the residues that originate from refinery processes contain large amounts of long-chain paraffins.

For the dispersion of paraffins in middle distillates, typically nitrogen compounds, especially amide-ammonium salts formed from polycarboxylic acids and fatty amines, are used. In low-sulfur marine diesel, these do not exhibit satisfactory efficacy or require very high dosage rates.

It was thus an object of the invention to provide low-sulfur marine diesel having a minimum pour point (determined according to ISO 3016). At the same time, they are to exhibit only low or ideally no sedimentation of paraffins on storage below the cloud point. Their filterability below the cloud point is to be very substantially uniform through the entire volume; it is to be impaired only insignificantly, if at all, with respect to filterability above the cloud point. The additives to be used for the purpose are to be free of sulfur compounds and nitrogen compounds, in order not to increase the content of environmentally harmful components in the oil.

It has been found that, surprisingly, by combination of flow improvers based on ethylene copolymers with particular comb polymers, it is possible both to lower the pour point of low-sulfur marine diesel and simultaneously to reduce or suppress the sedimentation of paraffins that precipitate out under cold conditions. In this way, ease of use and filterability of the fuels thus additized and the reliable operation of the machine even after prolonged storage of the fuel at temperatures below the cloud points thereof are assured.

In one aspect, there is provided a fuel oil composition comprising a low-sulfur marine diesel having a sulfur content of less than 1% by weight and,

(A) at least one ethylene copolymer containing, as well as ethylene, 8.0 to 17 mol% of one or more vinyl and/or (meth)acrylic esters, and,

(B) at least one comb polymer (B) comprising structural units B1 which derive from C_{10}-C_{28}-alkyl esters of unsaturated mono- and dicarboxylic acids, C_{10}-C_{28}-alkyl vinyl esters, C_{10}-C_{28}-alkyl vinyl ethers, C_{10}-C_{28}-alkyl allyl ethers and/or linear C_{12}-C_{30}-α-olefins, and wherein at least 20 mol% of the alkyl radicals bonded to the repeat structural units (B1) have 12 to 16 carbon atoms and at least 5 mol% of the alkyl radicals have 18 or more carbon atoms, in which the untreated low-sulfur marine diesel has a pour point of +6°C or higher.

In another aspect, there is provided the use of an additive comprising constituents (A) and (B) as described herein for dispersion of the paraffins that precipitate out of low-sulfur marine diesel having a sulfur content of less than 1% by weight and having, in untreated form, a pour point of +6°C or higher, on storage below the cloud point.

In another aspect, there is provided the use of a comb polymer (B) for dispersion of the paraffins that precipitate out of a low-sulfur marine diesel containing at least one ethylene copolymer (A) below the cloud point, in which the ethylene copolymer (A) contains, as well as ethylene, 8.0 to 17 mol% of one or more vinyl and/or (meth)acrylic esters, and the comb polymer (B) comprises structural units B1 which derive from C_{10}-C_{28}-alkyl esters of unsaturated mono- and dicarboxylic acids, C_{10}-C_{28}-alkyl vinyl esters, C_{10}-C_{28}-alkyl vinyl ethers, C_{10}-C_{28}-alkyl allyl ethers and/or linear C_{12}-C_{30}-α-olefins, and wherein at least 20 mol% of the alkyl radicals bonded to the repeat structural units (B1) have 12 to 16 carbon atoms and at least 5 mol% of the alkyl radicals have 18 or more carbon atoms, and in which the untreated low-sulfur marine diesel has a pour point of +6°C or higher.

In another aspect, there is provided a method of dispersing paraffins which precipitate out of low-sulfur marine diesel having a sulfur content of 1% by weight or lower on storage at temperatures below the cloud point, by adding to the low-sulfur marine diesel an ethylene copolymer (A) and a comb polymer (B) as described herein, and in which the untreated low-sulfur marine diesel has a pour point of +6°C or higher.

In another aspect, there is provided a method of dispersing paraffins which precipitate out of a low-sulfur marine diesel having a sulfur content of 1% by weight or lower on storage below the cloud point, wherein the low-sulfur marine diesel contains an ethylene copolymer (A), by adding a comb polymer (B) as described herein, in which the untreated low-sulfur marine diesel has a pour point of +6°C or higher, and in which the ethylene copolymer (A) contains, as well as ethylene, 8.0 to 17 mol% of one or more vinyl and/or (meth)acrylic esters.

The invention accordingly provides fuel oil compositions comprising a low-sulfur marine diesel having a sulfur content of less than 1% by weight and

(A) at least one ethylene copolymer and

(B) at least one comb polymer.

The invention further provides for the use of

(A) at least one ethylene copolymer and

(B) at least one comb polymer