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TRACY TRANSIENT EXPERIMENT DATABOOK
3) RAMP FEED EXPERIMENT

March 2002

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TRACY Transient Experiment Databook

3) Ramp Feed Experiment

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This is a databook of TRACY "ramp feed" experiments. TRACY is a reactor to perform supercritical experiments using low-enriched uranyl nitrate aqueous solution. The excess reactivity of TRACY is 3$ at maximum, and it is inserted by feeding the solution to a core tank or by withdrawing a control rod, which is called as the transient rod, from the core. In the ramp feed experiment, the supercritical experiment is initiated by feeding the fuel solution to the core tank in a constant feed rate.

The data in the present databook consist of datasheets and graphs. Experimental conditions and typical values of measured parameters are tabulated in the datasheet. In the graph, power and temperature profiles are plotted. Those data are useful for the investigation of criticality accidents with fissile solutions, and for validation of criticality accident analysis codes.

Keywords:
TRACY, Ramp Feed Experiment, Supercritical Experiment, Criticality Accident, Low-enriched Uranyl Nitrate Aqueous Solution, Databook, Experimental Conditions, Power, Temperature

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+ Department of Safety Research Technical Support

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TRACY 過渡実験データ集

3) ランプ給液実験

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(2002 年 2 月 8 日受理)

本書は、TRACY「ランプ給液」実験のデータ集である。TRACY は、低濃縮の硝酸ウラニル水溶液を用いて超臨界実験を行うための原子炉である。最大過剰反応度は 3$であり、溶液の炉心タンクへの供給あるいはトランジェント棒と呼ばれる制御棒を炉心から引き抜くことにより反応度が添加される。ランプ給液実験では、燃料溶液を一定速度で炉心タンクに供給し、超臨界実験を開始する。

本データ集は、データシートとグラフで構成されている。データシートには、実験条件及び測定したパラメータの代表値が表に記載されている。グラフには、出力及び温度の変化が描かれている。これらのデータは、核分裂性溶液の臨界事故研究及び臨界事故解析コードの検証に有用である。

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＋ 安全試験部

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1. Introduction

To investigate criticality accident phenomena in nuclear fuel cycle facilities such as a reprocessing plant and establish the evaluation method of criticality accidents, the Japan Atomic Energy Research Institute (JAERI) has conducted an experiment program using the transient experiment critical facility, TRACY[1-4]. TRACY is a reactor to perform supercritical experiments using fissile solution of low enriched uranium. The excess reactivity of TRACY is 3$ at maximum, and it is inserted by feeding the solution to a cylindrical core tank or by withdrawing a control rod, which is called as the transient rod, from the core. Using TRACY, a series of super critical experiments have been performed to simulate the criticality accident. From its first criticality on the 20th December 1995 to the end of Year 2001, total 204 operations have been conducted, including 101 static mode operations.

In the supercritical experiments, TRACY is operated with one of the following operation modes: "Pulse withdrawal", "Ramp withdrawal", and "Ramp feed". At the pulse withdrawal mode, the transient rod is withdrawn pneumatically in about 0.2 sec. At the ramp withdrawal mode, the reactivity is inserted by withdrawal of the transient rod in a constant speed using a motor drive system. At the ramp feed mode, the reactivity insertion is conducted by feeding fuel solution in a constant feed rate into the core tank, while the transient rod is being fully withdrawn from the core.

This report summarizes experimental data of TRACY "ramp feed" experiments. The data in the report consist of datasheets and graphs. In the datasheet, experimental conditions such as fuel and inserted reactivity conditions, and typical values of measured parameters (power, pressure, temperatures) are tabulated. In the graph, power, pressure, and temperature are plotted as a function of time. Those data are useful for the investigation of criticality accidents with fissile solutions, and for validation of criticality accident analysis codes.

2. Outline of TRACY

2.1 Facility[4)]

TRACY is a supercritical reactor to simulate criticality accidents in a fuel processing facility, such as a spent-fuel reprocessing plant. The maximum excess reactivity of TRACY is 3 dollars, and the integral power in an experiment is limited to 9kWh (32MJ), which corresponds to 10^{18} fissions. The major specifications of TRACY are listed in Table 2.1.

Major components of TRACY are an experimental assembly, a solution transfer system, a solution storage system, and an off-gas ventilation system as illustrated in Fig. 2.1. The experimental assembly consists of a core tank, a transient rod, three safety rods, and instrumentation. The core tank has an annular shape with an outer and inner diameter of 52 and 7.6 cm, respectively, and the effective height is about 2m. The central hole in the core tank is used for positioning the transient rod, which controls the reactivity for supercritical experiments. Up to the end of 1997 (Run 1 to 38), "Rod I" was used for the transient rod, and "Rod II" has been used from 1998 (Run39). The reactivity worths of Rod I and Rod II are about 1.8$ and about 3$, respectively. The safety rods are used for reactor shutdown only. The detailed structure of the core tank is shown in Figs.2.2 and 2.3. The transient rod structure is shown in Fig.2.4.

Figure 2.5 shows the locations of instruments. For monitoring the nuclear power conering a wide range of neutron flux change, several kinds of neutron detectors are placed surrounding the core tank. The specifications of neutron detectors are shown in Table 2.2. For static operations, 6 channels (neutron detectors) are installed beside the TRACY core tank (at about 1m from the core center): Start-up Ch.A and Ch.B, Linear Ch.A and Ch.B, and Log Ch.A and Ch.B. In addition, two safety channels are installed at the ceiling (about 10m high from the TRACY core) of the TRACY reactor room. For transient operations, the power is mainly measured by the following three systems: two linear channels (Transient Linear Ch.A and Ch.B), and one log channel (Transient Log Ch.), which are equipped at the ceiling of the TRACY reactor room. These channels are calibrated to the absolute power using the fission yield data obtained by radio-activity measurements of selected fission products in fuel solution, which is produced during the operation. The estimated error of the measured power is about 5 to 10%. In addition to these channels, one log-type channel can be used for experimental purposes (Experiment Log Ch.).

The fuel solution height during the static mode operation is measured by a high-accuracy needle-type level gauge, which has an accuracy of ±0.25mm. To measure the spatial distribution of the solution temperature, two types of thermocouple sets, Type-1 and Type-2, are used. Each type has 10 thermocouples. The position of thermocouples in the core tank is shown in Figs.2.6 and 2.7. In addition, one thermocouple is installed at the bottom of core tank, which is shown in Fig.2.3 as "Core thermometer." All those thermocouples are almel-chromel ones, of which the accuracy is ±1.5°C. To observe the pressure pulse to be generated in a large power excursion, a pressure gauge is installed at the

lower part of the core tank as shown in Fig. 2.3. Table 2.3 summarizes the specifications of main instruments used in transient measurements.

2.2 Fuel

In TRACY, uranyl nitrate aqueous solution is used as fuel. The enrichment of ^{235}U is 9.98 wt%. The maximum uranium concentration in the solution is limited to 500 gU/ℓ. Practically, the solution conditions are 375 to 433 g/ℓ for uranium concentration and 0.6 to 0.9 N for free nitric acid molarity.

The chemical composition of the solution fuel, such as uranium concentration and nitric acid molarity, are adjusted in the fuel treatment system. Solution fuel is supplied into TRACY for the experiments, and after a series of experiments, the solution fuel is returned to the fuel treatment system in order to purify, concentrate and recycle for the next experiments.

2.3 Operation

The reactivity of TRACY is controlled by two methods. One method changes the solution level in the core tank by feeding or draining fuel solution. The other method moves the transient rod, which contains B_4C pellets, along the guide tube positioned at the center of the core tank. In the supercritical experiments, an excess reactivity of up to three dollars can be inserted into the core. For these experiments, TRACY is operated with one of the following operation modes;

a) Pulse withdrawal,

b) Ramp withdrawal, and

c) Ramp feed.

At the pulse withdrawal mode, the transient rod is withdrawn pneumatically in about 0.2 sec. At the ramp withdrawal mode, the reactivity is inserted by withdrawal of the transient rod in a constant speed using a motor drive system. The maximum speed of rod withdrawal is 15 cm/sec (900 cm/min). At the ramp feed mode, the reactivity insertion is conducted by feeding fuel solution in a constant feed rate into the core tank. The maximum feed rate is 1 ℓ/sec (60 ℓ/min), which corresponds to 5.2 mm/sec of solution height change.

Table 2.1 Major specifications of TRACY

Core	500mmϕ cylindrical tank with a channel for the transient rod movement. Bare or water reflected.
Fuel	Uanyl nitrate aqueous solution (9.98wt% ^{235}U enriched). Maximum uranium concentration : 500 gU/liter
Reactivity insertion	Transient rod withdrawal or fuel solution feed.
Maximum excess reactivity	Static operation mode : 0.8 $ Transient operation mode : 3 $
Maximum power	Static operation mode : 10 kW Transient operation mode : 5 GW
Maximum energy	32 MJ/Experiment (= 10^{18} fissions/experiment)
Maximum pressure	0.9 MPa

Table 2.2 Specifications of neutron detectors

	Number of detectors.	Detector type	Range	Sensitivity
Start-up Ch.	2	B-10 proportional counter covered by 10mm-thick polyethylene	1×10^{-5} ~ 2×10^{0} W (1 ~ 2×10^{5} cps)	3.7 cps/nv
Log Ch.	2	CIC covered by 20mm-thick polyethylene	0 ~ 2×10^{4} W (10^{-5} ~ 200 %)	7.6×10^{-14} A/nv
Linear Ch.	2	CIC covered by 5mm-thick polyethylene	2×10^{-2} ~ 2×10^{4} W (0 ~ 100 %)	7.6×10^{-14} A/nv
Safety Ch.	2	CIC	0 ~ 2×10^{4} W	7.6×10^{-14} A/nv
Transient Linear Ch.	2	Fission chamber	0 ~ 1×10^{10} W (0 ~ 100 %)	1.80×10^{-17} A/nv
Transient Log Ch.	1	Fission chamber	1×10^{4} ~ 1×10^{10} W	1.28×10^{-17} A/nv

Table 2.3 Main instruments used in transient experiments

Parameter	Name of instrument	Alias in Datasheet	Detector	Range of measurement	Error
Power	Transient Linear Ch.A & Ch.B	Tr-Lin-N-A & Tr-Lin-N-B	Fission chamber (^{235}U)	10kW to 10GW	±5 to10%
	Transient Log Ch.	Tr-Log-N	Fission chamber (^{235}U)	10kW to 10GW	±5 to10%
	Experiment Ch.	Tr-Log-N-A	Fission chamber (^{235}U)	Depending on the experimental conditions	±5 to10%
Pressure	Core pressure gauge	Core-TK-P2	Strain gauge	0 to 15 kg/cm^2 (1.5MP)	±1.5% of full scale
	Ventilation Line pressure gauge	Vent-Gas-P2	Strain gauge	0 to 15 kg/cm^2 (1.5MP)	±1.5% of full scale
Temperature	Core thermometer	Core-Temp	Thermocouple (CA)	0 to 150 °C	±1.5 °C
	Type-1 thermocouples	Core-Temp-A to J	Thermocouple (CA)	0 to 130 °C	±1.5 °C
	Type-2 thermocouples	Core-Temp-1 to 10	Thermocouple (CA)	0 to 130 °C	±1.5 °C

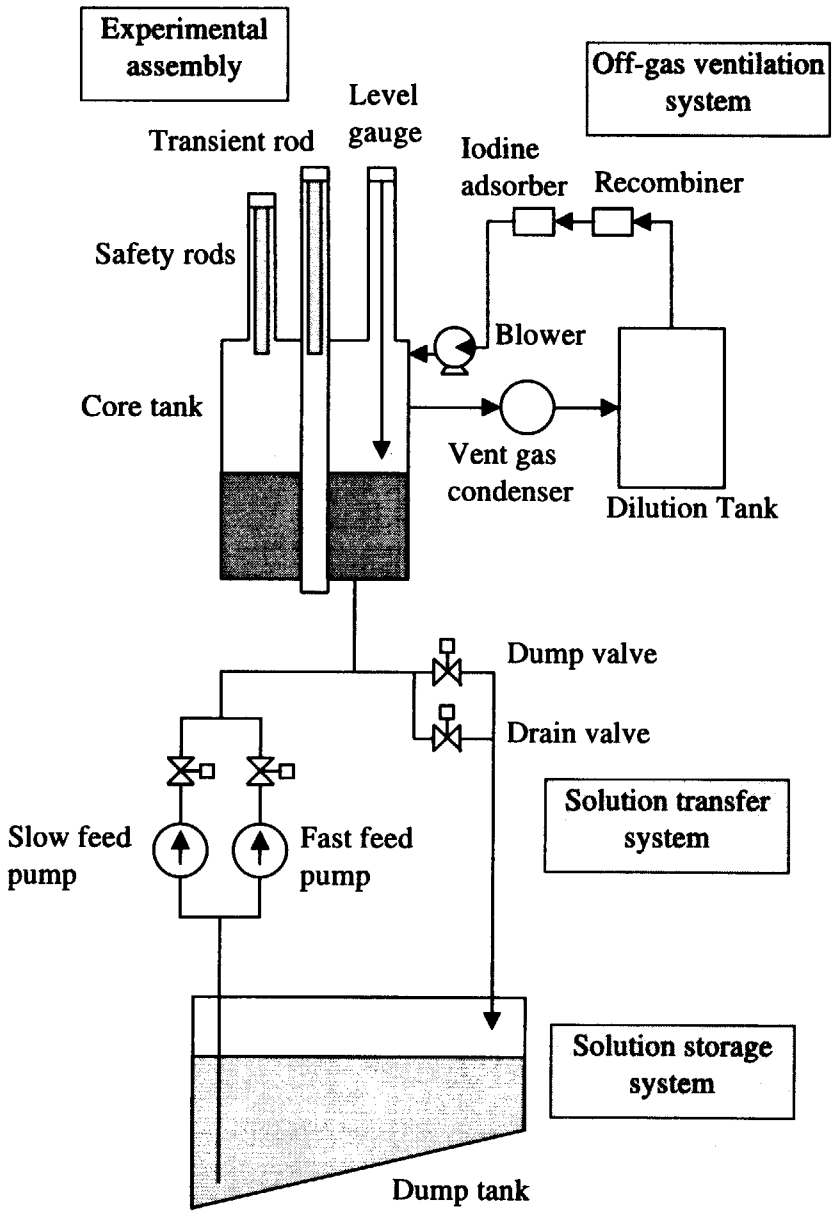

Fig. 2.1 Flow-diagram of TRACY

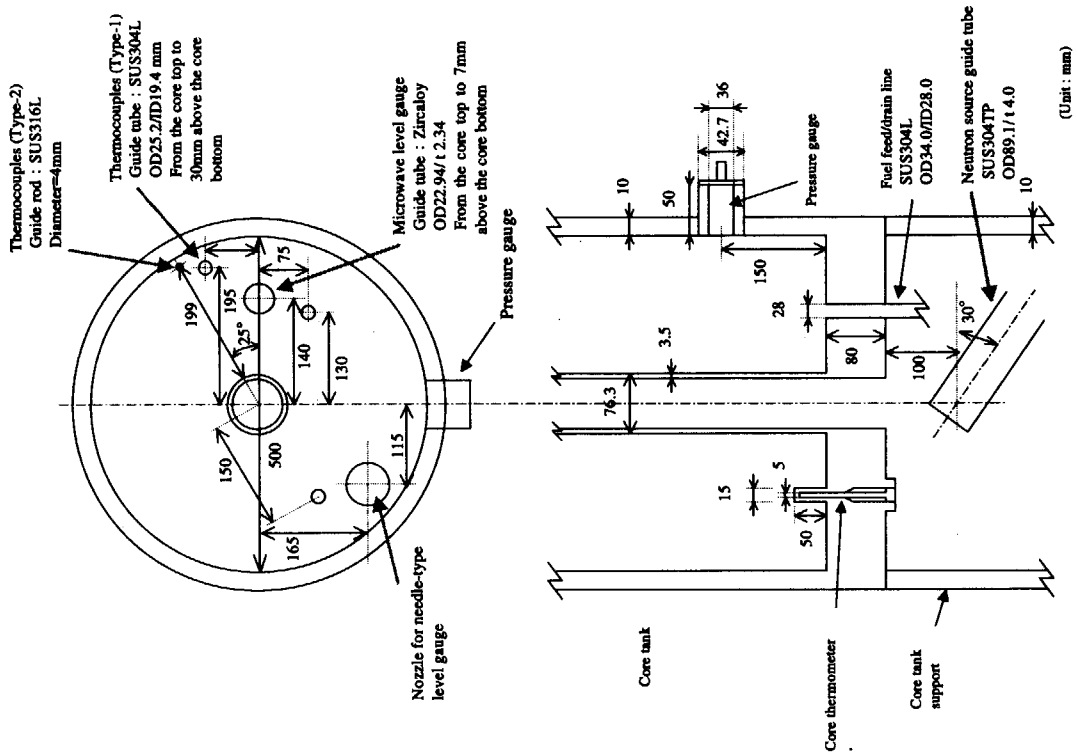

Fig. 2.3 Detailed structure of TRACY core tank

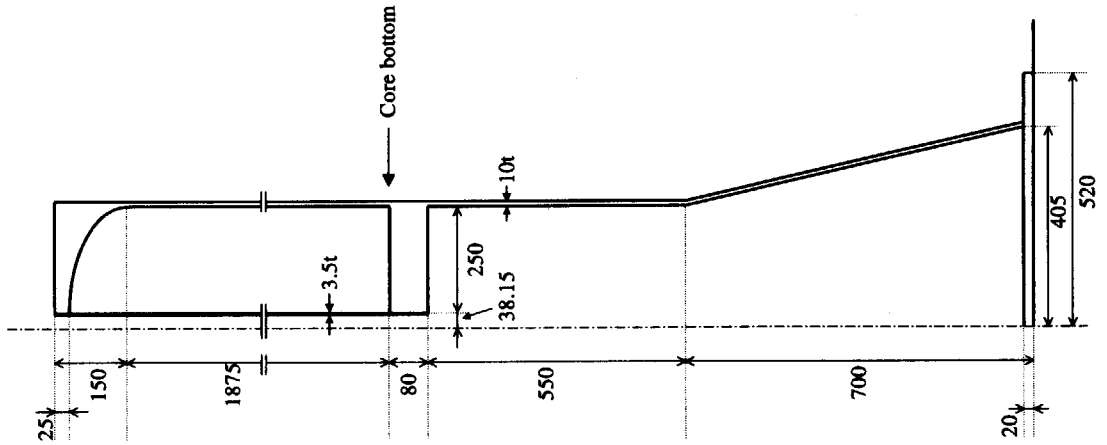

Fig. 2.2 Cutaway view of the core tank including support structure

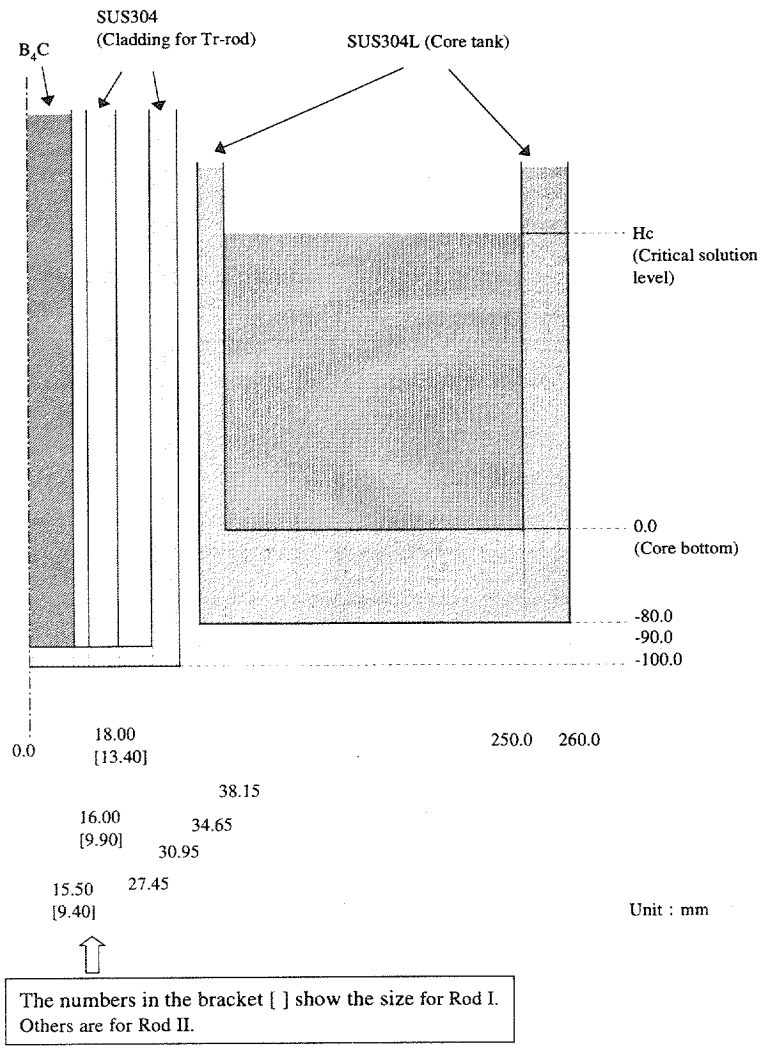

Fig. 2.4 Structure of Transient rod

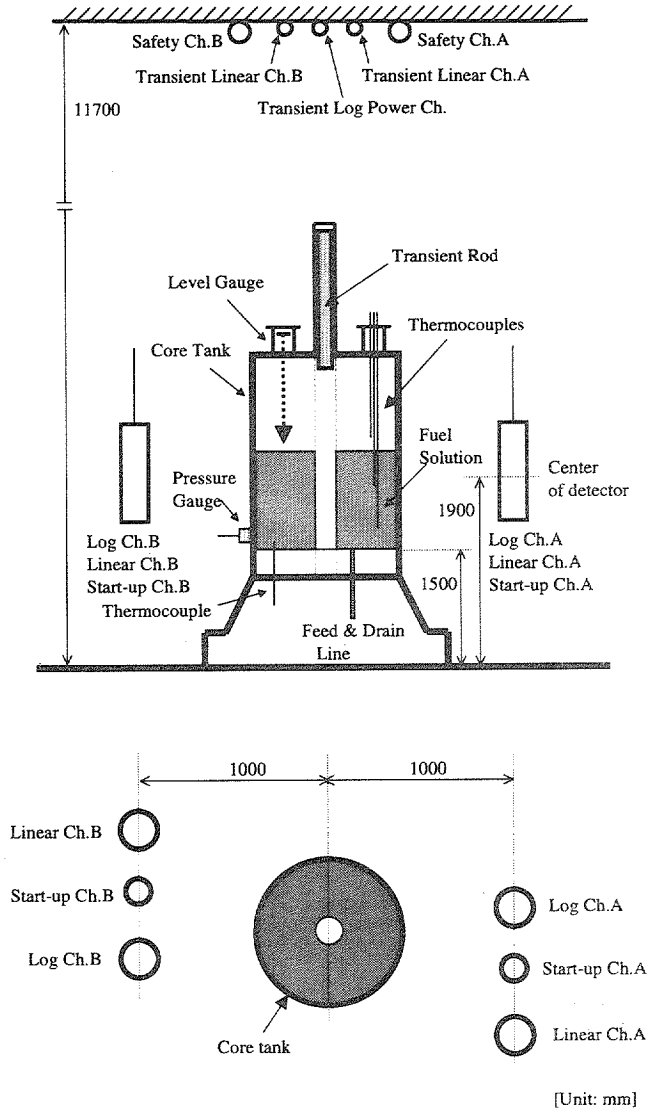

Fig. 2.5 Layout of instruments

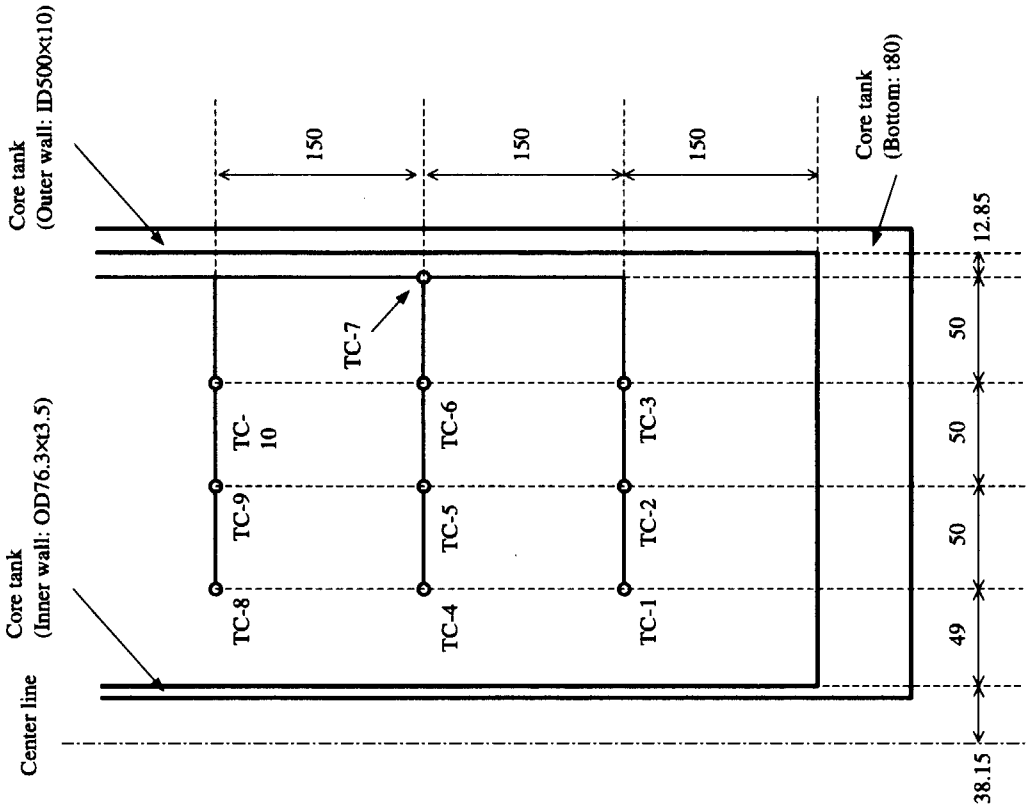

Fig. 2.7 Position of thermocouples for Type-2
(Refer Fig.2.3.)

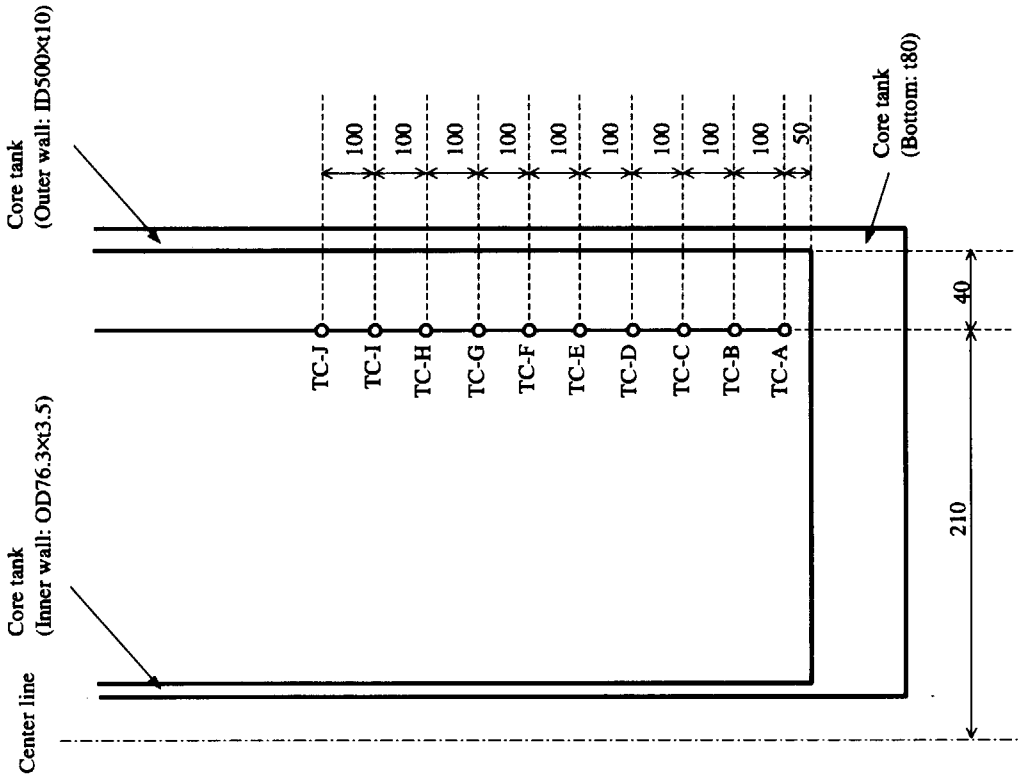

Fig. 2.6 Position of thermocouples for Type-1
(Refer Fig.2.3.)

3. Data of ramp feed experiment

3.1 Explanation about Datasheet

In the datasheet, 1) General information, 2) Fuel conditions, 3) Core conditions, 4) Reactivity insertion conditions, 5) Initial conditions, and 6) Time information are described, along with the following data: 7) Power, 8) Inverse Period, 9) Energy, 10) Pressure, and 11) Temperature. The contents of each item is as follows. An example of the datasheet is shown in Fig. 3.1.1.

1) General information

An ID number of the experiment, the date of experiment, and the purpose of experiment are described.

2) Fuel conditions

The uranium concentration, the free nitric acid molarity, and the density of fuel solution are measured prior to the experiment. The enrichment of ^{235}U is fixed for all the experiment period.

3) Core conditions

The following criticality data for a core with the transient rod inserted (*Tr-rod DOWN*) or withdrawn (*Tr-rod UP*) are measured.

Critical height H_{ci}: Critical solution level measured by needle-type level gauges A and B, $i = 1$ for *Tr-rod-UP* and $i = 2$ for *Tr-rod-DOWN*,

Temperature: Temperature at which the critical height is measured,

D-time meas. height H_{di}: Height at which the doubling time is measured,

Doubling time: Doubling time,

Reactivity: Reactivity corresponding to the doubling time,

Level worth: Differential worth of solution level (= *Reactivity*/(H_{di} - H_{ci})).

4) Reactivity insertion conditions

Reactivity insertion mode (pulse withdrawal, ramp withdrawal or ramp feed), the initial solution level at which the reactivity insertion starts, and the inserted reactivity are described. For the ramp withdrawal or ramp feed operations, the rate of the transient rod withdrawal or solution feed are also described. Additionally, the integral flow rates at level adjustment and at the end of feed are described for the ramp feed operation. The difference of these rates gives the volume of solution fed during the transient experiment.

The inserted reactivity (ρ) is evaluated using the critical height without the transient rod (H_{c1}) and the height at the end of reactivity insertion (H_F) as follows.

$$\rho = \frac{C}{2}\left\{(H_{c1}+\lambda)^{-2} - (H_F+\lambda)^{-2}\right\},$$

where C is a constant (7.67×10^8 cent/mm^2), and λ is a vertical extrapolated distance (102mm)[4].

5) Initial conditions

The solution temperature and the power at the beginning of the reactivity insertion are described. The condition if an external neutron source is used or not in the transient experiment is also given.

6) Time information

The start and end time of reactivity insertion, and the time of experiment terminated are described. The time used in these columns starts from the initiation of data measurement.

7) Power

The power values at the peak and bottom in the oscillation part measured with Transient Linear Ch.A (denominated as *Tr-Lin-N-A* in the *Data* column of datasheet) and Transient Log Ch. (*Tr-Log-N*) are tabulated with the corresponding time. For several experiments, Experiment Log Ch. (*Tr-Log-N-A*) is used instead of Transient Log. Ch. In particular, for the pulse withdrawal experiments with the inserted reactivity lager than 1.5$, the data measured by a cadmium covered detector, which was used as the Experiment Log Ch., was employed as the power to avoid the time delay effect of detecting thermal neutrons[5,6].

8) Inverse Period

An inverse period ω is obtained by differentiating the logarithm of power $P(t)$.

$$\omega = \frac{d}{dt}\ln(P(t)),$$

In the datasheet, the stable inverse period for the pulse withdrawal experiment, and the maximum inverse period for the ramp withdrawal experiment or for the ramp feed one are described. The corresponding period ($=1/\omega$) is also shown. These inverse periods should be evaluated using the increasing power in which no feedback occurs, i.e. very low power region. However the signal-to-noise ratio in the low power region is not so good, then the inverse period obtained by the above equation fluctuates significantly. Therefore, we have employed the averaged data as a representing value. For several experiments, we could not evaluated the data because of large nose in the power.

9) Energy

Energy is obtained by integrating the power measured with Transient Log Ch. The energy corresponding to the power peak and bottom is tabulated in the "Read value" columns. In addition, the energy at the end of experiment is also shown.

10) Pressure

Core pressure measured with the pressure gauge installed to the core tank (*Core-TK-P2*) is described, and the pressure inside the ventilation line measured by a gauge installed to the line (*Vent-Gas-P2*) is also listed, if it is available. The full width at half maximum (FWHM) of the core pressure pulse is also shown. The pressure was observed in the pulse withdrawal experiment only. For all the cases, the baseline of the pressure decreases after the power pulse, and the pressure oscillates heavily for several cases. The reason of these phenomena is still under investigation, however, it is considered to be caused by the noises due to radiation and temperature change.

11) Temperature

Temperature is measured by Core thermometer (*Core-Temp*), Type-1 thermocouples (*Core-Temp-A* to *J*) and Type-2 thermocouples (*Core-Temp-1* to *10*). Almel-chromel thermocouple is used for all these systems. Since Core thermometer, placed at the core bottom, is covered by a thick cladding (5mm-thick) as shown in Fig.2.3, it cannot follow the solution temperature change during the transient experiment. Type-1 and Type-2 thermocouples have response times of about 1s and 0.1s, respectively. For several cases, the measured temperature data in the power burst part were distorted by radiation influence on the electric circuit.

Experiment ID number

Date of the experiment

TRACY Experiment data sheet

Purpose of the experiment

No : Run 201	Date : 2000/10/23

	Purpose of experiment	Ramp feed (2.9$)				
Conditions	Fuel	Enrichment 9.98 wt%	U concentration 387.4 gU/l	Acid molarity 0.56 N	Density 1.53668 g/cm^3	Analysis Temp 24.99 ℃
	Core	Tr-rod UP		Tr-rod DOWN		
		Critical height Hc_1	A= 509.71 mm B= 509.72 mm	Critical height Hc_2	A= 623.92 mm B= 623.93 mm	
		Temperature	25.3 ℃	Temperature	25.3 ℃	
		D-time meas. height Hd_1	A= 512.83 mm B= 512.84 mm	D-time meas. height Hd_2	A= 628.99 mm B= 628.99 mm	Int. flow rate at level adjustment
		Doublimg time	61.1 s	Doublimg time	68.6 s	
		Reactivity	10.91 cent	Reactivity	9.98 cent	A= -42.708 L
		Level worth	3.50 cent/mm	Level worth	1.97 cent/mm	B= -42.394 L
	Reactivity insertion	Mode Ramp feed	Level A= 400.23 mm B= 400.25 mm	Reactivity 2.68 $	Rate 58.5 L/min	Int. flow rate at feed stop A= -2.462 L B= -2.168 L
	Initial conditions	Temperature 25.5 ℃	Power Subcritical	Neutron source No		

Fuel conditions

Core conditions without Tr-rod

Core conditions with Tr-rod

Reactivity insertion conditions

Initial conditions

Fig. 3.1.1 Explanation of Datasheet (1)

Core conditions

Critical height H_c: Critical solution level measured by needle-type level gauges A and B,
Temperature: Temperature at which the critical height is measured,
D-time meas. height H_d: Height at which the doubling time is measured,
Doubling time: Doubling time,
Reactivity: Reactivity corresponding to the doubling time,
Level worth: Differential worth of solution level (= *Reactivity*/(H_d-H_c)).

Fuel conditions

Enrichment: ^{235}U enrichment,
U concentration: Uranium concentration of the fuel solution,
Acid molarity: Free acid molarity of the fuel solution,
Density: Density of the fuel solution,
Analysis Temp: Temperature at which the fuel solution was analysed.

Reactivity insertion

Mode: Reactivity insertion mode (pulse withdrawal, ramp withdrawal or ramp feed),
Level: Initial solution level at which the reactivity insertion starts,
Reactivity: Inserted reactivity, which is evaluated with the critical height without the transient rod and the height at the end of reactivity insertion,
Rate: Rate of the transient rod withdrawal or solution feed,
Int. flow rate at feed stop: Integral flow rate, i.e. volume of solution fed, at the end of feed for the ramp feed experiments.

Initial conditions

Temperature: Solution temperature at the beginning of the reactivity insertion,
Power: Power at the beginning of the reactivity insertion,
Neutron source: Condition if an external neutron source is used or not in the supercritical experiment.

Fig. 3.1.1 Explanation of Datasheet (2)

TRACY Experiment data

For internal use

Time information

Experiment time	Standard point	Time(sec)	Data	Data point
Start time of reactivity insertion	Start of ramp feed	5.299	Tr-Ramp-ON	5300
End time of reactivity insertion	End of ramp feed	47.982		47983
End time of experiment	Tr rod down	79.099	Tr-Rod-Down	79100

Run No. :	R201
Date :	2001/10/23
Mode :	Ramp feed
Data file :	r201f11

Power

Power measured by Transient linear ch.A

Power measured by Transient log ch.

Peak		Data	Average(W)	Error	Start point	Points	Center*1 time	Relative time from 1st Peak
1st	Peak	Tr-Lin-N-A	1.781E+07	6.468E+04	35877	15	35.883	
	Bottom		-	-	-	-	-	-
1st	Peak	Tr-Log-N-A	1.824E+07	3.345E+04	35874	10	35.877	
	Bottom		1.248E+05	3.812E+02	43463	200	43.563	7.686
2nd	Peak		7.397E+05	1.224E+03	48971	200	49.071	13.194
	Bottom		2.069E+05	3.722E+02	59215	400	59.414	23.537
3rd	Peak		3.390E+05	4.760E+02	64854	400	65.054	29.177
	Bottom		-	-	-	-	-	-

Inverse Period

Stable period and stable inverse period measured by Transient log ch.A

Extract	Start point	35000	Movavg points	20
	Points	2000		

Period(msec) =[1000/INV. Period]	Data	Average (1/sec)	Error	Start point*2	Points	Center*1 time	Relative time from 1st Peak
33.639	Tr-Log-N-A	29.727	1.810E-01	717	40	35.735	-0.142

Energy

Energy obtained by integrating the power measured by Transient log ch.

Extract	Start point	5300	Movavg points	10
	Points	80000		

Time	Data	Read value (J)	fission	Data point*2	Center*1 time	Relative time from 1st Peak
1st peak	Tr-Log-N-A	1.120E+06	3.495E+16	30579	35.877	
2nd peak		6.863E+06	2.142E+17	43973	49.071	13.194
3rd peak		1.153E+07	3.598E+17	59756	65.054	29.177
End of experiment		1.444E+07	4.506E+17	73801	79.099	43.222

Pressure

Pressures of core (solution) and Ventilation line (air).

Core pressure FWHM(sec)	-	Start point	-	Time(sec)	-
		End point	-	Time(sec)	-

Name	Data	Average (MPa)	Error	Start point	Points	Center*1 time	Relative time from 1st Peak
Core pressure(Max.)	Core-TK-P2	-	-	-	-	-	-
Vent-gas pressure(Max.)	Vent-Gas-P2	-	-	-	-	-	-

*1 : Time from data measurement start
*2 : Value of extract data

Fig. 3.1.1 Explanation of Datasheet (3)

Temperature measured by Type-2 thermocouples

For internal use

Temperature [Data file : r201s11t]

Name		Data	Average (℃)	Error	Start point	Points	Center*1 time	Relative time from 1st Peak
Temp-1	Initial	Core-Temp-1	25.612	2.221E-03	480	50	5.04	-30.84
	Final		58.504	1.744E-02	7886	50	79.10	43.22
Temp-2	Initial	Core-Temp-2	25.620	2.030E-03	480	50	5.04	-30.84
	Final		58.813	1.927E-02	7886	50	79.10	43.22
Temp-3	Initial	Core-Temp-3	25.559	2.442E-03	480	50	5.04	-30.84
	Final		57.943	3.036E-03	7886	50	79.10	43.22
Temp-4	Initial	Core-Temp-4	25.595	2.115E-03	480	50	5.04	-30.84
	Final		59.078	2.634E-03	7886	50	79.10	43.22
Temp-5	Initial	Core-Temp-5	25.595	2.148E-03	480	50	5.04	-30.84
	Final		59.756	5.964E-03	7886	50	79.10	43.22
Temp-6	Initial	Core-Temp-6	24.974	1.893E-03	480	50	5.04	-30.84
	Final		57.720	1.723E-02	7886	50	79.10	43.22
Temp-7	Initial	Core-Temp-7	25.592	2.415E-03	480	50	5.04	-30.84
	Final		57.188	4.238E-03	7886	50	79.10	43.22
Temp-8	Initial	Core-Temp-8	24.863	2.265E-03	480	50	5.04	-30.84
	Final		59.431	6.595E-03	7886	50	79.10	43.22
Temp-9	Initial	Core-Temp-9	24.907	2.287E-03	480	50	5.04	-30.84
	Final		59.550	2.786E-03	7886	50	79.10	43.22
Temp-10	Initial	Core-Temp-10	24.852	2.086E-03	480	50	5.04	-30.84
	Final		58.743	1.832E-02	7886	50	79.10	43.22

Temperature measured by Type-1 thermocouples

For internal use

Temperature [Data file : r201s11t]

Name		Data	Average (℃)	Error	Start point	Points	Center*1 time	Relative time from 1st Peak
Temp	Initial	Core-Temp	25.469	2.624E-03	480	50	5.04	-30.84
	Final		41.194	1.187E-02	7886	50	79.10	43.22
Temp-A	Initial	Core-Temp-A	25.558	2.036E-03	480	50	5.04	-30.84
	Final		54.498	1.480E-02	7886	50	79.10	43.22
Temp-B	Initial	Core-Temp-B	25.608	2.267E-03	480	50	5.04	-30.84
	Final		55.545	3.169E-03	7886	50	79.10	43.22
Temp-C	Initial	Core-Temp-C	25.621	2.590E-03	480	50	5.04	-30.84
	Final		55.752	3.878E-03	7886	50	79.10	43.22
Temp-D	Initial	Core-Temp-D	25.603	2.221E-03	480	50	5.04	-30.84
	Final		55.824	8.206E-03	7886	50	79.10	43.22
Temp-E	Initial	Core-Temp-E	25.404	1.989E-03	480	50	5.04	-30.84
	Final		56.026	4.334E-03	7886	50	79.10	43.22
Temp-F	Initial	Core-Temp-F	25.345	2.267E-03	480	50	5.04	-30.84
	Final		55.757	9.303E-03	7886	50	79.10	43.22
Temp-G	Initial	Core-Temp-G	25.528	2.221E-03	480	50	5.04	-30.84
	Final		41.151	1.263E-02	7886	50	79.10	43.22
Temp-H	Initial	Core-Temp-H	25.885	2.380E-03	480	50	5.04	-30.84
	Final		30.408	3.655E-03	7886	50	79.10	43.22
Temp-I	Initial	Core-Temp-I	26.390	2.265E-03	480	50	5.04	-30.84
	Final		27.552	3.249E-03	7886	50	79.10	43.22
Temp-J	Initial	Core-Temp-J	27.053	2.267E-03	480	50	5.04	-30.84
	Final		27.964	4.055E-03	7886	50	79.10	43.22

*1 : Time from data measurement start

Fig. 3.1.1 Explanation of Datasheet (4)

3.2 Data

The data of 14 experiments with the ramp feed operation are shown in this section. Table 3.2.1 shows the main experimental conditions of those experiments. As shown in the table, the inserted reactivity was about 0.5$ to 2.7$, and the solution feed rate was 20 to 60ℓ/min. The detailed experimental conditions and the data are shown in each datasheet and corresponding graphs.

Table 3.2.1 Main experimental conditions of the ramp feed experiments

No.	H_{c1} (mm)	H_{c2} (mm)	H_I (mm)	H_F (mm)	ρ_{total} ($)	ρ_I ($)	ρ ($)	Feed rate (ℓ/min)	Time to achieve criticalty (s)	U (gU/ℓ)	H^+ (N)	Comments(Initial condition etc)
31	459.15	507.13	400.22	500.43	1.84	-3.03	1.61	57	11.90	426.3	0.77	Subcritical, No neutron source
61	461.38	541.54	400.00	535.40	2.82	-3.14	2.64	59	11.92	422.1	0.77	Subcritical, No neutron source
71	503.37	611.11	400.59	603.00	2.92	-4.72	2.75	41	28.85	392.7	0.75	Subcritical, No neutron source
76	496.25	598.96	400.33	587.87	2.91	-4.48	2.66	20	55.19	396.2	0.74	Subcritical, No neutron source
98	500.52	606.47	400.85	559.65	2.92	-4.60	1.80	60	19.12	391.7	0.73	Subcritical, No neutron source
149	525.66	651.10	400.26	579.07	2.97	-5.47	1.47	57	25.14	375.7	0.64	Subcritical, No neutron source
159	524.50	649.45	400.16	541.04	2.98	-5.44	0.50	59	24.17	379.4	0.6	Subcritical, No neutron source
160	524.21	648.83	400.26	541.22	2.98	-5.42	0.51	60	23.97	379.5	0.6	Subcritical, No neutron source
161	522.89	646.25	400.07	551.07	2.97	-5.39	0.83	59	23.96	380.4	0.61	Subcritical, No neutron source
163	520.95	642.96	399.90	564.67	2.97	-5.34	1.25	59	23.61	379.8	0.61	Subcritical, No neutron source
164	516.90	635.65	400.13	570.02	2.96	-5.20	1.52	60	22.58	382.3	0.62	Subcritical, No neutron source
167	505.71	615.90	399.45	601.90	2.94	-4.87	2.64	59	20.73	387.5	0.62	Subcritical, With neutron source
169	505.88	616.10	399.94	599.89	2.94	-4.84	2.59	58	20.88	387.8	0.61	Subcritical, No neutron source
201	509.72	623.93	400.24	610.02	2.97	-4.96	2.68	59	21.54	387.4	0.56	Subcritical, No neutron source

H_{c1} : Critical height with the transient rod withdrawn.
H_{c2} : Critical height with the transient rod inserted.
H_I : Initial height. (Height when the feed stared.)
H_F : Final height. (Height when the feed stopped.)
ρ_{total} : Reactivity worth between the heights of H_{c2} and H_{c1}.
ρ_I : Initial reactivity. (Reactivity worth between the heights of H_I and H_{c1}.)
ρ : Inserted reactivitry. (Reactivity worth between the heights of H_F and H_{c1}.)
U : Uranium concentration.
H^+ : Free acid molarity.

3.2.1 Datasheet

TRACY experiment datasheets are placed in the order of experiment ID number. The blank column in the sheet means that there is no available data or that item is outside the scope of experiment investigated.

TRACY Experiment data sheet

No : Run 31	Date : 96/ 8/27

Purpose of experiment		Ramp feed(1.6$)				
Conditions	Fuel	Enrichment 9.98 wt%	U concentration 426.3 gU/l	Acid molarity 0.77 N	Density 1.59462 g/cm^3	Analysis Temp 25.01 ℃
	Core	Tr-rod UP		Tr-rod DOWN		
		Critical height Hc_1	A= 459.15 mm B= 459.15 mm	Critical height Hc_2	A= 507.13 mm B= 507.12 mm	
		Temperature	25.3 ℃	Temperature	25.3 ℃	
		D-time meas. height Hd_1	A= 461.90 mm B= 461.91 mm	D-time meas. height Hd_2	A= 510.30 mm B= 510.31 mm	Int. flow rate at level adjustment
		Doublimg time	50.6 s	Doublimg time	61.3 s	
		Reactivity	12.56 cent	Reactivity	10.88 cent	A= -20.677 L
		Level worth	4.57 cent/mm	Level worth	3.43 cent/mm	B= -20.415 L
	Reactivity insertion	Mode Ramp feed	Level A= 400.22 mm B= 400.22 mm	Reactivity 1.61 $	Rate 57 l/min	Int. flow rate at feed stop A= -1.446 L B= -1.207 L
	Initial conditions	Temperature 25.4 ℃	Power Subcritical	Neutron source No		

TRACY Experiment data

Experiment time	Standard point	Time(sec)	Data	Data point
Start time of reactivity insertion	Start of ramp feed	21.6304	Pump	216305
End time of reactivity insertion	End of ramp feed	43.7363		437364
End time of experiment	End of data record	116.8010	–	1168011

Run No. : **R31**
Date : 1996/08/27
Mode : Ramp feed
Data file : R0031a

Power

Peak		Data	Average(W)	Error	Start point	Points	Center time	Relative time from 1st Peak
1st	Peak	TR-Lin-N-A	2.93E+07	3.029E+04	417506	100	41.7555	—
	Bottom		–	–	–	–	–	–
1st	Peak	TR-Log-N	2.92E+07	3.541E+04	417506	100	41.7555	—
	Bottom		2.59E+04	3.816E+01	557212	5000	55.9711	14.2156
2nd	Peak		5.91E+05	9.473E+02	686446	2000	68.7445	26.9890
	Bottom		–	–	–	–	–	–
3rd	Peak		–	–	–	–	–	–
	Bottom		–	–	–	–	–	–

Inverse Period

Extract	Start point	216305	Movavg points	20	*Value of extract data
	Points	215000			

Period(msec) =[1000/INV. Period]	Data	Average (1/sec)	Error	Start point*	Points	Center time	Relative time from 1st Peak
3.19E+01	TR-Log-N	3.13E+01	1.126E+00	200425	200	41.6828	-0.0727

Energy

Extract	Start point	216305	Movavg points	10	*Value of extract data
	Points	951706			

Time	Data	Read value (J)	fission	Data point*	Center time	Relative time from 1st Peak
1st peak	TR-Log-N	1.56E+06	4.88E+16	201252	41.7555	—
2nd peak		7.67E+06	2.39E+17	471142	68.7445	26.9890
3rd peak		–	–	–	–	–
End of experiment		9.75E+06	3.04E+17	951703	116.8010	75.0455

Temperature [Data file : R0031a]

Name		Data	Average (℃)	Error	Start point	Points	Center time	Relative time from 1st Peak
Temp	Initial	Core-Temp	25.3	7.735E-03	216204	100	21.6254	-20.1301
	Final		39.1	9.423E-03	216255	100	116.7959	75.0404
Temp-A	Initial	Core-Temp-A	25.4	3.003E-03	166	50	19.0	-22.7
	Final		46.0	1.386E-02	1118	50	116.7	75.0
Temp-B	Initial	Core-Temp-B	25.5	1.590E-03	166	50	19.0	-22.7
	Final		49.1	1.168E-02	1118	50	116.7	75.0
Temp-C	Initial	Core-Temp-C	25.6	1.368E-03	166	50	19.0	-22.7
	Final		49.6	2.214E-03	1118	50	116.7	75.0
Temp-D	Initial	Core-Temp-D	25.6	1.785E-03	166	50	19.0	-22.7
	Final		49.4	4.878E-03	1118	50	116.7	75.0
Temp-E	Initial	Core-Temp-E	25.3	1.376E-03	166	50	19.0	-22.7
	Final		49.5	1.020E-02	1118	50	116.7	75.0
Temp-F	Initial	Core-Temp-F	27.0	1.280E-03	166	50	19.0	-22.7
	Final		37.0	2.784E-02	1118	50	116.7	75.0
Temp-G	Initial	Core-Temp-G	24.9	1.170E-03	166	50	19.0	-22.7
	Final		26.4	4.908E-03	1118	50	116.7	75.0
Temp-H	Initial	Core-Temp-H	24.7	8.160E-04	166	50	19.0	-22.7
	Final		25.7	4.252E-03	1118	50	116.7	75.0
Temp-I	Initial	Core-Temp-I	–	–	–	–	–	–
	Final		–	–	–	–	–	–
Temp-J	Initial	Core-Temp-J	–	–	–	–	–	–
	Final		–	–	–	–	–	–

Pressure

Core pressure FWHM(sec)	–	Start point	–	Time(sec)	–
		End point	–	Time(sec)	–

Name	Data	Average (MPa)	Error	Start point	Points	Center time	Relative time from 1st Peak
Core pressure(Max.)	Core-TK-P2	–	–	–	–	–	–
Vent-gas pressure(Max.)	Vent-Gas-P2	–	–	–	–	–	–

TRACY Experiment data sheet

No : Run 61	Date : 97/ 7/29

Purpose of experiment		Ramp feed(2.8$)				
Conditions	Fuel	Enrichment	U concentration	Acid molarity	Density	Analysis Temp
		9.98 wt%	422.1 gU/l	0.77 N	1.58926 g/cm^3	25.02 ℃
	Core	Tr-rod UP		Tr-rod DOWN		
		Critical height Hc_1	A= 461.38 mm B= 461.38 mm	Critical height Hc_2	A= 541.54 mm B= 541.53 mm	
		Temperature	25.7 ℃	Temperature	25.6 ℃	
		D-time meas. height Hd_1	A= 464.07 mm B= 464.08 mm	D-time meas. height Hd_2	A= 545.14 mm B= 545.14 mm	Int. flow rate at level adjustment
		Doublimg time	55.1 s	Doublimg time	66.5 s	
		Reactivity	11.79 cent	Reactivity	10.22 cent	A= -27.900 L
		Level worth	4.38 cent/mm	Level worth	2.84 cent/mm	B= -26.400 L
	Reactivity insertion	Mode	Level	Reactivity	Rate	Int. flow rate at feed stop
		Ramp feed	A= 400.00 mm B= 400.01 mm	2.64 $	59.27 l/min	A= -1.186 L B= -1.175 L
	Initial conditions	Temperature	Power	Neutron source		
		25.8 ℃	Subcritical	No		

TRACY Experiment data

Experiment time	Standard point	Time(sec)	Data	Data point
Start time of reactivity insertion	Start of ramp feed	6.7149	Fast-Pump-ON	67150
End time of reactivity insertion	End of ramp feed	34.3024		343025
End time of experiment	End of data record	100.0000	-	1000001

Run No. : **R61**
Date : 1997/07/29
Mode : Ramp feed
Data file : R61f1data

Power

Peak		Data	Average(W)	Error	Start point	Points	Center time	Relative time from 1st Peak
1st	Peak	TR-Lin-N-A	2.36E+07	3.771E+04	265746	100	26.5795	---
	Bottom		1.15E+05	3.623E+02	383917	2000	38.4916	11.9121
1st	Peak	TR-Log-N	2.34E+07	2.743E+04	265746	100	26.5795	---
	Bottom		4.43E+04	1.020E+02	383917	2000	38.4916	11.9121
2nd	Peak		1.05E+06	1.395E+03	485657	2000	48.6656	22.0861
	Bottom		3.95E+04	9.251E+01	579139	2000	58.0138	31.4343
3rd	Peak		8.06E+05	1.165E+03	683363	2000	68.4362	41.8567
	Bottom		5.77E+04	1.289E+02	767750	2000	76.8749	50.2954

Inverse Period

Extract	Start point	67150	Movavg points	20	*Value of extract data
	Points	220000			

Period(msec) =[1000/INV. Period]	Data	Average (1/sec)	Error	Start point*	Points	Center time	Relative time from 1st Peak
3.35E+01	TR-Log-N-A	2.99E+01	6.597E-01	197501	400	26.4849	-0.0946

Energy

Extract	Start point	67150	Movavg points	10	*Value of extract data
	Points	932850			

Time	Data	Read value (J)	fission	Data point*	Center time	Relative time from 1st Peak
1st peak	TR-Log-N	1.38E+06	4.32E+16	198647	26.5795	---
2nd peak		7.33E+06	2.29E+17	419508	48.6656	22.0861
3rd peak		1.07E+07	3.32E+17	617214	68.4362	41.8567
End of experiment		1.55E+07	4.82E+17	932852	100.0000	73.4205

Temperature [Data file : R61s1data]

Name		Data	Average (℃)	Error	Start point	Points	Center time	Relative time from 1st Peak
Temp	Initial	Core-Temp	25.8	2.768E-03	621	50	6.46	-20.12
	Final		56.4	6.212E-03	13304	50	133.29	106.71
Temp-A	Initial	Core-Temp-A	26.0	2.213E-02	621	50	6.46	-20.12
	Final		66.9	2.505E-02	13304	50	133.29	106.71
Temp-B	Initial	Core-Temp-B	26.1	2.247E-02	621	50	6.46	-20.12
	Final		68.8	2.302E-02	13304	50	133.29	106.71
Temp-C	Initial	Core-Temp-C	26.1	2.214E-02	621	50	6.46	-20.12
	Final		68.8	2.330E-02	13304	50	133.29	106.71
Temp-D	Initial	Core-Temp-D	26.0	2.221E-02	621	50	6.46	-20.12
	Final		69.7	2.392E-02	13304	50	133.29	106.71
Temp-E	Initial	Core-Temp-E	25.7	2.190E-02	621	50	6.46	-20.12
	Final		69.6	2.376E-02	13304	50	133.29	106.71
Temp-F	Initial	Core-Temp-F	27.4	2.134E-02	621	50	6.46	-20.12
	Final		69.8	2.515E-02	13304	50	133.29	106.71
Temp-G	Initial	Core-Temp-G	25.3	2.243E-02	621	50	6.46	-20.12
	Final		30.7	2.078E-02	13304	50	133.29	106.71
Temp-H	Initial	Core-Temp-H	24.9	2.219E-02	621	50	6.46	-20.12
	Final		29.3	2.290E-02	13304	50	133.29	106.71
Temp-I	Initial	Core-Temp-I	25.9	2.272E-02	621	50	6.46	-20.12
	Final		27.9	2.517E-02	13304	50	133.29	106.71
Temp-J	Initial	Core-Temp-J	26.4	2.229E-02	621	50	6.46	-20.12
	Final		28.2	2.406E-02	13304	50	133.29	106.71

Pressure

Core pressure FWHM(sec)	-	Start point	-	Time(sec)	-
		End point	-	Time(sec)	-

Name	Data	Average (MPa)	Error	Start point	Points	Center time	Relative time from 1st Peak
Core pressure(Max.)	Core-TK-P2	-	-	-	-	-	-
Vent-gas pressure(Max.)	Vent-Gas-P2	-	-	-	-	-	-

TRACY Experiment data sheet

No : Run 71	Date : 97/ 11/11

Purpose of experiment		Ramp feed(2.9$)				
Conditions	Fuel	Enrichment	U concentration	Acid molarity	Density	Analysis Temp
		9.98 wt%	392.7 gU/l	0.75 N	1.54776 g/cm^3	24.98 ℃
	Core	Tr-rod UP		Tr-rod DOWN		
		Critical height Hc_1	A= 503.37 mm B= 503.37 mm	Critical height Hc_2	A= 611.11 mm B= 611.11 mm	
		Temperature	25.8 ℃	Temperature	25.8 ℃	
		D-time meas. height Hd_1	A= 505.19 mm B= 505.19 mm	D-time meas. height Hd_2	A= 616.17 mm B= 616.18 mm	Int. flow rate at level adjustment
		Doublimg time	116.5 s	Doublimg time	65.8 s	
		Reactivity	cent	Reactivity	10.31 cent	A= -40.631 L
		Level worth	cent/mm	Level worth	2.04 cent/mm	B= -40.193 L
	Reactivity insertion	Mode	Level	Reactivity	Rate	Int. flow rate at feed stop
		Ramp feed	A= 400.59 mm B= 400.59 mm	2.75 $	40 l/min	A= -1.763 L B= -1.418 L
	Initial conditions	Temperature	Power	Neutron source		
		26.1 ℃	Subcritical	No		

TRACY Experiment data

Experiment time	Standard point	Time(sec)	Data	Data point
Start time of reactivity insertion	Start of ramp feed	6.3852	Fast-Pump-ON	31927
End time of reactivity insertion	End of ramp feed	64.4054		322028
End time of experiment	Tr rod down	172.058	TrRod-Up-Down	860289

Run No. : **R71**
Date : 1997/11/11
Mode : Ramp feed
Data file : r71f1data

Power

Peak		Data	Average(W)	Error	Start point	Points	Center time	Relative time from 1st Peak
1st	Peak	TR-Lin-N-A	1.20E+07	2.452E+04	232824	50	46.5696	—
	Bottom		9.34E+04	3.449E+02	283451	2000	56.8900	10.3204
1st	Peak	TR-Log-N	1.20E+07	4.370E+04	232824	50	46.5696	—
	Bottom		5.53E+04	1.306E+02	283451	2000	56.8900	10.3204
2nd	Peak		1.23E+06	2.264E+03	322979	1000	64.6956	18.1260
	Bottom		5.00E+04	1.125E+02	368354	2000	73.8706	27.3010
3rd	Peak		8.61E+05	1.746E+03	419700	1000	84.0398	37.4702
	Bottom		5.92E+04	1.313E+02	458635	2000	91.9268	45.3572

Inverse Period

Extract	Start point	31927	Movavg points	20	*Value of extract data
	Points	208000			

Period(msec) =[1000/INV. Period]	Data	Average (1/sec)	Error	Start point*	Points	Center time	Relative time from 1st Peak
5.43E+01	TR-Log-N-A	1.84E+01	5.899E-01	200315	100	46.4580	-0.1116

Energy

Extract	Start point	31927	Movavg points	10	*Value of extract data
	Points	968000			

Time	Data	Read value (J)	fission	Data point*	Center time	Relative time from 1st Peak
1st peak	Tr-Log-N	1.04E+06	3.25E+16	200923	46.5696	—
2nd peak		7.15E+06	2.23E+17	291553	64.6956	18.1260
3rd peak		1.10E+07	3.42E+17	388274	84.0398	37.4702
End of experiment		2.28E+07	7.12E+17	828363	172.058	125.4884

Temperature [Data file : r71s1data]

Name		Data	Average (°C)	Error	Start point	Points	Center time	Relative time from 1st Peak
Temp	Initial	Core-Temp	26.0	2.217E-03	590	50	6.15	-40.42
	Final		60.2	5.045E-03	17182	50	172.06	125.49
Temp-A	Initial	Core-Temp-A	26.2	2.323E-02	590	50	6.15	-40.42
	Final		70.3	2.691E-02	17182	50	172.06	125.49
Temp-B	Initial	Core-Temp-B	26.2	2.084E-02	590	50	6.15	-40.42
	Final		72.1	2.405E-02	17182	50	172.06	125.49
Temp-C	Initial	Core-Temp-C	26.3	2.391E-02	590	50	6.15	-40.42
	Final		73.0	2.418E-02	17182	50	172.06	125.49
Temp-D	Initial	Core-Temp-D	26.2	2.203E-02	590	50	6.15	-40.42
	Final		73.1	2.236E-02	17182	50	172.06	125.49
Temp-E	Initial	Core-Temp-E	25.9	2.249E-02	590	50	6.15	-40.42
	Final		73.6	2.255E-02	17182	50	172.06	125.49
Temp-F	Initial	Core-Temp-F	27.7	2.318E-02	590	50	6.15	-40.42
	Final		73.7	2.515E-02	17182	50	172.06	125.49
Temp-G	Initial	Core-Temp-G	25.6	2.193E-02	590	50	6.15	-40.42
	Final		55.2	2.284E-02	17182	50	172.06	125.49
Temp-H	Initial	Core-Temp-H	25.3	2.384E-02	590	50	6.15	-40.42
	Final		39.7	3.369E-02	17182	50	172.06	125.49
Temp-I	Initial	Core-Temp-I	26.2	2.370E-02	590	50	6.15	-40.42
	Final		30.7	2.225E-02	17182	50	172.06	125.49
Temp-J	Initial	Core-Temp-J	26.7	2.405E-02	590	50	6.15	-40.42
	Final		30.6	2.087E-02	17182	50	172.06	125.49

Pressure

Core pressure FWHM(sec)	-	Start point	-	Time(sec)	-
		End point	-	Time(sec)	-

Name	Data	Average (MPa)	Error	Start point	Points	Center time	Relative time from 1st Peak
Core pressure(Max.)	Core-TK-P2	-	-	-	-	-	-
Vent-gas pressure(Max.)	Vent-Gas-P2	-	-	-	-	-	-

TRACY Experiment data sheet

No : Run 76	Date : 97/ 12/9

Purpose of experiment		Ramp feed(2.9$)				
Conditions	Fuel	Enrichment	U concentration	Acid molarity	Density	Analysis Temp
		9.98 wt%	396.2 gU/l	0.74 N	1.55305 g/cm^3	25.07 ℃
	Core	Tr-rod UP		Tr-rod DOWN		
		Critical height Hc_1	A= 496.25 mm B= 496.26 mm	Critical height Hc_2	A= 598.96 mm B= 598.97 mm	
		Temperature	25.3 ℃	Temperature	25.3 ℃	
		D-time meas. height Hd_1	A= 499.12 mm B= 499.14 mm	D-time meas. height Hd_2	A= 604.51 mm B= 604.51 mm	Int. flow rate at level adjustment
		Doublimg time	65.6 s	Doublimg time	54.5 s	
		Reactivity	10.33 cent	Reactivity	11.89 cent	A= -37.931 L
		Level worth	3.60 cent/mm	Level worth	2.14 cent/mm	B= -37.564 L
	Reactivity insertion	Mode	Level	Reactivity	Rate	Int. flow rate at feed stop
		Ramp feed	A= 400.33 mm B= 400.35 mm	2.66 $	20 l/min	A= -1.827 L B= -1.727 L
	Initial conditions	Temperature	Power	Neutron source		
		25.6 ℃	Subcritical	No		

TRACY Experiment data

Experiment time	Standard point	Time(sec)	Data	Data point
Start time of reactivity insertion	Start of ramp feed	4.2500	Fast-Pump-ON	21251
End time of reactivity insertion	End of ramp feed	115.079		575396
End time of experiment	Tr rod down	223.736	TrRod-UP-DOWN	1118682

Run No. : **R76**
Date : 1997/12/09
Mode : Ramp feed
Data file : r76f1data

Power

Peak		Data	Average(W)	Error	Start point	Points	Center time	Relative time from 1st Peak
1st	Peak	TR-Lin-N-A	4.13E+06	8.822E+03	400008	100	80.0114	---
	Bottom		6.10E+04	1.635E+02	455804	6000	91.7606	11.7492
1st	Peak	TR-Log-N	4.13E+06	1.423E+04	400008	100	80.0114	---
	Bottom		5.12E+04	7.003E+01	455804	6000	91.7606	11.7492
2nd	Peak		7.64E+05	1.117E+03	504529	2000	101.106	21.095
	Bottom		5.37E+04	6.910E+01	547884	6000	110.177	30.166
3rd	Peak		6.55E+05	1.047E+03	594889	2000	119.178	39.167
	Bottom		5.95E+04	7.557E+01	632537	6000	127.107	47.096

Inverse Period

Extract	Start point	21251	Movavg points	20	*Value of extract data
	Points	390000			

Period(msec) =[1000/INV. Period]	Data	Average (1/sec)	Error	Start point*	Points	Center time	Relative time from 1st Peak
1.08E+02	TR-Log-N-A	9.29E+00	6.028E-01	377780	200	79.8258	-0.1856

Energy

Extract	Start point	21251	Movavg points	10	*Value of extract data
	Points	1228000			

Time	Data	Read value (J)	fission	Data point*	Center time	Relative time from 1st Peak
1st peak	Tr-Log-N	7.10E+05	2.21E+16	378808	80.0114	---
2nd peak		6.59E+06	2.06E+17	484279	101.106	21.095
3rd peak		9.89E+06	3.09E+17	574639	119.178	39.167
End of experiment		2.21E+07	6.91E+17	1097429	223.736	143.725

Temperature [Data file : r76s1data]

Name		Data	Average (°C)	Error	Start point	Points	Center time	Relative time from 1st Peak
Temp	Initial	Core-Temp	25.5	2.760E-03	376	50	4.01	-76.00
	Final		59.4	4.886E-03	22349	50	223.73	143.72
Temp-A	Initial	Core-Temp-A	25.8	2.391E-02	376	50	4.01	-76.00
	Final		70.4	2.184E-02	22349	50	223.73	143.72
Temp-B	Initial	Core-Temp-B	25.8	2.268E-02	376	50	4.01	-76.00
	Final		72.3	2.351E-02	22349	50	223.73	143.72
Temp-C	Initial	Core-Temp-C	25.8	2.248E-02	376	50	4.01	-76.00
	Final		73.2	2.334E-02	22349	50	223.73	143.72
Temp-D	Initial	Core-Temp-D	25.8	2.161E-02	376	50	4.01	-76.00
	Final		73.3	2.451E-02	22349	50	223.73	143.72
Temp-E	Initial	Core-Temp-E	25.5	2.099E-02	376	50	4.01	-76.00
	Final		73.0	2.498E-02	22349	50	223.73	143.72
Temp-F	Initial	Core-Temp-F	27.3	2.261E-02	376	50	4.01	-76.00
	Final		73.6	2.476E-02	22349	50	223.73	143.72
Temp-G	Initial	Core-Temp-G	25.3	2.018E-02	376	50	4.01	-76.00
	Final		44.3	2.355E-02	22349	50	223.73	143.72
Temp-H	Initial	Core-Temp-H	24.9	2.355E-02	376	50	4.01	-76.00
	Final		36.8	2.476E-02	22349	50	223.73	143.72
Temp-I	Initial	Core-Temp-I	25.8	2.560E-02	376	50	4.01	-76.00
	Final		29.5	2.467E-02	22349	50	223.73	143.72
Temp-J	Initial	Core-Temp-J	26.3	2.387E-02	376	50	4.01	-76.00
	Final		29.6	2.433E-02	22349	50	223.73	143.72

Pressure

Core pressure FWHM(sec)	-	Start point	-	Time(sec)	-
		End point	-	Time(sec)	-

Name	Data	Average (MPa)	Error	Start point	Points	Center time	Relative time from 1st Peak
Core pressure(Max.)	Core-TK-P2	-	-	-	-	-	-
Vent-gas pressure(Max.)	Vent-Gas-P2	-	-	-	-	-	-

TRACY Experiment data sheet

No : Run 98	Date : 98/ 7/22

	Purpose of experiment	Ramp feed(1.8$)				
Conditions	Fuel	Enrichment 9.98 wt%	U concentration 391.7 gU/l	Acid molarity 0.73 N	Density 1.54716 g/cm^3	Analysis Temp 25.02 ℃
	Core	Tr-rod UP		Tr-rod DOWN		
		Critical height Hc_1	A= 500.52 mm B= 500.54 mm	Critical height Hc_2	A= 606.47 mm B= 606.46 mm	
		Temperature	25.9 ℃	Temperature	25.8 ℃	
		D-time meas. height Hd_1	A= 503.73 mm B= 503.73 mm	D-time meas. height Hd_2	A= 611.73 mm B= 611.74 mm	Int. flow rate at level adjustment
		Doublimg time	56.0 s	Doublimg time	57.7 s	
		Reactivity	11.65 cent	Reactivity	11.39 cent	A= -39.145 L
		Level worth	3.63 cent/mm	Level worth	2.17 cent/mm	B= -38.934 L
	Reactivity insertion	Mode Ramp feed	Level A= 400.85 mm B= 400.87 mm	Reactivity 1.80 $	Rate 60 L/min	Int. flow rate at feed stop A= -8.679 L B= -8.483 L
	Initial conditions	Temperature 26.1 ℃	Power Subcritical	Neutron source No		

TRACY Experiment data

Experiment time	Standard point	Time(sec)	Data	Data point
Start time of reactivity insertion	Start of ramp feed	8.0305	Fast-Pump-ON	16062
End time of reactivity insertion	End of ramp feed	39.7425		79486
End time of experiment	Tr rod down	166.7660	TrROD-UP-DOWN	333532

Run No. : **R98**
Date : 1998/07/22
Mode : Ramp feed
Data file : r98f1data

Power

Peak		Data	Average(W)	Error	Start point	Points	Center time	Relative time from 1st Peak
1st	Peak	TR-Lin-N-A	2.16E+07	6.608E+04	71460	20	35.7345	—
	Bottom		1.02E+05	4.820E+02	96869	1000	48.6975	12.9630
1st	Peak	TR-Log-N	2.23E+07	1.077E+05	71460	20	35.7345	—
	Bottom		3.47E+04	1.148E+02	96869	1000	48.6975	12.9630
2nd	Peak		5.93E+05	2.128E+03	123321	400	61.7600	26.0255
	Bottom		3.93E+04	1.245E+02	145359	1000	72.9290	37.1945
3rd	Peak		1.78E+05	6.799E+02	173663	600	86.9810	51.2465
	Bottom		5.12E+04	1.679E+02	198786	1000	99.6425	63.9080

Inverse Period

Extract	Start point	16062	Movavg points	20	*Value of extract data
	Points	60000			

Period(msec) =[1000/INV. Period]	Data	Average (1/sec)	Error	Start point*	Points	Center time	Relative time from 1st Peak
3.21E+01	TR-Log-N-A	3.11E+01	7.157E-02	55063	100	35.5865	-0.1480

Energy

Extract	Start point	16062	Movavg points	10	*Value of extract data
	Points	343000			

Time	Data	Read value (J)	fission	Data point*	Center time	Relative time from 1st Peak
1st peak	Tr-Log-N	1.34E+06	4.17E+16	55409	35.7345	—
2nd peak		7.27E+06	2.27E+17	107460	61.7600	26.0255
3rd peak		9.98E+06	3.11E+17	157902	86.9810	51.2465
End of experiment		1.55E+07	4.85E+17	317471	166.7660	131.0315

Temperature [Data file : r98s1data]

Name		Data	Average (℃)	Error	Start point	Points	Center time	Relative time from 1st Peak
Temp	Initial	Core-Temp	26.0	1.800E-03	754	50	7.78	-27.95
	Final		49.3	3.309E-03	16652	50	166.76	131.03
Temp-A	Initial	Core-Temp-A	25.8	2.293E-02	754	50	7.78	-27.95
	Final		56.9	2.297E-02	16652	50	166.76	131.03
Temp-B	Initial	Core-Temp-B	25.9	1.987E-02	754	50	7.78	-27.95
	Final		58.4	2.301E-02	16652	50	166.76	131.03
Temp-C	Initial	Core-Temp-C	26.0	2.051E-02	754	50	7.78	-27.95
	Final		58.7	2.052E-02	16652	50	166.76	131.03
Temp-D	Initial	Core-Temp-D	26.0	2.084E-02	754	50	7.78	-27.95
	Final		58.9	2.060E-02	16652	50	166.76	131.03
Temp-E	Initial	Core-Temp-E	25.6	2.091E-02	754	50	7.78	-27.95
	Final		59.0	2.184E-02	16652	50	166.76	131.03
Temp-F	Initial	Core-Temp-F	27.2	2.105E-02	754	50	7.78	-27.95
	Final		59.0	2.087E-02	16652	50	166.76	131.03
Temp-G	Initial	Core-Temp-G	25.3	1.761E-02	754	50	7.78	-27.95
	Final		33.0	1.817E-02	16652	50	166.76	131.03
Temp-H	Initial	Core-Temp-H	25.2	1.895E-02	754	50	7.78	-27.95
	Final		28.4	1.963E-02	16652	50	166.76	131.03
Temp-I	Initial	Core-Temp-I	26.1	2.080E-02	754	50	7.78	-27.95
	Final		27.8	1.995E-02	16652	50	166.76	131.03
Temp-J	Initial	Core-Temp-J	26.7	2.171E-02	754	50	7.78	-27.95
	Final		28.1	1.947E-02	16652	50	166.76	131.03

Pressure	Core pressure FWHM(sec)	-	Start point	-	Time(sec)	-
			End point	-	Time(sec)	-

Name	Data	Average (MPa)	Error	Start point	Points	Center time	Relative time from 1st Peak
Core pressure(Max.)	Core-TK-P2	-	-	-	-	-	-
Vent-gas pressure(Max.)	Vent-Gas-P2	-	-	-	-	-	-

TRACY Experiment data sheet

No : Run 149	Date : 2000/ 2/17

Purpose of experiment		Ramp feed(1.5$)				
Conditions	Fuel	Enrichment	U concentration	Acid molarity	Density	Analysis Temp
		9.98 wt%	375.7 gU/l	0.64 N	1.52417 g/cm^3	24.98 ℃
	Core	Tr-rod UP		Tr-rod DOWN		
		Critical height	A= 525.66 mm	Critical height	A= 651.10 mm	
		Hc_1	B= 525.65 mm	Hc_2	B= 651.10 mm	
		Temperature	24.4 ℃	Temperature	24.4 ℃	
		D-time meas.	A= 528.81 mm	D-time meas.	A= 658.05 mm	
		height Hd_1	B= 528.81 mm	height Hd_2	B= 658.05 mm	Int. flow rate at
		Doublimg time	66.6 s	Doublimg time	53.9 s	level adjustment
		Reactivity	10.21 cent	Reactivity	11.99 cent	A= -48.080 L
		Level worth	3.24 cent/mm	Level worth	1.73 cent/mm	B= -47.796 L
	Reactivity insertion	Mode	Level	Reactivity	Rate	Int. flow rate at
		Ramp feed	A= 400.26 mm	1.47 $	57.4 L/min	feed stop
			B= 400.27 mm			A= -13.808 L
	Initial conditions	Temperature	Power	Neutron source		B= -13.476 L
		24.6 ℃	Subcritical	No		

TRACY Experiment data

Experiment time	Standard point	Time(sec)	Data	Data point
Start time of reactivity insertion	Start of ramp feed	5.964	Fast-Pump-ON	5965
End time of reactivity insertion	End of ramp feed	43.133		43134
End time of experiment	Tr rod down	145.564	TrRod-UP-DOWN	145565

Run No. : **R149**
Date : 2000/02/17
Mode : Ramp feed
Data file : r149f11data

Power

Peak		Data	Average(W)	Error	Start point	Points	Center time	Relative time from 1st Peak
1st	Peak	Tr-Lin-N-A	1.56E+07	8.305E+04	40878	10	40.882	——
	Bottom		1.05E+05	3.224E+02	55739	2000	55.738	14.856
1st	Peak	Tr-Log-N	1.55E+07	9.612E+04	40878	10	40.882	——
	Bottom		2.90E+04	6.387E+01	55739	2000	55.738	14.856
2nd	Peak		3.10E+05	8.059E+02	70913	1000	71.412	30.530
	Bottom		3.53E+04	7.585E+01	85447	2000	86.446	45.564
3rd	Peak		9.35E+04	1.946E+02	102845	2000	103.844	62.962
	Bottom		4.55E+04	1.332E+02	120315	1000	120.314	79.432

Inverse Period

Extract	Start point	5965	Movavg points	20	*Value of extract data
	Points	45000			

Period(msec) =[1000/INV. Period]	Data	Average (1/sec)	Error	Start point*	Points	Center time	Relative time from 1st Peak
4.27E+01	Tr-Log-N-A	2.34E+01	5.783E-02	34600	150	40.657	0.225

Energy

Extract	Start point	5965	Movavg points	10	*Value of extract data
	Points	154000			

Time	Data	Read value (J)	fission	Data point*	Center time	Relative time from 1st Peak
1st peak	Tr-Log-N	1.19E+06	3.71E+16	34919	40.882	——
2nd peak		6.70E+06	2.09E+17	65449	71.412	30.530
3rd peak		9.10E+06	2.84E+17	97881	103.844	62.962
End of experiment		1.14E+07	3.54E+17	139601	145.564	104.682

Temperature [Data file : r149s11data]

Name		Data	Average (℃)	Error	Start point	Points	Center time	Relative time from 1st Peak
Temp	Initial	Core-Temp	24.5	2.720E-03	547	50	5.71	-35.17
	Final		39.8	5.220E-03	14532	50	145.56	104.68
Temp-A	Initial	Core-Temp-A	24.2	1.270E-03	547	50	5.71	-35.17
	Final		47.4	5.366E-03	14532	50	145.56	104.68
Temp-B	Initial	Core-Temp-B	24.4	3.499E-03	547	50	5.71	-35.17
	Final		48.9	4.469E-03	14532	50	145.56	104.68
Temp-C	Initial	Core-Temp-C	24.4	4.880E-03	547	50	5.71	-35.17
	Final		48.8	5.238E-03	14532	50	145.56	104.68
Temp-D	Initial	Core-Temp-D	24.3	2.138E-03	547	50	5.71	-35.17
	Final		49.9	5.870E-03	14542	20	145.56	104.68
Temp-E	Initial	Core-Temp-E	24.2	3.476E-03	547	50	5.71	-35.17
	Final		47.7	7.403E-03	14532	50	145.56	104.68
Temp-F	Initial	Core-Temp-F	22.4	2.251E-03	547	50	5.71	-35.17
	Final		49.5	1.342E-02	14532	50	145.56	104.68
Temp-G	Initial	Core-Temp-G	24.0	2.815E-03	547	50	5.71	-35.17
	Final		29.9	4.156E-03	14532	50	145.56	104.68
Temp-H	Initial	Core-Temp-H	24.1	2.571E-03	547	50	5.71	-35.17
	Final		26.9	3.740E-03	14532	50	145.56	104.68
Temp-I	Initial	Core-Temp-I	24.8	2.260E-03	547	50	5.71	-35.17
	Final		26.0	2.823E-03	14532	50	145.56	104.68
Temp-J	Initial	Core-Temp-J	25.8	3.513E-03	547	50	5.71	-35.17
	Final		26.6	4.218E-03	14532	50	145.56	104.68

Pressure

Core pressure FWHM(sec)	-	Start point	-	Time(sec)	-
		End point	-	Time(sec)	-

Name	Data	Average (MPa)	Error	Start point	Points	Center time	Relative time from 1st Peak
Core pressure(Max.)	-	-	-	-	-	-	-
Vent-gas pressure(Max.)	-	-	-	-	-	-	-

TRACY Experiment data sheet

No : Run 159	Date : 2000/6/7

Purpose of experiment		Ramp feed (0.5$)				
Conditions	Fuel	Enrichment	U concentration	Acid molarity	Density	Analysis Temp
		9.98 wt%	379.4 gU/l	0.60 N	1.52649 g/cm^3	24.98 ℃
	Core	Tr-rod UP		Tr-rod DOWN		
		Critical height Hc_1	A= 524.50 mm B= 524.50 mm	Critical height Hc_2	A= 649.45 mm B= 649.46 mm	
		Temperature	26.1 ℃	Temperature	26.2 ℃	
		D-time meas. height Hd_1	A= 528.06 mm B= 528.06 mm	D-time meas. height Hd_2	A= 656.56 mm B= 656.56 mm	Int. flow rate at level adjustment
		Doublimg time	54.8 s	Doublimg time	50.5 s	
		Reactivity	11.84 cent	Reactivity	12.58 cent	A= -47.973 L
		Level worth	3.33 cent/mm	Level worth	1.77 cent/mm	B= -47.671 L
	Reactivity insertion	Mode	Level	Reactivity	Rate	Int. flow rate at feed stop
		Ramp feed	A= 400.16 mm B= 400.17 mm	0.50 $	59.2 L/min	A= -20.958 L B= -20.645 L
	Initial conditions	Temperature	Power	Neutron source		
		26.4 ℃	Subcritical	No		

TRACY Experiment data

Experiment time	Standard point	Time(sec)	Data	Data point
Start time of reactivity insertion	Start of ramp feed	6.00	Fast-Pump-ON	601
End time of reactivity insertion	End of ramp feed	35.02		3503
End time of experiment	Tr rod down	2082.44	-	208245

Run No. : **R159**
Date : 2000/06/07
Mode : Ramp feed
Data file : r159f11

Power

Peak		Data	Average(W)	Error	Start point	Points	Center time	Relative time from 1st Peak
1st	Peak	Tr-Lin-N-A	8.18E+04	3.976E+02	20315	400	205.14	—
	Bottom		-	-	-	-	-	-
1st	Peak	Tr-Log-N	8.61E+04	4.253E+02	20315	400	205.14	—
	Bottom		-	-	-	-	-	-
2nd	Peak		-	-	-	-	-	-
	Bottom		-	-	-	-	-	-
3rd	Peak		-	-	-	-	-	-
	Bottom		-	-	-	-	-	-

Inverse Period (r159f11)

Extract	Start point	10000	Movavg points	200	*Value of extract data
	Points	10000			

Period(msec) =[1000/INV. Period]	Data	Average (1/sec)	Error	Start point*	Points	Center time	Relative time from 1st Peak
6.85E+03	Tr-Log-N-A	1.46E-01	8.000E-04	4158	600	154.55	-50.59

Inverse Period (r159s14)

Extract	Start point	5000	Movavg points	100	*Value of extract data
	Points	5000			

Period(msec) =[1000/INV. Period]	Data	Average (1/sec)	Error	Start point*	Points	Center time	Relative time from 1st Peak
6.80E+03	OP-Log-N-A	1.47E-01	2.200E-04	1703	1000	146.00	-59.14
6.80E+03	OP-Log-N-B	1.47E-01	8.700E-05	1703	1000	146.00	-59.14

Energy

Extract	Start point	601	Movavg points	10	*Value of extract data
	Points	279327			

Time	Data	Read value (J)	fission	Data point*	Center time	Relative time from 1st Peak
1st peak	Tr-Log-N	1.73E+06	5.38E+16	19915	205.14	—
2nd peak		-	-	-	-	-
3rd peak		-	-	-	-	-
End of experiment		5.65E+06	1.76E+17	207645	2082.44	1877.30

Pressure	Core pressure FWHM(sec)	-	Start point	-	Time(sec)	-
			End point	-	Time(sec)	-

Name	Data	Average (MPa)	Error	Start point	Points	Center time	Relative time from 1st Peak
Core pressure(Max.)	Core-TK-P2	-	-	-	-	-	-
Vent-gas pressure(Max.)	Vent-Gas-P2	-	-	-	-	-	-

Temperature [Data file : r159s14t]

Name		Data	Average (℃)	Error	Start point	Points	Center time	Relative time from 1st Peak
Temp-1	Initial	Core-Temp-1	26.2	2.176E-03	250	50	5.48	-199.66
	Final		38.9	1.886E-03	104098	50	2082.44	1877.30
Temp-2	Initial	Core-Temp-2	26.2	1.941E-03	250	50	5.48	-199.66
	Final		39.1	2.416E-03	104098	50	2082.44	1877.30
Temp-3	Initial	Core-Temp-3	26.1	2.221E-03	250	50	5.48	-199.66
	Final		39.0	2.229E-03	104098	50	2082.44	1877.30
Temp-4	Initial	Core-Temp-4	26.2	2.323E-03	250	50	5.48	-199.66
	Final		39.2	2.086E-03	104098	50	2082.44	1877.30
Temp-5	Initial	Core-Temp-5	26.1	2.201E-03	250	50	5.48	-199.66
	Final		39.2	2.473E-03	104098	50	2082.44	1877.30
Temp-6	Initial	Core-Temp-6	25.9	2.534E-03	250	50	5.48	-199.66
	Final		38.9	2.392E-03	104098	50	2082.44	1877.30
Temp-7	Initial	Core-Temp-7	26.3	2.274E-03	250	50	5.48	-199.66
	Final		39.3	2.267E-03	104098	50	2082.44	1877.30
Temp-8	Initial	Core-Temp-8	25.6	2.201E-03	250	50	5.48	-199.66
	Final		39.3	2.440E-03	104098	50	2082.44	1877.30
Temp-9	Initial	Core-Temp-9	25.5	1.936E-03	250	50	5.48	-199.66
	Final		39.2	2.482E-03	104098	50	2082.44	1877.30
Temp-10	Initial	Core-Temp-10	25.5	1.936E-03	250	50	5.48	-199.66
	Final		39.4	2.442E-03	104098	50	2082.44	1877.30

Temperature [Data file : r159s14t]

Name		Data	Average (℃)	Error	Start point	Points	Center time	Relative time from 1st Peak
Temp	Initial	Core-Temp	26.3	2.614E-03	250	50	5.48	-199.66
	Final		33.0	2.655E-03	104098	50	2082.44	1877.30
Temp-A	Initial	Core-Temp-A	26.1	2.265E-03	250	50	5.48	-199.66
	Final		34.9	3.345E-03	104098	50	2082.44	1877.30
Temp-B	Initial	Core-Temp-B	26.1	2.176E-03	250	50	5.48	-199.66
	Final		39.0	2.020E-03	104098	50	2082.44	1877.30
Temp-C	Initial	Core-Temp-C	26.1	2.086E-03	250	50	5.48	-199.66
	Final		39.1	2.221E-03	104098	50	2082.44	1877.30
Temp-D	Initial	Core-Temp-D	26.1	2.115E-03	250	50	5.48	-199.66
	Final		39.1	2.448E-03	104098	50	2082.44	1877.30
Temp-E	Initial	Core-Temp-E	25.9	2.287E-03	250	50	5.48	-199.66
	Final		39.2	3.029E-03	104098	50	2082.44	1877.30
Temp-F	Initial	Core-Temp-F	25.7	2.036E-03	250	50	5.48	-199.66
	Final		36.9	3.512E-03	104098	50	2082.44	1877.30
Temp-G	Initial	Core-Temp-G	25.8	2.176E-03	250	50	5.48	-199.66
	Final		31.0	3.301E-03	104098	50	2082.44	1877.30
Temp-H	Initial	Core-Temp-H	26.0	1.635E-03	250	50	5.48	-199.66
	Final		29.7	2.823E-03	104098	50	2082.44	1877.30
Temp-I	Initial	Core-Temp-I	26.8	1.230E-03	250	50	5.48	-199.66
	Final		28.8	4.530E-03	104098	50	2082.44	1877.30
Temp-J	Initial	Core-Temp-J	27.6	1.814E-03	250	50	5.48	-199.66
	Final		28.8	2.744E-03	104098	50	2082.44	1877.30

TRACY Experiment data sheet

No : Run 160	Date : 2000/6/13

Purpose of experiment		Ramp feed (0.5$)				
Conditions	Fuel	Enrichment	U concentration	Acid molarity	Density	Analysis Temp
		9.98 wt%	379.5 gU/l	0.60 N	1.52672 g/cm^3	24.99 ℃
	Core	Tr-rod UP		Tr-rod DOWN		
		Critical height Hc_1	A= 524.21 mm B= 524.22 mm	Critical height Hc_2	A= 648.83 mm B= 648.85 mm	
		Temperature	26.3 ℃	Temperature	26.3 ℃	
		D-time meas. height Hd_1	A= 527.76 mm B= 527.77 mm	D-time meas. height Hd_2	A= 654.91 mm B= 654.92 mm	Int. flow rate at level adjustment
		Doublimg time	56.3 s	Doublimg time	62.1 s	
		Reactivity	11.60 cent	Reactivity	10.77 cent	A= -47.339 L
		Level worth	3.27 cent/mm	Level worth	1.77 cent/mm	B= -47.188 L
	Reactivity insertion	Mode	Level	Reactivity	Rate	Int. flow rate at feed stop
		Ramp feed	A= 400.26 mm B= 400.28 mm	0.51 $	59.5 L/min	A= -20.329 L B= -20.127 L
	Initial conditions	Temperature	Power	Neutron source		
		26.6 ℃	Subcritical	No		

TRACY Experiment data

Experiment time	Standard point	Time(sec)	Data	Data point
Start time of reactivity insertion	Start of ramp feed	5.14	Fast-Pump-ON	515
End time of reactivity insertion	End of ramp feed	34.09		3410
End time of experiment	End of data record	16200.00	-	1620000

Run No. : **R160**
Date : 2000/06/13
Mode : Ramp feed
Data file : r160f11

Power

Peak		Data	Average(W)	Error	Start point	Points	Center time	Relative time from 1st Peak
1st	Peak	Tr-Lin-N-B	1.09E+05	4.864E+02	16937	400	171.36	---
	Bottom		-	-	-	-	-	-
1st	Peak	Tr-Log-N	1.10E+05	5.511E+02	16937	400	171.36	---
	Bottom		-	-	-	-	-	-
2nd	Peak		8.37E+02	3.416E+00	1096223	2000	10962.20	10790.84
	Bottom		-	-	-	-	-	-
3rd	Peak		-	-	-	-	-	-
	Bottom		-	-	-	-	-	-

Inverse Period (r160f11)

Extract	Start point	10000	Movavg points	200	*Value of extract data
	Points	10000			

Period(msec) =[1000/INV. Period]	Data	Average (1/sec)	Error	Start point*	Points	Center time	Relative time from 1st Peak
5.56E+03	Tr-Log-N-A	1.80E-01	7.740E-04	2115	600	134.12	-37.24

Inverse Period (r160s14)

Extract	Start point	5000	Movavg points	100	*Value of extract data
	Points	5000			

Period(msec) =[1000/INV. Period]	Data	Average (1/sec)	Error	Start point*	Points	Center time	Relative time from 1st Peak
5.46E+03	OP-Log-N-A	1.83E-01	2.010E-04	500	1000	116.94	-54.42
5.46E+03	OP-Log-N-B	1.83E-01	8.600E-05	500	1000	116.94	-54.42

Energy

Extract	Start point	515	Movavg points	10	*Value of extract data
	Points	1619485			

Time	Data	Read value (J)	fission	Data point*	Center time	Relative time from 1st Peak
1st peak	Tr-Log-N	1.74E+06	5.42E+16	16623	171.36	---
2nd peak		5.80E+06	1.810E+17	1095703	10962.20	10790.84
3rd peak		-	-	-	-	-
End of experiment		6.38E+06	1.99E+17	1619483	16200.00	16028.64

Pressure	Core pressure FWHM(sec)	-	Start point	-	Time(sec)	-
			End point	-	Time(sec)	-

Name	Data	Average (MPa)	Error	Start point	Points	Center time	Relative time from 1st Peak
Core pressure(Max.)	Core-TK-P2	-	-	-	-	-	-
Vent-gas pressure(Max.)	Vent-Gas-P2	-	-	-	-	-	-

Temperature [Data file : r160s14t]

Name		Data	Average (℃)	Error	Start point	Points	Center time	Relative time from 1st Peak
Temp-1	Initial	Core-Temp-1	26.2	1.893E-03	209	50	4.66	-166.70
	Final		37.5	2.021E-03	809950	50	16199.50	16028.14
Temp-2	Initial	Core-Temp-2	26.3	2.027E-03	209	50	4.66	-166.70
	Final		37.6	2.176E-03	809950	50	16199.50	16028.14
Temp-3	Initial	Core-Temp-3	26.1	2.331E-03	209	50	4.66	-166.70
	Final		37.3	2.229E-03	809950	50	16199.50	16028.14
Temp-4	Initial	Core-Temp-4	26.3	2.238E-03	209	50	4.66	-166.70
	Final		37.7	2.267E-03	809950	50	16199.50	16028.14
Temp-5	Initial	Core-Temp-5	26.2	2.399E-03	209	50	4.66	-166.70
	Final		37.7	2.323E-03	809950	50	16199.50	16028.14
Temp-6	Initial	Core-Temp-6	26.0	2.109E-03	209	50	4.66	-166.70
	Final		37.5	2.221E-03	809950	50	16199.50	16028.14
Temp-7	Initial	Core-Temp-7	26.4	2.274E-03	209	50	4.66	-166.70
	Final		37.8	2.296E-03	809950	50	16199.50	16028.14
Temp-8	Initial	Core-Temp-8	25.5	1.921E-03	209	50	4.66	-166.70
	Final		37.8	2.201E-03	809950	50	16199.50	16028.14
Temp-9	Initial	Core-Temp-9	25.4	2.401E-03	209	50	4.66	-166.70
	Final		37.7	2.176E-03	809950	50	16199.50	16028.14
Temp-10	Initial	Core-Temp-10	25.4	2.221E-03	209	50	4.66	-166.70
	Final		37.9	2.036E-03	809950	50	16199.50	16028.14

Temperature [Data file : r160s14t]

Name		Data	Average (℃)	Error	Start point	Points	Center time	Relative time from 1st Peak
Temp	Initial	Core-Temp	26.5	1.996E-03	209	50	4.66	-166.70
	Final		33.2	2.786E-03	809950	50	16199.50	16028.14
Temp-A	Initial	Core-Temp-A	26.2	2.115E-03	209	50	4.66	-166.70
	Final		34.1	1.430E-03	809950	50	16199.50	16028.14
Temp-B	Initial	Core-Temp-B	26.3	1.805E-03	209	50	4.66	-166.70
	Final		37.6	1.360E-03	809950	50	16199.50	16028.14
Temp-C	Initial	Core-Temp-C	26.2	1.814E-03	209	50	4.66	-166.70
	Final		37.6	1.742E-03	809950	50	16199.50	16028.14
Temp-D	Initial	Core-Temp-D	26.2	2.115E-03	209	50	4.66	-166.70
	Final		37.6	2.201E-03	809950	50	16199.50	16028.14
Temp-E	Initial	Core-Temp-E	25.9	2.036E-03	209	50	4.66	-166.70
	Final		37.6	1.694E-03	809950	50	16199.50	16028.14
Temp-F	Initial	Core-Temp-F	25.7	2.148E-03	209	50	4.66	-166.70
	Final		36.1	1.777E-03	809950	50	16199.50	16028.14
Temp-G	Initial	Core-Temp-G	25.9	1.730E-03	209	50	4.66	-166.70
	Final		32.3	1.869E-03	809950	50	16199.50	16028.14
Temp-H	Initial	Core-Temp-H	26.3	1.431E-03	209	50	4.66	-166.70
	Final		31.0	2.221E-03	809950	50	16199.50	16028.14
Temp-I	Initial	Core-Temp-I	26.7	2.186E-03	209	50	4.66	-166.70
	Final		30.2	2.115E-03	809950	50	16199.50	16028.14
Temp-J	Initial	Core-Temp-J	27.0	2.435E-03	209	50	4.66	-166.70
	Final		29.9	1.742E-03	809950	50	16199.50	16028.14

TRACY Experiment data sheet

No : Run 161	Date : 2000/6/20

Purpose of experiment		Ramp feed (0.8$)				
Conditions	Fuel	Enrichment	U concentration	Acid molarity	Density	Analysis Temp
		9.98 wt%	380.4 gU/l	0.61 N	1.52766 g/cm^3	24.96 ℃
	Core	Tr-rod UP		Tr-rod DOWN		
		Critical height Hc_1	A= 522.89 mm B= 522.88 mm	Critical height Hc_2	A= 646.25 mm B= 646.24 mm	
		Temperature	26.1 ℃	Temperature	26.2 ℃	
		D-time meas. height Hd_1	A= 526.85 mm B= 526.84 mm	D-time meas. height Hd_2	A= 653.33 mm B= 653.32 mm	Int. flow rate at level adjustment
		Doublimg time	46.6 s	Doublimg time	50.3 s	
		Reactivity	13.34 cent	Reactivity	12.61 cent	A= -47.383 L
		Level worth	3.37 cent/mm	Level worth	1.78 cent/mm	B= -47.076 L
	Reactivity insertion	Mode	Level	Reactivity	Rate	Int. flow rate at feed stop
		Ramp feed	A= 400.07 mm B= 400.06 mm	0.83 $	60 L/min	A= -18.370 L B= -18.169 L
	Initial conditions	Temperature	Power	Neutron source		
		26.4 ℃	Subcritical	No		

TRACY Experiment data

Experiment time	Standard point	Time(sec)	Data	Data point
Start time of reactivity insertion	Start of ramp feed	5.11	Fast-Pump-ON	512
End time of reactivity insertion	End of ramp feed	36.22		3623
End time of experiment	End of data record	3599.99	-	360000

Run No. : **R161**
Date : 2000/06/20
Mode : Ramp feed
Data file : r161f11

Power

Peak		Data	Average(W)	Error	Start point	Points	Center time	Relative time from 1st Peak
1st	Peak	Tr-Lin-N-A	5.24E+05	2.538E+03	5752	200	58.51	---
	Bottom		-	-	-	-	-	-
1st	Peak	Tr-Log-N	5.41E+05	3.346E+03	5752	200	58.51	---
	Bottom		-	-	-	-	-	-
2nd	Peak		-	-	-	-	-	-
	Bottom		-	-	-	-	-	-
3rd	Peak		-	-	-	-	-	-
	Bottom		-	-	-	-	-	-

Inverse Period (r161f11)

Extract	Start point	4500	Movavg points	50	*Value of extract data
	Points	2000			

Period(msec) =[1000/INV. Period]	Data	Average (1/sec)	Error	Start point*	Points	Center time	Relative time from 1st Peak
8.55E+02	Tr-Log-N-A	1.17E+00	5.792E-03	482	200	50.80	-7.71

Inverse Period (r161s14)

Extract	Start point	800	Movavg points	10	*Value of extract data
	Points	700			

Period(msec) =[1000/INV. Period]	Data	Average (1/sec)	Error	Start point*	Points	Center time	Relative time from 1st Peak
8.46E+02	OP-Log-N-A	1.18E+00	1.522E-03	145	100	49.65	-8.86
8.45E+02	OP-Log-N-B	1.18E+00	1.312E-03	145	100	49.65	-8.86

Energy (r161s14)

Extract	Start point	103	Movavg points	10	*Value of extract data
	Points	311537			

Time	Data	Read value (J)	fission	Data point*	Center time	Relative time from 1st Peak
1st peak	Tr-Log-N	1.46E+06	4.57E+16	1069	58.50	---
2nd peak		-	-	-	-	-
3rd peak		-	-	-	-	-
End of experiment		1.13E+07	3.54E+17	307747	15392.40	15333.89

Pressure	Core pressure FWHM(sec)	-	Start point	-	Time(sec)	-
			End point	-	Time(sec)	-

Name	Data	Average (MPa)	Error	Start point	Points	Center time	Relative time from 1st Peak
Core pressure(Max.)	Core-TK-P2	-	-	-	-	-	-
Vent-gas pressure(Max.)	Vent-Gas-P2	-	-	-	-	-	-

Temperature [Data file : r161s14t]

Name		Data	Average (℃)	Error	Start point	Points	Center time	Relative time from 1st Peak
Temp-1	Initial	Core-Temp-1	26.178	1.893E-03	53	50	3.85	-54.66
	Final		44.950	2.301E-03	307824	50	15392.40	15333.89
Temp-2	Initial	Core-Temp-2	26.195	2.020E-03	53	50	3.85	-54.66
	Final		45.350	2.605E-03	307824	50	15392.40	15333.89
Temp-3	Initial	Core-Temp-3	26.066	2.191E-03	53	50	3.85	-54.66
	Final		45.205	2.758E-03	307824	50	15392.40	15333.89
Temp-4	Initial	Core-Temp-4	26.229	2.267E-03	53	50	3.85	-54.66
	Final		45.467	2.251E-03	307824	50	15392.40	15333.89
Temp-5	Initial	Core-Temp-5	26.170	2.260E-03	53	50	3.85	-54.66
	Final		45.401	2.720E-03	307824	50	15392.40	15333.89
Temp-6	Initial	Core-Temp-6	25.930	1.805E-03	53	50	3.85	-54.66
	Final		45.146	2.399E-03	307824	50	15392.40	15333.89
Temp-7	Initial	Core-Temp-7	26.273	1.921E-03	53	50	3.85	-54.66
	Final		45.534	2.267E-03	307824	50	15392.40	15333.89
Temp-8	Initial	Core-Temp-8	25.728	2.534E-03	53	50	3.85	-54.66
	Final		45.460	2.238E-03	307824	50	15392.40	15333.89
Temp-9	Initial	Core-Temp-9	25.686	2.406E-03	53	50	3.85	-54.66
	Final		45.365	2.366E-03	307824	50	15392.40	15333.89
Temp-10	Initial	Core-Temp-10	25.732	1.408E-03	53	50	3.85	-54.66
	Final		45.562	2.323E-03	307824	50	15392.40	15333.89

Temperature [Data file : r161s14t]

Name		Data	Average (℃)	Error	Start point	Points	Center time	Relative time from 1st Peak
Temp	Initial	Core-Temp	26.293	2.666E-03	53	50	3.85	-54.66
	Final		38.027	2.539E-03	307824	50	15392.40	15333.89
Temp-A	Initial	Core-Temp-A	26.068	2.176E-03	53	50	3.85	-54.66
	Final		39.929	1.777E-03	307824	50	15392.40	15333.89
Temp-B	Initial	Core-Temp-B	26.169	1.921E-03	53	50	3.85	-54.66
	Final		45.329	2.684E-03	307824	50	15392.40	15333.89
Temp-C	Initial	Core-Temp-C	26.165	2.238E-03	53	50	3.85	-54.66
	Final		45.335	3.281E-03	307824	50	15392.40	15333.89
Temp-D	Initial	Core-Temp-D	26.133	1.473E-03	53	50	3.85	-54.66
	Final		45.308	2.186E-03	307824	50	15392.40	15333.89
Temp-E	Initial	Core-Temp-E	25.939	1.953E-03	53	50	3.85	-54.66
	Final		45.240	2.493E-03	307824	50	15392.40	15333.89
Temp-F	Initial	Core-Temp-F	25.780	2.238E-03	53	50	3.85	-54.66
	Final		44.646	4.414E-03	307824	50	15392.40	15333.89
Temp-G	Initial	Core-Temp-G	25.874	2.440E-03	53	50	3.85	-54.66
	Final		37.250	4.660E-03	307824	50	15392.40	15333.89
Temp-H	Initial	Core-Temp-H	26.131	1.730E-03	53	50	3.85	-54.66
	Final		35.169	6.453E-03	307824	50	15392.40	15333.89
Temp-I	Initial	Core-Temp-I	26.912	1.777E-03	53	50	3.85	-54.66
	Final		33.355	2.539E-03	307824	50	15392.40	15333.89
Temp-J	Initial	Core-Temp-J	27.722	2.176E-03	53	50	3.85	-54.66
	Final		32.542	2.764E-03	307824	50	15392.40	15333.89

TRACY Experiment data sheet

No : Run 163	Date : 2000/7/4

Purpose of experiment		Ramp feed (1.2$)				
Conditions	Fuel	Enrichment 9.98 wt%	U concentration 379.8 gU/l	Acid molarity 0.61 N	Density 1.52901 g/cm^3	Analysis Temp 24.95 ℃
	Core	Tr-rod UP		Tr-rod DOWN		
		Critical height Hc_1	A= 520.95 mm B= 520.96 mm	Critical height Hc_2	A= 642.96 mm B= 642.96 mm	
		Temperature	26.3 ℃	Temperature	26.3 ℃	
		D-time meas. height Hd_1	A= 524.93 mm B= 524.94 mm	D-time meas. height Hd_2	A= 648.83 mm B= 648.85 mm	Int. flow rate at level adjustment
		Doublimg time	49.0 s	Doublimg time	63.9 s	
		Reactivity	12.86 cent	Reactivity	10.54 cent	A= -46.367 L
		Level worth	3.23 cent/mm	Level worth	1.79 cent/mm	B= -46.092 L
	Reactivity insertion	Mode Ramp feed	Level A= 399.90 mm B= 399.92 mm	Reactivity 1.25 $	Rate 60 L/min	Int. flow rate at feed stop A= -14.771 L B= -14.482 L
	Initial conditions	Temperature 26.5 ℃	Power Subcritical	Neutron source No		

TRACY Experiment data

Experiment time	Standard point	Time(sec)	Data	Data point
Start time of reactivity insertion	Start of ramp feed	5.126	Fast-Pump-ON	5127
End time of reactivity insertion	End of ramp feed	38.733		38734
End time of experiment	End of data record	942.692	-	942693

Run No. : **R163**
Date : 2000/07/04
Mode : Ramp feed
Data file : r163f11

Power

Peak		Data	Average(W)	Error	Start point	Points	Center time	Relative time from 1st Peak
1st	Peak	Tr-Lin-N-A	1.33E+07	3.780E+04	38212	30	38.226	----
	Bottom		1.27E+05	5.014E+02	52463	1000	52.962	14.736
1st	Peak	Tr-Log-N	1.34E+07	6.309E+04	38212	30	38.226	----
	Bottom		4.45E+04	1.371E+02	52463	1000	52.962	14.736
2nd	Peak		1.03E+05	3.114E+02	67302	1000	67.801	29.575
	Bottom		4.71E+04	1.473E+02	83197	1000	83.696	45.470
3rd	Peak		-	-	-	-	-	-
	Bottom		-	-	-	-	-	-

Inverse Period	(r163f11)	Extract	Start point	5127	Movavg points	20	*Value of extract data
			Points	35000			

Period(msec) =[1000/INV. Period]	Data	Average (1/sec)	Error	Start point*	Points	Center time	Relative time from 1st Peak
3.75E+01	Tr-Log-N-A	2.67E+01	1.739E-01	32724	40	37.869	-0.357

Inverse Period	(r163s14)	Extract	Start point	700	Movavg points	20	*Value of extract data
			Points	100			

Period(msec) =[1000/INV. Period]	Data	Average (1/sec)	Error	Start point*	Points	Center time	Relative time from 1st Peak
3.80E+01	OP-Log-N-A	2.63E+01	1.627E-01	62	4	38.10	-0.12
3.81E+01	OP-Log-N-B	2.63E+01	2.083E-01	62	4	38.10	-0.12

Energy	(r163f11)	Extract	Start point	5127	Movavg points	10	*Value of extract data
			Points	937566			

Time	Data	Read value (J)	fission	Data point*	Center time	Relative time from 1st Peak
1st peak	Tr-Log-N	1.22E+06	3.80E+16	33101	38.226	----
2nd peak		6.45E+06	2.01E+17	62676	67.801	29.575
3rd peak		-	-	-	-	-
End of experiment		1.39E+07	4.33E+17	937567	942.692	904.466

Pressure	Core pressure FWHM(sec)	-	Start point	-	Time(sec)	-
			End point	-	Time(sec)	-

Name	Data	Average (MPa)	Error	Start point	Points	Center time	Relative time from 1st Peak
Core pressure(Max.)	Core-TK-P2	-	-	-	-	-	-
Vent-gas pressure(Max.)	Vent-Gas-P2	-	-	-	-	-	-

Temperature [Data file : r163s14t]

Name		Data	Average (℃)	Error	Start point	Points	Center time	Relative time from 1st Peak
Temp-1	Initial	Core-Temp-1	26.2	2.176E-03	53	50	3.85	-34.37
	Final		55.7	3.173E-03	287250	50	14363.70	14352.48
Temp-2	Initial	Core-Temp-2	26.2	2.138E-03	53	50	3.85	-34.37
	Final		55.9	2.603E-03	287250	50	14363.70	14352.48
Temp-3	Initial	Core-Temp-3	26.0	2.975E-03	53	50	3.85	-34.37
	Final		55.9	2.926E-03	287250	50	14363.70	14352.48
Temp-4	Initial	Core-Temp-4	26.2	2.435E-03	53	50	3.85	-34.37
	Final		56.1	2.696E-03	287250	50	14363.70	14352.48
Temp-5	Initial	Core-Temp-5	26.2	2.223E-03	53	50	3.85	-34.37
	Final		56.0	2.579E-03	287250	50	14363.70	14352.48
Temp-6	Initial	Core-Temp-6	25.9	2.526E-03	53	50	3.85	-34.37
	Final		55.8	2.406E-03	287250	50	14363.70	14352.48
Temp-7	Initial	Core-Temp-7	26.3	2.399E-03	53	50	3.85	-34.37
	Final		56.1	2.502E-03	287250	50	14363.70	14352.48
Temp-8	Initial	Core-Temp-8	25.7	2.358E-03	53	50	3.85	-34.37
	Final		56.1	2.605E-03	287250	50	14363.70	14352.48
Temp-9	Initial	Core-Temp-9	25.6	2.565E-03	53	50	3.85	-34.37
	Final		56.0	2.684E-03	287250	50	14363.70	14352.48
Temp-10	Initial	Core-Temp-10	25.7	2.125E-03	53	50	3.85	-34.37
	Final		56.2	2.734E-03	287250	50	14363.70	14352.48

Temperature [Data file : r163s14t]

Name		Data	Average (℃)	Error	Start point	Points	Center time	Relative time from 1st Peak
Temp	Initial	Core-Temp	26.4	2.440E-03	53	50	3.85	-34.37
	Final		46.0	2.607E-03	287250	50	14363.70	14352.48
Temp-A	Initial	Core-Temp-A	26.1	2.078E-03	53	50	3.85	-34.37
	Final		49.0	2.506E-03	287250	50	14363.70	14352.48
Temp-B	Initial	Core-Temp-B	26.1	4.100E-03	53	50	3.85	-34.37
	Final		55.8	2.287E-03	287250	50	14363.70	14352.48
Temp-C	Initial	Core-Temp-C	26.1	4.798E-03	53	50	3.85	-34.37
	Final		55.8	2.287E-03	287250	50	14363.70	14352.48
Temp-D	Initial	Core-Temp-D	26.1	2.605E-03	53	50	3.85	-34.37
	Final		55.8	1.571E-03	287250	50	14363.70	14352.48
Temp-E	Initial	Core-Temp-E	25.9	2.909E-03	53	50	3.85	-34.37
	Final		55.7	2.704E-03	287250	50	14363.70	14352.48
Temp-F	Initial	Core-Temp-F	25.7	2.665E-03	53	50	3.85	-34.37
	Final		55.6	4.934E-03	287250	50	14363.70	14352.48
Temp-G	Initial	Core-Temp-G	25.8	2.274E-03	53	50	3.85	-34.37
	Final		43.3	1.329E-02	287250	50	14363.70	14352.48
Temp-H	Initial	Core-Temp-H	26.0	2.756E-03	53	50	3.85	-34.37
	Final		39.6	4.080E-03	287250	50	14363.70	14352.48
Temp-I	Initial	Core-Temp-I	26.9	2.251E-03	53	50	3.85	-34.37
	Final		36.9	2.366E-03	287250	50	14363.70	14352.48
Temp-J	Initial	Core-Temp-J	27.6	3.083E-03	53	50	3.85	-34.37
	Final		35.5	2.401E-03	287250	50	14363.70	14352.48

TRACY Experiment data sheet

No : Run 164	Date : 2000/7/11

Purpose of experiment		Ramp feed (1.5$)				
Conditions	Fuel	Enrichment	U concentration	Acid molarity	Density	Analysis Temp
		9.98 wt%	382.3 gU/l	0.62 N	1.53097 g/cm^3	25.00 ℃
	Core	Tr-rod UP		Tr-rod DOWN		
		Critical height Hc_1	A= 516.90 mm B= 516.90 mm	Critical height Hc_2	A= 635.65 mm B= 635.65 mm	
		Temperature	26.1 ℃	Temperature	26.2 ℃	
		D-time meas. height Hd_1	A= 520.23 mm B= 520.24 mm	D-time meas. height Hd_2	A= 641.74 mm B= 641.74 mm	Int. flow rate at level adjustment
		Doublimg time	59.3 s	Doublimg time	57.7 s	
		Reactivity	11.16 cent	Reactivity	11.39 cent	A= -45.218 L
		Level worth	3.34 cent/mm	Level worth	1.87 cent/mm	B= -44.845 L
	Reactivity insertion	Mode	Level	Reactivity	Rate	Int. flow rate at feed stop
		Ramp feed	A= 400.13 mm B= 400.14 mm	1.52 $	59.5 L/min	A= -12.656 L B= -12.237 L
	Initial conditions	Temperature	Power	Neutron source		
		26.4 ℃	Subcritical	No		

TRACY Experiment data

Experiment time	Standard point	Time(sec)	Data	Data point
Start time of reactivity insertion	Start of ramp feed	5.373	Fast-Pump-ON	5374
End time of reactivity insertion	End of ramp feed	40.142		40143
End time of experiment	End of data record	899.999	-	900000

Run No. : **R164**
Date : 2000/07/11
Mode : Ramp feed
Data file : r164f11

Power

Peak		Data	Average(W)	Error	Start point	Points	Center time	Relative time from 1st Peak
1st	Peak	Tr-Lin-N-A	1.64E+07	6.177E+04	37611	20	37.619	—
	Bottom		1.44E+05	5.738E+02	49667	1000	50.166	12.547
1st	Peak	Tr-Log-N	1.65E+07	6.826E+04	37610	20	37.619	—
	Bottom		6.44E+04	1.974E+02	49667	1000	50.166	12.547
2nd	Peak		1.42E+05	4.089E+02	61795	1000	62.294	24.675
	Bottom		-	-	-	-	-	-
3rd	Peak		-	-	-	-	-	-
	Bottom		-	-	-	-	-	-

Inverse Period (r164f11)

Extract	Start point	5374	Movavg points	20	*Value of extract data
	Points	33000			

Period(msec) =[1000/INV. Period]	Data	Average (1/sec)	Error	Start point*	Points	Center time	Relative time from 1st Peak
3.69E+01	Tr-Log-N-A	2.71E+01	5.374E-02	32064	40	37.456	-0.163

Inverse Period (r164s14)

Extract	Start point	700	Movavg points	20	*Value of extract data
	Points	100			

Period(msec) =[1000/INV. Period]	Data	Average (1/sec)	Error	Start point*	Points	Center time	Relative time from 1st Peak
3.79E+01	OP-Log-N-A	2.64E+01	2.244E-01	51	4	37.50	-0.12
3.79E+01	OP-Log-N-B	2.64E+01	2.612E-01	51	4	37.50	-0.12

Energy (r164f11)

Extract	Start point	5374	Movavg points	10	*Value of extract data
	Points	894626			

Time	Data	Read value (J)	fission	Data point*	Center time	Relative time from 1st Peak
1st peak	Tr-Log-N	1.12E+06	3.49E+16	32247	37.619	—
2nd peak		6.65E+06	2.07E+17	56922	62.294	24.675
3rd peak		-	-	-	-	-
End of experiment		1.70E+07	5.32E+17	894627	899.999	862.380

Pressure	Core pressure FWHM(sec)	-	Start point	-	Time(sec)	-
			End point	-	Time(sec)	-

Name	Data	Average (MPa)	Error	Start point	Points	Center time	Relative time from 1st Peak
Core pressure(Max.)	Core-TK-P2	-	-	-	-	-	-
Vent-gas pressure(Max.)	Vent-Gas-P2	-	-	-	-	-	-

Temperature [Data file : r164s14t]

Name		Data	Average (℃)	Error	Start point	Points	Center time	Relative time from 1st Peak
Temp-1	Initial	Core-Temp-1	26.2	2.109E-03	59	50	8.40	-29.22
	Final		62.6	2.426E-03	290705	50	14536.40	14498.78
Temp-2	Initial	Core-Temp-2	26.2	2.684E-03	59	50	8.40	-29.22
	Final		62.5	2.758E-03	290705	50	14536.40	14498.78
Temp-3	Initial	Core-Temp-3	26.0	2.720E-03	59	50	8.40	-29.22
	Final		62.4	2.565E-03	290705	50	14536.40	14498.78
Temp-4	Initial	Core-Temp-4	26.2	2.265E-03	59	50	8.40	-29.22
	Final		62.7	2.337E-03	290705	50	14536.40	14498.78
Temp-5	Initial	Core-Temp-5	26.1	2.109E-03	59	50	8.40	-29.22
	Final		62.6	2.937E-03	290705	50	14536.40	14498.78
Temp-6	Initial	Core-Temp-6	25.9	2.274E-03	59	50	8.40	-29.22
	Final		62.4	2.692E-03	290705	50	14536.40	14498.78
Temp-7	Initial	Core-Temp-7	26.2	1.995E-03	59	50	8.40	-29.22
	Final		62.7	2.415E-03	290705	50	14536.40	14498.78
Temp-8	Initial	Core-Temp-8	25.7	2.115E-03	59	50	8.40	-29.22
	Final		62.7	2.442E-03	290705	50	14536.40	14498.78
Temp-9	Initial	Core-Temp-9	25.6	2.099E-03	59	50	8.40	-29.22
	Final		62.6	2.815E-03	290705	50	14536.40	14498.78
Temp-10	Initial	Core-Temp-10	25.5	2.109E-03	59	50	8.40	-29.22
	Final		62.9	2.399E-03	290705	50	14536.40	14498.78

Temperature [Data file : r164s14t]

Name		Data	Average (℃)	Error	Start point	Points	Center time	Relative time from 1st Peak
Temp	Initial	Core-Temp	26.3	2.655E-03	59	50	8.40	-29.22
	Final		51.6	3.139E-03	290705	50	14536.40	14498.78
Temp-A	Initial	Core-Temp-A	26.0	1.777E-03	59	50	8.40	-29.22
	Final		55.5	1.816E-03	290705	50	14536.40	14498.78
Temp-B	Initial	Core-Temp-B	26.1	2.399E-03	59	50	8.40	-29.22
	Final		62.3	3.507E-03	290705	50	14536.40	14498.78
Temp-C	Initial	Core-Temp-C	26.1	2.758E-03	59	50	8.40	-29.22
	Final		62.4	3.029E-03	290705	50	14536.40	14498.78
Temp-D	Initial	Core-Temp-D	26.1	1.814E-03	59	50	8.40	-29.22
	Final		62.4	2.460E-03	290705	50	14536.40	14498.78
Temp-E	Initial	Core-Temp-E	25.8	2.260E-03	59	50	8.40	-29.22
	Final		62.4	2.975E-03	290705	50	14536.40	14498.78
Temp-F	Initial	Core-Temp-F	25.7	1.989E-03	59	50	8.40	-29.22
	Final		62.3	3.301E-03	290705	50	14536.40	14498.78
Temp-G	Initial	Core-Temp-G	25.8	2.148E-03	59	50	8.40	-29.22
	Final		48.0	3.721E-03	290705	50	14536.40	14498.78
Temp-H	Initial	Core-Temp-H	25.9	2.078E-03	59	50	8.40	-29.22
	Final		44.6	4.512E-03	290705	50	14536.40	14498.78
Temp-I	Initial	Core-Temp-I	26.3	1.878E-03	59	50	8.40	-29.22
	Final		40.3	3.120E-03	290705	50	14536.40	14498.78
Temp-J	Initial	Core-Temp-J	27.3	2.605E-03	59	50	8.40	-29.22
	Final		38.3	5.253E-03	290705	50	14536.40	14498.78

TRACY Experiment data sheet

No : Run 167	Date : 2000/8/2

Purpose of experiment		Ramp feed (2.6$)				
Conditions	Fuel	Enrichment 9.98 wt%	U concentration 387.5 gU/l	Acid molarity 0.62 N	Density 1.53845 g/cm^3	Analysis Temp 24.98 ℃
	Core	Tr-rod UP		Tr-rod DOWN		
		Critical height Hc_1	A= 505.71 mm B= 505.70 mm	Critical height Hc_2	A= 615.90 mm B= 615.90 mm	
		Temperature	26.0 ℃	Temperature	26.1 ℃	
		D-time meas. height Hd_1	A= 509.41 mm B= 509.41 mm	D-time meas. height Hd_2	A= 622.93 mm B= 622.93 mm	Int. flow rate at level adjustment
		Doublimg time	48.2 s	Doublimg time	41.9 s	
		Reactivity	13.01 cent	Reactivity	14.39 cent	A= -41.578 L
		Level worth	3.52 cent/mm	Level worth	2.05 cent/mm	B= -41.259 L
	Reactivity insertion	Mode Ramp feed	Level A= 399.45 mm B= 399.46 mm	Reactivity 2.64 $	Rate 59 L/min	Int. flow rate at feed stop A= -2.740 L B= -2.437 L
	Initial conditions	Temperature 26.1 ℃	Power Subcritical	Neutron source Yes		

TRACY Experiment data

Experiment time	Standard point	Time(sec)	Data	Data point
Start time of reactivity insertion	Start of ramp feed	5.698	Fast-Pump-ON	5699
End time of reactivity insertion	End of ramp feed	47.184		47185
End time of experiment	Tr rod down	161.839	TrRod-UP-DOWN	161840

Run No. : **R167**
Date : 2000/08/02
Mode : Ramp feed
Data file : r167f11

Power

Peak		Data	Average(W)	Error	Start point	Points	Center time	Relative time from 1st Peak
1st	Peak	Tr-Lin-N-A	1.43E+07	6.668E+04	35677	20	35.686	---
	Bottom		2.86E+05	1.288E+03	42163	500	42.412	6.726
1st	Peak	Tr-Log-N	1.43E+07	7.655E+04	35677	20	35.686	---
	Bottom		2.07E+05	7.979E+02	42163	500	42.412	6.726
2nd	Peak		9.80E+05	4.699E+03	46868	200	46.967	11.281
	Bottom		2.87E+05	7.967E+02	49992	1000	50.491	14.805
3rd	Peak		3.37E+05	8.540E+02	52630	1000	53.129	17.443
	Bottom		2.74E+05	7.509E+02	55962	1000	56.461	20.775

Inverse Period

Extract	Start point	5699	Movavg points	20	*Value of extract data
	Points	31300			

Period(msec) =[1000/INV. Period]	Data	Average (1/sec)	Error	Start point*	Points	Center time	Relative time from 1st Peak
5.47E+01	Tr-Log-N-A	1.83E+01	3.670E-02	29750	100	35.497	-0.189

Energy

Extract	Start point	5699	Movavg points	10	*Value of extract data
	Points	165000			

Time	Data	Read value (J)	fission	Data point*	Center time	Relative time from 1st Peak
1st peak	Tr-Log-N	1.23E+06	3.84E+16	29989	35.686	---
2nd peak		7.43E+06	2.32E+17	41270	46.967	11.281
3rd peak		9.94E+06	3.10E+17	47432	53.129	17.443
End of experiment		2.66E+07	8.29E+17	156142	161.839	126.153

Pressure	Core pressure FWHM(sec)	-	Start point	-	Time(sec)	-
			End point	-	Time(sec)	-

Name	Data	Average (MPa)	Error	Start point	Points	Center time	Relative time from 1st Peak
Core pressure(Max.)	Core-TK-P2	-	-	-	-	-	-
Vent-gas pressure(Max.)	Vent-Gas-P2	-	-	-	-	-	-

Temperature [Data file : r167s11t]

Name		Data	Average (℃)	Error	Start point	Points	Center time	Relative time from 1st Peak
Temp-1	Initial	Core-Temp-1	26.0	2.605E-03	520	50	5.44	-30.24
	Final		81.6	2.937E-03	16159	50	161.83	126.15
Temp-2	Initial	Core-Temp-2	25.9	2.399E-03	520	50	5.44	-30.24
	Final		81.6	2.898E-03	16159	50	161.83	126.15
Temp-3	Initial	Core-Temp-3	25.8	2.435E-03	520	50	5.44	-30.24
	Final		81.3	3.143E-03	16159	50	161.83	126.15
Temp-4	Initial	Core-Temp-4	25.9	2.440E-03	520	50	5.44	-30.24
	Final		82.3	2.605E-03	16159	50	161.83	126.15
Temp-5	Initial	Core-Temp-5	25.8	2.078E-03	520	50	5.44	-30.24
	Final		82.6	2.823E-03	16159	50	161.83	126.15
Temp-6	Initial	Core-Temp-6	25.6	2.692E-03	520	50	5.44	-30.24
	Final		81.7	2.498E-02	16159	50	161.83	126.15
Temp-7	Initial	Core-Temp-7	25.9	2.028E-03	520	50	5.44	-30.24
	Final		81.9	3.666E-02	16159	50	161.83	126.15
Temp-8	Initial	Core-Temp-8	25.3	2.238E-03	520	50	5.44	-30.24
	Final		82.4	2.579E-03	16159	50	161.83	126.15
Temp-9	Initial	Core-Temp-9	25.2	2.605E-03	520	50	5.44	-30.24
	Final		81.3	2.696E-03	16159	50	161.83	126.15
Temp-10	Initial	Core-Temp-10	25.1	2.221E-03	520	50	5.44	-30.24
	Final		80.9	4.003E-03	16159	50	161.83	126.15

Temperature [Data file : r167s11t]

Name		Data	Average (℃)	Error	Start point	Points	Center time	Relative time from 1st Peak
Temp	Initial	Core-Temp	26.0	2.093E-03	520	50	5.44	-30.24
	Final		68.8	5.041E-03	16159	50	161.83	126.15
Temp-A	Initial	Core-Temp-A	25.8	2.274E-03	520	50	5.44	-30.24
	Final		79.6	1.035E-02	16159	50	161.83	126.15
Temp-B	Initial	Core-Temp-B	25.9	3.727E-03	520	50	5.44	-30.24
	Final		79.6	2.919E-03	16159	50	161.83	126.15
Temp-C	Initial	Core-Temp-C	25.9	5.130E-03	520	50	5.44	-30.24
	Final		79.5	2.673E-03	16159	50	161.83	126.15
Temp-D	Initial	Core-Temp-D	25.8	1.964E-03	520	50	5.44	-30.24
	Final		79.1	2.696E-03	16159	50	161.83	126.15
Temp-E	Initial	Core-Temp-E	25.6	3.423E-03	520	50	5.44	-30.24
	Final		79.0	2.898E-03	16159	50	161.83	126.15
Temp-F	Initial	Core-Temp-F	25.3	2.406E-03	520	50	5.44	-30.24
	Final		79.1	2.473E-03	16159	50	161.83	126.15
Temp-G	Initial	Core-Temp-G	25.5	2.605E-03	520	50	5.44	-30.24
	Final		52.1	5.493E-03	16159	50	161.83	126.15
Temp-H	Initial	Core-Temp-H	25.5	2.734E-03	520	50	5.44	-30.24
	Final		40.9	1.812E-02	16159	50	161.83	126.15
Temp-I	Initial	Core-Temp-I	26.4	2.435E-03	520	50	5.44	-30.24
	Final		31.8	2.331E-03	16159	50	161.83	126.15
Temp-J	Initial	Core-Temp-J	27.1	3.301E-03	520	50	5.44	-30.24
	Final		31.9	2.267E-03	16159	50	161.83	126.15

TRACY Experiment data sheet

No : Run 169	Date : 2000/8/22

Purpose of experiment		Ramp feed (2.6$)				
Conditions	Fuel	Enrichment	U concentration	Acid molarity	Density	Analysis Temp
		9.98 wt%	387.8 gU/l	0.61 N	1.53841 g/cm^3	24.98 ℃
	Core	Tr-rod UP		Tr-rod DOWN		
		Critical height Hc_1	A= 505.88 mm B= 505.88 mm	Critical height Hc_2	A= 616.10 mm B= 616.12 mm	
		Temperature	26.1 ℃	Temperature	26.1 ℃	
		D-time meas. height Hd_1	A= 509.36 mm B= 509.36 mm	D-time meas. height Hd_2	A= 623.41 mm B= 623.42 mm	Int. flow rate at level adjustment
		Doublimg time	51.4 s	Doublimg time	39.4 s	
		Reactivity	12.42 cent	Reactivity	15.02 cent	A= -41.589 L
		Level worth	3.57 cent/mm	Level worth	2.05 cent/mm	B= -41.239 L
	Reactivity insertion	Mode	Level	Reactivity	Rate	Int. flow rate at feed stop
		Ramp feed	A= 399.94 mm B= 399.96 mm	2.59 $	58.4 L/min	A= -3.289 L B= -2.839 L
	Initial conditions	Temperature	Power	Neutron source		
		26.2 ℃	Subcritical	No		

TRACY Experiment data

Experiment time	Standard point	Time(sec)	Data	Data point
Start time of reactivity insertion	Start of ramp feed	4.341	Fast-Pump-ON	4342
End time of reactivity insertion	End of ramp feed	46.004		46005
End time of experiment	Tr rod down	156.948	TrRod-UP-DOWN	156949

Run No. : **R169**
Date : 2000/08/22
Mode : Ramp feed
Data file : r169f11

Power

Peak		Data	Average(W)	Error	Start point	Points	Center time	Relative time from 1st Peak
1st	Peak	Tr-Lin-N-A	1.79E+07	6.645E+04	34686	20	34.695	—
	Bottom		2.45E+05	1.514E+03	41134	400	41.333	6.638
1st	Peak	Tr-Log-N	1.74E+07	9.178E+04	34686	20	34.695	—
	Bottom		1.54E+05	7.427E+02	41134	400	41.333	6.638
2nd	Peak		7.27E+05	2.983E+03	47136	300	47.285	12.590
	Bottom		2.66E+05	1.164E+03	50989	400	51.188	16.493
3rd	Peak		3.00E+05	1.386E+03	53108	400	53.307	18.612
	Bottom		2.22E+05	9.598E+02	56391	400	56.590	21.895

Inverse Period		Extract	Start point	4342	Movavg points	20	*Value of extract data
			Points	31000			
Period(msec) =[1000/INV. Period]	Data	Average (1/sec)	Error	Start point*	Points	Center time	Relative time from 1st Peak
3.67E+01	Tr-Log-N-A	2.73E+01	4.321E-02	30177	40	34.537	-0.158

Energy		Extract	Start point	4342	Movavg points	10	*Value of extract data
			Points	184000			
Time	Data	Read value (J)	fission	Data point*		Center time	Relative time from 1st Peak
1st peak	Tr-Log-N	1.16E+06	3.63E+16	30355		34.695	—
2nd peak		7.03E+06	2.19E+17	42945		47.285	12.590
3rd peak		9.31E+06	2.91E+17	48967		53.307	18.612
End of experiment		2.43E+07	7.58E+17	152608		156.948	122.253

Pressure	Core pressure FWHM(sec)	-	Start point	-	Time(sec)	-
			End point	-	Time(sec)	-

Name	Data	Average (MPa)	Error	Start point	Points	Center time	Relative time from 1st Peak
Core pressure(Max.)	Core-TK-P2	-	-	-	-	-	-
Vent-gas pressure(Max.)	Vent-Gas-P2	-	-	-	-	-	-

Temperature [Data file : r169s11t]

Name		Data	Average (℃)	Error	Start point	Points	Center time	Relative time from 1st Peak
Temp-1	Initial	Core-Temp-1	26.0	2.399E-03	385	50	4.09	-30.60
	Final		77.6	3.761E-02	15671	50	156.95	122.26
Temp-2	Initial	Core-Temp-2	25.9	2.401E-03	385	50	4.09	-30.60
	Final		78.7	4.372E-03	15671	50	156.95	122.26
Temp-3	Initial	Core-Temp-3	25.8	2.399E-03	385	50	4.09	-30.60
	Final		78.5	3.315E-03	15671	50	156.95	122.26
Temp-4	Initial	Core-Temp-4	26.0	2.099E-03	385	50	4.09	-30.60
	Final		78.7	3.995E-03	15671	50	156.95	122.26
Temp-5	Initial	Core-Temp-5	25.9	2.260E-03	385	50	4.09	-30.60
	Final		78.7	2.661E-03	15671	50	156.95	122.26
Temp-6	Initial	Core-Temp-6	25.6	2.028E-03	385	50	4.09	-30.60
	Final		78.0	4.987E-03	15671	50	156.95	122.26
Temp-7	Initial	Core-Temp-7	26.0	2.036E-03	385	50	4.09	-30.60
	Final		78.3	3.805E-03	15671	50	156.95	122.26
Temp-8	Initial	Core-Temp-8	25.4	1.921E-03	385	50	4.09	-30.60
	Final		78.5	3.899E-03	15671	50	156.95	122.26
Temp-9	Initial	Core-Temp-9	25.3	1.814E-03	385	50	4.09	-30.60
	Final		78.1	2.603E-03	15671	50	156.95	122.26
Temp-10	Initial	Core-Temp-10	25.3	1.230E-03	385	50	4.09	-30.60
	Final		78.1	3.792E-03	15671	50	156.95	122.26

Temperature [Data file : r169s11t]

Name		Data	Average (℃)	Error	Start point	Points	Center time	Relative time from 1st Peak
Temp	Initial	Core-Temp	26.1	2.554E-03	385	50	4.09	-30.60
	Final		66.8	4.315E-03	15671	50	156.95	122.26
Temp-A	Initial	Core-Temp-A	25.9	2.186E-03	385	50	4.09	-30.60
	Final		74.9	7.678E-03	15671	50	156.95	122.26
Temp-B	Initial	Core-Temp-B	26.0	2.440E-03	385	50	4.09	-30.60
	Final		76.7	3.512E-03	15671	50	156.95	122.26
Temp-C	Initial	Core-Temp-C	25.9	2.260E-03	385	50	4.09	-30.60
	Final		77.1	5.362E-03	15671	50	156.95	122.26
Temp-D	Initial	Core-Temp-D	25.9	2.115E-03	385	50	4.09	-30.60
	Final		76.9	2.634E-03	15671	50	156.95	122.26
Temp-E	Initial	Core-Temp-E	25.7	2.260E-03	385	50	4.09	-30.60
	Final		76.8	4.349E-03	15671	50	156.95	122.26
Temp-F	Initial	Core-Temp-F	25.5	2.406E-03	385	50	4.09	-30.60
	Final		77.0	3.083E-03	15671	50	156.95	122.26
Temp-G	Initial	Core-Temp-G	25.6	2.036E-03	385	50	4.09	-30.60
	Final		51.9	2.845E-03	15671	50	156.95	122.26
Temp-H	Initial	Core-Temp-H	25.8	1.408E-03	385	50	4.09	-30.60
	Final		40.9	6.400E-03	15671	50	156.95	122.26
Temp-I	Initial	Core-Temp-I	26.6	2.260E-03	385	50	4.09	-30.60
	Final		32.6	1.816E-03	15671	50	156.95	122.26
Temp-J	Initial	Core-Temp-J	27.3	1.995E-03	385	50	4.09	-30.60
	Final		32.4	3.740E-03	15671	50	156.95	122.26

TRACY Experiment data sheet

No : Run 201	Date : 2000/10/23

Purpose of experiment		Ramp feed (2.9$)				
Conditions	Fuel	Enrichment	U concentration	Acid molarity	Density	Analysis Temp
		9.98 wt%	387.4 gU/l	0.56 N	1.53668 g/cm^3	24.99 ℃
	Core	Tr-rod UP		Tr-rod DOWN		
		Critical height Hc_1	A= 509.71 mm B= 509.72 mm	Critical height Hc_2	A= 623.92 mm B= 623.93 mm	
		Temperature	25.3 ℃	Temperature	25.3 ℃	
		D-time meas. height Hd_1	A= 512.83 mm B= 512.84 mm	D-time meas. height Hd_2	A= 628.99 mm B= 628.99 mm	Int. flow rate at level adjustment
		Doublimg time	61.1 s	Doublimg time	68.6 s	
		Reactivity	10.91 cent	Reactivity	9.98 cent	A= -42.708 L
		Level worth	3.50 cent/mm	Level worth	1.97 cent/mm	B= -42.394 L
	Reactivity insertion	Mode	Level	Reactivity	Rate	Int. flow rate at feed stop
		Ramp feed	A= 400.23 mm B= 400.25 mm	2.68 $	58.5 L/min	A= -2.462 L B= -2.168 L
	Initial conditions	Temperature	Power	Neutron source		
		25.5 ℃	Subcritical	No		

TRACY Experiment data

Experiment time	Standard point	Time(sec)	Data	Data point
Start time of reactivity insertion	Start of ramp feed	5.299	Fast-Pump-ON	5300
End time of reactivity insertion	End of ramp feed	47.982		47983
End time of experiment	Tr rod down	79.099	TrRod-UP-DOWN	79100

Run No. : **R201**
Date : 2001/10/23
Mode : Ramp feed
Data file : r201f11

Power

Peak		Data	Average(W)	Error	Start point	Points	Center*1 time	Relative time from 1st Peak
1st	Peak	Tr-Lin-N-A	1.78E+07	6.468E+04	35877	15	35.883	
	Bottom		-	-	-	-	-	-
1st	Peak	Tr-Log-N-A	1.82E+07	3.345E+04	35874	10	35.877	
	Bottom		1.25E+05	3.812E+02	43463	200	43.563	7.686
2nd	Peak		7.40E+05	1.224E+03	48971	200	49.071	13.194
	Bottom		2.07E+05	3.722E+02	59215	400	59.414	23.537
3rd	Peak		3.39E+05	4.760E+02	64854	400	65.054	29.177
	Bottom		-	-	-	-	-	-

Inverse Period

Extract	Start point	35000	Movavg points	20
	Points	2000		

Period(msec) =[1000/INV. Period]	Data	Average (1/sec)	Error	Start point*2	Points	Center*1 time	Relative time from 1st Peak
3.36E+01	Tr-Log-N-A	2.97E+01	1.810E-01	717	40	35.735	-0.142

Energy

Extract	Start point	5300	Movavg points	10
	Points	80000		

Time	Data	Read value (J)	fission	Data point*2	Center*1 time	Relative time from 1st Peak
1st peak	Tr-Log-N-A	1.12E+06	3.50E+16	30579	35.877	
2nd peak		6.86E+06	2.14E+17	43773	49.071	13.194
3rd peak		1.15E+07	3.60E+17	59756	65.054	29.177
End of experiment		1.44E+07	4.51E+17	73801	79.099	43.222

Pressure

Core pressure FWHM(sec)	-	Start point	-	Time(sec)	-
		End point	-	Time(sec)	-

Name	Data	Average (MPa)	Error	Start point	Points	Center*1 time	Relative time from 1st Peak
Core pressure(Max.)	Core-TK-P2	-	-	-	-	-	-
Vent-gas pressure(Max.)	Vent-Gas-P2	-	-	-	-	-	-

*1 : Time from data measurement start
*2 : Value of extract data

Temperature [Data file : r201s11t]

Name		Data	Average (°C)	Error	Start point	Points	Center*1 time	Relative time from 1st Peak
Temp-1	Initial	Core-Temp-1	25.6	2.221E-03	480	50	5.04	-30.84
	Final		58.5	1.744E-02	7886	50	79.10	43.22
Temp-2	Initial	Core-Temp-2	25.6	2.030E-03	480	50	5.04	-30.84
	Final		58.8	1.927E-02	7886	50	79.10	43.22
Temp-3	Initial	Core-Temp-3	25.6	2.442E-03	480	50	5.04	-30.84
	Final		57.9	3.036E-03	7886	50	79.10	43.22
Temp-4	Initial	Core-Temp-4	25.6	2.115E-03	480	50	5.04	-30.84
	Final		59.1	2.634E-03	7886	50	79.10	43.22
Temp-5	Initial	Core-Temp-5	25.6	2.148E-03	480	50	5.04	-30.84
	Final		59.8	5.964E-03	7886	50	79.10	43.22
Temp-6	Initial	Core-Temp-6	25.0	1.893E-03	480	50	5.04	-30.84
	Final		57.7	1.723E-02	7886	50	79.10	43.22
Temp-7	Initial	Core-Temp-7	25.6	2.415E-03	480	50	5.04	-30.84
	Final		57.2	4.238E-03	7886	50	79.10	43.22
Temp-8	Initial	Core-Temp-8	24.9	2.265E-03	480	50	5.04	-30.84
	Final		59.4	6.595E-03	7886	50	79.10	43.22
Temp-9	Initial	Core-Temp-9	24.9	2.287E-03	480	50	5.04	-30.84
	Final		59.6	2.786E-03	7886	50	79.10	43.22
Temp-10	Initial	Core-Temp-10	24.9	2.086E-03	480	50	5.04	-30.84
	Final		58.7	1.832E-02	7886	50	79.10	43.22

Temperature [Data file : r201s11t]

Name		Data	Average (°C)	Error	Start point	Points	Center*1 time	Relative time from 1st Peak
Temp	Initial	Core-Temp	25.5	2.624E-03	480	50	5.04	-30.84
	Final		41.2	1.187E-02	7886	50	79.10	43.22
Temp-A	Initial	Core-Temp-A	25.6	2.036E-03	480	50	5.04	-30.84
	Final		54.5	1.480E-02	7886	50	79.10	43.22
Temp-B	Initial	Core-Temp-B	25.6	2.267E-03	480	50	5.04	-30.84
	Final		55.5	3.169E-03	7886	50	79.10	43.22
Temp-C	Initial	Core-Temp-C	25.6	2.590E-03	480	50	5.04	-30.84
	Final		55.8	3.878E-03	7886	50	79.10	43.22
Temp-D	Initial	Core-Temp-D	25.6	2.221E-03	480	50	5.04	-30.84
	Final		55.8	8.206E-03	7886	50	79.10	43.22
Temp-E	Initial	Core-Temp-E	25.4	1.989E-03	480	50	5.04	-30.84
	Final		56.0	4.334E-03	7886	50	79.10	43.22
Temp-F	Initial	Core-Temp-F	25.3	2.267E-03	480	50	5.04	-30.84
	Final		55.8	9.303E-03	7886	50	79.10	43.22
Temp-G	Initial	Core-Temp-G	25.5	2.221E-03	480	50	5.04	-30.84
	Final		41.2	1.263E-02	7886	50	79.10	43.22
Temp-H	Initial	Core-Temp-H	25.9	2.380E-03	480	50	5.04	-30.84
	Final		30.4	3.655E-03	7886	50	79.10	43.22
Temp-I	Initial	Core-Temp-I	26.4	2.265E-03	480	50	5.04	-30.84
	Final		27.6	3.249E-03	7886	50	79.10	43.22
Temp-J	Initial	Core-Temp-J	27.1	2.267E-03	480	50	5.04	-30.84
	Final		28.0	4.055E-03	7886	50	79.10	43.22

*1 : Time from data measurement start

3.2.1 Graph

The measured profiles of power and temperature(s) are plotted as a function of time. The time starts from when the measurement started and ends at the end of experiment, i.e. when the transient rod is inserted. If there is not available data, no graph exists for the corresponding parameter.

Table 3.2.2 List of graphs

Fig. 3.1 (1)	Run31 : Power
Fig. 3.1 (2)	Run31 : Temperature(1)
Fig. 3.1 (3)	Run31 : Temperature(2)
Fig. 3.2 (1)	Run61 : Power
Fig. 3.2 (2)	Run61 : Temperature(1)
Fig. 3.2 (3)	Run61 : Temperature(2)
Fig. 3.3 (1)	Run71 : Power
Fig. 3.3 (2)	Run71 : Temperature(1)
Fig. 3.3 (3)	Run71 : Temperature(2)
Fig. 3.4 (1)	Run76 : Power
Fig. 3.4 (2)	Run76 : Temperature(1)
Fig. 3.4 (3)	Run76 : Temperature(2)
Fig. 3.5 (1)	Run98 : Power
Fig. 3.5 (2)	Run98 : Temperature(1)
Fig. 3.5 (3)	Run98 : Temperature(2)
Fig. 3.6 (1)	Run149 : Power
Fig. 3.6 (2)	Run149 : Temperature(1)
Fig. 3.6 (3)	Run149 : Temperature(2)
Fig. 3.7 (1)	Run159 : Power
Fig. 3.7 (2)	Run159 : Temperature(1)
Fig. 3.7 (3)	Run159 : Temperature(2)
Fig. 3.7 (4)	Run159 : Temperature(3)
Fig. 3.7 (5)	Run159 : Temperature(4)
Fig. 3.7 (6)	Run159 : Temperature(5)
Fig. 3.8 (1)	Run160 : Power
Fig. 3.8 (2)	Run160 : Temperature(1)
Fig. 3.8 (3)	Run160 : Temperature(2)
Fig. 3.8 (4)	Run160 : Temperature(3)
Fig. 3.8 (5)	Run160 : Temperature(4)
Fig. 3.8 (6)	Run160 : Temperature(5)
Fig. 3.9 (1)	Run161 : Power
Fig. 3.9 (2)	Run161 : Temperature(1)
Fig. 3.9 (3)	Run161 : Temperature(2)
Fig. 3.9 (4)	Run161 : Temperature(3)
Fig. 3.9 (5)	Run161 : Temperature(4)
Fig. 3.9 (6)	Run161 : Temperature(5)
Fig. 3.10 (1)	Run163 : Power
Fig. 3.10 (2)	Run163 : Temperature(1)
Fig. 3.10 (3)	Run163 : Temperature(2)
Fig. 3.10 (4)	Run163 : Temperature(3)
Fig. 3.10 (5)	Run163 : Temperature(4)
Fig. 3.10 (6)	Run163 : Temperature(5)
Fig. 3.11 (1)	Run164 : Power
Fig. 3.11 (2)	Run164 : Temperature(1)
Fig. 3.11 (3)	Run164 : Temperature(2)
Fig. 3.11 (4)	Run164 : Temperature(3)
Fig. 3.11 (5)	Run164 : Temperature(4)
Fig. 3.11 (6)	Run164 : Temperature(5)
Fig. 3.12 (1)	Run167 : Power
Fig. 3.12 (2)	Run167 : Temperature(1)
Fig. 3.12 (3)	Run167 : Temperature(2)
Fig. 3.12 (4)	Run167 : Temperature(3)
Fig. 3.12 (5)	Run167 : Temperature(4)
Fig. 3.12 (6)	Run167 : Temperature(5)
Fig. 3.13 (1)	Run169 : Power
Fig. 3.13 (2)	Run169 : Temperature(1)
Fig. 3.13 (3)	Run169 : Temperature(2)
Fig. 3.13 (4)	Run169 : Temperature(3)
Fig. 3.13 (5)	Run169 : Temperature(4)
Fig. 3.13 (6)	Run169 : Temperature(5)
Fig. 3.14 (1)	Run201 : Power
Fig. 3.14 (2)	Run201 : Temperature(1)
Fig. 3.14 (3)	Run201 : Temperature(2)
Fig. 3.14 (4)	Run201 : Temperature(3)
Fig. 3.14 (5)	Run201 : Temperature(4)
Fig. 3.14 (6)	Run201 : Temperature(5)

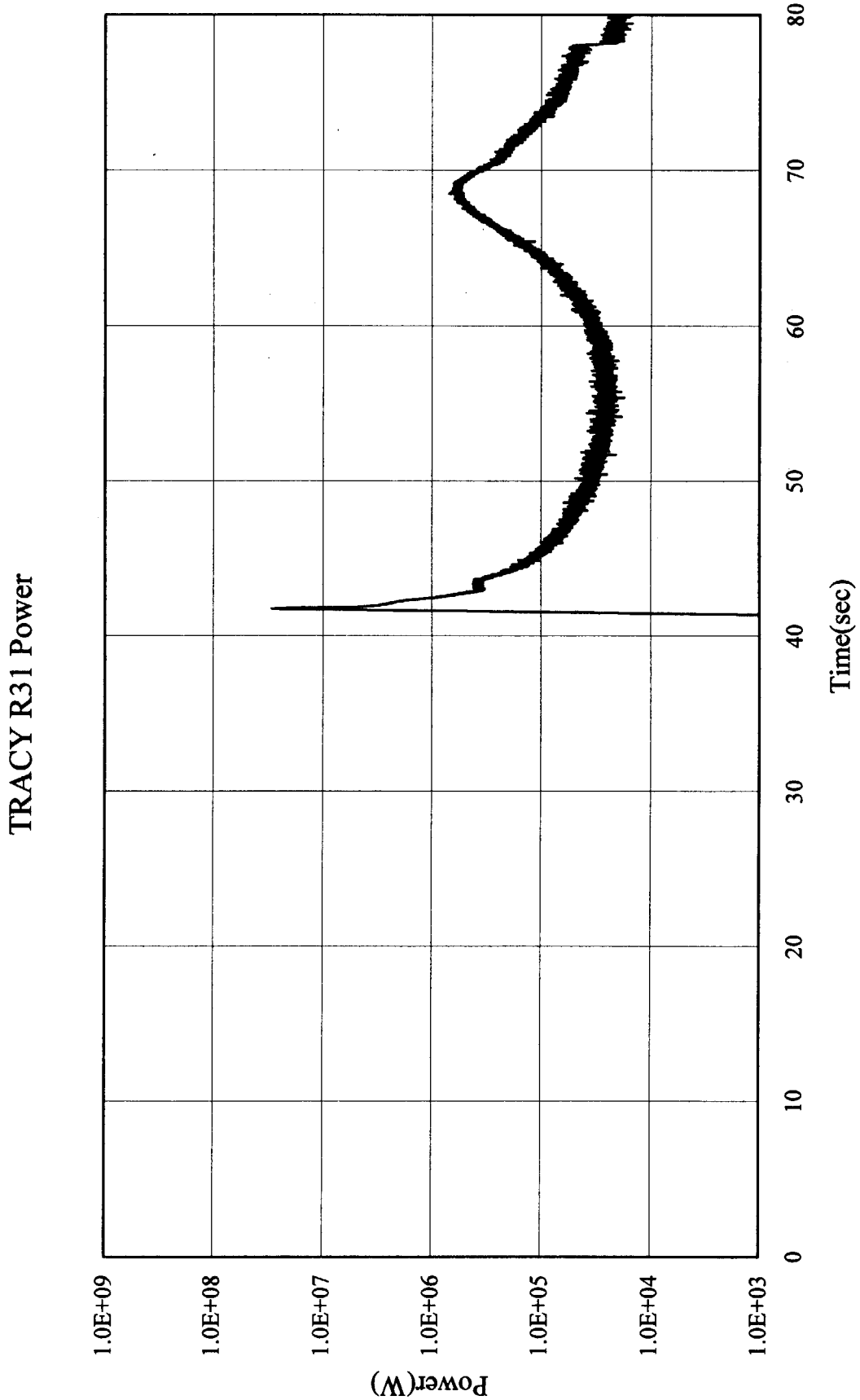

Fig. 3.1 (1) Run31 : Power

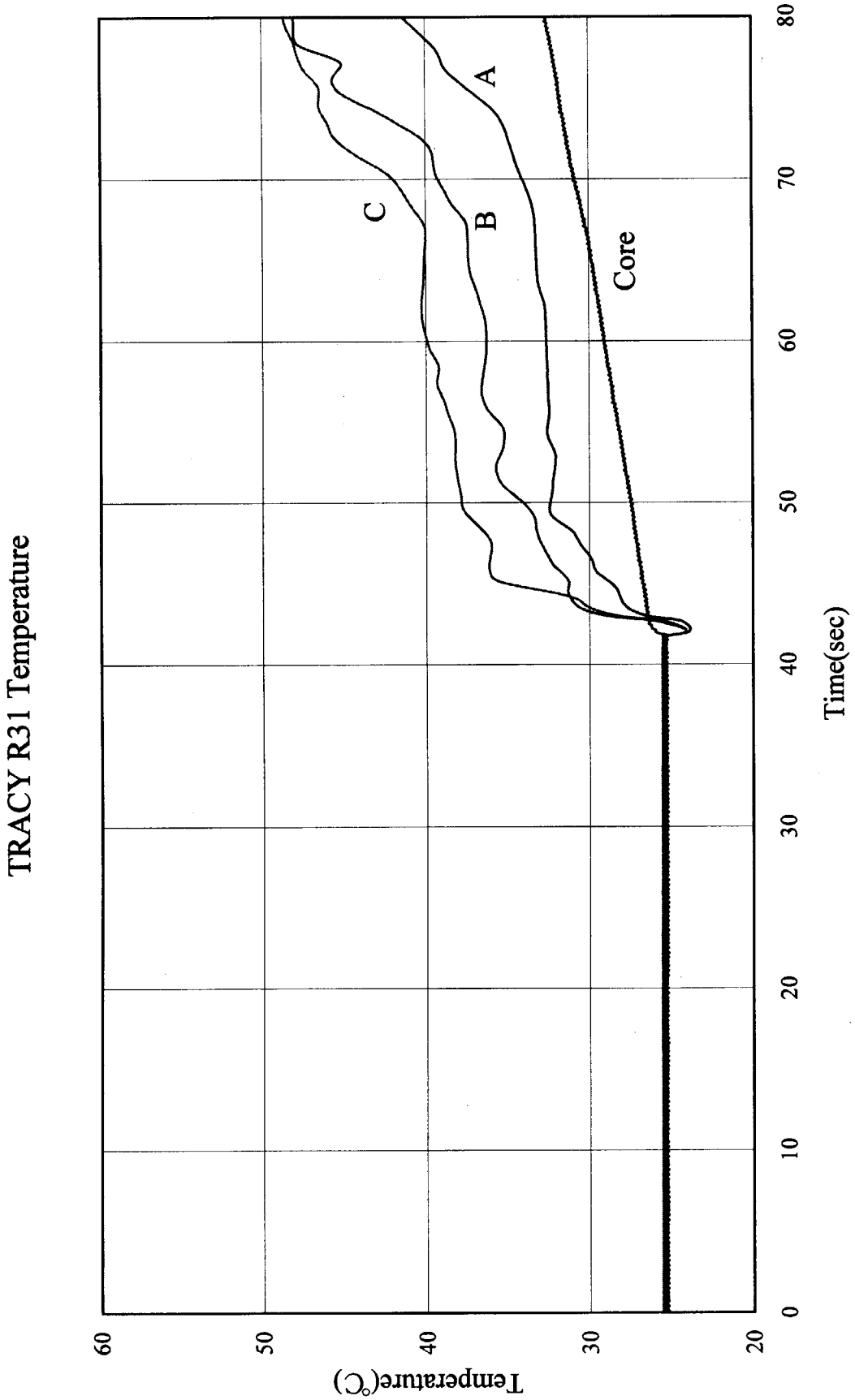

Fig. 3.1 (2) Run31 : Temperature(1)

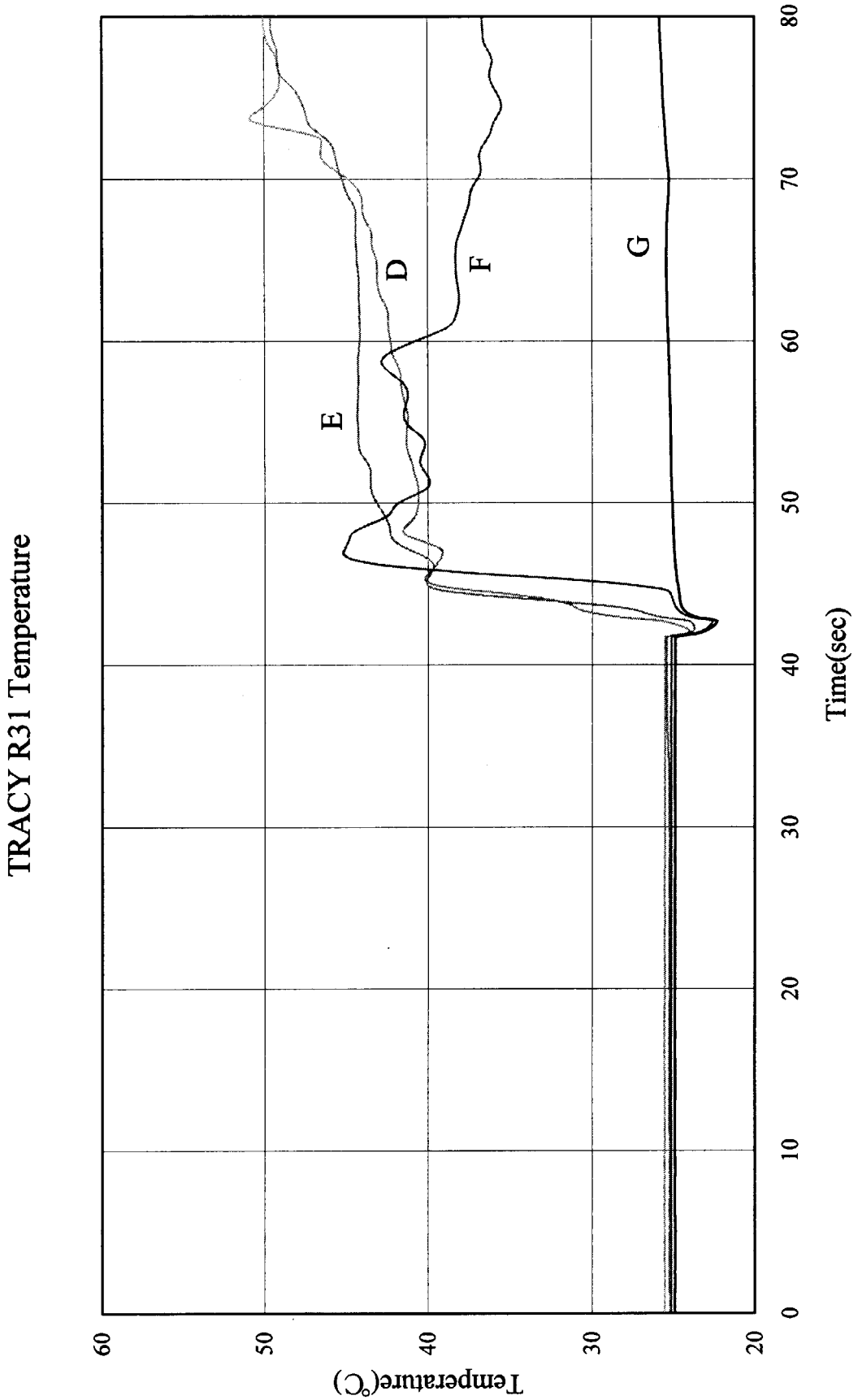

Fig. 3.1 (3) Run31 : Temperature(2)

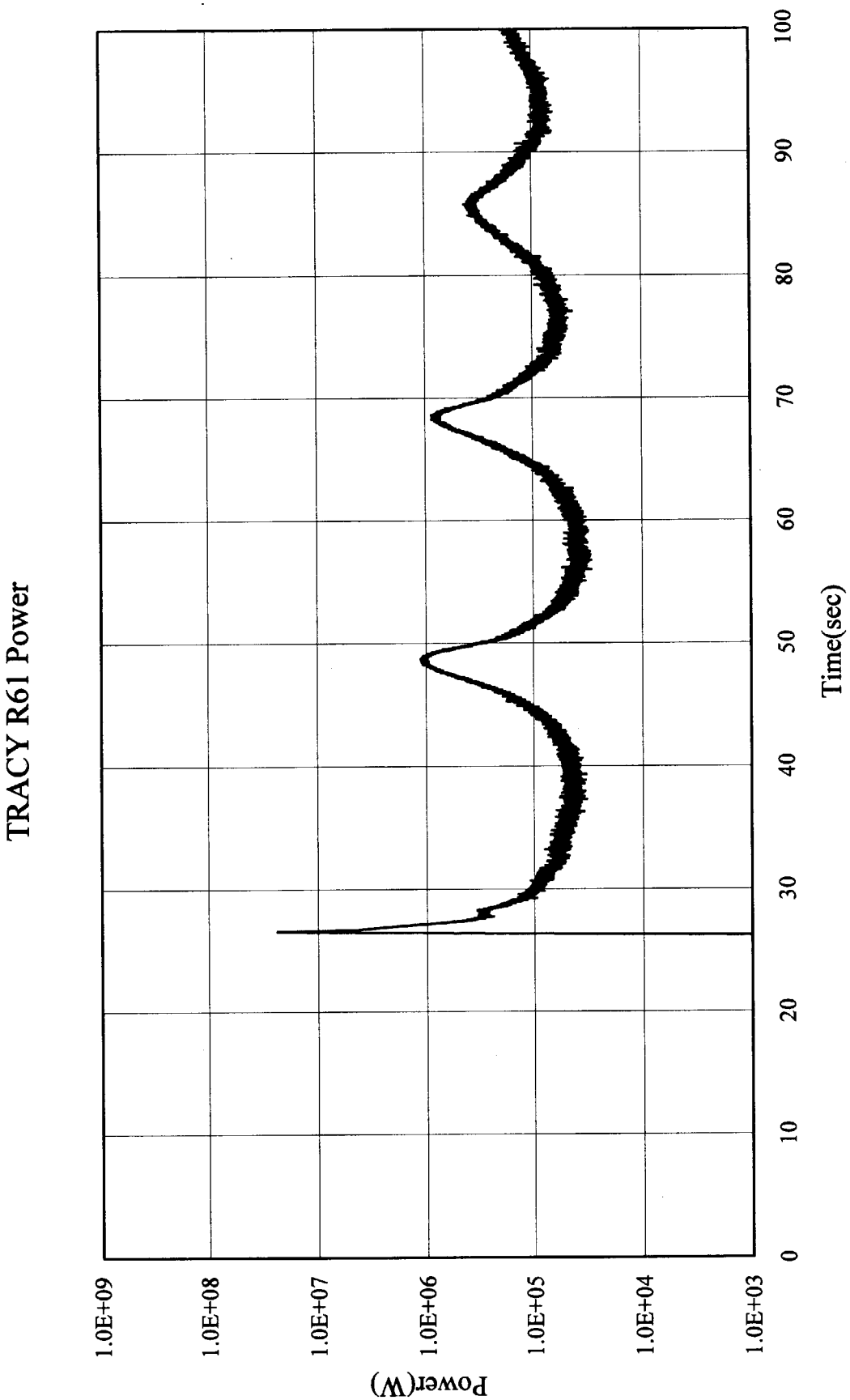

Fig. 3.2 (1) Run61 : Power

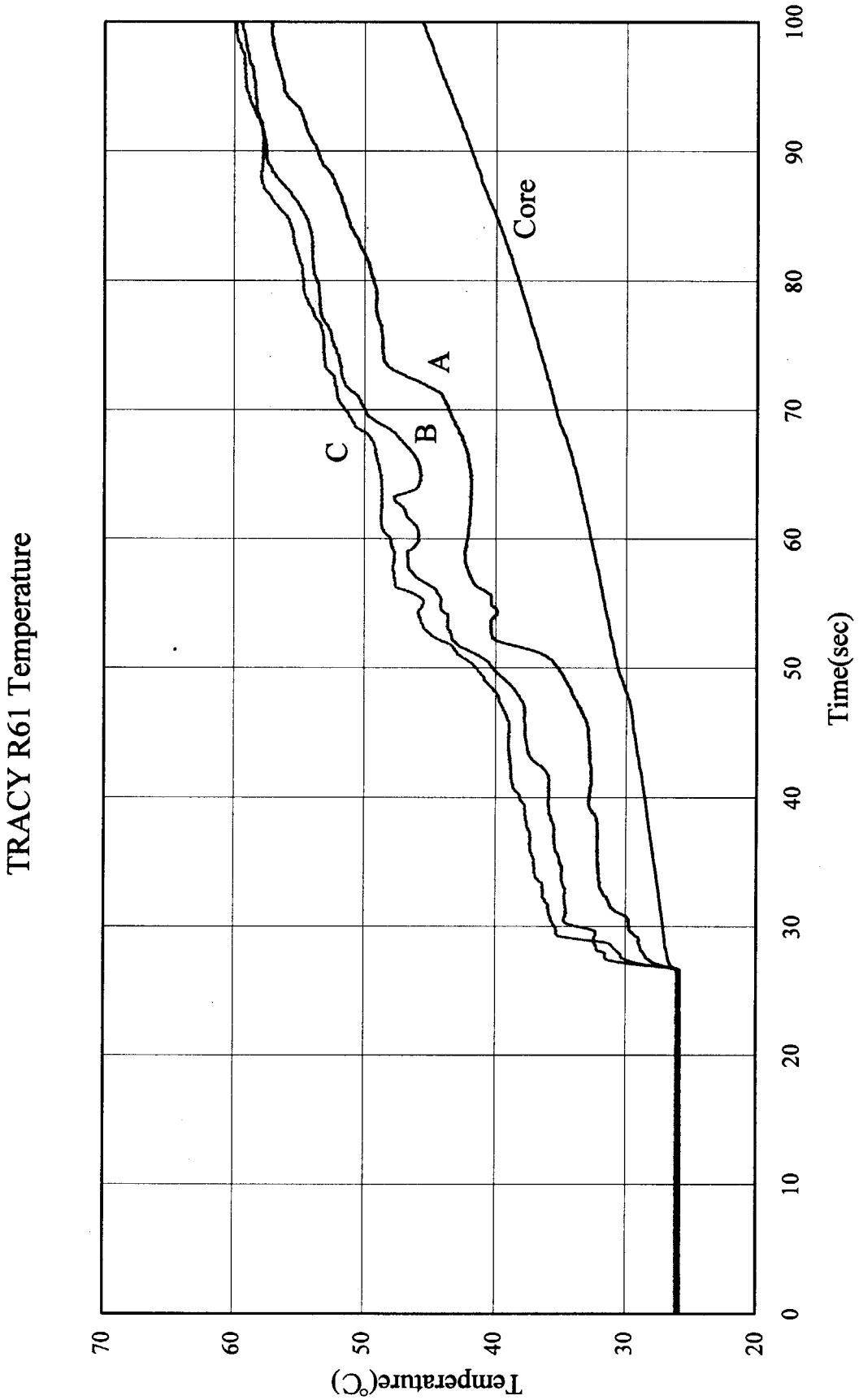

Fig. 3.2 (2) Run61 : Temperature(1)

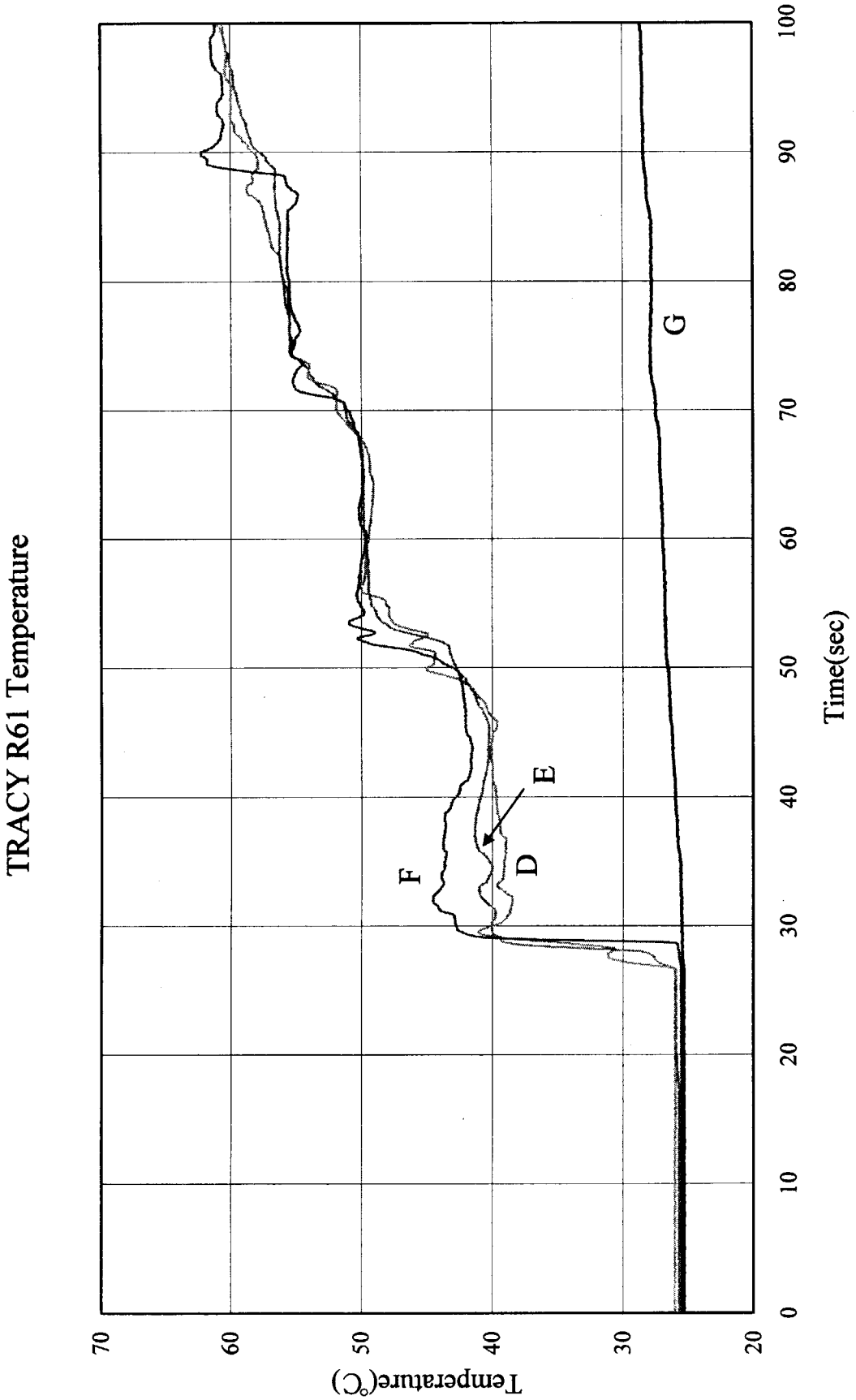

Fig. 3.2 (3) Run61 : Temperature(2)

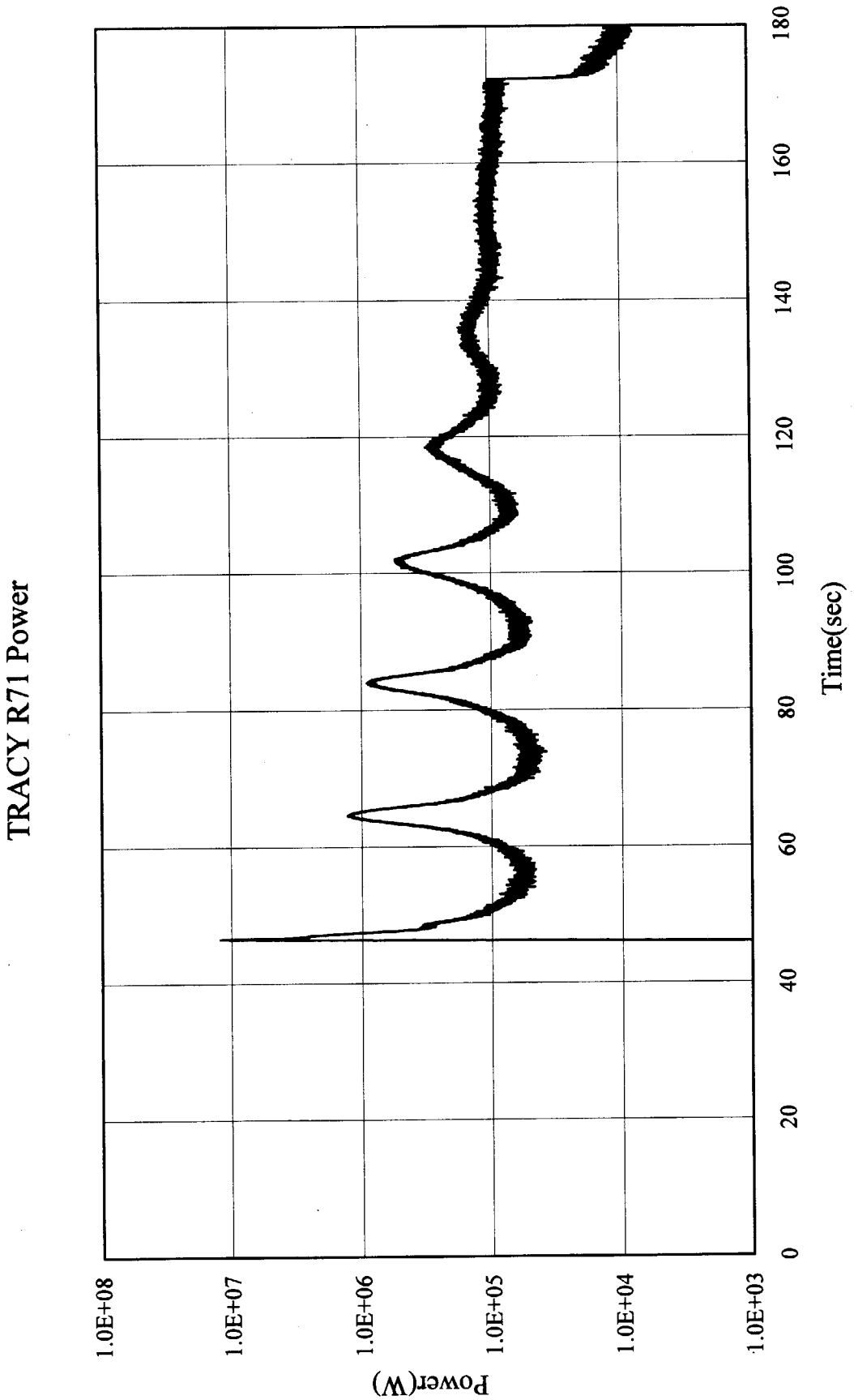

Fig. 3.3 (1) Run71 : Power

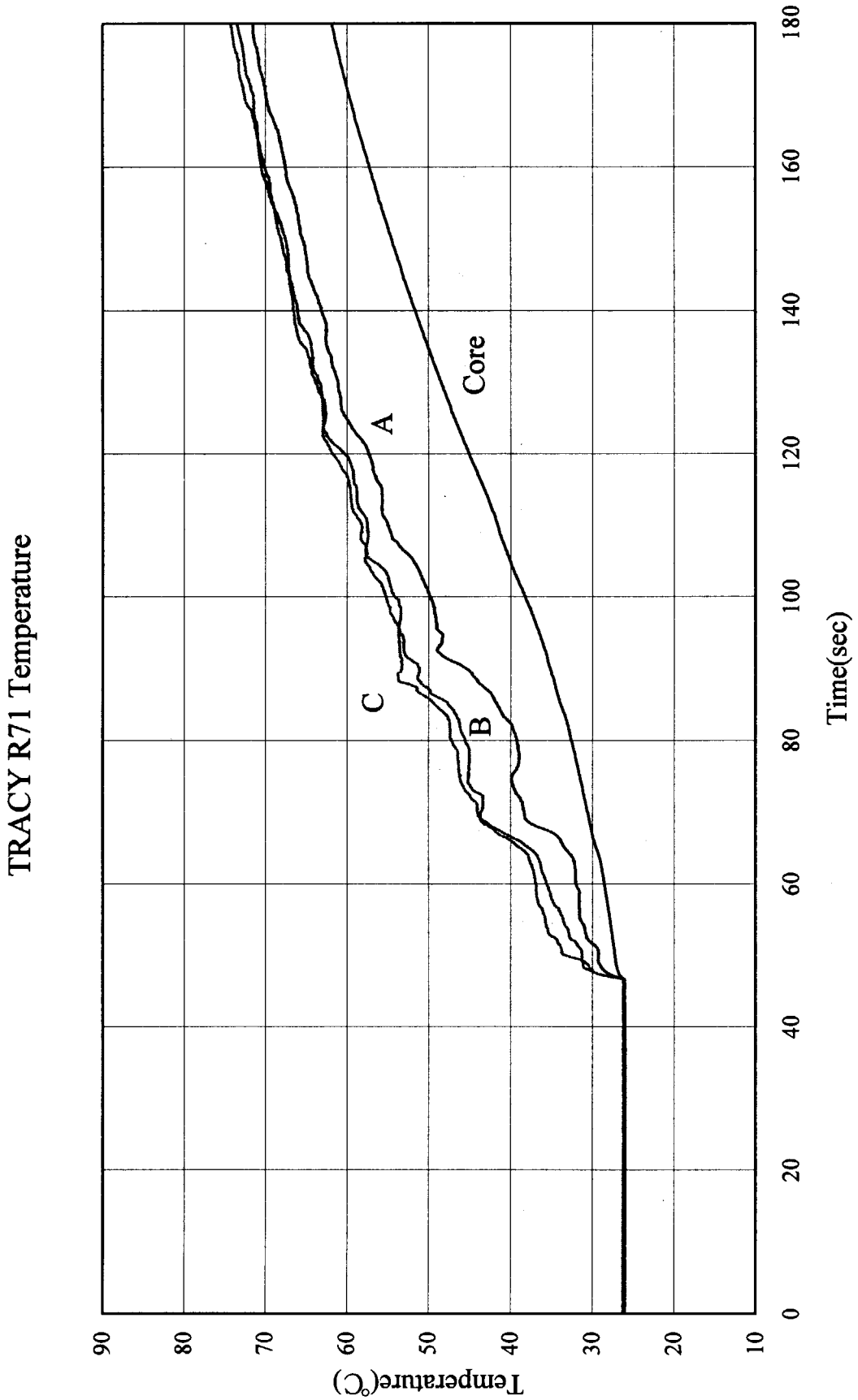

Fig. 3.3 (2) Run71 : Temperature(1)

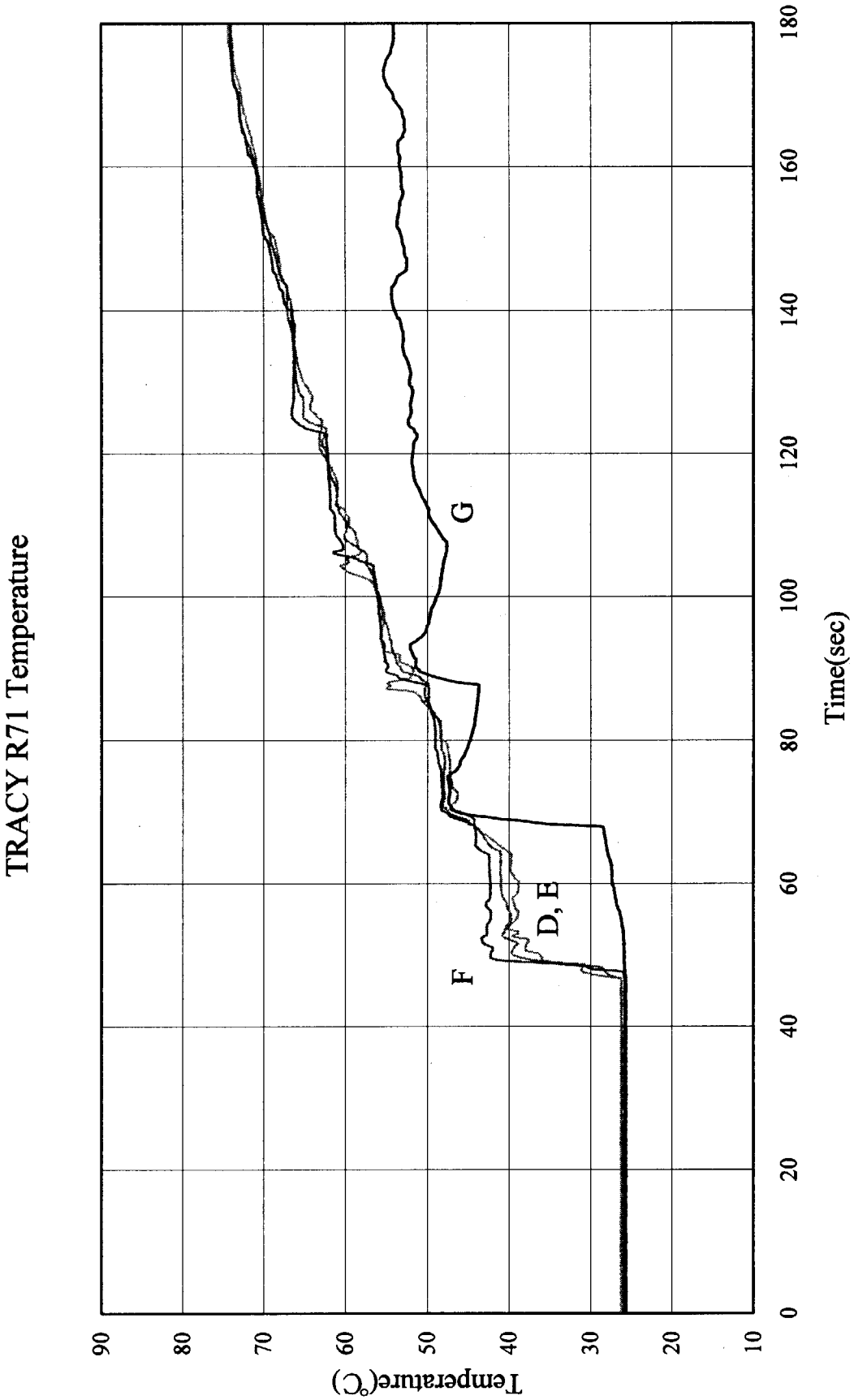

Fig. 3.3 (3) Run71 : Temperature(2)

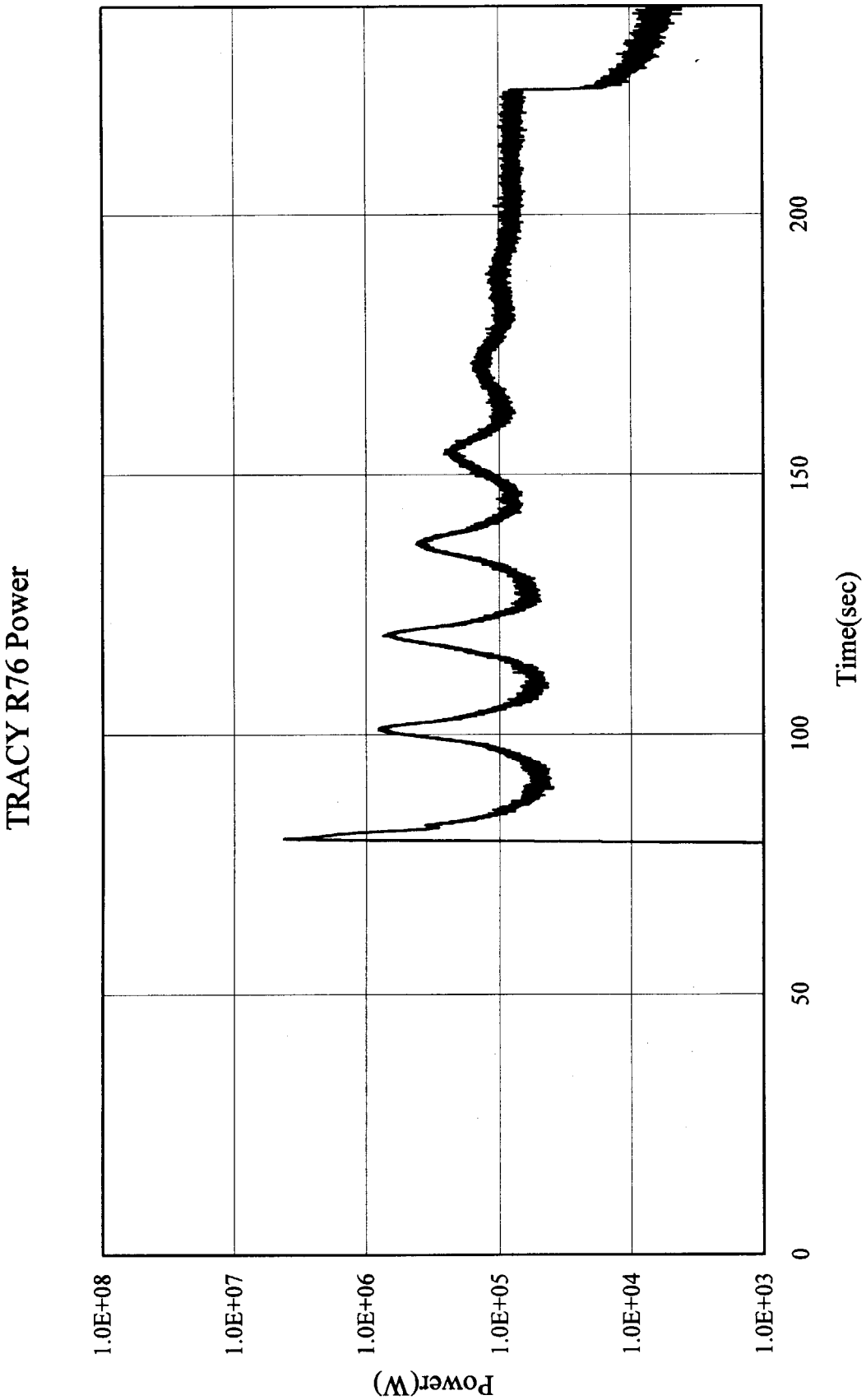

Fig. 3.4 (1) Run76 : Power

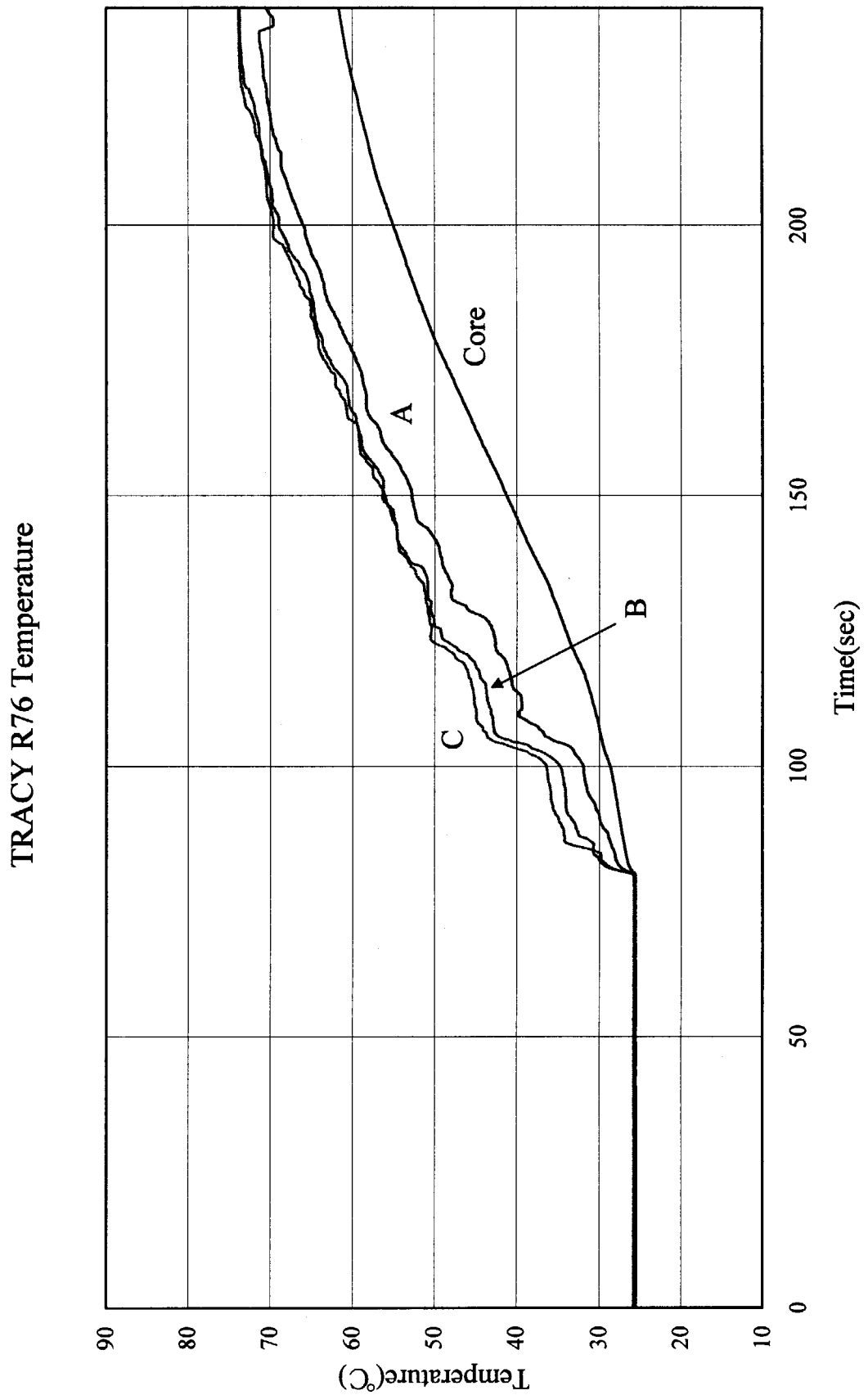

Fig. 3.4 (2) Run76 : Temperature(1)

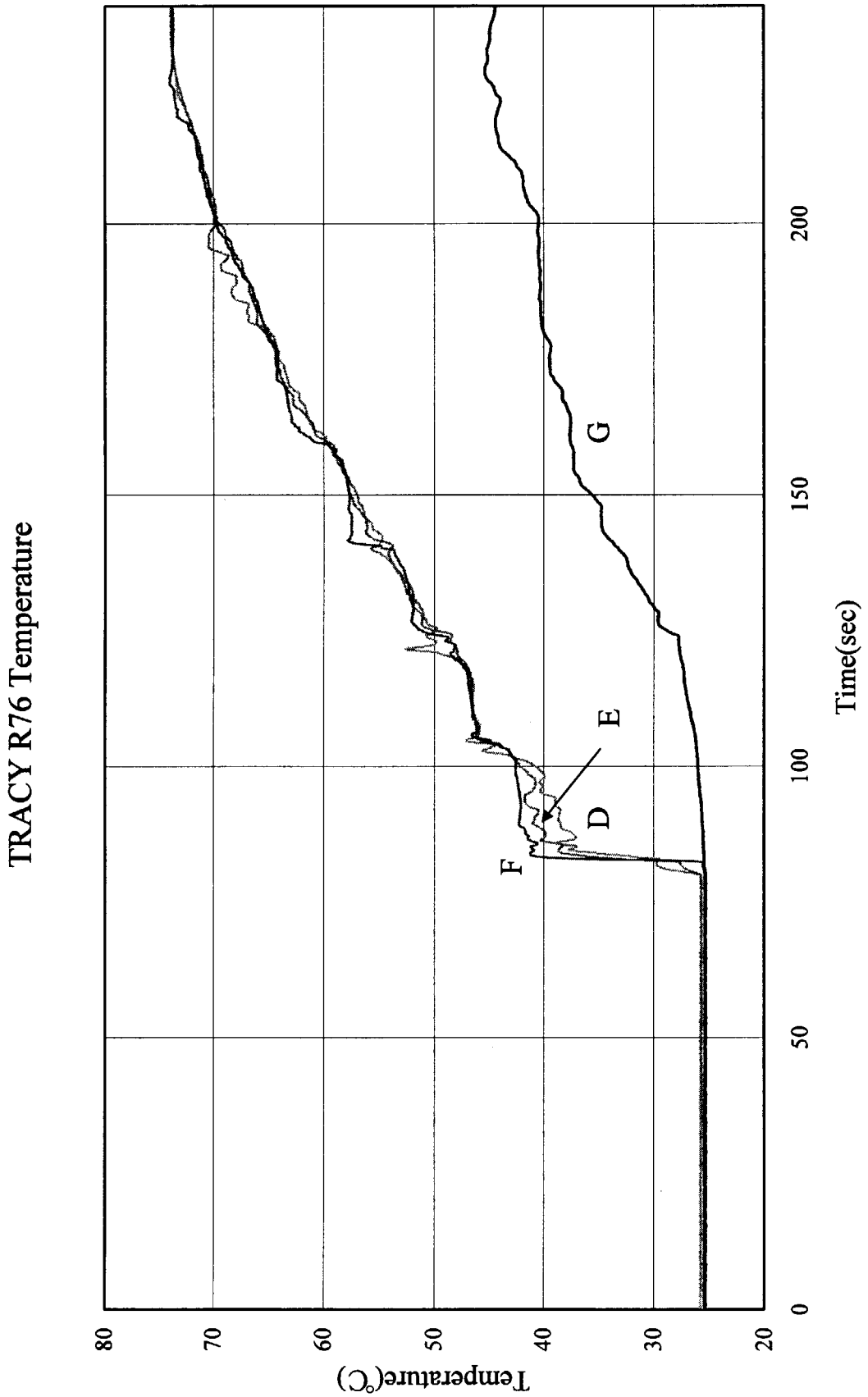

Fig. 3.4 (3) Run76 : Temperature(2)

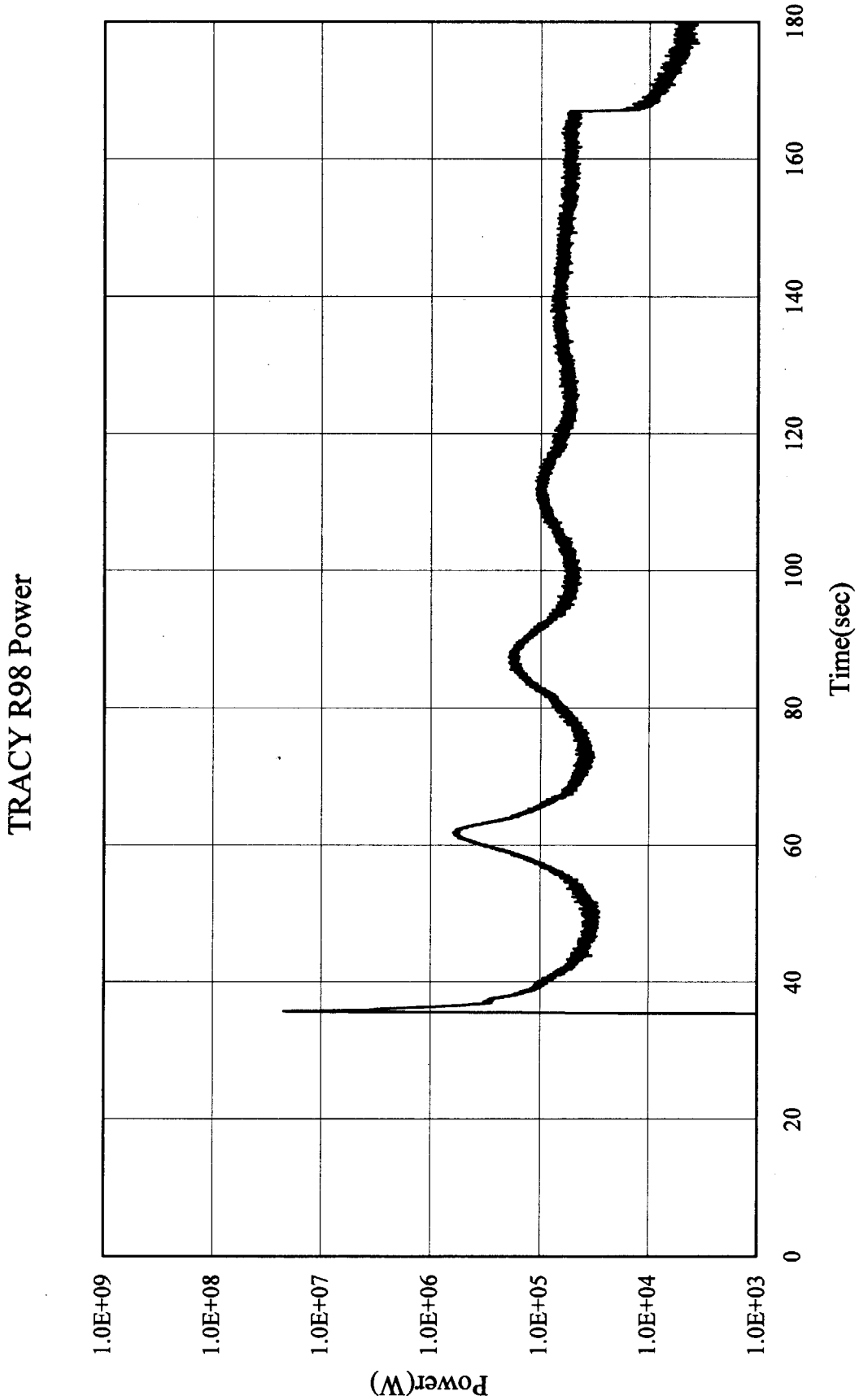

Fig. 3.5 (1) Run98 : Power

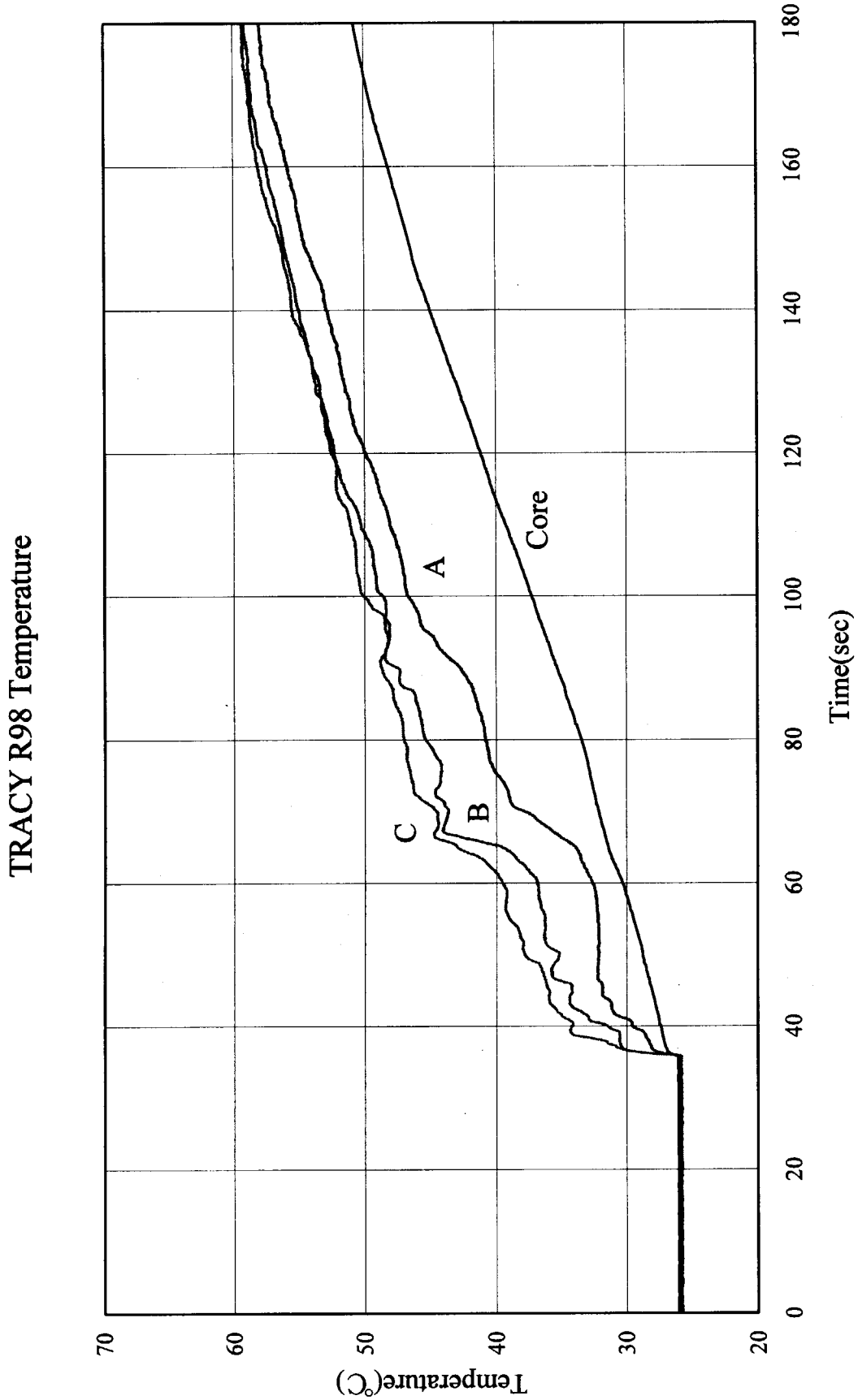

Fig. 3.5 (2) Run98 : Temperature(1)

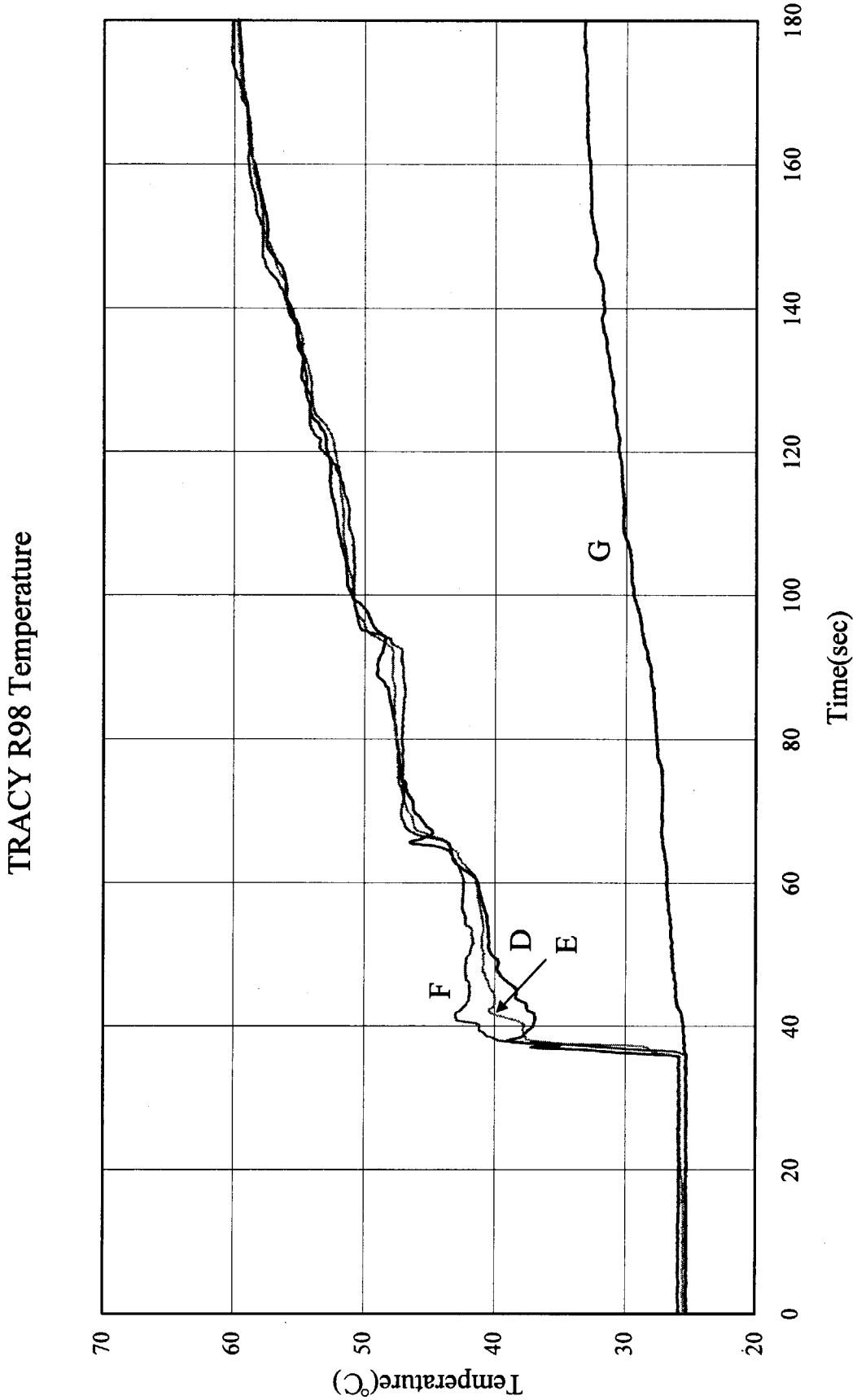

Fig. 3.5 (3) Run98 : Temperature(2)

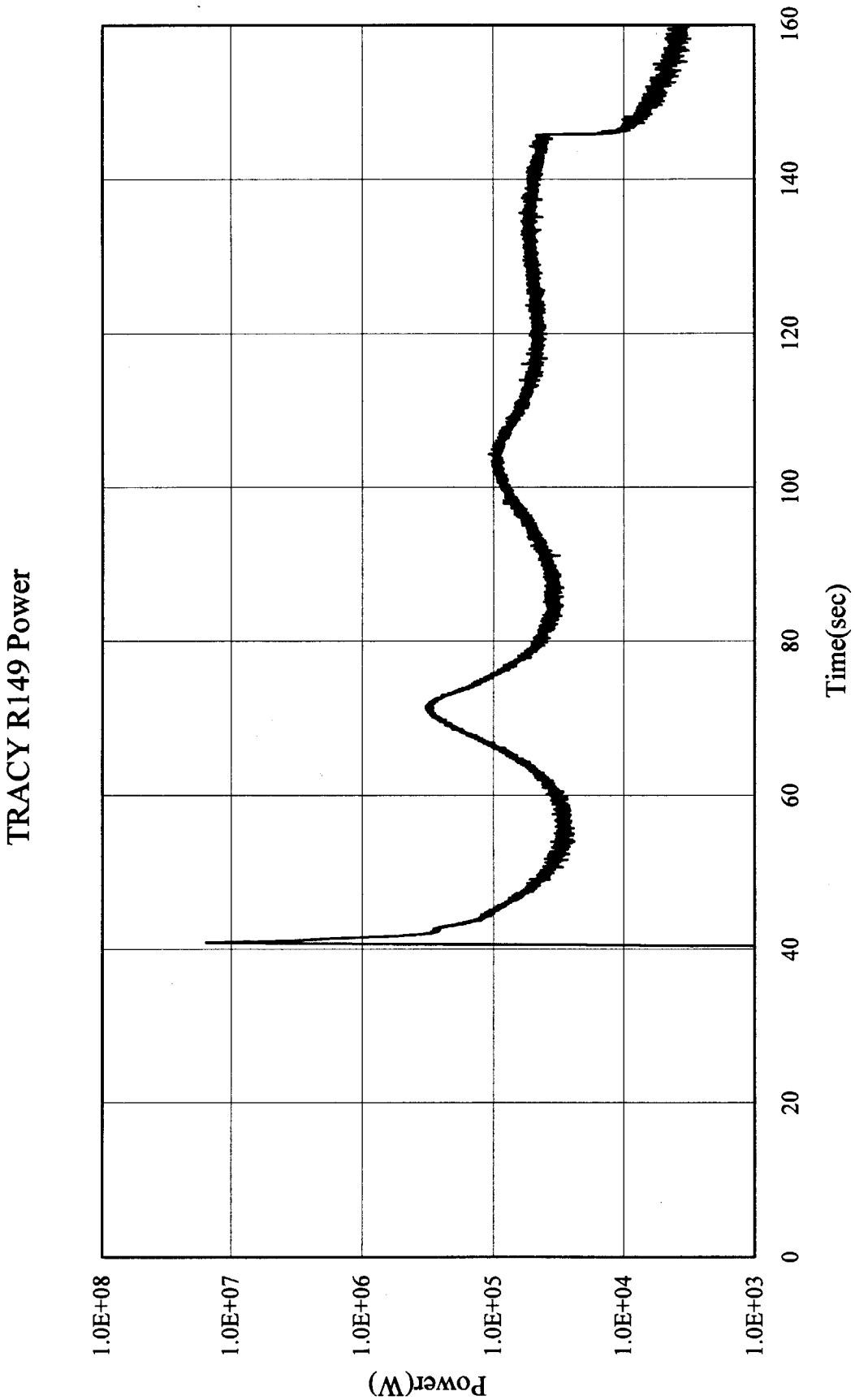

Fig. 3.6 (1) Run149 : Power

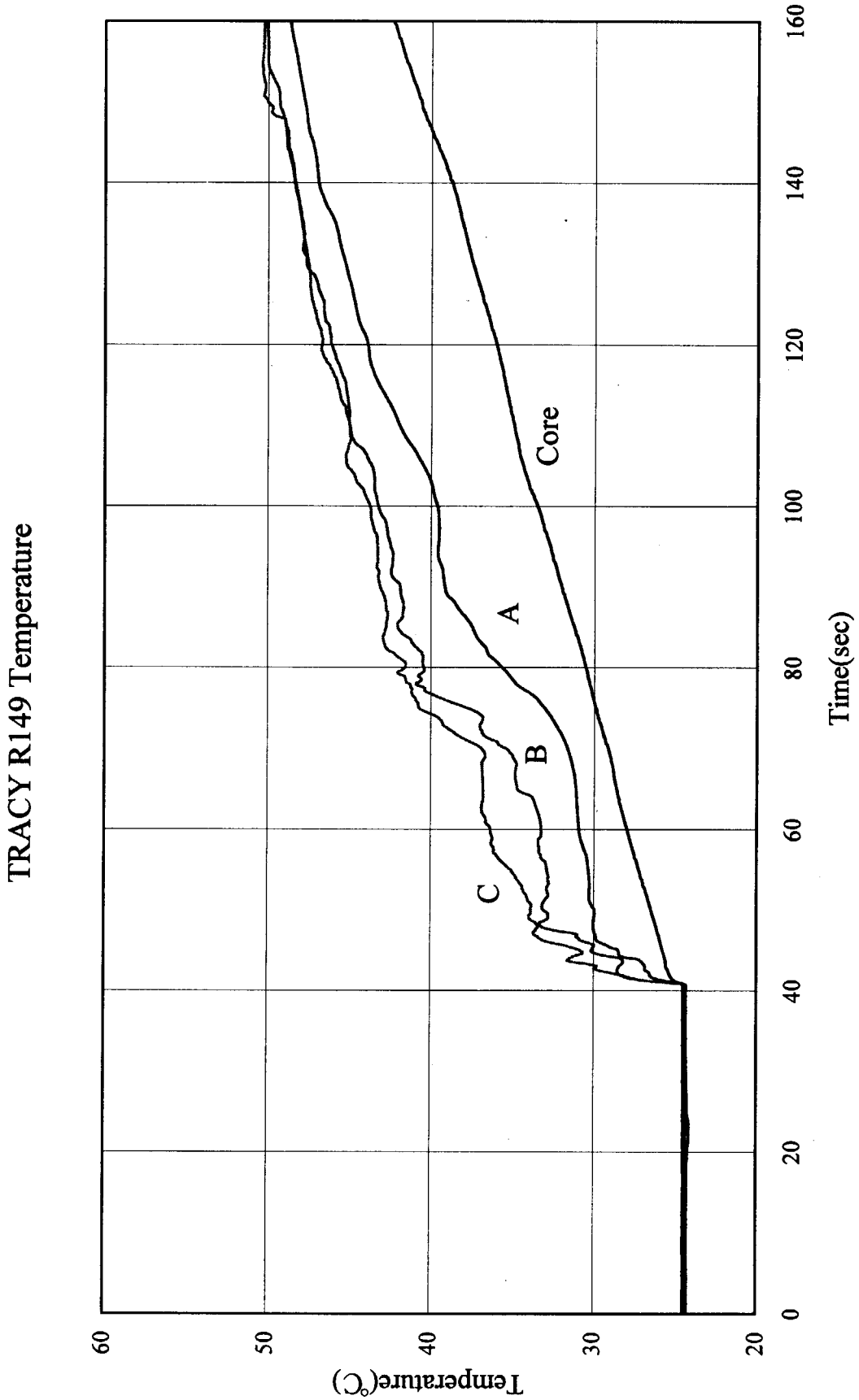

Fig. 3.6 (2) Run149 : Temperature(1)

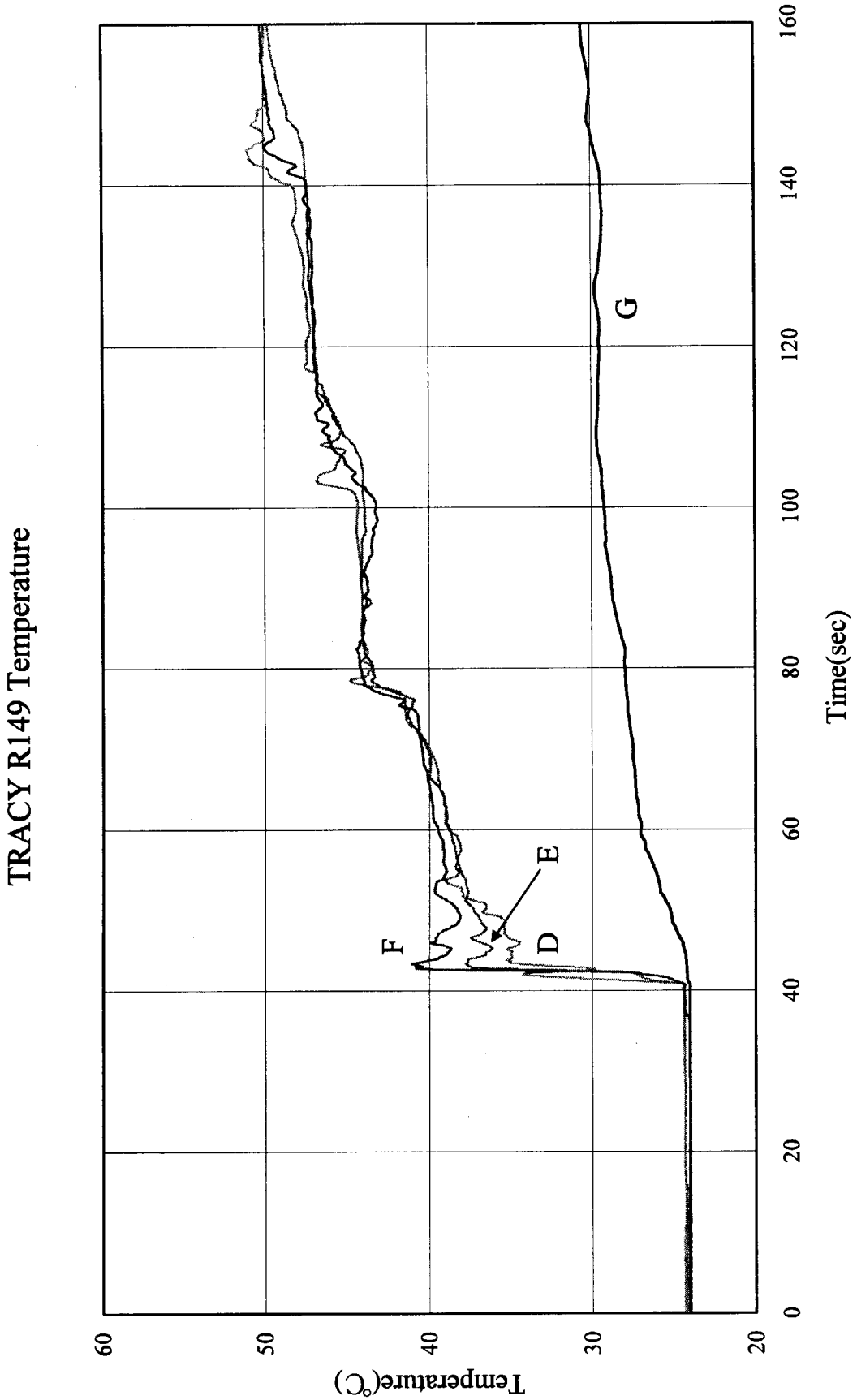

Fig. 3.6 (3) Run149 : Temperature(2)

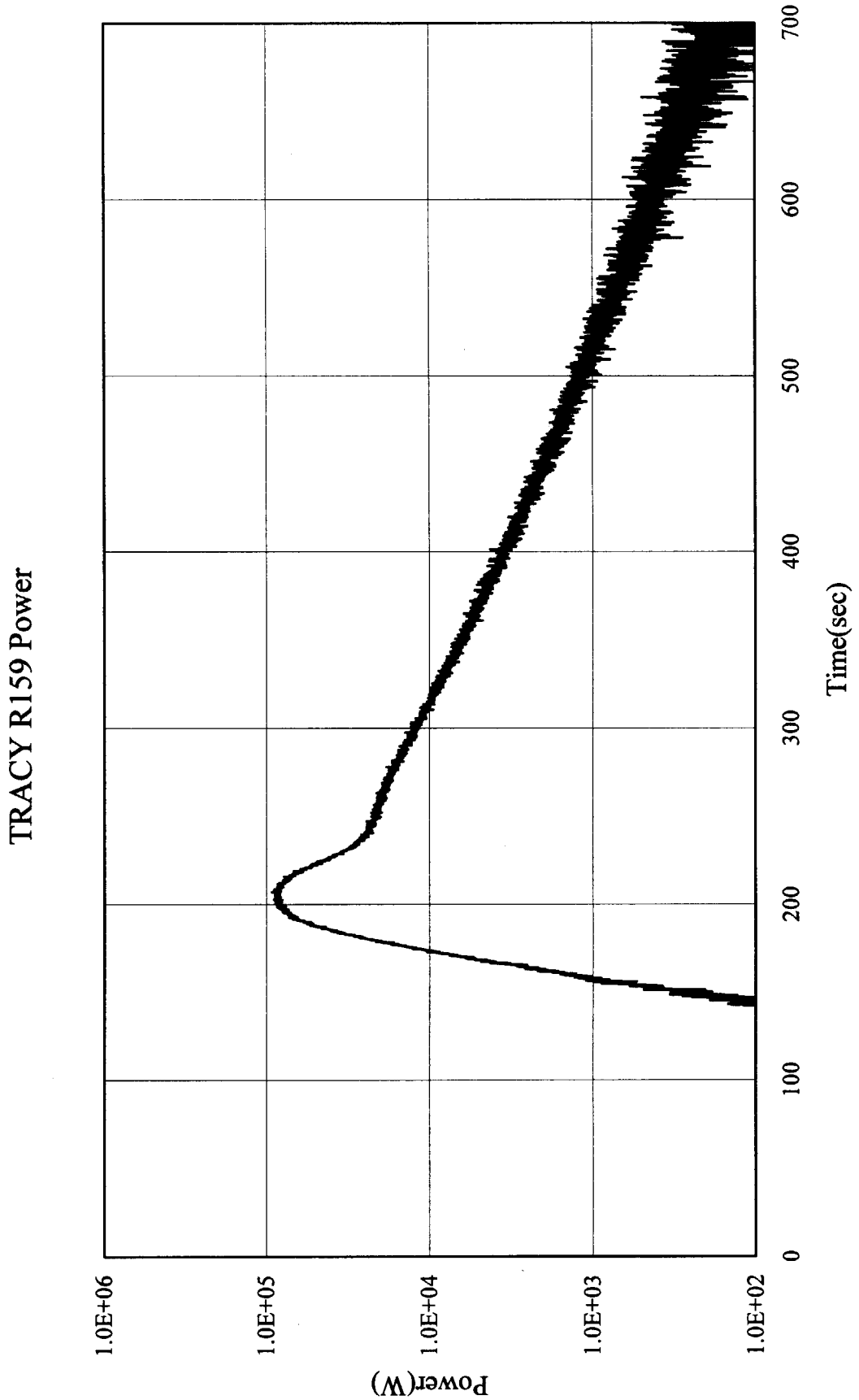

Fig. 3.7 (1) Run159 : Power

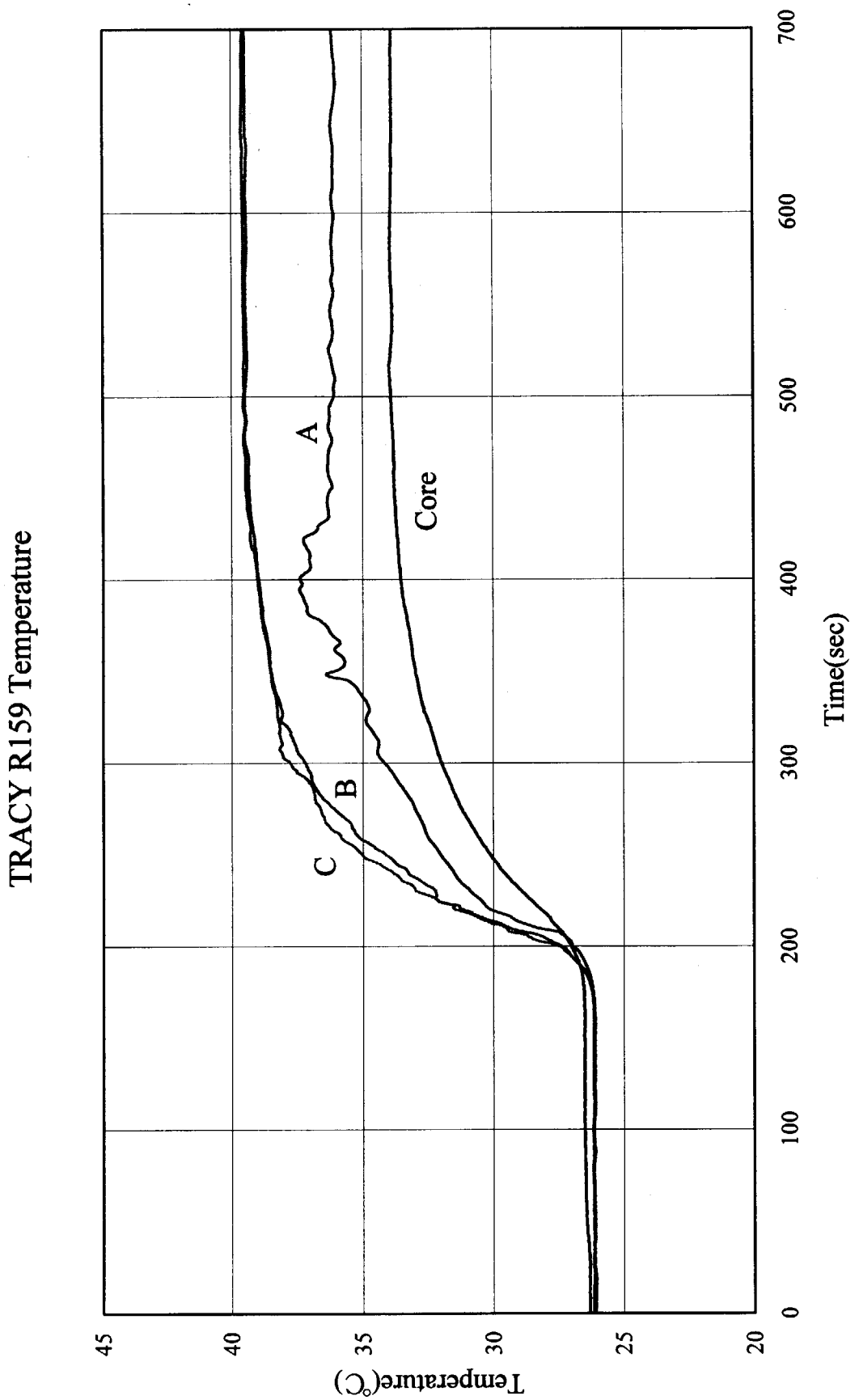

Fig. 3.7 (2) Run159 : Temperature(1)

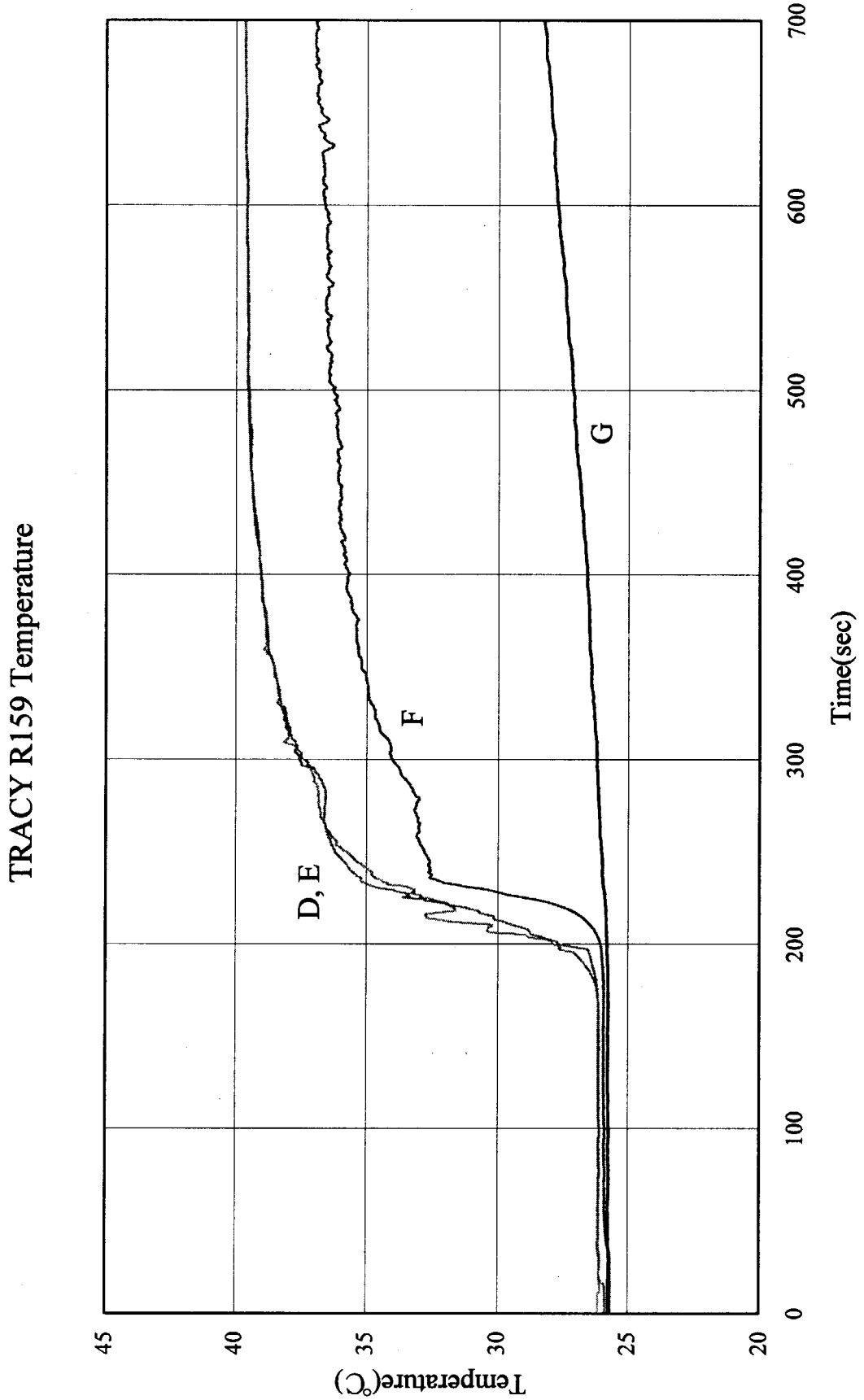

Fig. 3.7 (3) Run159 : Temperature(2)

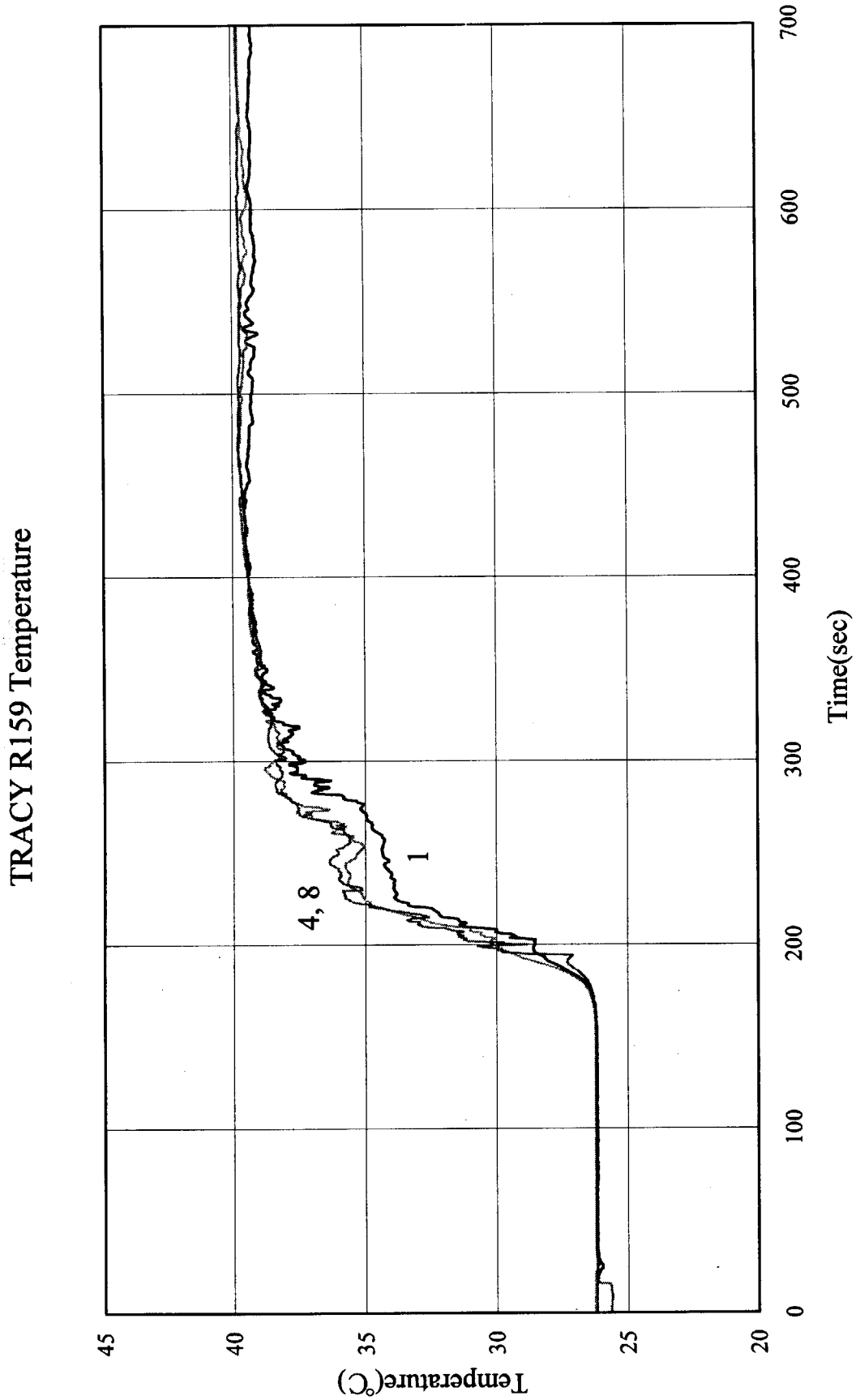

Fig. 3.7 (4) Run159 : Temperature(3)

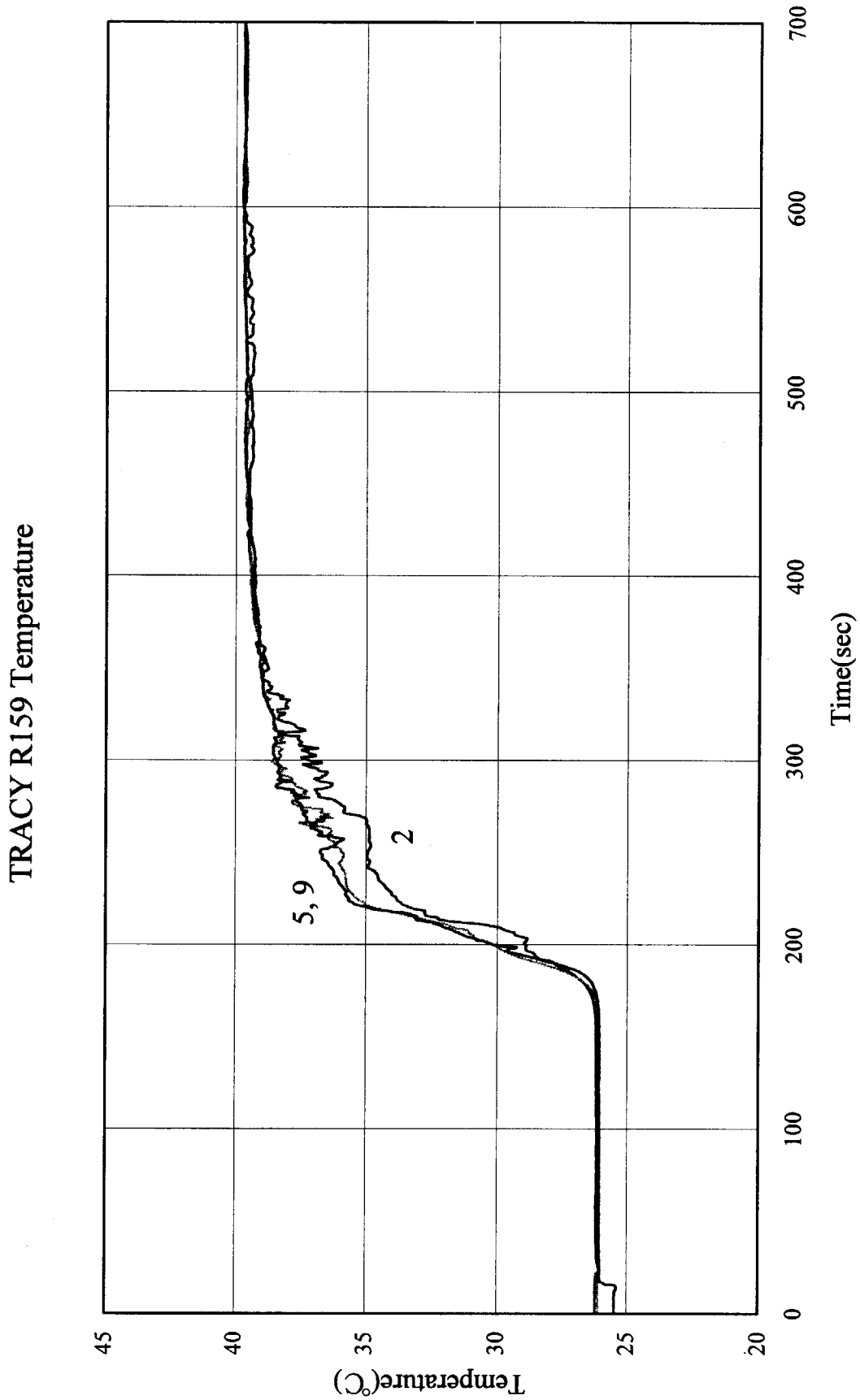

Fig. 3.7 (5) Run159 : Temperature(4)

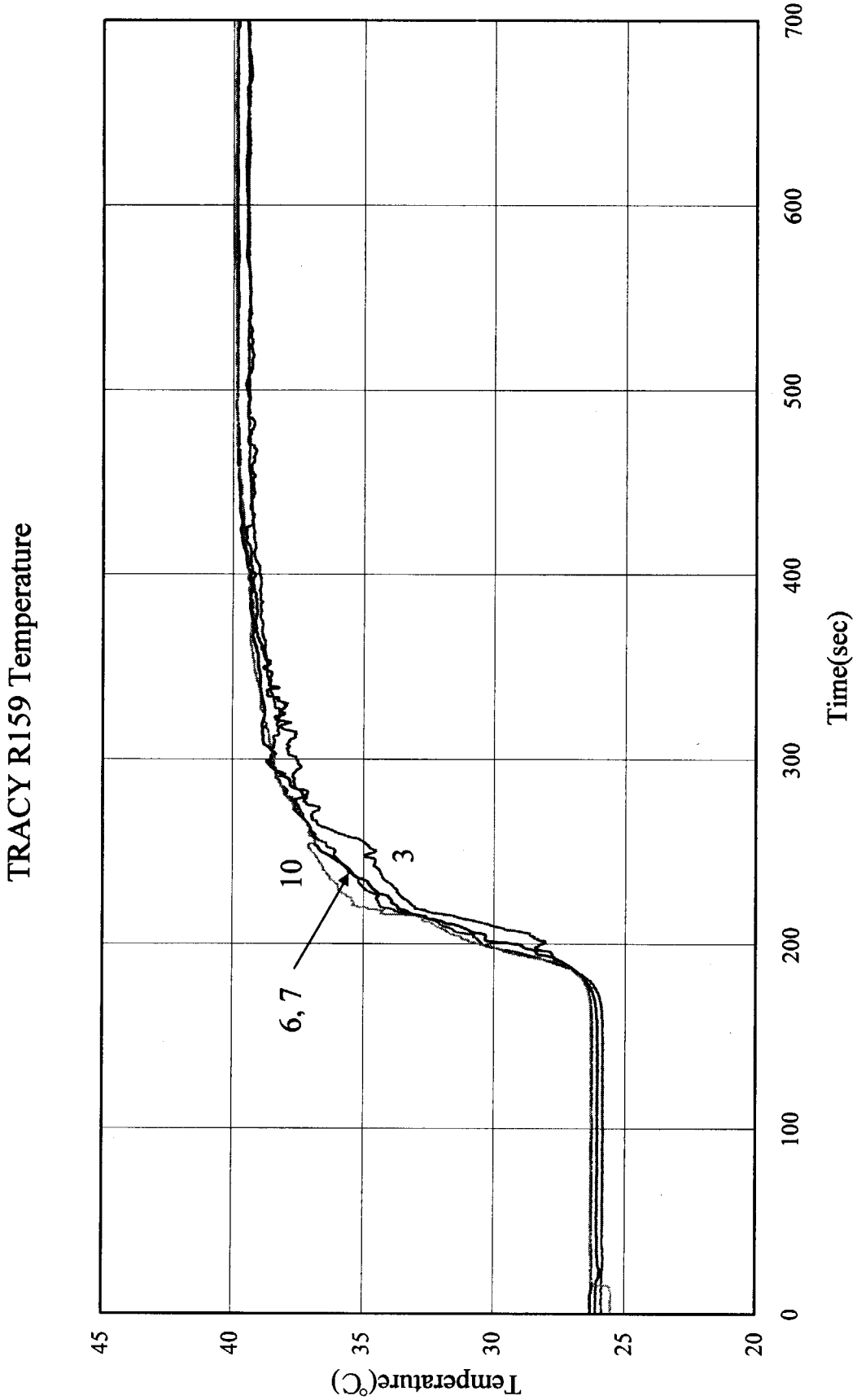

Fig. 3.7 (6) Run159 : Temperature(5)

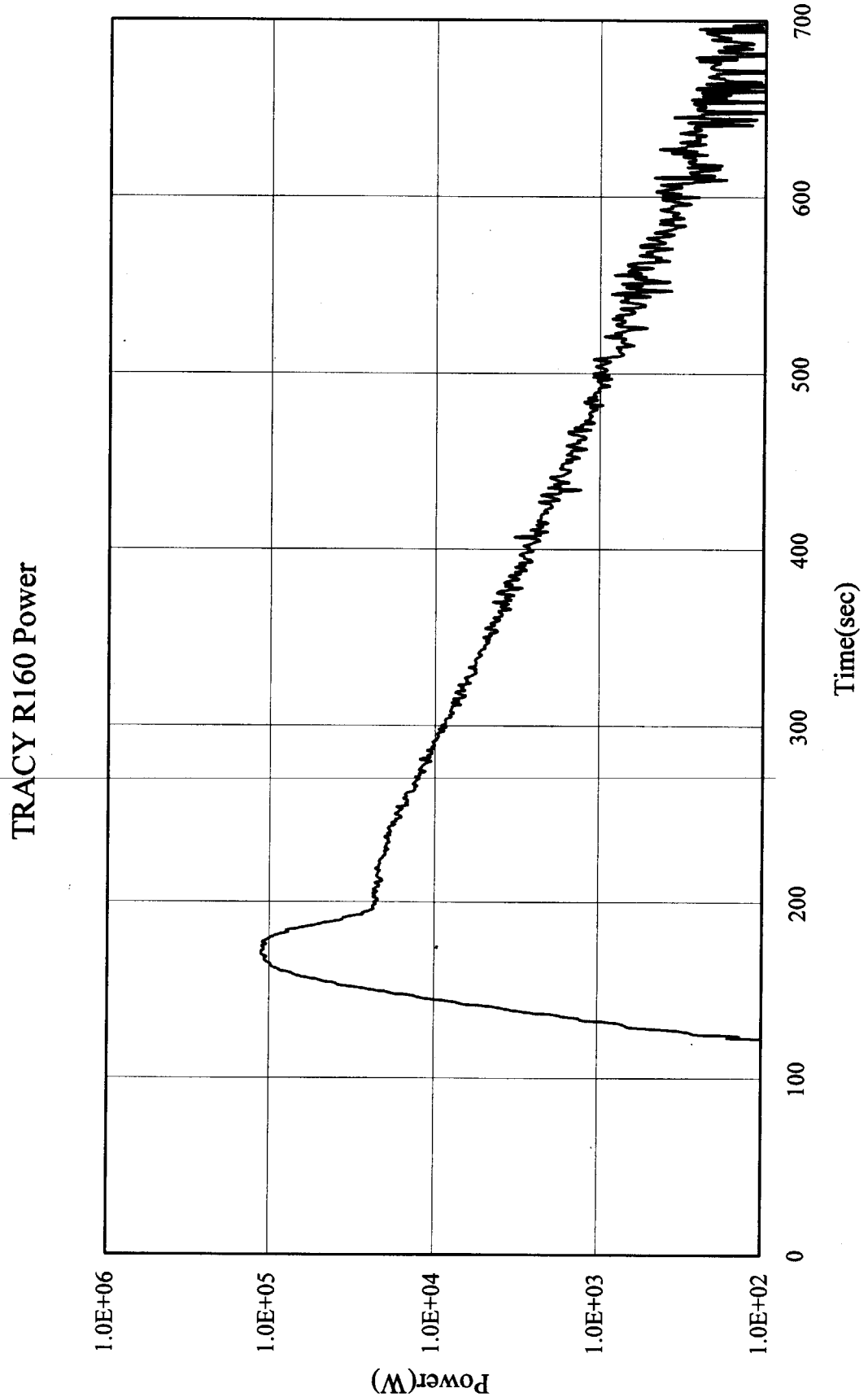

Fig. 3.8 (1) Run160 : Power

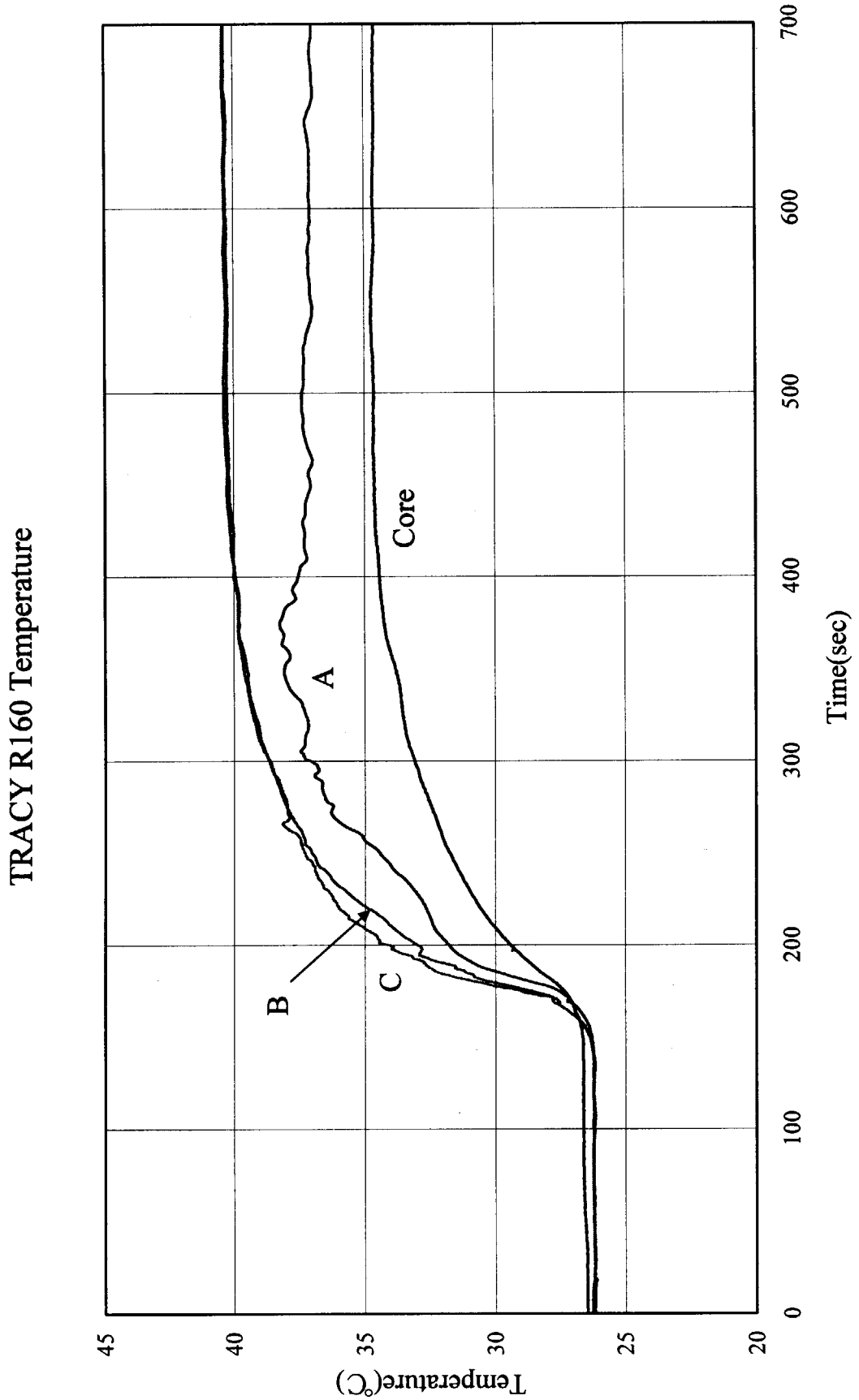

Fig. 3.8 (2) Run160 : Temperature(1)

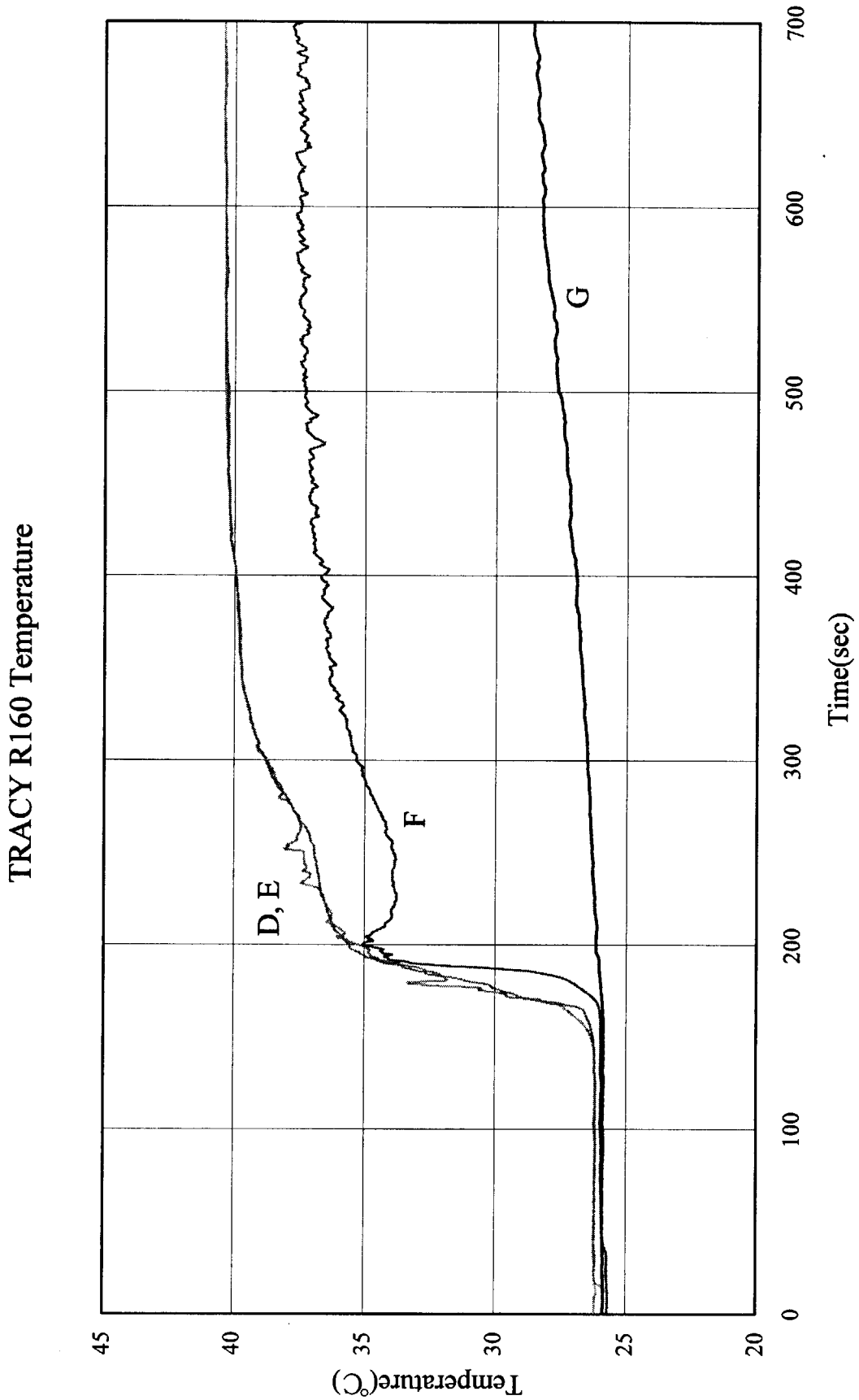

Fig. 3.8 (3) Run160 : Temperature(2)

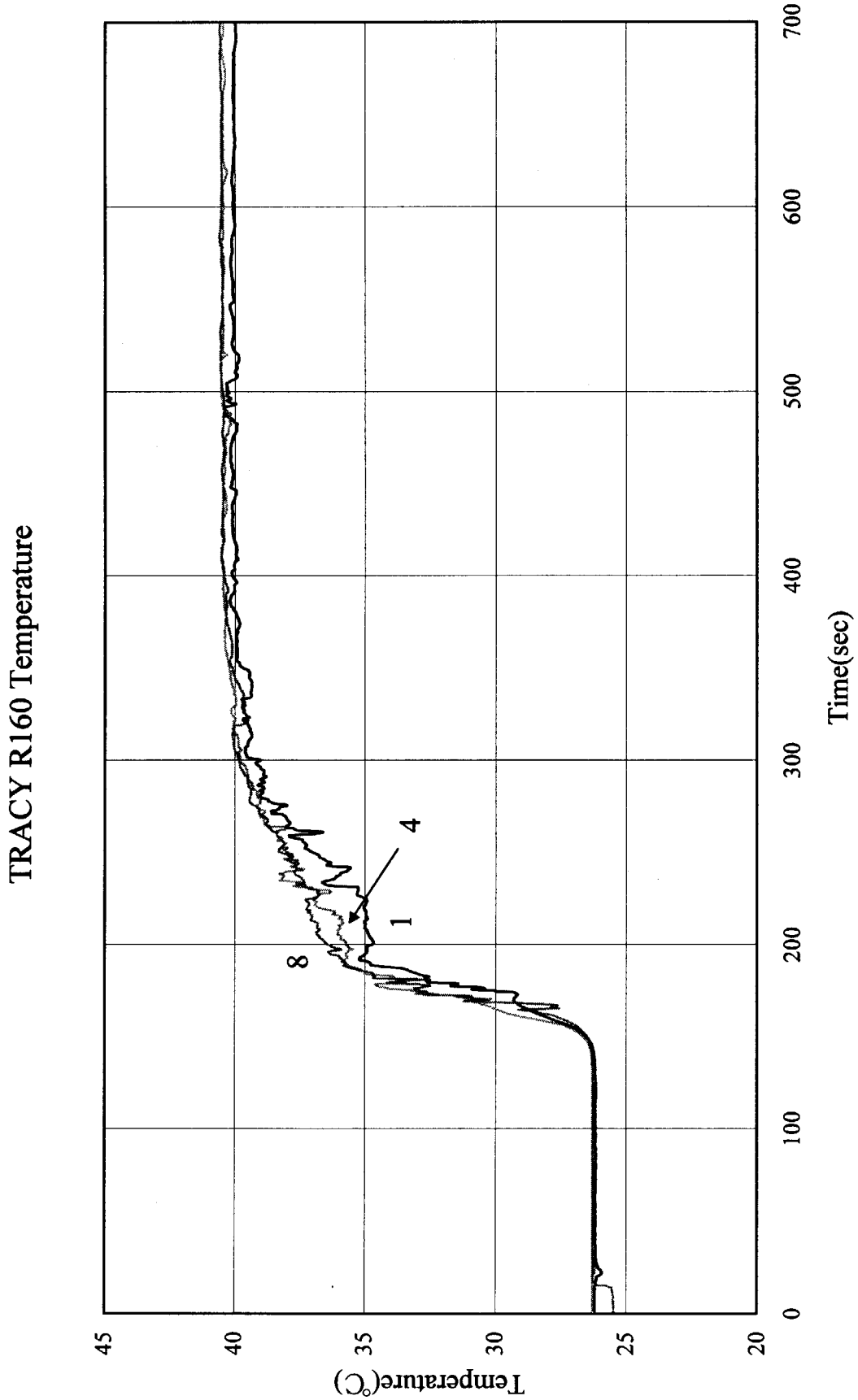

Fig. 3.8 (4) Run160 : Temperature(3)

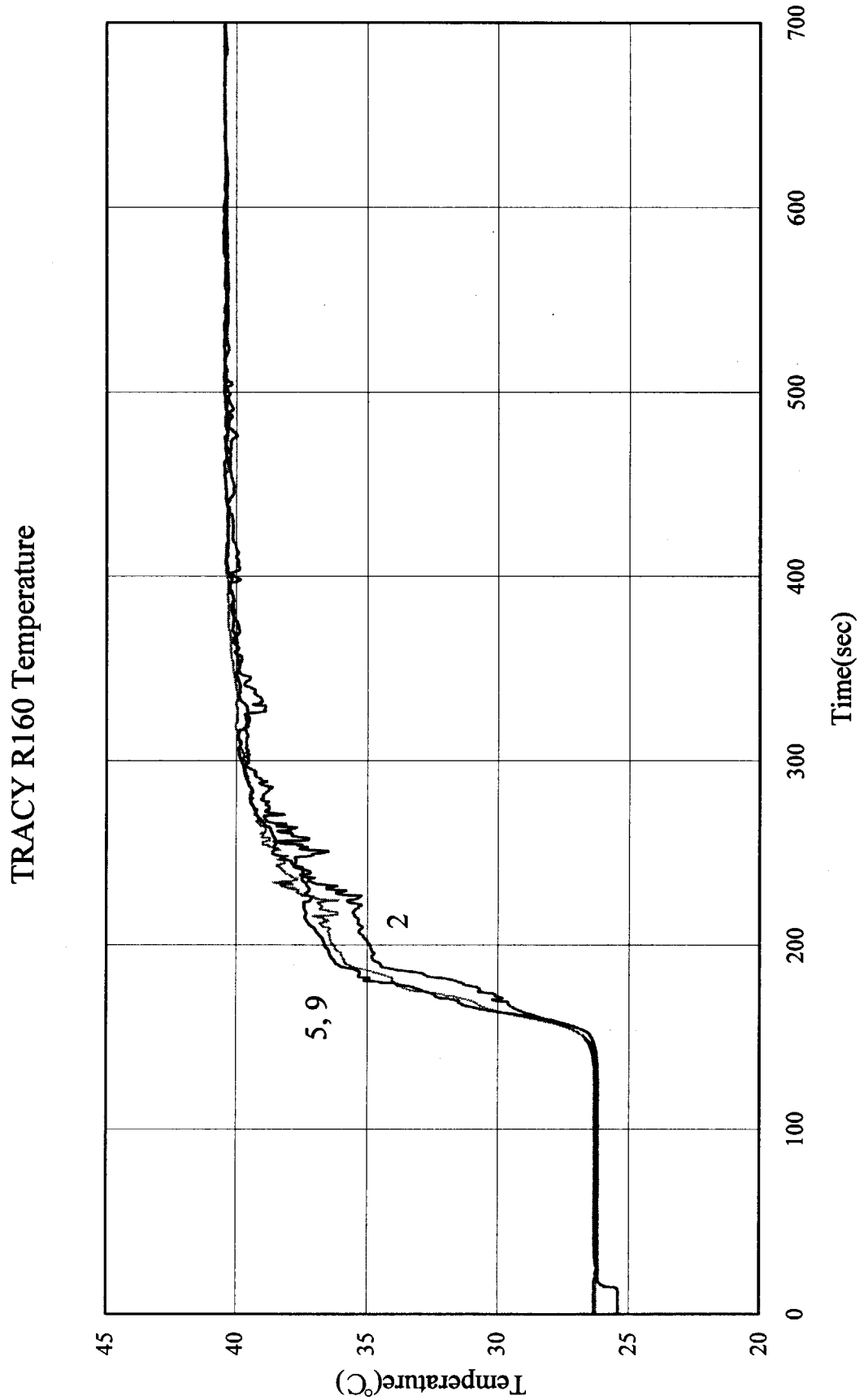

Fig. 3.8 (5) Run160 : Temperature(4)

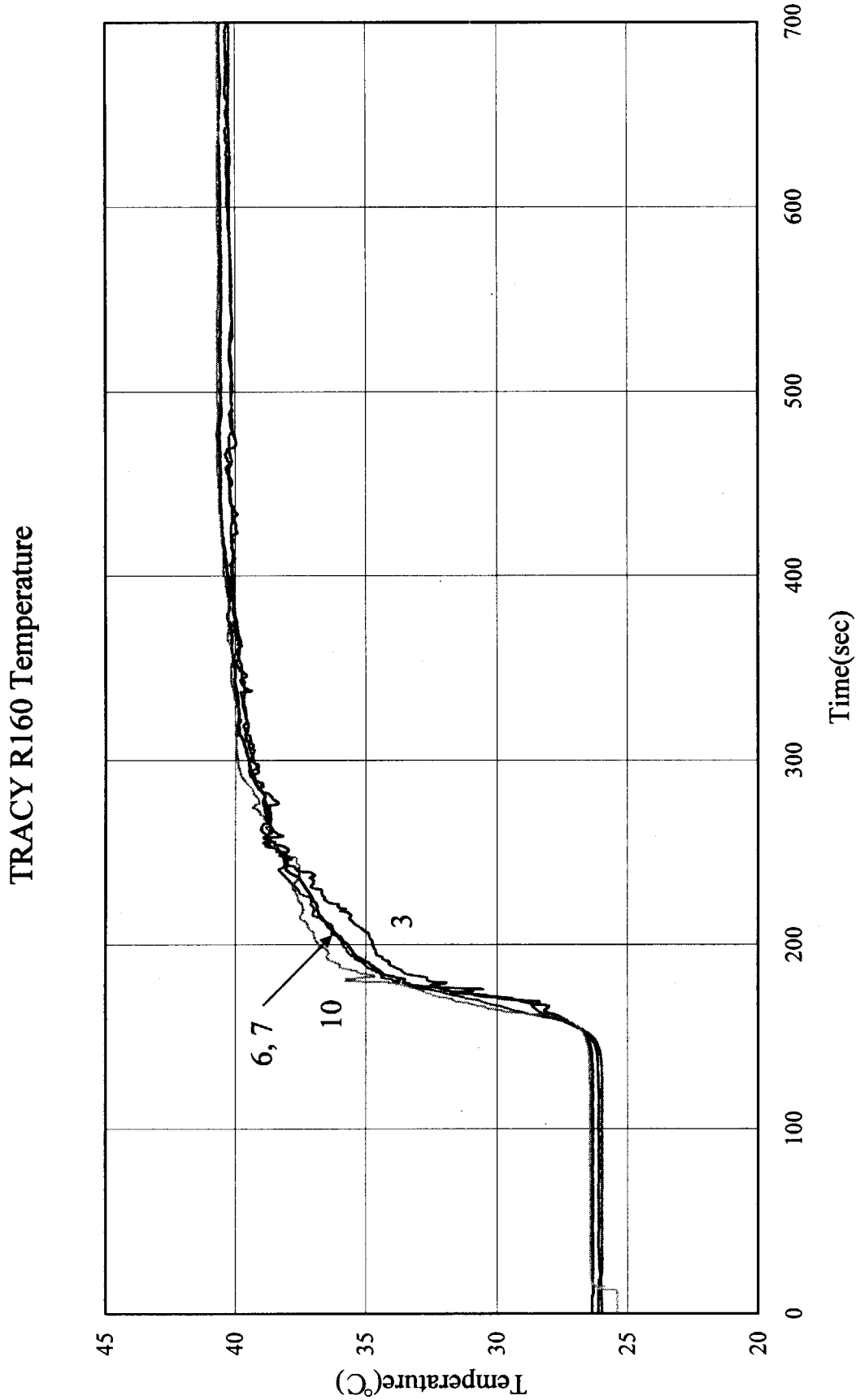

Fig. 3.8 (6) Run160 : Temperature(5)

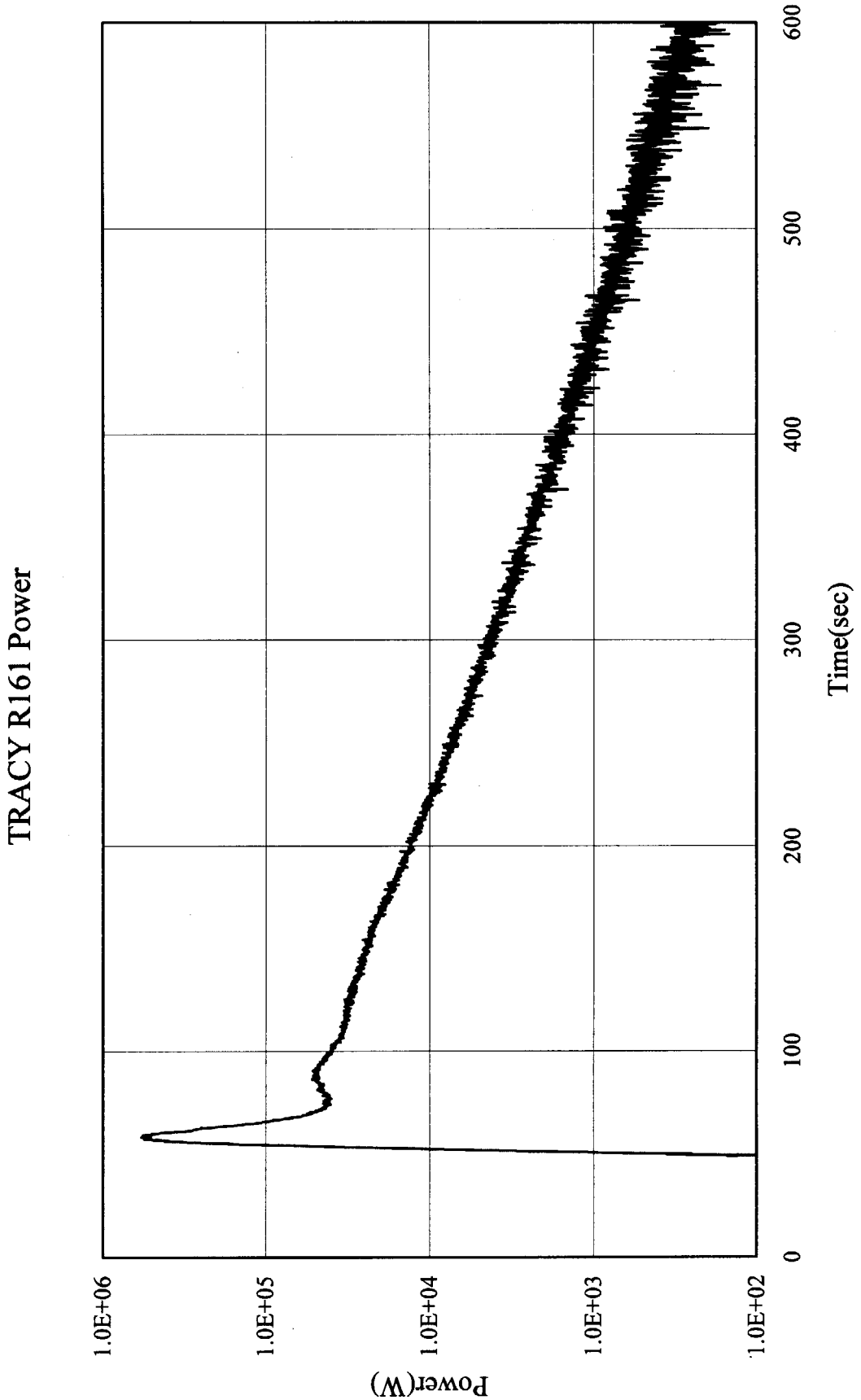

Fig. 3.9 (1) Run161 : Power

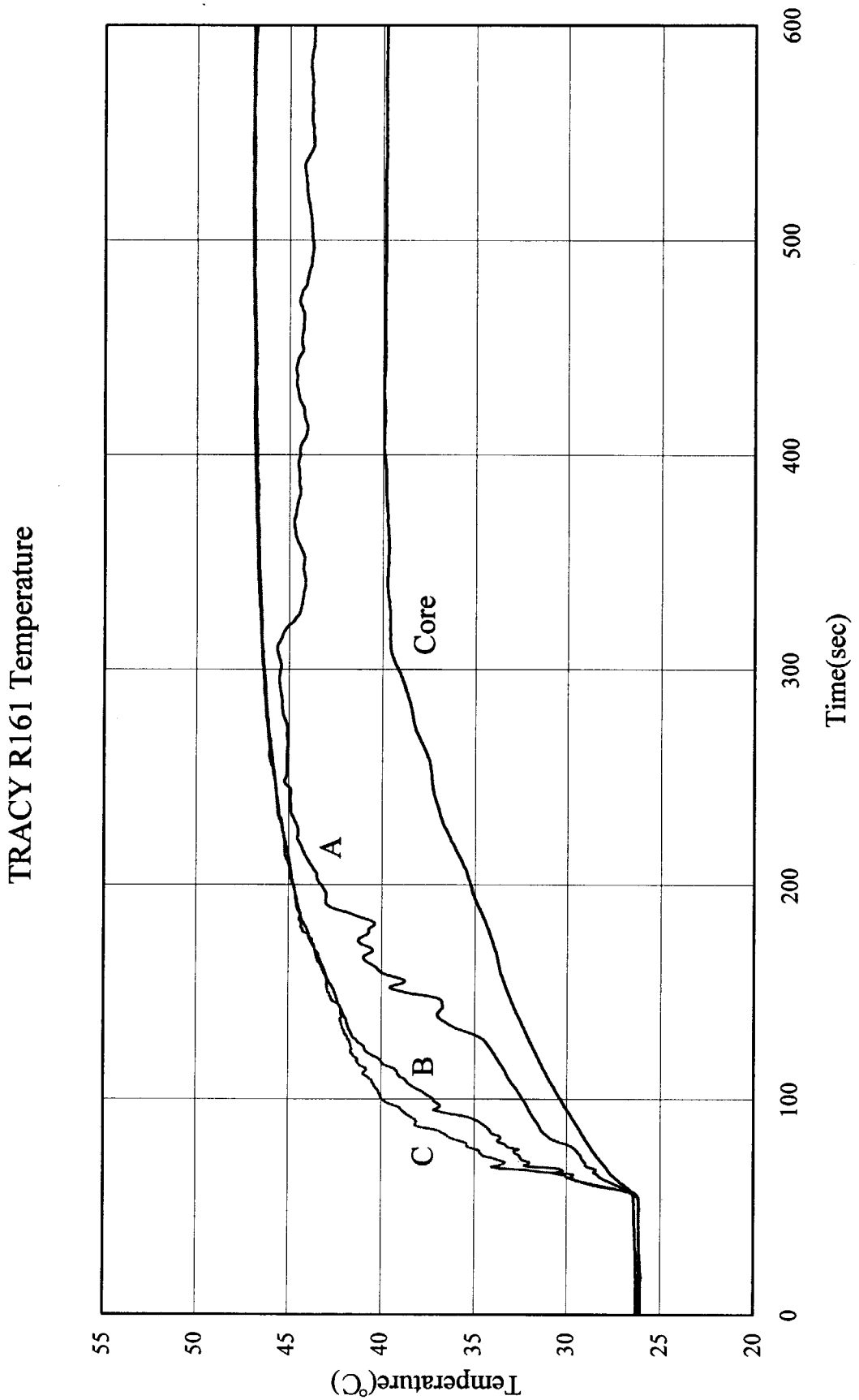

Fig. 3.9 (2) Run161 : Temperature(1)

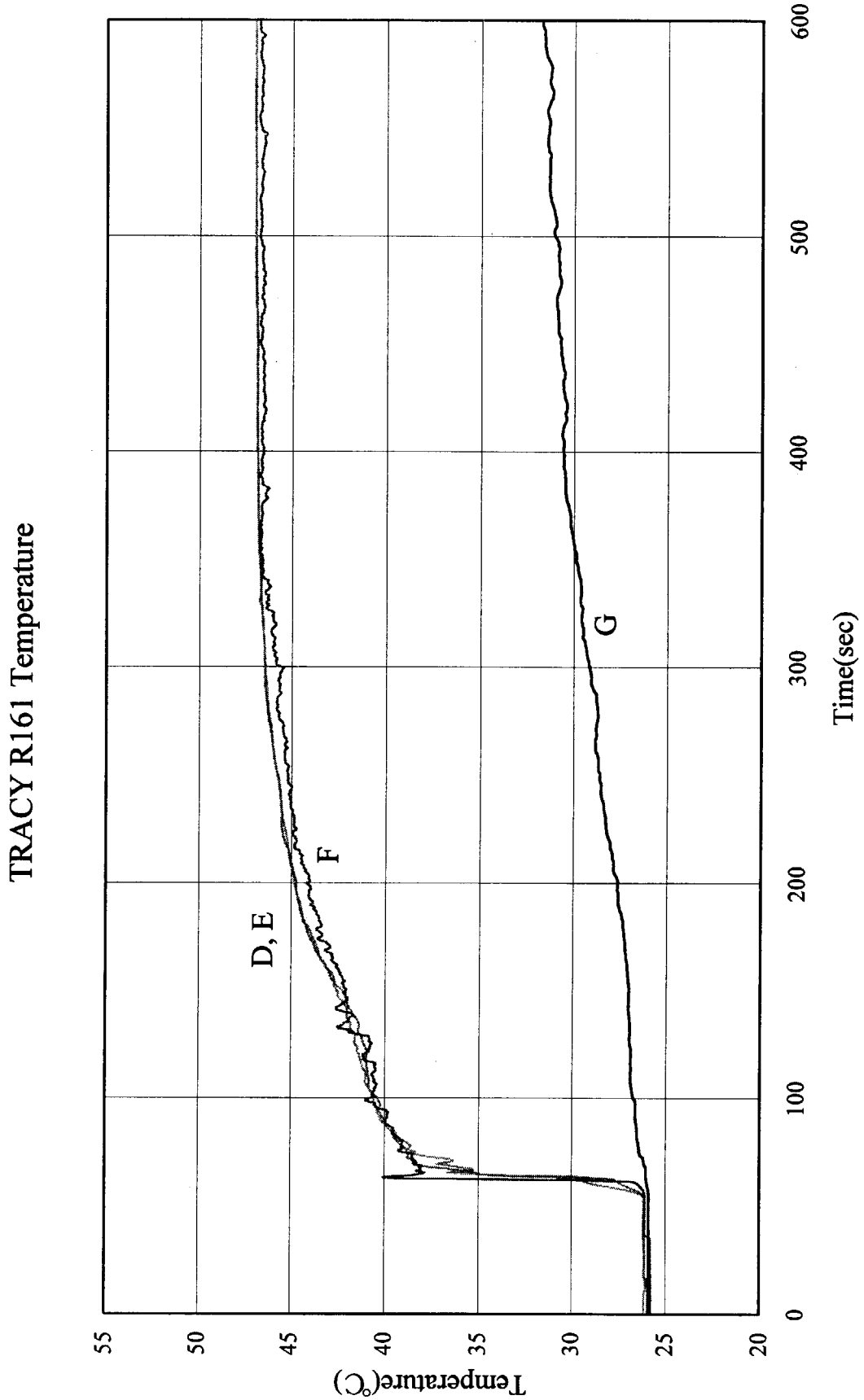

Fig. 3.9 (3) Run161 : Temperature(2)

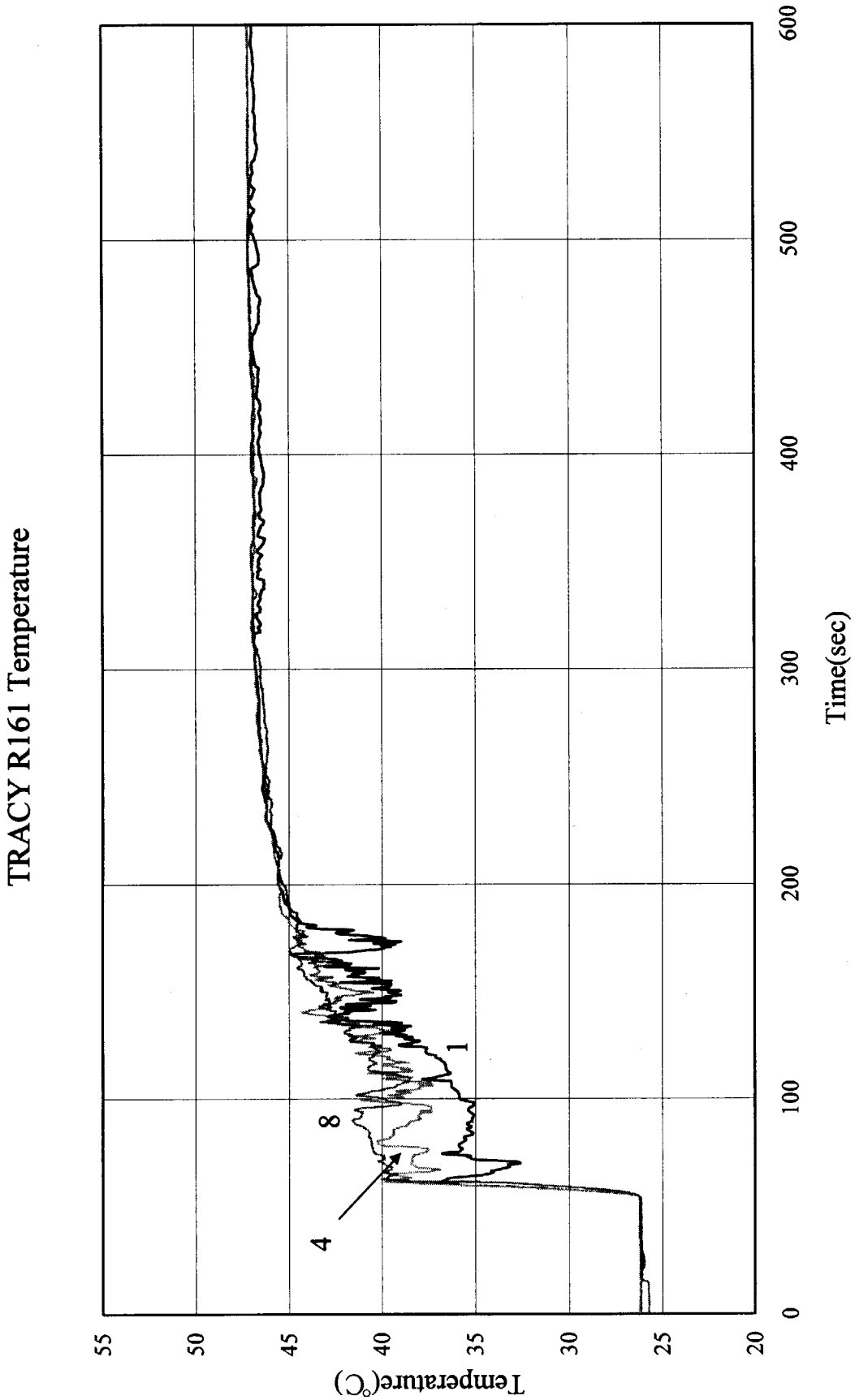

Fig. 3.9 (4) Run161 : Temperature(3)

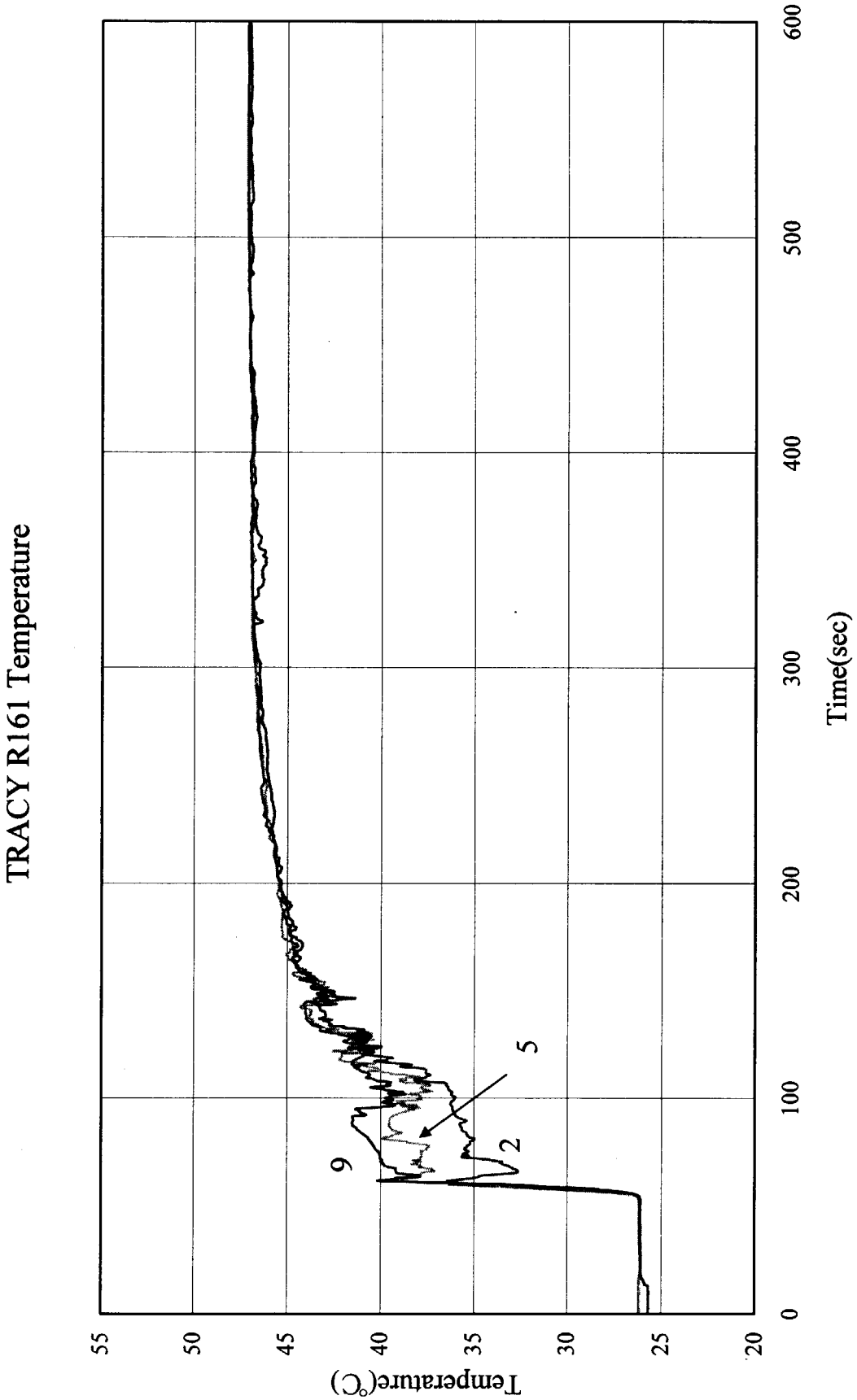

Fig. 3.9 (5) Run161 : Temperature(4)

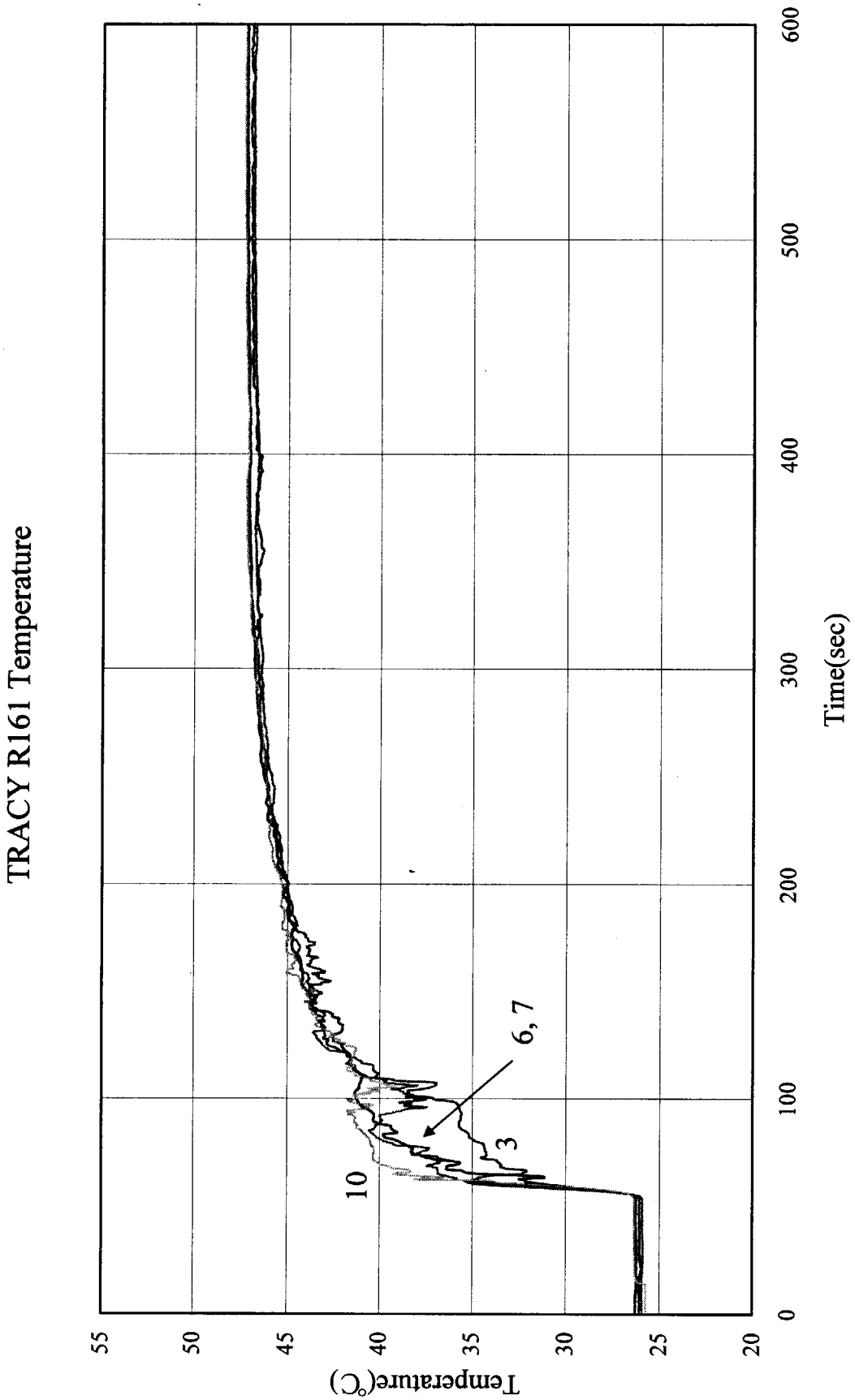

Fig. 3.9 (6) Run161 : Temperature(5)

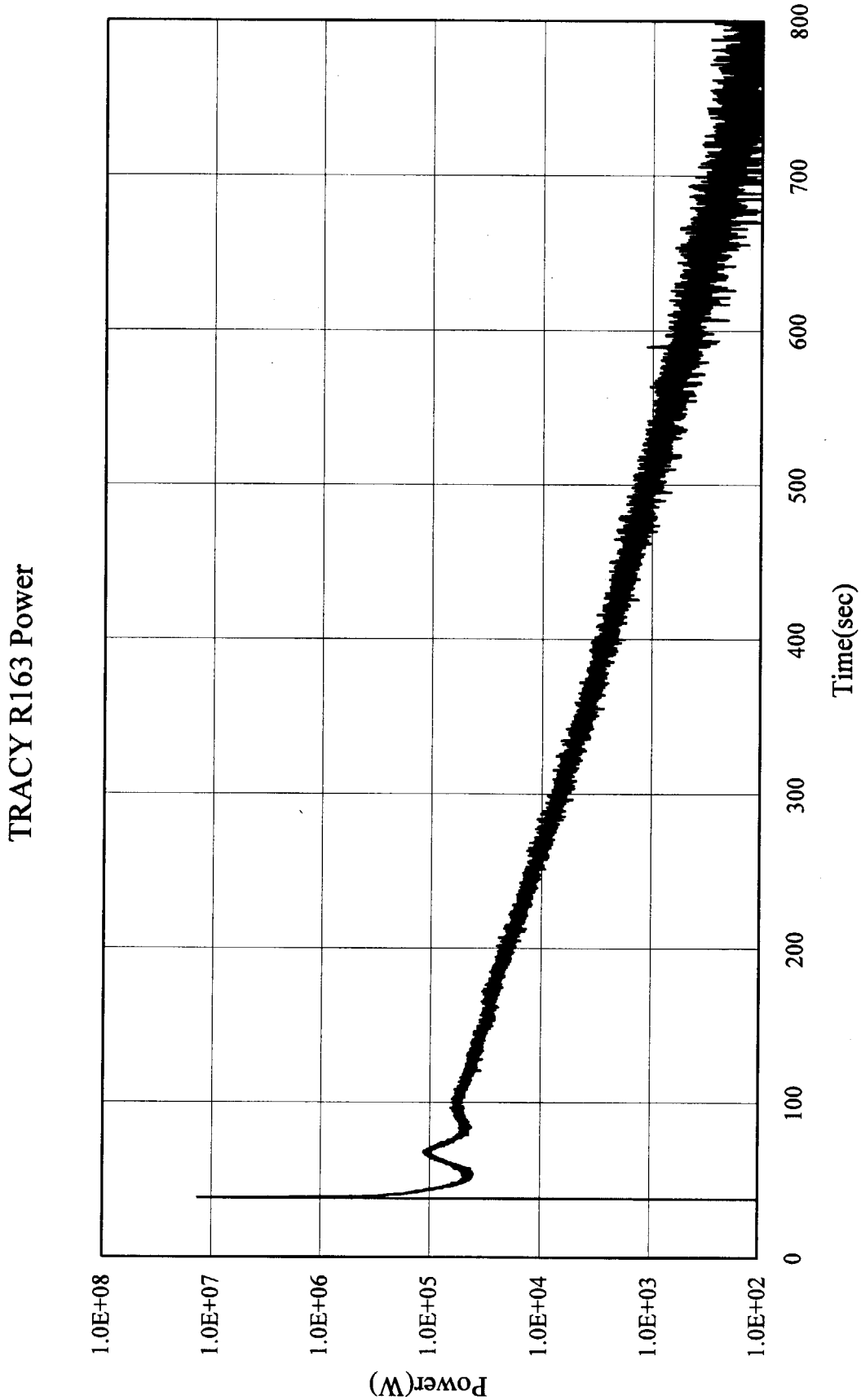

Fig. 3.10 (1) Run163 : Power

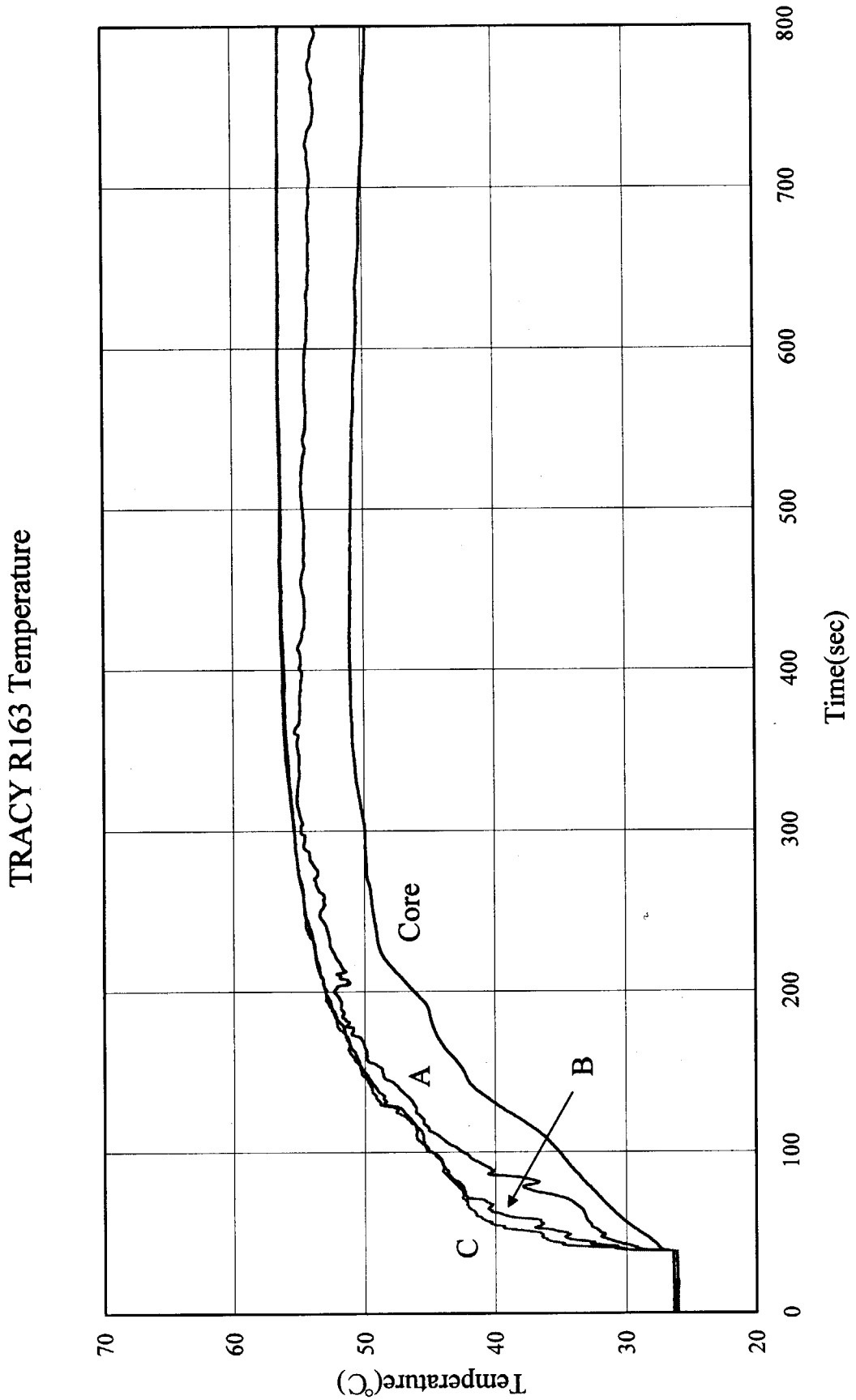

Fig. 3.10 (2) Run163 : Temperature(1)

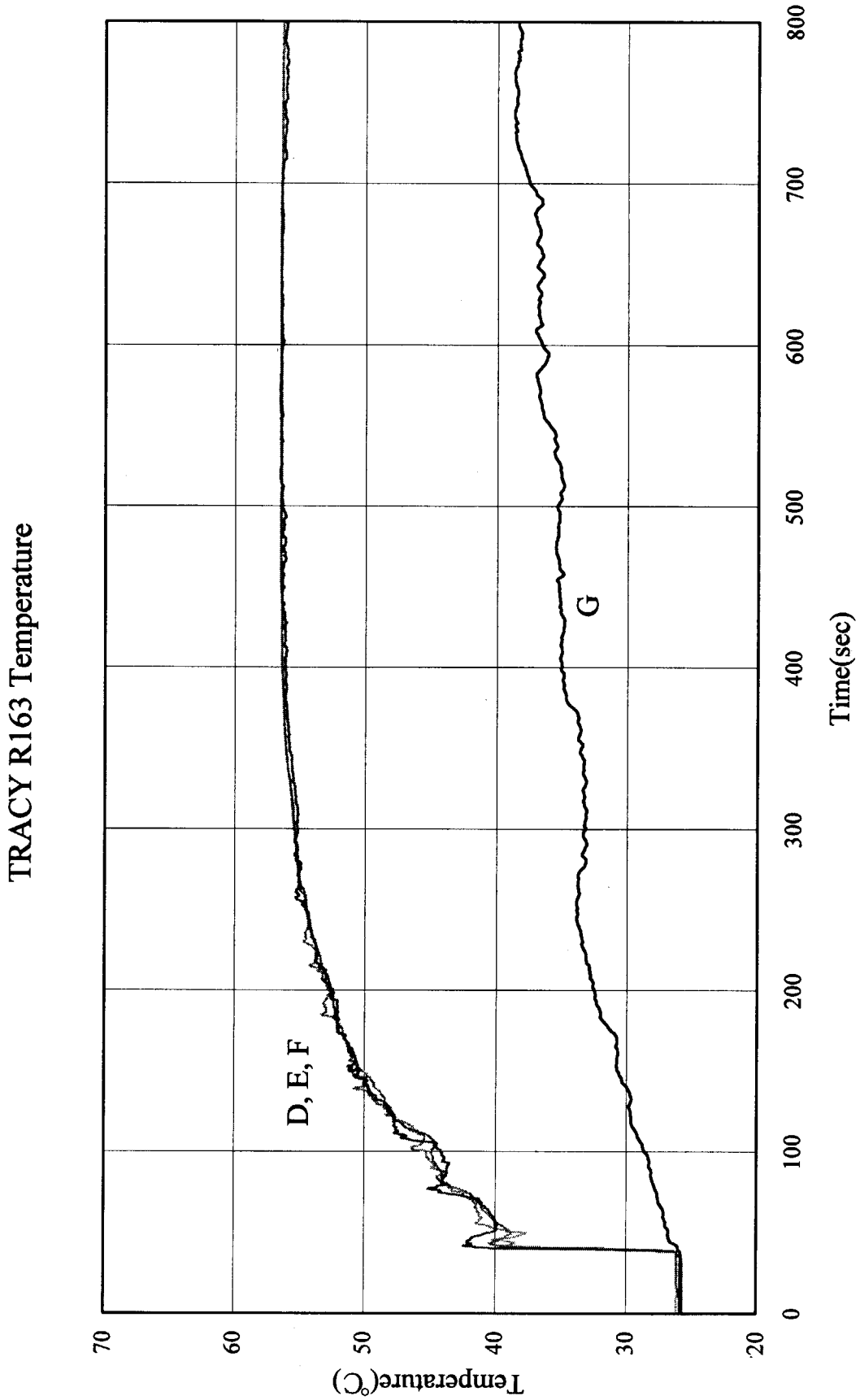

Fig. 3.10 (3) Run163 : Temperature(2)

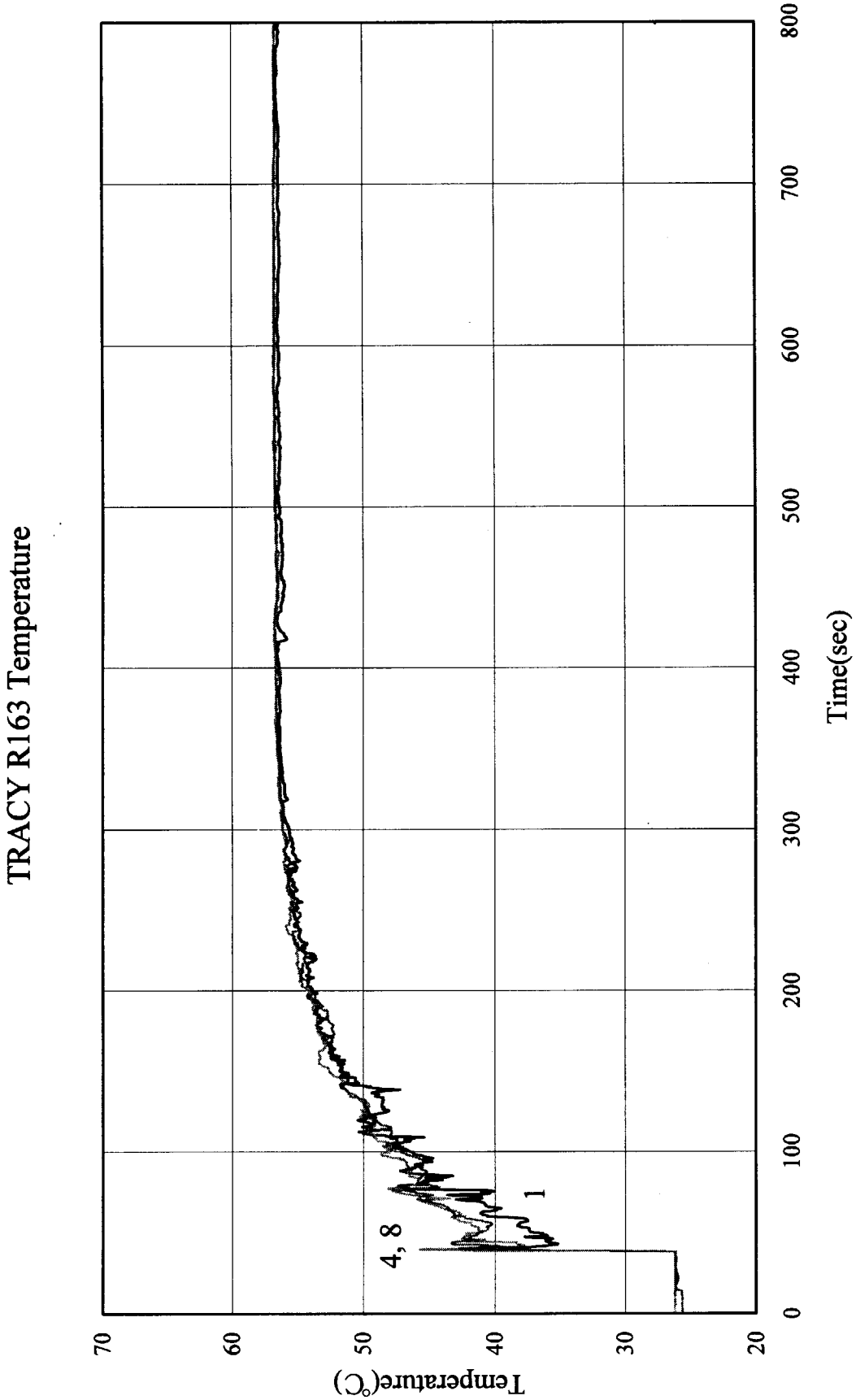

Fig. 3.10 (4) Run163 : Temperature(3)

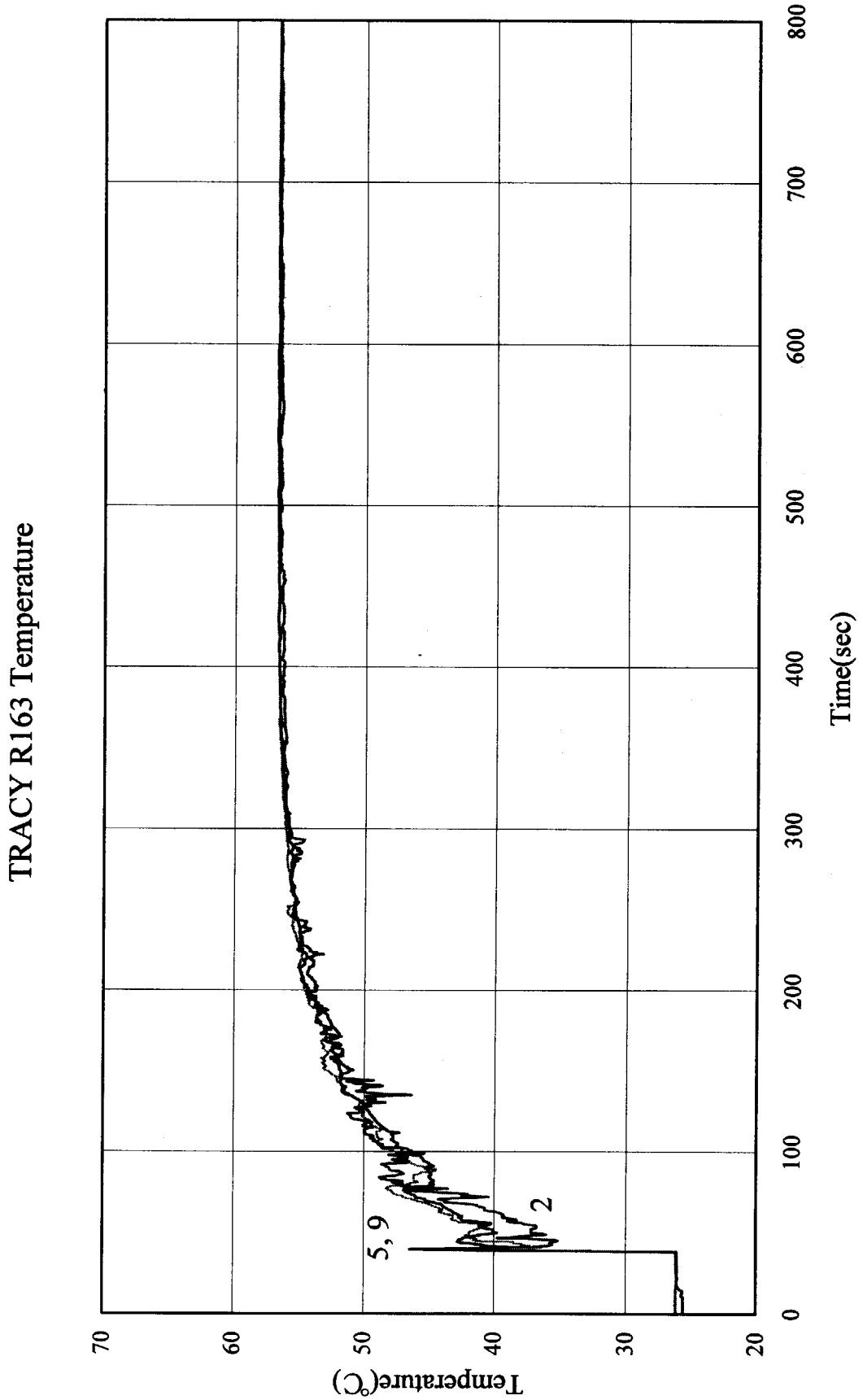

Fig. 3.10 (5) Run163 : Temperature(4)

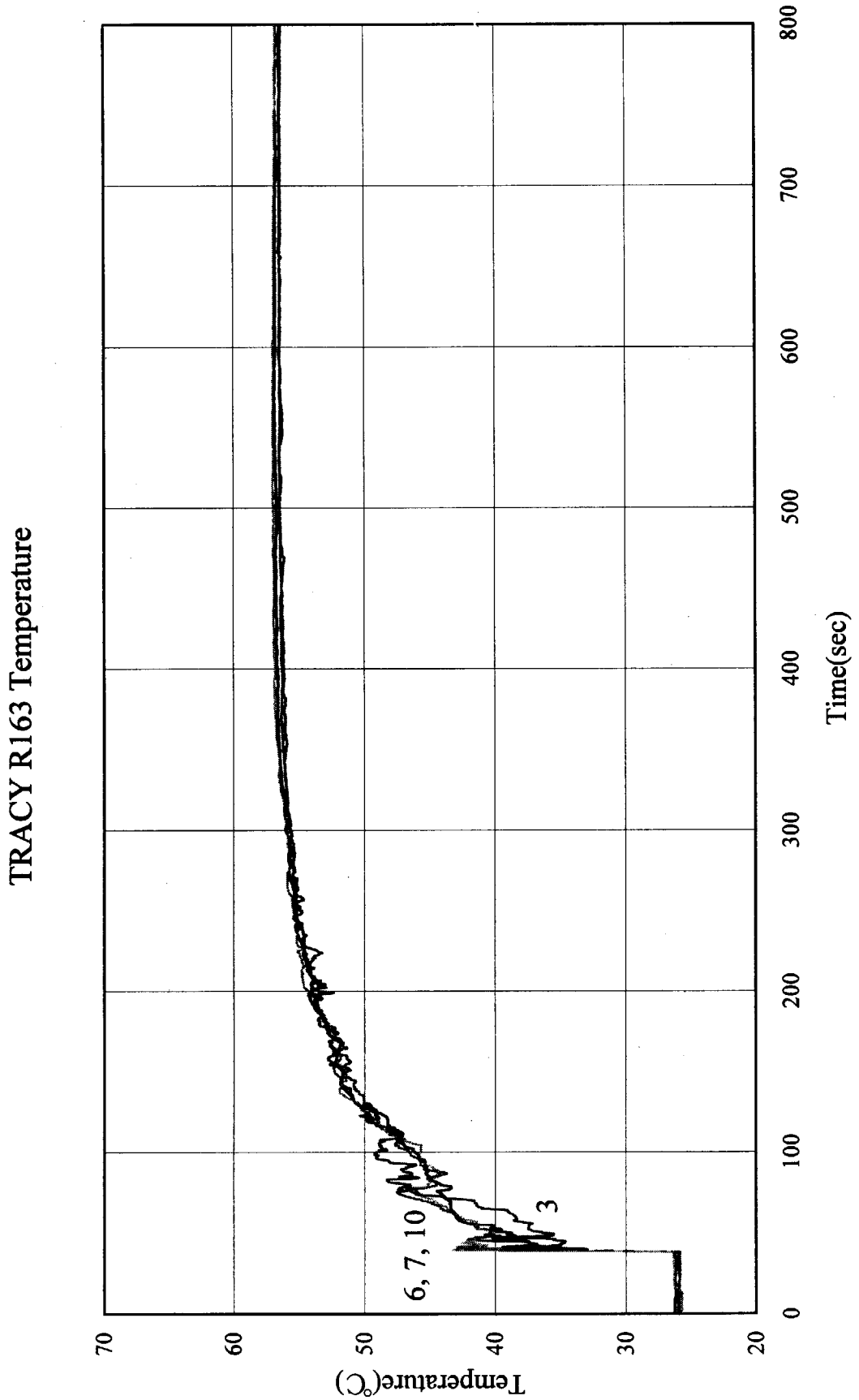

Fig. 3.10 (6) Run163 : Temperature(5)

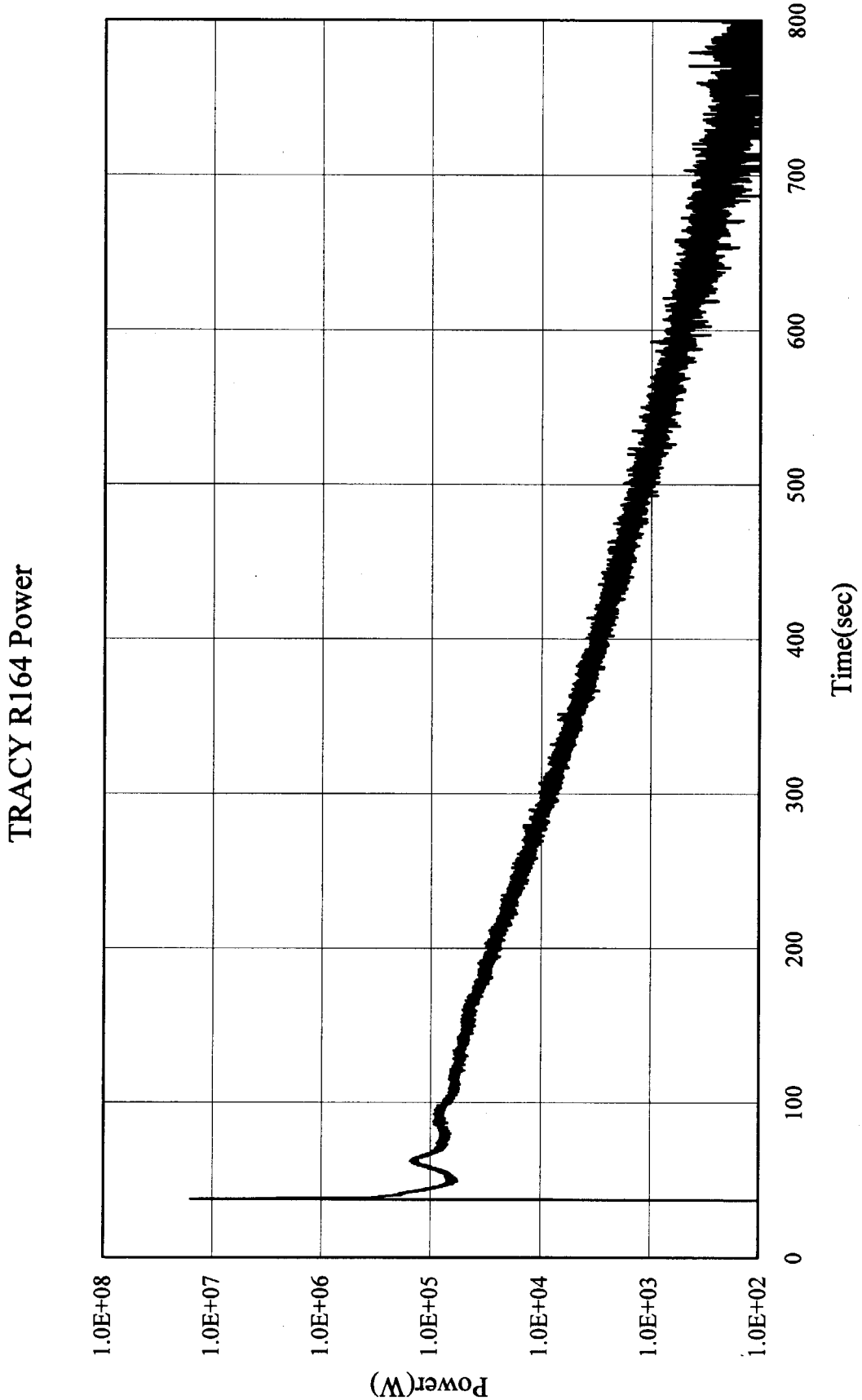

Fig. 3.11 (1) Run164 : Power

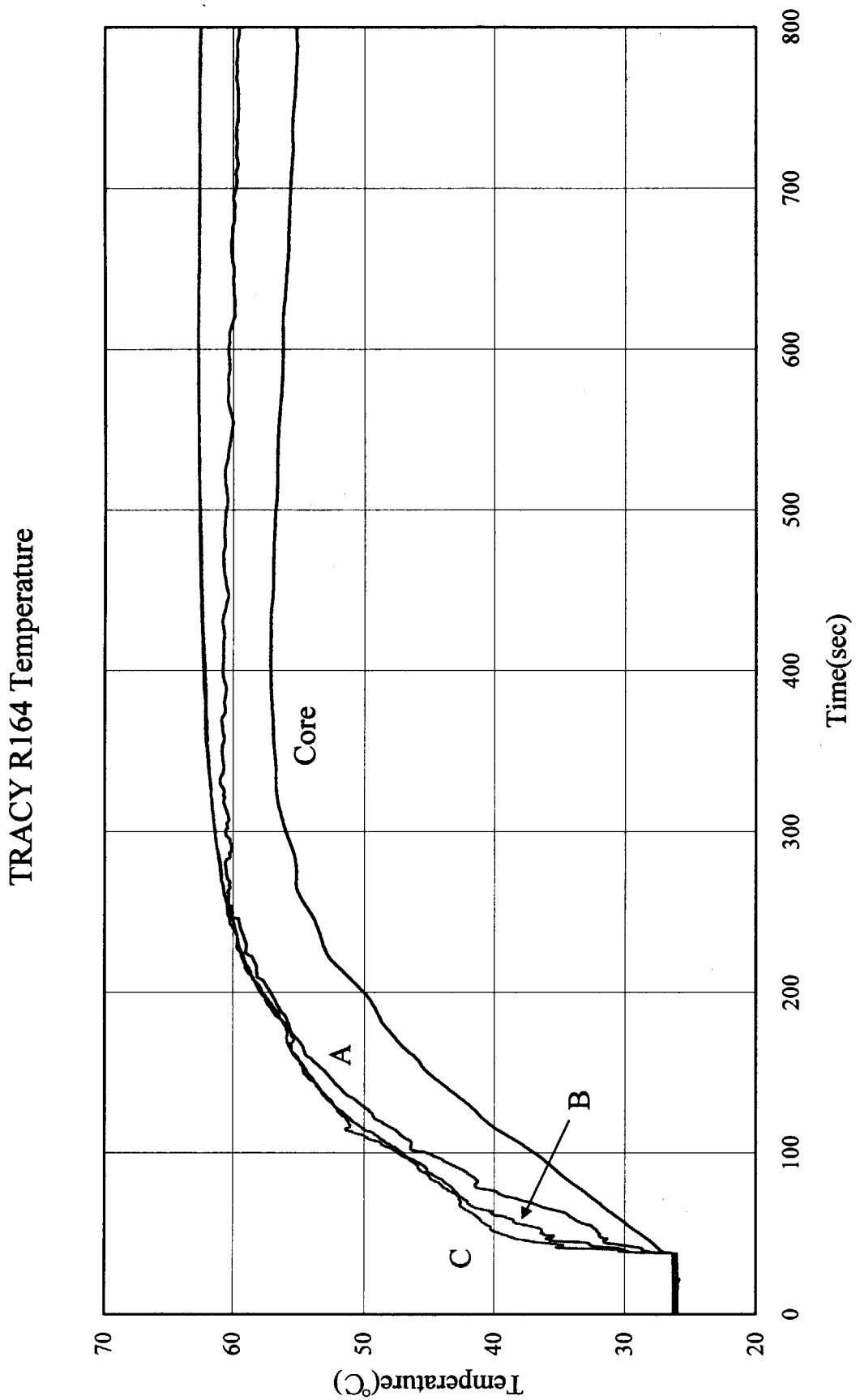

Fig. 3.11 (2) Run164 : Temperature(1)

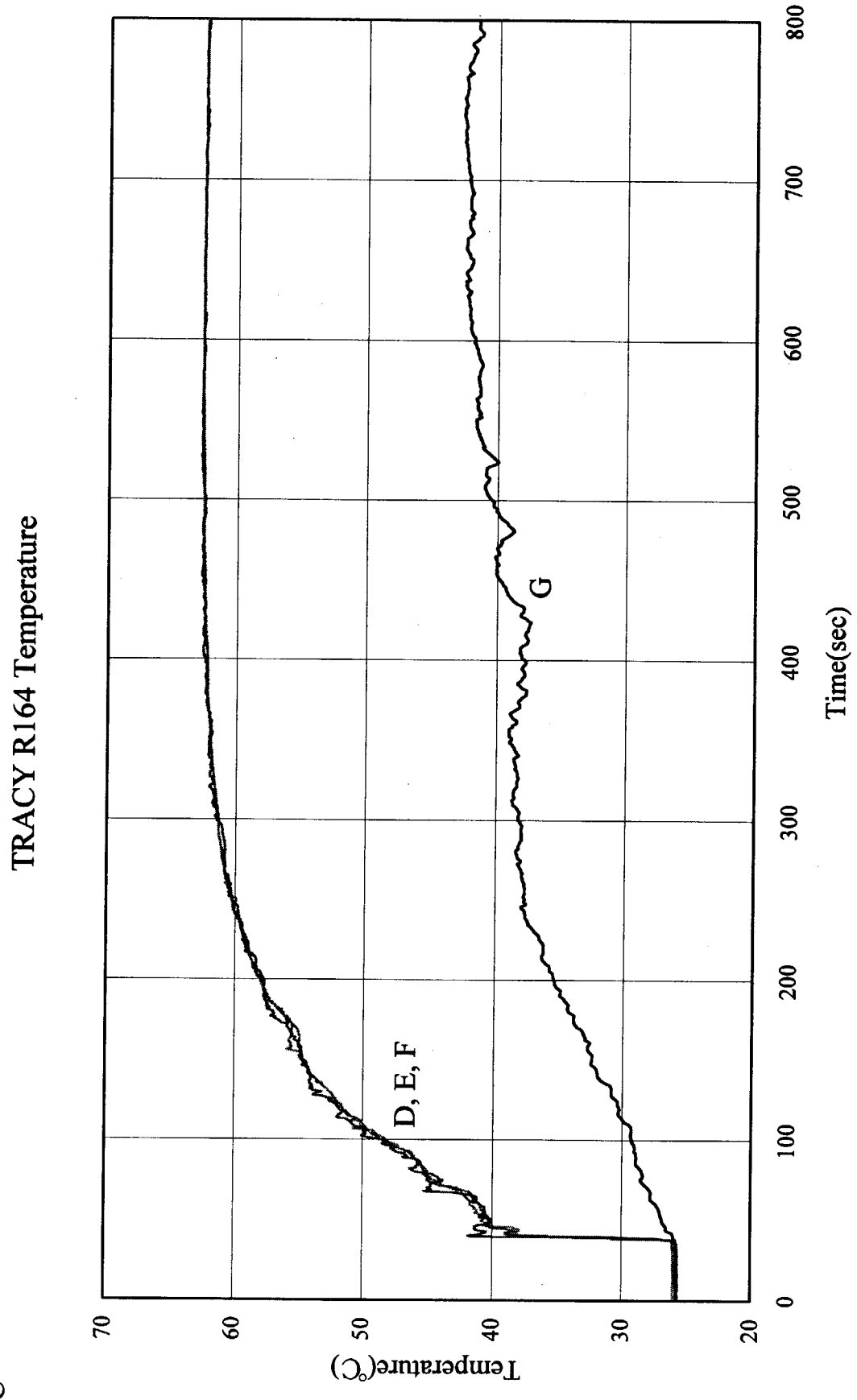

Fig. 3.11 (3) Run164 : Temperature(2)

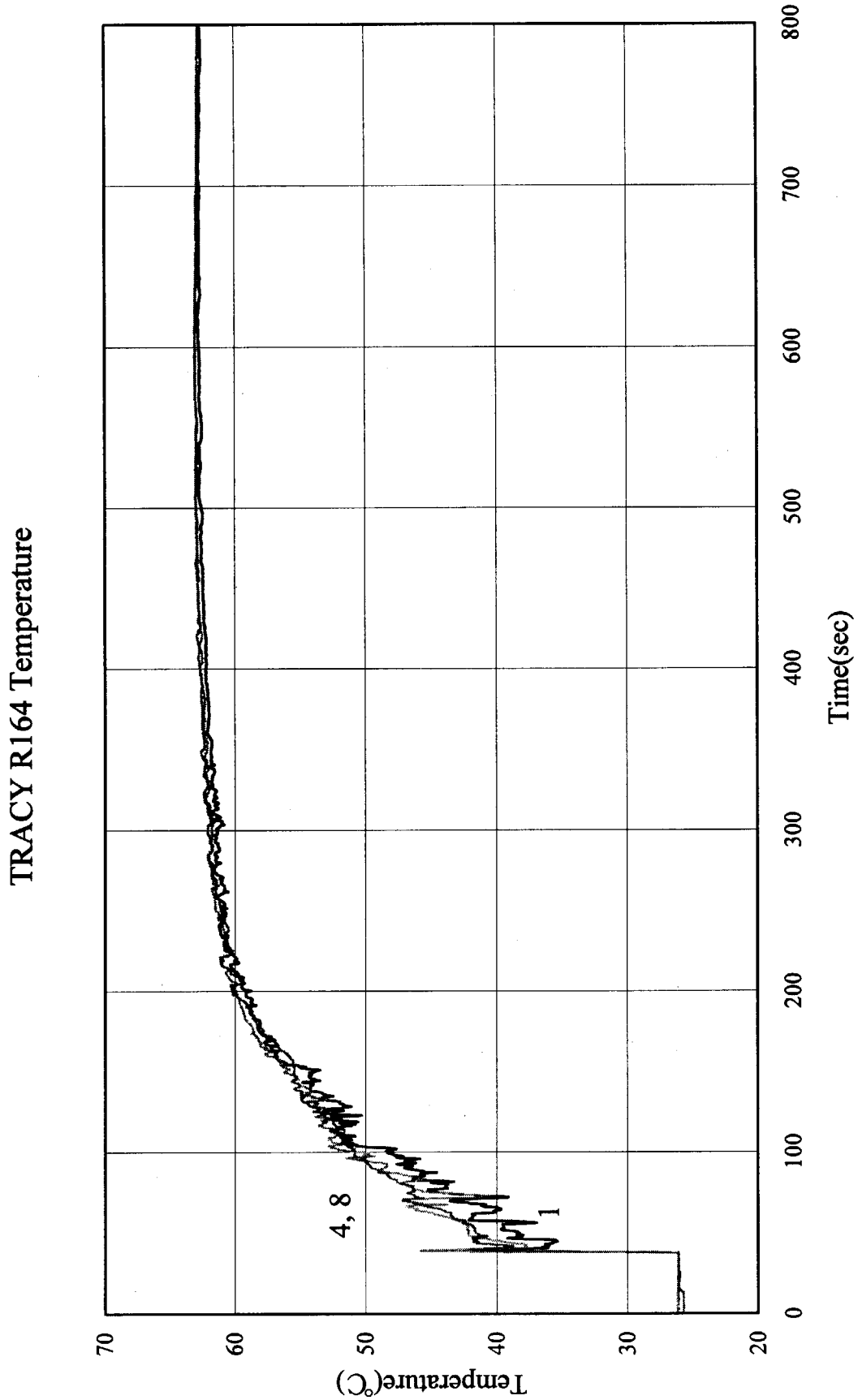

Fig. 3.11 (4) Run164 : Temperature(3)

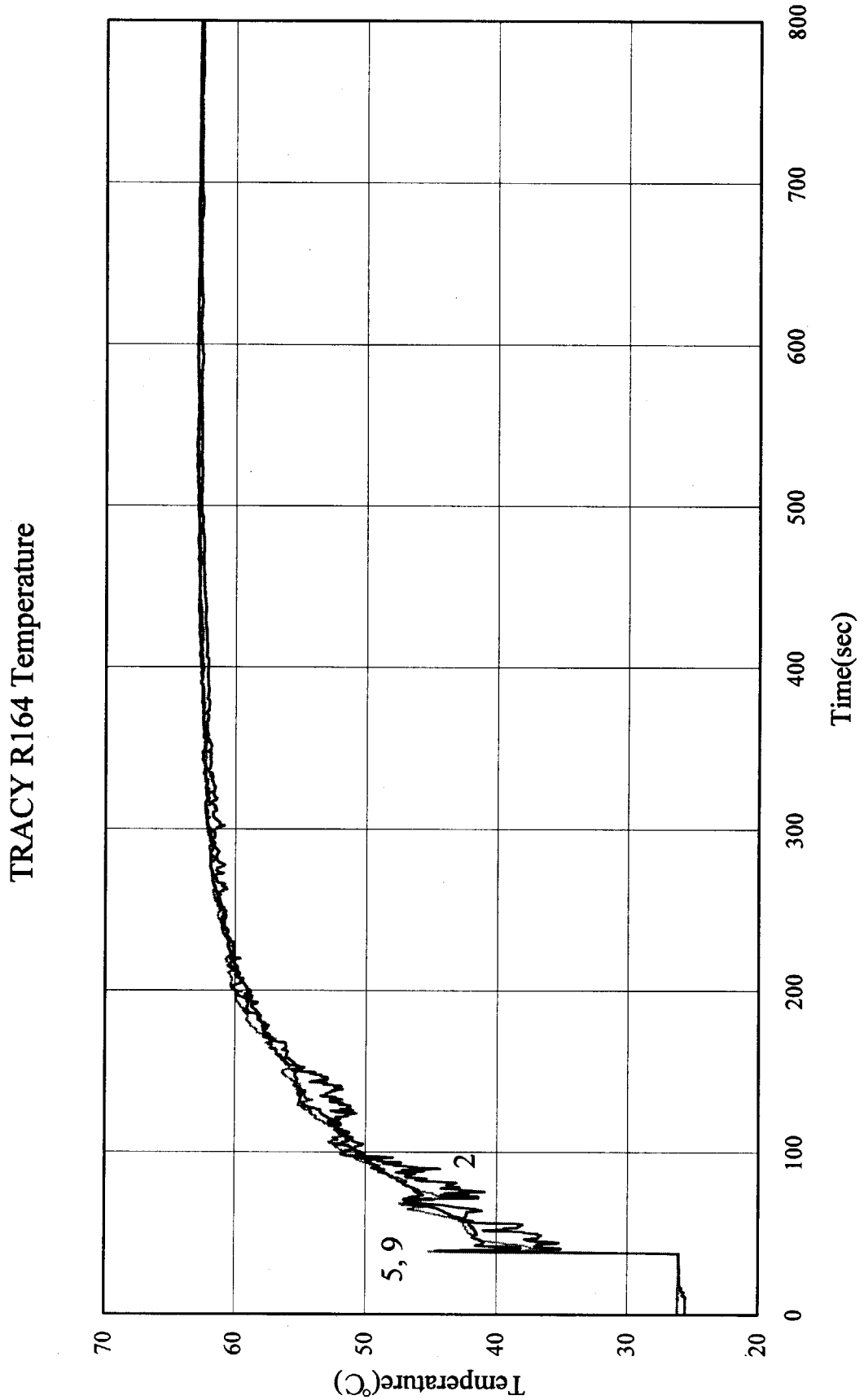

Fig. 3.11 (5) Run164 : Temperature(4)

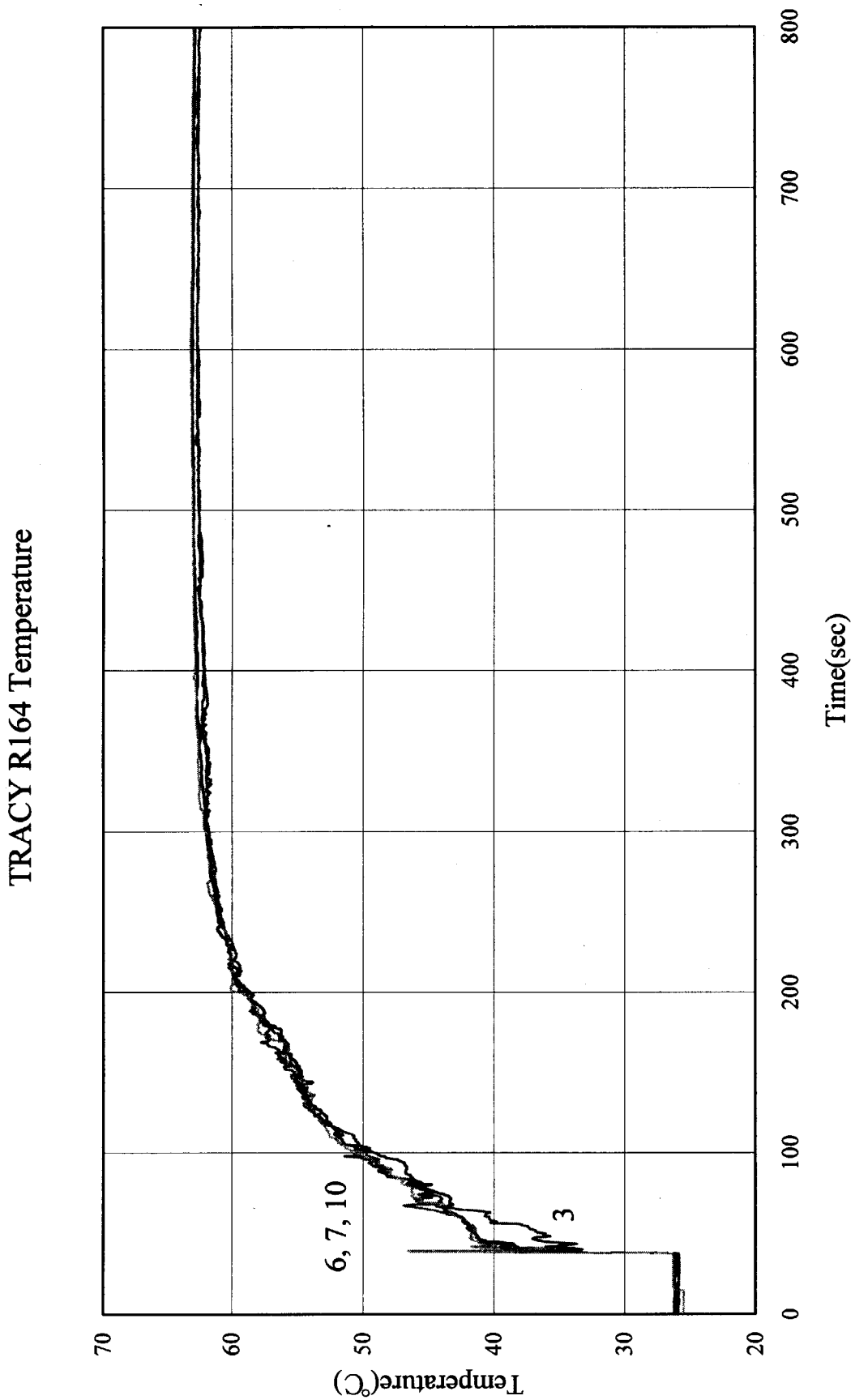

Fig. 3.11 (6) Run164 : Temperature(5)

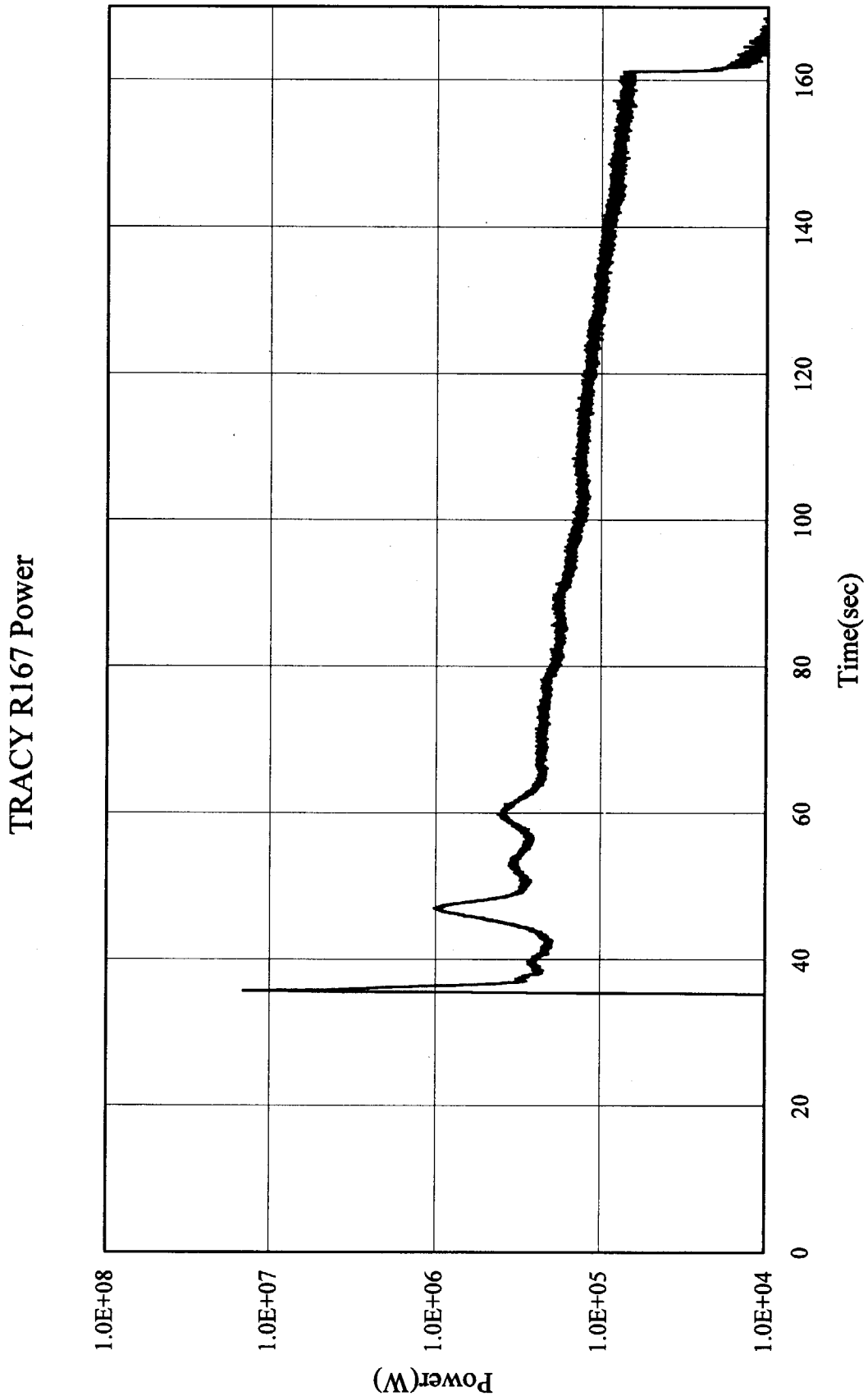

Fig. 3.12 (1) Run167 : Power

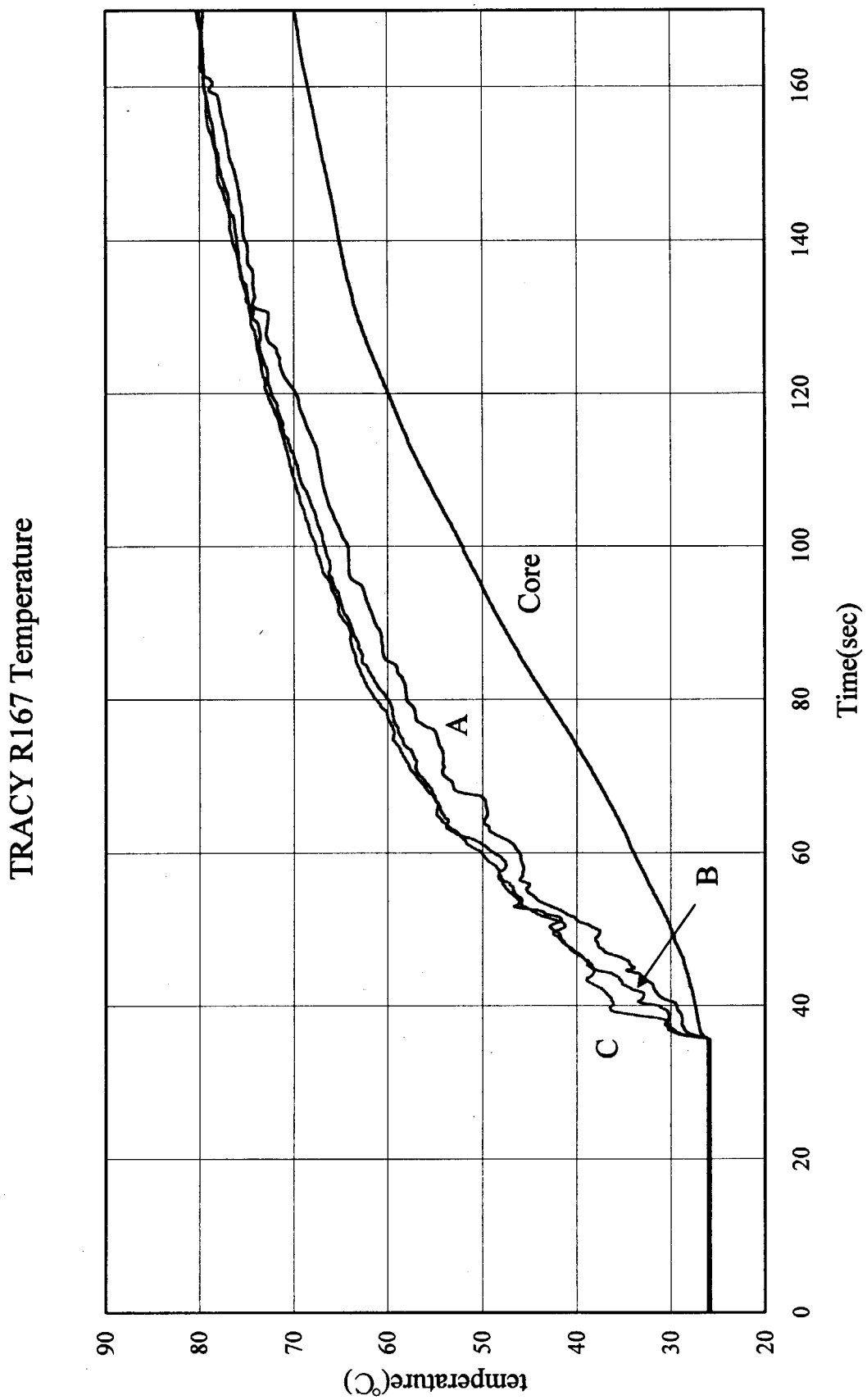

Fig. 3.12 (2) Run167 : Temperature(1)

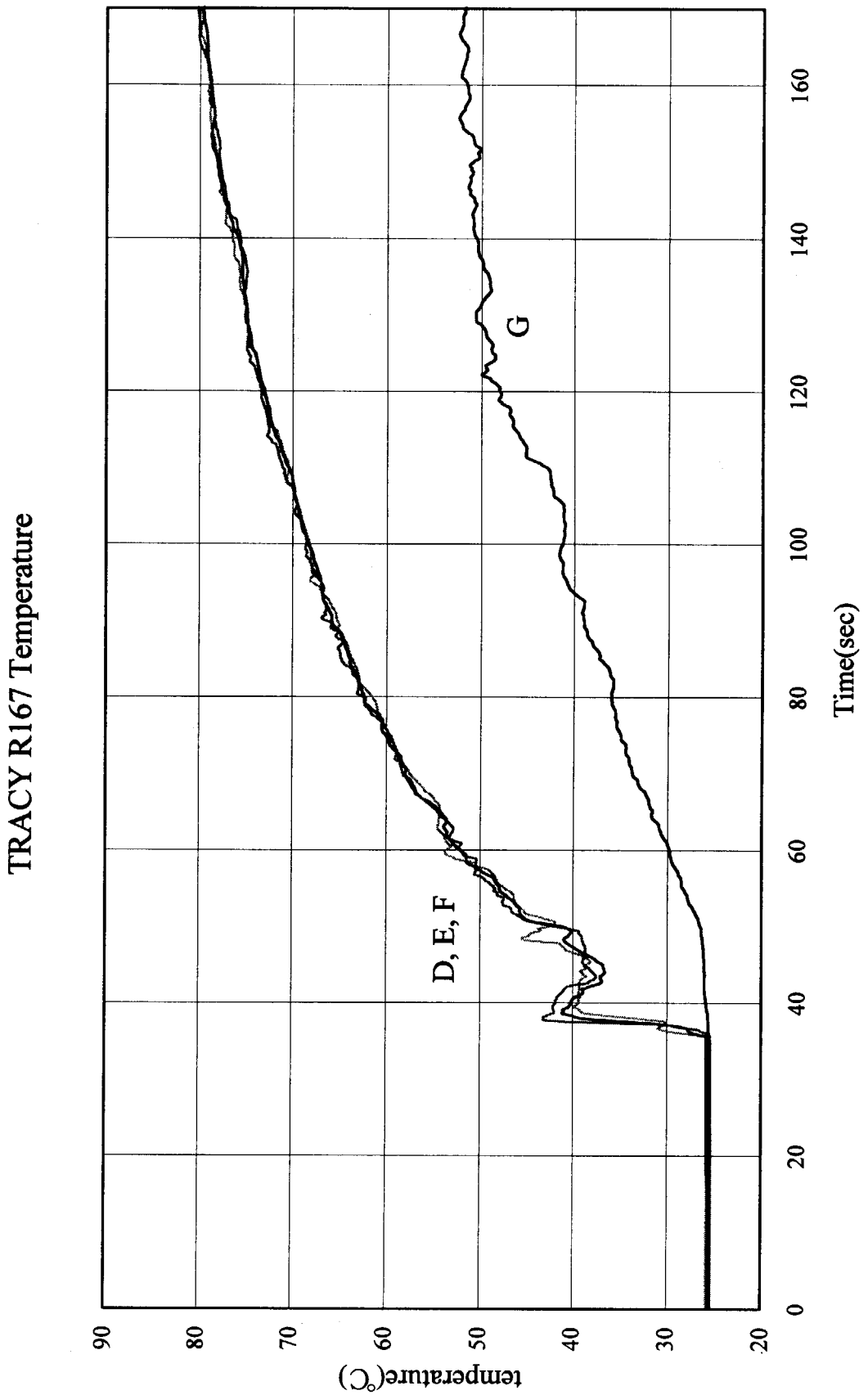

Fig. 3.12 (3) Run167 : Temperature(2)

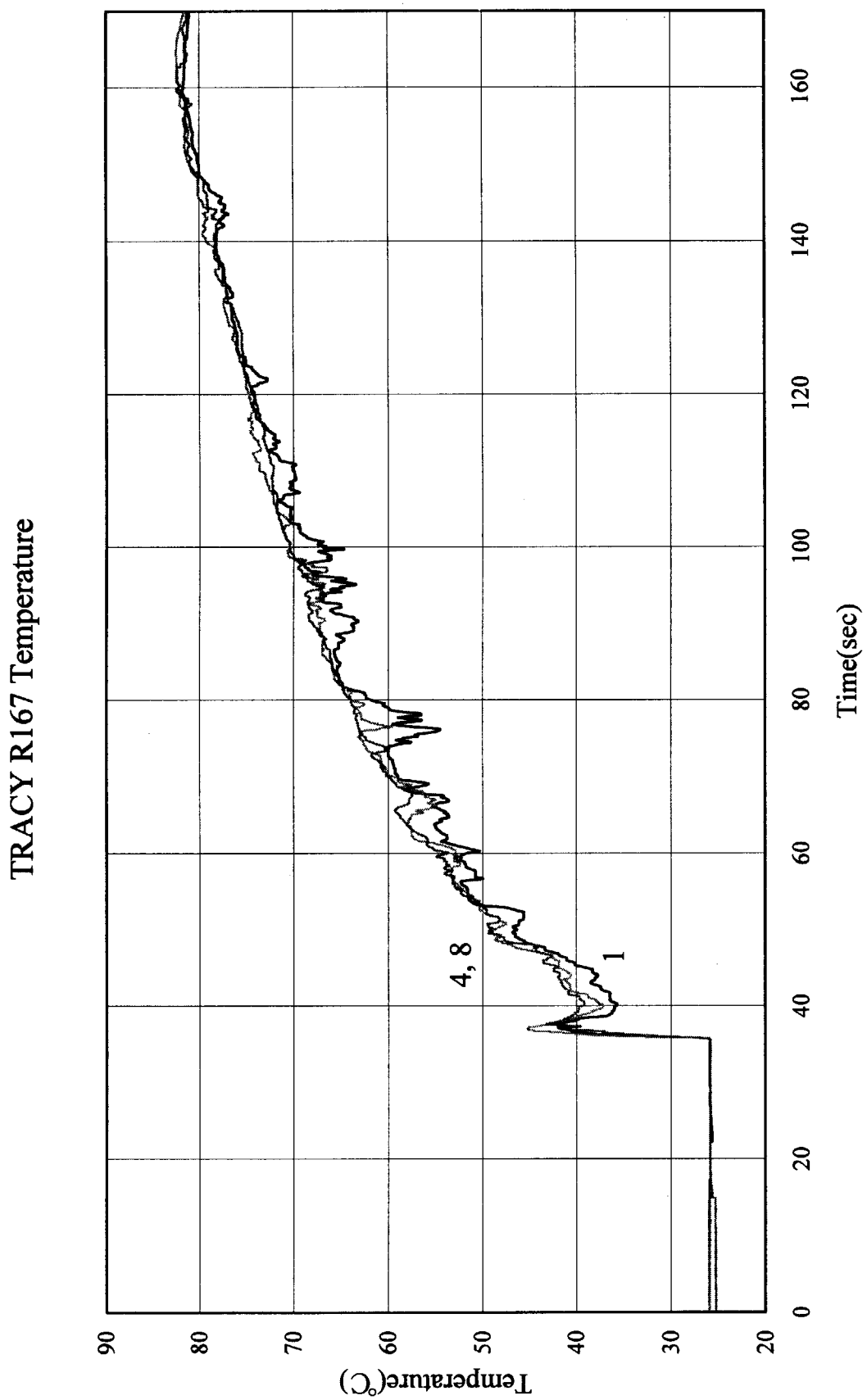

Fig. 3.12 (4) Run167 : Temperature(3)

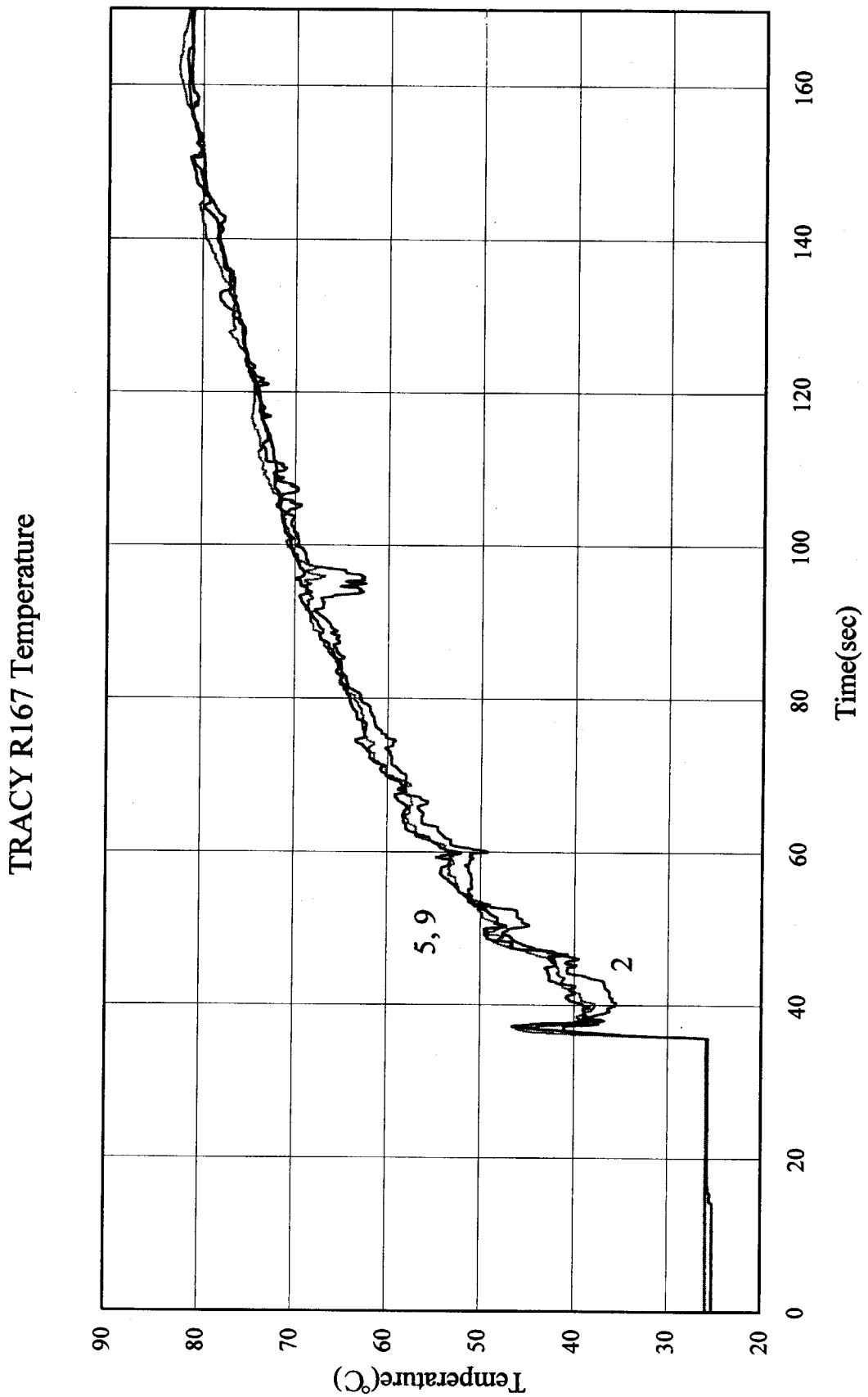

Fig. 3.12 (5) Run167 : Temperature(4)

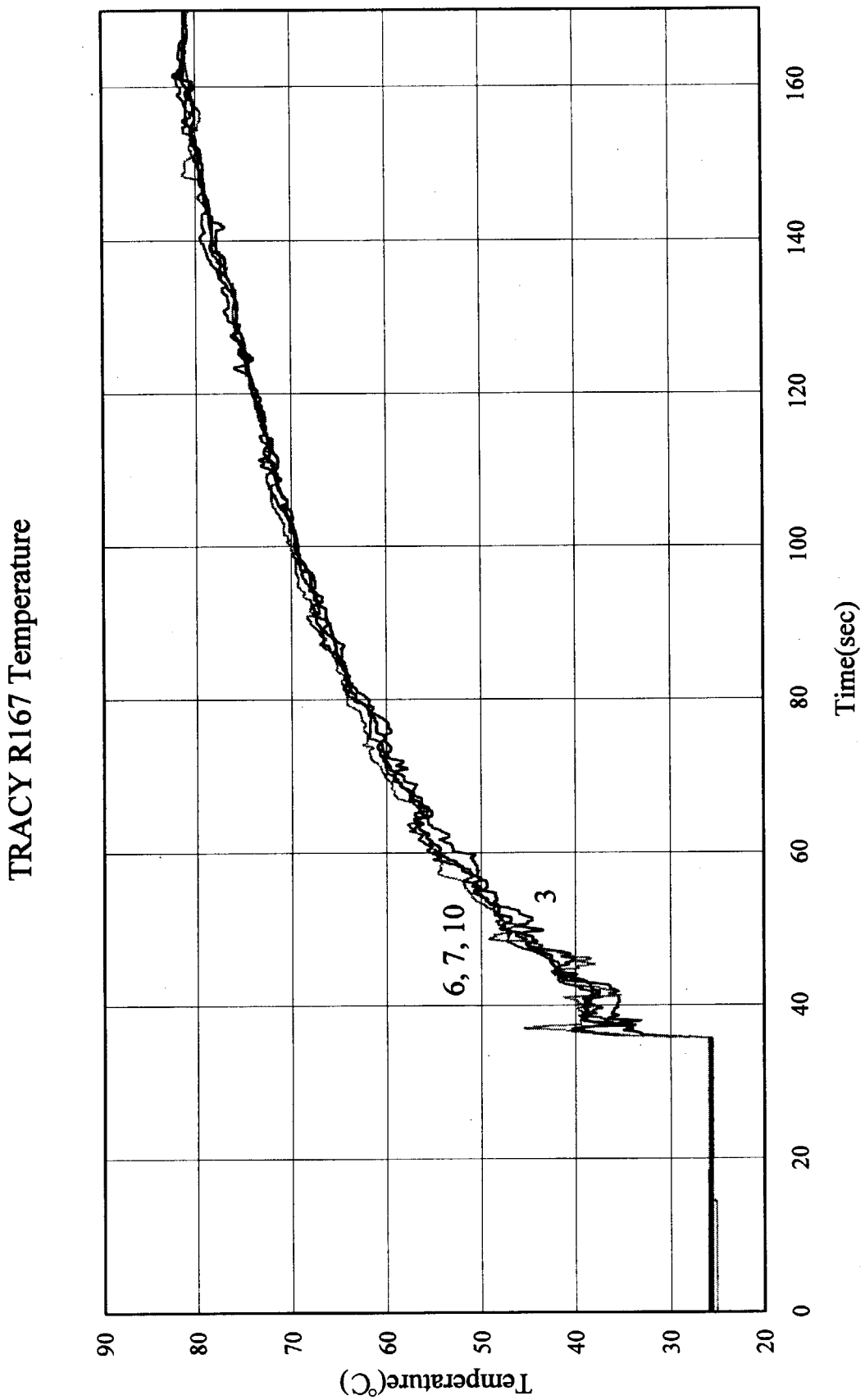

Fig. 3.12 (6) Run167 : Temperature(5)

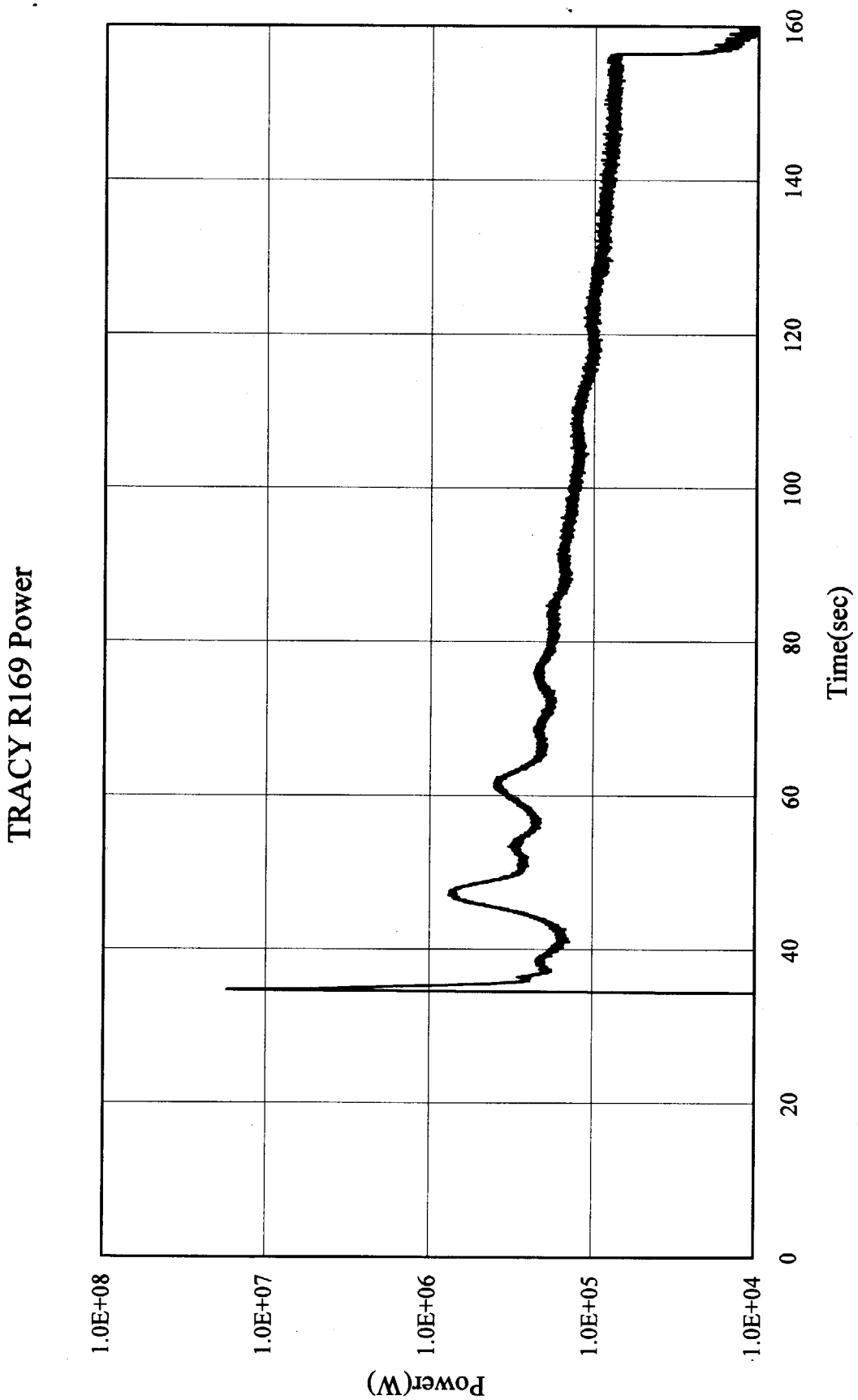

Fig. 3.13 (1) Run169 : Power

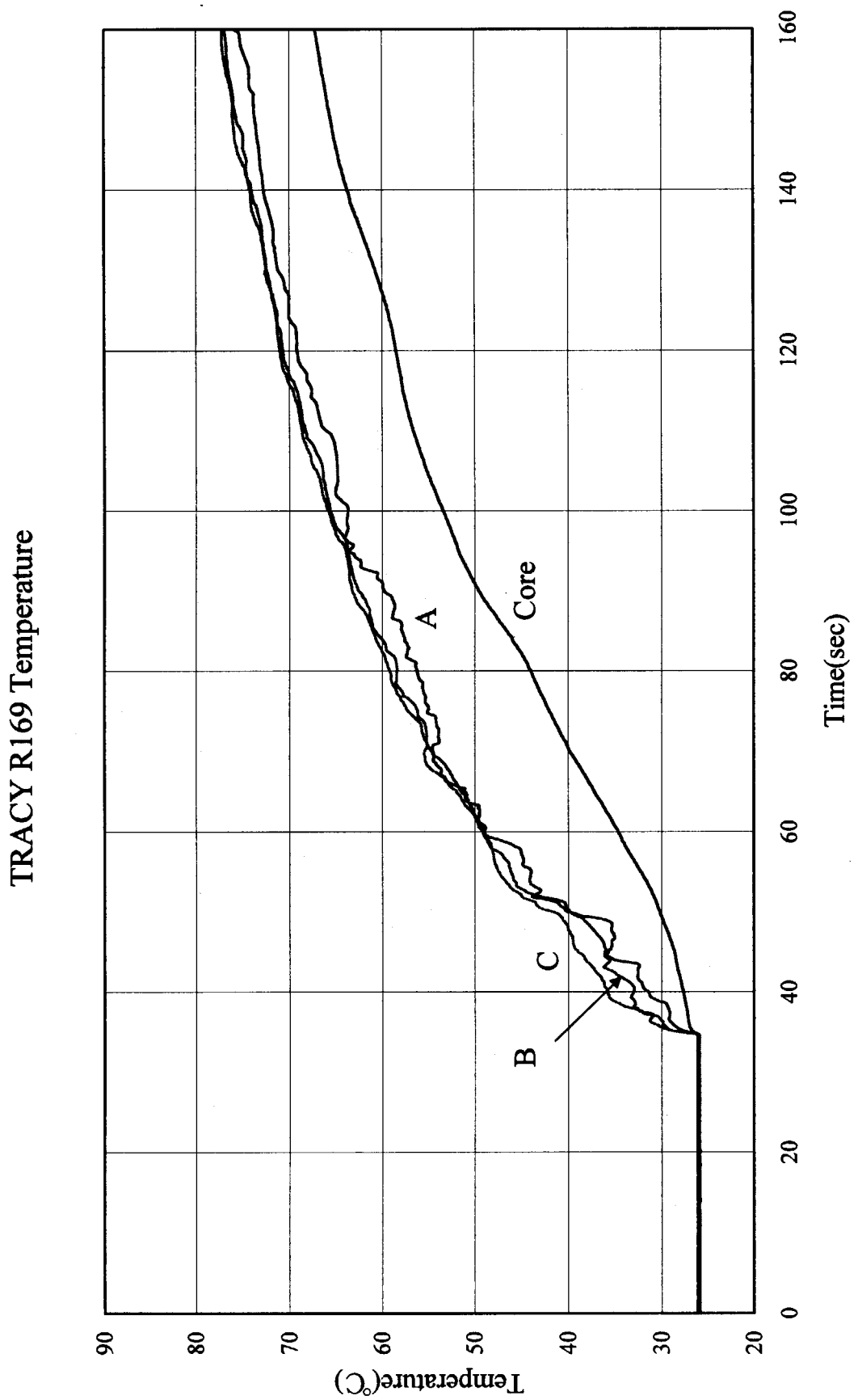

Fig. 3.13 (2) Run169 : Temperature(1)

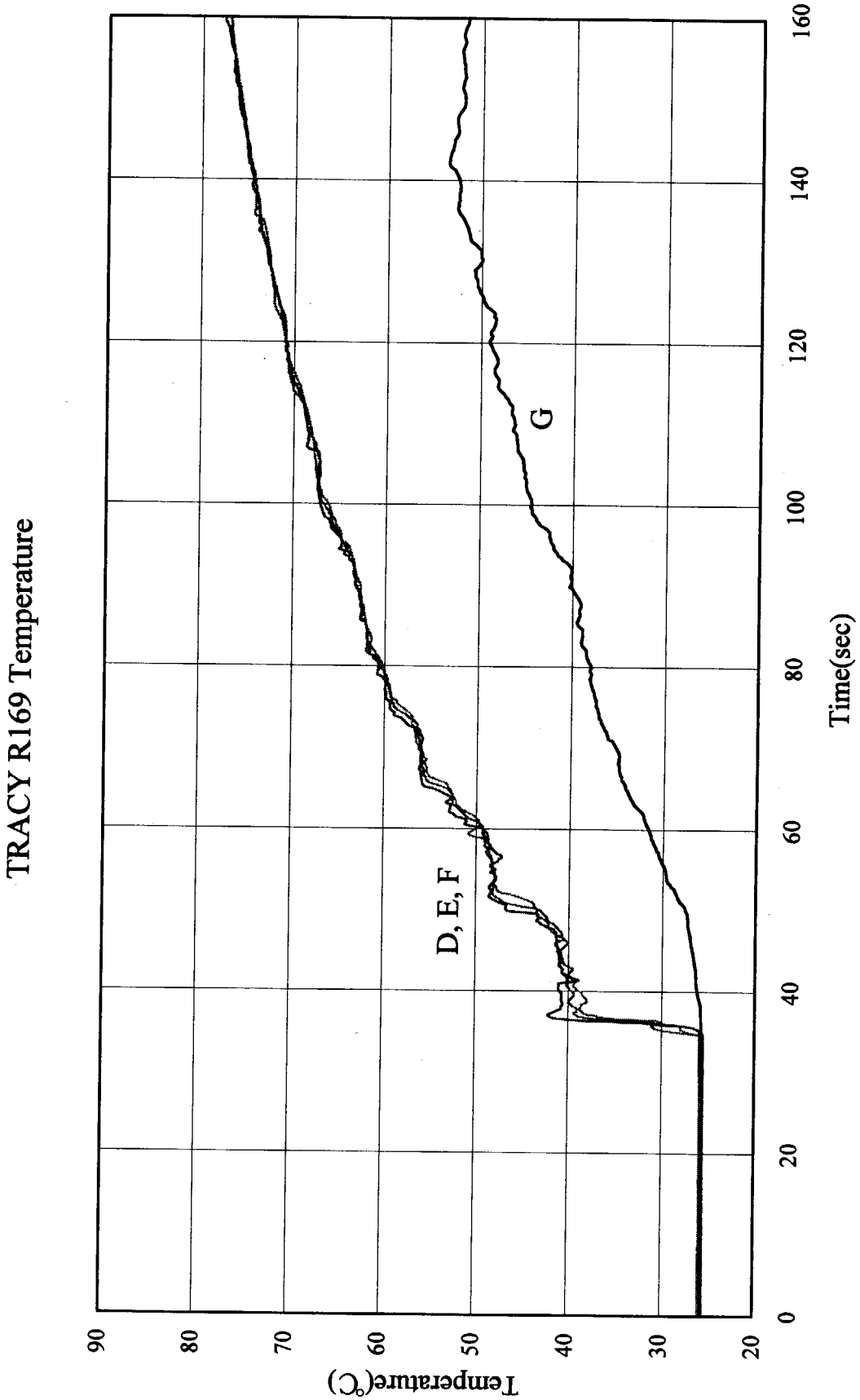

Fig. 3.13 (3) Run169 : Temperature(2)

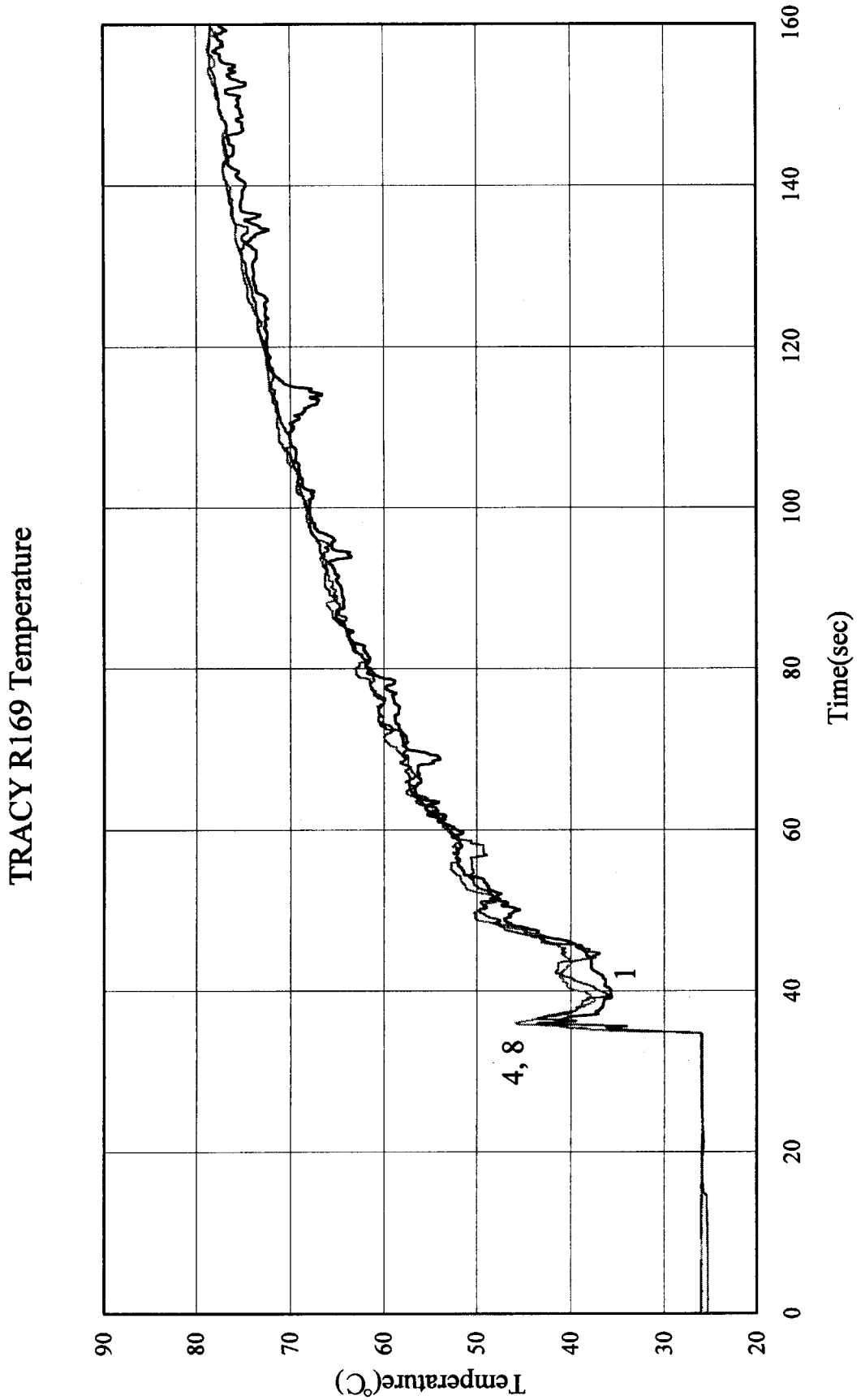

Fig. 3.13 (4) Run169 : Temperature(3)

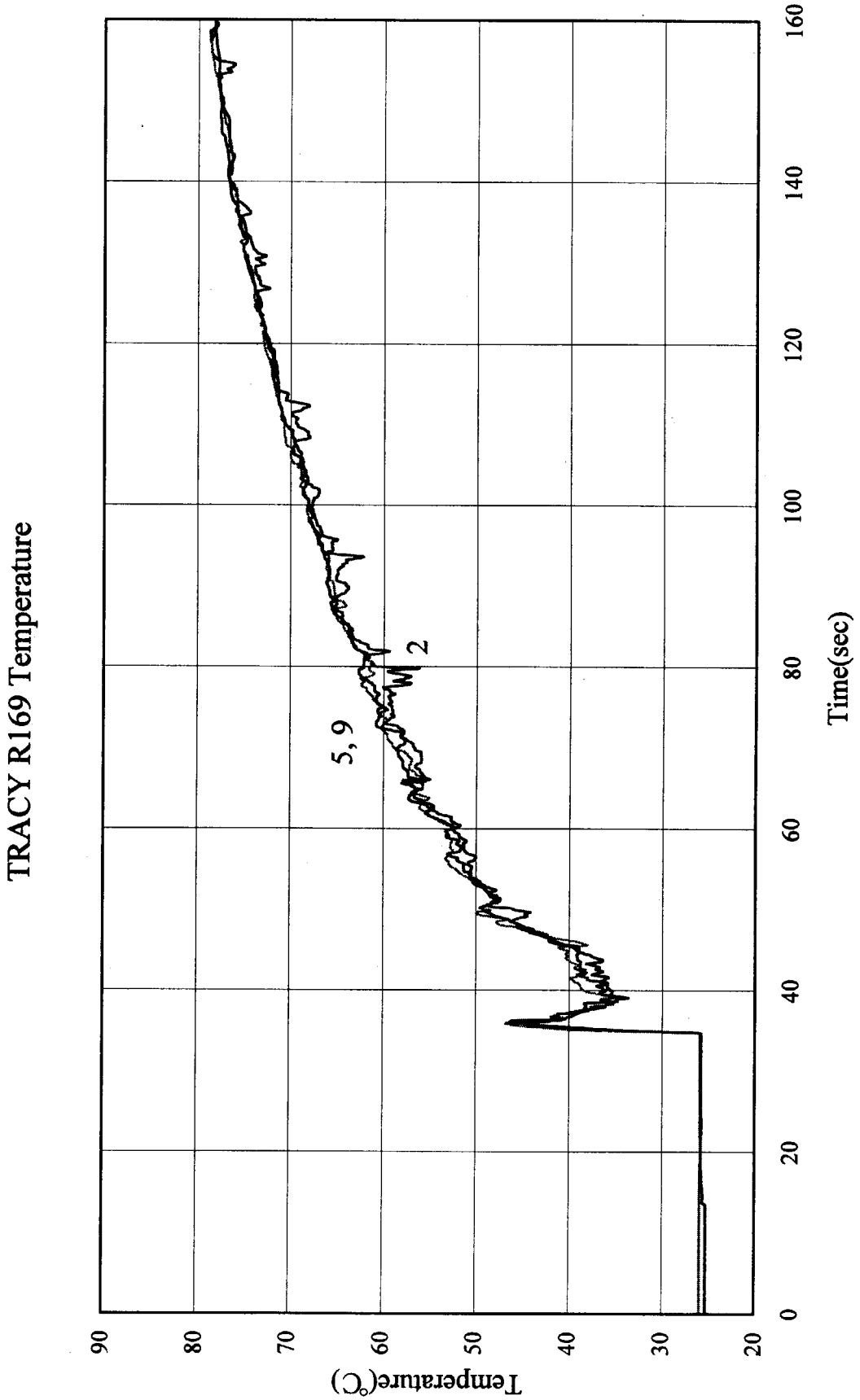

Fig. 3.13 (5) Run169 : Temperature(4)

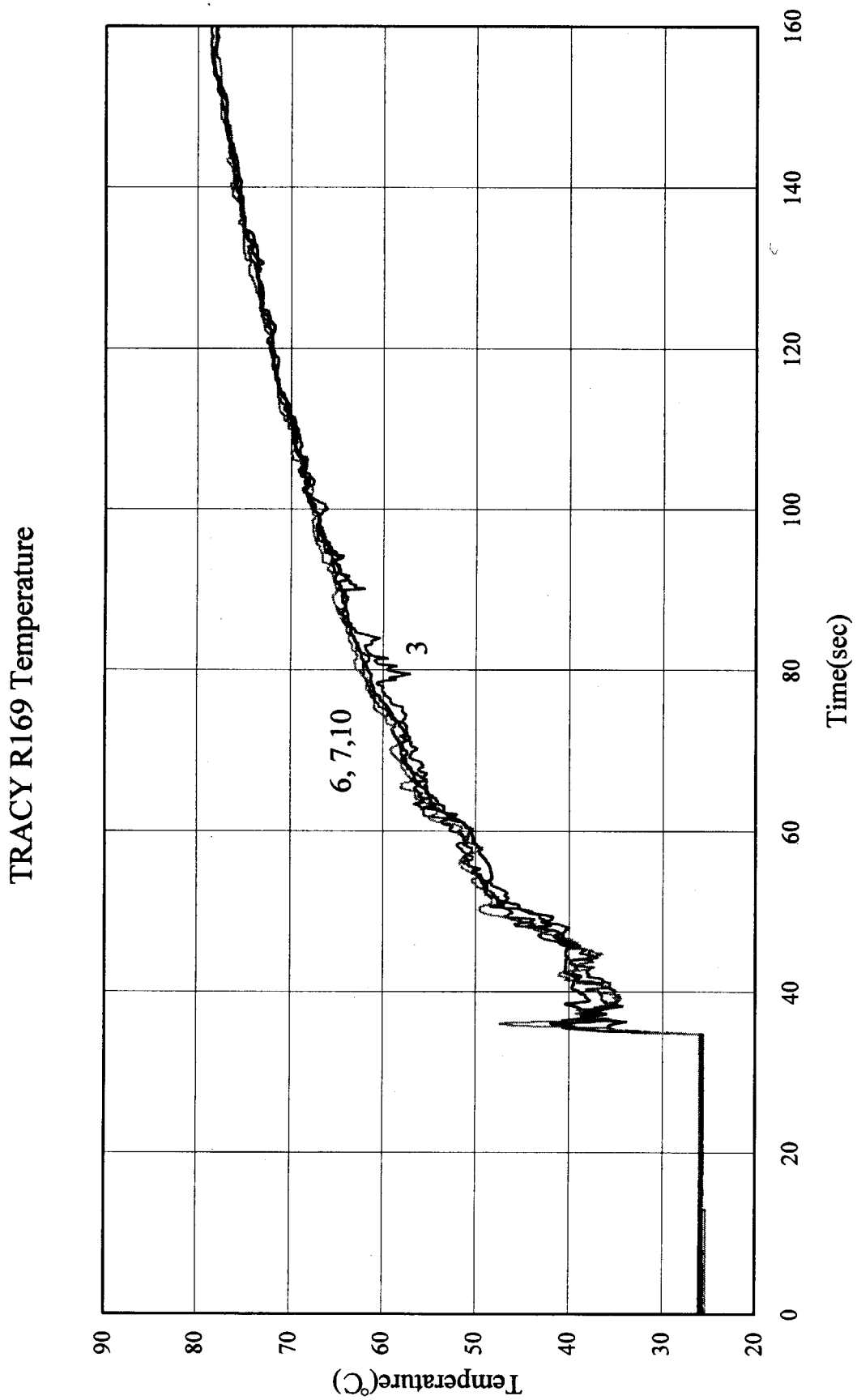

Fig. 3.13 (6) Run169 : Temperature(5)

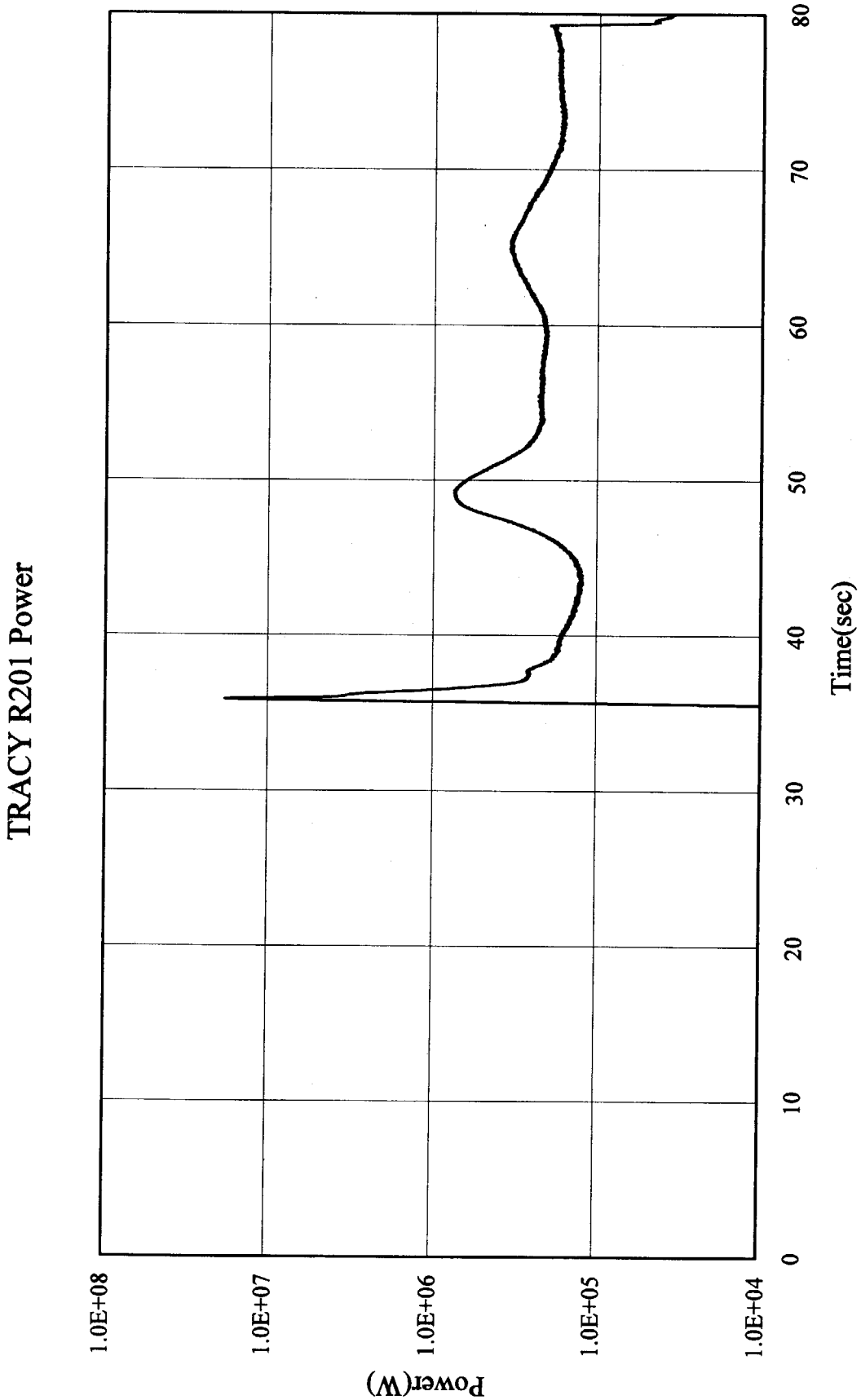

Fig. 3.14 (1) Run201 : Power

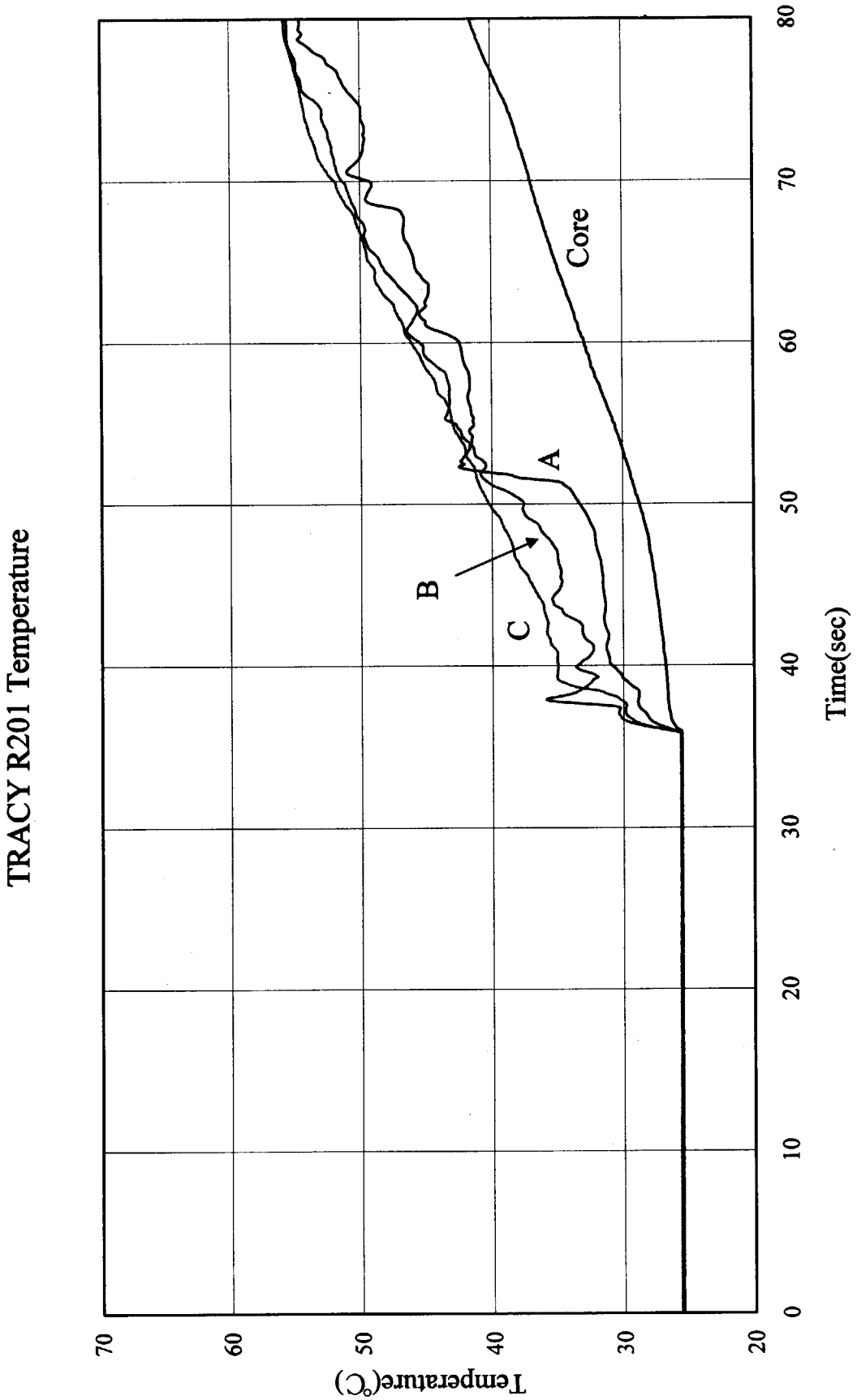

Fig. 3.14 (2) Run201 : Temperature(1)

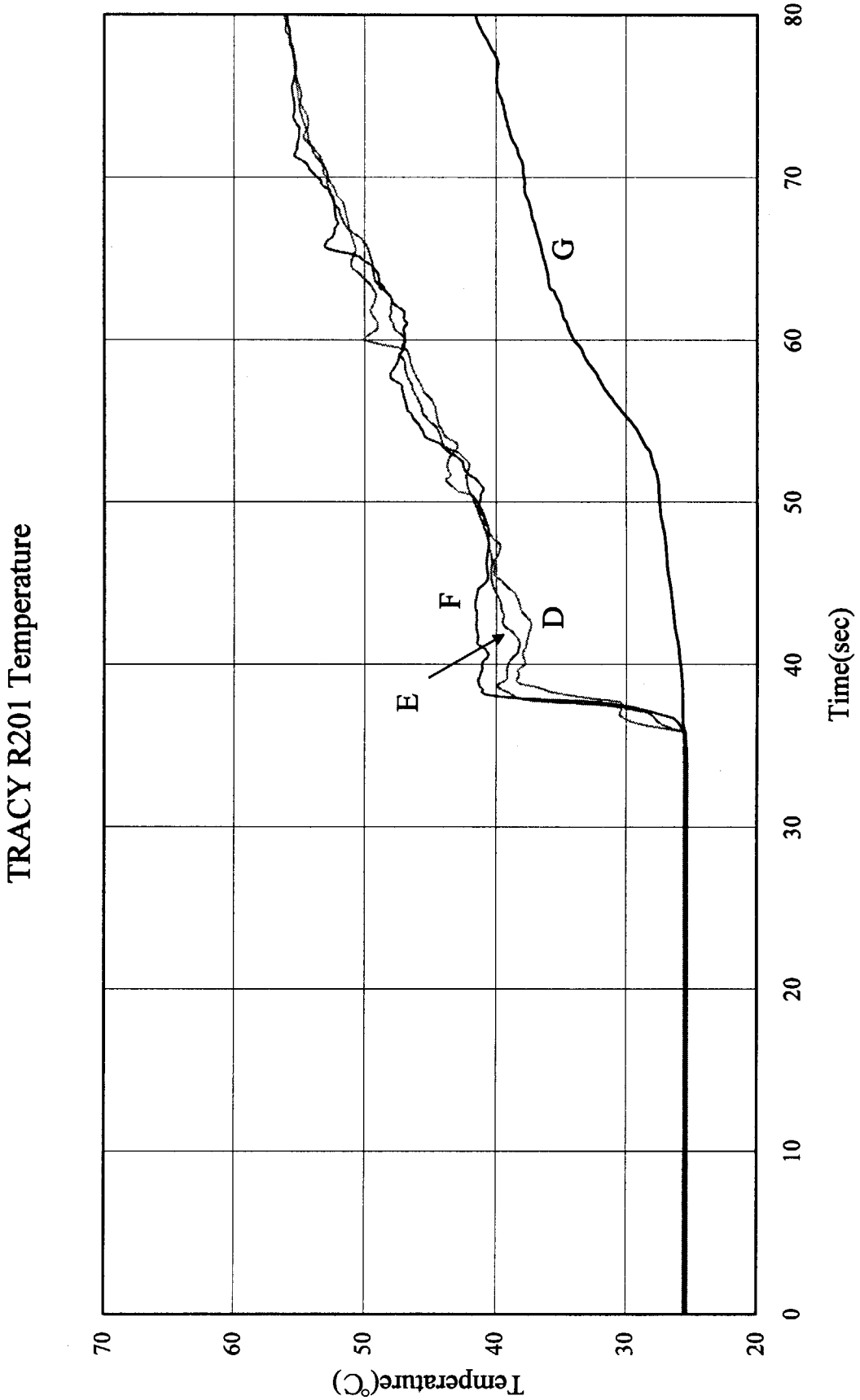

Fig. 3.14 (3) Run201 : Temperature(2)

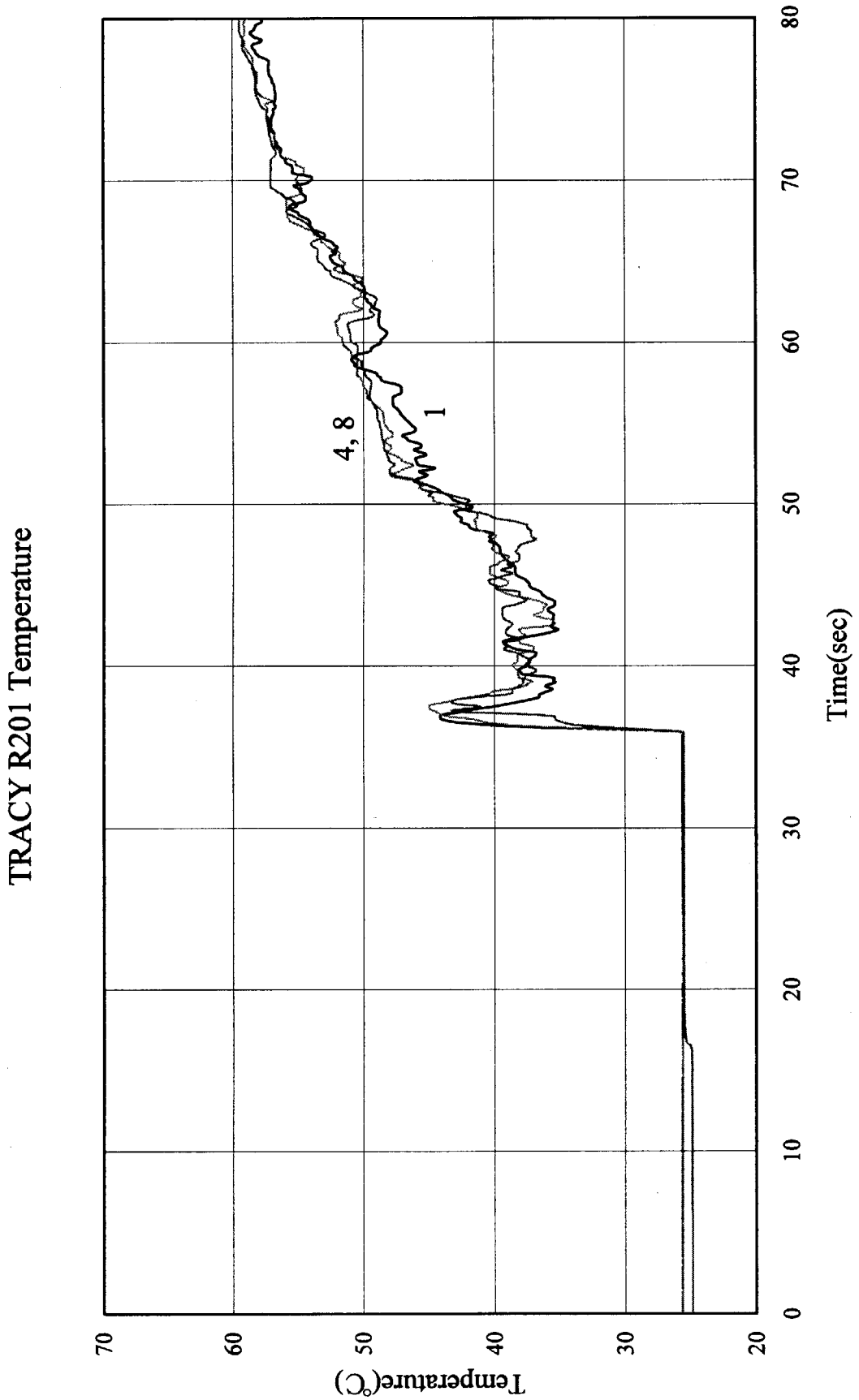

Fig. 3.14 (4) Run201 : Temperature(3)

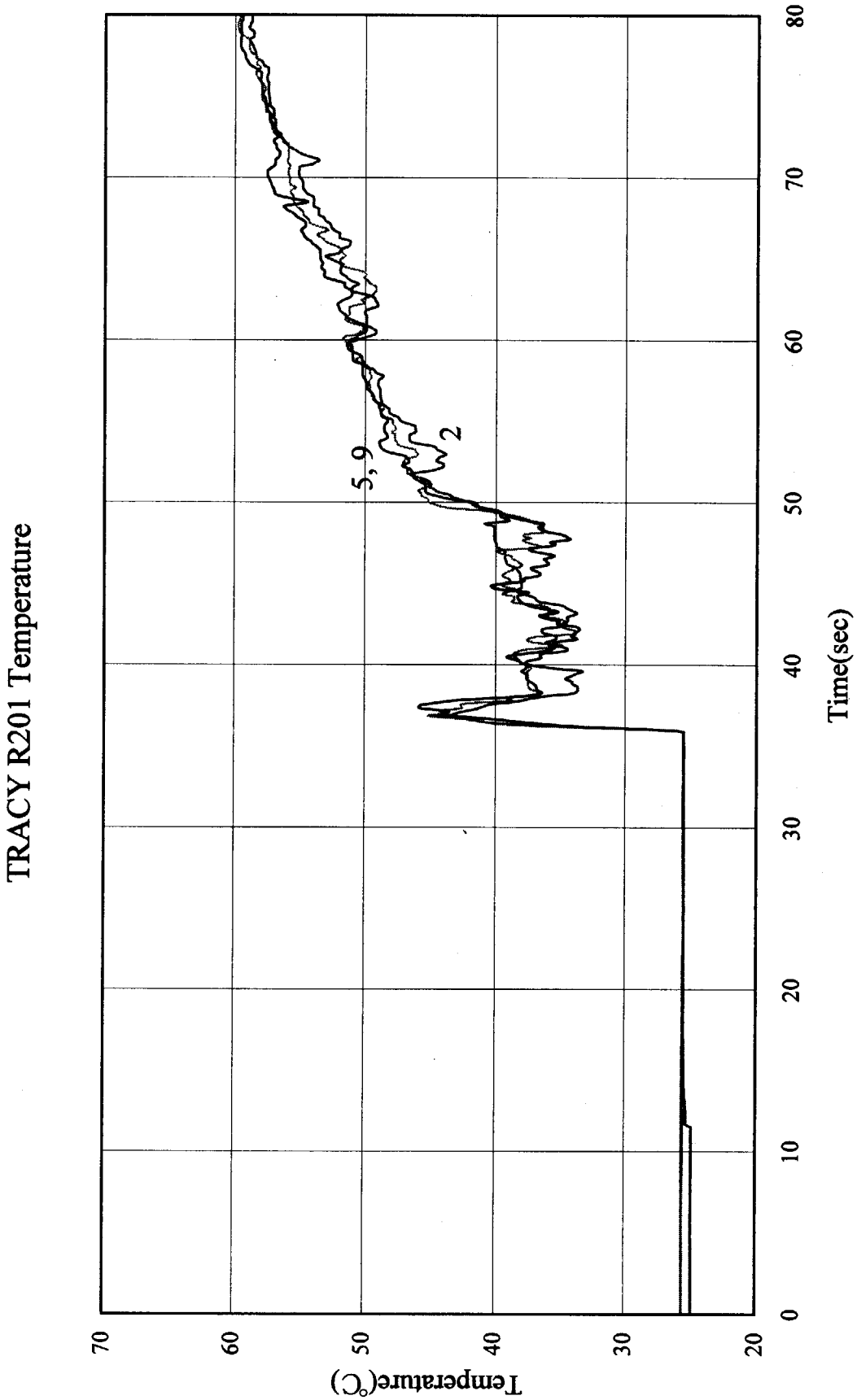

Fig. 3.14 (5) Run201 : Temperature(4)

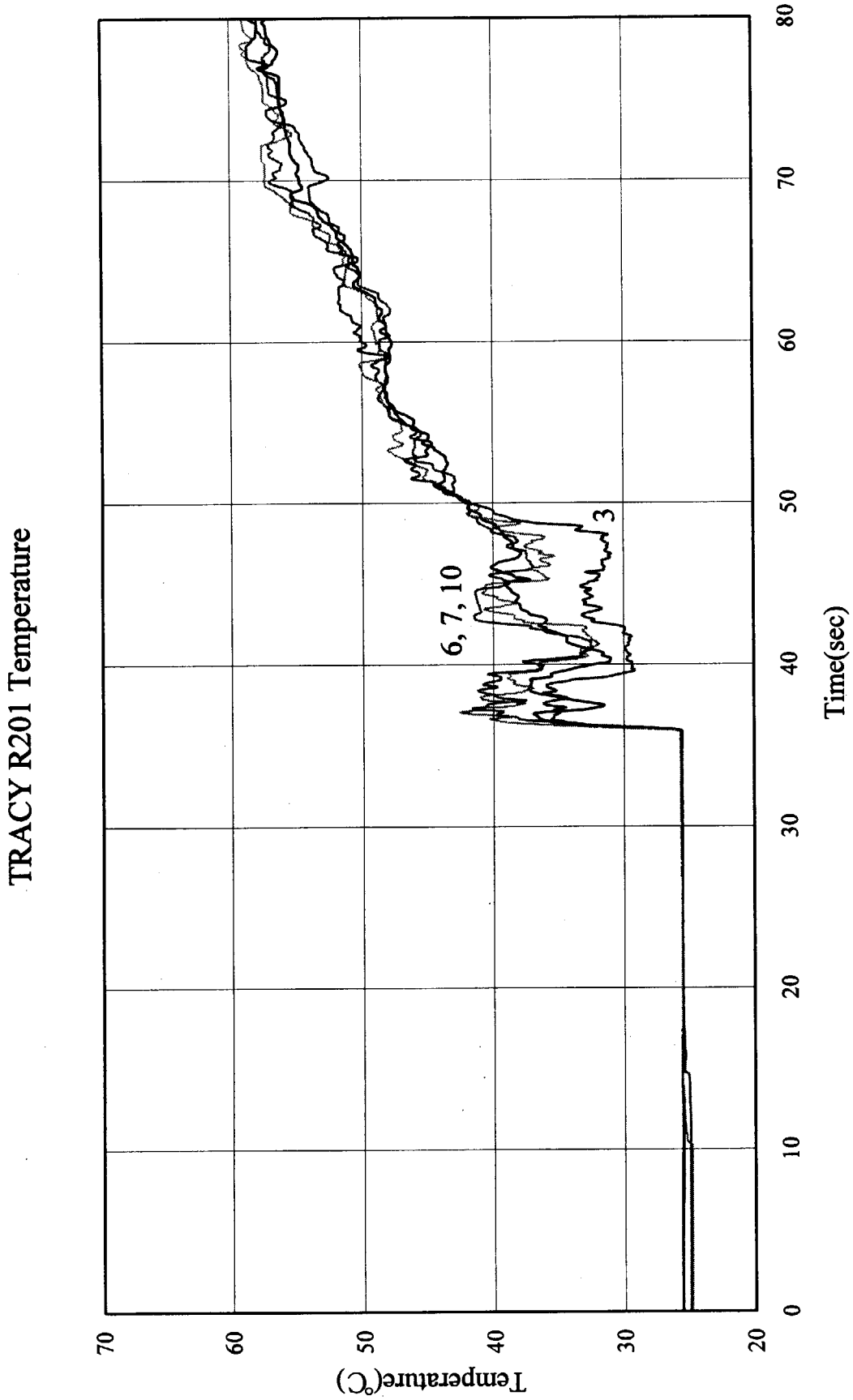

Fig. 3.14 (6) Run201 : Temperature(5)

Acknowledgements

The authors would like to express their gratitude to A. Ohno, and other members of the TRACY staff of the Japan Atomic Energy Research Institute (JAERI) for operating TRACY. They also would like to thank K. Futakami of Chiyoda Maintenance Co. for his help in handling the TRACY data. Thanks are also given to T. Yamamoto of JAERI for his valuable advice.

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Appendix 1: Measurement of long-sustained nuclear excursions

Four experiments were performed to observe the power profiles for long-sustained excursions with the inserted reactivity of 0.51$(Run160), 0.83$(Run161), 1.25$(Run163), 1.52$(Run164). In these cases, the experiments continued for about 5 hours (18000s). The measured power and temperature profiles are shown in Figs. A.1 to A.3. The power profiles were obtained by combining the data measured by the start-up channel, the log channel, and the transient log channel, depending on the range of power. The temperature in the figure is measured by the thermocouple No.5 (Temp-5) of Type-2 thermocouples. As seen in the figures, the power oscillates very slowly depending on the temperature change.

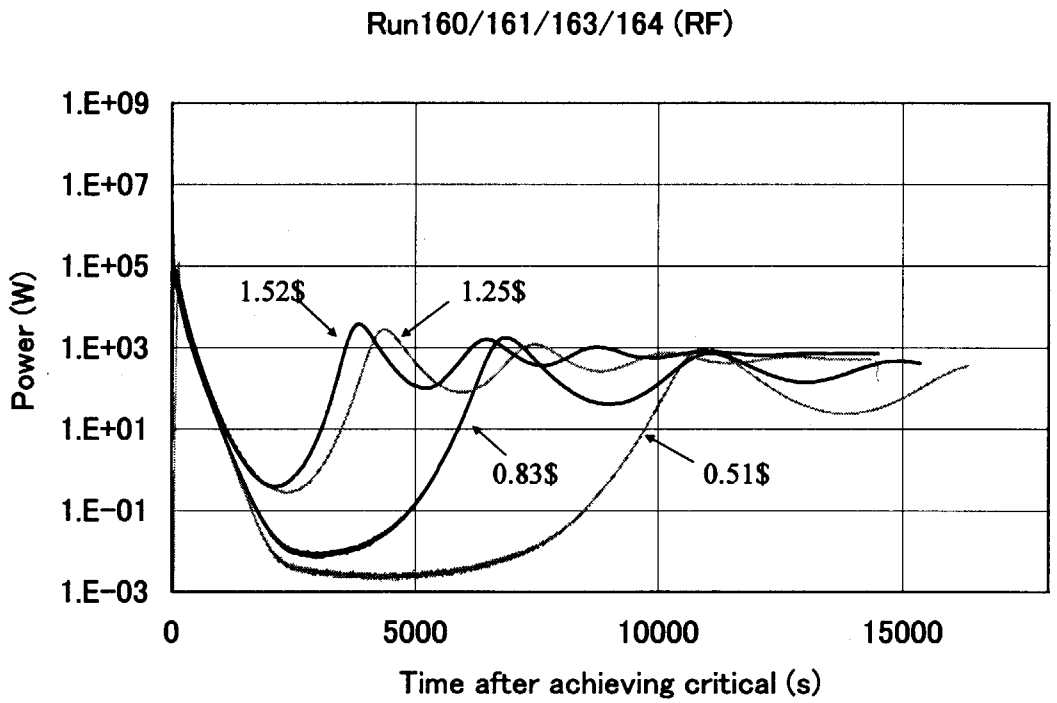

Fig. A.1 Power profiles for long-sustained nuclear excursions (1)

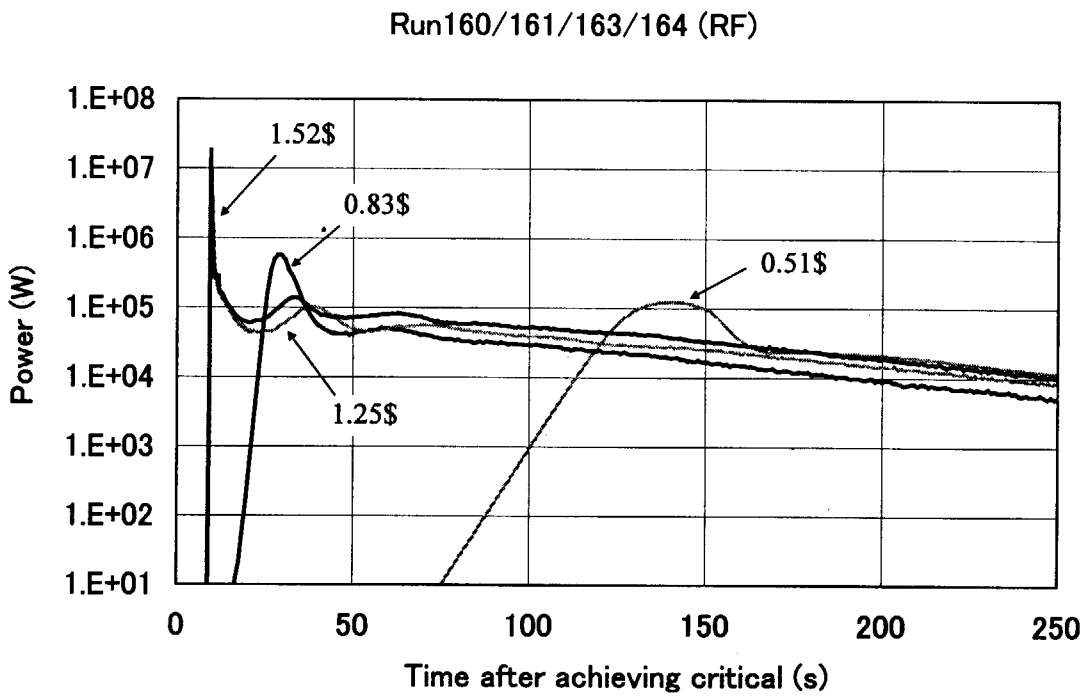

Fig. A.2 Power profiles for long-sustained nuclear excursions (2)
(Magnified of Fig. A.1.)

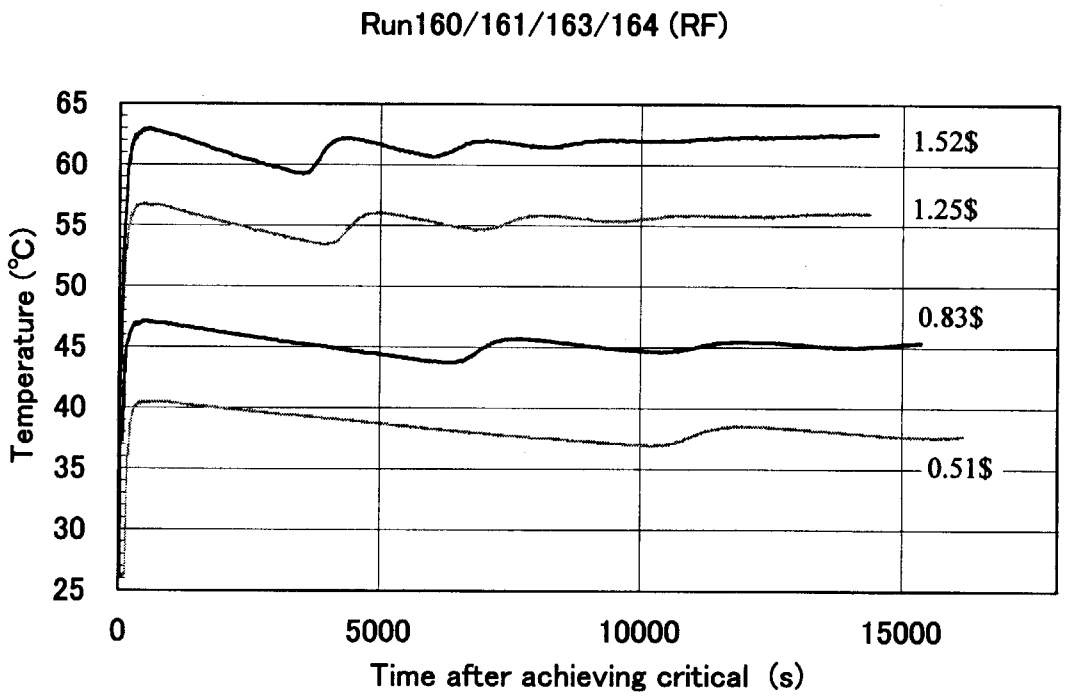

Fig. A.3 Temperature profiles for long-sustained nuclear excursions

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国際単位系（SI）と換算表

表1　SI基本単位および補助単位

量	名称	記号
長さ	メートル	m
質量	キログラム	kg
時間	秒	s
電流	アンペア	A
熱力学温度	ケルビン	K
物質量	モル	mol
光度	カンデラ	cd
平面角	ラジアン	rad
立体角	ステラジアン	sr

表2　SIと併用される単位

名称	記号
分，時，日	min，h，d
度，分，秒	°，′，″
リットル	l，L
トン	t
電子ボルト	eV
原子質量単位	u

1 eV=1.60218×10^{-19}J

1 u=1.66054×10^{-27}kg

表5　SI接頭語

倍数	接頭語	記号
10^{18}	エクサ	E
10^{15}	ペタ	P
10^{12}	テラ	T
10^{9}	ギガ	G
10^{6}	メガ	M
10^{3}	キロ	k
10^{2}	ヘクト	h
10^{1}	デカ	da
10^{-1}	デシ	d
10^{-2}	センチ	c
10^{-3}	ミリ	m
10^{-6}	マイクロ	μ
10^{-9}	ナノ	n
10^{-12}	ピコ	p
10^{-15}	フェムト	f
10^{-18}	アト	a

表3　固有の名称をもつSI組立単位

量	名称	記号	他のSI単位による表現
周波数	ヘルツ	Hz	s^{-1}
力	ニュートン	N	$m\cdot kg/s^2$
圧力，応力	パスカル	Pa	N/m^2
エネルギー,仕事,熱量	ジュール	J	N·m
工率，放射束	ワット	W	J/s
電気量，電荷	クーロン	C	A·s
電位，電圧，起電力	ボルト	V	W/A
静電容量	ファラド	F	C/V
電気抵抗	オーム	Ω	V/A
コンダクタンス	ジーメンス	S	A/V
磁束	ウェーバ	Wb	V·s
磁束密度	テスラ	T	Wb/m^2
インダクタンス	ヘンリー	H	Wb/A
セルシウス温度	セルシウス度	℃	
光束	ルーメン	lm	cd·sr
照度	ルクス	lx	lm/m^2
放射能	ベクレル	Bq	s^{-1}
吸収線量	グレイ	Gy	J/kg
線量等量	シーベルト	Sv	J/kg

表4　SIと共に暫定的に維持される単位

名称	記号
オングストローム	Å
バーン	b
バール	bar
ガル	Gal
キュリー	Ci
レントゲン	R
ラド	rad
レム	rem

1 Å=0.1nm=10^{-10}m

1 b=100fm^2=10^{-28}m^2

1 bar=0.1MPa=10^5Pa

1 Gal=1cm/s^2=10^{-2}m/s^2

1 Ci=3.7×10^{10}Bq

1 R=2.58×10^{-4}C/kg

1 rad=1cGy=10^{-2}Gy

1 rem=1cSv=10^{-2}Sv

(注)

1．表1－5は「国際単位系」第5版，国際度量衡局1985年刊行による。ただし，1 eVおよび1 uの値はCODATAの1986年推奨値によった。

2．表4には海里，ノット，アール，ヘクタールも含まれているが日常の単位なのでここでは省略した。

3．barは，JISでは流体の圧力を表わす場合に限り表2のカテゴリーに分類されている。

4．EC閣僚理事会指令ではbar，barnおよび「血圧の単位」mmHgを表2のカテゴリーに入れている。

換　算　表

力	N(=10^5dyn)	kgf	lbf
	1	0.101972	0.224809
	9.80665	1	2.20462
	4.44822	0.453592	1

粘度　1 Pa·s(N·s/m^2)=10 P(ポアズ)(g/(cm·s))

動粘度　1m^2/s=10^4St(ストークス)(cm^2/s)

圧力	MPa(=10bar)	kgf/cm^2	atm	mmHg(Torr)	lbf/in^2(psi)
	1	10.1972	9.86923	7.50062×10^3	145.038
	0.0980665	1	0.967841	735.559	14.2233
	0.101325	1.03323	1	760	14.6959
	1.33322×10^{-4}	1.35951×10^{-3}	1.31579×10^{-3}	1	1.93368×10^{-2}
	6.89476×10^{-3}	7.03070×10^{-2}	6.80460×10^{-2}	51.7149	1

エネルギー・仕事・熱量	J(=10^7 erg)	kgf·m	kW·h	cal(計量法)	Btu	ft·lbf	eV
	1	0.101972	2.77778×10^{-7}	0.238889	9.47813×10^{-4}	0.737562	6.24150×10^{18}
	9.80665	1	2.72407×10^{-6}	2.34270	9.29487×10^{-3}	7.23301	6.12082×10^{19}
	3.6×10^6	3.67098×10^5	1	8.59999×10^5	3412.13	2.65522×10^6	2.24694×10^{25}
	4.18605	0.426858	1.16279×10^{-6}	1	3.96759×10^{-3}	3.08747	2.61272×10^{19}
	1055.06	107.586	2.93072×10^{-4}	252.042	1	778.172	6.58515×10^{21}
	1.35582	0.138255	3.76616×10^{-7}	0.323890	1.28506×10^{-3}	1	8.46233×10^{18}
	1.60218×10^{-19}	1.63377×10^{-20}	4.45050×10^{-26}	3.82743×10^{-20}	1.51857×10^{-22}	1.18171×10^{-19}	1

1 cal= 4.18605J（計量法）

= 4.184J（熱化学）

= 4.1855J（15℃）

= 4.1868J（国際蒸気表）

仕事率　1 PS(仏馬力)

= 75 kgf·m/s

= 735.499W

放射能	Bq	Ci
	1	2.70270×10^{-11}
	3.7×10^{10}	1

吸収線量	Gy	rad
	1	100
	0.01	1

照射線量	C/kg	R
	1	3876
	2.58×10^{-4}	1

線量当量	Sv	rem
	1	100
	0.01	1

(86年12月26日現在)

TRACY Transient Experiment Databook 3) Ramp Feed Experiment