

GEO BASE[®]

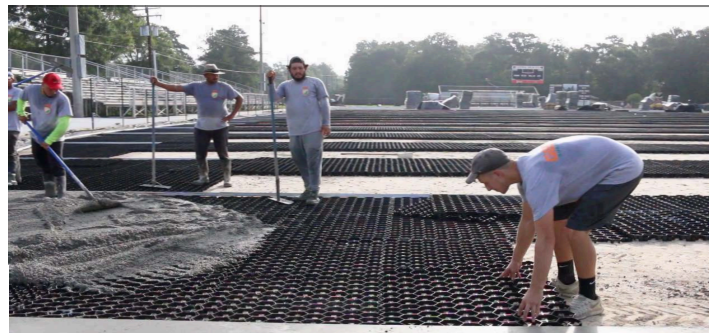
RIGID[™] SYSTEM

GeoBase[®] is a rigid, integrated, grid design (RIGID[™]) designed to strengthen and enhance free poured concrete while offering superior flexibility and expansion/contraction capabilities.

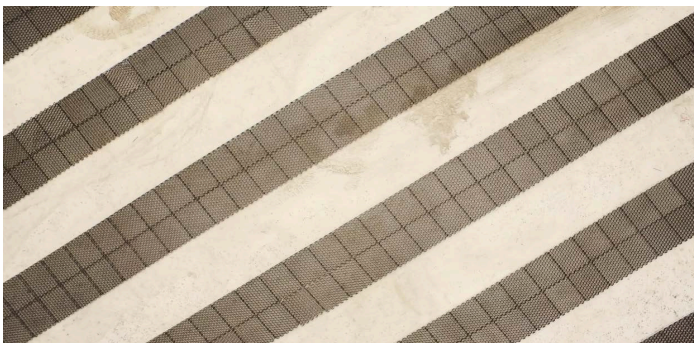
The GeoBase system utilizes 2500 PSI concrete minimum with pea gravel or 1/2" minus stone and may consist of up to 30% flyash.



MADE FROM RECYCLED MATERIALS



MANUFACTURED IN THE UNITED STATES



NORMAL SIZE: 3' X 4'



THICKNESS: 40mm

GEOBASE METHODOLOGY:

GeoBase is a structural base construction method that installs a Rigid Integrated Grid Design (RIGD™) to protect underlying soils and provides a stable platform for the installed turf system.

When compared to GeoBase structural base methodology, stone has limitations. Large amounts are needed to obtain support and planarity that turf systems rely on for high level competition. Stone is non-structural, meaning if the underlying materials are inadequate, have changing moisture content, or lack the strength to support the field, the stone cannot guarantee the consistency or uniformity of the playing surface and will move with the materials that support it. Many stone substrates rely on additional costly construction methods such as chemical stabilization or cut and fill to be completed before the stone can be imported and graded to final elevation.

GeoBase, conversely, relies upon on its own structural characteristics to bridge over the imperfections found in unsuitable soils or sites with high water content without the need to chemically stabilize, cut, or fill.

Site conditions when considering use of the GeoBase RIGD system should include materials that can reach a minimum proctor density of 90% and do not contain “classified clays” or materials that may expand or contract based on moisture content.

How effective is the GeoBase structural technology? So effective, it comes with a 25-year warranty covering planarity issues that are caused by known unsuitable soils, water tables or moisture contents. This base technology is the most efficient, effective, and least risky option when installing a base system for your artificial turf surface.



CONCRETE vs. STONE

The easiest way to understand the effectiveness of the GeoBase system is to compare a concrete driveway to a stone driveway or even a concrete road to a gravel road. Stone/gravel moves under stress and can be greatly impacted by rains, storms, and water content. Concrete maintains planarity through intense storms or high water events. The GeoBase works under the same premise. Once the GeoBase structure is in place, the field base is locked in and cannot move. It will offer a working, stable platform for multiple turf systems and comes with the warranty to back up the science.

THE SCIENCE:

In the U.S., a Light Weight Deflectometer (LWD) test is utilized to measure the “surface modulus”, commonly known as the stiffness of the material tested. This surface modulus quantifies how the foundation beneath reacts in terms of deflection when a dynamic stress is applied using a circular plate.

The deflection observed is a combined result from the foundation within the test's impact area (often termed the zone of significant stress). The size of the plate, the dynamic load applied, and the properties of the foundation materials determine this impact area.

The load, deflection and stress of the impacts are measured. Smaller deflection for a similar load/stress means the surface has a great modulus or strength.



In the U.S., the LWD and its procedures can be found in various state Department of Transportation (DOT) guidelines. The American Association of State Highway and Transportation Officials (AASHTO) and ASTM International have standards regarding LWD and pavement testing. Specifically, you may refer to:

- ASTM D6758 - Standard Test Method for Measuring Stiffness and Apparent Modulus of Soil and Soil-Aggregate In-Place by an Electro-Mechanical Method.
- Various state DOTs have specific procedures or guidelines for LWD use. For example, the California Department of Transportation (Caltrans) and the Texas Department of Transportation (TxDOT) have provided guidelines and specifications that include the use of LWD in pavement testing

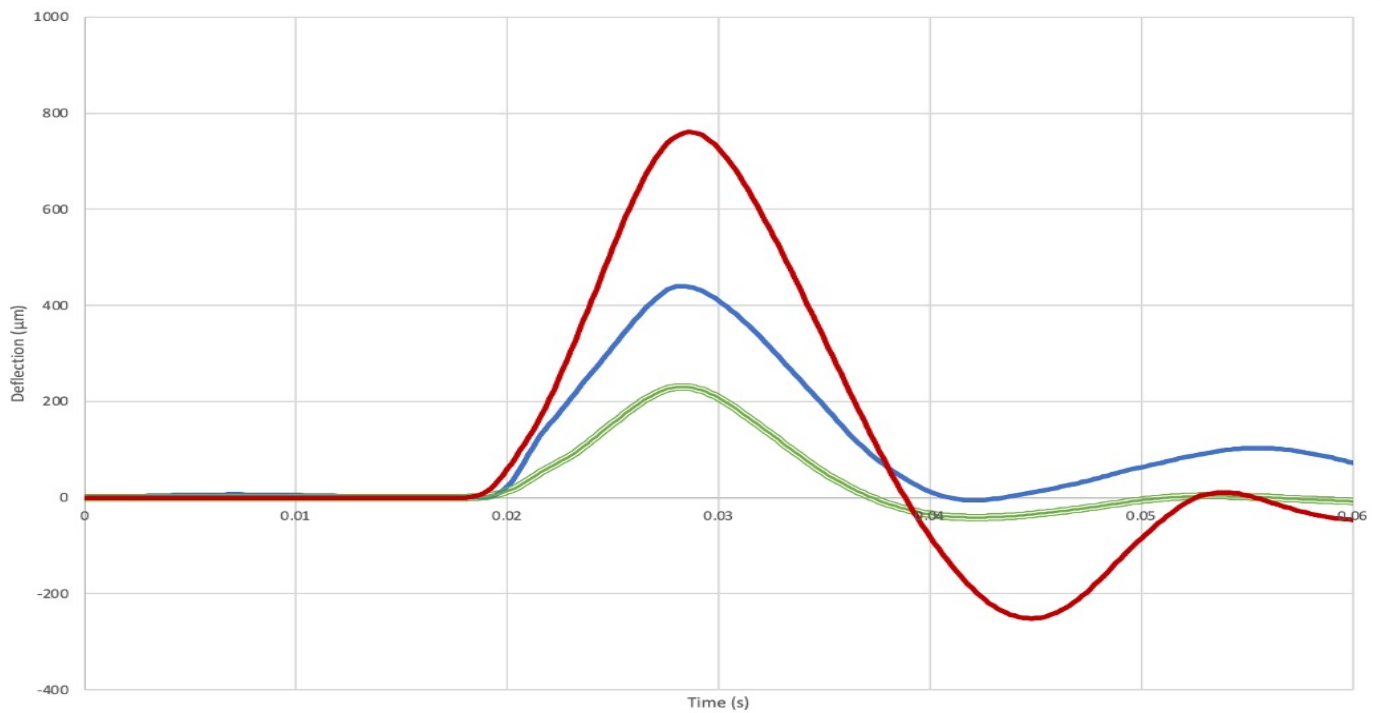
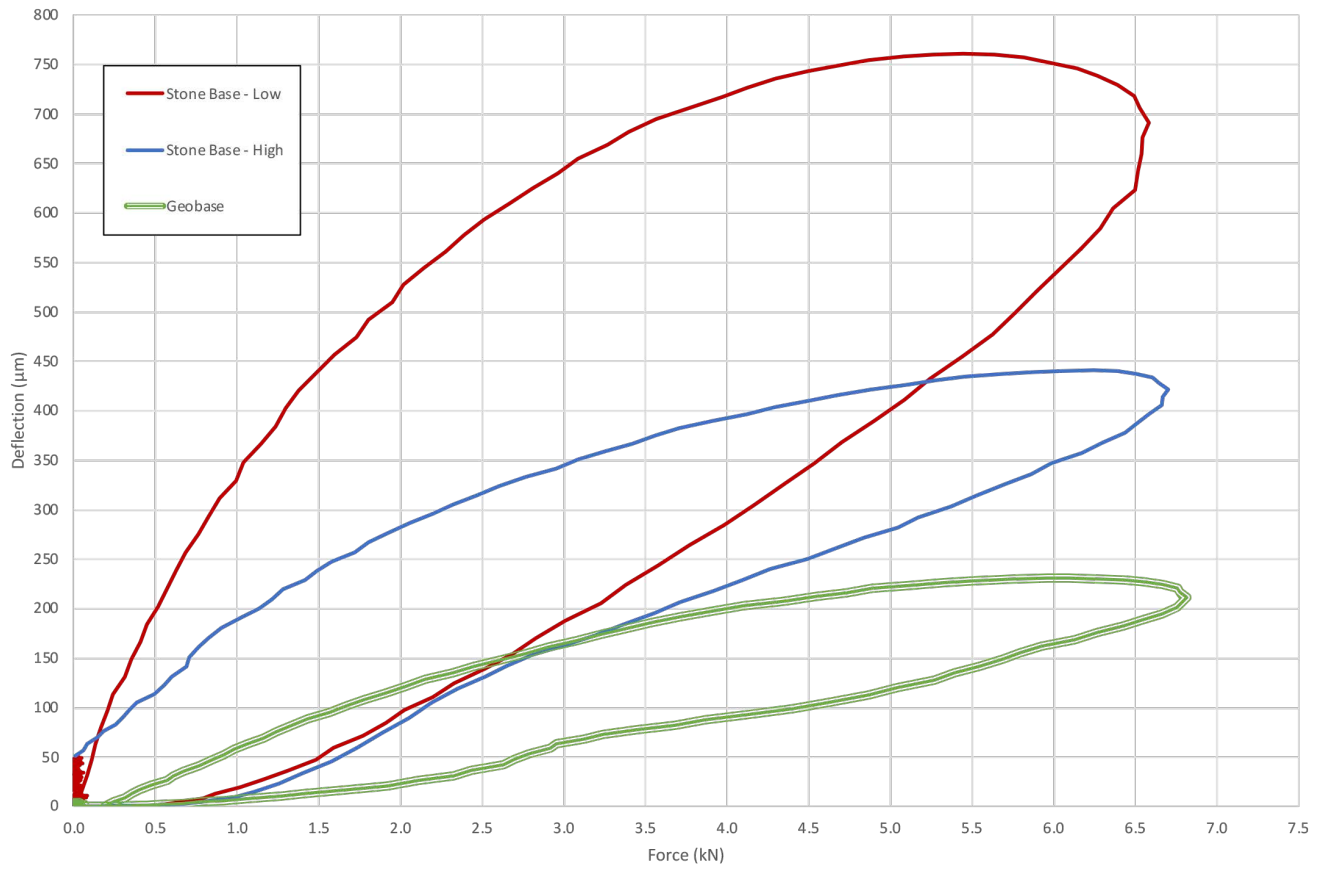
Note: These standards are based on pavement engineering for road construction which are relevant to turf bases but require a slight modification to make them more applicable. In other words, turf fields don't need to support loads from 18-wheeler trucks.

THREE PARAMETERS ARE USUALLY EVALUATED AS PART OF THE LWD METHOD:

Deflection (δ): The primary value measured directly from LWD is the deflection (usually in millimeters or micrometers) of the surface when subjected to a dynamic load. This deflection indicates how much the material compresses under the applied stress.

Modulus of Elasticity (E_v or E): Often termed the "stiffness" or "resilient modulus," this value (usually in MPa or psi) is derived from the measured deflection. It represents the material's ability to recover after being subjected to a temporary load, indicating its elasticity. The modulus of elasticity can be equated to the California Bearing Ratio (CBR) or even the R-value in certain contexts.

Load (P): Some LWD units will also display the applied load (usually in kN), which can be useful for correlation purposes.



See attached test results of porous stone, dense stone and GeoBase when tested using these methods. Note the Test 2 results show “rutting” when the identification line is below the impact “0”. Only the GeoBase deflects back to its original position when tested under high stress conditions.

CONCLUSION:

- The LWD is a commonly used test device for assessment of pavement and roads. It has been used extensively for sports base constructions in several parts of the world.
 - The LWD is an excellent device to understand the load bearing capacity and suitability of a base using a range of measurements including deflection and surface modulus.
 - The results on the same formation (sub-soil) with two different layer thicknesses of stone in contrast to the GeoBase show the large structural benefits of the GeoBase systems in terms of modulus and deflection.
 - Additional testing using a bridge span for basic concrete and GeoBase also demonstrate the impact of failure avoidance and recovery of the GeoBase system vs traditional concrete (note this is different test conditions to the LWD testing) See attached video.
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A **TENCATE** COMPANY 

TURN KEY" SPORTS SURFACING

GeoSurfaces is one of the few companies in the USA that offers in-house "turn key" sports lighting and sports surfacing. We are a licensed Professional Construction Firm, Electrical Firm, and Construction Manager that can offer complete construction and installation of World Athletics, FIH and ITF Approved Surfaces