ภาคผนวก ฉ

เอกสารแสดงการสอบเทียบอุปกรณ์การทดลอง

CERTIFICATE

THIS CERTIFIES THE PERFORMANCE OF SHIMADZU GAS CHROMATOGRAPHY AT
บัณฑิตร่วมด้านพลังงานและสิ่งแวดล้อม มหาวิทยาลัยเทคโนโลยีพรจอมเกล้าธนบุรี:

ADDRESS: 126 ถนนประชาอุทิศ บางมด ทุ่งครุ กรุงเทพฯ

SYSTEM CONFIGURATION : GC-2014ATF

DETECTOR TYPE : THERMAL CONDUCTIVITY DETECTOR (TCD)

METHOD : SENSITIVITY TEST OF TCD BY SHIMADZU CORPORATION, JAPAN.

CHEMICAL : n-Decane 1000 ng/ µL n-Hexane

SPECIFICATION OF TCD : the S sensitivity of C_{10} should be 800 (mV x ml/mg) or greater. When preamp x 10 is used, 8000 (mV x ml/mg) or greater

RESULT : SENSITIVITY OF TCD = **1,443** (m V * m L / mg)

ISSUED ON : 8 APRIL 2010

ISSUED AT : SERVICE SECTION, BARA SCIENTIFIC CO.,LTD.

APPROVED BY :

(MR. PANUMAS PIANHAPHOL)

SERVICE ENGINEER, ANALYTICAL PRODUCT

CERTIFICATE

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ADDRESS: 126 ถนนประชาอุทิศ บางมด ทุ่งครุ กรุงเทพฯ

SYSTEM CONFIGURATION : GC-2014ATF

DETECTOR TYPE : FLAME IONIZATION DETECTOR (FID)

METHOD : SENSITIVITY TEST OF FID BY SHIMADZU CORPORATION, JAPAN.

CHEMICAL : N-HEXADECANE(C_{16}) 100ng/ul (N-HEPTANE SOVENT)

SPECIFICATION OF FID :

When N_2 or He gas is supplied as carrier gas and N_2 gas is supplied as make up gas>
S (C/g) of C_{16} should be 0.01 (C/g) or greater.
When He gas is supplied as both carrier gas and make up gas>
S (C/g) of C_{16} should be 0.007 (C/g) or greater.

RESULT : SENSITIVITY OF FID CHANNAL # R = **0.0096** C/g

CHANNAL # L = **0.0096** C/g

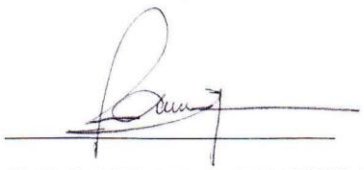
REPRODUCIBILITY : Area Value CV $\leq$ 10.00 % = **2.108 %**

Retention Time CV $\leq$ 2.00 % = **0.082 %**

ISSUED ON : 8 APRIL 2010

ISSUED AT : SERVICE SECTION, BARA SCIENTIFIC CO.,LTD.

APPROVED BY :



(MR. PANUMAS PIANHAPHOL)

SERVICE ENGINEER, ANALYTICAL PRODUCT

THERMOCOUPLES & RTDS

Tolerances on Temperature Reading

TO JIS C1602-1995 IEC 584-2-1982 (Amendment 1-1989) BS/EN 60584-2-1993 DIN/IEC 584-2-1992

Type		Classification of Tolerances		
		Class 1	Class 2	Class 3
B	Temp. Range Tolerance	--	--	Above 600°C Below 800°C ±4°C
	Temp. Range Tolerance	--	Above 600°C Below 1700°C ±0.0025· | t |	Above 800°C Below 1700°C ±0.005· | t |
	Previous Class	-	-	Class 0.5
R S	Temp. Range Tolerance	*Above 1100°C Below 1600°C ± [1 + 0.003 (t-1100)]	Above 0°C Below 600°C ±1.5°C	--
	Temp. Range Tolerance	Above 0°C Below 1100°C ±1°C	Above 600°C Below 1600°C ±0.0025· | t |	--
	Previous Class	-	Class 0.25	-
N	Temp. Range Tolerance	Above -40°C Below 375°C ±1.5 °C	Above -40°C Below 333°C ±2.5°C	Above -167°C Below 40°C ±2.5°C
	Temp. Range Tolerance	Above 375°C Below 1000°C ±0.004· | t |	Above 333°C Below 1200°C ±0.0075· | t |	Above -200°C Below -167°C ±0.015· | t |
K	Temp. Range Tolerance	Above -40°C Below 375°C ±1.5 °C	Above -40°C Below 333°C ±2.5°C	Above -167°C Below 40°C ±2.5°C
	Temp. Range Tolerance	Above 375°C Below 1000°C ±0.004· | t |	Above 333°C Below 1200°C ±0.0075· | t |	Above -200°C Below -167°C ±0.015· | t |
	Previous Class	Class 0.4	Class 0.75	Class 1.5
E	Temp. Range Tolerance	Above -40°C Below 375°C ±1.5 °C	Above -40°C Below 333°C ±2.5°C	Above -167°C Below 40°C ±2.5°C
	Temp. Range Tolerance	Above 375°C Below 800°C ±0.004· | t |	Above 333°C Below 900°C ±0.0075· | t |	Above -200°C Below -167°C ±0.015· | t |
	Previous Class	Class 0.4	Class 0.75	Class 1.5
J	Temp. Range Tolerance	Above -40°C Below 375°C ±1.5 °C	Above -40°C Below 333°C ±2.5°C	--
	Temp. Range Tolerance	Above 375°C Below 750°C ±0.004· | t |	Above 333°C Below 750°C ±0.0075· | t |	--
	Previous Class	Class 0.4	Class 0.75	-
T	Temp. Range Tolerance	Above -40°C Below 125°C ±0.5 °C	Above -40°C Below 133°C ±1°C	Above -67°C Below 40°C ±1°C
	Temp. Range Tolerance	Above 125°C Below 350°C ±0.004· | t |	Above 133°C Below 350°C ±0.0075· | t |	Above -200°C Below -67°C ±0.015· | t |
	Previous Class	Class 0.4	Class 0.75	Class 1.5

Note: 1) Tolerance denotes the maximum allowable value obtained by subtracting the temperature reading or the temperature at the hot junction from the standard temperature converted from the applicable temperature EMF table.

2) Tolerance Class 1 for Type R and S only apply to the Standard or Reference thermocouple.

3) | t | denotes the value of temperature (°C) irrespective of positive (+) or negative (-) sign.

4) Tolerance listed in this page applies to the new thermocouple wires.

รูปที่ ฉ.1 เอกสารแสดงค่าความคลาดเคลื่อนของ Thermocouple