

## NIST No. 2296 (Reformulated Gasoline (13% ETBE))

Sheet No.: **NSX2100V-PE-010E** Petroleum chemistry  
 Measurement model: **TS-2100V System** Relevant standard: **ASTM D5453**  
**ASC-250L/VF-210/SD-210** **JIS K 2541**

Detection method: Ultraviolet Fluorescence method

The sulfur content in gasoline becomes sulfur oxide (SOx) during combustion to directly affect the atmospheric air pollution as substance of concern. Moreover, it becomes a cause of corrosion in an engine and it needs to be controlled at low concentration and the quantitation method complying it is required. The sulfur analysis device (**TS-2100V**) of Mitsubishi Chemical Analytech Co., Ltd. can analyze the sulfur in gasoline quickly with accuracy.

Sample name	Reformulated Gasoline (13% ETBE)																						
Analytical item	Quantitative analysis of sulfur in combustion method																						
Standard	<b>ASTM-D5453</b> : standard testing method for measuring sulfur contained in carbon hydride and fuel using an ultraviolet fluorescence detector <b>JIS K 2541</b> : raw petroleum and petroleum product – sulfur content testing method – ultraviolet fluorescence method																						
Analytical principle	Ultraviolet fluorescence method: Sample is burned in argon / oxygen stream and the generated sulfur dioxide is introduced to the cell of ultraviolet irradiation. The fluorescence intensity generated by ultraviolet irradiation is measured and the amount of sulfur is calculated based on the standard curve that has been created using the standard sulfur sample.  $\text{Organic-S} + \text{O}_2 \rightarrow \text{SO}_2 + \text{CO}_2$ (combustion) $\text{SO}_2 + \text{h}\nu \rightarrow \text{SO}_2 + \text{h}\nu_2$ (ultraviolet fluorescence)																						
Result of sulfur analysis	<table border="1"> <thead> <tr> <th rowspan="2">Sample name</th> <th colspan="5">TS-2100V analysis value (S mg/kg)</th> </tr> <tr> <th>1</th> <th>2</th> <th>3</th> <th>Average</th> <th>RSD (%)</th> </tr> </thead> <tbody> <tr> <td>Reformulated Gasoline (13% ETBE)</td> <td>37.3</td> <td>37.5</td> <td>37.7</td> <td><b>37.5</b></td> <td>0.57</td> </tr> </tbody> </table>						Sample name	TS-2100V analysis value (S mg/kg)					1	2	3	Average	RSD (%)	Reformulated Gasoline (13% ETBE)	37.3	37.5	37.7	<b>37.5</b>	0.57
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Vertical combustion method																							
Required analysis time	Pretreatment (---) minutes, Measurement ( 4 ) minutes																						
Vertical type	Total ( 4 ) minutes/ (1)measurement																						

\*This sheet is provided as a reference and does not guarantee analytical values. Optimal conditions may vary depending on external factors, such as the analysis environment, and the nature of the sample.

Conditions of sulfur analysis	<b>Measurement condition</b>	<b>Gas flow rate</b>
	Temperature of electric furnace  Inlet Temp 900°C Outlet Temp 1,000°C PMT Range Low (for High concentration)	Ar..... 100mL/min O <sub>2</sub> ..... 500mL/min Ar time: 30sec O <sub>2</sub> time: 120sec
Vertical combustion method	Standard sample for standard curve: S_Dibutyl disulfide / toluene 0, 1, 10, 50, 100µg/mL × 30µL  Amount of introduced sample: 30µL  - The sample was not diluted, but was introduced directly.	