CERILON

Ultra-low Sulphur Diesel

Cerilon Gas-to-liquid Ultra-low Sulphur Diesel (Cerilon GTL ULSD) is a unique, premium quality, low carbon footprint, synthetic middle distillate produced in the USA, from natural gas. Globally, these will be the first and only GTL diesel manufactured from a production facility deploying Carbon Capture and Sequestration (CCS) on commercial scale. Cerilon GTL ULSD, a fully fungible drop-in alternative for crude-oil based diesel, offers a cleaner engine burn with reduced emission levels, and further positively contributes to the decarbonising of the transportation sector.

PRODUCT CHARACTERISTICS

- Highly Paraffinic and Essentially Aromatics Free
- Clear, Water-White Appearance
- Non-Toxic to Aquatic Organisms
- Readily Biodegradable
- Virtually Odourless
- Nominally No Sulphur
- Very High Cetane Number
- Low Carbon Intensity Rating

TYPICAL PROPERTIES (INDICATIVE)

PROPERTY	ASTM TEST METHOD	UNITS	VALUE
Aromatics	D5186	wt%	1 Max
Cetane Number	D613	-	70 Min
Cloud Point (Winter)	D2500	°C (°F)	-14.5 (6) Max
Density @ 15°C	D4052	kg/m^3	760 - 775
Gravity	D4052	°API	51 - 54
Pour Point (Winter)	D97	°C (°F)	-26 (-15) Max
Sulphur Content	D2622	ppm	5 Max

These properties are typical of anticipated production. Whilst future production will conform to Cerilon's specifications, variations in these properties may occur.

Cerilon GTL ULSD conforms to ASTM D975, the Cenex, Magellan and NuStar (North Line) Pipeline specification requirements, and others.

APPLICATIONS

- A unique refinery diesel pool component, ideally suited to unlock blending constraints
- A premium quality, finished product automotive diesel fuel blending component
- A neat diesel fuel for use in sensitive (e.g. marine) and/or challenging (e.g. underground mining) environments

MAIN BENEFITS POSSIBLE

- Improvement in refinery profitability given the blending pool's ability to accommodate additional volumes of lower quality components
- Enables the formulation of lower carbon footprint fuels
- No vehicle or infrastructure investment required to use as drop-in alternative
- Substantial reduction in exhaust emissions, including particulate matter
- Reduced particulate formation translates into additional fuel savings given elongation of Diesel Particulate Filter (DPF) regeneration cycle
- Potential lowering in engine combustion noise
- No negative impact on exhaust after-treatment devices
- Facilitates higher levels of bio-diesel blending without resultant increase in NO x emissions
- Lower handling and use related health risks compared to conventional diesel

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Base Oils

Cerilon Gas-to-liquid Base Oils (Cerilon GTL Base Oils) are unique, premium quality, low carbon footprint, synthetic fluids produced in the USA, from natural gas. Majority of the viscosity grades within the product range are classified as Group III+ base oils. Globally, these will be the first and only GTL base oils manufactured from a production facility deploying Carbon Capture and Sequestration (CCS) on commercial scale. Cerilon GTL Base Oils have a well-to-wheel carbon footprint exceeding best-in-class performance and offer quality consistency superior to most competitive products.

PRODUCT CHARACTERISTICS

- Highly Saturated with Good Oxidation Stability
- Virtually Odourless
- Top-Tier Volatility and Cold Flow Properties
- Essentially Contaminant Free
- Clear, Water-White Appearance
- Elevated Iso-paraffinicity Yielding Superior Viscosity Indices
- Low Carbon Intensity Rating

TYPICAL PROPERTIES (INDICATIVE)

PROPERTY	ASTM TEST METHOD	UNITS	VISCOSITY GRADES			
			3 cSt	4 cSt	6 cSt	8 cSt
CCS Viscosity @ -30°C	D5293	cP	-	1 004	3 603	5 189
Flash Point	D92	°C (°F)	185 (365)	225 (437)	235 (455)	241 (466)
NOACK Volatility	D5800-B	wt%	42.4	12.3	5.7	1.7
Pour Point	D97	°C (°F)	-33 (-27)	-18 (0)	-15 (5)	-15 (5)
Sulphur Content	D2622	ppm	<5	<5	<5	<5
Viscosity @ 40°C	D445	mm^2/s	9.58	17.37	30.75	43.96
Viscosity @ 100°C	D445	mm^2/s	2.68	4.02	6.00	7.69
Viscosity Index	D2270	-	119	133	145	145

These properties are typical of anticipated production. Whilst future production will conform to Cerilon's specifications, variations in these properties may occur.

APPLICATIONS

- 3 cSt : Top-tier transmission fluids and other automotive gear oils; niche automotive engine oils; premium process, transformer and white oils; specialty fluids
- 4 and 6 cSt : High performance, low viscosity engine oils; compressor, hydraulic, gear and turbine oils
- 8 cSt : Select industrial, marine engine and process oils

MAIN BENEFITS POSSIBLE

- For North American customers, local USA production ensures direct-from-facility deliveries and eliminates risks associated with over-stretched international supply chains
- Enables the formulation of ultra-fuel economy, low carbon footprint lubricants not accessible by regular Group III base oils
- Facilitates the elimination of expensive synthetic-derived base stocks, such as poly alpha olefins, from formulations
- Light viscosity grade is potentially readily biodegradable and suitable for environmentally sensitive applications
- Lower handling and use related health risks compared to conventional base oil

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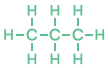
Naphtha

Cerilon Gas-to-liquid Naphtha (Cerilon GTL Naptha) is a premium quality, highly paraffinic, low carbon footprint, synthetic light distillate produced in the USA, from natural gas. Globally, these will be the first and only GTL naphtha manufactured from a production facility deploying Carbon Capture and Sequestration (CCS) on commercial scale. Cerilon GTL Naphtha, similar in carbon distribution than the more familiar US natural gasoline stream, offers quality consistency superior to that of competitive products.

PRODUCT CHARACTERISTICS



Highly Paraffinic and Essentially Aromatics Free

Nominally No Sulphur

Insignificant Levels of Metallic Contaminants

Virtually Odourless

Low Carbon Intensity Rating

TYPICAL PROPERTIES (INDICATIVE)

PROPERTY		ASTM TEST METHOD	UNITS	VALUE
Density @ 15°C		D4052	kg/m^3	680
Gravity		D287	°API	77
P	Paraffins	D6729	wt%	>95
O	Olefins			<1
N	Naphthenes			<3
A	Aromatics			<1
Reid Vapour Pressure @ 37.8°C		D323	kPa (psi)	103 (15) Max
Viscosity @ 7.5°C		D7042	cSt	1 Max
Wiehe Compatibility Analysis		-	-	Pass

These properties are typical of anticipated production. Whilst future production will conform to Cerilon's specifications, variations in these properties may occur. Cerilon GTL Naphtha conforms to Condensate Blend (CRW) Pool Quality specification requirements, and others.

APPLICATIONS

- A premium quality, alternative feedstock for light olefin production via steam cracking
- An essentially contaminant free diluent for bitumen and/or heavy oils
- A low octane, decarbonising aiding, finished product gasoline blending component
- A refinery gasoline reformer feedstock

MAIN BENEFITS POSSIBLE

- Superior light olefin yields, reduced coking rates and subsequent extended run durations, as well as lower Green House Gas (GHG) emissions intensity compared to alternative steam cracker feedstocks
- Improvement in stability of blending operations as a result of diluent quality consistency
- Enables the formulation of lower carbon footprint fuels
- Lower handling and use related health risks compared to conventional naphtha