

OCTANE RATING ANALYST

This is journey level skilled laboratory work in the testing of commercial motor fuels from samples obtained from refineries, terminals, secondary terminals, bulk plants or individual dispensing stations to determine octane and cetane ratings.

Employees operate ASTM-CFR test engines with variable compression ratios and associated component accessories and use both the motor method (ASTM D-2700) and research method (ASTM D-2699) to determine if the fuel's octane number meets the requirements of state regulations which govern the sale of motor fuels with respect to quality standards and distributor's specifications. Employees also operate an ASTM-CFR cetane engine to measure the ignition quality of diesel fuels. Employees assigned to diesel fuel testing also perform distillation, flash point, water/sediment and gravity tests. Employees independently troubleshoot, calibrate, repair, overhaul, operate and perform preventive maintenance on single-cylinder ASTM-CFR variable compression ratio engines and their associated component parts. Work requires skill in the recognition and correction of engine malfunctions affecting test accuracy and in maintaining optimum standard conditions in engine operation. Work is reviewed upon completion of activity reports for test results obtained. Work may include other duties as assigned.

I. DIFFICULTY OF WORK:

Complexity - Employees compare the engine's knocking tendency with those for blends of ASTM reference fuels. Employees blend standardization fuels to determine if their respective test engines are in acceptable operating condition to rate fuels within parameters established by ASTM. Incumbents make manual adjustments to engines, such as varying the compression ratio of the test engine until standard knock intensity is obtained and adjust the fuel-air mixture ratio. Employees determine when an engine not meeting established parameters must be overhauled or repaired. Repairs performed by employees include removal of the cylinder/piston assembly, cleaning and inspecting all component parts, reseating valves, installing rings, checking cylinder bore wear, resetting basic cylinder height, checking electronic components with appropriate test instruments and adjusting positive and negative voltages and resistances to specified limits and restoring the unit to required operating condition.

Guidelines - American Society for Testing and Materials guidelines are well established and can be readily applied to most work situations.

II. RESPONSIBILITY:

Accountability - Test results obtained by employees are important for determining if a product is sub-standard and should be removed from sale. Test result errors could negatively reflect upon the division's testing program.

Consequence of Action - Since octane and cetane test equipment is expensive and replacement parts are available from only one source, the failure of employees to recognize symptoms of mechanical trouble could cause extensive damage if not corrected. The significance of analytical error could result in dissatisfaction among the motoring public due to inferior products or an unwarranted condemnation causing unnecessary expense to industry.

Review - Employees receive general instructions and explanations concerning changes to laws, regulations, guidelines and directives. Work is performed independently, however, verbal instructions may be given on sample priorities. Work is reviewed by a combination of written daily reports and by the use of intralaboratory check samples. Work is also reviewed by comparing employees results with other governmental jurisdictions and members of the petroleum industry through national and regional sample exchange programs monitored by ASTM.

III. INTERPERSONAL COMMUNICATIONS:

Subject Matter - Contact is primarily with division personnel to discuss motor fuel test results obtained.

Purpose - Communications with division personnel are generally to provide information. .

IV. WORK ENVIRONMENT:

Nature of Working Conditions - Employees are exposed to laboratory conditions consisting of noise and fumes from gasoline, alcohols, toluene, reference fuels and diesel fuel.

Nature of Potential of Personal Hazards - Octane and cetane engines have moving parts and hot surfaces capable of inflicting injury.

V. RECRUITMENT STANDARDS:

Knowledges, Skills and Abilities - Considerable knowledge of the operation principles and parts nomenclature of small internal combustion engines. Considerable knowledge of the chemical and physical properties of fuels tested. Working knowledge of laboratory techniques, equipment, and terminology. Skill in the maintenance and repair of internal combustion engines. Ability to determine the causes of and the methods to be used in the repair of internal combustion engines. Ability to read and comprehend repair manuals. Ability to perform procedural laboratory tests with accuracy and reliability and to secure uniformly reproducible results. Ability to understand and follow oral and written instructions relating to testing methods. Ability to make standard mathematical calculations. Ability to prepare written reports indicating analyses performed and results obtained. Physical strength sufficient to carry out work assignments.

Minimum Training and Experience Requirements - Graduation from a technical college with a diploma in Automotive Technology or Automotive Mechanics and three years of laboratory experience in chemical or physical testing; or an equivalent combination of training and directly related experience.

NOTE: Preference in appointment may be given to applicants who have successfully completed courses in chemistry or other related physical science.