Total Sulfur Analyzer 300

1. Scope

The unit is meant for the automatic estimation of total sulfur in liquid hydrocarbons according to the procedure ASTM D 5453 and the total volatile sulfur in gaseous hydrocarbons and liquefied petroleum gases according to the procedure ASTM D 6667 by oxidative decomposition and ultraviolet fluorescence. The equipment should be compatible for other methods such as ASTM D7183, DIN EN 15486, JIS K2541-06 and DIN EN ISO 20846 for the determination of total sulfur in various types of samples using the technique of oxidative decomposition and ultraviolet fluorescence.

2. Specifications

- Total sulfur analyzer having inlets capable of injecting liquid hydrocarbons, liquefied petroleum gases and gaseous hydrocarbons
- The analyzer determines the total sulfur content in liquid hydrocarbons according to "ASTM D5453" using "**oxidation decomposition and ultraviolet fluorescence**". This test method covers the determination of total sulfur in liquid hydrocarbons, boiling in the range from approximately 25 to 400°C, with viscosities between approximately 0.2 and 20 cSt (mm2/S) at room temperature. It is applicable to analysis of liquid hydrocarbon samples containing total sulfur in the range of 1.0 to 10000 mg/L
- The analyzer determines the total volatile sulfur content in gaseous hydrocarbons and liquefied petroleum gases according to "ASTM D6667" using "**oxidation decomposition and ultraviolet fluorescence**". This test method covers the determination of total volatile sulfur in gaseous hydrocarbons and liquefied petroleum (LP) gases. It is applicable to analysis of natural, processed, and final product materials containing total sulfur in the range of 1 to 100 mg/L
- Liquid hydrocarbons will be injected from sample vials, placed in an auto sampl**er** having the capacity to accommodate at least 100 vials, using precise microlitre syringe capable of accurately delivering 5 to 50-µL quantities directly into the inlet system. The inlet system should be capable of allowing the quantitative delivery of the material to be analyzed into the oxidation zone at a controlled and repeatable rate

- A heated sample valve is used to inject gaseous samples from sample cylinders. The volume of sample loop should be configured suitably to inject sufficient quantity of gas having total sulfur in the range of 1-100 mg/kg
- The injection technique for liquefied petroleum gas (LPG) samples should ensure uniform repeatable injection volumes without bubble formation by providing cooled sample loop
- The injection of liquefied petroleum gas (LPG) samples should be possible even from cylinders with low pressure as 5 bar.
- The total volume of sample loop for injecting liquefied petroleum gas (LPG) samples should be configured to inject sufficient quantity of sample having total sulfur in the range of 1-100 mg/kg
- It should be possible to vary the sample volume between minimum and maximum quantity of the loop in fixed steps as low as 1 µl without requiring to exchange loop
- Lower detection limit up to 100 ppb of total sulfur should be possible for all methods and sample matrix
- Furnace temperature should be settable in the range of 100 to 1100°C
- Analysis time should be less than 5 min
- Repeatability and accuracy of the results should be equal or better than for the methods, ASTM D 5453 and ASTM D 6667
- Electronic mass flow gas controllers for oxygen and inert carrier gases
- Purity requirement of the gases (Oxygen and Argon) should be specified.
- Consumption rate of the gases should be specified for different methods and type of samples

3. Software

- The data handling software from the same manufacturer as the analyzer must be able to control all instrumental parameters
- The data handling software when installed on a single PC must be able to fully control the analyzer
- The data handling software must offer the ability to have “custom variables” defined and implemented to effect user specified and possibly unique post run data calculations
- The data handling software must have the ability to conduct post run mathematical or statistical calculation without the need to export to a secondary program (ex. MS Excel)
- The software should support calculation for both methods D 5453 and D 6667

- The capabilities of the software should be clearly specified and demonstrated by a tutor version before the contractual agreement for the supply of unit. The software should be user friendly and to be proven to the customer
- The software should be capable of storing unlimited number of results in the computer
- It should be possible to run multiple programs like off/online capability to reprocess data, generate report conduct evaluations.
- The data handling software should provide
    - Completely automated operation system,
    - Hardware setting control
    - Real-time peak display.
    - Sample peak reprocessing
    - Remote diagnostics capabilities
    - User identification on login
    - Report format which is interchangeable with spreadsheet programs.
    - Communication with local area networks and the flexibility to connect to LIMS system
    - Capability to calculate mean, standard deviation calculations and other statistical parameters
    - Able to do **quality control** check to determine:
        - The system status
        - Confirms the linearity of response values
        - Drift check that monitors circadian variations in response values

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