

HYGT-SS21[®]

Eco-Friendly Polymer for Sand Stabilization & Dust Control

General

HYGT-SS21[®] is an eco-friendly polymer for stabilization and dust-control of granular soils and soil mixes, with reduced amount of fines.

HYGT-SS21[®] can be used as a Stabilizer mixing it with the water added to the soil during a normal earthworks compaction process. In this case, can be considered as a “Water additive”, easy to be applied, and with several fields of application. The product will improve considerably the strength, deformation, durability, dust-control and waterproof properties of build-up.

HYGT-SS21[®] can be used as Dust-Control, mixed with water, and sprayed over the surface to coat. The application will create a relative hydrophobic/waterproof surface, and will keep the particles together, allowing a considerable reduction in the suspended particles coming out from the soil surface.

HYGT-SS21[®] is considered “Sand Stabilization / Sand-Control” as a representative name of “Granular Soil Stabilization / Dust-Control of Granular soils” to be easily linked with granular soils. As said before, can be used in other granular soils, not only sands. Soils that fall in the category of A-1, A-2, A-3 and A-4 according to H.R.B.(ASTM D3282) or G, S & M, according to U.S.C.S. (ASTM D 2487) are the target group of soils for the application of the product.

That means mainly Gravels, Sands and Silts.

Key properties of HYGT-SS21[®] for **Stabilization** are:

- Structural layer generation.
- Compressive, flexural and tensile strength improvement.
- Improved durability.
- Adequate coating with hydrophobic properties.
- Waterproof, permeability coefficient reduction.
- Dust-Control and particles migration reduction.

Key properties of HYGT-SS21[®] for **Dust-Control** are:

- Non-Structural layer.
- Adequate coating with hydrophobic properties.
- Dust-Control and particles migration reduction.

For both cases, all these properties are dependent on the type of soil, application, dosage and particular condition.

Applications

HYGT-SS21[®] is a broad-spectrum product, able to develop an outstanding perform in several process of infrastructure projects.

HYGT-SS21[®] is a concentrated product, meaning that different dilutions in water

are to be considered based on particular requirements.

Stabilization procedure, means that the product is meant to be mixed with the soil in a layer, with appreciable thickness, as a normal build-up layer of earthworks, being able to be considered as a volumetric application. Dust-Control application, considers the exposed surface of the soil to be treated, being able to be considered as a superficial/surface application.

The main applications for **Stabilization** are:

Roads:

- Unpaved roads in urban/rural areas.
- Unpaved roads in Mining, Oil & Gas, and Military projects.
- “Invisible Roads”, as the product does not colours the surface.
- Base and Sub base as part of Asphalt/Concrete Road.
- Cold Pothole repairation.
- Erosion control of build-ups and embankment slopes in granular soils.
- Pathways build-ups.

Hydraulic Projects:

- Open channels in granular soils.
- Open lagoons and water storage reservoirs.
- Impermeable build-ups in granular soils.
- Dredged granular material reutilization.
- Sedimentation pools in granular soils.

Slopes/Embankments:

- Slope/Embankments build-ups.

- Structural and stability improvements for embankments in granular soil.

Landfills:

- Impermeable build-ups in granular soils.
- Structural and stability improvements for embankments in granular soil.

Coastal Erosion:

- Roads, defences or build-ups on coastal areas.
- Stability, durability and structural improvements of slopes.

Complex soils treatment:

- Salty soils stabilization.

The main applications for **Dust-Control** are:

Roads:

- Dust-Control in near-road areas.
- Dust-Control and waterproofing of slope sides.
- Coating for prevention of infiltration in road sides.

Hydraulic Projects:

- Coating over stabilization for new open channels, lagoons and build-ups layers for enhancing hydrophobic and hydraulic properties.

Slopes/Embankments:

- Waterproofing of slope sides.

Landfills:

- Coating over stabilization for additional hydrophobic properties.
- Coating on the cover surface or under green cover.

Coastal Erosion:

- Dust-Control in coastal areas.
- Dunes waterproofing.

Complex soils treatment:

- Hydrophobic surface for prevention of infiltration.

Important notes on applications:

- HYGTT-SS21[®] is able to perform in Marine/Salty environments.
- HYGTT-SS21[®] has a complementary product that works as an anti-dote, meaning that the process can be undo. This is key and particularly relevant for temporary works.
- HYGTT-SS21[®] can be used with dredged granular material.
- HYGTT-SS21[®] can be used on the soil on site, avoiding importing off-site material.

Physical Chemical Properties

HYGTT-SS21[®] has the following properties:

PROPERTY	VALUE
Appearance	Liquid
Colour	Amber
Smell	Characteristic
pH	8
Solubility	Unlimited in water

Dosage, Testing and Use

HYGTT-SS21[®] needs to be dosed and applied according to the requirements, use and the type of soil to be treated.

Prior geotechnical laboratory testing is needed to obtain properties of the soil for a correct dosage.

Stabilization:

Basic geotechnical testing is required for soil stabilization evaluation as follow:

- Classification according to H.R.B. (ASTM D3282) and USCS (ASTM D2487).
- Atterberg Limits according to ASTM D4318
- Particle Sieve Distribution (PSD) according to ASTM D6913
- Proctor Standard test, according to ASTM D698 or Modified according to ASTM D1557.

Based on the tests above, soil can be classified, to check suitability. From Proctor test, Optimum Moisture Content (OMC) and Maximum Dry Density (MDD) values can be obtained, and are key for the dosage of the product.

As this is a volumetric application, the amount of product will be determined based as a partial replacement of the OMC with HYGTT-SS21[®].

For most of the uses, to obtain the adequate amount of product that will partially replace the OMC, the following tests are recommended:

- California Bearing Ratio (CBR) according to ASTM D1883, in the variant unsoaked dynamic simplified, for the soil in natural condition, and for several concentrations. Usually the

ranges are between 5% and 30% of OMC replacement.

- Unconfined Compressive Strength (UCS) according to ASTM D2166, for the soil in natural condition (If possible), and for several concentrations. Usually the ranges are between 5% and 30% of OMC replacement.

Additional geotechnical tests can be performed based on requirement to measure any required properties for the particular application.

The drying time is usually linked to the environmental condition, the moisture in the soil, drainage possibilities and other particular conditions. Usually, 48 – 72h is enough for a drying process of a 100mm thick layer on a 5% OMC sand.

For general information and results based on a particular case, our whitepaper can be consulted: “*Chemical stabilization of sands with SS21. Case of study: fine sands from the Argentinean Delta*”.

Dust-Control:

HYGT-SS21[®] dilution needs to be confirmed experimentally. As a rule of thumb, 10m² of surface are usually covered with 1 litre of product diluted as 10% of solution. The solution will be 9 litres of water and 1 litre of product, and will cover 10m². As the product is applied superficially, the calculations are based on covered area.

For most of the cases, the application above is enough to provide an appropriate coating. If stronger effects are required, the amount of product in solution can be upgraded.

For high temperature and evaporation rates areas, more water can be required as vehicle for the product.

The application by spray of the product, does not conform a structural layer, neither acts as permeation layer. Low thickness are usually achieved by using the product as spray.

Storage

HYGT-SS21[®] is to be stored in an appropriate container, usually 200 litre drums or IBC, in a safe, dark and cool place.

It is not recommended to store diluted product for long term, the product should be conserved pure until used.

Technical Support

HYGT-SS21[®] was developed by HyGT Chemical S.R.L. and Weg Consultora de Ingeniería S.A.

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