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MARINE FUEL SPECIALTIES

Enhancing your fleet performance

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fuel specialties

About Innospec

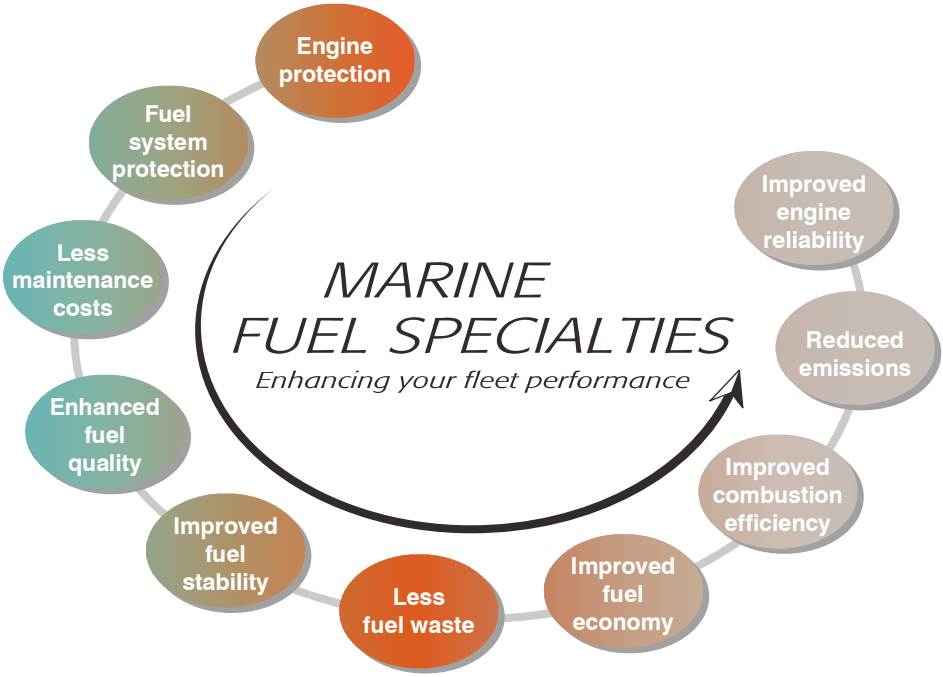
Innospec is a global specialty chemicals company focused on bringing innovative new technologies to market combined with a fast and responsive service.

We serve a range of industries across the world, bringing our products to customers in markets from oilfields, fuels, refineries and power stations to personal care.

Our global team of approximately 1800 employees spans 23 countries, applying their extensive experience and market understanding to customers' local needs. Integrating our global footprint with local service capability enables us to supply quality products that meet and anticipate changing market dynamics.

We are listed on NASDAQ (IOSP) and further information is available through our website www.innospecinc.com/our-markets/fuel-specialties/marine-fuel-specialties

Enhancing Your Fleet Performance



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Rev. 1 2020

Octamar - Fuel Management Products

Blended VLSFO/2020 Compliant Fuels (RMB, RMD & RME)

- Octamar™ HF10 Plus
- Octamar™ Ultra HF

Distillate Fuel/Marine Gas Oil, MGO
2020 Compliant Fuel & ECA Compliant Fuels (DMA/DFA, DMB/DFB, DMX & DMZ/DFZ)

- Octamar™ LI5 Plus
- Octamar™ LI5
- Octamar™ Winterflow
- Octamar™ Premium

Residual Fuel/Heavy Fuel Oil (RME, RMG & RMK)

- Octamar™ Complete
- Octamar™ BT-25
- Octamar™ F35C
- Octamar™ MP4
- Octamar™ BT-8 Plus

PRODUCT SUMMARY
Innospec IMO 2020 VLSFO Additives

Octamar™	HF10 Plus	Ultra HF
Product Highlights	Strong fuel dispersant, stabilizer and combustion improver for VLSFO	Strong fuel dispersant, stabilizer, soot dispersant, ignition improver & combustion catalyst for VLSFO
Benefits	• Improves stability of a single VLSFO for storage • Improves compatibility of different VLSFO blends from different origin • Reduces issues related to fuel commingling during fuel batch switching or change-over for ECA • Reduces sludge formation and filter clogging • Renders fuel homogenous • Keeps fuel purification system on-board clean for optimum efficiency	• Improves stability of a single VLSFO for storage • Improves compatibility of different VLSFO blends from different origin • Reduces issues related to fuel commingling during fuel batch switching or change-over for ECA • Reduces sludge formation and filter clogging • Renders fuel homogenous • Keeps fuel purification system on-board clean for optimum efficiency • Ensures maximum burnout of hydrocarbon & improves fuel economy-Reduction of SFOC • Reduces ignition delay of fuel • Disperse soot • Keep combustion and post combustion components clean • Reduce PM
Application	• All types of VLSFO (RMB, RMD, RME & RMG) with Kinematic Viscosity of between 20-300mm²/s • Fuels with potential High Reserve Stability Number, RSN (ASTM D7061) • Fuels with potential Poor Spot Test Stability Number (ASTM D4740) • Bad bunker with excessive sludge & filter clogging	• All types of VLSFO (RMB, RMD, RME & RMG) with Kinematic Viscosity of between 20-300mm²/s • Fuels with potential High Reserve Stability Number, RSN (ASTM D7061) • Fuels with potential Poor Spot Test Stability Number (ASTM D4740) • Fuels with high MCR or CCAI • Vessel on slow steaming
Frequency	Continuous	Continuous or problem fuels
Treat Rate	**1:10,000 - 1:15,000**	**1:6,000**
Dosing Method	Direct to Storage Tanks	Direct to Storage Tanks, Serv. & Sett. Tanks or Dosing pump
Packaging	25 ltrs	25 ltrs

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PRODUCT SUMMARY
Innospec Marine Heavy Fuel Oil Additives

Octamar™	BT - 25	F35C	Complete	MP4
Product Highlights	Totally organic strong fuel dispersant, stabilizer and combustion improver	Light dispersant, soot dispersant, ignition delay improver and strong combustion catalyst	Fuel dispersant, stabilizer, soot dispersant, ignition improver & strong combustion catalyst	Ash inhibitor & combustion catalyst
Benefits	• Reduces sludge formation • Renders fuel homogenous • Keeps fuel purification system on-board clean for optimum efficiency • Reduces ignition delay of fuel • Leaves soot dry and soft	• Ensures maximum burnout of hydrocarbon & improves fuel economy • Reduces ignition delay of fuel • Disperse soot • Keep combustion and post combustion components clean • Reduce PM	• Ensures maximum burnout of hydrocarbon & improves fuel economy • Reduces ignition delay of fuel • Disperse soot • Keep combustion and post combustion components clean • Reduce PM • Reduces sludge formation • Renders fuel homogenous	• Significantly reduces or eliminates ash deposits • Prevents hot corrosion • Assist in better combustion
Application	• Bad bunker with excessive sludge & filter clogging • High Reserve Stability Number (RSN) • Lay up of vessel. Delays aging of fuels	• Excessive carbon deposits in engine & turbo charger components • Excessive soot in waste heat recovery system • Fuels with high MCR or CCAI • Vessel on slow steaming	• Excessive carbon deposits in engine & turbo charger components • Excessive soot in waste heat recovery system • Fuels with high MCR or CCAI • Vessel on slow steaming • Bad bunker with excessive sludge & filter clogging • High Reserve Stability Number (RSN)	• For fuels with high Vanadium & Sodium content • Vanadium > 200mg/kg • Sodium > 80mg/kg
Frequency	Continuous or problem fuels	Continuous or problem fuels	Continuous or problem fuels	Problem fuels
Treat Rate	**1:15,000 - 1:25,000**	**1:6,000**	**1:6,000**	**1:3,000**
Dosing Method	Direct to storage tank or settling tank	Direct to storage tank or Dosing pump	Direct to storage tank or Dosing pump	Direct to storage tank or settling tank
Packaging	25 & 200 ltrs	200 ltrs	200 ltrs	200 ltrs

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PRODUCT SUMMARY
Innospec Marine Distillate Additives

Octamar™	LI5	LI5 Plus	Winterflow	Predator 8000	Premium NF
Product Highlights	Pure Lubricity Improver	Lubricity Improver with Stabilizer	Cold Flow Improver & Pour Point Depressant	Biocides	Organic Combustion Improver & antifoulant
Benefits	• Improves Lubricity of LSMGO • Reduces the Wear Scar of MDO/MGO	• Improves Lubricity of LSMGO • Reduces the Wear Scar of MDO/MGO • Prevent oxidation of LSMGO during prolonged storage • Prevent injector fouling	• Improves cold flow properties of LGMGO • Protects against paraffin waxes that causes filter clogging • Keeps LSMGO flowable & pumpable	• Protection against microbial activities • To kill the microbes in heavily contaminated fuels	• Promotes fuel economy • Engine cleanliness and reduce soot & carbon deposits • Prevents injection fouling • Reduce emission
Application	• For LSMGO • HFRR or above 520 microns	• For LSMGO • HFRR or above 520 microns • Prolong storage of LSMGO of over 60 days • Lay up of vessel. Delays oxidation of LSMGO	• Extreme cold climates	• For LSMGO • Present of FAME in fuel	• Fuels with low cetane index • Fouling of engine • Poor emission
Frequency	Continuous	Continuous	When operating in extreme Winter conditions	Continuous or as required	Continuous
Treat Rate	**1:10,000**	**1:4,000**	**1:1,000**	**1:1,000 - 1:20,000**	**1:3,000 - 1:5,000**
Dosing Method	Direct to storage tank	Direct to storage tank	Direct to storage tank	Direct to storage tank	Direct to storage tank
Packaging	25 ltrs	25 ltrs	25 ltrs	25 ltrs	25 ltrs

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Marine Specialties
Product Data Sheet

Product Group 30 – Pre-combustion Additives

Octamar™ HF-10 Plus

Product Description

Octamar™ HF-10 Plus is an innovative additive containing a dispersant-stabiliser and antifoulant for Very Low Sulphur Fuel Oil **(VLSFO)** to:

Improve fuel stability and compatibility during blending, handling and storage,

Disperse existing sludge formation and prevent further agglomeration.

Improve combustion reducing unburned carbon deposits throughout the engine and exhaust gas system.

Improve fuel stability against oxidation and thermal stressing.

Reduce fuel injector fouling.

Physical Properties

Appearance ..... brown, reddish liquid
Density at 15°C ..... 870 kg/m³
Viscosity at 25°C ..... 12 mPa.s
Flash Point, PMCC ..... >144°F/61°C

Dosage

For best results, Octamar™ HF-10 Plus should be dosed into storage tank prior to bunkering.

Recommended regular dosage range:

1:10,000 (1 litre per 10 tonnes of fuel) to

1:15,000 (1 litre per 15 tonnes of fuel)

Different dosage rates maybe recommended for emergency use and sludge reduction, fuel stability and injector fouling. Innospec personnel are available to assess your specific problems and advise a suitable product(s) and dosage program.

Packaging and Storage

Octamar™ HF-10 Plus is supplied in non-returnable 25-litre pails. Store away from heat, sparks and open flame.

Product Benefits and typical Applications

- Prevents issues related to fuels commingling like separation, sludge formation and filter clogging
- Improves stability and compatibility of different VLSFO blends, types, qualities and fuel origin
- Improves oxidation and thermal stability
- Maintains long term fuel stability and prevents fuel ageing
- Reduces fuel injector fouling
- ECA requirements - prevents incompatibility during fuel change-over
- Continuous use – for sludge reduction – cleaner fuel handling system, engines and exhaust gas system
- Improves combustion efficiency - cleaner engines and exhaust system
- ISO 9001 & 14001 certified by DNV
- EU Origin

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Product Group 31 – Combustion Additives

Octamar™ Ultra HF

Product Description

Octamar™ Ultra HF is a highly concentrated combustion improving additive, formulated to optimize the combustion of Very Low Sulphur Fuel Oils (VLSFO).

Combustion Improvement by using highly effective iron based product:

Faster and more complete burn-out of carbon and hydrocarbon will reduce deposits in the engine and exhaust system and significantly lower emissions of unburned carbon (particulates) to the atmosphere.

Ignition Improvement by using organic combustion improver:

Maintained cleanliness and efficiency of engine and T/C will enable optimum performance between recommended overhaul intervals.

Homogenisation and better atomisation/spray pattern by using stabilizer-dispersant:

The dispersant-stabilizer prevents fuel from stratification and the asphaltenes from agglomerating. This will reduce sludge formation in fuel tanks and helps to keep separators, filters, fuel heaters, viscometers and injector (burner) tips clean, resulting in less maintenance and downtime.

Physical Properties

Appearance ..... reddish, brown liquid
Density, 15 °C ..... 930 kg/m³
Flash Point, ... > 60°C

Dosage

For best results, Octamar™ Ultra HF should be dosed into storage tank prior to bunkering.

The normal dosage of Octamar™ Ultra HF, for VLSFO, is 1:6,000 (1 litre for 6.0 tonnes of fuel). Alternative dosages may be recommended based on fuel quality or operational conditions. Innospec personnel are always available to assess your specific problems and advise a suitable product(s) and dosage program.

Packaging and Storage

Octamar™ Ultra HF is supplied in 25-litre pails. Other pack sizes are available on request. Store Octamar™ Ultra HF away from heat, sparks and open flame and at temperature above 0°C.

Product Benefits

- Improves combustion and ignition
- Improves atomisation
- Maintains overall engine efficiency
- Improves fuel economy
- Maintains turbocharger and economizer cleanliness and efficiency
- Reduces piston fouling
- Reduces unburned carbon deposits in exhaust system and pollution of environment
- Significantly reduces particulate matter
- Less soot particulates on deck
- Reduces fuel sludge
- Maintains HFO stability at on board storage temperature up to 12 months
- Increases tolerance and compatibility for blending of heavy and light fuel components
- Inhibits or strongly reduces storage tank sludge formation

- ISO 9001 & 14001 certified by DNV
- EU Origin

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Product Group 33 – Special Marine Products

Octamar™ LI-5 Plus

Product Description

Octamar™ LI-5 Plus is a multi-functional additive formulated to improve the handling, storage and performance of MGO and MDO fuels.

Fuel systems and equipment will have the added protection from wear, fouling and corrosion when using distillate fuels intermittently or on a regular basis.

Octamar™ LI-5 Plus is an ash-less product and will not add to particulates / emissions loading.

The main benefits of the product have been verified by Lloyd's Register Product Verification Service.

Physical Properties

Appearance ..... clear amber liquid
Viscosity at 40°C ..... 25 mm^2/s
Density at 15°C ..... 925 kg/m^3
Flash point ..... >144°F/61°C
Pour point ..... > -51°C

Application

Manually dose Octamar™ LI-5 Plus direct to storage / bunker tanks – prior to or during every bunkering

OR

Manually dose Octamar™ LI-5 Plus direct to service tank – prior to or during every filling.
Use of a chemical metering pump to dose in line is optional.

Dosage Rate

The recommended dosage rate is 1kg Octamar™ LI-5 Plus per 4 tonnes fuel, **OR** approximately 1 litre per 4 tonnes of fuel.

Packaging and Storage

Octamar™ LI-5 Plus is supplied in 25L non-returnable pails. Store away from heat, sparks and open flame.

- ISO 9001 & 14001 certified by DNV
- EU Origin

Verified by Lloyd's Register PVS

Octamar™ LI-5 Plus improves

- Oxidation Stability according to (ISO12205)
- Thermal Stability according to (ASTM D6468)
- Injector Fouling according to (CEC F-23-01 Peugeot XUD9)
- Steel Corrosion according to (ASTM D665A&B)
- Fuel Lubricity according to HFRR (ISO12156)
- Filter Blocking Tendency according to (IP387)

CERTIFIED LR PRODUCT VERIFICATION SCHEME

Product Benefits

- Improves oxidation and thermal stability, allowing extended storage periods
- Protects against the potential presence of Biodiesel derived Fatty Acid Methyl Ester (FAME), and possible corrosion caused by high TAN fuels
- Reduces fuel injector fouling
- Provides improved protection against corrosion
- Reduces risk of filter blocking
- Improves fuel lubricity
- Reduces wear risk of fuel pumps and fuel injection equipment
- Proven by independent, in-house and industrial tests – HFRR and Bosch
- No harm tests showing no adverse effects to fuels, lubricants, and fully compatible with engine and system materials

Marine Specialties
Product Data Sheet

Product Group 33 – Special Marine Products

Octamar™ LI 5

Product Description

Octamar™ LI 5 is an additive formulated to improve the performance of MGO and MDO fuels.

Octamar™ LI 5 is a lubricity improver for use in low-sulphur distillate fuel oils that possess poor lubricity characteristics.

Fuel systems and equipment will have the added protection from wear and corrosion when using distillate fuels intermittently or on a regular basis.

Octamar™ LI 5 is an ash-less product and will not add to particulates/emissions loading.

The main benefit of the product has been verified by Lloyd's Register Product Verification Service.

Physical Properties

Appearance ..... yellow liquid
Viscosity at 40°C ..... 16 mm^2/s
Density at 15°C ..... 910 kg/m^3
Flash point ..... >144°F/61°C
Auto ignition temperature ..... >200°C
Pour point ..... > -15°C

Application

Manually dose Octamar™ LI 5 direct to storage / bunker tanks – prior to or during every bunkering.

OR

Manually dose Octamar™ LI 5 direct to settling tank – prior to or during every filling.

Use of a chemical metering pump to dose in line is optional.

Dosage Rate

The recommended dosage rate is 1 kg Octamar™ LI 5 per 10 tonnes of fuel.

Packaging and Storage

Octamar™ LI 5 is supplied in 200L non-returnable steel drums and 25L pails.

Storage and Handling on board

Store away from heat, sparks and open flame. Please ensure the product is always stored at temperatures above -3°C.

If by accident the product is stored at extremely low temperatures below -5°C, crystallisation may occur. If this happens re-store the product at room temperature (above 0°C) for 24 hours then agitate the contents by shaking the pail or rolling the drum. The product will then be fit for use.

Verified by Lloyd's Register PVS

Octamar™ LI 5 improves

- Fuel Lubricity according to HFRR ISO12156

CERTIFIED LR PRODUCT VERIFICATION SCHEME

Product Benefits

- Improves fuel lubricity
- Provides improved protection against corrosion
- Proven by independent, in-house and industrial tests – HFRR and Bosch
- No harm tests showing no adverse effects to fuels, lubricants, and fully compatible with engine and system materials

- ISO 9001 & 14001 certified by DNV
- EU Origin

Product Group 33 – Special Marine Products

Octamar™ Winterflow

Product Description

Octamar™ Winterflow is a cold flow improver and pour point depressant for marine diesel fuels.

For vessels operating in colder climates, Octamar™ Winterflow will protect against fuel solidification, and improve operability.

Octamar™ Winterflow is specifically formulated to improve operability temperature of DMA and DMZ grades of marine distillate fuel.

Octamar™ Winterflow gives significant improvements in Pour Point and CFPP, therefore providing enhanced low temperature operability.

Physical Properties

Appearance ..... opaque to lightly yellow liquid
Density ..... 895 kg/m³ at 15°C
Flash Point ..... > 60°C
Viscosity at 40°C ..... 7.5 mm²/s
Pour Point ..... -9°C

Application

Manually dose Octamar™ Winterflow direct to storage / bunker tanks – prior to or during every bunkering.

Dosing temperature should be 5°C above cloud point of marine diesel fuel.

Dosage Rate

The recommended dosage rate is 1 litre Octamar™ Winterflow per 1 tonne of fuel. The dosage rate can be increased to 1:500 to give enhanced protection.

Typical Performance

Typical response is 8°C reduction in CFPP Response will vary depending on fuel composition and pre-treatment.

Packaging and Storage

Octamar™ Winterflow is supplied in 25-liter (6.63 gallon) pails. Store away from heat, sparks and open flame.

Product Benefits

- Improves the cold flow properties of marine diesel fuel
- Protects against paraffin waxes caused blockings of pipes and filters
- Will keep diesel fuel flowable, pumpable and filterable over longer time period at lower temperatures
- Easy handling due to its low viscosity
- Blends perfectly with diesel fuel up to 5°C above cloud point
- ISO 9001 & 14001 certified by DNV
- EU Origin

Marine Specialties
Product Data Sheet

Product Group 33 – Special Marine Products

Octamar™ Premium NF

Product Description

Octamar™ Premium NF is an advanced multi-functional additive consisting of a combustion improver and an antifoulant.

Octamar™ Premium NF improves fuel economy, overall operating efficiency, atomisation, and fuel combustion.

Octamar™ Premium NF will protect against fuel injector fouling and fuel filter plugging.

Octamar™ Premium NF will not interact with lubricants or other fuel additives.

Octamar™ Premium NF is a pure organic product.

Physical Properties

Appearance ..... Clear, amber liquid
Density at 15°C ..... 890 kg/m³
Viscosity at 40°C ..... 8 mm²/s
Pour point ..... < - 63°C
Flash point ..... > 60°C

Application

Manually dose Octamar™ Premium NF direct to storage / bunker tanks – prior to or during every bunkering **OR**

Manually dose Octamar™ Premium NF direct to settling tank – prior to or during every filling.

Use of a chemical metering pump to dose in line is optional.

Dosage Rate

At recommended dosage rate of 1L Octamar™ Premium NF per 3 tonnes fuel superior efficiency will be given.

Octamar™ Premium NF is highly efficient, therefore, dosage rate can be widened to 1L additive to 5 tonnes fuel.

Innospec personnel are always available to assess your specific problems and advise a suitable product(s) and dosage program.

Packaging and Storage

Octamar™ Premium NF is supplied in nonreturnable 25L pails. Store away from heat, sparks and open flame.

Product Benefits

- Improves fuel economy
- Improves overall operating efficiency
- Supports better atomisation and combustion with reduced unburned carbon emissions
- Prevents and removes deposits in fuel injectors, which compromise performance
- Reduces soot and carbon deposits in combustion chamber, exhaust valves and turbo chargers
- Extends maintenance schedule and maintained maximum operational efficiency
- Cleans-up engine and fuel system when used
- No harm tests showing no adverse effects to fuels, lubricants, and fully compatible with engine and system materials
- Totally metal free
- ISO 9001 & 14001 certified by DNV
- EU Origin

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Precautionary Statement

Use only in approved manner. Do not contaminate drinking water. Dispose of empty container in accordance with local, state and federal rules. Do not re-use empty container. Avoid inhalation of fumes. When handling, use rubber gloves and face shield, wash after handling. Consult Innospec for questions and specific directions for use. Buyer assumes all risks of storage or handling of this material that are not in strict accordance with directions given. Consult the SDS for additional information. Store in a dry place away from food stuffs with the lid tightly closed. For commercial use only.

First Aid

HARMFUL IF SWALLOWED. CONTACT WITH SKIN OR EYES CAN CAUSE IRRITATION. KEEP OUT OF REACH OF CHILDREN!

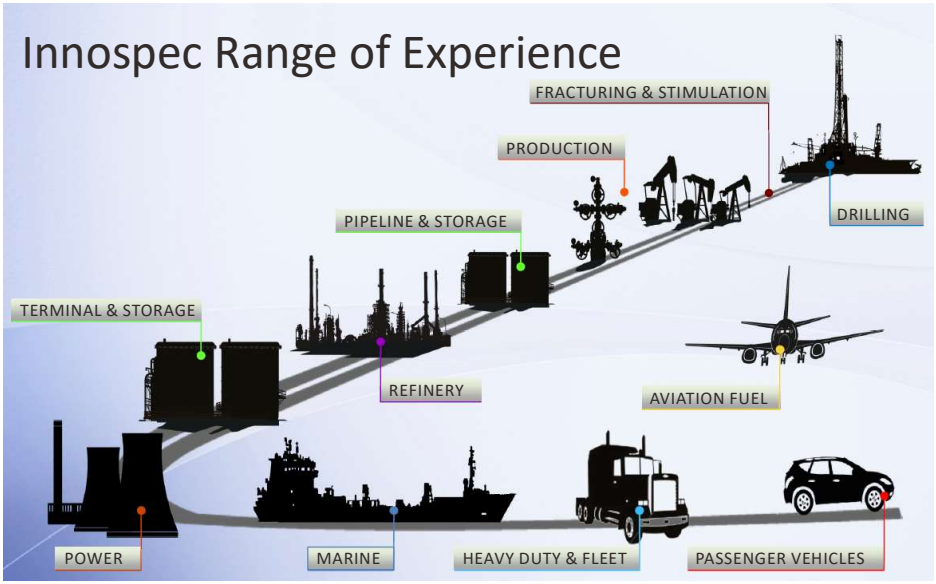
SKIN: Flush with water and wash with soap and water. Remove contaminated clothing. Get medical attention if irritation continues.

EYES: Flush with cool water for at least 15 minutes and get medical attention immediately.

INHALATION: Remove affected person to fresh air. Get medical attention immediately.

INGESTION: Do not induce vomiting. Drink large amounts of water. Do not give an unconscious person anything to drink. Get medical attention immediately.

The above Precaution statement and First Aid guide is for all products.
Full MSDS will be provided separately upon request and comes along with supply.



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Marine Specialties
Product Data Sheet

Product Group 31 – Combustion Additives

Octamar™ Complete

Product Description

Octamar™ Complete is a highly concentrated combustion improving additive, formulated to optimize the combustion of residual marine fuel oils.

Faster and more complete burn-out of carbon and hydrocarbon will reduce deposits in the engine and exhaust system and significantly lower emissions of unburned carbon (particulates) to the atmosphere.

Maintained cleanliness and efficiency of engine and T/C will enable optimum performance between recommended overhaul intervals.

Due to reduced soot particles in the post combustion flue gas, it might benefit efficiency of scrubbers for SOx removal.

The dispersantstabilizer prevents fuel from stratification and the asphaltenes from agglomerating. This will reduce sludge formation in fuel tanks and helps to keep separators, filters, fuel heaters, viscometers and injector (burner) tips clean, resulting in less maintenance and downtime.

Octamar™ Complete should be also a solution for VLSFO for emergency use, especially for fuel homogenation and combustion improvement.

Physical Properties

Appearance ..... dark amber liquid
Density, 15°C ..... 920 kg/m³
Flash Point, ... > 60°C

Application and Dosage

For best results, Octamar™ Complete should be injected into the fuel transfer line to the day tanks or settling tank via a chemical metering pump.

The normal dosage of Octamar™ Complete, for residual marine fuel, is 1:6,000 (1 litre for 6.0 tonnes of fuel). Alternative dosages may be recommended based on fuel quality or operational conditions. Innospec personnel are always available to assess your specific problems and advise a suitable product(s) and dosage program.

Packaging and Storage

Octamar™ Complete is supplied in 200-litre (53 gallon) non-returnable steel drums. Other pack sizes are available on request. Store Octamar™ Complete away from heat, sparks and open flame and at temperature above 0°C.

Product Benefits

- Improves combustion
- Maintains overall engine efficiency
- Improves fuel economy
- Maintains turbocharger and economizer cleanliness and efficiency
- Reduces piston fouling
- Reduces unburned carbon deposits in exhaust system and pollution of environment
- Significantly reduces particulate matter
- Less soot particulates on deck
- Substantially reduces the risk of economizer fires
- Reduces fuel sludge up to 50%
- Maintains HFO stability at on board storage temperature up to 12 months
- Increases tolerance and compatibility for blending of heavy and light fuel components
- Inhibits or strongly reduces storage tank sludge formation
- Improves atomisation
- VLSFO – prevent issues related to fuels commingling like separation, sludge formation and filter clogging
- ISO 9001 & 14001 certified by DNV
- EU Origin

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Marine Specialties
Product Data Sheet

Product Group 30 – Pre-combustion Additives

Octamar™ BT-25

Product Description

Octamar™ BT-25 is a heavy fuel dispersantstabiliser and combustion improver formulated to:

Maintain fuel stability during blending, handling and storage,

Disperse existing sludge formation and prevent further agglomeration.

Improve combustion reducing unburned carbon deposits throughout the engine and exhaust system.

Clean up sludge in fuel tanks.

Improved fuel system cleanliness and combustion using Octamar™ BT-25 will result in higher efficiency and better fuel economy.

Octamar™ BT-25 should be also a solution for VLSFO for emergency use, especially for fuel homogenation and combustion improvement.

Physical Properties

Appearance ..... dark, brownish liquid
Density/specific gravity ..... 950 kg/m³
Flash Point, PMCC ..... >144°F/61°C
Auto ignition temperature ..... >200°C

Dosage

For best results, Octamar™ BT-25 should be dosed immediately before bunkering, either manually or with a chemical metering pump.

The recommended regular dosage of Octamar™ BT-25 is in the range of 1:15,000 to 1:25,000 (1 litre per 15 to 25 tonnes of fuel). Different dosage rates maybe recommended for emergency use and tank cleaning (see also Technical Bulletin Tank Cleaning). Innospec personnel are available to assess your specific problems and advise a suitable product(s) and dosage program.

Packaging and Storage

Octamar™ BT-25 is supplied in non-returnable 200-litre drums or 25-litre pails. Store away from heat, sparks and open flame.

Product Benefits

- Significantly reduces fuel sludge waste - improved fuel economy.
- Improves combustion efficiency - cleaner engines and exhaust system.
- Truly organic product - metal free

Typical Applications

- Continuous use – for sludge reduction - cleaner fuel system, engines and exhaust.
- Emergency use – to restore stability or compatibility once issues have occurred.
- ECA requirements - prevent incompatibility during fuel change-over.
- VLSFO – prevent issues related to fuels commingling like separation, sludge formation and filter clogging
- Bunker fuels - prevent incompatibility when bunkering one fuel on top of another.
- “Dilution is the Solution” – maintain compatibility when mixing fuels to dilute a problem fuel.
- Maintain long term fuel stability on laid up ships
- Clean up fuel tanks prior to dry-dock or when changing tank allocation eg. HFO to MGO.

- ISO 9001 & 14001 certified by DNV
- EU Origin

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Marine Specialties
Product Data Sheet

Product Group 31 – Combustion Additives

Octamar™ F 35 C

Product Description

Octamar™ F 35 C is a highly concentrated combustion improving additive, formulated to optimize the combustion of residual marine fuel oils.

Faster and more complete burn-out of carbon and hydrocarbon will reduce deposits in the engine and exhaust system and significantly lower emissions of unburned carbon (particulates) to the atmosphere.

Maintained cleanliness and efficiency of engine and T/C will enable optimum performance between recommended overhaul intervals.

Physical Properties

Appearance ..... dark amber liquid
Density at 15°C ..... 910 kg/m³
Flash point ..... > 61°C

Application and Dosage

For best results, Octamar™ F 35 C should be injected into the fuel transfer line to the day tanks or settling tank via a chemical metering pump.

The normal dosage of Octamar™ F 35 C, for residual marine fuel, is 1:6,000 (1 litre for 6.0 tonnes of fuel). Alternative dosages may be recommended based on fuel quality or operational conditions. Innospec personnel are always available to assess your specific problems and advise a suitable product(s) and dosage program.

Packaging and Storage

Octamar™ F 35 C is supplied in 200-litre (53 gallon) non-returnable steel drums. Other pack sizes are available on request. Store Octamar™ F 35 C away from heat, sparks and open flame and at temperature above 0°C.

Product Benefits

- Improves combustion
- Maintains overall engine efficiency
- Improves fuel economy
- Maintains turbocharger and economizer cleanliness and efficiency
- Reduces piston fouling
- Reduces unburned carbon deposits in exhaust system and pollution of environment
- Significantly reduces particulate matter
- Less soot particulates on deck
- Enables optimum machinery performance between recommended overhaul intervals
- Substantially reduces the risk of economizer fires

- ISO 9001 & 14001 certified by DNV
- EU Origin

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Product Group 32 – Post-Combustion Additives

Octamar™ MP-4 LN

Product Description

Octamar™ MP-4 LN, ash inhibitor and combustion catalyst, is a highly concentrated organo-metallic additive for residual marine fuels.

Octamar™ MP-4 LN maintains exhaust valves, turbocharger and super-heater tubes free from ash and unburned carbon. Octamar™ MP-4 LN is soluble in all grades of residual fuel and is intended for use in diesel engines and boilers.

Octamar™ MP-4 LN prevents ash deposits by raising the melting point of the ash higher than the stiction temperature, which keeps the ash deposits from adhering to exhaust valves, turbochargers or boiler tube surfaces and increases the efficiency of heat transfer. This is particularly important with fuel that is high in ash (e.g. vanadium, sodium, nickel, aluminium, silica, calcium, potassium).

Octamar™ MP-4 LN also reduces unburned carbon, allowing less economizer cleaning and therefore savings in man-hours and downtime due to fouling.

An improved plant operation means reduced M&R costs, increased boiler efficiency and reduced fuel consumption.

Physical Properties

Appearance ..... dark red liquid
Density ..... 1030 kg/m³
Flash point (PMCC) ..... >144°F/61°C
Auto ignition temperature ..... >200°C

Application and Dosage

For best results, Octamar™ MP-4 LN should be injected into the fuel transfer line to the day tanks or settling tank via a chemical metering pump. The normal dosage of Octamar™ MP-4 LN for marine grade fuels is 1:3.000 (one liter to 3 tons of fuel); however, alternative dosages may be recommended when burning sludge, waste oils or heavily contaminated fuels. Innospec personnel are always available to assess your specific problems and advise a suitable product(s) and dosage program.

Product Benefits

- Significantly reduces or eliminates ash deposits
- Improves boiler and engine efficiency
- Reduces hot and cold end corrosion
- Improves combustion substantially reducing unburned carbon.
- Extends maintenance schedule
- Improves fuel economy
- ISO 9001 & 14001 certified by DNV
- EU Origin

- continued overleaf -

Product Group 30 – Pre-Combustion Additives

Octamar™ BT-8 PLUS LN x

Product Description

Octamar™ BT-8 PLUS LN x is an asphaltene dispersant-stabilizer uniquely combined with a combustion catalyst that keeps the fuel system clean and improves the combustion of fuel. The dispersant-stabilizer prevents fuel from stratification and the asphaltenes from agglomerating. This will reduce sludge formation in fuel tanks and helps to keep separators, filters, fuel heaters, viscometers and injector (burner) tips clean, resulting in less maintenance and downtime.

Completely homogenous fuel also helps reduce the separator workload and improves the fuel injection, atomization and combustion efficiency.

Asphaltenes and other fuel components with high C/H ratio are more easily burned due to the dual action of having asphaltenes well dispersed and addition of the combustion catalyst which lower energy level needed for complete carbon burnout.

Physical Properties

Appearance ..... Dark reddish-black clear liquid
Density/specific gravity ..... 990 kg/m^3
Flash point (PMCC) ..... > 144°F/61°C
Auto ignition temperature ..... >200°C

Application and Dosage

For best results, Octamar™ BT-8 PLUS LN x should be dosed directly to bunker or settling tanks prior to or during filling. Use of dosage equipment is optional. The normal dosage of Octamar™ BT-8 PLUS LN x, for residual marine fuel, is 1:10,000 (1 litre for 10 tonnes of fuel); though dosage rate can be lowered up to 1:20,000 depending on fuel quality and after consultation of Innospec Marine Technical Service. Innospec Marine personnel are always available to assess your specific problems and advise a suitable product(s) and dosage program. Special care need to be taken with strainers and filters during the initial dosage period.

Packaging and Storage

Octamar™ BT-8 PLUS LN x is supplied in 200-litre (53 gallon) non-returnable steel drums. Store away from heat, sparks and open flame.

Product Benefits

- Extensively proven by ship trials to reduce fuel sludge up to 70%
- Maintains HFO stability at on board storage temperature up to 12 months
- Increases tolerance and compatibility for blending of heavy and light fuel components
- Inhibits or strongly reduces storage tank sludge formation
- Effective in maintaining storage tank cleanliness
- Maintains performance of fuel handling system - separators, filters, viscometers and fuel lines
- Improves atomisation
- Improves fuel economy up to 3%
- Promotes complete combustion reducing carbon deposits throughout the exhaust system and to the environment
- Maintains turbocharger and economizer efficiency
- Reduces particulate matter up to 40%
- Substantially reduces the risk of economizer fires
- Less soot particulates on deck

- ISO 9001 & 14001 certified by DNV
- EU Origin

- continued overleaf -

ISO 8217 2017 FUEL STANDARD

MARINE RESIDUAL FUELS

Limit	Parameter	RMA 10	RMB 30	RMD 80	RME 180	RMG 180	RMG 380	RMG 500	RMG 700	RMK 380	RMK 500	RMK 700
Max.	Viscosity at 50°C (mm²/s)	10.00	30.00	80.00	180.0	180.0	380.0	500.0	700.0	380.0	500.0	700.0
Max.	Density at 15°C (kg/m³)	920.0	960.0	975.0	991.0	991.0				1010.0		
Max.	Micro Carbon Residue (% m/m)	2.50	10.00	14.00	15.00	18.00				20.00		
Max.	Aluminium + Silicon (mg/kg)	25	40		50	60						
Max.	Sodium (mg/kg)	50	100		50	100						
Max.	Ash (% m/m)	0.040	0.070			0.100				0.150		
Max.	Vanadium (mg/kg)	50	150			350				450		
Max.	CCAI	850	860			870						
Max.	Water (% V/V)	0.30	0.50									
Max.	Pour point (upper) in Summer (°C)	6	30									
Max.	Pour point (upper) in Winter (°C)	0	30									
Min.	Flash point (°C)	60.0										
Max.	Sulphur (% m/m)	To comply with statutory requirements as defined by purchaser										
Max.	Total Sediment, aged (% m/m)	0.10										
Max.	Acid Number (mgKOH/g)	2.5										
	Used lubricating oils (ULO): Calcium and Zinc; or Calcium and Phosphorus (mg/kg)	The fuel shall be free from ULO, and shall be considered to contain ULO when either one of the following conditions is met: Calcium > 30 and zinc > 15; or Calcium > 30 and phosphorus > 15.										
Max.	Hydrogen sulphide (mg/kg)	2.00										

MARINE DISTILLATE FUELS

Limit	Parameter	DMX	DMA	DFA	DMZ	DFZ	DMB	DFB
Max.	Viscosity at 40°C (mm²/s)	5.500	6.000		6.000		11.00	
Min.	Viscosity at 40°C (mm²/s)	1.400	2.000		3.000		2.000	
Max.	Micro Carbon Residue at 10% Residue (% m/m)	0.30	0.30		0.30		-	
Max.	Density at 15°C (kg/m³)	-	890.0		890.0		900.0	
Max.	Micro Carbon Residue (% m/m)	-	-		-		0.30	
Max.	Sulphur (% m/m)	1.00	1.00		1.00		1.50	
Max.	Water (% V/V)	-	-		-		0.30	
Max.	Total sediment by hot filtration (% m/m)	-	-		-		0.10	
Max.	Ash (% m/m)	0.010	0.010		0.010		0.010	
Min.	Flash point (°C)	43.0	60.0		60.0		60.0	
Max.	Pour point in Winter (°C)	-	-6		-6		0	
Max.	Pour point in Summer (°C)	-	0		0		6	
Max.	Cloud point in Winter (°C)	-16	Report		Report		-	
Max.	Cloud point in Summer (°C)	-16	-		-		-	
Max.	Cold filter plugging point in Winter (°C)	-	Report		Report		-	
Max.	Cold filter plugging point in Summer (°C)	-	-		-		-	
Min.	Calculated Cetane Index	45	40		40		35	
Max.	Acid Number (mgKOH/g)	0.5	0.5		0.5		0.5	
Max.	Oxidation Stability (g/m³)	25	25		25		25	
Max.	Fatty acid methyl ester (FAME)	-	-	7.0	-	7.0	-	7.0
Max.	Lubricity, corrected wear scar diameter (wsd 1.4 at 60°C) (um)	520	520		520		520	
Max.	Hydrogen sulphide (mg/kg)	2.00	2.00		2.00		2.00	
	Appearance	Clear & Bright					-	

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