



Jet Fuel



Gasoline



Diesel



Lubricants



Marine Fuel

Lab Solutions for
Measuring Physical
Properties of
Oil & Gas Products

Company Overview

PAC is a leading global manufacturer of advanced analytical instruments for laboratories in the Hydrocarbon Processing Industry.

With a product portfolio of over 200 testing instruments, PAC serves its customers with innovative technologies that are easy to use, comply to regulations, have an unmatched quality with a worldwide support.

We're an industry leader in standards development, and we work tirelessly to establish benchmark procedures in close cooperation with various standards organizations throughout the world like: ASTM, CEN, DIN, GPA, IP, ISO, and UOP. PAC also complies with ISO 9001-2015 standards.

PAC has combined the world's most respected and long-established brands of analytical and testing equipment into a single engineering design, manufacturing, marketing and service organization. Each of our brands have long histories of developing best-in-class analytical instrumentation for lab and process applications.

PAC is a unit of Roper Technologies, Inc., a diversified technology company and a constituent of S&P 500, Fortune 1000, and Russell 1000 indices.

Best In Class Support








Our individualized instrument service programs help our customers ensure maximum quality and repeatability, while complying with standards and regulatory requirements.

In addition to service programs, we also offer preventative maintenance, calibration, and relocation services.

Our Service Repair Centers, located around the world, are ISO-9001 accredited. All work is performed by skilled certified service technicians.

PAC offers a wide selection of training and educational programs to support our customers throughout the range of industries that our instruments serve. Our training programs may take place in one of our PAC facilities worldwide or right at the customer's facility.



	Density	Sulfur	Existent Gum	Benzene	Oxygenates	Vapor Pressure	Distillation	
ASTM D4814	ASTM D4052	ASTM D5453	ASTM D381	ASTM D6277	ASTM D5845	ASTM D5191 ASTM D6378	ASTM D86	ASTM D7345
EN 228	EN ISO 12185 JIS K 2249-1	SH/T 0689 KS M 2027 JIS K 2541-6	GOST 1567 EN ISO 6246-98 GB/T 8019 KSM ISO 6246 JIS K 2261 IS 1448 P:29 SASO-151w	EN 238 ASTM D6277	GOST R 52256 GSO-ASTM-D5845	EN 13016-1 GOST R EN ISO 13016 GB/T 8017 SH/T 0794 KS M ISO 3007 JIS K 2258-1 JIS K 2258-2 IS 1448 P:39 IRAM-IAP A 6504	GOST R 2177 EN ISO 3405 GB/T 6536 KS M ISO 3405 JIS K 2254	IP 596
PAC INSTRUMENTS	 VIDA	 ElemeNtS	 HGT 315/317	 OptiFuel	 HVP 972	 OptiDist	 PMD 110	



Leading fuel specifications like EURO 6 and Tier 3 have set new vehicle emission standards and lowered the sulfur content of gasoline to a maximum of 10 ppm. This is a prerequisite for the use of exhaust after-treatment technologies that drastically reduce the NOx and particle matter (PM) emissions from passenger cars, light-duty trucks, medium-duty and some heavy-duty vehicles.

Sources: EPA Gasoline Standards & "A technical summary of Euro 6/VI vehicle emission standards" ICCT 2016

BLENDSTOCKS FOR OXYGENATE BLENDING

(BOB, RBOB, CARBOB, etc.) are supplemented with additives, such as ethanol or ethers, throughout the supply chain to comply with local or international regulations and seasonal requirements. Testing is needed after blending to ensure that the optimal amount of additive was blended to the finished gasoline complies with the desired specification and other economic, legal, and technical considerations.

Gasoline Demand Continues to Grow

The total vehicle stock is estimated to grow by around 1.1 billion between 2017 and 2040 to reach 2.4 billion vehicles by 2040.

Source: OPEC

Passenger cars are estimated to grow by around 877 million



Commercial stock is forecast to more than double to 462 million



	Sulfur	Distillation		Flash Point		Density
ASTM D1655	ASTM D5453	ASTM D86	ASTM D7345	ASTM D56	ASTM D3828	ASTM D4052
DEFSTAN 91-91		IP 123	ASTM D7345	ASTM D56	IP 170 IP 523	IP 365
OTHER		GOST 2177				
PAC INSTRUMENTS						
	ElementS	OptiDist	PMD 110	OptiFlash Tag	OptiFlash Abel	VIDA
						
					OptiFlash Small Scale	

There's greater importance of safety monitoring due to more polar flights and ETOPS regulations



Jet fuel demand will significantly increase due to longer inter-continental travel

Air passengers will nearly double to 7.8 billion in 2036*
*IATA Forecast


Freezing Point		Viscosity		Thermal Oxidation Stability	Existent Gum
ASTM D7153 ASTM D2386	ASTM D5972 ASTM D2386	ASTM D7945 ASTM D445	ASTM D445	ASTM D3241	ASTM D381
IP 529 IP 16	IP 435 IP 16	IP 71	IP 71	IP 323	IP 540
ISO 3013 JIS K2276	GOST 52332 GB 6537			ISO 6249	
					
OptiFZP	JFA-70Xi	JFA-70Xi	HVU 482	JFTOT IV	HGT 915 & 917
					
	PSA-70Xi FPA-70Xi FCA-70Xi			OptiReader (D3241 Annex 4)	
					
				Intelligent Heater Tubes	

Global Aviation Fuel Consumption is on the Rise

As per the International Civil Aviation Organization (ICAO), 3.97 billion passengers flew on scheduled flights around the world in 2017; which represents a growth of 8.8% YoY, according to IATA.

Due to the sharp increase in economic growth and disposable incomes in emerging countries demand for air travel is expected to double in the next two decades and grow almost by 4% each year. China, the United States, India, Indonesia, and Turkey are expected to be the fastest-growing markets in terms of annual additional passengers by 2036. Asia-Pacific has emerged as one of the largest aviation fuel markets in the recent years.

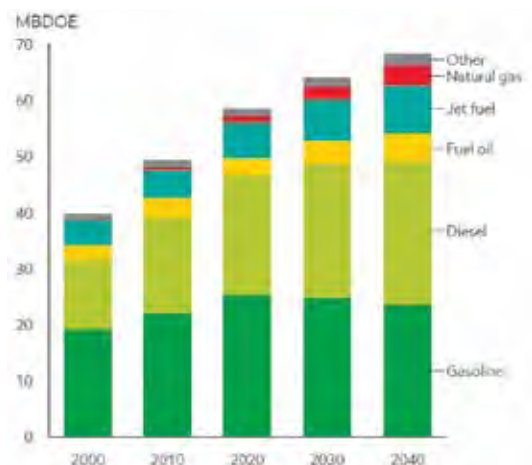
	Cetane Number	Flash Point	Distillation	Kinematic Viscosity	Sulfur	Pour Point
ASTM D975	ASTM D613 ASTM D7668	ASTM D93 ASTM D3828	ASTM D86 ASTM D7345 ASTM D2887	ASTM D445	ASTM D5453	
EN 590	EN 16715 EN 5165 IP 615	EN 2719	EN 3405	EN 3104	EN 20846 EN 20847 EN 20884	
ASTM D396		ASTM D93 ASTM D3828	ASTM D86 ASTM D7345	ASTM D445	ASTM D5453 ASTM D2622	ASTM D97 ASTM D5950 ASTM D5949 ASTM D7346
ASTM D7467	ASTM D613 ASTM D7668	ASTM D93 ASTM D3828	ASTM D86 ASTM D7345	ASTM D445	ASTM D5453 ASTM D2622 ASTM D129 ASTM D7039	
ASTM D2880		ASTM D93 ASTM D3828	ASTM D86 ASTM D7345	ASTM D445		ASTM D97 ASTM D5950 ASTM D5949 ASTM D7346
OTHER	GB 19147	GB/T 261	GB/T 6536	GB 19147		
PAC INSTRUMENTS						
	CID 510	OptiFlash Small Scale	OptiDist	HVM 472	ElemenTS	OptiCPP
						
		OptiFlash Pensky Martens	PMD 110	HVU 481		OptiMPP
						
			DFA 70Xi		CPA 70Xi PPA 70 Xi PCA 70X	
						
					DFA 70Xi	

Cloud Point	Cold Filter Plugging Point	Carbon Residue	Density	FAME	Red Dye
ASTM D2500 ASTM D5771 ASTM D7689 ASTM D5773	ASTM D6371	ASTM D524			ASTM D6258
IP 444 EN 23015, EN 23016 EN 590	EN 116 EN 16329	EN 10370	EN 3675 EN 12185		
		ASTM D524	ASTM D1298 ASTM D4052	ASTM D7371	
ASTM 2500 ASTM D5771 ASTM D7689 ASTM D5773	ASTM D6371	ASTM D524		ASTM D7371	
		ASTM D524	ASTM D1298 ASTM D4052		
	SH/T 0248	JIS K2270 GB/T 17144	SH/0604		
					
OptiCPP	OptiFPP	MCRT	VIDA	OptiFuel	DT 100



Leading fuel specifications like EURO 6 and Tier 3 have set new vehicle emission standards and lowered the sulfur content of diesel to a maximum of 10 ppm. This is a prerequisite for the use of exhaust after-treatment technologies that drastically reduce the NOx and particle matter (PM) emissions from passenger cars, light-duty trucks, medium-duty and some heavy-duty vehicles.

Sources: EPA Gasoline Standards and "A technical summary of Euro 6/VI vehicle emission standards" ICCT 2016









Diesel demand will grow 30% to meet trucking and marine needs.
Source: ExxonMobil Outlook for Energy report

	Cloud Point	Pour Point	Viscosity		Sulfur	Carbon Residue
ASTM	D2500	D97 D5950 D5949 D7346	D445 D446	D2270	D4952 D5453 D6667	D189 D524
ISO	3015	3016	3014	2909	20846	6615
IP		15	71	226	336	13
DIN		3016	51:550	2907	38409	51:551
GB/T	6989					
PAC INSTRUMENTS						
	OptiCPP	OptiCPP	HVU 481		ElementS	MCRT 160
						
	OptiMPP	OptiMPP	HVM 472			
						
	CPA-70Xi, PSA-70Xi PCA 70Xi, FCA-70Xi DFA 70Xi	PSA-70Xi, PCA 70Xi PFA-70Xi, PPA-70Xi DFA 70Xi				

INDUSTRY TRENDS DRIVING GROWTH

- Hybrid vehicles with internal combustion engines require synthetic engine oils
- New auto models favor synthetic oils for longer drain intervals
- High-performance biosynthetic oils production
- Co-branded oils growing worldwide between auto OEMs, heavy-duty equipment OEMs & industrial machinery producers
- Trend toward more distributor consolidation
- BRIC countries growing initiatives for local production

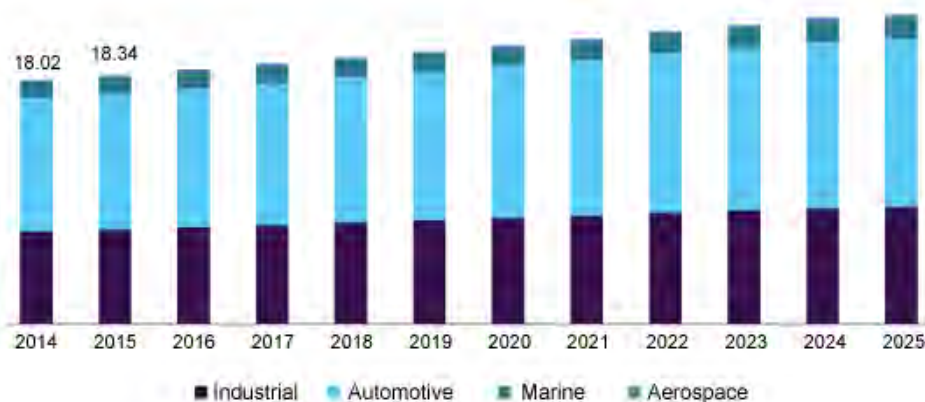
Density / API Gravity	Flash Point			NOACK	Distillation
D4052	D56 D1310	D92	D93	D6375	D86
		2592	2719	CEC 40-L-93	3405
		36	34		123
		51:376	51:758		
					
VIDA	OptiFlash Tag	OptiFlash COC	OptiFlash Pensky Martens	NCK2 5G	OptiDist

Market Growth

- The global lubricants market is projected to grow at an annual rate of 2.5 percent between 2014 and 2019 and be worth \$162.3 billion by 2019.*
- The market size was valued at \$118.89 billion in 2016.
- Constant innovation in the automotive industry, such as introduction of innovative rubber products that reduce detrimental impact of waste landfills on the environment, is a key trend expected to propel demand in upcoming years.
- With ever stringent low sulfur regulations, lubricant usage has become critically important.

* Source: Markets & Markets Report

U.S. lubricants market, by application, 2014 - 2025 (USD Billion)



Marine Fuel Solutions









	Kinematic Viscosity	Density	Cetane Index	CCAI	Sulfur
ISO 8217:2017	ISO 3104	ISO 12185	ISO 4264		Correlated to ISO 8754, ISO 14596, ASTM D4294
PAC INSTRUMENTS	 HVM 472	 VIDA	 OptiDist	 HVM 472 together with VIDA	 ElemenTS
	 DFA-70Xi		 PMD	 OptiFuel	
			 OptiFuel	Our instruments can be customized to your specific needs. Due to continuing product development, specifications are subject to change at any time without notice.	

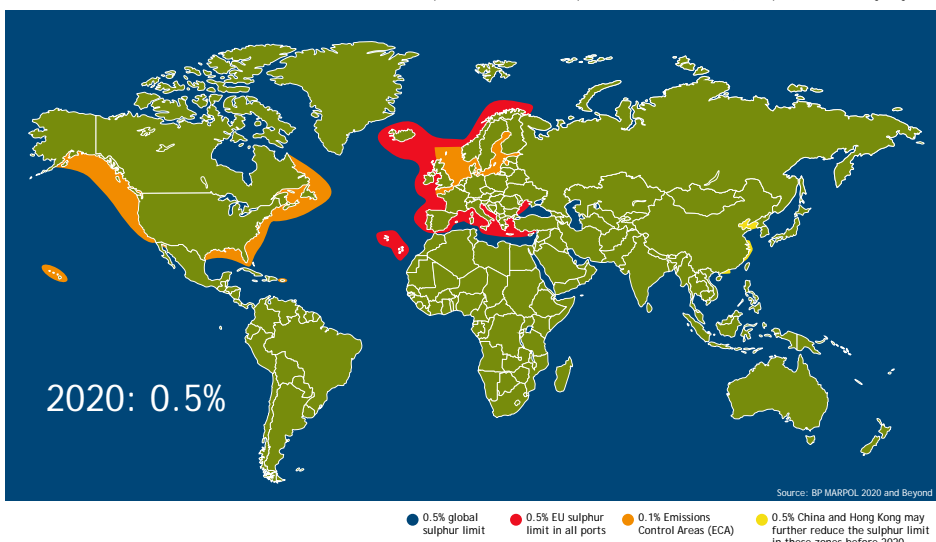
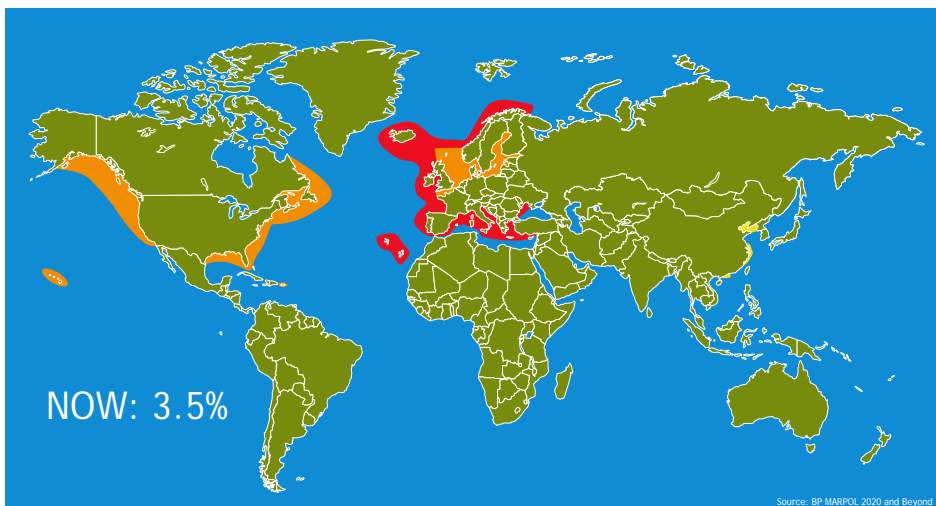
Our Marine Fuel Solutions apply to:

- Distillate marine fuel (ISO-F-DMX, DMA, DFA, DMZ, DFZ, DMB, DFB)
- Residual marine fuel (ISO-F-RMA, RMB, RMD, RME, RMG, RMK)

Regulations Affecting Marine Fuels

- ISO 4259: interpretation of test results
- CIMAC WG7 guideline
- ISO 8216: categories of marine fuel
- SOLAS Convention, MARPOL Annex VI
- ISO 8217: specifications (recipient & supplier)
- ISO 8217:2017:
 - Additional requirements have been included for distillate fuels to protect against cold operability issues. Cloud Point and Cold Filter Plugging Point.
 - Introduction of Distillate FAME grades. Fuel oil availability will improve in some ports.
 - Compared to ISO 8217:2005, 2017 carries over the stringent limits than those found in the 2010/12 edition.

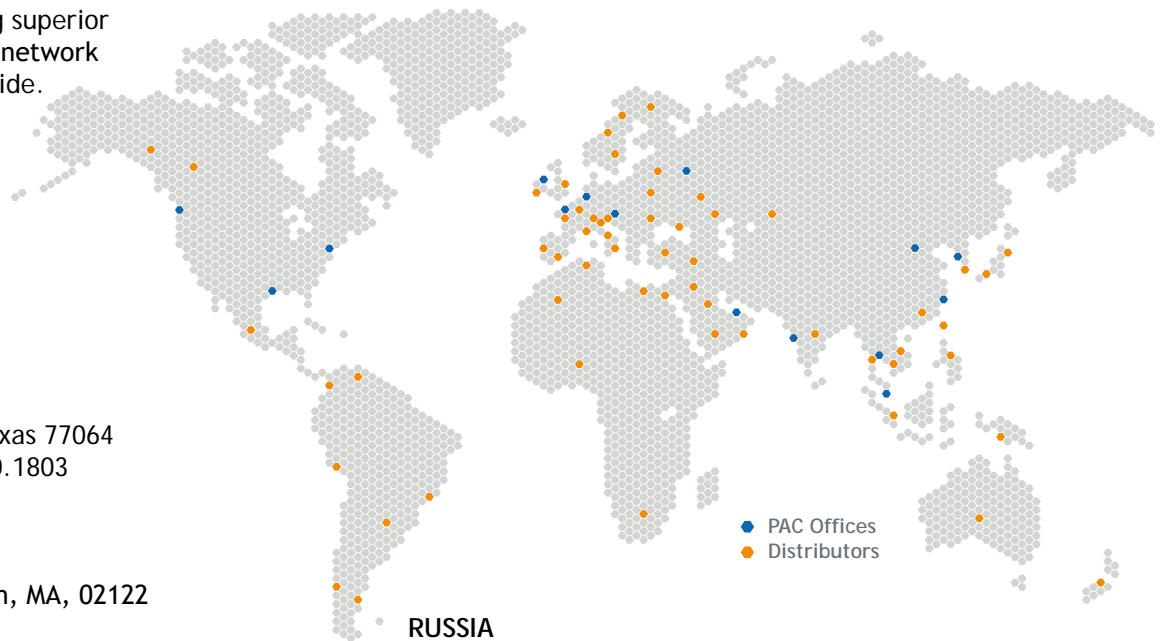
Flash Point	FAME	Carbon Residue	Cloud Point	Cold Filter Plugging Point	Pour Point
ISO 2719	ASTM D7963 IP 579	ISO 10370	ISO 3015	ISO 309 IP 612	ISO 3016
					
OptiFlash Pensky Martens	OptiFuel	MCRT 160	OptiCPP	OptiFPP	OptiCPP
					
			DFA-70Xi		DFA-70Xi



MARPOL

is the main international convention aimed at the prevention of pollution from ships caused by operational or accidental causes. Under the International Marine Organization's amendment the global cap on sulphur content for general shipping will be reduced from 3.50%wt to 0.50%wt starting on January 1st 2020.

We are committed to delivering superior service with sales offices and a network of over 140 distributors worldwide.



U.S.A. (Headquarters)

8824 Fallbrook Dr., Houston, Texas 77064
+1.800.444.TEST or +1.281.940.1803
sales.usa@pacpl.com
service.usa@pacpl.com

50 Redfield Street, #204, Boston, MA, 02122
+1.781-393-6500
sales@cambridgeviscosity.com

CANADA

11168 Hammersmith Gate, Richmond, BC V7A 5H8
+1.604.241.9568
customer_service@phase-technology.com

CHINA

Part 341, 3rd Floor, Building No. 1 Plot Section No. 526
East Fute 3rd Road, Pudong New District, Shanghai 200131
+86.21.2076.5611

Room 1003, Sunjoy Mansion, No. 6 RiTan Rd.
Chao Yang District, Beijing 100020
+86.10.6507.2236 ext. 370 to 375
sales.china@pacpl.com
service.china@pacpl.com

FRANCE

BP 70285, Verson, 14653, Carpiquet Cedex
+33.231.264.300
sales.france@pacpl.com
service.france@pacpl.com

GERMANY

Badstrasse 3-5, PO Box 1241, D-97912, Lauda-Königshofen
+49.9343.6400
sales.germany@pacpl.com
service.germany@pacpl.com

INDIA

508, Powai Plaza, Hiranandani Gardens, Central Ave.
Powai, Mumbai, 400076
+91 22 2570 3636
sales.southasia@pacpl.com
service.southasia@pacpl.com

● PAC Offices
● Distributors

RUSSIA

+7.495.107.0.109
+7.916.237.1989
sales.russia@pacpl.com
service.russia@pacpl.com

SINGAPORE

10 Eunos Road 8 #12-06, Singapore Post Centre, 408600
+65.6412.0890
sales.singapore@pacpl.com
service.singapore@pacpl.com

SOUTH KOREA

901-943, Gloyoffice, Daseung Plaza Building,
125 Gilju-ro, Wonmi-gu, Bucheon-si, 14542 Gyeonggi-do
+82.2785.3900
sales.southkorea@pacpl.com
service.southkorea@pacpl.com

THAILAND

Bhiraj Tower at EmQuartier, No. 3034, Level 30,
689 Sukhumvit Rd, Klongton Nuea, Vadhana, Bangkok, 10110
+66 2 017 2802
sales.thailand@pacpl.com
service.thailand@pacpl.com

THE NETHERLANDS

Innsbruckweg 35, 3047 AG Rotterdam
+31.10.462.4811
sales.netherlands@pacpl.com
service.netherlands@pacpl.com

UNITED KINGDOM

8 Meadowbank Road, Carrickfergus Co. Antrim
BT38 8YF, Belfast, Ireland
+44.0.28.93.32.89.22
sales@advancedsensors.co.uk

