Claims

1. An intumescent coating composition comprising:

an epoxy resin binder derived from a combination of a compound comprising at least one epoxide functionality with an aromatic co-reactant comprising at least two hydroxyl groups,

an epoxy reactive diluent formed from the reaction of a compound comprising at least one aliphatic epoxide functionality with an aliphatic alcohol or polyol,

a curing agent, and

an acid catalyst,

wherein the curing agent is comprised of a mixture of polyamide, polyetheramine and an amine multifunctional monomer and wherein the acid catalyst is effective to form a phosphoric acid on thermal decomposition, and wherein the coating composition has a viscosity, when measured within 1 minute of initial mixing, of between 20,000 and 140,000 mPa/s at 20 °C and shear rate 1.5 s^{-1}.

2. An intumescent coating composition according to claim 1, wherein the epoxy resin binder comprises a Bisphenol diglycidyl ether epoxide resin.

3. An intumescent coating composition according to claims 1 or 2, wherein the epoxy reactive diluent comprises a diglycidyl ether of an aliphatic alcohol.

4. An intumescent coating composition according to claims 1 to 3, wherein the polyamide of the curing agent comprises a polyamidoimidazoline.

5. An intumescent coating composition according to any preceding claim, wherein the polyetheramine of the curing agent comprises a polyether backbone selected from polypropylene glycol and/or polyethylene glycol.

6. An intumescent coating composition according to any preceding claim, wherein the amine multifunctional monomer of the curing agent comprises a polyamine.

7. An intumescent coating composition according to any preceding claim, wherein the coating composition comprises from 1 to 60 wt% of the epoxy resin binder based on the total solid weight of the coating composition.

8. An intumescent coating composition according to any preceding claim, wherein the coating composition comprises from 1 to 30 wt% of the epoxy reactive diluent based on the total solid weight of the coating composition.

9. An intumescent coating composition according to any preceding claims, wherein the coating composition comprises from 1 to 15 wt% of polyamide based on the total solid weight of the composition.

10. An intumescent coating composition according to any preceding claims, wherein the coating composition comprises from 0.1 to 10 wt% of polyetheramine based on the total solid weight of the coating composition.

11. An intumescent coating composition according to any preceding claims, wherein the coating composition comprises from about 0.1 to 10 wt% of amine multifunctional monomer based on the total solid weight of the coating composition.

12. An intumescent coating composition according to any preceding claim, wherein the coating composition is formed from two component compositions, wherein the first component composition comprises the epoxy resin binder and the second component composition comprises the curing agent.

13. A coated substrate, coated on at least a portion thereof with an intumescent coating composition, the intumescent coating composition comprising:

an epoxy resin binder derived from a combination of a compound comprising at least one epoxide functionality with an aromatic co-reactant comprising at least two hydroxyl groups,

an epoxy reactive diluent formed from the reaction of a compound comprising at least one aliphatic epoxide functionality with an aliphatic alcohol or polyol,

a curing agent, and

an acid catalyst,

wherein the curing agent is comprised of a mixture of polyamide, polyetheramine and an amine multifunctional monomer and wherein the acid catalyst is effective to form a phosphoric acid on thermal decomposition, and wherein the coating composition has a viscosity, when measured within 1 minute of initial mixing, of between 20,000 and 140,000 mPa/s at 20 °C and shear rate 1.5 s^{-1}.

14. A steel or concrete substrate coated on at least a portion thereof with an intumescent coating composition, the intumescent coating composition comprising:

an epoxy resin binder derived from a combination of a compound comprising at least one epoxide functionality with an aromatic co-reactant comprising at least two hydroxyl groups,

an epoxy reactive diluent formed from the reaction of a compound comprising at least one aliphatic epoxide functionality with an aliphatic alcohol or polyol,

a curing agent, and

an acid catalyst,

wherein the curing agent is comprised of a mixture of polyamide, polyetheramine and an amine multifunctional monomer and wherein the acid catalyst is effective to form a phosphoric acid on thermal decomposition, and wherein the coating composition has a viscosity, when measured within 1 minute of initial mixing, of between 20,000 and 140,000 mPa/s at 20 °C and shear rate 1.5 s^{-1}.

15. A method of increasing the passive fire protection of a substrate, comprising applying an intumescent coating composition thereto, the intumescent coating composition comprising:

an epoxy resin binder derived from a combination of a compound comprising at least one epoxide functionality with an aromatic co-reactant comprising at least two hydroxyl groups,

an epoxy reactive diluent formed from the reaction of a compound comprising at least one aliphatic epoxide functionality with an aliphatic alcohol or polyol,

a curing agent, and

an acid catalyst, wherein the curing agent is comprised of a mixture of polyamide, polyetheramine and an amine multifunctional monomer and wherein the acid catalyst is effective to form a phosphoric acid on thermal decomposition, and wherein the coating composition has a viscosity, when measured within 1 minute of initial mixing, of between 20,000 and 140,000 mPa/s at 20 °C and shear rate 1.5 s^{-1}.