

# Enkamat<sup>®</sup> filled with a bitumen-bound mineral filter

**Enkamat A20 is the high performer in Colbond Geosynthetics' range of products for erosion control. The A20 is an Enkamat type 7225 that is factory-filled with a bitumen-bound stone-chipping filter. It weighs approx. 20 kg/m<sup>2</sup>, is 4.8 m wide, 20 m long and comes wrapped around a steel pole.**

The A20 has retained its present design for 20 years, during which time it has proved its functionality. With or without vegetation, the mat can withstand exceptionally high hydraulic loads (see Enkamat Design Guide). The Enkamat A20 is relatively expensive, partly

because of high freight costs. The considerable mass of the mat means that one truck can only carry about 10 rolls (approx. 1,000 m<sup>2</sup>) at a time. In view of this, it is not surprising that we have often been asked, "Can't you make Enkamat A20 locally, closer to the project?"

The answer to this is more often than not: "Yes, but..."

In the past, several attempts have been made, mainly with large-scale projects, to produce Enkamat A20 close to the site where it is needed. This has never been successful. Even a 300,000 m<sup>2</sup> project on the island of Sicily had to be supplied from the Enkamat A factory in Cologne, Germany.

Prospective partners never seem to have the right location, raw materials, equipment or personnel to produce Enkamat A20 with the present production method, and they balk at the substantial investments that have to be made. Before they can use the name Enkamat A20, we require that any locally produced products have the

same quality and performance as the Enkamat A20 made in Cologne. For many projects, the high quality of Enkamat A20 is not required, but using regular Enkamat involves too much risk. In these situations, the performance and quality requirements of Enkamat A20 can be lowered and a similar mat filled with bitumen-bound stone chippings can be used that cannot, however, be called Enkamat A20. These mats can be produced with the following techniques:

#### Filled Enkamat

Production methods for Enkamat filled with bitumen-bound stone chippings:

##### Factory filled:

- Production in a covered, sheltered location.
- Hot asphalt system.
- The same as Enkamat A20 produced in Cologne.

##### On-site production:

- Production at a prepared location close to the project.
- Bitumen emulsion system.

##### In-situ production:

- Filling and binding after laying the mat.
- Bitumen emulsion system.

#### Description of filled Enkamat production methods

##### Factory filled:

Enkamat 7225 (4.80 m x 20 m) is rolled out on a flat concrete floor in a factory hall protected from rain and wind.

Basalt chippings (< 6 mm) and sand are mixed with additives and bitumen in an asphalt mixer. At a temperature of approx. 200°C, the chippings are totally encapsulated with bitumen. The mixture is spread over and raked into the Enkamat. The bonded granulate has to fill the mat before its temperature drops below 150°C otherwise the viscosity of the bitumen will be too high. At a temperature of 110°C to 90°C, the bitumen/granulate mixture is compacted in the mat with a special studded roller. If the product meets all Colbond Geosynthetics' quality assurance requirements, it can be called Enkamat A20.

##### On-site production:

Colbond Geosynthetics has designed a special type of Enkamat - the 7220 AU - for this production method.

The structure of this mat is more open than the 7220 and is cheaper than Enkamat 7225, the Enkamat for factory filled A20 production.

Enkamat 7220 AU should be rolled out on a flat floor, preferably concrete, that is pre-sanded to keep the mat from sticking to it after filling.

The Enkamat is first filled with a layer of stone chippings (< 6 mm) of 5 - 7 kg/m<sup>2</sup>. This layer is then sprayed with an unstable emulsion (0.75 l/m<sup>2</sup>), consisting of approx. 60% bitumen particles in water. The emulsion has to be unstable to allow destabilization to take place in one day.

With negatively charged minerals (which occur most frequently in nature), e.g. quartz, a positively charged bitumen emulsion has to be used, and with positively charged minerals, e.g. limestone, a negatively charged bitumen emulsion must be used in order to achieve sufficient binding and destabilization.

