

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

Sheet No.: **NSX2100H-PE-009E** Petroleum chemistry
 Measurement model: **TS-2100H System** Relevant standard: ASTM D5453
ABC-210/HF-210/SD-210 JIS K 2541

Detection method: Ultraviolet Fluorescence method

The sulfur content in gasoline becomes sulfur oxide (SO_x) 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-2100H**) 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	ASTM-D5453 : standard testing method for measuring sulfur contained in carbon hydride and fuel using an ultraviolet fluorescence detector JIS K 2541 : 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" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">Sample name</th> <th colspan="5">TS-2100H 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>37.5</td> <td>37.6</td> <td>37.3</td> <td>37.5</td> <td>0.43</td> </tr> </tbody> </table>					Sample name	TS-2100H analysis value (S mg/kg)					1	2	3	Average	RSD (%)	Reformulated Gasoline (13% ETBE)	37.5	37.6	37.3	37.5	0.43
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Horizontal combustion method																						
Required analysis time	Pretreatment (---) minutes, Measurement (9) minutes																					
Horizontal type	Total (9) 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 Horizontal combustion method	Measurement condition		Gas flow rate							
	Reaction tube ... double tube for ABC Temperature of electric furnace Inlet Temp 800°C Outlet Temp 1,000°C PMT Range Low (for High concentration)		Ar..... 300mL/min O ₂ 300mL/min							
	[ABC program]									
	Sample name	1st		2nd		3rd		End Time (sec)	Cool Time (sec)	Delay Time (sec)
		Pos (mm)	Time (sec)	Pos (mm)	Time (sec)	Pos (mm)	Time (sec)			
	Lubrication oil	105	10	115	60	125	20	100	60	200
	Boat Speed: 20mm/sec Ar Time: 30sec O ₂ Time (sec): 600sec									
	Standard sample for standard curve: S_Dibutyl disulfide / toluene 1, 10, 50µg/mL × 20µL									
	Amount of introduced sample: 20µL									
	- The sample was not diluted, but was introduced directly.									