



Fuel Performance Enhancement Process

Introduction:

Re-Synth International's (RSI) patented and proprietary technologies place your business ahead of the rest. Our implemented technology provides cost benefits derived from fuel efficiency while also decreasing your environmental footprint.

Fuels we work with:

RSI works with various oil-based fuels, biofuels and blends. We improve the efficiency of ULSD (Ultra Low Sulphur Diesel), D2, and Biodiesel blends. If a fuel or fuel blend is not included in the list, we work with our customer to satisfy their needs. We request a fuel analysis to determine if we can work with such fuel and emulsify it for our potential client.

Emissions and Maintenance Reduction

Our enhanced fuel is injected into the diesel engine combustion chamber in the form of emulsified fuel. Our data proves we enable a higher latent heat absorption due to the aqueous particles during the combustion. These in turn, lower the local temperature resulting in the reduction of Nitrogen Oxides (NOx) of up to 45%.

Lesser formation of soot and Particulate Matter (PM) indicates more efficient combustion. Results have shown that soot and PM are reduced. We achieve reductions in soot emission as high as 81% with W/D emulsion fuel. This translates to cleaner combustion chambers and exhaust pipes.

Emissions and Maintenance Reduction (cont.)

RSI emulsified fuels are not corrosive. Our proprietary technology encapsulates and binds small droplets of water into the fuel. Our product stability is above one month even though our product is designed for immediate use. There is no potential or imminent presence of "free water" in the fuel and therefore no change in lubricity.

How much money will I save?

RSI installs proprietary technology and shares the savings obtained, the client will only share the savings with RSI once the efficiency is confirmed by the change in consumption. You might ask how much would this savings represent per month based on your fuel type. Please refer to the following example based on \$2.00 per gallon for a client that has a daily fuel consumption of 1,000 gallons.

ULSD/Biodiesel Blends: Average of \$6,000/month*

* Savings range depends on the fuel, and the equipment.

**Maritime System, Which do you prefer?
Without System**



With System



www.resynthinternational.com


Our Corporate responsibility policy addresses publicly recognized social concerns as defined by the United Nations Sustainable Development Goals



Emulsions Capable Equipment Manufacturers



ReSynth Light Fuel Emulsion Chemical Characteristics

Physical and Chemical Descriptions	Result	Test Method (ISO)	Test Method (ASTM)	
Flash point (°C/°F)	69.0 / 156	ISO 2719	D93	
Specific Gravity	0.8877	ISO 3675	D1298	
Copper strip corrosion	1a	ISO 2160	D130	
Lubricity, HFRR @ 60°C	270	ISO 12156	D6079	

EMULSION CAPABLE BRANDS AND EQUIPMENT MODELS

Engine Manufacturer	Up to WiF %	Fuel Used	Models	Comments
Wärtsilä	30%	HFO	32	Models for Power Gen
		HFO	32TS	
		HFO	50	
		HFO	20	Models for Marine Engines that use Fuel Oil
		HFO	20DF	
		HFO	26	
		HFO	31	
		HFO	31DF	
		HFO	32	
		HFO	46F	Data obtained from WÄRTSILÄ website and product brochures
		HFO	46DF	Also mentioned in various papers on water/fuel emulsions in marine engines like;
		HFO	50DF	Holistic Solutions for Environmental Compliance January 27 2010

EMULSION CAPABLE BRANDS AND EQUIPMENT MODELS

Engine Manufacturer	Up to WiF %	Fuel Used	Models	Comments
Man	Tested up to 50%	HFO/M DO	L58/64	Data obtained from MAN Diesel Marine Engine IMO Tier II 2009 & Q008689-001 R Cardo Emulsion Paper May 23rd 2016,
		HFO	V51/60DF	Water-in-fuel emulsion as marine engine fuel, collaboration between Danish Ministry of the Environment and MAN Diesel & Turbo 2011
		HFO	L51/60DF	
		HFO/M DO	V48/60CR	
		HFO/M DO	L48/60CR	
		MDO	V32/44CR	
		MDO	L32/44CR	
		MDO	V32/40	
		MDO	L32/40	
		MDO	V28/33D	
		MDO	V28/33D STC	
		MDO	L27/38	
		MDO	L21/31	

EMULSION CAPABLE BRANDS AND EQUIPMENT MODELS

Engine Manufacturer	Up to WiF %	Fuel Used	Models	Comments	
Caterpillar	Tested up to 50%	Diesel	M20C	Engine used in Power Generation and Marine Propulsion	
		Diesel	M25C	Engine used in Power Generation and Marine Propulsion	
		Diesel	M25E	Engine used in Power Generation and Marine Propulsion	
		Diesel	M32C	Engine used in Power Generation and Marine Propulsion	
		Diesel	VM32C	Engine used in Power Generation and Marine Propulsion	
		Diesel	M32E	Engine used in Power Generation and Marine Propulsion	
		Diesel	M32DF	Power Generation	
		Diesel	M34DF	Marine Propulsion	
		Diesel	M43C	Engine used in Power Generation and Marine Propulsion	
		Diesel	VM43C	Engine used in Power Generation and Marine Propulsion	
		Diesel	M46DF	Engine used in Power Generation and Marine Propulsion	
		Diesel	VM46DF	Engine used in Power Generation and Marine Propulsion	
					Data Obtained from Marine Power Products Guide MAK/Cat 2014

EMULSION CAPABLE BRANDS AND EQUIPMENT MODELS

Engine Manufacturer	Up to WiF %	Fuel Used	Models	Comments
Mitsubishi	20%	MDO#2/ HFO	S6U	Data Obtained for medium speed engines from Mitsubishi Turbocharger and Engine Marine Product Guide
			S6U2	These motors are used for both; propulsion and generation.
			S8U	Use of emulsion has been documented in Journal of Mechanical Engineering Research and Developments (JMERD) (August 29 2019)
			S12U	
			S16U	
		HFO	UEC85	Data obtained from UE Diesel Engines (Mitsubishi) Low Speed engines
			UEC75	The only data found was 20% W/F emulsion on MITSUI 618OGFCA 15,000HP engine
			UEC68	
			UEC60	
			UEC52	
			UEC45	
			UEC43	
			UEC37	
UEC33				

EMULSION CAPABLE BRANDS AND EQUIPMENT MODELS

Engine Manufacturer	Up to WiF %	Fuel Used	Models	Comments
Rolls Royce Bergen	20%-30%	MDO/HFO	C25:33LA2	Data obtained from Bergen-Rolls Royce engine catalogs.
			B32:40VA2	Rolls Royce liquid fuel engines run with: High viscosity HFO, Emulsified fuels, Bio-Oils,
			B33:45LA	Crude Oils, Heavy Fuel Oils, and Diesel Oil.
			B33:45VA	(Medium and Low Speed engines)
Hyundai	No Data	MDO/HFO	8K90MC-C	Hyundai-MAN B&W
			H17/21VP	Designed by Himsen (Hyundai)
			H21/32P	
			H25/33P	Data obtained from Hyundai website.
			H32/40P	Hyundai is working in collaboration with MAN and Wärtsilä for new engine developments.
			H32/40VP	
			H46/60P	
			H46/60VP	

EMULSION CAPABLE BRANDS AND EQUIPMENT MODELS

Engine Manufacturer	Up to WiF %	Fuel Used	Models	Comments
MTU (by Rolls Royce)	20%-30%	MDO/HFO	4000M05	MTU is advertised as a Rolls Royce solution and is focused on marine solutions. The information is obtained by combining Rolls Royce data and MTU solution guide. They also have high speed engines which are smaller and also accept W/F Emulsions
			4000M23	
			4000M24	
			4000M25	
			4000M33	
			4000M34	
			4000M35	
			4000M43	
			4000M53	
			4000M53B	
			4000M54	
			4000M55R N	
			4000M55-N	
			4000M63	
			4000M65	
			4000M65-N	
			4000M73	
			4000M83	
			4000M93	
			16V8000	
20V8000				
16V1163				
20V1163				