TECHNICAL NOTICE

Colgrave®

Environmentally friendly grave emulsion

Colgrave® is a grave emulsion containing aggregates, RAP and emulsion, which helps ensure savings in transportation, energy and new materials. Colgrave® constitutes a high environmental value alternative.

Versatile and compliant with standard NF P 98-12, Colgrave® is adapted, via its mix design, to different uses: strengthening, re-profiling, widening, minor maintenance and spot repairs.

COLAS

The road forward

Colgrave®

Environmentally friendly grave emulsion

OVERVIEW

- Colgrave® is the name given by Colas to its grave emulsion mix.
- Colas offers different formulations of Colgrave® adapted to its **various areas of use**: new pavement, strengthening, re-profiling, widening and minor maintenance.
- Colas has been manufacturing and applying Colgrave® since 1975, both in France and around the world.
- Manufactured at **ambient temperature** in a cold mix asphalt plant, Colgrave® combines **selected aggregates and RAP with bitumen emulsion** tailored to the nature of the chosen materials and specific needs.
- The absence of heating, the use of mobile plants and the incorporation of reclaimed **asphalt pavement** (RAP) in the mix design make it an **environmentally sound product.**
- The use of aggregates and local sand may be preferred to reduce the impact of transport, provided that their characteristics conform to specifications.
- Using RAP in formulas **saves new materials**. The compatibility of its characteristics is always checked.
- The binder in the emulsion is pure bitumen or bitumen containing oil-based or plant based flux.
- The bitumen grade depends on the desired performance of the grave emulsion, the season, the type of mix design, the targeted use, traffic levels and constraints of the actual site.
- Many laboratory studies have contributed to the knowledge of emulsion-based mixes, particularly in the area of long and short term performance, based on various aging procedures.
- Colgrave® is **100% recyclable at end of its service life**.

MIX DESIGN

Type of Colgrave®	Storable	Colgrave® R				Colgrave® SI and S2			
Use	Small jobs, localized repairs	Reshaping, enlargement				Pavement Reinforcement			
Storability	Several weeks	24 to 48 hours				< 8 hours			
Grading curve O/D	0/6 – 0/10 0/14 or 0/20	0/6	0/10	0/14	0/20	0/6	0/10	0/14	0/20
Thickness of application, in cm		0 to 4	0 to 6	3 to 8			5 to 10	6 to 12	8 to 15
Mechanical performance	Not significant at early stage	Handling and increase in cohesion take precedence				Measure the modulus to calculate the required pavement thickness			
Base bitumen binder	160/220 penetration bitumen + high level of flux oil	160/200 or 70/100 + a few % of flux oil				50/70 or 70/100 pure bitumen			
Residual Binder Content	60 %	60 % or 65 % of Colacid H				65 % or 69 % of Colacid H or S			

QUICK MAINTENANCE | QUICK APPLICATION | RECYCLED MATERIALS | ENVIRONMENTAL PROTECTION | ENVIRONMENTALLY FRIENDLY | REINFORCEMENT

APPLICATIONS

STORABLE COLGRAVE® – MINOR MAINTENANCE AND SPOT REPAIR

- The use of fluxed bitumen provides **good workability even after storage for several weeks**. Its production can take place in advance, independent of application conditions.
- The mix design can contain high levels of reclaimed asphalt (RAP)
- Its flexibility is appreciated for manual patching of potholes or trenches and localized re-profiling.
- The rise in cohesion is slow and gradual. It depends on the thickness of the layer, its density and weather conditions encountered. The mix can reach its optimum stiffness after several months.

COLGRAVE® R – RE-PROFILING AND WIDENING

- Colgrave® R is a **flexible and adaptable material** during use. The entire layer thickness densifies under compaction, which means **the section can be quickly re-opened to traffic**.
- Colgrave® R can be used immediately or a few days after its manufacture with a specifically adapted formulation.
- Colgrave® R is mainly used in re-profiling or widening.
- Colgrave® R enables re-profiling to zero. In the case of a curved pavement profile, large amounts of filler materials are thus saved.
- The mix can be applied by either the paver, or the grader.
- Colgrave® R may, under low traffic, constitute a wearing course. It's necessary, however, to protect it by providing a curing layer. A surface dressing/chip seal can be applied later.

COLGRAVE® S – NEW ROAD SURFACES AND STRENGTHENING

- Colgrave® S is a grave emulsion possessing **excellent mechanical characteristics**, especially in modulus, whose values are taken into account for calculating the pavement thickness.
- The Colacid H or S emulsion is specially adapted to the aggregates used.
- It is often based on pure 50/70 or 70/100 bitumen. The bitumen content of the emulsion is between 60 and 69%.
- **The quality of the coating and workability can be adjusted**, based on the worksite conditions, by adding a liquid additive at the plant.
- A lab study must check the compatibility of the emulsion with the selected materials as well as the mix performance in accordance with the procedures described in standard NF P 98-121.
- The best performance is obtained with a class S2 grave emulsion with a residual binder content of approximately 4.0%; the residual binder content of SI grave emulsion is around 3.6% (according to the standard).

The Colgrave®

- Possible application under traffic conditions
- Uses recycled asphalt pavement (RAP)
- Savings in transportation, materials and energy
- Technique using bitumen emulsion
- Environmentally friendly
- Flexibility, workability

Colgrave®

Environmentally friendly grave emulsion

TECHNICAL NOTICE

APPLICATIONS (CONTINUED)

- To determine pavement thicknesses in the absence of sufficient data, one can refer to the table in a pavement reinforcement guide, whose results are based on construction experience.
- Colgrave® S can easily reach the performance required in standard NF P 98-I2I for water resistance, compressive strength and modulus value.
- Colgrave® S allows significant savings through manufacturing at ambient temperature and the possibility of using damp materials.
- The transportation time of grave emulsion shall not exceed I ½ hours.
- Colgrave® S (S2) is used in high traffic (up to TI) on any type of substrate.
- The mix is applied with either a paver or a grader, depending on the desired level of evenness.
- For a significant tonnage the mobile plant will preferably be located in the quarry or near the construction site, to reduce the impact of transporting materials or asphalt mix.

PRODUCTION AND APPLICATION

- Colgrave® can only be manufactured when the **ambient temperature** and that of the materials used are higher than 5°C.
- It is imperative to take advantage of **good weather**, without rain during the application, in order to facilitate the rise in cohesion.
- The design of some asphalt plants allows you to process the gravel and the sandy fraction separately (E.S.T. plant), while using the same emulsion and an additive. This process allows better control of the workability, to improve quality and mechanical performance.
- The design of some asphalt plants can handle the coating of gravel and sandy fraction separately (E.S.T. central plant) while using the same emulsion and an additive. This process allows better control of workability, improving the coating quality and mechanical performance of the mix.
- Measures are to be taken regarding the supply and storage, to control the water content of the sands.
- Trucks are to be covered by tarpaulins regardless of transportation time and weather.
- A tack coat of bitumen emulsion is recommended in some cases (smooth and dry surface for example). Its dosage is adapted to the condition of the substrate.
- Like any cold mix, **Colgrave® S requires strong compaction**. A pneumatic roller is most often combined with a heavy vibrating roller for optimal compaction.
- **A seal coat is recommended to protect Colgrave®** from the weather and the action of traffic, while awaiting the application of the wearing course, which is only applied at least I0 days later to facilitate curing.

COLAS

7, place René Clair - 92653 Boulogne-Billancourt Cedex - France
Tel.: +33 (0)I 47 6I 75 00 – Fax: +33 (0)I 47 6I 74 72
www.produitscolas.com