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(54) **NOUVEAU LIANT SYNERGIQUE**
(54) **NEW SYNERGISTIC BINDER COMPOSITION**

(57) The present invention broadly relates to composition usually referred to as "binder" in the trade, which are used for agglomerating and briquetting of metal fines, coal fines, minerals, fly ash and basically any waste fines that need to be recycled. More specifically the invention relates to a new binder composition which are mixed in suitable amounts, and together cooperate in a synergic manner to give very efficient results to agglomerate and briquette fines.

New Synergistic Binder composition

Abstract

The present invention broadly relates to composition usually referred to as "binder" in the trade, which are used for agglomerating and briquetting of metal fines, coal fines, minerals, fly ash and basically any waste fines that need to be recycled. More specifically the invention relates to a new **binder composition** which are mixed in suitable amounts, and together cooperate in a synergic manner to give very efficient results to agglomerate and briquette fines.

Specification

As previously mentioned numerous products are available in the market as cement, molasses, latex, starch, etc..., however, most of these known products are restricted to very special uses. The big advantage of the new binder composition is the fact that we can produce a waterproof briquette which is self curing, thus eliminating the need for high temperature curing. This is an important significant saving in the production of briquettes

The synergistic binder composition according to the invention basically comprises

from 5 to 95 % **Asphalt**
from 5 to 95 % **Sodium Carbonate Pulping Liquor**
from 1 to 3 % **Nonyl Phenol Ethoxylate**

The term **"Sodium Carbonate Pulping Liquor"** as used throughout the specification refers to the spent liquor of a no-sulfur semi-chemical pulping process. It is usually comprised of a mixture of one or more of the following, namely short chain carboxylates, polysacharides, lignin and lignin breakdown products. It may also include Sodium Hydroxide where Sodium Hydroxide is used in the delignification process. The term is not used to refer to a liquor or powder of a specific chemical composition as the chemical composition will vary to a greater or lesser degree depending on the type of wood used and the specific processing conditions. The sodium carbonate pulping liquor is produced by cooking wood

chips in steam at a pressure of 1100 kpa in the presence of a mild solution of Sodium carbonate (115 g/l) for about 14 minutes. As a result, the wood chips are softened so that they can be subsequently separated into individual fibres during the refining stage. The wood chips are then compressed to separate the spent Sodium Carbonate Liquor from the wood chips. The separated spent sodium carbonate liquor is evaporated to produce a solution of 25% to 65 % solids..

Comparative tests

To show the efficiency of the composition according to the invention, comparative tests were carried out between our composition(sample 1) according to the invention, and the pitch (sample 2) currently used for fine coal agglomeration and briquetting.

Sample 1 according to the invention that was used for these tests had the following formulation.

-about 50% of asphalt(cut-back)
-about 50% of Sodium Carbonate Pulping Liquor
-about 1-3% of Nonyl Phenol Ethoxylate

Sample 2 - Pitch is the binding agent most commonly used today. As environmental requirements become more rigid, its use make it necessary to submit agglomerated coal briquettes to a heat treatment in order to lower the concentration of phenolic compounds. This treatment results in atmospheric pollution. Pitch needs a high temperature for the curing process 320 C over a long period(90 minutes).

Laboratory Test

Drop tests

Briquettes were dropped from 1 meter on rubber mats and we measured the number of unbroken briquettes; the aim was to reach a 90% performance of unbroken briquettes. This test is performed a few minutes following the briquettes production.

Compression strength:

Compression strength evolution with time was measured every hour. We compared several other products, tar-pitch, starch, starch molasses, molasses, lime molasses, lignosulfonates, all of these products gave us different reactivities. As we wanted to eliminate curing our briquettes in the oven which normally gives the briquettes their final strength, our goal was to formulate a briquette binder that was self curing. We were looking to decrease as much as possible the curing time needed to reach 75% of the total curing of the briquettes. 75% of curing was reached after 72 hours.

Weather resistance
Resistance after immersion:

This parameter was a key issue for our binder. A thermal treatment normally provides resistance against water (for example, outside storage under the rain). The test applied was one of the more severe test existing. Briquettes were immersed in water for seven days and the residual compressive strength was measured. The target results were a compressive strength more than 75% of the initial strength before immersion.

Claims

1. A synergistic binder composition comprising all the percentages being expressed by volume from 5 to 95% asphalt product base and from 5 to 95% Sodium Carbonate Pulping Liquor and 1-3% Nonyl phenol ethoxylate.

2. The composition of claim 1, wherein the asphalt product base is an asphalt(cut-back) which is a liquid petroleum product produced by fluxing an asphaltic base with suitable distilates.

3. The composition of claim 1, wherein the asphalt product base is a rapid cure asphalt.

4. The composition of claim 1, wherein the asphalt product base is an asphalt (petroleum asphalt, Trinidad pitch, mineral pitch) the asphalt being a mixture hydrocarbons and heterocyclic compound containing sulfur, nitrogen and oxygen.

5. The composition of claim 1, wherein the asphalt product base can be a mixture of different types of asphalt.

6. The composition of claim 1, wherein said Sodium Carbonate Liquor can be replaced by lignosulfonate which is selected from the group consisting of sodium lignosulfonate.

7. The composition of claim 1, wherein said lignosulfonate can be ammonium lignosulfonate.

8. The composition of claim 1, wherein said lignosulfonate can be calcium lignosulfonate.

9. The composition of claim 1, wherein said lignosulfonate can be a mixture of calcium, sodium and ammonium lignosulfonate or a mixture of two or three of them.

10 The term also encompasses pulping liquors of the Sodium Carbonate pulping process and of the kraft and other well-known alkali pulping operations.

11. The composition of claim 1 comprises:

-about 50% by volume of asphalt cut back, or asphalt compound or a mixture of asphalt products.
-about 50% by volume of a lignosulfonate product usually sodium lignosulfonate or a mixture of different types of lignosulfonates.

12. A synergistic binder composition requiring from 5 to 95% asphalt product base or a mixture of asphalt product and any pulp liquor from the pulp and paper industry.

13. A synergistic binder composition requiring from 5 to 95% asphalt product base or a mixture of asphalt product and a mixture of 5 to 95 % pulp liquor and 1-3% Nonyl Phenol Ethoxylate.

14. A synergetic binder composition requiring from 5 to 95% asphalt product base or a mixture of asphalt product and 5 to 95% pulp liquor and 1-3% nonyl phenol ethoxylate, usually with 4, 6, and 9 moli of ethylene oxyde, and with 6 moli of ethylene oxyde for better results.

15. A synergistic binder composition requiring from 5 to 95% asphalt product base or a mixture of asphalt product and of 5 to 95 % pulp liquor mixture without using any surfactant(nonyl phenol ethoxylate) for some application.