

1 PRE-PROCESSING

- 1 -1. Put asphaltene standard for calibration and actual samples for measurement in a constant temperature chamber (at 50-60°C). : 30 min. to 1 hour
- 1 -2. Turn on the analyzer. **READY** : 20 min. or more
- 1 -3. Put Heptane into a water bath (80°C) to warm. : 30 min. to 1 hour

2 PREPARATION OF ASPHALTENE STANDARD AND SAMPLES FOR MEASUREMENT

- 500mL Heptane : for 0-100 calibration
- 500mL and 100mL measuring flask : for making standard liquid for calibration
- 100mL Erlenmeyer flask with stopper : x 5
- R (Heptane) : 100mL Erlenmeyer flask with stopper
- S (Toluene) : 100mL Erlenmeyer flask with stopper

2 -1. Take warmed asphaltene standard for calibration, and weigh and put it into a 500mL measuring flask. : 10g
 : Use a new pipette whenever you take and weigh.
 : Close a glass stopper of Erlenmeyer flask while weighing.

2 -2. Take warmed actual sample (or asphaltene standard for calibration), and weigh and put it into a 100mL Erlenmeyer flask. : 1 to 3g (around 1g normally)
 : 0.1, 0.3, 0.5, 0.7, 0.9g (Std. liquid for working curve)
 : Use a new pipette whenever you take and weigh.
Asphaltene content in the liquid prepared to make working curve: 1) 0.035g, 2) 0.028g, 3) 0.020g, 4) 0.012g, 5) 0.005g /100mL : Close a glass stopper of Erlenmeyer flask while weighing.

2 -3. **PREPARATION OF STANDARD LIQUID FOR CALIBRATION (continuation from 2-1)**
 Take specified amount of Toluene using a measuring cylinder and put it into a 500mL measuring flask with standard liquid for calibration. Shake the mixture well.

2 -4. PREPARATION OF ACTUAL SAMPLE FOR MEASUREMENT OR LIQUID TO MAKE WORKING CURVE (continuation from 2-2)

- (1) Add Toluene by 1mL using a pipette, put it in a water bath to warm and swing it gently.
- (2) Take warmed Heptane and put it into 100mL cylinder by measuring, and shake well. : Warm a cylinder by warmed Heptane.
- (3) Put a stirrer in.
- (4) Release heat for 40 minutes under room temperature. : Within 2 hours until measurement ends.

3 PREPARATION OF ANALYZER

3 -1. **0 to 100 Calibration** : Manual, Page 10

- (1) **F** 0 ENTER : Select F No. 0.
- (2) **-** ENTER : **Calibration ON**
- (3) **-** ENTER : **Calib 1 for APD**
- (4) ENTER : Set 0%T (Light source shutter is shut.)
- (5) ENTER : Set 0%.
- (6) ENTER : Set 100%T (Light source shutter opens.)
- (7) **Set 500mL Heptane to a suction nozzle.**
- (8) **Samp** : Suction by pump starts.
- (9) ENTER : Value becomes stable in about 10 to 20 seconds.
- (10) ENTER : Set value.
- (11) **Samp** : Suction by pump stops.
- (12) **RESET** : Display becomes "READY".
- (13) **Take 500mL Heptane out of a suction nozzle.**
- (14) **Samp** : Suction by pump starts.
- (15) **Samp** : Suction by pump stops.. 10 seconds later

3 -2. **Calibration of Cell Length and Wavelength** : Manual, Pages 11-14

3- 2-1. **Input of 750nm and 800nm absorbency**

- (1) **F** 0 ENTER : Select F No. 0
- (2) ENTER : **Calibration OFF**
- (3) **0** ENTER : S1 of STD-1 (Heptane): 750nm absorbency 0
- (4) **0** ENTER : L2 of STD-1 (Heptane): 800nm absorbency 0
- (5) ******** ENTER : S2 of STD-2 (Standard for calibration): 750nm absorbency ****

(6) ***,***** ENTER : L2 of STD-2 (Standard for calibration): 800nm absorbency ***,*****

S2: Standard for calibration taken (g) x 750nm absorbency (label on a bottle) / 10

L2: Standard for calibration taken (g) x 800nm absorbency (label on a bottle) / 10

(7) ENTER x 12 times

: **Keep pressing until "READY" appears on a display.**

3- 2-2. Calibration of cell wavelength

(1) **F** 0 ENTER : Select F No. 0

(2) **-** ENTER : **Calibration ON**

(3) **-** ENTER : **Calib 2 for APD -> Set STD-1 Soln !**

(4) **Set 500mL Heptane to a suction nozzle.**

(5) **Samp** : Suction by pump starts.

(6) ENTER : Value becomes stable in about 10 to 20 seconds. -> "0.00 0.00"

(7) ENTER : Set value.

(8) **Samp** : Suction by pump stops.

(9) **Take 500mL Heptane out of a suction nozzle.**

(10) ENTER : Displays "Set STD-2 Soln !".

(11) **Set 500ml standard liquid for calibration to a suction nozzle.**

(12) **Samp** : Suction by pump strts.

(13) ENTER : Value becomes stable in about 10 to 20 seconds. -> "*,*** *,***"

(14) ENTER : Set value.

(15) **Samp** : Suction by pump stops.

(16) **Take standard for calibration out of a suction nozzle.**

(17) **RESET** : **Displays "READY".**

3 -3. Making a Working Curve

: Manual, Page 25

3- 3-1. Input operation

(1) **F** 0 ENTER : Select F No. 0

(2) ENTER : **Calibration OFF**

(3) ENTER x 3 times : for confirmation only

(4) :

(5) **WT% *. **** ENTER : **Input wt% of asphaltene standard for calibration**

(6) **Mabs *. ***** ENTER : **Input soluble absorbency of standard for calibration**

(7) **CAL-1 *. ****** ENTER : **Input weight of standard for calibration - 1 (dense liquid)**

(8) **CAL-2 *. ****** ENTER : **Input weight of standard for calibration - 2**

(9) **CAL-3 *. ****** ENTER : **Input weight of standard for calibration - 3**

(10) **CAL-4 *. ****** ENTER : **Input weight of standard for calibration - 4**

(11) **CAL-5 *. ****** ENTER : **Input weight of standard for calibration - 5 (thin liquid)**

(12) ENTER x 10 times : for confirmation only

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3- 3-2. Confirmation of measuring parameters and change

: Manual, Pages 13-16

(1) **F** 1 ENTER : Select F No. 0

(2) 0 ENTER : Waiting time -> 0 minute

(3) 10 ENTER : Pump 1 running time -> 10 seconds

(4) 10 ENTER : Pump 2 running time -> 10 seconds

(5) 10 ENTER : Cleaning time -> 10 seconds

(6) **CHG Seq 1-3 ?** : 1 -> without cleaning

3 ENTER : 2 -> with cleaning

: **3 -> Make a working curve.**

(7) **Function (0-9) ?** **RESET** : **Displays "READY".**

3- 3-3. Input of calculation coefficient file

: Manual, Page 16-18

(1) **F** 2 ENTER : Select F No. 2

(2) 1 ENTER : Specify File No.

(3) ENTER x 9 times : for confirmation only

(4) **Function (0-9) ?** **RESET** : **Displays "READY".**

3- 3-4. Measurement of liquid prepared for a working curve

: Manual, Page 26

(1) **Samp** : Heptane is sucked. : **Mistake in suction can be avoided when suction line and pump are filled with Heptane before starting measurement.**

(2) **Samp** : Pump stops.

Put samples on a turn table in the order from dense to thin liquids.

(3) **START** : Measurements start. : **Must be done in the order from dense to thin liquids.**

After measurements, suction line and pump muse be cleaned well.

(4) **Samp** : Toluene is sucked and drained.

(5) : Heptane is sucked and drained.

(6) **Samp** : Pump stops.

3- 3-5. Saving files of coefficient calculation and its result : Manual, Page 27

- (1) **F** 0 ENTER : Select F No. 0
(2) **—** ENTER : Calibration 1 for APD → Calibration 2 for APD
: Calibration 2 for APD → **Calibration 3 for JPI**
(3) **Function (0-9) ?** **RESET** : Displays "READY".

3- 3-6. Change of Measuring Parameters : Manual, Pages 13-16

- (1) **F** 1 ENTER : Select F No. 1
(2) 0 ENTER : Waiting time → 0 minute
(3) 10 ENTER : Pump 1 running time → 10 seconds
(4) 8 ENTER : Pump 2 running time → 8 seconds
(5) 10 ENTER : Cleaning time → 10 seconds
(6) **CHG Seq 1-3 ?** : **1 → without cleaning**
1 ENTER : 2 → with cleaning
: 3 → Make a working curve.
(7) **Function (0-9) ?** **RESET** : Displays "READY".

4 MEASUREMENTS OF ACTUAL SAMPLES

: Manual, Page 22

- (1) From the turn table No.1, put a sample, S-Toluene and R-Heptane in this order.
(2) **SIZE**
(3) 1 : Input the turn table's starting number.
(4) **Total No.** : Total number (samle + 2)
(5) **ID** : Sample number
(6) **SW(g)** : Sample weight
(7) : : For S and R, input ID0 and SW0.
(8) **START** : Measurements start.
(9) **START** : Press again if the number larger than the max. turn table numbers was set.
(10) **Samp** : Inner Heptane is drained.
(11) **Samp** : Drain stops.