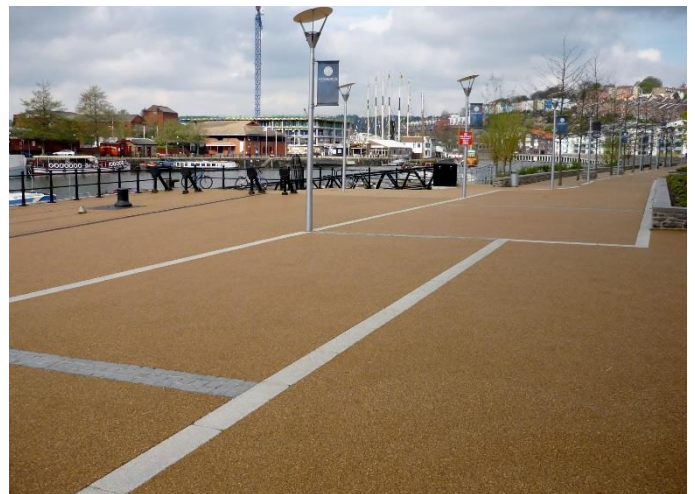




LeesonBound®

System Guide





Introduction

Leeson Polyurethanes have been supplying stone bound systems since the mid 1990's and over that time the systems have demonstrated their quality, durability and ease of maintenance. When used as described in the installation guidance, the LeesonBound systems retain their integrity and have a service life in excess of 10 years. A maintenance guide is provided to keep the surfacing in optimum condition.

LeesonBound is a high performance polyurethane based, SUDS compliant porous aggregate bond system incorporating resin and a range of aggregate blends. LeesonBound, when cured, gives excellent strength and elongation performance and is therefore an exceedingly durable system.

LeesonBound is available in 2 grades, PU5051/60 is not UV stabilized and therefore will darken in UV exposure. The strength of the system is not compromised. LeesonBound UVR (PU4844/60) is also available. This is an aliphatic system and is therefore colour stable when exposed to UV.

We have an approved range of aggregates for use within the LeesonBound range. The system, when installed with an approved stone mix, achieves a minimum standard for strength. We have also pre-screened for which types of aggregates are suitable with which product (PU5051/60 or PU4844/60). The systems both have excellent physical characteristics to give long service life and all of the resins are waterproof and have high thermal tolerance. (If customers wish to use another aggregate, they should make use of our in-house laboratory facilities prior to installing the system. This will confirm the stone mix strength, which resin is most appropriate for their chosen aggregate, and what UV discolouration will be present, if any).

LeesonBound systems are BBA certified when used with approved aggregate blends and at the listed mix ratios, if an alternative aggregate blend or alternative mix ratio is to be used full approval has to be gained before it can be BBA certified as part of the LeesonBound system.

Explanation of the System Components

Leeson Con Prime – 2: Description

When LeesonBound is being applied to smooth surfaces, such as acrylic sealed concrete priming may be required to give improved bonding performance. Leeson Con Prime - 2 is a two component fast curing epoxy primer for concrete. It is coated with CH52 sand at 1kg/sqm. At 20°C it is typically tack free and ready for overcoating in 90 minutes. Any excess loose sand should be swept off prior to overcoating. Alternatively, PU3922, a solvented one component primer can be used at 0.15 kg/sqm.

LeesonBound: 2 Component PU - Description

LeesonBound (PU5051/60) is a two component polyurethane (non UV stable) designed primarily for decorative applications, it is typically applied to concrete or asphalt surfaces.

LeesonBound UVR (PU4844/60) is a two component aliphatic (UV stable) system with excellent UV performance designed primarily for decorative applications; it is typically applied to concrete or asphalt surfaces.

Please refer to our technical datasheet for the properties of both LeesonBound products.

Installation of the System

Surface Preparation

Preparation and Priming of Concrete Surfaces with Leeson Con Prime -2

When installed correctly LeesonBound will last many years. Surface preparation and primer application is extremely important in this respect. All surfaces should be free from dust, grit, grease and liquid, ensure that the surface is clean and dry before proceeding with the application. If the system is being applied onto a difficult to bond surface, such as acrylic sealed concrete the use of a primer is advised to ensure a full bond between the LeesonBound system and the substrate.

1) Temperature and Relative Humidity during Primer Application:

Application temperature 10°C-35°C, 15-18°C is optimum for ease of application. The relative humidity should be between RH 30-85%.

2) Application Equipment

Equipment should be protected from contamination from water, grease and oils. If the system is to be applied outside then protection against rain should be made. Personal protective equipment should be worn as per the Health & Safety datasheet from Leeson Polyurethanes Ltd.

3) Areas not to be coated

These areas should be protected with masking tape to avoid unnecessary cleaning after application.

4) Before Using Leeson Con Prime - 2

Pre-mix the contents of the base (A component) with a drill and paddle. Once evenly mixed add the hardener and mix until evenly mixed.

5) Application of Leeson Con Prime -2

Leeson Con Prime - 2 is best applied by squeegee, with a 6mm notched rubber blade. It can also be applied by roller.

6) Coverage of Leeson Con Prime - 2

Typically 250gsm

The final surface should appear smooth and free from foreign particles. The surface is then covered with CH52 sand at 1kg/sqm. After curing any loose excess sand should be removed.

7) Operating Parameters for Primer

Relative humidity 30-85%, temperature 10-35°C

Application of LeesonBound (PU5051/60) & (PU4844/60)

Preparation of surfaces – refer to Leeson Con Prime - 2 information accompanying for concrete only.

The system can be applied to concrete, asphalt, compacted MOT Type 1, full details of subbases are listed below. The sub-base must be sound and free from cracks. Movement in the sub-base will lead to reflective cracking in the LeesonBound system,

The surface must be free from contamination or water prior to application, as such cleaning/drying may be required. LeesonBound should be allied at 10°C-35°C ground temperature and 10°C-35°C ambient temperature, temperatures of 15-18°C are optimum for ease of application. The relative humidity should be between RH 30-85%.

Application of LeesonBound

LeesonBound stone binders are both 2 component systems available in various pack sizes including. Kits are pre-weighed to the correct ratio and should not be split.

1. Mixing Pack A and Pack B:

Mix A component prior to addition of B component, mix the A & B for 1-2 minutes to a smooth consistency. It is recommended to use one batch on a project. If more than one batch is to be used, care should be taken to use the same batch in one area in case of small batch to batch variation, this equally applies to the aggregate.

2. Accelerator (D4860)

Accelerator (D4860) should be used with each mix to ensure uniformity of cure. Accelerator must be used for temperatures below 15°C (especially note overnight temperatures), as this can lead to protracted cure times and contamination of the surfacing. Refer to the table below for addition levels.

Air Temperature (°C)	D4860 Accelerator Addition Level	
	PU5051/60	PU4844/60
20	0% Accelerator	0% Accelerator
17.5	0.6g per 6.85g kit	4.4g per 6.5Kg kit
15	1.3g per 6.85g kit	9.8g per 6.5Kg kit
12.5	2.0g per 6.85g kit	16.6g per 6.5Kg kit
10	2.7g per 6.85g kit	29.3g per 6.5Kg kit

3. Premixing with aggregate:

The mixed PU resin should then be introduced into the mixer containing the aggregate. The aggregate must be dry (<0.5% moisture) and free from dust.

While the mixer is running with the dry aggregate, add the PU resin at a ratio of minimum 6.5% up to 15% depending on end user requirements and the size and particle distribution of the aggregate – smaller particles, or greater particle distribution will require relatively more PU resin as the overall surface area is increased. Resin additions at these levels will ensure a well bonded, durable and sound system.

A rotary mixer or low speed paddle mixer are suitable for mixing.

Mix for 5 minutes until all of the aggregate is uniformly coated.

4. Application of LeesonBound:

The blend of PU and aggregate should then be immediately applied to the surface and compacted with a trowel. The surface temperature should be between +10°C and +35°C for application (note comments above regarding the accelerator use for lower temperatures). The system should be applied at least 3°C above the dew point measured for the application surface. Care should

be taken to ensure that the correct, even coverage rate is applied across the application area. This is especially important at high temperatures where the PU can be thinner. The surface should be installed at a minimum thickness of 3x the maximum stone grading used. Once levelled and compacted the surface can be smoothed with a trowel coated in a release agent, this allows for the top facing stones to be knitted together, giving an even surface. Suitable release agents are organic solvents such as xylene and white spirit, water should not be used as a release agent as it may cause foaming in the system.

A LeesonBound Application Day Sheet is available to record site information and conditions as well as recording batch numbers and stone mixes used on the application site.

Resin Bound Stone Mixes

LPU Autumn Gold/Autumn Quartz 3mm – UV only						
Stone Type	Stone Size	Kg in Mix	Bag Size	No of Bags	Total Stone	93.75
Autumn Gold	1-3mm	75	25	3	Polyol	3.95kg
Autumn Gold	2-5mm	12.5	12.5	1	Iso	3.82kg
C50 Sand	0.5mm	6.25	6.25	1	Total PU	6.50kg
					%resin	6.93%



LPU Autumn Gold/ Autumn Quartz 5mm – UV only						
Stone Type	Stone Size	Kg in Mix	Bag Size	No of Bags	Total Stone	93.75
Autumn Gold	2-5mm	75	25	3	Polyol	3.95kg
Autumn Gold	1-3mm	12.5	12.5	1	Iso	3.82kg
C50 Sand	0.5mm	6.25	6.25	1	Total PU	6.50kg
					%resin	6.93%



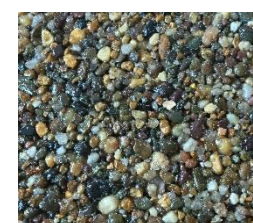
LPU Trent 3mm						
Stone Type	Stone Size	Kg in Mix	Bag Size	No of Bags	Total Stone	93.75
Brittany Bronze	1-3mm	75	25	3	Polyol	3.95kg
Trent Pea	2-5mm	12.5	12.5	1	Iso	3.82kg
C50 Sand	0.5mm	6.25	6.25	1	Total PU	6.50kg
					%resin	6.93%



LPU Trent 5mm						
Stone Type	Stone Size	Kg in Mix	Bag Size	No of Bags	Total Stone	93.75
Trent Pea	2-5mm	75	25	3	Polyol	3.95kg
Brittany Bronze	1-3mm	12.5	12.5	1	Iso	3.82kg
C50 Sand	0.5mm	6.25	6.25	1	Total PU	6.50kg
					%resin	6.93%



LPU Chocolate 3mm						
Stone Type	Stone Size	Kg in Mix	Bag Size	No of Bags	Total Stone	93.75
Brittany Bronze	1-3mm	50	25	2	Polyol	3.95kg
Autumn Gold	1-3mm	25	25	1	Iso	3.82kg
Autumn Gold	2-5mm	12.5	12.5	1	Total PU	6.50kg
C50 Sand	0.5mm	6.25	6.25	1	%resin	6.93%



LPU Chocolate 5mm						
Stone Type	Stone Size	Kg in Mix	Bag Size	No of Bags	Total Stone	93.75
Trent Pea	2-5mm	50	25	2	Polyol	3.95kg
Autumn Gold	2-5mm	25	25	1	Iso	3.82kg
Autumn Gold	1-3mm	12.5	12.5	1	Total PU	6.50kg
C50 Sand	0.5mm	6.25	6.25	1	%resin	6.93%



* BBA only valid when used with LeesonBound approved aggregate blends

LPU Terracotta 3mm						
Stone Type	Stone Size	Kg in Mix	Bag Size	No of Bags	Total Stone	93.75
Red Granite	1-3mm	75	25	3	Polyol	3.95kg
Red Granite	2-5mm	12.5	12.5	1	Iso	3.82kg
C50 Sand	0.5mm	6.25	6.25	1	Total PU	6.50kg
					%resin	6.93%



LPU Terracotta 5mm						
Stone Type	Stone Size	Kg in Mix	Bag Size	No of Bags	Total Stone	93.75
Red Granite	2-5mm	75	25	3	Polyol	3.95kg
Red Granite	1-3mm	12.5	12.5	1	Iso	3.82kg
C50 Sand	0.5mm	6.25	6.25	1	Total PU	6.50kg
					%resin	6.93%



LPU Scandinavian 3mm – UV only						
Stone Type	Stone Size	Kg in Mix	Bag Size	No of Bags	Total Stone	93.75
Danish Quartz	1-3mm	75	25	3	Polyol	3.95kg
Danish Quartz	2-5mm	12.5	12.5	1	Iso	3.82kg
C50 Sand	0.5mm	6.25	6.25	1	Total PU	6.50kg
					%resin	6.93%



LPU Scandinavian 5mm – UV only						
Stone Type	Stone Size	Kg in Mix	Bag Size	No of Bags	Total Stone	93.75
Danish Quartz	2-5mm	75	25	3	Polyol	3.95kg
Danish Quartz	1-3mm	12.5	12.5	1	Iso	3.82kg
C50 Sand	0.5mm	6.25	6.25	1	Total PU	6.50kg
					%resin	6.93%



LPU Silver 3mm – UV only						
Stone Type	Stone Size	Kg in Mix	Bag Size	No of Bags	Total Stone	93.75
Silver Granite	1-3mm	75	25	3	Polyol	3.95kg
Silver Granite	2-5mm	12.5	12.5	1	Iso	3.82kg
C50 Sand	0.5mm	6.25	6.25	1	Total PU	6.50kg
					%resin	6.93%



LPU Silver 5mm – UV only						
Stone Type	Stone Size	Kg in Mix	Bag Size	No of Bags	Total Stone	93.75
Silver Granite	2-5mm	75	25	3	Polyol	3.95kg
Silver Granite	1-3mm	12.5	12.5	1	Iso	3.82kg
C50 Sand	0.5mm	6.25	6.25	1	Total PU	6.50kg
					%resin	6.93%



* BBA only valid when used with LeesonBound approved aggregate blends

Specification Guides

Please see the tables below for the appropriate system.

Non slip finish (if required)

To create a non-slip surface the top can be scattered with D4937 microfine glass particles available from Leeson Polyurethanes Ltd. Application rates will vary depending on the aggregate used but is in the order of 50 – 100 grams per meter of resin bound surface.

We have a range of stone mixes available that have been approved on strength testing with this product. Please request the additional literature for any further information and note that we recommend these mixes alone and any alterations made may have a damaging effect on the overall strength of the stone binder system.

Traffic

The surface should be allowed to cure for 4 hours; this will be longer if the temperature is low. During the cure period the surface should be protected from rain.

Detailing

Expansion joints should be carried through to the surface of the LeesonBound. Any day joints or expansion joints should be detailed with a suitable edging strip e.g. aluminum edging or similar.

Resealing

The system also comprises a re-seal coating to rejuvenate the system. This is roller applied at 0.5-1.0kg/sqm depending on the porosity of the stone mix. Products included in the system for resealing are PU4775, PU4934 and PU5285. Please consult Leeson Polyurethanes for more details.

Note that LeesonBound is a permeable, SUDS compliant system. If waterproofing is required then this must be applied to the substrate prior to installing the decorative, porous, LeesonBound system

Maintenance Schedule for Resin Bound Surfacing

Leeson Polyurethanes have been supplying stonebound systems since the mid-1990s. Over that time the systems have demonstrated their quality, durability and ease of maintenance. With some simple routine procedures, the surfacing can be kept in optimum condition.

General

The resin bound surface should be regularly swept clean, removing leaves and detritus material in order to prevent moss growth. In order to keep the surface looking its best and to prevent staining any moss or weed growth the surface should be treated using an appropriate herbicide or weed killer. Any ingrained algal growth can be removed using an appropriate paving cleaner.

Please note that staining may occur from tanning if surfaces are not kept clean from leaf debris, twigs, seeds etc.

Heavy goods vehicles should not be permitted to park on, or regularly traverse resin bound surfacing, unless this has been allowed for in the overall construction. Heavy objects such as skips should not be dragged across the surface.

Periodic Cleaning

General cleaning of the surface can be carried out by cold pressure washing up to a maximum bar rating to remove dirt and grime. The water should be applied using a fan type lance which should be kept 200mm above the installed resin bound surface. Care should be

taken however to prevent damage to the surface with excessive water pressure. Pressure washing can also be used to remove tyre marks.

Cement Contamination

If the surface is contaminated with any cement or concrete marks these can be removed using dilute hydrochloric acid or a proprietary cement remover. In all cases we recommend that a small area is carried out first to confirm suitability.

Oil/ Fuel Contamination

Oil stains should be removed as soon as possible by using a mild detergent as required to prevent possible staining and degradation of the surface. Apply a good quality detergent neat to the surface using a stiff brush. Allow to penetrate for 10 minutes then pressure wash from surface.

Spillages

Please note it is important that any spillages or contamination are dealt with promptly otherwise permanent staining, marking or physical damage to the surfacing and underlying materials may result.

Sand/Soil

Shovel up material and sweep surface clean with a stiff brush. Pressure washing up to 150 Bar can also be used to clean sand from the resin bound surfacing.

Chewing Gum

Removal of individual pieces of chewing gum can be achieved by treating each piece with a freezing spray and then scraping off the gum with a suitable scraper. For more extensive gum removal, contact a specialist-cleaning contractor.

Mineral Staining

The system is made from natural aggregates. Therefore, whilst every step is taken to minimize its presence, naturally occurring iron pyrites can be present. If staining occurs, oxalic acid is an effective method of removing the stains from the surface and is readily available. The specialist acid solution should be washed off using cold water immediately after use.

Ice and Frost

Salt can be used on the surface to help eliminate ice and frost. Once weather conditions return to normal the salt/grit needs to be washed off thoroughly to remove all salt traces.

Chemical Resistance

The resin bound surfacing is resistant to a wide range of chemicals, details are specified on the appropriate Technical Datasheet. The full chemical resistance builds up over time, and care should be taken within the first 7 days of installation to not expose the surface to chemicals.

Patch Repairs

If the surface is damaged, small areas can be repaired with a repair kit. The damaged area should be removed with an angle cutter, sufficient to provide a clean edge to the repair. The same aggregate blend can then be mixed with the LeesonBound resin, and installed into the area. Care should be taken to "feather" the edges of the repair into the surrounding area, to give a strong, seamless and durable repair

LeesonBound Systems					
	Urban Pathway Occasional vehicles	Rural Pathway Light Pedestrian use	Tree Pit Heavy Pedestrian use	Private Drive Straight	Private Drive Turning
Surfacing Course	3mm aggregate 16mm depth 6mm aggregate 18mm depth 10mm aggregate 24mm depth	3mm aggregate 12mm depth 6mm aggregate 16mm depth 10mm aggregate 22mm depth	10mm aggregate 40mm depth 50mm collar with loose aggregate around newly planted trees	3mm aggregate 12mm depth 6mm aggregate 16mm depth 10mm aggregate 22mm depth	3mm aggregate 16mm depth 6mm aggregate 18mm depth 10mm aggregate 24mm depth
Binder Course Well compacted min fall 1.5%	50mm depth of AC14 close surf asphalt concrete max 160/220 pen to BS EN 13108-1:2006 (Bituminous Macadam).	50mm depth of AC14 close surf asphalt concrete max 160/220 pen to BS EN 13108-1:2006 (Bituminous Macadam).	Not Required	50mm depth of AC14 close surf asphalt concrete max 100/150 pen to BS EN 13108- 1:2006 (Bituminous Macadam).	50mm depth of AC14 close surf asphalt concrete max 100/150 pen to BS EN 13108-1:2006 (Bituminous Macadam).
Geotextile	Not Required	Not Required	Not Required	Not Required	Not Required
Sub-base Well compacted min fall 1.5%	150 mm depth of non-frost Type 1 to SHW clause 803 or locally available secondary or recycled aggregates complying with the requirements of SHW for sub- bases	100 mm depth of non-frost Type 1 to SHW clause 803 or locally available secondary or recycled aggregates complying with the requirements of SHW for sub-bases	150 mm depth well compacted Type 3 to SHW clause 805 or 4/40mm, 4/20mm blinded with 2/6.3mm crushed stone to EN12620. New trees only	150-225 mm depth of non- frost Type 1 to SHW clause 803 or locally available secondary or recycled aggregates complying with the requirements of SHW for sub- bases	150-225 mm depth of non-frost Type 1 to SHW clause 803 or locally available secondary or recycled aggregates complying with the requirements of SHW for sub-bases
Impermeable Membrane	Not Required	Not Required	Not Required	Not Required	Not Required
Capping Layer	If plastic or silty sub-grade layer is present (CBR < 2%) then a granular capping may be required.	Not Required	Not Required	Not Required	Not Required
Geotextile Membrane	Optional – to prevent upward migration of fine soil particles if required.				
Sub-Grade					

Notes:

Maximum deviation of the binder course should not exceed 3mm under a 1 metre straight edge.

These specifications are based on normal good practices; they do not absolve the specifier from designing a construction fit for the intended purpose/ traffic/ ground conditions.

The figures quoted do not constitute a specification. Movement/ construction joints should be extended to the surface of the system, through the LeesonBound. Concrete should be primed.

Notes:

	Car Park Cars and Occasional light delivery vehicles	Permeable Car Park SUDS Cars and Occasional light delivery vehicles	Permeable Access Road SUDS	Permeable Private Drive SUDS	Permeable Path SUDS
Surfacing Course	3mm aggregate 16mm depth 6mm aggregate 18mm depth 10mm aggregate 24mm depth	6mm aggregate 20mm depth 10mm aggregate 26mm depth	6mm aggregate 20mm depth 10mm aggregate 26mm depth	6mm aggregate 18mm depth 10mm aggregate 24mm depth	6mm aggregate 18mm depth 10mm aggregate 24mm depth
Binder Course Well compacted min fall 1.5%	35mm depth of AC14 close surf asphalt concrete max 100/150 pen to BS EN 13108-1:2006 (Bituminous Macadam).	70mm depth of AC14 open surf asphalt concrete max 100/150 pen to BS EN 13108-1:2006 (Bituminous Macadam).	70mm depth of AC14 open surf asphalt concrete max 100/150 pen to BS EN 13108-1:2006 (Bituminous Macadam).	70mm depth of AC14 open surf asphalt concrete max 100/150 pen to BS EN 13108-1:2006 (Bituminous Macadam).	70mm depth of AC14 open surf asphalt concrete max 100/150 pen to BS EN 13108-1:2006 (Bituminous Macadam).
Road Base Well compacted min fall 1.5%	70mm depth of AC32 dense base asphalt concrete max 100/150 pen to BS EN 13108-1:2006 (Bituminous Macadam).	Alternative Build Up	Alternative Build Up	Alternative Build Up	Alternative Build Up
Sub-base Well compacted min fall 1.5%	200-350 mm depth of non-frost Type 1 to SHW clause 803 or locally available secondary or recycled aggregates complying with the requirements of SHW for sub-bases	300-500 mm depth well compacted Type 3 to SHW clause 805 or 4/40mm, 4/20mm blinded with 2/6.3mm crushed stone to EN12620.	300-500 mm depth well compacted Type 3 to SHW clause 805 or 4/40mm, 4/20mm blinded with 2/6.3mm crushed stone to EN12620.	175 mm depth well compacted Type 3 to SHW clause 805 or 4/40mm, 4/20mm blinded with 2/6.3mm crushed stone to EN12620.	150 mm depth well compacted Type 3 to SHW clause 805 or 4/40mm, 4/20mm blinded with 2/6.3mm crushed stone to EN12620.
Impermeable Membrane	Not required	To convey water to storage system (option)	To convey water to storage system (option)	To convey water to storage system (option)	To convey water to storage system (option)
Geotextile	Not required	To prevent upward migration of fine soil (option).	To prevent upward migration of fine soil (option).	To prevent upward migration of fine soil (option).	To prevent upward migration of fine soil (option).
Capping Layer	If plastic or silty sub-grade layer is present (CBR < 2%) then a granular capping may be required.				
Sub-Grade					

Maximum deviation of the binder course should not exceed 3mm under a 1 metre straight edge.

These specifications are based on normal good practices; they do not absolve the specifier from designing a construction fit for the intended purpose/ traffic/ ground conditions.

The figures quoted do not constitute a specification. Movement/ construction joints should be extended to the surface of the system, through the LeesonBound. Concrete should be primed.

Miscellaneous Systems			
	Internal Floors	Pedestrian Bridge Concrete	Pedestrian Bridge Plywood
Surfacing Course	System can be sealed with clear sealer 3mm aggregate 8mm depth 6mm aggregate 12mm depth Primer on concrete	3mm aggregate 12mm depth 6mm aggregate 16mm depth 10mm aggregate 22mm depth	3mm aggregate 12mm depth 6mm aggregate 16mm depth 10mm aggregate 22mm depth
	Screed (min 25mm bonded, 50mm unbonded).	Concrete Deck to Bridge Specification min 1.5% fall	Marine Plywood 2 layers of 18mm thick marine ply to BS1088:2033 staggered overlapping joints (min 150mm overlap)
	Damp Proof Membrane (unbonded screed).	Structural Sub-structure	Structural Metal Tray
	Floor Slab 100mm GEN1 BS8500		Structural Sub-structure

Notes:

Maximum deviation of the binder course should not exceed 3mm under a 1 metre straight edge.

These specifications are based on normal good practices; they do not absolve the specifier from designing a construction fit for the intended purpose/ traffic/ ground conditions.

The figures quoted do not constitute a specification. Movement/ construction joints should be extended to the surface of the system, through the LeesonBound. Concrete should be primed.