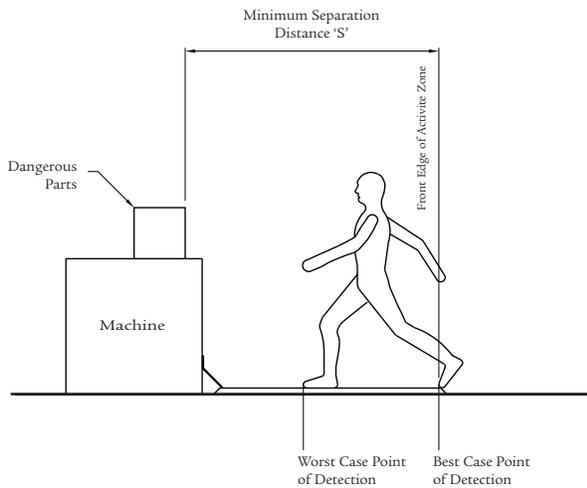
The dangerous parts will obviously continue to move during this time so the sensor must therefore be dimensioned such that a person cannot reach the dangerous parts before they have stopped.

According to EN999, the minimum separation distance, S in millimetres, can be calculated using the following formula:

$$S = (1.6 \times T) + 1200$$

Where T = overall system response time in milliseconds

When a mat is used to provide secondary guarding, i.e. it is used as a presence sensing device in conjunction with a trip device, the above formula does not apply. However, the mat(s) should be positioned so that it is not possible for a person to remain undetected in a dangerous position.



CKP/S1

- ▶ Custom shapes & sizes
- ▶ Durable construction
- ▶ Chemical & abrasion resistant
- ▶ Non-slip corrugated surface
- ▶ Low pressure actuation
- ▶ Dri-run cable
- ▶ No special floor preparation
- ▶ Rugged abrasion resistant design

CKP/S1 Safety Mat Systems are designed to protect operators working at or near dangerous machinery. They will also withstand incidental vehicle traffic.

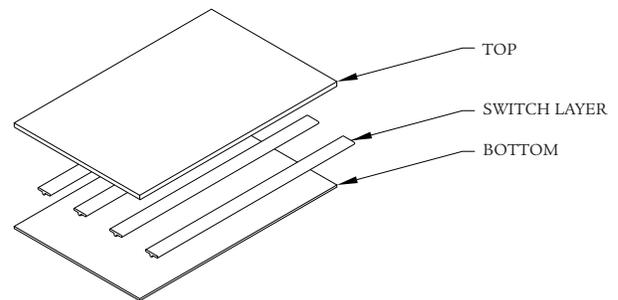
Field tested for over 20 years, the control mat surface is both weather and abrasion resistant and has an excellent record in the machine tool and automation industry.

A system consists of a mat sensor and a PSSU-style control unit. The CKP mat is of heavy-duty construction and comprises an array of Tapeswitch ribbon switches sandwiched between two layers of durable PVC material. When a person stands on the mat one or more of the switches is operated and a stop signal is transmitted to the machine control system.



Technical Specification

Colour	Black
Housing Material	Koroseal
Actuation Force	<300N (30Kg) 80mm - test piece
Maximum length	2.4m
Maximum width	1.2m
Depth	approx. 13mm
Inactive area	30mm wide around outer edge
Response time	30ms (DIN 31006-1)
Protection rating	IP65
Operating temperature	0°C to +50°C
Weight	approx. 16kg/m ²
Static load	75Kg/cm ²
Operating voltage	24Vdc
Power consumption	6VA
Switching current @24Vdc	1A



ARMORMAT

- ▶ Heavy duty design
- ▶ Custom sizes
- ▶ Impact resistant to over 1500psi
- ▶ Switching elements completely protected
- ▶ Non-slip corrugated surface

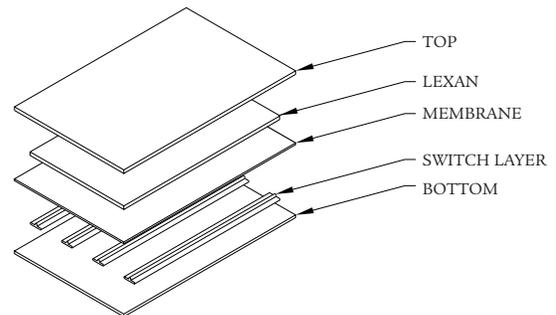
ARMORMAT extra heavy-duty industrial switching mat provides all the features of our CKP Mat. Designed for severe use and environments, they easily withstand abuse that would normally destroy ordinary switching mats, such as repeated gouging by dropped sheet metal, piercing by a heavy spoke and continual pounding with a large hammer.

Armormats are similar in construction to CKP mats but they are specifically designed to withstand heavy impacts. The mat incorporates a rubber membrane and a layer of tough polycarbonate which gives added protection to the switching elements in case the surface material is pierced.



Technical Specification

Colour	Black
Housing Material	Koroseal
Actuation Force	<300N (30Kg) 80mm - test piece
Maximum length	2.4m
Maximum width	1.2m
Depth	approx. 18mm
Inactive area	20mm wide around outer edge
Response time	30ms (DIN 31006-1)
Protection rating	IP65
Operating temperature	0°C to +50°C
Weight	approx. 21kg/m ²
Static load	75Kg/cm ²
Operating voltage	24Vdc
Power consumption	6VA
Switching current @24Vdc	1A



LMI

- ▶ Parallel plate technology
- ▶ Moulded product
- ▶ Custom shapes and sizes
- ▶ Custom colours
- ▶ Custom moulded logos
- ▶ Multiple switching zones

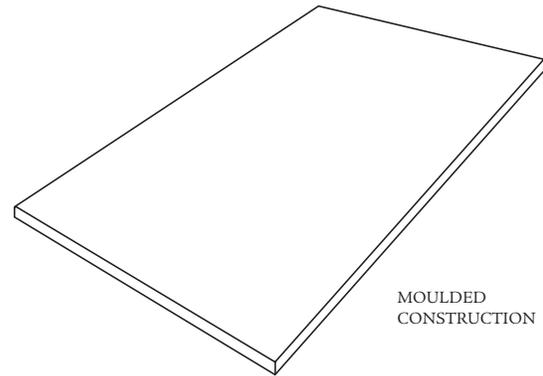
The Tapeswitch LMI mats use two parallel steel plates as a switch sensor. These are separated by insulated “buttons”, which keep the steel plates apart until a person stands on the mat and causes the top plate to make contact with the bottom plate.

The switch sensor is hermetically sealed and moulded in PVC to form the safety mat. A safety mat system comprises a mat sensor and a PSSU-style control unit.



Technical Specification

Colour	Black (standard). Others on request
Housing Material	PVC
Actuation Force	150N (15Kg) 80mm - test piece
Maximum length	1500mm
Maximum width	1000mm
Depth	approx. 12mm
Inactive area	20mm around outer edge
Operating temperature	-35°C to +50°C
Operating voltage	24Vdc
Operating current	50mA min. 1 A max
Power consumption	6VA
Weight	9.5kg/m ²



STANDARD SIZES

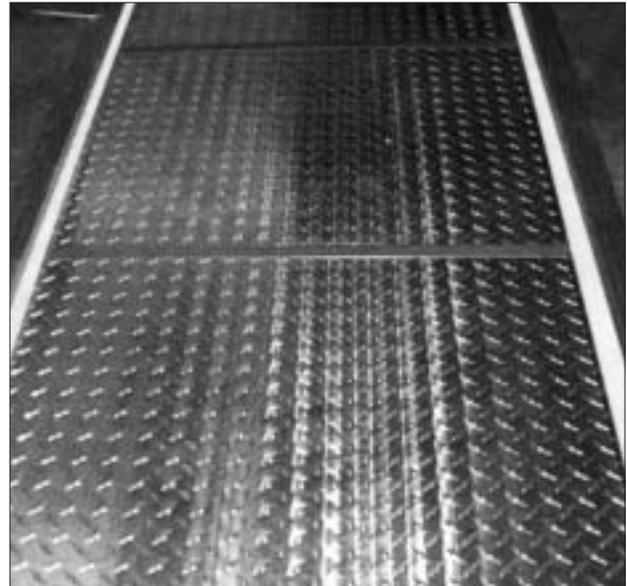
500mm	x	500mm
500mm	x	1500mm
750mm	x	500mm
750mm	x	750mm
750mm	x	1500mm
1000mm	x	500mm
1000mm	x	750mm
1000mm	x	1000mm
1000mm	x	1250mm
1000mm	x	1500mm

DPM

- ▶ Extremely heavy duty
- ▶ Aluminium diamond plate surface
- ▶ Withstands heavy traffic
- ▶ Assemble on-site
- ▶ Custom sizes
- ▶ Aluminium ramped edging

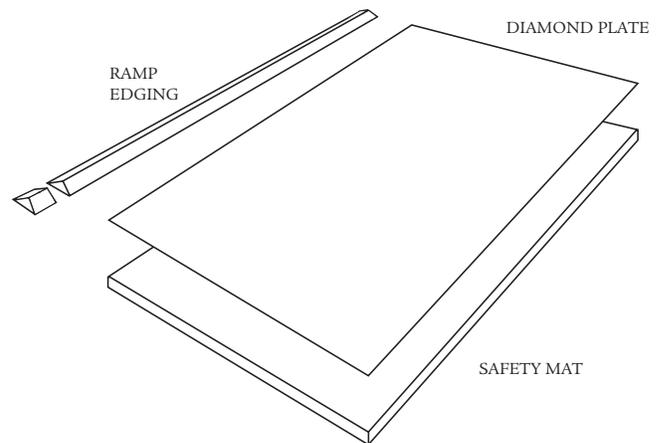
The DPM safety mat system has extremely high durability in harsh industrial environments.

The system comprises a Tapeswitch safety mat fitted below an aluminium diamond plate construction, which is held in position by extruded aluminium edge strips. The system is manufactured to the required size and despatched in kit form to be assembled on-site. The mat gives excellent resistance to impacts and is particularly useful in applications where hot materials falling on the mat would damage a conventional construction.

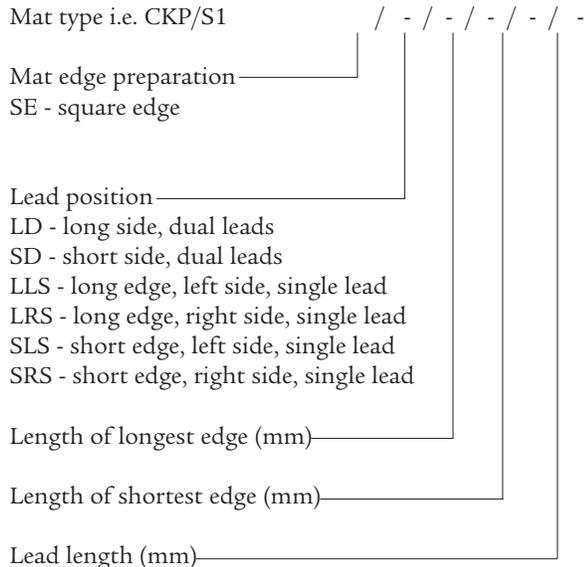


Technical Specification

Surface material	6061 T6 Aluminium
Actuation Force	<300N (30Kg) 80mm - test piece
Maximum area	On request
Response time	25mS
Depth	approx. 12mm
Inactive area	90mm around outer edge of sensor (ramped edge)
Weight	32kg/m ²
Operating temperature	0°C to +50°C
Protection rating	IP65
Operating voltage	24Vdc



ORDER CODE



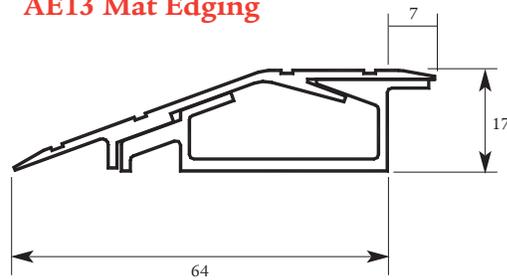
Example: CKP/S1 / SE / LD / 1000 / 0500 / 2000

ACCESSORIES

AE13 style aluminium mat edging can be used to fix safety mats in position. This specially designed edging comprises two parts; a base and a cover. The cover provides a 20 degree ramp to prevent tripping hazard at the outer sensor edges. The base can accommodate sensor wiring, protecting the cables from damage and acting as a conduit to route the cables to the control box.

AE13 is suitable for CKP, Armormat and LMI mats.

AE13 Mat Edging



CABLE OUTLET

