weber
SAINT-GOBAIN

Solutions for Airports

Runways and Taxiways

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Weber has a range of rapid solutions specially designed to assist airport infrastructure managers in overcoming problems in many areas of airport maintenance.

The need to have runways and taxiways operational for the maximum period of time is of great importance to airport operators and airlines but the critical factor is safety.

Every airport is responsible for keeping its runways and taxiways clear of foreign object debris (FOD), as well as clearing snow and ice from all surfaces on which aircraft move.

The airport must also maintain runway and taxiway paving and is responsible for the upkeep of the special lighting and signs required for safe aircraft operation.

Runway Lighting

Runway lighting is used at airports to allow safe landings. Seen from the air, runway lights form an outline of the runway and any surrounding obstacles. There are many different types of lighting and each have a specific role to play in ensuring safe arrival of aircraft at the airport.

There are two types of light commonly installed on or near airport runways. These are either elevated lights or inset lighting embedded in the runways and taxiways. It is the embedded lighting which Weber can offer strong and durable solutions for installation.

Light Bases

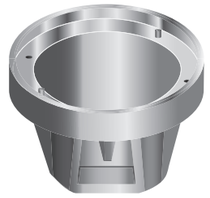
There are a large number of manufacturers who produce airport lights and fittings. Each manufacturer has its own system and installation recommendations. It is not the intention of this publication to review each offer from all manufacturers. Reference should be made with the system details on the manufacturer's website for further information.

Deep Base

A light base used in new concrete pavement construction is usually a deep base, i.e., one that is longer than the pavement thickness. The initial installation involves setting the bottom of a deep base in concrete for the purpose of providing an "anchor." The anchor provides stability to the light base during the paving operation. An embedded steel cage integrates the anchor and the concrete pavement. Confinement of the light base with concrete slightly increases the cylinder strength of the light base by bracing it against buckling.

Shallow Base

The alternative base is termed a "shallow" base that can be between 8" and 12" in diameter and from 4" to 8" deep. Shallow bases are commonly installed in concrete or asphalt overlays or for remedial work.



There is a wide variety of bases available to suit each type of light fitting depending on pavement type and structure, thickness of concrete or asphalt, options for conduit installation and whether pavement coring or pavement replacement is the optimum solution.

Deep and shallow bases can have the power cable entering from the side or bottom-fed and this factor needs to be taken into account when designing the installation method.

Standards

There are several principal Standards for Airport Lighting that are acknowledged worldwide and issued by the US Federal Aviation Administration (FAA).

There is a specification that governs the use of specialist adhesives for the fixing of in-surface light fittings which Weber products are tested to: **AC No: 150/5370-10H** under **Item P-606 Adhesive Compounds, Two-Component for Sealing Wire and Lights in Pavement**.

This specification covers two types of material; a liquid suitable for sealing electrical wire in saw cuts in pavement and for sealing light fixtures or bases in pavement, and a paste suitable for embedding light fixtures in the pavement. Both types of material are either two or three component filled formulas with the characteristics specified in paragraph 606-2.4. Materials supplied for use with bituminous concrete pavements must be formulated so they are compatible with the bituminous concrete in all respects.

Physical or Electrical Property	Minimum	Maximum	ASTM Method
Tensile			
Portland cement concrete	1,000 psi (70 kg/sq cm)		D 638
Bituminous concrete	500 psi (35 kg/sq cm)		
Elongation			
Portland cement concrete	20% or more (without filler) for formulations to be supplied for areas subject to freezing		D 638
Bituminous concrete	50%		D 638
Other			
Coeff. of cubical expansion $cm^3/cm^3/°C$	0.00090	0.00120	D 1168
Coeff. of linear expansion cm/cm/°C	0.000030	0.000040	D 1168
Dielectric strength, short time test	350 volts/mil		D 149
Arc resistance	125 sec		
Pull-off - Adhesion to steel	1,000 psi (70 kg/sq cm)		
Pull-off - Adhesion to Portland cement concrete	200 psi (14 kg/sq cm)		
Pull-off - Adhesion to asphalt concrete	No test available		
Pull-off - Adhesion to aluminium	250 psi		

The latest version of this specification also recommends the following:
Installation methods such as surface preparation, mixing ratios, and pot life are as important to satisfactory performance as the properties of the material itself. Therefore, the engineer may wish to require a manufacturer's representative to be present during the initial installation of the material to ensure the installation procedures are in accordance with the manufacturer's directions.

Installation of Airport Lighting Systems

Inset light fixtures are commonly installed in concrete runways by coring a shallow opening in the existing pavement and then bonding the fixture to the pavement with an epoxy or polyester adhesive. Channels wide enough to accommodate the wires are sawn into the pavement and the conductors are laid in and covered with the epoxy or polyester material.

Fixing of Lighting Bases

Bedding and grouting of airport lighting bases on runways and taxiways using a rapid mortar to bed the bases and a rapid pourable grout to fix the units into place.

webertec bedding mortar is a three-component, polyester-based mortar for the bedding and fixing of airport landing lights. It has been formulated for easy mixing and placement, even at low temperatures and, when cured, provides a durable, chemically resistant bedding and fixing material with good bond strength. Available in standard and winter grades.

webertec grout FG is a three-component polyester grout for anchoring and fixing. It is fast-setting for rapid installation and can be used down to 0°C. It is a flowing grout to fill gaps of between 5mm up to 30mm. Available in standard and winter grades and 2 colours: grey for concrete and black for asphalt.

Please refer to data sheets for product information, a full application guide is available on request.

Preparation

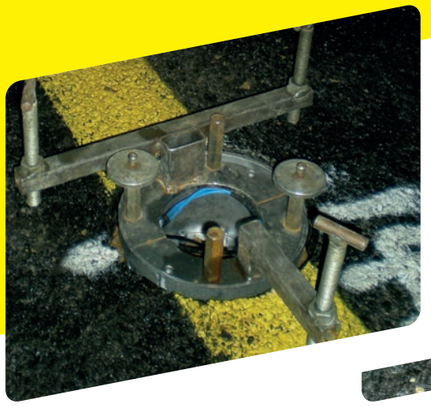
- Coring into new concrete or asphalt runways or over-coring existing light fittings should ensure that the gap between the selected light base and the concrete or asphalt is between 10 and 20mm. This is to allow the grout to be poured into place.
- The sides of a hole cored into concrete or asphalt should be roughened to provide a suitable mechanical key. Under-reaming during coring is an acceptable practice used by specialist installers. All dust and any loose particles shall be cleaned by vacuum.
- Wet holes shall be dried by hot air using flame torches or hot air lances. No wetness shall be permitted. Any water entering the cored hole from the bottom shall be sealed off with a suitable waterproofing plugging mortar.
- Bottom-fed cable entry points should be protected by a temporary baffle. A suitable method is to use a Formica strip bent round into a circle.
- Lighting unit bases should be designed to have flutes and lugs to give good resistance to torsion and pullout. Bases should also have lightly textured exterior surfaces to improve bond and not be smooth and shiny.
- The exterior surface of the lighting bases should be cleaned with a suitable solvent to remove any grease, oil or other contaminants. Shiny surfaces should be abraded by carborundum stone or emery cloth.

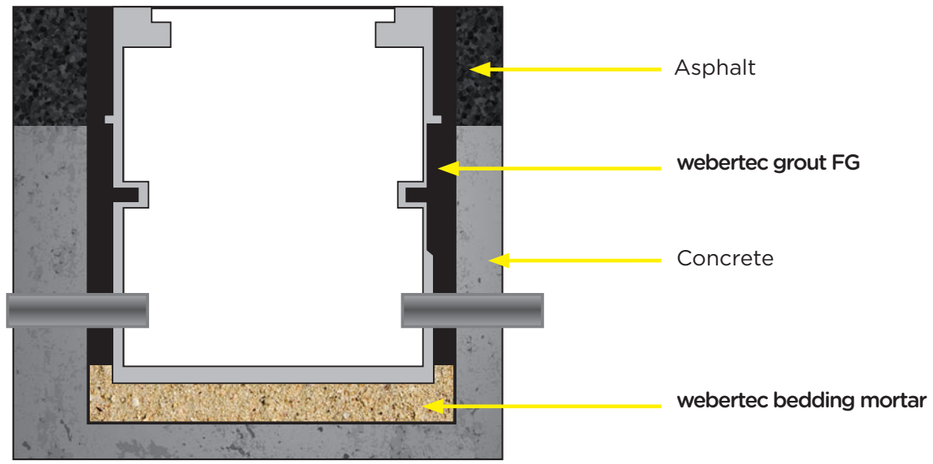
Using webertec bedding mortar

- A powerful forced action mixer should be used to mix the bedding mortar. The motor should be at least 1000w and the rotational speed of the blade should not exceed 500rpm.
- The mortar should be applied as soon as possible after mixing because at elevated temperatures above 20°C, it has a shorter working time of less than 15 minutes.
- In order to prevent the mortar from falling into the cored hole when using bottom-fed cabling design of the lighting pots, use a stiff but flexible thin plastic sheet such as Formica to act as a temporary dam during application of the mortar.
- The mortar should be applied around the base of the cored hole and filled to the required depth.
- The light pot is then inserted into the cored hole with a twisting motion and lined up with the special jig. A rubber mallet can be used to provide alignment by gentle tapping around the edges.

Using webertec grout FG

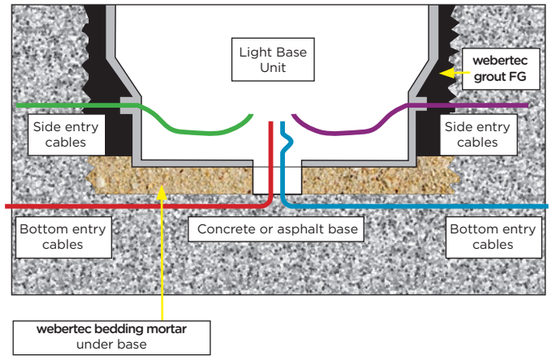
- Once the light pot has been lined up and levelled and the bedding mortar has set, the light unit can then be sealed tight and fixed into place with the grout.
- A powerful forced action mixer should be used to mix the grout. The motor should be at least 800w and the rotational speed of the blade should not exceed 500rpm.
- The grout should be poured as soon as possible after mixing because at elevated temperatures above 20°C, it has a shorter working time of less than 10 minutes.
- The grout is poured around the embedded base.





Grouting of Airport Cable Slots

Fixing of airport lighting cables on runways and taxiways using a rapid flowable grout to encapsulate cables. The filling of cable slots with a suitable material is governed by the type of substrate, whether stiff concrete or more flexible asphalt. The cable grout is not intended as a joint sealant.



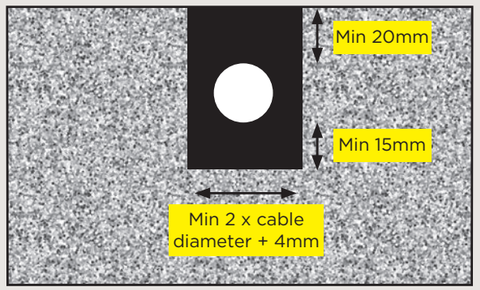
webertec cable grout is a three-component low-modulus, semi-flexible polyester resin compound for filling cable slots. Can be used in asphalt, bitumen and concrete surfaces. Use for gaps 5mm to 16mm wide.

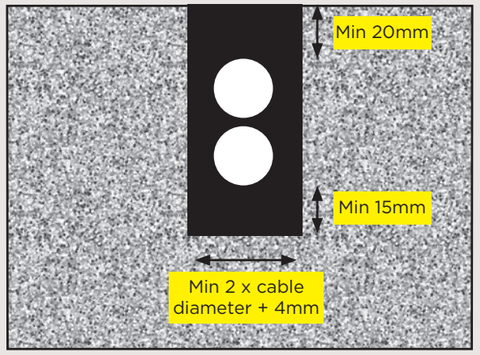
For gaps wider than 16mm, use bulked out **webertec cable grout** mixed with clean, dry, rounded aggregate 5mm diameter. Up to 10kg of aggregate per carton can be used for gaps not exceeding 30mm in width.

- In many cases, the cables leading to each airport light fitting are fed into a conduit embedded in the asphalt or concrete base under the surfacing. These cables can be either fed into the light fitting through the side of the light pot or through a hole in the base.
- Where new lights need to be fitted because the wearing surface has to be replaced or the light itself needs replacing, chases are cut into the asphalt or concrete surface and the cables have to be fitted into these cut slots.
- The normal practice that is recommended by Weber is to use the cable grout without the need for expanded plastic filler backing rods to ensure full and solid encapsulation of the cables.

Cable Embedment

- Variations on the type of cable and cable arrangements include: Single cable, double cable, multiple cable and conduits.
- Recommended bottom bedding thickness is 15mm.
- Recommended thickness of grout above cable or conduit is 20mm to allow even spread of load.
- Recommended width of slot is 2 x diameter of the cable to allow the grout to penetrate down the sides and to ensure even stress distribution around cables or conduit.
- Recommended maximum slot width for a single cable is 16mm.
- Recommended depth of slot is between 1.5 and 2.5 times the slot width.
- We do not normally recommend the practice of placing a foam backer rod between the cable and the grout as a filler as this usually tends to affect the integrity of the cable slot grout.





Please refer to product data sheets for full installation procedure.

Preparation

- The cable chase should be sawn x 2 wider than the diameter of the cable, normally 16mm wide by 40-45mm deep but this will vary with cable size and cable numbers.
- The area around the cut slot must be cleaned.
- The chase should be jet washed to remove debris and then allowed to dry. Cable slots can be dried using flame torches or hot air lances.

Using Cable Grout

- A powerful forced action mixer should be used to mix the grout. The motor should be at least 800w and the rotational speed of the blade should not exceed 500rpm.
- The grout should be poured as soon as possible after mixing because at elevated temperatures above 20°C, it has a shorter working time of less than 10 minutes.
- The grout is poured into the slot and flows under and around the cables. Fill to the top and avoid the grout spilling over the edges of the slot.

Other products suitable for use in and around Airports

Pavement Repairs

Concrete paved runways, taxiways, hard standings and parking aprons are subject to damage by abrasion, impact, frost attack, subsidence and cracking. They need to be repaired speedily with special fast setting concretes and protected by a surface hardening impregnating agent.

Spalled concrete:
Up to 2m²: **webercem pyrapatch**, fast setting repair concrete for thin bonded repairs or full depth concrete reinstatement.

Up to 15m²: **webercem pyratop**, rapid strength gaining thin bonded topping.

Service Access and Duct Cover Frame Bedding

There are many services such as water mains, lighting, power, drainage etc. located under runways that require access hatches. These have to be fixed with quick-setting durable bedding mortars.

Photo courtesy of Saint-Gobain PAM

Bedding of Access Chamber Frames

webertec bedding mortar, rapid setting resin-based thixotropic mortar for heavy duty applications.

Bedding of Drainage Ducts and Grills

webercem pyrabed, cement-based rapid setting mortar for bedding of lighter duty fixtures.

Terminal Buildings

Spalling concrete vertical and soffit areas:
webercem concrete repair system, a fully tested concrete repair and protection system which complies with BS EN 1504.

Facades renovation:
Refurbish with EWI, renders or **webercote smooth** protective and anti-carbonation coating.

Aircraft Hangars

Hangars provide covered floor space to accommodate aircraft for scheduled inspections and services and maintenance. Pavements for hangar floors must be designed to support aircraft loads.

Floor repairs:
Up to 2m^2: **webercem pyrapatch**, fast setting repair concrete for thin bonded repairs or full depth concrete reinstatement.

Up to 15m^2: **webercem pyratop**, rapid strength-gaining thin bonded topping.

Flooring:
Self-smoothing **weberfloor** cementitious floor screeds.

Fire Stations

Spalling concrete, vertical and soffit areas:
webercem concrete repair system, a fully tested concrete repair and protection system which complies with EN 1504.

Flooring:
Self-smoothing **weberfloor** cementitious floor screeds.

Car Parks

Car parks are relatively flexible concrete structures and therefore require special materials for repairs and reinstatement.

For concrete repairs to structural elements:
webercem concrete repair system, a complete scheme of primers, thixotropic repair mortars and anti-carbonation coatings.

For floor repairs:
Up to 2m^2: **webercem pyrapatch**, fast setting repair concrete for thin bonded repairs or full depth concrete reinstatement.

Up to 15m^2: **webercem pyratop**, rapid strength-gaining thin bonded topping.

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REV. 04/02/25