Isocrete K-Screed – Standard and Heavy Duty

Application instructions

Introduction
K-Screeds are modified cement:sand screeds which can be laid with bonded, unbonded and floating construction.

All K-Screeds will require a suitable floor finish.

Materials
Portland cement to CEM I class 42.5N, 42.5R or 52.5N
A well-graded sharp sand 0-4 mm, with not more than 10% passing sieve size 150 micron.
For Heavy Duty K-Screed, and Standard K-Screed over 75mm thickness, 6mm single size aggregate.
A graded 10mm to 4mm aggregate may be used providing a suitable closed screed surface can be achieved.
Isocrete "K-Additive", in pre-packed sachets. Sizes 3, 4 and 5 are available to suit the screed batch size.
Clean (potable) water.
Ivory 129, Ivory 108 as specified as bonding agent.

Note: Protect aggregates and bonding agents from frost, and store cement and additive in dry conditions.

Minimum Thicknesses
The following are the recommended minimum thicknesses for the laying of Isocrete K-Screeds. They are the minimum permitted at any point on the floor and additional thickness should be allowed to cater for slab level tolerances.

Bonded – On prepared concrete	**Standard K-Screed**	**Heavy Duty K-Screed**
Ivory129	30mm	40mm
Ivory 108	15mm	30mm

Stairs
Treads min. 20mm
Risers min. 20mm & max. 30mm

Cover to Pipes, Conduits and Trunking

Minimum cover:	Over a single pipe or conduit.	20mm
	Over trunking and multiple conduits.	25mm
	Over underfloor heating pipes/clips.	35mmm

Batching and Mixing

Site mixing
Forced action mixers only shall be used.
The mixing time must ensure thorough dispersion. Generally, 5 minutes from the time the last of the constituents is placed in the mixer should prove adequate.
In all forced action mixers the mixer must not be filled higher than the manufacturer's recommendation.

Mix Proportions by Weight
Materials per m3 (dry weights)

	Standard K-Screed	**Heavy Duty K-Screed**
Cement	300kg	300kg
Screeding sand	1500kg	1150kg
5mm or 6mm aggregate		350kg
K-Additive size 3	6kg (12 sachets)	6kg (12 sachets)
K-Additive size 4	3kg (6 sachets)	3kg (6 sachets)

Water is added to give the correct workability as judged by the standard "snowball test" approximately 100L.

Mix Proportions by Volume
Cement is measured by full bag (50 kg or 25 kg) or by full 15 litre bucket.
Sand and aggregates are batched to give an overall mix of 1 part cement to 4 parts total dry aggregate (by volume).
The Licensee may determine the method of measuring the aggregate to achieve an accurate volume batch.
Suitable methods include gauging by 15 litre buckets or by gauge boxes.
It must periodically be checked and demonstrated to give a correct volume batch. The 'bulking' of sand due to changes in moisture content should be taken into account when batching.

	Standard K-Screed	**Heavy Duty K-Screed**
Screedmaster Mix	25kg bag cement 6 buckets sand 1 Size 3 K-Additive	25kg bag cement 4 buckets sand 2 buckets coarse aggregate 1 Size 3 K-Additive
Mixokret mixer	50kg cement 12 buckets sand 1 Size 4 K-Additive (or 2 size 3)	50kg cement 9 buckets sand 3 buckets course additive 1 Size 4 K-Additive (or 2 size 3)

Water is added to give the correct workability as judged by the standard "snowball test", Approximately 17L.

General Notes
All screeds in excess of 75mm thickness should be batched with the Heavy Duty screed mix (25% of sand replaced by coarse aggregate).
In any mix containing coarse aggregate, the exact proportion of sand to coarse aggregate may be varied if the grading of the sand used makes it impossible to achieve a suitable closed screed

surface. However, the above proportions should not be varied unless it has proved impossible to close the surface.

Application
The area to be screeded must be weather-tight (i.e. all roofs, windows and doors are covered).
The mixed material should be placed and compacted within 20 minutes of mixing. Compaction must be thorough. A weighted roller or heavy hand rammers are suitable.
Thick screeds (over 75mm) are to be laid in two layers of roughly equal thickness. By laying the second layer within 20 minutes of the first, a monolithic screed is achieved. Each layer is to be compacted separately, the surface of the first layer being roughened to ensure a monolithic total thickness.
For screeds laid over underfloor heating systems apply the screed in two layers, the bottom layer being a little wetter than usual to ensure full compaction around the heating pipes.

Machine Laid Screed
For areas greater than 50 m2 the use of proprietary screeding machines may be found to be beneficial. Used on medium to large size jobs outputs of 100 m2 per hour are possible with reduced manual effort.
Consistency of compaction and regularity are simpler to achieve. A final finish by power trowel should leave a uniform, smooth but not polished surface, free from trowel marks.

Reinforcement
All floating and unbonded screeds are to be reinforced. The recommended reinforcement throughout is:
Isocrete PP Fibres, mixed into the screed, plus a strip of mesh placed nominally mid-depth of the screed across day joints with sheets lapped a minimum 150 mm and continuous at mid depth through all day joints. Occasionally a heavier mesh may be specified.
Screeds over conduit and trunking should incorporate a strip of reinforcement at mid depth above the conduit.
An acceptable and more flexible reinforcement is 50 mm square x 16 gauge welded wire mesh.
Note: Chicken wire is not an acceptable alternative, except for reinforcement over a single conduit.

Finishing
Ruling off must be accurate to meet the requirements of the specification. BS 8204-1 has three classes of surface regularity - SR1, SR2 and SR3.
SR2 will be the normal requirement, but it is important to check what is required, including the tolerance from datum.
To achieve the higher SR1 standard will require an increased intensity of supervision and attention to detail which can be expected to increase the cost of application.
On occasion, a good standard of wood float finish is adequate, but generally a tightly closed and flat, steel trowelled finish is specified.
Power trowelling by skilled operatives is acceptable providing the required surface regularity is maintained.
Isocrete K-Screed can be trowelled to receive floor finishes direct but on even well finished screeds, where thin finishes are to be applied, a smoothing compound may be required.

Joints in General
Screeds are to be laid continuously, as far as possible without bay joints, between straight vertical day joints.

Screeds tend to crack randomly as they dry and shrink. To minimize but not eliminate this risk, stress relief joints should be created by either forming with a trowel during laying or saw cutting after hardening.
Trowel cut induced joints are recommended across doorways, at corridor corners and at about 5 to 6 m intervals along corridors or long thin strips of screed. These are cut with a steel trowel into the wet screed and then wiped with the trowel to leave a smooth surface.
Where rigid tiles are laid in bays a saw cut should be made through approximately half the screed depth, one-third depth for heated screeds, coincident with the bay joints in the tiles. The saw cut is to be made at the time the tiles are laid to ensure accurate positioning. The depth of cut should not cut through the screed reinforcement (if present).

Joints in Heated Screeds
Screeds on underfloor heating may require additional joints. Separation joints should be formed against walls and columns by using strips of compressible material. Furthermore, a joint may be needed between areas of screed on different heating circuits. Different floor finishes have different joint requirements. Vinyl needs minimum joints whilst ceramic/stone finished screeds should be laid in 40 m2 bays with maximum 8 m length and an aspect ratio of 2:1. Ceramic/stone finishes are often laid on a debonding mat to prevent screed movements inducing cracks in the finish. The designer of the underfloor heating system should be consulted.

Curing
Cure the screed under polythene for a period of 5 days if bonded or 10 days if unbonded. The polythene sheet must be well lapped and completely cover all exposed edges.
Failure to prevent moisture loss from edges can greatly increase the risk of edge hollowness or curling.
Premature drying generally can increase the risk of cracking and reduce the screed wear resistance.
On completion of the curing period, the polythene may be left in place but will normally be removed to enable the screed to dry out.

Drying
Screed drying time is 1 week per 25 mm thickness in warm good drying conditions.
This will increase for screeds thicker than 80 mm and in poor drying conditions.
Good drying conditions are warm, well ventilated with low ambient humidity (20℃ and 50% RH).
Forced drying (dehumidifiers) may be used 28 days after laying of the screed but will inevitably increase the risk of shrinkage cracks and hollowness.
A screed that is wetted (by rain or leaks) will have a considerably extended drying time.

Underfloor Heating
Underfloor heating may be commissioned, in accordance with the instructions of the manufacturer, a minimum of three weeks after laying K-Screed. The underfloor heating should not be considered as a method to force dry the screed.

General Procedures
These procedures and application instructions should be read in conjunction with the relevant technical, product and MSDS information for the individual products.

Substrate Conditions
Where applicable, the structure may require a dpm against rising damp, which could be above or below the substrate slab.
Note that damp concrete substrates (e.g. with residual construction moisture) can result in considerably extended drying times for the overlying screed. Consideration should therefore be given to the need for a dpm over the substrate.
Note: The Designer and Main Contractor are responsible for determining the need for a dpm.

Screed Constructions and Substrate Preparation
Bonded
Remove laitance and surface contamination by shot blasting or mechanical scabbling to cleanly expose the main aggregate.
Remove dust and debris by vacuum immediately prior to screeding.

Priming
Bonding with Ivory 129
Prime the substrate with 129 Polymer 70 (diluted 3 parts water to 1 part Polymer) to avoid excess suction from the substrate. This should be carried out at least three hours (preferably overnight) before the screed is laid and any ponded primer should be brushed out. Allow the primer to dry.
Just before screeding, lay a slurry grout of cement mixed to a creamy consistency with 3:1 dilution water to Ivory 129.
Do not apply the grout too far ahead of the screed in order to avoid it either drying out or being trafficked.
While the grout is still wet lay screed as described in the Application sections.

Bonding with Ivory 108
Substrate preparation is as above.
See the relevant technical data and application data sheets for installation of the Ivory 108.

Requirements for Joints (including Heated Screeds)
It recommends that screeds are laid, as far as possible, without forming joints as cracks are easier to deal with compared to potential curling at joints.
It also recognised that screeds tend to crack randomly as they dry and shrink. To minimise, but not eliminate this risk, stress relief joints should be created by either forming with a trowel during laying or saw cutting after hardening.
To assist with the detailing of joint locations the following information may be of assistance:-
Movement Joints or Expansion Joints in the Base must be carried up through the screed and the floor finish. This will normally be achieved by the inclusion of a proprietary aluminium extrusion expansion joint.
Day Joints will be required by the screed layer at the limits of each day's work. The next area of screed will be butted up against the previously screeded area.
The position of day joints should be agreed with the designer, main contractor and screed contractor in advance of the screeding. For unbonded and floating screeds, a strip of mesh should be laid across the line of the joint at mid height of the screed.
Bonded Screeds may have construction joints and contraction joints in the base screeded over without the need for a screed joint. It is nevertheless a good idea to position screed day joints, where convenient to do so, over the line of such construction joints and contraction joints.
However, if these substrate joints are subject to movement, they may reflect through to the floor finish and a joint should be formed in the screed and floor finish. Similarly, joints should be considered along the lines of rigid support.
Bonded, Unbonded and Floating Screeds should have joints formed across doorways, at corridor corners, at about 5m intervals along corridors and at similar constrictions where high shrinkage

stresses are likely to induce a crack. These joints may be day joints or formed with a trowel cut through the wet screed.
Unbonded Screeds, Floating Screeds and Screeds on Underfloor Heating must all be separated from walls and columns. Joints should be formed across doorways, at corridor corners, at about 5m intervals along corridors and, for heated screeds, between areas on different heating circuits. For floating screeds, these joints and screed edges are usually filled with a strip of compressible foam material or insulation. For unbonded screeds, the separating layer should be turned up at the screed edges, or if not practical, insert a foam strip. Where thin vinyl skirting or similar precludes the use of a foam strip, the screed can be cut off the wall with a trowel cut through the wet screed. Where rigid tiles are laid in bays, a saw cut should be made through approximately half the screed depth (one-third depth for heated screeds), coincident with the bay joints in the tiles. The saw cut is to be made at the time the tiles are laid to ensure accurate positioning. The depth of cut should not cut through the screed reinforcement (if present).

Screeds on Underfloor Heating may require additional joints. Different floor finishes have different joint requirements. Resin and vinyl need minimum joints (120 to 150 m2 bays) whilst ceramic/stone finished screeds should be laid in 40 m2 bays with maximum 8 m length and an aspect ratio of 2:1. Ceramic/stone finishes are often laid on a debonding mat to prevent screed movements inducing cracks in the finish.
Furthermore, a joint may be needed between areas of screed on different heating circuits. The designer of the underfloor heating system should be consulted.

Trafficking
Access to screeds should be restricted for at least 36 (preferably 48) hours to prevent damage to the screed surface. Thereafter light foot traffic should be possible.
Normal site traffic and erection of partitions off the screed is permitted after completion of the curing period. Exposed edges of floating screeds are unsupported and particularly prone to facture if not properly protected.
Note: These times may be extended in cold weather.

Floating Screeds
The load carrying capabilities of any screed laid in floating construction on thermal and/or acoustic insulation is dictated by the strength of that insulation.
It is the responsibility of the appropriate project consultant to assess the exact loading on the floor and its distribution through to the insulation to ensure that the design strength of the insulation is not exceeded. This assessment should take into account any temporary loading from site construction or end user access equipment as well as the permanent design dead and imposed loads. Failure to carry out this assessment may lead to over compression of the insulation and excessive deflection of the screed leading to cracking and possible collapse.

Protection
Isocrete K-Screed is not intended to be wearing surfaces and must be protected by suitable sheet material in areas where they may be subjected to intensive or heavy use, before the final floor finish is laid.
Avoid water ingress to completed screeds, and arrange to dry out accidental ingress as soon as possible.

Floor Finishes
Check the moisture content or relative humidity of the substrate before floor finishes are laid. The screed and substrate should be checked to establish that it meets the requirements of the flooring material.

Underfloor Heating and Floor Finishes
Wait until at least 21 days after being laid before heat is be applied.
The initial heating should be in accordance with the instructions of the supplier of the underfloor system manufacturer. However, as a guide:-
For water based floor heating an initial water temperature of approx 25℃ should be maintained for 3 days, after which the water temperature shall be raised to the maximum design temperature for a further 4 days, and tests documented.
For electric cable heating systems a floor screed thermostat is required and set initially at 18 to 20℃, after which the temperature should be raised as described above or at 5℃ intervals until the design condition is achieved.
The commissioning process is held at operating temperature until the relative humidity in the screed is 75% or less. Allow to cool for 48 hours before applying the floor finish.

Testing
Bonded, Partially Bonded and Unbonded screeds may be tested using the BRE Screed Tester, to Category A or B as specified.

Worn screed surfaces can be repaired with Isocrete Industrial top.
Cracks can be made good with, use Ivory 340/5 LV low viscosity epoxy resin.
Hollowness is not normally detrimental to the performance of the screed, unless it is accompanied by measurable or visible curling to the extent that the screed might break under the loads imposed in service. Where remedial treatment is required, the screed can be drilled and filled with Ivory 340/5LV low viscosity epoxy resin.
Alternatively defective areas can be taken up and re-laid. All areas taken up should have disc cut vertical edges, the substrate/edges mechanically prepared, vacuum cleaned and primed.

Repairs for Cracks and Spalling

The following are typical repair situations and methods of remediation. The type of remedial treatment to cracks/open day-joints is dependent on whether they exhibit movement when the adjacent screed is trafficked or if the screeds have any significant lips.

- Open day-joints and drying shrinkage cracks where edge spalling is less than 10 mm wide.
- Remove any spalled edges and loose material by router/chase cutter.
- Remove dust and debris from the chase and crack/joint margin by industrial vacuum.
- Apply Isocrete Primer (dilution 1 - 5 parts water) and allow to dry, ideally overnight.
- Apply Isocrete industrial top compound working it into the crack/chase.
- Re-fill any settlement.
- Sand /grind as necessary to provide an even smooth surface.

Cracks/joints where edge spalling exceeds 10mm wide.

- Remove any spalled edges and loose material by router/chase cutter.
- Remove dust and debris from the chase and crack/joint margin by industrial vacuum.
- Apply Isocrete Primer (dilution 1 - 5 parts water) and allow to dry, ideally overnight.
- Apply Isocrete Self Level Renovation compound working it into the crack/chase.
- Re-fill any settlement.
- Sand /grind as necessary to provide an even smooth surface.

Spalling at cracks, joints, bay edges or corners that exceed 100mm in width.

- Disc cut to remove all spalled/fragmented areas of screed to leave neat vertical edges.
- Remove dust and fine debris by industrial vacuum.
- Apply Ivory 108 epoxy resin bonder to screed edges using a hand brush (100 – 150 mm stiff bristled paintbrush, or stiff hand brush suitable).
- Lay Isocrete K-Screed

Cracks (less than 1mm width) which show no movement.

- Rake out any spalled screed at duct edges.
- Remove dust and debris by industrial vacuum.
- Pour 340/5L ultra low viscosity resin into the gap.
- Use a steel trowel to help work the material into the crack.
- Return to the crack as necessary to top up the crack. If the crack is proving impossible to completely fill, mix some material to a thicker consistency and try again.
- Scrape off level with a steel trowel.

Significant edge curling or movement at a crack/day-joint when it is put under load.

- Remove any spalled edges and loose material by router/chase cutter.
- Remove dust and debris from the chase and crack/joint margin by industrial vacuum.
- Pour 340/5lv ultra low viscosity resin into the crack.
- Remove surplus material and trowel flush.
- Grind off as necessary once the resin has hardened

General Crack Repair with low viscosity epoxy resin.

- Rake out any loose material from the top of the crack with a pointed tool.
- Remove dust and debris from the chase and crack/joint margin by industrial vacuum.
- Pour low viscosity resin into the crack
- Re-fill any settlement.
- Remove surplus material and trowel flush.
- Grind off as necessary once the resin has hardened

Note: Ivory 340/5LV Application
When the base is mixed with the hardener a very exothermic reaction starts (i.e. much heat is generated). As with all epoxy resins, once mixed should always be used quickly.
Practical measures should be implemented to prevent the mix exotherming i.e. decant into smaller containers and do not leave containers with unused mixed resin to stand (e.g. at break times).
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