JAERI-M
92-167

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November 1992

Bing HAN*, Masurou OGAWA, Koichi EMORI and Makoto HISHIDA

日本原子力研究所
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編集兼発行　日本原子力研究所
印　　刷　いばらき印刷(株)

Experiments on Mass Transfer in a Natural Convection of High Temperature Gas Mixture with Graphite Corrosion due to Air Ingress

Bing HAN*, Masurou OGAWA, Koichi EMORI and Makoto HISHIDA

Department of High Temperature Engineering
Tokai Research Establishment
Japan Atomic Energy Research Institute
Tokai-mura, Naka-gun, Ibaraki-ken

(Received October 9, 1992)

Experiments on mass transfer in a natural convection of gas mixture with graphite corrosion at high temperature due to air ingress have been performed to predict the thermohydraulic characteristics with high accuracy at the pipe rupture in a high temperature gas cooled reactor. The whole shape of the multi-channel test section is a reverse U shape. The one side of the reverse U shaped test section consists of two hot graphite channels and one cold metal channel which are parallel to each other. The inlet and outlet mole fractions of oxygen, carbon monoxide and carbon dioxide, the corrosion thickness of the graphite tube, the distribution of flow rates were measured under the various temperature conditions of graphite channels up to 1200°C. From these data, the relationship of Sherwood number and dimensionless distance from the inlet of the graphite channel have been obtained. It was found under the present experimental conditions that the maximum mole fraction of carbon monoxide at the outlet is 0.25% and the Sherwood numbers obtained are smaller than those calculated on assumption of analogy between heat and mass transfer.

Keywords: High Temperature Gas Cooled Reactor, Mass Transfer, Graphite Chemical Reaction, Pipe Rupture Accident, Gas Mixture, Experiment

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* Institute of Nuclear Energy Technology (INET), Tsinghua University

黒鉛腐食を伴なう高温混合ガスの
自然対流における物質伝達実験

日本原子力研究所東海研究所高温工学部
韓　　兵*・小川　益郎
江森　恒一・菱田　　誠

(1992年10月 9 日受理)

高温ガス炉の配管破断事故時の熱流動特性をより高精度で予測するため，空気侵入による高温での黒鉛腐食を伴なった混合ガスの自然対流中における物質伝達に関する実験を行った。多流路試験部は，全体に逆U字型をしている。逆U字流路の片側は，それぞれ並行な，二本の高温の黒鉛製流路と一本の低温の金属製流路からなっている。出入口における酸素，一酸化炭素，二酸化炭素のモル分率，黒鉛管の腐食厚さ，流量配分などを1200℃以下の黒鉛流路の様々な温度条件下で測定した。これらの結果からシャーウッド数と黒鉛流路入口からの無次元距離との関係を得た。本実験条件では，出口における一酸化炭素のモル分率の最大値は0.25%であり，得られたシャーウッド数は，熱・物質伝達のアナロジーを仮定して得られる値より小さかった。

東海研究所：〒319-11　茨城県那珂郡東海村白方字白根2-4
＊精華大学核能技術研究院

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1. Introduction

The High Temperature Engineering Test Reactor[(1),(2)] (HTTR) is being built at Oarai Research Establishment of Japan Atomic Energy Research Institute (JAERI). The HTTR is a high temperature gas cooled reactor with the thermal output of 30 MW and the outlet coolant temperature of 950°C, employing the pin-in-block type fuel, and has the capability to demonstrate nuclear process utilization using an intermediate heat exchanger.

A primary pipe rupture accident is one of the most important design-base accidents of the HTTR. The accident starts from a guillotine break of the coaxial double pipe in the primary cooling system. When the primary pipe rupture occurs, a gas mixture containing oxygen (air and helium) enters the inside of the reactor vessel (RV) through the breach of the inner pipe of the double pipe from the reactor containment vessel (RCV) after a depressurization, and the oxygen reacts with high temperature graphite in the RV. The graphite corrosion during the massive air (and helium) ingress into the reactor core may lead to the following consequences:

(1) temperature rise caused by exothermic chemical reactions,
(2) changes in shape of the graphite, thus causing a reduction in mechanical strength, and
(3) production of inflammable carbon monoxide.

It has already been assured by the safety analysis and the evaluation under conservative assumptions that no serious damages are caused to the reactor core and the RCV during and after the accident[(3)]. The assumptions in the analysis were considerably conservative. For example, it was assumed that only the reaction; $C + \frac{1}{2} O_2 \rightarrow CO$ was taken into account as the chemical reaction of the graphite corrosion and no combustion of carbon monoxide generated was considered. Therefore, it is of great importance to understand the real phenomena of the accident in order to perform a safety design with higher accuracy and better economy.

We must examine the flow rate of the air ingress into the RV, the distribution of the flow rates into the cooling channels in the reactor core and the corrosion rate of the graphite to predict the corrosion amount of the graphite and the generation volume of carbon monoxide. The experiments on the graphite corrosion have already been done and the corrosion rates were obtained[(4)]. However, no experiments have been carried out on a natural convection through a multi-channel with the graphite corrosion. Accordingly, experiments in the natural convection through a multi-channel simply simulating the cooling channels of the reactor core have been performed to examine the flow rate entering the multi-channel and the distribution of the flow rates into those channels accompanied with the graphite chemical reactions. The experiments and the results are described in the present report.

2. Experimental Apparatus and Procedures

2.1 Experimental Apparatus

An experimental apparatus for examining mass transfer characteristics in a natural convection is shown in Figs. 2.1.1 and 2.1.2. The multi-channel test section of left-hand side in Fig. 2.1.1 was used in the present experiments. The experimental apparatus consists of flow channels, electric furnaces around a graphite tube, two electrical slide valves at the inlet and outlet, a gas supply system, and a cooling water system.

The main specifications of the multi-channel test section are as follows:

Maximum pressure:	0.2 MPa
Maximum temperature:	1300°C
Fluid:	Nitrogen, air, helium
Graphite material:	IG-110

The multi-channel test section is a reverse U shape. The one side of the reverse U channel branches away into three parallel channels. The two channels of those are the graphite tubes placed in the electric furnaces of test sections A and C. The rest channel is a cold metal channel cooled by water. The other side of the reverse U channel is also a cold metal channel.

Figure 2.1.3 shows the parallel channels. The channel of Fig. 2.1.3 consists of rectifiers, the graphite tubes, the electric furnaces, upper and lower headers, and some transducers. The rectifier was installed at the bottom and the top, and consisted of 21 circular tubes with the inner diameter of 27.2 mm and the length of 700 mm. After passing through the tubes, the gas flow was cooled down to almost water temperature. Figure 2.1.4 shows a cross-sectional view of the test sections A and C.

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Figure 2.1.5 shows the graphite tube. The length of the graphite tube is 700 mm, the inner diameter is 52.9 mm, and the material of the graphite is IG-110. There are 4 holes on the outer surface of the graphite tube for mounting R-type thermocouples to measure the temperatures of the graphite tube.

The electric furnace has 6 electric heaters. The power of the heater at the bottom was 3 kW, the powers of the others were 2 kW. These 6 heaters were divided into 4 groups to be controlled independently by 4 temperature controllers (Model DB, made by CHINO Incorporation), respectively. The controller receives the signals from thermocouples as input, and control the power of the heater so that the distribution of graphite tube temperature along the axial direction becomes uniform. The electric heaters were covered with thermal insulation material.

Figure 2.1.6 shows the cooling water supply system. The jacket of the electric furnace, the upper and lower headers and the cold channel were cooled by water.

Figures 2.1.7 and 2.1.8 show the dimensions of the flow channels.

2.2 Measurement System

A measurement system is the one of the most important systems of this experimental apparatus. Temperatures, pressures, differential pressures, flow rates, mole fractions of oxygen, carbon monoxide and carbon dioxide, inner diameters of the corroded graphite tube were measured in the experiments.

An arrangement of the temperature measurement points is shown in Fig. 2.2.1. TG denotes a gas temperature (TG1 to TG31) and TW denotes a wall temperature (TW1 to TW8). Figure 2.2.2 shows an arrangement of the temperature measurement points in the test sections A and C. Here, Thm denotes the temperature of the heater, Tem denotes the temperature of graphite. The Tem thermocouples are type R and the others are type K. Table 2.2.1 and Figures 2.2.3 to 2.2.5 show the locations of the above thermocouples.

Figure 2.2.6 shows locations of the pressure and differential pressure measurement points. The pressure and differential pressure transducers were made by OHKURA-ROSEMOUNT TOKYO, JAPAN. The main specifications are in Table 2.2.2.

Locations of the flow rate measurement points are shown in Fig. 2.2.7. The arrows in Fig. 2.2.7 indicate the flow directions. The flow

Table 2.2.2 Main specification of pressure and differential pressure transducers

Tag No.	DP1	DP2	P7
Model	1151DP3E22LMMBLVMS	1151DP3E12LMLVMS	PT3013A231
Range	0 ~ 150 mm H_2O	0 ~ 750 mm H_2O	-760 mm Hg ~ 2 kg/cm^2
Accuracy	±0.2% F.S	±0.2% F.S	±0.25% F.S
Linearity	±0.1% F.S	±0.1% F.S	±0.2% F.S
Repeatability	0.05% F.S	0.05% F.S	0.05% F.S
Zero stability	±0.2%F.S in 6 months	±0.2%F.S in 6months	<0.015% F.S/°C
Damping	0.2 ~ 1.6 s	0.2 ~ 1.6 s	<1 ms
Output	4 ~ 20 mA DC	4 ~ 20 mA DC	4 ~ 20 mA DC
Power supply	24 V DC	24 V DC	24 V DC
Use temp.	-40 ~ +105°C	-40 ~ +105°C	-30 ~ +80°C

rates were measured by 4 ultrasonic gas flow meters made by KAIJO DENKI CO., LTD. The ultrasonic gas flow meter consists of a measurement tube, a transmitter, a probe and some cables. The one (model GF-200) of the ultrasonic flow meters was located at UF-1, the others (model CF-300) were located at UF-3, UF-4 and UF-5 in Fig. 2.2.7. The ultrasonic gas flow meters of GF-200 and GF-300 are shown in Figs. 2.2.8 and 2.2.9, respectively, and their main specifications are listed in Table 2.2.3.

A block diagram of the signal measurement and the data acquisition is shown in Fig. 2.2.10. All of the signals from the thermocouples, the ultrasonic gas flow meters, the pressure and differential pressure transducers were first connected into a terminal box, then led to the scanner (HP3497A Data Acquisition/Control Unit). Last, those were sent through a GP-IB interface into a digital voltmeter (HP3455 AD). The measured data were collected by a computer (NEC PC-9801) to store in a floppy disk. The data were printed by a printer and figures were drawn on a plotter. The thirty important temperature signals were simultaneously observed by a recorder (YOKOGAWA Hybrid Recorder 4088-11/EA-30) during the test.

An arrangement of the mole fraction measurement points is shown in Fig. 2.2.11. The number of points was 16. There are two sampling ports at each point. C3, C4, C5 and C16 in Fig. 2.2.11 were located at the same height, and C6, C7, C8 and C15 at the same height. The sampling tubes of C2, C9, C10, C11 and C12 in Fig. 2.2.11 were inserted into the

Table 2.2.3 Main specifications of GF-200 and GF-300 of ultrasonic gas flow meters

Model	GF-200	GF-300
Measurement range	0 ~ 30 m/s	0 ~ 30 m/s
Gas temperature	center temperature ±25°C	center temperature ±25°C
Accuracy	±1% F.S	±1% F.S
Repeatabilty	±0.5%	±0.5%
Flow resolution	1 cm/s	1 cm/s
Averaging time	10 s	10 s
Output	DC 4 ~ 20 mA/F.S	DC 4 ~ 20 mA/F.S
Environment temp.	-10 ~ +50°C	-10 ~ +50°C
Power supply	AC 100V ±10%, 50/60Hz	AC 100V ±10%, 50/60Hz
Load resistance	< 600 Ω	< 600 Ω
Mounting condition:	straight tube section	
Upstream	> 15 D	> 15 D
Downstream	> 5 D	> 5 D

center of the channel, the others were equipped at the vicinity of the inside wall. The mole fractions of O_2, CO, CO_2 in the multi-channel test section were measured by two gas-chromatographs controlled by computers. A block diagram of the mole fraction measurement is shown in Fig. 2.2.12. The gas-chromatograph is a model M 201 made by Nippon TYLON cooperation. Its supply voltage is 12 V DC. Helium gas was used as a base gas. Each gas-chromatograph has two measurement channels, i.e., the channel A can measure O_2, N_2 and CO mole fractions, the channel B can measure air and CO_2 mole fractions. In the present experiments, the No.1 gas-chromatograph controlled by a computer (J-3300/30 of TOSHIBA) measured the inlet mole fractions at C4 in Fig. 2.2.11, the No.2 gas-chromatograph controlled by a computer (J-3100SGT of TOSHIBA) measured the outlet mole fractions at C16 in Fig. 2.2.11.

The measurement of the inner diameter of the corroded graphite tube was performed by the Graphite Inner Diameter Measurement Device (GIDMD) and a Laser Micro-Gauge (LMG). Figure 2.2.13 shows a schematic diagram of the GIDMD. The graphite test piece is driven by three stepping motors to perform rotating, declining and reciprocating motions. Figure 2.2.14 shows the LMG (model LMG55Ld-F) made by TOKYO KODENSHI KOGYO KK. It consists of a laser transmitter, a receiver, an indication and control unit, a platform and some cables, which can be controlled remotely by a computer. Its main specifications are listed in Table 2.2.4.

Table 2.2.4 Main specifications of LMG(55LD-F)

Range	0.5 ~ 80 mm
Min. reading	0.5 mm
Repeatability	± 2 μm
Linearity	± 4 μm
Laser scanning number	300 /s
Laser scanning velocity	180 mm/s
Indicating accuracy	6 digital, ±□□.□□□□ mm
Digital output	BCD, RS232C, GPIB
Environment temperature	0 ~ 45°C
Power supply	AC 100V ± 10V, 50/60Hz

We made the thin test piece with about 4.6 mm thickness by cutting the corroded graphite tube after the test. The measurement procedure of the graphite inner diameter is in the following:

(1) Mounting the graphite test piece vertically to the laser beam in the GIDMD,

(2) Moving and declining the test piece as shown in Fig. 2.2.13, searching the position of the maximum diameter.

(3) Recording the maximum diameter, and

(4) Rotating the test piece at the angle of 30 deg. in the clockwise direction, then repeating above steps.

The total number of circumferential measurement points was six. The average of the six measurements were adopted as the inner diameter of the test piece.

2.3 Experimental Procedures

A. Preparation

(1) To take off the corroded graphite tube from the electric furnace,

(2) To measure the weight and the inner diameters at both the ends of the corroded graphite tube, to number it as a RUN NO., and to cut it.,

(3) To measure the weight and the inner diameters at both the ends of a new graphite tube, and to mark the new graphite tube at both the

ends,

(4) To mount the new graphite tube.

B. Experiment

(1) The multi-channel test section is evacuated by the vacuum pump and filled with nitrogen.

(2) The zero points of the flow meters and so on are measured.

(3) The test sections A and C are heated up according to the experimental conditions.

(4) The two gas-chromatographs are set into measurement status.

(5) The two slide valves at the bottom of the multi-channel test section are simultaneously opened after the temperatures of the test sections reached the experimental conditions.

(6) The data are acquired and saved at intervals of 30 seconds.

(7) The two slide valves are closed at the same time when the test has just finished.

(8) The temperatures are automatically decreased.

C. Measurement of the inner diameter

(1) The inner diameters of the corroded graphite test pieces are measured by using the GIDMD and the LMG.

The test schedule in the rising and reducing temperature of the graphite during the test is shown in Fig. 2.3.1.

3. Experimental Results

3.1 Data Processing

3.1.1 Dimensionless Numbers

The following dimensionless numbers were used in the analysis of the present experiment: Sherwood number Sh, Reynolds number Re, Schmidt number Sc, Prandtl number Pr, Dimensionless distance X^*. They are defined by the following equations;

$$Sh = \frac{\beta \cdot d_o}{D_{o_2,mix}} \tag{3-1}$$

$$Re = \frac{\rho_{mix} \cdot \bar{u} \cdot d_o}{\mu_{mix}} \tag{3-2}$$

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$$Re = \frac{\rho_{mix} \cdot \bar{u} \cdot d_o}{\mu_{mix}} \qquad (3\text{-}2)$$

$$Sc = \frac{\mu_{mix}}{\rho_{mix} \cdot D_{O_2,mix}} \tag{3-3}$$

$$Pr = \frac{Cp_{mix} \cdot \mu_{mix}}{\lambda_{mix}} \tag{3.4}$$

$$X^* = \frac{\frac{x}{d_o}}{Re \cdot Sc} \tag{3.5}$$

where, β is a mass transfer coefficient, d is a diameter of the graphite tube before the test, $D_{O_2,mix}$ is a diffusivity of O_2 in a gas mixture, ρ is a density, $\bar{u}$ is an average flow velocity, μ is a viscosity, Cp is a specific heat in constant pressure, λ is a thermal conductivity, and x is a distance from the inlet of the graphite tube. A subscript of mix means the gas mixture, and subscript of o means an original value. The thermal properties of the gas mixture used in this section and the following sections were obtained from references (8) and (9).

3.1.2 Mass Transfer Coefficient

When mass transfer of oxygen from the gas mixture to the graphite takes place by graphite oxidation, the mass transfer coefficient of oxygen is defined by

$$\ddot{m}_{O_2} = \beta \cdot \rho_{mix} \cdot (\omega_{O_2,\infty} - \omega_{O_2,w}) \tag{3-6}$$

In this equation, the flux, $\ddot{m}_{O_2}$, represents the consumed mass of O_2 per unit time and unit interfacial area on the inner wall of the graphite tube. Its unit is [kg/m^2 s]. ρ_{mix} is the density of the gas mixture in unit [kg/m^3]. ω represents the mass fraction. Subscripts of O_2, w and ∞ indicate oxygen gas, wall, gas stream, respectively. The mass transfer coefficient β has a unit of [m/s].

In a high temperature region, boundary layer mass transfer plays a dominant role in the graphite corrosion. In this case, the mass fraction of oxygen on the inner wall of the graphite tube equals to zero, so the Eq.(3-6) can be written

$$\beta = \frac{\ddot{m}_{O_2}}{\rho_{mix} \cdot \omega_{O_2,\infty}} \tag{3-7}$$

In order to calculate the mass transfer coefficient of oxygen, $\ddot{m}_{O_2}$ and $\omega_{O_2,\infty}$ must be obtained first.

3.1.3 Calculation of Mass Flux of Oxygen

At $x=x_i$ (see Fig. 3.1.1) the corrosion mass of the graphite in unit time and unit length $\dot{m}_{ci}$ is calculated by

$$\dot{m}_{ci} = \frac{\pi}{4}\cdot(d_{cori}^2 - d_o^2)\cdot\rho_c\cdot\frac{1}{\Delta t} \qquad (3\text{-}8)$$

where, ρ_c denotes the density of the graphite (= 1780 kg/m^3), and Δt denotes an oxygen supplying duration.

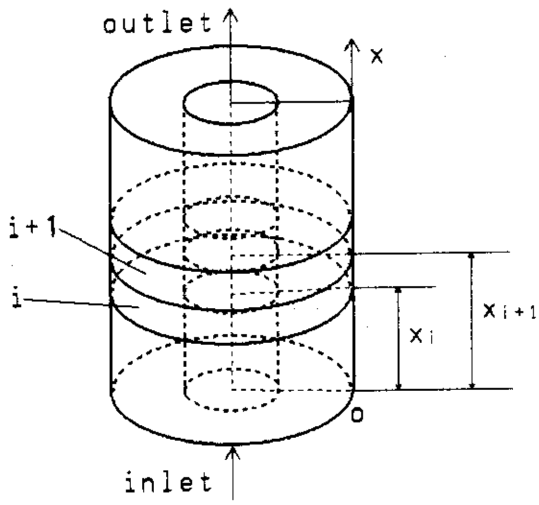

Fig. 3.1.1 Physical model

At $x=x_{i+1}$, Eq.(3-8) is rewritten as follows:

$$\dot{m}_{ci+1} = \frac{\pi}{4}\cdot(d_{cori+1}^2 - d_o^2)\cdot\rho_c\cdot\frac{1}{\Delta t} \qquad (3\text{-}9)$$

The consumed mass of oxygen at x_i and x_{i+1} is obtained from the following equations

$$\dot{m}_{O_2 i} = \dot{m}_{ci} \cdot \frac{M_{O_2}}{M_c} \cdot \frac{2 + f_{co/co_2}}{2 + 2f_{co/co_2}} \qquad (3\text{-}10)$$

$$\dot{m}_{O_2 i+1} = \dot{m}_{ci+1} \cdot \frac{M_{O_2}}{M_c} \cdot \frac{2 + f_{co/co_2}}{2 + f_{co/co_2}} \qquad (3\text{-}11)$$

where, M denotes molecular weight, $\dot{m}_{O_2}$ denotes consumed mass of oxygen and f_{co/co_2} denotes a ratio of the mole fractions of CO and CO_2 generated in the graphite oxidation.

The most important chemical reaction in the graphite corrosion due to air ingress is a heterogeneous reaction:

$$C + X\ O_2 \rightarrow Y\ CO + Z\ CO_2 \qquad (3\text{-}12)$$

where f_{co/co_2} = y/z; x,y and z are expressed by Eq.(3-13) with f_{co/co_2},

$$X = \frac{2 + f_{co/co_2}}{2 + 2f_{co/co_2}}$$

$$Y = \frac{f_{co/co_2}}{1 + f_{co/co_2}} \qquad (3\text{-}13)$$

$$Z = \frac{1}{1 + f_{co/co_2}}$$

In the present experiment, the mole fractions of CO and CO_2 at the outlet were used to calculate the f_{co/co_2}.

Finally, the mass fluxes of oxygen derived from (3-10) and (3-11) are as follows:

$$\left. \begin{aligned} m_{o_2i} &= m_{o_2i} \cdot \frac{1}{\pi d_o} \\ m_{o_2i+1} &= m_{o_2i+1} \cdot \frac{1}{\pi d_o} \end{aligned} \right) \qquad (3\text{-}14)$$

3.1.4 Calculation of Mass Fraction of Each Gas Species

$\omega_{o_2,\infty}$ can be calculated by using the following procedure.

First, the oxygen mass fraction $\omega_{o_21,\infty}$ at x_1=0 is expressed by

$$\omega_{o_21,\infty} = \frac{m_{o_21}}{m_{tot1}} \qquad (3\text{-}15)$$

where, m_{tot1} is the total mass flow rate of the gas mixture at the inlet with a unit of [kg/s] and m_{o_21} is the mass flow rate of oxygen at the inlet. The above mass flow rates at the inlet were measured. To obtain the oxygen mass fraction at the next point, the oxygen flow rate at the next point is necessary.

$$m_{o_2i+1} = m_{o_2i} - \Delta m_{o_2i} \qquad (3\text{-}16)$$

Δm_{o_2i} [kg/s] means the consumption rate of oxygen from x_i to x_{i+1}, Δm_{o_2i} can be evaluated by the following approximation.

$$\begin{aligned} \Delta m_{o_2i} &= \int_{x_i}^{x_{i+1}} Ae^{-Bx}\, dx \\ &= -\frac{A}{B}\,(e^{-Bx_{i+1}} - e^{-Bx_i}) \end{aligned} \qquad (3\text{-}17)$$

$$A = \frac{\dot{m}_{o_2 i}}{e^{-Bx_i}} \tag{3-18}$$

$$B = \frac{\ln \dfrac{\dot{m}_{o_2 i}}{\dot{m}_{o_2 i+1}}}{x_{i+1} - x_i} \tag{3-19}$$

Getting $\Delta m_{o_2 i}$, we can obtain the Δm_{ci}.

$$\Delta m_{ci} = \Delta m_{o_2 i} \cdot \frac{M_c}{M_{o_2}} \cdot \frac{2 + 2f_{co/co_2}}{2 + f_{co/co_2}} \tag{3-20}$$

Therefore, the total mass flow rate at the next point is calculated by

$$m_{toti+1} = m_{toti} + \Delta m_{ci} \tag{3-21}$$

The production masses of CO and CO_2 at the next point can be obtained from the relationship of the chemical reaction.

$$\left.\begin{aligned} m_{coi+1} &= m_{coi} + \Delta m_{ci} \cdot \frac{M_{co}}{M_c} \cdot \frac{f_{co/co_2}}{1 + f_{co/co_2}} \\ m_{co_2 i+1} &= m_{co_2 i} + \Delta m_{ci} \cdot \frac{M_{co_2}}{M_c} \cdot \frac{1}{1 + f_{co/co_2}} \end{aligned}\right) \tag{3-22}$$

Accordingly, we can estimate $\omega_{o_2 i+1}$, ω_{coi+1}, $\omega_{co_2 +1}$ and $\omega_{N_2 i+1}$

$$\left.\begin{aligned} \omega_{o_2 i+1} &= \frac{m_{o_2 i+1}}{m_{toti+1}} \\ \omega_{coi+1} &= \frac{m_{coi+1}}{m_{toti+1}} \\ \omega_{co_2 i+1} &= \frac{m_{co_2 i+1}}{m_{toti+1}} \\ \omega_{N_2 i+1} &= 1 - (\omega_{o_2 i+1} + \omega_{coi+1} + \omega_{co_2 i+1}) \end{aligned}\right) \tag{3-23}$$

The mole fraction γ_i and the mass fraction ω_i have the following relationship.

$$\gamma_i = \frac{\omega_i}{M_i} \frac{1}{\frac{1}{M}} \quad , \quad \frac{1}{M} = \sum_i \frac{\omega_i}{M_i} \tag{3-24}$$

or

$$\omega_i = \frac{\gamma_i\ M_i}{M} \quad , \quad M = \sum_i \gamma_i\ M_i \qquad (3\text{-}25)$$

3.2 Experimental Results

The experimental data of RUN NO. NNB01, NNB03, NNB04, NNB05, NNU01, NNU02, NNU03, NNU04, NNU05, NNU06 are listed in Tables 3.2.1 to 3.2.10. The calculation results of RUN NO. NNB03, NNB04, NNB05, NNU01, NNU02, NNU03, NNU04, NNU05, NNU06 are listed in Tables 3.2.11 to 3.2.19. Nomenclature used in these tables is listed as follows:

Tmix : air supplying duration. dTmeas: sampling interval.
Troom: room temperature. TIME : elapsed time.
Ptest: system pressure. Pabs : absolute pressure.
R : mole fraction. UF : flow rate.
Tem. channel A: graphite temperature of test section A.
Tem. channel C: graphite temperature of test section C.
X : distance from inlet of graphite tube.
Dcor : diameter, after corrosion.
Tg.ch-A: graphite temperature of test section A.
Tg.ch-C: graphite temperature of test section C.
X/D/Re Sc: dimensionless distance.
Sh : Sherwood number. Nu : Nusselt number.
Re : Reynolds number. Sc : Schmidt number.
W : mass fraction. RHO : density
VISC : viscosity.

In the tables 3.2.11 to 3.2.19, Nusselt number was calculated by the following equations:

$$\left.\begin{array}{ll} Nu = 1.077 \cdot X^{*\,-\frac{1}{3}} - 0.7 & (X^* \leq 0.01) \\ Nu = 3.657 + 6.874(1000X^*)^{-0.488} & (X^* > 0.01) \\ (X^* = \frac{x}{d}/(RePr)) & \end{array}\right\} \qquad (3\text{-}26)$$

The conditions of the experiments are listed in Tables 3.2.20 to 3.2.32. The experimental results of RUN NNB03, NNB04, NNB05, NNU01, NNU02, NNU03, NNU05 and NNU06 are shown in Figs. 3.2.1 to 3.2.8, respectively.

3.2.1 Mole Fractions of Oxygen, Carbon Monoxide and Carbon Dioxide

The time dependences of the mole fractions of O_2, CO and CO_2 at the inlet and outlet of RUN NO. NNB01, NNB03, NNB04, NNB05, NNU01, NNU02, NNU03, NNU04, NNU05, NNU06 are shown in Figs. 3.2.9 to 3.2.18. From these figures, we can find that when the inlet and outlet slide valves open, the mole fraction of O_2 increases rapidly from zero to a steady state value in a short time. This indicates that the natural convection throughout the whole test channel reaches the steady state within about 2 minutes. The mole fraction of CO_2 in air is very small, but at the inlet of the graphite channel the mole fraction of CO_2 is kept at a bigger value than the one in air because of the feedback from the cold channel B. The mole fraction of CO at the outlet was zero in most of the experiments. After the valves were closed, the inlet mole fraction of O_2 went down rapidly, while the mole fraction of CO_2 increased. The reason is that after the oxygen supply was stopped, oxygen was exhausted in a short time and a lot of carbon dioxide remained in the closed test channels.

In the channel near the outlet, the mole fractions of O_2, CO and CO_2 always held constant during the natural convection, even though after the valves were closed. The mole fractions of CO in all the experiments were nearly equal to zero. The maximum value of f_{co/co_2} was about 0.25%. From Figs. 3.2.12 to 3.2.18, we can find that the mole fraction of CO had a peak just after the valves were opened, then fell to about zero. The generation of carbon monoxide is said to be greater than that of carbon dioxide at temperatures higher than about 650°C. Only in the initial stage of the natural circulation, carbon monoxide flowed out through the test channel to the atmosphere without the combustion because oxygen supplied was almost consumed. After that, the carbon monoxide disappeared due to the carbon monoxide combustion.

3.2.2 Distribution of Flow Rates

The distribution of the flow rates in RUN NO. NNB03, NNB04, NNB05, NNU01, NNU02, NNU03, NNU05, NNU06 are shown in Figs. 3.2.1 to 3.2.8. The flow rates through the three parallel channels, which were two hot channels and one cold channel, were not equal to zero before the valves were opened because of the natural circulation through the three parallel channels. The flow rates of the channel C are shown in Figs. 3.2.19 to 3.2.25. The flow rates of the channel C were calculated as follows:

$$(UF\text{-}2) = [(UF\text{-}1) + (UF\text{-}5)]/2 - (UF\text{-}3) - (UF\text{-}4) \qquad (3\text{-}27)$$

where, UF-1 denotes the inlet flow rate, UF-5 denotes the outlet flow rate, UF-3 denotes the flow rate of the channel A, and UF-4 denotes the flow rate of the channel B.

When the inlet and outlet valves were opened, the flow rates of the channels A and C increased from the above initial values. In most of the RUNs, the higher the channel temperature was, the greater the flow rate was. Only temperature is not effective factor, but also many factors can influence the distribution of the flow rate. Observing Figs. 3.2.19 to 3.2.25 carefully, we can find that the flow rates of the channels A and C fluctuated around some average value within a narrow range, but the phase was opposite. This indicates that the flows between the two channels coupled weakly each other.

3.2.3 Amount of Graphite Corrosion

Figures 3.2.26 and 3.2.27 show the corrosion thickness of the graphite tube along the axis. The corrosion thickness was defined as a half of the difference between the diameter after the corrosion and the original diameter. Obviously, the corrosion thickness became maximum at the inlet. The corrosion thickness decreased gradually with the reduction of the oxygen concentration. The higher the temperature, the greater the flow rate and the mole fraction of oxygen, and the longer the elapsed-time were, the greater the corrosion thickness became. The amount of corrosion of the graphite tube increased with the temperature of the graphite, the oxygen concentration, the total flow rate and the duration time.

3.2.4 Sherwood Number

Axial variations of Sherwood numbers of oxygen are shown in Fig. 3.2.28. The horizontal axis represents the dimensionless axial distance corresponding to the reciprocal of Graetz number in which Prandtl number was replaced with Schmidt number. The vertical axis represents the Sherwood number. The solid line expresses the relationship between the Sherwood number and the dimensionless distance, which is derived from the conversion of the relationship between Nusselt number and the dimensionless distance by replacing Prandtl number with Schmidt number, assuming that the analogy between heat transfer and mass transfer holds under the condition of the thermally developing and hydrodynamically developed laminar flow.

The Sherwood numbers of the experiments for the high oxygen mole fractions (RUN NNU02: 37.5%, RUN NNU05: 25.6%) were less than that of the solid line as shown in fig. 3.2.18. This indicates that much graphite corrosion reduced the Sherwood numbers. It is known that an injection flow from a tube wall reduces the Nusselt number in a laminar flow through a circular tube. The decrease of the Sherwood number is caused by the injection flow from the wall due to the gaseous carbon of the carbon monoxide and/or carbon dioxide, as well as the above heat transfer problem.

4. Conclusions

An experimental study on mass transfer with the graphite corrosion at the high temperatures in the multi-channel test section has been performed to clarify the thermohydraulic characteristics during the primary pipe rupture accident of a high temperature gas cooled reactor with high accuracy. The main conclusions are summarized as follows:

(1) We obtained the experimental data of the mole fractions of oxygen, carbon monoxide and carbon dioxide, the flow rates of each channel, the temperatures of the graphite, the tube wall and the gas mixture, the inner diameters of the graphite corroded, and the change in the weight of the graphite.

(2) The amount of carbon monoxide at the outlet equaled almost zero under the present experimental conditions. The mole fraction of carbon dioxide at the inlet of the graphite channel held a higher value during the test because of the feedback from the cold channel.

(3) The total flow rate of the natural circulation increased with the increase of the graphite temperature. The increase of the flow rate caused the increase of the corrosion amount of the graphite.

(4) The Sherwood number in the experiment was less than that obtained from Nusselt number on the assumption of the analogy between heat and mass transfer.

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Table 2.2.1 Location of the thermocouples

THERMOCOUPLE NO.	LOCATION (mm)
TW1	550mm from the bottom of channel C
TW2	550mm from the bottom of channel A
TW3	2720mm from the bottom of channel C
TW4	2720mm from the bottom of channel A
TW5	1700mm from the bottom of channel B
TW6	50mm from the top of upper confluence
TW7	150mm from the top of upper confluence
TW8	2700mm from the bottom of outlet
TG2	535mm from the bottom of inlet
TG9, 10	770mm from the bottom of channel C
TG11, 12	770mm from the bottom of channel A
TG14, 15	2820mm from the bottom of channel C
Tg16, 17	2820mm from the bottom of channel A
TG23	50mm from the top of upper confluence
TG28	155.85mm from the top of upper confluence
TG29	4130mm from the bottom of outlet
TG30	1240mm from the bottom of outlet
TG31	0mm from the bottom of outlet

Table 3.2.1 Experimental data of RUN <NNB01>

=============> RUN NO. (NNB01) >==============> DATE (92/03/03) >===>

Tmix = 10 (min) dTmeas = 30 (s) Troom = 8 (C)

	P (V)	PA (V)	UF-1 (V)	UF-3 (V)	UF-4 (V)	UF-5 (V)
ZERO BEFORE :	1.0424E+00	4.3949E+00	1.0157E+00	-9.4251E+00	4.9320E-01	-2.3940E-03

	R o2,in	R co2,in	R co,in	R o2,out	R co2,out	R co,out	F co/co2
AVERAGE MOLE FRACTION :	14.90	6.45	0.00	12.27	10.84	0.03	0.00

NO.	TIME (S)	Ptest (Pa)	Pabs (Pa)	Tem. (11-18) channel A (C)	Tem. (21-28) channel C (C)
1	-94	-5.0580E+03	1.0183E+05	1021./1032./1043./1049./1052./1053./1031./ 887.	1031./1041./1051./1047./1045./1043./1034./ 946.
2	0	-6.0718E+03	1.0183E+05	1027./1039./1042./1040./1043./1052./1041./ 889.	1023./1033./1041./1044./1054./1053./1038./ 946.
3	41	-6.0742E+03	1.0183E+05	1027./1039./1041./1041./1043./1052./1042./ 890.	1025./1034./1042./1045./1055./1055./1040./ 947.
4	71	-6.0779E+03	1.0183E+05	1021./1041./1053./1051./1046./1049./1032./ 889.	1021./1041./1046./1042./1043./1050./1041./ 949.
5	101	-6.0754E+03	1.0183E+05	1024./1034./1041./1045./1052./1064./1038./ 890.	1034./1037./1051./1053./1058./1054./1033./ 947.
6	130	-6.0767E+03	1.0183E+05	1021./1040./1056./1065./1052./1057./1032./ 890.	1023./1043./1049./1045./1047./1057./1042./ 950.
7	160	-6.0791E+03	1.0183E+05	1025./1035./1043./1047./1054./1070./1041./ 891.	1030./1036./1050./1055./1063./1064./1035./ 948.
8	190	-6.0803E+03	1.0183E+05	1025./1036./1043./1048./1055./1073./1041./ 891.	1030./1036./1050./1055./1064./1067./1035./ 947.
9	221	-6.0742E+03	1.0183E+05	1023./1043./1058./1054./1052./1066./1038./ 891.	1020./1040./1048./1046./1053./1069./1045./ 951.
10	250	-6.0767E+03	1.0183E+05	1024./1044./1057./1053./1051./1067./1040./ 891.	1020./1040./1048./1047./1056./1071./1045./ 950.
11	280	-6.0754E+03	1.0183E+05	1026./1043./1053./1050./1052./1072./1043./ 891.	1024./1038./1048./1052./1065./1074./1039./ 949.
12	311	-6.0754E+03	1.0183E+05	1025./1045./1054./1051./1052./1071./1043./ 891.	1022./1039./1048./1051./1064./1075./1042./ 949.
13	341	-6.0767E+03	1.0183E+05	1025./1036./1045./1052./1060./1080./1039./ 889.	1036./1041./1056./1060./1063./1067./1033./ 947.
14	371	-6.0718E+03	1.0183E+05	1022./1044./1059./1056./1054./1069./1036./ 890.	1021./1043./1050./1048./1056./1073./1044./ 949.
15	401	-6.0779E+03	1.0183E+05	1025./1037./1045./1052./1060./1081./1039./ 889.	1035./1041./1055./1059./1067./1070./1034./ 946.
16	430	-6.0730E+03	1.0183E+05	1025./1045./1057./1053./1053./1072./1042./ 890.	1021./1041./1048./1049./1061./1076./1044./ 949.
17	460	-6.0791E+03	1.0183E+05	1023./1046./1059./1057./1054./1068./1037./ 889.	1020./1044./1050./1048./1058./1075./1044./ 949.
18	490	-6.0742E+03	1.0183E+05	1021./1036./1054./1061./1063./1076./1031./ 888.	1031./1047./1058./1054./1055./1066./1038./ 948.
19	520	-6.0730E+03	1.0183E+05	1022./1036./1051./1060./1063./1077./1032./ 888.	1034./1048./1058./1056./1057./1066./1037./ 948.
20	550	-6.0718E+03	1.0183E+05	1024./1046./1058./1054./1053./1071./1040./ 889.	1021./1044./1049./1049./1060./1076./1044./ 948.
21	580	-6.0730E+03	1.0184E+05	1020./1039./1057./1062./1061./1073./1031./ 887.	1027./1049./1056./1052./1053./1068./1041./ 948.
22	611	-6.0742E+03	1.0184E+05	1023./1046./1060./1058./1054./1070./1036./ 888.	1022./1045./1050./1050./1057./1074./1044./ 949.
23	641	-6.0754E+03	1.0184E+05	1025./1037./1046./1054./1062./1082./1040./ 888.	1038./1044./1058./1060./1063./1068./1033./ 946.
24	671	-6.0705E+03	1.0184E+05	1025./1046./1058./1054./1053./1071./1041./ 889.	1022./1044./1049./1049./1061./1076./1044./ 948.
25	701	-6.0742E+03	1.0184E+05	1021./1037./1054./1061./1063./1077./1032./ 887.	1034./1048./1059./1056./1056./1066./1037./ 947.
26	730	-6.0705E+03	1.0184E+05	1023./1045./1060./1059./1055./1070./1037./ 888.	1021./1045./1050./1049./1060./1076./1044./ 947.
27	760	-6.0730E+03	1.0184E+05	1022./1037./1053./1061./1063./1077./1033./ 887.	1031./1047./1057./1055./1056./1066./1037./ 947.
28	791	-6.0693E+03	1.0184E+05	1022./1044./1060./1060./1056./1070./1034./ 887.	1018./1044./1050./1049./1054./1072./1044./ 948.
29	820	-6.0693E+03	1.0184E+05	1022./1042./1060./1060./1055./1070./1034./ 887.	1016./1042./1047./1049./1055./1072./1040./ 948.
30	850	-6.0742E+03	1.0184E+05	1026./1037./1045./1053./1061./1082./1040./ 887.	1028./1038./1053./1061./1066./1069./1032./ 945.
31	880	-6.0681E+03	1.0184E+05	1024./1036./1050./1059./1064./1080./1034./ 886.	1026./1041./1055./1060./1060./1067./1034./ 945.
32	910	-6.0718E+03	1.0184E+05	1022./1044./1060./1059./1056./1070./1035./ 887.	1012./1040./1048./1051./1054./1072./1044./ 947.
33	940	-6.0669E+03	1.0184E+05	1026./1047./1058./1055./1053./1071./1041./ 887.	1010./1037./1045./1052./1061./1076./1044./ 947.
34	971	-6.0754E+03	1.0184E+05	1021./1038./1055./1061./1062./1076./1032./ 886.	1023./1042./1054./1058./1056./1066./1038./ 946.
35	1001	-6.0730E+03	1.0184E+05	1026./1047./1058./1054./1053./1071./1042./ 888.	1014./1037./1046./1054./1064./1077./1043./ 946.
36	1031	-6.0718E+03	1.0184E+05	1024./1046./1060./1057./1054./1070./1037./ 887.	1014./1039./1048./1052./1059./1075./1043./ 946.
37	1061	-6.0754E+03	1.0184E+05	1022./1037./1053./1061./1062./1075./1031./ 885.	1025./1044./1056./1057./1055./1066./1039./ 946.
38	1091	-6.0705E+03	1.0184E+05	1024./1045./1059./1058./1054./1070./1037./ 887.	1016./1042./1049./1052./1059./1075./1044./ 946.
39	1121	-6.0767E+03	1.0184E+05	1026./1038./1046./1054./1061./1081./1038./ 886.	1032./1041./1057./1062./1065./1069./1032./ 943.
40	1151	-6.0742E+03	1.0184E+05	1025./1047./1058./1054./1053./1071./1040./ 886.	1018./1040./1048./1052./1062./1076./1043./ 946.
AVERAGE :		-6.0739E+03	1.0184E+05	1024./1041./1053./1055./1056./1071./1037./ 888.	1024./1041./1051./1052./1058./1069./1040./ 947.
41	1181	-6.0730E+03	1.0184E+05	1021./1039./1055./1061./1062./1075./1031./ 884.	1026./1046./1057./1056./1055./1065./1037./ 945.

Table 3.2.1 Experimental data of RUN <NNB01> (continue)

NO.	TIME (S)	UF-1(m3/h)	UF-3(m3/h)	UF-4(m3/h)	UF-5(m3/h)
1	-94	-3.09E-02	1.54E+01	7.59E-01	-5.60E-03
2	0	-1.05E-01	3.90E-01	8.28E-01	2.85E-01
3	41	5.34E+00	3.87E+01	-1.23E+01	4.31E+00
4	71	5.57E+00	3.18E+01	2.08E+00	4.43E+00
5	101	5.56E+00	2.87E+01	3.08E+00	4.46E+00
6	130	5.85E+00	2.33E+01	3.17E+00	4.54E+00
7	160	5.75E+00	6.71E+00	2.27E+00	4.51E+00
8	190	5.81E+00	-7.69E+00	2.77E+00	4.53E+00
9	221	5.90E+00	-1.05E+01	3.21E+00	4.55E+00
10	250	5.91E+00	-8.61E+00	3.17E+00	4.53E+00
11	280	5.69E+00	-1.10E+01	3.17E+00	4.59E+00
12	311	5.79E+00	-9.13E+00	3.17E+00	4.55E+00
13	341	5.94E+00	-9.72E+00	3.21E+00	4.59E+00
14	371	5.80E+00	-1.07E+01	1.89E+00	4.60E+00
15	401	5.78E+00	-2.67E+00	3.15E+00	4.60E+00
16	430	5.93E+00	-1.05E+01	3.17E+00	4.59E+00
17	460	5.95E+00	-8.46E+00	2.75E+00	4.56E+00
18	490	5.94E+00	-1.03E+01	1.98E+00	4.58E+00
19	520	5.93E+00	-1.02E+01	2.37E+00	4.57E+00
20	550	6.08E+00	-1.04E+01	3.17E+00	4.57E+00
21	580	5.84E+00	-8.42E+00	3.22E+00	4.59E+00
22	611	5.84E+00	-8.85E+00	3.22E+00	4.58E+00
23	641	5.80E+00	-1.13E+01	1.67E+00	4.61E+00
24	671	5.93E+00	-1.14E+01	3.10E+00	4.62E+00
25	701	5.82E+00	-1.01E+01	2.89E+00	4.57E+00
26	730	5.75E+00	-2.70E+00	3.22E+00	4.60E+00
27	760	5.97E+00	-9.65E+00	2.68E+00	4.60E+00
28	791	5.77E+00	-6.86E+00	3.18E+00	4.58E+00
29	820	5.96E+00	-9.81E+00	3.17E+00	4.58E+00
30	850	5.86E+00	-9.98E+00	3.24E+00	4.58E+00
31	880	5.89E+00	-1.10E+01	3.07E+00	4.65E+00
32	910	5.83E+00	-9.35E+00	3.20E+00	4.61E+00
33	940	5.89E+00	-9.06E+00	3.23E+00	4.62E+00
34	971	5.84E+00	-1.10E+01	3.22E+00	4.62E+00
35	1001	5.91E+00	-1.11E+01	2.90E+00	4.59E+00
36	1031	5.82E+00	-9.73E+00	3.20E+00	4.59E+00
37	1061	5.87E+00	-1.04E+01	3.22E+00	4.60E+00
38	1091	5.83E+00	-8.60E+00	2.28E+00	4.63E+00
39	1121	5.94E+00	-1.05E+01	2.43E+00	4.59E+00
40	1151	5.87E+00	-5.55E+00	2.76E+00	4.55E+00
AVERAGE :		5.68E+00	-4.50E+00	2.45E+00	4.46E+00
41	1181	5.90E+00	-1.11E+01	1.87E+00	4.59E+00

NO.	TIME(S)	Ro2in	Rco2in	Rcoin	Ro2out	Rco2out	Rcoout	Fco/co2
1	20	6.71	0.36	0.49	0.05	0.05	1.09	22.31
2	150	14.41	4.57	0.00	11.72	8.59	0.02	0.00
3	280	14.59	6.08	0.00	12.22	10.48	0.02	0.00
4	410	14.61	6.48	0.00	12.30	10.78	0.03	0.00
5	540	14.87	6.56	0.00	12.29	10.88	0.03	0.00
6	670	15.11	6.38	0.00	12.28	10.94	0.03	0.00
7	800	15.14	6.47	0.00	12.23	11.03	0.04	0.00
8	930	15.11	6.73	0.00	12.32	10.95	0.04	0.00
9	1060	14.95	6.68	0.00	12.34	10.97	0.02	0.00
10	1190	11.61	9.68	0.00	12.39	10.96	0.04	0.00
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Table 3.2.1 Experimental data of RUN <NNB01> (continue)

=============> RUN NO. (NNB01) >===============> DATE (92/03/03) >==

NO.	TIME(S)	Tw1	Tw2	Tw3	Tw4	Tw5	Tw6	Tw7	Tw8	Tg1	Tg2	Tg3	Tg4	Tg5	Tg6	Tg7	Tg8	Tg9	Tg10	Tg11	Tg12	NO.
1	-94	10.	10.	106.	102.	7.	9.	7.	7.	7.	10.	9.	9.	9.	10.	10.	10.	15.	10.	14.	11.	1
2	0	10.	10.	106.	102.	7.	9.	7.	7.	7.	10.	9.	9.	9.	10.	10.	10.	15.	10.	14.	11.	2
3	41	10.	10.	106.	103.	7.	9.	7.	7.	7.	9.	9.	9.	9.	9.	10.	10.	14.	10.	14.	11.	3
4	71	9.	9.	107.	102.	7.	9.	7.	7.	7.	9.	9.	9.	9.	9.	10.	10.	14.	10.	14.	11.	4
5	101	9.	10.	107.	103.	7.	9.	7.	7.	7.	9.	9.	9.	9.	10.	10.	10.	14.	10.	14.	11.	5
6	130	9.	10.	108.	103.	7.	9.	8.	7.	7.	9.	9.	9.	9.	9.	10.	10.	14.	10.	14.	11.	6
7	160	9.	9.	109.	104.	7.	9.	7.	7.	7.	9.	9.	9.	9.	10.	10.	10.	14.	10.	14.	11.	7
8	190	9.	10.	109.	105.	7.	10.	7.	7.	7.	9.	9.	9.	9.	10.	10.	10.	14.	10.	14.	11.	8
9	221	9.	10.	109.	106.	7.	10.	8.	7.	7.	9.	9.	9.	9.	10.	10.	10.	14.	10.	14.	11.	9
10	250	9.	10.	110.	106.	7.	10.	8.	7.	7.	9.	9.	9.	9.	10.	10.	10.	14.	10.	14.	11.	10
11	280	9.	10.	111.	107.	7.	10.	7.	7.	7.	9.	9.	9.	9.	10.	10.	10.	14.	10.	14.	11.	11
12	311	9.	10.	111.	107.	7.	10.	7.	7.	7.	9.	9.	9.	9.	10.	10.	10.	14.	10.	14.	11.	12
13	341	9.	10.	112.	107.	7.	10.	7.	7.	7.	9.	9.	9.	9.	10.	10.	10.	14.	10.	14.	11.	13
14	371	9.	9.	113.	108.	7.	10.	7.	7.	7.	9.	9.	9.	9.	10.	10.	10.	14.	10.	14.	11.	14
15	401	9.	10.	112.	109.	7.	10.	7.	7.	7.	9.	9.	9.	9.	10.	10.	10.	15.	10.	14.	11.	15
16	430	9.	9.	113.	108.	7.	10.	7.	7.	7.	9.	9.	9.	9.	10.	10.	10.	14.	10.	14.	11.	16
17	460	9.	9.	114.	109.	7.	10.	7.	7.	7.	9.	9.	9.	9.	10.	10.	10.	15.	10.	14.	11.	17
18	490	9.	9.	114.	110.	7.	10.	7.	7.	7.	9.	9.	9.	9.	10.	10.	10.	14.	10.	14.	11.	18
19	520	9.	10.	114.	110.	7.	10.	7.	7.	7.	9.	9.	9.	9.	9.	10.	10.	14.	10.	14.	11.	19
20	550	9.	9.	114.	110.	7.	10.	7.	7.	7.	9.	9.	9.	9.	9.	10.	10.	14.	10.	14.	11.	20
21	580	9.	9.	115.	110.	7.	10.	7.	7.	7.	9.	9.	9.	9.	10.	10.	10.	15.	10.	14.	11.	21
22	611	9.	9.	115.	110.	7.	10.	7.	7.	7.	9.	9.	9.	9.	10.	10.	10.	14.	10.	14.	11.	22
23	641	9.	9.	116.	111.	7.	10.	7.	7.	7.	9.	9.	9.	9.	10.	10.	10.	14.	10.	14.	11.	23
24	671	9.	9.	115.	111.	7.	10.	7.	7.	7.	9.	9.	9.	9.	10.	10.	10.	14.	10.	14.	11.	24
25	701	9.	9.	116.	111.	7.	10.	7.	7.	7.	9.	9.	9.	9.	10.	10.	10.	14.	10.	14.	11.	25
26	730	9.	9.	116.	111.	7.	10.	7.	7.	7.	9.	9.	9.	9.	10.	10.	10.	14.	10.	14.	11.	26
27	760	9.	9.	116.	112.	7.	10.	7.	7.	7.	9.	9.	9.	9.	10.	10.	10.	14.	10.	14.	11.	27
28	791	9.	9.	117.	111.	7.	10.	7.	7.	7.	9.	9.	9.	9.	10.	10.	10.	14.	10.	14.	11.	28
29	820	9.	9.	116.	112.	7.	10.	7.	7.	7.	9.	9.	9.	9.	10.	10.	10.	14.	10.	14.	11.	29
30	850	9.	9.	117.	112.	7.	10.	7.	7.	7.	9.	9.	9.	9.	10.	10.	10.	14.	10.	14.	11.	30
31	880	9.	9.	117.	112.	7.	10.	7.	7.	7.	9.	9.	9.	9.	10.	10.	10.	14.	10.	14.	11.	31
32	910	9.	9.	117.	112.	7.	10.	7.	7.	7.	9.	9.	9.	9.	9.	10.	10.	14.	10.	14.	11.	32
33	940	9.	9.	118.	112.	7.	10.	7.	7.	7.	8.	9.	9.	9.	9.	9.	9.	14.	10.	14.	11.	33
34	971	9.	9.	118.	113.	7.	10.	7.	7.	7.	9.	9.	9.	9.	9.	10.	10.	14.	10.	14.	11.	34
35	1001	9.	9.	118.	113.	7.	10.	7.	7.	7.	9.	9.	9.	9.	9.	9.	9.	14.	10.	14.	11.	35
36	1031	9.	9.	117.	113.	7.	10.	7.	7.	7.	9.	9.	9.	9.	9.	9.	9.	14.	10.	14.	11.	36
37	1061	9.	9.	117.	113.	7.	10.	7.	7.	7.	9.	9.	9.	9.	9.	9.	10.	14.	10.	14.	11.	37
38	1091	9.	9.	118.	113.	7.	10.	7.	7.	7.	9.	9.	9.	9.	9.	9.	10.	14.	10.	14.	11.	38
39	1121	9.	9.	117.	113.	7.	10.	7.	7.	7.	9.	9.	9.	9.	9.	9.	10.	14.	10.	14.	11.	39
40	1151	9.	9.	118.	113.	7.	10.	7.	7.	7.	9.	9.	9.	9.	9.	9.	9.	14.	10.	14.	11.	40
41	1181	9.	9.	118.	114.	7.	10.	7.	7.	7.	9.	9.	9.	9.	9.	9.	9.	14.	10.	14.	11.	41
AVERAGE :		9.	9.	114.	109.	7.	10.	7.	7.	7.	9.	9.	9.	9.	10.	10.	10.	14.	10.	14.	11.	

Table 3.2.1 Experimental data of RUN <NNB01> (continue)

NO.	TIME(S)	Tg13	Tg14	Tg15	Tg16	Tg17	Tg18	Tg19	Tg20	Tg21	Tg22	Tg23	Tg24	Tg25	Tg26	Tg27	Tg28	Tg29	Tg30	Tg31	NO.
1	-94	10.	394.	141.	391.	146.	7.	7.	8.	8.	10.	10.	97.	90.	10.	10.	15.	10.	14.	11.	1
2	0	10.	394.	140.	391.	146.	7.	7.	8.	8.	10.	10.	97.	89.	10.	10.	15.	10.	14.	11.	2
3	41	10.	384.	149.	382.	160.	7.	7.	9.	9.	10.	12.	99.	91.	10.	10.	14.	10.	14.	11.	3
4	71	10.	385.	151.	382.	162.	7.	7.	9.	9.	11.	13.	100.	93.	10.	10.	14.	10.	14.	11.	4
5	101	10.	388.	160.	386.	165.	7.	7.	9.	9.	11.	14.	102.	96.	10.	10.	14.	10.	14.	11.	5
6	130	10.	393.	163.	391.	167.	7.	7.	9.	10.	11.	15.	104.	98.	10.	10.	14.	10.	14.	11.	6
7	160	10.	396.	164.	394.	168.	7.	7.	9.	10.	11.	15.	106.	100.	10.	10.	14.	10.	14.	11.	7
8	190	10.	397.	164.	397.	169.	7.	7.	10.	10.	11.	15.	108.	101.	10.	10.	14.	10.	14.	11.	8
9	221	10.	399.	167.	399.	171.	7.	7.	10.	10.	11.	15.	109.	102.	10.	10.	14.	10.	14.	11.	9
10	250	10.	400.	169.	400.	171.	7.	7.	10.	10.	11.	15.	110.	103.	10.	10.	14.	10.	14.	11.	10
11	280	10.	401.	168.	401.	173.	7.	7.	10.	10.	11.	15.	112.	105.	10.	10.	14.	10.	14.	11.	11
12	311	10.	402.	170.	400.	173.	7.	7.	10.	10.	11.	15.	113.	105.	10.	10.	14.	10.	14.	11.	12
13	341	10.	403.	170.	402.	172.	7.	7.	10.	10.	11.	15.	114.	106.	10.	10.	14.	10.	14.	11.	13
14	371	10.	403.	170.	402.	173.	7.	7.	10.	10.	11.	16.	114.	106.	10.	10.	14.	10.	14.	11.	14
15	401	10.	403.	171.	403.	175.	7.	7.	10.	10.	11.	16.	114.	106.	10.	10.	15.	10.	14.	11.	15
16	430	10.	404.	170.	401.	174.	7.	7.	10.	10.	11.	16.	115.	106.	10.	10.	14.	10.	14.	11.	16
17	460	10.	404.	172.	402.	173.	7.	7.	10.	10.	11.	16.	115.	106.	10.	10.	15.	10.	14.	11.	17
18	490	10.	404.	172.	403.	175.	7.	7.	10.	10.	11.	15.	115.	106.	10.	10.	14.	10.	14.	11.	18
19	520	10.	404.	172.	402.	173.	7.	7.	10.	10.	11.	16.	115.	107.	10.	10.	14.	10.	14.	11.	19
20	550	10.	404.	173.	403.	175.	7.	7.	10.	10.	11.	16.	115.	107.	10.	10.	14.	10.	14.	11.	20
21	580	10.	405.	173.	404.	175.	7.	7.	10.	10.	11.	16.	116.	108.	10.	10.	15.	10.	14.	11.	21
22	611	10.	404.	173.	404.	176.	7.	7.	10.	10.	11.	16.	116.	107.	10.	10.	14.	10.	14.	11.	22
23	641	10.	405.	175.	403.	177.	7.	7.	10.	10.	11.	16.	117.	107.	10.	10.	14.	10.	14.	11.	23
24	671	10.	405.	174.	403.	177.	7.	7.	10.	10.	11.	16.	116.	108.	10.	10.	14.	10.	14.	11.	24
25	701	10.	405.	174.	403.	177.	7.	7.	10.	10.	11.	16.	116.	108.	10.	10.	14.	10.	14.	11.	25
26	730	10.	406.	175.	402.	177.	7.	7.	10.	10.	11.	16.	117.	109.	10.	10.	14.	10.	14.	11.	26
27	760	10.	405.	174.	403.	177.	7.	7.	10.	10.	11.	16.	117.	108.	10.	10.	14.	10.	14.	11.	27
28	791	10.	405.	174.	403.	178.	7.	7.	10.	10.	11.	16.	116.	108.	10.	10.	14.	10.	14.	11.	28
29	820	10.	405.	174.	403.	178.	7.	7.	10.	10.	11.	16.	116.	108.	10.	10.	14.	10.	14.	11.	29
30	850	10.	405.	174.	402.	177.	7.	7.	10.	10.	11.	16.	116.	108.	10.	10.	14.	10.	14.	11.	30
31	880	10.	405.	175.	403.	177.	7.	7.	10.	10.	11.	16.	117.	108.	10.	10.	14.	10.	14.	11.	31
32	910	9.	406.	175.	404.	178.	7.	7.	10.	10.	11.	16.	116.	108.	10.	10.	14.	10.	14.	11.	32
33	940	9.	405.	175.	403.	177.	7.	7.	10.	10.	11.	16.	117.	109.	9.	9.	14.	10.	14.	11.	33
34	971	10.	406.	177.	404.	178.	7.	7.	10.	10.	11.	16.	117.	109.	10.	10.	14.	10.	14.	11.	34
35	1001	10.	406.	176.	404.	178.	7.	7.	10.	10.	11.	16.	116.	108.	9.	9.	14.	10.	14.	11.	35
36	1031	9.	406.	177.	404.	178.	7.	7.	10.	10.	11.	16.	116.	108.	9.	9.	14.	10.	14.	11.	36
37	1061	9.	406.	176.	404.	179.	7.	7.	10.	10.	11.	16.	117.	108.	9.	10.	14.	10.	14.	11.	37
38	1091	10.	406.	176.	404.	178.	7.	7.	10.	10.	11.	16.	117.	107.	9.	10.	14.	10.	14.	11.	38
39	1121	10.	406.	176.	404.	178.	7.	7.	10.	10.	11.	16.	117.	107.	9.	10.	14.	10.	14.	11.	39
40	1151	9.	406.	175.	403.	178.	7.	7.	10.	10.	11.	16.	117.	108.	9.	9.	14.	10.	14.	11.	40
41	1181	9.	406.	175.	404.	180.	7.	7.	10.	10.	11.	16.	117.	108.	9.	9.	14.	10.	14.	11.	41
AVERAGE :		10.	402.	170.	400.	173.	7.	7.	10.	10.	11.	15.	113.	105.	10.	10.	14.	10.	14.	11.	

Table 3.2.2 Experimental data of RUN <NNB03>

=============> RUN NO. (NNB03) >==============> DATE (92/03/10) >==>

Tmix = 18 (min)   dTmeas = 30 (s)   Troom = 10 (C)

ZERO BEFORE :	P (V)	PA (V)	UF-1 (V)	UF-3 (V)	UF-4 (V)	UF-5 (V)
	9.9671E-01	4.3802E+00	1.0099E+00	4.9926E-02	6.7891E-02	-4.3350E-03

AVERAGE MOLE FRACTION :	R o2,in	R co2,in	R co,in	R o2,out	R co2,out	R co,out	F co/co2
	15.03	6.69	0.00	11.63	10.94	0.01	0.00

NO.	TIME (S)	Ptest (Pa)	Pabs (Pa)	Tem. (11-18) channel A (C)	Tem. (21-28) channel C (C)
1	-223	1.6795E+02	1.0117E+05	1107./1118./1123./1120./1124./1127./1115./ 950.	1098./1111./1125./1131./1134./1122./1095./1002.
2	0	-4.6583E+02	1.0116E+05	1104./1118./1130./1134./1130./1126./1108./ 950.	1101./1116./1129./1127./1126./1115./1095./1005.
3	41	-4.6461E+02	1.0116E+05	1107./1118./1123./1121./1126./1131./1117./ 953.	1098./1112./1125./1132./1135./1124./1097./1004.
4	71	-4.7074E+02	1.0116E+05	1106./1122./1131./1130./1125./1126./1113./ 953.	1093./1114./1125./1125./1124./1124./1101./1011.
5	101	-4.6583E+02	1.0116E+05	1106./1121./1129./1126./1126./1133./1117./ 955.	1095./1113./1126./1132./1137./1131./1100./1009.
6	131	-4.6951E+02	1.0116E+05	1108./1118./1125./1125./1133./1142./1118./ 956.	1102./1113./1129./1136./1140./1134./1101./1006.
7	161	-4.6706E+02	1.0116E+05	1105./1121./1135./1139./1134./1137./1111./ 955.	1099./1118./1131./1130./1130./1130./1099./1010.
8	191	-4.6583E+02	1.0116E+05	1107./1123./1134./1135./1131./1138./1115./ 955.	1096./1117./1130./1130./1131./1134./1103./1014.
9	221	-4.6829E+02	1.0116E+05	1106./1123./1136./1138./1133./1140./1114./ 955.	1096./1118./1130./1131./1131./1137./1104./1015.
10	251	-4.6829E+02	1.0116E+05	1106./1123./1135./1134./1131./1141./1117./ 956.	1093./1116./1132./1130./1134./1140./1105./1016.
11	281	-4.6338E+02	1.0116E+05	1109./1121./1129./1128./1132./1147./1121./ 956.	1095./1115./1129./1133./1138./1143./1105./1015.
12	311	-4.6951E+02	1.0117E+05	1107./1118./1129./1133./1140./1154./1117./ 955.	1106./1117./1134./1141./1145./1139./1098./1006.
13	342	-4.6338E+02	1.0117E+05	1108./1122./1130./1128./1132./1147./1121./ 956.	1095./1116./1129./1133./1142./1144./1105./1014.
14	372	-4.7074E+02	1.0117E+05	1109./1122./1130./1128./1132./1149./1122./ 956.	1096./1116./1129./1134./1141./1145./1105./1014.
15	402	-4.6461E+02	1.0117E+05	1110./1121./1132./1127./1133./1152./1122./ 956.	1099./1116./1130./1137./1145./1145./1105./1013.
16	432	-4.6706E+02	1.0117E+05	1109./1122./1130./1128./1132./1148./1122./ 955.	1095./1116./1129./1133./1140./1145./1106./1015.
17	462	-4.6706E+02	1.0117E+05	1106./1124./1137./1142./1137./1146./1114./ 954.	1100./1121./1135./1134./1133./1139./1104./1015.
18	492	-4.7319E+02	1.0117E+05	1107./1125./1136./1139./1134./1144./1116./ 954.	1097./1121./1132./1131./1133./1141./1107./1018.
19	522	-4.6583E+02	1.0117E+05	1107./1125./1134./1131./1131./1146./1120./ 954.	1094./1119./1130./1130./1135./1146./1108./1021.
20	551	-4.6951E+02	1.0117E+05	1107./1125./1136./1138./1133./1145./1118./ 954.	1095./1120./1130./1128./1131./1142./1108./1020.
21	581	-4.6583E+02	1.0117E+05	1107./1125./1136./1137./1133./1145./1117./ 954.	1095./1120./1130./1131./1133./1144./1109./1020.
22	611	-4.6338E+02	1.0118E+05	1109./1123./1129./1128./1132./1150./1123./ 955.	1095./1117./1129./1132./1138./1147./1109./1019.
23	641	-4.6951E+02	1.0117E+05	1108./1124./1132./1129./1131./1146./1122./ 955.	1094./1118./1129./1131./1137./1147./1109./1020.
24	671	-4.6706E+02	1.0117E+05	1106./1124./1137./1141./1137./1147./1114./ 953.	1101./1122./1135./1135./1135./1141./1105./1016.
25	702	-4.6706E+02	1.0118E+05	1108./1125./1134./1131./1132./1147./1122./ 954.	1093./1118./1130./1131./1136./1147./1110./1022.
26	731	-4.6829E+02	1.0117E+05	1106./1125./1137./1141./1135./1146./1114./ 953.	1099./1122./1134./1133./1133./1141./1108./1019.
27	762	-4.6338E+02	1.0117E+05	1106./1125./1137./1141./1136./1147./1115./ 953.	1099./1122./1134./1134./1134./1141./1107./1018.
28	792	-4.6583E+02	1.0116E+05	1108./1126./1134./1131./1131./1146./1120./ 954.	1094./1119./1130./1131./1135./1146./1111./1023.
29	822	-4.6583E+02	1.0117E+05	1108./1120./1129./1133./1140./1156./1118./ 953.	1107./1119./1135./1141./1144./1143./1104./1011.
30	852	-4.6706E+02	1.0117E+05	1110./1122./1129./1127./1133./1152./1123./ 954.	1097./1117./1129./1136./1143./1148./1110./1019.
31	882	-4.7074E+02	1.0116E+05	1108./1120./1129./1133./1140./1156./1119./ 953.	1108./1120./1135./1141./1143./1143./1104./1012.
32	912	-4.6706E+02	1.0116E+05	1109./1120./1127./1129./1137./1156./1123./ 954.	1100./1117./1134./1139./1146./1152./1109./1017.
33	942	-4.6829E+02	1.0116E+05	1110./1123./1130./1128./1132./1150./1123./ 954.	1095./1118./1129./1132./1140./1149./1111./1022.
34	972	-4.6951E+02	1.0115E+05	1108./1120./1129./1132./1140./1156./1119./ 953.	1108./1120./1135./1141./1143./1142./1105./1014.
35	1002	-4.6706E+02	1.0116E+05	1107./1126./1136./1139./1134./1146./1117./ 953.	1097./1122./1132./1131./1125./1143./1112./1024.
36	1032	-4.6829E+02	1.0115E+05	1111./1123./1129./1127./1133./1151./1123./ 954.	1096./1117./1129./1134./1142./1148./1112./1022.
AVERAGE :		-4.6727E+02	1.0116E+05	1108./1122./1132./1132./1133./1145./1118./ 954.	1098./1118./1131./1133./1137./1141./1105./1015.
37	1061	-4.6583E+02	1.0116E+05	1107./1125./1137./1140./1135./1146./1115./ 953.	1099./1122./1134./1132./1133./1143./1110./1022.

Table 3.2.2 Experimental data of RUN <NNB03> (continue)

NO.	TIME (S)	UF-1 (m3/h)	UF-3 (m3/h)	UF-4 (m3/h)	UF-5 (m3/h)	NO.	TIME (S)	Ro2in	Rco2in	Rcoin	Ro2out	Rco2out	Rcoout	Fco/co2
1	-223	-4.57E-01	1.73E+00	-6.83E+00	3.31E-02	1	20	6.99	0.26	0.00	0.03	0.33	1.84	5.54
2	0	-4.59E-01	1.50E+00	-6.81E+00	3.16E-01	2	150	14.32	4.94	0.00	10.92	9.00	0.02	0.00
3	41	4.56E+00	3.07E+00	-4.90E+00	4.35E+00	3	280	14.65	6.75	0.00	11.50	10.70	0.00	0.00
4	71	4.66E+00	3.04E+00	-4.88E+00	4.54E+00	4	410	15.12	6.54	0.00	11.67	10.94	0.00	0.00
5	101	4.69E+00	3.24E+00	-4.85E+00	4.58E+00	5	540	14.96	6.97	0.00	11.61	11.00	0.01	0.00
6	131	4.62E+00	3.28E+00	-4.83E+00	4.59E+00	6	670	15.29	6.45	0.00	11.66	11.03	0.01	0.00
7	161	4.86E+00	3.36E+00	-4.78E+00	4.64E+00	7	800	15.15	6.72	0.00	11.69	11.04	0.00	0.00
8	191	4.77E+00	3.20E+00	-4.80E+00	4.62E+00	8	930	15.34	6.92	0.00	11.75	11.04	0.01	0.00
9	221	4.75E+00	2.95E+00	-4.84E+00	4.60E+00	9	1060	14.28	7.50	0.00	11.73	11.04	0.00	0.00
10	251	4.85E+00	2.85E+00	-4.87E+00	4.64E+00	10								
11	281	4.86E+00	2.76E+00	-4.87E+00	4.62E+00	11								
12	311	4.97E+00	2.75E+00	-4.83E+00	4.63E+00	12								
13	342	4.83E+00	2.79E+00	-4.85E+00	4.63E+00	13								
14	372	5.05E+00	2.79E+00	-4.88E+00	4.68E+00	14								
15	402	4.94E+00	2.87E+00	-4.88E+00	4.64E+00	15								
16	432	4.91E+00	2.81E+00	-4.83E+00	4.63E+00	16								
17	462	4.79E+00	2.89E+00	-4.83E+00	4.68E+00	17								
18	492	4.90E+00	2.89E+00	-4.86E+00	4.67E+00	18								
19	522	5.02E+00	2.84E+00	-4.85E+00	4.63E+00	19								
20	551	5.04E+00	2.75E+00	-4.85E+00	4.69E+00	20								
21	581	4.92E+00	2.83E+00	-4.84E+00	4.67E+00	21								
22	611	4.99E+00	2.88E+00	-4.85E+00	4.64E+00	22								
23	641	4.81E+00	2.79E+00	-4.88E+00	4.65E+00	23								
24	671	4.79E+00	2.88E+00	-4.88E+00	4.64E+00	24								
25	702	4.68E+00	2.80E+00	-4.88E+00	4.63E+00	25								
26	731	4.77E+00	2.88E+00	-4.86E+00	4.63E+00	26								
27	762	4.83E+00	2.93E+00	-4.87E+00	4.63E+00	27								
28	792	4.66E+00	2.84E+00	-4.85E+00	4.63E+00	28								
29	822	4.80E+00	2.82E+00	-4.87E+00	4.68E+00	29								
30	852	4.66E+00	2.85E+00	-4.87E+00	4.65E+00	30								
31	882	4.55E+00	2.98E+00	-4.85E+00	4.65E+00	31								
32	912	4.73E+00	2.90E+00	-4.86E+00	4.63E+00	32								
33	942	4.89E+00	3.00E+00	-4.85E+00	4.64E+00	33								
34	972	4.81E+00	2.87E+00	-4.88E+00	4.60E+00	34								
35	1002	4.64E+00	2.79E+00	-4.87E+00	4.60E+00	35								
36	1032	4.77E+00	2.86E+00	-4.89E+00	4.61E+00	36								
AVERAGE :		4.65E+00	2.87E+00	-4.91E+00	4.50E+00									
37	1061	4.65E+00	2.86E+00	-4.87E+00	4.59E+00	37								

Table 3.2.2 Experimental data of RUN <NNB03> (continue)

=============> RUN NO. (NNB03) >===============> DATE (92/03/10) >===

NO.	TIME(S)	Tw1	Tw2	Tw3	Tw4	Tw5	Tw6	Tw7	Tw8	Tg1	Tg2	Tg3	Tg4	Tg5	Tg6	Tg7	Tg8	Tg9	Tg10	Tg11	Tg12	NO.
1	-223	9.	9.	112.	109.	7.	9.	7.	7.	9.	10.	9.	9.	9.	9.	9.	9.	15.	11.	15.	11.	1
2	0	9.	9.	113.	109.	7.	9.	7.	7.	9.	11.	9.	9.	9.	9.	9.	9.	15.	10.	15.	11.	2
3	41	9.	9.	114.	110.	7.	9.	8.	7.	9.	11.	9.	10.	10.	9.	9.	9.	15.	10.	15.	11.	3
4	71	9.	9.	114.	110.	7.	9.	8.	7.	9.	11.	9.	10.	10.	9.	9.	9.	15.	10.	15.	11.	4
5	101	9.	9.	115.	111.	7.	10.	8.	7.	9.	11.	9.	10.	10.	9.	9.	9.	15.	10.	15.	11.	5
6	131	9.	9.	116.	112.	7.	10.	8.	7.	10.	11.	9.	10.	10.	9.	9.	9.	15.	11.	15.	11.	6
7	161	9.	9.	117.	113.	7.	10.	8.	7.	9.	11.	9.	10.	10.	9.	9.	9.	15.	10.	15.	11.	7
8	191	9.	9.	118.	113.	7.	10.	8.	7.	9.	11.	9.	10.	10.	9.	9.	9.	15.	11.	15.	11.	8
9	221	9.	9.	118.	114.	7.	10.	8.	7.	10.	11.	9.	10.	10.	9.	9.	9.	15.	11.	15.	11.	9
10	251	9.	9.	119.	115.	7.	10.	8.	7.	9.	11.	9.	10.	10.	9.	9.	9.	15.	11.	15.	11.	10
11	281	9.	9.	120.	115.	7.	10.	8.	7.	9.	11.	9.	10.	10.	9.	9.	9.	15.	10.	15.	11.	11
12	311	9.	9.	120.	115.	7.	10.	8.	7.	10.	11.	9.	10.	10.	9.	9.	9.	15.	10.	15.	11.	12
13	342	9.	9.	121.	117.	7.	10.	8.	7.	9.	11.	9.	10.	10.	9.	9.	9.	15.	10.	15.	11.	13
14	372	9.	9.	121.	117.	7.	10.	8.	7.	9.	11.	9.	10.	10.	9.	9.	9.	15.	11.	15.	11.	14
15	402	9.	9.	122.	118.	7.	10.	8.	7.	9.	11.	9.	10.	10.	9.	9.	9.	15.	11.	15.	11.	15
16	432	9.	9.	122.	119.	7.	10.	8.	7.	10.	11.	9.	10.	10.	9.	9.	9.	16.	11.	15.	11.	16
17	462	9.	9.	123.	119.	7.	10.	8.	7.	9.	11.	9.	10.	10.	9.	9.	9.	16.	10.	15.	11.	17
18	492	9.	9.	124.	120.	7.	10.	8.	7.	10.	11.	9.	10.	10.	9.	9.	9.	16.	11.	15.	11.	18
19	522	9.	9.	124.	120.	7.	10.	8.	7.	9.	11.	9.	10.	10.	9.	9.	9.	16.	10.	15.	11.	19
20	551	9.	9.	124.	121.	7.	10.	8.	7.	10.	11.	9.	10.	10.	9.	9.	9.	16.	10.	15.	11.	20
21	581	9.	9.	124.	120.	7.	10.	8.	7.	9.	11.	9.	10.	10.	9.	9.	9.	16.	10.	15.	11.	21
22	611	9.	9.	125.	121.	7.	10.	8.	7.	9.	11.	9.	10.	10.	9.	9.	9.	16.	10.	15.	11.	22
23	641	9.	9.	125.	122.	7.	10.	8.	7.	10.	11.	9.	10.	10.	9.	9.	9.	16.	11.	15.	11.	23
24	671	9.	9.	125.	122.	7.	10.	8.	7.	9.	11.	9.	10.	10.	9.	9.	9.	16.	10.	15.	11.	24
25	702	9.	9.	125.	121.	7.	10.	8.	7.	9.	11.	9.	10.	10.	9.	9.	9.	16.	11.	15.	11.	25
26	731	9.	9.	125.	121.	7.	10.	8.	7.	10.	11.	9.	10.	10.	9.	9.	9.	16.	11.	15.	11.	26
27	762	9.	9.	126.	123.	7.	10.	8.	7.	9.	11.	9.	10.	10.	9.	9.	9.	16.	10.	15.	11.	27
28	792	9.	9.	126.	122.	7.	10.	8.	7.	9.	11.	9.	10.	10.	9.	9.	9.	16.	10.	15.	11.	28
29	822	9.	9.	126.	123.	7.	10.	8.	7.	9.	11.	9.	10.	10.	9.	9.	9.	16.	11.	15.	11.	29
30	852	9.	9.	126.	123.	7.	10.	8.	7.	9.	11.	9.	10.	10.	9.	9.	9.	16.	10.	15.	10.	30
31	882	9.	9.	127.	123.	7.	10.	8.	7.	9.	11.	9.	10.	10.	9.	9.	9.	16.	11.	15.	11.	31
32	912	9.	9.	127.	123.	7.	10.	8.	7.	9.	11.	9.	10.	10.	9.	9.	9.	16.	10.	15.	10.	32
33	942	9.	9.	126.	124.	7.	10.	8.	7.	9.	11.	9.	10.	10.	9.	9.	9.	16.	10.	15.	10.	33
34	972	9.	9.	127.	123.	7.	11.	8.	7.	9.	11.	9.	10.	10.	9.	9.	9.	16.	10.	15.	10.	34
35	1002	9.	9.	127.	123.	7.	11.	8.	7.	9.	11.	9.	10.	10.	9.	9.	9.	16.	11.	15.	10.	35
36	1032	9.	9.	128.	124.	7.	11.	8.	7.	9.	11.	9.	10.	10.	9.	9.	9.	16.	10.	15.	10.	36
37	1061	9.	9.	128.	125.	7.	11.	8.	7.	9.	11.	9.	10.	10.	9.	9.	9.	16.	11.	15.	10.	37
AVERAGE :		9.	9.	122.	119.	7.	10.	8.	7.	9.	11.	9.	10.	10.	9.	9.	9.	15.	10.	15.	11.	

Table 3.2.2 Experimental data of RUN <NNB03> (continue)

NO.	TIME(S)	Tg13	Tg14	Tg15	Tg16	Tg17	Tg18	Tg19	Tg20	Tg21	Tg22	Tg23	Tg24	Tg25	Tg26	Tg27	Tg28	Tg29	Tg30	Tg31	NO.
1	-223	9.	424.	152.	424.	162.	7.	7.	8.	8.	10.	10.	101.	93.	9.	9.	15.	11.	15.	11.	1
2	0	9.	427.	153.	425.	161.	7.	7.	8.	9.	10.	10.	102.	94.	9.	9.	15.	10.	15.	11.	2
3	41	9.	434.	174.	435.	177.	7.	7.	9.	9.	11.	13.	105.	98.	9.	9.	15.	10.	15.	11.	3
4	71	9.	425.	174.	426.	177.	8.	7.	10.	10.	11.	14.	107.	102.	9.	9.	15.	10.	15.	11.	4
5	101	9.	426.	176.	427.	178.	7.	7.	10.	10.	11.	15.	108.	103.	9.	9.	15.	10.	15.	11.	5
6	131	9.	428.	177.	431.	182.	8.	7.	10.	10.	11.	15.	110.	106.	9.	9.	15.	11.	15.	11.	6
7	161	9.	432.	180.	434.	182.	7.	7.	10.	10.	11.	16.	113.	107.	9.	9.	15.	10.	15.	11.	7
8	191	9.	434.	183.	437.	184.	7.	7.	10.	10.	11.	16.	114.	109.	9.	9.	15.	11.	15.	11.	8
9	221	9.	436.	184.	438.	186.	8.	7.	10.	10.	12.	16.	116.	111.	9.	9.	15.	11.	15.	11.	9
10	251	9.	437.	185.	439.	187.	7.	7.	10.	10.	12.	16.	117.	111.	9.	9.	15.	11.	15.	11.	10
11	281	9.	438.	186.	438.	187.	7.	7.	10.	10.	12.	16.	118.	112.	9.	9.	15.	10.	15.	11.	11
12	311	9.	438.	186.	440.	188.	7.	7.	10.	10.	12.	16.	119.	113.	9.	9.	15.	10.	15.	11.	12
13	342	9.	439.	186.	440.	189.	7.	7.	10.	10.	12.	16.	120.	113.	9.	9.	15.	10.	15.	11.	13
14	372	9.	439.	188.	441.	189.	7.	7.	10.	10.	12.	16.	121.	114.	9.	9.	15.	11.	15.	11.	14
15	402	9.	439.	188.	441.	189.	7.	7.	10.	10.	12.	16.	121.	114.	9.	9.	15.	11.	15.	11.	15
16	432	9.	440.	189.	441.	190.	7.	7.	10.	10.	12.	16.	121.	114.	9.	9.	16.	11.	15.	11.	16
17	462	9.	440.	189.	441.	190.	7.	7.	10.	10.	12.	16.	121.	114.	9.	9.	16.	10.	15.	11.	17
18	492	9.	439.	190.	442.	192.	7.	7.	10.	10.	12.	16.	122.	114.	9.	9.	16.	11.	15.	11.	18
19	522	9.	440.	189.	442.	192.	7.	7.	10.	10.	12.	16.	123.	114.	9.	9.	16.	10.	15.	11.	19
20	551	9.	441.	189.	442.	192.	7.	7.	10.	10.	12.	16.	122.	114.	9.	9.	16.	10.	15.	11.	20
21	581	9.	441.	190.	442.	192.	7.	7.	10.	10.	12.	16.	123.	115.	9.	9.	16.	10.	15.	11.	21
22	611	9.	441.	191.	442.	192.	7.	7.	10.	10.	12.	16.	123.	115.	9.	9.	16.	10.	15.	11.	22
23	641	9.	441.	192.	443.	192.	7.	7.	10.	10.	12.	16.	123.	115.	9.	9.	16.	11.	15.	11.	23
24	671	9.	441.	192.	443.	193.	7.	7.	10.	10.	12.	16.	123.	115.	9.	9.	16.	10.	15.	11.	24
25	702	9.	440.	193.	442.	192.	7.	7.	10.	10.	12.	16.	123.	115.	9.	9.	16.	11.	15.	11.	25
26	731	9.	442.	192.	443.	193.	7.	7.	10.	10.	12.	16.	123.	115.	9.	9.	16.	11.	15.	11.	26
27	762	9.	442.	192.	443.	194.	7.	7.	10.	10.	12.	16.	124.	116.	9.	9.	16.	10.	15.	11.	27
28	792	9.	442.	192.	443.	193.	7.	7.	10.	10.	12.	16.	124.	117.	9.	9.	16.	10.	15.	11.	28
29	822	9.	441.	192.	443.	194.	7.	7.	10.	10.	12.	16.	124.	117.	9.	9.	16.	11.	15.	11.	29
30	852	9.	442.	193.	444.	194.	7.	7.	10.	10.	12.	16.	124.	117.	9.	9.	16.	10.	15.	10.	30
31	882	9.	442.	192.	443.	194.	7.	7.	10.	10.	12.	16.	124.	117.	9.	9.	16.	11.	15.	11.	31
32	912	9.	443.	193.	442.	195.	7.	7.	10.	10.	12.	16.	124.	116.	9.	9.	16.	10.	15.	10.	32
33	942	9.	443.	192.	443.	194.	7.	7.	10.	10.	12.	16.	124.	117.	9.	9.	16.	10.	15.	10.	33
34	972	9.	443.	194.	443.	194.	7.	7.	10.	10.	12.	16.	124.	116.	9.	9.	16.	10.	15.	10.	34
35	1002	9.	443.	193.	443.	194.	7.	7.	10.	10.	12.	16.	125.	117.	9.	9.	16.	11.	15.	10.	35
36	1032	9.	443.	193.	443.	195.	7.	7.	10.	10.	12.	16.	125.	117.	9.	9.	16.	10.	15.	10.	36
37	1061	9.	443.	194.	444.	195.	7.	7.	10.	10.	12.	16.	125.	116.	9.	9.	16.	11.	15.	10.	37
AVERAGE :		9.	438.	187.	440.	189.	7.	7.	10.	10.	12.	16.	119.	112.	9.	9.	15.	10.	15.	11.	

Table 3.2.3 Experimental data of RUN <NNB04>

=============> RUN NO. (NNB04) >==============> DATE (92/03/13) >===>

Tmix = 22 (min) dTmeas = 30 (s) Troom = 12 (C)

	P (V)	PA (V)	UF-1 (V)	UF-3 (V)	UF-4 (V)	UF-5 (V)
ZERO BEFORE :	9.9150E-01	4.4117E+00	1.0102E+00	9.3500E-04	4.6302E-02	-3.2680E-03

	R o2,in	R co2,in	R co,in	R o2,out	R co2,out	R co,out	F co/co2
AVERAGE MOLE FRACTION :	20.54	4.66	0.00	14.49	7.85	0.11	0.02

NO.	TIME (S)	Ptest (Pa)	Pabs (Pa)	Tem. (11-18) channel A (C)	Tem. (21-28) channel C (C)
1	-254	8.3482E+02	1.0214E+05	877./ 891./ 896./ 894./ 891./ 878./ 903./ 778.	881./ 891./ 896./ 898./ 900./ 903./ 895./ 808.
2	0	1.9123E+02	1.0214E+05	877./ 891./ 896./ 894./ 891./ 878./ 904./ 780.	881./ 891./ 896./ 899./ 901./ 904./ 896./ 809.
3	41	1.8388E+02	1.0214E+05	878./ 890./ 896./ 894./ 891./ 880./ 906./ 779.	883./ 891./ 896./ 898./ 901./ 904./ 895./ 808.
4	71	1.8143E+02	1.0213E+05	877./ 890./ 895./ 894./ 891./ 880./ 906./ 779.	884./ 892./ 896./ 899./ 902./ 906./ 894./ 808.
5	101	1.8388E+02	1.0213E+05	878./ 892./ 897./ 896./ 892./ 881./ 906./ 778.	882./ 892./ 897./ 902./ 904./ 907./ 893./ 805.
6	131	1.7775E+02	1.0213E+05	876./ 890./ 897./ 896./ 892./ 882./ 908./ 775.	884./ 891./ 898./ 903./ 905./ 907./ 890./ 802.
7	161	1.8388E+02	1.0213E+05	875./ 890./ 898./ 899./ 894./ 884./ 908./ 775.	883./ 892./ 899./ 905./ 906./ 907./ 889./ 800.
8	191	1.8266E+02	1.0212E+05	874./ 890./ 899./ 901./ 897./ 887./ 905./ 774.	882./ 892./ 900./ 906./ 907./ 907./ 888./ 809.
9	220	1.8510E+02	1.0212E+05	874./ 890./ 899./ 902./ 900./ 887./ 905./ 774.	882./ 892./ 900./ 907./ 908./ 909./ 889./ 800.
10	250	1.8266E+02	1.0212E+05	873./ 890./ 900./ 903./ 901./ 888./ 904./ 773.	881./ 892./ 901./ 908./ 908./ 909./ 888./ 800.
11	280	1.7775E+02	1.0212E+05	873./ 890./ 899./ 903./ 902./ 889./ 904./ 772.	882./ 892./ 901./ 908./ 909./ 911./ 890./ 800.
12	310	1.8266E+02	1.0212E+05	873./ 891./ 901./ 904./ 903./ 887./ 904./ 772.	880./ 892./ 902./ 909./ 910./ 912./ 890./ 800.
13	340	1.8020E+02	1.0212E+05	873./ 890./ 901./ 905./ 904./ 891./ 904./ 772.	881./ 892./ 903./ 909./ 911./ 913./ 889./ 799.
14	370	1.8020E+02	1.0212E+05	873./ 891./ 901./ 906./ 904./ 892./ 903./ 772.	880./ 893./ 903./ 911./ 912./ 914./ 889./ 799.
15	400	1.8143E+02	1.0212E+05	873./ 891./ 901./ 906./ 905./ 893./ 903./ 771.	881./ 893./ 903./ 910./ 912./ 915./ 889./ 799.
16	430	1.8266E+02	1.0212E+05	873./ 891./ 901./ 906./ 905./ 894./ 903./ 771.	880./ 893./ 904./ 911./ 912./ 915./ 888./ 798.
17	461	1.8510E+02	1.0212E+05	873./ 892./ 902./ 907./ 906./ 895./ 903./ 771.	879./ 893./ 904./ 912./ 913./ 917./ 888./ 798.
18	490	1.8266E+02	1.0212E+05	873./ 892./ 902./ 907./ 907./ 897./ 904./ 771.	880./ 893./ 904./ 911./ 913./ 917./ 888./ 798.
19	521	1.8633E+02	1.0212E+05	873./ 891./ 903./ 908./ 908./ 898./ 904./ 771.	881./ 894./ 905./ 912./ 914./ 919./ 888./ 798.
20	551	1.8143E+02	1.0212E+05	873./ 892./ 902./ 907./ 907./ 899./ 904./ 770.	872./ 893./ 904./ 913./ 913./ 919./ 888./ 796.
21	581	1.8510E+02	1.0212E+05	873./ 892./ 903./ 907./ 908./ 899./ 904./ 770.	880./ 894./ 905./ 912./ 914./ 920./ 887./ 796.
22	611	1.8266E+02	1.0212E+05	874./ 893./ 903./ 908./ 908./ 900./ 906./ 770.	880./ 894./ 905./ 913./ 915./ 921./ 889./ 797.
23	641	1.8388E+02	1.0212E+05	873./ 893./ 903./ 907./ 908./ 900./ 905./ 769.	881./ 892./ 905./ 912./ 915./ 921./ 888./ 796.
24	671	1.8388E+02	1.0212E+05	873./ 892./ 903./ 907./ 908./ 900./ 905./ 768.	879./ 894./ 904./ 913./ 915./ 922./ 888./ 795.
25	701	1.9369E+02	1.0212E+05	873./ 893./ 903./ 908./ 908./ 900./ 905./ 767.	878./ 894./ 905./ 913./ 915./ 922./ 887./ 794.
26	730	1.8879E+02	1.0212E+05	873./ 893./ 902./ 907./ 908./ 901./ 905./ 767.	881./ 894./ 905./ 912./ 915./ 922./ 886./ 793.
27	761	1.9246E+02	1.0212E+05	874./ 893./ 903./ 908./ 909./ 902./ 905./ 768.	880./ 895./ 905./ 914./ 916./ 923./ 887./ 793.
28	790	1.8756E+02	1.0212E+05	873./ 893./ 903./ 908./ 909./ 901./ 905./ 767.	879./ 894./ 905./ 913./ 915./ 922./ 885./ 791.
29	821	1.9123E+02	1.0212E+05	873./ 893./ 903./ 908./ 909./ 902./ 905./ 767.	879./ 894./ 905./ 913./ 916./ 923./ 886./ 791.
30	851	1.9001E+02	1.0212E+05	873./ 893./ 903./ 908./ 909./ 902./ 905./ 766.	880./ 894./ 905./ 913./ 915./ 922./ 885./ 790.
31	881	1.8756E+02	1.0212E+05	874./ 894./ 903./ 908./ 909./ 902./ 905./ 766.	878./ 894./ 905./ 913./ 915./ 923./ 885./ 790.
32	911	1.9246E+02	1.0212E+05	873./ 893./ 903./ 908./ 910./ 902./ 905./ 766.	879./ 895./ 906./ 913./ 916./ 923./ 885./ 789.
33	941	1.9246E+02	1.0212E+05	873./ 893./ 903./ 908./ 910./ 902./ 905./ 765.	880./ 895./ 906./ 913./ 916./ 923./ 884./ 789.
34	971	1.8756E+02	1.0212E+05	873./ 893./ 903./ 908./ 910./ 902./ 905./ 765.	878./ 894./ 905./ 913./ 915./ 922./ 884./ 788.
35	1001	1.9001E+02	1.0212E+05	873./ 893./ 903./ 908./ 910./ 903./ 905./ 765.	879./ 895./ 906./ 913./ 916./ 923./ 884./ 788.
36	1031	1.9246E+02	1.0212E+05	874./ 894./ 903./ 909./ 910./ 902./ 905./ 765.	878./ 895./ 905./ 914./ 916./ 923./ 884./ 788.
37	1061	1.9001E+02	1.0212E+05	873./ 893./ 903./ 908./ 910./ 903./ 906./ 765.	880./ 895./ 906./ 913./ 916./ 923./ 884./ 788.
38	1090	1.9001E+02	1.0212E+05	873./ 893./ 903./ 908./ 910./ 902./ 905./ 765.	880./ 895./ 905./ 913./ 916./ 923./ 884./ 788.
39	1121	1.8879E+02	1.0211E+05	874./ 894./ 904./ 915./ 911./ 903./ 906./ 765.	880./ 895./ 906./ 914./ 917./ 924./ 885./ 788.
40	1151	1.8879E+02	1.0211E+05	874./ 894./ 903./ 908./ 910./ 902./ 905./ 765.	879./ 895./ 906./ 913./ 916./ 924./ 884./ 787.
41	1181	1.8633E+02	1.0211E+05	873./ 894./ 903./ 908./ 911./ 903./ 905./ 764.	880./ 895./ 906./ 913./ 916./ 923./ 883./ 787.
42	1211	1.9123E+02	1.0211E+05	873./ 893./ 904./ 909./ 912./ 903./ 906./ 766.	880./ 896./ 907./ 914./ 917./ 924./ 884./ 787.
43	1241	1.8879E+02	1.0211E+05	873./ 894./ 903./ 909./ 911./ 902./ 906./ 764.	878./ 895./ 906./ 913./ 916./ 923./ 883./ 786.
44	1271	1.9246E+02	1.0211E+05	874./ 894./ 903./ 909./ 911./ 903./ 906./ 765.	880./ 895./ 906./ 914./ 917./ 924./ 884./ 787.
AVERAGE :		1.8630E+02	1.0212E+05	874./ 892./ 901./ 905./ 905./ 896./ 905./ 769.	880./ 894./ 903./ 910./ 912./ 918./ 887./ 795.
45	1300	1.8756E+02	1.0211E+05	874./ 894./ 903./ 909./ 911./ 902./ 906./ 765.	878./ 895./ 906./ 914./ 916./ 923./ 883./ 785.

Table 3.2.3 Experimental data of RUN <NNB04> (continue)

NO.	TIME (S)	UF-1 (m3/h)	UF-3 (m3/h)	UF-4 (m3/h)	UF-5 (m3/h)
1	-254	-4.70E-01	3.18E+00	-7.03E+00	-5.19E-03
2	0	-4.68E-01	3.21E+00	-6.99E+00	2.99E-01
3	41	3.48E+00	4.19E+00	-5.17E+00	4.32E+00
4	71	3.63E+00	4.41E+00	-5.18E+00	4.46E+00
5	101	3.86E+00	4.53E+00	-5.21E+00	4.51E+00
6	131	3.91E+00	4.56E+00	-5.22E+00	4.54E+00
7	161	4.13E+00	4.68E+00	-5.18E+00	4.57E+00
8	191	4.01E+00	4.66E+00	-5.14E+00	4.54E+00
9	220	4.05E+00	4.63E+00	-5.24E+00	4.62E+00
10	250	4.05E+00	4.65E+00	-5.19E+00	4.55E+00
11	280	4.08E+00	4.65E+00	-5.19E+00	4.59E+00
12	310	4.14E+00	4.46E+00	-5.20E+00	4.55E+00
13	340	4.14E+00	4.25E+00	-5.21E+00	4.60E+00
14	370	4.27E+00	4.26E+00	-5.19E+00	4.59E+00
15	400	4.14E+00	4.18E+00	-5.21E+00	4.56E+00
16	430	4.02E+00	4.35E+00	-5.24E+00	4.62E+00
17	461	4.12E+00	4.23E+00	-5.22E+00	4.60E+00
18	490	4.13E+00	4.26E+00	-5.23E+00	4.62E+00
19	521	4.15E+00	4.21E+00	-5.23E+00	4.59E+00
20	551	4.11E+00	4.14E+00	-5.22E+00	4.62E+00
21	581	4.22E+00	4.13E+00	-5.23E+00	4.62E+00
22	611	4.14E+00	4.32E+00	-5.21E+00	4.60E+00
23	641	4.08E+00	4.18E+00	-5.20E+00	4.58E+00
24	671	4.10E+00	4.10E+00	-5.17E+00	4.60E+00
25	701	4.10E+00	4.16E+00	-5.22E+00	4.67E+00
26	730	4.13E+00	4.17E+00	-5.19E+00	4.59E+00
27	761	4.16E+00	4.19E+00	-5.20E+00	4.59E+00
28	790	4.18E+00	4.22E+00	-5.20E+00	4.62E+00
29	821	4.19E+00	4.20E+00	-5.16E+00	4.59E+00
30	851	4.12E+00	4.26E+00	-5.18E+00	4.68E+00
31	881	4.25E+00	4.26E+00	-5.20E+00	4.62E+00
32	911	4.11E+00	4.21E+00	-5.21E+00	4.63E+00
33	941	4.22E+00	4.20E+00	-5.21E+00	4.63E+00
34	971	4.09E+00	4.25E+00	-5.15E+00	4.62E+00
35	1001	4.25E+00	4.23E+00	-5.16E+00	4.66E+00
36	1031	4.17E+00	4.20E+00	-5.14E+00	4.63E+00
37	1061	4.19E+00	4.17E+00	-5.18E+00	4.62E+00
38	1090	4.10E+00	4.23E+00	-5.13E+00	4.60E+00
39	1121	4.13E+00	4.25E+00	-5.15E+00	4.62E+00
40	1151	4.22E+00	4.10E+00	-5.17E+00	4.58E+00
41	1181	4.16E+00	4.18E+00	-5.17E+00	4.66E+00
42	1211	4.01E+00	4.13E+00	-5.14E+00	4.66E+00
43	1241	4.07E+00	4.13E+00	-5.16E+00	4.62E+00
44	1271	4.07E+00	4.16E+00	-5.13E+00	4.66E+00
AVERAGE :		3.99E+00	4.26E+00	-5.23E+00	4.50E+00
45	1300	4.13E+00	4.09E+00	-5.15E+00	4.67E+00

NO.	TIME(S)	Ro2In	Rco2In	RcoIn	Ro2out	Rco2out	Rcoout	Fco/co2
1	-100	0.01	0.09	0.04	0.62	0.02	0.00	0.00
2	20	19.59	0.07	0.00	0.03	0.09	0.09	0.93
3	140	19.70	2.35	0.00	14.72	4.38	0.13	0.03
4	260	19.80	3.70	0.00	15.75	6.42	0.12	0.02
5	380	20.60	4.44	0.00	15.27	7.49	0.12	0.02
6	500	20.75	4.88	0.00	14.71	8.11	0.11	0.01
7	620	20.78	4.91	0.00	14.38	8.50	0.11	0.01
8	740	20.76	5.22	0.00	14.08	8.74	0.11	0.01
9	860	20.84	5.44	0.00	13.92	8.91	0.10	0.01
10	980	20.82	5.49	0.00	13.79	9.03	0.10	0.01
11	1100	20.77	5.58	0.00	13.81	9.11	0.11	0.01
12	1220	20.78	5.67	0.00	13.75	9.19	0.10	0.01
13	1340	21.14	6.28	0.00	13.63	9.24	0.12	0.01
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Table 3.2.3 Experimental data of RUN <NNB04> (continue)

=============> RUN NO. (NNB04) >==============> DATE (92/03/13) >===

NO.	TIME(S)	Tw1	Tw2	Tw3	Tw4	Tw5	Tw6	Tw7	Tw8	Tg1	Tg2	Tg3	Tg4	Tg5	Tg6	Tg7	Tg8	Tg9	Tg10	Tg11	Tg12	NO.
1	-254	9.	9.	89.	85.	6.	9.	7.	6.	12.	11.	9.	9.	9.	9.	9.	10.	13.	10.	13.	11.	1
2	0	9.	9.	90.	85.	6.	9.	7.	6.	11.	11.	9.	9.	9.	9.	9.	10.	13.	10.	13.	11.	2
3	41	9.	9.	89.	85.	6.	9.	7.	6.	11.	12.	9.	10.	10.	9.	9.	10.	13.	10.	13.	11.	3
4	71	9.	9.	90.	86.	6.	9.	7.	6.	11.	12.	9.	10.	10.	9.	9.	10.	13.	10.	13.	11.	4
5	101	9.	9.	90.	86.	6.	9.	7.	6.	11.	13.	9.	10.	10.	9.	9.	10.	13.	10.	13.	11.	5
6	131	9.	9.	90.	86.	6.	9.	7.	6.	11.	13.	9.	11.	11.	9.	9.	10.	13.	10.	13.	11.	6
7	161	9.	9.	91.	86.	6.	9.	7.	6.	11.	13.	9.	11.	11.	9.	9.	9.	13.	10.	13.	11.	7
8	191	9.	9.	91.	87.	6.	10.	7.	6.	11.	13.	9.	11.	11.	9.	9.	10.	13.	10.	13.	11.	8
9	220	9.	9.	92.	88.	6.	10.	7.	6.	11.	13.	9.	11.	11.	9.	9.	10.	13.	10.	13.	11.	9
10	250	9.	9.	92.	88.	6.	10.	7.	6.	11.	13.	9.	11.	11.	9.	9.	10.	13.	11.	13.	11.	10
11	280	9.	9.	93.	88.	6.	10.	7.	6.	11.	13.	9.	11.	11.	9.	9.	9.	13.	10.	13.	11.	11
12	310	9.	9.	93.	89.	6.	10.	7.	6.	11.	13.	9.	11.	11.	9.	9.	9.	13.	10.	13.	11.	12
13	340	9.	9.	94.	89.	6.	10.	7.	6.	11.	13.	9.	11.	11.	9.	9.	10.	13.	10.	13.	11.	13
14	370	9.	9.	94.	89.	6.	10.	7.	6.	11.	13.	9.	11.	11.	9.	9.	9.	13.	10.	13.	11.	14
15	400	9.	9.	95.	90.	6.	10.	7.	6.	11.	13.	9.	11.	11.	9.	9.	10.	13.	10.	13.	11.	15
16	430	9.	9.	95.	91.	6.	10.	7.	6.	11.	13.	9.	11.	11.	9.	9.	9.	13.	10.	13.	11.	16
17	461	9.	9.	95.	91.	6.	10.	7.	6.	11.	13.	9.	11.	11.	9.	9.	9.	13.	10.	13.	11.	17
18	490	9.	9.	96.	91.	6.	10.	7.	6.	11.	13.	9.	11.	11.	9.	9.	10.	13.	10.	13.	11.	18
19	521	9.	9.	96.	91.	6.	10.	7.	6.	11.	13.	9.	11.	11.	9.	9.	9.	13.	10.	13.	11.	19
20	551	9.	9.	96.	92.	6.	10.	7.	6.	11.	13.	9.	11.	11.	9.	9.	9.	13.	10.	13.	11.	20
21	581	9.	9.	96.	92.	6.	10.	7.	6.	11.	13.	9.	11.	11.	9.	9.	9.	12.	10.	13.	11.	21
22	611	9.	9.	97.	93.	6.	10.	7.	6.	11.	13.	9.	11.	11.	9.	9.	9.	13.	10.	13.	11.	22
23	641	9.	9.	97.	93.	6.	10.	7.	6.	11.	13.	9.	11.	11.	9.	9.	9.	13.	10.	13.	11.	23
24	671	9.	9.	97.	93.	6.	10.	7.	6.	11.	13.	9.	11.	11.	9.	9.	9.	13.	10.	13.	11.	24
25	701	9.	9.	97.	93.	6.	10.	7.	6.	11.	13.	9.	11.	11.	9.	9.	9.	13.	10.	13.	11.	25
26	730	9.	9.	97.	94.	6.	10.	7.	6.	11.	13.	9.	11.	11.	9.	9.	9.	13.	10.	13.	11.	26
27	761	9.	9.	98.	93.	6.	10.	7.	6.	11.	13.	9.	11.	11.	9.	9.	9.	12.	10.	13.	11.	27
28	790	9.	9.	98.	93.	6.	10.	7.	6.	11.	13.	9.	11.	11.	9.	9.	9.	13.	10.	13.	11.	28
29	821	9.	9.	98.	94.	6.	10.	7.	6.	11.	13.	9.	11.	11.	9.	9.	9.	13.	10.	13.	11.	29
30	851	9.	9.	98.	94.	6.	10.	7.	6.	11.	13.	9.	11.	11.	9.	9.	9.	13.	10.	13.	11.	30
31	881	9.	9.	98.	94.	6.	10.	7.	6.	11.	13.	9.	11.	11.	9.	9.	9.	13.	10.	13.	11.	31
32	911	9.	9.	98.	95.	6.	10.	7.	6.	11.	13.	9.	11.	11.	9.	9.	9.	13.	10.	13.	11.	32
33	941	9.	9.	99.	95.	6.	10.	7.	6.	11.	13.	9.	11.	11.	9.	9.	9.	13.	10.	13.	11.	33
34	971	9.	9.	99.	95.	6.	10.	7.	6.	11.	13.	9.	11.	11.	9.	9.	9.	12.	10.	12.	11.	34
35	1001	9.	9.	99.	95.	6.	10.	7.	6.	11.	13.	9.	11.	11.	9.	9.	9.	13.	10.	13.	11.	35
36	1031	9.	9.	99.	95.	6.	10.	7.	6.	11.	13.	9.	11.	11.	9.	9.	9.	13.	10.	13.	11.	36
37	1061	9.	9.	99.	96.	6.	10.	7.	6.	11.	13.	9.	11.	11.	9.	9.	9.	12.	10.	12.	11.	37
38	1090	9.	9.	100.	95.	6.	10.	7.	6.	11.	13.	9.	11.	11.	9.	9.	9.	12.	10.	12.	11.	38
39	1121	9.	9.	99.	96.	6.	10.	7.	6.	11.	13.	9.	11.	11.	9.	9.	9.	12.	10.	12.	11.	39
40	1151	9.	9.	99.	95.	6.	10.	7.	6.	11.	13.	9.	11.	11.	9.	9.	9.	13.	10.	12.	11.	40
41	1181	9.	9.	100.	96.	6.	10.	7.	6.	11.	13.	9.	11.	11.	9.	9.	9.	12.	10.	13.	11.	41
42	1211	9.	9.	100.	96.	6.	10.	7.	6.	11.	13.	9.	11.	11.	9.	9.	9.	12.	10.	12.	11.	42
43	1241	9.	9.	100.	96.	6.	10.	7.	6.	11.	13.	9.	11.	11.	9.	9.	9.	12.	10.	12.	11.	43
44	1271	9.	9.	100.	96.	6.	10.	7.	6.	11.	13.	9.	11.	11.	9.	9.	9.	12.	10.	13.	11.	44
45	1300	9.	9.	100.	97.	6.	10.	7.	6.	11.	13.	9.	11.	11.	9.	9.	9.	12.	10.	12.	11.	45
AVERAGE :		9.	9.	96.	92.	6.	10.	7.	6.	11.	13.	9.	11.	11.	9.	9.	9.	13.	10.	13.	11.	

Table 3.2.3 Experimental data of RUN <NNB04> (continue)

NO.	TIME(S)	Tg13	Tg14	Tg15	Tg16	Tg17	Tg18	Tg19	Tg20	Tg21	Tg22	Tg23	Tg24	Tg25	Tg26	Tg27	Tg28	Tg29	Tg30	Tg31	NO.
1	-254	10.	334.	118.	331.	119.	6.	6.	7.	7.	8.	9.	83.	77.	9.	10.	13.	10.	13.	11.	1
2	0	10.	334.	118.	332.	119.	6.	6.	7.	7.	8.	9.	84.	77.	9.	10.	13.	10.	13.	11.	2
3	41	10.	308.	121.	307.	123.	6.	6.	8.	8.	9.	11.	84.	77.	9.	10.	13.	10.	13.	11.	3
4	71	10.	311.	124.	308.	125.	6.	6.	8.	8.	9.	12.	84.	78.	9.	10.	13.	10.	13.	11.	4
5	101	10.	314.	127.	313.	127.	6.	6.	8.	8.	9.	12.	86.	80.	9.	10.	13.	10.	13.	11.	5
6	131	9.	318.	127.	317.	128.	6.	6.	8.	8.	9.	12.	87.	81.	9.	10.	13.	10.	13.	11.	6
7	161	9.	321.	129.	320.	130.	6.	6.	8.	8.	9.	13.	88.	83.	9.	9.	13.	10.	13.	11.	7
8	191	10.	323.	131.	322.	130.	6.	6.	8.	8.	10.	13.	90.	84.	9.	10.	13.	10.	13.	11.	8
9	220	10.	325.	132.	325.	132.	6.	6.	9.	8.	10.	13.	91.	86.	9.	10.	13.	10.	13.	11.	9
10	250	10.	326.	132.	327.	133.	6.	6.	9.	9.	10.	13.	92.	87.	9.	10.	13.	11.	13.	11.	10
11	280	9.	328.	134.	328.	133.	6.	6.	9.	9.	10.	13.	93.	88.	9.	9.	13.	10.	13.	11.	11
12	310	10.	330.	134.	329.	133.	6.	6.	9.	9.	10.	13.	94.	89.	9.	9.	13.	10.	13.	11.	12
13	340	10.	331.	134.	329.	135.	6.	6.	9.	9.	10.	13.	95.	89.	9.	10.	13.	10.	13.	11.	13
14	370	9.	332.	135.	330.	134.	6.	6.	9.	9.	10.	13.	95.	89.	9.	9.	13.	10.	13.	11.	14
15	400	10.	332.	136.	331.	135.	6.	6.	9.	9.	10.	13.	96.	89.	9.	10.	13.	10.	13.	11.	15
16	430	9.	333.	135.	332.	135.	6.	6.	9.	9.	10.	13.	96.	90.	9.	9.	13.	10.	13.	11.	16
17	461	9.	334.	136.	333.	137.	6.	6.	9.	9.	10.	13.	96.	90.	9.	9.	13.	10.	13.	11.	17
18	490	10.	335.	137.	333.	136.	6.	6.	9.	9.	10.	13.	97.	90.	9.	10.	13.	10.	13.	11.	18
19	521	9.	335.	137.	334.	137.	6.	6.	9.	9.	10.	13.	98.	91.	9.	9.	13.	10.	13.	11.	19
20	551	9.	335.	137.	334.	137.	6.	6.	9.	9.	10.	13.	98.	91.	9.	9.	13.	10.	13.	11.	20
21	581	9.	336.	138.	334.	139.	6.	6.	9.	9.	10.	13.	98.	92.	9.	9.	12.	10.	13.	11.	21
22	611	9.	336.	139.	335.	139.	6.	6.	9.	9.	10.	14.	98.	92.	9.	9.	13.	10.	13.	11.	22
23	641	9.	336.	138.	335.	139.	6.	6.	9.	9.	10.	13.	99.	92.	9.	9.	13.	10.	13.	11.	23
24	671	9.	337.	139.	336.	140.	6.	6.	9.	9.	10.	13.	99.	92.	9.	9.	13.	10.	13.	11.	24
25	701	9.	337.	139.	336.	140.	6.	6.	9.	9.	10.	13.	99.	93.	9.	9.	13.	10.	13.	11.	25
26	730	9.	338.	139.	337.	140.	6.	6.	9.	9.	10.	13.	99.	92.	9.	9.	13.	10.	13.	11.	26
27	761	9.	338.	140.	336.	140.	6.	6.	9.	9.	10.	13.	99.	92.	9.	9.	12.	10.	13.	11.	27
28	790	9.	338.	141.	337.	140.	6.	6.	9.	9.	10.	13.	99.	92.	9.	9.	13.	10.	13.	11.	28
29	821	9.	338.	140.	337.	140.	6.	6.	9.	9.	10.	13.	99.	93.	9.	9.	13.	10.	13.	11.	29
30	851	9.	339.	140.	337.	140.	6.	6.	9.	9.	10.	13.	99.	93.	9.	9.	13.	10.	13.	11.	30
31	881	9.	338.	140.	337.	141.	6.	6.	9.	9.	10.	13.	99.	93.	9.	9.	13.	10.	13.	11.	31
32	911	9.	338.	140.	338.	140.	6.	6.	9.	9.	10.	14.	100.	93.	9.	9.	13.	10.	13.	11.	32
33	941	9.	338.	140.	338.	141.	6.	6.	9.	9.	10.	13.	100.	93.	9.	9.	13.	10.	13.	11.	33
34	971	9.	339.	141.	337.	140.	6.	6.	9.	9.	10.	14.	100.	93.	9.	9.	12.	10.	12.	11.	34
35	1001	9.	339.	139.	337.	142.	6.	6.	9.	9.	10.	14.	100.	93.	9.	9.	13.	10.	13.	11.	35
36	1031	9.	339.	140.	337.	141.	6.	6.	9.	9.	10.	14.	100.	93.	9.	9.	13.	10.	13.	11.	36
37	1061	9.	340.	141.	337.	142.	6.	6.	9.	9.	10.	13.	100.	93.	9.	9.	12.	10.	12.	11.	37
38	1090	9.	339.	141.	338.	142.	6.	6.	9.	9.	10.	13.	100.	93.	9.	9.	12.	10.	12.	11.	38
39	1121	9.	339.	141.	338.	143.	6.	6.	9.	9.	10.	14.	100.	93.	9.	9.	12.	10.	12.	11.	39
40	1151	9.	339.	141.	339.	142.	6.	6.	9.	9.	10.	14.	100.	92.	9.	9.	13.	10.	12.	11.	40
41	1181	9.	340.	141.	338.	142.	6.	6.	9.	9.	10.	14.	100.	93.	9.	9.	12.	10.	13.	11.	41
42	1211	9.	339.	142.	339.	142.	6.	6.	9.	9.	10.	14.	100.	93.	9.	9.	12.	10.	12.	11.	42
43	1241	9.	339.	141.	339.	142.	6.	6.	9.	9.	10.	14.	100.	93.	9.	9.	12.	10.	12.	11.	43
44	1271	9.	338.	142.	338.	142.	6.	6.	9.	9.	10.	14.	100.	94.	9.	9.	12.	10.	13.	11.	44
45	1300	9.	339.	141.	339.	144.	6.	6.	9.	9.	10.	14.	101.	94.	9.	9.	12.	10.	12.	11.	45
AVERAGE :		9.	333.	136.	332.	137.	6.	6.	9.	9.	10.	13.	96.	90.	9.	9.	13.	10.	13.	11.	

Table 3.2.4 Experimental data of RUN <NNB05>

=============> RUN NO. (NNB05) >==============> DATE (92/09/07) >===>

Tmix = 26 (min) dTmeas = 30 (s) Troom = 24 (C)

	P (V)	PA (V)	UF-1 (V)	UF-3 (V)	UF-4 (V)	UF-5 (V)
ZERO BEFORE :	9.9954E-01	4.3836E+00	1.0250E+00	1.6058E-02	-7.3320E-04	-1.7280E-03

	R o2,in	R co2,in	R co,in	R o2,out	R co2,out	R co,out	F co/co2
AVERAGE MOLE FRACTION :	28.76	6.69	0.00	11.43	10.55	0.00	0.00

NO.	TIME (S)	Ptest (Pa)	Pabs (Pa)	Tem. (11-18) channel A (C)			Tem. (21-28) channel C (C)	
1	-157	-1.5373E+02	1.0147E+05	0./1197./1202./	0./1205./1200./1195./1119.	1185./	0./1207./1208./1209./1204./	0./1146.
2	0	-8.4488E+02	1.0146E+05	0./1197./1204./	0./1204./1204./1193./1118.	1182./	0./1207./1207./1209./1200./	0./1144.
3	50	-8.4537E+02	1.0146E+05	0./1197./1202./	0./1206./1202./1195./1120.	1185./	0./1208./1208./1211./1204./	0./1146.
4	80	-8.4414E+02	1.0146E+05	0./1199./1204./	0./1210./1204./1199./1121.	1187./	0./1208./1209./1215./1210./	0./1146.
5	110	-8.4316E+02	1.0147E+05	0./1198./1207./	0./1208./1212./1194./1121.	1184./	0./1207./1210./1208./1207./	0./1148.
6	140	-8.4488E+02	1.0147E+05	0./1201./1210./	0./1212./1211./1200./1122.	1189./	0./1209./1211./1216./1217./	0./1146.
7	171	-8.4341E+02	1.0147E+05	0./1200./1211./	0./1213./1218./1197./1121.	1186./	0./1208./1212./1211./1213./	0./1148.
8	201	-8.4414E+02	1.0148E+05	0./1200./1211./	0./1215./1216./1199./1121.	1189./	0./1209./1212./1216./1217./	0./1147.
9	231	-8.4659E+02	1.0147E+05	0./1200./1206./	0./1215./1214./1197./1121.	1187./	0./1211./1213./1220./1220./	0./1148.
10	261	-8.4610E+02	1.0147E+05	0./1200./1212./	0./1212./1222./1196./1119.	1186./	0./1209./1213./1213./1218./	0./1148.
11	291	-8.4683E+02	1.0147E+05	0./1199./1206./	0./1213./1218./1194./1119.	1184./	0./1211./1214./1218./1219./	0./1147.
12	321	-8.4586E+02	1.0147E+05	0./1202./1213./	0./1215./1220./1190./1119.	1188./	0./1209./1214./1217./1222./	0./1146.
13	350	-8.4659E+02	1.0147E+05	0./1200./1207./	0./1212./1218./1195./1118.	1186./	0./1212./1214./1220./1220./	0./1147.
14	380	-8.4635E+02	1.0147E+05	0./1202./1206./	0./1214./1217./1195./1118.	1187./	0./1211./1214./1220./1221./	0./1146.
15	410	-8.4586E+02	1.0147E+05	0./1202./1207./	0./1215./1216./1196./1118.	1188./	0./1211./1214./1221./1223./	0./1145.
16	440	-8.4463E+02	1.0146E+05	0./1203./1208./	0./1215./1216./1198./1117.	1189./	0./1211./1214./1220./1224./	0./1143.
17	471	-8.4635E+02	1.0147E+05	0./1203./1207./	0./1216./1216./1197./1116.	1188./	0./1211./1214./1221./1223./	0./1143.
18	501	-8.4463E+02	1.0147E+05	0./1201./1211./	0./1211./1222./1193./1115.	1185./	0./1210./1214./1214./1217./	0./1145.
19	531	-8.4365E+02	1.0147E+05	0./1200./1211./	0./1211./1223./1194./1115.	1185./	0./1208./1213./1213./1218./	0./1144.
20	561	-8.4635E+02	1.0147E+05	0./1200./1209./	0./1211./1221./1193./1114.	1184./	0./1211./1214./1216./1217./	0./1144.
21	590	-8.4635E+02	1.0147E+05	0./1200./1209./	0./1211./1221./1192./1114.	1184./	0./1210./1214./1215./1217./	0./1144.
22	620	-8.4513E+02	1.0147E+05	0./1202./1213./	0./1212./1223./1196./1114.	1187./	0./1209./1213./1216./1222./	0./1142.
23	650	-8.4733E+02	1.0147E+05	0./1201./1206./	0./1214./1219./1193./1113.	1185./	0./1211./1214./1219./1220./	0./1141.
24	680	-8.4733E+02	1.0147E+05	0./1201./1207./	0./1213./1221./1192./1112.	1184./	0./1211./1214./1215./1217./	0./1144.
25	710	-8.4513E+02	1.0147E+05	0./1201./1210./	0./1211./1222./1192./1112.	1185./	0./1210./1214./1214./1217./	0./1143.
26	740	-8.4610E+02	1.0147E+05	0./1201./1211./	0./1212./1223./1193./1111.	1185./	0./1209./1214./1213./1218./	0./1141.
27	771	-8.4537E+02	1.0147E+05	0./1203./1209./	0./1215./1217./1197./1112.	1190./	0./1211./1213./1221./1224./	0./1139.
28	801	-8.4292E+02	1.0147E+05	0./1202./1207./	0./1216./1216./1196./1112.	1189./	0./1211./1214./1220./1223./	0./1139.
29	830	-8.4513E+02	1.0147E+05	0./1203./1208./	0./1216./1217./1196./1112.	1189./	0./1210./1213./1220./1224./	0./1138.
30	860	-8.4242E+02	1.0147E+05	0./1205./1208./	0./1216./1217./1193./1111.	1190./	0./1211./1213./1220./1224./	0./1138.
31	890	-8.4120E+02	1.0147E+05	0./1204./1211./	0./1215./1220./1197./1110.	1190./	0./1209./1213./1217./1224./	0./1137.
32	920	-8.4683E+02	1.0147E+05	0./1202./1206./	0./1213./1219./1192./1110.	1186./	0./1211./1214./1219./1219./	0./1139.
33	950	-8.4855E+02	1.0147E+05	0./1201./1206./	0./1212./1219./1191./1109.	1186./	0./1211./1214./1219./1220./	0./1138.
34	980	-8.5027E+02	1.0147E+05	0./1201./1207./	0./1216./1217./1194./1110.	1188./	0./1211./1214./1221./1223./	0./1138.
35	1010	-8.4513E+02	1.0147E+05	0./1203./1212./	0./1213./1223./1192./1108.	1187./	0./1209./1214./1213./1219./	0./1137.
36	1040	-8.4488E+02	1.0147E+05	0./1202./1207./	0./1215./1215./1193./1109.	1184./	0./1212./1214./1221./1221./	0./1137.
37	1070	-8.4537E+02	1.0147E+05	0./1203./1212./	0./1213./1223./1193./1108.	1187./	0./1209./1213./1214./1220./	0./1135.
38	1100	-8.4708E+02	1.0147E+05	0./1202./1212./	0./1213./1223./1191./1107.	1185./	0./1209./1214./1213./1218./	0./1138.
39	1130	-8.4439E+02	1.0147E+05	0./1203./1213./	0./1213./1223./1193./1107.	1188./	0./1209./1213./1216./1223./	0./1135.
40	1160	-8.4683E+02	1.0147E+05	0./1202./1209./	0./1213./1221./1189./1107.	1185./	0./1211./1214./1218./1218./	0./1135.
41	1190	-8.4463E+02	1.0147E+05	0./1199./1212./	0./1208./1224./1191./1106.	1186./	0./1209./1213./1212./1218./	0./1135.
42	1220	-8.4414E+02	1.0147E+05	0./1201./1209./	0./1211./1221./1189./1106.	1185./	0./1211./1214./1216./1217./	0./1134.
43	1250	-8.4683E+02	1.0146E+05	0./1203./1207./	0./1216./1216./1193./1106.	1189./	0./1212./1214./1222./1224./	0./1133.
44	1280	-8.4635E+02	1.0146E+05	0./1203./1210./	0./1216./1218./1195./1106.	1190./	0./1210./1213./1219./1225./	0./1131.
45	1310	-8.4683E+02	1.0146E+05	0./1204./1213./	0./1214./1222./1193./1105.	1188./	0./1209./1213./1216./1222./	0./1132.
46	1340	-8.4904E+02	1.0146E+05	0./1202./1208./	0./1215./1216./1193./1106.	1188./	0./1211./1213./1221./1224./	0./1132.
47	1370	-8.4610E+02	1.0146E+05	0./1203./1212./	0./1212./1223./1191./1104.	1186./	0./1209./1213./1214./1220./	0./1131.
48	1400	-8.4708E+02	1.0146E+05	0./1203./1212./	0./1214./1220./1193./1104.	1189./	0./1209./1213./1217./1224./	0./1130.
49	1431	-8.4708E+02	1.0147E+05	0./1201./1210./	0./1212./1222./1188./1104.	1184./	0./1210./1214./1215./1217./	0./1133.
50	1461	-8.4708E+02	1.0146E+05	0./1202./1212./	0./1212./1223./1190./1104.	1186./	0./1209./1214./1213./1218./	0./1132.
51	1491	-8.4733E+02	1.0146E+05	0./1201./1211./	0./1212./1223./1189./1103.	1185./	0./1209./1214./1214./1217./	0./1132.
52	1520	-8.4806E+02	1.0146E+05	0./1199./1206./	0./1213./1220./1188./1103.	1184./	0./1211./1214./1219./1219./	0./1131.
AVERAGE :		-8.4577E+02	1.0147E+05	0./1201./1209./	0./1213./1218./1194./1112.	1186./	0./1210./1213./1217./1219./	0./1140.
53	1550	-8.4757E+02	1.0146E+05	0./1202./1207./	0./1215./1216./1192./1104.	1188./	0./1211./1214./1222./1224./	0./1129.

Table 3.2.4 Experimental data of RUN <NNB05> (continue)

NO.	TIME (S)	UF-1 (m3/h)	UF-3 (m3/h)	UF-4 (m3/h)	UF-5 (m3/h)
1	-157	-6.00E-03	3.96E+00	-8.27E+00	-1.50E-02
2	0	9.63E-01	4.19E+00	-7.91E+00	1.02E+00
3	50	4.79E+00	5.32E+00	-6.49E+00	4.32E+00
4	80	4.83E+00	5.26E+00	-6.35E+00	4.50E+00
5	110	4.91E+00	5.22E+00	-6.35E+00	4.57E+00
6	140	4.93E+00	5.11E+00	-6.36E+00	4.59E+00
7	171	4.95E+00	4.97E+00	-6.37E+00	4.59E+00
8	201	5.14E+00	4.99E+00	-6.33E+00	4.65E+00
9	231	4.99E+00	4.98E+00	-6.36E+00	4.60E+00
10	261	4.97E+00	5.04E+00	-6.37E+00	4.65E+00
11	291	5.11E+00	5.02E+00	-6.37E+00	4.63E+00
12	321	4.92E+00	5.06E+00	-6.36E+00	4.61E+00
13	350	5.02E+00	5.00E+00	-6.32E+00	4.64E+00
14	380	4.88E+00	5.01E+00	-6.34E+00	4.65E+00
15	410	4.79E+00	5.03E+00	-6.38E+00	4.61E+00
16	440	4.79E+00	5.04E+00	-6.36E+00	4.62E+00
17	471	4.75E+00	5.03E+00	-6.37E+00	4.61E+00
18	501	4.82E+00	5.06E+00	-6.36E+00	4.64E+00
19	531	4.73E+00	5.10E+00	-6.37E+00	4.65E+00
20	561	4.82E+00	5.01E+00	-6.35E+00	4.66E+00
21	590	4.73E+00	5.05E+00	-6.31E+00	4.60E+00
22	620	4.69E+00	5.06E+00	-6.39E+00	4.63E+00
23	650	4.73E+00	5.04E+00	-6.35E+00	4.68E+00
24	680	4.70E+00	5.07E+00	-6.35E+00	4.59E+00
25	710	4.66E+00	4.98E+00	-6.36E+00	4.62E+00
26	740	4.69E+00	5.00E+00	-6.40E+00	4.60E+00
27	771	4.68E+00	4.99E+00	-6.35E+00	4.64E+00
28	801	4.78E+00	5.08E+00	-6.37E+00	4.64E+00
29	830	4.66E+00	4.99E+00	-6.39E+00	4.65E+00
30	860	4.65E+00	5.05E+00	-6.38E+00	4.63E+00
31	890	4.60E+00	5.04E+00	-6.37E+00	4.64E+00
32	920	4.59E+00	5.03E+00	-6.38E+00	4.62E+00
33	950	4.52E+00	5.02E+00	-6.34E+00	4.61E+00
34	980	4.48E+00	5.04E+00	-6.36E+00	4.64E+00
35	1010	4.55E+00	5.08E+00	-6.37E+00	4.64E+00
36	1040	4.56E+00	5.01E+00	-6.36E+00	4.67E+00
37	1070	4.54E+00	5.01E+00	-6.38E+00	4.67E+00
38	1100	4.39E+00	5.03E+00	-6.38E+00	4.65E+00
39	1130	4.44E+00	5.02E+00	-6.36E+00	4.63E+00
40	1160	4.45E+00	4.98E+00	-6.35E+00	4.67E+00
41	1190	4.47E+00	5.07E+00	-6.36E+00	4.65E+00
42	1220	4.55E+00	5.00E+00	-6.37E+00	4.64E+00
43	1250	4.38E+00	5.06E+00	-6.37E+00	4.64E+00
44	1280	4.36E+00	4.99E+00	-6.37E+00	4.59E+00
45	1310	4.36E+00	5.00E+00	-6.36E+00	4.63E+00
46	1340	4.31E+00	5.04E+00	-6.39E+00	4.63E+00
47	1370	4.38E+00	4.99E+00	-6.34E+00	4.61E+00
48	1400	4.37E+00	5.04E+00	-6.37E+00	4.64E+00
49	1431	4.32E+00	4.99E+00	-6.34E+00	4.63E+00
50	1461	4.25E+00	5.00E+00	-6.39E+00	4.64E+00
51	1491	4.29E+00	5.00E+00	-6.35E+00	4.58E+00
52	1520	4.36E+00	5.02E+00	-6.38E+00	4.64E+00
AVERAGE :		4.58E+00	5.02E+00	-6.40E+00	4.55E+00
53	1550	4.28E+00	5.02E+00	-6.36E+00	4.61E+00

NO.	TIME (S)	Ro2in	Rco2in	Rcoin	Ro2out	Rco2out	Rcoout	Fco/co2
1	-100	0.00	0.03	9.71	5.83	0.00	0.00	99.99
2	20	15.14	0.03	5.48	0.11	0.00	6.72	99.99
3	140	27.78	4.63	0.00	10.73	8.33	0.00	0.00
4	260	28.77	6.38	0.00	11.44	10.25	0.00	0.00
5	380	29.02	6.72	0.00	11.51	10.61	0.00	0.00
6	500	28.90	6.83	0.00	11.54	10.73	0.00	0.00
7	620	28.92	6.71	0.00	11.51	10.75	0.00	0.00
8	740	28.78	7.00	0.00	11.52	10.80	0.00	0.00
9	860	28.64	6.97	0.00	11.54	10.83	0.00	0.00
10	980	29.39	6.90	0.00	11.52	10.84	0.00	0.00
11	1100	28.44	6.95	0.00	11.50	10.85	0.00	0.00
12	1220	28.46	7.15	0.00	11.49	10.87	0.00	0.00
13	1340	28.94	6.92	0.00	11.42	10.88	0.00	0.00
14	1460	29.04	7.17	0.00	11.48	10.89	0.00	0.00
15	1580	20.70	10.78	0.00	11.53	10.89	0.00	0.00
16	1700	4.05	19.71	0.00	11.51	10.91	0.00	0.00

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Table 3.2.4 Experimental data of RUN <NNB05> (continue)

=============> RUN NO. (NNB05) >==============> DATE (92/09/07) >==

NO.	TIME(S)	Tw1	Tw2	Tw3	Tw4	Tw5	Tw6	Tw7	Tw8	Tg1	Tg2	Tg3	Tg4	Tg5	Tg6	Tg7	Tg8	Tg9	Tg10	Tg11	Tg12	NO.
1	-157	27.	27.	135.	130.	23.	24.	23.	23.	23.	25.	27.	27.	27.	27.	27.	27.	36.	28.	35.	28.	1
2	0	27.	27.	134.	130.	23.	24.	23.	23.	24.	26.	27.	27.	27.	27.	27.	27.	36.	28.	35.	28.	2
3	50	27.	27.	138.	134.	23.	25.	24.	23.	25.	25.	27.	26.	26.	27.	27.	27.	36.	28.	35.	28.	3
4	80	27.	27.	140.	134.	23.	25.	24.	23.	25.	25.	27.	26.	26.	27.	27.	27.	36.	28.	35.	28.	4
5	110	27.	27.	140.	135.	23.	25.	24.	23.	25.	25.	27.	26.	26.	27.	27.	27.	36.	28.	35.	28.	5
6	140	27.	27.	142.	137.	23.	25.	24.	23.	25.	25.	27.	26.	26.	27.	27.	27.	36.	28.	35.	28.	6
7	171	27.	27.	143.	137.	23.	25.	24.	23.	25.	25.	27.	26.	26.	27.	27.	27.	36.	28.	35.	28.	7
8	201	27.	27.	144.	138.	23.	25.	24.	23.	25.	25.	27.	26.	26.	27.	27.	27.	36.	28.	35.	28.	8
9	231	27.	27.	145.	140.	23.	25.	24.	23.	25.	25.	27.	26.	26.	27.	27.	27.	36.	28.	35.	28.	9
10	261	27.	27.	146.	140.	23.	25.	24.	23.	25.	25.	27.	26.	26.	27.	27.	27.	36.	28.	35.	28.	10
11	291	27.	27.	146.	142.	23.	25.	24.	23.	25.	25.	27.	26.	26.	27.	27.	27.	36.	28.	35.	28.	11
12	321	27.	27.	147.	142.	23.	26.	24.	23.	25.	25.	27.	26.	26.	27.	27.	27.	36.	28.	35.	28.	12
13	350	27.	27.	147.	142.	23.	26.	24.	23.	25.	24.	27.	26.	26.	27.	27.	27.	36.	28.	35.	28.	13
14	380	27.	27.	149.	143.	23.	26.	24.	23.	25.	24.	27.	26.	26.	27.	27.	27.	36.	28.	35.	28.	14
15	410	27.	27.	149.	143.	23.	26.	24.	23.	25.	24.	27.	26.	26.	27.	27.	27.	36.	28.	35.	28.	15
16	440	27.	27.	150.	143.	23.	26.	24.	23.	25.	25.	27.	26.	26.	27.	27.	27.	36.	29.	35.	28.	16
17	471	27.	27.	150.	144.	23.	26.	24.	23.	25.	25.	27.	26.	26.	27.	27.	27.	36.	28.	35.	28.	17
18	501	27.	27.	150.	145.	23.	26.	24.	23.	25.	25.	27.	26.	26.	27.	27.	27.	36.	28.	35.	28.	18
19	531	27.	27.	151.	145.	23.	26.	24.	23.	25.	25.	27.	26.	26.	27.	27.	27.	36.	28.	35.	28.	19
20	561	27.	27.	152.	146.	23.	26.	24.	23.	25.	25.	27.	26.	26.	27.	27.	27.	36.	28.	35.	28.	20
21	590	27.	27.	152.	146.	23.	26.	24.	23.	25.	25.	27.	26.	26.	27.	27.	27.	36.	28.	35.	28.	21
22	620	27.	27.	153.	147.	23.	26.	24.	23.	25.	25.	27.	26.	26.	27.	27.	27.	36.	28.	35.	28.	22
23	650	27.	27.	152.	147.	23.	26.	24.	23.	25.	25.	27.	26.	26.	27.	27.	27.	36.	28.	35.	28.	23
24	680	27.	27.	152.	148.	23.	26.	24.	23.	25.	24.	27.	26.	26.	27.	27.	27.	36.	28.	35.	28.	24
25	710	27.	27.	152.	147.	23.	26.	24.	23.	25.	24.	27.	26.	26.	27.	27.	27.	36.	28.	35.	28.	25
26	740	27.	27.	151.	147.	23.	26.	24.	23.	25.	24.	27.	26.	25.	27.	27.	27.	36.	28.	35.	28.	26
27	771	27.	27.	152.	148.	23.	26.	24.	23.	25.	24.	27.	26.	25.	27.	27.	27.	36.	28.	35.	28.	27
28	801	27.	27.	153.	148.	23.	26.	24.	23.	25.	24.	27.	26.	25.	27.	27.	27.	36.	28.	35.	28.	28
29	830	27.	27.	153.	148.	23.	26.	24.	23.	25.	24.	27.	26.	25.	27.	27.	27.	36.	28.	35.	28.	29
30	860	27.	27.	153.	148.	23.	26.	24.	23.	25.	24.	27.	26.	25.	27.	27.	27.	36.	28.	35.	28.	30
31	890	27.	27.	154.	149.	23.	26.	24.	23.	25.	24.	27.	26.	26.	27.	27.	27.	36.	28.	35.	28.	31
32	920	27.	27.	154.	149.	23.	26.	24.	23.	25.	24.	27.	26.	25.	27.	27.	27.	36.	28.	35.	28.	32
33	950	27.	27.	155.	150.	23.	26.	24.	23.	25.	24.	27.	26.	25.	27.	27.	27.	36.	28.	35.	28.	33
34	980	27.	27.	154.	149.	23.	26.	24.	23.	25.	24.	27.	26.	25.	27.	27.	27.	36.	28.	35.	28.	34
35	1010	27.	27.	154.	149.	23.	26.	24.	23.	25.	24.	27.	26.	25.	27.	27.	27.	36.	28.	35.	28.	35
36	1040	27.	27.	155.	151.	23.	26.	24.	23.	25.	24.	27.	26.	26.	27.	27.	27.	36.	28.	35.	28.	36
37	1070	27.	27.	155.	150.	23.	26.	24.	23.	25.	24.	27.	26.	25.	27.	27.	27.	36.	28.	35.	28.	37
38	1100	27.	27.	156.	150.	23.	26.	24.	23.	25.	24.	27.	26.	26.	27.	27.	27.	36.	28.	35.	28.	38
39	1130	27.	27.	156.	150.	23.	26.	24.	23.	25.	24.	27.	26.	26.	27.	27.	27.	36.	28.	35.	28.	39
40	1160	27.	27.	156.	150.	23.	26.	24.	23.	25.	24.	27.	26.	26.	27.	27.	27.	36.	28.	35.	28.	40
41	1190	27.	27.	156.	150.	23.	26.	24.	23.	25.	24.	27.	26.	26.	27.	27.	27.	36.	28.	35.	28.	41
42	1220	27.	27.	156.	151.	23.	26.	24.	23.	25.	24.	27.	26.	26.	27.	27.	27.	36.	28.	35.	28.	42
43	1250	27.	27.	156.	150.	23.	26.	24.	23.	25.	25.	27.	26.	26.	27.	27.	27.	36.	28.	35.	28.	43
44	1280	27.	27.	156.	150.	23.	26.	24.	23.	25.	24.	27.	26.	25.	27.	27.	27.	36.	28.	35.	28.	44
45	1310	27.	27.	157.	151.	23.	26.	24.	23.	25.	24.	27.	26.	26.	27.	27.	27.	36.	28.	35.	28.	45
46	1340	27.	27.	157.	151.	23.	26.	24.	23.	25.	24.	27.	26.	25.	27.	27.	27.	36.	28.	35.	28.	46
47	1370	27.	27.	156.	151.	23.	26.	24.	23.	25.	24.	26.	26.	25.	27.	27.	27.	36.	28.	35.	28.	47
48	1400	27.	27.	157.	151.	23.	26.	24.	23.	25.	24.	27.	26.	25.	27.	27.	27.	36.	28.	35.	28.	48
49	1431	27.	27.	156.	152.	23.	26.	24.	23.	25.	24.	27.	26.	26.	27.	27.	27.	36.	28.	35.	28.	49
50	1461	27.	27.	155.	152.	23.	26.	24.	23.	25.	24.	27.	25.	25.	27.	27.	27.	36.	28.	35.	28.	50
51	1491	27.	27.	155.	153.	23.	26.	24.	23.	25.	24.	27.	25.	25.	27.	27.	27.	36.	28.	35.	28.	51
52	1520	27.	27.	155.	151.	23.	26.	24.	23.	25.	24.	27.	25.	25.	27.	27.	27.	36.	28.	35.	28.	52
53	1550	27.	27.	156.	152.	23.	26.	24.	23.	25.	24.	26.	25.	25.	27.	27.	27.	36.	28.	35.	28.	53
AVERAGE :		27.	27.	151.	146.	23.	26.	24.	23.	25.	24.	27.	26.	26.	27.	27.	27.	36.	28.	35.	28.	54

Table 3.2.4 Experimental data of RUN <NNB05> (continue)

NO.	TIME(S)	Tg13	Tg14	Tg15	Tg16	Tg17	Tg18	Tg19	Tg20	Tg21	Tg22	Tg23	Tg24	Tg25	Tg26	Tg27	Tg28	Tg29	Tg30	Tg31	NO.
1	-157	27.	477.	181.	473.	184.	23.	23.	24.	24.	25.	25.	113.	109.	27.	27.	36.	28.	35.	28.	1
2	0	27.	476.	181.	473.	183.	23.	23.	24.	24.	25.	25.	114.	110.	27.	27.	36.	28.	35.	28.	2
3	50	27.	580.	217.	574.	221.	23.	23.	25.	25.	26.	28.	125.	124.	27.	27.	36.	28.	35.	28.	3
4	80	27.	492.	206.	494.	209.	23.	23.	25.	26.	27.	29.	126.	124.	27.	27.	36.	28.	35.	28.	4
5	110	27.	478.	205.	480.	207.	23.	23.	25.	26.	26.	30.	127.	124.	27.	27.	36.	28.	35.	28.	5
6	140	27.	478.	208.	479.	208.	23.	23.	25.	25.	27.	30.	128.	124.	27.	27.	36.	28.	35.	28.	6
7	171	27.	480.	208.	482.	211.	23.	23.	25.	26.	27.	30.	130.	126.	27.	27.	36.	28.	35.	28.	7
8	201	27.	483.	211.	483.	212.	23.	23.	26.	26.	27.	31.	131.	127.	27.	27.	36.	28.	35.	28.	8
9	231	27.	484.	212.	485.	213.	23.	23.	26.	26.	27.	31.	133.	128.	27.	27.	36.	28.	35.	28.	9
10	261	27.	486.	214.	485.	215.	23.	23.	26.	26.	27.	31.	134.	128.	27.	27.	36.	28.	35.	28.	10
11	291	27.	486.	215.	487.	215.	23.	23.	26.	26.	27.	31.	134.	129.	27.	27.	36.	28.	35.	28.	11
12	321	27.	487.	215.	488.	215.	23.	23.	26.	26.	27.	31.	135.	129.	27.	27.	36.	28.	35.	28.	12
13	350	27.	487.	216.	488.	216.	23.	23.	26.	26.	27.	31.	135.	129.	27.	27.	36.	28.	35.	28.	13
14	380	27.	488.	217.	489.	217.	23.	23.	26.	26.	27.	31.	136.	131.	27.	27.	36.	28.	35.	28.	14
15	410	27.	487.	218.	489.	217.	23.	23.	26.	26.	27.	31.	136.	131.	27.	27.	36.	28.	35.	28.	15
16	440	27.	488.	218.	489.	217.	23.	23.	26.	26.	27.	31.	136.	131.	27.	27.	36.	28.	35.	28.	16
17	471	27.	488.	218.	488.	219.	23.	23.	26.	26.	27.	31.	137.	132.	27.	27.	36.	28.	35.	28.	17
18	501	27.	488.	219.	489.	218.	23.	23.	26.	26.	27.	31.	137.	132.	27.	27.	36.	28.	35.	28.	18
19	531	27.	488.	219.	490.	219.	23.	23.	26.	26.	27.	31.	137.	133.	27.	27.	36.	28.	35.	28.	19
20	561	27.	488.	220.	490.	220.	23.	23.	26.	26.	27.	31.	137.	133.	27.	27.	36.	28.	35.	28.	20
21	590	27.	489.	219.	489.	221.	23.	23.	26.	26.	27.	31.	138.	133.	27.	27.	36.	28.	35.	28.	21
22	620	27.	490.	222.	489.	221.	23.	23.	26.	26.	27.	31.	138.	131.	27.	27.	36.	28.	35.	28.	22
23	650	27.	490.	221.	488.	220.	23.	23.	26.	26.	27.	31.	138.	132.	27.	27.	36.	28.	35.	28.	23
24	680	27.	488.	221.	490.	221.	23.	23.	26.	26.	27.	31.	138.	132.	27.	27.	36.	28.	35.	28.	24
25	710	27.	489.	222.	490.	222.	23.	23.	26.	26.	27.	31.	138.	132.	27.	27.	36.	28.	35.	28.	25
26	740	27.	489.	221.	490.	222.	23.	23.	26.	26.	27.	31.	138.	132.	27.	27.	36.	28.	35.	28.	26
27	771	27.	488.	221.	490.	222.	23.	23.	26.	26.	27.	31.	138.	132.	27.	27.	36.	28.	35.	28.	27
28	801	27.	488.	222.	490.	223.	23.	23.	26.	26.	27.	31.	138.	133.	27.	27.	36.	28.	35.	28.	28
29	830	27.	489.	222.	490.	223.	23.	23.	26.	26.	27.	31.	138.	133.	27.	27.	36.	28.	35.	28.	29
30	860	27.	488.	223.	490.	222.	23.	23.	26.	26.	27.	31.	138.	132.	27.	27.	36.	28.	35.	28.	30
31	890	27.	489.	222.	491.	222.	23.	23.	26.	26.	27.	31.	138.	133.	27.	27.	36.	28.	35.	28.	31
32	920	27.	490.	221.	490.	223.	23.	23.	26.	26.	27.	31.	138.	134.	27.	27.	36.	28.	35.	28.	32
33	950	27.	490.	222.	490.	223.	23.	23.	26.	26.	27.	31.	138.	134.	27.	27.	36.	28.	35.	28.	33
34	980	27.	489.	222.	490.	224.	23.	23.	26.	26.	27.	31.	138.	133.	27.	27.	36.	28.	35.	28.	34
35	1010	27.	490.	222.	491.	223.	23.	23.	26.	26.	27.	31.	139.	133.	27.	27.	36.	28.	35.	28.	35
36	1040	27.	489.	223.	490.	224.	23.	23.	26.	26.	27.	31.	138.	133.	27.	27.	36.	28.	35.	28.	36
37	1070	27.	490.	222.	490.	223.	23.	23.	26.	26.	27.	31.	139.	133.	27.	27.	36.	28.	35.	28.	37
38	1100	27.	489.	222.	490.	223.	23.	23.	26.	26.	27.	31.	139.	133.	27.	27.	36.	28.	35.	28.	38
39	1130	27.	490.	223.	490.	224.	23.	23.	26.	26.	27.	31.	139.	133.	27.	27.	36.	28.	35.	28.	39
40	1160	27.	490.	223.	491.	224.	23.	23.	26.	26.	27.	31.	139.	133.	27.	27.	36.	28.	35.	28.	40
41	1190	27.	491.	222.	490.	223.	23.	23.	26.	26.	27.	31.	139.	133.	27.	27.	36.	28.	35.	28.	41
42	1220	27.	489.	223.	490.	224.	23.	23.	26.	26.	27.	31.	139.	133.	27.	27.	36.	28.	35.	28.	42
43	1250	27.	490.	222.	491.	224.	23.	23.	26.	26.	27.	31.	139.	132.	27.	27.	36.	28.	35.	28.	43
44	1280	27.	490.	223.	491.	223.	23.	23.	26.	26.	27.	31.	139.	133.	27.	27.	36.	28.	35.	28.	44
45	1310	27.	489.	223.	490.	223.	23.	23.	26.	26.	27.	31.	139.	132.	27.	27.	36.	28.	35.	28.	45
46	1340	27.	490.	222.	491.	224.	23.	23.	26.	26.	27.	31.	140.	133.	27.	27.	36.	28.	35.	28.	46
47	1370	27.	490.	223.	490.	224.	23.	23.	26.	26.	27.	31.	140.	133.	27.	27.	36.	28.	35.	28.	47
48	1400	27.	489.	223.	491.	225.	23.	23.	26.	26.	27.	31.	140.	134.	27.	27.	36.	28.	35.	28.	48
49	1431	27.	490.	223.	491.	224.	23.	23.	26.	26.	27.	31.	140.	134.	27.	27.	36.	28.	35.	28.	49
50	1461	27.	491.	223.	491.	224.	23.	23.	26.	26.	27.	31.	140.	133.	27.	27.	36.	28.	35.	28.	50
51	1491	27.	491.	223.	490.	225.	23.	23.	26.	26.	27.	31.	140.	133.	27.	27.	36.	28.	35.	28.	51
52	1520	27.	490.	223.	490.	225.	23.	23.	26.	26.	27.	31.	140.	134.	27.	27.	36.	28.	35.	28.	52
53	1550	27.	490.	223.	490.	224.	23.	23.	26.	26.	27.	32.	140.	134.	27.	27.	36.	28.	35.	28.	53
AVERAGE :		27.	490.	219.	490.	219.	23.	23.	26.	26.	27.	31.	136.	131.	27.	27.	36.	28.	35.	28.	54

Table 3.2.5 Experimental data of RUN <NNU01>

===========> RUN NO. (NNU01) >=============> DATE (92/03/24) >===>

Tmix = 20 (min) dTmeas = 30 (s) Troom = 12 (C)

ZERO	P (V)	PA (V)	UF-1 (V)	UF-3 (V)	UF-4 (V)	UF-5 (V)
BEFORE :	9.9266E-01	4.3865E+00	1.0143E+00	-2.2186E-02	-2.4840E-03	1.8300E-04

AVERAGE	R o2,in	R co2,in	R co,in	R o2,out	R co2,out	R co,out	F co/co2
MOLE FRACTION :	12.07	6.69	0.02	10.52	9.29	0.04	0.01

NO.	TIME (S)	Ptest (Pa)	Pabs (Pa)	Tem. (11-18) channel A (C)	Tem. (21-28) channel C (C)
1	-175	8.5689E+02	1.0143E+05	1024./1042./1053./ 142./1049./1041./1024./ 893.	8./ 9./ 10./ 10./ 10./ 9./ 8./ 8.
2	0	2.9424E+01	1.0144E+05	1025./1041./1053./ 143./1051./1042./1023./ 891.	10./ 9./ 9./ 10./ 10./ 10./ 9./ 9.
3	40	2.4522E+01	1.0143E+05	1025./1042./1054./ 140./1048./1041./1024./ 893.	9./ 9./ 10./ 9./ 10./ 10./ 10./ 9.
4	71	2.8197E+01	1.0144E+05	1023./1041./1049./ 130./1045./1043./1030./ 894.	10./ 9./ 9./ 9./ 9./ 8./ 8./ 8.
5	100	2.2067E+01	1.0143E+05	1024./1042./1055./ 139./1048./1043./1027./ 893.	9./ 34./ 9./ 9./ 9./ 8./ 8./ 8.
6	130	2.6969E+01	1.0143E+05	1023./1042./1052./ 131./1047./1045./1027./ 891.	8./ 9./ 10./ 5./ 10./ 10./ 10./ 9.
7	160	2.9424E+01	1.0144E+05	1025./1039./1053./ 144./1058./1052./1022./ 888.	10./ 9./ 11./ 9./ 8./ 9./ 11./ 12.
8	191	2.9424E+01	1.0143E+05	1024./1043./1054./ 132./1049./1049./1027./ 889.	9./ 8./ 9./ 8./ 10./ 9./ 9./ 8.
9	220	2.5742E+01	1.0144E+05	1023./1038./1048./ 136./1059./1058./1026./ 887.	11./ 10./ 9./ 8./ 8./ 9./ 9./ 9.
10	251	2.6969E+01	1.0144E+05	1023./1043./1055./ 131./1050./1051./1025./ 887.	10./ 9./ 10./ 9./ 10./ 9./ 9./ 8.
11	281	2.8197E+01	1.0145E+05	1024./1042./1057./ 144./1059./1054./1019./ 886.	11./ 10./ 9./ 9./ 9./ 10./ 10./ 10.
12	310	2.3294E+01	1.0144E+05	1026./1044./1059./ 144./1058./1053./1018./ 886.	9./ 10./ 10./ 10./ 10./ 9./ 9./ 9.
13	340	2.4522E+01	1.0145E+05	1027./1044./1058./ 144./1059./1055./1018./ 885.	11./ 10./ 9./ 9./ 9./ 8./ 8./ 9.
14	370	3.0652E+01	1.0145E+05	1028./1044./1058./ 144./1061./1057./1018./ 885.	10./ 10./ 10./ 10./ 10./ 10./ 10./ 10.
15	401	2.5742E+01	1.0145E+05	1027./1043./1051./ 130./1054./1060./1027./ 886.	9./ 9./ 9./ 10./ 10./ 9./ 9./ 9.
16	431	2.6969E+01	1.0146E+05	1025./1040./1050./ 138./1062./1064./1022./ 884.	9./ 10./ 9./ 9./ 9./ 10./ 10./ 10.
17	461	2.9424E+01	1.0146E+05	1026./1041./1051./ 141./1063./1064./1021./ 884.	9./ 9./ 9./ 10./ 10./ 11./ 10./ 10.
18	490	2.8197E+01	1.0146E+05	1027./1043./1057./ 144./1062./1058./1017./ 883.	8./ 8./ 8./ 9./ 8./ 10./ 10./ 8.
19	520	3.0652E+01	1.0146E+05	1027./1046./1056./ 131./1053./1057./1024./ 884.	7./ 8./ 9./ 9./ 10./ 10./ 11./ 8.
20	551	3.0652E+01	1.0147E+05	1025./1041./1051./ 140./1063./1065./1021./ 883.	11./ 10./ 10./ 9./ 9./ 10./ 10./ 10.
21	580	2.5742E+01	1.0147E+05	1024./1044./1053./ 129./1053./1058./1024./ 884.	8./ 7./ 9./ 9./ 10./ 9./ 8./ 7.
22	611	2.9424E+01	1.0147E+05	1023./1043./1051./ 130./1054./1061./1025./ 884.	8./ 8./ 10./ 10./ 11./ 10./ 9./ 9.
23	640	2.8197E+01	1.0147E+05	1023./1041./1049./ 137./1062./1066./1022./ 882.	10./ 10./ 10./ 10./ 9./ 10./ 9./ 10.
24	670	2.6969E+01	1.0147E+05	1024./1045./1056./ 131./1053./1058./1023./ 883.	7./ 7./ 8./ 9./ 9./ 9./ 9./ 9.
25	700	2.9424E+01	1.0148E+05	1023./1045./1056./ 131./1053./1058./1023./ 883.	8./ 8./ 8./ 9./ 10./ 10./ 9./ 8.
26	731	2.8197E+01	1.0147E+05	1023./1041./1049./ 136./1063./1066./1023./ 882.	9./ 9./ 9./ 10./ 9./ 10./ 10./ 11.
27	761	2.6969E+01	1.0148E+05	1024./1046./1058./ 134./1053./1057./1021./ 882.	9./ 8./ 9./ 9./ 8./ 9./ 9./ 9.
28	791	2.9424E+01	1.0148E+05	1024./1045./1055./ 132./1053./1059./1023./ 882.	8./ 9./ 9./ 9./ 10./ 10./ 9./ 8.
29	821	2.6969E+01	1.0148E+05	1023./1046./1056./ 133./1053./1059./1023./ 882.	10./ 9./ 9./ 9./ 10./ 12./ 9./ 10.
30	851	2.5742E+01	1.0147E+05	1023./1043./1051./ 131./1054./1062./1025./ 883.	9./ 10./ 6./ 9./ 9./ 10./ 10./ 9.
31	881	2.6969E+01	1.0148E+05	1023./1045./1054./ 131./1053./1059./1024./ 882.	6./ 6./ 7./ 9./ 10./ 10./ 10./ 9.
32	911	3.0652E+01	1.0148E+05	1023./1045./1057./ 133./1053./1059./1023./ 882.	7./ 7./ 7./ 8./ 10./ 10./ 10./ 9.
33	940	2.5742E+01	1.0148E+05	1025./1045./1058./ 146./1062./1061./1017./ 881.	11./ 10./ 10./ 9./ 19./ 9./ 9./ 10.
34	971	2.2067E+01	1.0148E+05	1027./1047./1059./ 145./1058./1058./1017./ 881.	8./ 9./ 10./ 10./ 11./ 10./ 9./ 8.
35	1001	2.6969E+01	1.0148E+05	1027./1046./1055./ 133./1053./1059./1024./ 882.	9./ 9./ 9./ 9./ 10./ 11./ 8./ 8.
36	1030	2.8197E+01	1.0148E+05	1027./1045./1057./ 146./1062./1060./1017./ 881.	8./ 9./ 9./ 10./ 11./ 11./ 10./ 10.
37	1060	2.9424E+01	1.0148E+05	1027./1042./1050./ 141./1062./1067./1023./ 880.	9./ 9./ 9./ 9./ 9./ 9./ 9./ 9.
38	1091	2.8197E+01	1.0148E+05	1027./1043./1056./ 147./1063./1061./1017./ 880.	10./ 9./ 8./ 9./ 8./ 10./ 10./ 8.
39	1120	3.1872E+01	1.0149E+05	1028./1044./1056./ 147./1062./1060./1017./ 880.	10./ 9./ 9./ 9./ 9./ 9./ 10./ 9.
40	1151	2.3294E+01	1.0149E+05	1027./1047./1057./ 136./1053./1058./1023./ 881.	9./ 9./ 10./ 9./ 10./ 8./ 8./ 7.
AVERAGE :		2.7474E+01	1.0146E+05	1025./1043./1054./ 137./1056./1057./1022./ 885.	9./ 10./ 9./ 9./ 10./ 10./ 9./ 9.
41	1180	2.9424E+01	1.0149E+05	1025./1044./1051./ 133./1055./1063./1026./ 882.	11./ 11./ 8./ 9./ 9./ 9./ 9./ 9.

Table 3.2.5 Experimental data of RUN <NNU01> (continue)

NO.	TIME (S)	UF-1 (m3/h)	UF-3 (m3/h)	UF-4 (m3/h)	UF-5 (m3/h)
1	-175	-6.46E-01	5.81E+00	-3.66E+00	-4.03E-02
2	0	-6.45E-01	5.81E+00	-3.73E+00	2.11E-01
3	40	6.88E-01	5.76E+00	-2.98E+00	1.72E+00
4	71	8.10E-01	6.02E+00	-3.01E+00	1.70E+00
5	100	8.40E-01	5.98E+00	-3.04E+00	1.74E+00
6	130	8.74E-01	5.90E+00	-2.99E+00	1.78E+00
7	160	8.88E-01	5.94E+00	-2.98E+00	1.81E+00
8	191	9.05E-01	5.98E+00	-2.98E+00	1.85E+00
9	220	9.48E-01	5.89E+00	-2.99E+00	1.86E+00
10	251	8.91E-01	5.76E+00	-2.95E+00	1.88E+00
11	281	9.61E-01	5.92E+00	-2.91E+00	1.89E+00
12	310	9.92E-01	5.77E+00	-2.91E+00	1.88E+00
13	340	9.07E-01	5.91E+00	-2.90E+00	1.91E+00
14	370	9.66E-01	5.97E+00	-2.90E+00	1.92E+00
15	401	9.87E-01	5.99E+00	-2.74E+00	1.93E+00
16	431	1.03E+00	5.93E+00	-2.87E+00	1.91E+00
17	461	1.07E+00	5.90E+00	-2.91E+00	1.91E+00
18	490	1.02E+00	5.82E+00	-2.84E+00	1.94E+00
19	520	1.08E+00	5.93E+00	-2.87E+00	1.96E+00
20	551	1.03E+00	5.81E+00	-2.88E+00	1.96E+00
21	580	1.02E+00	5.93E+00	-2.86E+00	1.95E+00
22	611	9.72E-01	5.93E+00	-2.88E+00	1.96E+00
23	640	1.07E+00	5.81E+00	-2.89E+00	1.97E+00
24	670	1.08E+00	5.74E+00	-2.89E+00	1.96E+00
25	700	9.73E-01	5.81E+00	-2.87E+00	1.97E+00
26	731	1.04E+00	5.93E+00	-2.86E+00	1.97E+00
27	761	9.46E-01	5.79E+00	-2.83E+00	1.98E+00
28	791	9.92E-01	5.96E+00	-2.86E+00	1.98E+00
29	821	9.95E-01	5.95E+00	-2.88E+00	1.98E+00
30	851	1.01E+00	5.87E+00	-2.84E+00	1.96E+00
31	881	9.99E-01	5.89E+00	-2.84E+00	1.96E+00
32	911	1.02E+00	5.98E+00	-2.84E+00	1.98E+00
33	940	9.48E-01	5.94E+00	-2.84E+00	1.99E+00
34	971	1.04E+00	5.84E+00	-2.84E+00	1.99E+00
35	1001	9.38E-01	5.91E+00	-2.83E+00	1.97E+00
36	1030	9.65E-01	5.95E+00	-2.82E+00	1.99E+00
37	1060	9.30E-01	6.01E+00	-2.89E+00	1.99E+00
38	1091	9.36E-01	5.90E+00	-2.87E+00	1.98E+00
39	1120	1.01E+00	5.83E+00	-2.85E+00	1.99E+00
40	1151	9.86E-01	5.86E+00	-2.85E+00	1.99E+00
	AVERAGE :	9.26E-01	5.89E+00	-2.91E+00	1.88E+00
41	1180	1.05E+00	5.95E+00	-2.84E+00	1.99E+00

NO.	TIME(S)	Ro2in	Rco2in	Rcoin	Ro2out	Rco2out	Rcoout	Fco/co2
1	-100	0.00	0.25	1.05	0.97	0.00	0.00	99.99
2	20	3.89	0.21	0.92	0.01	0.24	1.37	5.77
3	140	8.69	2.28	0.19	7.28	3.84	0.20	0.05
4	260	11.14	4.83	0.00	9.91	6.99	0.04	0.01
5	380	12.67	6.29	0.00	10.71	9.01	0.03	0.00
6	500	12.65	7.25	0.00	11.09	10.13	0.03	0.00
7	620	12.65	7.93	0.00	11.29	10.74	0.03	0.00
8	740	13.07	8.14	0.00	11.27	11.05	0.03	0.00
9	860	12.93	8.34	0.00	11.28	11.25	0.01	0.00
10	980	12.78	8.46	0.00	11.34	11.34	0.01	0.00
11	1100	12.33	8.49	0.00	11.35	11.38	0.00	0.00
12	1220	12.01	9.55	0.00	11.31	11.44	0.03	0.00
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Table 3.2.5 Experimental data of RUN <NNU01> (continue)

============> RUN NO. (NNU01) >==============> DATE (92/03/24) >==

NO.	TIME(S)	Tw1	Tw2	Tw3	Tw4	Tw5	Tw6	Tw7	Tw8	Tg1	Tg2	Tg3	Tg4	Tg5	Tg6	Tg7	Tg8	Tg9	Tg10	Tg11	Tg12	NO.
1	-175	10.	10.	12.	97.	9.	11.	9.	9.	13.	12.	10.	10.	10.	10.	10.	10.	10.	10.	15.	12.	1
2	0	10.	10.	13.	97.	9.	11.	9.	9.	12.	12.	10.	10.	10.	10.	10.	10.	10.	10.	15.	11.	2
3	40	10.	10.	12.	97.	9.	11.	9.	9.	13.	12.	10.	10.	10.	10.	10.	10.	10.	10.	15.	11.	3
4	71	10.	10.	12.	98.	9.	11.	9.	9.	13.	13.	10.	11.	10.	10.	10.	10.	10.	10.	15.	12.	4
5	100	10.	10.	12.	99.	9.	11.	9.	9.	13.	13.	10.	11.	10.	10.	10.	10.	10.	10.	15.	12.	5
6	130	10.	10.	13.	98.	9.	11.	9.	9.	13.	13.	10.	11.	10.	10.	10.	10.	10.	10.	15.	12.	6
7	160	10.	10.	13.	99.	9.	12.	9.	9.	13.	13.	10.	11.	10.	10.	10.	10.	10.	10.	15.	12.	7
8	191	10.	10.	12.	100.	9.	12.	9.	9.	13.	13.	10.	11.	10.	10.	10.	10.	10.	10.	15.	12.	8
9	220	10.	10.	13.	100.	9.	12.	9.	9.	13.	13.	10.	11.	10.	10.	10.	10.	10.	10.	15.	12.	9
10	251	10.	10.	12.	101.	9.	12.	9.	9.	13.	13.	10.	11.	10.	10.	10.	10.	10.	10.	14.	12.	10
11	281	10.	10.	13.	102.	9.	12.	9.	9.	13.	13.	10.	11.	10.	10.	10.	10.	10.	10.	15.	12.	11
12	310	10.	10.	13.	102.	9.	12.	9.	9.	13.	13.	10.	11.	10.	10.	10.	10.	10.	10.	15.	12.	12
13	340	10.	10.	13.	103.	9.	12.	9.	9.	13.	13.	10.	11.	10.	10.	10.	10.	10.	10.	15.	12.	13
14	370	10.	10.	13.	103.	9.	12.	9.	9.	13.	13.	10.	11.	10.	10.	10.	10.	10.	10.	15.	12.	14
15	401	10.	10.	13.	104.	9.	12.	9.	9.	13.	13.	10.	11.	10.	10.	10.	10.	10.	10.	15.	12.	15
16	431	10.	10.	13.	104.	9.	12.	9.	9.	13.	13.	10.	11.	10.	10.	10.	10.	10.	10.	15.	12.	16
17	461	10.	10.	13.	105.	9.	12.	9.	9.	13.	13.	10.	11.	10.	10.	10.	10.	10.	10.	15.	12.	17
18	490	10.	10.	13.	105.	9.	12.	9.	9.	13.	13.	10.	11.	10.	10.	10.	10.	10.	10.	15.	12.	18
19	520	10.	10.	13.	105.	9.	12.	9.	9.	13.	13.	10.	11.	10.	10.	10.	10.	10.	10.	15.	12.	19
20	551	10.	10.	13.	106.	9.	12.	9.	9.	13.	13.	10.	11.	10.	10.	10.	10.	10.	10.	15.	12.	20
21	580	10.	10.	12.	106.	9.	12.	9.	9.	13.	13.	10.	11.	10.	10.	10.	10.	10.	10.	15.	12.	21
22	611	10.	10.	12.	107.	9.	12.	9.	9.	13.	13.	10.	11.	10.	10.	10.	10.	10.	10.	15.	12.	22
23	640	10.	10.	13.	107.	9.	12.	9.	9.	13.	13.	10.	11.	10.	10.	10.	10.	10.	10.	15.	12.	23
24	670	10.	10.	13.	108.	9.	12.	9.	9.	13.	13.	10.	11.	10.	10.	10.	10.	10.	10.	15.	12.	24
25	700	10.	10.	12.	107.	9.	12.	9.	9.	13.	13.	10.	11.	10.	10.	10.	10.	10.	10.	15.	12.	25
26	731	10.	10.	12.	108.	9.	12.	9.	9.	13.	13.	10.	11.	10.	10.	10.	10.	10.	10.	15.	12.	26
27	761	10.	10.	13.	109.	9.	12.	9.	9.	13.	13.	10.	11.	10.	10.	10.	10.	10.	10.	15.	12.	27
28	791	10.	10.	12.	109.	9.	12.	9.	9.	13.	13.	10.	11.	10.	10.	10.	10.	10.	10.	15.	12.	28
29	821	10.	10.	13.	109.	9.	12.	9.	9.	13.	13.	10.	11.	10.	10.	10.	10.	10.	10.	15.	12.	29
30	851	10.	10.	13.	110.	9.	12.	9.	9.	13.	13.	10.	11.	10.	10.	10.	10.	10.	10.	15.	12.	30
31	881	10.	10.	12.	109.	9.	12.	9.	9.	13.	13.	10.	11.	10.	10.	10.	10.	10.	10.	15.	12.	31
32	911	10.	10.	12.	110.	9.	12.	9.	9.	13.	13.	10.	11.	10.	10.	10.	10.	10.	10.	15.	12.	32
33	940	10.	10.	13.	110.	9.	12.	9.	9.	13.	13.	10.	11.	10.	10.	10.	10.	10.	10.	15.	12.	33
34	971	10.	10.	12.	111.	9.	12.	9.	9.	13.	13.	10.	11.	10.	10.	10.	10.	10.	10.	15.	12.	34
35	1001	10.	10.	12.	111.	9.	12.	9.	9.	13.	13.	10.	11.	10.	10.	10.	10.	10.	10.	15.	12.	35
36	1030	10.	10.	12.	112.	9.	12.	9.	9.	13.	13.	10.	11.	10.	10.	10.	10.	10.	10.	15.	12.	36
37	1060	10.	10.	12.	111.	9.	12.	9.	9.	13.	13.	10.	11.	10.	10.	10.	10.	10.	10.	15.	12.	37
38	1091	10.	10.	12.	111.	9.	12.	9.	9.	13.	13.	10.	11.	10.	10.	10.	10.	10.	10.	15.	12.	38
39	1120	10.	10.	12.	111.	9.	12.	9.	9.	13.	13.	10.	11.	10.	10.	10.	10.	10.	10.	15.	12.	39
40	1151	10.	10.	12.	111.	9.	12.	9.	9.	13.	13.	10.	11.	10.	10.	10.	10.	10.	10.	15.	12.	40
41	1180	10.	10.	12.	111.	9.	12.	9.	9.	13.	13.	10.	11.	10.	10.	10.	10.	10.	10.	15.	12.	41
AVERAGE :		10.	10.	13.	106.	9.	12.	9.	9.	13.	13.	10.	11.	10.	10.	10.	10.	10.	10.	15.	12.	

Table 3.2.5 Experimental data of RUN <NNU01> (continue)

NO.	TIME(S)	Tg13	Tg14	Tg15	Tg16	Tg17	Tg18	Tg19	Tg20	Tg21	Tg22	Tg23	Tg24	Tg25	Tg26	Tg27	Tg28	Tg29	Tg30	Tg31	NO.
1	-175	10.	11.	11.	299.	142.	9.	9.	13.	12.	13.	13.	9.	9.	10.	10.	10.	10.	15.	12.	1
2	0	10.	11.	11.	299.	141.	9.	9.	13.	12.	13.	13.	9.	9.	10.	10.	10.	10.	15.	11.	2
3	40	10.	11.	11.	323.	149.	9.	9.	13.	13.	13.	14.	9.	9.	10.	10.	10.	10.	15.	11.	3
4	71	10.	11.	11.	325.	150.	9.	9.	13.	13.	13.	15.	9.	9.	10.	10.	10.	10.	15.	12.	4
5	100	10.	11.	11.	326.	150.	9.	9.	13.	13.	13.	15.	9.	9.	10.	10.	10.	10.	15.	12.	5
6	130	10.	11.	11.	328.	151.	9.	9.	13.	13.	13.	15.	9.	9.	10.	10.	10.	10.	15.	12.	6
7	160	10.	11.	11.	332.	152.	9.	9.	13.	13.	13.	16.	9.	9.	10.	10.	10.	10.	15.	12.	7
8	191	10.	11.	11.	336.	155.	9.	9.	13.	13.	13.	16.	9.	9.	10.	10.	10.	10.	15.	12.	8
9	220	10.	11.	11.	338.	155.	9.	9.	13.	13.	13.	16.	9.	9.	10.	10.	10.	10.	15.	12.	9
10	251	10.	11.	11.	339.	164.	9.	9.	13.	13.	13.	16.	9.	9.	10.	10.	10.	10.	14.	12.	10
11	281	10.	11.	11.	343.	165.	9.	9.	13.	13.	14.	16.	9.	9.	10.	10.	10.	10.	15.	12.	11
12	310	10.	11.	11.	344.	166.	9.	9.	14.	13.	14.	16.	9.	9.	10.	10.	10.	10.	15.	12.	12
13	340	10.	11.	11.	345.	168.	9.	9.	14.	14.	14.	16.	9.	9.	10.	10.	10.	10.	15.	12.	13
14	370	10.	11.	11.	348.	168.	9.	9.	14.	14.	14.	17.	9.	9.	10.	10.	10.	10.	15.	12.	14
15	401	10.	11.	11.	348.	169.	9.	9.	14.	14.	14.	17.	9.	9.	10.	10.	10.	10.	15.	12.	15
16	431	10.	11.	11.	348.	169.	9.	9.	14.	14.	14.	17.	9.	9.	10.	10.	10.	10.	15.	12.	16
17	461	10.	11.	11.	349.	170.	9.	9.	14.	14.	14.	17.	9.	9.	10.	10.	10.	10.	15.	12.	17
18	490	10.	11.	11.	349.	171.	9.	9.	14.	14.	14.	17.	9.	9.	10.	10.	10.	10.	15.	12.	18
19	520	10.	11.	11.	350.	171.	9.	9.	14.	14.	14.	17.	9.	9.	10.	10.	10.	10.	15.	12.	19
20	551	10.	11.	11.	351.	172.	9.	9.	14.	14.	14.	17.	9.	9.	10.	10.	10.	10.	15.	12.	20
21	580	10.	11.	11.	351.	171.	9.	9.	14.	14.	14.	17.	9.	9.	10.	10.	10.	10.	15.	12.	21
22	611	10.	11.	11.	351.	171.	9.	9.	14.	14.	14.	17.	9.	9.	10.	10.	10.	10.	15.	12.	22
23	640	10.	11.	11.	352.	175.	9.	9.	14.	14.	15.	17.	9.	9.	10.	10.	10.	10.	15.	12.	23
24	670	10.	11.	11.	352.	173.	9.	9.	14.	14.	15.	17.	9.	9.	10.	10.	10.	10.	15.	12.	24
25	700	10.	11.	11.	352.	173.	9.	9.	14.	14.	15.	17.	9.	9.	10.	10.	10.	10.	15.	12.	25
26	731	10.	11.	11.	352.	173.	9.	9.	14.	14.	15.	17.	9.	9.	10.	10.	10.	10.	15.	12.	26
27	761	10.	11.	11.	352.	173.	9.	9.	15.	14.	15.	17.	9.	9.	10.	10.	10.	10.	15.	12.	27
28	791	10.	11.	11.	352.	175.	9.	9.	15.	14.	15.	17.	9.	9.	10.	10.	10.	10.	15.	12.	28
29	821	10.	11.	11.	353.	174.	9.	9.	14.	14.	15.	17.	9.	9.	10.	10.	10.	10.	15.	12.	29
30	851	10.	11.	11.	353.	175.	9.	9.	15.	14.	15.	17.	9.	9.	10.	10.	10.	10.	15.	12.	30
31	881	10.	11.	11.	353.	176.	9.	9.	14.	14.	15.	17.	9.	9.	10.	10.	10.	10.	15.	12.	31
32	911	10.	11.	11.	354.	176.	9.	9.	14.	14.	15.	17.	9.	9.	10.	10.	10.	10.	15.	12.	32
33	940	10.	11.	11.	354.	176.	9.	9.	15.	14.	15.	17.	9.	9.	10.	10.	10.	10.	15.	12.	33
34	971	10.	11.	11.	353.	175.	9.	9.	15.	14.	15.	17.	9.	9.	10.	10.	10.	10.	15.	12.	34
35	1001	10.	11.	11.	353.	176.	9.	9.	15.	14.	15.	17.	9.	9.	10.	10.	10.	10.	15.	12.	35
36	1030	10.	11.	11.	353.	177.	9.	9.	15.	14.	15.	17.	9.	9.	10.	10.	10.	10.	15.	12.	36
37	1060	10.	11.	11.	353.	176.	9.	9.	15.	14.	15.	17.	9.	9.	10.	10.	10.	10.	15.	12.	37
38	1091	10.	11.	11.	354.	176.	9.	9.	15.	14.	15.	17.	9.	9.	10.	10.	10.	10.	15.	12.	38
39	1120	10.	11.	11.	354.	176.	9.	9.	15.	14.	15.	17.	9.	9.	10.	10.	10.	10.	15.	12.	39
40	1151	10.	11.	11.	354.	177.	9.	9.	15.	14.	15.	17.	9.	9.	10.	10.	10.	10.	15.	12.	40
41	1180	10.	11.	11.	354.	177.	9.	9.	15.	14.	15.	17.	9.	9.	10.	10.	10.	10.	15.	12.	41
AVERAGE :		10.	11.	11.	346.	168.	9.	9.	14.	14.	14.	16.	9.	9.	10.	10.	10.	10.	15.	12.	

Table 3.2.6 Experimental data of RUN <NNU02>

============> RUN NO. (NNU02) >==============> DATE (92/03/26) >===>

Tmix = 20 (min) dTmeas = 30 (s) Troom = 14 (C)

	P (V)	PA (V)	UF-1 (V)	UF-3 (V)	UF-4 (V)	UF-5 (V)	
ZERO BEFORE :	9.9992E-01	4.3919E+00	9.9906E-01	-3.1421E-02	4.5555E-02	1.1670E-03	

	R o2,in	R co2,in	R co,in	R o2,out	R co2,out	R co,out	F co/co2
AVERAGE MOLE FRACTION :	37.49	3.68	0.00	16.01	6.16	0.02	0.00

NO.	TIME (S)	Ptest (Pa)	Pabs (Pa)	Tem. (11-18) channel A (C)	Tem. (21-28) channel C (C)
1	-163	-4.2783E+02	1.0181E+05	1020./1042./1050./1044./1048./1040./1023./ 878.	588./ 598./ 602./ 601./ 600./ 602./ 597./ 488.
2	0	-8.4953E+02	1.0181E+05	1020./1037./1050./1052./1055./1041./1017./ 877.	589./ 598./ 601./ 601./ 601./ 602./ 598./ 487.
3	41	-8.5199E+02	1.0181E+05	1025./1044./1057./1052./1046./1033./1016./ 878.	594./ 598./ 601./ 600./ 600./ 601./ 596./ 487.
4	70	-8.5321E+02	1.0181E+05	1023./1037./1051./1053./1057./1046./1019./ 879.	596./ 598./ 601./ 600./ 600./ 602./ 597./ 488.
5	101	-8.4831E+02	1.0180E+05	1027./1045./1060./1056./1050./1039./1017./ 880.	594./ 598./ 601./ 601./ 601./ 602./ 596./ 488.
6	130	-8.5443E+02	1.0180E+05	1024./1043./1053./1049./1054./1050./1024./ 882.	574./ 599./ 600./ 600./ 600./ 602./ 598./ 488.
7	161	-8.5443E+02	1.0180E+05	1023./1043./1055./1050./1055./1054./1025./ 882.	593./ 597./ 601./ 600./ 600./ 602./ 596./ 488.
8	191	-8.4831E+02	1.0180E+05	1026./1046./1063./1057./1053./1049./1020./ 882.	592./ 597./ 601./ 600./ 600./ 601./ 596./ 487.
9	220	-8.5076E+02	1.0180E+05	1025./1040./1057./1061./1065./1060./1019./ 881.	593./ 597./ 601./ 600./ 601./ 603./ 597./ 487.
10	250	-8.4586E+02	1.0180E+05	1024./1045./1058./1053./1057./1060./1026./ 882.	591./ 590./ 601./ 600./ 600./ 602./ 596./ 487.
11	281	-8.4463E+02	1.0180E+05	1025./1041./1060./1063./1066./1061./1018./ 880.	591./ 597./ 600./ 601./ 601./ 601./ 596./ 486.
12	311	-8.4831E+02	1.0180E+05	1024./1045./1058./1054./1059./1064./1026./ 882.	590./ 597./ 600./ 600./ 599./ 601./ 595./ 486.
13	341	-8.4831E+02	1.0180E+05	1027./1048./1065./1059./1057./1057./1022./ 882.	589./ 596./ 600./ 601./ 600./ 599./ 595./ 485.
14	371	-8.4586E+02	1.0181E+05	1029./1049./1064./1057./1056./1058./1024./ 882.	588./ 597./ 599./ 601./ 600./ 601./ 595./ 485.
15	401	-8.4708E+02	1.0181E+05	1026./1046./1058./1055./1061./1066./1027./ 882.	588./ 597./ 600./ 600./ 600./ 601./ 595./ 486.
16	430	-8.5076E+02	1.0181E+05	1026./1048./1062./1056./1056./1060./1025./ 882.	587./ 595./ 599./ 601./ 599./ 600./ 594./ 485.
17	461	-8.5199E+02	1.0181E+05	1028./1049./1065./1058./1057./1060./1024./ 882.	587./ 596./ 599./ 601./ 600./ 600./ 594./ 485.
18	491	-8.5076E+02	1.0182E+05	1026./1048./1060./1054./1057./1063./1027./ 882.	587./ 596./ 600./ 601./ 599./ 600./ 594./ 485.
19	521	-8.5321E+02	1.0182E+05	1029./1049./1065./1059./1058./1060./1021./ 882.	586./ 595./ 599./ 601./ 600./ 600./ 594./ 485.
20	551	-8.5199E+02	1.0182E+05	1030./1050./1065./1060./1057./1060./1024./ 882.	585./ 595./ 600./ 600./ 600./ 601./ 593./ 485.
21	581	-8.5076E+02	1.0182E+05	1029./1044./1063./1065./1066./1064./1020./ 880.	587./ 595./ 600./ 601./ 600./ 602./ 594./ 485.
22	611	-8.4831E+02	1.0182E+05	1029./1045./1064./1065./1064./1061./1020./ 880.	585./ 595./ 599./ 600./ 600./ 600./ 594./ 485.
23	640	-8.4953E+02	1.0182E+05	1029./1045./1064./1065./1065./1061./1019./ 880.	586./ 595./ 600./ 600./ 600./ 601./ 594./ 485.
24	671	-8.4953E+02	1.0183E+05	1027./1048./1059./1054./1059./1066./1029./ 882.	585./ 595./ 600./ 600./ 599./ 601./ 593./ 486.
25	701	-8.5199E+02	1.0183E+05	1029./1048./1071./1065./1060./1060./1021./ 881.	584./ 595./ 601./ 600./ 600./ 600./ 593./ 484.
26	731	-8.5199E+02	1.0183E+05	1031./1050./1066./1060./1057./1060./1024./ 881.	585./ 594./ 600./ 601./ 599./ 600./ 593./ 484.
27	760	-8.4831E+02	1.0183E+05	1032./1050./1066./1060./1058./1060./1024./ 881.	585./ 595./ 599./ 601./ 599./ 600./ 593./ 485.
28	790	-8.5076E+02	1.0182E+05	1032./1046./1066./1065./1064./1062./1021./ 880.	584./ 595./ 599./ 601./ 600./ 600./ 593./ 484.
29	821	-8.5076E+02	1.0182E+05	1030./1044./1061./1063./1068./1069./1023./ 880.	585./ 596./ 599./ 601./ 600./ 600./ 594./ 485.
30	850	-8.4708E+02	1.0182E+05	1028./1043./1060./1063./1068./1069./1024./ 880.	585./ 596./ 600./ 601./ 600./ 601./ 594./ 485.
31	881	-8.4586E+02	1.0181E+05	1030./1048./1066./1065./1062./1061./1021./ 880.	584./ 594./ 600./ 600./ 600./ 600./ 592./ 485.
32	911	-8.5199E+02	1.0181E+05	1028./1049./1060./1054./1058./1066./1030./ 881.	584./ 595./ 599./ 601./ 599./ 600./ 595./ 485.
33	940	-8.4953E+02	1.0181E+05	1026./1047./1059./1054./1059./1066./1030./ 881.	584./ 595./ 599./ 601./ 599./ 600./ 594./ 486.
34	970	-8.4708E+02	1.0182E+05	1028./1045./1064./1065./1064./1061./1021./ 880.	584./ 593./ 600./ 601./ 600./ 601./ 593./ 485.
35	1000	-8.4953E+02	1.0182E+05	1029./1050./1063./1055./1057./1062./1029./ 882.	584./ 594./ 600./ 600./ 600./ 600./ 593./ 485.
36	1031	-8.4708E+02	1.0182E+05	1025./1043./1058./1060./1067./1070./1028./ 880.	585./ 595./ 600./ 601./ 600./ 601./ 594./ 485.
37	1061	-8.5076E+02	1.0182E+05	1025./1042./1059./1061./1067./1070./1027./ 880.	584./ 596./ 599./ 601./ 599./ 600./ 594./ 485.
38	1091	-8.5321E+02	1.0183E+05	1026./1042./1060./1063./1067./1068./1025./ 879.	584./ 595./ 600./ 600./ 600./ 600./ 594./ 484.
39	1121	-8.5076E+02	1.0183E+05	1025./1047./1060./1054./1058./1067./1031./ 881.	583./ 595./ 599./ 600./ 599./ 600./ 593./ 486.
40	1150	-8.4953E+02	1.0183E+05	1029./1049./1066./1062./1059./1059./1024./ 880.	583./ 594./ 600./ 601./ 600./ 601./ 593./ 484.
AVERAGE :		-8.4985E+02	1.0181E+05	1027./1046./1061./1058./1060./1060./1023./ 881.	587./ 596./ 600./ 601./ 600./ 601./ 595./ 486.
41	1180	-8.4831E+02	1.0183E+05	1031./1050./1066./1061./1057./1059./1026./ 881.	583./ 594./ 599./ 600./ 600./ 600./ 593./ 484.

Table 3.2.6 Experimental data of RUN <NNU02> (continue)

NO.	TIME (S)	UF-1 (m3/h)	UF-3 (m3/h)	UF-4 (m3/h)	UF-5 (m3/h)
1	-163	2.59E+00	3.94E+00	-6.68E+00	-8.49E-02
2	0	2.62E+00	4.07E+00	-6.62E+00	2.03E-01
3	41	7.91E+00	5.02E+00	-4.98E+00	4.07E+00
4	70	8.14E+00	5.30E+00	-4.97E+00	4.25E+00
5	101	8.19E+00	5.30E+00	-5.01E+00	4.27E+00
6	130	8.19E+00	5.38E+00	-4.99E+00	4.30E+00
7	161	8.13E+00	5.26E+00	-5.03E+00	4.27E+00
8	191	8.18E+00	5.20E+00	-5.03E+00	4.31E+00
9	220	8.22E+00	5.20E+00	-5.00E+00	4.29E+00
10	250	8.30E+00	4.97E+00	-4.96E+00	4.33E+00
11	281	8.38E+00	5.04E+00	-5.00E+00	4.31E+00
12	311	8.31E+00	5.09E+00	-5.00E+00	4.28E+00
13	341	8.04E+00	5.17E+00	-4.99E+00	4.28E+00
14	371	8.26E+00	5.10E+00	-5.01E+00	4.30E+00
15	401	8.18E+00	4.96E+00	-5.02E+00	4.32E+00
16	430	8.30E+00	4.96E+00	-4.99E+00	4.34E+00
17	461	8.17E+00	4.99E+00	-5.03E+00	4.31E+00
18	491	8.13E+00	4.93E+00	-4.99E+00	4.32E+00
19	521	8.29E+00	5.02E+00	-5.00E+00	4.31E+00
20	551	8.34E+00	4.95E+00	-5.01E+00	4.32E+00
21	581	8.32E+00	5.10E+00	-5.01E+00	4.35E+00
22	611	8.38E+00	4.99E+00	-5.00E+00	4.37E+00
23	640	8.42E+00	5.08E+00	-4.99E+00	4.30E+00
24	671	8.31E+00	5.01E+00	-4.99E+00	4.33E+00
25	701	8.24E+00	4.99E+00	-5.01E+00	4.32E+00
26	731	8.10E+00	4.86E+00	-5.02E+00	4.33E+00
27	760	8.31E+00	5.03E+00	-5.03E+00	4.32E+00
28	790	8.22E+00	5.04E+00	-5.02E+00	4.32E+00
29	821	8.33E+00	5.03E+00	-5.02E+00	4.32E+00
30	850	8.29E+00	5.11E+00	-5.04E+00	4.31E+00
31	881	8.16E+00	5.01E+00	-5.03E+00	4.35E+00
32	911	8.23E+00	5.19E+00	-5.02E+00	4.32E+00
33	940	8.37E+00	5.05E+00	-5.02E+00	4.35E+00
34	970	8.25E+00	4.98E+00	-5.04E+00	4.29E+00
35	1000	8.40E+00	5.13E+00	-5.00E+00	4.28E+00
36	1031	8.18E+00	5.04E+00	-5.01E+00	4.33E+00
37	1061	8.28E+00	5.07E+00	-5.03E+00	4.33E+00
38	1091	8.20E+00	5.02E+00	-5.02E+00	4.27E+00
39	1121	8.19E+00	5.07E+00	-5.01E+00	4.34E+00
40	1150	8.30E+00	5.04E+00	-5.03E+00	4.35E+00
AVERAGE :		8.10E+00	5.04E+00	-5.05E+00	4.20E+00
41	1180	8.27E+00	5.05E+00	-5.01E+00	4.31E+00

NO.	TIME(S)	Ro2in	Rco2in	Rcoin	Ro2out	Rco2out	Rcoout	Fco/co2
1	-100	9.98	0.35	0.00	0.65	0.09	0.00	0.00
2	20	28.01	0.21	0.00	0.02	0.36	1.71	4.75
3	140	36.80	2.45	0.00	14.49	4.60	0.11	0.02
4	260	37.63	3.66	0.00	16.08	5.93	0.01	0.00
5	380	37.67	3.77	0.00	16.13	6.28	0.01	0.00
6	500	37.56	3.91	0.00	16.23	6.52	0.01	0.00
7	620	37.57	3.91	0.00	16.35	6.41	0.01	0.00
8	740	37.60	3.80	0.00	16.38	6.31	0.01	0.00
9	860	37.58	4.04	0.00	16.23	6.60	0.01	0.00
10	980	37.48	3.93	0.00	16.20	6.59	0.00	0.00
11	1100	37.43	4.01	0.00	16.23	6.58	0.00	0.00
12	1220	37.11	6.60	0.00	16.17	6.50	0.01	0.00
13								
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Table 3.2.6 Experimental data of RUN <NNU02> (continue)

=============> RUN NO. (NNU02) >===============> DATE (92/03/26) >==

NO.	TIME(S)	Tw1	Tw2	Tw3	Tw4	Tw5	Tw6	Tw7	Tw8	Tg1	Tg2	Tg3	Tg4	Tg5	Tg6	Tg7	Tg8	Tg9	Tg10	Tg11	Tg12	NO.
1	-163	12.	12.	64.	104.	10.	12.	11.	10.	13.	14.	12.	12.	12.	12.	12.	12.	13.	12.	17.	14.	1
2	0	12.	12.	64.	105.	10.	12.	11.	10.	15.	14.	12.	12.	12.	12.	12.	12.	13.	12.	17.	14.	2
3	41	12.	12.	63.	105.	10.	12.	11.	10.	15.	14.	12.	12.	12.	12.	12.	12.	13.	12.	16.	14.	3
4	70	12.	12.	63.	106.	10.	12.	11.	10.	15.	14.	12.	13.	13.	12.	12.	12.	13.	12.	17.	14.	4
5	101	12.	12.	63.	106.	10.	13.	11.	10.	15.	14.	12.	13.	13.	12.	12.	12.	13.	12.	17.	14.	5
6	130	12.	12.	64.	107.	10.	13.	11.	10.	15.	14.	12.	13.	13.	12.	12.	12.	13.	12.	17.	14.	6
7	161	12.	12.	63.	108.	10.	13.	11.	10.	15.	14.	12.	13.	13.	12.	12.	12.	13.	12.	17.	14.	7
8	191	12.	12.	63.	108.	10.	13.	11.	10.	15.	14.	12.	13.	13.	12.	12.	12.	13.	12.	17.	14.	8
9	220	12.	12.	63.	109.	10.	13.	11.	10.	15.	14.	12.	13.	13.	12.	12.	12.	13.	12.	17.	14.	9
10	250	12.	12.	63.	110.	10.	13.	11.	10.	15.	14.	12.	13.	13.	12.	12.	12.	13.	12.	17.	14.	10
11	281	12.	12.	63.	110.	10.	13.	11.	10.	15.	14.	12.	13.	13.	12.	12.	12.	13.	12.	17.	14.	11
12	311	12.	12.	63.	110.	10.	13.	11.	10.	15.	14.	12.	13.	13.	12.	12.	12.	13.	12.	17.	14.	12
13	341	12.	12.	64.	110.	10.	13.	11.	10.	15.	14.	12.	13.	13.	12.	12.	12.	13.	12.	17.	14.	13
14	371	12.	12.	63.	111.	10.	13.	11.	10.	15.	14.	12.	13.	13.	12.	12.	12.	13.	12.	17.	14.	14
15	401	12.	12.	63.	112.	10.	13.	11.	10.	15.	14.	12.	13.	13.	12.	12.	12.	13.	12.	17.	14.	15
16	430	12.	12.	64.	112.	10.	13.	11.	10.	15.	14.	12.	13.	13.	12.	12.	12.	13.	12.	17.	14.	16
17	461	12.	12.	64.	113.	10.	13.	11.	10.	15.	14.	12.	13.	13.	12.	12.	12.	13.	12.	17.	14.	17
18	491	12.	12.	63.	113.	10.	13.	11.	10.	15.	14.	12.	13.	13.	12.	12.	12.	13.	12.	17.	14.	18
19	521	12.	12.	63.	112.	10.	13.	11.	10.	15.	14.	12.	13.	13.	12.	12.	12.	13.	12.	17.	14.	19
20	551	12.	12.	64.	113.	10.	13.	11.	10.	15.	14.	12.	13.	13.	12.	12.	12.	13.	12.	17.	14.	20
21	581	12.	12.	63.	114.	10.	13.	11.	10.	15.	14.	12.	13.	13.	12.	12.	12.	13.	12.	17.	14.	21
22	611	12.	12.	64.	114.	10.	13.	11.	10.	15.	14.	12.	13.	13.	12.	12.	12.	13.	12.	17.	14.	22
23	640	12.	12.	64.	114.	10.	13.	11.	10.	15.	14.	12.	13.	13.	12.	12.	12.	13.	12.	17.	14.	23
24	671	12.	12.	64.	114.	10.	13.	11.	10.	15.	14.	12.	13.	13.	12.	12.	12.	13.	12.	17.	14.	24
25	701	12.	12.	63.	114.	10.	13.	11.	10.	15.	14.	12.	13.	13.	12.	12.	12.	13.	12.	17.	14.	25
26	731	12.	12.	63.	115.	10.	13.	11.	10.	15.	14.	12.	13.	13.	12.	12.	12.	13.	12.	17.	14.	26
27	760	12.	12.	63.	115.	10.	13.	11.	10.	15.	14.	12.	13.	13.	12.	12.	12.	13.	12.	17.	14.	27
28	790	12.	12.	63.	115.	10.	13.	11.	10.	15.	14.	12.	13.	13.	12.	12.	12.	13.	12.	17.	14.	28
29	821	12.	12.	63.	115.	10.	13.	11.	10.	15.	14.	12.	13.	13.	12.	12.	12.	13.	12.	17.	14.	29
30	850	12.	12.	63.	115.	10.	13.	11.	10.	15.	14.	12.	13.	13.	12.	12.	12.	13.	12.	17.	14.	30
31	881	12.	12.	64.	115.	10.	13.	11.	10.	15.	14.	12.	13.	13.	12.	12.	12.	13.	12.	17.	14.	31
32	911	12.	12.	64.	116.	10.	13.	11.	10.	15.	14.	12.	13.	13.	12.	12.	12.	13.	12.	17.	14.	32
33	940	12.	12.	63.	116.	10.	13.	11.	10.	15.	14.	12.	13.	13.	12.	12.	12.	13.	12.	17.	14.	33
34	970	12.	12.	64.	116.	10.	13.	11.	10.	15.	14.	12.	13.	13.	12.	12.	12.	13.	12.	17.	14.	34
35	1000	12.	12.	64.	116.	10.	13.	11.	10.	15.	14.	12.	13.	13.	12.	12.	12.	13.	12.	17.	14.	35
36	1031	12.	12.	64.	117.	10.	13.	11.	10.	15.	14.	12.	13.	13.	12.	12.	12.	13.	12.	17.	14.	36
37	1061	12.	12.	64.	116.	10.	13.	11.	10.	15.	14.	12.	13.	13.	12.	12.	12.	13.	12.	17.	14.	37
38	1091	12.	12.	63.	117.	10.	13.	11.	10.	15.	14.	12.	13.	13.	12.	12.	12.	13.	12.	17.	14.	38
39	1121	12.	12.	64.	117.	10.	13.	11.	10.	15.	14.	12.	13.	13.	12.	12.	12.	13.	12.	17.	14.	39
40	1150	12.	12.	63.	117.	10.	13.	11.	10.	15.	14.	12.	13.	13.	12.	12.	12.	13.	12.	17.	14.	40
41	1180	12.	12.	63.	117.	10.	13.	11.	10.	15.	14.	12.	13.	13.	12.	12.	12.	13.	12.	17.	14.	41
AVERAGE :		12.	12.	63.	113.	10.	13.	11.	10.	15.	14.	12.	13.	13.	12.	12.	12.	13.	12.	17.	14.	

Table 3.2.6 Experimental data of RUN <NNU02> (continue)

NO.	TIME(S)	Tg13	Tg14	Tg15	Tg16	Tg17	Tg18	Tg19	Tg20	Tg21	Tg22	Tg23	Tg24	Tg25	Tg26	Tg27	Tg28	Tg29	Tg30	Tg31	NO.
1	-163	12.	250.	78.	385.	146.	10.	10.	11.	11.	12.	13.	69.	63.	12.	12.	13.	12.	17.	14.	1
2	0	12.	250.	79.	384.	146.	10.	10.	11.	11.	12.	13.	69.	62.	12.	12.	13.	12.	17.	14.	2
3	41	12.	217.	82.	385.	155.	10.	10.	11.	12.	13.	14.	67.	60.	12.	12.	13.	12.	16.	14.	3
4	70	12.	208.	82.	386.	164.	10.	10.	11.	12.	13.	15.	66.	59.	12.	12.	13.	12.	17.	14.	4
5	101	12.	206.	82.	387.	165.	11.	10.	11.	13.	13.	16.	65.	59.	12.	12.	13.	12.	17.	14.	5
6	130	12.	205.	82.	389.	167.	11.	10.	11.	13.	13.	16.	65.	59.	12.	12.	13.	12.	17.	14.	6
7	161	12.	205.	83.	392.	168.	10.	10.	11.	13.	13.	16.	64.	59.	12.	12.	13.	12.	17.	14.	7
8	191	12.	204.	83.	395.	169.	11.	10.	12.	13.	13.	16.	64.	59.	12.	12.	13.	12.	17.	14.	8
9	220	12.	204.	83.	395.	171.	11.	10.	12.	14.	13.	16.	64.	60.	12.	12.	13.	12.	17.	14.	9
10	250	12.	204.	84.	396.	171.	11.	10.	12.	14.	13.	16.	64.	60.	12.	12.	13.	12.	17.	14.	10
11	281	12.	203.	84.	397.	170.	11.	10.	12.	14.	13.	17.	64.	60.	12.	12.	13.	12.	17.	14.	11
12	311	12.	203.	84.	398.	171.	10.	10.	12.	14.	13.	16.	64.	60.	12.	12.	13.	12.	17.	14.	12
13	341	12.	204.	85.	399.	172.	10.	10.	12.	14.	13.	17.	64.	60.	12.	12.	13.	12.	17.	14.	13
14	371	12.	204.	84.	400.	174.	10.	10.	12.	14.	13.	17.	65.	60.	12.	12.	13.	12.	17.	14.	14
15	401	12.	204.	84.	400.	174.	11.	10.	12.	14.	13.	17.	65.	61.	12.	12.	13.	12.	17.	14.	15
16	430	12.	204.	84.	401.	175.	11.	10.	12.	14.	13.	17.	65.	61.	12.	12.	13.	12.	17.	14.	16
17	461	12.	203.	85.	400.	175.	10.	10.	12.	14.	13.	17.	65.	61.	12.	12.	13.	12.	17.	14.	17
18	491	12.	203.	85.	401.	176.	10.	10.	12.	14.	13.	17.	65.	61.	12.	12.	13.	12.	17.	14.	18
19	521	12.	203.	85.	401.	175.	11.	10.	12.	14.	13.	17.	65.	61.	12.	12.	13.	12.	17.	14.	19
20	551	12.	203.	84.	402.	176.	10.	10.	12.	14.	13.	17.	65.	60.	12.	12.	13.	12.	17.	14.	20
21	581	12.	203.	84.	402.	176.	10.	10.	12.	14.	13.	17.	65.	61.	12.	12.	13.	12.	17.	14.	21
22	611	12.	203.	84.	402.	176.	11.	10.	12.	14.	13.	17.	65.	61.	12.	12.	13.	12.	17.	14.	22
23	640	12.	203.	85.	402.	177.	10.	10.	12.	14.	13.	17.	65.	61.	12.	12.	13.	12.	17.	14.	23
24	671	12.	203.	85.	402.	178.	10.	10.	12.	14.	13.	17.	65.	61.	12.	12.	13.	12.	17.	14.	24
25	701	12.	203.	85.	402.	177.	10.	10.	12.	14.	13.	17.	65.	61.	12.	12.	13.	12.	17.	14.	25
26	731	12.	203.	86.	403.	178.	10.	10.	12.	14.	13.	16.	65.	61.	12.	12.	13.	12.	17.	14.	26
27	760	12.	204.	86.	402.	177.	10.	10.	12.	14.	13.	17.	66.	61.	12.	12.	13.	12.	17.	14.	27
28	790	12.	203.	85.	403.	177.	10.	10.	12.	14.	13.	17.	65.	61.	12.	12.	13.	12.	17.	14.	28
29	821	12.	203.	84.	402.	178.	11.	10.	12.	14.	13.	16.	66.	61.	12.	12.	13.	12.	17.	14.	29
30	850	12.	203.	85.	402.	178.	10.	10.	12.	14.	13.	17.	66.	61.	12.	12.	13.	12.	17.	14.	30
31	881	12.	203.	85.	402.	178.	11.	10.	12.	14.	13.	17.	66.	61.	12.	12.	13.	12.	17.	14.	31
32	911	12.	203.	86.	402.	177.	11.	10.	12.	14.	13.	17.	65.	61.	12.	12.	13.	12.	17.	14.	32
33	940	12.	203.	86.	402.	178.	10.	10.	12.	14.	13.	16.	65.	61.	12.	12.	13.	12.	17.	14.	33
34	970	12.	203.	85.	402.	178.	11.	10.	12.	14.	13.	17.	65.	61.	12.	12.	13.	12.	17.	14.	34
35	1000	12.	203.	85.	402.	178.	11.	11.	12.	14.	13.	17.	65.	61.	12.	12.	13.	12.	17.	14.	35
36	1031	12.	203.	85.	402.	179.	10.	10.	12.	14.	13.	17.	65.	61.	12.	12.	13.	12.	17.	14.	36
37	1061	12.	203.	85.	402.	178.	11.	10.	12.	14.	13.	17.	65.	61.	12.	12.	13.	12.	17.	14.	37
38	1091	12.	203.	85.	402.	178.	11.	10.	12.	14.	13.	17.	65.	61.	12.	12.	13.	12.	17.	14.	38
39	1121	12.	203.	85.	403.	180.	11.	10.	12.	14.	13.	17.	65.	61.	12.	12.	13.	12.	17.	14.	39
40	1150	12.	203.	85.	402.	179.	11.	10.	12.	14.	13.	17.	65.	61.	12.	12.	13.	12.	17.	14.	40
41	1180	12.	204.	85.	402.	178.	11.	10.	12.	14.	13.	17.	66.	61.	12.	12.	13.	12.	17.	14.	41
AVERAGE :		12.	205.	84.	399.	174.	10.	10.	12.	14.	13.	16.	65.	61.	12.	12.	13.	12.	17.	14.	

Table 3.2.7 Experimental data of RUN <NNU03>

=============> RUN NO. (NNU03) >=============> DATE (92/07/28) >==>

Tmix = 20 (min) dTmeas = 30 (s) Troom = 28 (C)

	P (V)	PA (V)	UF-1 (V)	UF-3 (V)	UF-4 (V)	UF-5 (V)
ZERO BEFORE :	9.9962E-01	4.3624E+00	9.9935E-01	9.0120E-04	-1.2946E-02	-1.3540E-04

	R o2,in	R co2,in	R co,in	R o2,out	R co2,out	R co,out	F co/co2
AVERAGE MOLE FRACTION :	24.09	3.95	0.00	15.12	6.16	0.00	0.00

NO.	TIME (S)	Ptest (Pa)	Pabs (Pa)	Tem. (11-18) channel A (C)	Tem. (21-28) channel C (C)
1	-223	5.8990E+02	1.0067E+05	1036./1047./1054./1053./1060./1058./1057./ 929.	311./ 314./ 314./ 314./ 312./ 306./ 290./ 214.
2	0	-7.8652E+02	1.0067E+05	1035./1050./1055./1051./1056./1055./1057./ 931.	310./ 313./ 313./ 314./ 312./ 306./ 291./ 213.
3	47	-7.8799E+02	1.0067E+05	1041./1051./1064./1063./1063./1055./1049./ 928.	312./ 313./ 313./ 313./ 312./ 307./ 292./ 214.
4	77	-7.8922E+02	1.0067E+05	1038./1054./1064./1057./1056./1053./1052./ 930.	310./ 312./ 312./ 313./ 313./ 306./ 291./ 213.
5	107	-7.8848E+02	1.0067E+05	1041./1049./1065./1066./1067./1063./1050./ 929.	311./ 313./ 312./ 313./ 312./ 307./ 292./ 215.
6	137	-7.8897E+02	1.0067E+05	1040./1048./1063./1066./1070./1068./1053./ 929.	311./ 313./ 312./ 313./ 311./ 306./ 292./ 213.
7	167	-7.8848E+02	1.0066E+05	1036./1047./1059./1059./1068./1071./1058./ 930.	310./ 313./ 313./ 313./ 312./ 302./ 291./ 213.
8	197	-7.8922E+02	1.0067E+05	1038./1048./1062./1064./1071./1073./1054./ 929.	310./ 313./ 312./ 312./ 311./ 306./ 292./ 214.
9	227	-7.8750E+02	1.0067E+05	1041./1052./1069./1070./1072./1070./1050./ 927.	311./ 314./ 312./ 313./ 311./ 306./ 292./ 214.
10	257	-7.8922E+02	1.0067E+05	1038./1055./1069./1063./1063./1068./1052./ 929.	310./ 311./ 312./ 309./ 313./ 306./ 291./ 214.
11	287	-7.8897E+02	1.0067E+05	1035./1049./1061./1060./1069./1076./1058./ 929.	310./ 312./ 312./ 313./ 312./ 305./ 291./ 213.
12	317	-7.9044E+02	1.0067E+05	1040./1055./1072./1071./1067./1070./1048./ 926.	310./ 311./ 311./ 313./ 312./ 306./ 292./ 213.
13	347	-7.9216E+02	1.0067E+05	1035./1050./1062./1060./1068./1077./1057./ 929.	309./ 312./ 312./ 313./ 312./ 305./ 291./ 213.
14	377	-7.9069E+02	1.0067E+05	1037./1048./1064./1066./1074./1081./1054./ 927.	308./ 312./ 311./ 313./ 290./ 306./ 292./ 214.
15	407	-7.9044E+02	1.0067E+05	1040./1052./1071./1072./1073./1075./1047./ 924.	309./ 311./ 311./ 312./ 311./ 306./ 292./ 214.
16	437	-7.9069E+02	1.0067E+05	1036./1049./1063./1063./1072./1080./1055./ 927.	309./ 311./ 312./ 312./ 311./ 305./ 290./ 214.
17	467	-7.8995E+02	1.0067E+05	1038./1049./1065./1068./1075./1082./1053./ 926.	309./ 312./ 311./ 312./ 311./ 305./ 290./ 214.
18	497	-7.9069E+02	1.0067E+05	1040./1051./1069./1071./1076./1080./1049./ 924.	309./ 311./ 311./ 312./ 311./ 305./ 291./ 214.
19	527	-7.8873E+02	1.0067E+05	1040./1057./1080./1072./1070./1073./1046./ 924.	309./ 310./ 310./ 312./ 310./ 306./ 290./ 214.
20	557	-7.9093E+02	1.0067E+05	1036./1050./1063./1062./1071./1081./1055./ 926.	308./ 311./ 312./ 313./ 311./ 305./ 291./ 213.
21	587	-7.9143E+02	1.0067E+05	1037./1057./1072./1064./1064./1072./1051./ 925.	308./ 310./ 310./ 312./ 312./ 305./ 291./ 212.
22	617	-7.8922E+02	1.0066E+05	1040./1053./1071./1072./1074./1076./1046./ 923.	309./ 309./ 310./ 312./ 311./ 305./ 291./ 214.
23	647	-7.8897E+02	1.0066E+05	1041./1053./1071./1072./1074./1077./1046./ 923.	308./ 311./ 310./ 312./ 311./ 306./ 291./ 213.
24	677	-7.8995E+02	1.0066E+05	1035./1051./1064./1061./1067./1078./1055./ 926.	307./ 310./ 311./ 312./ 311./ 305./ 289./ 212.
25	707	-7.8799E+02	1.0066E+05	1035./1050./1063./1062./1071./1080./1055./ 925.	308./ 310./ 311./ 312./ 311./ 302./ 291./ 212.
26	737	-7.8971E+02	1.0066E+05	1035./1049./1063./1063./1073./1081./1054./ 924.	308./ 310./ 310./ 312./ 311./ 304./ 290./ 212.
27	767	-7.8946E+02	1.0066E+05	1039./1050./1068./1070./1076./1081./1050./ 923.	308./ 310./ 310./ 312./ 311./ 305./ 290./ 214.
28	796	-7.9044E+02	1.0066E+05	1037./1050./1067./1069./1075./1081./1051./ 923.	308./ 310./ 310./ 311./ 315./ 305./ 291./ 214.
29	827	-7.8946E+02	1.0066E+05	1038./1051./1071./1071./1074./1078./1047./ 922.	308./ 309./ 310./ 311./ 311./ 305./ 289./ 214.
30	857	-7.9020E+02	1.0066E+05	1039./1055./1073./1072./1071./1073./1046./ 922.	308./ 309./ 310./ 311./ 311./ 305./ 290./ 214.
31	887	-7.8823E+02	1.0066E+05	1039./1055./1073./1072./1071./1072./1046./ 922.	308./ 310./ 310./ 311./ 312./ 305./ 290./ 214.
32	917	-7.8971E+02	1.0066E+05	1036./1049./1066./1068./1075./1081./1053./ 923.	307./ 310./ 315./ 310./ 310./ 306./ 290./ 213.
33	946	-7.9118E+02	1.0066E+05	1033./1051./1064./1060./1067./1076./1054./ 924.	307./ 309./ 310./ 312./ 311./ 305./ 288./ 212.
34	977	-7.8823E+02	1.0066E+05	1035./1050./1070./1072./1074./1076./1047./ 922.	308./ 310./ 310./ 312./ 310./ 305./ 290./ 214.
35	1007	-7.8774E+02	1.0066E+05	1034./1049./1066./1069./1075./1080./1050./ 922.	308./ 309./ 310./ 311./ 310./ 304./ 290./ 214.
36	1037	-7.8823E+02	1.0066E+05	1035./1050./1070./1071./1074./1076./1047./ 921.	308./ 310./ 310./ 311./ 310./ 305./ 290./ 214.
37	1067	-7.8995E+02	1.0066E+05	1031./1051./1063./1059./1067./1076./1053./ 924.	308./ 309./ 310./ 312./ 311./ 304./ 289./ 212.
38	1097	-7.8971E+02	1.0066E+05	1033./1048./1067./1070./1075./1079./1049./ 921.	307./ 309./ 310./ 311./ 310./ 305./ 292./ 213.
39	1127	-7.8799E+02	1.0066E+05	1031./1047./1063./1064./1073./1079./1052./ 922.	307./ 309./ 310./ 311./ 310./ 304./ 289./ 213.
40	1157	-7.8848E+02	1.0066E+05	1034./1052./1071./1072./1074./1073./1046./ 920.	307./ 309./ 309./ 311./ 310./ 305./ 291./ 214.
41	1187	-7.8946E+02	1.0066E+05	1030./1050./1063./1060./1067./1074./1053./ 923.	306./ 309./ 309./ 311./ 311./ 304./ 289./ 212.
AVERAGE :		-7.8938E+02	1.0066E+05	1037./1051./1067./1066./1070./1074./1051./ 925.	309./ 311./ 311./ 312./ 311./ 305./ 291./ 213.
42	1205	-8.1668E+02	1.0066E+05	1032./1054./1073./1071./1070./1070./1045./ 920.	307./ 308./ 309./ 311./ 310./ 304./ 290./ 214.

Table 3.2.7 Experimental data of RUN <NNU03> (continue)

NO.	TIME (S)	UF-1 (m3/h)	UF-3 (m3/h)	UF-4 (m3/h)	UF-5 (m3/h)
1	-223	-1.29E-03	4.47E+00	-6.86E+00	-5.96E-02
2	0	-2.58E-04	4.56E+00	-6.57E+00	8.66E-01
3	47	5.13E-01	5.11E+00	-5.20E+00	3.75E+00
4	77	6.43E-01	5.18E+00	-5.26E+00	3.83E+00
5	107	7.63E-01	5.23E+00	-5.28E+00	3.85E+00
6	137	7.90E-01	5.33E+00	-5.26E+00	3.90E+00
7	167	8.12E-01	5.18E+00	-5.31E+00	4.01E+00
8	197	7.76E-01	5.26E+00	-5.29E+00	3.98E+00
9	227	7.17E-01	5.24E+00	-5.29E+00	3.97E+00
10	257	7.15E-01	5.29E+00	-5.32E+00	3.97E+00
11	287	5.58E-01	5.29E+00	-5.32E+00	3.98E+00
12	317	4.89E-01	5.29E+00	-5.28E+00	3.96E+00
13	347	4.81E-01	5.30E+00	-5.32E+00	4.03E+00
14	377	4.70E-01	5.25E+00	-5.40E+00	4.02E+00
15	407	5.05E-01	5.27E+00	-5.32E+00	3.96E+00
16	437	3.93E-01	5.27E+00	-5.34E+00	3.97E+00
17	467	3.10E-01	5.23E+00	-5.36E+00	3.98E+00
18	497	4.29E-01	5.25E+00	-5.33E+00	4.00E+00
19	527	3.73E-01	5.28E+00	-5.32E+00	3.95E+00
20	557	3.31E-01	5.31E+00	-5.32E+00	3.94E+00
21	587	3.85E-01	5.26E+00	-5.36E+00	3.98E+00
22	617	3.84E-01	5.28E+00	-5.34E+00	4.01E+00
23	647	3.99E-01	5.29E+00	-5.36E+00	4.01E+00
24	677	2.85E-01	5.25E+00	-5.36E+00	3.94E+00
25	707	2.51E-01	5.31E+00	-5.38E+00	4.02E+00
26	737	2.52E-01	5.24E+00	-5.35E+00	3.99E+00
27	767	2.23E-01	5.28E+00	-5.36E+00	4.00E+00
28	796	2.30E-01	5.30E+00	-5.36E+00	3.98E+00
29	827	1.83E-01	5.24E+00	-5.38E+00	4.00E+00
30	857	1.83E-01	5.30E+00	-5.41E+00	3.99E+00
31	887	2.21E-01	5.26E+00	-5.35E+00	3.99E+00
32	917	2.70E-01	5.27E+00	-5.37E+00	3.98E+00
33	946	2.06E-01	5.28E+00	-5.35E+00	4.01E+00
34	977	2.64E-01	5.28E+00	-5.35E+00	4.01E+00
35	1007	2.11E-01	5.32E+00	-5.38E+00	3.98E+00
36	1037	2.29E-01	5.28E+00	-5.36E+00	3.97E+00
37	1067	1.73E-01	5.28E+00	-5.36E+00	3.97E+00
38	1097	2.20E-01	5.32E+00	-5.39E+00	3.97E+00
39	1127	1.95E-01	5.31E+00	-5.36E+00	3.97E+00
40	1157	1.06E-02	5.27E+00	-5.40E+00	3.92E+00
41	1187	2.36E-01	5.29E+00	-5.37E+00	4.00E+00
AVERAGE :		3.77E-01	5.25E+00	-5.37E+00	3.89E+00
42	1205	-8.69E-05	4.92E+00	-6.21E+00	1.98E+00

NO.	TIME (S)	Ro2in	Rco2in	Rcoin	Ro2out	Rco2out	Rcoout	Fco/co2
1	-100	0.00	0.00	0.00	0.34	0.00	0.00	99.99
2	20	7.99	0.00	0.00	0.00	0.00	0.00	99.99
3	140	21.48	2.17	0.00	13.02	3.79	0.00	0.00
4	260	23.74	3.96	0.00	15.24	5.74	0.00	0.00
5	380	24.18	4.05	0.00	15.47	6.17	0.00	0.00
6	500	24.34	4.25	0.00	15.31	6.59	0.00	0.00
7	620	24.52	4.09	0.00	15.39	6.65	0.00	0.00
8	740	24.57	4.25	0.00	15.39	6.63	0.00	0.00
9	860	24.79	4.29	0.00	15.52	6.47	0.00	0.00
10	980	24.59	4.27	0.00	15.25	6.85	0.00	0.00
11	1100	24.61	4.19	0.00	15.50	6.56	0.00	0.00
12	1220	21.74	7.09	0.00	15.24	6.73	0.00	0.00
13	1340	12.84	13.67	0.00	15.18	6.74	0.00	0.00

Table 3.2.7 Experimental data of RUN <NNU03> (continue)

=============> RUN NO. (NNU03) >==============> DATE (92/07/28) >==

NO.	TIME(S)	Tw1	Tw2	Tw3	Tw4	Tw5	Tw6	Tw7	Tw8	Tg1	Tg2	Tg3	Tg4	Tg5	Tg6	Tg7	Tg8	Tg9	Tg10	Tg11	Tg12	NO.
1	-223	31.	31.	73.	112.	29.	29.	29.	29.	28.	29.	31.	31.	31.	31.	31.	31.	31.	31.	35.	31.	1
2	0	31.	31.	74.	112.	29.	29.	29.	29.	27.	29.	31.	31.	30.	31.	31.	31.	31.	30.	35.	31.	2
3	47	31.	31.	72.	113.	29.	30.	29.	29.	27.	29.	30.	30.	30.	31.	31.	31.	31.	31.	35.	31.	3
4	77	31.	31.	72.	114.	29.	30.	29.	29.	27.	28.	31.	30.	30.	31.	31.	31.	31.	31.	35.	31.	4
5	107	31.	31.	71.	114.	28.	30.	29.	29.	27.	28.	31.	30.	30.	31.	31.	31.	31.	31.	35.	31.	5
6	137	31.	31.	70.	115.	28.	30.	29.	29.	28.	28.	31.	30.	30.	31.	31.	31.	31.	31.	35.	31.	6
7	167	31.	31.	69.	116.	28.	30.	29.	29.	28.	28.	31.	30.	30.	31.	31.	31.	31.	31.	35.	31.	7
8	197	31.	31.	69.	117.	29.	30.	29.	29.	28.	28.	31.	30.	30.	31.	31.	31.	31.	31.	35.	31.	8
9	227	31.	31.	68.	118.	29.	30.	29.	29.	28.	28.	31.	30.	30.	31.	31.	31.	31.	31.	35.	31.	9
10	257	31.	31.	67.	119.	29.	30.	29.	29.	28.	28.	31.	30.	30.	31.	31.	31.	31.	31.	35.	31.	10
11	287	31.	31.	67.	120.	29.	30.	29.	29.	28.	28.	31.	30.	30.	31.	31.	31.	31.	31.	35.	31.	11
12	317	31.	31.	67.	122.	29.	30.	29.	29.	28.	28.	31.	30.	30.	31.	31.	31.	31.	31.	35.	31.	12
13	347	31.	31.	66.	122.	29.	30.	29.	29.	28.	28.	31.	30.	30.	31.	31.	31.	31.	30.	35.	31.	13
14	377	31.	31.	66.	122.	28.	30.	29.	29.	27.	28.	31.	29.	30.	31.	31.	31.	31.	30.	35.	31.	14
15	407	31.	31.	65.	122.	28.	30.	29.	29.	28.	28.	31.	29.	30.	31.	31.	31.	31.	31.	35.	31.	15
16	437	31.	31.	65.	123.	28.	30.	29.	29.	27.	28.	30.	29.	29.	31.	31.	31.	31.	30.	35.	31.	16
17	467	31.	31.	65.	124.	28.	30.	29.	29.	28.	28.	31.	30.	30.	31.	31.	31.	31.	30.	35.	31.	17
18	497	31.	31.	65.	125.	28.	30.	29.	29.	27.	28.	30.	29.	29.	31.	31.	31.	31.	30.	35.	31.	18
19	527	31.	31.	64.	125.	28.	30.	29.	29.	27.	28.	31.	30.	30.	31.	31.	31.	31.	31.	35.	31.	19
20	557	31.	31.	64.	126.	28.	30.	29.	28.	28.	28.	31.	29.	29.	31.	31.	31.	31.	30.	35.	31.	20
21	587	31.	31.	64.	126.	28.	30.	29.	28.	27.	28.	30.	30.	29.	31.	31.	31.	31.	30.	35.	31.	21
22	617	31.	31.	64.	127.	28.	30.	29.	29.	27.	28.	30.	29.	29.	31.	31.	31.	31.	31.	35.	31.	22
23	647	31.	31.	64.	127.	28.	30.	29.	29.	28.	28.	30.	30.	29.	31.	31.	31.	31.	31.	35.	31.	23
24	677	31.	31.	63.	127.	28.	30.	29.	28.	27.	28.	30.	29.	29.	31.	31.	31.	31.	30.	35.	31.	24
25	707	31.	31.	63.	128.	28.	30.	29.	28.	28.	28.	30.	29.	29.	31.	31.	31.	31.	31.	35.	31.	25
26	737	31.	31.	63.	128.	28.	30.	29.	28.	28.	28.	30.	29.	29.	31.	31.	31.	31.	30.	35.	31.	26
27	767	31.	31.	63.	129.	28.	30.	29.	28.	28.	28.	30.	29.	29.	31.	31.	31.	31.	31.	35.	31.	27
28	796	31.	31.	62.	129.	28.	30.	29.	28.	27.	28.	30.	29.	29.	31.	31.	31.	31.	30.	35.	31.	28
29	827	31.	31.	62.	129.	28.	30.	29.	28.	28.	28.	30.	29.	29.	31.	31.	31.	31.	30.	35.	31.	29
30	857	31.	31.	62.	129.	28.	30.	29.	28.	27.	28.	30.	29.	29.	31.	31.	31.	31.	31.	35.	31.	30
31	887	31.	31.	62.	129.	28.	30.	29.	28.	28.	28.	30.	29.	29.	31.	31.	31.	31.	31.	35.	31.	31
32	917	31.	31.	62.	130.	28.	30.	29.	28.	27.	28.	30.	29.	29.	31.	31.	31.	31.	30.	35.	31.	32
33	946	31.	31.	62.	130.	28.	30.	29.	28.	28.	28.	30.	29.	29.	31.	31.	31.	31.	31.	35.	31.	33
34	977	31.	31.	61.	130.	28.	30.	29.	29.	27.	28.	30.	29.	29.	31.	31.	31.	31.	31.	35.	31.	34
35	1007	31.	31.	62.	130.	28.	30.	29.	28.	28.	28.	30.	29.	29.	31.	31.	31.	31.	31.	35.	31.	35
36	1037	31.	31.	62.	131.	28.	30.	29.	29.	28.	28.	30.	29.	29.	31.	31.	31.	31.	31.	35.	31.	36
37	1067	31.	31.	61.	131.	28.	30.	29.	28.	28.	28.	30.	29.	29.	31.	31.	31.	31.	30.	35.	31.	37
38	1097	31.	31.	61.	131.	28.	30.	29.	28.	28.	28.	30.	29.	29.	31.	31.	31.	31.	30.	35.	31.	38
39	1127	31.	31.	61.	131.	28.	30.	29.	28.	28.	28.	30.	29.	29.	31.	31.	31.	31.	31.	35.	31.	39
40	1157	31.	31.	61.	131.	28.	30.	29.	28.	27.	28.	30.	30.	29.	31.	31.	31.	31.	30.	35.	31.	40
41	1187	31.	31.	61.	131.	28.	30.	29.	28.	27.	28.	30.	29.	29.	31.	31.	31.	31.	30.	35.	31.	41
42.	1205	31.	31.	61.	132.	28.	30.	29.	28.	28.	28.	30.	29.	29.	31.	31.	31.	31.	30.	35.	31.	42
AVERAGE :		31.	31.	65.	125.	28.	30.	29.	29.	28.	28.	31.	30.	30.	31.	31.	31.	31.	31.	35.	31.	

Table 3.2.7 Experimental data of RUN <NNU03> (continue)

NO.	TIME(S)	Tg13	Tg14	Tg15	Tg16	Tg17	Tg18	Tg19	Tg20	Tg21	Tg22	Tg23	Tg24	Tg25	Tg26	Tg27	Tg28	Tg29	Tg30	Tg31	NO.
1	-223	31.	132.	76.	374.	151.	29.	29.	30.	30.	30.	30.	56.	48.	31.	31.	31.	31.	35.	31.	1
2	0	31.	132.	76.	374.	151.	29.	28.	30.	29.	30.	30.	55.	48.	31.	31.	31.	30.	35.	31.	2
3	47	31.	136.	72.	378.	158.	29.	29.	30.	30.	30.	31.	55.	50.	31.	31.	31.	31.	35.	31.	3
4	77	31.	135.	71.	383.	162.	29.	29.	29.	30.	30.	31.	55.	51.	31.	31.	31.	31.	35.	31.	4
5	107	31.	134.	71.	389.	164.	29.	28.	29.	30.	31.	32.	55.	51.	31.	31.	31.	31.	35.	31.	5
6	137	31.	133.	70.	393.	167.	29.	28.	29.	30.	31.	32.	55.	52.	31.	31.	31.	31.	35.	31.	6
7	167	31.	133.	70.	396.	168.	29.	29.	29.	30.	31.	32.	55.	52.	31.	31.	31.	31.	35.	31.	7
8	197	31.	132.	70.	399.	169.	29.	29.	29.	31.	31.	33.	55.	52.	31.	31.	31.	31.	35.	31.	8
9	227	31.	132.	70.	400.	170.	29.	29.	29.	31.	31.	33.	55.	52.	31.	31.	31.	31.	35.	31.	9
10	257	31.	131.	70.	403.	179.	29.	29.	29.	31.	31.	33.	55.	52.	31.	31.	31.	31.	35.	31.	10
11	287	31.	131.	69.	404.	180.	29.	29.	29.	31.	31.	33.	55.	52.	31.	31.	31.	31.	35.	31.	11
12	317	31.	131.	69.	406.	180.	29.	29.	29.	31.	31.	33.	55.	52.	31.	31.	31.	31.	35.	31.	12
13	347	31.	131.	69.	407.	181.	29.	29.	29.	31.	31.	33.	55.	52.	31.	31.	31.	30.	35.	31.	13
14	377	31.	131.	68.	407.	182.	29.	28.	29.	31.	31.	33.	54.	52.	31.	31.	31.	30.	35.	31.	14
15	407	31.	131.	68.	408.	182.	29.	29.	29.	31.	31.	33.	54.	52.	31.	31.	31.	31.	35.	31.	15
16	437	31.	130.	68.	408.	184.	28.	28.	29.	31.	31.	33.	54.	52.	31.	31.	31.	30.	35.	31.	16
17	467	31.	130.	67.	407.	183.	29.	28.	29.	31.	31.	33.	54.	52.	31.	31.	31.	30.	35.	31.	17
18	497	31.	130.	67.	408.	185.	29.	28.	29.	31.	31.	33.	54.	52.	31.	31.	31.	30.	35.	31.	18
19	527	31.	130.	67.	409.	184.	29.	28.	29.	31.	31.	33.	54.	52.	31.	31.	31.	31.	35.	31.	19
20	557	31.	130.	67.	408.	185.	29.	28.	29.	31.	31.	33.	54.	52.	31.	31.	31.	30.	35.	31.	20
21	587	31.	130.	66.	409.	185.	29.	28.	29.	31.	31.	33.	54.	52.	31.	31.	31.	30.	35.	31.	21
22	617	31.	129.	66.	409.	186.	29.	28.	29.	31.	31.	33.	54.	52.	31.	31.	31.	31.	35.	31.	22
23	647	31.	130.	66.	409.	186.	29.	28.	29.	31.	31.	33.	54.	52.	31.	31.	31.	31.	35.	31.	23
24	677	31.	130.	66.	409.	186.	28.	28.	29.	31.	31.	33.	54.	52.	31.	31.	31.	30.	35.	31.	24
25	707	31.	130.	66.	409.	187.	29.	28.	29.	31.	31.	33.	54.	52.	31.	31.	31.	31.	35.	31.	25
26	737	31.	129.	65.	409.	187.	28.	28.	29.	31.	31.	33.	54.	52.	31.	31.	31.	30.	35.	31.	26
27	767	31.	129.	65.	410.	188.	28.	28.	29.	31.	31.	33.	54.	52.	31.	31.	31.	31.	35.	31.	27
28	796	31.	129.	65.	410.	187.	29.	28.	29.	31.	31.	33.	54.	52.	31.	31.	31.	30.	35.	31.	28
29	827	31.	129.	65.	409.	188.	29.	28.	29.	31.	31.	33.	54.	52.	31.	31.	31.	30.	35.	31.	29
30	857	31.	129.	65.	409.	188.	28.	28.	29.	31.	31.	33.	54.	52.	31.	31.	31.	31.	35.	31.	30
31	887	31.	129.	65.	409.	189.	28.	28.	29.	31.	31.	33.	54.	52.	31.	31.	31.	31.	35.	31.	31
32	917	31.	129.	64.	409.	189.	28.	28.	29.	31.	31.	33.	54.	52.	31.	31.	31.	30.	35.	31.	32
33	946	31.	129.	64.	410.	190.	28.	28.	29.	31.	31.	33.	54.	52.	31.	31.	31.	31.	35.	31.	33
34	977	31.	129.	65.	410.	190.	28.	28.	29.	31.	31.	33.	54.	52.	31.	31.	31.	31.	35.	31.	34
35	1007	31.	129.	65.	411.	191.	28.	28.	29.	31.	31.	33.	54.	52.	31.	31.	31.	31.	35.	31.	35
36	1037	31.	129.	65.	410.	190.	28.	28.	29.	31.	31.	33.	54.	52.	31.	31.	31.	31.	35.	31.	36
37	1067	31.	129.	64.	411.	190.	28.	28.	29.	31.	31.	33.	54.	52.	31.	31.	31.	30.	35.	31.	37
38	1097	31.	129.	65.	411.	190.	28.	28.	29.	31.	31.	33.	54.	52.	31.	31.	31.	30.	35.	31.	38
39	1127	31.	129.	64.	410.	191.	28.	28.	29.	31.	31.	33.	54.	52.	31.	31.	31.	31.	35.	31.	39
40	1157	31.	129.	64.	411.	191.	28.	28.	29.	31.	31.	33.	54.	52.	31.	31.	31.	30.	35.	31.	40
41	1187	31.	129.	64.	410.	190.	28.	28.	29.	31.	31.	33.	54.	52.	31.	31.	31.	30.	35.	31.	41
42	1205	31.	129.	63.	413.	190.	28.	28.	29.	31.	31.	33.	54.	52.	31.	31.	31.	30.	35.	31.	42
AVERAGE :		31.	130.	67.	405.	182.	29.	28.	29.	31.	31.	33.	54.	52.	31.	31.	31.	31.	35.	31.	

Table 3.2.8 Experimental data of RUN <NNU04>

=============> RUN NO. (NNU04) >==============> DATE (92/08/07) >==>

Tmix = 40 (min) dTmeas = 30 (s) Troom = 26 (C)

	P (V)	PA (V)	UF-1 (V)	UF-3 (V)	UF-4 (V)	UF-5 (V)
ZERO BEFORE :	9.9372E-01	0.0000E+00	9.9898E-01	7.1400E-03	2.7660E-02	-2.3200E-03

	R o2,in	R co2,in	R co,in	R o2,out	R co2,out	R co,out	F co/co2
AVERAGE MOLE FRACTION :	27.79	4.62	0.00	15.65	5.47	0.25	0.04

NO.	TIME (S)	Ptest (Pa)	Pabs (Pa)	Tem. (11-18) channel A (C)	Tem. (21-28) channel C (C)
1	-288	6.1294E+02	1.0122E+05	1022./1042./1058./1058./1049./1051./1051./ 933.	789./ 801./ 805./ 806./ 805./ 809./ 804./ 720.
2	0	-1.0591E+02	1.0121E+05	1022./1048./1056./1050./1056./1055./1044./ 934.	788./ 800./ 804./ 805./ 805./ 809./ 803./ 719.
3	50	-1.1057E+02	1.0121E+05	1022./1042./1057./1060./1050./1051./1051./ 934.	793./ 801./ 805./ 806./ 805./ 810./ 804./ 719.
4	80	-1.1008E+02	1.0121E+05	1022./1042./1053./1061./1053./1051./1051./ 936.	796./ 801./ 805./ 806./ 805./ 810./ 804./ 720.
5	111	-1.0984E+02	1.0121E+05	1023./1043./1061./1062./1052./1058./1052./ 935.	799./ 801./ 805./ 806./ 805./ 810./ 805./ 719.
6	140	-1.1008E+02	1.0121E+05	1022./1048./1053./1060./1064./1059./1045./ 936.	799./ 801./ 804./ 805./ 805./ 810./ 804./ 719.
7	170	-1.0959E+02	1.0121E+05	1022./1050./1058./1055./1065./1066./1045./ 935.	799./ 801./ 804./ 805./ 805./ 810./ 804./ 719.
8	200	-1.0959E+02	1.0121E+05	1023./1048./1055./1064./1063./1062./1049./ 936.	800./ 802./ 804./ 806./ 805./ 809./ 804./ 719.
9	230	-1.0911E+02	1.0121E+05	1023./1045./1065./1063./1058./1070./1052./ 933.	799./ 801./ 804./ 806./ 805./ 809./ 804./ 719.
10	261	-1.0886E+02	1.0121E+05	1022./1048./1055./1065./1067./1066./1049./ 935.	798./ 801./ 804./ 805./ 805./ 809./ 803./ 725.
11	290	-1.0641E+02	1.0121E+05	1023./1046./1066./1063./1060./1074./1052./ 932.	797./ 801./ 804./ 806./ 804./ 801./ 804./ 718.
12	320	-1.1008E+02	1.0121E+05	1023./1044./1063./1067./1060./1072./1053./ 933.	798./ 801./ 804./ 806./ 805./ 809./ 804./ 718.
13	350	-1.1008E+02	1.0121E+05	1023./1045./1066./1065./1060./1075./1052./ 932.	797./ 801./ 804./ 805./ 804./ 809./ 804./ 718.
14	380	-1.1057E+02	1.0121E+05	1023./1043./1062./1068./1061./1072./1053./ 932.	797./ 801./ 804./ 806./ 804./ 808./ 803./ 718.
15	410	-1.0959E+02	1.0121E+05	1023./1046./1067./1063./1063./1078./1050./ 930.	796./ 801./ 804./ 805./ 804./ 808./ 803./ 717.
16	440	-1.1180E+02	1.0121E+05	1023./1045./1058./1068./1064./1070./1053./ 933.	796./ 801./ 804./ 806./ 804./ 808./ 803./ 718.
17	470	-1.1082E+02	1.0121E+05	1023./1045./1062./1069./1062./1072./1054./ 932.	796./ 801./ 804./ 806./ 804./ 808./ 803./ 717.
18	500	-1.1057E+02	1.0121E+05	1023./1046./1067./1066./1060./1076./1053./ 931.	795./ 801./ 805./ 806./ 804./ 807./ 802./ 717.
19	530	-1.1106E+02	1.0121E+05	1023./1045./1066./1068./1060./1074./1054./ 931.	795./ 801./ 804./ 806./ 804./ 808./ 802./ 717.
AVERAGE :		-1.0970E+02	1.0121E+05	1023./1046./1061./1063./1060./1067./1051./ 933.	796./ 801./ 804./ 806./ 805./ 808./ 803./ 719.
20	560	-1.1106E+02	1.0121E+05	1023./1052./1064./1059./1067./1081./1046./ 931.	794./ 801./ 804./ 805./ 804./ 808./ 802./ 716.

NO.	TIME (S)	UF-1(m3/h)	UF-3(m3/h)	UF-4(m3/h)	UF-5(m3/h)	NO.	TIME(S)	Ro2in	Rco2in	Rcoin	Ro2out	Rco2out	Rcoout	Fco/co2
1	-288	1.80E-03	3.92E+00	-7.54E+00	-4.31E-02	1	-100	0.10	0.00	0.00	0.45	0.00	0.00	99.99
2	0	1.44E-01	4.16E+00	-7.17E+00	9.59E-01	2	20	11.10	0.00	0.00	0.01	0.00	2.02	99.99
3	50	3.40E+00	4.87E+00	-5.82E+00	3.93E+00	3	140	26.06	2.58	0.00	14.70	3.03	0.12	0.04
4	80	3.58E+00	4.86E+00	-5.81E+00	4.02E+00	4	260	27.85	4.43	0.00	16.09	4.78	0.11	0.02
5	111	3.59E+00	4.86E+00	-6.00E+00	4.02E+00	5	380	27.80	4.50	0.00	15.86	5.61	0.14	0.03
6	140	3.71E+00	4.85E+00	-5.81E+00	4.11E+00	6	500	27.88	4.78	0.00	15.88	5.76	0.19	0.03
7	170	3.78E+00	4.88E+00	-5.85E+00	4.15E+00	7	620	27.80	4.68	0.00	15.80	5.82	0.23	0.04
8	200	3.77E+00	4.86E+00	-5.85E+00	4.14E+00	8	740	28.24	4.89	0.00	15.85	5.79	0.28	0.05
9	230	3.79E+00	4.82E+00	-5.88E+00	4.16E+00	9	860	27.92	5.04	0.00	15.62	5.89	0.29	0.05
10	261	3.83E+00	4.86E+00	-5.88E+00	4.27E+00	10	980	28.02	5.21	0.00	15.59	5.99	0.34	0.06
11	290	3.67E+00	4.87E+00	-5.87E+00	4.28E+00	11	1100	28.19	4.98	0.00	15.68	5.89	0.38	0.07
12	320	3.71E+00	4.89E+00	-5.90E+00	4.22E+00	12	1220	28.14	5.12	0.00	15.45	6.13	0.41	0.07
13	350	3.72E+00	4.88E+00	-5.87E+00	4.16E+00	13	1340	28.32	4.93	0.00	15.62	6.06	0.45	0.07
14	380	3.88E+00	4.83E+00	-5.85E+00	4.19E+00	14	1460	16.05	13.19	0.00	15.48	6.07	0.46	0.08
15	410	3.80E+00	4.89E+00	-5.84E+00	4.18E+00	15								
16	440	3.88E+00	4.90E+00	-5.87E+00	4.19E+00	16								
17	470	3.84E+00	4.88E+00	-5.83E+00	4.19E+00	17								
18	500	3.76E+00	4.85E+00	-5.84E+00	4.22E+00	18								
19	530	3.73E+00	4.87E+00	-5.89E+00	4.17E+00	19								
AVERAGE :		3.53E+00	4.83E+00	-5.94E+00	3.97E+00									
20	560	3.88E+00	4.83E+00	-5.89E+00	4.18E+00	20								

Table 3.2.8 Experimental data of RUN <NNU04> (continue)

=============> RUN NO. (NNU04) >==============> DATE (92/08/07) >===

NO.	TIME(S)	Tw1	Tw2	Tw3	Tw4	Tw5	Tw6	Tw7	Tw8	Tg1	Tg2	Tg3	Tg4	Tg5	Tg6	Tg7	Tg8	Tg9	Tg10	Tg11	Tg12	NO.
1	-288	26.	26.	105.	121.	20.	28.	21.	21.	25.	26.	26.	26.	26.	26.	27.	27.	29.	27.	31.	27.	1
2	0	26.	26.	105.	121.	20.	28.	21.	21.	25.	26.	26.	26.	26.	26.	27.	27.	29.	27.	31.	27.	2
3	50	26.	26.	105.	122.	21.	29.	22.	21.	25.	26.	26.	26.	26.	26.	27.	27.	29.	27.	31.	27.	3
4	80	26.	26.	105.	122.	21.	29.	22.	21.	25.	26.	26.	26.	26.	26.	27.	27.	29.	27.	31.	27.	4
5	111	26.	26.	105.	123.	21.	29.	22.	21.	25.	26.	27.	26.	26.	27.	27.	27.	29.	27.	31.	27.	5
6	140	26.	26.	105.	123.	21.	29.	22.	21.	25.	26.	27.	26.	26.	27.	27.	27.	29.	27.	31.	27.	6
7	170	26.	26.	105.	123.	21.	30.	22.	21.	25.	26.	27.	26.	26.	27.	27.	27.	29.	27.	31.	27.	7
8	200	26.	26.	105.	124.	21.	30.	22.	21.	25.	26.	27.	26.	26.	26.	27.	27.	29.	27.	31.	27.	8
9	230	26.	26.	105.	125.	21.	30.	22.	21.	25.	26.	27.	26.	26.	26.	27.	27.	29.	27.	31.	27.	9
10	261	26.	26.	105.	125.	21.	30.	22.	21.	25.	26.	26.	26.	26.	26.	27.	27.	29.	27.	31.	27.	10
11	290	26.	26.	105.	126.	21.	30.	22.	21.	25.	26.	26.	26.	26.	26.	26.	27.	29.	27.	31.	27.	11
12	320	26.	26.	105.	126.	21.	30.	22.	21.	25.	26.	26.	26.	26.	26.	26.	27.	29.	27.	31.	27.	12
13	350	26.	26.	105.	127.	21.	30.	23.	21.	25.	26.	26.	26.	26.	26.	27.	27.	29.	27.	31.	27.	13
14	380	26.	26.	105.	127.	21.	30.	23.	21.	25.	26.	26.	26.	26.	26.	27.	27.	29.	27.	31.	27.	14
15	410	26.	26.	105.	128.	21.	30.	23.	21.	25.	26.	26.	26.	26.	26.	27.	27.	29.	27.	31.	27.	15
16	440	26.	26.	106.	128.	21.	30.	23.	21.	25.	26.	26.	26.	26.	26.	26.	27.	29.	27.	31.	27.	16
17	470	26.	26.	106.	129.	21.	30.	23.	21.	25.	26.	26.	26.	26.	26.	27.	27.	29.	27.	31.	27.	17
18	500	26.	26.	106.	129.	21.	30.	23.	21.	25.	26.	26.	26.	26.	26.	27.	27.	29.	27.	31.	27.	18
19	530	26.	26.	106.	129.	21.	30.	23.	21.	25.	26.	26.	26.	26.	26.	27.	27.	29.	27.	31.	27.	19
20	560	26.	26.	106.	129.	21.	30.	23.	21.	25.	26.	26.	26.	26.	26.	26.	27.	29.	27.	31.	27.	20
AVERAGE :		26.	26.	105.	125.	21.	30.	22.	21.	25.	26.	26.	26.	26.	26.	27.	27.	29.	27.	31.	27.	

NO.	TIME(S)	Tg13	Tg14	Tg15	Tg16	Tg17	Tg18	Tg19	Tg20	Tg21	Tg22	Tg23	Tg24	Tg25	Tg26	Tg27	Tg28	Tg29	Tg30	Tg31	NO.
1	-288	27.	344.	124.	420.	159.	21.	21.	28.	28.	33.	29.	90.	87.	27.	27.	29.	27.	31.	27.	1
2	0	27.	344.	123.	419.	159.	21.	21.	28.	28.	33.	29.	90.	87.	27.	27.	29.	27.	31.	27.	2
3	50	27.	307.	126.	417.	177.	21.	21.	28.	28.	32.	41.	91.	87.	27.	27.	29.	27.	31.	27.	3
4	80	27.	299.	126.	405.	169.	21.	21.	28.	28.	32.	43.	92.	87.	27.	27.	29.	27.	31.	27.	4
5	111	27.	297.	126.	406.	177.	21.	21.	28.	27.	31.	44.	93.	88.	27.	27.	29.	27.	31.	27.	5
6	140	27.	298.	128.	408.	177.	21.	21.	28.	27.	31.	45.	93.	88.	27.	27.	29.	27.	31.	27.	6
7	170	27.	298.	128.	411.	179.	21.	21.	29.	27.	31.	45.	94.	89.	27.	27.	29.	27.	31.	27.	7
8	200	27.	298.	128.	414.	181.	21.	21.	29.	27.	31.	46.	94.	90.	27.	27.	29.	27.	31.	27.	8
9	230	27.	299.	129.	416.	182.	21.	21.	29.	27.	31.	46.	95.	90.	27.	27.	29.	27.	31.	27.	9
10	261	27.	299.	129.	418.	183.	21.	21.	29.	27.	31.	46.	95.	90.	27.	27.	29.	27.	31.	27.	10
11	290	27.	299.	129.	419.	184.	21.	21.	29.	27.	31.	46.	96.	91.	26.	27.	29.	27.	31.	27.	11
12	320	27.	299.	129.	419.	184.	21.	21.	29.	27.	31.	46.	96.	91.	26.	27.	29.	27.	31.	27.	12
13	350	27.	300.	130.	421.	185.	21.	21.	29.	27.	31.	46.	97.	91.	27.	27.	29.	27.	31.	27.	13
14	380	27.	300.	129.	421.	186.	21.	21.	29.	27.	31.	46.	97.	91.	27.	27.	29.	27.	31.	27.	14
15	410	27.	299.	130.	422.	186.	21.	21.	29.	27.	31.	46.	97.	92.	27.	27.	29.	27.	31.	27.	15
16	440	27.	299.	130.	423.	187.	21.	21.	29.	27.	31.	47.	97.	93.	26.	27.	29.	27.	31.	27.	16
17	470	27.	300.	130.	422.	187.	21.	21.	29.	27.	31.	47.	97.	92.	27.	27.	29.	27.	31.	27.	17
18	500	27.	300.	129.	423.	187.	21.	21.	29.	27.	31.	46.	97.	92.	27.	27.	29.	27.	31.	27.	18
19	530	27.	300.	129.	423.	189.	21.	21.	29.	27.	31.	46.	97.	92.	27.	27.	29.	27.	31.	27.	19
20	560	27.	300.	129.	423.	188.	21.	21.	29.	27.	31.	46.	97.	92.	26.	27.	29.	27.	31.	27.	20
AVERAGE :		27.	302.	128.	417.	181.	21.	21.	29.	27.	31.	45.	95.	90.	27.	27.	29.	27.	31.	27.	

Table 3.2.9 Experimental data of RUN <NNU05>

=============> RUN NO. (NNU05) >==============> DATE (92/08/18) >===>

Tmix = 26 (min) dTmeas = 30 (s) Troom = 26 (C)

ZERO BEFORE :	P (V)	PA (V)	UF-1 (V)	UF-3 (V)	UF-4 (V)	UF-5 (V)
	9.9815E-01	4.3842E+00	9.9921E-01	2.3004E-03	9.2940E-04	-4.7240E-03

AVERAGE MOLE FRACTION :	R o2,in	R co2,in	R co,in	R o2,out	R co2,out	R co,out	F co/co2
	25.62	4.25	0.00	0.00	6.18	0.00	0.00

NO.	TIME (S)	Ptest (Pa)	Pabs (Pa)	Tem.(11-18) channel A (C)	Tem.(21-28) channel C (C)
1	-169	2.9004E+02	1.0142E+05	1168./1196./1205./1205./1203./1198./1190./1100.	788./ 800./ 804./ 805./ 806./ 805./ 793./ 703.
2	0	-6.7227E+02	1.0142E+05	1174./1194./1202./1205./1208./1207./1190./1101.	788./ 801./ 804./ 805./ 806./ 805./ 793./ 703.
3	48	-6.7643E+02	1.0142E+05	1170./1194./1202./1206./1207./1204./1191./1102.	792./ 801./ 804./ 806./ 806./ 806./ 793./ 702.
4	78	-6.7325E+02	1.0142E+05	1177./1195./1205./1210./1212./1211./1189./1103.	796./ 801./ 804./ 806./ 806./ 807./ 795./ 703.
5	108	-6.7399E+02	1.0142E+05	1177./1196./1206./1211./1214./1216./1190./1104.	800./ 802./ 804./ 806./ 807./ 807./ 795./ 704.
6	138	-6.7350E+02	1.0142E+05	1175./1198./1211./1213./1210./1208./1190./1104.	801./ 802./ 805./ 807./ 807./ 806./ 795./ 704.
7	168	-6.7325E+02	1.0142E+05	1170./1197./1208./1210./1209./1210./1191./1104.	801./ 802./ 804./ 806./ 806./ 805./ 795./ 703.
8	198	-6.7668E+02	1.0142E+05	1170./1197./1206./1211./1213./1216./1193./1105.	802./ 802./ 804./ 806./ 806./ 805./ 795./ 703.
9	228	-6.7350E+02	1.0142E+05	1178./1200./1213./1215./1214./1214./1190./1104.	803./ 802./ 804./ 806./ 806./ 805./ 795./ 704.
10	258	-6.7276E+02	1.0142E+05	1170./1199./1209./1212./1213./1218./1193./1105.	802./ 802./ 804./ 806./ 806./ 805./ 796./ 704.
11	288	-6.7717E+02	1.0142E+05	1170./1198./1207./1212./1215./1221./1193./1105.	802./ 802./ 804./ 805./ 805./ 805./ 796./ 704.
12	318	-6.7742E+02	1.0142E+05	1177./1198./1209./1215./1219./1228./1191./1104.	803./ 802./ 804./ 806./ 805./ 806./ 797./ 705.
13	348	-6.7815E+02	1.0142E+05	1178./1200./1213./1217./1217./1223./1189./1103.	803./ 802./ 804./ 806./ 805./ 805./ 797./ 705.
14	378	-6.7668E+02	1.0142E+05	1176./1201./1213./1216./1214./1217./1190./1103.	805./ 802./ 804./ 806./ 805./ 804./ 797./ 706.
15	408	-6.7423E+02	1.0141E+05	1176./1198./1208./1214./1218./1228./1191./1104.	804./ 802./ 804./ 805./ 805./ 805./ 797./ 705.
16	438	-6.7643E+02	1.0141E+05	1170./1199./1207./1212./1215./1222./1193./1104.	804./ 802./ 804./ 605./ 805./ 805./ 796./ 705.
17	468	-6.7963E+02	1.0141E+05	1175./1198./1207./1213./1218./1228./1191./1103.	804./ 802./ 804./ 805./ 805./ 805./ 797./ 706.
18	498	-6.8110E+02	1.0141E+05	1175./1199./1208./1213./1218./1228./1192./1103.	804./ 802./ 804./ 805./ 805./ 805./ 796./ 705.
19	528	-6.8036E+02	1.0141E+05	1178./1200./1210./1216./1219./1228./1190./1103.	804./ 802./ 804./ 806./ 805./ 805./ 797./ 706.
20	558	-6.7840E+02	1.0141E+05	1178./1200./1210./1216./1219./1228./1190./1102.	804./ 802./ 804./ 805./ 805./ 805./ 797./ 706.
21	588	-6.7545E+02	1.0141E+05	1177./1202./1213./1216./1216./1221./1189./1102.	804./ 802./ 805./ 806./ 806./ 806./ 797./ 706.
22	618	-6.7914E+02	1.0141E+05	1178./1200./1211./1217./1219./1227./1190./1102.	804./ 802./ 804./ 806./ 805./ 806./ 797./ 706.
23	648	-6.7521E+02	1.0141E+05	1179./1201./1213./1217./1217./1220./1188./1102.	804./ 802./ 805./ 806./ 805./ 806./ 797./ 706.
24	678	-6.7791E+02	1.0141E+05	1170./1199./1206./1212./1216./1223./1193./1102.	803./ 802./ 804./ 806./ 805./ 804./ 796./ 705.
25	708	-6.7496E+02	1.0141E+05	1174./1202./1213./1215./1214./1218./1190./1100.	803./ 801./ 804./ 806./ 805./ 805./ 796./ 705.
26	738	-6.7276E+02	1.0141E+05	1169./1200./1209./1211./1212./1219./1193./1102.	802./ 802./ 805./ 806./ 805./ 804./ 796./ 705.
27	768	-6.7864E+02	1.0142E+05	1170./1200./1207./1211./1214./1223./1193./1101.	802./ 802./ 804./ 806./ 805./ 804./ 795./ 705.
28	798	-6.7202E+02	1.0142E+05	1170./1201./1211./1213./1212./1218./1192./1101.	802./ 802./ 805./ 806./ 805./ 804./ 796./ 705.
29	828	-6.7693E+02	1.0142E+05	1177./1200./1209./1215./1219./1229./1191./1101.	801./ 802./ 805./ 806./ 805./ 805./ 796./ 706.
30	858	-6.7301E+02	1.0142E+05	1176./1199./1208./1214./1219./1229./1191./1101.	802./ 802./ 805./ 806./ 806./ 805./ 796./ 705.
31	888	-6.7864E+02	1.0142E+05	1170./1200./1206./1211./1214./1221./1193./1101.	800./ 802./ 805./ 806./ 805./ 804./ 795./ 704.
32	918	-6.7325E+02	1.0142E+05	1175./1199./1200./1213./1217./1228./1191./1101.	800./ 802./ 805./ 806./ 805./ 805./ 796./ 705.
33	948	-6.7496E+02	1.0142E+05	1173./1199./1207./1213./1217./1228./1192./1101.	800./ 802./ 805./ 806./ 805./ 805./ 795./ 704.
34	978	-6.7252E+02	1.0142E+05	1178./1199./1211./1217./1225./1229./1190./1100.	800./ 804./ 805./ 807./ 806./ 805./ 796./ 705.
35	1008	-6.7252E+02	1.0142E+05	1178./1202./1213./1215./1215./1221./1189./1099.	800./ 802./ 806./ 807./ 806./ 805./ 795./ 704.
36	1038	-6.7643E+02	1.0142E+05	1170./1200./1206./1212./1215./1223./1193./1100.	798./ 802./ 805./ 806./ 806./ 804./ 795./ 704.
37	1068	-6.7545E+02	1.0142E+05	1174./1199./1207./1213./1218./1228./1191./1100.	798./ 802./ 805./ 807./ 805./ 804./ 795./ 704.
38	1098	-6.7815E+02	1.0142E+05	1178./1200./1213./1218./1217./1225./1188./1099.	798./ 803./ 806./ 807./ 806./ 805./ 788./ 705.
39	1128	-6.7301E+02	1.0142E+05	1170./1200./1206./1212./1216./1224./1192./1100.	797./ 802./ 805./ 807./ 806./ 804./ 795./ 704.
40	1158	-6.7276E+02	1.0142E+05	1170./1199./1206./1212./1217./1226./1192./1100.	797./ 802./ 806./ 807./ 806./ 805./ 795./ 704.
41	1188	-6.7570E+02	1.0142E+05	1177./1202./1213./1215./1215./1221./1189./1098.	797./ 802./ 806./ 807./ 806./ 804./ 795./ 704.
42	1218	-6.7693E+02	1.0142E+05	1176./1202./1213./1215./1215./1222./1188./1098.	797./ 802./ 806./ 807./ 806./ 805./ 795./ 704.
43	1248	-6.7448E+02	1.0142E+05	1175./1202./1213./1215./1214./1217./1189./1098.	796./ 802./ 806./ 807./ 806./ 805./ 795./ 703.
44	1278	-6.7423E+02	1.0142E+05	1170./1201./1209./1211./1212./1218./1192./1099.	795./ 802./ 806./ 807./ 806./ 804./ 794./ 703.
45	1308	-6.7643E+02	1.0142E+05	1177./1200./1209./1216./1219./1229./1190./1099.	795./ 802./ 806./ 807./ 806./ 805./ 795./ 703.
46	1338	-6.7472E+02	1.0142E+05	1171./1199./1206./1213./1217./1227./1191./1099.	795./ 802./ 806./ 807./ 806./ 804./ 795./ 703.
47	1368	-6.7570E+02	1.0141E+05	1170./1201./1209./1211./1212./1218./1192./1098.	794./ 802./ 806./ 807./ 806./ 804./ 794./ 703.
48	1398	-6.7399E+02	1.0142E+05	1175./1202./1213./1215./1214./1218./1189./1098.	795./ 803./ 807./ 808./ 807./ 805./ 795./ 703.
49	1428	-6.7668E+02	1.0141E+05	1173./1202./1212./1214./1213./1216./1190./1098.	794./ 802./ 807./ 807./ 806./ 804./ 794./ 703.
50	1458	-6.7742E+02	1.0141E+05	1169./1201./1209./1211./1212./1218./1192./1098.	794./ 802./ 807./ 807./ 806./ 804./ 794./ 702.
51	1488	6.7252E+02	1.0141E+05	1178./1201./1212./1217./1217./1225./1188./1098.	794./ 803./ 807./ 808./ 807./ 805./ 795./ 703.
52	1518	-6.7350E+02	1.0141E+05	1177./1199./1208./1214./1219./1228./1190./1098.	794./ 803./ 807./ 807./ 806./ 805./ 795./ 703.
AVERAGE :		-6.7551E+02	1.0142E+05	1174./1199./1209./1213./1215./1221./1191./1101.	800./ 802./ 805./ 806./ 806./ 805./ 795./ 704.
53	1548	-6.7325E+02	1.0141E+05	1176./1200./1208./1214./1219./1228./1190./1098.	794./ 803./ 807./ 808./ 807./ 805./ 794./ 703.

Table 3.2.9 Experimental data of RUN <NNU05> (continue)

NO.	TIME (S)	UF-1(m3/h)	UF-3(m3/h)	UF-4(m3/h)	UF-5(m3/h)
1	-169	6.85E-04	4.34E+00	-7.98E+00	-2.31E-02
2	0	1.11E-03	4.52E+00	-7.60E+00	9.18E-01
3	48	2.49E+00	5.41E+00	-6.16E+00	4.29E+00
4	78	2.66E+00	5.23E+00	-6.13E+00	4.36E+00
5	108	2.61E+00	5.23E+00	-6.11E+00	4.41E+00
6	138	2.67E+00	5.30E+00	-6.39E+00	4.45E+00
7	168	2.74E+00	5.31E+00	-6.18E+00	4.44E+00
8	198	2.94E+00	5.15E+00	-6.16E+00	4.60E+00
9	228	3.00E+00	5.17E+00	-6.17E+00	4.49E+00
10	258	3.17E+00	5.19E+00	-6.18E+00	4.46E+00
11	288	3.05E+00	5.17E+00	-6.16E+00	4.43E+00
12	318	3.05E+00	5.17E+00	-6.15E+00	4.50E+00
13	348	3.14E+00	5.23E+00	-6.15E+00	4.49E+00
14	378	3.26E+00	5.26E+00	-6.13E+00	4.50E+00
15	408	3.59E+00	5.15E+00	-6.15E+00	4.50E+00
16	438	3.50E+00	5.20E+00	-6.15E+00	4.50E+00
17	468	3.43E+00	5.15E+00	-6.14E+00	4.52E+00
18	498	3.33E+00	5.19E+00	-6.15E+00	4.47E+00
19	528	3.42E+00	5.17E+00	-6.16E+00	4.49E+00
20	558	3.75E+00	5.20E+00	-6.15E+00	4.47E+00
21	588	3.67E+00	5.20E+00	-6.19E+00	4.50E+00
22	618	3.62E+00	5.23E+00	-6.21E+00	4.49E+00
23	648	3.52E+00	5.22E+00	-6.18E+00	4.47E+00
24	678	3.43E+00	5.22E+00	-6.19E+00	4.48E+00
25	708	3.79E+00	5.19E+00	-6.20E+00	4.50E+00
26	738	3.64E+00	5.12E+00	-6.18E+00	4.45E+00
27	768	3.51E+00	5.22E+00	-6.17E+00	4.44E+00
28	798	3.53E+00	5.22E+00	-6.19E+00	4.46E+00
29	828	3.85E+00	5.22E+00	-6.18E+00	4.43E+00
30	858	3.57E+00	5.21E+00	-6.20E+00	4.53E+00
31	888	3.49E+00	5.24E+00	-6.15E+00	4.48E+00
32	918	3.51E+00	5.22E+00	-6.15E+00	4.50E+00
33	948	3.59E+00	5.16E+00	-6.20E+00	4.48E+00
34	978	3.72E+00	5.16E+00	-6.16E+00	4.48E+00
35	1008	3.73E+00	5.26E+00	-6.17E+00	4.51E+00
36	1038	3.61E+00	5.22E+00	-6.18E+00	4.51E+00
37	1068	3.62E+00	5.23E+00	-6.20E+00	4.50E+00
38	1098	3.69E+00	5.18E+00	-6.17E+00	4.52E+00
39	1128	3.75E+00	5.22E+00	-6.18E+00	4.52E+00
40	1158	3.73E+00	5.20E+00	-6.14E+00	4.50E+00
41	1188	3.69E+00	5.19E+00	-6.15E+00	4.51E+00
42	1218	3.83E+00	5.24E+00	-6.14E+00	4.54E+00
43	1248	3.75E+00	5.17E+00	-6.17E+00	4.52E+00
44	1278	4.00E+00	5.18E+00	-6.17E+00	4.48E+00
45	1308	3.87E+00	5.19E+00	-6.20E+00	4.51E+00
46	1338	3.70E+00	5.21E+00	-6.18E+00	4.49E+00
47	1368	3.85E+00	5.22E+00	-6.19E+00	4.47E+00
48	1398	3.84E+00	5.20E+00	-6.22E+00	4.47E+00
49	1428	3.82E+00	5.23E+00	-6.19E+00	4.52E+00
50	1458	3.65E+00	5.24E+00	-6.21E+00	4.50E+00
51	1488	3.64E+00	5.14E+00	-6.22E+00	4.50E+00
52	1518	3.81E+00	5.18E+00	-6.20E+00	4.58E+00
AVERAGE :		3.41E+00	5.19E+00	-6.20E+00	4.41E+00
53	1548	3.72E+00	5.20E+00	-6.20E+00	4.53E+00

NO.	TIME(S)	Ro2in	Rco2in	Rcoin	Ro2out	Rco2out	Rcoout	Fco/co2
1	-100	0.00	0.00	7.00	0.00	0.00	0.00	99.99
2	20	8.66	0.00	5.23	0.00	0.00	0.00	99.99
3	140	23.84	2.65	0.00	0.00	4.32	0.00	0.00
4	260	25.87	3.80	0.00	0.00	5.68	0.00	0.00
5	380	25.75	4.12	0.00	0.00	6.11	0.00	0.00
6	500	26.16	3.96	0.00	0.00	6.11	0.00	0.00
7	620	26.19	3.97	0.00	0.00	6.27	0.00	0.00
8	740	26.25	3.88	0.00	0.00	6.37	0.00	0.00
9	860	26.28	4.16	0.00	0.00	6.43	0.00	0.00
10	980	25.75	4.63	0.00	0.00	6.26	0.00	0.00
11	1100	26.02	4.21	0.00	0.00	6.51	0.00	0.00
12	1220	25.63	4.34	0.00	0.00	6.58	0.00	0.00
13	1340	26.42	4.10	0.00	0.00	6.41	0.00	0.00
14	1460	26.08	4.17	0.00	0.00	6.63	0.00	0.00
15	1580	22.76	7.21	0.00	0.00	6.69	0.00	0.00
16	1700	11.11	15.23	0.00	0.00	6.70	0.00	0.00
17	1820	5.36	18.74	0.00	0.00	6.68	0.00	0.00
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Table 3.2.9 Experimental data of RUN <NNU05> (continue)

=============> RUN NO. (NNU05) >==============> DATE (92/08/18) >===

NO.	TIME(S)	Tw1	Tw2	Tw3	Tw4	Tw5	Tw6	Tw7	Tw8	Tg1	Tg2	Tg3	Tg4	Tg5	Tg6	Tg7	Tg8	Tg9	Tg10	Tg11	Tg12	NO.
1	-169	29.	29.	101.	132.	24.	25.	24.	24.	26.	28.	29.	29.	29.	29.	30.	29.	32.	30.	36.	30.	1
2	0	29.	29.	101.	132.	24.	25.	24.	24.	25.	28.	29.	29.	29.	29.	30.	29.	32.	29.	36.	30.	2
3	48	29.	29.	102.	135.	24.	25.	25.	24.	25.	27.	29.	29.	28.	29.	30.	29.	32.	29.	36.	30.	3
4	78	29.	29.	102.	137.	24.	25.	25.	24.	26.	27.	29.	28.	28.	29.	30.	29.	31.	29.	36.	30.	4
5	108	29.	29.	102.	138.	24.	26.	25.	24.	26.	26.	29.	28.	28.	29.	30.	29.	31.	29.	36.	30.	5
6	138	29.	29.	102.	139.	24.	26.	25.	24.	26.	26.	29.	28.	28.	29.	30.	29.	31.	29.	36.	30.	6
7	168	29.	29.	102.	139.	24.	26.	25.	24.	26.	26.	29.	28.	28.	29.	30.	29.	31.	29.	36.	30.	7
8	198	29.	29.	102.	141.	24.	26.	25.	24.	26.	27.	29.	28.	28.	29.	30.	29.	31.	29.	37.	30.	8
9	228	29.	29.	102.	141.	24.	26.	25.	24.	25.	26.	29.	28.	28.	29.	29.	29.	31.	29.	37.	30.	9
10	258	29.	29.	103.	142.	24.	26.	25.	24.	26.	27.	29.	28.	28.	29.	30.	29.	31.	29.	37.	30.	10
11	288	29.	29.	103.	142.	24.	26.	25.	24.	26.	26.	29.	28.	28.	29.	30.	29.	31.	29.	37.	30.	11
12	318	29.	29.	103.	144.	24.	26.	25.	24.	25.	26.	29.	28.	28.	29.	29.	29.	31.	29.	37.	30.	12
13	348	29.	29.	103.	144.	24.	26.	25.	24.	25.	26.	29.	28.	28.	29.	30.	29.	31.	29.	37.	30.	13
14	378	29.	29.	102.	145.	24.	26.	25.	24.	26.	26.	29.	28.	28.	29.	30.	29.	31.	29.	37.	30.	14
15	408	29.	29.	103.	145.	24.	26.	25.	24.	25.	26.	29.	28.	28.	29.	29.	29.	31.	29.	37.	30.	15
16	438	29.	29.	103.	146.	24.	26.	25.	24.	25.	26.	29.	28.	28.	29.	30.	29.	31.	29.	37.	30.	16
17	468	29.	29.	103.	146.	24.	26.	25.	24.	25.	26.	29.	28.	28.	29.	30.	29.	31.	29.	37.	30.	17
18	498	29.	29.	103.	146.	24.	26.	25.	24.	26.	26.	29.	28.	28.	29.	30.	29.	31.	29.	37.	30.	18
19	528	29.	29.	103.	148.	24.	26.	25.	24.	25.	27.	29.	28.	28.	29.	30.	29.	31.	29.	37.	30.	19
20	558	29.	29.	104.	148.	24.	26.	25.	24.	25.	26.	29.	28.	28.	29.	30.	29.	31.	29.	37.	30.	20
21	588	29.	29.	103.	148.	24.	26.	25.	24.	25.	26.	29.	28.	28.	29.	30.	29.	31.	29.	37.	30.	21
22	618	29.	29.	104.	149.	24.	26.	25.	24.	25.	26.	29.	28.	28.	29.	29.	29.	31.	29.	37.	30.	22
23	648	29.	29.	104.	149.	24.	26.	25.	24.	25.	26.	29.	28.	28.	29.	30.	29.	31.	29.	37.	30.	23
24	678	29.	29.	104.	149.	24.	26.	25.	24.	25.	26.	29.	28.	28.	29.	30.	29.	31.	29.	37.	30.	24
25	708	29.	29.	104.	150.	24.	26.	25.	24.	25.	26.	29.	28.	28.	29.	29.	29.	31.	29.	37.	30.	25
26	738	29.	29.	104.	150.	24.	26.	25.	24.	25.	26.	29.	28.	28.	29.	29.	29.	31.	29.	37.	30.	26
27	768	29.	29.	104.	150.	24.	26.	25.	24.	25.	26.	29.	28.	28.	29.	30.	29.	31.	29.	37.	30.	27
28	798	29.	29.	104.	151.	24.	26.	25.	24.	25.	26.	29.	28.	28.	29.	30.	29.	31.	29.	37.	30.	28
29	828	29.	29.	104.	151.	24.	26.	25.	24.	25.	26.	29.	28.	28.	29.	30.	29.	31.	29.	37.	30.	29
30	858	29.	29.	104.	152.	24.	26.	25.	24.	25.	26.	29.	28.	28.	29.	29.	29.	31.	29.	37.	30.	30
31	888	29.	29.	105.	151.	24.	26.	25.	24.	25.	26.	29.	28.	28.	29.	29.	29.	31.	29.	37.	30.	31
32	918	29.	29.	104.	151.	24.	26.	25.	24.	25.	26.	29.	28.	28.	29.	29.	29.	31.	29.	37.	30.	32
33	948	29.	29.	104.	151.	24.	26.	25.	24.	25.	26.	29.	28.	28.	29.	29.	29.	31.	29.	37.	30.	33
34	978	29.	29.	105.	152.	24.	27.	25.	24.	25.	26.	29.	28.	28.	29.	29.	29.	31.	29.	37.	30.	34
35	1008	29.	29.	105.	152.	24.	26.	25.	24.	25.	26.	29.	28.	28.	29.	29.	29.	31.	29.	37.	30.	35
36	1038	29.	29.	104.	151.	24.	27.	25.	24.	25.	26.	29.	28.	28.	29.	29.	29.	31.	29.	37.	30.	36
37	1068	29.	29.	104.	153.	24.	27.	25.	24.	25.	26.	29.	28.	28.	29.	29.	29.	31.	29.	37.	30.	37
38	1098	29.	29.	104.	153.	24.	27.	25.	25.	25.	26.	29.	28.	28.	29.	29.	29.	31.	29.	37.	30.	38
39	1128	29.	29.	104.	153.	24.	27.	25.	24.	25.	26.	29.	28.	28.	29.	29.	29.	31.	29.	37.	30.	39
40	1158	29.	29.	105.	153.	24.	27.	25.	25.	25.	26.	29.	28.	28.	29.	29.	29.	31.	29.	37.	30.	40
41	1188	29.	29.	104.	153.	24.	27.	25.	24.	25.	26.	29.	28.	28.	29.	29.	29.	31.	29.	37.	30.	41
42	1218	29.	29.	104.	153.	24.	27.	25.	24.	25.	26.	29.	28.	28.	29.	29.	29.	31.	29.	37.	30.	42
43	1248	29.	29.	105.	153.	24.	27.	25.	25.	25.	26.	29.	28.	28.	29.	29.	29.	31.	29.	37.	30.	43
44	1278	29.	29.	105.	153.	24.	27.	25.	24.	25.	26.	29.	28.	28.	29.	29.	29.	31.	29.	37.	30.	44
45	1308	29.	29.	105.	154.	24.	27.	25.	24.	25.	26.	29.	28.	28.	29.	29.	29.	31.	29.	37.	30.	45
46	1338	29.	29.	105.	154.	24.	27.	25.	24.	25.	26.	29.	28.	28.	29.	29.	29.	31.	29.	37.	30.	46
47	1368	29.	29.	105.	154.	24.	27.	25.	25.	25.	26.	29.	28.	28.	29.	29.	29.	31.	29.	37.	30.	47
48	1398	29.	29.	105.	154.	24.	27.	25.	24.	25.	26.	29.	28.	28.	29.	29.	29.	31.	29.	37.	30.	48
49	1428	29.	29.	105.	154.	24.	27.	25.	25.	25.	26.	29.	28.	28.	29.	29.	29.	31.	29.	37.	30.	49
50	1458	29.	29.	105.	155.	24.	27.	25.	25.	25.	26.	29.	28.	28.	29.	29.	29.	31.	29.	37.	30.	50
51	1488	29.	29.	105.	154.	24.	27.	25.	24.	25.	26.	29.	28.	28.	29.	29.	29.	31.	29.	37.	30.	51
52	1518	29.	29.	105.	155.	24.	27.	25.	24.	25.	26.	29.	28.	28.	29.	29.	29.	31.	29.	37.	30.	52
53	1548	29.	29.	105.	155.	24.	27.	25.	24.	25.	26.	29.	28.	28.	29.	29.	29.	31.	29.	37.	30.	53
AVERAGE :		29.	29.	104.	148.	24.	26.	25.	24.	25.	26.	29.	28.	28.	29.	29.	29.	31.	29.	37.	30.	

Table 3.2.9 Experimental data of RUN <NNU05> (continue)

NO.	TIME(S)	Tg13	Tg14	Tg15	Tg16	Tg17	Tg18	Tg19	Tg20	Tg21	Tg22	Tg23	Tg24	Tg25	Tg26	Tg27	Tg28	Tg29	Tg30	Tg31	NO.
1	-169	29.	341.	119.	463.	186.	24.	24.	24.	24.	25.	25.	89.	84.	30.	29.	32.	30.	36.	30.	1
2	0	29.	341.	119.	463.	185.	24.	24.	24.	24.	25.	25.	89.	84.	30.	29.	32.	29.	36.	30.	2
3	48	29.	318.	127.	555.	217.	24.	24.	25.	26.	26.	27.	90.	85.	30.	29.	32.	29.	36.	30.	3
4	78	29.	301.	125.	494.	208.	24.	24.	25.	26.	26.	28.	90.	85.	30.	29.	31.	29.	36.	30.	4
5	108	29.	296.	124.	481.	208.	24.	24.	25.	26.	27.	29.	90.	86.	30.	29.	31.	29.	36.	30.	5
6	138	29.	294.	126.	480.	209.	24.	24.	25.	27.	27.	29.	90.	86.	30.	29.	31.	29.	36.	30.	6
7	168	29.	294.	126.	480.	211.	24.	24.	25.	27.	27.	29.	90.	86.	30.	29.	31.	29.	36.	30.	7
8	198	29.	294.	127.	483.	212.	24.	24.	25.	27.	27.	29.	91.	87.	30.	29.	31.	29.	37.	30.	8
9	228	29.	294.	128.	485.	213.	24.	24.	25.	27.	27.	29.	91.	86.	29.	29.	31.	29.	37.	30.	9
10	258	29.	294.	128.	486.	215.	24.	24.	25.	27.	27.	29.	91.	87.	30.	29.	31.	29.	37.	30.	10
11	288	29.	294.	129.	488.	214.	24.	24.	25.	27.	27.	29.	91.	87.	30.	29.	31.	29.	37.	30.	11
12	318	29.	295.	128.	488.	216.	24.	24.	25.	27.	27.	29.	91.	87.	29.	29.	31.	29.	37.	30.	12
13	348	29.	295.	129.	490.	217.	24.	24.	25.	27.	27.	29.	92.	88.	30.	29.	31.	29.	37.	30.	13
14	378	29.	295.	129.	491.	218.	24.	24.	25.	27.	27.	29.	92.	88.	30.	29.	31.	29.	37.	30.	14
15	408	29.	295.	128.	491.	218.	24.	24.	25.	27.	27.	29.	93.	88.	29.	29.	31.	29.	37.	30.	15
16	438	29.	295.	128.	492.	218.	24.	24.	25.	27.	27.	29.	93.	88.	30.	29.	31.	29.	37.	30.	16
17	468	29.	295.	128.	491.	218.	24.	24.	25.	27.	27.	29.	93.	88.	30.	29.	31.	29.	37.	30.	17
18	498	29.	295.	129.	492.	220.	24.	24.	25.	27.	27.	29.	93.	88.	30.	29.	31.	29.	37.	30.	18
19	528	29.	296.	129.	490.	220.	24.	24.	25.	27.	27.	29.	93.	88.	30.	29.	31.	29.	37.	30.	19
20	558	29.	296.	129.	491.	221.	24.	24.	25.	27.	27.	29.	93.	89.	30.	29.	31.	29.	37.	30.	20
21	588	29.	295.	130.	492.	221.	24.	24.	25.	27.	27.	29.	94.	88.	30.	29.	31.	29.	37.	30.	21
22	618	29.	296.	129.	493.	221.	24.	24.	25.	27.	27.	29.	93.	88.	29.	29.	31.	29.	37.	30.	22
23	648	29.	295.	129.	491.	221.	24.	24.	25.	27.	27.	29.	93.	88.	30.	29.	31.	29.	37.	30.	23
24	678	29.	296.	129.	492.	221.	24.	24.	26.	27.	27.	29.	93.	88.	30.	29.	31.	29.	37.	30.	24
25	708	29.	295.	130.	492.	223.	24.	24.	25.	27.	27.	29.	93.	89.	29.	29.	31.	29.	37.	30.	25
26	738	29.	295.	129.	492.	223.	24.	24.	25.	27.	27.	29.	94.	88.	29.	29.	31.	29.	37.	30.	26
27	768	29.	296.	130.	493.	223.	24.	24.	25.	27.	27.	29.	94.	89.	30.	29.	31.	29.	37.	30.	27
28	798	29.	296.	130.	493.	224.	24.	24.	25.	27.	27.	29.	94.	88.	30.	29.	31.	29.	37.	30.	28
29	828	29.	296.	129.	493.	224.	24.	24.	25.	27.	27.	29.	94.	89.	30.	29.	31.	29.	37.	30.	29
30	858	29.	296.	130.	492.	224.	24.	24.	25.	27.	27.	29.	94.	89.	29.	29.	31.	29.	37.	30.	30
31	888	29.	296.	130.	493.	224.	24.	24.	25.	27.	27.	29.	94.	89.	29.	29.	31.	29.	37.	30.	31
32	918	29.	296.	130.	493.	224.	24.	24.	25.	27.	27.	29.	94.	89.	29.	29.	31.	29.	37.	30.	32
33	948	29.	296.	130.	492.	224.	24.	24.	25.	27.	27.	29.	94.	89.	29.	29.	31.	29.	37.	30.	33
34	978	29.	296.	130.	494.	225.	24.	24.	26.	27.	27.	29.	94.	88.	29.	29.	31.	29.	37.	30.	34
35	1008	29.	296.	131.	494.	225.	24.	24.	25.	27.	27.	29.	94.	88.	29.	29.	31.	29.	37.	30.	35
36	1038	29.	295.	131.	493.	224.	24.	24.	26.	27.	27.	29.	94.	89.	29.	29.	31.	29.	37.	30.	36
37	1068	29.	296.	130.	494.	226.	24.	24.	26.	27.	27.	29.	94.	89.	29.	29.	31.	29.	37.	30.	37
38	1098	29.	296.	131.	494.	226.	24.	24.	26.	27.	27.	29.	94.	89.	29.	29.	31.	29.	37.	30.	38
39	1128	29.	296.	131.	494.	226.	24.	24.	26.	27.	27.	30.	94.	89.	29.	29.	31.	29.	37.	30.	39
40	1158	29.	296.	131.	494.	227.	24.	24.	26.	27.	27.	30.	94.	89.	29.	29.	31.	29.	37.	30.	40
41	1188	29.	297.	130.	492.	226.	24.	24.	26.	27.	27.	30.	94.	89.	29.	29.	31.	29.	37.	30.	41
42	1218	29.	296.	131.	492.	226.	24.	24.	26.	27.	27.	30.	94.	90.	29.	29.	31.	29.	37.	30.	42
43	1248	29.	297.	131.	493.	226.	24.	24.	26.	27.	27.	30.	94.	90.	29.	29.	31.	29.	37.	30.	43
44	1278	29.	297.	131.	493.	227.	24.	24.	26.	27.	27.	30.	94.	90.	29.	29.	31.	29.	37.	30.	44
45	1308	29.	296.	130.	494.	227.	24.	24.	26.	27.	27.	30.	94.	89.	29.	29.	31.	29.	37.	30.	45
46	1338	29.	297.	131.	495.	227.	24.	24.	26.	27.	27.	30.	94.	90.	29.	29.	31.	29.	37.	30.	46
47	1368	29.	297.	130.	494.	227.	24.	24.	26.	28.	27.	30.	95.	90.	29.	29.	31.	29.	37.	30.	47
48	1398	29.	297.	131.	494.	227.	24.	24.	26.	28.	27.	30.	95.	90.	29.	29.	31.	29.	37.	30.	48
49	1428	29.	297.	132.	495.	227.	24.	24.	26.	28.	27.	30.	95.	90.	29.	29.	31.	29.	37.	30.	49
50	1458	29.	296.	131.	494.	227.	24.	24.	26.	28.	27.	30.	94.	90.	29.	29.	31.	29.	37.	30.	50
51	1488	29.	298.	131.	492.	228.	24.	24.	26.	27.	27.	30.	94.	90.	29.	29.	31.	29.	37.	30.	51
52	1518	29.	297.	131.	494.	228.	24.	24.	26.	27.	27.	30.	94.	90.	29.	29.	31.	29.	37.	30.	52
53	1548	29.	298.	131.	493.	228.	24.	24.	26.	27.	27.	30.	95.	89.	29.	29.	31.	29.	37.	30.	53
AVERAGE :		29.	297.	129.	492.	221.	24.	24.	25.	27.	27.	29.	93.	88.	29.	29.	31.	29.	37.	30.	

Table 3.2.10 Experimental data of RUN<<NNU06>

=============> RUN NO. (NNU06) >==============> DATE (92/08/25) >===>

Tmix = 26 (min) dTmeas = 30 (s) Troom = 26 (C)

	P (V)	PA (V)	UF-1 (V)	UF-3 (V)	UF-4 (V)	UF-5 (V)
ZERO BEFORE :	9.9867E-01	4.3846E+00	9.9923E-01	-4.9856E-03	-3.9600E-03	-2.4502E-03

	R o2,in	R co2,in	R co,in	R o2,out	R co2,out	R co,out	F co/co2
AVERAGE MOLE FRACTION :	23.17	6.33	0.00	10.73	9.21	0.00	0.00

NO.	TIME (S)	Ptest (Pa)	Pabs (Pa)	Tem. (11-18) channel A (C)	Tem. (21-28) channel C (C)
1	-166	8.6376E+02	1.0129E+05	1176./1192./1198./1202./1206./1206./1187./1087.	1029./1043./1050./1052./1060./1060./1046./ 971.
2	0	-7.4337E+02	1.0129E+05	1175./1192./1200./1208./1207./1207./1186./1087.	1032./1041./1050./1054./1061./1060./1044./ 969.
3	48	-7.4459E+02	1.0128E+05	1172./1194./1209./1209./1205./1200./1183./1086.	1036./1047./1058./1059./1057./1053./1035./ 964.
4	78	-7.4435E+02	1.0128E+05	1176./1192./1199./1205./1209./1210./1188./1089.	1031./1042./1051./1055./1065./1064./1045./ 970.
5	108	-7.4165E+02	1.0129E+05	1175./1193./1204./1210./1211./1212./1185./1089.	1040./1042./1057./1061./1068./1064./1037./ 965.
6	138	-7.4288E+02	1.0129E+05	1174./1193./1207./1212./1212./1213./1185./1089.	1040./1042./1058./1063./1069./1066./1038./ 965.
7	168	-7.4263E+02	1.0128E+05	1176./1193./1202./1207./1212./1218./1189./1091.	1031./1044./1054./1057./1068./1071./1046./ 971.
8	198	-7.4410E+02	1.0128E+05	1174./1194./1208./1214./1214./1218./1185./1089.	1041./1043./1059./1065./1072./1073./1039./ 966.
9	228	-7.4754E+02	1.0128E+05	1177./1194./1202./1207./1212./1217./1189./1090.	1029./1045./1055./1057./1067./1074./1047./ 973.
10	258	-7.4582E+02	1.0128E+05	1177./1194./1202./1208./1213./1218./1189./1090.	1028./1046./1056./1058./1067./1076./1047./ 972.
11	288	-7.4361E+02	1.0128E+05	1173./1196./1212./1212./1210./1212./1185./1088.	1033./1051./1063./1062./1062./1066./1037./ 967.
12	318	-7.4459E+02	1.0128E+05	1177./1195./1204./1212./1215./1222./1187./1089.	1039./1043./1056./1064./1074./1079./1043./ 967.
13	348	-7.4558E+02	1.0128E+05	1177./1197./1212./1210./1210./1213./1186./1088.	1032./1052./1061./1061./1062./1069./1041./ 970.
14	378	-7.4288E+02	1.0128E+05	1174./1196./1212./1216./1214./1218./1184./1088.	1043./1047./1062./1067./1071./1073./1035./ 962.
15	408	-7.4361E+02	1.0127E+05	1174./1197./1213./1213./1211./1213./1184./1087.	1035./1051./1063./1064./1064./1069./1034./ 965.
16	438	-7.4141E+02	1.0128E+05	1178./1195./1202./1208./1213./1222./1189./1089.	1030./1047./1056./1059./1069./1079./1046./ 972.
17	468	-7.4631E+02	1.0127E+05	1178./1195./1202./1208./1214./1222./1189./1089.	1030./1047./1056./1059./1067./1079./1048./ 972.
18	498	-7.4288E+02	1.0127E+05	1175./1198./1211./1210./1210./1213./1185./1087.	1031./1052./1063./1063./1062./1069./1042./ 967.
19	528	-7.4141E+02	1.0127E+05	1177./1196./1206./1214./1215./1221./1185./1088.	1040./1044./1059./1065./1075./1081./1041./ 963.
20	558	-7.4386E+02	1.0128E+05	1178./1196./1203./1207./1212./1220./1189./1088.	1028./1049./1056./1059./1065./1077./1045./ 970.
21	588	-7.4410E+02	1.0127E+05	1175./1198./1211./1210./1210./1213./1186./1087.	1032./1052./1062./1060./1062./1072./1041./ 967.
22	618	-7.4092E+02	1.0127E+05	1178./1196./1202./1208./1214./1223./1189./1089.	1031./1047./1056./1060./1071./1081./1046./ 968.
23	648	-7.4337E+02	1.0127E+05	1178./1196./1202./1208./1213./1221./1188./1088.	1029./1048./1056./1059./1067./1080./1046./ 970.
24	678	-7.4386E+02	1.0127E+05	1179./1196./1203./1210./1213./1223./1188./1088.	1034./1046./1056./1062./1072./1081./1043./ 966.
25	708	-7.4435E+02	1.0127E+05	1176./1198./1210./1215./1213./1218./1183./1087.	1043./1048./1062./1067./1072./1074./1037./ 957.
26	738	-7.4459E+02	1.0127E+05	1179./1197./1203./1207./1212./1219./1189./1088.	1029./1051./1058./1059./1063./1076./1044./ 968.
27	768	-7.4238E+02	1.0126E+05	1178./1197./1206./1214./1215./1222./1186./1088.	1039./1045./1057./1065./1074./1081./1042./ 963.
28	798	-7.4238E+02	1.0127E+05	1176./1199./1214./1214./1211./1213./1184./1086.	1039./1052./1063./1066./1067./1072./1034./ 959.
29	828	-7.4312E+02	1.0127E+05	1179./1197./1203./1207./1212./1218./1188./1087.	1030./1052./1059./1059./1062./1073./1043./ 967.
30	858	-7.4435E+02	1.0127E+05	1177./1197./1209./1215./1214./1220./1185./1087.	1043./1047./1062./1067./1071./1075./1034./ 958.
31	888	-7.4263E+02	1.0126E+05	1176./1198./1211./1215./1214./1219./1184./1087.	1043./1048./1062./1068./1073./1076./1035./ 958.
32	918	-7.4509E+02	1.0127E+05	1176./1197./1210./1215./1214./1220./1184./1087.	1043./1046./1061./1067./1074./1078./1036./ 959.
33	948	-7.4484E+02	1.0126E+05	1179./1196./1201./1207./1212./1220./1188./1087.	1030./1049./1056./1058./1065./1078./1044./ 967.
34	978	-7.4558E+02	1.0126E+05	1179./1197./1204./1206./1212./1218./1188./1087.	1029./1051./1057./1059./1064./1075./1044./ 967.
35	1008	-7.4533E+02	1.0126E+05	1179./1197./1202./1207./1214./1220./1188./1088.	1029./1050./1057./1059./1064./1077./1045./ 968.
36	1038	-7.4631E+02	1.0126E+05	1179./1197./1202./1203./1212./1218./1188./1087.	1029./1051./1057./1059./1063./1076./1044./ 967.
37	1068	-7.4459E+02	1.0126E+05	1176./1199./1213./1213./1211./1213./1185./1086.	1037./1052./1063./1065./1066./1072./1034./ 960.
38	1098	-7.4435E+02	1.0126E+05	1176./1199./1214./1214./1210./1214./1183./1086.	1040./1052./1063./1067./1068./1073./1034./ 958.
39	1128	-7.4435E+02	1.0126E+05	1176./1199./1214./1214./1212./1215./1183./1086.	1041./1052./1063./1067./1069./1072./1034./ 959.
40	1158	-7.4214E+02	1.0126E+05	1176./1199./1211./1210./1210./1213./1184./1086.	1032./1053./1062./1061./1063./1071./1039./ 964.
41	1188	-7.4238E+02	1.0126E+05	1179./1197./1205./1213./1214./1221./1186./1087.	1040./1045./1059./1066./1075./1082./1041./ 960.
42	1218	-7.4509E+02	1.0126E+05	1176./1199./1211./1210./1210./1213./1185./1086.	1034./1053./1066./1063./1063./1070./1037./ 962.
43	1248	-7.4067E+02	1.0126E+05	1180./1197./1203./1210./1214./1222./1187./1088.	1034./1046./1056./1061./1074./1082./1046./ 965.
44	1278	-7.4582E+02	1.0126E+05	1179./1197./1203./1209./1214./1222./1187./1087.	1032./1047./1055./1061./1073./1081./1045./ 965.
45	1308	-7.4337E+02	1.0126E+05	1178./1197./1207./1214./1214./1221./1187./1087.	1040./1045./1058./1066./1076./1082./1040./ 960.
46	1338	-7.4410E+02	1.0125E+05	1178./1197./1206./1214./1214./1221./1185./1086.	1042./1045./1059./1066./1075./1082./1040./ 959.
47	1369	-7.4043E+02	1.0126E+05	1179./1197./1203./1209./1214./1222./1187./1087.	1033./1046./1056./1062./1074./1082./1045./ 963.
48	1398	-7.4312E+02	1.0126E+05	1176./1199./1213./1214./1211./1214./1183./1086.	1039./1052./1063./1067./1069./1073./1033./ 956.
49	1428	-7.4361E+02	1.0126E+05	1179./1197./1201./1212./1212./1220./1188./1087.	1030./1049./1057./1058./1065./1077./1044./ 966.
50	1458	-7.4288E+02	1.0126E+05	1176./1198./1213./1215./1213./1216./1183./1086.	1044./1049./1062./1067./1075./1076./1034./ 957.
51	1488	-7.4214E+02	1.0126E+05	1179./1197./1202./1208./1213./1219./1188./1087.	1031./1048./1056./1059./1068./1079./1045./ 966.
52	1518	-7.4288E+02	1.0126E+05	1176./1198./1213./1214./1212./1215./1183./1086.	1043./1050./1063./1067./1071./1074./1034./ 957.
AVERAGE :		-7.4369E+02	1.0127E+05	1177./1196./1206./1211./1212./1217./1186./1088.	1035./1048./1059./1062./1068./1074./1041./ 965.
53	1548	-7.4337E+02	1.0125E+05	1180./1198./1204./1207./1212./1216./1187./1086.	1031./1053./1059./1060./1063./1073./1041./ 965.

Table 3.2.10 Experimental data of RUN <NNU06> (continue)

NO.	TIME (S)	UF-1(m3/h)	UF-3(m3/h)	UF-4(m3/h)	UF-5(m3/h)
1	-166	4.12E-03	3.80E+00	-6.75E+00	-7.61E-02
2	0	4.12E-01	3.96E+00	-6.42E+00	9.83E-01
3	48	4.91E+00	5.05E+00	-4.94E+00	4.42E+00
4	78	5.32E+00	5.07E+00	-4.98E+00	4.51E+00
5	108	5.35E+00	5.12E+00	-5.09E+00	4.61E+00
6	138	5.54E+00	5.04E+00	-5.02E+00	4.57E+00
7	168	5.46E+00	4.95E+00	-5.04E+00	4.55E+00
8	198	5.54E+00	4.98E+00	-5.04E+00	4.60E+00
9	228	5.70E+00	4.96E+00	-5.08E+00	4.54E+00
10	258	5.58E+00	4.96E+00	-5.09E+00	4.60E+00
11	288	5.62E+00	5.06E+00	-5.09E+00	4.59E+00
12	318	5.65E+00	5.04E+00	-5.06E+00	4.57E+00
13	348	5.63E+00	5.06E+00	-5.08E+00	4.58E+00
14	378	5.61E+00	5.04E+00	-5.07E+00	4.58E+00
15	408	5.61E+00	5.02E+00	-5.05E+00	4.61E+00
16	438	5.58E+00	5.13E+00	-5.04E+00	4.60E+00
17	468	5.53E+00	5.04E+00	-5.06E+00	4.58E+00
18	498	5.42E+00	5.08E+00	-5.09E+00	4.64E+00
19	528	5.53E+00	4.99E+00	-5.09E+00	4.64E+00
20	558	5.37E+00	5.00E+00	-5.09E+00	4.62E+00
21	588	5.42E+00	5.03E+00	-5.06E+00	4.60E+00
22	618	5.49E+00	5.02E+00	-5.03E+00	4.59E+00
23	648	5.38E+00	5.03E+00	-5.05E+00	4.62E+00
24	678	5.39E+00	5.04E+00	-5.04E+00	4.59E+00
25	708	5.39E+00	5.04E+00	-5.05E+00	4.62E+00
26	738	5.42E+00	5.01E+00	-5.08E+00	4.61E+00
27	768	5.30E+00	5.08E+00	-5.08E+00	4.59E+00
28	798	5.37E+00	5.08E+00	-5.08E+00	4.59E+00
29	828	5.24E+00	5.00E+00	-5.08E+00	4.60E+00
30	858	5.32E+00	5.08E+00	-5.12E+00	4.64E+00
31	888	5.33E+00	5.04E+00	-5.10E+00	4.63E+00
32	918	5.22E+00	5.04E+00	-5.09E+00	4.63E+00
33	948	5.15E+00	5.04E+00	-5.09E+00	4.61E+00
34	978	5.29E+00	4.95E+00	-5.06E+00	4.62E+00
35	1008	5.18E+00	5.10E+00	-5.06E+00	4.62E+00
36	1038	5.16E+00	5.09E+00	-5.09E+00	4.59E+00
37	1068	5.27E+00	5.08E+00	-5.07E+00	4.61E+00
38	1098	5.19E+00	5.09E+00	-5.08E+00	4.63E+00
39	1128	5.09E+00	5.14E+00	-5.07E+00	4.62E+00
40	1158	5.10E+00	5.03E+00	-5.12E+00	4.62E+00
41	1188	5.06E+00	5.08E+00	-5.07E+00	4.61E+00
42	1218	5.12E+00	5.06E+00	-5.05E+00	4.61E+00
43	1248	5.17E+00	5.02E+00	-5.10E+00	4.62E+00
44	1278	4.97E+00	5.06E+00	-5.07E+00	4.64E+00
45	1308	5.08E+00	5.04E+00	-5.06E+00	4.61E+00
46	1338	5.18E+00	5.05E+00	-5.09E+00	4.62E+00
47	1369	5.00E+00	5.05E+00	-5.08E+00	4.62E+00
48	1398	5.03E+00	5.11E+00	-5.08E+00	4.66E+00
49	1428	5.04E+00	5.10E+00	-5.09E+00	4.63E+00
50	1458	4.96E+00	5.09E+00	-5.07E+00	4.60E+00
51	1488	5.04E+00	5.17E+00	-5.08E+00	4.62E+00
52	1518	4.91E+00	5.12E+00	-5.09E+00	4.60E+00
AVERAGE :		5.21E+00	5.03E+00	-5.09E+00	4.53E+00
53	1548	4.89E+00	5.07E+00	-5.07E+00	4.64E+00

NO.	TIME(S)	Ro2in	Rco2in	Rcoin	Ro2out	Rco2out	Rcoout	Fco/co2
1	-100	0.00	0.18	3.12	0.15	0.00	0.00	99.99
2	20	11.77	0.06	0.03	0.01	0.00	2.26	99.99
3	140	24.71	4.36	0.00	10.94	7.48	0.01	0.00
4	260	25.72	6.17	0.00	11.68	9.62	0.00	0.00
5	380	26.19	6.36	0.00	11.73	10.07	0.00	0.00
6	500	25.83	6.70	0.00	11.67	10.19	0.00	0.00
7	620	26.40	6.55	0.00	11.68	10.20	0.00	0.00
8	740	25.83	6.76	0.00	11.69	10.21	0.00	0.00
9	860	26.33	6.60	0.00	11.65	10.27	0.00	0.00
10	980	25.83	6.75	0.00	11.64	10.30	0.00	0.00
11	1100	26.13	6.64	0.00	11.68	10.28	0.00	0.00
12	1220	26.25	6.68	0.00	11.67	10.32	0.00	0.00
13	1340	25.92	6.71	0.00	11.71	10.31	0.00	0.00
14	1460	25.68	6.93	0.00	11.69	10.31	0.00	0.00
15	1580	16.79	11.68	0.00	11.70	10.33	0.00	0.00
16	1700	3.80	19.12	0.00	11.69	10.33	0.00	0.00
17	1820	1.62	19.36	1.55	11.66	10.34	0.00	0.00
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Table 3.2.10 Experimental data of RUN <NNU06> (continue)

============> RUN NO. (NNU06) >============> DATE (92/08/25) >============

NO.	TIME(S)	Tw1	Tw2	Tw3	Tw4	Tw5	Tw6	Tw7	Tw8	Tg1	Tg2	Tg3	Tg4	Tg5	Tg6	Tg7	Tg8	Tg9	Tg10	Tg11	Tg12	NO.
1	-166	25.	25.	112.	128.	21.	23.	21.	21.	25.	25.	25.	25.	25.	25.	25.	25.	32.	27.	34.	27.	1
2	0	25.	25.	113.	128.	21.	23.	21.	21.	24.	25.	25.	25.	25.	25.	25.	25.	32.	27.	34.	27.	2
3	48	25.	25.	114.	129.	21.	24.	22.	21.	25.	26.	25.	25.	25.	25.	25.	26.	31.	27.	34.	27.	3
4	78	25.	25.	115.	130.	21.	24.	22.	21.	25.	26.	25.	26.	26.	25.	25.	25.	31.	27.	33.	27.	4
5	108	25.	25.	116.	131.	21.	24.	22.	21.	25.	26.	25.	26.	26.	25.	25.	25.	31.	27.	33.	27.	5
6	138	25.	25.	117.	133.	21.	24.	22.	21.	25.	26.	25.	26.	26.	25.	25.	25.	31.	26.	33.	27.	6
7	168	25.	25.	118.	134.	21.	24.	22.	21.	25.	26.	25.	26.	26.	25.	25.	25.	31.	27.	33.	27.	7
8	198	25.	25.	119.	135.	21.	24.	22.	21.	25.	26.	25.	26.	26.	25.	25.	26.	31.	27.	33.	27.	8
9	228	25.	25.	120.	137.	21.	24.	22.	21.	25.	26.	25.	26.	26.	25.	25.	25.	31.	27.	33.	27.	9
10	258	25.	25.	121.	137.	21.	24.	22.	21.	25.	26.	25.	26.	26.	25.	25.	25.	31.	27.	33.	27.	10
11	288	25.	25.	121.	138.	21.	24.	22.	21.	25.	26.	25.	25.	26.	25.	25.	25.	31.	27.	33.	27.	11
12	318	25.	25.	122.	139.	21.	24.	22.	21.	25.	26.	25.	26.	26.	25.	25.	25.	31.	27.	33.	27.	12
13	348	25.	25.	123.	140.	21.	24.	22.	21.	25.	26.	25.	26.	26.	25.	25.	25.	31.	27.	33.	27.	13
14	378	25.	25.	124.	141.	21.	24.	22.	21.	25.	26.	25.	26.	26.	25.	25.	25.	31.	27.	33.	27.	14
15	408	25.	25.	124.	142.	20.	24.	22.	21.	25.	26.	25.	26.	26.	25.	25.	25.	31.	27.	33.	27.	15
16	438	25.	25.	124.	142.	20.	24.	22.	21.	25.	26.	25.	25.	26.	25.	25.	25.	31.	27.	33.	27.	16
17	468	25.	25.	125.	143.	21.	24.	22.	21.	25.	26.	25.	26.	26.	25.	25.	25.	31.	27.	33.	27.	17
18	498	25.	25.	126.	143.	20.	24.	22.	21.	25.	26.	25.	26.	26.	25.	25.	25.	31.	27.	33.	27.	18
19	528	25.	25.	127.	145.	20.	24.	22.	21.	25.	26.	25.	26.	26.	25.	25.	25.	31.	27.	33.	27.	19
20	558	25.	25.	127.	144.	20.	24.	22.	21.	25.	26.	25.	26.	26.	25.	25.	25.	31.	27.	33.	27.	20
21	588	25.	25.	127.	145.	20.	24.	21.	21.	25.	26.	25.	26.	26.	25.	25.	25.	31.	27.	33.	27.	21
22	618	25.	25.	128.	146.	20.	24.	22.	21.	25.	26.	25.	26.	26.	25.	25.	25.	31.	27.	33.	27.	22
23	648	25.	25.	128.	146.	20.	24.	22.	21.	25.	26.	25.	26.	26.	25.	25.	25.	31.	27.	33.	27.	23
24	678	25.	25.	129.	146.	20.	24.	22.	21.	25.	26.	25.	26.	26.	25.	25.	25.	31.	27.	33.	27.	24
25	708	25.	25.	129.	147.	20.	24.	22.	21.	25.	26.	25.	26.	26.	25.	25.	25.	31.	27.	33.	27.	25
26	738	25.	25.	130.	148.	20.	24.	21.	21.	25.	26.	25.	26.	26.	25.	25.	25.	31.	27.	33.	27.	26
27	768	25.	25.	129.	147.	20.	24.	22.	21.	25.	26.	25.	26.	26.	25.	25.	25.	31.	27.	33.	27.	27
28	798	25.	25.	130.	148.	20.	24.	22.	21.	25.	26.	25.	26.	26.	25.	25.	25.	31.	27.	33.	27.	28
29	828	25.	25.	130.	149.	20.	24.	21.	21.	25.	26.	25.	26.	26.	25.	25.	25.	31.	27.	33.	27.	29
30	858	25.	25.	131.	149.	20.	24.	22.	21.	25.	26.	25.	26.	26.	25.	25.	25.	31.	27.	33.	27.	30
31	888	25.	25.	130.	148.	20.	24.	21.	21.	25.	26.	25.	26.	26.	25.	25.	25.	31.	27.	33.	27.	31
32	918	25.	25.	131.	149.	20.	24.	21.	21.	25.	26.	25.	25.	26.	25.	25.	25.	31.	27.	33.	27.	32
33	948	25.	25.	131.	150.	20.	24.	21.	21.	25.	26.	25.	26.	26.	25.	25.	25.	31.	27.	33.	27.	33
34	978	25.	25.	132.	150.	20.	24.	21.	21.	25.	26.	25.	25.	26.	25.	25.	25.	31.	27.	33.	27.	34
35	1008	25.	25.	132.	150.	20.	24.	21.	21.	25.	26.	25.	25.	26.	25.	25.	25.	31.	26.	33.	27.	35
36	1038	25.	25.	132.	150.	20.	24.	21.	21.	25.	26.	25.	25.	26.	25.	25.	25.	31.	27.	33.	27.	36
37	1068	25.	25.	132.	151.	20.	24.	21.	21.	25.	26.	25.	25.	26.	25.	25.	25.	31.	27.	33.	27.	37
38	1098	25.	25.	133.	151.	20.	24.	21.	21.	25.	26.	25.	25.	26.	25.	25.	25.	31.	26.	33.	27.	38
39	1128	25.	25.	133.	151.	20.	24.	21.	21.	25.	26.	25.	26.	26.	25.	25.	25.	31.	27.	33.	27.	39
40	1158	25.	25.	133.	151.	20.	24.	21.	20.	25.	26.	25.	25.	26.	25.	25.	25.	31.	27.	33.	27.	40
41	1188	25.	25.	133.	153.	20.	24.	21.	20.	25.	26.	25.	25.	26.	25.	25.	25.	31.	26.	33.	27.	41
42	1218	25.	25.	133.	152.	20.	24.	21.	20.	25.	26.	25.	25.	26.	25.	25.	25.	31.	26.	33.	27.	42
43	1248	25.	25.	133.	152.	20.	24.	21.	20.	25.	26.	25.	25.	26.	25.	25.	25.	31.	26.	33.	27.	43
44	1278	25.	25.	133.	152.	20.	24.	21.	20.	25.	26.	25.	25.	26.	25.	25.	25.	31.	27.	33.	27.	44
45	1308	25.	25.	133.	152.	20.	24.	21.	20.	25.	26.	25.	25.	26.	25.	25.	25.	31.	26.	33.	27.	45
46	1338	25.	25.	133.	152.	20.	24.	21.	20.	25.	26.	25.	25.	26.	25.	25.	25.	31.	26.	33.	27.	46
47	1369	25.	25.	133.	152.	20.	24.	21.	20.	25.	26.	25.	25.	25.	25.	25.	25.	31.	26.	33.	27.	47
48	1398	25.	25.	133.	152.	20.	24.	21.	20.	25.	26.	25.	25.	26.	25.	25.	25.	31.	26.	33.	27.	48
49	1428	25.	25.	133.	153.	20.	24.	21.	20.	25.	26.	25.	25.	26.	25.	25.	25.	31.	26.	33.	27.	49
50	1458	25.	25.	133.	153.	20.	24.	21.	20.	25.	26.	25.	25.	26.	25.	25.	25.	31.	26.	33.	27.	50
51	1488	25.	25.	133.	153.	20.	24.	21.	20.	25.	26.	25.	25.	26.	25.	25.	25.	31.	26.	33.	27.	51
52	1518	25.	25.	133.	153.	20.	24.	21.	20.	25.	26.	25.	25.	26.	25.	25.	25.	31.	26.	33.	27.	52
53	1548	25.	25.	133.	153.	20.	24.	21.	20.	25.	26.	25.	25.	26.	25.	25.	25.	31.	26.	33.	27.	53
AVERAGE :		25.	25.	128.	145.	20.	24.	21.	21.	25.	26.	25.	26.	26.	25.	25.	25.	31.	27.	33.	27.	

Table 3.2.10 Experimental data of RUN <NNU06> (continue)

NO.	TIME(S)	Tg13	Tg14	Tg15	Tg16	Tg17	Tg18	Tg19	Tg20	Tg21	Tg22	Tg23	Tg24	Tg25	Tg26	Tg27	Tg28	Tg29	Tg30	Tg31	NO.
1	-166	25.	410.	145.	453.	181.	21.	21.	22.	22.	23.	24.	104.	99.	25.	25.	32.	27.	34.	27.	1
2	0	25.	409.	146.	453.	180.	21.	21.	22.	22.	23.	24.	104.	99.	25.	25.	32.	27.	34.	27.	2
3	48	26.	409.	156.	477.	198.	21.	21.	22.	22.	24.	26.	106.	102.	25.	26.	31.	27.	34.	27.	3
4	78	26.	400.	157.	465.	197.	21.	21.	22.	23.	24.	27.	107.	103.	25.	25.	31.	27.	33.	27.	4
5	108	25.	402.	160.	468.	202.	21.	21.	23.	23.	24.	27.	108.	105.	25.	25.	31.	27.	33.	27.	5
6	138	25.	403.	163.	470.	204.	21.	21.	23.	23.	24.	27.	110.	107.	25.	25.	31.	26.	33.	27.	6
7	168	25.	405.	164.	474.	206.	21.	21.	23.	23.	24.	28.	112.	108.	25.	25.	31.	27.	33.	27.	7
8	198	26.	407.	166.	477.	208.	21.	21.	23.	23.	25.	28.	113.	109.	25.	26.	31.	27.	33.	27.	8
9	228	26.	409.	169.	479.	209.	21.	21.	23.	23.	25.	28.	115.	110.	25.	25.	31.	27.	33.	27.	9
10	258	26.	411.	176.	481.	209.	21.	21.	23.	23.	25.	28.	116.	111.	25.	25.	31.	27.	33.	27.	10
11	288	25.	413.	177.	482.	212.	21.	21.	23.	23.	24.	28.	116.	112.	25.	25.	31.	27.	33.	27.	11
12	318	25.	413.	178.	483.	212.	21.	21.	23.	24.	25.	28.	117.	112.	25.	25.	31.	27.	33.	27.	12
13	348	25.	414.	177.	484.	214.	21.	21.	23.	23.	25.	28.	118.	113.	25.	25.	31.	27.	33.	27.	13
14	378	25.	415.	178.	484.	214.	21.	21.	23.	23.	25.	28.	118.	112.	25.	25.	31.	27.	33.	27.	14
15	408	25.	414.	179.	484.	214.	21.	21.	23.	23.	25.	28.	118.	113.	25.	25.	31.	27.	33.	27.	15
16	438	25.	414.	179.	486.	216.	21.	21.	23.	23.	25.	28.	119.	114.	25.	25.	31.	27.	33.	27.	16
17	468	25.	415.	180.	485.	218.	21.	21.	23.	23.	25.	28.	119.	114.	25.	25.	31.	27.	33.	27.	17
18	498	25.	415.	181.	486.	217.	21.	21.	23.	24.	25.	28.	119.	114.	25.	25.	31.	27.	33.	27.	18
19	528	25.	415.	182.	486.	218.	21.	21.	23.	24.	25.	28.	119.	114.	25.	25.	31.	27.	33.	27.	19
20	558	25.	415.	182.	485.	219.	20.	21.	23.	23.	25.	28.	119.	113.	25.	25.	31.	27.	33.	27.	20
21	588	25.	416.	181.	486.	219.	20.	21.	23.	23.	25.	28.	120.	114.	25.	25.	31.	27.	33.	27.	21
22	618	25.	416.	183.	487.	220.	20.	21.	23.	24.	25.	28.	120.	114.	25.	25.	31.	27.	33.	27.	22
23	648	25.	415.	183.	487.	220.	20.	21.	23.	23.	24.	28.	120.	113.	25.	25.	31.	27.	33.	27.	23
24	678	25.	417.	183.	486.	220.	20.	21.	23.	23.	25.	28.	120.	114.	25.	25.	31.	27.	33.	27.	24
25	708	25.	415.	183.	486.	221.	20.	21.	23.	23.	24.	28.	120.	114.	25.	25.	31.	27.	33.	27.	25
26	738	25.	416.	183.	486.	221.	20.	21.	23.	23.	25.	28.	120.	115.	25.	25.	31.	27.	33.	27.	26
27	768	25.	416.	183.	487.	221.	20.	20.	23.	23.	24.	28.	120.	114.	25.	25.	31.	27.	33.	27.	27
28	798	25.	417.	183.	486.	222.	20.	20.	23.	23.	24.	28.	121.	115.	25.	25.	31.	27.	33.	27.	28
29	828	25.	416.	183.	487.	223.	20.	20.	23.	23.	24.	28.	121.	115.	25.	25.	31.	27.	33.	27.	29
30	858	25.	417.	184.	488.	223.	20.	20.	23.	23.	24.	28.	121.	115.	25.	25.	31.	27.	33.	27.	30
31	888	25.	417.	185.	488.	223.	20.	20.	23.	23.	24.	28.	120.	115.	25.	25.	31.	27.	33.	27.	31
32	918	25.	417.	185.	487.	223.	20.	20.	23.	23.	24.	28.	120.	115.	25.	25.	31.	27.	33.	27.	32
33	948	25.	416.	184.	487.	224.	20.	20.	23.	23.	24.	28.	121.	115.	25.	25.	31.	27.	33.	27.	33
34	978	25.	416.	185.	487.	224.	20.	20.	23.	23.	24.	28.	121.	115.	25.	25.	31.	27.	33.	27.	34
35	1008	25.	417.	185.	487.	224.	20.	20.	23.	23.	24.	28.	121.	115.	25.	25.	31.	26.	33.	27.	35
36	1038	25.	416.	185.	488.	224.	20.	20.	23.	23.	24.	28.	121.	115.	25.	25.	31.	27.	33.	27.	36
37	1068	25.	417.	185.	488.	225.	20.	20.	23.	23.	24.	28.	121.	115.	25.	25.	31.	27.	33.	27.	37
38	1098	25.	417.	187.	488.	225.	20.	20.	23.	23.	24.	28.	121.	115.	25.	25.	31.	26.	33.	27.	38
39	1128	25.	418.	186.	488.	224.	20.	20.	23.	23.	24.	28.	120.	115.	25.	25.	31.	27.	33.	27.	39
40	1158	25.	417.	186.	488.	225.	20.	20.	23.	23.	24.	28.	121.	115.	25.	25.	31.	27.	33.	27.	40
41	1188	25.	418.	187.	488.	225.	20.	20.	23.	23.	24.	28.	121.	115.	25.	25.	31.	26.	33.	27.	41
42	1218	25.	417.	187.	489.	225.	20.	20.	23.	23.	24.	28.	121.	116.	25.	25.	31.	26.	33.	27.	42
43	1248	25.	417.	187.	488.	225.	20.	20.	23.	23.	24.	28.	121.	115.	25.	25.	31.	26.	33.	27.	43
44	1278	25.	417.	187.	487.	225.	20.	20.	23.	23.	24.	28.	121.	115.	25.	25.	31.	27.	33.	27.	44
45	1308	25.	416.	187.	488.	225.	20.	20.	23.	23.	24.	28.	122.	115.	25.	25.	31.	26.	33.	27.	45
46	1338	25.	417.	186.	487.	226.	20.	20.	23.	23.	24.	28.	122.	116.	25.	25.	31.	26.	33.	27.	46
47	1369	25.	416.	186.	488.	226.	20.	20.	23.	23.	24.	28.	122.	115.	25.	25.	31.	26.	33.	27.	47
48	1398	25.	416.	188.	488.	227.	20.	20.	23.	23.	24.	28.	122.	115.	25.	25.	31.	26.	33.	27.	48
49	1428	25.	417.	187.	488.	226.	20.	20.	23.	23.	24.	28.	122.	116.	25.	25.	31.	26.	33.	27.	49
50	1458	25.	417.	186.	488.	227.	20.	20.	23.	23.	24.	28.	121.	116.	25.	25.	31.	26.	33.	27.	50
51	1488	25.	416.	188.	486.	226.	20.	20.	23.	23.	24.	28.	122.	115.	25.	25.	31.	26.	33.	27.	51
52	1518	25.	417.	187.	488.	227.	20.	20.	23.	23.	24.	28.	122.	116.	25.	25.	31.	26.	33.	27.	52
53	1548	25.	417.	188.	488.	227.	20.	20.	23.	23.	24.	28.	122.	115.	25.	25.	31.	26.	33.	27.	53
AVERAGE :		25.	414.	180.	484.	218.	20.	20.	23.	23.	24.	28.	118.	113.	25.	25.	31.	27.	33.	27.	

Table 3.2.11 Calculation results of RUN <NNB03>

=============> RUN NO. (NNB03) >==============> DATE (92/09/08) >==>

Tmix = 18 (min) dTmeas = 30 (s) Troom = 10 (C)

AVERAGE MOLE FRACTION :	R o2,in	R co2,in	R co,in	R o2,out	R co2,out	R co,out	F co/co2
	15.03	6.69	0.00	11.63	10.94	0.01	0.00

Ptest (Pa)	Pabs (Pa)	Tg.ch-A (C)	Tg.ch-C (C)	Flowch-A(m3/h)	Flowch-B(m3/h)	Flowch-C(m3/h)
-4.6727E+02	1.0116E+05	1132./1132./1133./1145. AVERAGE : 1135.71	1131./1133./1137./1141. AVERAGE : 1135.25	2.87E+00	-4.91E+00	6.62E+00

CHANNEL A :

NO.	X(M)	Dcor(M)	X/D/Re·Sc	Sh	Nu	Re	Sc	W(O2)	W(CO)	W(CO2)	R(O2)	R(CO)	R(CO2)	RHO(kg/m3)	VISC(Pa·s)	NO.
1	.001	.05531	3.064E-04	22.1948	16.0167	96.4	0.612	.1620	.0000	.0991	.1503	.0000	.0669	0.2552	5.086E-05	1
2	.011	.05439	3.274E-03	17.9445	6.8236	98.2	0.629	.1255	.0000	.1453	.1179	.0000	.0993	0.2585	5.056E-05	2
3	.022	.05418	6.349E-03	20.1604	5.2939	99.7	0.642	.0972	.0000	.1809	.0923	.0000	.1249	0.2612	5.032E-05	3
4	.028	.05406	7.835E-03	21.1630	4.8727	100.3	0.647	.0850	.0000	.1963	.0810	.0000	.1361	0.2623	5.022E-05	4
5	.034	.05397	9.448E-03	22.8889	4.5213	101.0	0.652	.0727	.0000	.2119	.0696	.0000	.1476	0.2635	5.012E-05	5
6	.040	.05391	1.105E-02	25.8372	4.8737	101.6	0.657	.0611	.0000	.2264	.0588	.0000	.1583	0.2646	5.002E-05	6
7	.046	.05383	1.253E-02	28.7433	4.7065	102.2	0.662	.0512	.0000	.2389	.0494	.0000	.1677	0.2656	4.993E-05	7
8	.052	.05377	1.408E-02	33.2707	4.5615	102.7	0.666	.0414	.0000	.2513	.0401	.0001	.1771	0.2666	4.985E-05	8
9	.058	.05373	1.558E-02	41.2735	4.4447	103.2	0.670	.0323	.0001	.2627	.0314	.0001	.1857	0.2675	4.977E-05	9
10	.064	.05368	1.704E-02	52.2057	4.3480	103.7	0.674	.0239	.0001	.2733	.0233	.0001	.1938	0.2683	4.970E-05	10
11	.070	.05366	1.850E-02	77.3485	4.2653	104.1	0.677	.0158	.0001	.2835	.0155	.0001	.2016	0.2691	4.963E-05	11

CHANNEL C :

NO.	X(M)	Dcor(M)	X/D/Re·Sc	Sh	Nu	Re	Sc	W(O2)	W(CO)	W(CO2)	R(O2)	R(CO)	R(CO2)	RHO(kg/m3)	VISC(Pa·s)	NO.
1	.001	.05536	1.328E-04	22.7018	21.3876	222.1	0.612	.1620	.0000	.0991	.1503	.0000	.0669	0.2553	5.085E-05	1
2	.011	.05444	1.455E-03	15.7008	9.2052	224.0	0.620	.1456	.0000	.1198	.1359	.0000	.0813	0.2568	5.071E-05	2
3	.022	.05425	2.874E-03	15.1332	7.1705	225.5	0.626	.1326	.0000	.1363	.1243	.0000	.0929	0.2580	5.061E-05	3
4	.028	.05410	3.615E-03	14.1381	6.5811	226.3	0.628	.1266	.0000	.1439	.1189	.0000	.0983	0.2585	5.056E-05	4
5	.034	.05400	4.373E-03	13.5497	6.1244	226.9	0.631	.1210	.0000	.1509	.1139	.0000	.1033	0.2590	5.051E-05	5
6	.040	.05391	5.137E-03	13.0992	5.7599	227.5	0.633	.1158	.0000	.1575	.1092	.0000	.1080	0.2595	5.047E-05	6
7	.046	.05384	5.883E-03	12.7217	5.4676	228.1	0.635	.1111	.0000	.1634	.1049	.0000	.1122	0.2600	5.043E-05	7
8	.052	.05380	6.621E-03	12.6453	5.2232	228.6	0.637	.1067	.0000	.1690	.1009	.0000	.1162	0.2604	5.039E-05	8
9	.058	.05372	7.348E-03	12.0866	5.0160	229.1	0.639	.1026	.0000	.1741	.0973	.0000	.1199	0.2608	5.036E-05	9
10	.064	.05370	8.111E-03	12.2871	4.8255	229.6	0.641	.0986	.0000	.1792	.0935	.0000	.1236	0.2611	5.032E-05	10
11	.070	.05366	8.825E-03	12.1268	4.6679	230.0	0.643	.0949	.0000	.1838	.0902	.0000	.1270	0.2615	5.029E-05	11

Table 3.2.12 Calculation results of RUN <NNB04>

=============> RUN NO. (NNB04) >==============> DATE (92/09/08) >==>

Tmix = 22 (min) dTmeas = 30 (s) Troom = 12 (C)

	R o2,in	R co2,in	R co,in	R o2,out	R co2,out	R co,out	F co/co2
AVERAGE MOLE FRACTION :	20.54	4.66	0.00	14.49	7.85	0.11	0.02

Ptest (Pa)	Pabs (Pa)	Tg.ch-A (C)	Tg.ch-C (C)	Flowch-A(m3/h)	Flowch-B(m3/h)	Flowch-C(m3/h)
1.8630E+02	1.0212E+05	901./ 905./ 905./ 896. AVERAGE : 902.059	903./ 910./ 912./ 918. AVERAGE : 910.951	4.26E+00	-5.23E+00	5.21E+00

CHANNEL A :

NO.	X(M)	Dcor(M)	X/D/Re·Sc	Sh	Nu	Re	Sc	W(O2)	W(CO)	W(CO2)	R(O2)	R(CO)	R(CO2)	RHO(kg/m3)	VISC(Pa·s)	NO.
1	.001	.05454	1.641E-04	9.2121	20.2685	193.1	0.579	.2222	.0000	.0694	.2054	.0000	.0466	0.3097	4.568E-05	1
2	.011	.05405	1.792E-03	6.8571	8.7202	194.3	0.584	.2100	.0001	.0845	.1949	.0002	.0570	0.3110	4.559E-05	2
3	.022	.05389	3.547E-03	6.2333	6.7826	195.3	0.589	.1997	.0003	.0972	.1860	.0003	.0658	0.3121	4.551E-05	3
4	.028	.05378	4.526E-03	5.6735	6.1895	195.8	0.592	.1946	.0003	.1034	.1816	.0004	.0702	0.3127	4.548E-05	4
5	.035	.05369	5.513E-03	5.2565	5.7433	196.3	0.594	.1901	.0004	.1090	.1777	.0004	.0741	0.3132	4.544E-05	5
6	.041	.05364	6.444E-03	5.0414	5.4103	196.7	0.596	.1861	.0004	.1139	.1742	.0005	.0775	0.3136	4.541E-05	6
7	.047	.05356	7.376E-03	4.5823	5.1360	197.0	0.597	.1825	.0005	.1184	.1710	.0005	.0807	0.3140	4.538E-05	7
8	.052	.05350	8.257E-03	4.2027	4.9161	197.4	0.599	.1794	.0005	.1222	.1683	.0006	.0833	0.3143	4.536E-05	8
9	.058	.05344	9.165E-03	3.9067	4.7201	197.7	0.600	.1766	.0006	.1257	.1658	.0006	.0858	0.3146	4.534E-05	9
10	.064	.05347	1.012E-02	4.1426	4.5407	198.0	0.602	.1736	.0006	.1294	.1632	.0006	.0884	0.3150	4.532E-05	10
11	.070	.05340	1.102E-02	3.7306	4.3901	198.2	0.603	.1709	.0006	.1327	.1608	.0007	.0908	0.3153	4.530E-05	11

CHANNEL C :

NO.	X(M)	Dcor(M)	X/D/Re·Sc	Sh	Nu	Re	Sc	W(O2)	W(CO)	W(CO2)	R(O2)	R(CO)	R(CO2)	RHO(kg/m3)	VISC(Pa·s)	NO.
1	.001	.05430	1.365E-04	7.7765	21.5995	233.3	0.579	.2222	.0000	.0694	.2054	.0000	.0466	0.3074	4.591E-05	1
2	.011	.05383	1.498E-03	5.3263	9.3121	234.3	0.583	.2138	.0001	.0797	.1982	.0001	.0537	0.3083	4.585E-05	2
3	.022	.05374	2.972E-03	5.0098	7.2519	235.1	0.586	.2068	.0002	.0883	.1922	.0002	.0597	0.3090	4.579E-05	3
4	.028	.05368	3.796E-03	4.7531	6.6222	235.5	0.588	.2032	.0002	.0928	.1891	.0002	.0628	0.3094	4.577E-05	4
5	.034	.05359	4.540E-03	4.2472	6.1927	235.9	0.589	.2003	.0003	.0964	.1865	.0003	.0653	0.3097	4.574E-05	5
6	.040	.05353	5.333E-03	3.9342	5.8280	236.2	0.590	.1975	.0003	.0999	.1841	.0003	.0677	0.3100	4.572E-05	6
7	.046	.05353	6.115E-03	3.9948	5.5324	236.5	0.592	.1948	.0003	.1032	.1818	.0004	.0700	0.3103	4.570E-05	7
8	.052	.05348	6.899E-03	3.7360	5.2827	236.9	0.593	.1922	.0004	.1064	.1795	.0004	.0722	0.3106	4.568E-05	8
9	.058	.05344	7.705E-03	3.5682	5.0627	237.2	0.594	.1897	.0004	.1094	.1774	.0004	.0744	0.3109	4.566E-05	9
10	.064	.05344	8.465E-03	3.5763	4.8815	237.4	0.595	.1875	.0004	.1122	.1754	.0005	.0763	0.3111	4.565E-05	10
11	.070	.05343	9.247E-03	3.5560	4.7162	237.7	0.596	.1852	.0005	.1150	.1734	.0005	.0783	0.3113	4.563E-05	11

Table 3.2.13 Calculation results of RUN <NNB05>

=============> RUN NO. (NNB05) >==============> DATE (92/09/15) >==>

Tmix = 26 (min) dTmeas = 30 (s) Troom = 24 (C)

AVERAGE MOLE FRACTION :	R o2, in	R co2, in	R co, in	R o2, out	R co2, out	R co, out	F co/co2
	28.76	6.69	0.00	11.43	10.55	0.00	0.00

Ptest (Pa)	Pabs (Pa)	Tg.ch-A (C)	Tg.ch-C (C)	Flowch-A(m3/h)	Flowch-B(m3/h)	Flowch-C(m3/h)
-8.4577E+02	1.0147E+05	1209./1213./1213./1218. AVERAGE : 1213.26	1210./1213./1217./1219. AVERAGE : 1214.62	4.88E+00	-6.21E+00	5.79E+00

CHANNEL A :

NO.	X(M)	Dcor(M)	X/D/Re·Sc	Sh	Nu	Re	Sc	W(O2)	W(CO)	W(CO2)	R(O2)	R(CO)	R(CO2)	RHO(kg/m3)	VISC(Pa·s)	NO.
1	.001	.05615	2.311E-04	9.0234	18.7125	148.4	0.519	.3044	.0000	.0974	.2876	.0000	.0669	0.2462	5.406E-05	1
2	.011	.05501	2.511E-03	6.2900	8.0028	150.1	0.530	.2817	.0000	.1247	.2682	.0000	.0863	0.2480	5.386E-05	2
3	.022	.05475	4.917E-03	5.9609	6.2181	151.5	0.539	.2634	.0000	.1466	.2523	.0000	.1021	0.2496	5.370E-05	3
4	.028	.05457	6.180E-03	5.5960	5.6940	152.2	0.544	.2548	.0000	.1570	.2448	.0000	.1097	0.2503	5.363E-05	4
5	.034	.05442	7.446E-03	5.2890	5.2949	152.8	0.547	.2469	.0000	.1665	.2378	.0000	.1166	0.2510	5.356E-05	5
6	.040	.05432	8.713E-03	5.1014	4.9769	153.4	0.551	.2395	.0000	.1753	.2313	.0000	.1231	0.2517	5.349E-05	6
7	.046	.05423	9.943E-03	4.9533	4.7220	153.9	0.554	.2328	.0000	.1834	.2254	.0000	.1291	0.2522	5.343E-05	7
8	.052	.05414	1.118E-02	4.7482	4.5043	154.4	0.557	.2264	.0000	.1911	.2197	.0000	.1348	0.2528	5.338E-05	8
9	.058	.05409	1.240E-02	4.7289	4.3197	154.9	0.560	.2204	.0000	.1983	.2143	.0000	.1402	0.2533	5.332E-05	9
10	.064	.05404	1.359E-02	4.6379	4.8086	155.3	0.563	.2148	.0000	.2050	.2093	.0000	.1452	0.2538	5.327E-05	10
11	.060	.05394	1.282E-02	4.1454	4.8875	155.1	0.561	.2183	.0000	.2008	.2124	.0000	.1421	0.2535	5.330E-05	11

CHANNEL C :

NO.	X(M)	Dcor(M)	X/D/Re·Sc	Sh	Nu	Re	Sc	W(O2)	W(CO)	W(CO2)	R(O2)	R(CO)	R(CO2)	RHO(kg/m3)	VISC(Pa·s)	NO.
1	.001	.05607	1.951E-04	8.7633	19.8405	176.1	0.519	.3044	.0000	.0974	.2876	.0000	.0669	0.2459	5.410E-05	1
2	.011	.05502	2.128E-03	6.2179	8.5079	177.8	0.529	.2855	.0000	.1201	.2714	.0000	.0831	0.2475	5.393E-05	2
3	.022	.05474	4.184E-03	5.7485	6.6152	179.2	0.536	.2700	.0000	.1387	.2581	.0000	.0964	0.2488	5.379E-05	3
4	.028	.05455	5.288E-03	5.3076	6.0508	179.8	0.540	.2626	.0000	.1476	.2517	.0000	.1028	0.2494	5.373E-05	4
5	.034	.05442	6.376E-03	5.0393	5.6301	180.6	0.543	.2560	.0000	.1556	.2458	.0000	.1086	0.2500	5.367E-05	5
6	.040	.05432	7.451E-03	4.8352	5.2989	181.0	0.546	.2498	.0000	.1629	.2405	.0000	.1140	0.2505	5.361E-05	6
7	.046	.05424	8.547E-03	4.6973	5.0207	181.6	0.549	.2439	.0000	.1701	.2352	.0000	.1192	0.2510	5.356E-05	7
8	.052	.05414	9.603E-03	4.4611	4.7944	182.1	0.551	.2386	.0000	.1765	.2305	.0000	.1240	0.2515	5.352E-05	8
9	.058	.05409	1.064E-02	4.3805	4.6016	182.5	0.554	.2336	.0000	.1825	.2261	.0000	.1284	0.2519	5.347E-05	9
10	.064	.05402	1.171E-02	4.2248	4.4279	183.0	0.556	.2287	.0000	.1883	.2217	.0000	.1328	0.2524	5.343E-05	10
11	.070	.05399	1.271E-02	4.2162	4.9056	183.4	0.558	.2243	.0000	.1937	.2177	.0000	.1367	0.2527	5.339E-05	11

Table 3.2.14 Calculation results of RUN <NNU01>

=============> RUN NO. (NNU01) >==============> DATE (92/03/24) >===>

Tmix = 20 (min) dTmeas = 30 (s) Troom = 12 (C)

AVERAGE MOLE FRACTION :	R o2, in	R co2, in	R co, in	R o2, out	R co2, out	R co, out	F co/co2
	12.07	6.69	0.02	10.52	9.29	0.04	0.01

Ptest (Pa)	Pabs (Pa)	Tg.ch-A (C)	Tg.ch-C (C)	Flowch-A (m3/h)	Flowch-B (m3/h)	Flowch-C (m3/h)
2.7474E+01	1.0146E+05	1054./ 137./1056./1057. AVERAGE : 826.032	9./ 9./ 10./ 10. AVERAGE : 9.33286	5.89E+00	-2.91E+00	-1.58E+00

CHANNEL A :

NO.	X (M)	Dcor (M)	X/D/Re·Sc	Sh	Nu	Re	Sc	W (O2)	W (CO)	W (CO2)	R (O2)	R (CO)	R (CO2)	RHO (kg/m3)	VISC (Pa·s)	NO.
1	.001	.05507	9.534E-05	26.9971	23.6778	300.7	0.633	.1307	.0002	.0996	.1207	.0002	.0669	0.3284	4.303E-05	1
2	.011	.05438	1.047E-03	20.1164	10.2385	302.6	0.639	.1190	.0003	.1144	.1104	.0003	.0772	0.3297	4.294E-05	2
3	.022	.05421	2.075E-03	19.4516	7.9879	304.1	0.643	.1092	.0004	.1269	.1017	.0004	.0859	0.3309	4.287E-05	3
4	.028	.05408	2.650E-03	18.4004	7.2986	304.9	0.645	.1043	.0004	.1331	.0973	.0004	.0903	0.3315	4.284E-05	4
5	.034	.05400	3.202E-03	17.8907	6.8025	305.6	0.647	.1000	.0004	.1386	.0934	.0005	.0941	0.3320	4.281E-05	5
6	.041	.05397	3.774E-03	18.2576	6.3956	306.3	0.649	.0956	.0005	.1441	.0895	.0005	.0980	0.3325	4.278E-05	6
7	.046	.05392	4.299E-03	18.0623	6.0884	306.9	0.651	.0918	.0005	.1489	.0860	.0005	.1014	0.3330	4.275E-05	7
8	.052	.05388	4.846E-03	18.2264	5.8171	307.6	0.652	.0880	.0005	.1537	.0826	.0006	.1049	0.3334	4.272E-05	8
9	.059	.05384	5.408E-03	18.3302	5.5778	308.2	0.654	.0842	.0005	.1585	.0791	.0006	.1083	0.3339	4.269E-05	9
10	.065	.05382	5.921E-03	18.6499	5.3865	308.7	0.656	.0809	.0006	.1628	.0761	.0006	.1113	0.3343	4.267E-05	10
11	.071	.05378	6.460E-03	18.6491	5.2081	309.3	0.657	.0775	.0006	.1671	.0730	.0006	.1144	0.3347	4.264E-05	11

Table 3.2.15 Calculation results of RUN <NNU02>

=============> RUN NO. (NNU02) >==============> DATE (92/03/26) >===>

Tmix = 20 (min) dTmeas = 30 (s) Troom = 14 (C)

AVERAGE MOLE FRACTION :	R o2, in	R co2, in	R co, in	R o2, out	R co2, out	R co, out	F co/co2
	37.49	3.68	0.00	16.01	6.16	0.02	0.00

Ptest (Pa)	Pabs (Pa)	Tg.ch-A (C)	Tg.ch-C (C)	Flowch-A (m3/h)	Flowch-B (m3/h)	Flowch-C (m3/h)
-8.4985E+02	1.0181E+05	1061./1058./1060./1060. AVERAGE : 1059.62	600./ 601./ 600./ 601. AVERAGE : 600.286	5.04E+00	-5.05E+00	6.16E+00

CHANNEL A :

NO.	X (M)	Dcor (M)	X/D/Re·Sc	Sh	Nu	Re	Sc	W (O2)	W (CO)	W (CO2)	R (O2)	R (CO)	R (CO2)	RHO (kg/m3)	VISC (Pa·s)	NO.
1	.001	.05580	2.149E-04	7.4181	19.9763	180.6	0.462	.3985	.0000	.0539	.3749	.0000	.0368	0.2743	5.121E-05	1
2	.011	.05489	2.313E-03	5.4522	8.5832	182.8	0.474	.3745	.0001	.0822	.3550	.0001	.0566	0.2764	5.101E-05	2
3	.022	.05466	4.501E-03	5.1873	6.6825	184.6	0.485	.3544	.0001	.1058	.3382	.0001	.0734	0.2783	5.084E-05	3
4	.029	.05448	5.756E-03	4.8312	6.0766	185.5	0.490	.3439	.0002	.1181	.3293	.0002	.0822	0.2792	5.076E-05	4
5	.035	.05434	6.893E-03	4.5587	5.6625	186.3	0.494	.3352	.0002	.1283	.3220	.0002	.0896	0.2800	5.068E-05	5
6	.040	.05425	7.953E-03	4.3979	5.3507	187.0	0.498	.3277	.0002	.1372	.3155	.0002	.0960	0.2807	5.062E-05	6
7	.046	.05415	8.965E-03	4.1919	5.1007	187.7	0.502	.3209	.0002	.1452	.3097	.0003	.1019	0.2814	5.056E-05	7
8	.053	.05411	1.019E-02	4.1612	4.8444	188.4	0.506	.3130	.0003	.1544	.3029	.0003	.1086	0.2821	5.050E-05	8
9	.059	.05404	1.131E-02	4.0600	4.6431	189.1	0.509	.3061	.0003	.1625	.2969	.0003	.1146	0.2828	5.044E-05	9
10	.065	.05400	1.235E-02	4.0079	4.4770	189.7	0.512	.2999	.0003	.1699	.2914	.0003	.1200	0.2833	5.039E-05	10
11	.070	.05397	1.330E-02	3.9876	4.3421	190.2	0.515	.2944	.0003	.1764	.2866	.0004	.1249	0.2839	5.034E-05	11

Table 3.2.16 Calculation results of RUN <NNU03>

=============> RUN NO. (NNU03) >==============> DATE (92/07/28) >==>

Tmix = 20 (min) dTmeas = 30 (s) Troom = 28 (C)

AVERAGE MOLE FRACTION :	R o2, in	R co2, in	R co, in	R o2, out	R co2, out	R co, out	F co/co2
	24.09	3.95	0.00	15.12	6.16	0.00	0.00

Ptest (Pa)	Pabs (Pa)	Tg.ch-A (C)	Tg.ch-C (C)	Flowch-A(m3/h)	Flowch-B(m3/h)	Flowch-C(m3/h)
-7.8938E+02	1.0066E+05	1067./1066./1070./1074.	311./ 312./ 311./ 305.	5.25E+00	-5.37E+00	2.25E+00
		AVERAGE : 1069.24	AVERAGE : 309.685			

CHANNEL A :

NO.	X(M)	Dcor(M)	X/D/Re·Sc	Sh	Nu	Re	Sc	W(O2)	W(CO)	W(CO2)	R(O2)	R(CO)	R(CO2)	RHO(kg/m3)	VISC(Pa·s)	NO.
1	.001	.05512	1.768E-04	9.9943	20.0543	185.1	0.554	.2604	.0000	.0587	.2409	.0000	.0395	0.2649	5.015E-05	1
2	.011	.05483	1.906E-03	9.4273	8.6458	186.8	0.563	.2417	.0000	.0817	.2251	.0000	.0553	0.2666	5.000E-05	2
3	.022	.05460	3.738E-03	8.9854	6.7298	188.5	0.572	.2241	.0000	.1034	.2100	.0000	.0704	0.2683	4.986E-05	3
4	.028	.05445	4.716E-03	8.4895	6.1596	189.3	0.576	.2157	.0000	.1138	.2026	.0000	.0777	0.2691	4.979E-05	4
5	.034	.05433	5.682E-03	8.0856	5.7334	190.1	0.579	.2080	.0000	.1232	.1960	.0000	.0844	0.2698	4.973E-05	5
6	.040	.05422	6.637E-03	7.7041	5.3975	190.7	0.583	.2011	.0000	.1318	.1899	.0000	.0905	0.2704	4.967E-05	6
7	.046	.05411	7.553E-03	7.2871	5.1309	191.3	0.586	.1950	.0000	.1393	.1845	.0000	.0959	0.2710	4.962E-05	7
8	.053	.05407	8.590E-03	7.2785	4.8764	192.0	0.589	.1884	.0000	.1474	.1787	.0000	.1017	0.2716	4.956E-05	8
9	.058	.05400	9.469E-03	7.0056	4.6907	192.5	0.591	.1831	.0000	.1539	.1740	.0000	.1064	0.2721	4.952E-05	9
10	.064	.05395	1.038E-02	6.9292	4.5207	193.0	0.594	.1779	.0000	.1604	.1693	.0000	.1110	0.2726	4.948E-05	10
11	.070	.05391	1.129E-02	6.8504	4.3707	193.5	0.596	.1729	.0000	.1665	.1649	.0000	.1155	0.2731	4.944E-05	11

Table 3.2.17 Calculation results of RUN <NNU04>

=============> RUN NO. (NNU04) >==============> DATE (92/08/07) >==>

Tmix = 40 (min) dTmeas = 30 (s) Troom = 26 (C)

AVERAGE MOLE FRACTION :	R o2, in	R co2, in	R co, in	R o2, out	R co2, out	R co, out	F co/co2
	27.79	4.62	0.00	15.65	5.47	0.25	0.04

Ptest (Pa)	Pabs (Pa)	Tg.ch-A (C)	Tg.ch-C (C)	Flowch-A(m3/h)	Flowch-B(m3/h)	Flowch-C(m3/h)
-1.0970E+02	1.0121E+05	1061./1063./1060./1067.	804./ 806./ 805./ 808.	4.83E+00	-5.94E+00	4.86E+00
		AVERAGE : 1062.57	AVERAGE : 805.734			

CHANNEL A :

NO.	X(M)	Dcor(M)	X/D/Re·Sc	Sh	Nu	Re	Sc	W(O2)	W(CO)	W(CO2)	R(O2)	R(CO)	R(CO2)	RHO(kg/m3)	VISC(Pa·s)	NO.
1	.001	.05562	1.957E-04	5.0902	19.6929	173.9	0.528	.2978	.0000	.0681	.2779	.0000	.0462	0.2719	5.035E-05	1
2	.011	.05464	2.159E-03	3.2548	8.4313	174.8	0.533	.2873	.0004	.0805	.2690	.0004	.0548	0.2728	5.026E-05	2
3	.022	.05442	4.284E-03	2.9113	6.5478	175.5	0.538	.2790	.0006	.0904	.2620	.0007	.0617	0.2735	5.019E-05	3
4	.029	.05423	5.536E-03	2.5517	5.9454	175.9	0.540	.2748	.0008	.0954	.2584	.0008	.0652	0.2739	5.016E-05	4
5	.035	.05412	6.739E-03	2.3533	5.5169	176.2	0.541	.2712	.0009	.0996	.2553	.0010	.0682	0.2742	5.013E-05	5
6	.041	.05403	7.842E-03	2.1971	5.2054	176.5	0.543	.2681	.0010	.1032	.2527	.0011	.0707	0.2745	5.010E-05	6
7	.047	.05396	8.957E-03	2.0788	4.9446	176.7	0.544	.2653	.0011	.1066	.2502	.0012	.0731	0.2748	5.008E-05	7
8	.053	.05392	1.014E-02	2.0116	4.7117	177.0	0.546	.2624	.0012	.1100	.2477	.0013	.0755	0.2750	5.006E-05	8
9	.059	.05388	1.128E-02	1.9403	4.5190	177.2	0.547	.2597	.0013	.1132	.2454	.0014	.0778	0.2753	5.003E-05	9
10	.065	.05382	1.240E-02	1.8346	4.3532	177.4	0.548	.2573	.0014	.1161	.2433	.0015	.0798	0.2755	5.001E-05	10
11	.071	.05378	1.354E-02	1.7610	4.8413	177.6	0.549	.2549	.0015	.1189	.2412	.0016	.0818	0.2757	4.999E-05	11

Table 3.2.18 Calculation results of RUN <NNU05>

=============> RUN NO. (NNU05) >==============> DATE (92/08/18) >===>

Tmix = 26 (min) dTmeas = 30 (s) Troom = 26 (C)

	R o2,in	R co2,in	R co,in	R o2,out	R co2,out	R co,out	F co/co2
AVERAGE MOLE FRACTION :	25.62	4.25	0.00	0.00	6.18	0.00	0.00

Ptest (Pa)	Pabs (Pa)	Tg.ch-A (C)	Tg.ch-C (C)	Flowch-A(m3/h)	Flowch-B(m3/h)	Flowch-C(m3/h)
-6.7551E+02	1.0142E+05	1209./1213./1215./1221. AVERAGE : 1214.76	805./ 806./ 806./ 805. AVERAGE : 805.459	5.19E+00	-6.20E+00	4.92E+00

CHANNEL A :

NO.	X(M)	Dcor(M)	X/D/Re·Sc	Sh	Nu	Re	Sc	W(O2)	W(CO)	W(CO2)	R(O2)	R(CO)	R(CO2)	RHO(kg/m3)	VISC(Pa·s)	NO.
1	.001	.05653	2.088E-04	11.4616	19.0754	156.0	0.543	.2758	.0000	.0629	.2562	.0000	.0425	0.2420	5.378E-05	1
2	.011	.05530	2.273E-03	8.0900	8.1624	157.8	0.554	.2525	.0000	.0915	.2363	.0000	.0623	0.2439	5.357E-05	2
3	.022	.05496	4.458E-03	7.5453	6.3426	159.3	0.563	.2338	.0000	.1144	.2202	.0000	.0784	0.2455	5.341E-05	3
4	.028	.05473	5.669E-03	6.9223	5.7840	160.1	0.568	.2248	.0000	.1254	.2124	.0000	.0862	0.2463	5.333E-05	4
5	.035	.05460	6.875E-03	6.6898	5.3665	160.7	0.572	.2166	.0000	.1355	.2053	.0000	.0934	0.2470	5.326E-05	5
6	.041	.05449	8.010E-03	6.4495	5.0540	161.3	0.575	.2094	.0000	.1443	.1989	.0000	.0997	0.2476	5.320E-05	6
7	.047	.05440	9.129E-03	6.3148	4.7987	161.9	0.578	.2027	.0000	.1525	.1930	.0000	.1056	0.2482	5.314E-05	7
8	.053	.05431	1.024E-02	6.0940	4.5834	162.4	0.581	.1964	.0000	.1602	.1875	.0000	.1111	0.2487	5.309E-05	8
9	.059	.05423	1.134E-02	5.9071	4.3988	162.9	0.584	.1906	.0000	.1673	.1823	.0000	.1163	0.2492	5.304E-05	9
10	.065	.05417	1.243E-02	5.8221	4.8700	163.4	0.587	.1851	.0000	.1740	.1774	.0000	.1212	0.2497	5.299E-05	10
11	.071	.05410	1.351E-02	5.6255	4.7578	163.8	0.589	.1800	.0000	.1803	.1728	.0000	.1258	0.2501	5.294E-05	11

Table 3.2.19 Calculation results of RUN <NNU06>

=============> RUN NO. (NNU06) >==============> DATE (92/09/08) >==>

Tmix = 26 (min) dTmeas = 30 (s) Troom = 26 (C)

AVERAGE MOLE FRACTION :	R o2,in	R co2,in	R co,in	R o2,out	R co2,out	R co,out	F co/co2
	23.17	6.33	0.00	10.73	9.21	0.00	0.00

Ptest (Pa)	Pabs (Pa)	Tg.ch-A (C)	Tg.ch-C (C)	Flowch-A(m3/h)	Flowch-B(m3/h)	Flowch-C(m3/h)
-7.4369E+02	1.0127E+05	1206./1211./1212./1217. AVERAGE : 1211.63	1059./1062./1068./1074. AVERAGE : 1065.87	5.03E+00	-5.09E+00	4.93E+00

CHANNEL A :

NO.	X(M)	Dcor(M)	X/D/Re·Sc	Sh	Nu	Re	Sc	W(O2)	W(CO)	W(CO2)	R(O2)	R(CO)	R(CO2)	RHO(kg/m3)	VISC(Pa·s)	NO.
1	.001	.05610	2.088E-04	11.4610	18.9053	153.1	0.558	.2475	.0000	.0931	.2317	.0000	.0633	0.2439	5.345E-05	1
2	.011	.05498	2.278E-03	7.9278	8.0879	154.7	0.567	.2269	.0000	.1184	.2139	.0000	.0811	0.2456	5.327E-05	2
3	.022	.05471	4.480E-03	7.4319	6.2833	156.0	0.575	.2105	.0000	.1385	.1995	.0000	.0955	0.2471	5.313E-05	3
4	.028	.05451	5.645E-03	6.8011	5.7521	156.7	0.579	.2029	.0000	.1478	.1929	.0000	.1022	0.2477	5.307E-05	4
5	.034	.05437	6.776E-03	6.3949	5.3603	157.2	0.582	.1963	.0000	.1559	.1870	.0000	.1080	0.2483	5.301E-05	5
6	.040	.05426	7.989E-03	6.1398	5.0268	157.7	0.585	.1897	.0000	.1640	.1812	.0000	.1139	0.2488	5.295E-05	6
7	.046	.05417	9.059E-03	5.8458	4.7839	158.2	0.588	.1844	.0000	.1705	.1764	.0000	.1186	0.2493	5.290E-05	7
8	.052	.05409	1.025E-02	5.6291	4.5550	158.6	0.590	.1788	.0000	.1773	.1714	.0000	.1236	0.2498	5.286E-05	8
9	.058	.05401	1.140E-02	5.4239	4.3661	159.0	0.593	.1738	.0000	.1835	.1669	.0000	.1281	0.2502	5.281E-05	9
10	.064	.05395	1.254E-02	5.2104	4.8409	159.4	0.595	.1692	.0000	.1892	.1627	.0000	.1323	0.2507	5.277E-05	10
11	.070	.05393	1.364E-02	5.2581	4.7301	159.8	0.597	.1648	.0000	.1945	.1588	.0000	.1362	0.2510	5.273E-05	11

CHANNEL C :

NO.	X(M)	Dcor(M)	X/D/Re·Sc	Sh	Nu	Re	Sc	W(O2)	W(CO)	W(CO2)	R(O2)	R(CO)	R(CO2)	RHO(kg/m3)	VISC(Pa·s)	NO.
1	.001	.05575	1.804E-04	10.7868	19.8737	178.2	0.558	.2475	.0000	.0931	.2317	.0000	.0633	0.2705	4.998E-05	1
2	.011	.05483	1.971E-03	7.6624	8.5270	179.7	0.566	.2304	.0000	.1141	.2169	.0000	.0781	0.2721	4.984E-05	2
3	.022	.05457	3.887E-03	7.0525	6.6297	181.0	0.573	.2165	.0000	.1312	.2048	.0000	.0902	0.2734	4.973E-05	3
4	.027	.05441	4.800E-03	6.5122	6.1211	181.6	0.576	.2106	.0000	.1383	.1997	.0000	.0954	0.2739	4.968E-05	4
5	.034	.05427	5.875E-03	6.0359	5.6662	182.1	0.579	.2044	.0000	.1459	.1942	.0000	.1008	0.2745	4.963E-05	5
6	.040	.05420	6.865E-03	5.9061	5.3353	182.6	0.581	.1991	.0000	.1525	.1895	.0000	.1055	0.2750	4.959E-05	6
7	.046	.05412	7.900E-03	5.6599	5.0513	183.1	0.584	.1938	.0000	.1589	.1848	.0000	.1102	0.2755	4.954E-05	7
8	.052	.05407	8.922E-03	5.5605	4.8155	183.6	0.586	.1889	.0000	.1649	.1805	.0000	.1146	0.2760	4.950E-05	8
9	.058	.05401	9.906E-03	5.3944	4.6203	184.0	0.588	.1844	.0000	.1705	.1764	.0000	.1186	0.2765	4.946E-05	9
10	.064	.05396	1.096E-02	5.2701	4.4375	184.5	0.590	.1798	.0000	.1761	.1723	.0000	.1227	0.2769	4.943E-05	10
11	.070	.05391	1.187E-02	5.1240	4.9179	184.8	0.592	.1761	.0000	.1807	.1689	.0000	.1261	0.2773	4.940E-05	11

Table 3.2.20 Inner diameters of the corroded graphite tube in <NNB01>

INNER DIAMETER MEASURMENTS RUN:NNB01A DATE:92/09/09

Len. (mm): 700.0
Temp. (C): 1060.0 MIX_Time (min): 20.0
Weight before(g): 5012.0
Weight after (g): 4937.6 Decrease (g): 74.4 (1.48 %)

NO	Xp(mm)	DI(mm)	dD(mm)	Th(mm)	Wt(g)
0	4.7	55.3892	0.1910	4.650	10.67
1	15.7	54.5108	0.0335	4.654	32.27
2	21.4	54.3338	0.0550	4.641	32.34
3	27.5	54.1872	0.0275	4.646	32.49
4	33.6	54.0966	0.0225	4.646	32.69
5	39.7	54.0029	0.0195	4.639	32.54
6	45.8	53.9603	0.0115	4.639	32.69
7	51.9	53.8888	0.0295	4.636	32.28
8	57.9	53.8572	0.0190	4.634	32.58
9	64.0	53.8136	0.0320	4.637	32.73
10	70.1	53.7753	0.0510	4.637	32.79

INNER DIAMETER MEASURMENTS RUN:NNB01C DATE:92/09/10

Len. (mm): 700.0
Temp. (C): 1060.0 MIX_Time (min): 20.0
Weight before(g): 4993.3
Weight after (g): 4921.3 Decrease (g): 72.0 (1.44 %)

NO	Xp(mm)	DI(mm)	dD(mm)	Th(mm)	Wt(g)
0	4.7	55.3133	0.1170	4.652	10.74
1	15.7	54.4759	0.0455	4.654	31.74
2	21.5	54.2737	0.0665	4.660	32.52
3	27.4	54.1992	0.0975	4.641	32.42
4	33.6	54.0526	0.0460	4.631	32.27
5	39.5	53.9587	0.0570	4.628	32.49
6	45.7	53.8944	0.0290	4.617	32.18
7	51.6	53.8478	0.0350	4.623	31.97
8	57.7	53.7669	0.0350	4.625	32.33
9	63.7	53.7413	0.0290	4.625	32.34
10	69.8	53.7323	0.0400	4.639	32.58

Table 3.2.21 Inner diameters of the corroded graphite tube in <NNB02>

INNER DIAMETER MEASURMENTS RUN:NNB02A DATE:92/09/08

Len. (mm): 700.0
Temp. (C): 1200.0 MIX_Time (min): 17.0
Weight before(g): 4991.1
Weight after (g): 4908.6 Decrease (g): 82.5 (1.65 %)

NO	Xp(mm)	DI(mm)	dD(mm)	Th(mm)	Wt(g)
0	4.7	55.2332	0.1610	4.680	10.81
1	15.7	54.3303	0.0810	4.705	31.84
2	21.2	54.1483	0.0350	4.673	32.23
3	27.2	54.0175	0.0465	4.668	32.65
4	33.5	53.9169	0.0250	4.661	32.38
5	39.5	53.8217	0.0130	4.673	32.43
6	45.5	53.7762	0.0285	4.669	32.65
7	51.7	53.7269	0.0175	4.659	32.41
8	57.6	53.6750	0.0175	4.649	32.33
9	63.9	53.6320	0.0265	4.656	32.56
10	70.0	53.6003	0.0115	4.653	32.57

INNER DIAMETER MEASURMENTS RUN:NNB02C DATE:92/09/07

Len. (mm): 700.0
Temp. (C): 1200.0 MIX_Time (min): 17.0
Weight before(g): 4981.3
Weight after (g): 4900.8 Decrease (g): 80.5 (1.62 %)

NO	Xp(mm)	DI(mm)	dD(mm)	Th(mm)	Wt(g)
0	4.6	55.2162	0.1995	4.646	10.89
1	15.7	54.3139	0.0485	4.653	31.63
2	21.4	54.0972	0.0570	4.661	32.06
3	27.4	53.9668	0.0675	4.662	32.46
4	33.6	53.8829	0.0385	4.658	32.38
5	39.6	53.8095	0.0495	4.653	32.32
6	45.6	53.7430	0.0260	4.648	32.58
7	51.6	53.7037	0.0285	4.641	32.06
8	57.7	53.6517	0.0230	4.630	32.11
9	63.7	53.6226	0.0190	4.628	32.42
10	69.8	53.5862	0.0255	4.613	32.27

Table 3.2.22 Inner diameters of the corroded graphite tube in <NNB03>

INNER DIAMETER MEASURMENTS RUN:NNB03A DATE:92/09/04

Len. (mm): 700.0
Temp. (C): 1130.0 MIX_Time (min): 18.0
Weight before(g): 5031.2
Weight after (g): 4962.4 Decrease (g): 68.8 (1.37 %)

NO	Xp(mm)	DI(mm)	dD(mm)	Th(mm)	Wt(g)
0	4.6	55.3064	0.0475	4.633	10.89
1	15.6	54.3947	0.0490	4.645	31.52
2	21.2	54.1772	0.0300	4.664	32.34
3	27.3	54.0632	0.0605	4.659	32.85
4	33.4	53.9676	0.0255	4.633	32.65
5	39.2	53.9061	0.0435	4.636	32.53
6	45.4	53.8309	0.0310	4.636	32.51
7	51.5	53.7655	0.0165	4.626	32.42
8	57.5	53.7330	0.0215	4.621	32.69
9	63.6	53.6761	0.0225	4.613	32.33
10	69.6	53.6572	0.0440	4.638	32.78

INNER DIAMETER MEASURMENTS RUN:NNB03C DATE:92/09/01

Len. (mm): 700.0
Temp. (C): 1130.0 MIX_Time (min): 18.0
Weight before(g): 5009.1
Weight after (g): 4941.6 Decrease (g): 67.5 (1.35 %)

NO	Xp(mm)	DI(mm)	dD(mm)	Th(mm)	Wt(g)
0	4.7	55.3574	0.1960	4.664	10.90
1	15.7	54.4431	0.0660	4.687	32.46
2	21.4	54.2457	0.0260	4.635	32.50
3	27.4	54.0987	0.0225	4.637	32.35
4	33.5	53.9959	0.0350	4.646	32.75
5	39.5	53.9118	0.0310	4.636	32.63
6	45.5	53.8407	0.0380	4.628	32.68
7	51.4	53.7956	0.0170	4.621	32.27
8	57.7	53.7224	0.0335	4.636	32.77
9	63.6	53.7006	0.0295	4.638	32.89
10	69.7	53.6594	0.0285	4.629	32.83

Table 3.2.23 Inner diameters of the corroded graphite tube in <NNB04>

INNER DIAMETER MEASURMENTS RUN:NNB04A DATE:92/08/26

Len. (mm): 700.0
Temp. (C): 900.0 MIX_Time (min): 22.0
Weight before(g): 5052.2
Weight after (g): 4990.9 Decrease (g): 61.3 (1.21 %)

NO	Xp(mm)	DI(mm)	dD(mm)	Th(mm)	Wt(g)
0	4.6	54.5364	0.1220	4.603	11.10
1	15.6	54.0528	0.0495	4.639	31.75
2	21.8	53.8911	0.1115	4.633	32.12
3	28.1	53.7779	0.1100	4.577	31.86
4	34.1	53.6928	0.1265	4.579	31.92
5	40.1	53.6427	0.0615	4.572	31.91
6	45.7	53.5612	0.0380	4.503	31.34
7	51.8	53.4956	0.0665	4.664	32.26
8	58.1	53.4441	0.1025	4.675	32.78
9	63.9	53.4653	0.0745	4.644	32.58
10	70.1	53.4009	0.0795	4.616	32.36

INNER DIAMETER MEASURMENTS RUN:NNB04C DATE:92/08/29

Len. (mm): 700.0
Temp. (C): 900.0 MIX_Time (min): 22.0
Weight before(g): 5027.3
Weight after (g): 4967.0 Decrease (g): 60.3 (1.20 %)

NO	Xp(mm)	DI(mm)	dD(mm)	Th(mm)	Wt(g)
0	4.6	54.2975	0.1600	4.599	11.26
1	15.7	53.8258	0.0445	4.653	31.75
2	21.8	53.7386	0.0970	4.619	32.12
3	27.4	53.6803	0.0685	4.611	31.86
4	33.4	53.5870	0.0475	4.593	31.92
5	39.4	53.5268	0.0755	4.626	31.91
6	45.4	53.5262	0.0660	4.632	31.34
7	51.6	53.4773	0.0955	4.586	32.26
8	57.5	53.4435	0.0895	4.613	32.78
9	63.6	53.4372	0.0885	4.645	32.58
10	69.7	53.4266	0.0630	4.593	32.36

Table 3.2.24 Inner diameters of the corroded graphite tube in <NNB05>

INNER DIAMETER MEASURMENTS RUN:NNB05A DATE:92/09/10

Len. (mm): 700.0
Temp. (C): 1200.0
Weight before(g): 5041.5
Weight after (g): 4930.0

MIX_Time (min): 26.0
Decrease (g): 111.5 (2.21 %)

NO	Xp (mm)	DI (mm)	dD (mm)	Th (mm)	Wt (g)
0	4.6	56.1510	0.0255	4.619	9.68
1	15.6	55.0098	0.0430	4.623	31.38
2	21.5	54.7463	0.0235	4.630	32.05
3	27.5	54.5693	0.0345	4.621	31.85
4	33.6	54.4222	0.0315	4.627	32.52
5	39.6	54.3176	0.0690	4.593	32.54
6	45.7	54.2316	0.0405	4.571	32.23
7	51.8	54.1367	0.0470	4.586	31.93
8	57.8	54.0932	0.0360	4.578	31.72
9	53.8	54.0357	0.0285	4.611	32.12
10	69.8	53.9381	0.0660	4.652	32.82

INNER DIAMETER MEASURMENTS RUN:NNB05C DATE:92/09/11

Len. (mm): 700.0
Temp. (C): 1200.0
Weight before(g): 5044.5
Weight after (g): 4931.6

MIX_Time (min): 26.0
Decrease (g): 112.9 (2.24 %)

NO	Xp (mm)	DI (mm)	dD (mm)	Th (mm)	Wt (g)
0	4.6	56.0664	0.2295	4.632	10.05
1	15.6	55.0228	0.0365	4.634	31.46
2	21.6	54.7394	0.0225	4.625	32.38
3	27.6	54.5477	0.0420	4.621	32.37
4	33.6	54.4194	0.0515	4.621	32.58
5	39.8	54.3177	0.0405	4.615	32.13
6	45.8	54.2392	0.0200	4.628	32.51
7	51.8	54.1405	0.0390	4.628	32.24
8	58.0	54.0881	0.0290	4.627	32.62
9	63.9	54.0184	0.0540	4.629	32.73
10	70.2	53.9903	0.0465	4.631	32.74

Table 3.2.25 Inner diameters of the corroded graphite tube in <NNB06>

INNER DIAMETER MEASURMENTS RUN:NNB06A DATE:92/08/08

Len. (mm): 700.0
Temp. (C): 1050.0 MIX_Time (min): 20.0
Weight before(g): 5003.8
Weight after (g): 4928.5 Decrease (g): 75.3 (1.50 %)

NO	Xp(mm)	DI(mm)	dD(mm)	Th(mm)	Wt(g)
0	4.6	55.1896	0.2930	4.602	10.85
1	15.7	54.5070	0.0245	4.650	31.31
2	21.8	54.3257	0.0430	4.613	31.87
3	28.1	54.1861	0.0410	4.620	32.00
4	33.7	54.1091	0.0450	4.634	32.18
5	39.6	54.0160	0.0610	4.645	32.24
6	45.8	53.9688	0.0325	4.658	32.55
7	52.0	53.9092	0.0450	4.574	31.57
8	58.2	53.8672	0.0095	4.704	32.83
9	64.1	53.8246	0.0070	4.646	32.45
10	70.5	53.7917	0.0215	4.668	32.69

INNER DIAMETER MEASURMENTS RUN:NNB06C DATE:92/08/21

Len. (mm): 700.0
Temp. (C): 1050.0 MIX_Time (min): 20.0
Weight before(g): 4988.7
Weight after (g): 4916.4 Decrease (g): 72.3 (1.45 %)

NO	Xp(mm)	DI(mm)	dD(mm)	Th(mm)	Wt(g)
0	4.6	55.2130	0.0615	4.598	10.86
1	15.7	54.4281	0.0215	4.711	32.01
2	21.9	54.2467	0.0440	4.637	31.72
3	27.8	54.1278	0.0425	4.636	31.83
4	33.9	54.0446	0.0355	4.667	32.23
5	40.1	53.9580	0.0210	4.614	32.00
6	46.0	53.9037	0.0290	4.655	32.26
7	52.2	53.8683	0.0295	4.627	31.71
8	57.9	53.8245	0.0550	4.555	31.68
9	64.0	53.7897	0.0180	4.621	32.14
10	70.1	53.7399	0.0370	4.693	33.17

Table 3.2.26 Inner diameters of the corroded graphite tube in <NNU01>

INNER DIAMETER MEASURMENTS RUN:NNU01A DATE:92/08/19

Len. (mm): 700.0
Temp. (C): 1050.0 MIX_Time (min): 20.0
Weight before(g): 5036.8
Weight after (g): 4971.9 Decrease (g): 64.9 (1.29 %)

NO	Xp(mm)	DI(mm)	dD(mm)	Th(mm)	Wt(g)
0	4.5	55.0673	0.2115	4.539	10.98
1	15.7	54.3835	0.0615	4.706	31.95
2	21.8	54.2113	0.0385	4.639	32.48
3	27.7	54.0839	0.0465	4.536	32.64
4	34.1	54.0017	0.0645	4.628	32.57
5	39.9	53.9727	0.0365	4.642	32.65
6	46.2	53.9173	0.0555	4.751	33.23
7	52.4	53.8817	0.0290	4.656	32.42
8	58.1	53.8429	0.0330	4.591	32.32
9	64.2	53.8191	0.0260	4.610	32.51
10	70.4	53.7789	0.0215	4.658	32.95

Table 3.2.27 Inner diameters of the corroded graphite tube in <NNU02>

INNER DIAMETER MEASURMENTS RUN:NNU02A DATE:92/08/14

Len. (mm): 700.0
Temp. (C): 1050.0 MIX_Time (min): 20.0
Weight before(g): 5049.1
Weight after (g): 4961.8 Decrease (g): 87.3 (1.73 %)

NO	Xp(mm)	DI(mm)	dD(mm)	Th(mm)	Wt(g)
0	4.6	55.8010	0.0765	4.570	10.21
1	15.5	54.8917	0.0465	4.497	30.42
2	22.1	54.6602	0.0245	4.642	31.85
3	28.2	54.4788	0.0805	4.691	32.38
4	33.8	54.3426	0.0505	4.648	32.08
5	39.4	54.2515	0.0270	4.676	32.43
6	46.2	54.1549	0.0575	4.684	32.50
7	52.4	54.1057	0.0430	4.625	31.62
8	58.4	54.0432	0.0450	4.604	32.02
9	64.0	53.9989	0.0160	4.656	32.40
10	70.4	53.9674	0.0255	4.675	32.60

Table 3.2.28 Inner diameters of the corroded graphite tube in <NNU03>

INNER DIAMETER MEASURMENTS RUN:NNU03A DATE:92/08/08

Len. (mm): 700.0
Temp. (C): 1050.0 MIX_Time (min): 20.0
Weight before(g): 4962.7
Weight after (g): 4890.2 Decrease (g): 72.5 (1.46 %)

NO	Xp (mm)	DI (mm)	dD (mm)	Th (mm)	Wt (g)
0	9.9	55.1187	0.1590	9.932	23.52
1	14.9	54.8343	0.0410	3.875	26.04
2	21.7	54.6028	0.0360	4.658	31.68
3	27.7	54.4512	0.0355	4.660	31.75
4	33.7	54.3278	0.0400	4.673	32.00
5	39.5	54.2183	0.0340	4.672	32.14
6	46.0	54.1139	0.0650	4.537	31.13
7	51.8	54.0695	0.0250	4.555	31.02
8	57.8	53.9975	0.0620	4.597	31.72
9	63.9	53.9548	0.0595	4.658	32.17
10	70.1	53.9142	0.0280	4.607	31.84

Table 3.2.29 Inner diameters of the corroded graphite tube in <NNU04>

INNER DIAMETER MEASURMENTS RUN:NNU04A DATE:92/08/22

Len. (mm): 700.0
Temp. (C): 1050.0 MIX_Time (min): 22.0
Weight before(g): 5050.4
Weight after (g): 4964.6 Decrease (g): 85.8 (1.70 %)

NO	Xp (mm)	DI (mm)	dD (mm)	Th (mm)	Wt (g)
0	4.6	55.6209	0.1400	4.601	10.41
1	15.7	54.6418	0.0435	4.671	32.02
2	22.1	54.4218	0.0350	4.648	32.31
3	28.4	54.2283	0.0985	4.638	32.33
4	34.2	54.1170	0.1075	4.634	32.44
5	40.1	54.0303	0.0750	4.636	32.41
6	46.4	53.9633	0.0550	4.611	32.36
7	52.6	53.9203	0.0560	4.658	32.26
8	58.6	53.8773	0.0160	4.658	32.67
9	64.7	53.8208	0.0490	4.634	32.53
10	70.6	53.7795	0.0450	4.636	32.59

Table 3.2.30 Inner diameters of the corroded graphite tube in <NNU05>

INNER DIAMETER MEASURMENTS RUN:NNU05A DATE:92/08/25

Len. (mm): 700.0
Temp. (C): 1200.0 MIX_Time (min): 26.0
Weight before(g): 5069.0
Weight after (g): 4953.2 Decrease (g): 115.8 (2.28 %)

NO	Xp(mm)	DI(mm)	dD(mm)	Th(mm)	Wt(g)
0	4.6	56.5259	0.0815	4.584	9.64
1	15.6	55.2977	0.0385	4.602	30.93
2	21.9	54.9648	0.0255	4.674	31.91
3	28.0	54.7286	0.0200	4.542	31.17
4	34.1	54.6020	0.0405	4.628	31.91
5	40.1	54.4872	0.0440	4.634	32.10
6	46.1	54.4035	0.0375	4.566	31.58
7	52.1	54.3081	0.0420	4.587	31.37
8	58.1	54.2263	0.0445	4.616	32.16
9	64.1	54.1696	0.0240	4.617	32.05
10	70.2	54.0955	0.0550	4.650	32.40

Table 3.2.31 Inner diameters of the corroded graphite tube in <NNU06>

INNER DIAMETER MEASURMENTS RUN:NNU06A DATE:92/08/28

Len. (mm): 700.0
Temp. (C): 1200.0 MIX_Time (min): 26.0
Weight before(g): 5098.1
Weight after (g): 5001.9 Decrease (g): 96.2 (1.89 %)

NO	Xp (mm)	DI (mm)	dD (mm)	Th (mm)	Wt (g)
0	4.6	56.0993	0.0145	4.594	10.26
1	15.7	54.9836	0.0600	4.663	30.93
2	21.5	54.7098	0.0145	4.649	31.91
3	27.3	54.5055	0.0345	4.600	31.17
4	33.6	54.3658	0.0315	4.579	31.91
5	39.2	54.2631	0.0125	4.626	32.10
6	45.5	54.1658	0.0445	4.634	31.58
7	51.6	54.0854	0.0515	4.629	31.37
8	57.7	54.0138	0.0255	4.596	32.16
9	63.7	53.9455	0.0785	4.570	32.05
10	69.6	53.9263	0.0425	4.624	32.40

INNER DIAMETER MEASURMENTS RUN:NNU06C DATE:92/09/01

Len. (mm): 700.0
Temp. (C): 1050.0 MIX_Time (min): 26.0
Weight before(g): 5033.0
Weight after (g): 4951.3 Decrease (g): 81.7 (1.62 %)

NO	Xp (mm)	DI (mm)	dD (mm)	Th (mm)	Wt (g)
0	4.6	55.7510	0.0780	4.604	10.47
1	15.7	54.8328	0.0810	4.726	31.16
2	20.9	54.5740	0.0600	4.610	31.64
3	27.2	54.4123	0.0355	4.649	32.07
4	33.2	54.2678	0.0595	4.709	32.56
5	39.3	54.2040	0.0730	4.636	32.21
6	45.6	54.1203	0.0620	4.671	32.42
7	51.5	54.0691	0.0290	4.637	31.84
8	58.1	54.0097	0.0505	4.666	32.56
9	63.6	53.9589	0.0630	4.617	32.22
10	70.0	53.9108	0.0385	4.690	32.83

Table 3.2.32 Experimental conditions

Run No.	NNB01	NNB03	NNB04	NNB05	NNU01	NNU02	NNU03	NNU04	NNU05	NNU06
Graphite temperature [℃]										
Channel A	1060	1130	900	1200	1050	1050	1050	1050	1200	1200
Channel C	1060	1130	900	1200	20	600	300	800	800	1050
Duration time of oxidation [min.]	20	18	22	26	20	20	20	22	26	26
Gas	N2/air	N2/air	N2/air	N2/air	N2/air	N2/air	N2/air	N2/air	N2/air	n2/AIR
Graphite material	IG-110	IG-110	IG-110	IG-110	IG-110	IG-110	IG-110	IG-110	IG-110	IG-110
Diameter [mm] before experiment										
Channel A	52.9	52.8	52.9	52.4	52.9	52.9	53	53	53	53
Channel C	52.9	52.8	52.9	52.2	52.9	52.9	53	53	53	53

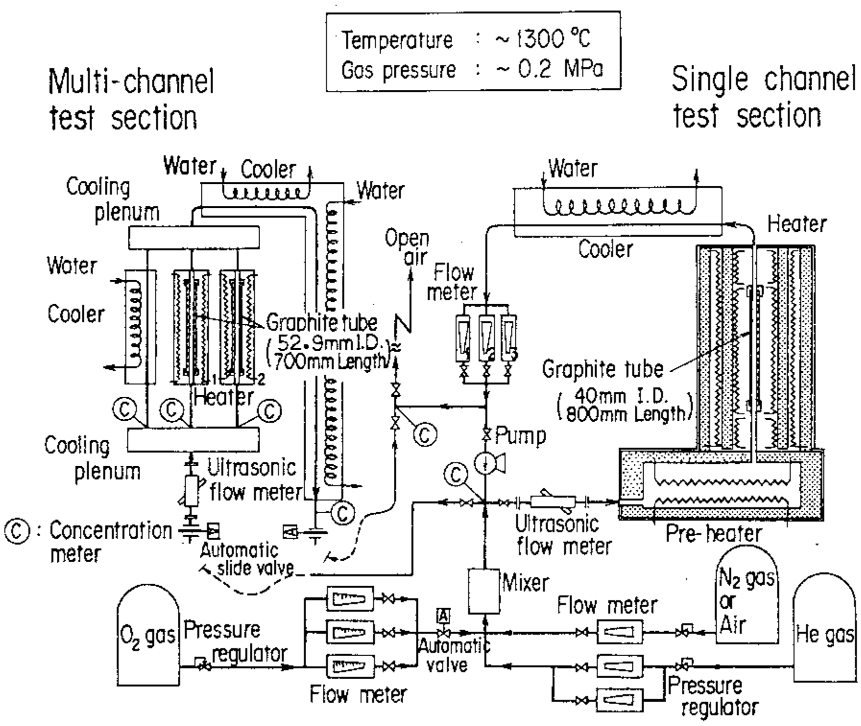


Fig. 2.1.1 Outline of the experimental apparatus

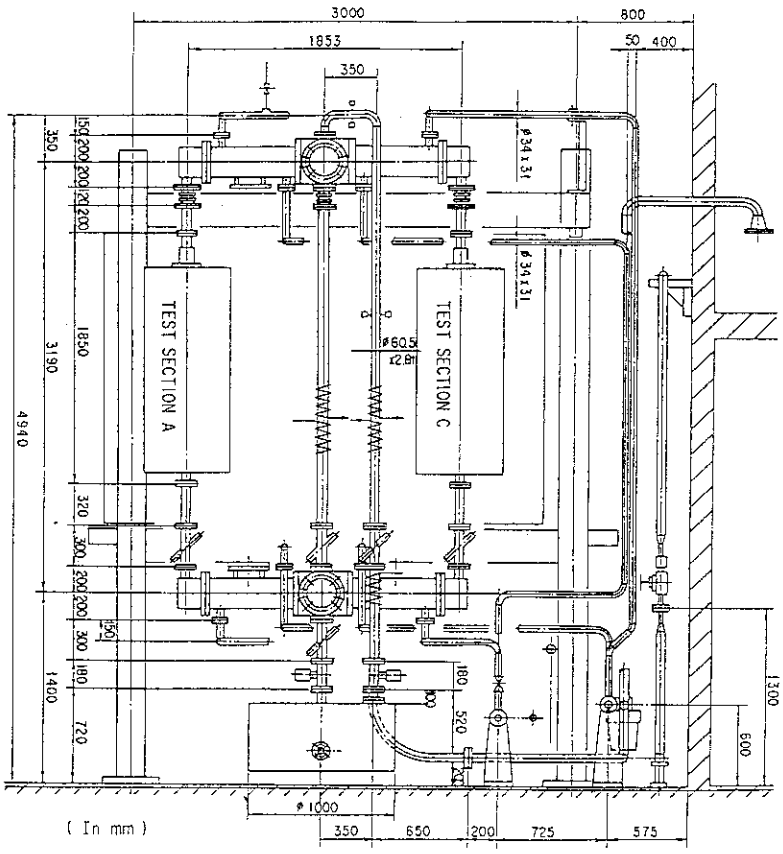


Fig. 2.1.2 Arrangement of the experimental apparatus

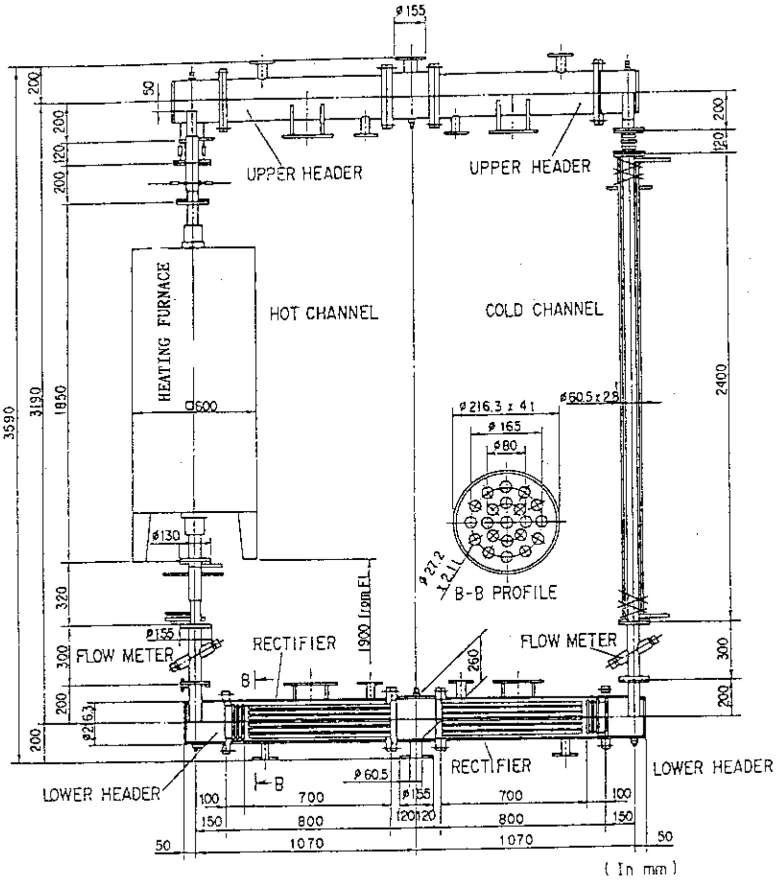


Fig. 2.1.3 Structure of the hot graphite and cold channels

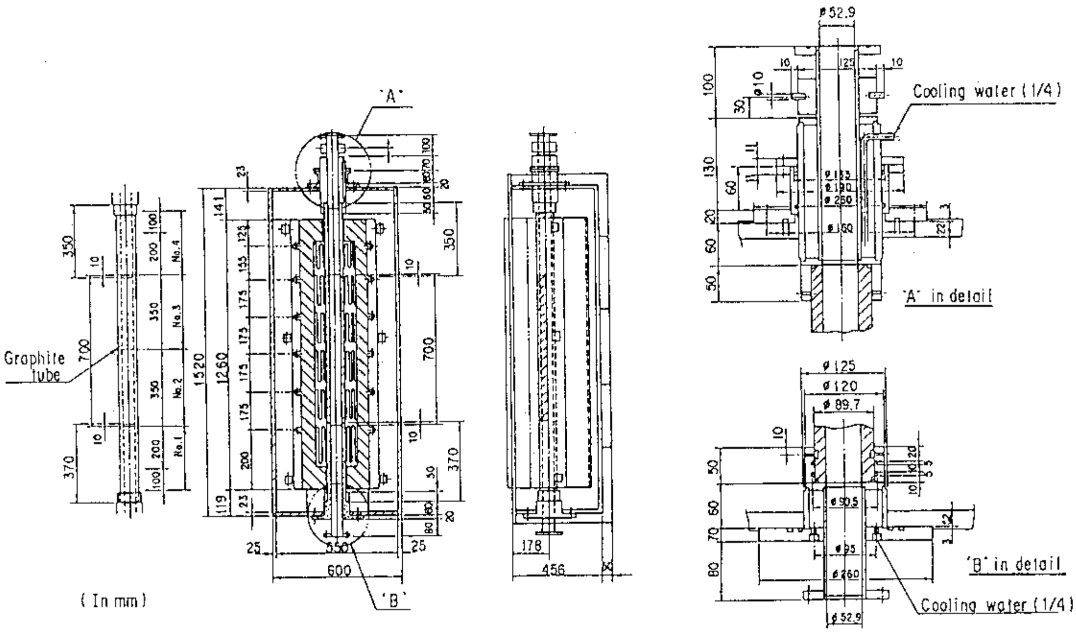


Fig. 2.1.4 Cross-sectional view of the graphite test section

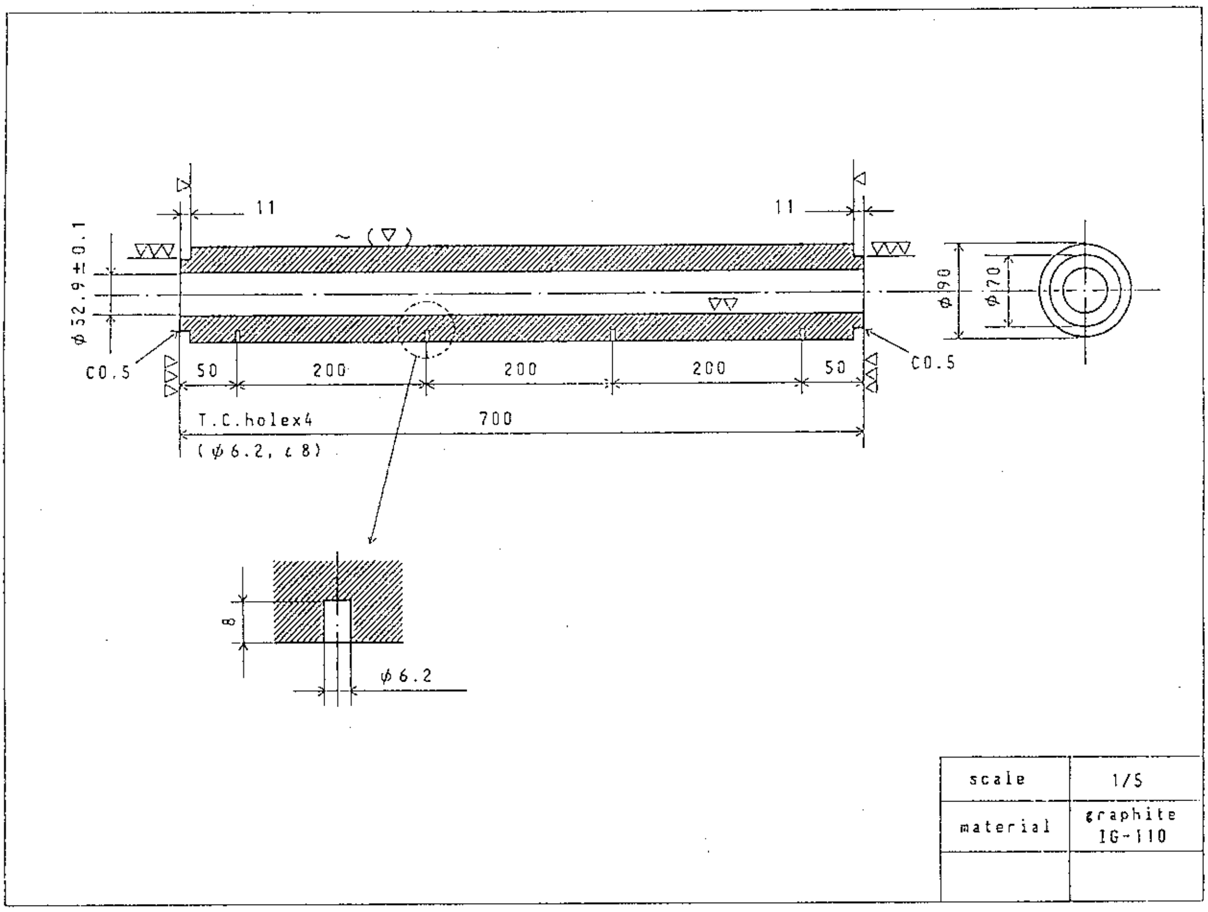


Fig. 2.1.5 Graphite test tube (in mm)

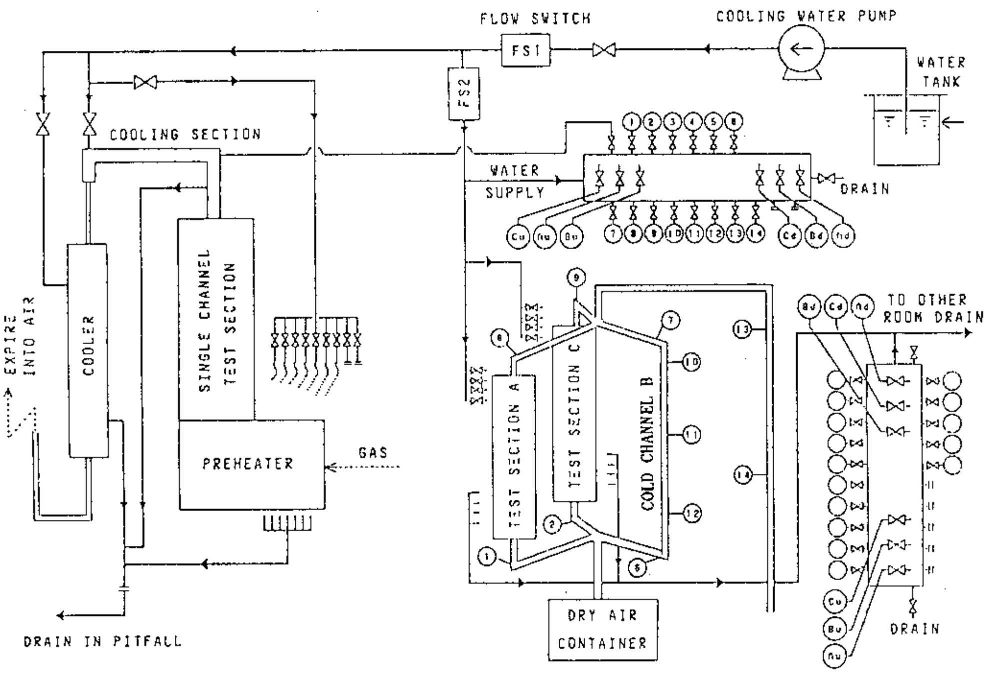


Fig. 2.1.6 Cooling water supply system

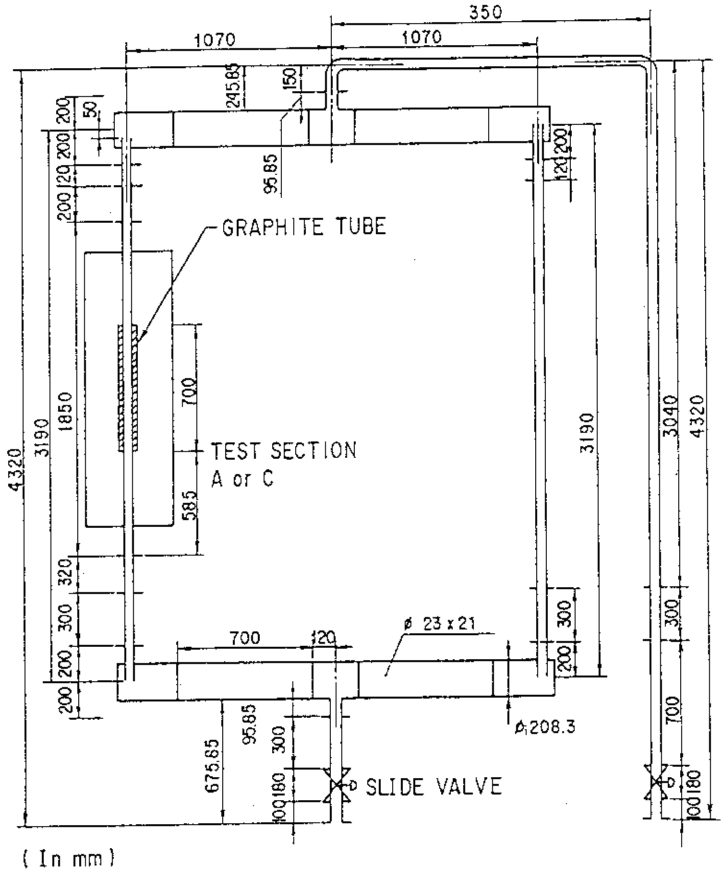


Fig. 2.1.7 Dimensions of the flow channels

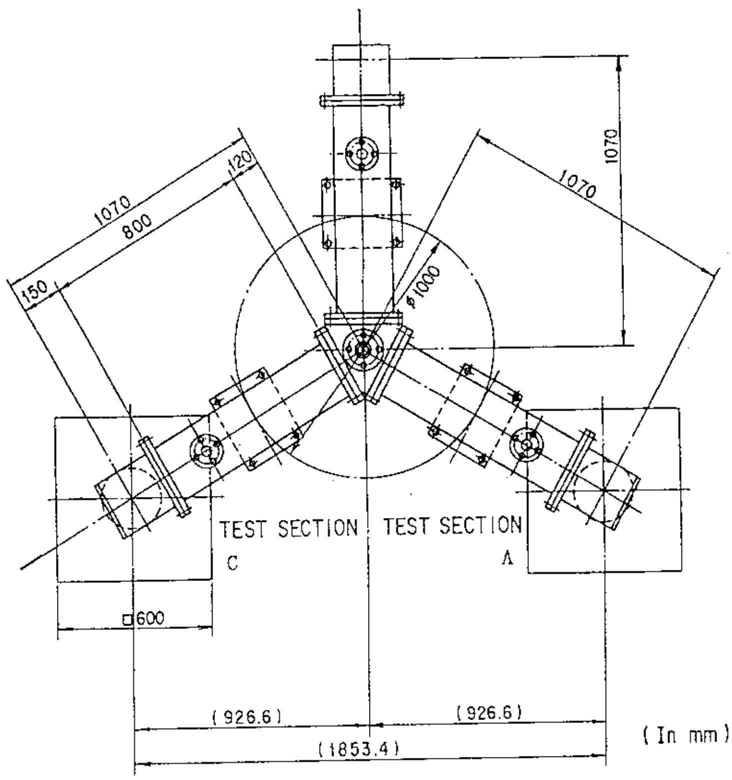


Fig. 2.1.8 Dimensions of the upper and lower leaders

	LOCATION
C1	520mm from bottom
C6	2770mm from bottom
C7	2770mm from bottom
C8	2770mm from bottom
C13	160mm from the top confluence
C15	3450mm from bottom
C16	780mm from bottom

(TG/i) Gas temperature, total number: 31.

(TW/j) Wall temperature, total number: 8.

Gas temperature and wall temperature are measured by type K thermocouples.

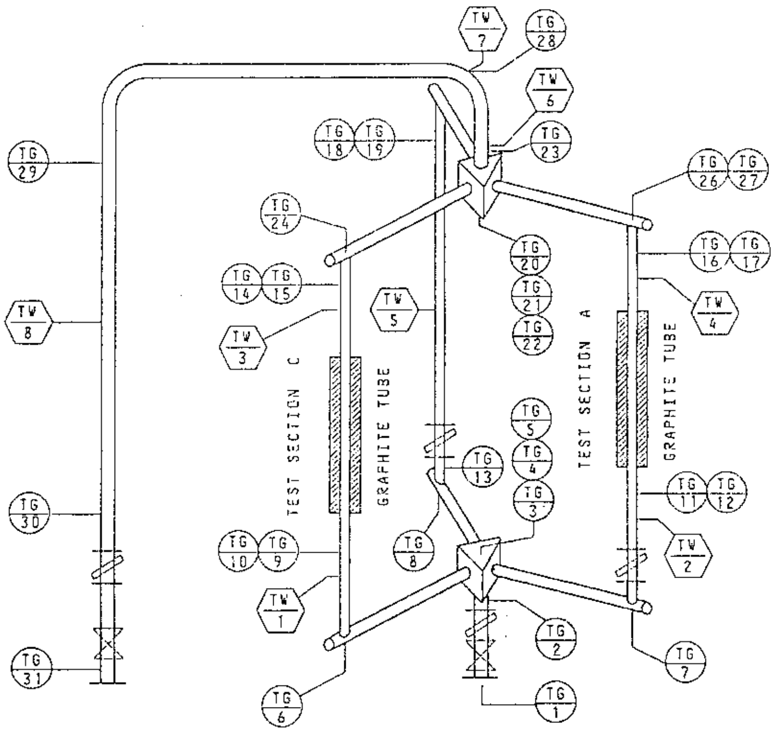
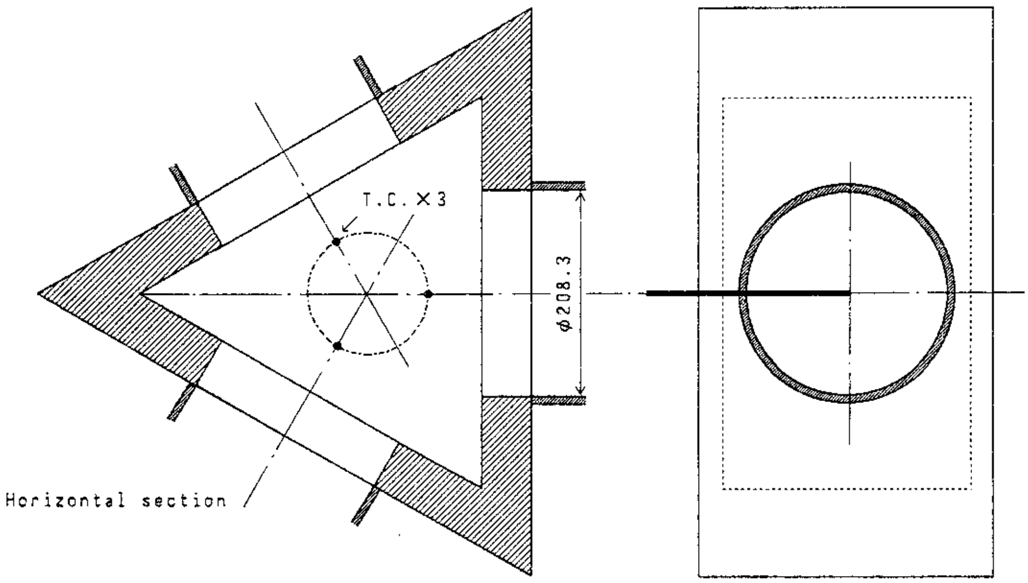


Fig. 2.2.1 Arrangement of the temperature measurement points



Confluence of three parallel channels (same at top and bottom)
(TG3,4,5 at bottom, TG20,21,22 at top)

Fig. 2.2.2 Locations of the thermocouples (I)

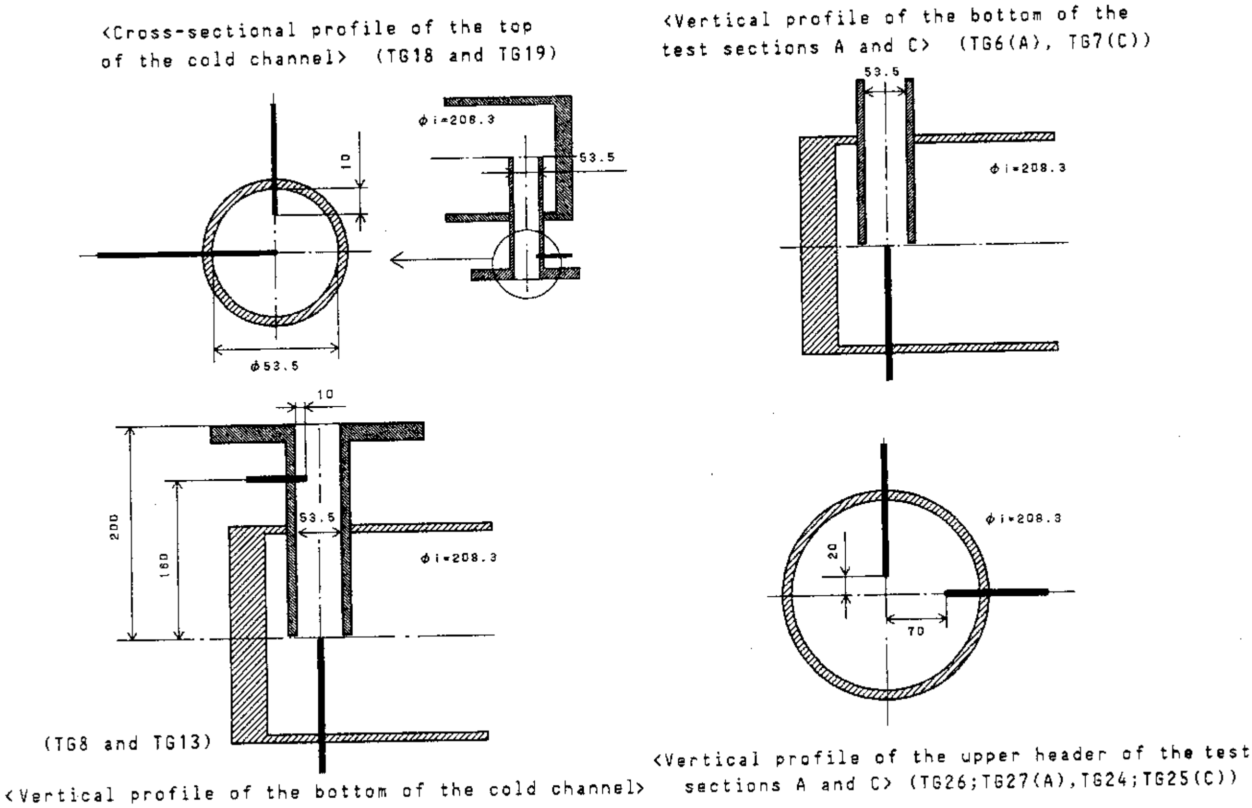


Fig. 2.2.3 Locations of the thermocouples (II)

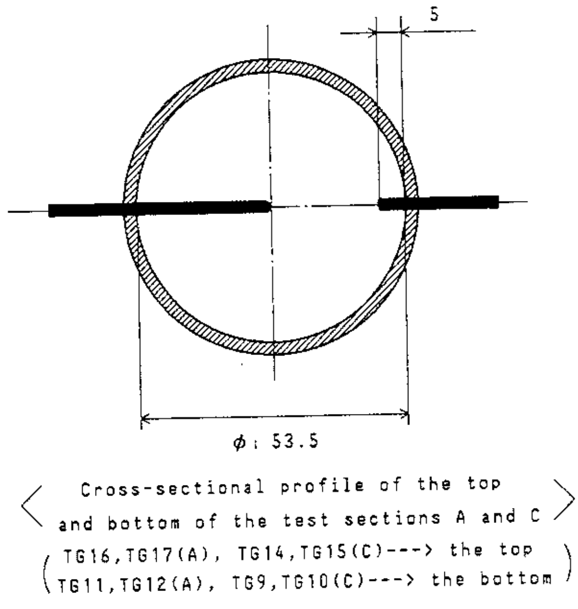


Fig. 2.2.4 Locations of the thermocouples (III)

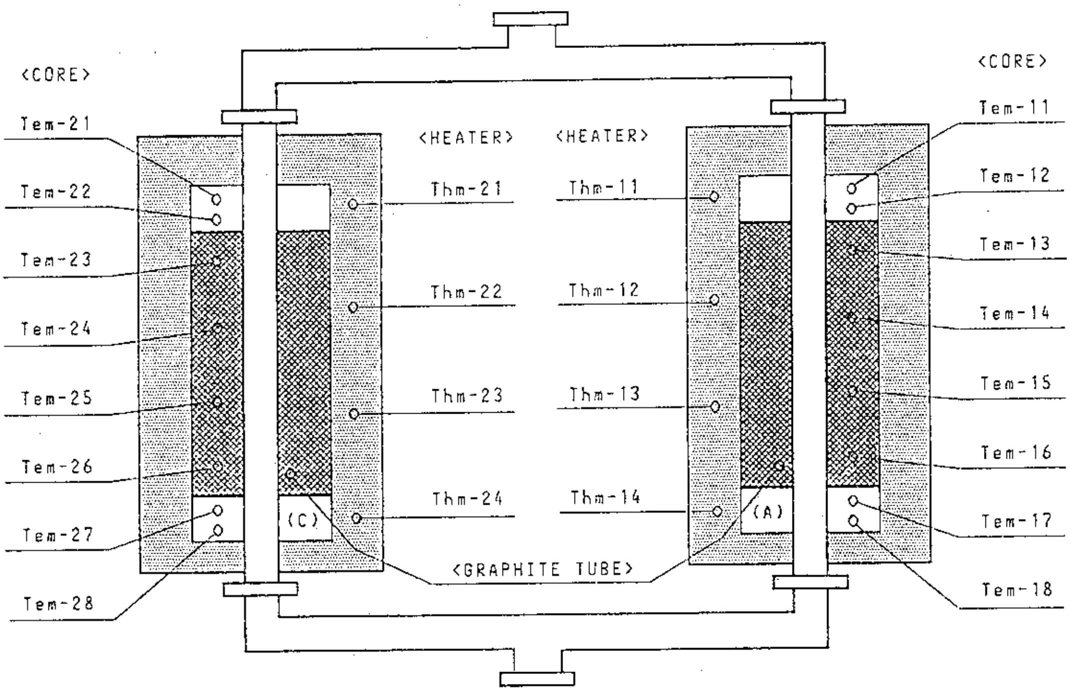


Fig. 2.2.5 Arrangement of the temperature measurement points in test sections A and C

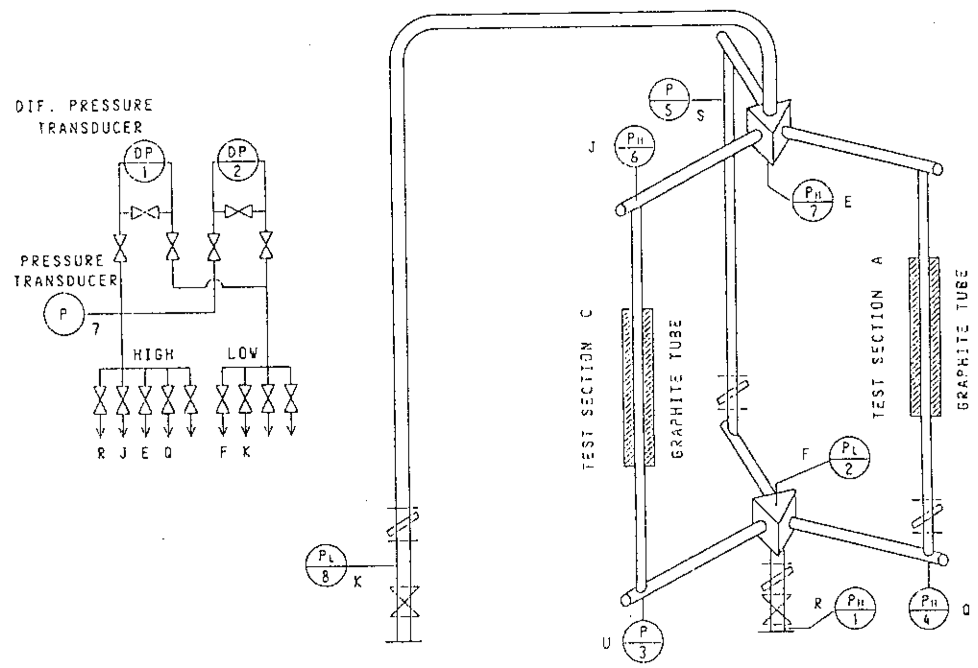
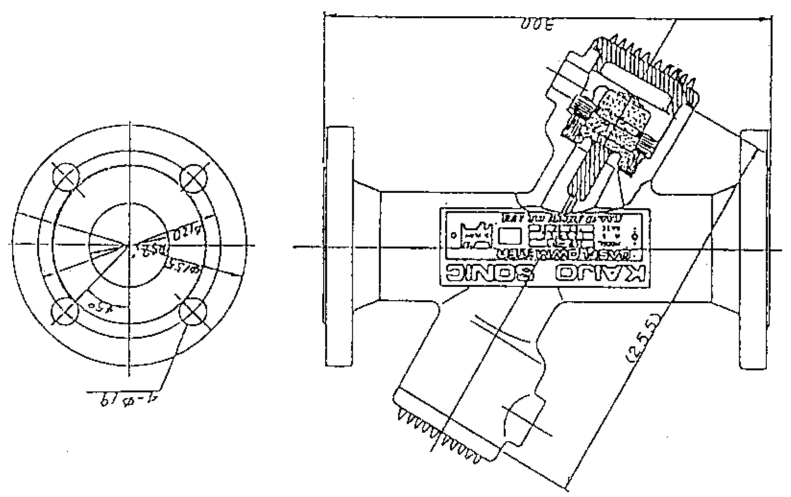


Fig. 2.2.6 Arrangement of the pressure and differential pressure measurement points



Ultrasonic span	74.9 mm
Material	FC25
Weight	about 13 kg

Fig. 2.2.8 Measurement tube of GF-200 of the ultrasonic gas flow meter

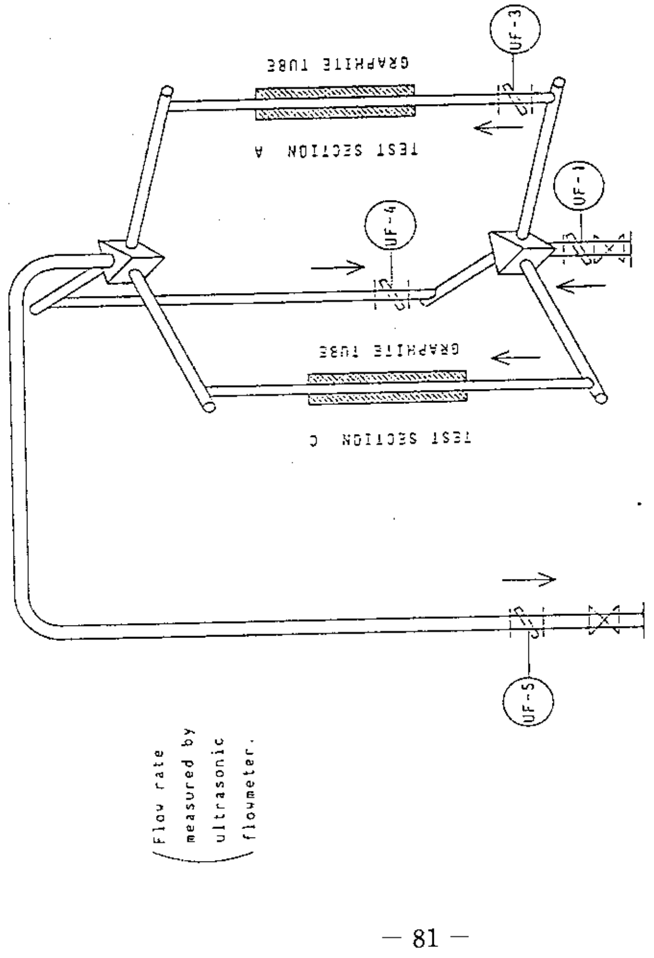


Fig. 2.2.7 Location of the flow rate measurement

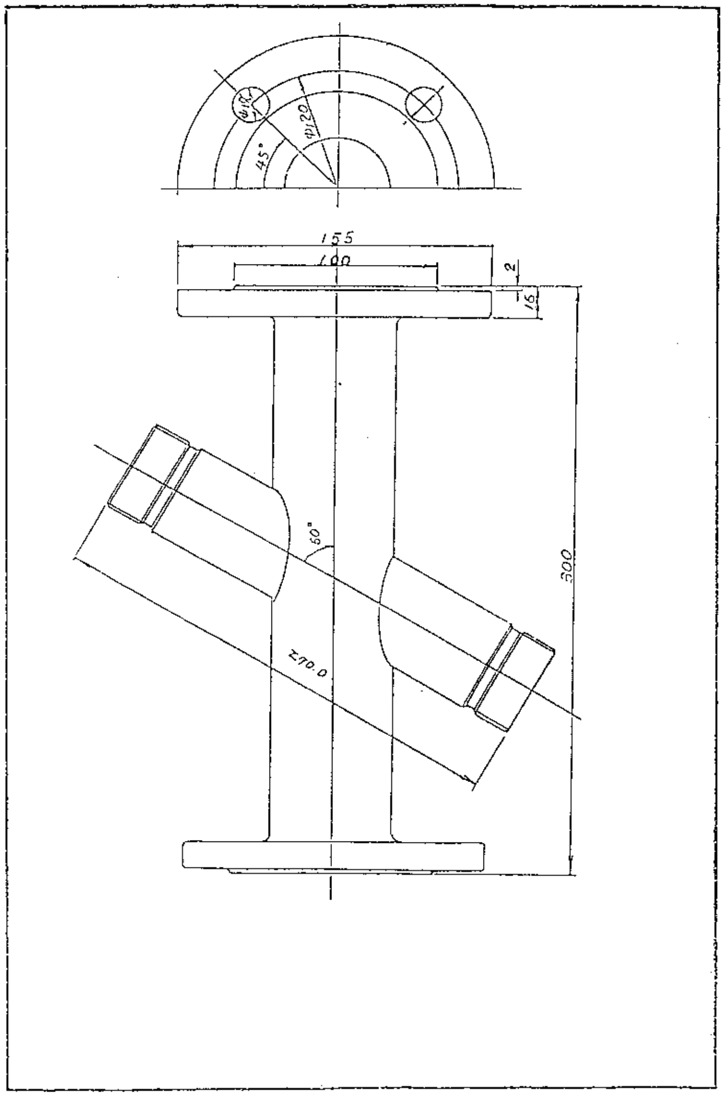


Fig. 2.2.9 Measurement tube of GF-300 of the ultrasonic gas flow meter

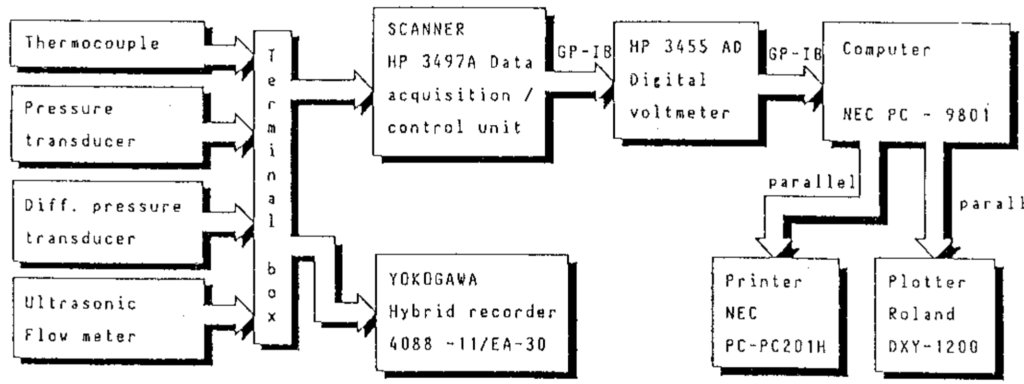


Fig. 2.2.10 Block diagram of the signal measurement and the data acquisition

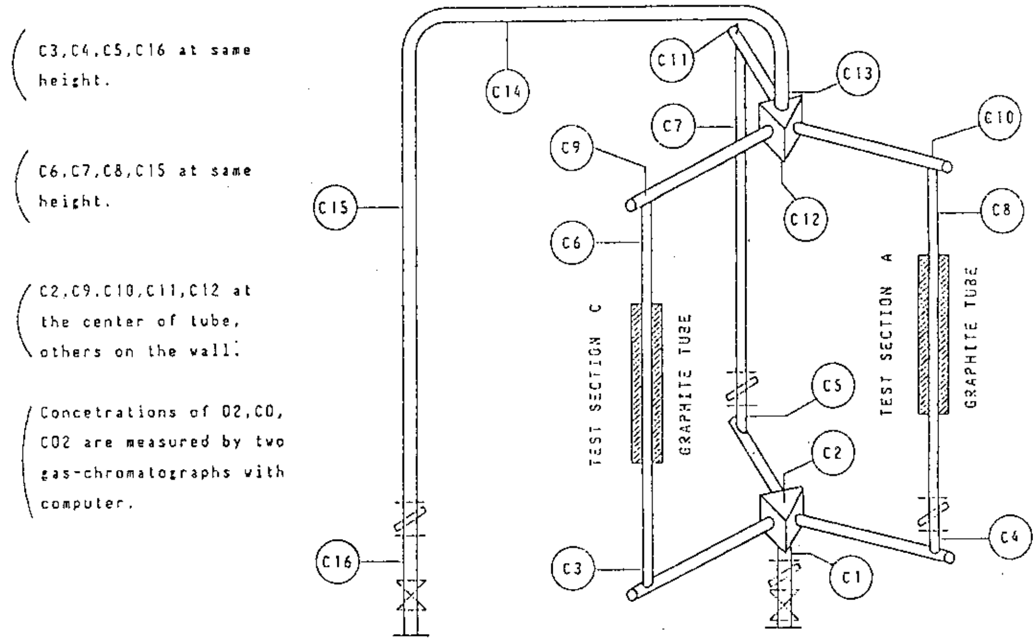


Fig. 2.2.11 Arrangement of the mole fraction measurement points

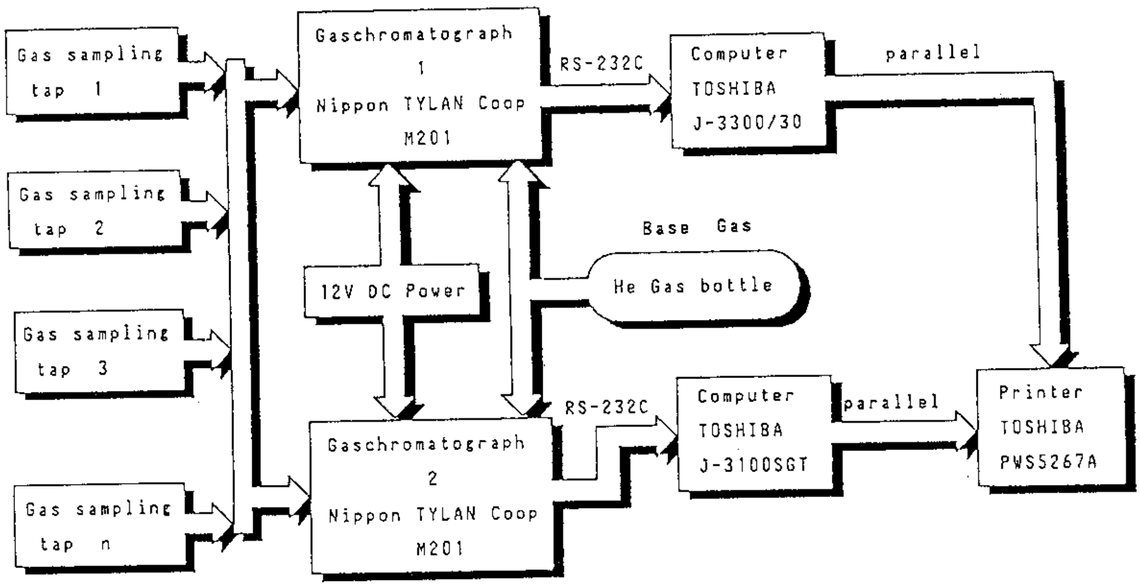


Fig. 2.2.12 Block diagram of the mole fraction measurement

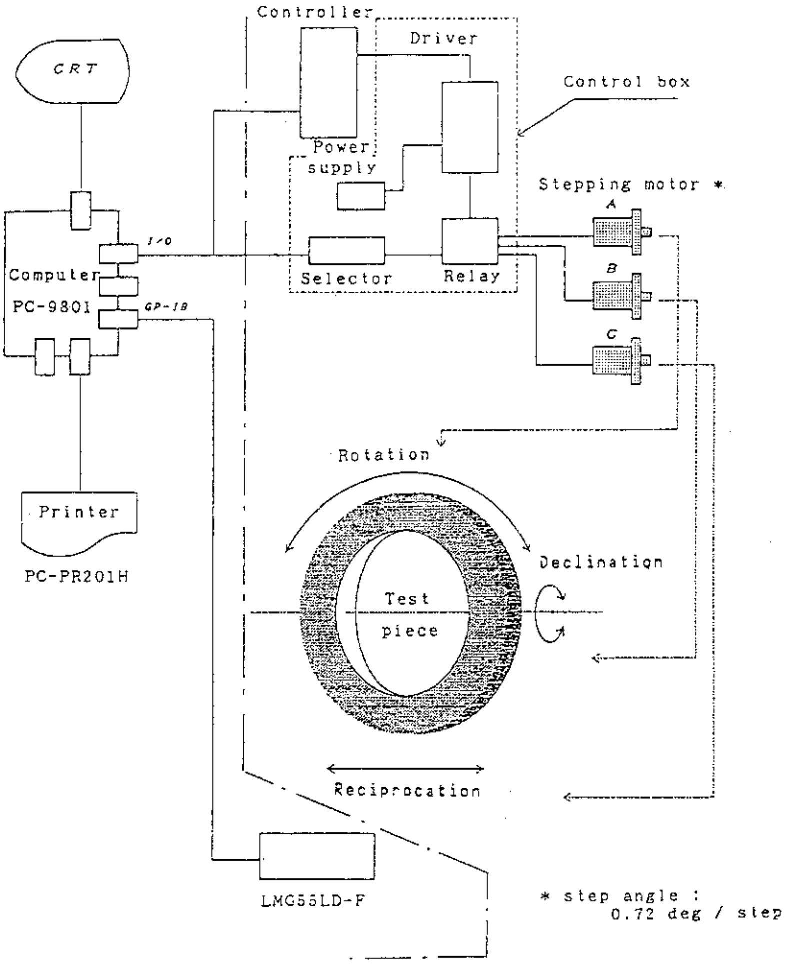


Fig. 2.2.13 Schematic diagram of the Graphite Inner Diameter Measurement Device (GIDMD)

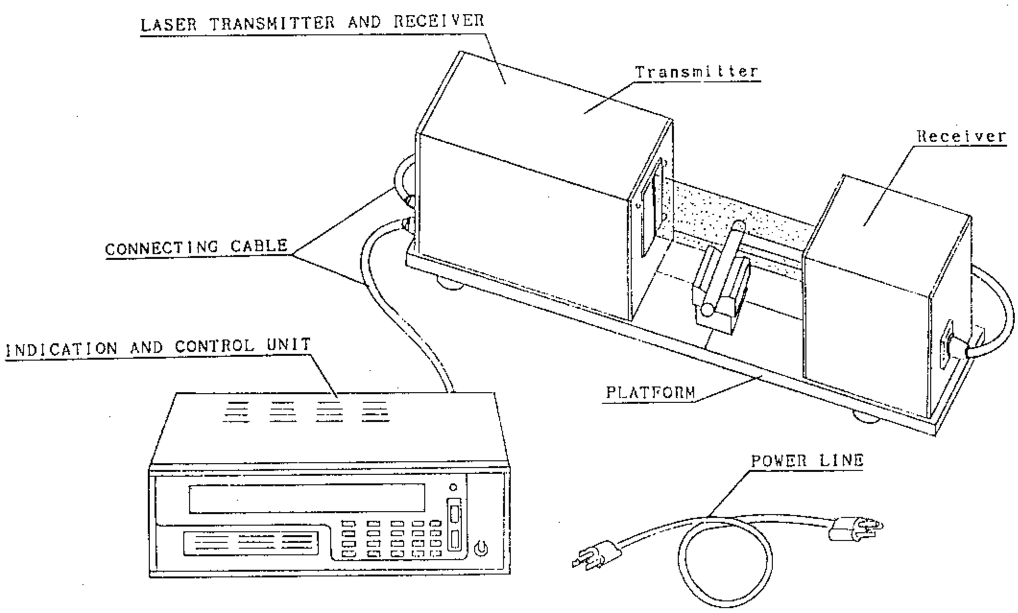


Fig. 2.2.14 Laser Micro Gauge: LMG(55LD-F)

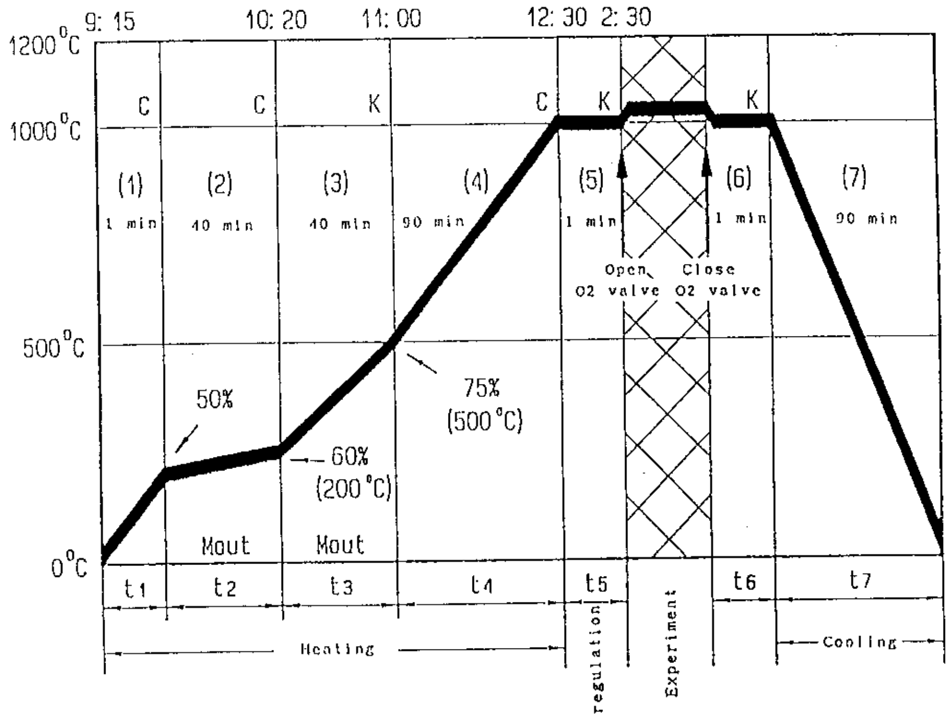


Fig. 2.3.1 Process of the temperature control during the experiment

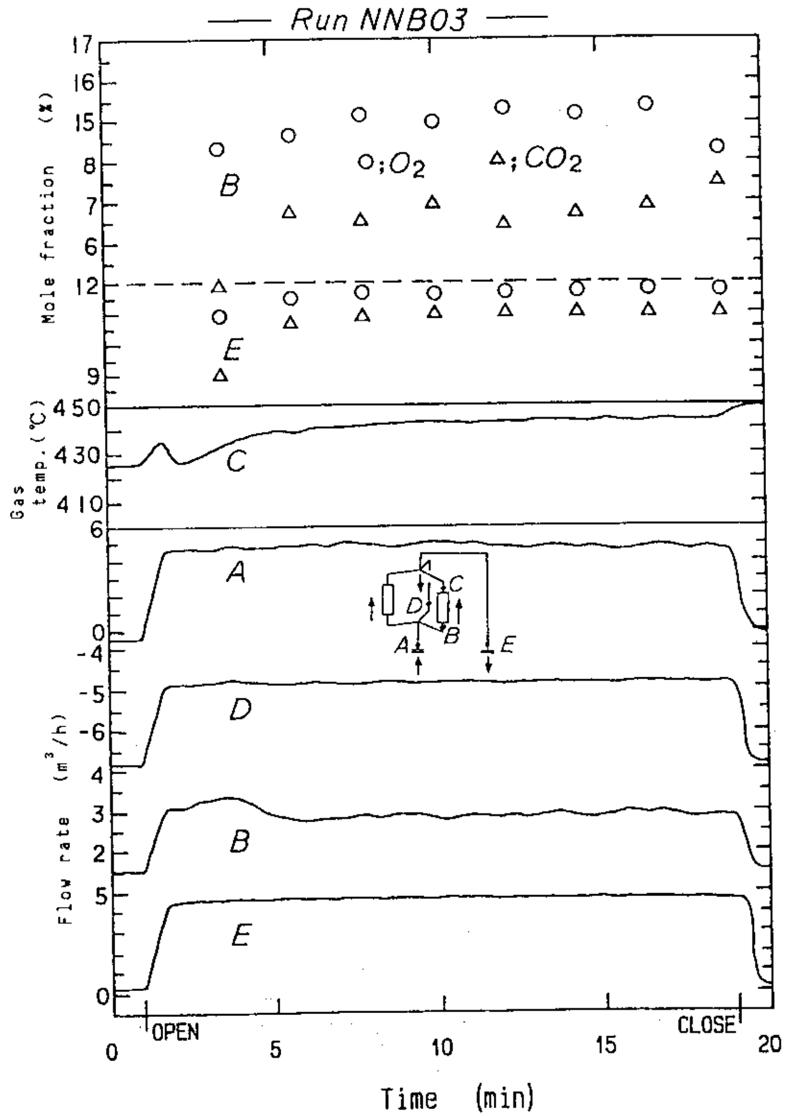


Fig. 3.2.1 Flow rates, temperature and mole fractions of RUN <NNB03>

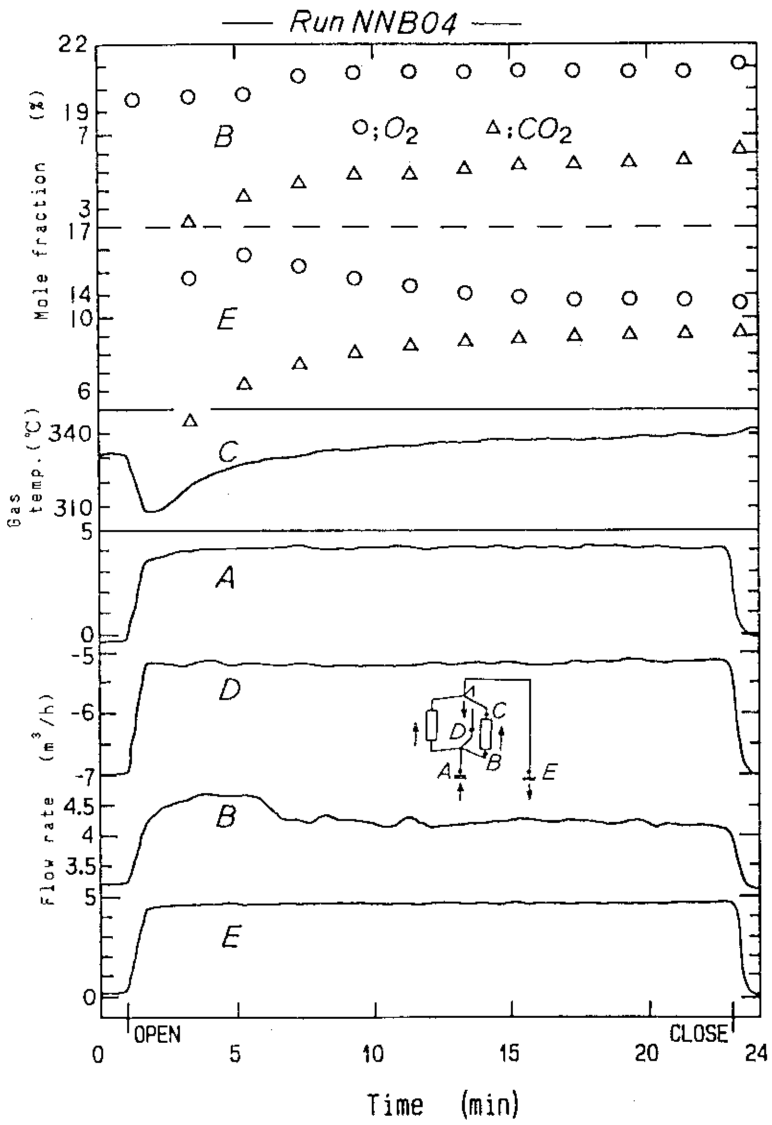


Fig. 3.2.2 Flow rates, temperature and mole fractions of RUN <NNB04>

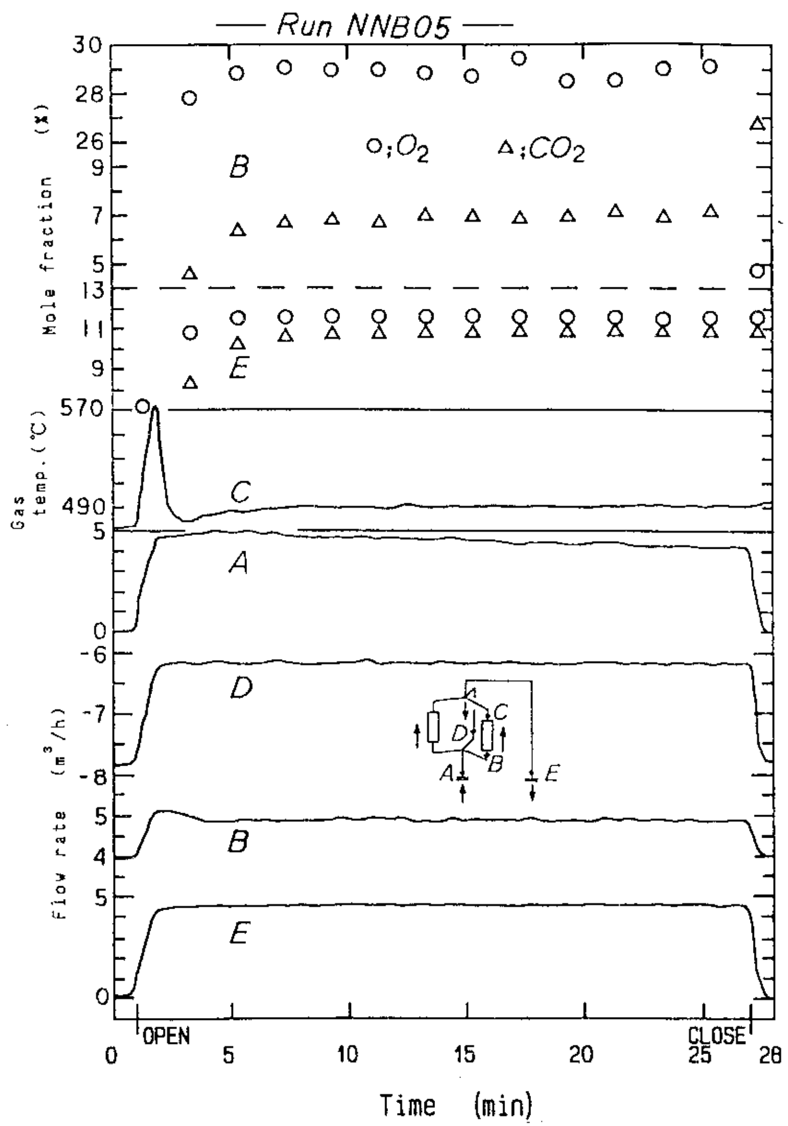


Fig. 3.2.3 Flow rates, temperature and mole fractions of RUN <NNB05>

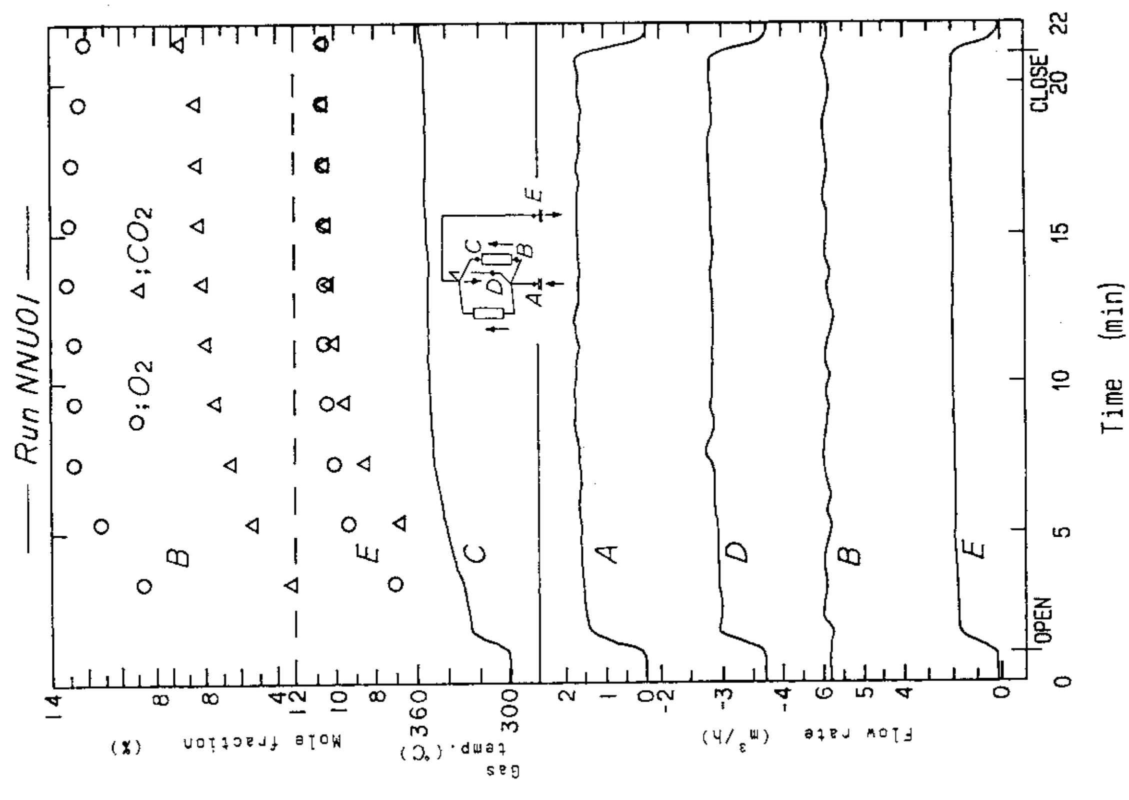


Fig. 3.2.4 Flow rates, temperature and mole fractions of RUN <NNU01>

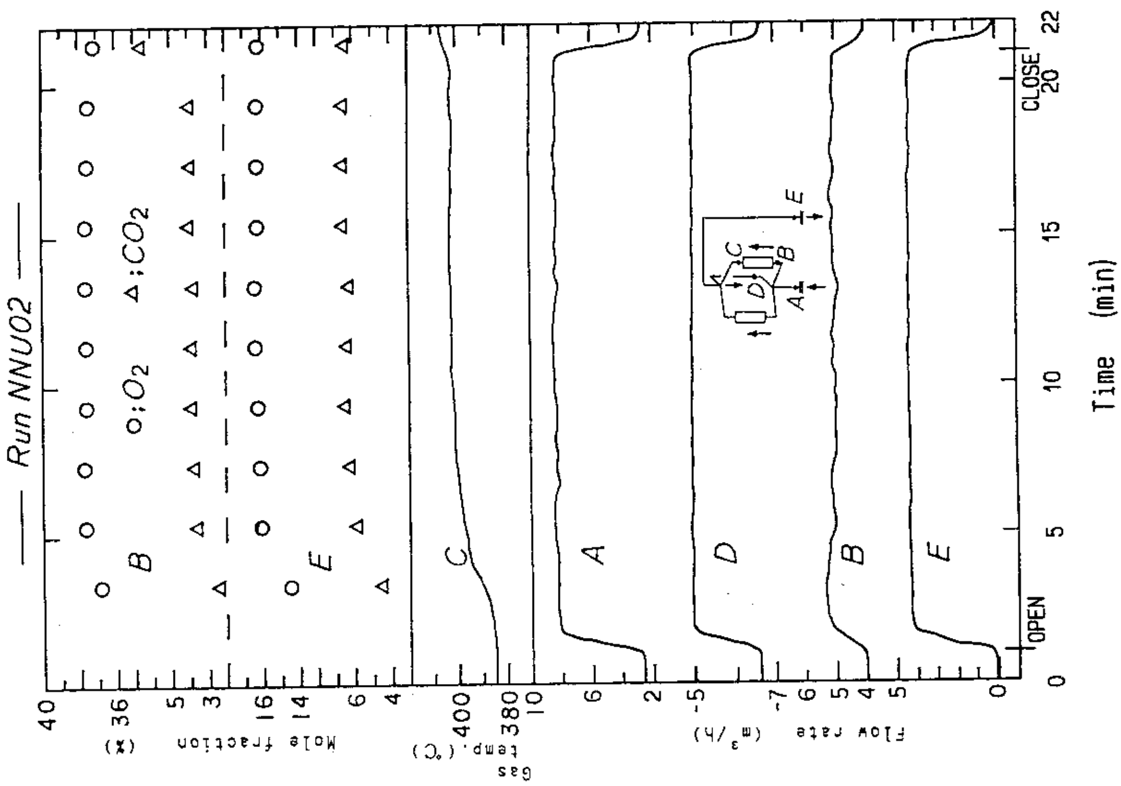


Fig. 3.2.5 Flow rates, temperature and mole fractions of RUN <NNU02>

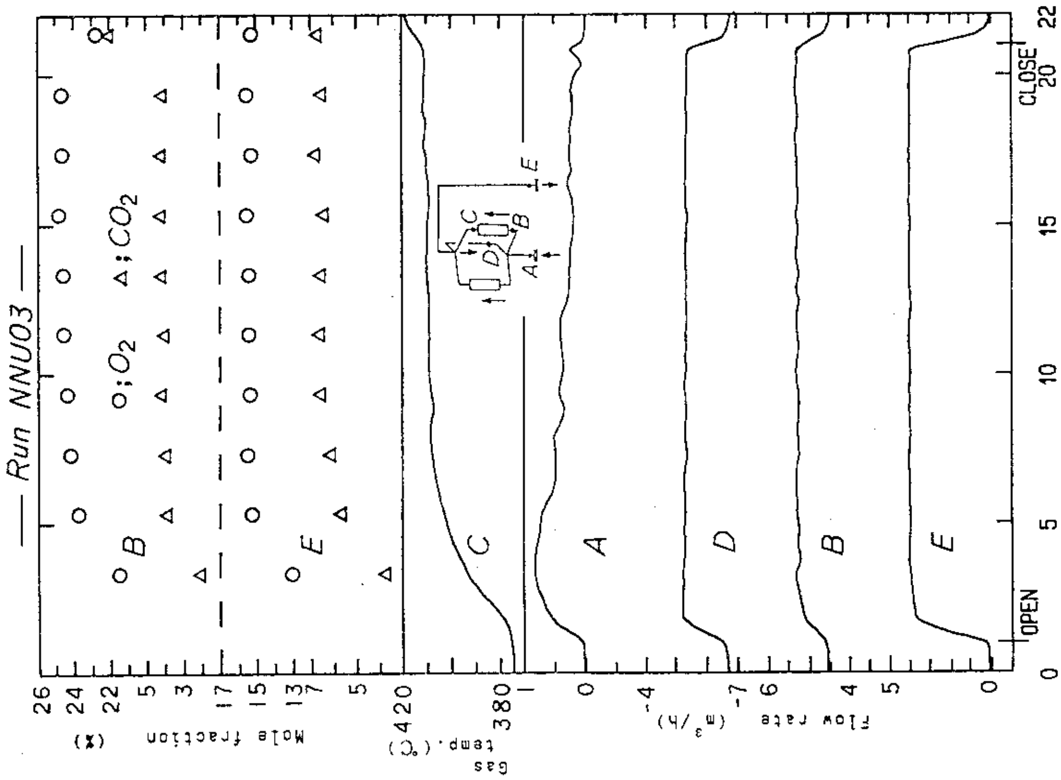


Fig. 3.2.6 Flow rates, temperature and mole fractions of RUN <NNU03>

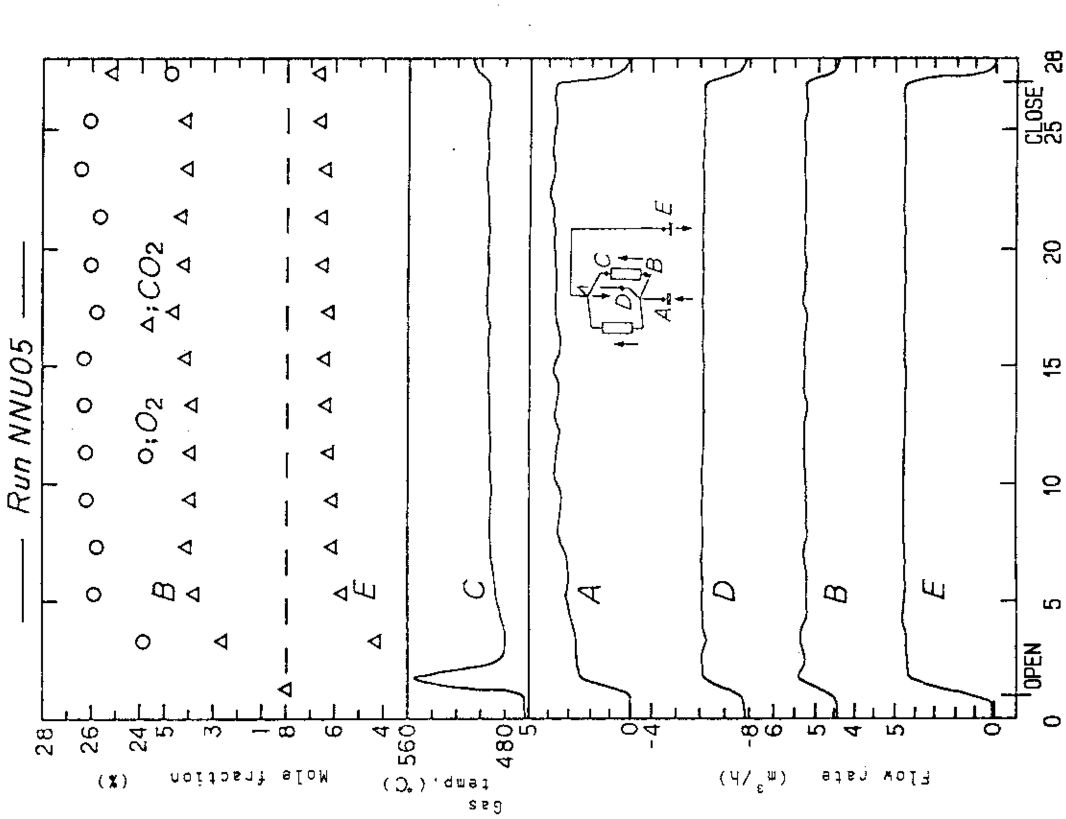


Fig. 3.2.7 Flow rates, temperature and mole fractions of RUN <NNU05>

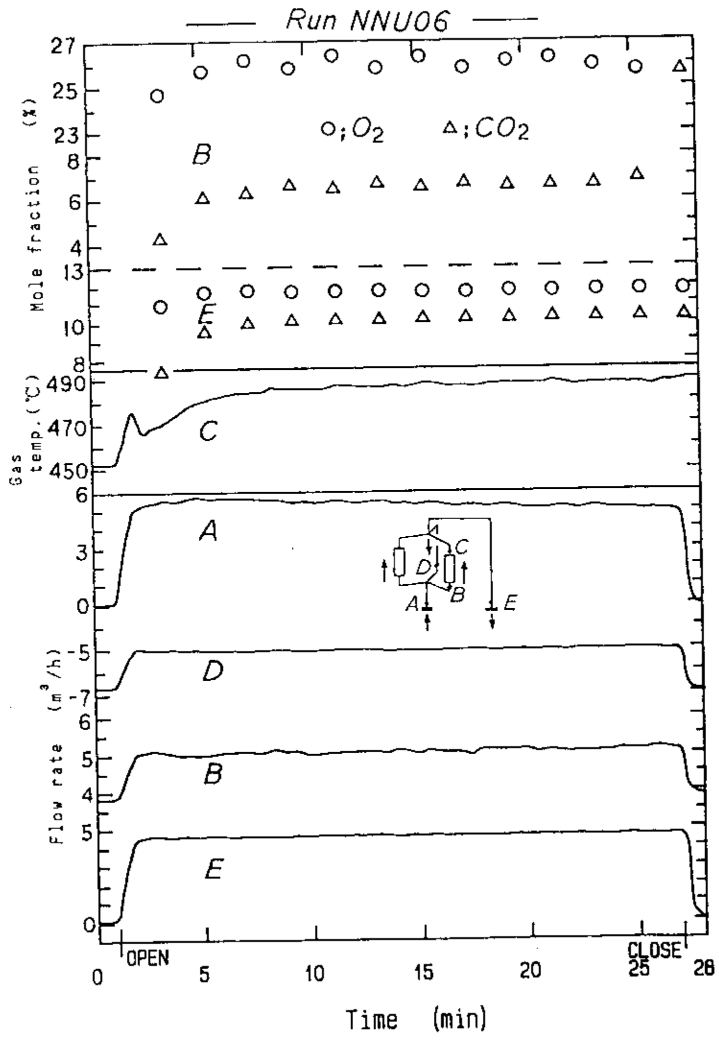


Fig. 3.2.8 Flow rates, temperature and mole fractions of RUN <NNU06>

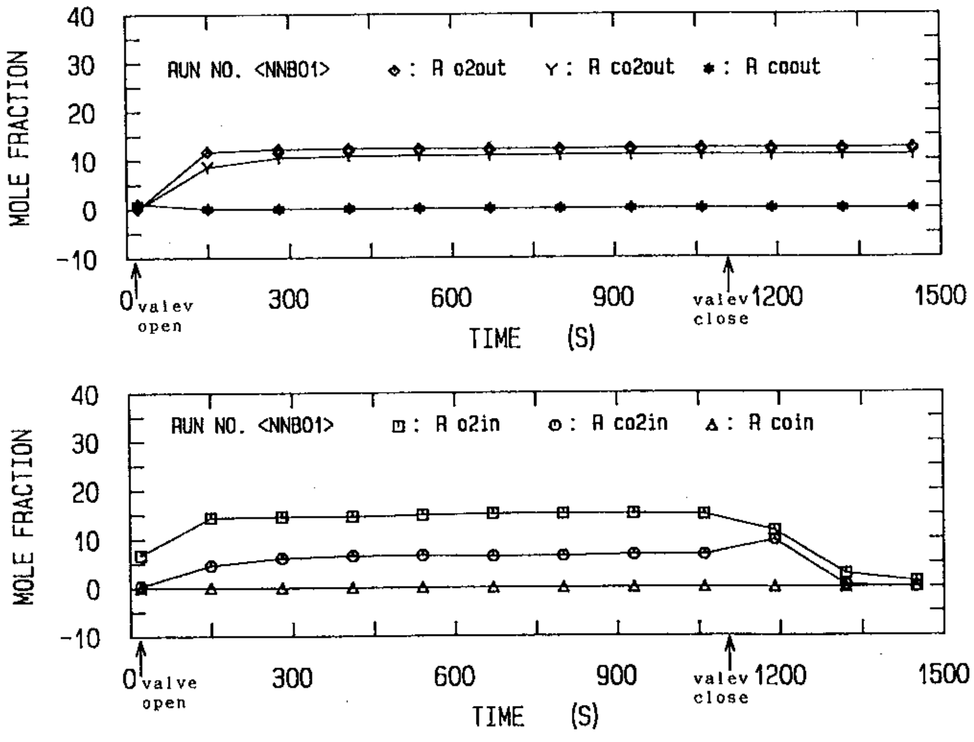


Fig. 3.2.9 Inlet and outlet mole fractions of RUN <NNB01>

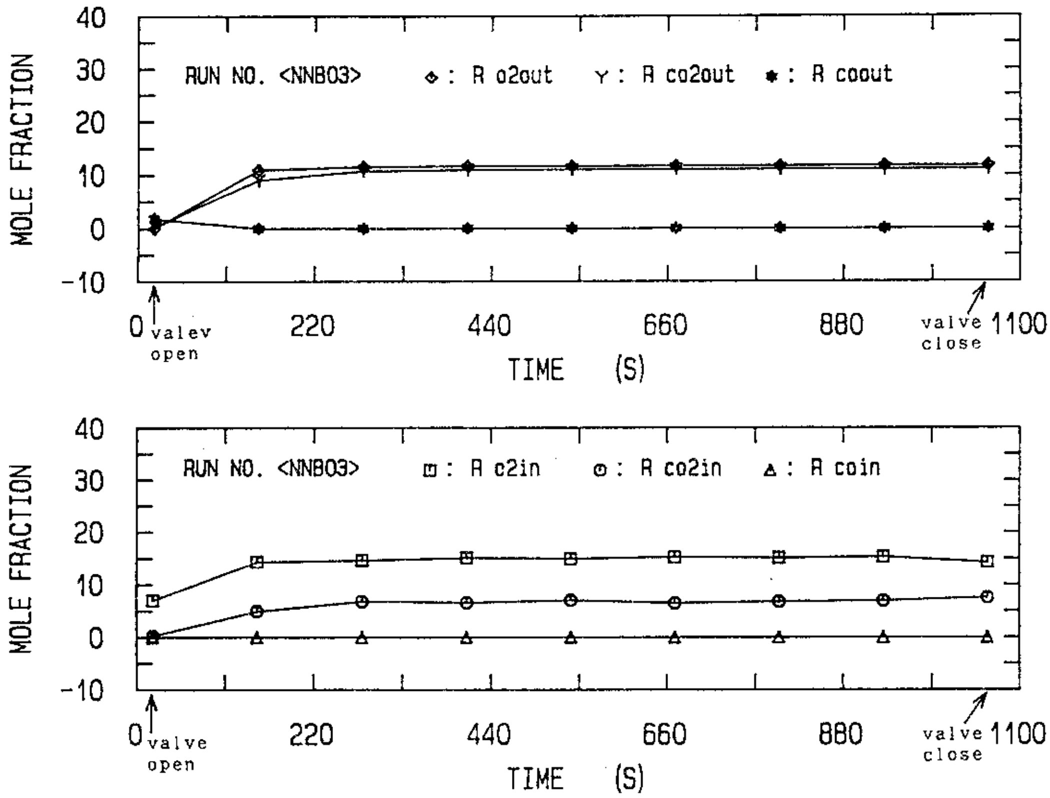


Fig. 3.2.10 Inlet and outlet mole fractions of RUN <NNB03>

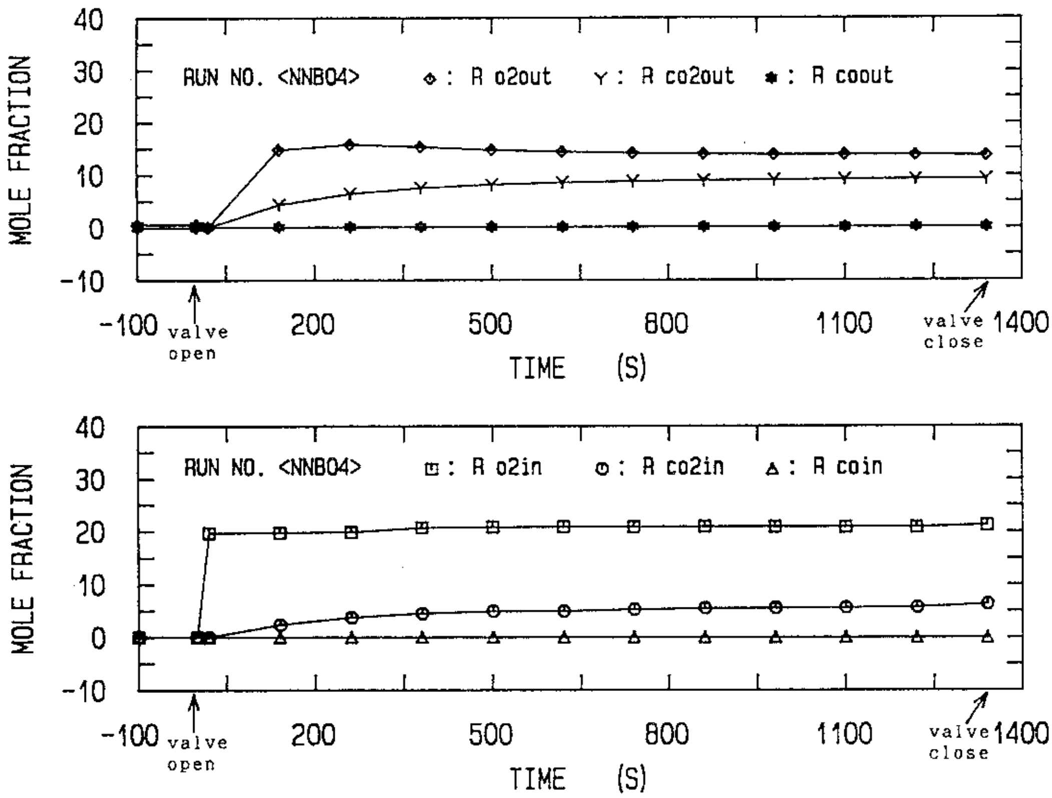


Fig. 3.2.11 Inlet and outlet mole fractions of RUN <NNB04>

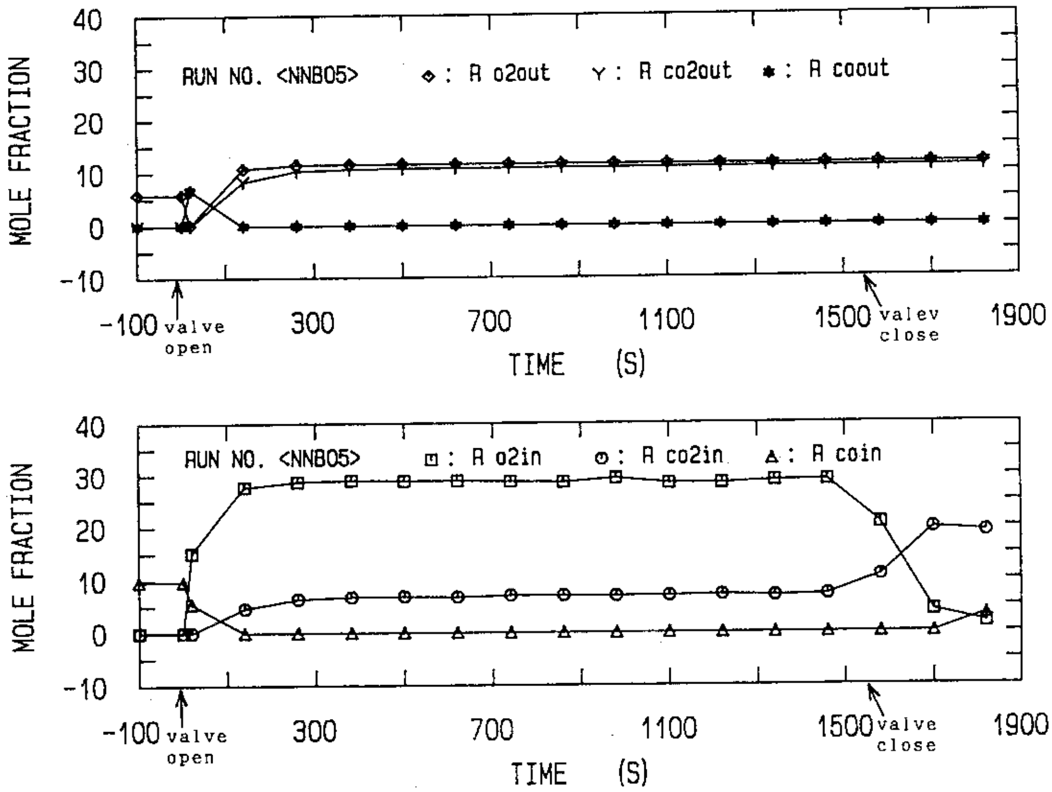


Fig. 3.2.12 Inlet and outlet mole fractions of RUN <NNB05>

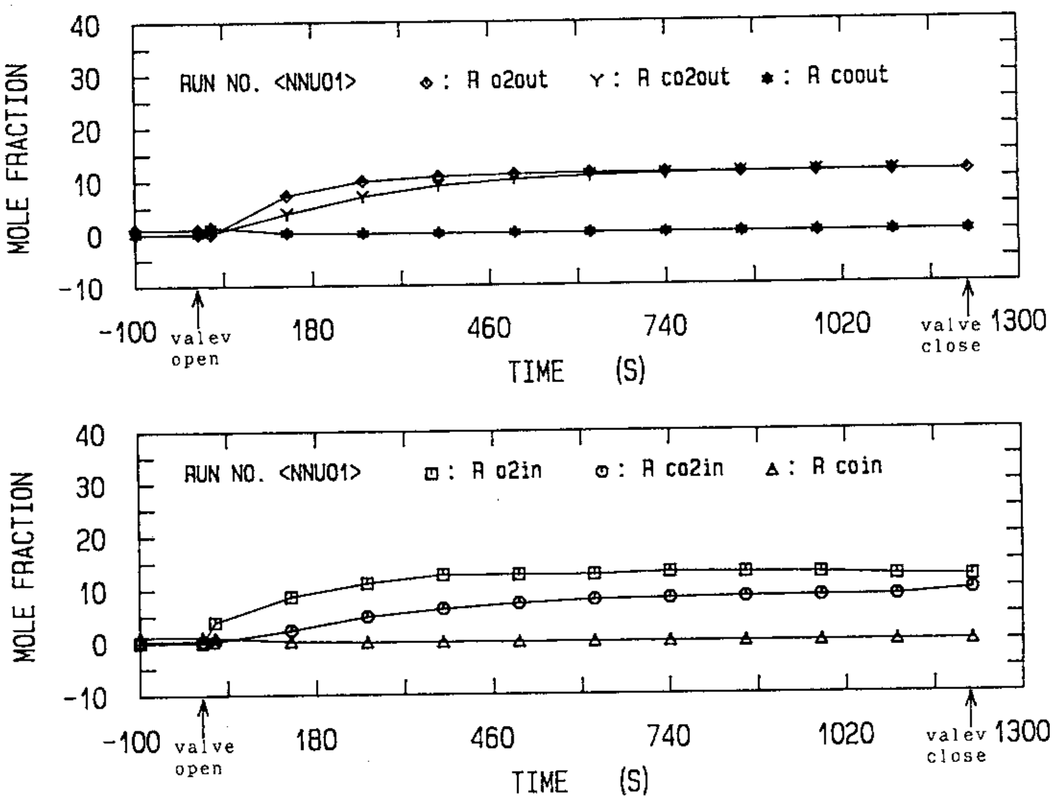


Fig. 3.2.13 Inlet and outlet mole fractions of RUN <NNU01>

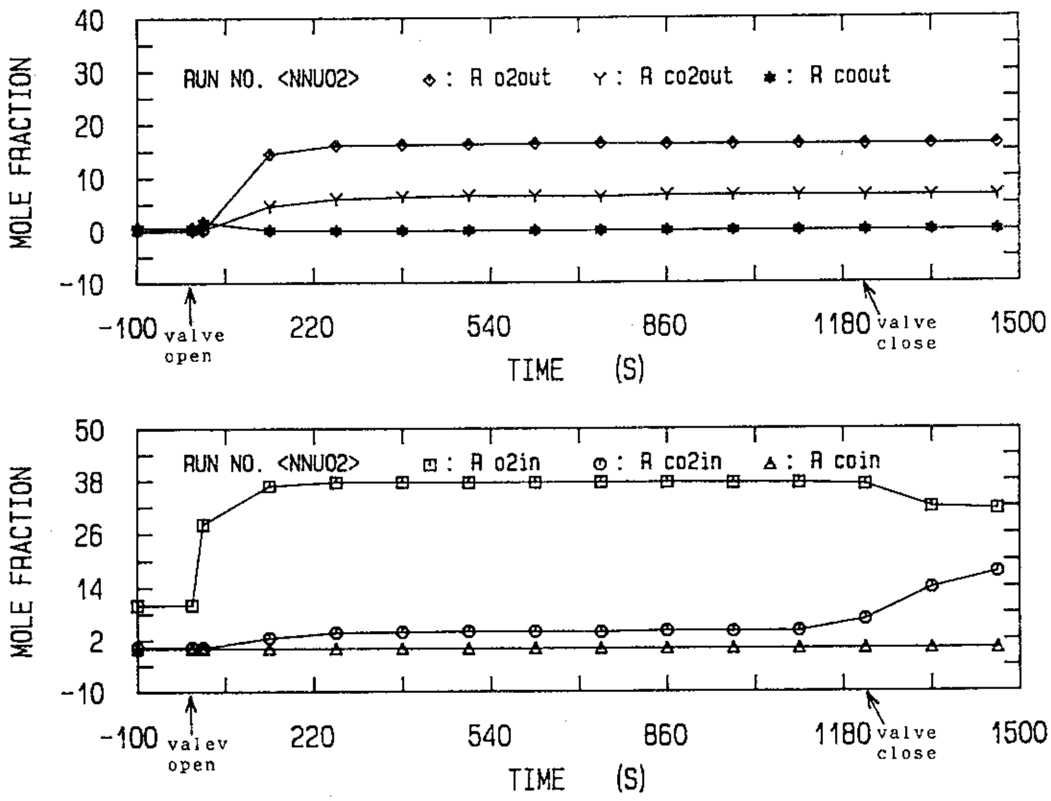


Fig. 3.2.14 Inlet and outlet mole fractions of RUN <NNU02>

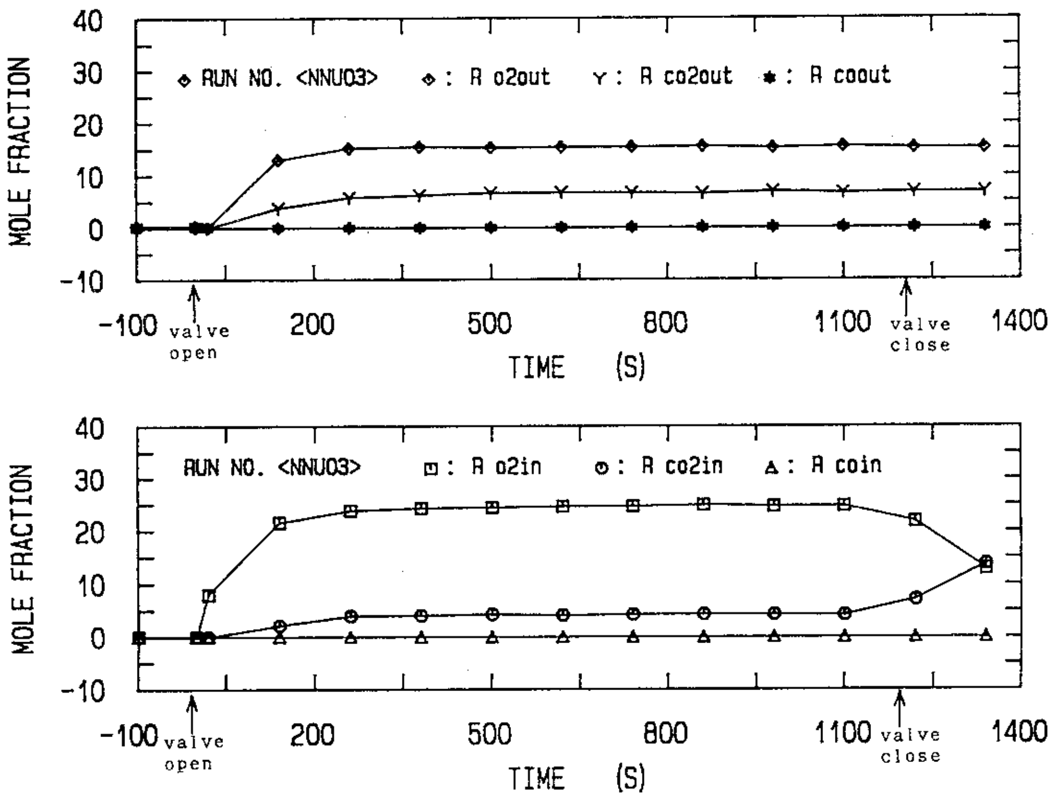


Fig. 3.2.15 Inlet and outlet mole fractions of RUN <NNU03>

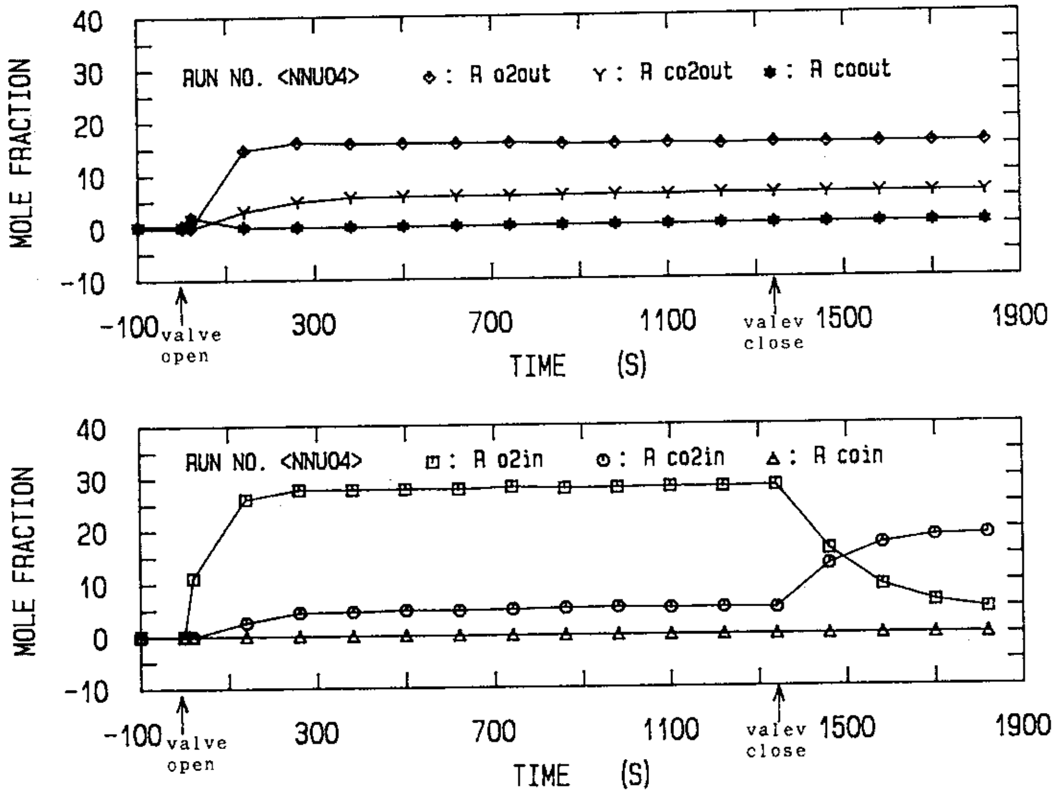


Fig. 3.2.16 Inlet and outlet mole fractions of RUN <NNU04>

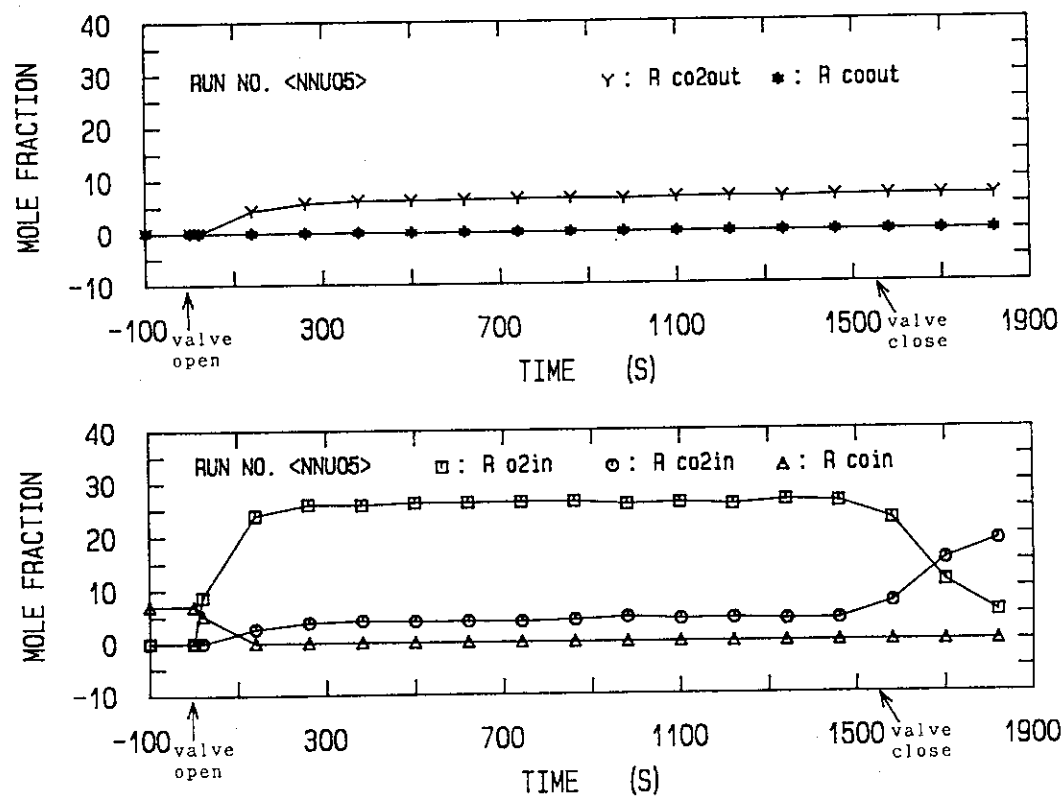


Fig. 3.2.17 Inlet and outlet mole fractions of RUN <NNU05>

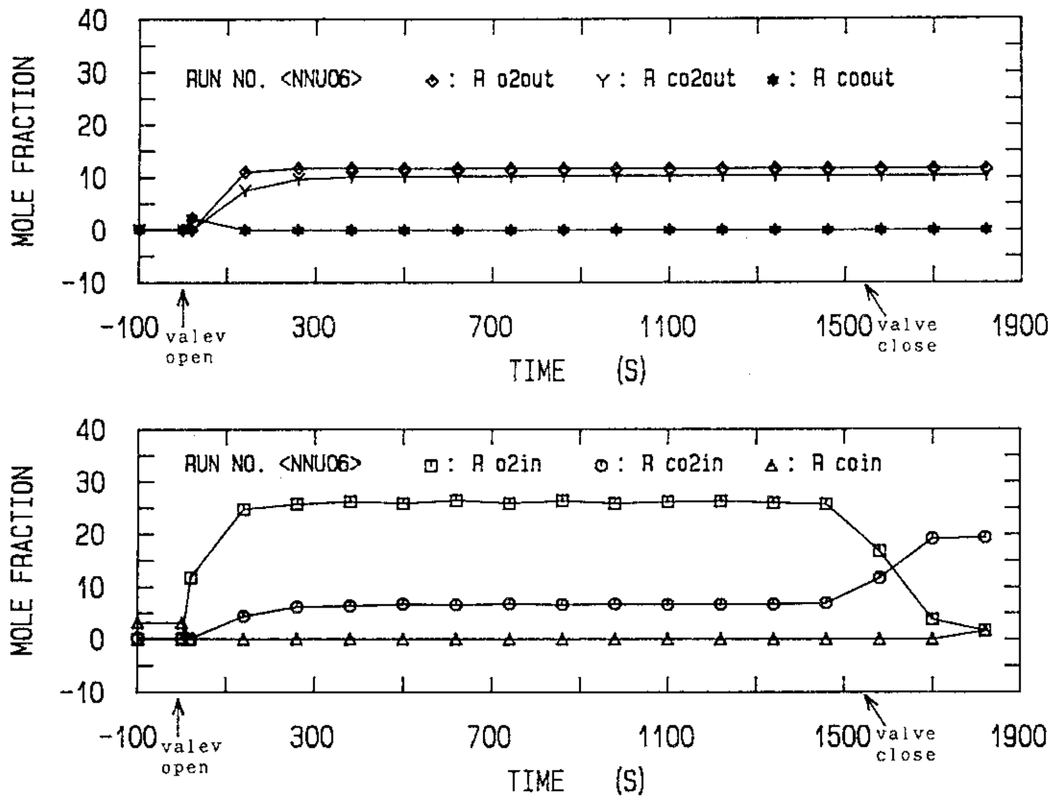


Fig. 3.2.18 Inlet and outlet mole fractions of RUN <NNU06>

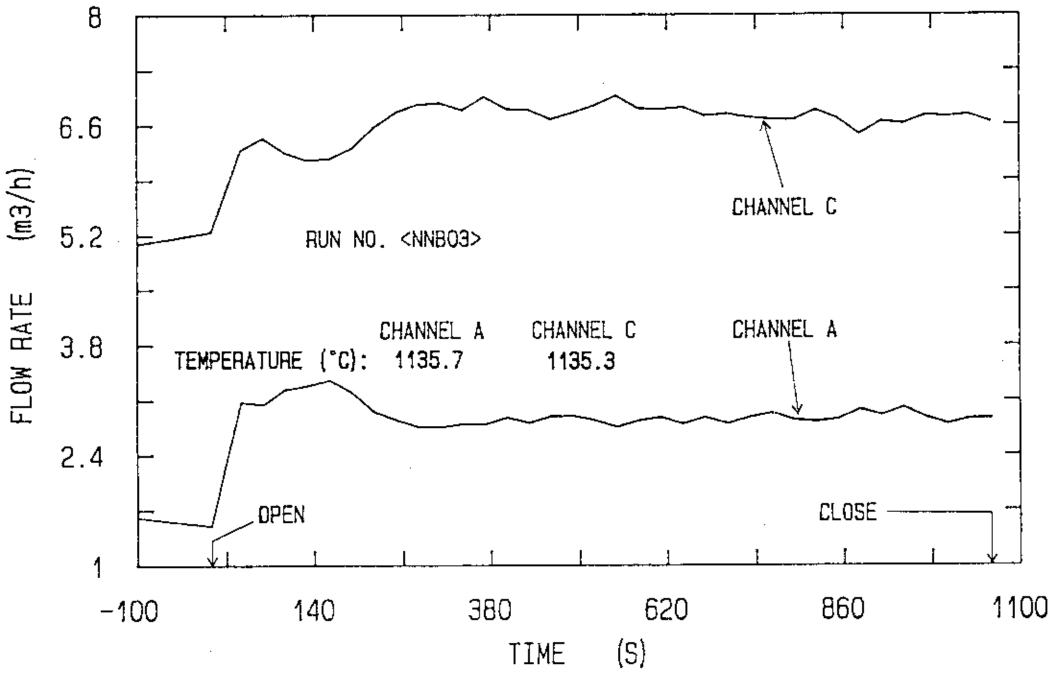


Fig. 3.2.19 Flow rates of the hot channels A and C of RUN <NNB03>

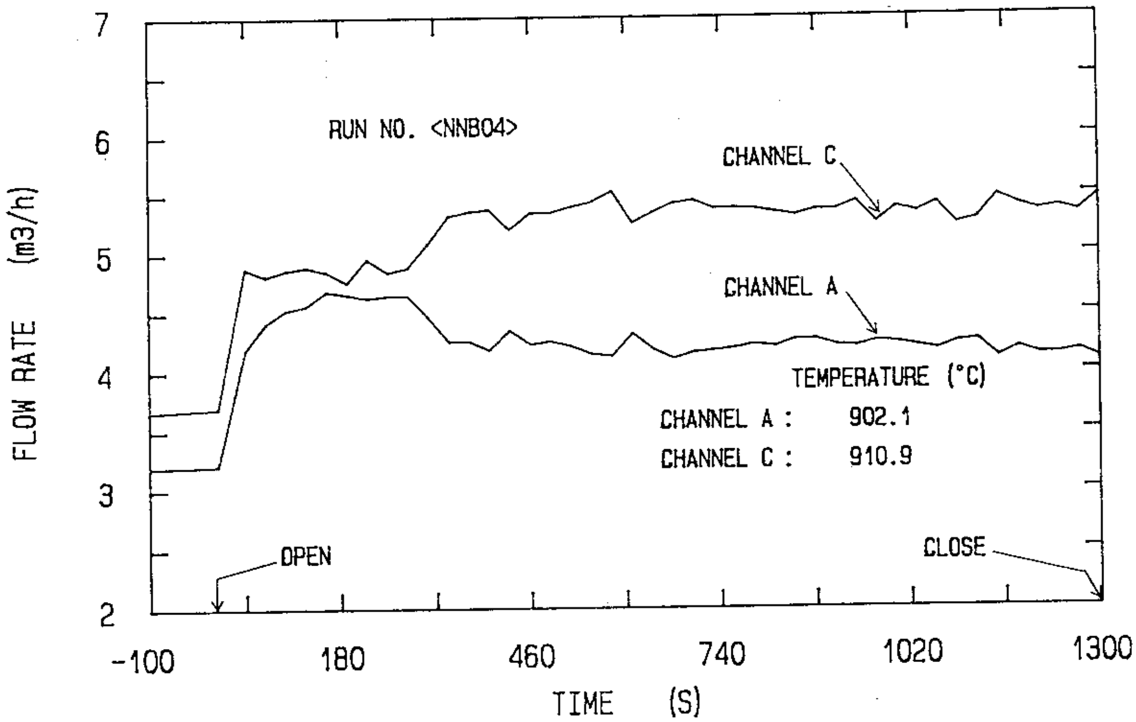


Fig. 3.2.20 Flow rates of the hot channels A and C of RUN <NNB04>

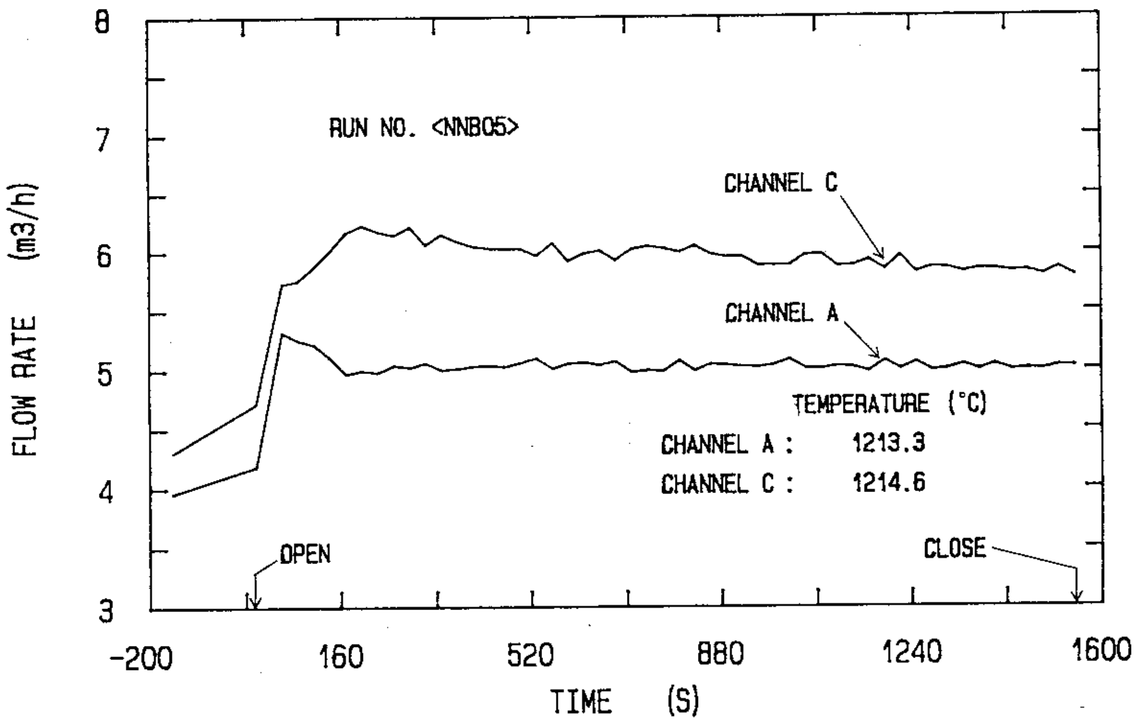


Fig. 3.2.21 Flow rates of the hot channels A and C of RUN <NNB05>

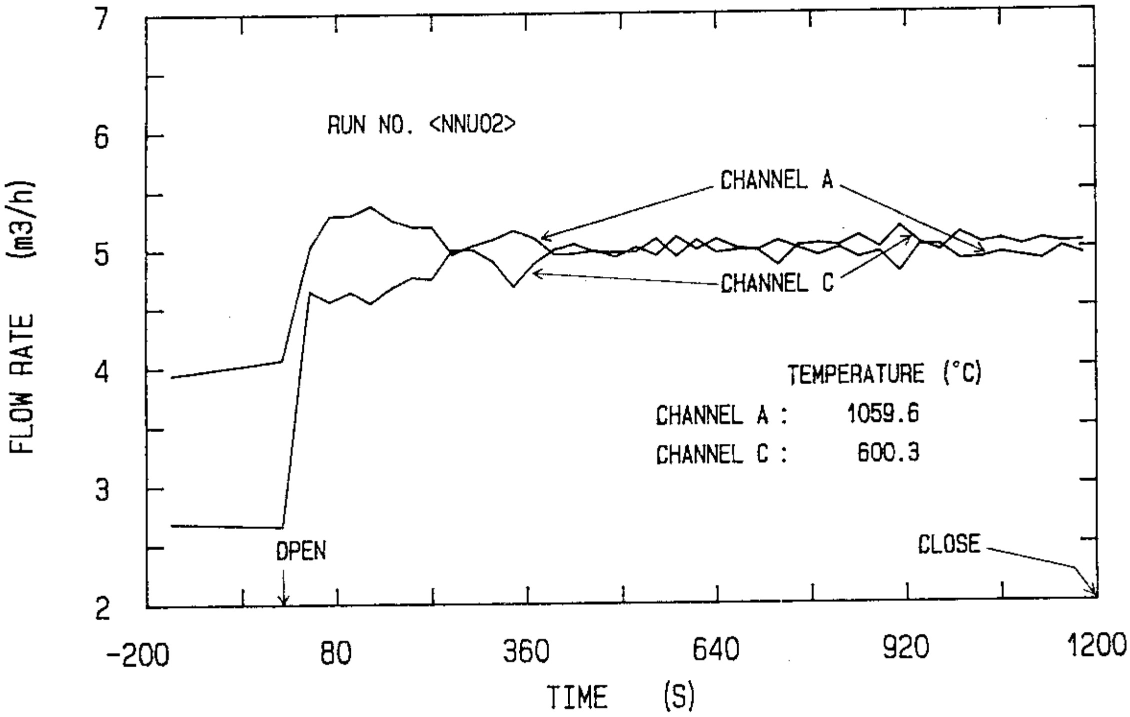


Fig. 3.2.22 Flow rates of the hot channels A and C of RUN <NNU02>

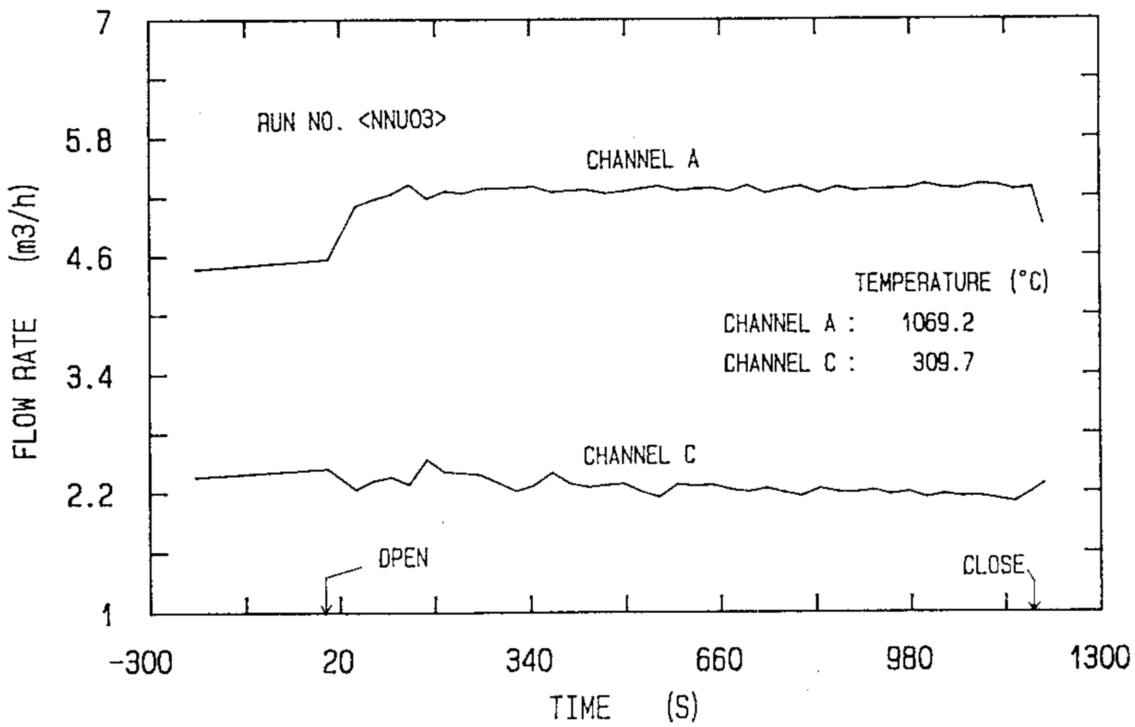


Fig. 3.2.23 Flow rates of the hot channels A and C of RUN <NNU03>

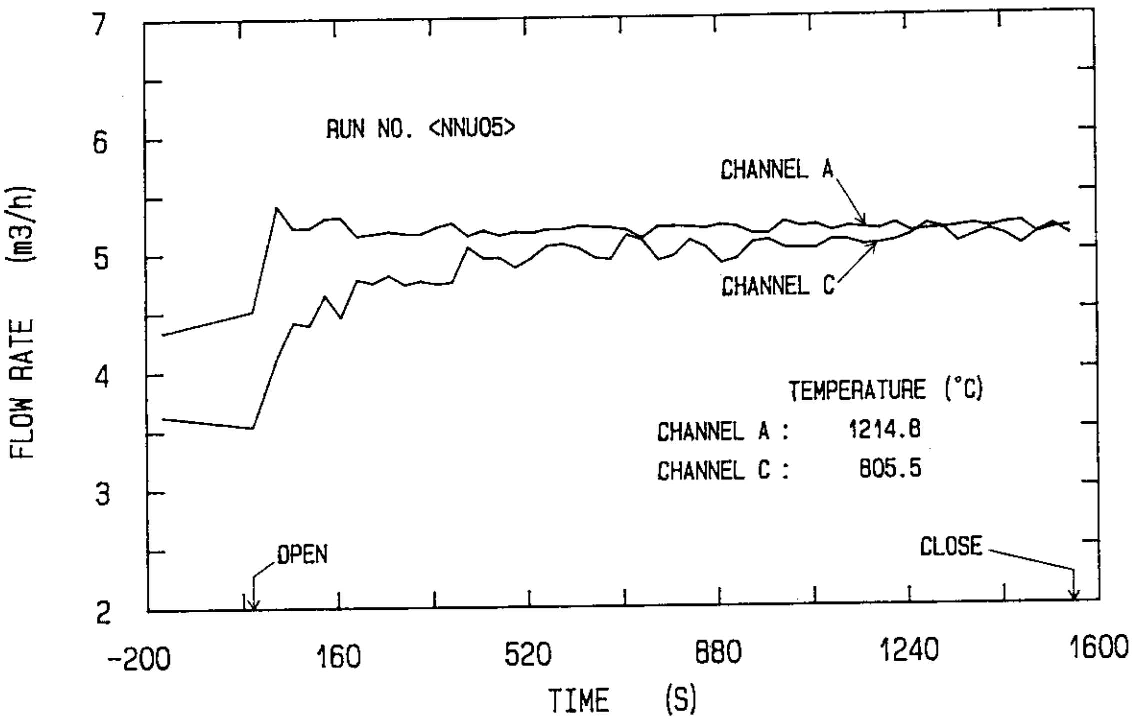


Fig. 3.2.24 Flow rates of the hot channels A and C of RUN <NNU05>

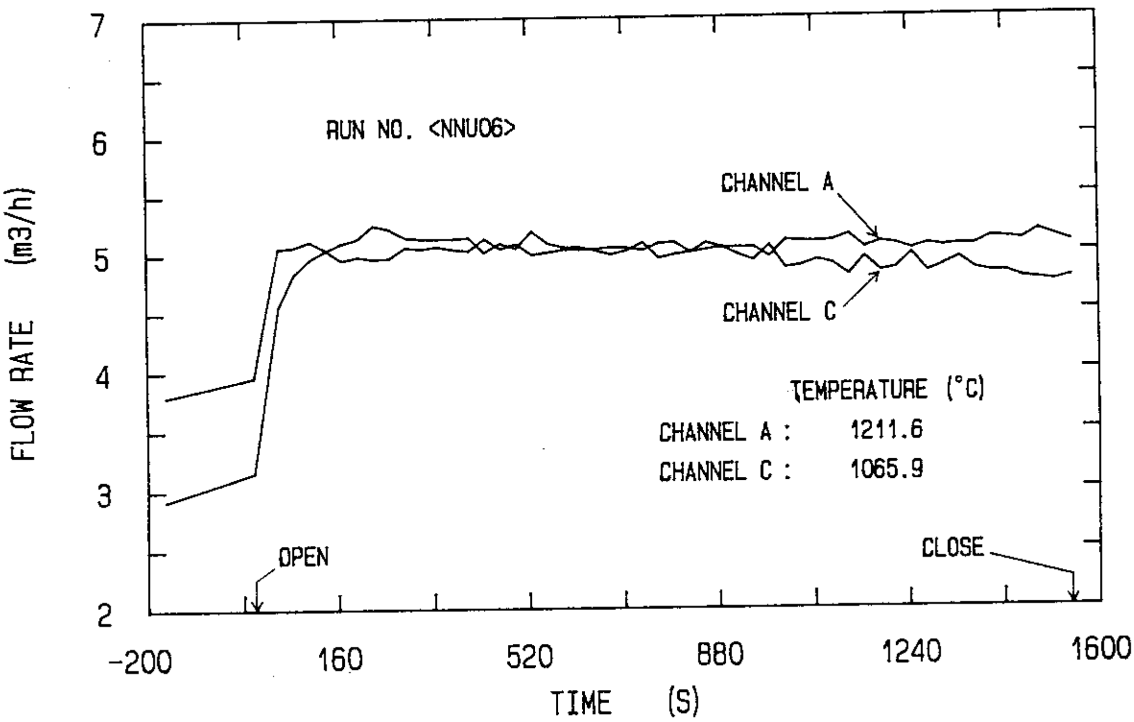
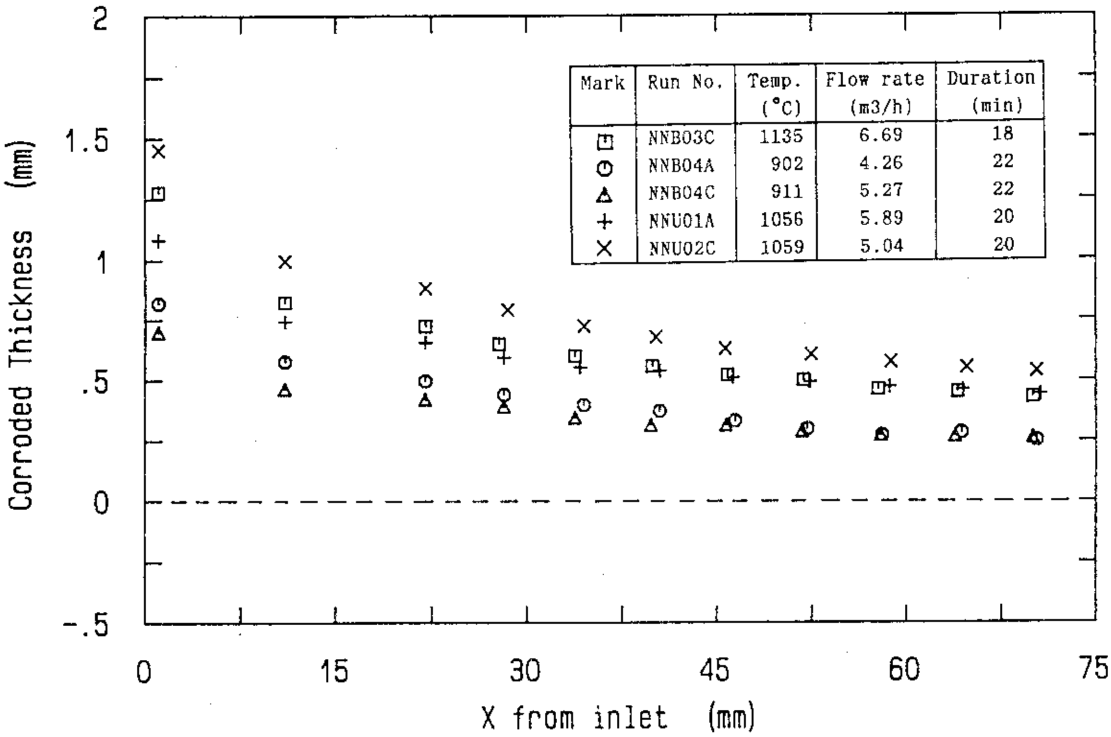
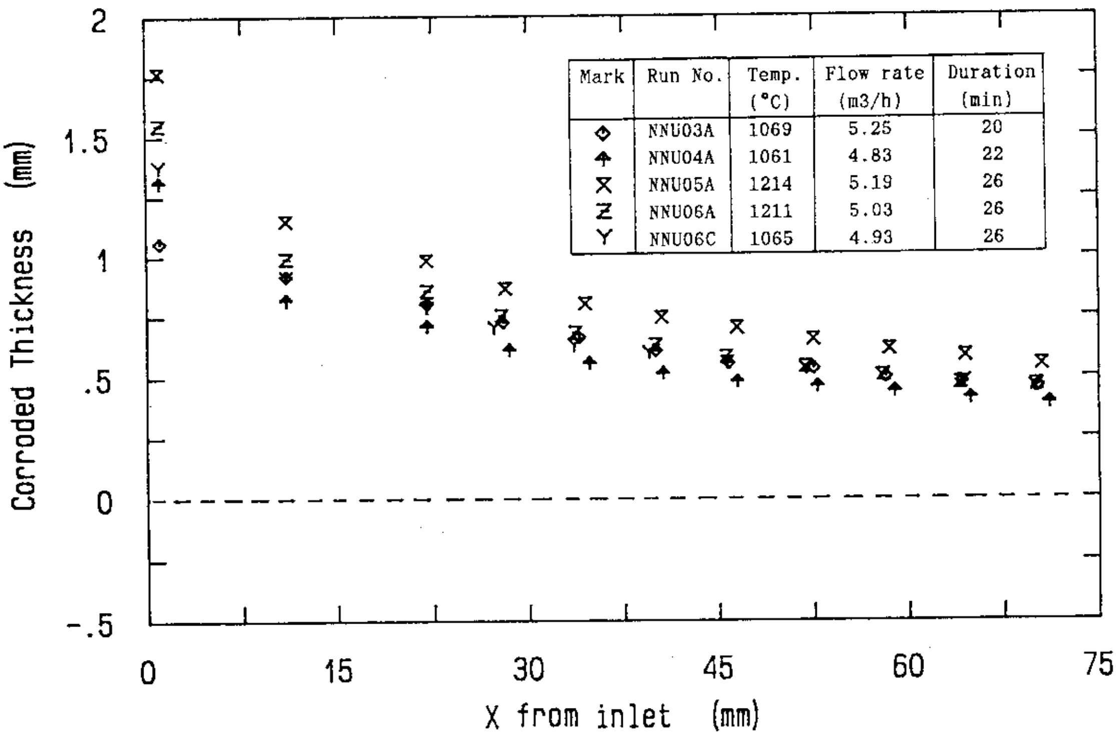


Fig. 3.2.25 Flow rates of the hot channels A and C of RUN <NNU06>



Mark	Run No.	Temp. (°C)	Flow rate (m3/h)	Duration (min)
□	NNB03C	1135	6.69	18
O	NNB04A	902	4.26	22
Δ	NNB04C	911	5.27	22
+	NNU01A	1056	5.89	20
X	NNU02C	1059	5.04	20

Fig. 3.2.26 Corrosion thickness of the graphite along axis



Mark	Run No.	Temp. (°C)	Flow rate (m3/h)	Duration (min)
◇	NNU03A	1069	5.25	20
↑	NNU04A	1061	4.83	22
X	NNU05A	1214	5.19	26
Z	NNU06A	1211	5.03	26
Y	NNU06C	1065	4.93	26

Fig. 3.2.27 Corrosion thickness of the graphite along axis

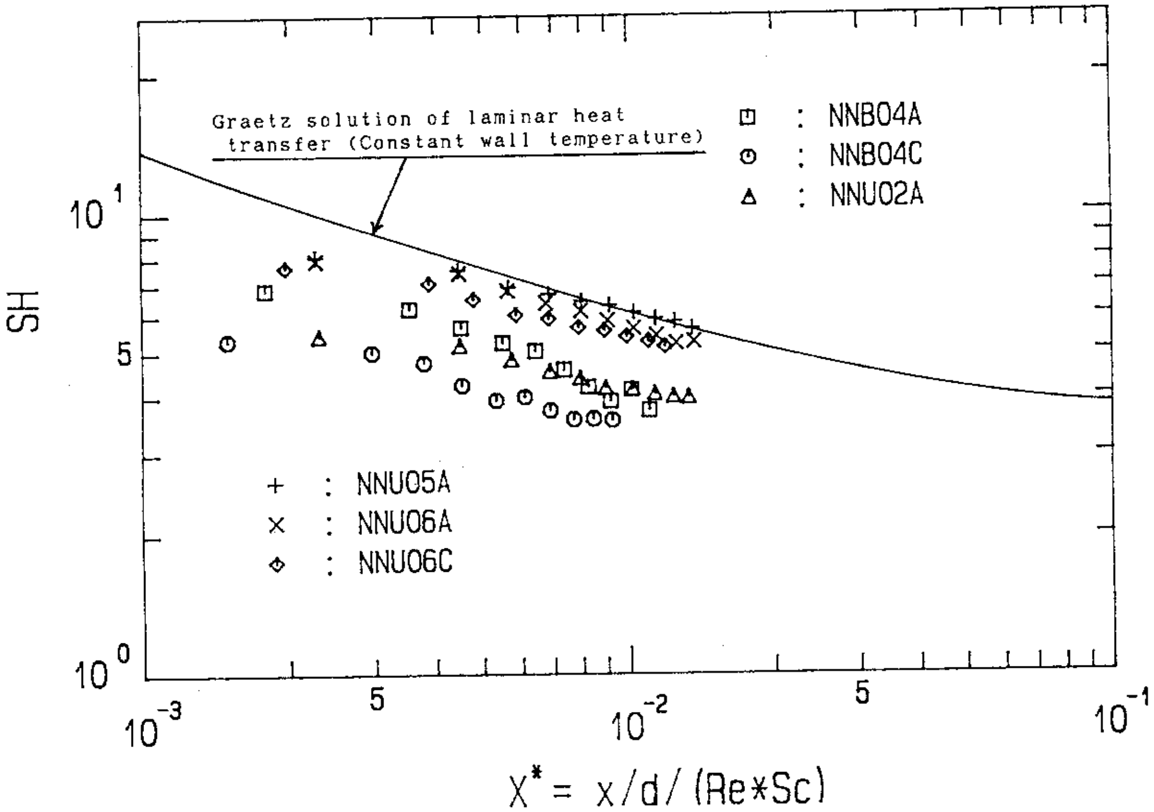


Fig. 3.2.28 Relationship between the Sherwood number and the dimensionless distance

APPENDIX A Computer Programs for Data Processing

The computer programs of PROC and MULTI were used to process the experimental data.

The PROC is a preprocessing program. It performs:

1. The conversion of sampled data from voltage values to corresponding physical ones such as temperature, pressure and flow rate.
2. The calculation of average values.
3. The calculation of $f_{co}/_{co_2}$.
4. Saving and printing the results according to the certain format.

The MULTI is a main program. It performs:

1. The calculation of thermal properties of the gases and gas mixtures.
2. The calculation of the mass transfer coefficient, the Sherwood number and so on.
3. Printing the results.
4. Drawing the results on the plotter.

The MULTI and PROC accept block structure, most of functions were performed in various subroutines. In order to understand the program easily, the names of the subroutines and function programs, arguments and their descriptions of the MULTI are listed in Tables A-1 and A-2.

The PROC and MULTI programs are shown in Tables A-3 and A-4, respectively.

Table A-1 List of the subroutines in <MULTI>

NO.	name	FUNCTION
1	•ACLR	Clear all screen except function lable.
2	•BASE1	Base map 1 on screen.
3	•BASE2	Base map 2 on screen.
4	•CA	mV---->℃. thermocouple sampling data transfer 2.
5	•CALC	Calculation.
6	•CLR	Clear one line display.
7	•CONS	Constant initialization.
8	•CPC	Calculate specific heat CP.
9	•CVC	Calculate specific heat CV.
10	•DCONV	Change original data into measurement data.
11	•DENS	Calculate density.
12	•DIF	Calculate mass diffusivity.
13	•DSAVE	Save calculation results into file.
14	•ERRIN	Error informatiom.
15	•FSTP	Calculate mass fraction of gases at x(0).
16	•INIT	Program initialization.
17	•MTC	Calculate mass transfer coefficient β(i) at every x(i).
18	•N	Return without operation.
19	•OCQ	Calculate consumed amount of O2 at every x(i).
20	•OMG	Calculate mass fraction and mole fraction of gases.
21	•PLOT	Plot graph of result on plotter.
22	•PR	mV---->℃. thermocouple sampling data transfer 1.
23	•PRN	Calculate Prandtl number.
24	•PRNT	Print calculation results in printer.
25	•RCCL	Calculate QM.

Table A-1 List of the subroutines in <MULTI> (continue)

NO.	name	FUNCTION
26	•RDATA	Read data from original data file.
27	•REN	Calculate Reynolds number.
28	•RETN	Return to upper menu.
29	•RGN	Calculate 1/Gz.
30	•RSULT	Read data from calculation result file.
31	•SCN	Calculate Schmidt number.
32	•SCREN	Draw graph of result on screen.
33	•SDISP	Display measurement data on screen.
34	•SF	Confirm gas which exists in gas mixture
35	•SHN	Calculate Sherwood number.
36	•SPRNT	Display calculation results on screen.
37	•T1	Function lable 1 of function keys.
38	•T2	Function lable 2 of function keys.
39	•T3	Function lable 3 of function keys.
40	•T6	Clear function lable.
41	•THCO	Calculate thermal conductivity.
42	•UISC	Calculate viscosity.
43		
44		
45		
46		
47		
48		
49		
50		

Table A-2 List of the arguments in <MULTI>

NO.	NAME	DESCRIPTION	UNIT
1	BETA(i)	Mass transfer coefficient of O2 in gas mixture.	m/s
2	CA1(i)	Characteristic diameter σ of gases.	
3	CA2(i)	ε/k value of gases.	
4	CA3(i)	Coefficient of Cp polynome.	
5	CA4(i)	coefficient of Cv polynome.	
6	CM(i)	Molecular wight of gases.	kg/mol
7	CP(i)	Specific heat at constant pressure.	J/kg·K
8	CV(i)	Specific heat at constant volume.	J/kg·K
9	CPM(i)	CP of gas mixture at x(i)	J/kg·K
10	CVM(i)	CV of gas mixture at x(i)	J/kg·K
11	D(i)	Diffusivity of O2 to i gas.	m2/s
12	DA~DH	Coefficient of ΩD.	
13	DA(i)	Original sampling data array.	volt
14	DM(i)	Diffusivity of O2 to gas mixture at x(i)	m2/s
15	DCO(i)	Corrosion diameter at x(i).	m
16	DO(i)	Original diameter.	m
17	DP	Differential pressure	Pa
18	DZ(i)	Zero point array of instruments.	volt
19	F	fco/o2	
20	LEMBTA(i)	Thermal conductivity of i gas.	w/m·K
21	LEMBTAM(i)	Thermal conductivity of gas mixture at x(i)	w/m·K
22	MIXT	O2 mixing time.	s
23	MJU(i)	Viscosity of i gas.	Pa·s
24	MJUM(i)	Viscosity of gas mixture at x(i)	Pa·s
25	MM	Total number of x(i).	
26	MO(i)	Mass flow rate of O2 at x(i).	kg/s
27	MO1(i)	Consumed amount of O2 in unit time and length	kg/m·s
28	MO2(i)	Consumed amount of O2 in unit time and area	kg/m2·s
29	MT(i)	Total mass flow rate at x(i).	kg/s
30	P	Pressure	Pa
31	PA	Pressure	atm
32	PR(i)	Prandtl number at x(i).	
33	PV(i)	meassurement data array.	

Table A-2 List of the arguments in <MULTI> (continue)

NO.	NAME	DESCRIPTION	UNIT
34	QM	Qm=1/M=ΣWi/Mi.	
35	R(i,j)	Mole fraction of i gas at x(j).	
36	RD$	Run date of experiment ment.	
37	RE(i)	Reynolds number at x(i).	
38	RMT	Room temperature.	℃
39	RN$	Run number of experiment ment.	
40	RO(i)	Density of i gas.	kg/m3
41	ROM(i)	Density of gas mixture at x(i)	kg/m3
42	SC(i)	Schmidt number at x(i).	
43	SCN	Circulatory number of sampling.	
44	SH(i)	Sherwood number at x(i).	
45	ST$	Time of saving sampled data into file.	
46	TK	Absolute temperature.	K
47	TMA	Gas average temperature in channel A.	℃
48	TMC	Gas average temperature in channel C.	℃
49	VA−VF	Coefficient of Ωv.	
50	VFU	Average flow velocity.	m/s
51	W(i,j)	Mass fraction of i gas at x(j).	
52	X(i)	Distance far from original point.	m
53	XL(i)	Locating coordinate of cursor in horizontal.	
54	YL(i)	Locating coordinate of cursor in verticle.	
55	ZG(i)	1/Gz at x(i).	
56			
57			
58			
59			
60			
61			
62			
63			
64			
65			
66			

Table A-3 List of the <PROC> (1/5)

```
10 ' *****************************************************************
20 ' *      THE COMPUTER CODE NAME :      PROC.BAS                   *
30 ' *      THIS CODE USED TO RANGE ORIGINAL DATA AND SAVE            *
40 ' *      THE RESULTS IN FILE WITH EXTENSION NAME .A                *
50 ' *                                                                *
60 ' *                                  HAN  BING   1992.7.13          *
70 ' *****************************************************************
80 '
90 WIDTH 80,25        : CONSOLE 0,25,0,1
100 SCREEN 3,0         : COLOR ,,,,1              : CLS 3
110 COLOR = (0,&H44B)  : COLOR = (4,&H5E8)
120 COLOR = (1,&H888)   : COLOR = (5,&H494)
130 COLOR = (2,&HFFF)  : COLOR = (6,&H0)
140 COLOR = (3,&H723)  : COLOR = (7,&H337)
150 '
160 FLAG=0:X1 = 639 : Y1 = 399
170 WINDOW (0,0)-(X1,Y1)    : VIEW (0,0)-(X1,Y1)
180 '
190 ' MAIN PROGRAM      /////////////////////////////////////////////
200 '
210 INPUT "THE NUMBER OF SAMPLING NN =",NN
220 DIM DZ(26),DA(NN,99),PV(NN,99)
230 DIM P(NN),PA(NN),TMA(NN),TMC(NN),TT(NN),DTT(NN)
240 GOSUB *RZERO
250 FOR I=0 TO NN-1
260 GOSUB *RDATA
270 NEXT I
280 CLOSE #1
290 PRINT " READING FINISHED !"
300 GOSUB *AVER
310 GOSUB *MOLE
320 GOSUB *PRNT
330 GOSUB *SAVING
340 END
350 *RZERO     '/////////////////////////////////////////////////////////////
360 '
370 COLOR 6:PRINT "PLEASE INSERT DATA DISK IN DRIVE #2."
380 INPUT "ORIGINAL DATA FILENAME :";RN$
390 OPEN "B:"+RN$ FOR INPUT AS #1
400 PRINT " RAEDING DATA NOW !"
410 INPUT #1,RN$,RD$,RMT,MIXT
420 FOR N=0 TO 26 : INPUT #1,DZ(N) : NEXT N
430 RETURN
440 *RDATA       '//////////////////////////////////////////////////////////
450 INPUT #1,SCN,ST$
460 H=VAL(LEFT$(ST$,2)):M=VAL(MID$(ST$,4,2)):S=VAL(RIGHT$(ST$,2))
470 TT(I)=H*3600+M*60+S
480 IF I=1 THEN TBASE=TT(I):DTT(0)=TT(0)-TBASE
490 DTT(I)=TT(I)-TBASE
500 FOR N=0 TO 99 : INPUT #1,DA(I,N):NEXT N
510 GOSUB *DCONV
520 BEEP:RETURN
530 '
540 '
```

Table A-3 List of the <PROC> (2/5)

```
550 *DCONV  '·························//
560 '
570 FOR N = 0 TO 99
580 IF N<=38             THEN E=DA(I,N)*1000 : GOSUB *CA : PV(I,N)=J+RMT
590 IF N>=40 AND N<=63 THEN E=DA(I,N)*1000 : GOSUB *PR : PV(I,N)=J+RMT
600 '
610 IF N=64          THEN PV(I,N)=(DA(I,N)-DZ(N-64))*13.221/.308196 'UF-1
620 IF N=66          THEN PV(I,N)=(DA(I,N)-DZ(N-64))*4.6993/.238316 'UF-3
630 IF N=67          THEN PV(I,N)=-(DA(I,N)-DZ(N-64))*3.82243/.193848 'UF-4
640 IF N=68          THEN PV(I,N)=(DA(I,N)-DZ(N-64))*13.221/.678088 'UF-5
650 IF N=69            THEN PV(I,N)=(DA(I,N)-DZ(N-64))*5/4       'Pm-1
660 IF N=70            THEN PV(I,N)=(DA(I,N)-1)*900/4            'Pa-1
670 IF N=73            THEN PV(I,N)=DA(I,N)*3!/4!-7!/4!          'P-7
680 IF N=74            THEN PV(I,N)=(DA(I,N)-DZ(N-64))*150/4     'DP-1
690 IF N=75            THEN PV(I,N)=(DA(I,N)-DZ(N-64))*750/4     'DP-2
700 '
710 NEXT N
720 '
730 P(I)   = 98070!*PV(I,69)                           '         (Pa)
740 PA(I)  = 133.3*PV(I,70)                            '         (Pa)
750 '
760 TMA(I) = (PV(I,50)+PV(I,51)+PV(I,52)+PV(I,53))/4    '          (C)
770 TMC(I) = (PV(I,58)+PV(I,59)+PV(I,60)+PV(I,61))/4    '          (C)
780 RETURN
790 '
800 *PR  '························//
810 '
820  IF E <= .647   THEN J=(E-0)*100/(.647-0)                       : RETURN
830  IF E <= 1.468  THEN J=(E-.647)*100/(1.468-.647)+100            : RETURN
840  IF E <= 2.4    THEN J=(E-1.468)*100/(2.4-1.468)+200            : RETURN
850  IF E <= 3.407  THEN J=(E-2.4)   *100/(3.407-2.4)+300           : RETURN
860  IF E <= 4.471  THEN J=(E-3.407)*100/(4.471-3.407)+400          : RETURN
870  IF E <= 5.582  THEN J=(E-4.471)*100/(5.582-4.471)+500          : RETURN
880  IF E <= 6.741  THEN J=(E-5.582)*100/(6.741-5.582)+600          : RETURN
890  IF E <= 7.949  THEN J=(E-6.741)*100/(7.949-6.741)+700          : RETURN
900  IF E <= 9.203  THEN J=(E-7.949)*100/(9.203-7.949)+800          : RETURN
910  IF E <=10.503  THEN J=(E-9.203)*100/(10.503-9.203)+900         : RETURN
920  IF E <=11.846  THEN J=(E-10.503)*100/(11.846-10.503)+1000      : RETURN
930  IF E <=13.224  THEN J=(E-11.846)*100/(13.224-11.846)+1100      : RETURN
940  IF E <=14.624  THEN J=(E-13.224)*100/(14.624-13.224)+1200      : RETURN
950  IF E <=16.035  THEN J=(E-14.624)*100/(16.035-14.624)+1300      : RETURN
960  IF E <=17.445  THEN J=(E-16.035)*100/(17.445-16.035)+1400      : RETURN
970  IF E <=21.006  THEN J=(E-17.445)*100/(18.842-17.445)+1500      : RETURN
980                      J= 9999                                    : RETURN
990 '
1000 *CA  '·························//
1010 '
1020 IF E < 2.022  THEN J= .187109+25.6237*E-.578319 *E^2 : RETURN
1030 IF E < 6.137  THEN J= 2.12422+23.5345*E-.0898101*E^2 : RETURN
1040 IF E < 10.151 THEN J= -5.983+25.6852*E-.0455579*E^2  : RETURN
1050 IF E < 14.292 THEN J= -6.6769+26.1028*E-.0803355*E^2 : RETURN
1060 IF E < 18.513 THEN J= 1.40916+24.9287*E-.0376684*E^2 : RETURN
1070 IF E < 22.772 THEN J= 9.6138 +24.0422*E-.0137236*E^2 : RETURN
1080 IF E < 27.022 THEN J= 29.3834+22.3067*E+.0244233*E^2 : RETURN
```

Table A-3 List of the <PROC> (3/5)

```
1090 IF E < 31.214 THEN J= 51.885 +20.647 *E+.0550444*E^2 : RETURN
1100 IF E < 35.314 THEN J= 69.5985+19.507 *E+.0733931*E^2 : RETURN
1110 IF E < 39.31  THEN J= 80.1571+18.904 *E+.0820089*E^2 : RETURN
1120 IF E < 43.202 THEN J= 87.7917+18.5154*E+.0869604*E^2 : RETURN
1130                    J= 9999                           : RETURN
1140 '
1150 *AVER   '/////////////////////////////////////////////////////////////////
1160 '
1170 FOR I=0 TO 99
1180 PV(NN,I)=0
1190 NEXT I
1200 P(NN)=0:PA(NN)=0:TMA(NN)=0:TMC(NN)=0
1210 FOR I=1 TO NN-2
1220 FOR J=0 TO 99
1230 PV(NN,J)=PV(NN,J)+PV(I,J)
1240 NEXT J
1250 P(NN)=P(NN)+P(I)
1260 PA(NN)=PA(NN)+PA(I)
1270 TMA(NN)=TMA(NN)+TMA(I)
1280 TMC(NN)=TMC(NN)+TMC(I)
1290 NEXT I
1300 FOR I=0 TO 99
1310 PV(NN,I)=PV(NN,I)/(NN-2)
1320 NEXT I
1330 P(NN)=P(NN)/(NN-2)
1340 PA(NN)=PA(NN)/(NN-2)
1350 TMA(NN)=TMA(NN)/(NN-2)
1360 TMC(NN)=TMC(NN)/(NN-2)
1370 RETURN
1380 *PRNT    '////////////////////////////////////////////////////////////
1390 LPRINT "=============>  RUN NO.  ( ";RN$;" )  ==============>  DATE ";
1400 LPRINT "(";RD$;" )  >==============================================="
1410 LPRINT
1420 LPRINT "         Tmix = ";MIXT;" (min)                dTmeas =  30    (s)  ";
1430 LPRINT "         Troom = ";RMT;"   (C)   "
1440 LPRINT
1450 LPRINT " ZERO               P (V)             PA (V)              UF-1 (V)";
1460 LPRINT "          UF-3 (V)           UF-4 (V)           UF-5 (V) "
1470 LPRINT "BEFORE :  ";
1480 LPRINT USING "       ##.####^^^^";DZ(5);DZ(6);DZ(0);DZ(2);DZ(3);DZ(4)
1490 LPRINT
1500 LPRINT " AVERAGE             R o2,in        R co2,in        R co,in ";
1510 LPRINT "        R o2,out        R co2,out       R co,out         F co/co2 "
1520 LPRINT "MOLE FRACTION :";
1530 LPRINT USING "    ###.##";CIN(MM,0);
1540 LPRINT USING "          ###.##";CIN(MM,1);CIN(MM,2);COUT(MM,0);
1550 LPRINT USING "          ###.##";COUT(MM,1);COUT(MM,2);F(MM)
1560 LPRINT
1570 LPRINT "NO.  TIME (S)  Ptest (Pa)    Pabs (Pa)   Tg.in (C)";
1580 LPRINT "   Tg.out (C)        Tg.ch-A (C)       Tg.ch-B (C)        Tg.ch-C";
1590 LPRINT " (C)      NO."
1600 FLAG=0:SFLAG=0
1610 FOR I=0 TO NN
1620 IF I=NN-1 THEN LPRINT "   AVERAGE :  ";:I=NN:FLAG=1:GOTO 1650
```

Table A-3 List of the <PROC> (4/5)

```
1630 IF I=NN THEN I=NN-1:SFLAG=1
1640 LPRINT USING "##    ";I+1;:LPRINT USING "#####      ";DTT(I);
1650 LPRINT USING "##.####^^^^";P(I);:LPRINT USING "  ##.####^^^^  ";PA(I);
1660 LPRINT USING "##.";PV(I,2);:LPRINT "/";
1670 LPRINT USING "##.";PV(I,3);:LPRINT "   ";
1680 LPRINT USING "##.";PV(I,19);:LPRINT "/";
1690 LPRINT USING "##.";PV(I,20);:LPRINT "/";
1700 LPRINT USING "##.";PV(I,21);:LPRINT "   ";
1710 LPRINT USING "##.";PV(I,10);:LPRINT "/";
1720 LPRINT USING "##.";PV(I,11);:LPRINT "/";
1730 LPRINT USING "###.";PV(I,15);:LPRINT "/";
1740 LPRINT USING "###.";PV(I,16);:LPRINT "   ";
1750 LPRINT USING "##.";PV(I,12);:LPRINT "/";
1760 LPRINT USING "##.";PV(I,17);:LPRINT "/";
1770 LPRINT USING "##.";PV(I,18);:LPRINT "   ";
1780 LPRINT USING "##.";PV(I,8);:LPRINT "/";
1790 LPRINT USING "##.";PV(I,9);:LPRINT "/";
1800 LPRINT USING "###.";PV(I,13);:LPRINT "/";
1810 LPRINT USING "###.";PV(I,14);
1820 IF FLAG=1 THEN FLAG=0:I=NN-1:LPRINT:GOTO 1860
1830 LPRINT "   ";
1840 LPRINT USING "##";I+1
1850 IF SFLAG=1 THEN SFLAG=0:I=NN
1860 NEXT I
1870 FLAG=0:SFLAG=0:LPRINT:LPRINT
1880 LPRINT "NO.  TIME (S)     Te.graphite-A (C)         Te.graphite-C (C)";
1890 LPRINT "       UF-1(m3/h)  UF-3(m3/h)  UF-4(m3/h)   UF-5(m3/h)   ";
1900 LPRINT "  NO."
1910 FOR I=0 TO NN
1920 IF I=NN-1 THEN FLAG=1:I=NN:LPRINT "   AVERAGE :   ";:GOTO 1950
1930 IF I=NN THEN SFLAG=1:I=NN-1
1940 LPRINT USING "##    ";I+1;:LPRINT USING "#####      ";DTT(I);
1950 LPRINT USING "####.";PV(I,50);:LPRINT "/";
1960 LPRINT USING "####.";PV(I,51);:LPRINT "/";
1970 LPRINT USING "####.";PV(I,52);:LPRINT "/";
1980 LPRINT USING "####.";PV(I,53);:LPRINT "    ";
1990 LPRINT USING "####.";PV(I,58);:LPRINT "/";
2000 LPRINT USING "####.";PV(I,59);:LPRINT "/";
2010 LPRINT USING "####.";PV(I,60);:LPRINT "/";
2020 LPRINT USING "####.";PV(I,61);:LPRINT "     ";
2030 LPRINT USING "##.##^^^^";PV(I,64);:LPRINT "    ";
2040 LPRINT USING "##.##^^^^";PV(I,66);:LPRINT "    ";
2050 LPRINT USING "##.##^^^^";PV(I,67);:LPRINT "     ";
2060 LPRINT USING "##.##^^^^";PV(I,68);:LPRINT "     ";
2070 IF FLAG=1 THEN FLAG=0:I=NN-1:LPRINT:GOTO 2100
2080 LPRINT USING "##";I+1
2090 IF SFLAG=1 THEN SFLAG=0:I=NN
2100 NEXT I
2110 RETURN
2120 *SAVING    '///////////////////////////////////////////////////////////
2130 '
2140 'INPUT "INPUT DATA FILENAME :",SF$
2150 OPEN "B:"+RN$+".B" FOR OUTPUT AS #1
2160 PRINT #1,RN$,RD$,RMT,MIXT
```

Table A-3 List of the <PROC> (5/5)

```
2170 PRINT #1,P(NN),PA(NN),TMA(NN),TMC(NN)
2180 PRINT #1,PV(NN,50),PV(NN,51),PV(NN,52),PV(NN,53)
2190 PRINT #1,PV(NN,58),PV(NN,59),PV(NN,60),PV(NN,61)
2200 PRINT #1,PV(NN,64),PV(NN,66),PV(NN,67),PV(NN,68)
2210 FOR J=0 TO 2
2220 PRINT #1,CIN(MM,J),COUT(MM,J)
2230 NEXT J
2240 PRINT #1,F(MM)
2250 CLOSE #1
2260 RETURN
2270 '
2280 *MOLE   '/////////////////////////////////////////////
2290 '
2300 OPEN "B:"+RNS+".A" FOR INPUT AS #1
2310 INPUT #1,MM
2320 DIM F(MM),CIN(MM,2),COUT(MM,2)
2330 FOR I=0 TO MM-1
2340 INPUT #1,T,CIN(I,0),CIN(I,1),CIN(I,2),COUT(I,0),COUT(I,1),COUT(I,2)
2350 NEXT I
2360 CLOSE #1
2370 FOR I=0 TO 2
2380 CIN(MM,I)=0:COUT(MM,I)=0
2390 NEXT I
2400 F(MM)=0:OFLAG=0
2410 FOR I=1 TO MM-3
2420 FOR J=0 TO 2
2430 CIN(MM,J)=CIN(MM,J)+CIN(I,J)
2440 COUT(MM,J)=COUT(MM,J)+COUT(I,J)
2450 NEXT J
2460 IF COUT(I,1)=0 THEN OFLAG=OFLAG+1:GOTO 2490
2470 F(I)=COUT(I,2)/COUT(I,1)
2480 F(MM)=F(MM)+F(I)
2490 NEXT I
2500 FOR I=0 TO 2
2510 CIN(MM,I)=CIN(MM,I)/(MM-3)
2520 COUT(MM,I)=COUT(MM,I)/(MM-3)
2530 NEXT I
2540 F(MM)=F(MM)/(MM-3-OFLAG)
2550 RETURN
```

Table A-4 List of the <MULTI> (1/14)

```
10 ' ****************************************************************
20 ' *        THE COMPUTER CODE NAME :      MULTI.BAS                *
30 ' *        THIS CODE USED FOR MASS TRANSFOR EXPERIMENTS  WITH      *
40 ' *        MIXED GAS IN  MULTI-CHANNEL GRAPHITE TUBES AT HIGH      *
50 ' *        TEMPERATURE.                                            *
60 ' *                                   HAN  BING   1992.7.17        *
70 ' ****************************************************************
80 '
90 WIDTH 80,25        : CONSOLE 0,25,0,1
100 SCREEN 3,0         : COLOR ,,,,1            : CLS 3
110 COLOR = (0,&H44B)  : COLOR = (4,&H5E8)
120 COLOR = (1,&H888)   : COLOR = (5,&H494)
130 COLOR = (2,&HFFF)   : COLOR = (6,&H0)
140 COLOR = (3,&H723)   : COLOR = (7,&H337)
150 '
160 FLAG=0:X1 = 639 : Y1 = 399
170 WINDOW (0,0)-(X1,Y1)   : VIEW (0,0)-(X1,Y1)
180 '
190 ' MAIN PROGRAM     /////////////////////////////////////////////
200 '
210 GOSUB *INIT
220 ON ERROR GOTO *ERRIN:GOSUB *RESET
230 PPPPP=0
240 GOTO 230
250 '
260 *CALC      '////////////////////////////////////////////////////
270 '
280 GOSUB *ACLR
290 LINE (110,110)-(545,255),6,BF
300 LINE (100,100)-(535,245),7,BF
310 LINE (100,100)-(535,245),4,B:LINE (105,105)-(530,240),2,B:COLOR 6
320 LOCATE 18,9:PRINT "WHICH CHANNEL TO BE CALCULATED (A=> 0, C=> 1)"
330 LOCATE 18,11:INPUT "PLEASE MAKE YOUR CHOICE :",CHO
340 IF CHO=1 THEN TK=TMC+273.15:GOTO 360
350 TK=TMA+273.15
360 DELTAT=MIXT*60:NN=0
370 R(0,0)=CIN(0)/100:R(2,0)=CIN(2)/100:R(3,0)=CIN(1)/100
380 R(1,0)=1-R(0,0)-R(2,0)-R(3,0)
390 GOSUB *ACLR:GOSUB *DENS:GOSUB *FP
400 GOSUB *ACLR:COLOR 5:LOCATE 27,9:PRINT "   CALCULATING  NOW ! "
410 KEY OFF:LOCATE 25,11:PRINT "   PLEASE WAIT A MOMENT ! "
420 COLOR = (7,&H55E):GOSUB *OCQ :GOSUB *OMG :GOSUB *MTC:GOSUB *SHN
430 GOSUB *REN
440 GOSUB *SCN
450 GOSUB *PRN
460 GOSUB *RGN :GOSUB *NUN
470 LOCATE 27,9:PRINT "                          "
480 LOCATE 25,11:PRINT "                          "
490 LOCATE 25,11:PRINT "   CALCULATING FINISHED ! "
500 COLOR = (7,&H337):BEEP:KEY ON : RETURN
510 '
520 *OCQ   '//////////////////////////////////////////////////////////
530 '
540 FOR I=0 TO MM
```

Table A-4 List of the <MULTI> (2/14)

```
550 MC1=PI*(DCO(I)^2-DO^2)*ROC/4/DELTAT
560 MO1(I)=MC1*CM(0)*(2+F)/(CM(6)*(2+2*F))
570 MO2(I)=MO1(I)/(PI*DO)
580 NEXT I
590 RETURN
600 '
610 *OMG    '////////////////////////////////////////////////////////////
620 '
630 FOR I=1 TO MM
640 BB=LOG(MO1(I-1)/MO1(I))/(X(I)-X(I-1))
650 IF BB=0 THEN DELTAMO=MO1(I-1)*(X(I)-X(I-1)):GOTO 680
660 AA=MO1(I-1)/EXP(-1*BB*X(I-1))
670 DELTAMO=AA*(EXP(-1*BB*X(I-1))-EXP(-1*BB*X(I)))/BB
680 DELTAMC=DELTAMO*CM(6)*(2+2*F)/(CM(0)*(2+F))
690 MO(I)=MO(I-1)-DELTAMO
700 MT(I)=MT(I-1)+DELTAMC
710 W(0,I)=MO(I)/MT(I)
720 MCO2=MCO1+DELTAMC*CM(2)*F/CM(6)/(1+F)
730 MCO22=MCO21+DELTAMC*CM(3)/CM(6)/(1+F)
740 W(2,I)=MCO2/MT(I)
750 W(3,I)=MCO22/MT(I)
760 W(1,I)=1-W(0,I)-W(2,I)-W(3,I)
770 MCO1=MCO2:MCO21=MCO22
780 GOSUB *RCCL
790 R(1,I)=1
800 FOR J=0 TO 3
810 IF J=1 THEN GOTO 840
820 R(J,I)=W(J,I)/CM(J)/QM
830 R(1,I)=R(1,I)-R(J,I)
840 NEXT J
850 NEXT I
860 RETURN
870 '
880 *MTC    '////////////////////////////////////////////////////////////
890 '
900 BB=NN
910 FOR NN=0 TO MM
920 GOSUB *DENS
930 BETA(NN)=MO2(NN)/(ROM(NN)*W(0,NN))
940 NEXT NN
950 NN=BB
960 RETURN
970 '
980 *RCCL    '////////////////////////////////////////////////////////////
990 '
1000 QM=0
1010 FOR J=0 TO 3
1020 QM=QM+W(J,I)/CM(J)
1030 NEXT J
1040 RETURN
1050 '
1060 *FSTP    '/////////////////////////////////////////////////////////
1070 '
1080 MCO2=0:MCO22=0
```

Table A-4 List of the <MULTI> (3/14)

```
1090 W(0,0)=MO(0)/MT(0)
1100 W(1,0)=1-W(0,0)
1110 W(2,0)=0:W(3,0)=0
1120 RETURN
1130 '
1140 *SHN    '///////////////////////////////////////////////////////
1150 '
1160 BB=NN
1170 FOR NN=0 TO MM
1180 GOSUB *DIF
1190 SH(NN)=BETA(NN)*DCO(NN)/DM(NN)
1200 NEXT NN
1210 NN=BB
1220 RETURN
1230 '
1240 *REN   '////////////////////////////////////////////////////////
1250 '
1260 VFV=4*MT(0)/(ROM(0)*PI*DO^2)
1270 BB=NN
1280 FOR NN=0 TO MM
1290 GOSUB *VISC
1300 RE(NN)=VFV*ROM(NN)*DO/MJUM(NN)
1310 NEXT NN
1320 NN=BB
1330 RETURN
1340 '
1350 *SCN   '///////////////////////////////////////////////////////
1360 '
1370 FOR NN=0 TO MM
1380 SC(NN)=MJUM(NN)/ROM(NN)/DM(NN)
1390 NEXT NN
1400 RETURN
1410 '
1420 *PRN    '//////////////////////////////////////////////////////
1430 '
1440 FOR NN=0 TO MM
1450 GOSUB *CPC:GOSUB *THCO
1460 PR(NN)=CPM(NN)*MJUM(NN)/LEMBTAM(NN)
1470 NEXT NN
1480 RETURN
1490 '
1500 *RGN    '///////////////////////////////////////////////////////
1510 '
1520 FOR NN=0 TO MM
1530 ZG(NN)=X(NN)/(DCO(NN)*RE(NN)*SC(NN))
1540 NEXT NN
1550 RETURN
1560 '
1570 *RDATA    '//////////////////////////////////////////////////////
1580 '
1590 GOSUB *ACLR:COLOR = (5,&H494)
1600 LINE (110,110)-(545,255),6,BF
1610 LINE (100,100)-(535,245),5,BF
1620 LINE (100,100)-(535,245),4,B:LINE (105,105)-(530,240),2,B
```

Table A-4 List of the <MULTI> (4/14)

```
1630 COLOR 6:LOCATE 15,7:PRINT "PLEASE INSERT DATA DISK IN DRIVE #2."
1640 LOCATE 15,9:INPUT "ORIGINAL DATA FILENAME :";RN$
1650 LOCATE 0,9:GOSUB *CLR
1660 LOCATE 15,9:INPUT "CORRODED DATA FILENAME : ";CR$
1670 KEY OFF:OPEN "B:"+RN$+".B" FOR INPUT AS #1
1680 COLOR=(5,&H6E6):COLOR 5:LOCATE 30,12:PRINT " RAEDING DATA NOW !"
1690 INPUT #1,RNS,RDS,RMT,MIXT,PB,PAA,TMA,TMC:P=PB+PAA:PA=P*9.8692E-06
1700 FOR N=0 TO 11 : INPUT #1,PV(N) : NEXT N
1710 FOR N=0 TO 2 : INPUT #1,CIN(N),COUT(N) : NEXT N
1720 INPUT #1,F
1730 CLOSE #1
1740 OPEN "B:"+CR$+".GRP" FOR INPUT AS #1
1750 INPUT #1,AA$,AA$
1760 FOR N=0 TO MM:INPUT #1,AP,AX,AD
1770 X(N)=AX/1000: DCO(N)=AD/1000
1780 NEXT N
1790 CLOSE #1
1800 COLOR=(5,&H494):LOCATE 29,12:PRINT "  END OF READING DATA.               "
1810 BEEP:KEY ON:RETURN
1820 '
1830 *ERRIN  '//////////////////////////////////////////////////////////////////
1840 '
1850 COLOR=(3,&HF0):LINE (180,196)-(465,271),6,BF
1860 LINE (170,186)-(455,261),3,BF
1870 LINE (170,186)-(455,261),2,B
1880 COLOR 0:LOCATE 24,12:PRINT "    ********ERROR";ERR;"********"
1890 IF ERR=6 THEN LOCATE 34,14:PRINT "OVER FLOW ! ":GOTO 2030
1900 IF ERR=11 THEN LOCATE 31,14:PRINT "DIVISION BY ZERO ! ":GOTO 2030
1910 IF ERR=53 THEN LOCATE 26,14:PRINT "FILE NOT FOUND IN DRIVE #2!":GOTO 1930
1920 GOTO 1970
1930 LOCATE 34,15:INPUT "< RETURN >",AN$:COLOR 7:COLOR=(3,&H723)
1940 IF RFLAG=1 THEN RFLAG=0:GOTO 1960
1950 GOSUB *BASE1:GOSUB *BASE2:GOSUB *T2:RESUME *RDATA
1960 GOSUB *BASE1:GOSUB *BASE2:GOSUB *T2:RESUME *RSULT
1970 IF ERR=54 THEN LOCATE 30,14:PRINT "FILE ALREADY OPEN ! ":GOTO 2030
1980 IF ERR=55 THEN LOCATE 32,14:PRINT "INPUT PAST END ! ":GOTO 2030
1990 IF ERR=56 THEN LOCATE 32,14:PRINT "BAD FILE NAME ! ":GOTO 2030
2000 IF ERR=61 THEN LOCATE 29,14:PRINT "FILE WRITE PROTECTED ! ":GOTO 2030
2010 IF ERR=64 THEN LOCATE 32,14:PRINT "DISK I/O ERROR ! ":GOTO 2030
2020 IF ERR=68 THEN LOCATE 34,14:PRINT "DISK FULL ! ":GOTO 2030
2030 LOCATE 34,15:INPUT "< RETURN >",ANS$:COLOR 7:RESUME *RESET
2040 '
2050 *DIF  '///////////////////////////////////////////////////////////////
2060 ' /*  SUBROUTINE FOR CALCULATING DIFFUSIVITY OF O2, N2, CO, CO2,    */
2070 ' /*  HE.          UNIT:        (M2/S)                                  */
2080 '
2090 ZZ=0
2100 FOR K=1 TO 3
2110 Z=TK/(CA2(0)*CA2(K))^.5
2120 Z=DA*Z^(-DB)+DC*EXP(-DD*Z)+DE*EXP(-DF*Z)+DG*EXP(-DH*Z)
2130 Z=((CM(0)+CM(K))/CM(0)/CM(K))^.5/(PA*((CA1(0)+CA1(K))/2)^2*Z)
2140 D(K)=1.858E-07*TK^(3/2)*Z
2150 ZZ=ZZ+R(K,NN)/D(K)
2160 NEXT K
```

Table A-4 List of the <MULTI> (5/14)

```
2170 IF R(2,NN)=0 AND R(3,NN)=0 THEN DM(NN)=D(1):GOTO 2190
2180 DM(NN)=1/ZZ
2190 RETURN
2200 '
2210 *CPC '//////////////////////////////////////////////////////////////////
2220 ' /*  SUBROUTINE FOR CALCULATING SPECIFIC HEAT AT CONSTANT PRESSURE */
2230 ' /*  OF O2, N2, CO, CO2, HE AND MIXED GAS.    UNIT:   (J/KG*K)      */
2240 '
2250 ZZ=0
2260 FOR K=0 TO 3
2270 CP(K)=TK*(CA3(K,2)+TK*CA3(K,3))
2280 CP(K)=1000*(CA3(K,0)+TK*(CA3(K,1)+CP(K)))
2290 ZZ=ZZ+CP(K)*R(K,NN)
2300 NEXT K
2310 CPM(NN)=ZZ
2320 RETURN
2330 '
2340 *CVC '//////////////////////////////////////////////////////////////////
2350 ' /*  SUBROUTINE FOR CALCULATING SPECIFIC HEAT AT CONSTANT VOLUME   */
2360 ' /*  OF O2, N2, CO, CO2, He AND MIXED GAS.    UNIT:   (J/KG*K)      */
2370 '
2380 ZZ=0
2390 FOR K=0 TO 3
2400 CV(K)=TK*(CA4(K,2)+TK*CA4(K,3))
2410 CV(K)=1000*(CA4(K,0)+TK*(CA4(K,1)+CV(K)))
2420 ZZ=ZZ+CV(K)*R(K,NN)
2430 NEXT K
2440 CVM(NN)=ZZ
2450 RETURN
2460 '
2470 *VISC '//////////////////////////////////////////////////////////////
2480 ' /*  SUBROUTINE FOR CALCULATING VISCOSITY  OF O2, N2, CO, CO2,  */
2490 ' /*  HE AND MIXED GAS.           UNIT:      (Pa*S)=(KG/M*S)      */
2500 '
2510 ZZ=0
2520 FOR K=0 TO 3
2530 Z=TK/CA2(K)
2540 Z=VA*Z^(-VB)+VC*EXP(-VD*Z)+VE*EXP(-VF*Z)
2550 MJU(K)=2.669E-06*(CM(K)*TK)^.5/CA1(K)^2/Z
2560 NEXT K
2570 FOR I=0 TO 3
2580 FOR J=0 TO 3
2590 IF J<I THEN GOTO 2640
2600 Z=(8*(1+CM(I)/CM(J)))^.5
2610 Z=(1+(MJU(I)/MJU(J))^.5*(CM(J)/CM(I))^.25)^2/Z
2620 FAI(I,J)=Z
2630 GOTO 2650
2640 FAI(I,J)=MJU(I)*CM(J)*FAI(J,I)/MJU(J)/CM(I)
2650 NEXT J
2660 NEXT I
2670 ZZ=0
2680 FOR I=0 TO 3
2690 Z=0
2700 FOR J=0 TO 3
```

Table A-4 List of the <MULTI> (6/14)

```
2710 Z=Z+R(J,NN)*FAI(I,J)
2720 NEXT J
2730 ZZ=ZZ+R(I,NN)*MJU(I)/Z
2740 NEXT I
2750 MJUM(NN)= ZZ
2760 RETURN
2770 '
2780 *DENS  '//////////////////////////////////////////////////////////
2790 ' /*  SUBROUTINE FOR CALCULATING DENSITY  OF O2, N2, CO, CO2,   */
2800 ' /*  HE AND MIXED GAS.     UNIT:        (KG/M3)                 */
2810 '
2820 ZZ=0
2830 FOR K=0 TO 3
2840 RO(K)=CM(K)*P/(8314!*TK)
2850 ZZ=ZZ+CM(K)*R(K,NN)
2860 NEXT K
2870 ROM(NN)=P*ZZ/(8314!*TK)
2880 RETURN
2890 '
2900 *THCO  '////////////////////////////////////////////////////////////////
2910 ' /*  SUBROUTINE FOR CALCULATING THERMAL CONDUCTIVITY  OF O2, N2,   */
2920 ' /*  CO, CO2 ,AND MIXED GAS.        UNIT:    (W/M.K)               */
2930 '
2940 GOSUB *CVC
2950 ZZ=0
2960 FOR K=0 TO 3
2970 Z=TK/CA2(K)
2980 Z=VA*Z^(-VB)+VC*EXP(-VD*Z)+VE*EXP(-VF*Z)
2990 LEMBTA(K)=2.669E-05*(CM(K)*TK)^.5/CA1(K)^2/Z
3000 LEMBTA(K)=(1.32*CV(K)*CM(K)*.001/4.186+3.52)*LEMBTA(K)/CM(K)
3010 LEMBTA(K)=LEMBTA(K)*4.186*100
3020 NEXT K
3030 FOR I=0 TO 3
3040 FOR J=0 TO 3
3050 IF J<I THEN GOTO 3100
3060 Z=(8*(1+CM(I)/CM(J)))^.5
3070 Z=(1+(LEMBTA(I)/LEMBTA(J))^.5*(CM(J)/CM(I))^.25)^2/Z
3080 FAI(I,J)=Z
3090 GOTO 3120
3100 FAI(I,J)=FAI(J,I)/LEMBTA(J)/CM(I)
3110 FAI(I,J)=LEMBTA(I)*CM(J)*FAI(I,J)
3120 NEXT J
3130 NEXT I
3140 ZZ=0
3150 FOR I=0 TO 3
3160 Z=0
3170 FOR J=0 TO 3
3180 Z=Z+R(J,NN)*FAI(I,J)
3190 NEXT J
3200 ZZ=ZZ+R(I,NN)*LEMBTA(I)/Z
3210 NEXT I
3220 LEMBTAM(NN)= ZZ
3230 RETURN
3240 '
```

Table A-4 List of the <MULTI> (7/14)

```
3250 *CONS  '///////////////////////////////////////////////////////////
3260 '
3270 DIM CA1(4),CA2(4),CA3(3,3),CA4(3,3),CM(6),XL(3),YL(1),SS(6)
3280 PST = 101300!
3290 PI=3.1415926#
3300 FOR I=0 TO 4
3310 READ CA1(I),CA2(I)
3320 NEXT I
3330 FOR I=0 TO 3:FOR J=0 TO 3
3340 READ CA3(J,I)
3350 NEXT J:NEXT I
3360 FOR I=0 TO 3:FOR J=0 TO 3
3370 READ CA4(J,I)
3380 NEXT J:NEXT I
3390 FOR I=0 TO 6
3400 READ CM(I)
3410 NEXT I
3420 READ YL(0)
3430 FOR J=0 TO 3
3440 READ XL(J)
3450 NEXT J
3460 READ DA,DB,DC,DD,DE,DF,DG,DH
3470 READ VA,VB,VC,VD,VE,VF
3480 FOR I=0 TO 6
3490 READ SS(I)
3500 NEXT I
3510 DATA 3.467,106.7,3.798,71.4,3.690,91.7
3520 DATA 3.941,195.2,2.551,10.22
3530 DATA 0.817026,0.938314,0.929207,0.618542
3540 DATA 3.87124E-04,2.95732E-04,3.43656E-04,9.43157E-04
3550 DATA -1.41476E-07,-7.31507E-08,-1.00711E-07,-3.9229E-07
3560 DATA 1.99678E-11,5.81796E-12,1.01493E-11,5.44078E-11
3570 DATA .547045,.656848,.641668,.396046
3580 DATA 4.12982E-04,2.46015E-04,3.13564E-04,.001053
3590 DATA -1.61964E-07,-3.16796E-08,-7.5708E-08,-4.83891E-07
3600 DATA 2.46892E-11,-3.91928E-12,4.29183E-12,7.58699E-11
3610 DATA 32.000,28.016,28.010,44.010,4.003,0,12.010
3620 DATA 7,17,28,38,48
3630 DATA 1.06036,0.15610,0.19300,0.47635
3640 DATA 1.03587,1.52996,1.76474,3.89411
3650 DATA 1.16145,0.14874,0.52487,0.77320
3660 DATA 2.16178,2.43787
3670 DATA "O2","N2","CO","CO2","He","MIX","C"
3680 RETURN
3690 '
3700 '
3710 *SDRAW    '/////////////////////////////////////////////////////////
3720 '
3730 KEY OFF:COLOR 5:LOCATE 0,21:GOSUB *CLR
3740 LOCATE 15,21:INPUT " SELECT Y AXIS ( 1==> LINEAR , 2==> LOG ) :";PP
3750 GOSUB *ACLR:COLOR 6
3760 LINE (100,30)-(610,270),6,BF
3770 LINE (90,20)-(600,260),0,BF
3780 LINE (90,20)-(600,260),2,B
```

Table A-4 List of the <MULTI> (8/14)

```
3790 FOR I=1 TO 10
3800 X=90+LOG(I)*255/LOG(10)
3810 LINE (X,250)-(X,260),2
3820 LINE (X,20)-(X,30),2
3830 X=345+LOG(I)*255/LOG(10)
3840 LINE (X,250)-(X,260),2
3850 LINE (X,20)-(X,30),2
3860 IF PP=1 THEN GOTO 3960
3870 Y=260-INT(.5+LOG(I)*200/LOG(10))
3880 LINE (90,Y)-(100,Y),2
3890 LINE (590,Y)-(600,Y),2
3900 IF I=1 THEN GOTO 3990
3910 Y=INT(60-LOG(I)*200/LOG(10))
3920 IF Y<20 THEN GOTO 3990
3930 LINE (90,Y)-(100,Y),2
3940 LINE (590,Y)-(600,Y),2
3950 GOTO 3990
3960 Y=260-I*24
3970 LINE (90,Y)-(100,Y),2
3980 LINE (590,Y)-(600,Y),2
3990 NEXT I
4000 COLOR 6:IF PP=1 THEN GOTO 4060
4010 LOCATE 8,4:PRINT "8"
4020 LOCATE 8,3:PRINT "10":LOCATE 8,8:PRINT "4"
4030 LOCATE 8,12:PRINT "2"
4040 LOCATE 5,16:PRINT "1"
4050 GOTO 4090
4060 LOCATE 7,1:PRINT "10":LOCATE 8,4:PRINT "8"
4070 LOCATE 8,7:PRINT "6":LOCATE 8,10:PRINT "4"
4080 LOCATE 8,13:PRINT "2":LOCATE 8,16:PRINT "0"
4090 LOCATE 9,18:PRINT ".001":LOCATE 33,17:PRINT "5"
4100 LOCATE 42,18:PRINT ".01"
4110 LOCATE 65,17:PRINT "5"
4120 LOCATE 74,18:PRINT ".1"
4130 LOCATE 2,8:PRINT "SH"
4140 LOCATE 35,19:PRINT "1/GR = X/D/(RE*SC)"
4150 IF PP=1 THEN GOTO 4240
4160 FOR I=1 TO MM
4170 X=90+INT(LOG(ZG(I)*1000)*255/LOG(10))
4180 Y=260-INT(.5+LOG(SH(I))*200/LOG(10))
4190 IF X>595 OR X<95 THEN GOTO 4220
4200 IF Y>255 OR Y<25 THEN GOTO 4220
4210 GOSUB *PNT
4220 NEXT I
4230 GOTO 4310
4240 FOR I=1 TO MM
4250 X=90+INT(LOG(ZG(I)*1000)*255/LOG(10))
4260 Y=260-INT(SH(I)*240/10)
4270 IF X>595 OR X<95 THEN GOTO 4300
4280 IF Y>255 OR Y<25 THEN GOTO 4300
4290 GOSUB *PNT
4300 NEXT I
4310 KEY ON:RETURN
4320 '
```

Table A-4 List of the <MULTI> (9/14)

```
4330 *PNT    '/////////////////////////////////////////////////////////////
4340 '
4350 LINE (X-5,Y-5)-(X+5,Y+5),2,B
4360 RETURN
4370 '
4380 *PLOT    '/////////////////////////////////////////////////////////////////
4390 '
4400 KEY OFF:LOCATE 0,21:GOSUB *CLR :COLOR 5
4410 LOCATE 29,21:PRINT "<<  PLOTTING  NOW ! >>"
4420 DIM XXL(3),YYL(2),EEK(3)
4430 LPRINT "J1":LPRINT "^VS 15"
4440 XXL(0)=1400:XXL(1)=5100:XXL(2)=8800
4450 YYL(0)=1000:YYL(1)=4500:YYL(2)=6000
4460 EEK(0)=1000:EEK(1)=5880:EEK(2)=1400:EEK(3)=8680
4470 LPRINT "M1400,1000,"
4480 LPRINT "T2,7400,5000,10,2 ":LPRINT "^VS 15"
4490 FOR K=0 TO 1
4500 FOR J=0 TO 1
4510 FOR I=2 TO 10
4520 X=XXL(J)+INT(LOG(I)*3700/LOG(10))
4530 LPRINT "M ";X;",";EEK(K)
4540 IF I=10 THEN GOTO 4560
4550 LPRINT "I0,120":GOTO 4590
4560 IF J=2 THEN GOTO 4590
4570 IF K=1 THEN LPRINT "R0,-80"
4580 LPRINT "I0,200"
4590 NEXT I
4600 NEXT J
4610 NEXT K
4620 FOR K=2 TO 3
4630 FOR J=0 TO 1
4640 FOR I=2 TO 10
4650 Y=YYL(J)+INT(LOG(I)*3500/LOG(10))
4660 IF Y>6000 THEN GOTO 4730
4670 LPRINT "M ";EEK(K);",";Y
4680 IF I=10 THEN GOTO 4700
4690 LPRINT "I120,0":GOTO 4730
4700 IF J=1 THEN GOTO 4730
4710 IF K=3 THEN LPRINT "R -80,0"
4720 LPRINT "I200,0"
4730 NEXT I
4740 NEXT J
4750 NEXT K
4760 FOR I=0 TO 2
4770 LPRINT "S5":LPRINT "M ";XXL(I)-320;",500":LPRINT "P 10"
4780 LPRINT "S3":LPRINT "M ";XXL(I);",700":LPRINT "P ";-3+I
4790 NEXT I
4800 FOR I=0 TO 1
4810 LPRINT "S5":LPRINT "M 700,";YYL(I)-50:LPRINT "P 10"
4820 LPRINT "S3":LPRINT "M 1000,";YYL(I)+140:LPRINT "P ";I
4830 NEXT I
4840 LPRINT "S4"
4850 FOR I=0 TO 1:LPRINT "M";3000+I*3700;",750":LPRINT "P 5":NEXT I
4860 LPRINT "M 1100,3400":LPRINT "P 5"
```

Table A-4 List of the <MULTI> (10/14)

```
4870 LPRINT "S6":LPRINT "M4000,0":LPRINT "P X = x/d/(Re*Sc)"
4880 LPRINT "M 3800,6280":LPRINT "PRUN NO. << ";RN$;" >>"
4890 LPRINT "Q1":LPRINT "M600,3500":LPRINT "P SH":LPRINT "Q0"
4900 LPRINT "S3":LPRINT "M 4240,200":LPRINT "P *"
4910 LPRINT "S4"
4920 A$="'"+LEFT$(RD$,2)+"."+MID$(RD$,4,2)+"."+RIGHT$(RD$,2)
4930 LPRINT "M7600,6080":LPRINT "P ";A$
4940 LPRINT "S6"
4950 FOR I=0 TO MM
4960 IF ZG(I)=0 THEN GOTO 5010
4970 X=1400+INT(LOG(ZG(I)*1000)*3700/LOG(10))
4980 Y=1000+INT(LOG(SH(I))*3500/LOG(10))
4990 IF X<1460 OR X>9260 OR Y<1060 OR Y>5940 THEN GOTO 5010
5000 LPRINT "M ";X;",";Y:LPRINT "N1"
5010 NEXT I
5020 LPRINT "H"
5030 ERASE XXL,YYL,EEK
5040 LOCATE 0,21:GOSUB *CLR
5050 LOCATE 26,21:PRINT "<<   PLOTTING FINISHED !  >>"
5060 KEY ON:RETURN
5070 *BASE1      '//////////////////////////////////////////////////////////////
5080 CLS 3:LINE (0,0)-(X1,Y1),1,BF
5090 LINE (0,0)-(X1,Y1),2,B
5100 RETURN
5110 *BASE2      '//////////////////////////////////////////////////////////////
5120 LINE (0,359)-(300,391),4,BF:LINE (339,359)-(X1,391),4,BF
5130 LINE (0,359)-(300,391),2,B:LINE (339,359)-(X1,391),2,B
5140 FOR I=1 TO 4
5150 LINE (I*60,359)-(I*60,391),2:LINE (339+I*60,359)-(339+I*60,391),2
5160 NEXT I
5170 RETURN
5180 *T1         '//////////////////////////////////////////////////////////////
5190 BEEP:COLOR 7:LOCATE 2,23
5200 PRINT "SAVE                  READ    CALC":LOCATE 44,23
5210 PRINT "DISP    PLOT    PRNT  RESET   QUIT"
5220 KEY ON:RETURN
5230 *T2         '//////////////////////////////////////////////////////////////
5240 GOSUB *ACLR:GOSUB *T6:COLOR 7:LOCATE 1,23
5250 PRINT "ODATA   CDATA":LOCATE 44,23
5260 PRINT "                      RETUN   "
5270 KEY OFF:ON KEY GOSUB *RDATA,*RSULT,*N,*N,*N,*N,*N,*N,*RETN,*N
5280 KEY ON:RETURN
5290 *T3         '//////////////////////////////////////////////////////////////
5300 GOSUB *ACLR:GOSUB *T6:COLOR 7:LOCATE 1,23
5310 PRINT "SCREN   PLTER":LOCATE 44,23
5320 PRINT "                      RETUN   "
5330 KEY OFF:ON KEY GOSUB *SDRAW,*PLOT,*N,*N,*N,*N,*N,*N,*RETN,*N
5340 KEY ON:RETURN
5350 *T6         '//////////////////////////////////////////////////////////////
5360 LOCATE 0,23
5370 PRINT "
5380 RETURN
5390 *CLR       '//////////////////////////////////////////////////////////////
5400 PRINT "
```

Table A-4 List of the <MULTI> (11/14)

```
5410 RETURN
5420 *N          '//////////////////////////////////////////////////////////////
5430 RETURN
5440 *RESET      '//////////////////////////////////////////////////////////////
5450 KEY OFF:CLS 3:GOSUB *BASE1:GOSUB *BASE2:GOSUB *T1
5460 ON KEY GOSUB *DSAVE,*N,*N,*T2,*CALC,*SPRNT,*T3,*PRNT,*RESET,*QUIT:KEY ON
5470 COLOR 7:IF FFLAG=1 THEN GOTO 5510
5480 LOCATE 3,3:INPUT "PLEASE INPUT THE NUMBER OF Xi (MM<=50) ==>> ",MM
5490 IF FLAG=0 THEN GOTO 5510
5500 BEEP:COLOR 4:LOCATE 45,20:PRINT "<<  PLEASE GOING ON !  >>"
5510 FFLAG=0:GOTO 230
5520 *QUIT       '//////////////////////////////////////////////////////////////
5530 KEY OFF:CLS 3:END
5540 *ACLR       '//////////////////////////////////////////////////////////////
5550 FOR I=0 TO 21
5560 LOCATE 0,I
5570 PRINT "
5580 NEXT I
5590 RETURN
5600 *DSAVE      '//////////////////////////////////////////////////////////////
5610 GOSUB *ACLR:COLOR = (5,&HA7A)
5620 LINE (110,110)-(545,255),6,BF
5630 LINE (100,100)-(535,245),5,BF
5640 LINE (100,100)-(535,245),4,B:LINE (105,105)-(530,240),2,B
5650 COLOR 2:LOCATE 15,7:PRINT "PLEASE INSERT DATA DISK IN DRIVE #2."
5660 LOCATE 15,9:INPUT "SAVE DATA FILENAME :";WN$
5670 OPEN "B:"+WN$+".D" FOR OUTPUT AS #1
5680 COLOR=(5,&HFAF)
5690 LOCATE 23,12:PRINT "SAVING RESULTS OF CALCULATION NOW."
5700 WRITE #1,RN$,DATE$,RMT,MIXT,MM
5710 WRITE #1,TK,P,DO
5720 FOR I=0 TO MM
5730 WRITE #1,X(I),DCO(I),MO(I),MO1(I),MO2(I),MT(I)
5740 WRITE #1,W(0,I),W(1,I),W(2,I),W(3,I),R(0,I),R(1,I),R(2,I),R(3,I)
5750 WRITE #1,ROM(I),BETA(I),DM(I),MJUM(I),LEMBTAM(I)
5760 WRITE #1,SH(I),RE(I),SC(I),PR(I),ZG(I)
5770 NEXT I
5780 CLOSE #1:LOCATE 0,12:GOSUB *CLR
5790 BEEP:LOCATE 32,12:PRINT "SAVING FINISHED !"
5800 COLOR = (5,&HA7A):RETURN
5810 *RSULT      '//////////////////////////////////////////////////////////////
5820 RFLAG=1:GOSUB *ACLR:COLOR = (5,&H8F0)
5830 LINE (110,110)-(545,255),6,BF
5840 LINE (100,100)-(535,245),5,BF
5850 LINE (100,100)-(535,245),4,B:LINE (105,105)-(530,240),2,B
5860 COLOR 1:LOCATE 15,7:PRINT "PLEASE INSERT DATA DISK IN DRIVE #2."
5870 LOCATE 15,9:INPUT "RESULT DATA FILE NAME :";SN$
5880 OPEN "B:"+SN$+".D" FOR INPUT AS #1
5890 COLOR=(5,&HCF5):LOCATE 30,12:PRINT "READING DATA NOW !"
5900 INPUT #1,RN$,RD$,RMT,MIXT,MM
5910 INPUT #1,TK,P,DO
5920 FOR I=0 TO MM
5930 INPUT #1,X(I),DCO(I),MO(I),MO1(I),MO2(I),MT(I)
5940 INPUT #1,W(0,I),W(1,I),W(2,I),W(3,I),R(0,I),R(1,I),R(2,I),R(3,I)
```

Table A-4 List of the <MULTI> (12/14)

```
5950 INPUT #1,ROM(I),BETA(I),DM(I),MJUM(I),LEMBTAM(I)
5960 INPUT #1,SH(I),RE(I),SC(I),PR(I),ZG(I)
5970 NEXT I
5980 CLOSE #1:LOCATE 0,12:GOSUB *CLR
5990 BEEP:LOCATE 30,12:PRINT "READING FINISHED !"
6000 RFLAG=0:COLOR = (5,&H8F0):RETURN
6010 *SPRNT     '////////////////////////////////////////////////////////////////
6020 KEY OFF:CLS 3:GOSUB *BASE1:COLOR 7:COLOR = (1,&H444)
6030 PRINT "     RUN NO. :  <<";RNS;">>                                   ";
6040 PRINT "RUN DATE  :  ";RDS
6050 COLOR 6:PRINT " ----------------------------------------------";
6060 COLOR 6:PRINT "---------------------------------"
6070 PRINT "CALCULATING  CONDITIONS :"
6080 PRINT "SYSTEM PRES. :";P;"Pa, GAS AVERAGE TEMP. :";TK;
6090 PRINT "K, MIXING TIME :";MIXT;"m"
6100 PRINT
6110 COLOR 7:PRINT "  Xi";:COLOR 3:PRINT "    Dcor";
6120 COLOR 4:PRINT "    X/D/Re·Sc";:COLOR 5:PRINT "     SH";
6130 COLOR 6:PRINT "     W(O2)";:COLOR 7:PRINT "  W(CO)";
6140 COLOR 3:PRINT "  W(CO2)";:COLOR 4:PRINT "  R(O2)";
6150 COLOR 5:PRINT "  R(CO)";:COLOR 6:PRINT "  R(CO2)"
6160 CONSOLE 6,19,0,1
6170 FOR I=0 TO MM
6180 COLOR 7:PRINT USING " .###";X(I);:COLOR 3:PRINT USING "  .#####";DCO(I);
6190 COLOR 4:PRINT USING "  ##.####^^^^";ZG(I);
6200 COLOR 5:PRINT USING " ##.####";SH(I);
6210 COLOR 6:PRINT USING "   .####";W(0,I);
6220 COLOR 7:PRINT USING "   .####";W(2,I);
6230 COLOR 3:PRINT USING "   .####";W(3,I);
6240 COLOR 4:PRINT USING "    .####";R(0,I);
6250 COLOR 5:PRINT USING "   .####";R(2,I);
6260 COLOR 6:PRINT USING "   .####";R(3,I)
6270 IF I=17 OR I=34 OR I=51 THEN LOCATE 20,24:COLOR 6:GOTO 6290
6280 GOTO 6300
6290 INPUT "PRESS <RETURN> FOR CONTINUE !",PPPP
6300 NEXT I
6310 COLOR 6:LOCATE 20,24:INPUT "PRESS <RETURN> FOR RETURN !",PPPP
6320 CONSOLE 0,25,0,1:COLOR = (1,&H888):GOTO 6340
6330 *RETN      '///////////////////////////////////////////////////////////////
6340 KEY OFF:FFLAG=1:GOSUB *RESET
6350 *INIT      '///////////////////////////////////////////////////////////////
6360 KEY OFF:GOSUB *BASE1
6370 LINE (110,110)-(545,255),6,BF
6380 LINE (100,100)-(535,245),3,BF
6390 LINE (100,100)-(535,245),4,B:LINE (105,105)-(530,240),2,B
6400 COLOR 7:LOCATE 27,9:PRINT "   INITIALIZING  NOW ! "
6410 LOCATE 25,11:PRINT "   PLEASE WAIT A MOMENT ! "
6420 FOR I=0 TO 2000:PPPP=1:NEXT I
6430 DIM DZ(36),DA(99),PV(99)
6440 DIM DCO(50),X(50),MO(50),MO1(50),MO2(50),MT(50)
6450 DIM SH(50),RE(50),PR(50),SC(50),NU(50),ZG(50)
6460 DIM R(3,50),CP(3),CV(3),MJU(3),RO(3)
6470 DIM W(3,50),BETA(50),LEMBTA(3),CIN(2),COUT(2)
6480 DIM CPM(50),CVM(50),DM(50),MJUM(50),ROM(50),LEMBTAM(50)
```

Table A-4 List of the <MULTI> (13/14)

```
6490 GOSUB *CONS
6500 DO=.0529:PI=3.1415926#
6510 GOSUB *ACLR
6520 FLAG=1:LOCATE 27,11:PRINT " INITIALIZING  FINISHED !  "
6530 FOR I=0 TO 2000:PPPP=1:NEXT I
6540 ROC=1780
6550 KEY ON:RETURN
6560 *FP    '///////////////////////////////////////////////////////
6570 QQ=0
6580 FOR J=0 TO 3
6590 QQ=QQ+R(J,0)*CM(J)
6600 NEXT J
6610 W(0,0)=R(0,0)*CM(0)/QQ
6620 W(2,0)=R(2,0)*CM(2)/QQ
6630 W(3,0)=R(3,0)*CM(3)/QQ
6640 W(1,0)=1-W(0,0)-W(2,0)-W(3,0)
6650 IF CHO=0 THEN MT(0)=PV(9)*ROM(0)/3600:GOTO 6670
6660 MT(0)=(((PV(8)+PV(11))/2)-PV(9)-PV(10))*ROM(0)/3600
6670 MO(0)=W(0,0)*MT(0)
6680 MCO21=W(3,0)*MT(0)
6690 MCO1=W(2,0)*MT(0)
6700 RETURN
6710 *PRNT    '///////////////////////////////////////////////////////////
6720 LPRINT "============>  RUN NO.  ( ";RNS;" )  >=============>  DATE   ( "
6730 LPRINT RD$;" )  >============================================>"
6740 LPRINT
6750 LPRINT " Tmix = ";MIXT;" (min)              dTmeas =  30    (s)   ";
6760 LPRINT "        Troom = ";RMT;"   (C)   "
6770 LPRINT
6780  LPRINT " AVERAGE            R o2,in         R co2,in        R co,in ";
6790  LPRINT "           R o2,out        R co2,out       R co,out         F co/co2 "
6800  LPRINT "MOLE FRACTION :";
6810  LPRINT USING "    ###.##";CIN(0);
6820  LPRINT USING "             ###.##";CIN(1);CIN(2);COUT(0);COUT(1);COUT(2);F
6830  LPRINT
6840 LPRINT " Ptest (Pa)    Pabs (Pa)        Tg.ch-A (C)                   Tg.ch";
6850 LPRINT "-C (C)         Flowch-A(m3/h)  Flowch-B(m3/h)  Flowch-C(m3/h)"
6860 LPRINT USING "##.####^^^^";PB;:LPRINT USING "  ##.####^^^^  ";PAA;
6870 LPRINT USING "####.";PV(0);:LPRINT "/";
6880 LPRINT USING "####.";PV(1);:LPRINT "/";
6890 LPRINT USING "####.";PV(2);:LPRINT "/";
6900 LPRINT USING "####.";PV(3);:LPRINT "    ";
6910 LPRINT USING "####.";PV(4);:LPRINT "/";
6920 LPRINT USING "####.";PV(5);:LPRINT "/";
6930 LPRINT USING "####.";PV(6);:LPRINT "/";
6940 LPRINT USING "####.";PV(7);:LPRINT "    ";
6950 LPRINT USING "##.##^^^^";PV(9);:LPRINT "          ";
6960 LPRINT USING "##.##^^^^";PV(10);:LPRINT "          ";
6970 LPRINT USING "##.##^^^^";(PV(8)+PV(11))/2-PV(9)-PV(10)
6980 LPRINT "                           AVERAGE : ";TMA;
6990 LPRINT "        AVERAGE : ";TMC
7000 LPRINT :LPRINT
7010 LPRINT "NO. X(M) Dcor(M)  X/D/Re·Sc     Sh        Nu      Re       Sc     W(";
7020 LPRINT "O2)  W(CO)  W(CO2)  R(O2)  R(CO)  R(CO2)  RHO(kg/m3) VISC(Pa·s)";
```

Table A-4 List of the <MULTI> (14/14)

```
7030 LPRINT "  NO."
7040 FOR I=0 TO MM
7050 LPRINT USING "##  ";I+1;:LPRINT USING ".### ";X(I);
7060 LPRINT USING ".#####  ";DCO(I);
7070 LPRINT USING "##.###^^^^  ";ZG(I);
7080 LPRINT USING "##.####  ";SH(I);
7090 LPRINT USING "##.####  ";NU(I);
7100 LPRINT USING "###.#  ";RE(I);
7110 LPRINT USING "##.###  ";SC(I);
7120 LPRINT USING ".####  ";W(0,I);
7130 LPRINT USING ".####  ";W(2,I);
7140 LPRINT USING ".####  ";W(3,I);
7150 LPRINT USING ".####  ";R(0,I);
7160 LPRINT USING ".####  ";R(2,I);
7170 LPRINT USING ".####      ";R(3,I);
7180 LPRINT USING "#.####  ";ROM(I);
7190 LPRINT USING "##.###^^^^    ";MJUM(I);
7200 LPRINT USING "##";I+1
7210 NEXT I
7220 RETURN
7230 '
7240 *NUN     '/////////////////////////////////////////////////////////////
7250 '
7260 BB=NN
7270 FOR NN=0 TO MM
7280 ZGP=X(NN)/(DCO(NN)*RE(NN)*PR(NN))
7290 IF ZGP>.01 THEN GOTO 7320
7300 NU(NN)=1.077*ZGP^(-1/3)-.7
7310 GOTO 7330
7320 NU(NN)=3.657+6.874*((1000*ZGP)^(-.488))*EXP(-57.2*ZGP)
7330 NEXT NN
7340 NN=BB
7350 RETURN
```