or other back problems to workers during removal and reinstallation of the covers.

Utility vault and pit covers are also made of plastic but these have limited application for use in areas where they are subjected to less load, i.e. green belt or yard applications. The problem with plastic lids is that because they cannot withstand substantial loads, they have limited applicability and plastic lids provide less coefficient of friction when wet versus polymer covers. Consequently a need exists for a new utility vault and pit cover design which is light in weight, yet is durable in that it can withstand substantial loads and provide improved slip resistance over currently available covers.

SUMMARY OF THE INVENTION

The present invention in an embodiment seek to provide an improved utility vault cover or lid which is manufactured from a fiberglass reinforced polymer matrix material producing a reduced weight and increased strength cover which is lighter, stronger, has improved UV characteristics and slip resistance and is less expensive to manufacture compared to existing cover designs. The lid or cover is used for vaults, pits, chambers or boxes and for ease of presentation shall all be referred to herein as a vault. Vaults are used in a number of industries including utility, security, gas and rail, for example, where they are underground, buried or at grade level.

According to a first aspect of the present invention, there is provided a fiber reinforced polymer material lid for a vault comprising an unsaturated polyester thermosetting resin matrix, fiber reinforcement and an inorganic filler manufactured in a sheet molding process, the lid having a substantially flat upper surface having a texture of indentations extending into the flat upper surface creating a resin rich layer above individual fibers of the fiber reinforced polymer material.

There is also provided a fiber reinforced polymer material cover for an utility pit comprising: a substantially flat upper surface; a bottom surface having an outer perimeter rim with a recessed interior cavity; at least one continuous support rib extending through the recessed interior cavity from opposite sides of the outer perimeter rim to transfer load placed on the cover and minimize deflection under the load to the outer perimeter rim.

According to a second aspect of the present invention, there is provided a lid for a vault comprising: a layer of glass fiber reinforced polymer material sized to be positioned on an opening of the vault; a UV inhibitor within the layer of glass fiber reinforced material; and a substantially flat upper surface having a texture of indentations extending into the flat upper surface creating a resin rich layer above individual glass fibers of the glass fiber reinforced polymer material.

The fiberglass reinforced polymer matrix (FRPM) material is a fiber reinforced polymer material which consists of an unsaturated polyester thermosetting resin matrix, glass fiber reinforcement and inorganic or mineral filler. Additional ingredients are low-profile additives including a UV inhibitor, cure initiators, thickeners, process additives and mold release agents. The formulation undergoes a cross linking reaction when cured under heat and pressure. The fiber reinforced polymer material for the cover will retain its

WHAT IS CLAIMED IS:

1. A fiber reinforced polymer material lid for a vault comprising an unsaturated polyester thermosetting resin matrix, fiber reinforcement and an inorganic filler manufactured in a sheet molding process,

the lid having a substantially flat upper surface having a texture of indentations extending into the flat upper surface creating a resin rich layer above individual fibers of the fiber reinforced polymer material.

2. The lid of claim 1 further comprising a low-profile additive, a cure initiator, a thickener, a process additive and a mold release agent.

3. The lid of claim 1 or 2 further comprising a UV stable pigment.

4. The lid of any one of the preceding claims wherein the resin matrix includes a UV inhibitor.

5. The lid of any one of the preceding claims wherein the polyester resin is orthophthalic resin.

6. The lid of claim 5 wherein the orthophthalic resin comprises about 10% to about 40% of the fiber reinforced polymer material.

7. The lid of any one of claims 1 to 3 wherein the resin matrix includes polystyrene.

8. The lid of claim 7 wherein the polystyrene comprises about 5% to about 30% of the fiber reinforced polymer material.

9. The lid of any one of the preceding claims wherein the fiber reinforcement is chopped fiberglass.

10. The lid of claim 9 wherein the chopped fiberglass comprises about 5% to about 60% of the fiber reinforced polymer material.

11. The lid of any one of the preceding claims wherein the inorganic filler comprises about 15% to about 50% of the fiber reinforced polymer material.

12. The lid of any one of claims 1 to 10 wherein the inorganic filler is a mineral.

13. The lid of claim 12 wherein the mineral is alumina trihydrate.

14. A lid for a vault comprising:

a layer of glass fiber reinforced polymer material sized to be positioned on an opening of the vault;

a UV inhibitor within the layer of glass fiber reinforced material; and

a substantially flat upper surface having a texture of indentations extending into the flat upper surface creating a resin rich layer above individual glass fibers of the glass fiber reinforced polymer material.

15. The lid of claim 14 further comprising a pattern of bosses extending above the substantially flat upper surface.

16. The lid of claim 15 wherein the bosses include the texture and have at least two different heights.