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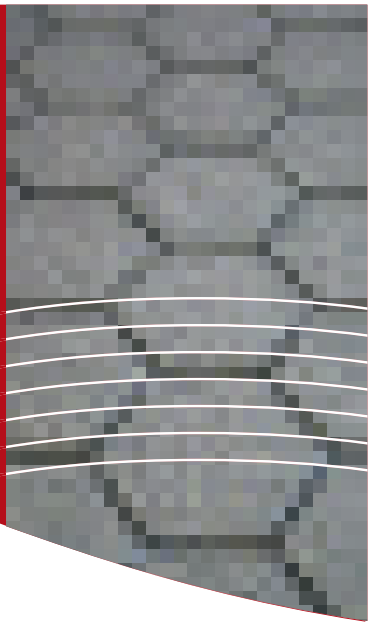

Technical Data Sheet

VIBROGARD HD and HDE

Product Description

Originally considered a revolutionary departure from the conventional concepts of industrial ceramic flooring; the Vibrogard system has, over the past twenty five years, proved that the combination of a brilliant original concept, allied to careful and painstaking development, is capable of producing what is probably the finest industrial ceramic floor finish available.

Ultrasonic vibration industrial tiling was conceived and developed in Germany over 35 years ago. In 1988 the system was introduced into the UK by John L. Lord & Son Ltd. John Lord with its unrivalled experience in all spheres of industrial flooring and well established reputation for quality products and installation has further developed the concept; culminating in 1999, when John Lord launched Vibrogard HD; the most significant development and performance improvement in the system's history. Throughout Europe more than one million square metres of ultrasonically vibrated industrial ceramics provide an on-going testimony to design and installation integrity.

Whilst developed for the Food Processing, Chemical Processing and Pharmaceutical Industries, the Vibrogard HD system is suitable for a wide variety of environments. In areas where aggressive chemical or physical conditions prevail, Vibrogard HD is capable of satisfying the demands of many of the harshest environments. Chemical and high temperature spillages, impact, abrasion and constant trafficking are well within the system's long-term capability.

Vibrogard HD is not a ceramic tile, an installation technique nor a unique resin jointing medium; it is a total system - relying on the sum of its component parts and installation method to provide unrivalled performance characteristics

VIBROGARD HD System

Vibrogard HD uses fully vitrified ceramic floor tiles with their legendary hexagonal format which have a 35 year record of proven reliability. The introduction of the HD module with or without cavity joint profile provides the system with its most dramatic performance improvement since the system was introduced.

The hexagonal format in itself provides significant advantages over square or rectangular tiles in terms of tensile and flexural strength and avoidance of tile lipping. The cavity joint profile improves resin joint penetration to such a degree that the tensile and flexural strength in the cross section of the epoxy resin joint are greatly improved over straight, spacer joints.

Vibrogard HD is available in smooth or anti-slip profiles. As an economical alternative to the range of top quality hexagonal ware, John Lord offer a limited number of carefully selected rectangular tiles. This selected range provides a worthwhile cost saving whilst maintaining system performance in all major categories.

Design Concept

The principle behind the Vibrogard HD concept is to produce independent panels of floor finish with extremely high compressive, flexural and tensile strength. These panels can be bonded to or isolated from the structural substrate and are bounded by designed flexible joints. Each panel can be laid flat or with inbuilt falls to specially designed drainage units.

The multi-panel concept creates flooring installations with maximum in-service flexibility and practicality.

Installation Technique

Reliance upon traditional operative disciplines for certain key sections of the installation has been significantly reduced.

Mechanically aided compaction of the bedding medium, ultrasonic vibration to consolidate and level the ceramic ware and mechanically aided jointing technique all conspire to ensure dramatically improved physical properties and consistency in quality.

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Technical Data

John L. Lord & Son Ltd is an ISO 9001:2008 accredited company and all products are manufactured strictly to ISO quality standards. This test data is for Vibrogard ceramic floor tiles only.

Performance Data

Tests	Requirements to standards	Vibrogard HD
Water uptake to EN99	max. 3%	0.5%
Flexural strength	min. 270kgf/cm²	350-400kgf/cm²
Compressive strength	-	2500-3000kgf.cm²
Linear thermal coef-ficient of expansion	-	8 x 10^6 per °C
Scratch hardness of the ceramic tile to EN 101, measured on Mohs' scale	min. 6	7
Wear resistance to EN 102 (volume lost)	250 m/m³	116m/m³
Frost resistance to EN 202	required	guaranteed
Resistance to thermal shock to EN 104	required	guaranteed
Resistance to chemi-cals to EN 106/DIN 18 158/DIN 18 155/EN 176	required	guaranteed

Resistance to hydrofluoric acid and its compounds was not required and has not been tested.

Substrate Interface

Structural considerations and in-service conditions influence the decision to install bonded or isolated Vibrogard HD floor systems.

Bonded Systems

The concrete substrate must be thoroughly prepared by mechanically shot-blasting or scarifying prior to the application of resin polymer/ cement bonding grout. The bonding grout is immediately overlaid with the bedding medium.

Isolated Systems

Suspended floors, and floors subject to high thermal stresses, are particular candidates for the isolated method of construction. The Vibrogard HD system offers three qualities of isolated membrane. The basic polythene slip membrane is supplemented by two comprehensive chemical resistant multi layer sheet membranes, which bond to drainage units providing a completely impervious sub-barrier.

Bedding Medium/Bonding Grout

The Vibrogard HD system relies on a 'thick bed' method of installation. Bedding medium is laid to a minimum 40mm thickness when bonded and 50mm when isolated and comprises; aggregates to BS882, OP cement, modified resins and additives. The mixed material is laid to desired levels in a semi-dry consistency incorporating structural steel mesh fabric to B196 or random fibres and is mechanically compacted for maximum density.

When fully compacted and levelled a polymer/cement bonding grout is applied and the ceramic tiles are placed in position.

Tile Installation/Jointing System

Upon placement the Vibrogard HD hexagonal tiles are subject to ultrasonic vibration. This technique has significant advantages over traditional methods of installation.

a. The vibration removes all entrapped air from beneath the tiles (aided by the specially designed groove profile on the underside of the HD hexagonal): This ensures total bonding grout contact.
b. The vibration compacts the tile into the bonding grout and in turn, the grout into the bedding medium: This technique provides a system of unrivalled density and strength.
c. The ultrasonic vibration equipment levels out any slight lipping between adjacent tiles producing a finish to high tolerances.

Upon initial cure the tiles are fully jointed with low viscosity resin; the resin type being dependant on chemical resistance requirements and installation limitations. The Vibrogard HD tile with or without cavity profile joint ensures effective resin impregnation. The mechanical jointing technique further ensures complete resin impregnation providing a completely sealed and chemical resistant surface.

VIBROGARD HD and HDE

VIBROGARD HDE System

To further enhance the performance of the Vibrogard HD system, the HDE performance plus system incorporates a full epoxy resin based bonding grout beneath the ceramic tiles.

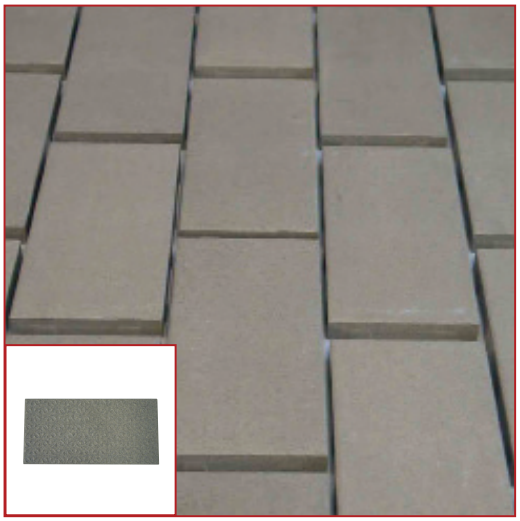
This enhanced specification increases the already high level of durability and chemical resistance to new levels and should be considered in areas where the harshness of the working environment is liable to test the toughest of conventional floor finishes.

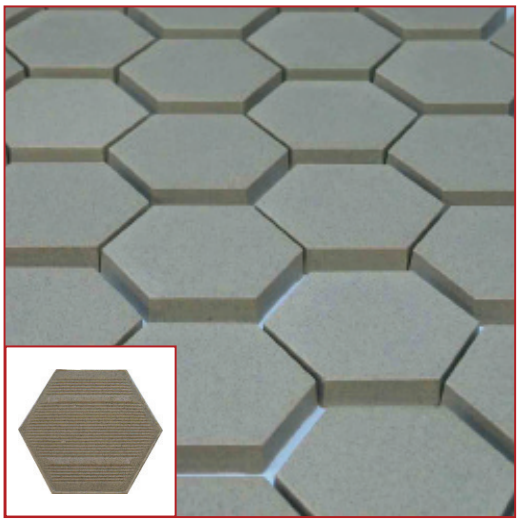
Other Products

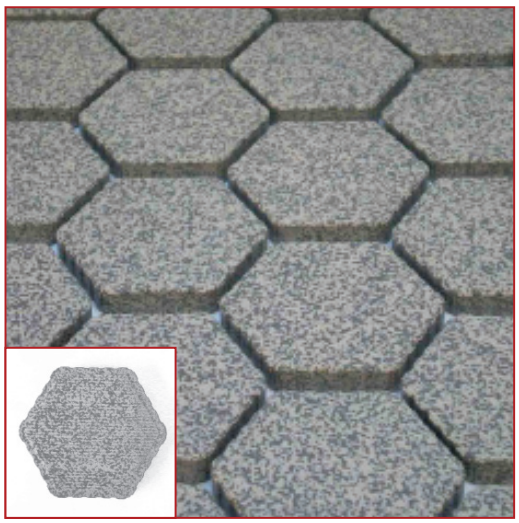
ASPEN Stainless is recommended for use with Vibrogard HD systems. ASPEN Stainless offers a wide range of top quality, specially designed prefabricated stainless steel drainage channels, gully units, service sleeves, hopper units and reinforcing details; ensuring long-term durability with low maintenance costs.

Many novel, and some unique, features of ASPEN Stainless drainage provide the client with high performance units, which comply with all safety and hygiene requirements, yet remain durable and practical.

ASPEN Stainless angle reinforcement of movement joints and vulnerable, exposed edges are available to protect the investment and minimise future maintenance.







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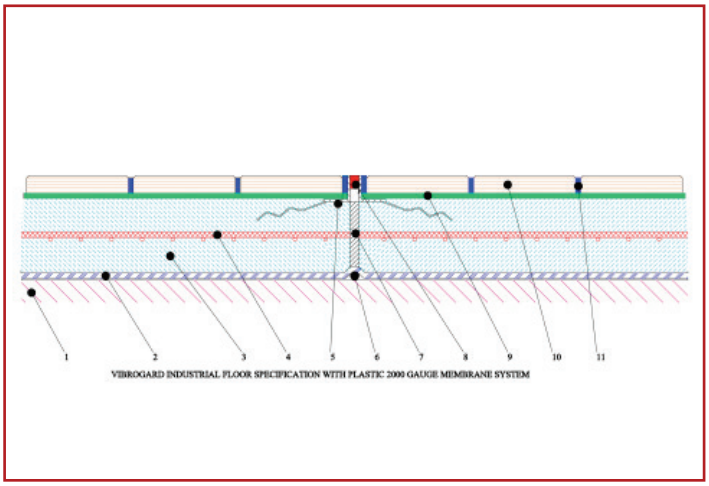

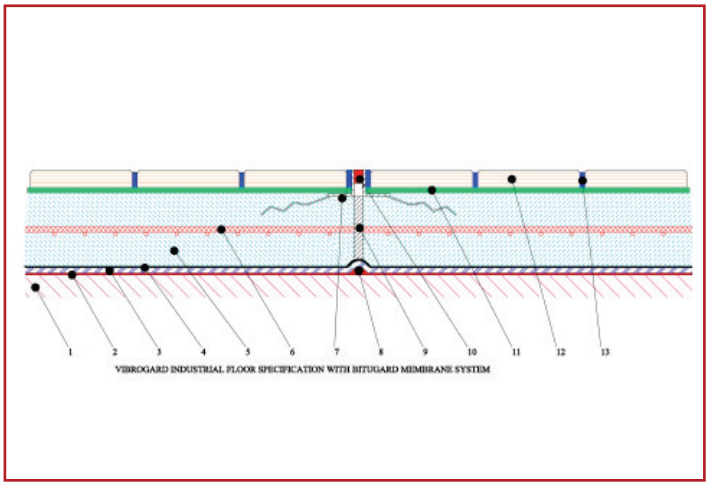

VIBROGARD HD Industrial Floor Specification with Bitugard Membrane System

1. The Vibrogard HD industrial floor is applied to an existing or new concrete slab. The surface of the concrete slab should be smooth and flat; or it can be laid to required falls. Any contamination and excessive laitance should be removed.
2. Apply bituminous bonding primer.
3. Apply 4mm thick glass fibre reinforced damp-proof membrane sheet with a minimum of 100mm overlaps.
4. Membrane sheet is sealed and coated with hot melt bitumen mastic for protection during Vibrogard installation.
5. Semi-dry bed consisting of OPC, sand to BS 882 coarse to medium grade, resin/polymer based additive and reinforcing fibres.
6. Structural mesh fabric to BS reference B196 (optional).
7. Stainless steel angle reinforcement to sides of expansion joint (optional).
8. Movement joint facility within membrane.
9. Flexible filler to movement joints.
10. Chemical resistant Epiflex or Neoprene movement joint.
11. Resin/Polymer modified cement adhesive slurry, or full resin/ cement slurry (HDE).
12. Vibrogard hexagonal industrial flooring tiles, 100mm x 110mm x 18mm, other sizes available.
13. Low viscosity chemical resistant epoxy cement to tile joints.

VIBROGARD HD Industrial Floor Specification with Plastic 2000 Gauge Membrane System

1. The Vibrogard HD industrial floor is applied to an existing or new concrete slab. The surface of the concrete slab should be smooth and flat; or it can be laid to required falls. Any contamination and excessive laitance should be removed.
2. Apply 2000 gauge polythene self adhesive damp-proof membrane sheet with a minimum of 100mm overlaps.
3. Semi-dry bed consisting of OPC, sand to BS 882 coarse to medium grade, resin/polymer based additive and reinforcing fibres.
4. Structural mesh fabric to BS reference B196 (optional).
5. Stainless steel angle reinforcement to sides of expansion joint (optional).
6. Movement joint facility within membrane.
7. Flexible filler to movement joints.
8. Chemical resistant Epiflex or Neoprene movement joint.
9. Resin/Polymer modified cement adhesive slurry, or full resin/ cement slurry (HDE).
10. Vibrogard HD hexagonal industrial flooring tiles, 100mm x 110mm x 18mm, other sizes available.
11. Low viscosity chemical resistant epoxy cement to tile joints.

Vibrogard HD can also be installed as a fully bonded system to a prepared concrete floor, substituting items 2 and 6 in the above specification for a brush applied polymer/cement bonding slurry.