

NIST No. 2722 (Crude Oil (Heavy-Sweet))

Sheet No.: **NSX2100H-PE-013E** 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 raw petroleum is purified by distillation or catalyst to become various raw materials of petroleum products. The necessary amount of desulfurization catalyst can be decided by controlling the concentration of sulfur in each purification process and the extraction rate can be considerably improved. The sulfur analysis device (**TS-2100H**) of Mitsubishi Chemical Analytech Co., Ltd. can analyze the sulfur in raw petroleum quickly with accuracy.

Sample name	Crude Oil (Heavy-Sweet)																					
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) $\text{SO}_2 + h\nu \rightarrow \text{SO}_2 + h\nu_2$ (ultraviolet fluorescence)																					
Result of sulfur analysis	<table border="1"> <thead> <tr> <th rowspan="2">Sample name</th><th colspan="5">TS-2100H analysis value (S %)</th></tr> <tr> <th>1</th><th>2</th><th>3</th><th>Average</th><th>RSD (%)</th></tr> </thead> <tbody> <tr> <td>Crude Oil (Heavy-Sweet)</td><td>0.209</td><td>0.209</td><td>0.209</td><td>0.209</td><td>0.14</td></tr> </tbody> </table>					Sample name	TS-2100H analysis value (S %)					1	2	3	Average	RSD (%)	Crude Oil (Heavy-Sweet)	0.209	0.209	0.209	0.209	0.14
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Crude Oil (Heavy-Sweet)	0.209	0.209	0.209	0.209	0.14																	
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				Ar..... 300mL/min						
	Temperature of electric furnace				O ₂ 300mL/min						
	Inlet Temp 800°C										
	Outlet Temp 1,000°C										
	PMT Range Low (for High concentration)										
	[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		90	10	105	90	115	20	100	60	180
Boat Speed: 20mm/sec Ar Time: 10sec O ₂ Time (sec): 600sec											
Standard sample for standard curve: S_Dibutyl disulfide / toluene 0, 10, 50, 100μg/mL × 20μL											
Amount of introduced sample: 20μL											
- For the sample for measurement, the sample diluted to 2% with toluene was used. The obtained measurement value multiplied by dilution rate was set to the sulfur quantitative value.											