# Petroleum Quality Information System

1999

**Defense Energy Support Center**
**Product Technology and**
**Standardization Division**
**DESC-BP**

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IN REPLY
REFER TO

December 4, 2000

**PETROLEUM QUALITY INFORMATION SYSTEM FUELS DATA (1999)**

This is the Defense Energy Support Center's (DESC's) fourth installment of what has now been recognized by the petroleum industry as a very beneficial annual report used to monitor fuel quality trends around the globe. Those interested include the users (Government/commercial), manufacturers, and general interest parties (i.e., OEMs, fuel handling manufacturers, etc.). As part of our goal to offer quality statistical information for all products purchased by DESC and supplied to our customers, the Petroleum Quality Information System (PQIS) has been expanded to include quality data for all products purchased by the Bulk Commodity Business Unit. This report is the first to include statistical summaries of information for Fuel Naval Distillate (F76) and gasoline purchased in 1999. Since we are committed to continue to improve what PQIS has to offer, a contractor prepared the 1999 publication, in order to provide the utmost in quality and added features. One such feature available is a CD-ROM, which displays an interactive web page where you can access this publication, the 1998 publication, and tables used in this as well as the 1998 publications.

Here is a brief summary of how far we have come with respect to publishing these annual reports. The first PQIS report was published in June 1998 and covered data for years 1990 – 1996. Data was summarized to provide statistical information on average, minimum and maximum values of selected test properties for use by our customers in researching specification or quality issues. The second report was published in December 1998 and summarized data for jet fuels manufactured in 1997 with statistical information presented for calendar years 1995 – 1997. The third PQIS report was published in April 2000 and summarized data for jet fuels manufactured in 1998.

As always, any comments and questions pertaining to this report and recommendations for future reports are welcome. Please contact Mr Kenneth Henz at Commercial (703) 767-8356 or DSN 427-8356, e-mail khenz@desc.dla.mil.

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Federal Recycling Program Printed on Recycled Paper

## Executive Summary

This report provides a statistical assessment of fuel properties compiled from the Petroleum Quality Information System (PQIS) database. Fuel was procured in 1999 under contracts let by the Bulk Commodity Business Unit (CBU) of the Defense Energy Support Center (DESC). Evaluation of test properties is based on test data submitted in a standard test report format with fuel shipments. This fourth annual report continues review of overall and regional trends for selected fuel properties, comparing like values documented for the period 1995 through 1999. The first three annual PQIS Reports chronicled aviation turbine fuel grades JP-5 and JP-8, NATO codes F-44 and F-34, respectively; with minimal reporting on JP-4, corresponding to F-40. In addition to aviation fuels, this edition adds expanded data on JP-4, and introduces data for Naval Distillate fuel, F-76, and motor gasoline.

The Office of the Secretary of Defense, Energy Policy Directorate, authorized the establishment of the PQIS database in 1989. The intent, with automated data processing, is to facilitate garnering and dissemination of standardized quality control data, as well as tracking trends in product quality. It expedites data interchange through electronic access and, further, promotes a comprehensive approach in addressing quality issues.

Within this report, histograms chart the distribution of 1999 test results to the volume of fuel represented. Tables show statistical summaries of minimum, average, volumetrically weighted average, and maximum values for selected test properties segregated on the geographic source of the fuels. Regions 1 through 5 correspond to U.S. Petroleum Administration for Defense Districts (PADDs), denoting areas of the United States supplying the fuel. Properties of fuels procured from outside the U.S. are reported under Region 6, the Middle East; Region 7, Europe; Region 8, the Pacific; and Region 9, the Caribbean.

Extensive effort was made to ensure the complete volumetric representation of test information upon which this report is based. With the assistance of the Defense Contract Management District (DCMD) field offices, this effort for 1999 resulted in a greater than 89% representation of JP-8 procured for the military services and greater than 99% representation of JP-5 fuel procured for the U.S. Navy. Continual effort to collect the missing information, providing analysis without compromise, remains a priority.

Again, based on reported test data, the total sulfur and olefin content of JP-5 jet fuel are not driven by DoD specification limits for these properties. The olefin limit was in fact deleted from the U.S. JP-4, JP-5, and JP-8 specifications in 1999. It should be noted that military specifications were used to procure these fuels for the U.S. government. As such, the trends noted in this report may not necessarily reflect those seen in industry, since the military fuels are in some cases specially blended to meet U.S. government requirements.

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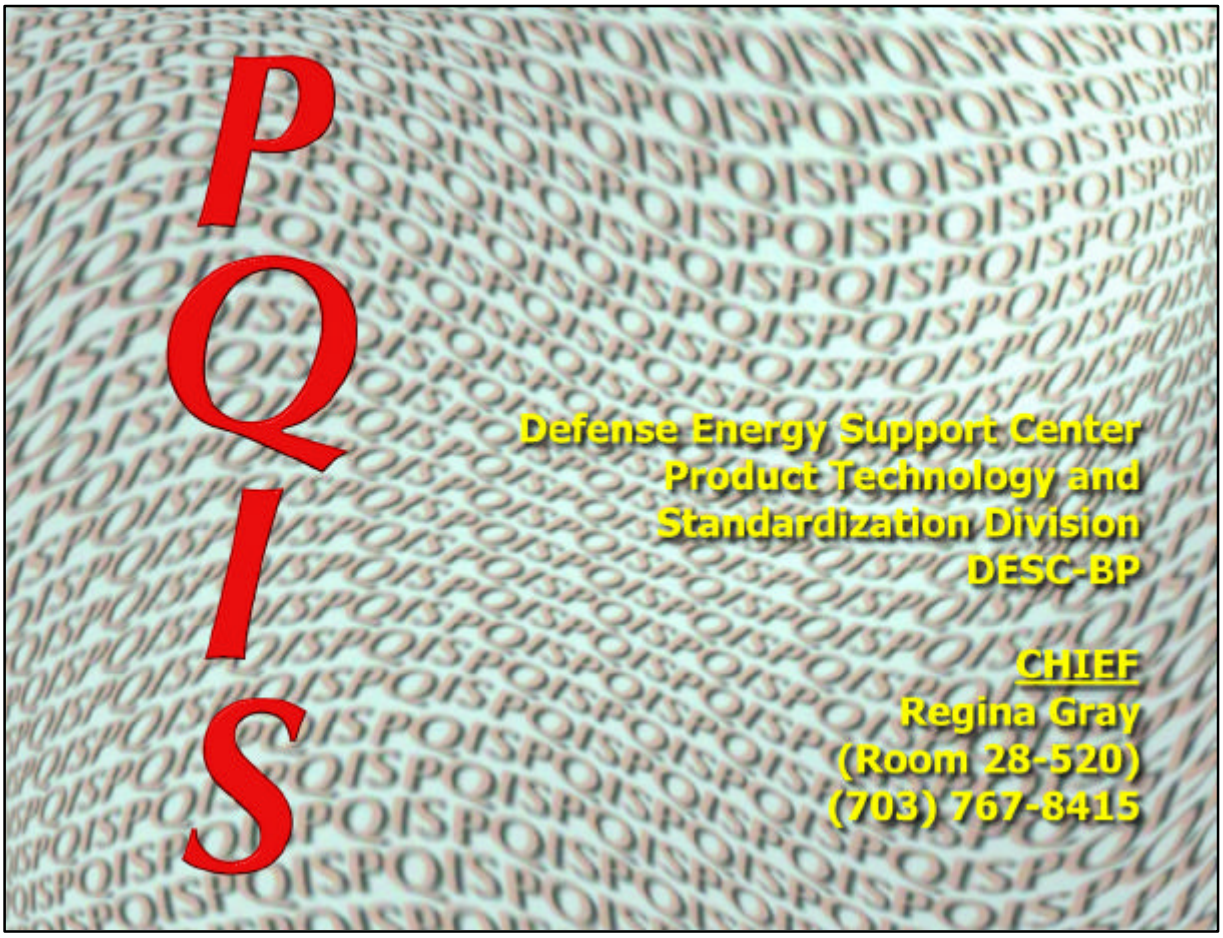



# The Source for Fuel Data

# Section I – Introduction

## Background

In 1987, the Logistics Management Institute (LMI) published a report entitled "Petroleum Quality Information System (PQIS): Architecture and Design Alternatives", which outlined requirements and alternatives for a system to store and process information on the quality of petroleum products procured and used by the Department of Defense (DoD). The Office of the Assistant Secretary of Defense, Energy Policy Directorate, made a request for review and comment on this LMI report to the Services in February 1988. Responses collected from March – May 1988 clearly established a need for a comprehensive system to track quality trends and to have a standardized method of entering data electronically. As a result, the Defense Energy Program Policy Memorandum (DEPPM) 89-1 was issued 25 April 1989, establishing the requirement for PQIS and designating responsibility for designing the PQIS to the Defense Fuel Supply Center, now the Defense Energy Support Center (DESC). PQIS was planned as an automated, mainframe, information management system that would bring dissimilar government and private sector quality control and surveillance data reporting formats into a standardized format. The information in the database would be available to DoD personnel for use in identifying, investigating, and resolving fuel related problems.

The DEPPM 89-1 authorized LMI to develop a prototype to be tested and evaluated by the DESC. This review was completed in March 1989. Because of funding constraints and the complexity of designing an all-encompassing system, the initial PQIS database system only processed data on procurements of aviation fuels (JP-4, JP-5 and JP-8). This prototype PQIS system was put into operation in October 1990, utilizing a desktop-PC platform and a DOS-based program, dBase IV®. The database has since been converted to MS-Access® format, with iterations in versions 2, 7, 8, and 9 (Access2000), but remains on a PC platform. Plans for the immediate future are to locate this database on an Internet application for worldwide use.

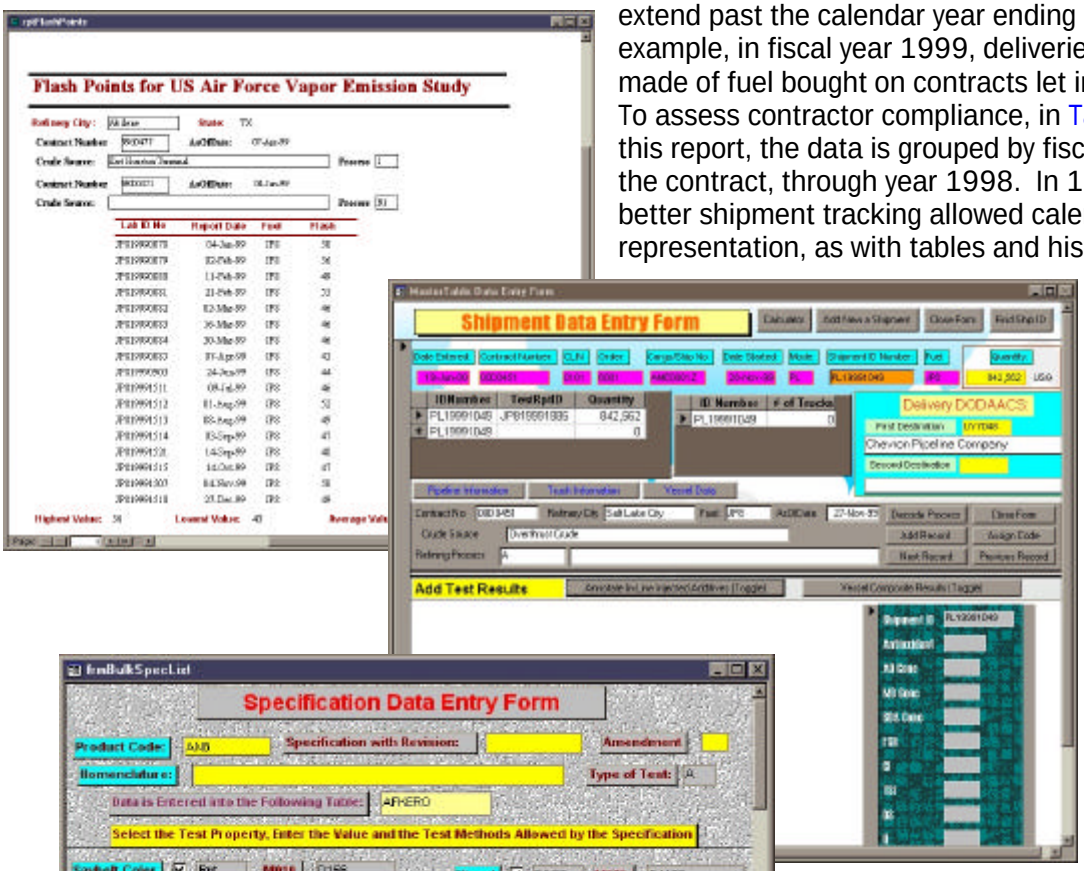
Test reports received from refiners worldwide are entered into the database. Currently data on procurements of aviation fuels, marine diesel fuels, and motor gasoline are being processed. The first PQIS Report was published in June 1998, providing statistical information on data from calendar years 1990 to 1996. The second and third were published, successively, in 1997 and 1998, each covering supplementary information for the preceding year. This report succeeds those, using the same formats for Histograms and Tables, to facilitate comparison of information in the previous reports.

Upon issue of the initial report, all test results for calendar years 1990 to 1994 were archived and those starting from 1 January 1995 were kept in the then active database. Because of the low percentage of product volume represented in the PQIS database versus product purchased, as reflected in previous editions of this Report, a special effort was made to increase the volume by requesting the test reports not originally submitted for processing. Fuel volumes in PQIS were analyzed against known receipts, and a list of missing reports generated, by contractor, and sent to Defense Contract Management District (DCMD) field offices to gather and submit this data.

The response from the DCMD was tremendous; all the data for JP-4 purchased in fiscal years 1996 through 1998 is represented in the database. For fiscal year 1997, the representation of JP-5 increased from 97% to 99% and the representation of JP-8 increased from 70% to 90%. Through the efforts of DCMD, the amount of product represented in the database increase by 0.8 billion gallons of JP-5 and JP-8. This database, too, was archived, at the end of this update, but remains online for referral, internally. Records starting with data for 1999 procurements are entered into the currently active database for processing and analysis. The system permits

querying the preceding database, however, so that historical data remains accessible. Requests for this type of information, though, should be submitted with a sufficient allowance of time to develop adequate queries and/or linking of database tables.

In review of the data presented herein, it needs to be noted that contract delivery periods often extend past the calendar year ending date. For example, in fiscal year 1999, deliveries may be made of fuel bought on contracts let in 1998. To assess contractor compliance, in Table 2 of this report, the data is grouped by fiscal year of the contract, through year 1998. In 1999, better shipment tracking allowed calendar year representation, as with tables and histograms.




In the 1999 PQIS database:

- Contracts expanded to 136
- F-76 data is now included
- MOGAS data is now included

F-76 information represents 127 batches of Marine diesel; and the MOGAS, 15 batches (Midrange and Regular).

Fuel shipments represented in PQIS totaled 3.65 billion USG, categorized by mode as follows:

| Mode | Tanker | Barge | Pipeline | Tank Truck |
|---|---|---|---|---|
| Count | 189 | 215 | 1177 | 5773 |
| Volume (Million USG) | 1,267.6 | 269.9 | 1,806.2 | 307.9 |

Terminology

For the purposes of this report, these subordinate definitions apply:

Spectender: A complete specification analysis report of product being offered for acceptance by the US Government. For fuels, it is the written report of results for full specification testing, in the refinery or terminal shipping tank, of product offered for acceptance.

Report: Represents one spectender tank test result (Complete Specification Test Results), regardless of how many shipments were made from the tank or if more than one tank is involved in a total loading or product movement.

Volume: Total volume, expressed in millions of gallons, delivered to the US Government or other designee, from the shipping tank referenced in the report.

Region: The grouping of states or countries into defined geographical areas affording a more specific or focused data analysis for a particular area of interest. It is based on the US Department of Energy designated Petroleum Administration for Defense Districts (PADDs), cited here to provide a standard industry reference for comparative study. These do not correlate with the Defense Fuel Regions or Offices. Since shipments can originate and terminate in different Regions, the determination of the Region is based on the refinery location rather than the receipt location.

| Region | Title | PADDs | States or Countries |
|---|---|---|---|
| 1 | East Coast | I | ME, VT, NH, MA, RI, CT, NY, PA, NJ, DE, MD, VA, WV, NC, SC, GA, FL |
| 2 | East Central | II | ND, SD, MN, IA, NE, WI, MI, OH, KY, TN, IN, IL, MO, KS, OK |
| 3 | Gulf Coast | III | AL, MS, AR, LA, TX, NM |
| 4 | West Central | IV | MT, ID, WY, UT, CO |
| 5 | West Coast | V | WA, OR, CA, NV, AZ |
| 6 | Middle East | | Kuwait and Bahrain |
| 7 | European | | Europe, Israel and Turkey |
| 8 | Pacific | | Korea, Japan, HI, AK, Australia |
| 9 | Caribbean | | Coastal Aruba |

Average: The average calculated on volume of fuel purchased rather than each instance of purchase. For example, if one batch of product had an API Gravity of 46.0 with 1,000,000 gallons delivered and another batch had an API Gravity of 43.5 with 500,000 delivered, the average, based on occurrences of test values, would be:

(46.0+ 43.5)/2 = 44.75.

The volumetrically weighted average, based on volumes of product represented by the test values, would be:

(46.0 x 1,000,000) + (43.5 x 500,000) / 1,500,000 = (67,750,000 / 1,500,000) = 45.17

The difference between the two averaging methods is 0.42 °API. Each method uses a different basis to calculate the average. Both averages are provided in this report.

DESC

# Fueling the Forces !

Product Distribution

Data in the PQIS database for 1999 represents nearly 4 billion gallons of fuel. Table 1 shows the volumes and number of shipping tank reports, presented by product for each year.

Table 1. Total Fuel Database Entries.

| Fuel | 1995 | | 1996 | | 1997 | | 1998 | | 1999 | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Volume | Reports | Volume | Reports | Volume | Reports | Volume | Reports | Volume | Reports | Volume | Reports |
| AN8 | — | — | 9.11 | 6 | 3.20 | 3 | 3.39 | 1 | 3.92 | 1 | 19.62 | 11 |
| F76 | — | — | — | — | — | — | — | — | 552.61 | 115 | 552.61 | 115 |
| JP4 | 67.10 | 139 | 0.89 | 6 | 1.64 | 9 | 1.71 | 10 | 1.20 | 80 | 72.54 | 244 |
| JP5 | 87.22 | 41 | 494.45 | 160 | 707.32 | 252 | 615.81 | 230 | 662.39 | 298 | 2,567.19 | 981 |
| JP8 | 992.81 | 738 | 1831.80 | 1231 | 2142.56 | 1695 | 2228.68 | 1952 | 2406.22 | 6842 | 9,602.07 | 12,458 |
| MU | — | — | — | — | — | — | — | — | 15.00 | 16 | 15.00 | 16 |
| RME | — | — | — | — | — | — | — | — | 10.34 | 2 | 10.34 | 2 |

[Volume in Millions of Gallons]

The report data in Table 1 indicates the number of test reports for each individual shipping tank used to sell product to the DESC, irrespective of the contractor. A single product movement may involve more than one shipping tank; just as many product movements (e.g., truck shipments) could have the same source tank. The quantities cited represent the actual quantity shipped to the US Government from a particular shipping tank at a refinery or terminal, not total quantity in the tank at the time of sampling. The quantity reported on a test report from each shipping tank is the basis for calculating volumetrically weighted averages (see Terminology) for a specification property.

Included in Table 1 for this year's report is some disclosure on Naval Distillate Fuels (DFM/F76); Marine Residual Fuel, Grade RME-25 (IFO 180); Unleaded, Automotive Gasoline; and continued reporting on the special aviation fuel procured for use in the Antarctic with a product code of "AN8". Since these product procurements are comparatively small, they are omitted from analysis and the Histograms in Section II; and from those tables where there is yet insufficient information in the database to warrant their inclusion. The latter is also true of JP4. However, minimum, average, volumetrically weighted average, and maximum values for selected test properties are included for JP4, MOGAS, and AN8.

Table 2 shows the representative volume of product recorded in PQIS versus the amount actually purchased. Each contract number contains a segment that indicates the fiscal year in which the contract was awarded. With contracts grouped according to the fiscal year in which awarded, the Defense Fuel Automated Management System (DFAMS) printout for each Contract Line Item was compared, order by order, to the quantity represented in the PQIS database. Since orders can be made in December and delivered in January, causing delivery period groupings to extend across calendar years, the fiscal year was chosen, in lieu of calendar, as the basis for comparison. Fuel volumes in the table represent information on fuels on a worldwide basis, focusing on what was shipped to DESC customers. Modifications to the PQIS database in 1999, in tracking shipments, effecting volumes being based on a calendar year instead of fiscal; resulting in some overlap in volumes between 1998 and 1999.

Table 2. Volumes Reported vs. Volumes Purchased.

| AN8 | 1995 | 1996 | 1997 | 1998 | 1999 |
|---|---|---|---|---|---|
| Reported | — | — | — | — | 3.9 |
| Purchased | — | — | — | — | 3.9 |
| Difference | — | — | — | — | 0.0 |
| Percentage | — | — | — | — | 100% |
| **F76** | **1995** | **1996** | **1997** | **1998** | **1999** |
| Reported | — | — | — | — | 552.6 |
| Purchased | — | — | — | — | 576.2 |
| Difference | — | — | — | — | 23.6 |
| Percentage | — | — | — | — | 96% |
| **JP4** | **1995** | **1996** | **1997** | **1998** | **1999** |
| Reported | 66.9 | 1.6 | 1.5 | 0.8 | 1.2 |
| Purchased | 117.2 | 1.6 | 1.5 | 0.8 | 1.2 |
| Difference | 50.3 | 0.0 | 0.0 | 0.0 | 0.0 |
| Percentage | 57% | 100% | 100% | 100% | 100% |
| **JP5** | **1995** | **1996** | **1997** | **1998** | **1999** |
| Reported | 186.4 | 670.2 | 696.3 | 338.0 | 662.4 |
| Purchased | 986.5 | 771.0 | 702.7 | 393.1 | 664.3 |
| Difference | 800.1 | 100.8 | 6.4 | 55.1 | 1.9 |
| Percentage | 19% | 87% | 99% | 86% | 99% |
| **JP8** | **1995** | **1996** | **1997** | **1998** | **1999** |
| Reported | 686.9 | 1896.8 | 2309.6 | 1155.9 | 2,406.2 |
| Purchased | 3137.3 | 2343.8 | 2577.0 | 1277.5 | 2,698.9 |
| Difference | 2450.4 | 477.0 | 267.4 | 121.6 | 292.7 |
| Percentage | 22% | 81% | 90% | 90% | 89% |
| **MU** | **1995** | **1996** | **1997** | **1998** | **1999** |
| Reported | — | — | — | — | 15.0 |
| Purchased | — | — | — | — | 15.0 |
| Difference | — | — | — | — | 0.0 |
| Percentage | — | — | — | — | 100% |
| **RME** | **1995** | **1996** | **1997** | **1998** | **1999** |
| Reported | — | — | — | — | 10.34 |
| Purchased | — | — | — | — | 10.34 |
| Difference | — | — | — | — | 0.0 |
| Percentage | — | — | — | — | 100% |

[Volume in Millions of Gallons]

Summary by Region

The next three Tables provide a breakdown of the total number of reports received per Region, and a breakdown of both the volume and number of reports received for each product grade. Table 3 indicates the total number of fuel test reports received, by year, from each region, as an aid to the reader in evaluating data presented in this report. Clause E40.05, Material Inspection and Receiving Report, cited in DESC contracts, requires fuel contractors to submit a copy of the complete laboratory test report from each shipping tank used for shipments to DESC Customers.

Table 3. Total Reports Received by Year and Region.

| Year | PQIS Region | | | | | | | | | Totals |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
| 1995 | 30 | 83 | 349 | 150 | 154 | — | 30 | 122 | — | 918 |
| 1996 | 60 | 148 | 544 | 96 | 241 | 10 | 132 | 166 | — | 1397 |
| 1997 | 97 | 306 | 787 | 86 | 360 | 10 | 111 | 202 | — | 1959 |
| 1998 | 150 | 272 | 997 | 112 | 350 | 6 | 76 | 229 | — | 2192 |
| 1999 | 137 | 302 | 1069 | 198 | 252 | 12 | 133 | 256 | 9 | 2368 |

The values above represent the number of possible data points available for each Region, for all fuel received for the specific year that was entered into the PQIS database. Again, note that the number of occurrences does not necessarily relate directly to the number of shipments made, since one batch from a particular refinery tank may have been used in multiple shipments, on different orders. The information may be considered an overview of responses received from each Region. Regions 2 through 5 and 8 submitted the largest number of reports, although Region 5 reporting is down, comparatively; as is Region 1. The downturn though may be more reflective of a decrease in procurements than remissive. Region 3, which includes Texas, still leads in the submission of reports, commensurate with total procurements. Data from Region 9 (Caribbean) is introduced in this report.

Table 4 provides information on the number of reports received per calendar year, by Region, for each type of fuel reported, representing a more detailed breakdown of Table 3. It can be used in conjunction with the data in Table 5 for an indication of the average parcel size, which might be indicative of the modes of transportation used. For example, for JP8 in 1996, Region 6 reported seven tenders that represent 37.28 million gallons; which means that each tender corresponds to over 5.3 million gallons, or the parcel size of a tanker. Reported for Region 4 in 1997 were 86 tenders for 53.28 million gallons of JP8, or an average parcel size of 0.62 million gallons or 619,000 USG. This would suggest mainly truck shipments, probably mixed with some pipeline shipments, during this period, for Region 4.

Table 5 represents the volumes of fuels, in millions of gallons, refined each calendar year in the various Regions, and sold to DoD customers. The data reflects the trend of a decrease in the volume of JP4 delivered, and corresponding increase in the total volume of JP8, as customers converted from JP4 to JP8. Although outside the scope of this report, it is possible to further break down volumes received; categorized by the state in which the refinery is located, by company name, by refinery location, or by contract. Organizations with a particular interest may contact DESC-BP, to submit a request for custom reports.

Table 4. Annual Reports Received – By Region

| Year | Fuel | PQIS Region | | | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
| 1995 | JP4 | — | — | — | 134 | — | — | 1 | 4 | — | 139 |
| | JP5 | — | — | 33 | — | — | — | 8 | — | — | 41 |
| | JP8 | 30 | 83 | 316 | 16 | 154 | — | 21 | 118 | — | 738 |
| 1996 | JP4 | — | — | — | — | — | — | — | 6 | — | 6 |
| | JP5 | — | — | 111 | — | 17 | 3 | 21 | 8 | — | 160 |
| | JP8 | 60 | 148 | 433 | 96 | 224 | 7 | 111 | 152 | — | 1231 |
| 1997 | JP4 | — | — | — | — | — | — | — | 9 | — | 9 |
| | JP5 | — | — | 129 | — | 74 | 10 | 19 | 20 | — | 252 |
| | JP8 | 97 | 306 | 658 | 86 | 286 | — | 92 | 170 | — | 1695 |
| 1998 | JP4 | — | — | — | — | — | — | — | 10 | — | 10 |
| | JP5 | — | — | 125 | — | 66 | 5 | 19 | 15 | — | 230 |
| | JP8 | 150 | 272 | 872 | 112 | 284 | 1 | 57 | 204 | — | 1952 |
| 1999 | AN8 | — | — | — | — | — | — | 1 | — | — | 1 |
| | JP4 | — | — | — | — | — | — | — | 8 | — | 8 |
| | JP5 | — | 32 | 117 | — | 53 | 12 | 13 | 10 | 2 | 239 |
| | JP8 | 137 | 270 | 951 | 198 | 199 | — | 118 | 225 | 7 | 2105 |
| | MU | — | — | 1 | — | — | — | 1 | 13 | — | 15 |

Table 5. Annual Volume of Fuel Received – By Region.

| Year | Fuel | PQIS Region | | | | | | | | | Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
| 1995 | JP4 | — | — | — | 61.87 | — | — | 4.89 | 0.34 | — | 67.1 |
| | JP5 | — | — | 55.48 | — | — | — | 31.74 | — | — | 87.22 |
| | JP8 | 2.88 | 126.64 | 451.51 | 9.97 | 239.30 | — | 65.12 | 97.39 | — | 992.81 |
| 1996 | JP4 | — | — | — | — | — | — | — | 0.89 | — | 0.89 |
| | JP5 | — | — | 308.86 | — | 51.36 | 22.72 | 71.87 | 39.65 | — | 494.46 |
| | JP8 | 18.81 | 191.35 | 633.67 | 84.94 | 426.64 | 37.28 | 263.07 | 176.03 | — | 1831.79 |
| 1997 | JP4 | — | — | — | — | — | — | — | 1.64 | — | 1.64 |
| | JP5 | — | — | 322.88 | — | 210.78 | 59.19 | 55.84 | 58.63 | — | 707.32 |
| | JP8 | 91.36 | 213.98 | 799.86 | 53.28 | 421.54 | — | 261.00 | 301.48 | — | 2142.50 |
| 1998 | JP4 | — | — | — | — | — | — | — | 1.71 | — | 1.71 |
| | JP5 | — | — | 310.80 | — | 168.26 | 24.10 | 54.74 | 57.90 | — | 615.80 |
| | JP8 | 123.59 | 215.78 | 976.11 | 60.22 | 434.64 | 6.68 | 149.36 | 262.30 | — | 2228.68 |
| 1999 | AN8 | — | — | — | — | — | — | 3.92 | — | — | 3.92 |
| | JP4 | — | — | — | — | — | — | — | 1.42 | — | 1.42 |
| | JP5 | — | 15.58 | 307.56 | — | 168.06 | 62.01 | 52.63 | 46.87 | 19.63 | 672.34 |
| | JP8 | 104.17 | 204.00 | 1,037.72 | 92.41 | 306.48 | — | 316.74 | 293.85 | 47.03 | 2,402.40 |
| | MU | — | — | 0.38 | — | — | — | 0.29 | 14.33 | — | 15.00 |

[Volume in Millions of Gallons]

## Section II – Product Specifications

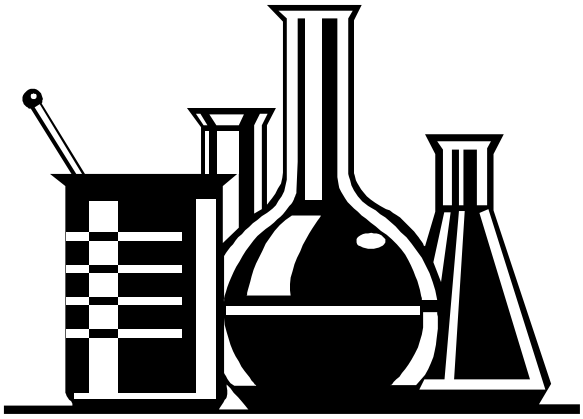
The Military Specification for procurement of JP4 and JP5 is currently MIL-DTL-5624T, Turbine Fuel, Aviation, Grades JP-4, JP-5, and JP-5/JP-8 ST, dated 18 September 1998. The specification for JP8 is MIL-T-83133E, Turbine Fuels, Aviation, Kerosene Types, NATO F-34 (JP-8), NATO F-35, and JP-8+100, dated 1 April 1999. These specifications govern the composition of these fuels, procured for the DoD.

For the purposes of this report, only those specification properties that have measurable and definitive requirements in the specification are summarized, with the exception of the "reported" cetane index and the naphthalene content (not required for JP5). In addition, specification properties that involve an assigned rating (e.g., water reaction, and copper corrosion) are not summarized. However, data for the specification properties not reported is available by request, from DESC-BP.

Not all tests need to be performed on all batches. For the Net Heat of Combustion requirement, contractors have a choice of two or three different methods/units of measurement for reporting, depending on the product. Contractors also have the option of not performing Mercaptan Sulfur testing, when opting for the Doctor Test. If the Doctor Test is negative, Mercaptan Sulfur testing need not be performed. Some contractors elected to report both the Doctor Test and Mercaptan Sulfur results. Further, if the Smoke Point is below 25 mm, the product is acceptable as long as the Naphthalenes Content is below 3.0% and the Smoke Point above the minimum of 19 mm. Therefore, the number of reports represented by the data may be different for individual test parameters. Specification limits are provided on all Histograms and Tables.

### Fuel Characteristics - Global

Since there were only 15 shipments of motor gasoline (MUM/MUR) in 1999, its data collection incomplete, and its fuel characteristics and specification differ from those for turbine fuels, it is reported separately here; and in less detail. Because there are insufficient data points for a proper statistical analysis, histograms are not used; rather the data is presented in a table. Noting the volume of fuel and the number of shipment reports in Table 6, be cognizant that this data is representative only.



Histograms depicting diesel fuel product characteristic variances follow. Histograms show the volumes of each test property result reported for 1999, for all Regions combined, providing an overview of fuel delivered to DESC customers. These charts are augmented with specific data in the Tables, presented by region.

While the formulation of JP-4 is closer to that of a motor gasoline, it is combined with the turbine fuels since testing, additives, and end use are more akin to them. As with motor fuels, there is yet insufficient data recorded in PQIS to provide useful histograms; but there is enough specific data to warrant inclusion in the characteristic Tables, reported by region, for most. However, note that there are instances where there is no analogous table, where that characteristic is inapplicable or not reported. The same is true of Naval Distillate Fuel, F-76.

Table 6. Motor Gasoline (Midrange & Regular) Characteristics – 1999.

| Characteristic | PQIS Reporting | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Fuel | Region | Volume | Min | Avg | Wt Avg | Max | Count |
| Anti-Oxidants (mg/L) | MUM | 3 | 0.38 | 20.50 | 20.50 | 20.50 | 20.50 | 1 |
| | MUM | 7 | 0.29 | 17.10 | 17.10 | 17.10 | 17.10 | 1 |
| | MUM | 8 | 14.08 | 15.70 | 17.30 | 15.08 | 20.13 | 8 |
| | MUR | 8 | 0.25 | (NR) | (NR) | (NR) | (NR) | 0 |
| API Gravity (@ 60°F) | MUM | 3 | 0.38 | 53.50 | 53.50 | 53.50 | 53.50 | 1 |
| | MUM | 7 | 0.29 | (NR) | (NR) | (NR) | (NR) | 0 |
| | MUM | 8 | 14.08 | 54.10 | 56.18 | 56.20 | 58.80 | 9 |
| | MUR | 8 | 0.25 | 59.26 | 61.79 | 62.15 | 64.80 | 4 |
| Aromatics (% volume) | MUM | 3 | 0.38 | 41.10 | 41.10 | 41.10 | 41.10 | 1 |
| | MUM | 8 | 14.08 | 28.22 | 34.25 | 34.10 | 38.49 | 9 |
| Distillation 10% Recovered (°C) | MUM | 3 | 0.38 | 48.00 | 48.00 | 48.00 | 48.00 | 1 |
| | MUM | 7 | 0.29 | 42.00 | 42.00 | 42.00 | 42.00 | 1 |
| | MUM | 8 | 14.08 | 49.70 | 56.14 | 56.24 | 58.80 | 9 |
| | MUR | 8 | 0.25 | 47.80 | 51.45 | 50.67 | 57.20 | 4 |
| Final Boiling Point (°C) | MUM | 3 | 0.38 | 220.00 | 220.00 | 220.00 | 220.00 | 1 |
| | MUM | 7 | 0.29 | 195.00 | 195.00 | 195.00 | 195.00 | 1 |
| | MUM | 8 | 14.08 | 181.00 | 189.89 | 189.96 | 196.00 | 9 |
| | MUR | 8 | 0.25 | 188.30 | 200.68 | 203.35 | 210.60 | 4 |
| Lead (g/L) | MUM | 3 | 0.38 | 0.01 | 0.01 | 0.01 | 0.01 | 1 |
| | MUM | 7 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 1 |
| | MUM | 8 | 14.08 | 0.00 | 0.00 | 0.00 | 0.00 | 9 |
| | MUR | 8 | 0.25 | 0.00 | 0.01 | 0.01 | 0.02 | 4 |
| AKI (Octane) | MUM | 3 | 0.38 | 93.00 | 93.00 | 93.00 | 93.00 | 1 |
| | MUM | 7 | 0.29 | 91.85 | 91.85 | 91.85 | 91.85 | 1 |
| | MUM | 8 | 14.08 | 89.05 | 89.88 | 89.85 | 90.40 | 9 |
| | MUR | 8 | 0.25 | 87.00 | 87.89 | 87.75 | 89.45 | 4 |
| Total Sulfur (% mass) | MUM | 3 | 0.38 | 0.01 | 0.01 | 0.01 | 0.01 | 1 |
| | MUM | 7 | 0.29 | 0.10 | 0.10 | 0.10 | 0.10 | 1 |
| | MUM | 8 | 14.08 | 0.01 | 0.02 | 0.02 | 0.03 | 9 |
| | MUR | 8 | 0.25 | 0.00 | 0.02 | 0.02 | 0.04 | 4 |
| Vapor Liquid Ratio (@ 0.1°C) | MUM | 3 | 0.38 | 61.10 | 61.10 | 61.10 | 61.10 | 1 |
| | MUM | 7 | 0.29 | 47.80 | 47.80 | 47.80 | 47.80 | 1 |
| | MUM | 8 | 14.08 | 57.60 | 61.64 | 61.78 | 63.90 | 9 |
| | MUR | 8 | 0.25 | 52.80 | 61.25 | 62.48 | 75.00 | 4 |

[(NR) = Not Recorded] – [Volume in Millions of Gallons]

Histograms show, for each product and fuel characteristic, the percent by volume of product refined for delivery to DESC customers worldwide, for 1999. The grades of fuel and specification values are indicated in the text within the chart with the mean and standard deviation values; which are automatically calculated for each Histogram. Percentages above the bars represent the percent of total volume of product falling within the data ranges indicated on the x-axis. Heavy dashed lines in the graph depict specification values. To ensure that all data is included, the first and last bars have an allowance for data outside of the ranges upon which the histogram is based, where appropriate. A "<[low value]" indicates all occurrences of volumes less than lower range [low value] and a "[high value]+" indicates all occurrences of volumes greater than the upper range [high value].

Values are grouped into data ranges indicated in the x-axis. The range includes data at the lower limit and up to, but not including, the upper limit. Consequently, values in the next data grouping above the specification limit, indicated by the dashed line, might include data that matches the upper specification limit. Consult the pertinent table, following the Histograms, to ascertain the maximum value for the property, to determine whether any volume purchased exceeded the specification limit.

Because the mean indicates the value at which 50% of the data occurs and the bars on the Histograms display volume percentages, the mean may not always occur where visual inspection of the Histogram indicates. The differences in two values are similar to the differences between the average and the volumetrically weighted average.

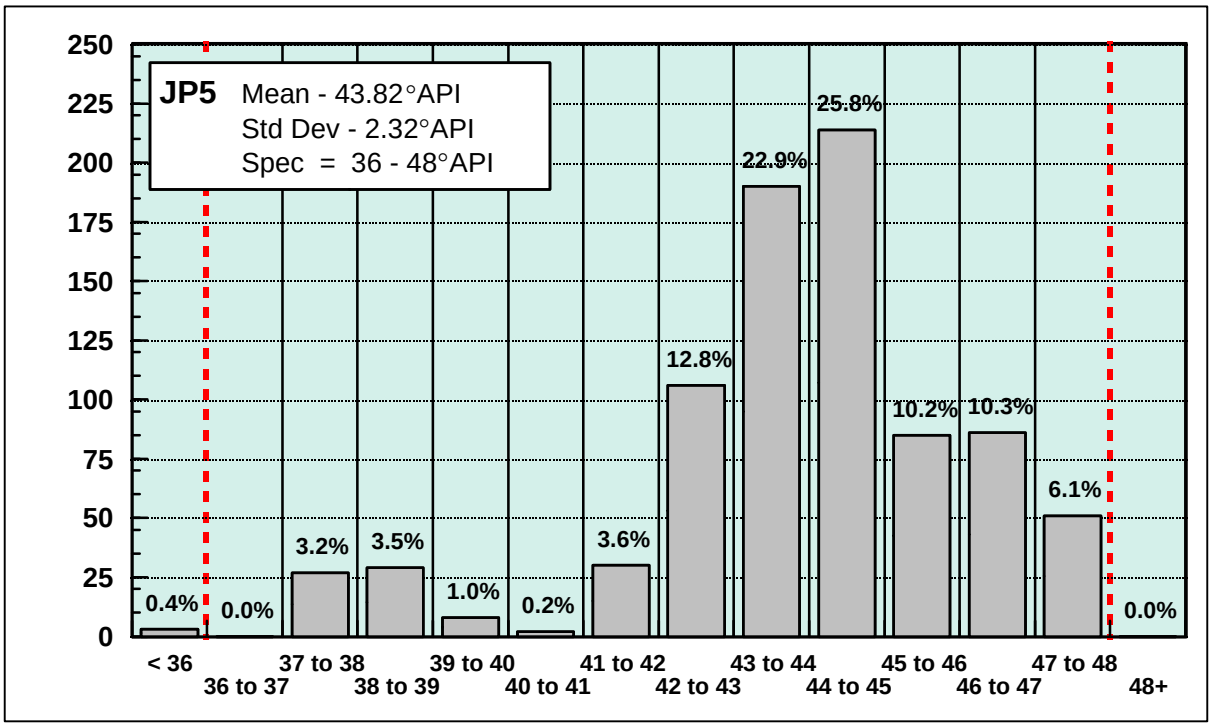
The data indicates the overall distribution of test results on a worldwide basis for 1999. No attempt was made to separate results by the test method used, where more than one method was possibly utilized, although this also can be provided on specific request.

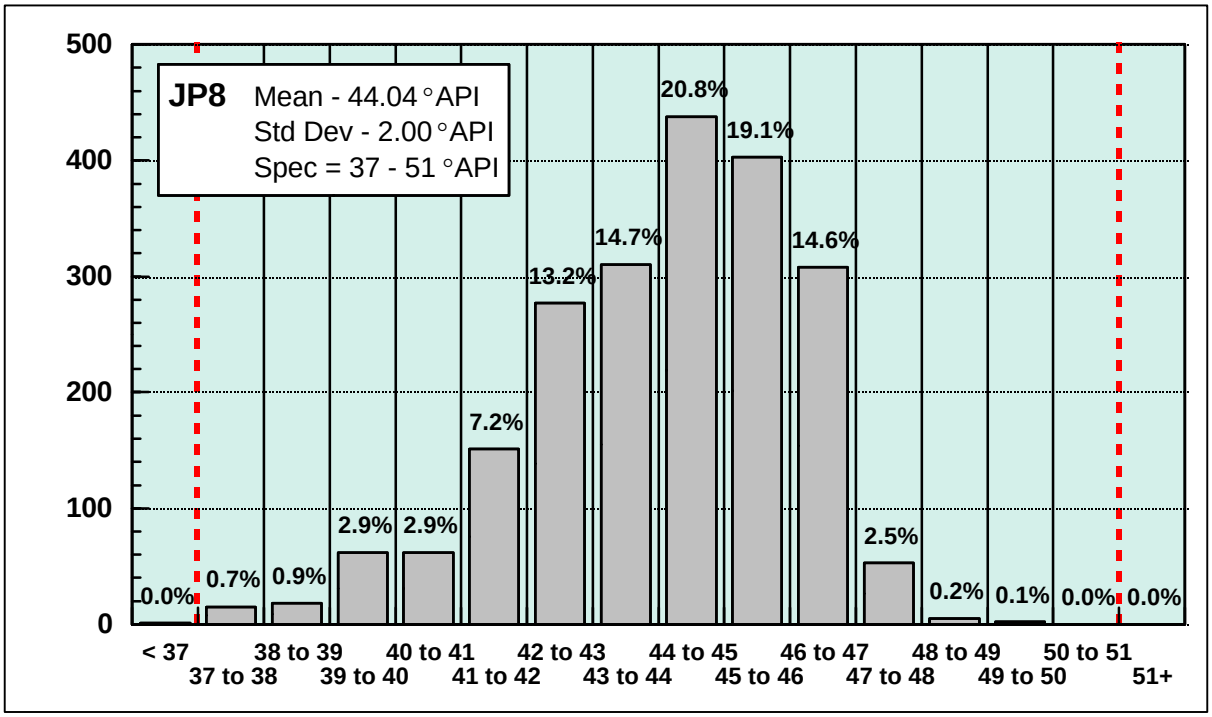
Comparing Histograms for 1999 with those for 1998, only changes in distributions, the volumes of fuel processed, is observed. No significant changes are observed in either the mean value or the shape of the curve, for either JP5 or JP8 for Total Sulfur, Mercaptan Sulfur, Olefins, Filtration Time, Total Acid Number, Smoke Point, Naphthalenes, Hydrogen Content, Flash Point, Cetane Number, Particulate Contamination, or for JP5 API Gravity.

For JP8 API Gravity, the mean rose slightly and distribution in the curve changed, but still with about 97% of fuel volume purchased between the range of 41 and 48 °API. Aromatics showed a drop in the mean value, and a narrowing of the curve for JP5. JP8 remained ostensibly constant, with slight changes in distributions.

Histograms show that greater than 96% of the volume of fuel received in 1999 met all graphed specification properties. The most notable exception is Particulate Contamination, with the Total Acid Number and Filtration Time for JP8 being of concern; the Total Acid Number, particularly, because it indicates what might be deemed a trend. This office will continue to monitor Filtration Times, to determine if there is culpable correlation to the increase in Particulate Contamination.

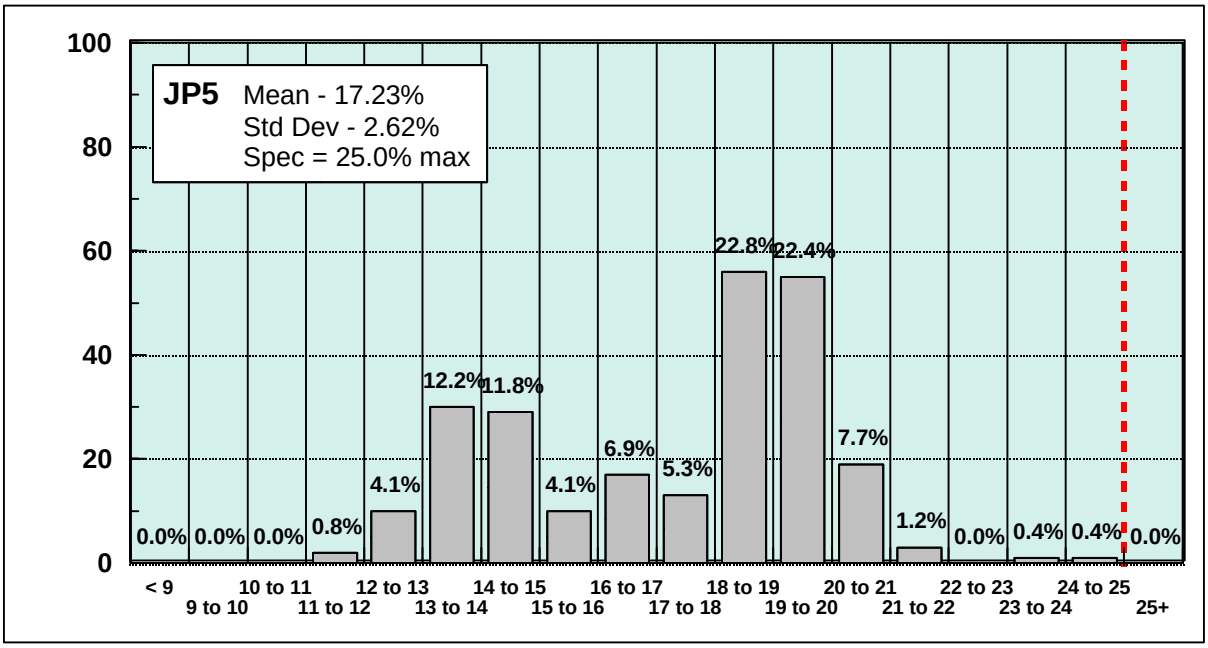
Histogram 1. API Gravity in Volume Received – 1999.

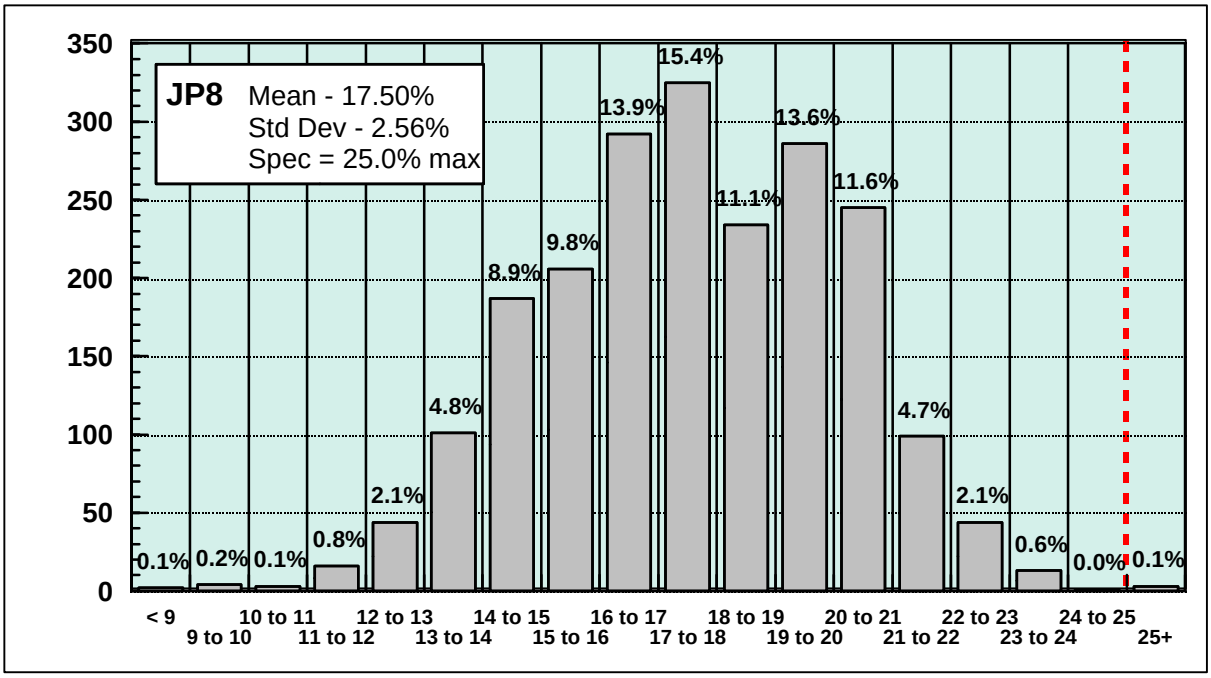



[Volume in Millions of Gallons]

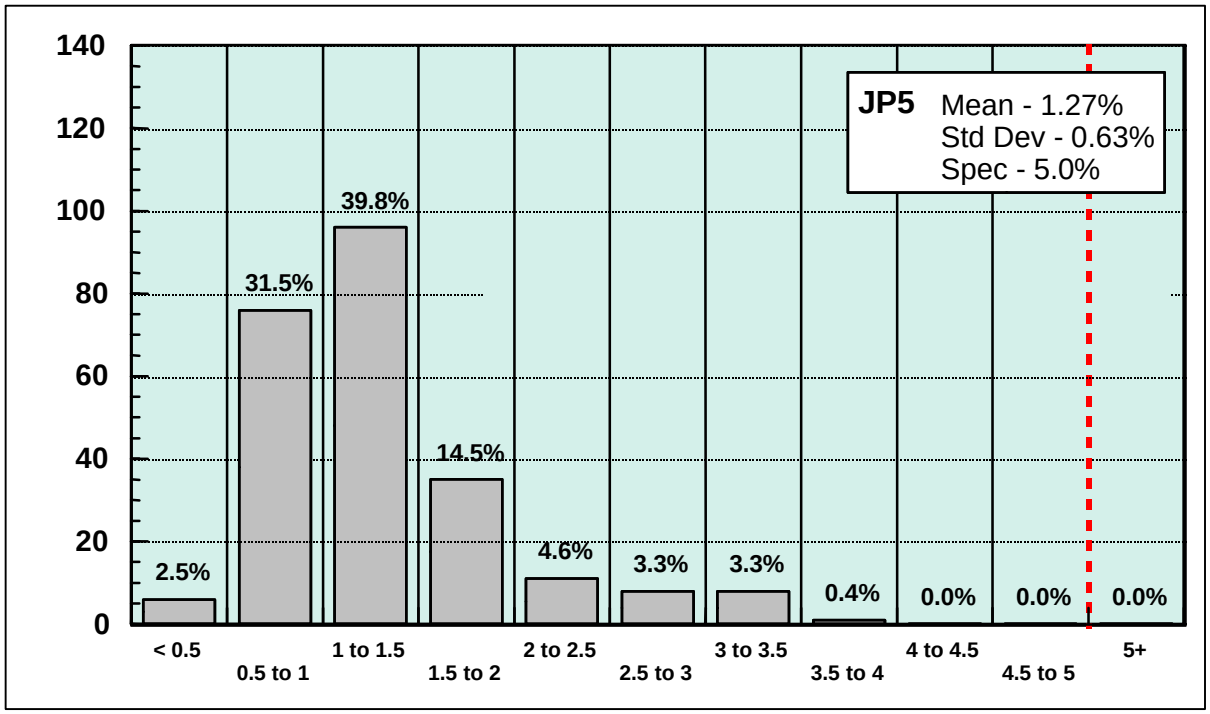
Histogram 2. Aromatics in Volume Received – 1999.

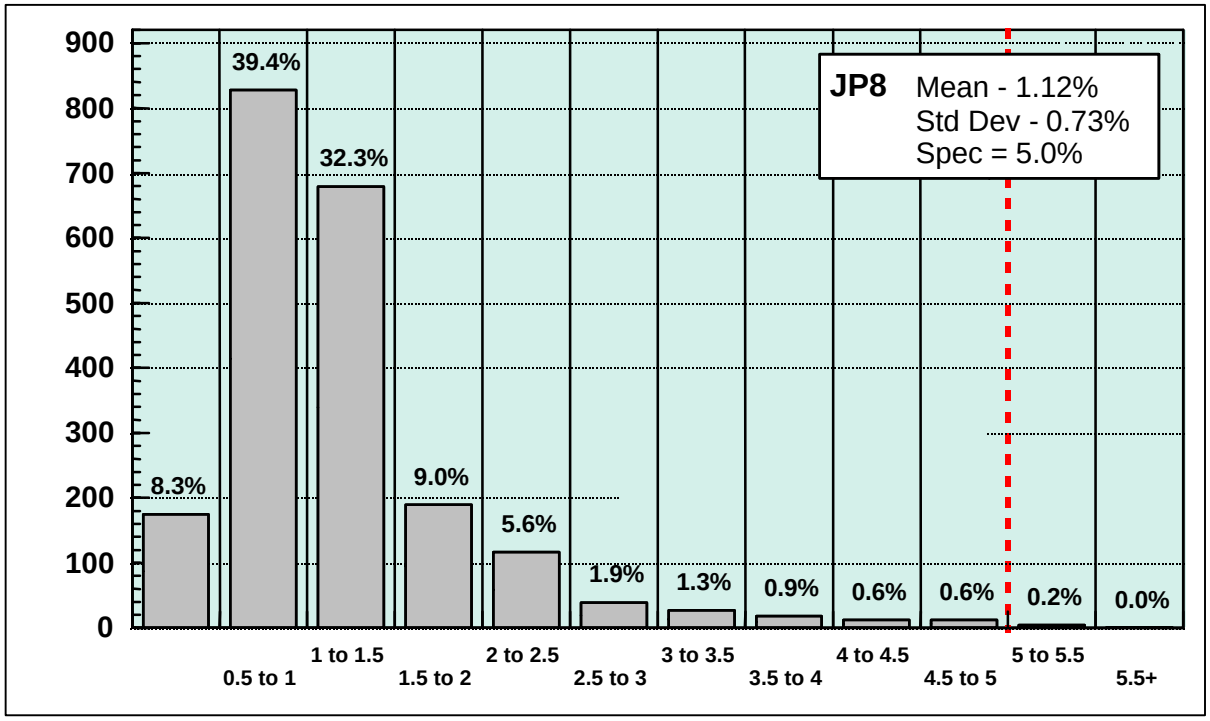



[Volume in Millions of Gallons]

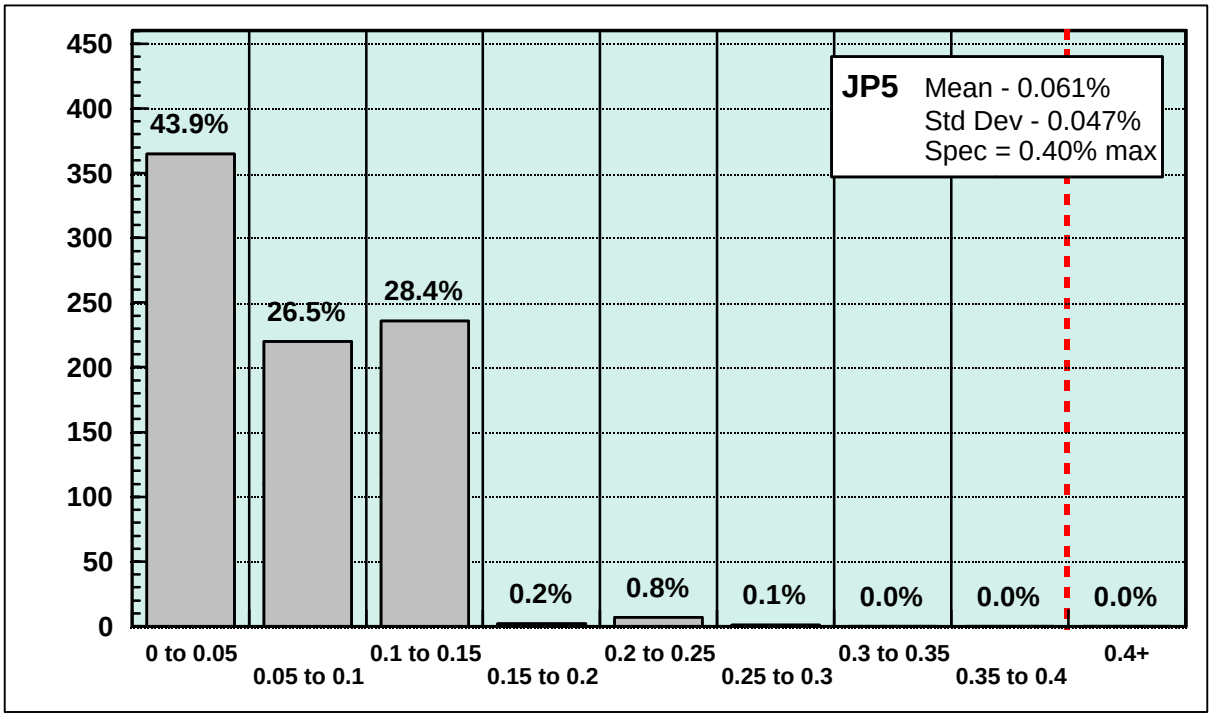
Histogram 3. Olefins in Volume Received – 1999.

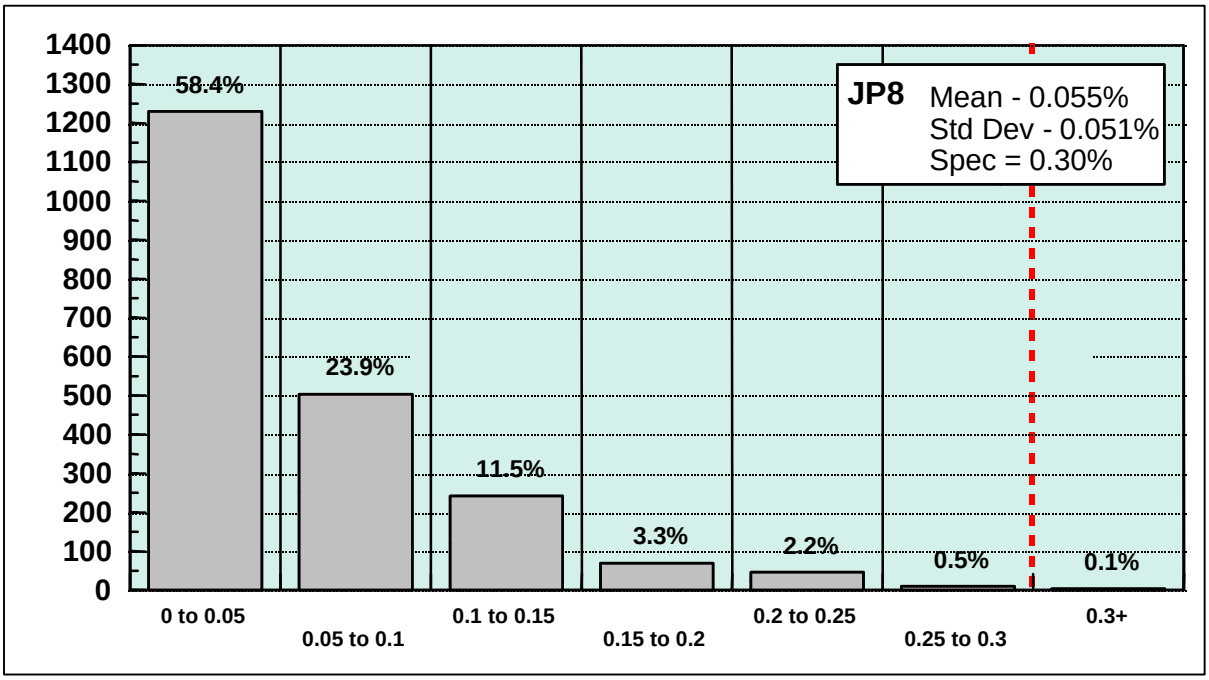



[Volume in Millions of Gallons]

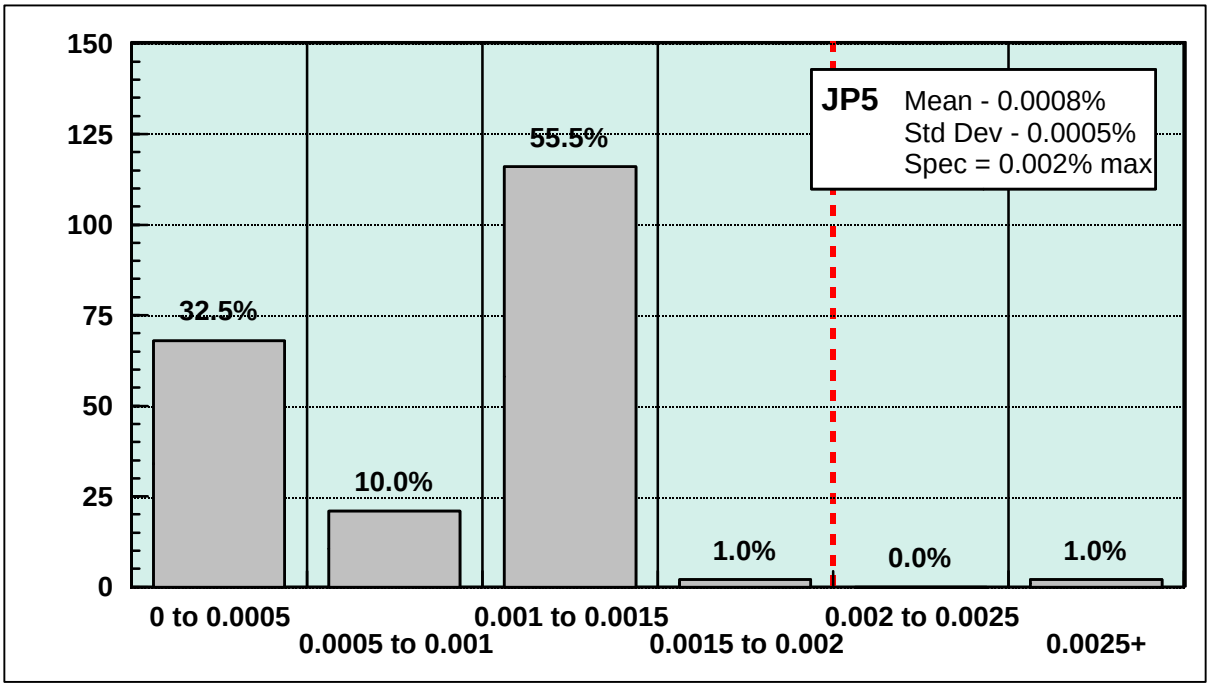
Histogram 4. Total Sulfur in Volume Received – 1999.

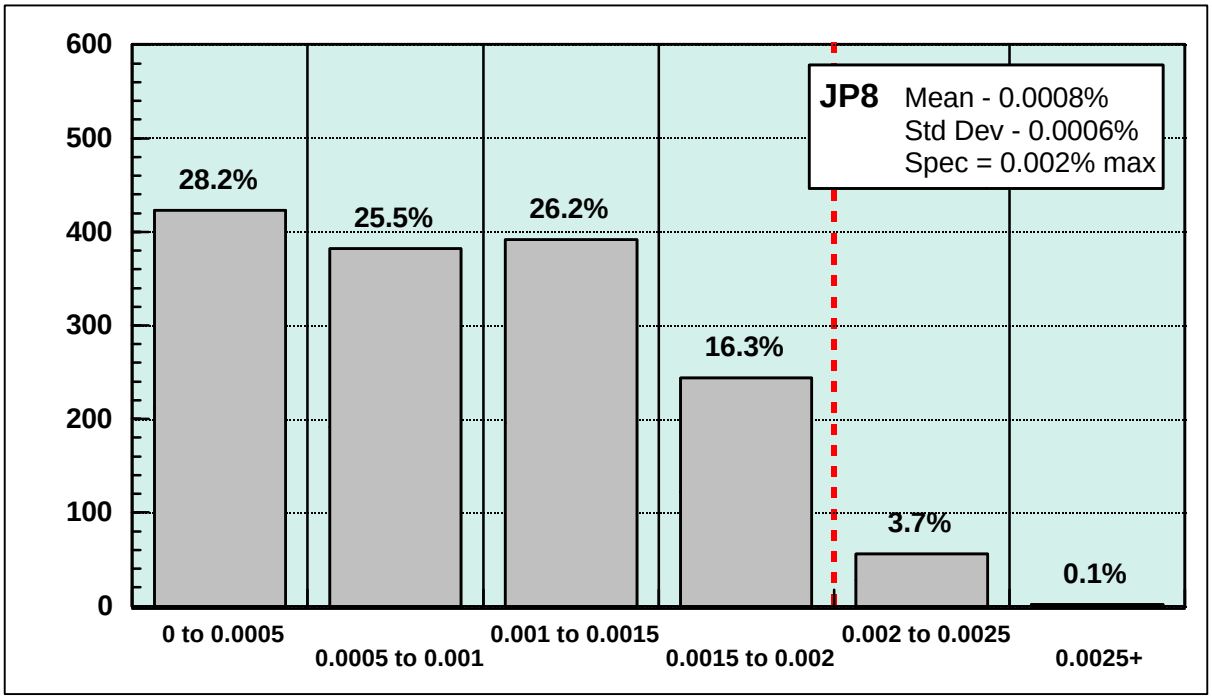



[Volume in Millions of Gallons]

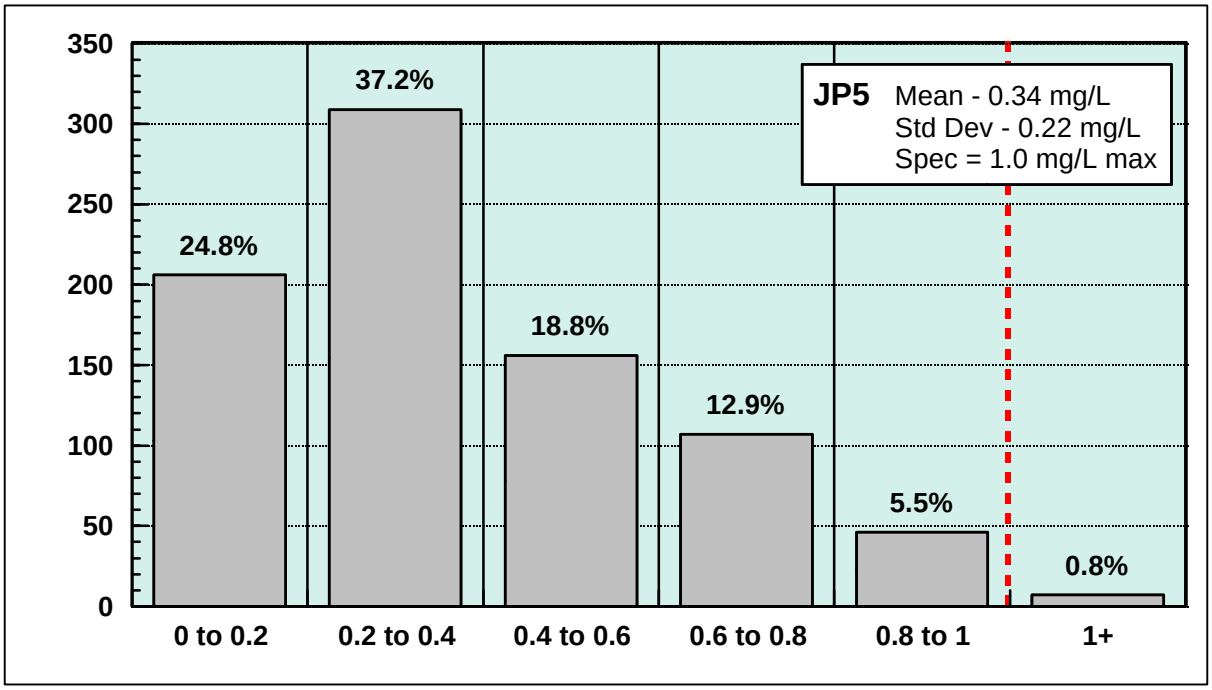
Histogram 5. Mercaptan Sulfur in Volume Received – 1999.

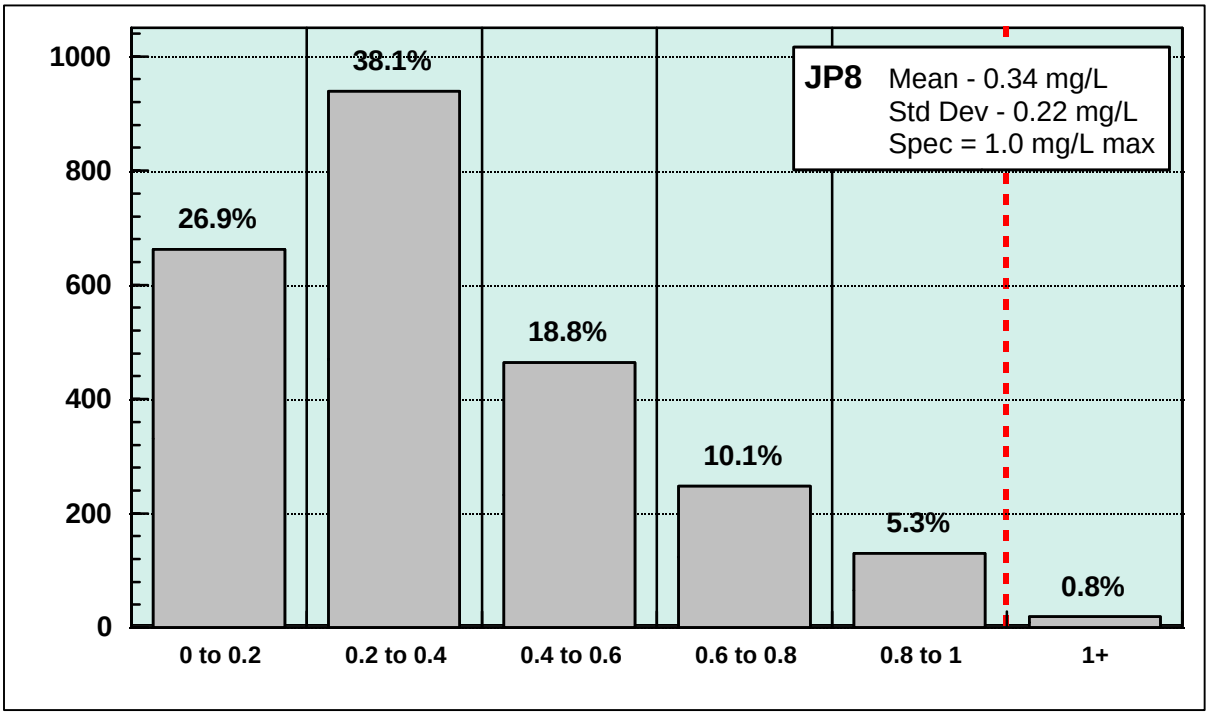



[Volume in Millions of Gallons]

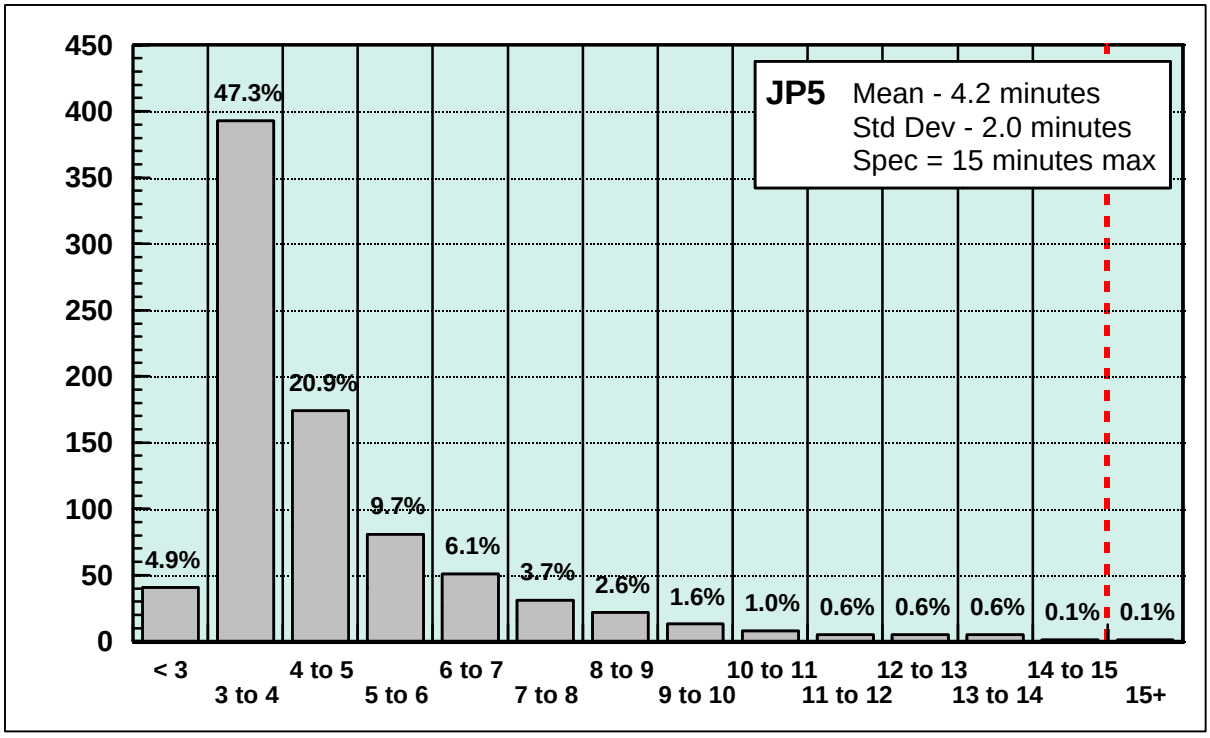
Histogram 6. Particulate Contamination in Volume Received – 1999.

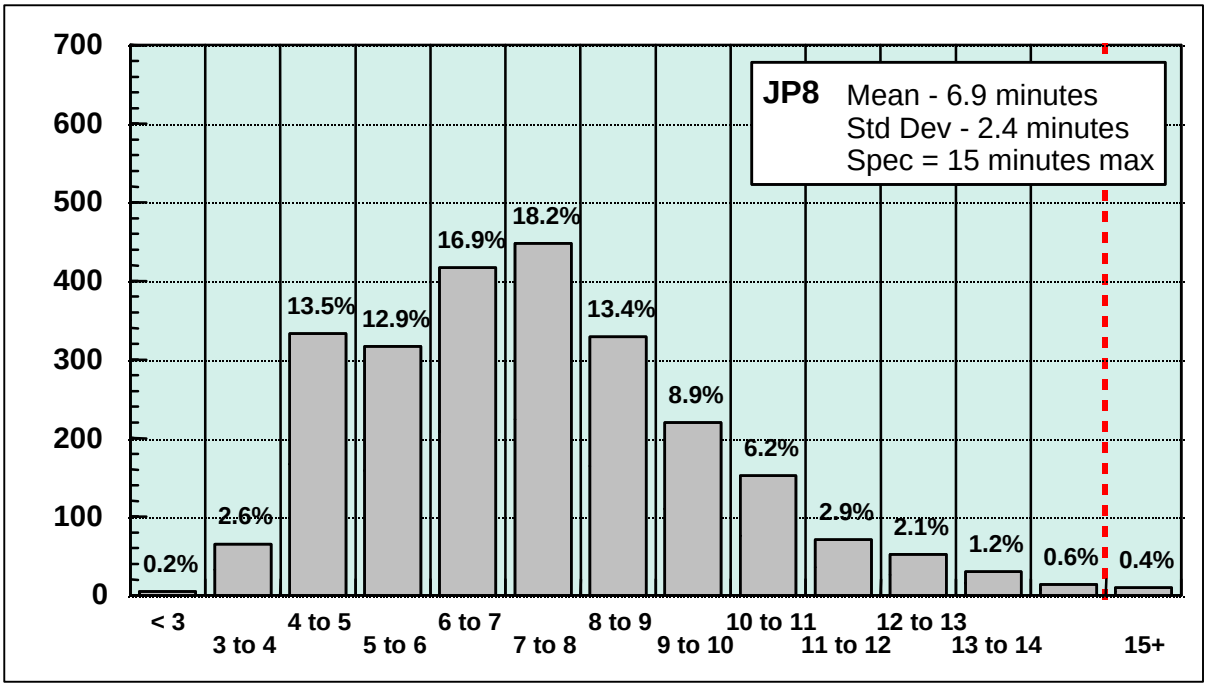



[Volume in Millions of Gallons]

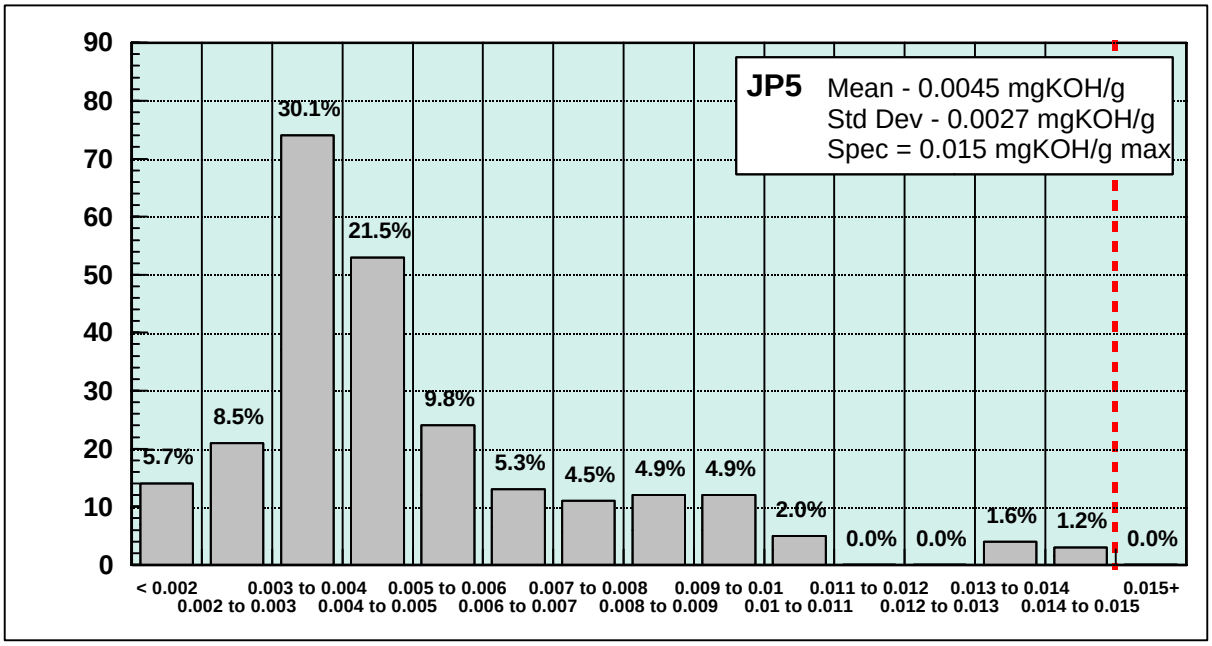
Histogram 7. Filtration Time for Volume Received – 1999.

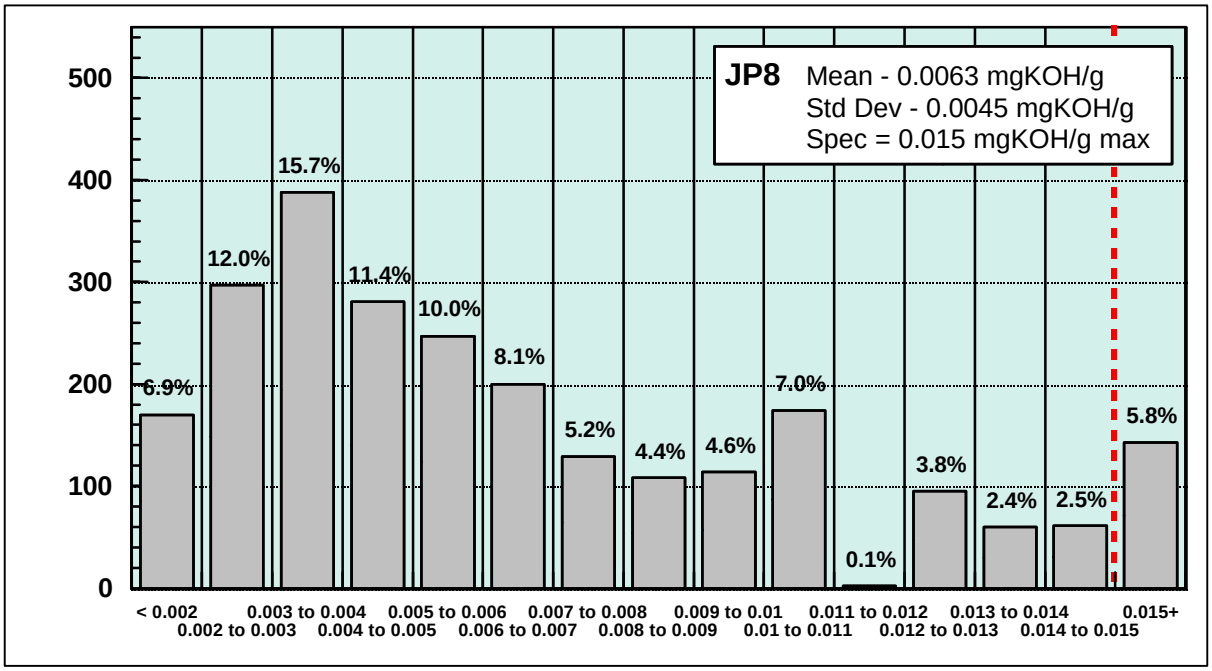



[Volume in Millions of Gallons]

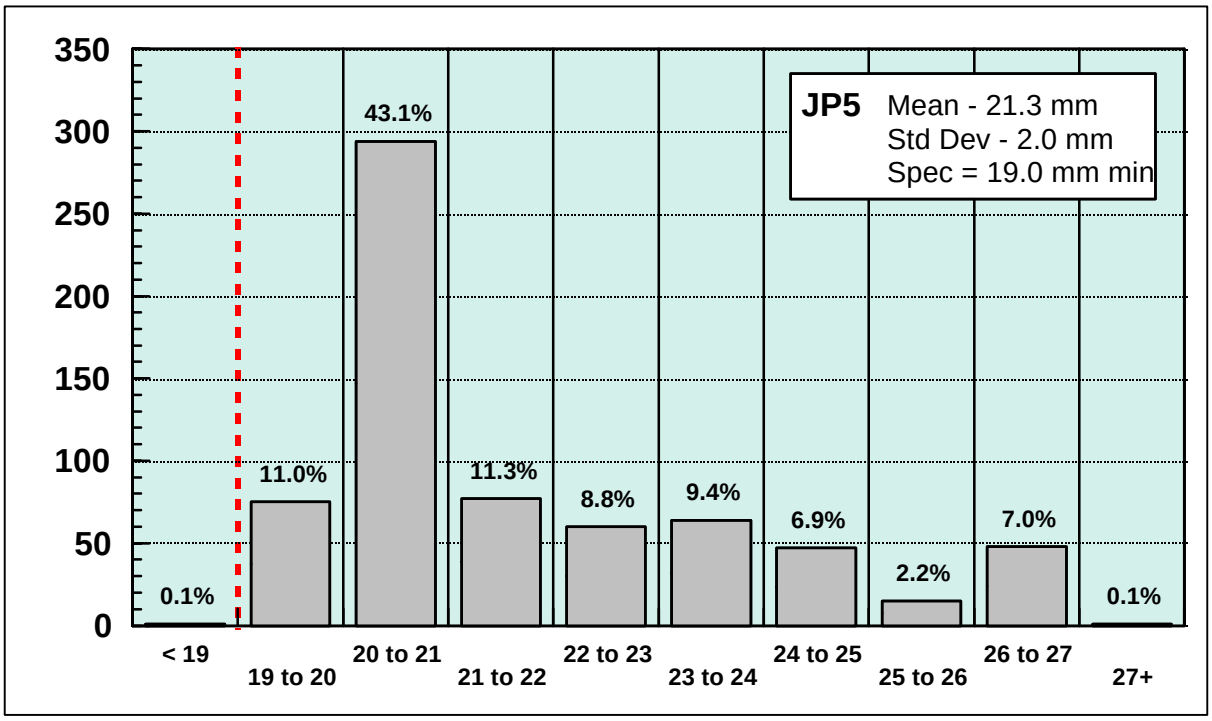
Histogram 8. Total Acid Number in Volume Received – 1999.

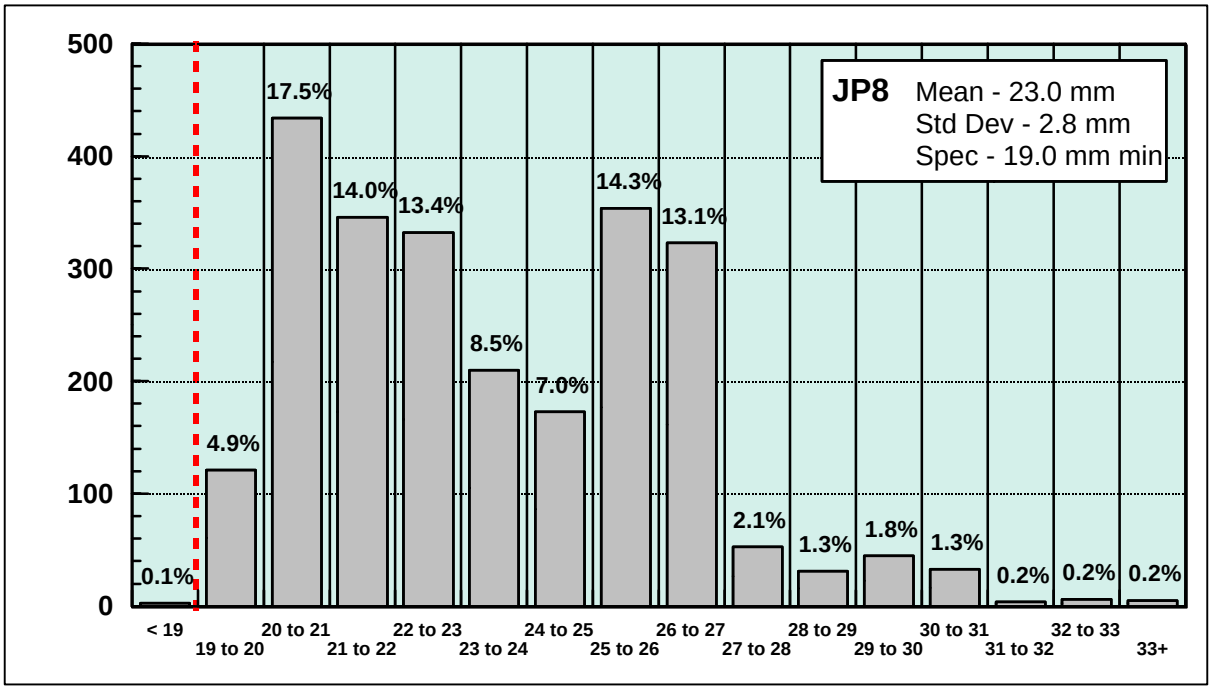



[Volume in Millions of Gallons]

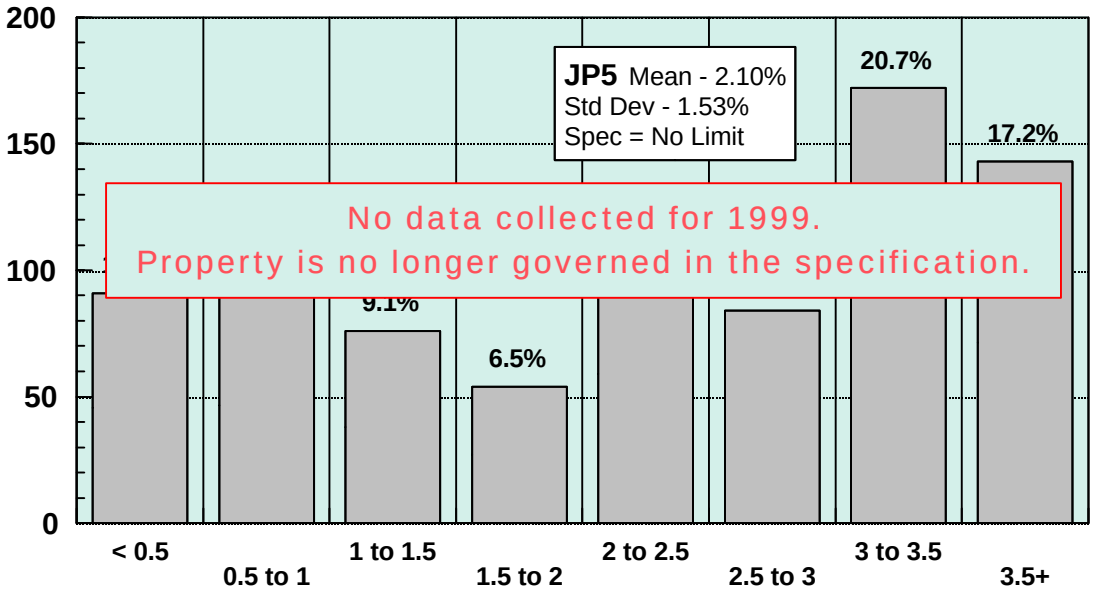
Histogram 9. Smoke Point in Volume Received – 1999.

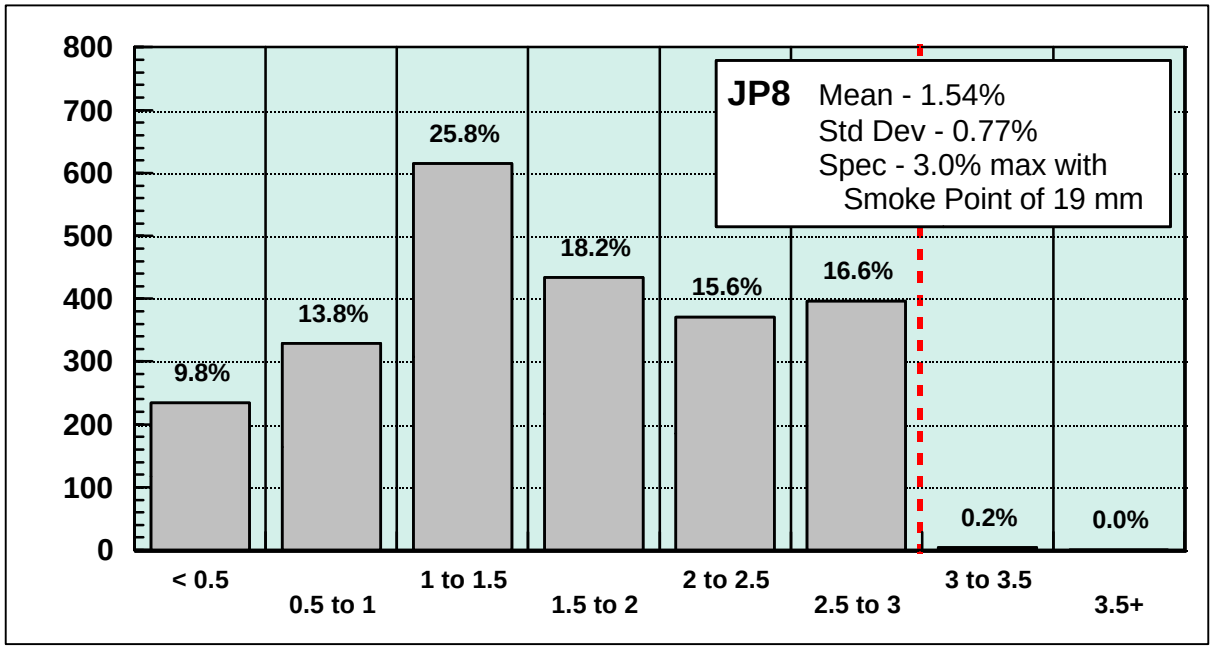



[Volume in Millions of Gallons]

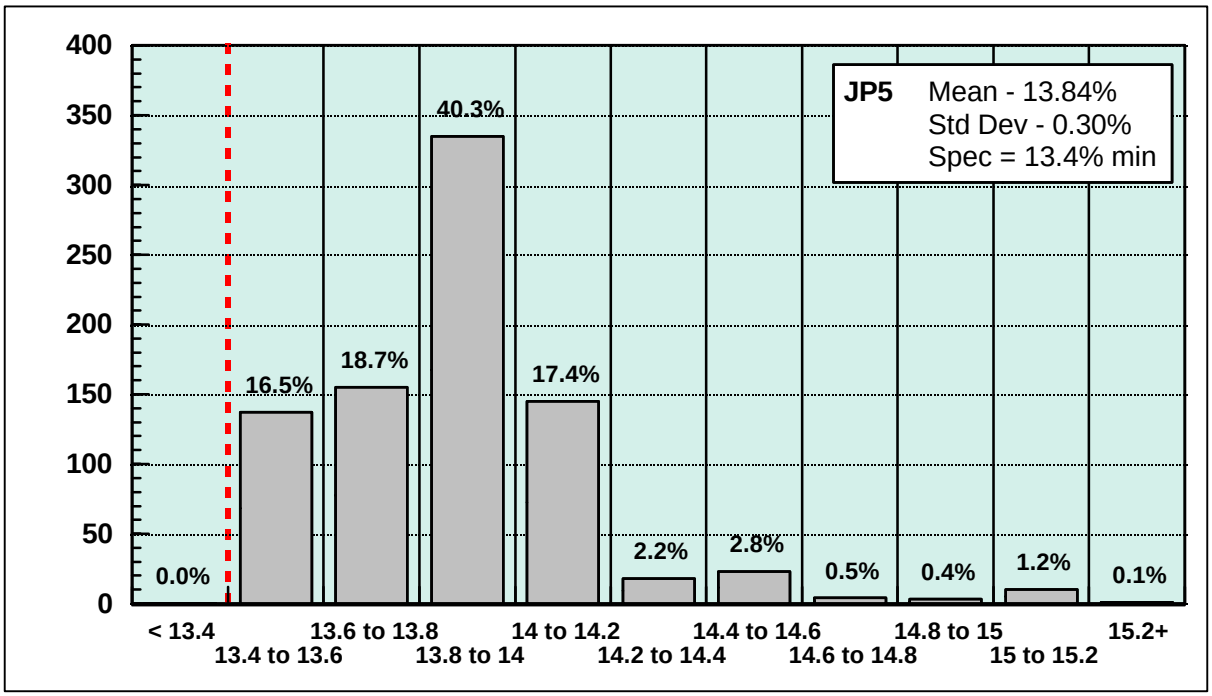
Histogram 10. Naphthalene in Volume Received – 1999.

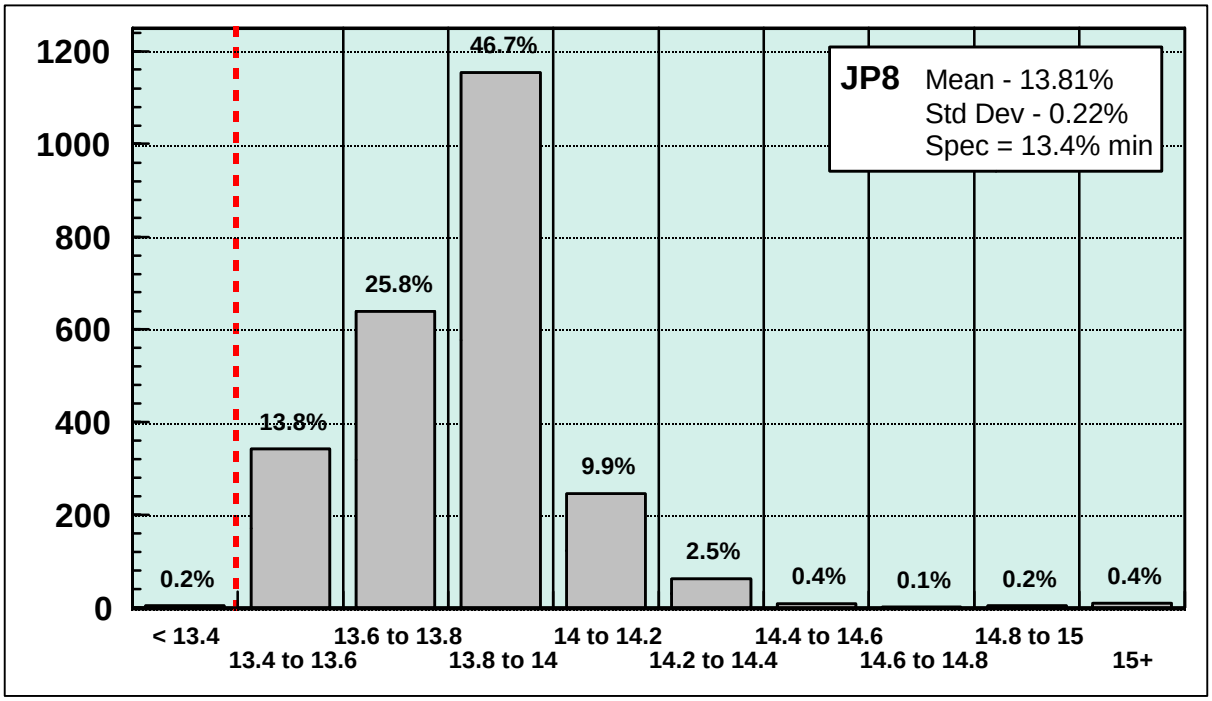



[Volume in Millions of Gallons]

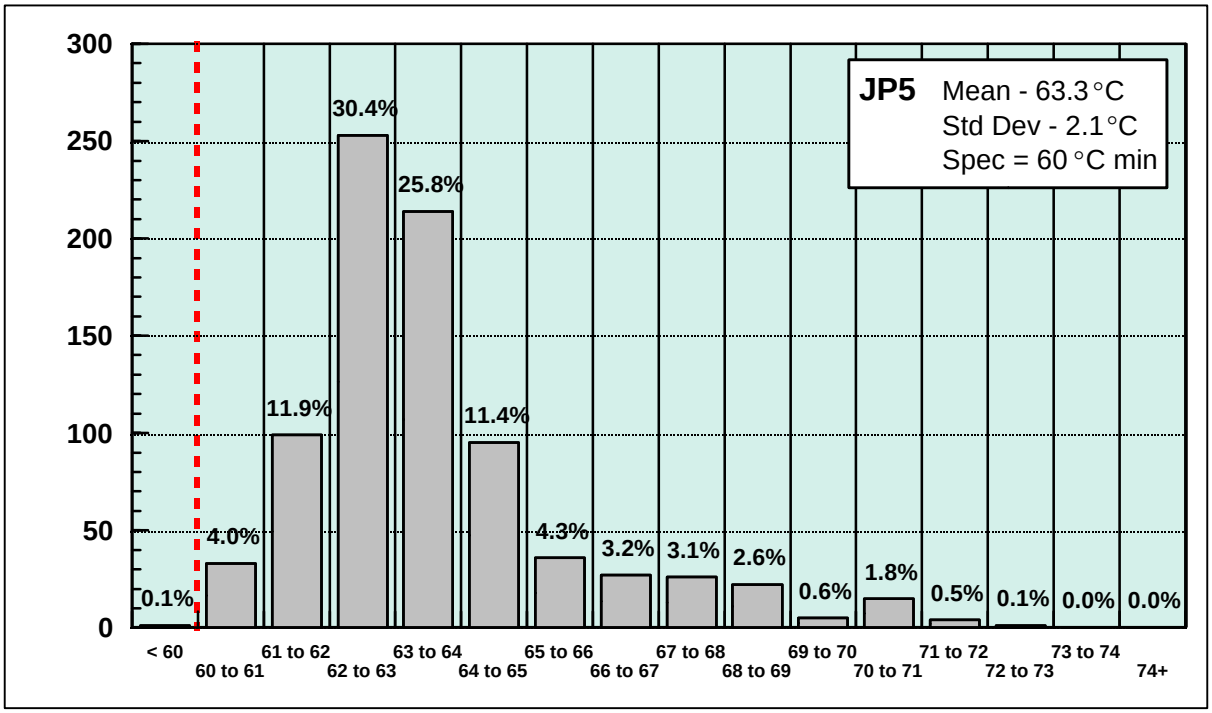
Histogram 11. Hydrogen Content in Volume Received – 1999.

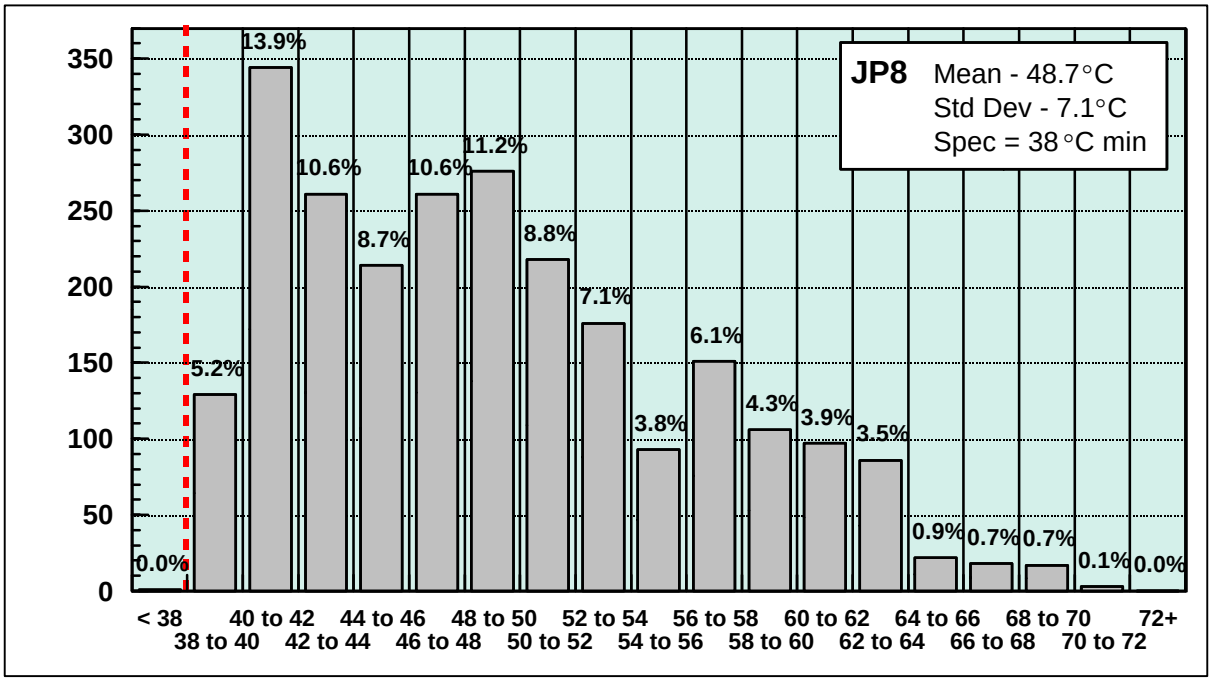



[Volume in Millions of Gallons]

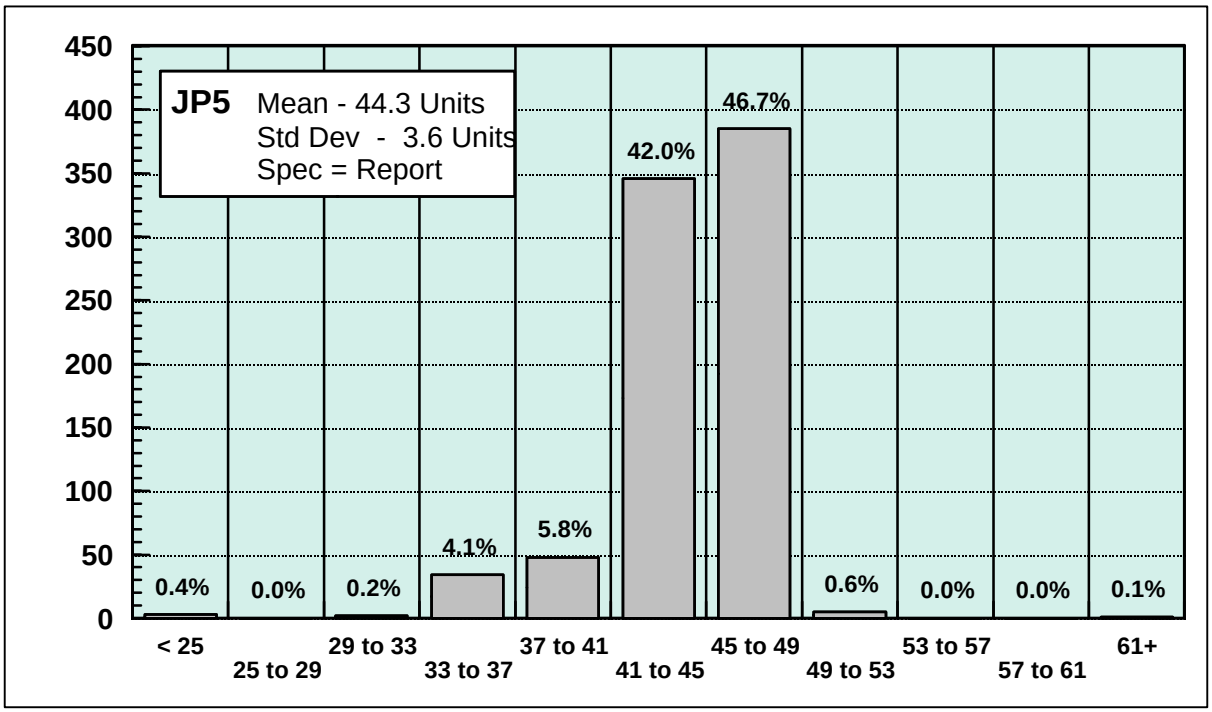
Histogram 12. Flash Point in Volume Received – 1999.

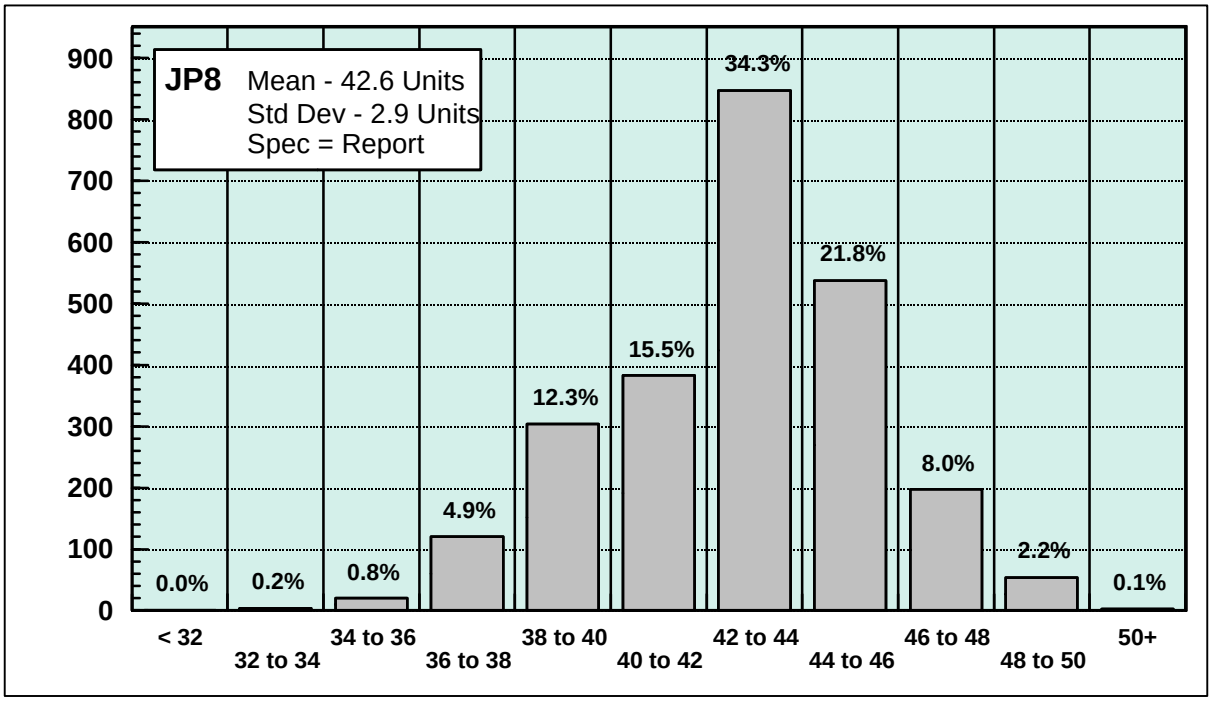



[Volume in Millions of Gallons]

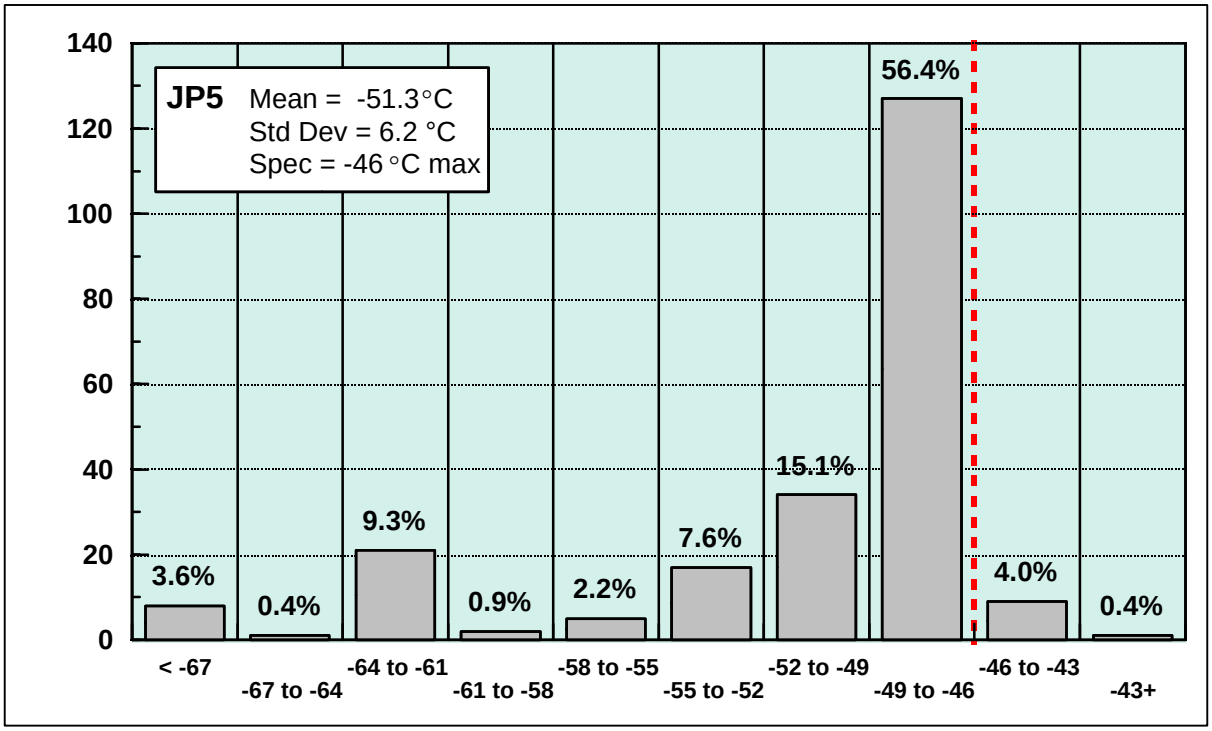
Histogram 13. Cetane Index in Volume Received – 1999.

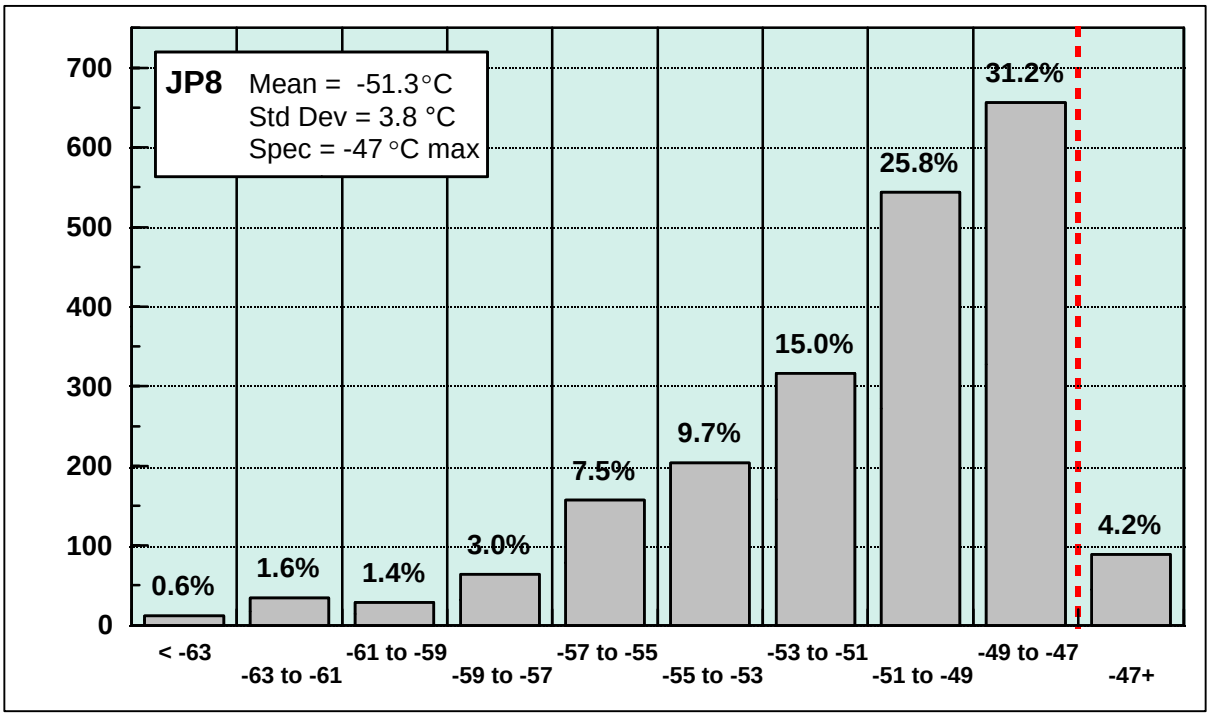



[Volume in Millions of Gallons]

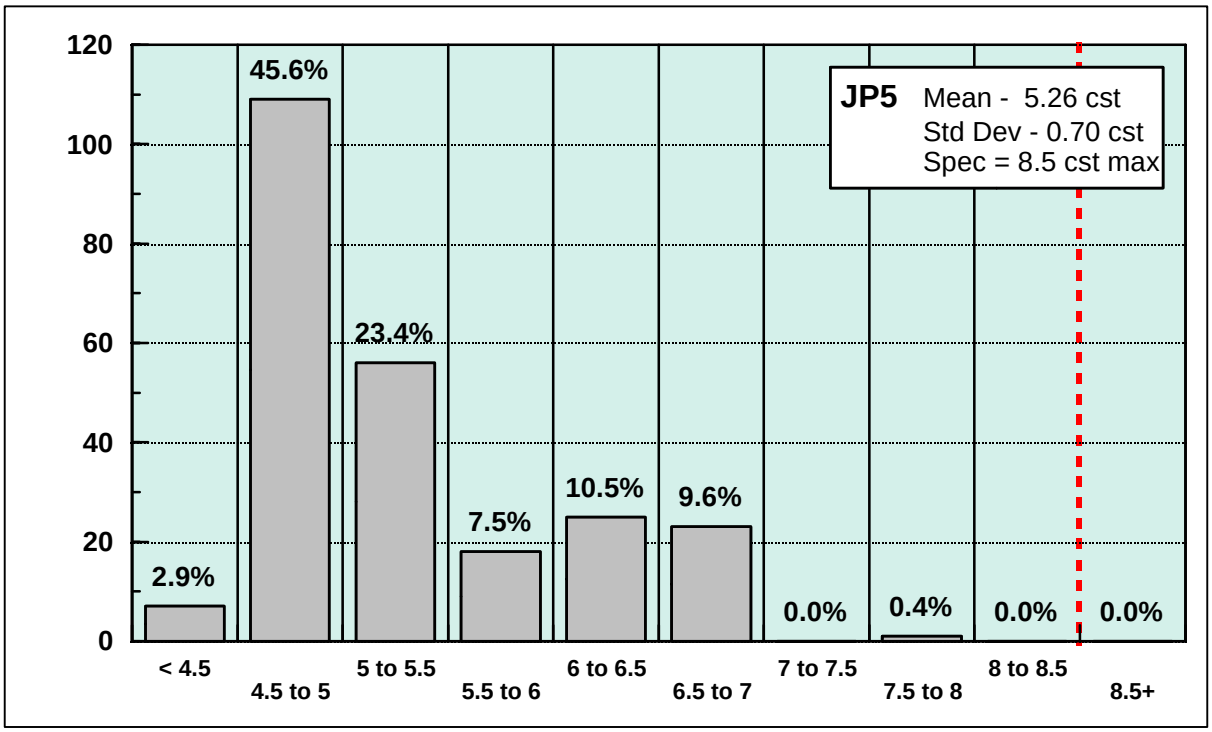
Histogram 14. Freezing Point in Volume Received – 1999.

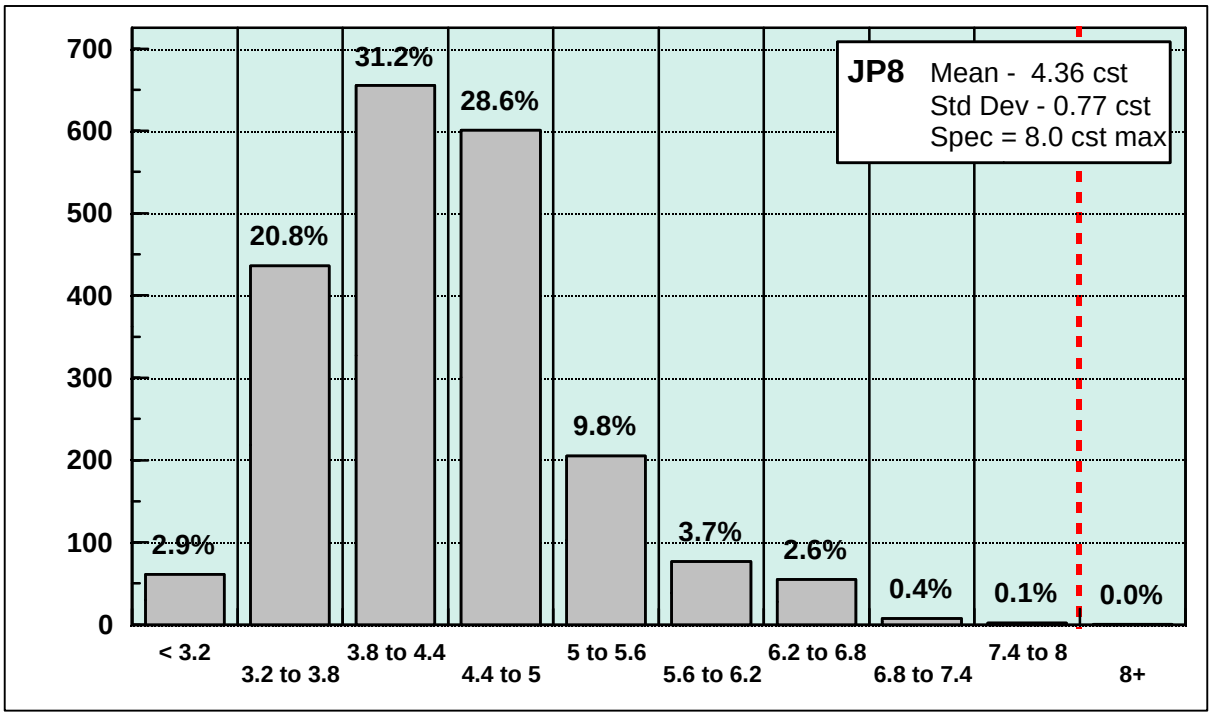



[Volume in Millions of Gallons]

Histogram 15. Viscosity in Volume Received – 1999.




[Volume in Millions of Gallons]

Fuel Characteristics - Regional

Tables (7— 59) provide the minimum, average, volumetrically weighted average, and maximum values for each fuel property of the specified grade of fuel, categorized by calendar year and by region. This supplements the preceding histograms, and facilitates comparison of characteristics from different regions. Also supplied for each year and region combination is the volume, in millions of gallons, represented by the data; as well as the number of reports that comprised that data from the field. Note that in each means of reporting, summarization is based on a different focus, producing slightly different results.

Comments noting observed trends in product or test values are included in Conclusions, where appropriate. Since Histograms and Tables are designed to be self-contained, to allow each to be useable separated from the main body of the report; these observations will need to be separately captured, if desired.

In perusing these charts, it is possible to compare individual fuel characteristics from different regions. A researcher, for example, attempting to determine what differences there may be in a comparison of regional averages for the API Gravity of JP8, would consult Table 10. The researcher could also contrast API Gravity, one fuel to another, comparing this data to that in Table 7, Table 8, or Table 9. For specificity, “actuals” may be compared; and weighted against the amount of data recorded, as cited in the last column. The tables also afford year-to-year comparisons of the condition or attributes of fuels. The same evaluations could be accomplished for any characteristic, that is governed in the specification, in consulting the appropriate table(s).

It is important to note in utilizing this data to draw conclusions of the condition or composition of fuels, however, that this data reflects "Level A procurement Quality test data"; that is to say, the results compiled from testing/evaluation at the point of origin. It must be recognized that the various transport mediums (pipeline, tankers, tank-truck, etc.) all have the potentiality to “contaminate” fuel, and that there is also a probability of mixing product from different sources/batches for allotment. This could result in different values, in product finally delivered to the end user, than those obtained in spectender terminal shipping tank or refinery test results. DESC-BP can provide transportation data for first, second, and third tier bulk deliveries, but not information on (re)distribution or on what constitutes an individual allotment.

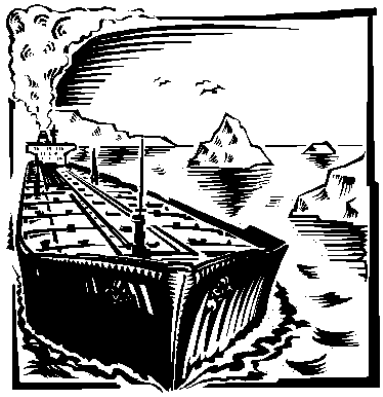


Table 7. API Gravity Conformance – F-76.

| Year | Region | Fuel | Volume | Min | Avg | WtAvg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1999 | 3 | F76 | 176.3 | 30.0 | 36.52 | 36.26 | 38.31 | 47 |
| 1999 | 5 | F76 | 93.2 | 31.5 | 32.64 | 32.53 | 34.60 | 24 |
| 1999 | 7 | F76 | 38.6 | 35.4 | 36.43 | 36.55 | 37.66 | 11 |
| 1999 | 8 | F76 | 250.5 | 31.6 | 35.50 | 36.07 | 38.20 | 44 |
| 1999 | 9 | F76 | 9.8 | 33.2 | 33.25 | 33.25 | 33.25 | 1 |

[Spec = 30.0 °API min] – [Volume in Millions of Gallons]

Table 8. API Gravity Conformance – JP-4.

| Year | Region | Fuel | Volume | Min | Avg | WtAvg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1999 | 8 | JP4 | 1.4 | 55.1 | 55.54 | 55.40 | 56.2 | 8 |

[Spec = 45.0 - 57.0 °API] – [Volume in Millions of Gallons]

Table 9. API Gravity Conformance – JP-5.

| Year | Region | Fuel | Volume | Min | Avg | WtAvg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1995 | 3 | JP5 | 55.5 | 37.1 | 42.76 | 42.78 | 44.2 | 33 |
| 1995 | 7 | JP5 | 31.7 | 40.8 | 43.44 | 43.72 | 46.5 | 8 |
| 1996 | 3 | JP5 | 308.9 | 37.2 | 43.60 | 43.69 | 47.8 | 111 |
| 1996 | 5 | JP5 | 51.4 | 39.3 | 40.34 | 40.80 | 41.8 | 17 |
| 1996 | 6 | JP5 | 22.7 | 44.1 | 45.13 | 44.98 | 45.7 | 3 |
| 1996 | 7 | JP5 | 71.9 | 41.2 | 43.82 | 43.96 | 46.8 | 21 |
| 1996 | 8 | JP5 | 39.6 | 44.4 | 45.11 | 45.12 | 46.0 | 8 |
| 1997 | 3 | JP5 | 322.9 | 42.1 | 43.94 | 44.04 | 44.8 | 129 |
| 1997 | 5 | JP5 | 210.8 | 36.6 | 39.86 | 40.56 | 43.1 | 74 |
| 1997 | 6 | JP5 | 59.2 | 40.8 | 43.05 | 42.92 | 44.2 | 10 |
| 1997 | 7 | JP5 | 55.8 | 41.1 | 43.44 | 43.52 | 45.9 | 19 |
| 1997 | 8 | JP5 | 58.6 | 40.7 | 43.58 | 43.61 | 45.9 | 20 |
| 1998 | 3 | JP5 | 310.8 | 42.3 | 44.14 | 44.21 | 45.1 | 125 |
| 1998 | 5 | JP5 | 168.3 | 36.4 | 38.82 | 39.17 | 41.9 | 66 |
| 1998 | 6 | JP5 | 24.1 | 40.6 | 40.76 | 40.74 | 41.1 | 5 |
| 1998 | 7 | JP5 | 54.7 | 40.6 | 44.38 | 44.33 | 46.4 | 19 |
| 1998 | 8 | JP5 | 57.9 | 40.4 | 44.12 | 45.05 | 46.2 | 15 |
| 1999 | 2 | JP5 | 15.9 | 43.7 | 44.07 | 44.09 | 44.6 | 32 |
| 1999 | 3 | JP5 | 307.6 | 34.0 | 43.79 | 43.90 | 44.9 | 117 |
| 1999 | 5 | JP5 | 168.1 | 28.8 | 38.36 | 39.08 | 42.5 | 53 |
| 1999 | 6 | JP5 | 62.0 | 40.6 | 44.31 | 44.37 | 46.2 | 12 |
| 1999 | 7 | JP5 | 52.6 | 41.3 | 42.94 | 43.54 | 45.6 | 13 |
| 1999 | 8 | JP5 | 46.9 | 44.7 | 45.23 | 45.23 | 45.6 | 10 |
| 1999 | 9 | JP5 | 19.6 | 42.3 | 42.50 | 42.50 | 42.7 | 2 |

[Spec = 36.0 - 48.0 °API] – [Volume in Millions of Gallons]

Table 10. API Gravity Conformance – JP-8.

| Year | Region | Fuel | Volume | Min | Avg | WtAvg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1995 | 1 | JP8 | 2.9 | 40.9 | 42.79 | 42.91 | 44.7 | 30 |
| 1995 | 2 | JP8 | 126.6 | 42.2 | 44.23 | 44.29 | 45.0 | 83 |
| 1995 | 3 | JP8 | 451.5 | 41.0 | 44.29 | 44.38 | 48.7 | 316 |
| 1995 | 4 | JP8 | 10.0 | 42.8 | 44.77 | 44.72 | 46.8 | 16 |
| 1995 | 5 | JP8 | 239.3 | 39.7 | 41.75 | 42.00 | 44.1 | 154 |
| 1995 | 7 | JP8 | 65.1 | 41.8 | 45.35 | 45.32 | 48.0 | 21 |
| 1995 | 8 | JP8 | 97.4 | 41.9 | 43.03 | 43.11 | 46.1 | 118 |
| 1996 | 1 | JP8 | 18.8 | 41.2 | 42.87 | 44.11 | 45.3 | 60 |
| 1996 | 2 | JP8 | 191.4 | 41.4 | 44.35 | 44.22 | 46.0 | 148 |
| 1996 | 3 | JP8 | 633.7 | 40.5 | 44.34 | 44.02 | 48.2 | 433 |
| 1996 | 4 | JP8 | 84.9 | 42.4 | 45.31 | 45.20 | 47.2 | 96 |
| 1996 | 5 | JP8 | 426.6 | 39.1 | 41.42 | 41.94 | 46.0 | 224 |
| 1996 | 6 | JP8 | 37.3 | 45.9 | 46.19 | 46.18 | 46.3 | 7 |
| 1996 | 7 | JP8 | 263.1 | 40.8 | 45.10 | 45.40 | 48.0 | 111 |
| 1996 | 8 | JP8 | 176.0 | 42.0 | 43.91 | 45.80 | 50.1 | 152 |
| 1997 | 1 | JP8 | 91.4 | 41.0 | 44.12 | 44.83 | 46.4 | 97 |
| 1997 | 2 | JP8 | 214.0 | 39.0 | 44.32 | 44.15 | 47.3 | 306 |
| 1997 | 3 | JP8 | 799.9 | 40.3 | 44.67 | 44.27 | 49.4 | 658 |
| 1997 | 4 | JP8 | 53.3 | 42.2 | 45.68 | 45.92 | 46.9 | 86 |
| 1997 | 5 | JP8 | 421.5 | 38.5 | 41.36 | 41.63 | 44.9 | 286 |
| 1997 | 7 | JP8 | 261.0 | 39.5 | 45.67 | 45.90 | 48.0 | 92 |
| 1997 | 8 | JP8 | 301.5 | 41.7 | 44.07 | 45.44 | 48.6 | 170 |
| 1998 | 1 | JP8 | 123.6 | 41.1 | 43.70 | 44.71 | 46.1 | 150 |
| 1998 | 2 | JP8 | 215.8 | 38.0 | 44.13 | 43.62 | 48.1 | 272 |
| 1998 | 3 | JP8 | 976.1 | 40.8 | 44.63 | 43.93 | 47.5 | 872 |
| 1998 | 4 | JP8 | 60.2 | 43.5 | 45.26 | 45.54 | 46.6 | 112 |
| 1998 | 5 | JP8 | 434.6 | 37.2 | 41.82 | 41.57 | 44.1 | 284 |
| 1998 | 6 | JP8 | 6.7 | 46.0 | 46.00 | 46.00 | 46.0 | 1 |
| 1998 | 7 | JP8 | 149.4 | 40.5 | 45.54 | 45.64 | 47.5 | 57 |
| 1998 | 8 | JP8 | 262.3 | 41.7 | 44.34 | 45.54 | 48.4 | 204 |
| 1999 | 1 | JP8 | 104.2 | 39.9 | 43.40 | 44.86 | 47.4 | 137 |
| 1999 | 2 | JP8 | 204.0 | 37.8 | 43.80 | 43.63 | 46.2 | 270 |
| 1999 | 3 | JP8 | 1037.7 | 38.8 | 44.49 | 44.78 | 48.1 | 951 |
| 1999 | 4 | JP8 | 92.4 | 42.3 | 45.17 | 45.28 | 49.9 | 198 |
| 1999 | 5 | JP8 | 306.5 | 34.4 | 40.98 | 40.42 | 43.6 | 199 |
| 1999 | 7 | JP8 | 316.7 | 40.9 | 45.04 | 45.40 | 48.8 | 118 |
| 1999 | 8 | JP8 | 293.9 | 40.0 | 43.92 | 44.71 | 49.4 | 225 |
| 1999 | 9 | JP8 | 47.0 | 45.1 | 46.24 | 46.07 | 47.5 | 7 |
| 1999 | 7 | AN8 | 3.9 | 46.2 | 46.20 | 46.20 | 46.2 | 1 |

[Spec = 37.0 - 51.0 °API] – [Volume in Millions of Gallons]

Table 11. Aromatics Conformance – JP-4.

| Year | Region | Fuel | Volume | Min | Avg | WtAvg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1999 | 8 | JP4 | 1.4 | 7.1 | 8.94 | 9.06 | 10.5 | 8 |

[Spec = 25% max] – [Volume in Millions of Gallons]

Table 12. Aromatics Conformance – JP-5.

| Year | Region | Fuel | Volume | Min | Avg | WtAvg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1995 | 3 | JP5 | 55.5 | 11.5 | 16.79 | 17.34 | 20.2 | 33 |
| 1995 | 7 | JP5 | 31.7 | 19.0 | 20.06 | 20.11 | 21.0 | 8 |
| 1996 | 3 | JP5 | 308.9 | 12.8 | 18.51 | 18.60 | 23.6 | 111 |
| 1996 | 5 | JP5 | 51.4 | 19.0 | 20.47 | 20.56 | 22.9 | 17 |
| 1996 | 6 | JP5 | 22.7 | 16.2 | 19.33 | 20.38 | 21.8 | 3 |
| 1996 | 7 | JP5 | 71.9 | 15.6 | 18.64 | 18.54 | 20.7 | 21 |
| 1996 | 8 | JP5 | 39.6 | 15.6 | 16.43 | 16.41 | 18.4 | 8 |
| 1997 | 3 | JP5 | 322.9 | 11.8 | 18.41 | 18.74 | 20.6 | 129 |
| 1997 | 5 | JP5 | 210.8 | 13.0 | 19.80 | 20.08 | 22.6 | 74 |
| 1997 | 6 | JP5 | 59.2 | 18.0 | 19.46 | 19.40 | 20.7 | 10 |
| 1997 | 7 | JP5 | 55.8 | 18.6 | 19.98 | 20.07 | 22.6 | 19 |
| 1997 | 8 | JP5 | 58.6 | 14.0 | 16.85 | 16.80 | 19.6 | 20 |
| 1998 | 3 | JP5 | 310.8 | 11.5 | 18.39 | 18.57 | 20.8 | 125 |
| 1998 | 5 | JP5 | 168.3 | 10.0 | 18.04 | 18.08 | 24.1 | 66 |
| 1998 | 6 | JP5 | 24.1 | 20.0 | 21.66 | 21.59 | 22.8 | 5 |
| 1998 | 7 | JP5 | 54.7 | 15.3 | 18.75 | 18.59 | 20.4 | 19 |
| 1998 | 8 | JP5 | 57.9 | 14.0 | 16.99 | 16.35 | 20.3 | 15 |
| 1999 | 2 | JP5 | 15.9 | 12.6 | 14.01 | 14.20 | 15.4 | 32 |
| 1999 | 3 | JP5 | 307.6 | 13.4 | 18.34 | 18.61 | 20.8 | 117 |
| 1999 | 5 | JP5 | 168.1 | 11.2 | 15.97 | 15.71 | 21.0 | 53 |
| 1999 | 6 | JP5 | 62.0 | 16.1 | 20.00 | 19.95 | 24.1 | 12 |
| 1999 | 7 | JP5 | 52.6 | 14.7 | 18.99 | 18.17 | 21.0 | 13 |
| 1999 | 8 | JP5 | 46.9 | 12.0 | 16.22 | 15.94 | 18.2 | 10 |
| 1999 | 9 | JP5 | 19.6 | 16.1 | 16.35 | 16.35 | 16.6 | 2 |

[Spec = 25% max] – [Volume in Millions of Gallons]

Table 13. Aromatics Conformance - JP-8.

| Year | Region | Fuel | Volume | Min | Avg | WtAvg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1995 | 1 | JP8 | 2.9 | 17.0 | 19.25 | 19.12 | 20.7 | 30 |
| 1995 | 2 | JP8 | 126.6 | 11.0 | 15.27 | 15.31 | 22.6 | 83 |
| 1995 | 3 | JP8 | 451.5 | 7.1 | 17.57 | 17.81 | 24.8 | 316 |
| 1995 | 4 | JP8 | 10.0 | 13.7 | 17.29 | 16.95 | 21.2 | 16 |
| 1995 | 5 | JP8 | 239.3 | 10.9 | 20.79 | 18.49 | 25.0 | 154 |
| 1995 | 7 | JP8 | 65.1 | 9.7 | 16.75 | 16.74 | 21.8 | 21 |
| 1995 | 8 | JP8 | 97.4 | 10.1 | 18.30 | 17.94 | 22.0 | 118 |
| 1996 | 1 | JP8 | 18.8 | 17.5 | 19.56 | 19.87 | 23.7 | 60 |
| 1996 | 2 | JP8 | 191.4 | 11.1 | 14.64 | 14.97 | 21.5 | 148 |
| 1996 | 3 | JP8 | 633.7 | 9.1 | 17.66 | 18.56 | 24.9 | 433 |
| 1996 | 4 | JP8 | 84.9 | 13.0 | 17.65 | 17.89 | 22.9 | 96 |
| 1996 | 5 | JP8 | 426.6 | 7.8 | 18.61 | 16.66 | 24.6 | 224 |
| 1996 | 6 | JP8 | 37.3 | 15.8 | 16.01 | 16.00 | 16.3 | 7 |
| 1996 | 7 | JP8 | 263.1 | 12.2 | 18.25 | 17.17 | 23.0 | 111 |
| 1996 | 8 | JP8 | 176.0 | 13.0 | 18.41 | 17.15 | 21.1 | 152 |
| 1997 | 1 | JP8 | 91.4 | 12.9 | 17.70 | 16.43 | 21.8 | 97 |
| 1997 | 2 | JP8 | 214.0 | 6.1 | 14.33 | 14.43 | 21.0 | 306 |
| 1997 | 3 | JP8 | 799.9 | 6.0 | 17.60 | 18.90 | 24.6 | 658 |
| 1997 | 4 | JP8 | 53.3 | 13.1 | 16.52 | 15.92 | 22.0 | 86 |
| 1997 | 5 | JP8 | 421.5 | 10.7 | 19.83 | 17.75 | 23.7 | 286 |
| 1997 | 7 | JP8 | 261.0 | 13.5 | 17.17 | 16.60 | 23.0 | 92 |
| 1997 | 8 | JP8 | 301.5 | 10.8 | 18.58 | 17.81 | 20.9 | 170 |
| 1998 | 1 | JP8 | 123.6 | 14.3 | 18.05 | 16.59 | 21.8 | 150 |
| 1998 | 2 | JP8 | 215.8 | 5.2 | 13.94 | 14.75 | 22.6 | 272 |
| 1998 | 3 | JP8 | 976.1 | 10.4 | 17.60 | 18.75 | 24.8 | 872 |
| 1998 | 4 | JP8 | 60.2 | 12.2 | 16.31 | 15.80 | 21.5 | 112 |
| 1998 | 5 | JP8 | 434.6 | 9.4 | 19.63 | 17.71 | 22.9 | 284 |
| 1998 | 6 | JP8 | 6.7 | 16.2 | 16.20 | 16.20 | 16.2 | 1 |
| 1998 | 7 | JP8 | 149.4 | 12.3 | 16.85 | 16.70 | 20.3 | 57 |
| 1998 | 8 | JP8 | 262.3 | 6.8 | 18.25 | 17.57 | 24.9 | 204 |
| 1999 | 1 | JP8 | 104.2 | 11.0 | 19.18 | 17.34 | 23.6 | 137 |
| 1999 | 2 | JP8 | 204.0 | 9.5 | 15.23 | 15.27 | 22.0 | 270 |
| 1999 | 3 | JP8 | 1037.7 | 7.9 | 17.77 | 17.97 | 24.7 | 951 |
| 1999 | 4 | JP8 | 92.4 | 11.4 | 15.98 | 16.16 | 22.4 | 198 |
| 1999 | 5 | JP8 | 306.5 | 10.1 | 19.05 | 18.18 | 25.0 | 199 |
| 1999 | 7 | JP8 | 316.7 | 9.8 | 16.60 | 16.59 | 21.4 | 118 |
| 1999 | 8 | JP8 | 293.9 | 7.9 | 18.43 | 17.74 | 21.6 | 225 |
| 1999 | 9 | JP8 | 47.0 | 19.4 | 20.00 | 20.11 | 21.8 | 7 |
| 1999 | 7 | AN8 | 3.9 | 17.7 | 17.70 | 17.70 | 17.7 | 1 |

[Spec = 25% max] – [Volume in Millions of Gallons]

Table 14. Olefins Conformance – JP-4.

| Year | Region | Fuel | Volume | Min | Avg | WtAvg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1999 | 8 | JP4 | 1.4 | 0.0 | 0.22 | 0.05 | 1.8 | 8 |

[Spec = 5% max] – [Volume in Millions of Gallons]

Table 15. Olefins Conformance – JP-5.

| Year | Region | Fuel | Volume | Min | Avg | WtAvg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1995 | 3 | JP5 | 55.5 | 0.5 | 0.97 | 0.99 | 2.1 | 33 |
| 1995 | 7 | JP5 | 31.7 | 0.5 | 0.79 | 0.78 | 1.2 | 8 |
| 1996 | 3 | JP5 | 308.9 | 0.1 | 0.91 | 0.89 | 2.0 | 111 |
| 1996 | 5 | JP5 | 51.4 | 0.8 | 1.19 | 1.11 | 2.0 | 17 |
| 1996 | 6 | JP5 | 22.7 | 0.3 | 0.37 | 0.39 | 0.5 | 3 |
| 1996 | 7 | JP5 | 71.9 | 0.2 | 0.97 | 0.96 | 2.0 | 21 |
| 1996 | 8 | JP5 | 39.6 | 0.6 | 0.79 | 0.78 | 1.0 | 8 |
| 1997 | 3 | JP5 | 322.9 | 0.4 | 0.87 | 0.82 | 2.7 | 129 |
| 1997 | 5 | JP5 | 210.8 | 0.6 | 1.72 | 1.66 | 4.8 | 74 |
| 1997 | 6 | JP5 | 59.2 | 0.4 | 0.65 | 0.70 | 1.2 | 10 |
| 1997 | 7 | JP5 | 55.8 | 0.5 | 1.17 | 1.13 | 2.2 | 19 |
| 1997 | 8 | JP5 | 56.6 | 0.4 | 0.88 | 1.06 | 1.4 | 18 |
| 1998 | 3 | JP5 | 303.2 | 0.6 | 0.89 | 0.88 | 2.6 | 120 |
| 1998 | 5 | JP5 | 148.6 | 0.6 | 1.62 | 1.37 | 3.6 | 57 |
| 1998 | 6 | JP5 | 14.2 | 0.0 | 0.0 | 0.00 | 0.0 | 3 |
| 1998 | 7 | JP5 | 49.3 | 0.6 | 1.06 | 1.01 | 1.9 | 17 |
| 1998 | 8 | JP5 | 50.2 | 0.3 | 0.61 | 0.74 | 1.2 | 14 |
| 1999 | 2 | JP5 | 15.6 | 0.8 | 1.62 | 1.41 | 3.40 | 32 |
| 1999 | 3 | JP5 | 307.6 | 0.1 | 0.96 | 0.20 | 1.70 | 29 |
| 1999 | 5 | JP5 | 168.1 | 0.5 | 1.17 | 0.62 | 2.30 | 24 |
| 1999 | 6 | JP5 | 62.0 | 0.0 | 0.0 | 0.00 | 0.0 | 0 |
| 1999 | 7 | JP5 | 52.6 | 1.2 | 1.20 | 1.20 | 1.20 | 1 |
| 1999 | 8 | JP5 | 46.9 | 0.0 | 0.0 | 0.00 | 0.0 | 0 |
| 1999 | 9 | JP5 | 19.6 | 1.2 | 1.20 | 1.20 | 1.20 | 1 |

[Spec = 5% max] – [Volume in Millions of Gallons]

Table 16. Olefins Conformance – JP-8.

| Year | Region | Fuel | Volume | Min | Avg | WtAvg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1995 | 1 | JP8 | 2.9 | 0.4 | 1.23 | 1.24 | 2.1 | 30 |
| 1995 | 2 | JP8 | 126.6 | 0.7 | 2.32 | 2.38 | 5.0 | 83 |
| 1995 | 3 | JP8 | 448.0 | 0.3 | 1.24 | 1.33 | 4.6 | 314 |
| 1995 | 4 | JP8 | 10.0 | 0.5 | 1.00 | 1.05 | 2.9 | 16 |
| 1995 | 5 | JP8 | 239.3 | 0.6 | 2.17 | 2.34 | 4.4 | 154 |
| 1995 | 7 | JP8 | 65.1 | 0.2 | 0.51 | 0.55 | 1.1 | 21 |
| 1995 | 8 | JP8 | 84.2 | 0.0 | 0.89 | 1.05 | 4.1 | 71 |
| 1996 | 1 | JP8 | 18.8 | 0.6 | 1.02 | 0.95 | 1.9 | 60 |
| 1996 | 2 | JP8 | 191.4 | 0.8 | 1.70 | 1.95 | 5.0 | 148 |
| 1996 | 3 | JP8 | 620.6 | 0.1 | 1.18 | 1.18 | 4.3 | 422 |
| 1996 | 4 | JP8 | 78.6 | 0.2 | 0.97 | 0.99 | 3.0 | 90 |
| 1996 | 5 | JP8 | 426.6 | 0.4 | 1.88 | 2.31 | 5.0 | 224 |
| 1996 | 6 | JP8 | 37.3 | 0.3 | 0.30 | 0.30 | 0.3 | 7 |
| 1996 | 7 | JP8 | 249.2 | 0.1 | 0.62 | 0.50 | 1.3 | 101 |
| 1996 | 8 | JP8 | 87.3 | 0.0 | 0.55 | 0.74 | 3.1 | 132 |
| 1997 | 1 | JP8 | 91.4 | 0.6 | 1.88 | 2.30 | 4.6 | 97 |
| 1997 | 2 | JP8 | 214.0 | 0.0 | 1.22 | 1.35 | 4.8 | 306 |
| 1997 | 3 | JP8 | 799.9 | 0.0 | 1.15 | 1.17 | 4.6 | 658 |
| 1997 | 4 | JP8 | 53.3 | 0.3 | 0.85 | 0.89 | 2.4 | 86 |
| 1997 | 5 | JP8 | 421.5 | 0.3 | 1.49 | 2.00 | 4.7 | 286 |
| 1997 | 7 | JP8 | 261.0 | 0.1 | 0.46 | 0.40 | 1.4 | 78 |
| 1997 | 8 | JP8 | 301.5 | 0.0 | 0.38 | 0.20 | 3.5 | 170 |
| 1998 | 1 | JP8 | 123.6 | 0.5 | 1.62 | 2.00 | 3.9 | 150 |
| 1998 | 2 | JP8 | 215.8 | 0.0 | 1.23 | 1.33 | 4.8 | 272 |
| 1998 | 3 | JP8 | 976.1 | 0.3 | 1.10 | 1.10 | 4.0 | 872 |
| 1998 | 4 | JP8 | 60.2 | 0.4 | 1.21 | 1.13 | 4.2 | 112 |
| 1998 | 5 | JP8 | 434.6 | 0.1 | 1.25 | 1.73 | 4.3 | 284 |
| 1998 | 6 | JP8 | 6.7 | 0.3 | 0.30 | 0.30 | 0.3 | 1 |
| 1998 | 7 | JP8 | 149.4 | 0.1 | 0.61 | 0.60 | 2.7 | 57 |
| 1998 | 8 | JP8 | 262.3 | 0.0 | 0.62 | 0.36 | 4.5 | 204 |
| 1999 | 1 | JP8 | 104.2 | 0.1 | 1.31 | 1.68 | 3.9 | 137 |
| 1999 | 2 | JP8 | 204.0 | 0.5 | 1.36 | 1.32 | 5.0 | 269 |
| 1999 | 3 | JP8 | 1037.7 | 0.0 | 1.01 | 1.01 | 4.0 | 947 |
| 1999 | 4 | JP8 | 92.4 | 0.0 | 1.44 | 1.31 | 4.9 | 198 |
| 1999 | 5 | JP8 | 306.5 | 0.2 | 1.17 | 1.35 | 5.0 | 199 |
| 1999 | 7 | JP8 | 316.7 | 0.0 | 0.84 | 0.93 | 4.6 | 118 |
| 1999 | 8 | JP8 | 293.9 | 0.0 | 1.02 | 0.92 | 4.9 | 225 |
| 1999 | 9 | JP8 | 47.0 | 0.5 | 0.59 | 0.60 | 0.7 | 7 |
| 1999 | 7 | AN8 | 3.9 | 0.4 | 0.40 | 0.40 | 0.4 | 1 |

[Spec = 5% max] – [Volume in Millions of Gallons]

Table 17. Total Sulfur Conformance – F-76.

| Year | Region | Fuel | Volume | Min | Avg | Wt Avg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1999 | 3 | F76 | 176.3 | 0.030 | 0.4633 | 0.4871 | 0.850 | 47 |
| 1999 | 5 | F76 | 93.2 | 0.146 | 0.3915 | 0.3880 | 0.526 | 24 |
| 1999 | 7 | F76 | 38.6 | 0.160 | 0.6882 | 0.6787 | 0.980 | 11 |
| 1999 | 8 | F76 | 250.5 | 0.220 | 0.5461 | 0.5048 | 0.950 | 44 |
| 1999 | 9 | F76 | 9.8 | 0.146 | 0.1460 | 0.1460 | 0.146 | 1 |

[Spec = 1.0% max] – [Volume in Millions of Gallons]

Table 18. Total Sulfur Conformance – JP-4.

| Year | Region | Fuel | Volume | Min | Avg | Wt Avg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1999 | 8 | JP4 | 1.4 | 0.030 | 0.0412 | 0.0426 | 0.050 | 8 |

[Spec = 0.4% max] – [Volume in Millions of Gallons]

Table 19. Total Sulfur Conformance – JP-5.

| Year | Region | Fuel | Volume | Min | Avg | WtAvg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1995 | 3 | JP5 | 55.5 | 0.000 | 0.0443 | 0.0513 | 0.110 | 33 |
| 1995 | 7 | JP5 | 31.7 | 0.010 | 0.0138 | 0.0144 | 0.020 | 8 |
| 1996 | 3 | JP5 | 308.9 | 0.000 | 0.0828 | 0.0838 | 0.140 | 111 |
| 1996 | 5 | JP5 | 51.4 | 0.010 | 0.0120 | 0.0133 | 0.020 | 17 |
| 1996 | 6 | JP5 | 22.7 | 0.010 | 0.0130 | 0.0140 | 0.019 | 3 |
| 1996 | 7 | JP5 | 71.9 | 0.010 | 0.0352 | 0.0293 | 0.140 | 21 |
| 1996 | 8 | JP5 | 39.6 | 0.010 | 0.0175 | 0.0174 | 0.030 | 8 |
| 1997 | 3 | JP5 | 322.9 | 0.004 | 0.0915 | 0.0935 | 0.130 | 129 |
| 1997 | 5 | JP5 | 210.8 | 0.000 | 0.0115 | 0.0126 | 0.150 | 74 |
| 1997 | 6 | JP5 | 59.2 | 0.010 | 0.0100 | 0.0100 | 0.010 | 10 |
| 1997 | 7 | JP5 | 55.8 | 0.004 | 0.0327 | 0.0253 | 0.150 | 19 |
| 1997 | 8 | JP5 | 58.6 | 0.010 | 0.0330 | 0.0252 | 0.090 | 20 |
| 1998 | 3 | JP5 | 310.8 | 0.030 | 0.0981 | 0.0993 | 0.140 | 125 |
| 1998 | 5 | JP5 | 168.3 | 0.000 | 0.0255 | 0.0235 | 0.060 | 66 |
| 1998 | 6 | JP5 | 24.1 | 0.010 | 0.0100 | 0.0100 | 0.010 | 5 |
| 1998 | 7 | JP5 | 54.7 | 0.006 | 0.0454 | 0.0407 | 0.200 | 19 |
| 1998 | 8 | JP5 | 57.9 | 0.001 | 0.0527 | 0.0364 | 0.120 | 15 |
| 1999 | 2 | JP5 | 15.6 | 0.070 | 0.1177 | 0.1230 | 0.142 | 32 |
| 1999 | 3 | JP5 | 307.6 | 0.060 | 0.1017 | 0.1034 | 0.140 | 117 |
| 1999 | 5 | JP5 | 168.1 | 0.000 | 0.0161 | 0.0165 | 0.080 | 53 |
| 1999 | 6 | JP5 | 62.0 | 0.010 | 0.0100 | 0.0100 | 0.010 | 12 |
| 1999 | 7 | JP5 | 52.6 | 0.001 | 0.0559 | 0.0949 | 0.240 | 13 |
| 1999 | 8 | JP5 | 46.9 | 0.010 | 0.1650 | 0.1544 | 0.280 | 10 |
| 1999 | 9 | JP5 | 19.6 | 0.000 | 0.0015 | 0.0015 | 0.003 | 2 |

[Spec = 0.4% max] – [Volume in Millions of Gallons]

Table 20. Total Sulfur Conformance – JP-8.

| Year | Region | Fuel | Volume | Min | Avg | WtAvg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1995 | 1 | JP8 | 2.9 | 0.003 | 0.0143 | 0.0135 | 0.029 | 30 |
| 1995 | 2 | JP8 | 126.6 | 0.029 | 0.0921 | 0.0873 | 0.260 | 83 |
| 1995 | 3 | JP8 | 451.5 | 0.000 | 0.0506 | 0.0548 | 0.240 | 316 |
| 1995 | 4 | JP8 | 10.0 | 0.010 | 0.0297 | 0.0300 | 0.060 | 16 |
| 1995 | 5 | JP8 | 239.3 | 0.000 | 0.0368 | 0.0269 | 0.125 | 154 |
| 1995 | 7 | JP8 | 65.1 | 0.008 | 0.0416 | 0.0451 | 0.160 | 21 |
| 1995 | 8 | JP8 | 97.4 | 0.010 | 0.0725 | 0.0538 | 0.110 | 118 |
| 1996 | 1 | JP8 | 18.8 | 0.007 | 0.0231 | 0.0308 | 0.050 | 60 |
| 1996 | 2 | JP8 | 191.4 | 0.020 | 0.0851 | 0.0885 | 0.260 | 148 |
| 1996 | 3 | JP8 | 633.7 | 0.000 | 0.0372 | 0.0378 | 0.210 | 433 |
| 1996 | 4 | JP8 | 84.9 | 0.002 | 0.0300 | 0.0261 | 0.100 | 96 |
| 1996 | 5 | JP8 | 426.6 | 0.000 | 0.0449 | 0.0290 | 0.200 | 224 |
| 1996 | 6 | JP8 | 37.3 | 0.009 | 0.0099 | 0.0098 | 0.010 | 7 |
| 1996 | 7 | JP8 | 263.1 | 0.001 | 0.0830 | 0.1060 | 0.280 | 111 |
| 1996 | 8 | JP8 | 176.0 | 0.001 | 0.0670 | 0.0481 | 0.110 | 152 |
| 1997 | 1 | JP8 | 91.4 | 0.006 | 0.0353 | 0.0422 | 0.074 | 97 |
| 1997 | 2 | JP8 | 214.0 | 0.000 | 0.0885 | 0.0845 | 0.260 | 306 |
| 1997 | 3 | JP8 | 799.9 | 0.000 | 0.0309 | 0.0347 | 0.160 | 658 |
| 1997 | 4 | JP8 | 53.3 | 0.004 | 0.0281 | 0.0287 | 0.050 | 86 |
| 1997 | 5 | JP8 | 421.5 | 0.000 | 0.0604 | 0.0322 | 0.200 | 286 |
| 1997 | 7 | JP8 | 261.0 | 0.009 | 0.1001 | 0.1199 | 0.210 | 92 |
| 1997 | 8 | JP8 | 301.5 | 0.001 | 0.0566 | 0.0495 | 0.120 | 170 |
| 1998 | 1 | JP8 | 123.6 | 0.001 | 0.0227 | 0.0255 | 0.190 | 150 |
| 1998 | 2 | JP8 | 215.8 | 0.000 | 0.0734 | 0.0659 | 0.145 | 272 |
| 1998 | 3 | JP8 | 976.1 | 0.000 | 0.0375 | 0.0342 | 0.300 | 741 |
| 1998 | 4 | JP8 | 60.2 | 0.000 | 0.0236 | 0.0255 | 0.101 | 112 |
| 1998 | 5 | JP8 | 434.6 | 0.000 | 0.0808 | 0.0498 | 0.300 | 284 |
| 1998 | 6 | JP8 | 6.7 | 0.010 | 0.0100 | 0.0100 | 0.010 | 1 |
| 1998 | 7 | JP8 | 149.4 | 0.009 | 0.0743 | 0.0945 | 0.215 | 57 |
| 1998 | 8 | JP8 | 262.3 | 0.001 | 0.0652 | 0.0463 | 0.130 | 204 |
| 1999 | 1 | JP8 | 104.17 | 0.000 | 0.0317 | 0.0301 | 0.289 | 137 |
| 1999 | 2 | JP8 | 204.00 | 0.000 | 0.1021 | 0.0976 | 0.280 | 270 |
| 1999 | 3 | JP8 | 1037.72 | 0.000 | 0.0446 | 0.0537 | 0.295 | 951 |
| 1999 | 4 | JP8 | 92.41 | 0.000 | 0.0184 | 0.0208 | 0.052 | 198 |
| 1999 | 5 | JP8 | 306.48 | 0.000 | 0.0696 | 0.0611 | 0.328 | 199 |
| 1999 | 7 | JP8 | 316.74 | 0.002 | 0.0540 | 0.0660 | 0.300 | 118 |
| 1999 | 8 | JP8 | 293.85 | 0.000 | 0.0740 | 0.0587 | 0.140 | 225 |
| 1999 | 9 | JP8 | 47.03 | 0.012 | 0.0451 | 0.0406 | 0.190 | 7 |
| 1999 | 7 | AN8 | 3.92 | 0.030 | 0.0300 | 0.0300 | 0.030 | 1 |

[Spec = 0.4% max] — [Volume in Millions of Gallons]

Table 21. Mercaptan Sulfur Conformance – JP-4.

| Year | Region | Fuel | Volume | Min | Avg | Wt Avg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1999 | 8 | JP4 | 1.4 | 0.0000 | 0.0006 | 0.0006 | 0.0010 | 8 |

[Spec = 0.002% max] – [Volume in Millions of Gallons]

Table 22. Mercaptan Sulfur Conformance – JP-5.

| Year | Region | Fuel | Volume | Min | Avg | WtAvg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1995 | 3 | JP5 | 55.5 | 0.0001 | 0.00057 | 0.00067 | 0.0015 | 33 |
| 1995 | 7 | JP5 | 31.7 | 0.0002 | 0.00020 | 0.00002 | 0.0002 | 1 |
| 1996 | 3 | JP5 | 308.9 | 0.0001 | 0.00098 | 0.00099 | 0.0020 | 111 |
| 1996 | 5 | JP5 | 30.2 | 0.0007 | 0.00105 | 0.00101 | 0.0017 | 6 |
| 1996 | 6 | JP5 | 2.6 | 0.0004 | 0.00040 | 0.00005 | 0.0004 | 1 |
| 1996 | 7 | JP5 | 40.5 | 0.0001 | 0.00050 | 0.00051 | 0.0017 | 14 |
| 1996 | 8 | JP5 | 39.6 | 0.0009 | 0.00090 | 0.00090 | 0.0009 | 8 |
| 1997 | 3 | JP5 | 322.9 | 0.0001 | 0.00072 | 0.00073 | 0.0013 | 129 |
| 1997 | 5 | JP5 | 146.9 | 0.0001 | 0.00064 | 0.00073 | 0.0020 | 29 |
| 1997 | 7 | JP5 | 34.0 | 0.0001 | 0.00019 | 0.00016 | 0.0006 | 13 |
| 1997 | 8 | JP5 | 55.0 | 0.0001 | 0.00077 | 0.00086 | 0.0009 | 15 |
| 1998 | 3 | JP5 | 310.8 | 0.0001 | 0.00099 | 0.00100 | 0.0020 | 125 |
| 1998 | 5 | JP5 | 96.8 | 0.0001 | 0.00039 | 0.00051 | 0.0020 | 32 |
| 1998 | 7 | JP5 | 32.1 | 0.0001 | 0.00039 | 0.00039 | 0.0014 | 14 |
| 1998 | 8 | JP5 | 57.9 | 0.0006 | 0.00079 | 0.00086 | 0.0009 | 14 |
| 1999 | 2 | JP5 | 15.6 | 0.000 | 0.00062 | 0.00085 | 0.0015 | 32 |
| 1999 | 3 | JP5 | 307.6 | 0.000 | 0.00096 | 0.00099 | 0.0040 | 117 |
| 1999 | 5 | JP5 | 168.1 | 0.000 | 0.00026 | 0.00024 | 0.0012 | 38 |
| 1999 | 7 | JP5 | 52.6 | 0.000 | 0.00052 | 0.00065 | 0.0015 | 12 |
| 1999 | 8 | JP5 | 46.9 | 0.000 | 0.00083 | 0.00078 | 0.0014 | 10 |

[Spec = 0.002% max] – [Volume in Millions of Gallons]

Table 23. Mercaptan Sulfur Conformance – JP-8.

| Year | Region | Fuel | Volume | Min | Avg | WtAvg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1995 | 1 | JP8 | 1.5 | 0.0001 | 0.00013 | 0.00013 | 0.0003 | 13 |
| 1995 | 2 | JP8 | 61.0 | 0.0007 | 0.00136 | 0.00133 | 0.0020 | 42 |
| 1995 | 3 | JP8 | 303.6 | 0.0001 | 0.00099 | 0.00113 | 0.0020 | 240 |
| 1995 | 4 | JP8 | 4.2 | 0.0010 | 0.00154 | 0.00158 | 0.0020 | 7 |
| 1995 | 5 | JP8 | 237.8 | 0.0001 | 0.00054 | 0.00066 | 0.0019 | 151 |
| 1995 | 7 | JP8 | 57.3 | 0.0001 | 0.00093 | 0.00110 | 0.0025 | 20 |
| 1995 | 8 | JP8 | 55.1 | 0.0003 | 0.00056 | 0.00059 | 0.0008 | 92 |
| 1996 | 1 | JP8 | 14.3 | 0.0003 | 0.00095 | 0.00076 | 0.0018 | 11 |
| 1996 | 2 | JP8 | 137.3 | 0.0001 | 0.00127 | 0.00126 | 0.0020 | 117 |
| 1996 | 3 | JP8 | 344.4 | 0.0001 | 0.00115 | 0.00123 | 0.0099 | 293 |
| 1996 | 4 | JP8 | 51.9 | 0.0010 | 0.00173 | 0.00175 | 0.0030 | 70 |
| 1996 | 5 | JP8 | 396.8 | 0.0001 | 0.00051 | 0.00060 | 0.0020 | 173 |
| 1996 | 6 | JP8 | 37.3 | 0.0003 | 0.00037 | 0.00038 | 0.0004 | 7 |
| 1996 | 7 | JP8 | 242.7 | 0.0001 | 0.00124 | 0.00125 | 0.0029 | 103 |
| 1996 | 8 | JP8 | 63.8 | 0.0001 | 0.00054 | 0.00053 | 0.0020 | 125 |
| 1997 | 1 | JP8 | 86.6 | 0.0001 | 0.00018 | 0.00017 | 0.0014 | 57 |
| 1997 | 2 | JP8 | 197.2 | 0.0001 | 0.00123 | 0.00126 | 0.0040 | 295 |
| 1997 | 3 | JP8 | 799.9 | 0.0001 | 0.00097 | 0.00095 | 0.0071 | 381 |
| 1997 | 4 | JP8 | 52.9 | 0.0002 | 0.00171 | 0.00178 | 0.0030 | 85 |
| 1997 | 5 | JP8 | 333.9 | 0.0001 | 0.00065 | 0.00079 | 0.0021 | 136 |
| 1997 | 7 | JP8 | 260.5 | 0.0000 | 0.00101 | 0.00109 | 0.0025 | 91 |
| 1997 | 8 | JP8 | 51.1 | 0.0004 | 0.00059 | 0.00059 | 0.0010 | 86 |
| 1998 | 1 | JP8 | 119.0 | 0.0001 | 0.00032 | 0.00029 | 0.0017 | 83 |
| 1998 | 2 | JP8 | 186.4 | 0.0001 | 0.00085 | 0.00079 | 0.0020 | 252 |
| 1998 | 3 | JP8 | 684.3 | 0.0000 | 0.00078 | 0.00054 | 0.0023 | 568 |
| 1998 | 4 | JP8 | 60.2 | 0.0002 | 0.00146 | 0.00150 | 0.0030 | 112 |
| 1998 | 5 | JP8 | 377.4 | 0.0002 | 0.00087 | 0.00076 | 0.0020 | 121 |
| 1998 | 6 | JP8 | 6.7 | 0.0004 | 0.00040 | 0.00040 | 0.0004 | 1 |
| 1998 | 7 | JP8 | 149.4 | 0.0000 | 0.00083 | 0.00091 | 0.0020 | 57 |
| 1998 | 8 | JP8 | 262.3 | 0.0002 | 0.00058 | 0.00024 | 0.0018 | 158 |
| 1999 | 1 | JP8 | 104.2 | 0.0003 | 0.00033 | 0.00030 | 0.0019 | 64 |
| 1999 | 2 | JP8 | 204.0 | 0.0000 | 0.00120 | 0.00095 | 0.0020 | 232 |
| 1999 | 3 | JP8 | 1037.7 | 0.0000 | 0.00086 | 0.00082 | 0.0029 | 683 |
| 1999 | 4 | JP8 | 92.4 | 0.0000 | 0.00103 | 0.00102 | 0.0020 | 166 |
| 1999 | 5 | JP8 | 306.5 | 0.0001 | 0.00106 | 0.00058 | 0.0021 | 67 |
| 1999 | 7 | JP8 | 316.7 | 0.0001 | 0.00078 | 0.00077 | 0.0040 | 97 |
| 1999 | 8 | JP8 | 293.8 | 0.0002 | 0.00063 | 0.00046 | 0.0016 | 183 |
| 1999 | 9 | JP8 | 47.0 | 0.0001 | 0.00027 | 0.00025 | 0.0005 | 7 |
| 1999 | 7 | AN8 | 3.9 | 0.0012 | 0.00120 | 0.00120 | 0.0012 | 1 |

[Spec = 0.002% max] — [Volume in Millions of Gallons]

Table 24. Particulate Contamination Conformance – F-76.

| Year | Region | Fuel | Volume | Min | Avg | Wt Avg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1999 | 3 | F76 | 176.3 | 0.10 | 2.147 | 2.480 | 10.0 | 47 |
| 1999 | 5 | F76 | 93.2 | 0.70 | 2.808 | 2.951 | 9.1 | 24 |
| 1999 | 7 | F76 | 38.6 | 1.50 | 4.021 | 4.079 | 7.1 | 11 |
| 1999 | 8 | F76 | 250.5 | 0.00 | 1.742 | 1.801 | 4.0 | 44 |
| 1999 | 9 | F76 | 9.8 | 1.20 | 1.200 | 1.200 | 1.2 | 1 |

[Spec = 10 mg/L max] – [Volume in Millions of Gallons]

Table 25. Particulate Contamination Conformance – JP-4.

| Year | Region | Fuel | Volume | Min | Avg | Wt Avg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1999 | 8 | JP4 | 1.4 | 0.05 | 0.556 | 0.540 | 0.8 | 8 |

[Spec = 1.0 mg/L max] – [Volume in Millions of Gallons]

Table 26. Particulate Contamination Conformance – JP-5.

| Year | Region | Fuel | Volume | Min | Avg | WtAvg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1995 | 3 | JP5 | 55.5 | 0.03 | 0.316 | 0.234 | 1.0 | 33 |
| 1995 | 7 | JP5 | 31.7 | 0.02 | 0.325 | 0.304 | 0.6 | 8 |
| 1996 | 3 | JP5 | 308.9 | 0.03 | 0.145 | 0.145 | 0.8 | 110 |
| 1996 | 5 | JP5 | 51.4 | 0.04 | 0.235 | 0.151 | 1.0 | 16 |
| 1996 | 6 | JP5 | 22.7 | 0.26 | 0.360 | 0.307 | 0.5 | 3 |
| 1996 | 7 | JP5 | 71.9 | 0.2 | 0.497 | 0.465 | 1.0 | 21 |
| 1996 | 8 | JP5 | 39.6 | 0.4 | 0.650 | 0.659 | 0.9 | 8 |
| 1997 | 3 | JP5 | 322.9 | 0.03 | 0.196 | 0.194 | 0.7 | 129 |
| 1997 | 5 | JP5 | 210.8 | 0 | 0.171 | 0.137 | 0.6 | 74 |
| 1997 | 6 | JP5 | 59.2 | 0.18 | 0.293 | 0.278 | 0.5 | 10 |
| 1997 | 7 | JP5 | 55.8 | 0.13 | 0.436 | 0.405 | 0.8 | 19 |
| 1997 | 8 | JP5 | 58.6 | 0.1 | 0.386 | 0.441 | 0.7 | 20 |
| 1998 | 3 | JP5 | 310.8 | 0.05 | 0.234 | 0.186 | 2.0 | 125 |
| 1998 | 5 | JP5 | 168.3 | 0 | 0.286 | 0.264 | 1.0 | 66 |
| 1998 | 6 | JP5 | 24.1 | 0.2 | 0.217 | 0.212 | 0.3 | 5 |
| 1998 | 7 | JP5 | 54.7 | 0.15 | 0.520 | 0.510 | 1.0 | 19 |
| 1998 | 8 | JP5 | 57.9 | 0.1 | 0.485 | 0.497 | 0.9 | 15 |
| 1999 | 2 | JP5 | 15.6 | 0.20 | 0.577 | 0.7177 | 1.00 | 32 |
| 1999 | 3 | JP5 | 307.6 | 0.01 | 0.223 | 0.2174 | 1.00 | 117 |
| 1999 | 5 | JP5 | 168.1 | 0.00 | 0.298 | 0.2723 | 1.00 | 53 |
| 1999 | 6 | JP5 | 62.0 | 0.10 | 0.393 | 0.3958 | 0.68 | 12 |
| 1999 | 7 | JP5 | 52.6 | 0.20 | 0.430 | 0.4658 | 0.78 | 13 |
| 1999 | 8 | JP5 | 46.9 | 0.40 | 0.572 | 0.5861 | 0.80 | 10 |
| 1999 | 9 | JP5 | 19.6 | 0.32 | 0.475 | 0.4758 | 0.63 | 2 |

[Spec = 1.0 mg/L max] – [Volume in Millions of Gallons]

Table 27. Particulate Contamination Conformance – JP-8.

| Year | Region | Fuel | Volume | Min | Avg | WtAvg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1995 | 1 | JP8 | 2.9 | 0.10 | 0.320 | 0.293 | 0.7 | 30 |
| 1995 | 2 | JP8 | 126.6 | 0.10 | 0.444 | 0.466 | 1.00 | 83 |
| 1995 | 3 | JP8 | 451.5 | 0.03 | 0.335 | 0.311 | 1.00 | 312 |
| 1995 | 4 | JP8 | 10.0 | 0.05 | 0.416 | 0.475 | 1.00 | 16 |
| 1995 | 5 | JP8 | 239.3 | 0.10 | 0.189 | 0.271 | 1.00 | 154 |
| 1995 | 7 | JP8 | 65.1 | 0.12 | 0.495 | 0.470 | 0.80 | 21 |
| 1995 | 8 | JP8 | 97.4 | 0.05 | 0.355 | 0.364 | 0.98 | 116 |
| 1996 | 1 | JP8 | 18.8 | 0.05 | 0.206 | 0.284 | 1.00 | 60 |
| 1996 | 2 | JP8 | 191.4 | 0.05 | 0.435 | 0.427 | 0.98 | 147 |
| 1996 | 3 | JP8 | 633.7 | 0.01 | 0.346 | 0.298 | 1.20 | 428 |
| 1996 | 4 | JP8 | 84.9 | 0.10 | 0.359 | 0.397 | 0.90 | 96 |
| 1996 | 5 | JP8 | 426.6 | 0.01 | 0.280 | 0.327 | 1.00 | 224 |
| 1996 | 6 | JP8 | 37.3 | 0.48 | 0.561 | 0.562 | 0.61 | 7 |
| 1996 | 7 | JP8 | 263.1 | 0.03 | 0.342 | 0.391 | 1.00 | 100 |
| 1996 | 8 | JP8 | 176.0 | 0.05 | 0.378 | 0.555 | 1.00 | 152 |
| 1997 | 1 | JP8 | 91.4 | 0.00 | 0.184 | 0.186 | 1.00 | 97 |
| 1997 | 2 | JP8 | 214.0 | 0.03 | 0.446 | 0.401 | 1.00 | 306 |
| 1997 | 3 | JP8 | 799.9 | 0.00 | 0.340 | 0.316 | 1.00 | 658 |
| 1997 | 4 | JP8 | 53.3 | 0.01 | 0.316 | 0.327 | 1.00 | 86 |
| 1997 | 5 | JP8 | 421.5 | 0.00 | 0.286 | 0.346 | 1.00 | 286 |
| 1997 | 7 | JP8 | 261.00 | 0.03 | 0.353 | 0.393 | 0.90 | 83 |
| 1997 | 8 | JP8 | 301.5 | 0.05 | 0.434 | 0.580 | 1.10 | 170 |
| 1998 | 1 | JP8 | 123.6 | 0.00 | 0.225 | 0.366 | 0.80 | 150 |
| 1998 | 2 | JP8 | 215.8 | 0.02 | 0.436 | 0.420 | 1.00 | 272 |
| 1998 | 3 | JP8 | 976.1 | 0.00 | 0.300 | 0.316 | 0.90 | 741 |
| 1998 | 4 | JP8 | 60.2 | 0.10 | 0.316 | 0.332 | 0.90 | 112 |
| 1998 | 5 | JP8 | 434.6 | 0.03 | 0.314 | 0.350 | 1.00 | 284 |
| 1998 | 6 | JP8 | 6.7 | 0.79 | 0.790 | 0.790 | 0.80 | 1 |
| 1998 | 7 | JP8 | 149.4 | 0.05 | 0.374 | 0.416 | 1.00 | 57 |
| 1998 | 8 | JP8 | 262.3 | 0.09 | 0.425 | 0.500 | 2.10 | 204 |
| 1999 | 1 | JP8 | 104.2 | 0.00 | 0.239 | 0.320 | 1.00 | 137 |
| 1999 | 2 | JP8 | 204.0 | 0.08 | 0.465 | 0.476 | 1.00 | 270 |
| 1999 | 3 | JP8 | 1037.7 | 0.00 | 0.323 | 0.357 | 1.20 | 951 |
| 1999 | 4 | JP8 | 92.4 | 0.01 | 0.315 | 0.306 | 0.98 | 198 |
| 1999 | 5 | JP8 | 306.5 | 0.00 | 0.328 | 0.328 | 1.00 | 199 |
| 1999 | 7 | JP8 | 316.7 | 0.01 | 0.403 | 0.414 | 1.00 | 118 |
| 1999 | 8 | JP8 | 293.8 | 0.00 | 0.340 | 0.494 | 0.90 | 225 |
| 1999 | 9 | JP8 | 47.0 | 0.20 | 0.343 | 0.333 | 0.60 | 7 |
| 1999 | 7 | AN8 | 3.9 | 0.97 | 0.970 | 0.970 | 0.97 | 1 |

[Spec = 1.0 mg/L max] – [Volume in Millions of Gallons]

Table 28. Filtration Time Conformance – JP-4.

| Year | Region | Fuel | Volume | Min | Avg | Wt Avg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1999 | 8 | JP4 | 1.42 | 4 | 4.75 | 4.78 | 7 | 8 |

[Spec = 15 minutes max] – [Volume in Millions of Gallons]

Table 29. Filtration Time Conformance – JP-5.

| Year | Region | Fuel | Volume | Min | Avg | WtAvg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1995 | 3 | JP5 | 55.5 | 2 | 5.2 | 3.8 | 15 | 33 |
| 1995 | 7 | JP5 | 31.7 | 4 | 4.6 | 4.7 | 6 | 8 |
| 1996 | 3 | JP5 | 308.9 | 2 | 3.1 | 3.1 | 6 | 111 |
| 1996 | 5 | JP5 | 51.4 | 3 | 3.7 | 3.5 | 4 | 17 |
| 1996 | 6 | JP5 | 22.7 | 8 | 8.7 | 8.9 | 10 | 3 |
| 1996 | 7 | JP5 | 71.9 | 4 | 5.3 | 5.3 | 7 | 21 |
| 1996 | 8 | JP5 | 39.6 | 3 | 4.4 | 4.4 | 7 | 8 |
| 1997 | 3 | JP5 | 322.9 | 2 | 3.3 | 3.1 | 8 | 129 |
| 1997 | 5 | JP5 | 210.8 | 3 | 4.4 | 4.2 | 12 | 74 |
| 1997 | 6 | JP5 | 59.2 | 7 | 8.7 | 8.6 | 10 | 10 |
| 1997 | 7 | JP5 | 55.8 | 4 | 6.5 | 6.7 | 11 | 19 |
| 1997 | 8 | JP5 | 58.6 | 3 | 6.2 | 5.9 | 15 | 20 |
| 1998 | 3 | JP5 | 310.8 | 2 | 3.2 | 3.1 | 9 | 125 |
| 1998 | 5 | JP5 | 168.3 | 3 | 5.8 | 5.6 | 15 | 66 |
| 1998 | 6 | JP5 | 24.1 | 10 | 11.4 | 11.6 | 13 | 5 |
| 1998 | 7 | JP5 | 54.7 | 4 | 6.7 | 6.7 | 12 | 19 |
| 1998 | 8 | JP5 | 57.9 | 3 | 5.2 | 5.1 | 7 | 15 |
| 1999 | 2 | JP5 | 15.6 | 4 | 5.9 | 7.8 | 9 | 32 |
| 1999 | 3 | JP5 | 307.6 | 2 | 3.2 | 3.1 | 6 | 117 |
| 1999 | 5 | JP5 | 168.1 | 3 | 7.1 | 6.7 | 14 | 52 |
| 1999 | 6 | JP5 | 62.0 | 8 | 10.8 | 10.8 | 13 | 12 |
| 1999 | 7 | JP5 | 52.6 | 4 | 6.0 | 5.8 | 8 | 13 |
| 1999 | 8 | JP5 | 46.9 | 4 | 4.9 | 4.9 | 7 | 10 |
| 1999 | 9 | JP5 | 19.6 | 2 | 4.5 | 4.5 | 7 | 2 |

[Spec = 15 minutes max] – [Volume in Millions of Gallons]

Table 30. Filtration Time Conformance – JP-8.

| Year | Region | Fuel | Volume | Min | Avg | WtAvg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1995 | 1 | JP8 | 2.9 | 6 | 7.1 | 7.0 | 10 | 30 |
| 1995 | 2 | JP8 | 126.6 | 3 | 7.3 | 7.0 | 13 | 82 |
| 1995 | 3 | JP8 | 451.5 | 3 | 6.3 | 5.9 | 14 | 310 |
| 1995 | 4 | JP8 | 10.0 | 6 | 8.1 | 8.0 | 10 | 16 |
| 1995 | 5 | JP8 | 239.3 | 4 | 5.6 | 5.8 | 12 | 154 |
| 1995 | 7 | JP8 | 65.1 | 4 | 7.0 | 7.4 | 13 | 21 |
| 1995 | 8 | JP8 | 97.4 | 4 | 6.7 | 6.3 | 11 | 118 |
| 1996 | 1 | JP8 | 18.8 | 3 | 7.1 | 4.3 | 12 | 60 |
| 1996 | 2 | JP8 | 191.4 | 3 | 7.8 | 7.7 | 13 | 148 |
| 1996 | 3 | JP8 | 633.7 | 3 | 6.4 | 6.4 | 13 | 429 |
| 1996 | 4 | JP8 | 84.9 | 4 | 7.2 | 7.0 | 11 | 96 |
| 1996 | 5 | JP8 | 426.6 | 3 | 6.4 | 7.1 | 14 | 224 |
| 1996 | 6 | JP8 | 37.3 | 8 | 8.3 | 8.3 | 9 | 7 |
| 1996 | 7 | JP8 | 263.1 | 3 | 6.5 | 6.7 | 14 | 101 |
| 1996 | 8 | JP8 | 176.0 | 4 | 7.2 | 7.0 | 14 | 152 |
| 1997 | 1 | JP8 | 91.4 | 4 | 7.4 | 6.8 | 11 | 97 |
| 1997 | 2 | JP8 | 214.0 | 3 | 7.4 | 7.2 | 14 | 306 |
| 1997 | 3 | JP8 | 799.9 | 4 | 6.4 | 6.7 | 14 | 658 |
| 1997 | 4 | JP8 | 53.3 | 5 | 7.5 | 7.3 | 14 | 86 |
| 1997 | 5 | JP8 | 421.5 | 3 | 5.2 | 6.3 | 15 | 286 |
| 1997 | 7 | JP8 | 261.0 | 4 | 7.6 | 7.1 | 14 | 83 |
| 1997 | 8 | JP8 | 301.5 | 4 | 6.7 | 7.3 | 11 | 170 |
| 1998 | 1 | JP8 | 123.6 | 4 | 7.5 | 7.0 | 12 | 150 |
| 1998 | 2 | JP8 | 216.0 | 3 | 7.6 | 7.6 | 15 | 272 |
| 1998 | 3 | JP8 | 927.6 | 3 | 6.9 | 7.6 | 15 | 872 |
| 1998 | 4 | JP8 | 60.2 | 4 | 8.4 | 8.4 | 14 | 112 |
| 1998 | 5 | JP8 | 434.6 | 2 | 5.4 | 6.7 | 15 | 284 |
| 1998 | 6 | JP8 | 6.7 | 10 | 10 | 10 | 10 | 1 |
| 1998 | 7 | JP8 | 149.4 | 5 | 7.5 | 7.3 | 12 | 57 |
| 1998 | 8 | JP8 | 262.3 | 4 | 6.6 | 6.4 | 13 | 204 |
| 1999 | 1 | JP8 | 104.2 | 3 | 7.5 | 7.2 | 11 | 137 |
| 1999 | 2 | JP8 | 204.0 | 3 | 8.3 | 8.5 | 15 | 270 |
| 1999 | 3 | JP8 | 1037.7 | 1 | 6.4 | 6.2 | 15 | 950 |
| 1999 | 4 | JP8 | 92.4 | 4 | 7.0 | 7.2 | 13 | 198 |
| 1999 | 5 | JP8 | 306.5 | 3 | 5.6 | 5.6 | 13 | 191 |
| 1999 | 7 | JP8 | 316.7 | 4 | 9.1 | 9.0 | 31 | 118 |
| 1999 | 8 | JP8 | 293.8 | 4 | 7.3 | 6.7 | 14 | 225 |
| 1999 | 9 | JP8 | 47.0 | 5 | 6.0 | 6.0 | 7 | 7 |
| 1999 | 7 | AN8 | 3.9 | 7 | 7.0 | 7.0 | 7 | 1 |

[Spec = 15 minutes max] – [Volume in Millions of Gallons]

Table 31. Total Acid Number Conformance – F-76.

| Year | Region | Fuel | Volume | Min | Avg | Wt Avg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1999 | 3 | F76 | 176.3 | 0.002 | 0.0449 | 0.0522 | 0.262 | 47 |
| 1999 | 5 | F76 | 93.2 | 0.000 | 0.1449 | 0.1339 | 0.300 | 24 |
| 1999 | 7 | F76 | 38.6 | 0.002 | 0.0538 | 0.0560 | 0.100 | 11 |
| 1999 | 8 | F76 | 250.5 | 0.010 | 0.0869 | 0.0734 | 0.241 | 44 |
| 1999 | 9 | F76 | 9.8 | 0.030 | 0.0300 | 0.0300 | 0.030 | 1 |

[Spec = 0.30 mg KOH/100mL max] – [Volume in Millions of Gallons]

Table 32. Total Acid Number Conformance – JP-4.

| Year | Region | Fuel | Volume | Min | Avg | Wt Avg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1999 | 8 | JP4 | 1.4 | 0.006 | 0.0080 | 0.0084 | 0.011 | 8 |

[Spec = 0.015 mg KOH/g max] – [Volume in Millions of Gallons]

Table 33. Total Acid Number Conformance – JP-5.

| Year | Region | Fuel | Volume | Min | Avg | WtAvg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1995 | 3 | JP5 | 55.5 | 0.001 | 0.0050 | 0.0038 | 0.011 | 33 |
| 1995 | 7 | JP5 | 31.8 | 0.004 | 0.0060 | 0.0059 | 0.009 | 8 |
| 1996 | 3 | JP5 | 308.9 | 0.0005 | 0.0032 | 0.0031 | 0.013 | 110 |
| 1996 | 5 | JP5 | 51.4 | 0.003 | 0.0056 | 0.0062 | 0.014 | 17 |
| 1996 | 6 | JP5 | 22.7 | 0.003 | 0.0039 | 0.0033 | 0.006 | 3 |
| 1996 | 7 | JP5 | 71.9 | 0.003 | 0.0048 | 0.0049 | 0.009 | 21 |
| 1996 | 8 | JP5 | 39.6 | 0.003 | 0.0047 | 0.0048 | 0.007 | 8 |
| 1997 | 3 | JP5 | 322.9 | 0.001 | 0.0031 | 0.0030 | 0.009 | 129 |
| 1997 | 5 | JP5 | 210.8 | 0.001 | 0.0050 | 0.0060 | 0.015 | 73 |
| 1997 | 6 | JP5 | 59.2 | 0.003 | 0.0044 | 0.0047 | 0.008 | 10 |
| 1997 | 7 | JP5 | 55.8 | 0.001 | 0.0051 | 0.0054 | 0.008 | 19 |
| 1997 | 8 | JP5 | 58.6 | 0.001 | 0.0071 | 0.0061 | 0.020 | 20 |
| 1998 | 3 | JP5 | 310.8 | 0.001 | 0.0029 | 0.0029 | 0.012 | 125 |
| 1998 | 5 | JP5 | 168.3 | 0.001 | 0.0055 | 0.0054 | 0.014 | 66 |
| 1998 | 6 | JP5 | 24.1 | 0.003 | 0.0046 | 0.0049 | 0.008 | 5 |
| 1998 | 7 | JP5 | 54.7 | 0.003 | 0.0049 | 0.0053 | 0.007 | 19 |
| 1998 | 8 | JP5 | 57.9 | 0.003 | 0.0089 | 0.0060 | 0.019 | 15 |
| 1999 | 2 | JP5 | 15.6 | 0.002 | 0.0067 | 0.0057 | 0.014 | 32 |
| 1999 | 3 | JP5 | 307.6 | 0.001 | 0.0035 | 0.0034 | 0.008 | 117 |
| 1999 | 5 | JP5 | 168.1 | 0.000 | 0.0051 | 0.0052 | 0.015 | 52 |
| 1999 | 6 | JP5 | 62.0 | 0.003 | 0.0032 | 0.0032 | 0.005 | 12 |
| 1999 | 7 | JP5 | 52.6 | 0.002 | 0.0041 | 0.0045 | 0.009 | 13 |
| 1999 | 8 | JP5 | 46.9 | 0.005 | 0.0077 | 0.0077 | 0.011 | 10 |
| 1999 | 9 | JP5 | 19.6 | 0.001 | 0.0030 | 0.0030 | 0.005 | 2 |

[Spec = 0.015 mg KOH/g max] – [Volume in Millions of Gallons]

Table 34. Total Acid Number Conformance – JP-8.

| Year | Region | Fuel | Volume | Min | Avg | WtAvg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1995 | 1 | JP8 | 2.9 | 0.001 | 0.0024 | 0.0023 | 0.010 | 30 |
| 1995 | 2 | JP8 | 126.6 | 0.002 | 0.0053 | 0.0053 | 0.012 | 83 |
| 1995 | 3 | JP8 | 451.5 | 0.001 | 0.0035 | 0.0034 | 0.012 | 316 |
| 1995 | 4 | JP8 | 10.0 | 0.003 | 0.0065 | 0.0063 | 0.013 | 16 |
| 1995 | 5 | JP8 | 239.3 | 0.001 | 0.0025 | 0.0028 | 0.013 | 154 |
| 1995 | 7 | JP8 | 65.1 | 0.002 | 0.0047 | 0.0050 | 0.009 | 21 |
| 1995 | 8 | JP8 | 97.4 | 0.001 | 0.0148 | 0.0114 | 0.020 | 118 |
| 1996 | 1 | JP8 | 18.8 | 0.001 | 0.0041 | 0.0066 | 0.012 | 60 |
| 1996 | 2 | JP8 | 191.4 | 0.001 | 0.0053 | 0.0055 | 0.014 | 146 |
| 1996 | 3 | JP8 | 633.7 | 0.0001 | 0.0044 | 0.0039 | 0.040 | 433 |
| 1996 | 4 | JP8 | 84.9 | 0.001 | 0.0057 | 0.0055 | 0.015 | 95 |
| 1996 | 5 | JP8 | 426.6 | 0.001 | 0.0038 | 0.0040 | 0.015 | 224 |
| 1996 | 6 | JP8 | 37.3 | 0.005 | 0.0059 | 0.0059 | 0.006 | 7 |
| 1996 | 7 | JP8 | 263.1 | 0.001 | 0.0053 | 0.0055 | 0.015 | 111 |
| 1996 | 8 | JP8 | 176.0 | 0.001 | 0.0040 | 0.0085 | 0.020 | 152 |
| 1997 | 1 | JP8 | 91.4 | 0.001 | 0.0063 | 0.0077 | 0.015 | 97 |
| 1997 | 2 | JP8 | 214.0 | 0.0002 | 0.0043 | 0.0047 | 0.014 | 306 |
| 1997 | 3 | JP8 | 799.9 | 0.0006 | 0.0076 | 0.0038 | 0.14 | 658 |
| 1997 | 4 | JP8 | 53.3 | 0.001 | 0.0060 | 0.0062 | 0.014 | 86 |
| 1997 | 5 | JP8 | 421.5 | 0.001 | 0.0045 | 0.0040 | 0.013 | 285 |
| 1997 | 7 | JP8 | 261.0 | 0.001 | 0.0035 | 0.0039 | 0.0095 | 92 |
| 1997 | 8 | JP8 | 301.5 | 0.001 | 0.0125 | 0.0093 | 0.020 | 170 |
| 1998 | 1 | JP8 | 123.6 | 0.001 | 0.0079 | 0.0112 | 0.015 | 150 |
| 1998 | 2 | JP8 | 215.8 | 0.001 | 0.0045 | 0.0041 | 0.014 | 272 |
| 1998 | 3 | JP8 | 976.1 | 0.000 | 0.0057 | 0.0041 | 0.015 | 872 |
| 1998 | 4 | JP8 | 60.2 | 0.001 | 0.0065 | 0.0066 | 0.014 | 112 |
| 1998 | 5 | JP8 | 434.6 | 0.001 | 0.0044 | 0.0037 | 0.014 | 284 |
| 1998 | 6 | JP8 | 6.7 | 0.006 | 0.006 | 0.006 | 0.006 | 1 |
| 1998 | 7 | JP8 | 149.4 | 0.001 | 0.0034 | 0.0036 | 0.009 | 57 |
| 1998 | 8 | JP8 | 262.3 | 0.001 | 0.0125 | 0.0092 | 0.020 | 204 |
| 1999 | 1 | JP8 | 104.2 | 0.002 | 0.0064 | 0.0096 | 0.018 | 137 |
| 1999 | 2 | JP8 | 204.0 | 0.000 | 0.0041 | 0.0043 | 0.030 | 270 |
| 1999 | 3 | JP8 | 1037.7 | 0.000 | 0.0067 | 0.0057 | 0.018 | 951 |
| 1999 | 4 | JP8 | 92.4 | 0.000 | 0.0051 | 0.0053 | 0.013 | 198 |
| 1999 | 5 | JP8 | 306.5 | 0.000 | 0.0045 | 0.0045 | 0.015 | 191 |
| 1999 | 7 | JP8 | 316.7 | 0.000 | 0.0050 | 0.0059 | 0.014 | 118 |
| 1999 | 8 | JP8 | 293.8 | 0.000 | 0.0123 | 0.0088 | 0.020 | 225 |
| 1999 | 9 | JP8 | 47.0 | 0.001 | 0.0051 | 0.0047 | 0.009 | 7 |
| 1999 | 7 | AN8 | 3.9 | 0.008 | 0.0080 | 0.0080 | 0.008 | 1 |

[Spec = 0.015 mg KOH/g max] – [Volume in Millions of Gallons]

Table 35. Smoke Point Conformance – JP-4.

| Year | Region | Fuel | Volume | Min | Avg | Wt Avg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1999 | 8 | JP4 | 1.4 | 23.0 | 26.38 | 26.97 | 30.0 | 8 |

[Spec = 20.0 mm max] – [Volume in Millions of Gallons]

Table 36. Smoke Point Conformance – JP-5.

| Year | Region | Fuel | Volume | Min | Avg | WtAvg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1995 | 3 | JP5 | 55.5 | 19.0 | 21.25 | 5.44 | 25.0 | 14 |
| 1995 | 7 | JP5 | 31.7 | 21.0 | 21.00 | 9.19 | 21.0 | 3 |
| 1996 | 3 | JP5 | 308.9 | 18.0 | 19.95 | 15.18 | 22.0 | 87 |
| 1996 | 5 | JP5 | 51.4 | 19.3 | 19.98 | 20.17 | 21.0 | 17 |
| 1996 | 6 | JP5 | 22.75 | 21.0 | 24.33 | 23.45 | 27.0 | 3 |
| 1996 | 7 | JP5 | 71.9 | 21.0 | 22.38 | 16.40 | 25.0 | 16 |
| 1996 | 8 | JP5 | 39.6 | 21.0 | 23.00 | 23.01 | 24.0 | 8 |
| 1997 | 3 | JP5 | 322.9 | 19.0 | 20.68 | 20.31 | 26.0 | 129 |
| 1997 | 5 | JP5 | 210.8 | 19.0 | 19.95 | 20.21 | 22.5 | 74 |
| 1997 | 6 | JP5 | 59.2 | 21.0 | 22.40 | 22.19 | 24.0 | 10 |
| 1997 | 7 | JP5 | 55.8 | 21.0 | 22.26 | 21.92 | 25.0 | 19 |
| 1997 | 8 | JP5 | 58.6 | 19.7 | 23.28 | 23.30 | 25.0 | 20 |
| 1998 | 3 | JP5 | 310.8 | 19.0 | 20.55 | 20.32 | 26.0 | 125 |
| 1998 | 5 | JP5 | 168.3 | 19.0 | 19.49 | 19.56 | 20.5 | 66 |
| 1998 | 6 | JP5 | 24.1 | 21.0 | 21.60 | 21.49 | 23.0 | 5 |
| 1998 | 7 | JP5 | 54.7 | 21.0 | 22.68 | 22.06 | 25.0 | 19 |
| 1998 | 8 | JP5 | 57.9 | 19.2 | 22.43 | 23.25 | 25.0 | 15 |
| 1999 | 2 | JP5 | 15.6 | 26.0 | 26.00 | 26.00 | 26.0 | 32 |
| 1999 | 3 | JP5 | 307.6 | 19.0 | 20.73 | 20.37 | 26.0 | 117 |
| 1999 | 5 | JP5 | 168.1 | 18.0 | 19.94 | 20.23 | 30.0 | 53 |
| 1999 | 6 | JP5 | 62.0 | 21.0 | 22.83 | 22.85 | 26.0 | 12 |
| 1999 | 7 | JP5 | 52.6 | 20.0 | 22.00 | 22.41 | 25.0 | 13 |
| 1999 | 8 | JP5 | 46.9 | 22.0 | 23.60 | 23.60 | 25.0 | 10 |
| 1999 | 9 | JP5 | 19.6 | 20.0 | 20.00 | 20.00 | 20.0 | 2 |

[Spec = 19.0 mm max] – [Volume in Millions of Gallons]

Table 37. Smoke Point Conformance – JP-8.

| Year | Region | Fuel | Volume | Min | Avg | WtAvg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1995 | 1 | JP8 | 2.9 | 20.2 | 22.30 | 22.42 | 28.8 | 30 |
| 1995 | 2 | JP8 | 126.6 | 20.0 | 24.33 | 24.00 | 26.0 | 82 |
| 1995 | 3 | JP8 | 451.5 | 20.0 | 22.98 | 22.28 | 33.0 | 314 |
| 1995 | 4 | JP8 | 10.0 | 21.0 | 23.32 | 23.62 | 27.0 | 16 |
| 1995 | 5 | JP8 | 239.3 | 19.0 | 20.24 | 20.68 | 23.0 | 154 |
| 1995 | 7 | JP8 | 65.1 | 19.0 | 25.29 | 25.37 | 29.0 | 21 |
| 1995 | 8 | JP8 | 97.4 | 19.5 | 21.13 | 21.19 | 28.4 | 117 |
| 1996 | 1 | JP8 | 18.8 | 20.0 | 21.60 | 22.36 | 23.1 | 60 |
| 1996 | 2 | JP8 | 191.4 | 20.0 | 24.51 | 24.29 | 27.7 | 148 |
| 1996 | 3 | JP8 | 633.7 | 19.0 | 23.22 | 22.14 | 30.0 | 433 |
| 1996 | 4 | JP8 | 84.9 | 20.0 | 24.47 | 24.47 | 29.0 | 96 |
| 1996 | 5 | JP8 | 426.6 | 19.0 | 20.28 | 20.58 | 27.0 | 224 |
| 1996 | 6 | JP8 | 37.3 | 27.0 | 27.00 | 27.00 | 27.0 | 7 |
| 1996 | 7 | JP8 | 263.1 | 19.0 | 23.57 | 24.37 | 27.0 | 111 |
| 1996 | 8 | JP8 | 176.0 | 19.5 | 22.01 | 23.45 | 25.0 | 152 |
| 1997 | 1 | JP8 | 91.4 | 20.0 | 21.39 | 21.29 | 25.0 | 97 |
| 1997 | 2 | JP8 | 214.0 | 19.0 | 25.29 | 24.93 | 29.0 | 306 |
| 1997 | 3 | JP8 | 799.9 | 19.0 | 23.41 | 22.15 | 29.0 | 658 |
| 1997 | 4 | JP8 | 53.3 | 21.0 | 26.11 | 26.84 | 29.0 | 86 |
| 1997 | 5 | JP8 | 421.5 | 19.0 | 20.09 | 20.56 | 25.0 | 286 |
| 1997 | 7 | JP8 | 261.0 | 19.0 | 24.49 | 24.76 | 27.0 | 92 |
| 1997 | 8 | JP8 | 301.5 | 19.4 | 21.76 | 23.15 | 26.2 | 170 |
| 1998 | 1 | JP8 | 123.6 | 19.2 | 21.43 | 21.88 | 25.0 | 150 |
| 1998 | 2 | JP8 | 215.8 | 19.0 | 24.78 | 24.06 | 29.0 | 272 |
| 1998 | 3 | JP8 | 976.1 | 19.0 | 23.24 | 22.18 | 34.0 | 872 |
| 1998 | 4 | JP8 | 60.2 | 21.0 | 26.13 | 26.81 | 29.7 | 112 |
| 1998 | 5 | JP8 | 434.6 | 19.0 | 20.09 | 20.42 | 24.0 | 284 |
| 1998 | 6 | JP8 | 6.7 | 27.0 | 27.00 | 27.00 | 27.0 | 1 |
| 1998 | 7 | JP8 | 149.4 | 22.0 | 24.61 | 24.63 | 26.0 | 57 |
| 1998 | 8 | JP8 | 262.3 | 19.2 | 22.15 | 23.60 | 28.0 | 204 |
| 1999 | 1 | JP8 | 104.2 | 17.0 | 21.15 | 21.67 | 31.0 | 137 |
| 1999 | 2 | JP8 | 204.0 | 19.0 | 24.37 | 24.28 | 43.0 | 270 |
| 1999 | 3 | JP8 | 1037.7 | 19.0 | 23.19 | 22.60 | 44.0 | 951 |
| 1999 | 4 | JP8 | 92.4 | 21.0 | 26.58 | 26.47 | 35.0 | 196 |
| 1999 | 5 | JP8 | 306.5 | 18.0 | 19.94 | 20.04 | 24.0 | 199 |
| 1999 | 7 | JP8 | 316.7 | 21.0 | 24.71 | 24.57 | 27.0 | 118 |
| 1999 | 8 | JP8 | 293.8 | 19.0 | 21.55 | 22.61 | 35.0 | 225 |
| 1999 | 9 | JP8 | 47.0 | 23.0 | 23.00 | 23.00 | 23.0 | 7 |
| 1999 | 7 | AN8 | 3.9 | 25.0 | 25.00 | 25.00 | 25.0 | 1 |

[Spec = 25 mm min **or** 19 mm min w/ 3.0% Naphthalenes] – [Volume in Millions of Gallons]

Table 38. Naphthalenes Conformance – JP-8.

| Year | Region | Fuel | Volume | Min | Avg | WtAvg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1995 | 1 | JP8 | 2.9 | 0.5 | 0.89 | 0.87 | 1.7 | 30 |
| 1995 | 2 | JP8 | 94.2 | 0.8 | 1.23 | 0.21 | 2.0 | 62 |
| 1995 | 3 | JP8 | 450.9 | 0.1 | 1.24 | 1.13 | 2.9 | 315 |
| 1995 | 4 | JP8 | 5.1 | 0.1 | 0.66 | 0.79 | 1.1 | 9 |
| 1995 | 5 | JP8 | 239.3 | 0.2 | 1.79 | 1.36 | 3.0 | 154 |
| 1995 | 7 | JP8 | 32.1 | 0.2 | 1.55 | 0.97 | 3.0 | 10 |
| 1995 | 8 | JP8 | 97.4 | 0.1 | 2.14 | 1.64 | 2.9 | 118 |
| 1996 | 1 | JP8 | 18.8 | 0.8 | 1.38 | 2.00 | 2.9 | 60 |
| 1996 | 2 | JP8 | 148.1 | 0.6 | 1.33 | 1.33 | 2.9 | 116 |
| 1996 | 3 | JP8 | 583.8 | 0.1 | 1.28 | 1.12 | 3.0 | 383 |
| 1996 | 4 | JP8 | 35.3 | 0.0 | 0.92 | 0.98 | 1.7 | 27 |
| 1996 | 5 | JP8 | 416.6 | 0.1 | 1.38 | 0.90 | 3.0 | 222 |
| 1996 | 6 | JP8 | 27.3 | 0.5 | 0.52 | 0.52 | 0.5 | 5 |
| 1996 | 7 | JP8 | 130.1 | 0.1 | 1.55 | 1.54 | 2.9 | 76 |
| 1996 | 8 | JP8 | 162.1 | 0.3 | 2.16 | 1.15 | 3.0 | 135 |
| 1997 | 1 | JP8 | 91.4 | 0.9 | 1.38 | 1.57 | 3.0 | 97 |
| 1997 | 2 | JP8 | 161.5 | 0.1 | 1.31 | 1.28 | 1.7 | 180 |
| 1997 | 3 | JP8 | 695.6 | 0.1 | 1.06 | 1.08 | 3.5 | 423 |
| 1997 | 4 | JP8 | 2.4 | 0.0 | 0.28 | 0.05 | 1.3 | 14 |
| 1997 | 5 | JP8 | 410.5 | 0.1 | 1.79 | 1.04 | 3.0 | 282 |
| 1997 | 7 | JP8 | 129.9 | 0.1 | 1.54 | 1.56 | 2.9 | 60 |
| 1997 | 8 | JP8 | 301.5 | 0.1 | 1.67 | 1.16 | 2.9 | 170 |
| 1998 | 1 | JP8 | 121.9 | 0.0 | 1.38 | 1.56 | 2.2 | 122 |
| 1998 | 2 | JP8 | 135.0 | 0.1 | 1.26 | 1.23 | 2.1 | 122 |
| 1998 | 3 | JP8 | 845.8 | 0.0 | 1.17 | 1.13 | 2.3 | 579 |
| 1998 | 4 | JP8 | 2.8 | 0.1 | 0.51 | 0.51 | 1.0 | 18 |
| 1998 | 5 | JP8 | 434.6 | 0.2 | 1.99 | 1.27 | 2.8 | 284 |
| 1998 | 6 | JP8 | 6.7 | 0.5 | 0.53 | 0.53 | 0.5 | 1 |
| 1998 | 7 | JP8 | 102.3 | 0.1 | 1.23 | 1.18 | 3.0 | 46 |
| 1998 | 8 | JP8 | 194.7 | 0.1 | 2.18 | 1.63 | 2.9 | 146 |
| 1999 | 1 | JP8 | 104.2 | 0.2 | 1.42 | 1.62 | 3.0 | 137 |
| 1999 | 2 | JP8 | 204.0 | 0.2 | 1.36 | 0.91 | 2.8 | 210 |
| 1999 | 3 | JP8 | 1037.7 | 0.0 | 1.38 | 1.12 | 3.0 | 634 |
| 1999 | 4 | JP8 | 92.4 | 0.0 | 0.39 | 0.04 | 1.0 | 44 |
| 1999 | 5 | JP8 | 306.5 | 0.0 | 1.45 | 1.16 | 3.0 | 197 |
| 1999 | 7 | JP8 | 316.7 | 0.1 | 1.55 | 0.67 | 2.8 | 66 |
| 1999 | 8 | JP8 | 293.8 | 0.2 | 2.02 | 1.53 | 3.0 | 214 |
| 1999 | 9 | JP8 | 47.0 | 0.9 | 1.09 | 1.11 | 1.4 | 7 |

[Spec = 3.0% max] – [Volume in Millions of Gallons]

Table 39. Hydrogen Content Conformance – F-76.

| Year | Region | Fuel | Volume | Min | Avg | Wt Avg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1999 | 3 | F76 | 176.34 | 12.8 | 13.32 | 13.30 | 15.34 | 47 |
| 1999 | 5 | F76 | 93.17 | 12.5 | 12.86 | 12.84 | 13.13 | 24 |
| 1999 | 7 | F76 | 38.57 | 13.1 | 13.69 | 13.64 | 15.80 | 11 |
| 1999 | 8 | F76 | 250.53 | 12.6 | 13.14 | 13.13 | 13.70 | 44 |
| 1999 | 9 | F76 | 9.79 | 13.3 | 13.30 | 13.30 | 13.30 | 1 |

[Spec = 12.5% min] – [Volume in Millions of Gallons]

Table 40. Hydrogen Content Conformance – JP-4.

| Year | Region | Fuel | Volume | Min | Avg | Wt Avg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1999 | 8 | JP4 | 1.4 | 14.5 | 14.58 | 14.55 | 14.7 | 8 |

[Spec = 13.5% min] – [Volume in Millions of Gallons]

Table 41. Hydrogen Content Conformance – JP-5.

| Year | Region | Fuel | Volume | Min | Avg | WtAvg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1995 | 3 | JP5 | 55.5 | 13.6 | 13.86 | 13.84 | 14.1 | 33 |
| 1995 | 7 | JP5 | 31.7 | 13.7 | 13.85 | 13.86 | 14.0 | 8 |
| 1996 | 3 | JP5 | 308.9 | 13.5 | 13.94 | 13.95 | 14.6 | 111 |
| 1996 | 5 | JP5 | 51.4 | 13.4 | 13.60 | 13.70 | 14.4 | 17 |
| 1996 | 6 | JP5 | 22.7 | 13.7 | 13.92 | 13.81 | 14.3 | 3 |
| 1996 | 7 | JP5 | 71.9 | 13.4 | 14.03 | 14.01 | 15.1 | 21 |
| 1996 | 8 | JP5 | 39.6 | 13.7 | 13.81 | 13.81 | 13.9 | 8 |
| 1997 | 3 | JP5 | 322.9 | 13.4 | 13.97 | 13.97 | 14.4 | 129 |
| 1997 | 5 | JP5 | 210.8 | 13.4 | 13.58 | 13.65 | 14.1 | 74 |
| 1997 | 6 | JP5 | 59.2 | 13.6 | 13.78 | 13.75 | 14.0 | 10 |
| 1997 | 7 | JP5 | 55.8 | 13.6 | 13.81 | 13.82 | 14.1 | 19 |
| 1997 | 8 | JP5 | 58.6 | 13.6 | 13.84 | 13.78 | 14.1 | 20 |
| 1998 | 3 | JP5 | 310.8 | 13.4 | 13.95 | 13.96 | 14.7 | 125 |
| 1998 | 5 | JP5 | 168.3 | 13.4 | 13.59 | 13.57 | 15.3 | 66 |
| 1998 | 6 | JP5 | 24.1 | 13.6 | 13.62 | 13.62 | 13.7 | 5 |
| 1998 | 7 | JP5 | 54.7 | 13.4 | 13.89 | 13.86 | 14.1 | 19 |
| 1998 | 8 | JP5 | 57.9 | 13.8 | 13.93 | 13.93 | 14.2 | 15 |
| 1999 | 2 | JP5 | 15.6 | 13.9 | 14.42 | 15.24 | 15.7 | 32 |
| 1999 | 3 | JP5 | 307.6 | 13.4 | 13.92 | 13.93 | 14.4 | 117 |
| 1999 | 5 | JP5 | 168.1 | 13.4 | 13.60 | 13.64 | 14.2 | 53 |
| 1999 | 6 | JP5 | 62.0 | 13.6 | 13.90 | 13.90 | 14.2 | 12 |
| 1999 | 7 | JP5 | 52.6 | 13.7 | 14.07 | 14.04 | 15.0 | 13 |
| 1999 | 8 | JP5 | 46.9 | 13.8 | 13.99 | 14.01 | 14.4 | 10 |
| 1999 | 9 | JP5 | 19.6 | 13.7 | 13.78 | 13.77 | 13.9 | 2 |

[Spec = 13.4% min] – [Volume in Millions of Gallons]

Table 42. Hydrogen Content Conformance – JP-8.

| Year | Region | Fuel | Volume | Min | Avg | WtAvg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1995 | 1 | JP8 | 2.9 | 13.5 | 13.60 | 13.61 | 13.8 | 30 |
| 1995 | 2 | JP8 | 126.6 | 13.6 | 13.87 | 13.87 | 14.1 | 83 |
| 1995 | 3 | JP8 | 451.5 | 13.4 | 13.79 | 13.79 | 14.5 | 316 |
| 1995 | 4 | JP8 | 10.0 | 13.6 | 13.81 | 13.83 | 14.0 | 16 |
| 1995 | 5 | JP8 | 239.3 | 13.4 | 13.56 | 13.62 | 14.5 | 154 |
| 1995 | 7 | JP8 | 65.1 | 13.7 | 13.89 | 13.90 | 14.2 | 21 |
| 1995 | 8 | JP8 | 97.4 | 13.5 | 13.80 | 13.84 | 14.2 | 118 |
| 1996 | 1 | JP8 | 18.8 | 13.5 | 13.64 | 13.79 | 14.3 | 60 |
| 1996 | 2 | JP8 | 191.4 | 13.5 | 13.88 | 13.87 | 14.8 | 148 |
| 1996 | 3 | JP8 | 633.7 | 13.4 | 13.78 | 13.74 | 14.7 | 433 |
| 1996 | 4 | JP8 | 84.9 | 13.4 | 13.80 | 13.78 | 14.1 | 96 |
| 1996 | 5 | JP8 | 426.6 | 13.4 | 13.62 | 13.69 | 14.2 | 224 |
| 1996 | 6 | JP8 | 37.3 | 14.0 | 14.08 | 14.08 | 14.2 | 7 |
| 1996 | 7 | JP8 | 263.1 | 13.4 | 13.87 | 13.95 | 15.0 | 111 |
| 1996 | 8 | JP8 | 176.0 | 13.4 | 13.88 | 13.95 | 14.2 | 152 |
| 1997 | 1 | JP8 | 91.4 | 13.5 | 13.86 | 13.83 | 14.0 | 97 |
| 1997 | 2 | JP8 | 214.0 | 13.4 | 13.89 | 13.88 | 14.4 | 306 |
| 1997 | 3 | JP8 | 799.9 | 12.9 | 15.87 | 14.16 | 13.9 | 658 |
| 1997 | 4 | JP8 | 53.3 | 13.6 | 13.85 | 13.89 | 14.0 | 86 |
| 1997 | 5 | JP8 | 421.5 | 13.4 | 13.54 | 13.63 | 13.9 | 286 |
| 1997 | 7 | JP8 | 261.0 | 13.5 | 14.02 | 14.01 | 15.2 | 92 |
| 1997 | 8 | JP8 | 301.5 | 13.4 | 13.92 | 13.90 | 14.1 | 170 |
| 1998 | 1 | JP8 | 123.6 | 13.4 | 13.69 | 13.78 | 14.0 | 150 |
| 1998 | 2 | JP8 | 215.8 | 13.4 | 13.94 | 13.86 | 15.0 | 272 |
| 1998 | 3 | JP8 | 976.1 | 13.4 | 16.98 | 14.37 | 13.9 | 871 |
| 1998 | 4 | JP8 | 60.2 | 13.6 | 13.85 | 13.88 | 14.1 | 112 |
| 1998 | 5 | JP8 | 434.6 | 13.4 | 13.57 | 13.65 | 14.6 | 284 |
| 1998 | 6 | JP8 | 6.7 | 14.0 | 14.00 | 14.00 | 14.0 | 1 |
| 1998 | 7 | JP8 | 149.4 | 13.1 | 13.90 | 13.92 | 14.2 | 57 |
| 1998 | 8 | JP8 | 262.3 | 13.6 | 13.92 | 13.94 | 14.4 | 204 |
| 1999 | 1 | JP8 | 104.2 | 13.3 | 13.63 | 13.76 | 14.0 | 137 |
| 1999 | 2 | JP8 | 204.0 | 13.4 | 13.85 | 13.85 | 14.2 | 257 |
| 1999 | 3 | JP8 | 1037.7 | 13.2 | 13.85 | 13.85 | 15.5 | 951 |
| 1999 | 4 | JP8 | 92.4 | 13.4 | 13.85 | 13.79 | 14.2 | 196 |
| 1999 | 5 | JP8 | 306.5 | 13.4 | 13.57 | 13.59 | 15.5 | 199 |
| 1999 | 7 | JP8 | 316.7 | 13.6 | 13.93 | 13.94 | 15.5 | 118 |
| 1999 | 8 | JP8 | 293.8 | 13.5 | 13.88 | 13.85 | 14.5 | 216 |
| 1999 | 9 | JP8 | 47.0 | 13.7 | 13.81 | 13.80 | 13.9 | 7 |
| 1999 | 7 | AN8 | 3.9 | 13.8 | 13.80 | 13.80 | 13.8 | 1 |

[Spec = 13.4% min] – [Volume in Millions of Gallons]

Table 43. Distillation (10% Recovered) Conformance – F-76.

| Year | Region | Fuel | Volume | Min | Avg | Wt Avg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1999 | 3 | F76 | 176.3 | 196 | 232.89 | 179.77 | 246 | 39 |
| 1999 | 5 | F76 | 93.2 | 212 | 233.18 | 233.87 | 248 | 24 |
| 1999 | 7 | F76 | 38.6 | 201 | 217.73 | 215.83 | 240 | 11 |
| 1999 | 8 | F76 | 250.5 | 203 | 236.62 | 236.46 | 261 | 44 |
| 1999 | 9 | F76 | 9.8 | 365 | 365.00 | 365.00 | 365 | 1 |

[Spec = (Report)] — [Volume in Millions of Gallons]

Table 44. Distillation (10% Recovered) Conformance – JP-4.

| Year | Region | Fuel | Volume | Min | Avg | Wt Avg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1999 | 8 | JP4 | 1.4 | 88 | 91.00 | 90.54 | 94 | 8 |

[Spec = (Report)] — [Volume in Millions of Gallons]

Table 45. Distillation (10% Recovered) Conformance – JP-5.

| Year | Region | Fuel | Volume | Min | Avg | WtAvg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1995 | 3 | JP5 | 55.5 | 171 | 181.93 | 178.43 | 198 | 33 |
| 1995 | 7 | JP5 | 31.7 | 186 | 195.99 | 195.10 | 203 | 8 |
| 1996 | 3 | JP5 | 308.9 | 169 | 173.44 | 173.14 | 194 | 111 |
| 1996 | 5 | JP5 | 51.4 | 169 | 190.71 | 185.27 | 200 | 17 |
| 1996 | 6 | JP5 | 22.7 | 164 | 181.33 | 187.05 | 190 | 3 |
| 1996 | 7 | JP5 | 71.9 | 187 | 191.48 | 191.14 | 200 | 21 |
| 1996 | 8 | JP5 | 39.6 | 186 | 189.07 | 189.06 | 195 | 8 |
| 1997 | 3 | JP5 | 322.9 | 156 | 174.06 | 172.63 | 201 | 129 |
| 1997 | 5 | JP5 | 210.8 | 170 | 191.49 | 183.99 | 202 | 74 |
| 1997 | 6 | JP5 | 59.2 | 189 | 191.30 | 191.48 | 193 | 10 |
| 1997 | 7 | JP5 | 55.8 | 180 | 193.36 | 192.69 | 202 | 19 |
| 1997 | 8 | JP5 | 58.6 | 189 | 192.81 | 193.40 | 198 | 20 |
| 1998 | 3 | JP5 | 310.8 | 150 | 174.34 | 173.57 | 201 | 125 |
| 1998 | 5 | JP5 | 168.3 | 176 | 195.09 | 192.60 | 205 | 66 |
| 1998 | 6 | JP5 | 24.1 | 194 | 195.00 | 197.07 | 197 | 5 |
| 1998 | 7 | JP5 | 54.7 | 186 | 193.93 | 191.42 | 201 | 19 |
| 1998 | 8 | JP5 | 57.9 | 191 | 194.10 | 194.15 | 195 | 15 |
| 1999 | 2 | JP5 | 15.6 | 186 | 189.21 | 186.91 | 192 | 32 |
| 1999 | 3 | JP5 | 307.6 | 171 | 175.73 | 174.40 | 197 | 117 |
| 1999 | 5 | JP5 | 168.1 | 172 | 192.71 | 179.87 | 201 | 52 |
| 1999 | 6 | JP5 | 62.0 | 180 | 188.92 | 188.96 | 191 | 12 |
| 1999 | 7 | JP5 | 52.6 | 187 | 192.78 | 192.37 | 196 | 13 |
| 1999 | 8 | JP5 | 46.9 | 191 | 192.95 | 193.16 | 200 | 10 |
| 1999 | 9 | JP5 | 19.6 | 197 | 197.50 | 197.50 | 198 | 2 |

[Spec = 205/206 °C max] — [Volume in Millions of Gallons]

Table 46. Distillation (10% Recovered) Conformance – JP-8.

| Year | Region | Fuel | Volume | Min | Avg | WtAvg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1995 | 1 | JP8 | 2.9 | 177 | 185.40 | 184.91 | 197 | 30 |
| 1995 | 2 | JP8 | 126.6 | 176 | 182.91 | 182.85 | 191 | 83 |
| 1995 | 3 | JP8 | 451.5 | 150 | 180.68 | 178.65 | 194 | 316 |
| 1995 | 4 | JP8 | 10.0 | 171 | 178.38 | 178.01 | 188 | 16 |
| 1995 | 5 | JP8 | 239.3 | 141 | 154.14 | 158.60 | 190 | 154 |
| 1995 | 7 | JP8 | 65.1 | 164 | 176.79 | 178.28 | 198 | 21 |
| 1995 | 8 | JP8 | 97.4 | 160 | 167.49 | 166.01 | 175 | 118 |
| 1996 | 1 | JP8 | 18.8 | 167 | 183.93 | 174.41 | 197 | 60 |
| 1996 | 2 | JP8 | 191.4 | 168 | 179.79 | 180.21 | 191 | 148 |
| 1996 | 3 | JP8 | 633.7 | 157 | 179.39 | 179.43 | 197 | 433 |
| 1996 | 4 | JP8 | 84.9 | 152 | 170.04 | 170.09 | 188 | 96 |
| 1996 | 5 | JP8 | 426.6 | 148 | 166.95 | 164.01 | 198 | 224 |
| 1996 | 6 | JP8 | 37.3 | 162 | 165.29 | 165.03 | 168 | 7 |
| 1996 | 7 | JP8 | 263.1 | 164 | 172.41 | 172.75 | 193 | 111 |
| 1996 | 8 | JP8 | 176.0 | 158 | 165.85 | 166.71 | 183 | 152 |
| 1997 | 1 | JP8 | 91.4 | 168 | 178.92 | 176.73 | 191 | 97 |
| 1997 | 2 | JP8 | 214.0 | 172 | 181.48 | 181.42 | 197 | 306 |
| 1997 | 3 | JP8 | 799.9 | 126 | 174.86 | 177.05 | 200 | 658 |
| 1997 | 4 | JP8 | 53.3 | 156 | 167.06 | 165.02 | 193 | 86 |
| 1997 | 5 | JP8 | 421.5 | 148 | 171.53 | 167.34 | 201 | 286 |
| 1997 | 7 | JP8 | 261.0 | 152 | 171.74 | 171.83 | 193 | 92 |
| 1997 | 8 | JP8 | 301.5 | 157 | 167.37 | 170.52 | 195 | 170 |
| 1998 | 1 | JP8 | 123.6 | 166 | 178.67 | 172.78 | 195 | 150 |
| 1998 | 2 | JP8 | 215.8 | 167 | 183.37 | 182.85 | 197 | 272 |
| 1998 | 3 | JP8 | 976.1 | 183 | 180.11 | 181.13 | 201 | 741 |
| 1998 | 4 | JP8 | 60.2 | 158 | 172.39 | 169.06 | 186 | 112 |
| 1998 | 5 | JP8 | 434.6 | 148 | 168.32 | 165.96 | 199 | 284 |
| 1998 | 6 | JP8 | 6.7 | 170 | 170.00 | 170.00 | 170 | 1 |
| 1998 | 7 | JP8 | 149.4 | 157 | 174.35 | 174.22 | 190 | 57 |
| 1998 | 8 | JP8 | 262.3 | 154 | 166.93 | 169.92 | 182 | 204 |
| 1999 | 1 | JP8 | 104.2 | 164 | 179.00 | 173.61 | 194 | 137 |
| 1999 | 2 | JP8 | 204.0 | 158 | 183.07 | 183.71 | 198 | 270 |
| 1999 | 3 | JP8 | 1037.7 | 122 | 177.12 | 179.12 | 202 | 951 |
| 1999 | 4 | JP8 | 92.4 | 156 | 172.67 | 170.05 | 189 | 198 |
| 1999 | 5 | JP8 | 306.5 | 148 | 178.42 | 161.94 | 201 | 191 |
| 1999 | 7 | JP8 | 316.7 | 163 | 175.04 | 173.86 | 190 | 118 |
| 1999 | 8 | JP8 | 293.8 | 158 | 166.88 | 168.09 | 177 | 225 |
| 1999 | 9 | JP8 | 47.0 | 168 | 172.43 | 172.69 | 176 | 7 |
| 1999 | 7 | AN8 | 3.9 | 162 | 162.00 | 162.00 | 162 | 1 |

[Spec = 205/206 °C max] — [Volume in Millions of Gallons]

Table 47. Final Boiling Point Conformance – F-76.

| Year | Region | Fuel | Volume | Min | Avg | Wt Avg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1999 | 3 | F76 | 176.3 | 256 | 348.46 | 350.07 | 367 | 47 |
| 1999 | 5 | F76 | 93.2 | 343 | 355.16 | 353.75 | 365 | 24 |
| 1999 | 7 | F76 | 38.6 | 359 | 368.55 | 368.94 | 371 | 11 |
| 1999 | 8 | F76 | 250.5 | 348 | 365.33 | 366.03 | 383 | 44 |
| 1999 | 9 | F76 | 9.8 | 366 | 366.00 | 366.00 | 366 | 1 |

[Spec = 385 °C max] – [Volume in Millions of Gallons]

Table 48. Final Boiling Point Conformance – JP-4.

| Year | Region | Fuel | Volume | Min | Avg | Wt Avg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1999 | 8 | JP4 | 1.4 | 257 | 262.25 | 262.14 | 266 | 8 |

[Spec = 270 °C max] – [Volume in Millions of Gallons]

Table 49. Final Boiling Point Conformance – JP-5.

| Year | Region | Fuel | Volume | Min | Avg | WtAvg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1995 | 3 | JP5 | 55.5 | 246 | 269.04 | 273.03 | 287 | 33 |
| 1995 | 7 | JP5 | 31.7 | 244 | 255.05 | 254.38 | 262 | 8 |
| 1996 | 3 | JP5 | 308.9 | 254 | 278.33 | 278.22 | 286 | 111 |
| 1996 | 5 | JP5 | 51.4 | 255 | 274.88 | 285.57 | 312 | 17 |
| 1996 | 6 | JP5 | 22.7 | 250 | 266.67 | 258.99 | 290 | 3 |
| 1996 | 7 | JP5 | 71.9 | 233 | 250.90 | 250.41 | 261 | 21 |
| 1996 | 8 | JP5 | 39.6 | 253 | 262.35 | 262.22 | 274 | 8 |
| 1997 | 3 | JP5 | 322.9 | 263 | 279.34 | 279.73 | 289 | 129 |
| 1997 | 5 | JP5 | 210.8 | 250 | 275.24 | 290.15 | 309 | 74 |
| 1997 | 6 | JP5 | 59.2 | 259 | 266.40 | 266.74 | 278 | 10 |
| 1997 | 7 | JP5 | 55.8 | 234 | 255.76 | 255.67 | 273 | 19 |
| 1997 | 8 | JP5 | 58.6 | 238 | 252.52 | 247.00 | 280 | 20 |
| 1998 | 3 | JP5 | 310.8 | 262 | 279.46 | 279.61 | 289 | 128 |
| 1998 | 5 | JP5 | 168.3 | 244 | 263.20 | 269.05 | 314 | 66 |
| 1998 | 6 | JP5 | 24.1 | 281 | 281.60 | 281.71 | 283 | 5 |
| 1998 | 7 | JP5 | 54.7 | 232 | 248.08 | 249.31 | 266 | 19 |
| 1998 | 8 | JP5 | 57.9 | 236 | 252.43 | 245.35 | 281 | 15 |
| 1999 | 2 | JP5 | 15.6 | 244 | 250.55 | 248.79 | 256 | 32 |
| 1999 | 3 | JP5 | 307.6 | 269 | 283.29 | 283.69 | 297 | 117 |
| 1999 | 5 | JP5 | 168.1 | 249 | 266.52 | 260.75 | 314 | 52 |
| 1999 | 6 | JP5 | 62.0 | 250 | 262.58 | 262.25 | 280 | 12 |
| 1999 | 7 | JP5 | 52.6 | 241 | 257.22 | 254.44 | 264 | 13 |
| 1999 | 8 | JP5 | 46.9 | 246 | 247.65 | 247.72 | 252 | 10 |
| 1999 | 9 | JP5 | 19.6 | 267 | 268.00 | 268.01 | 269 | 2 |

[Spec = 300 °C max] – [Volume in Millions of Gallons]

Table 50. Final Boiling Point Conformance – JP-8.

| Year | Region | Fuel | Volume | Min | Avg | WtAvg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1995 | 1 | JP8 | 2.9 | 256 | 265.10 | 264.68 | 279 | 30 |
| 1995 | 2 | JP8 | 126.6 | 246 | 255.33 | 255.31 | 272 | 83 |
| 1995 | 3 | JP8 | 451.5 | 214 | 263.49 | 265.11 | 283 | 316 |
| 1995 | 4 | JP8 | 10.0 | 236 | 255.38 | 256.53 | 289 | 16 |
| 1995 | 5 | JP8 | 239.3 | 209 | 301.57 | 293.65 | 330 | 154 |
| 1995 | 7 | JP8 | 65.1 | 233 | 246.72 | 248.49 | 261 | 21 |
| 1995 | 8 | JP8 | 97.4 | 264 | 274.87 | 277.45 | 296 | 118 |
| 1996 | 1 | JP8 | 18.8 | 250 | 261.68 | 256.95 | 272 | 60 |
| 1996 | 2 | JP8 | 191.4 | 221 | 255.07 | 255.07 | 275 | 148 |
| 1996 | 3 | JP8 | 633.7 | 238 | 261.88 | 264.22 | 284 | 433 |
| 1996 | 4 | JP8 | 84.9 | 235 | 260.47 | 262.35 | 276 | 96 |
| 1996 | 5 | JP8 | 426.6 | 255 | 289.62 | 291.97 | 319 | 224 |
| 1996 | 6 | JP8 | 37.3 | 278 | 282.14 | 282.25 | 288 | 7 |
| 1996 | 7 | JP8 | 263.1 | 231 | 255.19 | 255.19 | 300 | 111 |
| 1996 | 8 | JP8 | 176.0 | 248 | 272.92 | 271.21 | 290 | 152 |
| 1997 | 1 | JP8 | 91.4 | 234 | 254.80 | 251.13 | 278 | 97 |
| 1997 | 2 | JP8 | 214.0 | 232 | 254.89 | 254.73 | 285 | 306 |
| 1997 | 3 | JP8 | 799.9 | 220 | 259.44 | 263.62 | 300 | 658 |
| 1997 | 4 | JP8 | 53.3 | 237 | 262.81 | 263.70 | 295 | 86 |
| 1997 | 5 | JP8 | 421.5 | 242 | 280.19 | 284.85 | 313 | 286 |
| 1997 | 7 | JP8 | 261.0 | 236 | 256.83 | 256.84 | 276 | 92 |
| 1997 | 8 | JP8 | 301.5 | 257 | 275.54 | 274.03 | 293 | 170 |
| 1998 | 1 | JP8 | 123.6 | 242 | 257.29 | 251.21 | 292 | 150 |
| 1998 | 2 | JP8 | 215.8 | 234 | 254.79 | 256.85 | 288 | 272 |
| 1998 | 3 | JP8 | 976.1 | 220 | 260.98 | 265.10 | 290 | 872 |
| 1998 | 4 | JP8 | 60.2 | 235 | 257.68 | 260.25 | 273 | 112 |
| 1998 | 5 | JP8 | 434.6 | 238 | 275.40 | 287.62 | 316 | 284 |
| 1998 | 6 | JP8 | 6.7 | 258 | 258.00 | 258.00 | 258 | 1 |
| 1998 | 7 | JP8 | 149.4 | 230 | 254.44 | 254.67 | 273 | 57 |
| 1998 | 8 | JP8 | 262.3 | 251 | 271.53 | 269.01 | 291 | 204 |
| 1999 | 1 | JP8 | 104.2 | 231 | 253.70 | 246.88 | 286 | 137 |
| 1999 | 2 | JP8 | 204.0 | 201 | 256.85 | 258.08 | 365 | 270 |
| 1999 | 3 | JP8 | 1037.7 | 217 | 257.44 | 259.72 | 355 | 951 |
| 1999 | 4 | JP8 | 92.4 | 232 | 258.29 | 261.49 | 287 | 198 |
| 1999 | 5 | JP8 | 306.5 | 236 | 260.66 | 253.60 | 310 | 191 |
| 1999 | 7 | JP8 | 316.7 | 229 | 257.49 | 256.69 | 370 | 118 |
| 1999 | 8 | JP8 | 293.8 | 178 | 271.02 | 268.02 | 294 | 225 |
| 1999 | 9 | JP8 | 47.0 | 258 | 263.43 | 263.95 | 269 | 7 |
| 1999 | 7 | AN8 | 3.9 | 243 | 243.00 | 243.00 | 243 | 1 |

[Spec = 300 °C max] — [Volume in Millions of Gallons]

Table 51. Flash Point Conformance – F-76.

| Year | Region | Fuel | Volume | Min | Avg | Wt Avg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1999 | 3 | F76 | 176.3 | 66 | 81.09 | 80.2681 | 90 | 47 |
| 1999 | 5 | F76 | 93.2 | 64 | 72.92 | 73.9574 | 91 | 24 |
| 1999 | 7 | F76 | 38.6 | 63 | 71.09 | 70.0783 | 84 | 11 |
| 1999 | 8 | F76 | 250.5 | 61 | 75.64 | 76.3499 | 89 | 44 |
| 1999 | 9 | F76 | 9.8 | 110 | 110.00 | 110.0000 | 110 | 1 |

[Spec = 60 °C min] – [Volume in Millions of Gallons]

Table 52. Flash Point Conformance – JP-5.

| Year | Region | Fuel | Volume | Min | Avg | WtAvg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1995 | 3 | JP5 | 55.5 | 60 | 62.34 | 61.93 | 65 | 33 |
| 1995 | 7 | JP5 | 31.7 | 61 | 67.25 | 66.71 | 72 | 8 |
| 1996 | 3 | JP5 | 308.9 | 60 | 62.04 | 62.04 | 65 | 111 |
| 1996 | 5 | JP5 | 51.4 | 60 | 61.53 | 61.91 | 63 | 17 |
| 1996 | 6 | JP5 | 22.7 | 62 | 62.33 | 62.44 | 63 | 3 |
| 1996 | 7 | JP5 | 71.9 | 60 | 63.90 | 63.86 | 70 | 21 |
| 1996 | 8 | JP5 | 39.6 | 62 | 62.88 | 62.83 | 65 | 8 |
| 1997 | 3 | JP5 | 322.9 | 60 | 62.44 | 62.06 | 72 | 129 |
| 1997 | 5 | JP5 | 210.8 | 60 | 62.63 | 62.76 | 69 | 74 |
| 1997 | 6 | JP5 | 59.2 | 61 | 63.40 | 63.56 | 65 | 10 |
| 1997 | 7 | JP5 | 55.8 | 61 | 65.42 | 65.42 | 73 | 19 |
| 1997 | 8 | JP5 | 58.6 | 61 | 63.85 | 63.87 | 67 | 20 |
| 1998 | 3 | JP5 | 310.8 | 60 | 62.48 | 62.33 | 71 | 125 |
| 1998 | 5 | JP5 | 168.3 | 61 | 64.52 | 64.44 | 72 | 66 |
| 1998 | 6 | JP5 | 24.1 | 64 | 64.40 | 64.42 | 65 | 5 |
| 1998 | 7 | JP5 | 54.7 | 61 | 64.42 | 64.49 | 72 | 19 |
| 1998 | 8 | JP5 | 57.9 | 43 | 62.73 | 63.30 | 66 | 15 |
| 1999 | 2 | JP5 | 15.6 | 60 | 62.25 | 60.79 | 66 | 32 |
| 1999 | 3 | JP5 | 307.6 | 61 | 62.70 | 62.58 | 67 | 117 |
| 1999 | 5 | JP5 | 168.1 | 57 | 64.25 | 64.09 | 69 | 53 |
| 1999 | 6 | JP5 | 62.0 | 62 | 62.67 | 62.68 | 65 | 12 |
| 1999 | 7 | JP5 | 52.6 | 60 | 62.92 | 62.22 | 67 | 13 |
| 1999 | 8 | JP5 | 46.9 | 62 | 63.60 | 63.62 | 67 | 10 |
| 1999 | 9 | JP5 | 19.6 | 63 | 64.00 | 64.01 | 65 | 2 |

[Spec = 60 °C min] – [Volume in Millions of Gallons]

Table 53. Flash Point Conformance – JP-8.

| Year | Region | Fuel | Volume | Min | Avg | WtAvg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1995 | 1 | JP8 | 2.9 | 40 | 52.80 | 52.39 | 63 | 30 |
| 1995 | 2 | JP8 | 126.6 | 40 | 51.65 | 51.77 | 59 | 83 |
| 1995 | 3 | JP8 | 451.5 | 38 | 50.73 | 50.22 | 63 | 316 |
| 1995 | 4 | JP8 | 10.0 | 43 | 47.20 | 46.99 | 51 | 16 |
| 1995 | 5 | JP8 | 239.3 | 44 | 49.52 | 50.52 | 63 | 154 |
| 1995 | 7 | JP8 | 65.1 | 42 | 49.93 | 50.50 | 69 | 21 |
| 1995 | 8 | JP8 | 97.4 | 38 | 41.01 | 40.69 | 46 | 118 |
| 1996 | 1 | JP8 | 18.8 | 40 | 49.48 | 43.15 | 60 | 60 |
| 1996 | 2 | JP8 | 191.4 | 42 | 50.66 | 50.88 | 66 | 148 |
| 1996 | 3 | JP8 | 633.7 | 38 | 49.98 | 49.88 | 70 | 433 |
| 1996 | 4 | JP8 | 84.9 | 38 | 44.80 | 44.52 | 64 | 96 |
| 1996 | 5 | JP8 | 426.6 | 40 | 48.93 | 50.03 | 62 | 224 |
| 1996 | 6 | JP8 | 37.3 | 43 | 45.71 | 45.62 | 51 | 7 |
| 1996 | 7 | JP8 | 263.1 | 38 | 45.13 | 46.13 | 64 | 111 |
| 1996 | 8 | JP8 | 176.0 | 38 | 41.99 | 43.70 | 50 | 152 |
| 1997 | 1 | JP8 | 91.4 | 42 | 53.19 | 55.17 | 74 | 97 |
| 1997 | 2 | JP8 | 214.0 | 41 | 53.39 | 53.05 | 66 | 306 |
| 1997 | 3 | JP8 | 799.9 | 38 | 48.75 | 50.10 | 77 | 658 |
| 1997 | 4 | JP8 | 53.3 | 38 | 44.53 | 43.11 | 63 | 86 |
| 1997 | 5 | JP8 | 421.5 | 40 | 48.38 | 48.96 | 64 | 286 |
| 1997 | 7 | JP8 | 261.0 | 39 | 46.57 | 46.86 | 63 | 92 |
| 1997 | 8 | JP8 | 301.5 | 39 | 44.41 | 47.03 | 59 | 170 |
| 1998 | 1 | JP8 | 123.6 | 46 | 53.13 | 52.11 | 67 | 150 |
| 1998 | 2 | JP8 | 215.8 | 40 | 54.49 | 53.46 | 69 | 272 |
| 1998 | 3 | JP8 | 976.1 | 38 | 49.77 | 51.04 | 72 | 871 |
| 1998 | 4 | JP8 | 60.2 | 38 | 45.37 | 43.97 | 58 | 112 |
| 1998 | 5 | JP8 | 434.6 | 40 | 45.56 | 47.88 | 66 | 284 |
| 1998 | 6 | JP8 | 6.7 | 52 | 52.00 | 52.00 | 52 | 1 |
| 1998 | 7 | JP8 | 149.4 | 40 | 47.69 | 47.52 | 60 | 57 |
| 1998 | 8 | JP8 | 262.3 | 39 | 42.93 | 44.74 | 53 | 204 |
| 1999 | 1 | JP8 | 104.2 | 42 | 51.58 | 51.70 | 64 | 137 |
| 1999 | 2 | JP8 | 204.0 | 43 | 52.66 | 53.49 | 64 | 270 |
| 1999 | 3 | JP8 | 1037.7 | 37 | 49.64 | 50.55 | 71 | 951 |
| 1999 | 4 | JP8 | 92.4 | 38 | 45.14 | 43.84 | 57 | 198 |
| 1999 | 5 | JP8 | 306.5 | 39 | 49.31 | 52.13 | 69 | 199 |
| 1999 | 7 | JP8 | 316.7 | 38 | 47.59 | 46.79 | 61 | 118 |
| 1999 | 8 | JP8 | 293.8 | 38 | 42.27 | 42.14 | 50 | 225 |
| 1999 | 9 | JP8 | 47.0 | 42 | 42.29 | 42.39 | 43 | 7 |
| 1999 | 7 | AN8 | 3.9 | 39 | 39.00 | 39.00 | 39 | 1 |

[Spec = 38 °C min] — [Volume in Millions of Gallons]

Table 54. Cetane Index Conformance – F-76.

| Year | Region | Fuel | Volume | Min | Avg | Wt Avg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1999 | 3 | F76 | 176.3 | 43.0 | 51.51 | 51.42 | 55.0 | 47 |
| 1999 | 5 | F76 | 93.2 | 43.0 | 46.06 | 46.12 | 47.8 | 24 |
| 1999 | 7 | F76 | 38.6 | 50.3 | 52.66 | 52.70 | 53.9 | 11 |
| 1999 | 8 | F76 | 250.5 | 43.0 | 52.46 | 53.68 | 56.4 | 44 |
| 1999 | 9 | F76 | 9.8 | 49.5 | 49.50 | 49.50 | 49.5 | 1 |

[Spec = 42 min] – [Volume in Millions of Gallons]

Table 55. Cetane Index Conformance – JP-5.

| Year | Region | Fuel | Volume | Min | Avg | WtAvg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1995 | 3 | JP5 | 55.5 | 36.0 | 45.22 | 45.34 | 48.0 | 33 |
| 1995 | 7 | JP5 | 31.7 | 41.1 | 44.54 | 44.66 | 46.0 | 8 |
| 1996 | 3 | JP5 | 308.9 | 32.6 | 47.00 | 47.21 | 59.4 | 111 |
| 1996 | 5 | JP5 | 51.4 | 39.0 | 42.66 | 43.16 | 47.1 | 17 |
| 1996 | 6 | JP5 | 22.7 | 44.4 | 45.80 | 45.40 | 47.0 | 3 |
| 1996 | 7 | JP5 | 71.9 | 40.8 | 44.30 | 44.32 | 47.5 | 21 |
| 1996 | 8 | JP5 | 39.6 | 40.0 | 45.63 | 45.64 | 49.0 | 8 |
| 1997 | 3 | JP5 | 322.9 | 44.3 | 47.43 | 47.58 | 49.1 | 129 |
| 1997 | 5 | JP5 | 210.8 | 33.7 | 41.75 | 42.67 | 46.0 | 74 |
| 1997 | 6 | JP5 | 59.2 | 42.4 | 44.21 | 44.14 | 45.2 | 10 |
| 1997 | 7 | JP5 | 55.8 | 42.4 | 45.35 | 45.02 | 56.5 | 19 |
| 1997 | 8 | JP5 | 56.6 | 39.5 | 44.08 | 43.73 | 49.0 | 18 |
| 1998 | 3 | JP5 | 310.8 | 40.8 | 47.42 | 47.50 | 49.2 | 125 |
| 1998 | 5 | JP5 | 168.3 | 32.3 | 38.93 | 39.45 | 44.0 | 66 |
| 1998 | 6 | JP5 | 24.1 | 43.0 | 43.26 | 43.27 | 44.1 | 5 |
| 1998 | 7 | JP5 | 54.7 | 41.4 | 45.70 | 45.43 | 48.0 | 19 |
| 1998 | 8 | JP5 | 57.9 | 37.5 | 45.40 | 46.99 | 49.0 | 15 |
| 1999 | 2 | JP5 | 15.6 | 41.7 | 43.58 | 42.38 | 44.9 | 32 |
| 1999 | 3 | JP5 | 307.6 | 43.1 | 47.31 | 47.47 | 49.0 | 117 |
| 1999 | 5 | JP5 | 168.1 | 20.0 | 37.97 | 39.26 | 45.0 | 53 |
| 1999 | 6 | JP5 | 62.0 | 42.9 | 46.12 | 46.16 | 49.0 | 12 |
| 1999 | 7 | JP5 | 52.6 | 42.1 | 44.18 | 44.90 | 48.2 | 13 |
| 1999 | 8 | JP5 | 46.9 | 46.0 | 47.20 | 47.23 | 49.0 | 10 |
| 1999 | 9 | JP5 | 19.6 | 44.9 | 45.20 | 45.20 | 45.5 | 2 |

[Spec = (Report)] – [Volume in Millions of Gallons]

Table 56. Cetane Index Conformance – JP-8.

| Year | Region | Fuel | Volume | Min | Avg | WtAvg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1995 | 1 | JP8 | 2.9 | 37.6 | 40.08 | 40.00 | 42.6 | 30 |
| 1995 | 2 | JP8 | 112.8 | 42.3 | 44.77 | 44.82 | 47.0 | 76 |
| 1995 | 3 | JP8 | 451.5 | 35.5 | 43.78 | 42.85 | 49.1 | 316 |
| 1995 | 4 | JP8 | 10.0 | 39.0 | 43.49 | 43.76 | 45.6 | 16 |
| 1995 | 5 | JP8 | 239.3 | 37.0 | 41.49 | 40.84 | 43.0 | 154 |
| 1995 | 7 | JP8 | 65.1 | 34.0 | 42.95 | 43.97 | 47.0 | 21 |
| 1995 | 8 | JP8 | 97.4 | 36.3 | 42.07 | 41.13 | 49.0 | 118 |
| 1996 | 1 | JP8 | 4.5 | 37.3 | 41.09 | 41.27 | 44.9 | 49 |
| 1996 | 2 | JP8 | 191.4 | 39.0 | 44.00 | 44.04 | 46.3 | 148 |
| 1996 | 3 | JP8 | 633.3 | 35.7 | 43.67 | 43.28 | 56.0 | 432 |
| 1996 | 4 | JP8 | 84.9 | 35.0 | 41.50 | 41.50 | 46.1 | 96 |
| 1996 | 5 | JP8 | 426.6 | 38.0 | 40.83 | 40.84 | 45.0 | 224 |
| 1996 | 6 | JP8 | 37.3 | 44.5 | 46.00 | 46.05 | 49.0 | 7 |
| 1996 | 7 | JP8 | 233.6 | 37.0 | 43.50 | 44.16 | 52.0 | 89 |
| 1996 | 8 | JP8 | 176.0 | 37.1 | 41.53 | 42.72 | 47.4 | 152 |
| 1997 | 1 | JP8 | 91.4 | 37.7 | 40.88 | 41.48 | 45.0 | 97 |
| 1997 | 2 | JP8 | 214.0 | 38.9 | 43.76 | 43.80 | 46.9 | 306 |
| 1997 | 3 | JP8 | 799.9 | 32.8 | 42.02 | 41.54 | 49.9 | 658 |
| 1997 | 4 | JP8 | 53.3 | 38.0 | 40.95 | 41.00 | 45.4 | 86 |
| 1997 | 5 | JP8 | 411.7 | 35.0 | 40.65 | 40.42 | 49.5 | 284 |
| 1997 | 7 | JP8 | 258.4 | 38.0 | 44.27 | 44.61 | 48.1 | 90 |
| 1997 | 8 | JP8 | 301.5 | 35.3 | 42.22 | 45.07 | 59.3 | 170 |
| 1998 | 1 | JP8 | 123.6 | 36.3 | 40.11 | 40.30 | 49.0 | 150 |
| 1998 | 2 | JP8 | 215.8 | 38.0 | 43.81 | 43.42 | 46.9 | 272 |
| 1998 | 3 | JP8 | 975.5 | 33.4 | 43.65 | 43.39 | 50.6 | 871 |
| 1998 | 4 | JP8 | 60.2 | 36.1 | 42.96 | 42.52 | 47.0 | 112 |
| 1998 | 5 | JP8 | 434.6 | 33.9 | 39.76 | 40.58 | 51.0 | 284 |
| 1998 | 6 | JP8 | 6.7 | 42.5 | 42.5 | 42.5 | 42.5 | 1 |
| 1998 | 7 | JP8 | 149.4 | 40.3 | 44.61 | 44.85 | 48.0 | 57 |
| 1998 | 8 | JP8 | 247.4 | 33.5 | 41.82 | 45.02 | 51.6 | 199 |
| 1999 | 1 | JP8 | 104.2 | 34.8 | 39.52 | 40.05 | 50.0 | 137 |
| 1999 | 2 | JP8 | 204.0 | 39.0 | 43.63 | 43.50 | 48.5 | 270 |
| 1999 | 3 | JP8 | 1037.7 | 11.0 | 43.47 | 44.16 | 50.5 | 950 |
| 1999 | 4 | JP8 | 92.4 | 37.3 | 43.20 | 42.43 | 49.0 | 198 |
| 1999 | 5 | JP8 | 306.5 | 32.5 | 38.98 | 39.37 | 43.8 | 199 |
| 1999 | 7 | JP8 | 316.7 | 37.3 | 44.07 | 44.17 | 48.9 | 118 |
| 1999 | 8 | JP8 | 293.8 | 37.1 | 41.30 | 39.23 | 48.2 | 216 |
| 1999 | 9 | JP8 | 47.0 | 43.2 | 45.76 | 45.61 | 47.8 | 7 |
| 1999 | 7 | AN8 | 3.9 | 37.6 | 37.60 | 37.60 | 37.6 | 1 |

[Spec = (Report)] — [Volume in Millions of Gallons]

Table 57. Combustion Net Heat Conformance – JP-4.

| Year | Region | Fuel | AG | | | BTU | | | MJ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Min | Avg | Max | Min | Avg | Max | Min | Avg | Max |
| 1999 | 8 | JP4 | — | — | — | — | — | — | 43.8 | 43.84 | 43.9 |

[Spec: Aniline-G. = 4500 min, Net Heat = 18385 BTU or 42.8 MJ/kg min] – [Volume in Millions of Gallons]

Table 58. Combustion Net Heat Conformance – JP-5.

| Year | Region | Fuel | AG | | | BTU | | | MJ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Min | Avg | Max | Min | Avg | Max | Min | Avg | Max |
| 1995 | 3 | JP5 | 5,009 | 6,048.8 | 6,408 | 18,557 | 18,586.8 | 18,608 | — | — | — |
| 1995 | 7 | JP5 | 5,859 | 6,367.1 | 6,688 | — | — | — | — | — | — |
| 1996 | 3 | JP5 | 4,899 | 6,150.9 | 6,525 | 18,582 | 18,582.0 | 18,582 | — | — | — |
| 1996 | 5 | JP5 | 5,224 | 5,520.5 | 6,014 | — | — | — | 41.6 | 42.78 | 43.1 |
| 1996 | 6 | JP5 | 6,086 | 6,242.0 | 6,398 | — | — | — | 43.4 | 43.39 | 43.4 |
| 1996 | 7 | JP5 | 5,894 | 6,186.5 | 6,658 | — | — | — | 42.2 | 42.99 | 43.3 |
| 1996 | 8 | JP5 | — | — | — | — | — | — | 40.4 | 42.94 | 43.4 |
| 1997 | 3 | JP5 | 5,711 | 6,217.0 | 6,442 | 18,431 | 18,573.6 | 18,615 | — | — | — |
| 1997 | 5 | JP5 | 4,924 | 5,397.0 | 6,249 | — | — | — | 43.0 | 43.02 | 43.1 |
| 1997 | 6 | JP5 | 5,569 | 6,066.3 | 6,254 | — | — | — | — | — | — |
| 1997 | 7 | JP5 | 5,710 | 6,136.2 | 6,600 | — | — | — | 43.2 | 43.22 | 43.2 |
| 1997 | 8 | JP5 | 6,480 | 6,578.0 | 6,650 | — | — | — | 43.0 | 43.20 | 43.3 |
| 1998 | 3 | JP5 | 5,577 | 6,258.5 | 6,575 | 18,577 | 18,583.2 | 18,591 | — | — | — |
| 1998 | 5 | JP5 | 4,784 | 5,242.6 | 5,755 | 18,442 | 18,465.3 | 18,490 | 43.0 | 43.00 | 43.0 |
| 1998 | 6 | JP5 | — | — | — | — | — | — | 43.1 | 43.11 | 43.1 |
| 1998 | 7 | JP5 | 5,575 | 6,224.6 | 6,728 | — | — | — | 43.2 | 43.28 | 43.3 |
| 1998 | 8 | JP5 | 6,810 | 6,810.0 | 6,810 | — | — | — | 43.0 | 43.27 | 43.5 |
| 1999 | 2 | JP5 | — | — | — | 18,579 | 18,594.8 | 18,611 | — | — | — |
| 1999 | 3 | JP5 | 5,427 | 6,144.8 | 6,403 | 18,567 | 18,584.9 | 18,599 | 43.1 | 43.22 | 43.5 |
| 1999 | 5 | JP5 | 5,136 | 5,226.1 | 5,393 | 18,374 | 18,463.6 | 18,495 | 43.0 | 43.00 | 43.0 |
| 1999 | 6 | JP5 | — | — | — | — | — | — | 43.0 | 43.22 | 43.4 |
| 1999 | 7 | JP5 | — | — | — | — | — | — | 42.5 | 43.13 | 43.4 |
| 1999 | 8 | JP5 | — | — | — | — | — | — | 43.3 | 43.68 | 46.4 |
| 1999 | 9 | JP5 | 6,135 | 6,135.0 | 6,135 | — | — | — | 43.1 | 43.10 | 43.1 |

[Spec: Aniline-G. = 4500 min, Net Heat = 18300 BTU or 42.6 MJ/kg min] – [Volume in Millions of Gallons]

Table 59. Combustion Net Heat Conformance – JP-8.

| Year | Region | Fuel | AG | | | BTU | | | MJ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Min | Avg | Max | Min | Avg | Max | Min | Avg | Max |
| 1995 | 1 | JP8 | — | — | — | — | — | — | 43.1 | 43.14 | 43.2 |
| 1995 | 2 | JP8 | 5,913 | 6,152.8 | 7,352 | 18,540 | 18,612.9 | 18,645 | 43.1 | 43.18 | 43.2 |
| 1995 | 3 | JP8 | 5,913 | 6,273.8 | 6,825 | 18,523 | 18,616.4 | 19,188 | 42.8 | 43.21 | 43.8 |
| 1995 | 4 | JP8 | — | — | — | 18,557 | 18,602.8 | 18,632 | 43.2 | 43.22 | 43.3 |
| 1995 | 5 | JP8 | 5,828 | 6,262.7 | 6,396 | 18,483 | 18,523.2 | 18,611 | 43.0 | 43.04 | 43.1 |
| 1995 | 7 | JP8 | 5,913 | 5,913.0 | 5,913 | — | — | — | 43.2 | 43.26 | 43.7 |
| 1995 | 8 | JP8 | 5,913 | 5,913.0 | 5,913 | 18,514 | 18,557.6 | 18,689 | 42.8 | 43.24 | 43.4 |
| 1996 | 1 | JP8 | — | — | — | — | — | — | 43.1 | 43.14 | 43.3 |
| 1996 | 2 | JP8 | — | — | — | 18,500 | 18,609.8 | 18,647 | 43.1 | 43.21 | 43.3 |
| 1996 | 3 | JP8 | 6,322 | 6,357.0 | 6,402 | 15,585 | 18,572.7 | 18,950 | 43.0 | 43.23 | 43.4 |
| 1996 | 4 | JP8 | — | — | — | 18,544 | 18,602.9 | 18,649 | 42.8 | 43.17 | 43.2 |
| 1996 | 5 | JP8 | 5,857 | 6,225.7 | 6,913 | 15,566 | 18,505.6 | 18,984 | 43.0 | 43.03 | 43.1 |
| 1996 | 6 | JP8 | — | — | — | — | — | — | 43.3 | 43.37 | 43.4 |
| 1996 | 7 | JP8 | 5,571 | 5,947.5 | 6,283 | — | — | — | 43.1 | 43.23 | 43.4 |
| 1996 | 8 | JP8 | 5,665 | 5,692.0 | 5,719 | 15,589 | 18,502.1 | 18,999 | 43.1 | 43.64 | 46.7 |
| 1997 | 1 | JP8 | — | — | — | — | — | — | 43.1 | 43.20 | 43.4 |
| 1997 | 2 | JP8 | — | — | — | 18,504 | 18,605.7 | 18,725 | 42.8 | 43.49 | 44.0 |
| 1997 | 3 | JP8 | — | — | — | 18,503 | 18,602.3 | 19,605 | 43.0 | 43.23 | 43.7 |
| 1997 | 4 | JP8 | — | — | — | 18,539 | 18,602.0 | 18,646 | 43.2 | 43.29 | 43.4 |
| 1997 | 5 | JP8 | 5,819 | 6,060.3 | 6,258 | 18,487 | 18,547.4 | 18,857 | 43.0 | 43.04 | 43.1 |
| 1997 | 7 | JP8 | 5,749 | 6,148.0 | 6,488 | 18,601 | 18,615.6 | 18,648 | 43.1 | 43.32 | 45.5 |
| 1997 | 8 | JP8 | — | — | — | 18,505 | 18,615.1 | 19,646 | 43.2 | 43.49 | 45.0 |
| 1998 | 1 | JP8 | — | — | — | — | — | — | 42.8 | 43.18 | 43.5 |
| 1998 | 2 | JP8 | — | — | — | 18,460 | 18,591.6 | 18,631 | 43.0 | 43.83 | 44.0 |
| 1998 | 3 | JP8 | — | — | — | 18,400 | 18,598.0 | 18,851 | 43.0 | 43.23 | 43.5 |
| 1998 | 4 | JP8 | — | — | — | 18,557 | 18,600.7 | 18,638 | 43.3 | 43.33 | 43.4 |
| 1998 | 5 | JP8 | 5,567 | 5,954.3 | 6,342 | 18,451 | 18,549.2 | 18,634 | 43.0 | 43.05 | 43.1 |
| 1998 | 6 | JP8 | — | — | — | — | — | — | 43.3 | 43.30 | 43.3 |
| 1998 | 7 | JP8 | 6,231 | 6,399.8 | 6,516 | 18,596 | 18,618.7 | 18,634 | 43.0 | 43.27 | 43.4 |
| 1998 | 8 | JP8 | — | — | — | 13,750 | 18,425.6 | 18,674 | 43.2 | 43.35 | 43.8 |
| 1999 | 1 | JP8 | — | — | — | — | — | — | 43.0 | 43.15 | 43.5 |
| 1999 | 2 | JP8 | — | — | — | 18,400 | 18,593.4 | 18,650 | 43.1 | 43.37 | 43.5 |
| 1999 | 3 | JP8 | — | — | — | 18,400 | 18,586.5 | 18,727 | 42.2 | 43.27 | 44.0 |
| 1999 | 4 | JP8 | — | — | — | 18,437 | 18,607.2 | 19,265 | 43.0 | 43.33 | 45.0 |
| 1999 | 5 | JP8 | — | — | — | 18,448 | 18,507.2 | 18,612 | 42.1 | 43.04 | 43.1 |
| 1999 | 7 | JP8 | — | — | — | 18,610 | 18,658.1 | 18,864 | 43.0 | 43.25 | 43.4 |
| 1999 | 8 | JP8 | — | — | — | 18,508 | 18,552.4 | 18,754 | 43.2 | 43.34 | 44.3 |
| 1999 | 9 | JP8 | — | — | — | — | — | — | 43.2 | 43.27 | 43.3 |
| 1999 | 7 | AN8 | — | — | — | — | — | — | 43.0 | 43.00 | 43.0 |

[Spec: Aniline-G. = 4500 min, Net Heat = 18300 BTU or 42.6 MJ/kg min] — [Volume in Millions of Gallons]

Table 60. Freezing Point Conformance – JP-4.

| Year | Region | Fuel | Volume | Min | Avg | Wt Avg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1999 | 8 | JP4 | 1.42 | -65.00 | -61.375 | -61.157 | -58.00 | 8 |

[Spec = -58 °C max] – [Volume in Millions of Gallons]

Table 61. Freezing Point Conformance – JP-5.

| Year | Region | Fuel | Volume | Min | Avg | Wt Avg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1999 | 2 | JP5 | 15.58 | -56.00 | -52.844 | -54.839 | -46.00 | 32 |
| 1999 | 3 | JP5 | 307.56 | -51.10 | -47.637 | -47.580 | -42.00 | 117 |
| 1999 | 5 | JP5 | 168.06 | -71.00 | -60.436 | -48.067 | -47.00 | 39 |
| 1999 | 6 | JP5 | 62.01 | -54.00 | -51.417 | -51.401 | -49.00 | 12 |
| 1999 | 7 | JP5 | 52.63 | -75.00 | -54.262 | -52.464 | -46.00 | 13 |
| 1999 | 8 | JP5 | 46.87 | -55.00 | -49.500 | -49.606 | -47.00 | 10 |
| 1999 | 9 | JP5 | 19.63 | -49.00 | -48.505 | -48.497 | -48.00 | 2 |

[Spec = -46 °C max] – [Volume in Millions of Gallons]

Table 62. Freezing Point Conformance – JP-8.

| Year | Region | Fuel | Volume | Min | Avg | Wt Avg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1999 | 1 | JP8 | 104.17 | -66.00 | -57.334 | -56.863 | -52.00 | 137 |
| 1999 | 2 | JP8 | 204.00 | -61.00 | -50.256 | -50.492 | -47.00 | 269 |
| 1999 | 3 | JP8 | 1037.72 | -63.54 | -50.333 | -50.579 | -2.00 | 951 |
| 1999 | 4 | JP8 | 92.41 | -63.00 | -50.533 | -49.978 | -47.00 | 198 |
| 1999 | 5 | JP8 | 306.48 | -70.60 | -54.119 | -54.200 | -47.00 | 199 |
| 1999 | 7 | JP8 | 316.74 | -60.00 | -51.657 | -51.655 | -47.00 | 118 |
| 1999 | 8 | JP8 | 293.85 | -60.00 | -50.643 | -50.333 | -47.00 | 225 |
| 1999 | 9 | JP8 | 47.03 | -67.00 | -54.857 | -55.043 | -48.00 | 7 |
| 1999 | 7 | AN8 | 3.92 | -62.80 | -62.800 | -62.800 | -62.80 | 1 |

[Spec = -47 °C max] – [Volume in Millions of Gallons]

Table 63. Viscosity Conformance – F-76.

| Year | Region | Fuel | Volume | Min | Avg | Wt Avg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1999 | 3 | F76 | 176.34 | 2.70 | 3.06 | 3.122 | 3.60 | 47 |
| 1999 | 5 | F76 | 93.17 | 2.80 | 3.43 | 3.481 | 4.20 | 24 |
| 1999 | 7 | F76 | 38.57 | 2.00 | 2.80 | 2.866 | 3.80 | 11 |
| 1999 | 8 | F76 | 250.53 | 2.78 | 3.65 | 3.631 | 4.30 | 44 |
| 1999 | 9 | F76 | 9.79 | 4.18 | 4.18 | 4.180 | 4.18 | 1 |

[Spec = 1.7 – 4.3 cst @ 40 °C] – [Volume in Millions of Gallons]

Table 64. Viscosity Conformance – JP-5.

| Year | Region | Fuel | Volume | Min | Avg | Wt Avg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1999 | 2 | JP5 | 15.58 | 4.60 | 4.98 | 4.931 | 6.80 | 32 |
| 1999 | 3 | JP5 | 307.56 | 4.60 | 5.04 | 4.961 | 6.48 | 117 |
| 1999 | 5 | JP5 | 168.06 | 4.40 | 6.19 | 6.006 | 7.70 | 53 |
| 1999 | 6 | JP5 | 62.01 | 4.36 | 5.10 | 5.089 | 5.61 | 12 |
| 1999 | 7 | JP5 | 52.63 | 3.63 | 4.60 | 4.606 | 5.69 | 13 |
| 1999 | 8 | JP5 | 46.87 | 4.50 | 4.77 | 4.837 | 5.50 | 10 |
| 1999 | 9 | JP5 | 19.63 | 5.62 | 5.72 | 5.726 | 5.83 | 2 |

[Spec = 8.5 $mm^2/s$ @ -20 °C] – [Volume in Millions of Gallons]

Table 65. Viscosity Conformance – JP-8.

| Year | Region | Fuel | Volume | Min | Avg | Wt Avg | Max | Count |
|---|---|---|---|---|---|---|---|---|
| 1999 | 1 | JP8 | 104.17 | 2.78 | 4.11 | 3.608 | 7.70 | 137 |
| 1999 | 2 | JP8 | 204.00 | 3.79 | 4.76 | 4.795 | 7.40 | 268 |
| 1999 | 3 | JP8 | 1037.72 | 2.26 | 4.36 | 4.319 | 8.00 | 948 |
| 1999 | 4 | JP8 | 92.41 | 2.20 | 4.03 | 4.048 | 6.50 | 198 |
| 1999 | 5 | JP8 | 306.48 | 3.40 | 4.83 | 5.187 | 6.90 | 199 |
| 1999 | 7 | JP8 | 316.74 | 2.83 | 4.14 | 4.028 | 6.62 | 118 |
| 1999 | 8 | JP8 | 293.85 | 2.70 | 4.02 | 4.005 | 5.30 | 225 |
| 1999 | 9 | JP8 | 47.03 | 3.83 | 4.11 | 4.146 | 4.30 | 7 |
| 1999 | 7 | AN8 | 3.92 | 3.78 | 3.78 | 3.780 | 3.78 | 1 |

[Spec = 8.0 $mm^2/s$ @ -20 °C] – [Volume in Millions of Gallons]

Conclusions

All fuel procured in 1999 met specifications for API Gravity.

All fuel procured in 1999 met specifications for Aromatics, most well within limits.

All fuel procured in 1999 met specifications for Olefins, most approaching one-tenth of limits.

All fuel procured in 1999 met specifications for Total Sulfur; and for Mercaptan content, except in two instances. Parts of shipments of JP5 and JP8, from Region 3, were slightly over limit but fall in line with volumetrically weighted averaging.

All fuel procured in 1999 met specifications for Particulate Contamination except one instance of JP8 from Region 3. The 0.2 mg/L overage of the single shipment was easily absorbed, in what translated to a third of the limit overall, with volumetrically weighted averaging.

All fuel procured in 1999 met specifications for Filtration Time except in one instance of JP8 from Region 7. Again, the overage was waived, mitigated by averaging.

All fuel procured in 1999 met specifications for Total Acid Number except one instance of JP8 from Region 2; again waived, mitigated by averaging.

Although several shipments met the specifications for Smoke Point values, on the average, all JP4 and JP5 fuel procured in 1999 slightly exceeded limits. JP8 fell in line with averaging and allowances for Naphthalene, all of which was within specification.

Note that Naphthalene reporting for JP5 is discontinued with this edition of the Report. The property is no longer governed by the specification.

All fuel procured in 1999 met specifications for Hydrogen Content.

All fuel procured in 1999 met specifications for Distillation temperatures (10% Recovered) and well within limits at Final Boiling Point. Note, only reporting is required for JP4 10% Recovered.

All fuel procured in 1999 met specifications for Flash Point.

Whereas the cetane index is a “report only requirement”, trends show an improvement over last year’s averages. Region 3 continues to report the highest average cetane indexes; but not by a wide margin over several other Regions.

All fuel procured in 1999 met specifications for Net Heat of Combustion. The Net Heat can be reported in three different ways: the Aniline-API Gravity product or net heat, reported in either British Thermal Units (BTUs) or in MegaJoules per kg (MJ/kg). No obvious trends are apparent. Cumulative averages (MJ/kg), from all reporting regions, for 1999 were as follows:

| | Specification | Min | Avg | Max |
|---|---|---|---|---|
| JP4 | 42.8 min | 43.8 | 43.84 | 43.9 |
| JP5 | 42.6 min | 43.0 | 43.23 | 43.7 |
| JP8 | 42.6 min | 42.9 | 43.25 | 43.8 |
| AN8 | 42.6 min | 43.0 | 43.00 | 43.0 |

If there is sufficient interest, this data will be analyzed further and plotted to Histograms in future versions of this report.

Data on the Freezing Point and Viscosity of fuels is new to this Report. They have been added as a point of reference in discussions on survivability of aircraft subject to adverse high altitude and arctic conditions.

## Appendix – JFTOT

Jet Fuel Thermal Oxidation Stability Tester (JFTOT) Test Results at test temperatures of 260 °C vs. 275 °C.

This Appendix follows on reporting of the 1998 report prompted by the December 1998 ASTM conference on the issue of equating JFTOT results at test temperatures of 260 °C and 275 °C. The following data is presented, illustrating JFTOT results for JP5 and JP8 reported at either of the two test result temperatures; since contractors were not required to report results at both.

Whereas military jet fuel specifications stipulate the temperature of the JFTOT test to be 260 °C, most DESC contracts require a JFTOT test temperature of 275 °C. Specified limits on the tube deposit rating (less than 3 max) and on the pressure differential (25 mm Hg max) are the same however. If the test fails at 275 °C, the refiner has the option of performing the test at 260 °C. JFTOT test results are entered into the PQIS database with a separate Test Method codes to indicate the test temperature employed.

Although most of the jet fuel we procure can pass the JFTOT at 275 °C, still only a percentage of contractors provide results at that higher temperature. In fact, records indicate a drop from last years reporting, to less than 10% for JP8. The following table shows a distribution of contractors reporting JFTOT results at the two test temperatures; thirteen reported at both.

Table 66. Proportion of Contractors testing JFTOT, **260 °C to 275 °C – per Region**.

| Region | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | | 9 | | Totals | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fuel | JP5 | JP8 | JP5 | JP8 | JP5 | JP8 | JP5 | JP8 | JP5 | JP8 | JP5 | JP8 | JP5 | JP8 | JP5 | JP8 | JP5 | JP8 | JP5 | JP8 |
| 260°C | 0 | 0 | 0 | 3 | 2 | 9 | 0 | 1 | 2 | 4 | 0 | 0 | 2 | 4 | 0 | 1 | 1 | 0 | 7 | 22 |
| 275°C | 0 | 2 | 3 | 5 | 3 | 19 | 0 | 12 | 1 | 4 | 1 | 0 | 1 | 5 | 2 | 8 | 0 | 1 | 11 | 56 |

The following table indicates the number of 260 °C JFTOT test results, contrasting the number additionally reported at 275 °C, each with the volume of product represented. The histograms that follow plot the volume in millions of gallons for the JFTOT characteristic, contrasting the result at the alternative temperature for the 1999 reporting data.

Table 67. JFTOT Test Temperatures.

| Year | Fuel | Test Temperature | Count | Volume |
|---|---|---|---|---|
| 1998 | JP5 | 260 °C | 80 | 190.0 |
| 1998 | JP5 | 275 °C | 150 | 425.8 |
| 1998 | JP8 | 260 °C | 346 | 577.5 |
| 1998 | JP8 | 275 °C | 1592 | 1559.4 |
| 1999 | JP5 | 260 °C | 223 | 611.67 |
| 1999 | JP5 | 275 °C | 16 | 60.66 |
| 1999 | JP8 | 260 °C | 2053 | 2,307.52 |
| 1999 | JP8 | 275 °C | 52 | 94.87 |
| 1999 | AN8 | 275 °C | 1 | 3.92 |

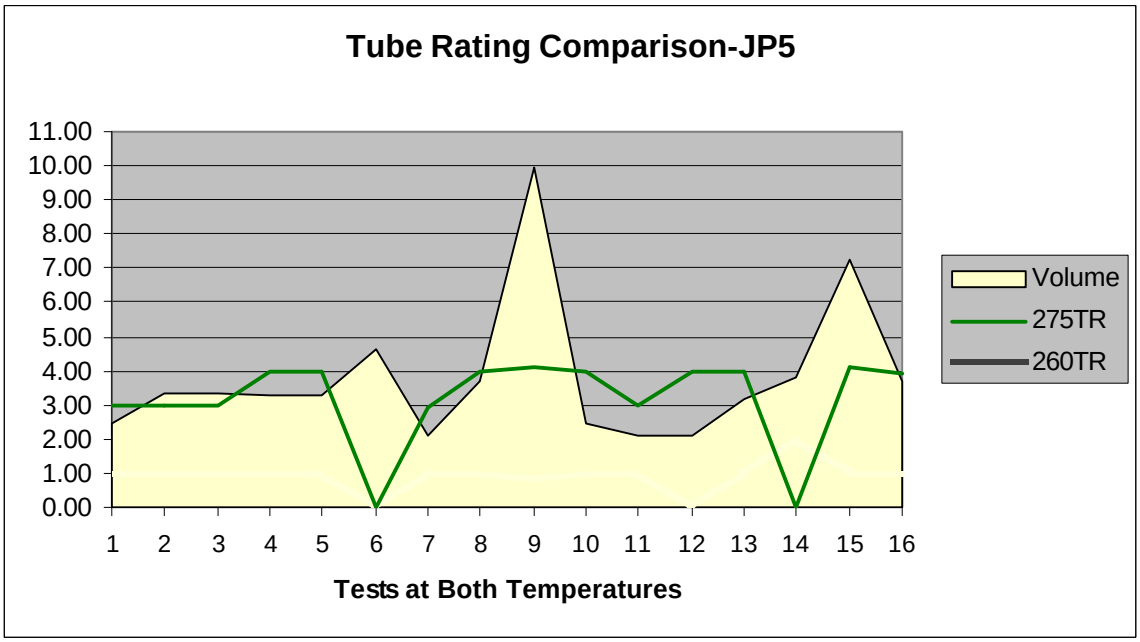
[Volume in Millions of Gallons]

Table 68. JFTOT Test Temperatures – Per Region.

| Fuel | Region | Temp | 1998 | | 1999 | |
|---|---|---|---|---|---|---|
| | | | Count | Volume | Count | Volume |
| JP5 | 2 | 260°C | — | — | 32 | 15.57 |
| | 3 | 260°C | 46 | (NR) | 105 | 272.53 |
| | 3 | 275°C | 79 | (NR) | 12 | 35.02 |
| | 5 | 260°C | 32 | (NR) | 53 | 168.06 |
| | 5 | 275°C | 34 | (NR) | — | — |
| | 6 | 260°C | — | — | 12 | 62.01 |
| | 6 | 275°C | 5 | (NR) | — | — |
| | 7 | 260°C | — | — | 9 | 26.99 |
| | 7 | 275°C | 19 | (NR) | 4 | 25.64 |
| | 8 | 260°C | 2 | (NR) | 10 | 46.87 |
| | 8 | 275°C | 13 | (NR) | — | — |
| | 9 | 260°C | — | — | 2 | 19.63 |
| JP8 | 1 | 260°C | — | — | 137 | 104.17 |
| | 1 | 275°C | 150 | (NR) | — | — |
| | 2 | 260°C | 86 | (NR) | 267 | 202.33 |
| | 2 | 275°C | 186 | (NR) | 3 | 1.67 |
| | 3 | 260°C | 140 | (NR) | 940 | 1030.18 |
| | 3 | 275°C | 732 | (NR) | 11 | 7.54 |
| | 4 | 260°C | — | — | 194 | 91.45 |
| | 4 | 275°C | 112 | (NR) | 4 | 0.96 |
| | 5 | 260°C | 46 | (NR) | 180 | 274.43 |
| | 5 | 275°C | 238 | (NR) | 19 | 32.05 |
| | 6 | 275°C | 1 | (NR) | — | — |
| | 7 | 260°C | — | — | 103 | 264.08 |
| | 7 | 275°C | 57 | (NR) | 15 | 52.65 |
| | 8 | 260°C | 74 | (NR) | 225 | 293.85 |
| | 8 | 275°C | 116 | (NR) | — | — |
| | 9 | 260°C | — | — | 7 | 4.70 |
| AN8 | 7 | 275°C | — | — | 1 | 3.92 |

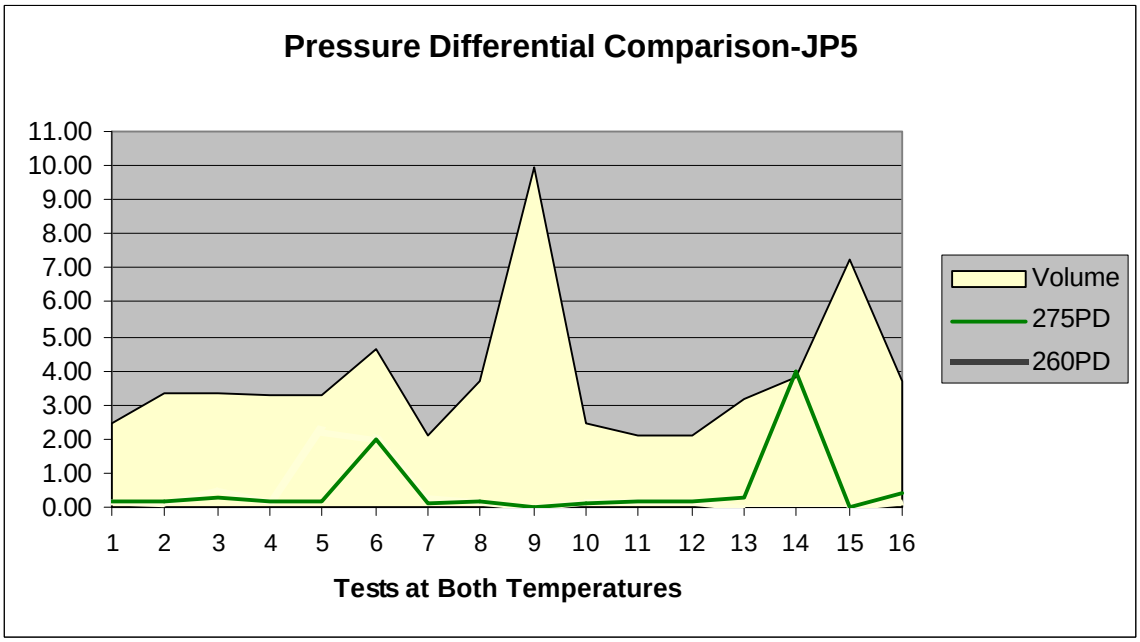
[(NR) = Not Recorded] – [Volume in Millions of Gallons]

Line Chart 1. JP 5 JFTOT Tube Rating Comparison, 260 °C vs 275 °C – 1999.



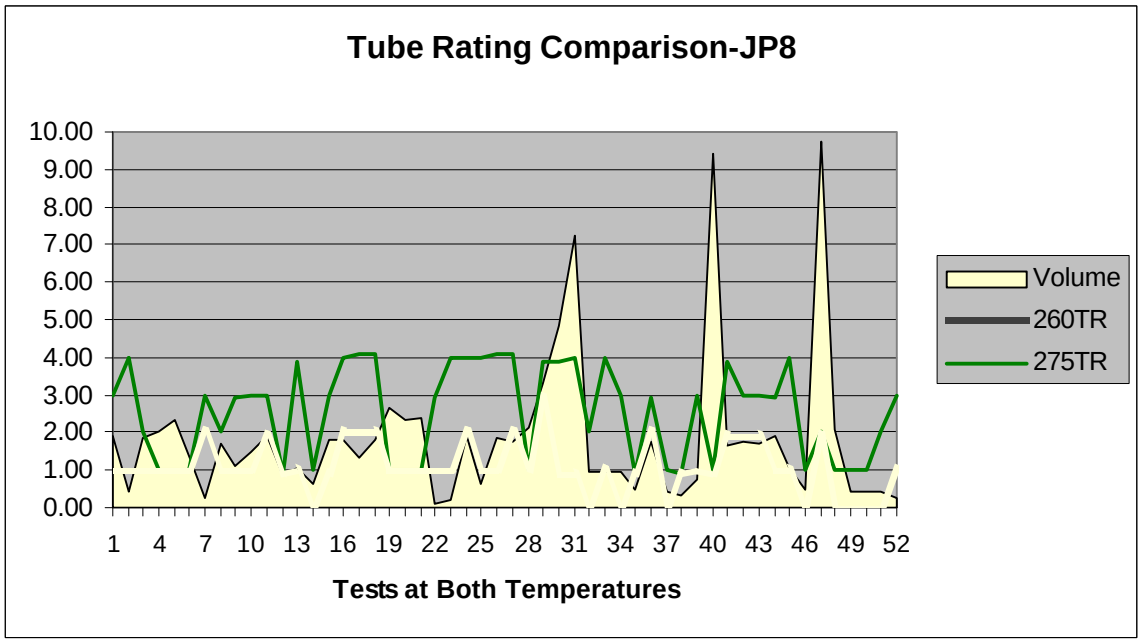

[Volume in Millions of Gallons]

Line Chart 2. JP 5 JFTOT Pressure Differential Comparison, 260 °C vs 275 °C – 1999.



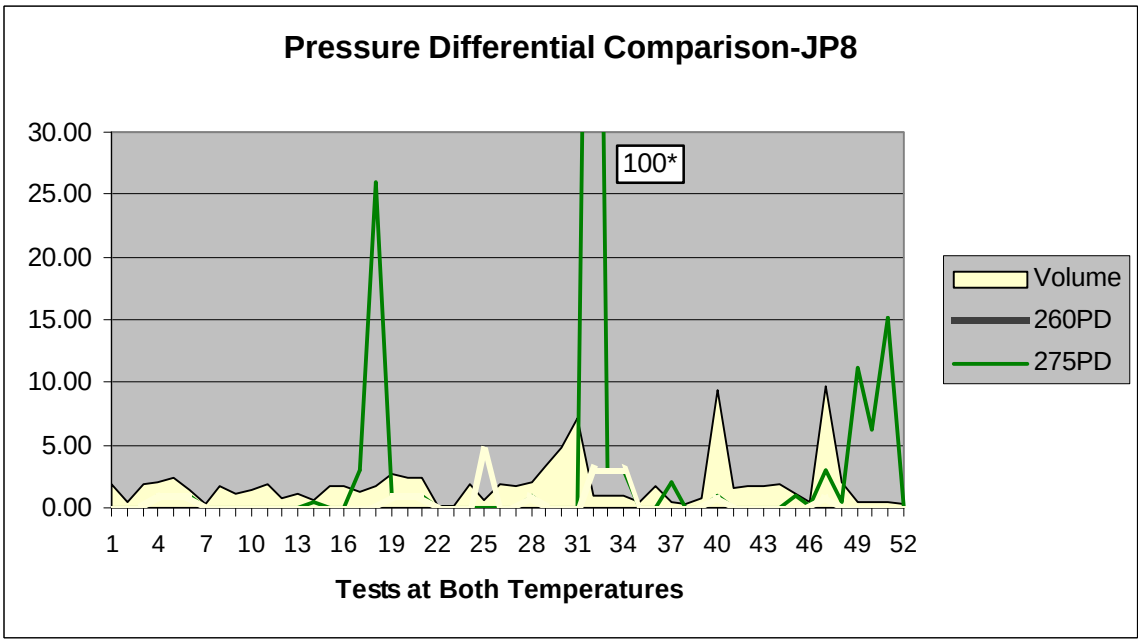

[Volume in Millions of Gallons]

Line Chart 3. JP 8 JFTOT Tube Rating Comparison, 260 °C vs 275 °C – 1999.



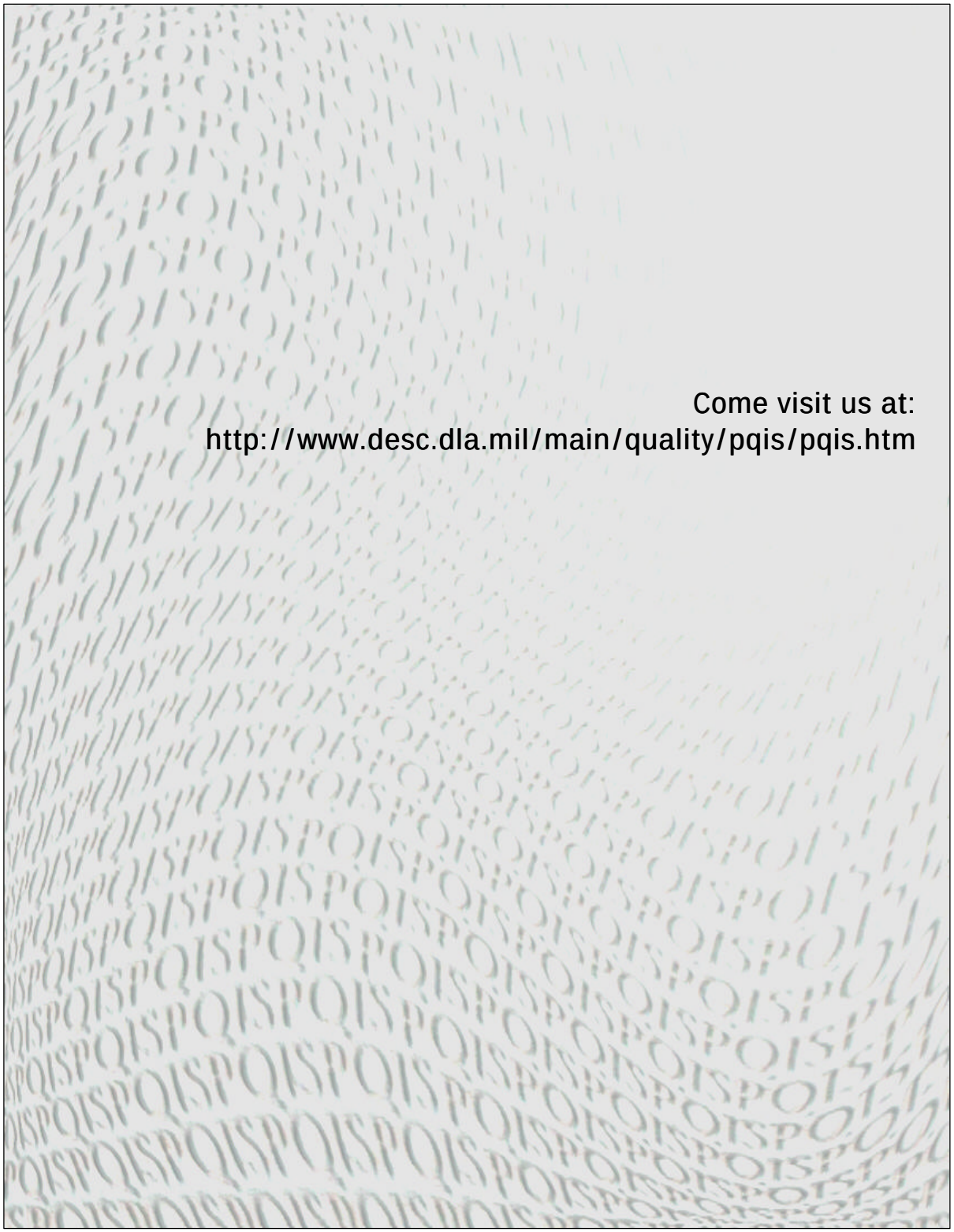

[Volume in Millions of Gallons]

Line Chart 4. JP 8 JFTOT Pressure Differential Comparison, 260 °C vs 275 °C – 1999.




[Volume in Millions of Gallons]

* This spike represents a reported differential of 100 mm HG; allowed to go off the chart to maintain legibility of the other data.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