Reference Fuels

Overview

Chevron Phillips has manufactured a range of reference fuels to support refinery analytical testing protocols for over 50 years. Chevron Phillips' ISO 9001 and OSHA VPP certified plant manufactures and certifies reference fuels to required ASTM standards. Chevron Phillips' experience and commitment to safety provides you the confidence in the critical quality needed for reference fuels.

Octane Reference Fuels

Chevron Phillips Chemical produces high purity primary reference fuels (PRF) required to measure the octane number of gasoline fuels for engine knocking. All fuels meet the specifications outlined in ASTM D-2699 and D-2700 using Cooperative Fuel Research engines. Chevron Phillips Chemical supplies PRF Isooctane (2,2,4 trimethylpentane), which has an octane rating of 100, and PRF n-Heptane, which has an assigned octane rating of 0 as primary reference fuels for calibration checks. Chevron Phillips Chemical offers certified blends of PRF Isooctane and PRF n-Heptane equivalent to octane ratings between 80-98 in increments of two. In addition, Chevron Phillips Chemical offers Toluene Reference Fuel grade for fuel rating needs as well as certified blends of Reference Fuel grade Toluene, PRF Isooctane, and PRF n-Heptane as referenced in ASTM D-2699 and ASTM D-2700 with octane number values of 89.3, 93.4, 96.9, and 99.8 for secondary calibration against the primary reference fuels. A blend of PRF Isooctane + 6.0 mls/Gal Tetraethyl lead (TEL) is also available for octane testing needs above 100 octane.

Table 1 provides some of the product specifications for each fuel. For complete specifications, please view the appropriate Reference Fuels Technical Data Sheet (TDS) on our website.

Cetane Reference Fuels

Chevron Phillips Chemical produces reference fuels of known cetane numbers for measuring the ignition quality of diesel blends as specified in ASTM D-613. Chevron Phillips Chemical supplies secondary reference fuels Diesel SEC reference fuel T (high cetane) and Diesel SEC reference fuel U (low cetane), which are calibrated against primary reference fuels n-cetane and heptamethylnonane and are certified by the Diesel National Exchange Group through ASTM Subcommittee D02.01. These fuels, following the ASTM D-613 protocol, are then used to obtain the interval between the start of injection and ignition for diesel fuels. Chevron Phillips Chemical also produces Diesel Cetane Check Fuel – High and Diesel Cetane Check Fuel – Low for use in checking engine conditions at one point only. These fuels are also certified by the Diesel National Exchange Group through ASTM Subcommittee D02.01.

Table 1 provides some of the product specifications for each fuel. For complete specifications, please view the appropriate Reference Fuels Technical Data Sheet (TDS) on our website.

Other Reference Fuels

- ASTM D-2887 Reference Gas Oil #1 – ASTM D-2 D-IV study group on boiling range distribution by gas chromatography
- Sulfur Calibration Standard – ASTM D-2622, D-4045, and D-4294 for determining sulfur content in petroleum products
- n-Pentane Pure – ASTM D-5191 standard method for vapor pressure of petroleum products
- Reference Material A and B – ASTM D-471 standards for the evaluation of vulcanized rubbers response to liquid exposure
- Hydrocarbon Fluid Type I and III – Rubber swelling test fuels per MIL-S-3136B and TT-S-735 specs
- Jet RF - AMS2629 compatibility and interaction with aircraft materials standard
- High Octane E10 – ASTM D-8076 minimum 100RON rated fuel for higher compression ratio engines

For complete specifications, please view the appropriate Reference Fuels Technical Data Sheet (TDS) on our website.

Chevron Phillips Chemical Company LP
Specialty Chemicals Division
10001 Six Pines Drive
The Woodlands, TX 77380
www.cpchem.com/specialtychemicals

U.S., Canada & Latin America: 1-800-858-4327
Europe, Africa & Middle East: +32 (0) 2 689 12 11
Asia Pacific: +65-6517 3100
sc@cpchem.com

Safety and Handling

Gasoline and diesel fuels are extremely volatile and flammable liquids. These products have the potential to cause fires if exposed to an ignitable source. Electrostatic charge can accumulate and create a hazardous condition when handling these materials. Due to their inherent characteristics, there are specific requirements for handling, storage, transportation, labeling and disposal. Gasoline and diesel fuels are also described as being hazardous to human health and the environment. Therefore use only in well vented areas, wear proper protective equipment, and care should be taken to avoid releases to sewage and drainage systems and water bodies.

Gasoline and diesel fuels are compatible and should be stored in carbon or stainless steel, aluminum, fluorinated polyethylene, fluorinated polypropylene, and most fiberglasses. Gaskets should be Teflon® or Viton® fluoroelastomer; diesels are not compatible with nitrile elastomers, EPDM, butyl, or silicone materials. Both fuels should be kept away from oxygen and strong oxidizing agents.

Gasoline and diesel are not appreciably soluble in water. Neither fuel should be allowed to enter drains, water courses or the soil. Spillage collected with non-combustible absorbent material such as sand should be placed in containers using spark resistant tools for disposal according to local/national regulations.

Please reference the Safety Data Sheet for additional handling and safety recommendations. Safety Data Sheets are available upon request and on our website: www.cpchem.com/specialtychemicals

Table 1 – Product Specifications:

Octane Reference Fuels:

Test	Units	Method	Isooctane	N-Heptane	Toluene	Octane 80	TSF 93.4	Isooctane + TEL
Isooctane	LV%	GC	>99.75	<.10		79.9-80.1		>99.75
Lead	g/gal	ICP/OES	<.002	<.002		<.002		5.95-6.05
N-Heptane	LV%	GC	<.10	>99.78		19.7-20.3	25.7-26.3	<.10
Toluene	LV%	GC			>99.5		73.7-74.3	
Water	ppm	D-6304			<200			

Cetane Reference Fuels*:

Test	Units	Method	Diesel T	Diesel U	High Check	Low Check
Cetane		D-613	73.61	20.08	51.39	40.74
Sulfur	ppm	D-2622	10.63	70.2	5.99	8.65
Viscosity 40C	cSt	D-445	3.247	1.898	2.40	2.32
Aromatics	LV%	D-1319	6.9	44.4	19.50	27.92
IBP	FAH	D-86	415.0	348.8	354.0	357.9
Distillation 90%	FAH	D-86	676.6	546.8	596.1	579.5

* Results from ASTM Subcommite D02.01 calibration testing performed by the Diesel NEG Group for lots: T-32, U-32, 17CPCFH01 (High Check), and 17CPCFL01 (Low Check)

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Europe, Africa & Middle East: +32 (0) 2 689 12 11
Asia Pacific: +65-6517 3100
sc@cpchem.com