

Concepts

Products

Service

**The safe way.**

Lindner Secure – Blast-enhanced building products



**Lindner**

Building New Solutions

# Building new solutions.

Lindner undertakes major projects worldwide in all areas of interior fit-out, insulation technology, industrial services and building facades. From pre-planning through to project completion Lindner is your partner of choice.

The Company's extensive manufacturing capability enables quality to be strictly maintained whilst allowing maximum flexibility to meet individual project requirements.

Environmental considerations are fundamental to all Lindner's business principles.

Through partnerships with clients Lindner turns concepts into reality.

## Choosing Lindner you have:

**Lindner Concepts:**  
Tailored solutions specifically geared to satisfy individual project requirements

**Lindner Products:**  
Quality materials and systems to the very highest industry standards

**Lindner Service:**  
Comprehensive project management services

# Preventing fragmentation saves lives.

## Lindner Secure

The Lindner Group is Europe's leading fit-out and facade construction company, specialising in developing and manufacturing its own products to ensure superior quality and functionality. Lindner solutions for commerce, industry, transport, healthcare and entertainment can be found worldwide.



Lindner Secure is a new product range developed in response to the increasing demand for enhanced security environments. With an increasing risk of terrorist activities in today's society, where political unrest and religious tensions are playing out on an international stage, it is unfortunately necessary to assess any public structure that sees the gathering of large numbers of people – from airports and stadia to shopping centres, hospitals and government buildings – in the context of bomb-blast security.

Lindner recognized the lack of product systems available in this field and commissioned Crossley Consult, specialist in high security and counter-terrorism material solutions, and building product

design specialist Billings Jackson Design to collaborate on the pioneering Lindner Secure range.

The intention is to provide architects and designers with the tools and systems they need to create inherently blast-enhanced environments without compromising design excellence. A comprehensive range of facades, partitions and wall claddings, suspended ceilings and raised floors, with complementary products including waste bins, which meets security best practice without detracting from aesthetic or functional performance and importantly without inspiring public fear or paranoia.

Lindner Secure products are elegant, unobtrusive and effective, integrating seamlessly into architectural schemes of all scales to ensure safety is quite literally 'designed in'.

What happens in the case of a bomb detonation? It is not only the explosion itself but also the highly underestimated hidden danger in the surrounding environment that imperils people. Released fragments of glass, metal or even concrete surfaces act like bullets when a bomb explodes. Moreover larger parts of claddings and ceilings might collapse and their single components might come down and hit people.

The bomb blast tests performed by Lindner have revealed that the forces acting a structure depend on the environment surrounding the origin of the blast. Such forces can cause breakup and the release of fragments and particles from surrounding structures, representing a huge danger in the area surrounding an explosion.

# Life-savers in public buildings.

## Lindner Secure products



Malaga Airport, Terminal 3, Spain  
© 2010www.erco.com / Photo: Thomas Mayer



Central Station, Cologne, Germany

The above images show typical scenes on an airport and railway station as an exemplary environment and area of application for Lindner Secure building products. To date, unfortunately only few public buildings, which might become the target of bomb blast attacks, have blast-enhanced interior building products installed. Many might argue that there are security personnel, the police, detection systems or even body scanners eliminating the threats of such attacks. However, these measures of security can simply not cover the entire building area at all times. Many airport terminals and railway station buildings are open to the public unless you reach the security area. Especially the zones outside the security area, e.g. on an airport, could be targeted as the potential location of an attack to maximise the harming effect of a bomb blast assault.

Crowds of people standing in front of check-in, baggage drop-off desks or moving in narrow highly frequented areas with their luggage are typical target areas of terrorist attacks. In the event of a bomb detonation, the construction materials of the surrounding buildings, such as metal, glass or concrete can contribute to the debris and fragment hazard. Interior ceiling and wall cladding panels subject to blast loading can be damaged and fall down as large objects.

## Do you know what is inside the waste bin on the right of the photo? – Certainly not!

Thinking of explosive devices and places to hide and detonate them, criminals might use waste bins as the perfect location in crowded places for maximising the effects of their attack and harm to people close-by. It only requires small amounts of explosive materials disguised as waste to do enormous harm when placed in an ordinary waste bin that has not been designed against such a threat.



### Customer benefits at a glance

- Preventing fragmentation and the release of particles endangering life
- Meeting security best practice without detracting from aesthetic or functional performance
- Seamless integration into architectural schemes without inspiring public fear or paranoia
- Tested to the highest quality standards
- Widely customisable to suit the individual project's requirements

# Put through the paces.

## Testing procedures for Lindner Secure products



The photos above show a typical test scenario for a suspended blast-enhanced post cap ceiling system LMD-B 100 Secure at the beginning of the explosion and after the explosion. The system successfully passed the test as the components of the ceiling system did not show any fragmentation and were securely held through connections to the ceilings substructure.

An interesting viewpoint – The camera positioned behind the Lindner Life 137 Secure glass partition with integrated glass door GTB 100 Secure records the explosion of the test bomb. Both systems performed well and passed the test against the suitcase sized IED threat.



Photographs of Lindner Free Secure wall claddings test set-up with cladding panels made of Corian® before and after the bomb detonation having successfully passed the test requirements.



You want to find out more about testing bomb-blast-enhanced products?  
Find out more by scanning this QR-Code.

# No chance for explosive waste.

## Blast-enhanced waste bins

Waste bins in or in front of public buildings need to fulfil their intended purpose and should have an adequate appearance to fit into the overall design of the building environment. An additional requirement gaining more and more in importance due to increased terrorist activities is to prevent terrorists from maximizing the potential of harm. Waste bins can easily be used to place explosives within in the twinkling of an eye. With the detonation, fragmented bin components as well as waste items might act like bullets and even increase the deadliness of such an attack.

Lindner has addressed this potential threat and developed specially designed waste bins preventing the dangerous fragmentation. The bin has been tested with a 4 STAR security rating even in free-standing position, not additionally fixed to the floor. A wide range of visual design for indoor and outdoor by using our tremendous range of surface options on metal is available to fulfil the visual needs of the project and providing people's confidence in a safe environment.

### Technical data

Test standards	Centre For Applied Science and Technology (CAST), 23/13 "Determination of the explosion resistance of litter and recycling bins"
Test requirements	Ratings are available upon request
External diameter	620 mm
Internal diameter	390 mm
Overall height	900 mm
Capacity	75 litre plastic liner (including liner and refuse bag clip)
Weight	approx. 200 kg





London Heathrow International Airport Terminal 5, UK  
Photo: © BAA Limited

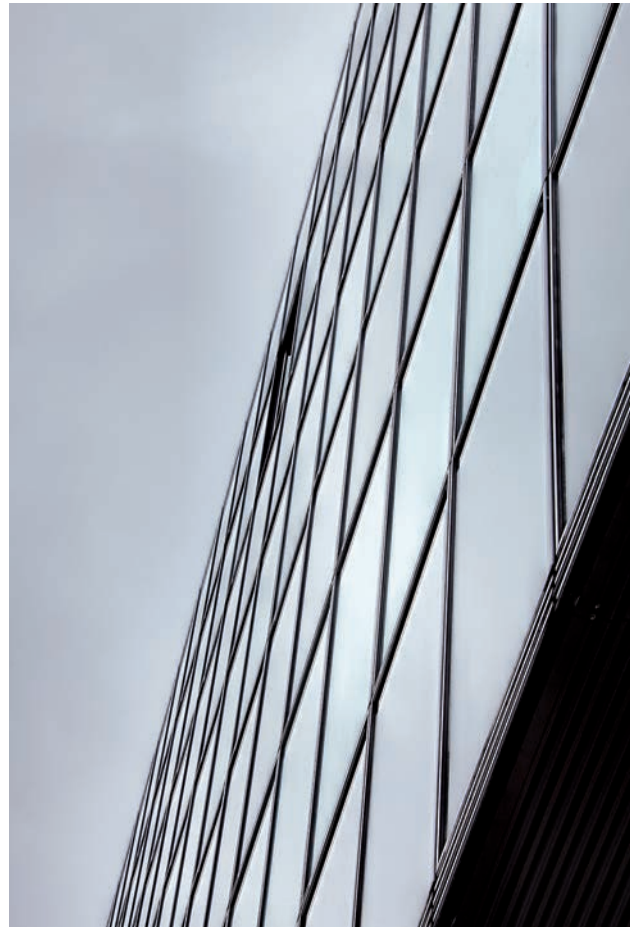


# Turning your visions into reality.

## Blast-enhanced facades and curtain walling

The facade of a building is the most important part of a building envelope when it comes to providing protection against not only climate and weather, but also from terrorist attacks such as vehicle borne explosive devices.

London Heathrow Terminal 5's facades are made up of over 45,000 m<sup>2</sup> of glass, equating to 7,500 bespoke glass panels. These were installed in T5A and T5B, the Car Park, the Control Tower and also at the Rail Station. The high quality systems were also used for the Air Intake Towers, the Lift Towers and at the Landside Bridges. Natural light floods the buildings, bringing a tremendous feeling of space and cuts down the use of artificial lighting. Facades need to perform specific functions such as controlling the potential for overheating in summer. To help manage the temperature, the glass is coated with a film which controls the amount of sunlight entering the building. Each facade is glazed to allow greater transparency through the building and clear views of the airfield and surrounding countryside. Maximising the use of natural light also contributes to the energy efficiency of the building. Besides all these features the design also includes enhanced safety of passengers and airport staff within the terminal as parts of the facade have been designed as a bomb blast resistant construction.



Interested in more detailed information on blast-enhanced facades and curtain walling for a tailor-made solution to suit your project requirements? – Please contact our experienced experts for details on a fit for purpose solution.

# Lindner's blast-enhanced products



1 Facades

2 Suspended Ceilings

3 Wall Claddings

# cts in an exemplary environment.



Visualisation by Lindner

4 Partitions and Doors

5 Raised Floors

6 Waste Bins



Karlshöfe, Munich, Germany

# Transparent safety.

## Blast-enhanced glass partitions and doors

The system Lindner Life 137 Secure with flush-mounted, bonded glazings brings a sense of transparency and space into the room. The unique bonding technology using structural glazing practice eliminates the need for a finish at the edges and is guaranteed for durability and longevity.

Having successfully passed various bomb blast tests, Lindner Life 137 Secure together with the door type GTB 100 Secure meets the demands of visual appearance, functionality and security aspects.

### Lindner Life 137 Secure



### Technical data

Blast pressure	42 kPa
Blast impulse	178 kPa.msec
Partition thickness	109 and 134 mm
Element width	up to 1,200 mm in standard configuration
Element height	up to 3,000 mm in standard configuration
System weight	approx. 60 kg/m <sup>2</sup> when fully glazed
Sound insulation	up to 50 dB R <sub>w</sub> tested to DIN EN ISO 140-03

### GTB 100 Secure



### Technical data

Blast pressure	42 kPa
Blast impulse	178 kPa.msec
Door width	up to 1,000 mm in standard configuration
Door height	up to 2,200 mm in standard configuration
Sound insulation	up to 37 dB R <sub>w</sub> tested to DIN EN ISO 140-03



M M

- Meeting Rooms
- Rest Rooms
- Locker Room
- First Aid Room

ADIDAS, Herzogenaurach, Germany

# Safe cover.

## Blast-enhanced wall claddings

Lindner Free Secure wall claddings offer tailor-made solutions to specifically meet the project requirements for covering solid unfinished walls and columns. A harmonious atmosphere is created by the different exceptionally elegant design options. Various surface options and coating systems are available, including colours according to the customer preference, that provide for a visually appealing appearance. These surface technologies make it a perfect choice for impressive wall claddings used for advertising or route instructions and are also suitable for front claddings for shops and kiosks for example on airport terminals or railway stations.

### Lindner Free Secure with glass panes



Intelligently constructed, the Lindner Secure cladding system incorporates high-quality glazed, metal or synthetic panels that are engineered to withstand a blast impact. The panels are hooked into a gravity system. This gravity system is a combination of a robust steel basic structure, extruded aluminium L-sections responsible for the support of the panels, and minimum use of single components to ensure easy installation.

Special safety catches prevent the panels from being detached. This design feature also ensures optimum security against vandalism. Having successfully passed the blast testing procedures, Lindner Free Secure wall claddings not only stand out as a visual highlight but also provide maximum safety.

### Lindner Free Secure with Corian® cladding panels



### Technical data

Blast pressure	485 kPa
Blast impulse	634 kPa.msec
Distance to solid wall	min. 140 mm up to 250 mm
Module width	up to 1,500 mm in standard configuration
Construction height	unlimited
System weight	Metal: 20 - 25 kg/m <sup>2</sup> Corian®: 30 - 35 kg/m <sup>2</sup> Glass: 40 - 45 kg/m <sup>2</sup>



Canberra International Airport, Australia



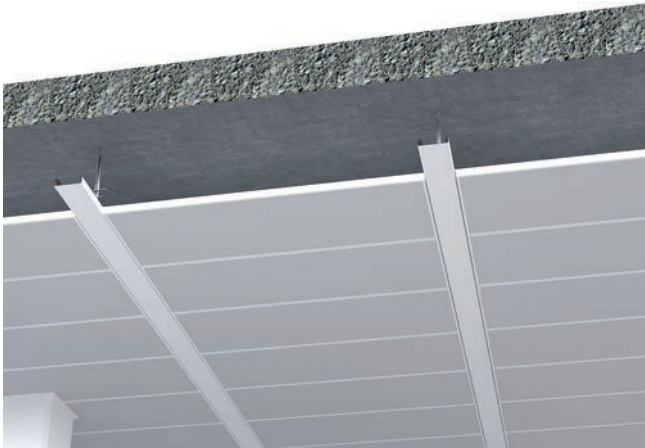
# Resting in place.

## Blast-enhanced suspended ceilings

No matter what demands will be required from your ceiling we can find the perfect solution. For functionality as well as style; from concealed substructure to fully accessible. We will find the perfect solution not only for all internal and external areas but also for project-related designs in underground train stations, airports and many other specialist projects. Lindner Secure ceilings not only prevent the dangerous fragmentation when explosive is placed nearby, they also feature secured components resting connected to the building structure they are fixed to. Thus, in case of a blast, the danger of ceiling elements falling down and injuring people is eliminated.

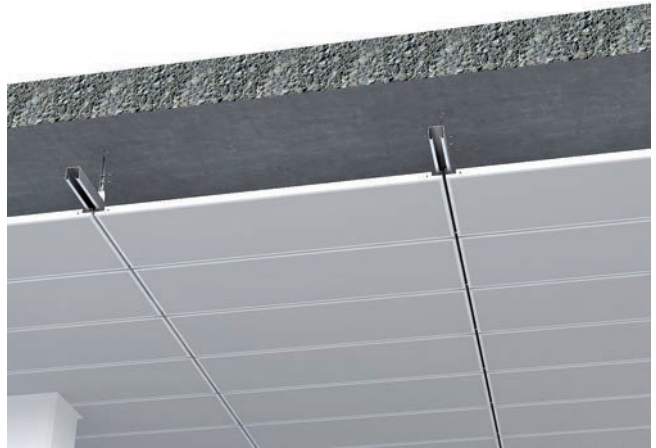
### LMD-B 100 Secure

Linear post cap ceiling with tethered metal ceiling panels and visible post cap profiles



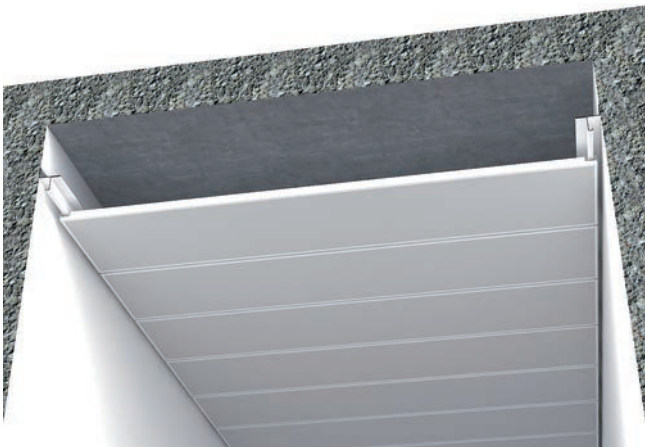
### LMD-E 213 Secure

Hook-on ceiling with accentuated joints, tethered metal ceiling panels and concealed substructure



### LMD-E 312 Secure

Corridor ceiling with tethered metal ceiling panels and concealed substructure



### Technical data

Blast pressure	63 kPa
Blast impulse	176 kPa.msec
Building material class	A2-s1, d0 tested to EN 13501-1 Class A (IBC) tested to ASTM E 84 Class 0 tested to BS 476 part 6/7
Accessibility	Ceiling panels can be removed from substructure to gain access to the ceiling void
System weight	approx. 8 - 10 kg/m <sup>2</sup> (without fixtures/installations)
Sound absorption	up to $\alpha_w = 1.00$ tested to EN ISO 354 up to NRC = 0.95 rated to ASTM C 423
Design options	A wide variety of different configurations and designs is available



Fraport A-Plus, Frankfurt on the Main, Germany  
Photo: © Fraport AG

# Stepping out with class.

## Blast-enhanced raised floors

### FLOOR and more® secure

Lindner FLOOR and more® secure systems and their built-in security ensure that the single components rest in their intended place and do not show any fragmentation endangering life in case of a bomb blast. The design also includes special measures for access hatches to hold them in place during the blast. Additionally, FLOOR and more® secure shoulders the weight of heavy duty situations. In certain circumstances floors need to withstand heavier loads, for example airport terminals, railway stations, museums and libraries. In such situations, FLOOR and more® secure offers unbeatable load-bearing strength. The floor system carries immense loads.

- Product features:**
- Special panel composition
  - Strengthened pedestals
  - Stringers are not required
  - Safe for driving over with heavy motorised lifting apparatus
  - Maintenance-friendly access panels



### Technical data

Blast pressure	63 kPa
Blast impulse	176 kPa.msec
Building material class	A2 tested to DIN 4102-1, A1 tested to EN 13501-1
Pedestal height	57 - 605 mm
Panel dimensions	600 x 600 mm
Panel thickness	40 - 44 mm
Loadability (point load)	8 - 20 kN
Fire resistance performance	F30 tested to DIN 4102-2, REI30 tested to EN 13501-2
Normalised flanking level difference $D_{n,f,w}$	46 dB with covering
Weighted sound reduction index $R_w$	62 dB without covering
Reduction of impact sound pressure level $\Delta L_w$	23 dB with covering
Normalised flanking impact sound pressure level $L_{n,f,w}$	55 dB with covering
Earth quake safety	available in category A - F tested to IBC

## We can do it all for you.

### Lindner Concepts:

- Airports and Railways
- Clean Rooms and Operating Theatres
- Cruise Liner and Ship Fit-out
- General Contracting
- Hotels and Resorts
- Insulation and Industrial Service
- Interior Fit-out and Furnishings
- Special-Purpose Constructions and Stadiums
- Studios and Concert Halls
- System Buildings

### Lindner Products:

- Ceiling Systems
- Doors
- Dry Lining Systems
- Facades
- Floor Systems
- Heating and Cooling Technologies
- Lights and Lighting Systems
- Partition Systems
- Roofing Systems
- Steel & Glass

### Lindner Service:

- Clearance of Harmful Substances
- Construction Management and Project Development
- Deconstruction and Interior Demolition
- General Planning
- Global Product Supplies
- Green Building
- Industrial Scaffolding
- Installation and Building Services
- Research and Development

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