

List of undesirable substances

Included in existing regulations or standards

Substance	Relevant regulation or standard	Reason for inclusion in list
Inorganic acids	Marpol 18.3	Addition is illegal. Corrosive, jeopardizes ship safety and adversely affects machinery performance.
Waste	EU Directive 2008/98/EC	Addition of any substance classified as waste is illegal.
Any PCB containing oil	EU Directive 96/59/EC USA TSCA	Addition of PCB's is illegal. Toxicity, formation of dioxines during combustion, i.e. contributes to additional air pollution.
Any oil containing organic halogen compounds e.g. solvents, freon coolants	Regulated in some EU member states	Addition is illegal. Toxicity, formation of dioxines during combustion, i.e. contributes to additional air pollution.
Used lubricating oil	ISO 8217	Should be qualified as chemical waste.
Biodiesel (FAME)	ISO 8217	Blending is not allowed in residual fuel oil and most distillate marine fuel grades. Will only be allowed in new DF distillate fuel grade (2016).

Substances not derived from petroleum refining, that may also violate Marpol Annex VI 18.3.1.3. requirements

Non- hydrocarbon combustibles derived from biomass	ISO 8217:2016 will allow only the following hydrocarbons from renewable sources: HVO, BTL and coprocessed renewable feedstock. Other biomass derived fuels are therefore undesirable as fuel oil blend component until there is sufficient technical evidence that they do not violate Annex VI 18.3.1.3 requirements. Examples of such fuels are: <ul style="list-style-type: none"> • Vegetable and animal fats and oils • Fatty and other organic acids • Tall oil • Biodiesel production residues
Coal derived combustibles	These are sometimes offered as bunker components. There are concerns about compatibility, sludge formation. Examples of such fuels are: <ul style="list-style-type: none"> • Coal tar • Brown coal tar • Creosote oil
Styrene monomer	May polymerise at high concentrations in the presence of precursors and cause deposits in engine systems.
Polymers	Have been the cause of incidents caused by engine system problems.
Resins e.g. polyurethane-, epoxy- en alkydresin.	Not compatible, poor mixability with hydrocarbons.

Test methods or analytical techniques for detection and limit values

Substance	Indicator	Test method or technique
Polychlorinated Biphenyls	7 indicator PCB's	EN 12766
Organic halogen compounds	Total organically bound Cl+Br+I	EN 14077
Used lubrication oil	Calcium, zinc en phosphorus	IP 501
Inorganic acids	Strong acid number (SAN)	ASTM D664
Organic acids	Acid number (TAN)	ASTM D664
Biodiesel	FAME	ASTM D7963
Creosote oil	Phenol + Cresols	ASTM D7845
Styrene monomer		ASTM D7845

Substance	Indicator	Limit value
Polychlorinated Biphenyls	7 indicator PCB's (PCB 28, PCB 52, PCB 101, PCB 118, PCB 138, PCB 153, PCB 180)	max 0.5 mg/kg per congener
Organic halogen compounds	Total organically bound Cl+Br+I	max 50 mg/kg ¹
Used lubrication oil (ULO)	Calcium, zinc and phosphorus (ISO 8217)	ULO is present in bunker fuel if: Ca > 30 mg/kg and Zn > 15 mg/kg or: Ca > 30 mg/kg and P > 15 mg/kg
Inorganic acids	Strong acid number (SAN)	Nil
Organic acids	Acid number(TAN)	max 2.5 mg KOH/g
Biodiesel	FAME	De minimis: max±0.5%
Creosote oil	Phenol + Cresols	Proposed: max 0.5%
Styrene monomer		Proposed: max 1.0%

¹ Legal limit values in EU member states: 50 mg/kg (Netherlands), 250 mg/kg (Belgium), 500 mg/kg (Germany)