NIST No. 1848 (Lubricating Oil Additive Package)

Sheet No.: **NSX2100H-CH-007E** 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

As the sulfur in lubrication oil is a direct cause of corrosion at metallic part of machine, it needs to be controlled at low concentration. The sulfur analysis device (**TS-2100H**) of Mitsubishi Chemical Analytech Co., Ltd. can analyze the sulfur in lubrication oil quickly with accuracy.

Sample name	Lubricating Oil Additive Package
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. Organic-S + O_2 → SO_2 + CO_2 (combustion) SO_2 + hv → SO_2 + hv_2 (ultraviolet fluorescence)
Result of sulfur analysis Horizontal combustion method	

Sample name	**TS-2100H** analysis value (S %)				
	1	2	3	**Average**	RSD (%)
Lubricating Oil Additive Package	2.288	2.283	2.283	**2.285**	0.13

Required analysis time Horizontal type	Pretreatment (---) minutes, Measurement (9) minutes 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

Reaction tube ... double tube for ABC

Temperature of electric furnace

Inlet Temp 900°C

Outlet Temp 900°C

PMT Range Low (for High concentration)

Gas flow rate

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	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 0.25% with toluene was used. The obtained measurement value multiplied by dilution rate was set to the sulfur quantitative value.