

Process for absorbing leakages of liquids

The present invention relates to a process for absorbing leakages, particularly of toxic or radioactive liquids.

5 In various types of plant, especially in the industrial chemistry and nuclear industry sectors, accidental leakages of liquids, whether aqueous or otherwise, exhibiting toxicity or radioactivity characteristics, can occur. To contain the contamination, it is appropriate to act rapidly with a view to stopping the leakages as soon as possible and limiting the spreading of the liquids to reduce the contaminated regions. In fact, the more rapidly action is taken, the more it is then possible to limit the contamination not only horizontally but also vertically owing to entry under gravity into the soil.

15 At the present time the methods employed for combating leakages consist in applying certain products which function by capillary absorption such as, for example, sand or sawdust.

20 While these products enable the liquids to be absorbed, they are nevertheless not very convenient because it is difficult to remove them after absorption and, furthermore, they can give rise to risks of contamination through dispersion due to inclement weather, especially due to rain or wind.

25 The present invention provides a process which makes it possible to combat accidental leakages of liquids, whether aqueous or otherwise, without encountering the disadvantages of the methods employed hitherto.

30 Furthermore, the process according to the invention has the advantage of being capable of being implemented in a particularly simple and effective way.

35 The process according to the invention for absorbing leakages of liquids consists in spreading on the surface of the liquid granules of at least one porous inorganic compound having a mean diameter of 1 to 10mm,

allowing the liquid to be absorbed and spraying onto the granules a composition based on a resin capable of being cured by chemical action with a view to forming a rigid to semirigid mass.

5           The porous inorganic compound is an aluminium silicate such as clay of the montmorillonite type or of the kaolinite type or an alkali or alkaline-earth metal aluminosilicate such as, for example, the zeolites.

10           As shown above, the granules are of a relatively large diameter, the latter having to be between approximately 1 and 10mm.

15           In addition to their absorption properties, clay and more particularly the zeolites have physicochemical adsorption properties which allow liquids to be fixed much more efficiently.

20           Clays of the montmorillonite type additionally have ion exchange properties which make it possible to fix by means of strong physical bonds metal ions such as mercury, lead, cadmium, strontium or, furthermore, caesium, which are particularly toxic.

25           The granules employed in the process according to the invention therefore have, in addition to their absorption characteristics, retention and ion exchange properties of great advantage in respect of toxic or radioactive liquids.

30           According to a particular embodiment of the invention, granules of clay of the montmorillonite type are employed in combination with fine zeolite powder, the latter being present in a proportion of 1 to 100% by weight relative to the clay and preferably of approximately 10% by weight. The zeolite powder has the property of coating the clay granules with a thin layer, which makes it possible to improve the absorption and the adsorption of the liquids.

35           The rate of absorption of the granules is generally fast but depends on the nature of the liquid.

          After absorption, the granules tend to agglomerate together with a view to forming a compact and coherent mass, this being particularly marked when the

liquids are of an aqueous nature.

The granules of the porous inorganic compound can be spread on the surface of the liquid in various ways, for example by sprinkling, by gravitation or else by spraying with the aid of a device using compressed air.

After absorption of the liquid by the granules, a polymeric resin capable of being cured by a chemical action is sprayed onto them with a view to forming, in a few minutes, a rigid or semirigid mass covering the granules with an impervious cover.

The mass obtained can then be easily removed by manual or mechanical pelleting and can be stored optionally for a number of weeks without any particular precaution before destruction or retreatment.

Single-component polyurethanes may be employed, for example, as curable resin. This involves a system which can be crosslinked by moisture, the resin being a prepolymer containing isocyanate end functional groups.

After crosslinking by moisture, the polymer obtained is of the polyurethane-polyurea type.

It is also possible to employ according to the invention a resin of the two-component polyurethane type, the first component being a polyol and the second component a hardener of the isocyanate type, such as tolylene diisocyanate or diphenylmethane diisocyanate.

The two-component system employed may be in particular the product manufactured by Carbochim under the name of "Frothpak".

A two-component system is preferably employed insofar as a particularly rapid curing, of the order of 1 to 2 minutes, is obtained after the spraying.

A further subject of the present invention is a device for making use of the process according to the invention.

This device consists of two compartments, one containing granules of a porous inorganic compound having a mean diameter of approximately 1 to 10mm, and the other containing a resin capable of being cured by a chemical action, containing one or two components, these

compartments being provided with means allowing, on the one hand, the granules and, on the other hand, the curable resin to be projected at a distance.

- 5      According to a preferred embodiment, the two compartments, preferably cylindrical, are arranged on a movable trolley of the type of those employed for large-capacity extinguishers.



CLAIMS

1. Process for absorbing leakages of liquids, characterised in that it consists in spreading on the surface of the liquid granules of at least one porous inorganic compound having a diameter of 1 to 10 mm, allowing the liquid to be absorbed and spraying onto the granules a composition based on a resin capable of being cured by chemical action with a view to forming a rigid to semirigid mass.
2. Process according to Claim 1, characterised in that the granules are granules of clay of the montmorillonite type or of the kaolinite type.
3. Process according to Claim 1 or 2, characterised in that the granules are granules of clay of the montmorillonite type in combination with powdered zeolite in a proportion of 1 to 100% by weight relative to the clay.
4. Process according to Claim 1, characterised in that the granules are granules of zeolites.
5. Process according to Claim 1, characterised in that the curable resin is a polyurethane resin containing a component which can be crosslinked by moisture.
6. Process according to Claim 1, characterised in that the curable resin is of the two-component polyurethane type.
7. Process according to Claim 6, characterised in that the first component is a polyol and the second component a hardener of the isocyanate type.
8. Device for making use of the process according to any one of Claims 1 to 7, characterised in that it consists of two compartments, one containing granules of a porous inorganic compound having a mean diameter of approximately 1 to 10 mm, and the other containing a resin capable of being cured by a chemical action, containing one or two components, the said compartments being provided with means allowing, on the one hand, the granules and, on the other hand, the curable resin to be projected at a distance.
9. Device according to Claim 8, characterised in that the compartments are arranged on a movable trolley.