specified on the technical specification provided by suppliers. This reflects the fact that the particles are hollow rather than solid.

The hollow, organic, spherical, filler particles present in the coating compositions of the present invention comprise, and more preferably consist of, poly(meth)acrylate, polystyrene, polyacrylamide, polyurethane, polysiloxane, polyolefin (e.g. polyethylene, polypropylene, polytetrafluoroethylene), polyacrylonitrile, nylon, poly(vinyl ester), vinylidene, polyacetate, poly(ester), or copolymers thereof. Hollow, organic, spherical, filler particles comprising these polymers have been found to yield coatings with high thermal insulation and good crack resistance, even at elevated temperatures.

The hollow, organic, filler particles present in the coating compositions of the invention are substantially spherical and more preferably spherical. This is advantageous as it allows the filler particles to pack more closely together in the coating compositions of the invention. Preferably the hollow, organic, filler particles have a Z-average diameter of 10 to 150 μm, more preferably 10 to 120 μm and still more preferably 15-120 μm, as determined by ISO 22412:2017 using a Malvern Mastersizer 2000. These particle sizes are preferred to ensure that the coating has adequate insulative properties and achieve a high packing efficiency in the coating.

Preferred coating compositions of the present invention comprise 5-20 vol%, more preferably 10-20 vol% and still more preferably 10-15 vol% hollow, organic, spherical, filler particles, based on the total volume of the composition.

Preferred coating compositions of the present invention comprise 0.25-1.75 wt%, more preferably 0.25-1 wt% and still more preferably 0.3-0.7 wt% hollow, organic, spherical, filler particles, based on the total weight of the composition.

In preferred coating compositions of the present invention, the average diameter of the hollow, organic, spherical filler particles is greater than the average diameter of the hollow, inorganic, spherical filler particles. Preferably the average diameter of the hollow, organic, spherical, filler particles is 1-5 times greater, and more preferably 2-4 times greater than the average diameter of the hollow, inorganic, spherical filler particles. With this combination of hollow, filler particles it has been found that coatings with a high level of thermal insulation, as well as peel and crack resistance can be provided.

In preferred coating compositions of the present invention, the volume ratio of hollow, inorganic, spherical filler particles to hollow, organic, spherical particles is 1.1:1.0 to 10.0:1.0, preferably 5.1:1.0 to 1.2:1.0, more preferably 4.1:1.0 to 1.2:1.0 and still more preferably 3.8:1.0 to 1.3:1.0. It has been found that with this ratio, wherein the amount

by volume of hollow, inorganic, spherical filler particles is greater than the amount by volume of hollow, organic, spherical filler particles, provides the most desirable balance of cracking and peeling resistance, whilst maintaining adequate thermal insulation and hardness.

In further preferred coating compositions of the present invention, the weight ratio of hollow, inorganic, spherical filler particles to hollow, organic, spherical particles is at least 50:2.5, preferably 50:2.5 to 50:0.25.

Preferred coating compositions of the present invention comprise a total amount of 50-80 vol%, more preferably 60-70 vol% of hollow, inorganic, spherical filler particles and hollow, organic, spherical filler particles, based on the total volume of the composition. The hollow, spherical, filler particles therefore comprise a significant total volume amount of the composition and provide its key thermal insulation property.

Further preferred coating compositions of the present invention comprise a total amount of 10-40 wt%, more preferably 15-30 wt% of hollow, inorganic, spherical filler particles and hollow, organic, spherical filler particles, based on the total weight of the composition.

Thickener

The coating compositions of the present invention further comprise a thickener. Optionally a mixture of at least 2 or 3 thickeners may be present. The presence of the thickener in the coating compositions of the present invention advantageously improves the storage stability, the application properties of the compositions and the sagging resistance of the compositions.

Another coating composition of the present invention therefore comprises:

(i) a binder;
(ii) a curing agent;
(iii) hollow, inorganic, spherical, filler particles;
(iv) hollow, organic, spherical, filler particles; and
(v) a thickener.

Preferred coating compositions of the invention comprise a thickener which is solvent-free. This is beneficial to reduce the VOC content of the compositions and to increase its solids content.

A wide range of conventional thickeners may be used in the coating compositions of the present invention. For example, fumed silica may be used as a