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管内流路における流量低下過渡  
バーンアウト (1)

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管内流路における流量低下過渡バーンアウト(1)

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黒柳 利之・岩村 公道

(1980年2月7日受理)

過渡沸騰試験装置を用いて流量低下バーンアウト実験を行い、過渡時のバーンアウト発生条件に対する諸パラメータの影響を調べた。テスト部は内径10mm、外径12mm、加熱長さ800mmのステンレス鋼製垂直上向管内流路で、直流直接通電により加熱した。

実験範囲は以下の通りである。圧力：0.5～3.9MPa，熱流束： $2.16 \sim 3.86 \times 10^6$  W/m<sup>2</sup>，入口温度：66～201°C，初期質量速度：1,240～3,050 kg/S·m<sup>2</sup>，流量低下時間：0.35～83 sec。

実験結果を、過渡時および定常時のバーンアウト発生時入口質量速度比 ( $G_{BO}^t / G_{BO}^s$ ) と流速減少率 (初期流速に対する流速低下速度の割合：%/sec) との関係で整理し、以下の諸点が明らかとなった。

- 1) 流速減少率が、ある境界値以上となると、 $G_{BO}^t / G_{BO}^s$  は1より減少し始める。
- 2) 流速減少率増大時の  $G_{BO}^t / G_{BO}^s$  の低下率は、圧力が高い程小さくなる。
- 3) 入口サブクール度、熱流束、初期質量速度等の流速減少率増大時の  $G_{BO}^t / G_{BO}^s$  低下率に及ぼす影響は、本実験範囲内では特に認められない。

Flow Reduction Transient Burnout in a Vertical Tube, 1

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(Received February 7, 1980)

A flow reduction burnout experiment was made in a vertical tube to investigate the effects of parameters on transient burnout phenomena.

The electrically heated stainless steel tube test section was 10mm diameter and 800mm long. The ranges of experimental conditions were pressure 0.5~3.9MPa, heat flux  $2.16 \sim 3.86 \times 10^6 \text{w/m}^2$ , inlet temperature  $66 \sim 201^\circ\text{C}$ , initial mass velocity  $1240 \sim 3050 \text{kg/s.m}^2$ , and flow reduction time  $0.35 \sim 83 \text{sec}$ .

The onset of flow reduction transient burnout was correlated with  $G_{\text{BO}}^t/G_{\text{BO}}^s$  (the ratio of transient and steady-state burnout inlet mass velocity) and flow reduction rate ( $100\Delta V/(V_i\Delta t)$ ).

Following are the results.

- (1)  $G_{\text{BO}}^t/G_{\text{BO}}^s$  decreases below unity, as the flow reduction rate increases beyond a threshold value.
- (2) The reduction rate of  $G_{\text{BO}}^t/G_{\text{BO}}^s$  becomes smaller at higher pressure.
- (3) The effect of inlet subcooling, heat flux and initial mass velocity are unobservable in the experimental conditions.

Keywords: Transient Burnout, Critical Heat Flux, Flow Reduction, Two-phase Flow, Boiling, Power-Cooling Mismatch, Reactor Safety

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## 1. ま え が き

軽水炉の異常な出力上昇や流量低下事故すなわちPCM時には、バーンアウト発生により、燃料被覆管温度が急上昇して、強度の低下や溶融など、燃料棒破損に至る可能性がある。従って、出力上昇や流量低下過渡時におけるバーンアウト発生を正確に予測することは、PCM時の被覆管温度挙動評価のため重要である。

PCM研究の一環として、昭和50年から53年まで常圧大気開放ループによる流量低下過渡バーンアウト実験を実施した。<sup>(1)(2)</sup>そして昭和53年度に圧力が過渡バーンアウト現象におよぼす影響を調べるため、最高使用圧力3.92 MPa (40 kg/cm<sup>2</sup>・abs)の過渡沸騰試験装置<sup>(3)</sup>を建設した。

本実験のテスト部は内径10 mm、加熱長さ800 mmのステンレス鋼製垂直上向管内流路で、実験範囲は、圧力0.5～3.9 MPa、熱流束2.16～3.86×10<sup>6</sup> W/m<sup>2</sup>、入口温度66～201°C、流量低下時間0.35～83 secである。

本報では、圧力の影響を中心に、流量低下過渡バーンアウト実験結果の概要について報告する。

## 2. 実 験 装 置

### 2.1 過渡沸騰試験装置の概要

過渡沸騰試験装置のフローシートの概要をFig. 2.1に示し、本装置の主要性能をTable 2.1に示す。Fig. 2.2に計測器等も含めた詳細なフローシートを示す。

Fig. 2.2に示すように、本装置は、給水系（イオン交換装置、純水タンク、給水ポンプ等）、循環ポンプ、流量計（高流量用ローターメータ、低流量用ローターメータ、タービン流量計等）、流量制御用弁群（流量調節弁、急速作動弁、手動弁等）、入口温度制御用ヒータ部、テスト部、気水分離器、圧力制御装置（圧力制御用流量調節弁、減圧タンク、圧力避け弁等）、蒸気凝縮器、加圧器（ヒーター付）、冷却器、高圧ガス系（N<sub>2</sub>ガスボンベ、定圧タンク、各種差圧計等）、流量計較正系、等から構成されている。

過渡沸騰試験装置の主要な特徴は以下の通りである。

- (1) 定常状態におけるテスト部入口水温、流量、加圧器温度、気水分離器圧力等はPID方式によって制御し、実験条件を一定に保持できるようにした。
- (2) 高圧ガス系配管による圧力計較正回路を設置し、歪型圧力計又は差圧計を、全て同時に精密圧力計又は差圧計により較正できるようにした。この較正作業を容易に行なうため、圧力操作盤を設置した。
- (3) 主要部分の圧力の測定には、測定精度を上げるため、歪式差圧計を用いて、圧力検出端

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とループに付設した定圧タンク（ループ圧力より $1 \sim 5 \text{ kg/cm}^2$ 程度低く保つ）との差圧を検出し、別途測定する定圧タンクの圧力を加える方式をとった。

- (4) 流量低下実験中にテスト部出口圧力をなるべく一定に保持するため、テスト部と気水分離器間の抵抗をできるだけ小さくした。

また、気水分離器圧力が設定値より上昇すると、必要なだけ蒸気を外部に放出するPID制御機構を設置した。この際、直接大気に放出すると急激な圧力低下を伴うおそれがあるので、中間に減圧タンク（ループ圧力より数 $\text{kg/cm}^2$ 低く保つ）を介して放出するようにした。

これにより、より精度の高い圧力制御が可能となる。

- (5)  $0.5 \sim 100$ 秒程度にわたる広範囲な流量減少過渡時間を実現できるように、複数の流量低下実験用弁を設置し、計算機による流量低下パターンの制御を行なった。

以下、テスト部、流量計較正流路、入口流量制御機構、計測系、データ集録系のそれぞれに関して概要を述べる。なお、本装置の詳細は文献(3)に述べてある。

## 2.2 テスト部

本実験で使用したテスト部の形状と計装取り付け位置をFig. 2.3に示す。テスト部は、内径 $10 \text{ mm}$ 、外径 $12 \text{ mm}$ 、長さ $800 \text{ mm}$ のSUS304ステンレス製パイプで、最高 $100 \text{ kW}$  ( $50 \text{ V}$ ,  $2000 \text{ A}$ )の直流直接通電により加熱した。

Fig. 2.3に示すように、テスト部の入口と出口には、圧力検出用タップ（検出端は $1 \text{ mm}\phi$ ）を設置し、テスト部外壁には、直径 $0.32 \text{ mm}$ のC-A熱電対6本をスポット溶接した。また2.6節で述べるように、本装置はバーンアウト発生により熱電対信号が設定値を越えると、小型計算機からの指令で供給電力を遮断する機能をもっているが、さらにバックアップとして、温度上昇による電気抵抗変化を利用したブリッジ式バーンアウト検出器も設置した。そのリード線の取り付け位置もFig. 2.3に示す。

## 2.3 流量計較正流路

過渡沸騰試験装置は最高使用圧力 $40 \text{ kg/cm}^2 \cdot \text{abs}$ 、最高使用温度 $250^\circ\text{C}$ なので、各種の温度、圧力条件下でタービン流量を較正するための流量計較正流路を付設した。流量計較正流路は、Fig. 2.4に示すように、主循環ループより分岐し、流路切換器、冷却タンク、計量タンク等からなり、一定時間内に冷却タンクに流入する水の重量とその期間のタービン流量計出力を比較して、流量計の較正が行なえる。

流量計較正実験の手順および実験結果の例は3.1.3節に述べる。

## 2.4 流量低下パターン制御方式

各種の圧力、温度、熱流束等の条件下で流量低下バーンアウト実験を系統的に実施するため、

流量低下パターンをデータ集録用小型電子計算機のアナログ出力を用いて制御した。以下に本機能の概要を示す。

本装置では、Fig. 2.6 に示すように、計算機主記憶上に設定した2個のバッファ領域を交互に使用して実験データを集録するので、1個のバッファからディスクにデータを転送終了後の計算機空き時間を利用して、あらかじめプログラムされたアナログ信号を出力し、電空変換器を経由して、空気作動自動弁 (Fig. 2.2 弁V3) を制御する。本制御方式の概要と、実際の制御信号と流量変化の測定例 (流量変化時間約5秒および約19秒の場合) を Fig. 2.5 に示す。本方式により制御可能な過渡時間範囲は約1秒以上であり、これより急激な流量過渡変化の実験は、手動弁又は急速作動弁 (Fig. 2.2 弁V5) を用いて行なった。

なお、希望する流量変動パターンを得るには、自動弁作動の遅れ時間や弁開度と流量が比例しないことなどを考慮して、計算機アナログ出力関数形を設定する必要がある。本実験では、相互比較を容易にするため、直線状の流量低下が実現できるように、アナログ出力関数としては、Fig. 2.5 に示すように、指数関数と直線を組み合わせた形とした。

## 2.5 データ集録処理系

本データ集録処理システムは、小型電子計算機 (PANAFACOM U-300, 中央処理装置記憶容量64Kバイト) を中心に、プロセス入出力装置, タイプライタ装置, 紙テープ読取せん孔装置, XYプロッタ装置, 磁気ディスク装置, 磁気テープ装置, およびその他の付属装置から構成されている。Fig. 2.6 に集録データの処理概要を示す。なお、データ集録処理系およびソフトウェアの詳細は文献(4)で報告した。

データ集録機能としては、定常または1~100秒程度の過渡期間中における沸騰流路内圧力, 流量, 温度, テスト部加熱電力, 壁温等32chの信号を最高2msec/32chの速度で集録する。集録する実験データの標準的な項目, 点数等はTable 2.2 に示す。集録した実験データはチェック作図を行ってから磁気テープに記録する。

この磁気テープデータは、大型計算機 (FACOM 230/75) 用に変換され、データの作図, 解析計算等を行なう。計算結果等は大型計算機のラインプリンタ, 35mm COMなどに出力する他、オンライン化により、本システムのXYプロッタ装置に出力することも可能である。

Table 2.1 Characteristics of Transient Boiling Experiment Loop

1) Loop	
Pressure	40 kg/cm <sup>2</sup> (Max.)
Flow rate	50 ℓ/min (Max.)
Pump head	100m
Inlet temperature	250°C (Max.)
Flow transient time	0.5 sec (Min.)
2) Main Component	
Steam separator	200 ℓ
Pressurizer	300 ℓ (Heater 22 kW)
Condenser	162 ℓ (Condensing power 150 kW (Max.))
Cooler	100 ℓ (Cooling power 100 kW (Max.))
Pressure buffer tank	100 ℓ
Deionized water tank	1200 ℓ
Cooling water tank	280 ℓ
3) Test Section	
Heating power	100 kW (Max.)
Geometry	Tube
Maximum length	2 m

Table 2.2 Measuring items

(item)	(points)
Flow rate	1
Test section heating voltage	2
Test section heating current	1
Inlet pressure	1
Outlet pressure	1
Test section differential pressure	1
Constant pressure tank pressure	1
Pressurizer pressure	2
Inlet water temperature	1
Outlet water temperature	1
Test section wall temperature	6
Burnout detector signal	1
Load cell	1
Flow control signal	1
Spare channels	1 1
Total	3 2 points

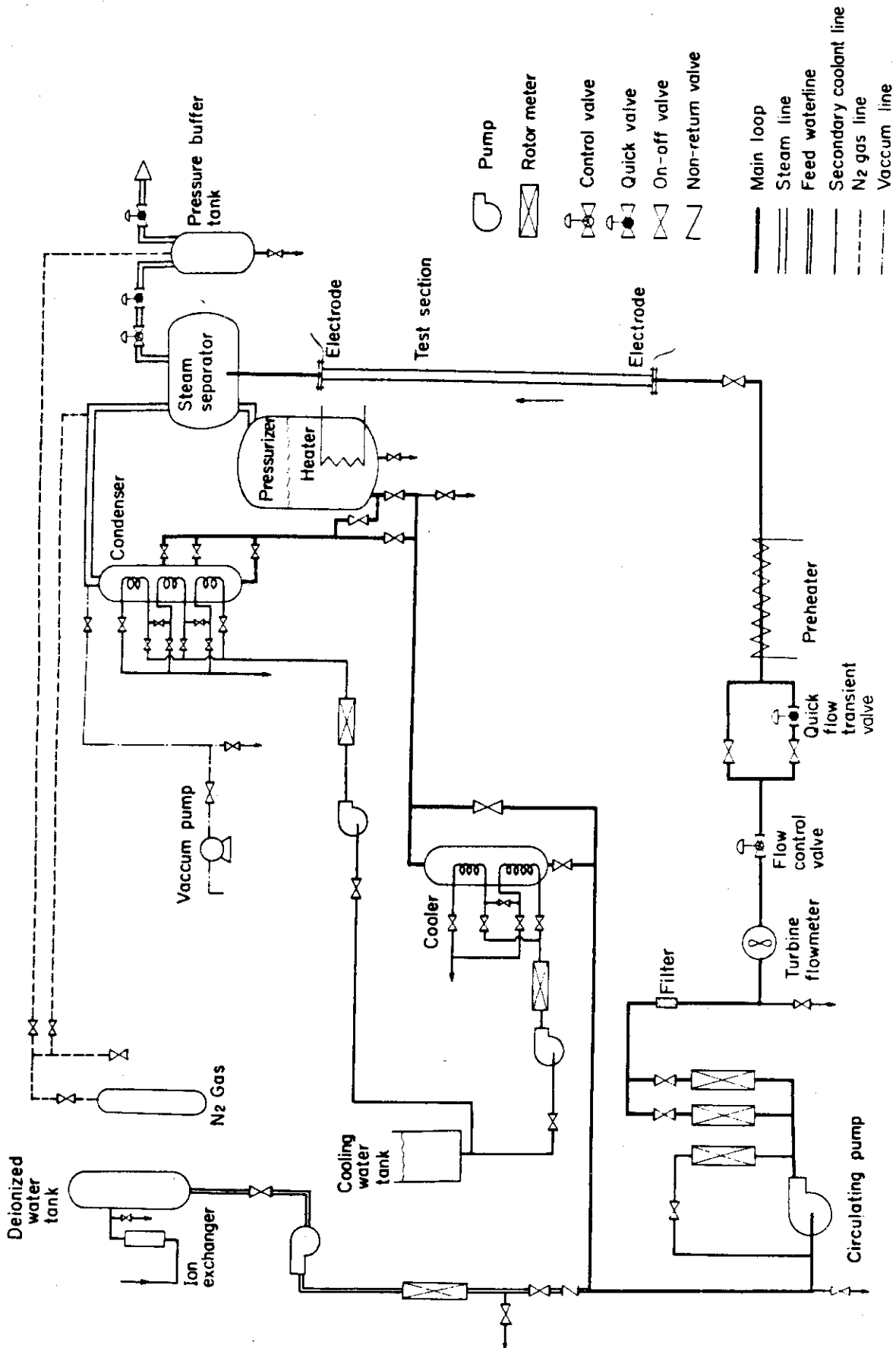


Fig. 2.1 Transient boiling experiment loop

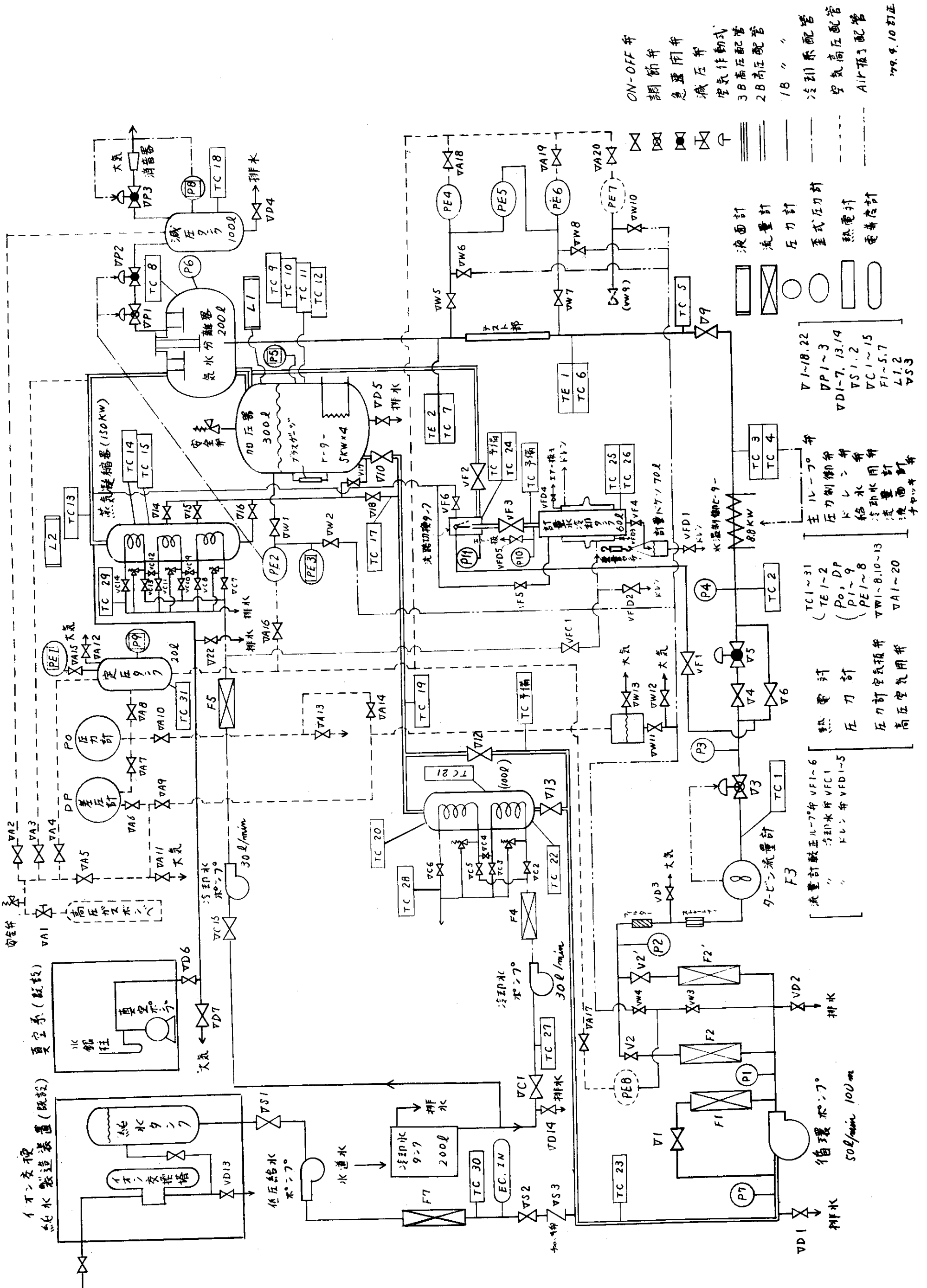


Fig. 2.2 Detail flowsheet of transient boiling experiment loop

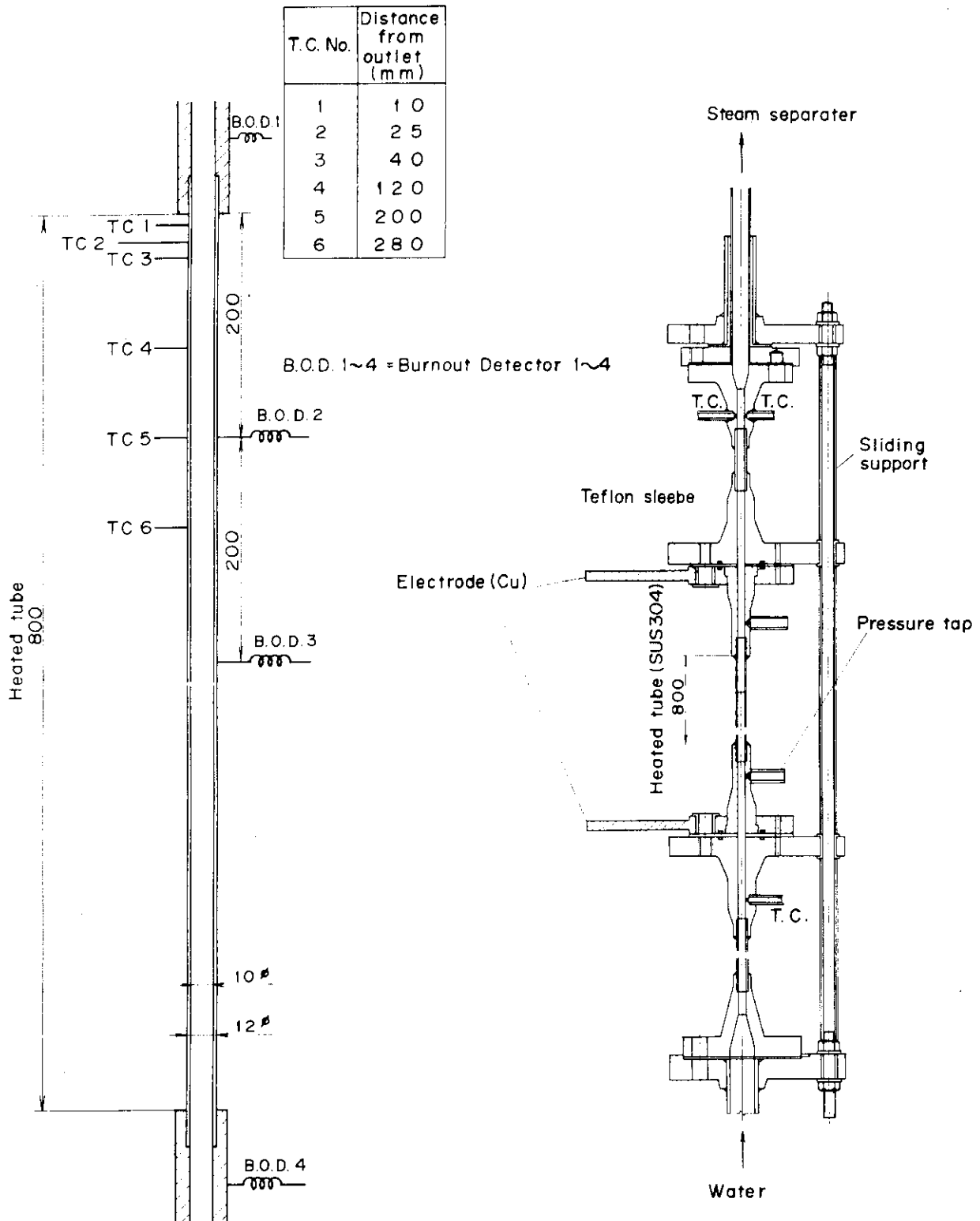


Fig. 2.3 Test Section

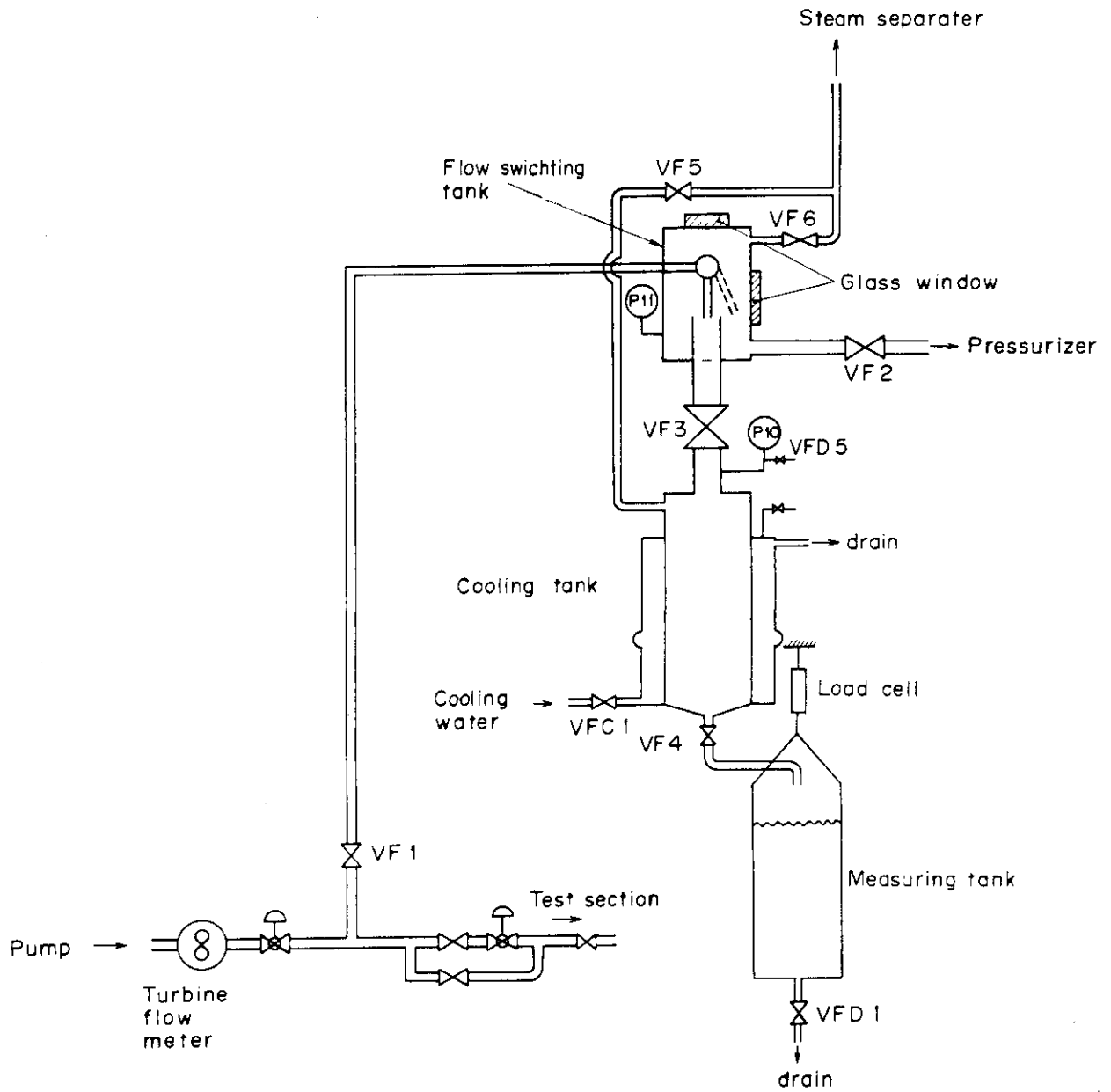
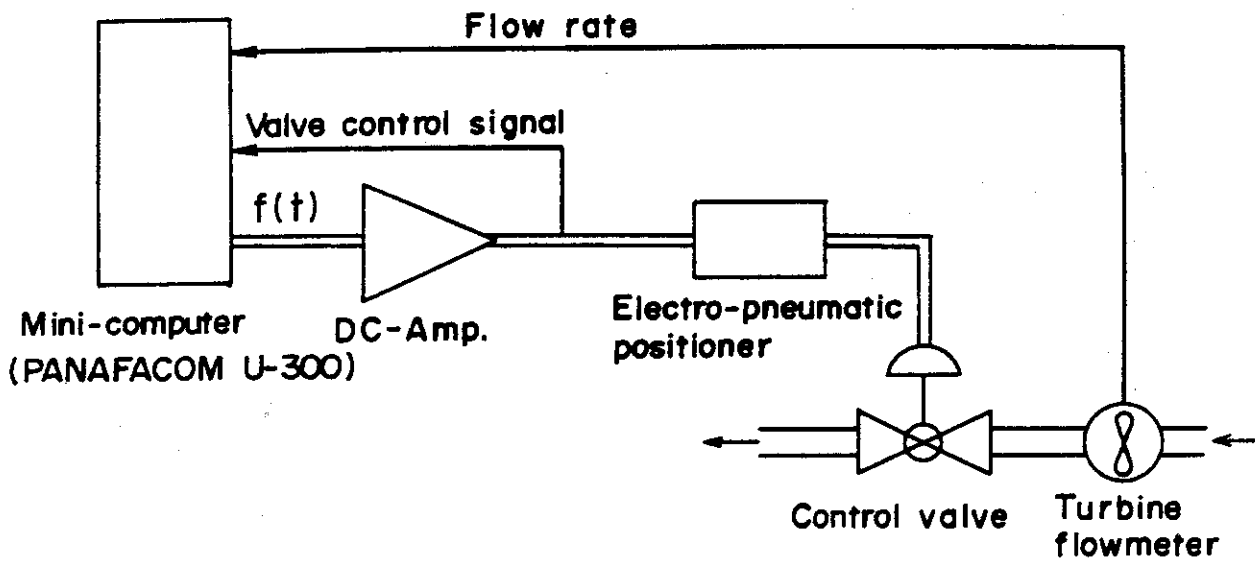


Fig. 2.4 Turbine flow meter calibration loop



Valve control signal

$$f(t) = \begin{cases} a & t \leq t_i \\ b - (b-a)e^{-\frac{c}{\Delta r} t} & t_i < t < t_i + g\Delta r \\ b - (b-a)e^{-\frac{c}{\Delta r} (t_i + g\Delta r)} + d(b-a)\frac{c}{\Delta r} e^{-\frac{c}{\Delta r} (t_i + g\Delta r)} (t - t_i - g\Delta r) & t \geq t_i + g\Delta r \end{cases}$$

(Example)

$$a = 0.85, b = 0.15, c = 2.30259, d = 1.2, g = 0.6, t_i = 0.15\Delta r$$

$\Delta r = 5.0 \text{ sec}$

$\Delta r = 20.0 \text{ sec}$

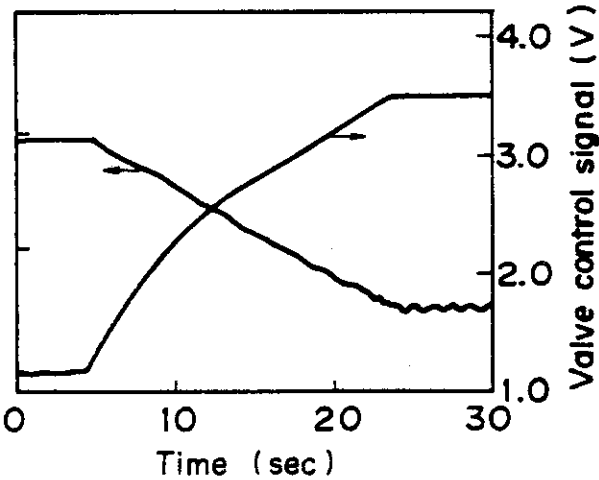
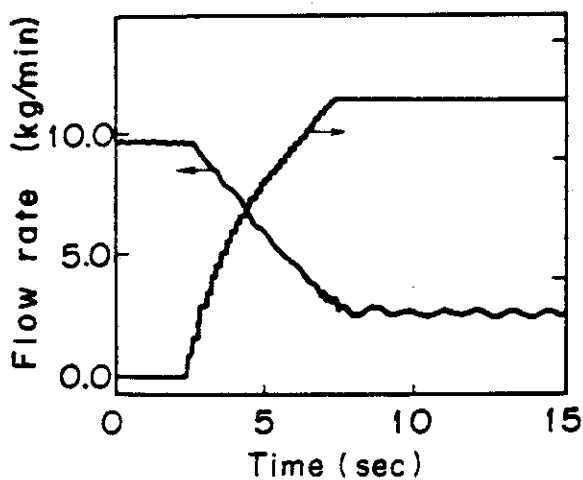


Fig. 2.5 Control method of flow reduction pattern



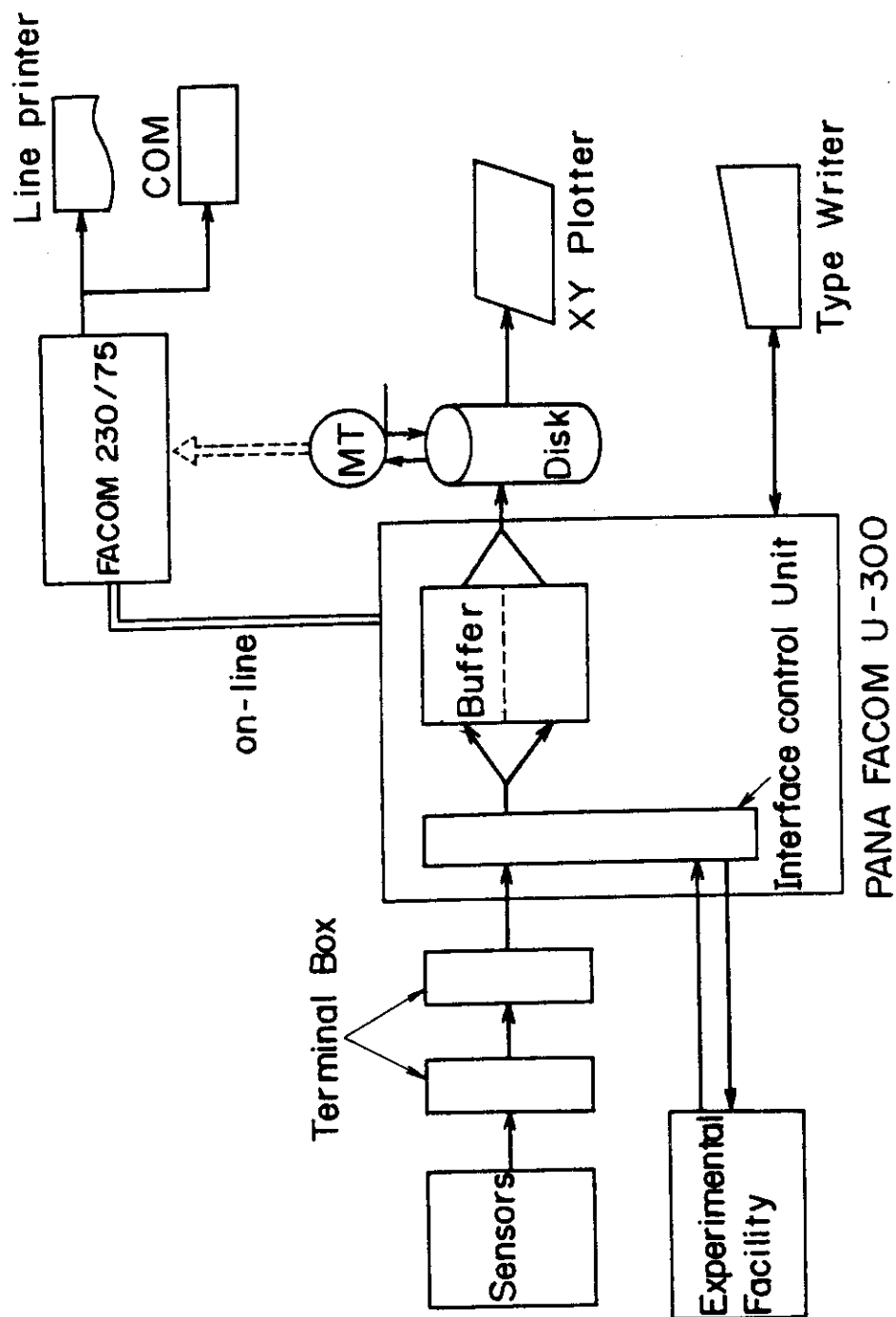


Fig. 2.6 Data processing system

### 3. 実験方法および実験結果

#### 3.1 測定値の物理量変換

本実験で集録する実験データ（加熱電圧，電流，流量，圧力，温度等）は増巾器により $\pm 5$  V以内の電圧信号に変換されて，計算機のプロセス入力装置に接続される。従って，集録データを物理量に変換するための換算係数を求める必要がある。本実験では，実測値のデータ集録，換算値の入力，最小二乗法による換算曲線の計算，結果の作図，換算係数のディスクへの転送等の物理量変換作業が迅速に行なえるよう考慮した。

##### 3.1.1 測定器の較正

センサと増巾器を含めた回路系の較正方法は各測定器にほぼ共通であり，以下に物理量変換手順を述べる。

1. 測定器系を較正用機器系に切り換える。歪型圧力計および差圧計の場合は，測定系を較正用窒素圧系に切り換え，窒素圧をかけ，精密圧力計又は精密差圧計にて測定する。加熱電流の場合は，別途較正した電圧（mV）と電流の関係から求めた電圧を標準電圧発生器にて加える。熱電対および加熱電圧の場合は標準電圧発生器から所定の電圧を加える。重量計（流量計較正時に使用）の場合は，標準重量を加重として測定する。
2. 物理量（上述の精密圧力計・差圧計の読み，標準電圧発生器の設定値，標準重量等）を操作盤上のデジタルスイッチにセットし，データの集録を行なうと同時に較正值を読み込む。なお，実測データの集録に際しては，ノイズ成分を除去するため，5秒間連続集録し，その間の平均値を採用する。
3. 物理量を変更して，2の作業を繰り返す。
4. 必要な数の換算点が得られれば，集録データと物理量の関係から最少二乗法により換算曲線を得る。
5. 集録データと換算曲線をXYプロッタにて作図し，満足すべき結果なら，求めた換算係数をディスク上の所定の場所に格納し，磁気テープにも記録する。データを使用する際は，この換算係数を用いて物理量に変換する。

上述の手順による物理量変換結果の作図例（集録データおよび換算曲線）を，テスト部差圧，加熱電圧，電流，壁温用熱電対の各場合について Fig. 3.1 に示す。

##### 3.1.2 熱電対取付偏差の補正

次に，本テスト部では熱電対を直接スポット溶接したので，熱電対によっては，加熱時に流れる最大2000 Aの直流電流の影響により，熱電対起電力に加熱電圧にほぼ比例する偏差を生じる場合がある。この偏差を補正するため，電源を遮断する前後の壁温データを集録し，各熱電対ごとに電源遮断時の偏差を求め，この操作を加熱電圧を変更して繰り返し，偏差と加熱

電圧の換算曲線を求めた。熱電対の取付偏差の測定例を Fig. 3.2 に示す。

壁温データを物理量に変換する際には、まず標準電圧発生器による換算曲線を用いて V 単位を起電力単位 (mV) に変換し、さらに測定時の加熱電圧より求めた取付偏差を補正してから温度単位に変換する。

### 3.1.3 流量計の較正

2.3 節に述べた流量計較正流路を用いてタービン流量計を較正する手順は以下の通りである。なお、Fig. 2.4 に示した較正流路の全弁は初期に閉じているとする。

1. 歪式重量計を標準重量を用いて較正する。
2. ループを運転し、所定の圧力、温度を得る。
3. 流路切換ノズルを加圧器側に倒す。
4. 弁 VF 2, VF 6 開とし、VF 1 を開いて、流路をテスト部から較正流路に切り換える。
5. 主循環ループの弁を調節して、所定の流量を得る。
6. 弁 VF 5 開とし、冷却タンクの圧力をループ圧力に等しくしてから弁 VF 3 を開く。
7. 流路切換ノズルを冷却タンク側に倒し、冷却タンク内に水を流入させ、その時間をストップウォッチにて測定し、所定の時間を経過すると再び切換ノズルを加圧器側に倒す。なお、冷却タンク流入中にタービン流量計出力を測定する。
8. 弁 VF 5, VF 3 を閉とし、必要なら冷却タンク外側ジャケット部に冷却水を流してタンク内の水を  $100^{\circ}\text{C}$  以下に冷却する。
9. 弁 VF 4, VFD 5 開とし、計量タンク内に水を流入させて、歪式重量計により、水の重量を測定する。
10. 流量を変化させて 5~9 を繰り返す。
11. 以上のようにして求めた各種流量における、冷却タンク流入時間、タービン流量計出力、流入水の重量等の測定値を用いて、最小二乗法により流量計較正曲線 ( $\text{kg}/\text{min-Volt}$ ) を求める。

Fig. 3.3 に、各種温度、圧力条件下で得られたタービン流量計出力電圧と質量流量の関係を示す。同図より、水温  $38.5 \sim 197^{\circ}\text{C}$ 、圧力  $0.098 \sim 2.40 \text{ MPa}$  の範囲内で較正曲線間はかなり相異があり、例えば  $10 \text{ kg}/\text{min}$  の流量で出力電圧に約 16% の差が見られた。次に同データを体積流量に関してプロットした結果を Fig. 3.4 に示す。同図より、体積流量に関しては  $38.5^{\circ}\text{C}$  の場合と  $135^{\circ}\text{C}$  の場合とはほとんど一致したが、 $197^{\circ}\text{C}$  の場合には  $10 \text{ l}/\text{min}$  の流量でなお 5% 程度の差が見られる。

以上の結果より、タービン流量計の較正曲線としては、なるべく実験条件に近い条件下での較正值を採用する必要があると思われる。

## 3.2 流量低下バーンアウト実験

流量低下バーンアウト実験においては、テスト部加熱量を一定に保持し、入口流量低下によりバーンアウトを発生させ、テスト部壁温が設定値以上となると小型計算機からの指令により

加熱用電源を遮断した。流量低下は2.4節で述べたように、あらかじめ設定した小型計算機アナログ出力信号により空気作動弁を動作させて行なったが、その際実験データを流速減少率(%/sec)で整理するため、なるべく直線状の流量低下が実現できるように出力信号を設定した。

加熱長さ800mm, 内径10mmテスト部での流量低下バーンアウト実験は、公称圧力0.5MPaで105点, 1.0MPaで114点, 2.0MPaで53点, 3.0MPaで64点, 3.9MPaで45点の総計381点である。各圧力下で、入口温度, 熱流束, 初期流量等をパラメータとし、流速減少率を約1.0以下~130程度に変化させて実験を行なった。Table 3.1に実験パラメータの範囲を示す。

Table 3.3~3.7に各公称圧力における実験のRun No., 加圧器圧力 $P$ , 入口温度 $T_{in}$ , 初期質量速度 $G_i$ , 熱流束 $q''$ , 初期出口クォリティ $X_i^{out}$ , 等の実験条件, およびバーンアウト発生時刻 $t_{BO}$ , 流量低下時間 $\Delta t$ , 流速減少率 $\frac{100 \Delta V}{V_i \Delta t}$ , バーンアウト発生時入口質量速度 $G_{BO}^i$ , 過渡時と定常時のバーンアウト発生入口質量速度比 $G_{BO}^i/G_{BO}^s$ 等の実験結果を示す。また, Table 3.2にはTable 3.3~3.7の使用記号の説明を述べる。なお,  $G_{BO}^s$ とは $G_{BO}^i$ がほぼ一定となるような十分小さな流速減少率における $G_{BO}^i$ の値をとった。

本実験データは2.5節に述べたように、すべて磁気テープ(MT)に集録した。付録AのTable A1~A5に全実験データの実験条件と、そのデータを集録したMTボリューム番号およびMT内ファイル番号を示す。また、本実験データのうち代表的な過渡記録例を付録BのFig. B1-1-1~B5-3-3に示す。同図の各データは、まず左上にRun No., MTボリューム番号, ファイル番号, サンプリング周期, 加熱電圧, 電力, 熱流束, 入口温度, 初期入口質量速度, 圧力(加圧器), 初期出口クォリティ等の表を示し、左下の図に入口質量速度と入口および出口温度のデータを、右上の図に入口および出口圧力とテスト部差圧のデータを、右下の図に壁温5点(加熱部出口より10~200mm)および加熱電圧のデータをそれぞれ示す。各データは、圧力, 入口温度, 熱流束, 初期入口流量等の一定条件下で、流速減少率の小さい方から大きい方の順に並べた。また、付録Bに収録した実験データのFig. No.はTable 3.3~3.7に示してあるので、同表より各データの流速減少率や $G_{BO}^i/G_{BO}^s$ 等の値がわかる。

付録Bのうち、比較的流速減少率の大きなFig. B1-1-4を例にとってバーンアウト発生状況を説明する。同図は加圧器圧力0.55MPa, 入口温度65.5°C, 熱流束 $3.55 \times 10^6$  W/m<sup>2</sup>, 初期質量速度2950 kg/s·m<sup>2</sup>の場合で、1.9秒の時点から流量低下を開始し、約5.5秒の時点で加熱部出口より10~120mmの4本の熱電対信号が急上昇してバーンアウト発生を示し、加熱電力は約5.9秒の時点で遮断されている。さらに電源遮断後も壁温は約380~400°Cのレベルで約1.0~1.7秒間保持されてから、テスト部出口から順次急冷されている。また、入口温度は実験中ほぼ一定に保持されているが、出口温度は流量低下に伴い少し上昇し約160°Cで一定となっている。本データの流速減少率は16.8%/secで、バーンアウト時の入口質量速度 $G_{BO}^i$ は約1130 kg/s·m<sup>2</sup>,  $G_{BO}^i/G_{BO}^s$ は約0.917である。

なお、バーンアウト発生時刻の決定に際しては、壁温熱電対信号の急上昇開始点のみでは信号間にかなりのバラツキが生じるので、原則としてバーンアウト検出器出力信号の急変化時刻をバーンアウト発生時刻とした。Fig. 3.5にFig. B1-1-4と同一Runのバーンアウト検出器出力信号データを示す。

Table 3.1 Range of parameters for flow reduction burnout experiment

Pressure (P)	0.50~3.9 (MPa)
Burnout heat flux (q)	$2.16\sim 3.86\times 10^6$ (W/m <sup>2</sup> )
Inlet temperature (T <sub>in</sub> )	66~201 (°C)
Initial mass velocity (G <sub>i</sub> )	1240~3050 (kg/s.m <sup>2</sup> )
Initial outlet quality (X <sub>i</sub> <sup>out</sup> )	-0.03~0.38
Flow transient time (Δt)	0.35~83 (sec)
Flow reduction rate ( $\frac{100 \Delta V}{V_i \Delta t}$ )	0.6~160 (%/sec)

Table 3.2 Nomenclature of Table 3.3~3.7

L	=	heated length (mm)
D	=	inner diameter (mm)
P	=	pressure (MPa)
T <sub>in</sub>	=	inlet water temperature (°C)
G <sub>i</sub>	=	initial mass velocity (kg/s.m <sup>2</sup> )
q''	=	heat flux (W/m <sup>2</sup> )
X <sub>i</sub> <sup>out</sup>	=	initial outlet quality
t <sub>BO</sub>	=	burnout time (sec)
Δt	=	flow transient time (sec)
V <sub>i</sub>	=	initial velocity
ΔV	=	velocity reduction range during Δt
$100 \Delta V / (V_i \Delta t)$	=	flow reduction rate (%/sec)
G <sub>BO</sub> <sup>t</sup>	=	inlet mass velocity at burnout time (kg/s.m <sup>2</sup> )
G <sub>BO</sub> <sup>s</sup>	=	steady state burnout mass velocity (kg/s.m <sup>2</sup> )
Fig. No.	=	Fig. No. of transient data (presented in Appendix B)

Table 3.3(1) Experimental Conditions and Results (I) (0.5MPa)

Run No.	Experimental Conditions						Experimental Results					Fig. No.	
	L (mm)	D (mm)	P (MPa)	T <sub>in</sub> (°C)	G <sub>i</sub> (kg/s.m <sup>2</sup> )	q'' × 10 <sup>6</sup> (W/m <sup>2</sup> )	X <sub>i</sub> <sup>out</sup>	t <sub>BO</sub> (sec)	Δt (sec)	$\frac{100 \Delta V}{V_i \Delta t}$ (%/sec)	G <sub>BO</sub> <sup>i</sup> (kg/s.m <sup>2</sup> )		$\frac{G_{BO}^i}{G_{BO}^s}$
541115-91	800	10	0.60	65	3029	3.56	-0.009	12.1	8.7	7.27	1114	0.905	B1-1-2
-92	"	"	0.58	"	2990	3.57	-0.003	31.0	26.7	2.34	1120	0.910	B1-1-3
-93	"	"	"	"	2997	3.56	-0.004	22.7	18.0	3.48	"	0.910	B1-1-4
-94	"	"	"	"	3007	"	-0.006	17.3	13.2	4.76	1118	0.908	B1-1-5
-95	"	"	"	"	2989	3.55	-0.005	14.4	11.2	5.85	1031	0.838	B1-1-6
-96	"	"	0.56	66	2966	"	0.002	9.62	6.94	8.85	1144	0.929	B1-1-1
-97	"	"	0.53	"	2929	"	0.007	8.07	5.38	11.9	1057	0.859	B1-1-2
-98	"	"	"	"	2912	"	0.008	7.48	6.32	10.5	972	0.790	B1-1-3
-99	"	"	0.55	"	2953	"	0.003	5.51	3.68	16.8	1129	0.917	B1-1-4
-100	"	"	"	"	2947	"	0.004	4.74	2.11	30.7	1038	0.843	B1-1-5
-101	"	"	"	65.5	2965	3.56	0.003	3.15	2.08	34.7	830	0.674	B1-1-6
-102	"	"	0.56	65.2	2966	3.59	0.002	1.95	0.58	113	1023	0.831	B1-1-1
-103	"	"	0.62	65.4	3027	3.56	-0.012	38.6	33.7	1.76	1233	1.0	B1-1-1
-104	"	"	0.59	"	3006	3.54	-0.008	76.8	68.5	0.86	1231	1.0	B1-1-1
-105	"	"	"	66.1	3049	2.69	-0.051	14.7	11.5	6.88	637	0.827	B1-2-1
-106	"	"	0.58	65.5	3012	2.70	-0.048	48.9	42.7	1.76	751	0.975	B1-2-1
-107	"	"	0.52	66.1	2781	2.71	-0.037	5.68	3.85	20.0	679	0.882	B1-2-1
-108	"	"	0.55	65.9	2995	2.70	-0.043	36.4	31.6	2.35	770	1.0	B1-2-1
-109	"	"	0.58	65.4	2974	"	-0.048	26.3	21.0	3.54	764	0.992	B1-2-2
-110	"	"	0.56	"	2967	2.69	-0.044	20.6	16.2	4.67	722	0.938	B1-2-2
-111	"	"	"	"	2987	2.70	-0.045	16.9	13.3	5.79	679	0.882	B1-2-2

Table 3.3(2)

Run No.	Experimental Conditions						Experimental Results				Fig. No.		
	L (mm)	D (mm)	P (MPa)	T <sub>in</sub> (°C)	G <sub>i</sub> (kg/s.m <sup>2</sup> )	q'' × 10 <sup>6</sup> (W/m <sup>2</sup> )	X <sub>i</sub> <sup>out</sup>	t <sub>BO</sub> (sec)	Δt (sec)	$\frac{100 \Delta V}{V_i \Delta t}$ (%/sec)		G <sub>BO</sub> <sup>t</sup> (kg/s.m <sup>2</sup> )	$\frac{G_{BO}^t}{G_{BO}^s}$
541115-112	800	10	0.58	65.3	2996	2.70	-0.048	12.0	9.04	8.67	647	0.840	B1-2-3
-113	"	"	0.54	65.6	2989	"	-0.041	9.6	6.8	11.4	668	0.868	
-114	"	"	0.52	65.4	2977	2.71	-0.038	8.72	6.0	13.0	679	0.882	B1-2-4
-115	"	"	0.53	65.3	2989	2.70	-0.040	7.05	5.0	16.3	531	0.690	
-116	"	"	0.52	65.5	2986	2.72	-0.038	3.53	2.48	30.9	700	0.909	
-117	"	"	0.51	"	2975	2.71	-0.036	2.65	—	—	—	—	
541206-1	"	"	0.53	120.3	2425	"	0.102	6.66	4.9	14.0	760	0.773	B1-3-4
-2	"	"	0.52	122.0	2408	2.67	0.106	44.5	39.8	1.49	983	1.0	B1-3-1
-3	"	"	0.56	119.3	2515	"	0.089	35.6	31.6	2.01	915	0.931	
-4	"	"	"	119.5	2513	"	"	26.0	21.8	2.94	908	0.924	
-5	"	"	"	118.2	2570	2.66	0.082	24.4	19.8	3.42	832	0.846	
-6	"	"	0.53	120.7	2463	2.68	0.098	20.5	16.8	3.94	834	0.848	B1-3-2
-7	"	"	0.56	119.2	2558	2.66	0.084	15.2	12.5	5.48	806	0.820	
-8	"	"	0.54	122.4	2459	2.65	0.099	10.2	8.24	8.11	815	0.829	B1-3-3
-9	"	"	0.51	121.9	2400	2.67	0.108	8.49	6.32	10.8	760	0.773	
-10	"	"	0.54	121.4	2471	2.66	0.097	6.04	4.55	15.4	743	0.756	
-11	"	"	0.52	"	2421	2.67	0.103	3.46	—	—	615	0.626	
-12	"	"	"	121.2	2421	2.68	"	2.28	0.45	167	605	0.615	
-13	"	"	"	120.8	1709	2.67	0.171	66.4	57.0	0.69	1031	1.049	
-14	"	"	0.56	119.3	1778	"	0.155	39.8	33.8	1.48	891	0.906	B1-4-1
-15	"	"	0.55	118.9	1764	"	0.157	22.2	17.2	2.93	874	0.889	
-16	"	"	0.54	120.3	1742	2.66	0.162	17.3	12.9	3.97	849	0.864	B1-4-2
-17	"	"	"	120.6	1728	"	0.166	12.3	8.80	6.07	804	0.818	B1-4-3

Table 3.3(3)

Run No.	Experimental Conditions							Experimental Results					Fig. No.	
	L (mm)	D (mm)	P (MPa)	T <sub>in</sub> (°C)	G <sub>i</sub> (kg/s.m <sup>2</sup> )	q'' × 10 <sup>6</sup> (W/m <sup>2</sup> )	X <sub>i</sub> <sup>out</sup>	t <sub>BO</sub> (sec)	Δt (sec)	$\frac{100 \Delta V}{V_i \Delta t}$ (%/sec)	G <sub>BO</sub> <sup>t</sup> (kg/s.m <sup>2</sup> )	$\frac{G_{BO}^t}{G_{BO}^s}$		
541206-18	800	10	0.53	120.6	1717	2.66	0.169	8.54	5.68	10.1	728	0.741		
-19	"	"	0.57	120.7	1764	2.67	0.157	6.24	4.25	14.5	679	0.691	B1-4-4	
-20	"	"	0.56	"	1741	2.70	0.165	3.47	2.4	27.4	594	—		
-21	"	"	0.50	119.0	2252	3.21	0.150	9.9	7.1	7.17	1106	0.905		
-22	"	"	"	119.9	2194	"	0.157	29.0	25.0	1.83	1190	0.974	B1-5-1	
-23	"	"	0.54	120.8	2279	"	0.146	21.9	19.0	2.47	1210	0.990		
-24	"	"	0.50	120.9	2184	"	0.162	17.7	14.3	3.36	1135	0.929		
-25	"	"	0.51	120.6	2219	3.22	0.156	15.3	11.3	4.05	1203	0.984		
-26	"	"	0.53	119.6	2283	3.21	0.145	13.1	10.1	4.68	1205	0.986	B1-5-2	
-27	"	"	"	122.1	2240	3.22	0.155	10.8	8.2	5.67	1201	0.983		
-28	"	"	0.51	121.1	2207	"	0.158	7.6	5.44	8.48	1188	0.972		
-29	"	"	0.52	120.9	2230	3.23	0.155	6.7	4.96	10.9	1021	0.836	B1-5-3	
-30	"	"	0.51	121.0	2220	3.22	0.157	4.86	3.35	16.0	1029	0.842		
-31	"	"	0.50	121.2	2206	3.21	0.159	4.18	2.55	21.5	997	0.816		
-32	"	"	"	119.9	2202	"	0.157	2.83	1.88	33.7	806	0.660	B1-5-4	
-33	"	"	0.49	120.3	2172	3.22	0.163	54.4	46.0	0.95	1222	1.0		
-34	"	"	0.52	121.6	2213	3.20	0.156	6.43	4.08	13.2	1019	0.834		
-35	"	"	0.49	120.9	2161	3.23	0.165	2.25	0.38	147	955	0.782		
-36	"	"	0.51	121.6	2451	2.16	0.072	13.6	10.6	6.73	702	0.871		
-37	"	"	0.53	122.2	2479	2.15	0.068	45.5	41.3	1.70	758	0.940	B1-6-1	
-38	"	"	0.51	119.0	2481	2.17	0.065	34.4	31.4	2.23	753	0.934		
-39	"	"	0.52	121.1	2468	2.16	0.068	24.2	20.1	3.40	779	0.967		
-40	"	"	0.50	121.4	2425	"	0.074	3.96	—	—	—	—		



Table 3.3(4)

Run No.	Experimental Conditions							Experimental Results					Fig. No.
	L (mm)	D (mm)	P (MPa)	T <sub>i,n</sub> (°C)	G <sub>i</sub> (kg/s.m <sup>2</sup> )	q'' × 10 <sup>6</sup> (W/m <sup>2</sup> )	X <sub>i</sub> <sup>out</sup>	t <sub>BO</sub> (sec)	Δt (sec)	$\frac{100\Delta V}{V_i \Delta t}$ (%/sec)	G <sub>BO</sub> <sup>t</sup> (kg/s.m <sup>2</sup> )	$\frac{G_{BO}^t}{G_{BO}^s}$	
541206-41	800	10	0.51	119.8	2474	2.16	0.067	23.4	18.8	3.76	726	0.901	
-42	"	"	0.53	121.2	2485	"	0.066	20.1	16.5	4.40	679	0.842	B1-6-2
-43	"	"	0.52	119.9	2483	2.18	"	17.0	14.4	5.12	654	0.811	
-44	"	"	0.53	119.6	2516	2.16	0.061	11.9	9.84	7.74	601	0.746	B1-6-3
-45	"	"	0.51	120.1	1297	2.17	0.188	80.6	60.0	0.63	806	1.0	B1-7-1
-46	"	"	"	119.6	1288	2.16	"	38.6	28.8	1.25	819	1.016	
-47	"	"	0.53	120.3	1294	2.17	"	23.3	15.5	2.70	753	0.934	
-48	"	"	0.54	120.4	1299	2.15	0.183	18.3	11.3	3.93	722	0.896	B1-7-2
-49	"	"	0.51	120.2	1281	2.17	0.192	13.5	8.3	5.86	658	0.816	
-50	"	"	0.53	120.0	1292	"	0.187	11.3	6.08	8.40	632	0.784	B1-7-3
-51	"	"	0.55	119.7	1309	2.16	0.180	16.2	9.5	5.20	662	0.821	
-52	"	"	0.52	120.5	1285	"	0.190	21.6	12.2	3.65	713	0.885	
-53	"	"	0.51	119.5	1228	2.68	0.265	31.7	24.0	0.94	957	0.974	
-54	"	"	0.54	120.8	1251	2.66	0.255	20.4	12.6	2.40	872	0.887	
-55	"	"	0.55	120.9	1260	2.67	0.254	11.5	6.7	4.97	840	0.855	
-56	"	"	0.53	120.0	1252	"	0.256	5.62	2.95	13.3	760	0.773	
-57	"	"	0.52	119.9	1246	"	0.259	3.11	1.63	29.0	658	0.669	
-58	"	"	"	119.5	1244	"	"	25.1	18.6	1.39	923	0.939	
-59	"	"	0.53	120.2	1242	2.68	0.260	15.7	9.75	3.11	866	0.881	
-60	"	"	0.52	119.5	1240	2.67	"	7.6	4.72	5.52	917	0.933	
-61	"	"	0.51	119.9	1231	2.68	0.265	4.64	2.25	16.5	775	0.788	
-62	"	"	0.49	"	1214	"	0.272	57.2	—	—	966	0.983	

Table 3.3(5)

Run No.	Experimental Conditions						Experimental Results					Fig. No.	
	L (mm)	D (mm)	P (MPa)	T <sub>in</sub> (°C)	G <sub>i</sub> (kg/s.m <sup>2</sup> )	q'' × 10 <sup>6</sup> (W/m <sup>2</sup> )	X <sub>i</sub> <sup>out</sup>	t <sub>BO</sub> (sec)	Δt (sec)	$\frac{100\Delta V}{V_i \Delta t}$ (%/sec)	G <sub>BO</sub> <sup>t</sup> (kg/s.m <sup>2</sup> )		$\frac{G_{BO}^t}{G_{BO}^s}$
550124-1	800	10	0.49	120.4	1759	3.81	0.267	9.55	6.9	4.35	1231	1.00	
- 2	"	"	0.48	118.7	1801	"	0.256	8.64	6.08	5.85	1161	0.944	
- 3	"	"	0.47	117.2	1807	3.82	0.254	7.28	5.12	7.33	1129	0.918	
- 4	"	"	0.48	119.5	1787	"	0.261	6.76	4.48	8.38	1116	0.907	
- 5	"	"	0.47	117.0	1807	3.80	0.253	5.15	3.75	10.2	1118	0.909	B1-8-3
- 6	"	"	0.48	119.7	1808	3.81	0.257	4.7	3.15	13.5	1040	0.846	
- 7	"	"	0.51	116.8	1938	3.82	0.227	2.5	1.6	31.0	976	0.793	B1-8-4
- 8	"	"	0.52	118.7	1884	"	0.238	1.35	0.35	112	1146	—	
- 9	"	"	0.55	118.8	1998	3.78	0.214	13.7	11.1	3.65	1188	0.966	
- 10	"	"	0.52	116.0	1971	3.82	0.219	16.6	14.1	3.05	1123	—	B1-8-2
- 11	"	"	0.54	118.5	1948	3.81	0.225	18.6	14.9	2.55	1207	0.981	
- 12	"	"	0.52	116.2	1953	"	0.221	19.7	15.8	2.41	1210	0.984	
- 13	"	"	0.54	118.4	1952	"	0.224	28.1	25.0	1.50	1227	0.998	
- 14	"	"	0.51	120.2	1846	3.82	0.249	39.0	35.0	1.07	1157	0.941	B1-8-1
- 15	"	"	0.53	117.3	1928	"	0.228	52.2	48.0	0.78	1205	0.980	
- 16	"	"	0.54	119.7	1940	"	0.230	62.4	52.4	0.65	1284	—	

Table 3.4(1) Experimental Conditions and Results (II) (1.0MPa)

Run No.	Experimental Conditions							Experimental Results					Fig. No.
	L (mm)	D (mm)	P (MPa)	T <sub>in</sub> (°C)	G <sub>i</sub> (kg/s.m <sup>2</sup> )	q'' × 10 <sup>6</sup> (W/m <sup>2</sup> )	X <sub>i</sub> <sup>out</sup>	t <sub>BO</sub> (sec)	Δt (sec)	$\frac{100 \Delta V}{V_i \Delta t}$ (%/sec)	G <sub>BO</sub> <sup>t</sup> (kg/s.m <sup>2</sup> )	$\frac{G_{BO}^t}{G_{BO}^s}$	
541207-101	800	10	1.04	136.9	2560	3.19	0.102	3.19	2.2	32.2	747	0.914	B2-1-4
-102	"	"	0.99	140.6	2483	"	0.120	"	41.5	1.67	768	0.940	B2-1-1
-103	"	"	1.06	141.3	2550	3.21	0.111	3.21	30.7	2.30	753	0.922	
-104	"	"	1.09	142.1	2554	3.23	0.112	3.23	20.3	3.45	764	0.935	
-105	"	"	1.08	140.8	2551	3.19	0.107	3.19	17.6	3.97	768	0.940	
-106	"	"	1.05	140.1	2530	3.20	0.111	3.20	14.3	4.75	804	0.984	B2-1-2
-107	"	"	1.06	140.5	2542	3.19	0.109	3.19	12.6	5.44	802	0.982	
-108	"	"	1.08	144.5	2525	3.20	0.111	3.20	10.7	6.58	747	0.914	
-109	"	"	"	139.0	2534	3.19	0.105	3.19	8.56	8.37	719	0.880	B2-1-3
-110	"	"	1.07	141.7	2551	"	0.110	"	6.48	11.1	722	0.884	
-111	"	"	1.05	139.5	2543	"	0.108	"	4.25	16.5	764	0.935	
-112	"	"	1.07	139.8	2562	"	0.105	"	—	—	—	—	
-113	"	"	1.01	141.9	1638	3.22	0.230	3.22	33.5	1.50	817	1.0	
-114	"	"	1.04	140.2	1677	3.19	0.214	3.19	17.9	2.99	781	0.956	
-115	"	"	"	141.7	1662	3.20	0.220	3.20	13.2	4.11	760	0.930	B2-2-2
-116	"	"	1.09	140.3	1708	3.19	0.204	3.19	9.8	5.89	722	0.884	
-117	"	"	"	141.5	1704	3.20	0.209	3.20	5.68	10.2	717	0.878	
-118	"	"	1.07	141.4	1691	3.21	0.212	3.21	2.1	27.4	717	0.878	B2-2-3
-119	"	"	"	141.1	1694	3.20	0.211	3.20	6.7	0.77	817	1.0	B2-2-1
541210-1	"	"	1.02	138.7	2358	3.80	0.165	3.80	1.72	30.9	1106	0.937	
-2	"	"	1.11	142.2	2385	3.78	0.161	3.78	8.2	6.55	1103	0.935	

Table 3.4(2)

Run No.	Experimental Conditions						Experimental Results					Fig. No.	
	L (mm)	D (mm)	P (MPa)	T <sub>in</sub> (°C)	G <sub>i</sub> (kg/s.m <sup>2</sup> )	q'' × 10 <sup>6</sup> (W/m <sup>2</sup> )	X <sub>i</sub> <sup>out</sup>	t <sub>BO</sub> (sec)	Δt (sec)	$\frac{100\Delta V}{V_i \Delta t}$ (%/sec)	G <sub>BO</sub> <sup>t</sup> (kg/s.m <sup>2</sup> )		$\frac{G_{BO}^t}{G_{BO}^s}$
541210-3	800	10	1.08	139.8	2493	3.79	0.148	33.3	30.5	1.72	1182	1.002	B2-3-1
4	"	"	1.00	140.2	2421	3.78	0.162	25.2	24.0	2.15	1171	0.992	
5	"	"	1.08	140.6	2511	3.79	0.148	19.1	15.8	3.36	1178	0.998	
6	"	"	"	139.5	2514	"	0.145	17.5	14.0	3.89	1146	0.971	
7	"	"	"	140.3	2509	3.77	0.147	15.4	12.2	4.60	1101	0.933	
8	"	"	1.07	"	2500	3.79	0.150	12.6	10.6	5.21	1120	0.949	
9	"	"	1.04	139.1	2485	"	0.151	10.4	—	—	1159	—	
10	"	"	1.06	140.8	2449	3.80	0.157	8.82	6.8	8.18	1086	0.920	B2-3-2
11	"	"	1.10	140.9	2510	3.79	0.148	7.36	5.04	11.5	1057	0.896	
12	"	"	1.07	138.7	2525	3.78	0.143	5.16	3.65	15.9	1059	0.897	
13	"	"	1.08	141.7	2475	3.80	0.155	2.61	1.65	35.0	1044	0.885	B2-3-3
14	"	"	1.09	138.9	2534	"	0.142	2.05	0.38	138	1210	—	
15	"	"	1.06	139.3	2020	3.79	0.206	64	54	0.77	1180	1.00	B2-4-1
16	"	"	1.01	139.1	1998	3.80	0.213	34	28.8	1.54	1112	0.942	
17	"	"	1.06	141.2	2010	"	0.122	7.14	4.56	10.2	1072	0.908	
18	"	"	1.10	141.3	2043	"	0.204	18.3	13.5	3.16	1171	0.992	
19	"	"	1.07	137.3	2064	3.79	0.194	—	—	—	—	—	
20	"	"	1.02	142.2	1971	3.80	0.223	10.9	7.6	6.24	1036	0.878	B2-4-2
21	"	"	1.06	"	1990	"	0.218	8.9	6.24	7.80	1021	0.865	
22	"	"	1.03	140.8	2010	3.76	0.210	5.1	3.23	15.2	1025	0.869	
23	"	"	1.01	139.2	2013	3.80	0.211	2.64	1.53	33.0	997	0.845	B2-4-3
24	"	"	1.04	141.6	1237	3.20	0.326	5.63	2.85	12.8	781	1.0	
25	"	"	1.05	141.8	1239	"	0.324	42.6	28	1.43	753	0.965	

Table 3.4(3)

Run No.	Experimental Conditions							Experimental Results					Fig. No.
	L (mm)	D (mm)	P (MPa)	T <sub>in</sub> (°C)	G <sub>i</sub> (kg/s.m <sup>2</sup> )	q'' × 10 <sup>6</sup> (W/m <sup>2</sup> )	X <sub>i</sub> <sup>out</sup>	t <sub>BO</sub> (sec)	Δt (sec)	$\frac{100 \Delta V}{V_i \Delta t}$ (%/sec)	G <sub>BO</sub> <sup>t</sup> (kg/s.m <sup>2</sup> )	$\frac{G_{BO}^t}{G_{BO}^s}$	
541210-26	800	10	1.00	141.6	1229	3.19	0.330	22.7	12.5	2.90	781	1.0	B2-5-1
-27	"	"	1.08	140.1	1255	3.20	0.313	18.2	11.3	3.63	741	0.949	
-28	"	"	1.09	138.7	1259	3.19	0.306	12.6	7.5	5.33	755	0.967	
-29	"	"	1.10	138.4	1254	3.20	0.308	8.52	4.24	10.1	717	0.918	
-30	"	"	1.06	138.0	1252	3.19	0.310	3.08	1.4	31.2	705	0.903	
-31	"	"	1.05	136.5	1254	3.20	0.308	83.4	45	0.87	764	0.978	
550108-101	"	"	0.99	91.4	2991	3.19	-0.019	15.5	12.1	5.98	828	0.971	B2-6-3
-102	"	"	0.96	91.7	2981	3.21	-0.014	12.4	10.2	7.12	817	0.958	
-103	"	"	0.94	91.2	2972	3.23	-0.010	10.6	8.0	9.57	698	0.818	
-104	"	"	0.92	90.5	2983	3.22	-0.011	9.14	7.19	10.4	753	0.883	
-105	"	"	0.90	90.6	2993	3.23	-0.009	7.1	5.75	13.0	758	0.889	
-106	"	"	"	92.1	2948	3.23	-0.003	5.82	4.46	16.7	751	0.880	
-107	"	"	"	91.8	2960	"	-0.005	3.3	1.98	37.8	743	0.871	B2-6-4
-108	"	"	0.89	90.9	2978	3.22	-0.007	-	-	-	-	-	
-109	"	"	"	"	2957	3.23	-0.006	17.0	14.7	4.63	944	(1.107)	
-110	"	"	"	91.7	2936	3.22	-0.004	22.2	19.8	3.69	792	0.928	
-111	"	"	0.90	89.8	2967	3.23	-0.009	20.8	18.3	3.66	978	(1.147)	
-112	"	"	"	91.6	2965	"	-0.005	26.0	25.2	2.92	783	0.918	
-113	"	"	0.91	92.0	2963	"	-0.006	34.8	33.4	2.16	823	0.965	B2-6-1
-114	"	"	"	91.7	2958	"	"	45.2	44.8	1.59	849	0.995	

Table 3.4(4)

Run No.	Experimental Conditions							Experimental Results					Fig. No.
	L (mm)	D (mm)	P (MPa)	T <sub>in</sub> (°C)	G <sub>i</sub> (kg/s.m <sup>2</sup> )	q'' × 10 <sup>6</sup> (W/m <sup>2</sup> )	X <sub>i</sub> <sup>out</sup>	t <sub>BO</sub> (sec)	Δt (sec)	$\frac{100 \Delta V}{V_i \Delta t}$ (%/sec)	G <sub>BO</sub> <sup>t</sup> (kg/s.m <sup>2</sup> )	$\frac{G_{BO}^t}{G_{BO}^s}$	
550109-1	800	10	0.93	89.2	2567	3.20	0.012	15.3	11.8	5.98	758	0.889	
-2	"	"	0.96	89.7	2561	3.22	"	9.6	6.48	10.5	811	0.951	
-3	"	"	0.94	90.3	2556	3.21	0.015	7.14	5.35	13.3	732	0.858	
-4	"	"	0.97	89.8	2572	3.20	0.009	3.55	2.4	31.4	637	0.747	
-5	"	"	0.96	90.3	2543	3.21	0.014	19.0	15.7	4.45	766	0.898	
-6	"	"	0.95	89.3	2553	3.22	0.012	22.2	18.0	3.70	853	1.0	
-7	"	"	0.93	91.4	2528	"	0.021	27.2	22.4	2.93	866	1.015	
-8	"	"	0.95	92.5	2524	"	0.022	44.3	39.8	1.66	853	1.0	
-9	"	"	"	90.4	2550	3.23	0.015	93.1	85.0	0.81	785	0.920	
-10	"	"	"	91.1	1706	3.19	0.113	12.7	8.9	5.58	859	1.007	
-11	"	"	0.94	90.5	1700	3.22	0.116	11.1	7.4	6.80	845	0.991	
-12	"	"	0.95	92.2	1705	3.20	0.115	39.3	32.8	1.68	768	0.900	B2-7-1
-13	"	"	0.96	92.0	1712	"	0.113	28.8	23.6	2.29	785	0.920	
-14	"	"	0.95	89.4	1711	3.21	0.110	19.4	14.0	3.42	891	1.045	
-15	"	"	0.93	88.7	1718	3.20	0.108	17.9	13.1	4.24	764	0.896	
-16	"	"	0.96	89.5	1726	3.21	0.107	14.3	10.5	5.37	753	0.883	B2-7-2
-17	"	"	0.91	88.7	1713	3.20	0.111	9.04	6.16	8.29	838	0.982	
-18	"	"	0.95	91.4	1712	3.21	0.114	7.84	4.8	11.5	764	0.896	B2-7-3
-19	"	"	0.92	90.1	1702	3.20	"	4.55	2.5	21.7	777	0.911	
-20	"	"	0.95	"	1711	"	0.110	3.46	2.14	28.9	651	0.763	B2-7-4
-21	"	"	0.92	89.1	1691	3.19	0.113	-	-	-	-	-	

Table 3.4(5)

Run No.	Experimental Conditions						Experimental Results						Fig. No.
	L (mm)	D (mm)	P (MPa)	T <sub>in</sub> (°C)	G <sub>i</sub> (kg/s.m <sup>2</sup> )	q'' × 10 <sup>6</sup> (W/m <sup>2</sup> )	X <sub>i</sub> <sup>out</sup>	t <sub>BO</sub> (sec)	Δt (sec)	$\frac{100 \Delta V}{V_i \Delta t}$ (%/sec)	G <sub>BO</sub> <sup>t</sup> (kg/s.m <sup>2</sup> )	$\frac{G_{BO}^t}{G_{BO}^s}$	
550109-22	800	10	0.95	93.2	1692	3.19	0.119	—	—	—	—	—	—
— 23	"	"	0.96	90.9	1708	3.21	0.112	71.0	56.5	0.89	849	0.995	—
— 24	"	"	0.93	89.9	1705	3.85	0.173	9.1	5.5	6.91	1057	0.810	—
— 25	"	"	0.94	88.6	1739	3.80	0.157	5.02	2.25	10.8	1318	1.01	—
— 26	"	"	"	90.6	1731	3.82	0.165	4.05	2.05	16.5	1146	0.878	—
— 27	"	"	0.96	92.6	1726	"	0.168	2.75	1.4	31.6	963	0.738	—
— 28	"	"	0.99	90.4	1745	3.80	0.157	—	—	—	—	—	—
— 29	"	"	0.93	90.2	1722	3.82	0.167	6.32	3.6	7.92	1231	0.943	—
— 30	"	"	"	90.0	"	3.80	0.165	8.8	5.4	5.24	1235	0.946	—
— 31	"	"	0.91	89.4	"	3.82	0.168	13.8	9.45	4.35	1014	0.777	—
— 32	"	"	0.95	92.3	1728	3.81	"	15.5	9.9	3.53	1125	0.862	—
— 33	"	"	"	91.8	1723	3.79	0.166	17.4	12.5	2.19	1252	0.959	—
— 34	"	"	0.94	93.1	"	3.80	0.170	24.5	18.9	1.64	1188	0.910	—
— 35	"	"	0.93	92.7	1722	"	"	30.0	20.6	1.12	1324	1.015	—
— 36	"	"	0.94	91.4	2583	3.81	0.052	9.15	6.0	9.30	1142	0.875	B2-8-3
— 37	"	"	"	91.2	2583	"	0.051	7.36	4.8	11.7	1135	0.870	—
— 38	"	"	0.95	90.8	2616	3.82	0.047	7.0	4.56	11.6	1231	0.943	—
— 39	"	"	0.94	93.0	2577	3.81	0.055	5.53	3.85	16.0	987	0.756	B2-8-4
— 40	"	"	0.96	93.4	2585	3.80	0.054	4.4	2.65	21.9	1082	0.829	—
— 41	"	"	"	92.0	2599	3.82	0.050	2.94	1.85	35.1	912	0.670	B2-8-5
— 42	"	"	0.95	92.1	2588	"	0.052	—	—	—	—	—	—

Table 3.4(6)

Run No.	Experimental Conditions						Experimental Results						Fig. No.	
	L (mm)	D (mm)	P (MPa)	T <sub>in</sub> (°C)	G <sub>i</sub> (kg/s.m <sup>2</sup> )	q'' × 10 <sup>6</sup> (W/m <sup>2</sup> )	X <sub>i</sub> <sup>out</sup>	t <sub>BO</sub> (sec)	Δt (sec)	$\frac{100 \Delta V}{V_i \Delta t}$ (%/sec)	G <sub>BO</sub> <sup>t</sup> (kg/s.m <sup>2</sup> )	$\frac{G_{BO}^t}{G_{BO}^s}$		
550109-43	800	10	0.93	91.1	2588	3.81	0.051	11.8	9.0	5.61	1282	0.982	B2-8-2	
-44	"	"	0.94	91.0	2589	"	"	15.6	12.2	4.58	1142	0.875		
-45	"	"	0.96	92.6	2587	"	0.052	17.9	14.0	3.86	1188	0.910		
-46	"	"	"	92.8	2576	"	0.053	20.0	16.1	3.36	1184	0.907		
-47	"	"	0.94	90.5	2630	3.80	0.045	28.0	24.8	2.31	1120	0.858		
-48	"	"	0.96	92.0	2615	3.78	0.047	35.1	31.0	1.76	1188	0.910		
-49	"	"	0.95	91.9	2592	3.83	0.052	47.7	42.9	1.16	1305	1.0		
-50	"	"	0.96	90.7	2627	3.81	0.045	72.4	61.2	0.82	"	"		B2-8-1



Table 3.5(I) Experimental Conditions and Results (III) (2.0MPa)

Run No.	Experimental Conditions								Experimental Results					Fig. No.
	L (mm)	D (mm)	P (MPa)	T <sub>in</sub> (°C)	G <sub>i</sub> (kg/s.m <sup>2</sup> )	q'' × 10 <sup>6</sup> (W/m <sup>2</sup> )	X <sub>i</sub> <sup>out</sup>	t <sub>BO</sub> (sec)	Δt (sec)	$\frac{100 \Delta V}{V_i \Delta t}$ (%/sec)	G <sub>BO</sub> <sup>t</sup> (kg/s.m <sup>2</sup> )	$\frac{G_{BO}^t}{G_{BO}^s}$		
541211-101	800	10	2.01	160.9	1710	3.45	0.220	13.3	9.7	5.82	745	0.961	B3-1-1	
-102	"	"	1.95	161.0	1707	3.46	0.224	45.5	40.3	1.40	747	0.964		
-103	"	"	1.96	"	1703	3.45	0.223	34.2	29.4	1.90	751	0.969		
-104	"	"	1.94	160.9	1700	3.47	0.227	24.3	19.4	2.81	775	1.0		
-105	"	"	1.92	161.2	1712	"	"	22.1	17.1	3.25	760	0.981		
-106	"	"	1.93	161.1	1711	3.46	0.225	19.1	15.0	3.77	743	0.959		B3-1-2
-107	"	"	1.94	161.0	1722	3.44	0.220	16.0	12.6	4.55	734	0.947		
-108	"	"	1.98	"	1741	"	0.214	11.0	8.32	7.01	726	0.937		B3-1-3
-109	"	"	1.96	160.5	1724	3.46	0.219	8.76	6.08	9.42	736	0.950		
-110	"	"	1.99	160.7	1730	3.47	0.218	6.25	4.35	13.5	711	0.917		B3-1-4
-111	"	"	"	161.1	1746	3.44	0.213	3.18	1.93	30.5	717	0.925		
-112	"	"	1.96	160.7	1730	3.46	0.218	1.85	0.35	161	753	0.972		B3-1-5
-113	"	"	1.95	160.9	1730	"	0.220	88	76	0.73	770	0.994		
-114	"	"	1.98	160.7	1343	3.48	0.317	43.1	32.5	1.34	760	0.981	B3-2-1	
-115	"	"	1.97	160.4	1345	3.45	0.313	24.2	17.3	2.59	743	0.959		
-116	"	"	1.92	161.0	1342	"	0.318	18.5	12.2	3.67	741	0.956	B3-2-2	
-117	"	"	1.96	159.7	1353	3.46	0.311	13.0	8.3	5.55	730	0.942		
-118	"	"	1.95	160.5	1349	3.47	0.315	6.0	3.5	13.3	722	0.932		
-119	"	"	1.98	160.4	1356	3.46	0.310	9.36	5.84	7.77	741	0.956		
-120	"	"	1.96	160.0	1444	3.45	0.312	3.09	1.58	32.3	707	0.912		B3-2-3
-121	"	"	"	160.4	1348	"	0.313	83.4	64.5	0.65	775	1.0		

Table 3.5(2)

Run No.	Experimental Conditions							Experimental Results					Fig. No.	
	L (mm)	D (mm)	P (MPa)	T <sub>in</sub> (°C)	G <sub>i</sub> (kg/s.m <sup>2</sup> )	q'' × 10 <sup>6</sup> (W/m <sup>2</sup> )	X <sub>i</sub> <sup>out</sup>	t <sub>BO</sub> (sec)	Δt (sec)	$\frac{100 \Delta V}{V_i \Delta t}$ (%/sec)	G <sub>BO</sub> <sup>t</sup> (kg/s.m <sup>2</sup> )	$\frac{G_{BO}^t}{G_{BO}^s}$		
541212-1	800	10	1.99	161.8	2537	3.46	0.112	14.5	11.7	5.96	768	0.991	B3-3-2	
-2	"	"	"	162.3	2553	3.44	0.110	21.2	18.0	3.89	766	0.988		
-3	"	"	1.96	161.3	2568	"	0.108	17.7	15.9	4.43	760	0.981		
-4	"	"	"	162.8	2534	"	0.115	12.0	9.92	7.08	755	0.974		
-5	"	"	1.95	160.7	2555	"	0.109	9.46	7.2	9.70	770	0.994		
-6	"	"	1.96	161.7	2569	"	"	6.74	5.2	13.7	743	0.959		
-7	"	"	1.94	161.9	2543	3.48	0.116	—	—	—	—	—		
-8	"	"	1.95	162.7	2539	3.44	0.115	5.06	3.25	22.0	722	0.932		
-9	"	"	"	161.2	2528	3.45	0.113	—	—	—	—	—		
-10	"	"	1.97	162.7	2550	3.46	0.114	23.1	20.3	3.44	768	0.991		
-11	"	"	"	162.8	"	3.47	"	25.1	22.5	3.04	804	1.037		
-12	"	"	"	162.0	2546	3.44	0.111	36.1	33.7	2.08	762	0.983		
-13	"	"	1.98	162.5	2563	3.45	0.112	47.6	46.0	1.53	"	"		B3-3-1
-14	"	"	"	161.2	"	3.47	0.109	3.66	2.81	25.3	743	0.959		B3-3-3
-15	"	"	1.96	162.1	2498	3.74	0.137	19.5	16.4	3.88	908	0.982	B3-4-2	
-16	"	"	1.94	162.0	2470	3.77	0.143	16.1	14.0	4.51	910	0.984		
-17	"	"	1.97	161.0	2496	3.76	0.135	13.5	10.7	5.98	900	0.973		
-18	"	"	1.96	163.3	2476	3.75	0.143	10.9	8.82	7.21	902	0.975		
-19	"	"	1.98	163.2	2425	3.77	0.147	8.7	6.58	9.64	887	0.959	B3-4-3	
-20	"	"	1.96	161.2	2477	3.76	0.138	6.16	4.58	13.8	908	0.982	B3-4-4	
-21	"	"	1.94	162.4	2469	"	0.143	2.99	1.95	33.4	859	0.929		
-22	"	"	1.99	"	2495	3.77	0.138	20.9	17.3	3.67	912	0.986		

Table 3.5(3)

Run No.	Experimental Condition							Experimental Results					Fig. No.
	L (mm)	D (mm)	P (MPa)	T <sub>in</sub> (°C)	G <sub>i</sub> (kg/s.m <sup>2</sup> )	q'' × 10 <sup>6</sup> (W/m <sup>2</sup> )	X <sub>i</sub> <sup>out</sup>	t <sub>BO</sub> (sec)	Δt (sec)	$\frac{100 \Delta V}{V_i \Delta t}$ (%/sec)	G <sub>BO</sub> <sup>t</sup> (kg/s.m <sup>2</sup> )	$\frac{G_{BO}^t}{G_{BO}^s}$	
541212-23	800	10	1.97	163.8	2482	3.76	0.143	23.3	20.4	3.11	908	0.982	
-24	"	"	1.99	162.9	2498	"	0.138	32.2	29.4	2.19	891	0.963	
-25	"	"	1.97	163.5	2464	3.73	0.143	42.5	39.6	1.60	904	0.977	B3-4-1
-26	"	"	2.00	164.4	2476	"	0.142	2.0	0.48	124	1008	—	
-27	"	"	1.97	162.2	1769	3.75	0.242	39.5	32.8	1.44	925	1.0	B3-5-1
-28	"	"	1.94	160.6	1758	"	"	17.2	12.9	3.75	908	0.982	
-29	"	"	1.98	160.3	1767	3.77	0.239	12.3	9.0	5.53	887	0.959	B3-5-2
-30	"	"	1.99	161.9	1766	3.72	0.238	8.1	5.45	9.11	889	0.961	
-31	"	"	1.98	162.1	1765	3.76	0.243	2.84	1.63	30.4	891	0.963	B3-5-3
-32	"	"	1.96	163.0	1762	3.77	0.248	78.2	67.7	0.69	929	1.0	

Table 3.6(1) Experimental Conditions and Results (W) (3.0MPa)

Run No.	Experimental Conditions							Experimental Results					Fig.No.
	L (mm)	D (mm)	P (MPa)	T <sub>in</sub> (°C)	G <sub>i</sub> (kg/s·m <sup>2</sup> )	q <sup>w</sup> ×10 <sup>6</sup> (W/m <sup>2</sup> )	X <sub>i</sub> <sup>out</sup>	t <sub>BO</sub> (sec)	Δt (sec)	$\frac{100\Delta V}{V_i \Delta t}$ (%/sec)	G <sub>BO</sub> <sup>i</sup> (kg/s·m <sup>2</sup> )	$\frac{G_{BO}^i}{G_{BO}^s}$	
541102-101	800	10	2.97	130	2103	3.72	0.059	11.8	8.5	7.37	785	1.03	B4-1-1
-102	"	"	3.02	"	2048	3.71	0.064	39.9	34.4	1.84	753	0.986	
-103	"	"	2.92	131	2038	3.72	0.075	30.0	24.2	2.61	753	0.986	
-104	"	"	2.98	"	2043	"	0.069	22.3	17.4	3.70	726	0.950	
-105	"	"	"	130	2035	3.69	0.068	16.8	12.6	5.06	738	0.966	
-106	"	"	3.01	131	2031	3.71	0.069	13.9	10.4	6.19	724	0.948	
-107	"	"	2.96	"	2041	"	"	9.67	6.98	9.15	738	0.966	
-108	"	"	2.97	"	2038	"	0.070	7.81	5.09	12.2	757	0.991	B4-1-3
-109	"	"	"	"	2035	3.70	"	7.16	4.43	14.1	746	0.976	
-110	"	"	2.96	"	2040	3.72	0.072	5.59	3.71	17.4	726	0.950	
-111	"	"	"	"	2032	3.71	"	4.88	2.95	21.9	719	0.941	B4-1-4
-112	"	"	"	"	2040	"	0.070	3.36	2.17	29.8	710	0.930	
-113	"	"	2.95	"	2038	3.72	0.071	1.87	0.57	113	726	0.950	B4-1-5
-114	"	"	3.04	"	2034	3.70	0.066	76.9	66.6	0.94	764	1.00	
541107-1	"	"	2.92	133	2986	3.70	-0.026	12.04	8.7	8.61	751	0.983	B4-2-1
-2	"	"	2.91	132	2952	3.71	-0.026	39.9	34.9	2.13	758	0.992	
-3	"	"	"	"	2984	3.72	-0.028	30.0	25.4	2.93	762	0.997	
-4	"	"	2.97	133	2992	"	-0.028	22.1	17.3	4.29	772	1.01	
-5	"	"	2.94	"	2982	3.73	-0.025	17.1	12.5	5.96	758	0.992	
-6	"	"	"	"	2977	3.72	-0.025	13.9	10.9	6.83	758	"	
-7	"	"	"	134	2965	3.71	-0.023	9.79	7.19	10.4	758	"	

Table 3.6(2)

Run No.	Experimental Conditions							Experimental Results					Fig.No.
	L (mm)	D (mm)	P (MPa)	T <sub>in</sub> (°C)	G <sub>i</sub> (kg/s·m <sup>2</sup> )	q' ×10 <sup>6</sup> (W/m <sup>2</sup> )	X <sub>i</sub> <sup>out</sup>	t <sub>BO</sub> (sec)	Δt (sec)	$\frac{100JV}{V_i \Delta t}$ (%/sec)	G <sub>BO</sub> <sup>i</sup> (kg/s·m <sup>2</sup> )	$\frac{G_{BO}^i}{G_{BO}^s}$	
541107-8	800	10	2.95	132	2981	3.72	-0.027	8.42	5.74	13.0	751	0.983	B4-2-3
-9	"	"	2.95	133	2988	"	-0.028	7.73	5.21	14.5	728	0.953	
-10	"	"	2.92	132	2974	"	-0.026	5.90	4.10	18.2	758	0.992	
-11	"	"	2.93	133	2959	3.71	-0.025	5.00	3.20	23.4	743	0.973	
-12	"	"	2.94	132	2950	3.73	-0.024	3.31	2.26	33.9	758	0.992	B4-2-4
-13	"	"	2.95	133	3027	3.71	-0.030	1.725	0.625	123	702	0.919	B4-2-5
-14	"	"	2.97	"	2976	"	-0.027	62.4	54.4	1.37	764	1.0	
541109-106	"	"	3.00	184	1642	3.70	0.275	10.1	6.68	7.46	824	0.983	
-107	"	"	3.01	182	1667	3.72	0.264	33.6	28.1	1.85	806	0.962	
-108	"	"	3.00	183	1652	3.70	0.269	18.8	13.8	3.72	804	0.959	
-109	"	"	"	180	1692	"	0.253	14.4	9.98	5.13	(826)	0.986	
-110	"	"	3.03	"	1703	3.69	0.247	11.8	8.4	6.29	800	0.955	B4-3-2
-111	"	"	3.02	"	1692	3.72	0.255	8.42	5.62	9.45	796	0.950	
-112	"	"	3.04	"	1689	3.70	0.251	7.01	4.3	12.5	787	0.939	
-113	"	"	3.01	183	1684	3.72	0.263	6.35	3.55	14.8	796	0.950	B4-3-3
-114	"	"	3.00	182	1689	3.69	0.258	4.96	3.06	17.9	770	0.919	
-115	"	"	3.01	179	1680	3.72	0.255	4.21	2.3	23.3	779	0.930	
-116	"	"	3.04	180	1710	3.70	0.248	2.97	1.85	30.2	758	0.905	B4-3-4
-117	"	"	"	181	1707	3.71	0.252	64.8	54.1	0.95	828	0.988	B4-3-1
-118	"	"	3.01	180	1699	"	"	1.95	-	-	-	-	
541113-1	"	"	3.00	180	2605	3.73	0.119	12.6	9.4	7.33	811	0.968	
-2	"	"	2.98	181	2561	3.71	0.124	41.8	36.3	1.85	838	1.0	B4-4-1

Table 3.6(3)

Run No.	Experimental Conditions						Experimental Results						
	L (mm)	D (mm)	P (MPa)	T <sub>ia</sub> (°C)	G <sub>i</sub> (kg/s·m <sup>2</sup> )	q'' × 10 <sup>6</sup> (W/m <sup>2</sup> )	X <sub>i</sub> <sup>out</sup>	t <sub>BO</sub> (sec)	Δt (sec)	$\frac{100\Delta V}{V_i \Delta t}$ (%/sec)	G <sub>BO</sub> <sup>t</sup> (kg/s·m <sup>2</sup> )	$\frac{G_{BO}^t}{G_{BO}^s}$	Fig.No.
541113-3	800	10	3.01	180	2575	3.70	0.119	23.7	19.1	3.60	804	0.959	
-4	"	"	3.00	"	2613	"	0.117	18.2	14.2	4.90	796	0.950	B4-4-2
-5	"	"	3.02	"	2629	3.71	0.114	14.7	11.4	6.09	804	0.959	
-6	"	"	3.01	"	2599	3.74	0.120	10.4	7.92	8.74	800	0.955	B4-4-3
-7	"	"	3.00	183	2593	3.70	0.126	8.32	6.0	11.5	805	0.961	
-8	"	"	"	181	2612	"	0.117	7.64	5.25	13.3	783	0.934	
-9	"	"	"	180	2639	"	0.112	6.0	4.2	16.9	762	0.909	
-10	"	"	"	181	2631	3.71	0.117	4.89	3.11	22.6	785	0.937	
-11	"	"	3.01	180	2617	3.67	0.113	3.15	2.18	32.8	743	0.891	B4-4-4
-12	"	"	"	"	2626	"	"	2.30	0.53	125	883	-	
-13	"	"	2.99	181	2585	3.70	0.121	84.2	74.3	0.92	830	0.995	
-14	"	"	3.00	179	2127	3.71	0.172	12.7	9.43	6.71	781	0.932	
-15	"	"	2.98	182	2143	"	0.179	41.6	35.8	1.71	834	1.0	B4-5-1
-16	"	"	2.99	180	2135	3.72	0.174	17.8	13.2	4.68	815	0.973	
-17	"	"	2.98	"	2149	"	0.173	7.43	4.67	13.4	806	0.962	B4-5-2
-18	"	"	2.97	181	2105	"	0.183	2.98	1.95	31.7	797	0.955	B4-5-3
-19	"	"	3.00	182	1291	3.71	0.381	24.5	18.7	1.95	821	0.980	
-20	"	"	"	183	1293	3.72	0.383	11.2	6.60	5.45	828	0.988	
-21	"	"	2.99	181	1294	3.70	0.375	8.14	4.56	7.98	823	0.987	
-22	"	"	3.00	"	"	3.71	0.376	5.34	2.52	15.0	804	0.964	
-23	"	"	3.01	182	1299	3.72	0.379	2.85	1.5	25.8	795	0.953	

Table 3.7(1) Experimental Conditions and Results (V) (3.9MPa)

Run No.	Experimental Conditions							Experimental Results						Fig.No.
	L (mm)	D (mm)	P (MPa)	T <sub>in</sub> (°C)	G <sub>i</sub> (kg/s·m <sup>2</sup> )	q <sup>w</sup> × 10 <sup>6</sup> (W/m <sup>2</sup> )	X <sub>i</sub> <sup>out</sup>	t <sub>BO</sub> (sec)	Δt (sec)	$\frac{100\Delta V}{V_i \Delta t}$ (%/sec)	G <sub>BO</sub> <sup>t</sup> (kg/s·m <sup>2</sup> )	$\frac{G_{BO}^t}{G_{BO}^s}$		
550122-1	800	10	3.77	194.2	2507	3.69	0.132	13.1	10.5	6.16	885	—	B5-1-3	
-2	"	"	3.85	200.2	2495	3.66	0.143	10.4	9.6	6.65	902	0.950		
-3	"	"	3.90	200.5	2503	3.69	"	8.48	6.4	9.94	910	0.959		
-4	"	"	3.82	202.0	2495	"	0.150	5.4	4.5	14.1	910	"		
-5	"	"	"	198.9	2513	"	0.141	5.01	3.6	18.1	876	0.923		
-6	"	"	3.86	202.4	2492	3.65	0.148	2.91	1.93	33.4	887	0.935	B5-1-4	
-7	"	"	3.83	200.3	2503	3.72	0.147	—	—	—	—	—	B5-1-5	
-8	"	"	3.85	202.7	2500	3.69	0.151	15.1	13.0	4.77	951	1.002		
-9	"	"	3.83	199.5	2538	"	0.139	18.8	16.5	3.93	891	0.939	B5-1-2	
-10	"	"	3.86	201.0	2502	3.67	0.145	21.5	18.3	3.43	929	0.979		
-11	"	"	3.85	"	2507	3.70	0.147	23.9	21.0	2.99	934	0.984		
-12	"	"	"	200.3	2496	3.69	0.145	33.6	32.0	2.00	902	0.950		
-13	"	"	3.86	202.1	2507	3.70	0.149	43.0	41.3	1.51	946	0.997	B5-1-1	
-14	"	"	3.85	202.0	2502	"	"	85.5	83.0	0.75	940	0.991		
-15	"	"	3.82	199.0	1712	3.68	0.267	12.4	9.1	5.04	927	0.977		
-16	"	"	3.85	200.2	1719	"	0.268	8.2	5.52	8.50	912	0.961	B5-2-3	
-17	"	"	3.86	202.5	1729	3.66	0.269	5.7	3.8	12.4	915	0.964		
-18	"	"	3.87	201.9	1725	3.69	0.272	2.75	1.63	29.0	908	0.957	B5-2-4	
-19	"	"	3.86	202.4	1721	3.68	"	15.9	12.4	3.96	876	—		
-20	"	"	3.93	201.8	1717	3.69	0.271	18.5	14.3	3.19	934	0.984	B5-2-2	
-21	"	"	3.85	201.2	1720	3.70	0.272	22.4	17.3	2.52	970	—		
-22	"	"	3.90	200.4	1726	3.67	0.263	32.4	27.8	1.72	900	0.948		

Table 3.7 (2)

Run No.	Experimental Conditions							Experimental Results					Fig.No.
	L (mm)	D (mm)	P (MPa)	T <sub>i,n</sub> (°C)	G <sub>i</sub> (kg/s·m <sup>2</sup> )	q' × 10 <sup>6</sup> (W/m <sup>2</sup> )	X <sub>i</sub> <sup>out</sup>	t <sub>BO</sub> (sec)	Δt (sec)	$\frac{100\Delta V}{V_i \Delta t}$ (%/sec)	G <sub>BO</sub> <sup>t</sup> (kg/s·m <sup>2</sup> )	$\frac{G_{BO}^t}{G_{BO}^s}$	
550122-23	800	10	3.88	202.9	1723	3.68	0.273	41.0	35.5	1.27	944	0.995	
-24	"	"	3.87	200.2	1724	3.69	0.267	61.4	53.3	0.85	942	0.993	
-25	"	"	3.88	199.6	1728	3.67	0.262	80.0	69.0	0.65	949	1.0	B5-2-1
-26	"	"	3.92	203.1	1713	3.39	0.242	14.3	10.9	5.33	717	0.982	
-27	"	"	3.87	201.7	1709	3.38	0.241	9.36	6.56	8.90	711	0.974	B5-3-3
-28	"	"	"	205.6	1705	3.37	0.251	5.4	3.4	17.0	717	-	
-29	"	"	3.83	200.8	1706	"	0.239	17.8	14.4	4.03	715	0.979	B5-3-2
-30	"	"	3.86	200.5	1716	3.38	0.236	22.7	18.6	3.13	717	0.982	
-31	"	"	3.84	202.9	1709	3.40	0.247	31.7	27.0	2.08	751	-	
-32	"	"	3.87	200.9	1706	3.38	0.239	48.3	41.5	1.37	738	1.01	B5-3-1
-33	"	"	3.84	200.1	1708	3.37	0.237	95.5	83.5	0.69	730	1.0	
-34	"	"	3.83	203.5	2517	3.38	0.129	14.5	12.5	5.71	719	0.985	
-35	"	"	"	201.5	2527	"	0.123	11.6	9.76	7.31	724	0.992	
-36	"	"	"	199.3	2522	"	0.118	9.52	7.76	9.25	711	0.974	
-37	"	"	3.79	202.4	2516	"	0.128	6.65	5.5	13.1	705	0.966	
-38	"	"	3.88	200.2	2545	3.40	0.117	5.48	3.95	18.4	700	0.959	
-39	"	"	3.87	202.4	2507	3.39	0.126	3.23	2.28	31.6	702	0.962	
-40	"	"	"	198.5	2553	3.38	0.111	-	-	-	-	-	
-41	"	"	"	201.3	2526	3.37	0.120	17.5	15.8	4.56	707	0.968	
-42	"	"	"	200.9	2536	"	0.118	20.7	18.8	3.81	719	0.985	
-43	"	"	3.88	202.2	2518	3.40	0.125	24.1	21.8	3.25	734	1.005	
-44	"	"	3.90	200.7	"	3.39	0.120	28.2	26.7	2.67	724	0.992	
-45	"	"	3.89	202.2	2535	3.38	0.122	37.3	36.0	1.99	724	"	



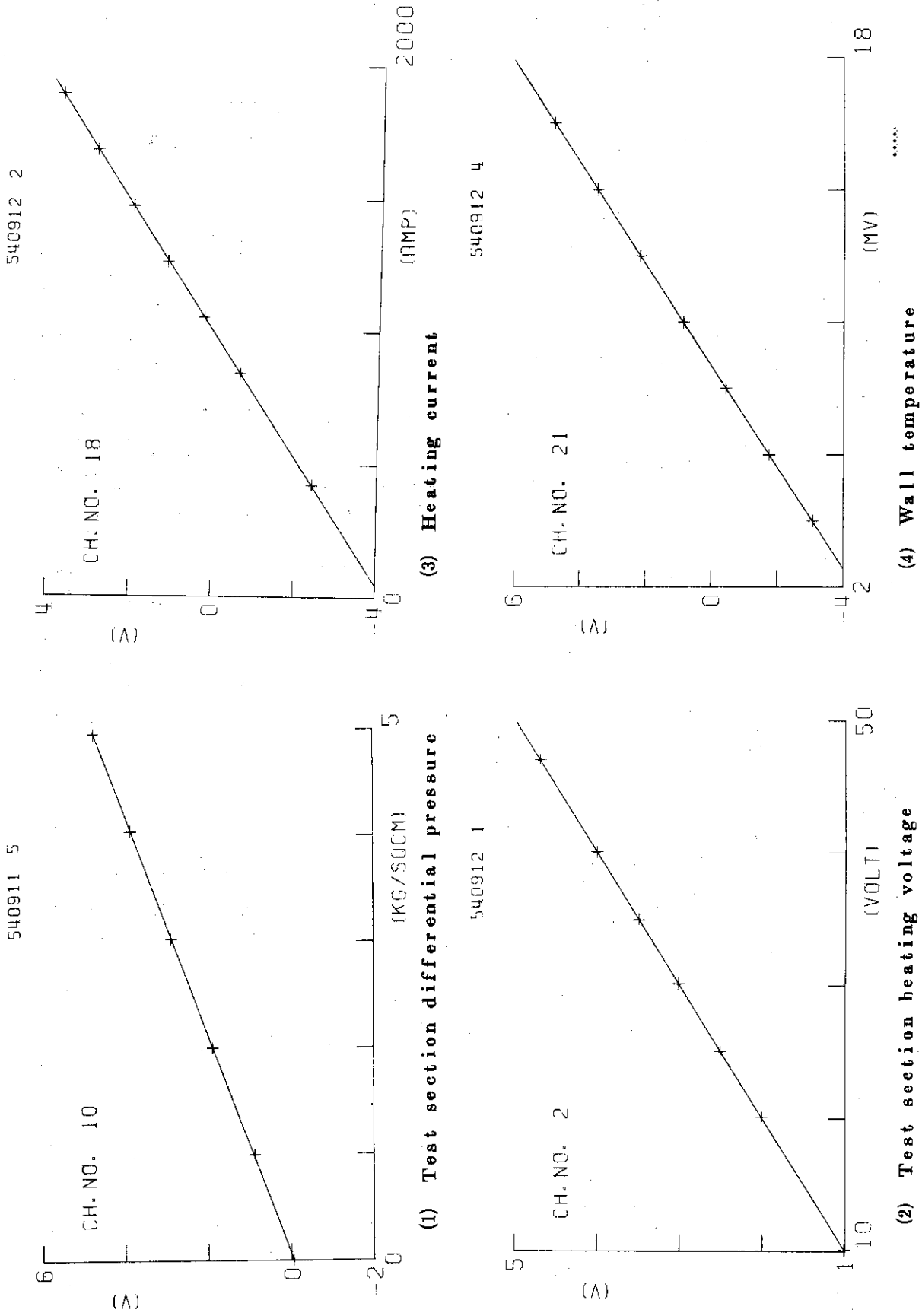


Fig. 3.1 Examples of calibration curve

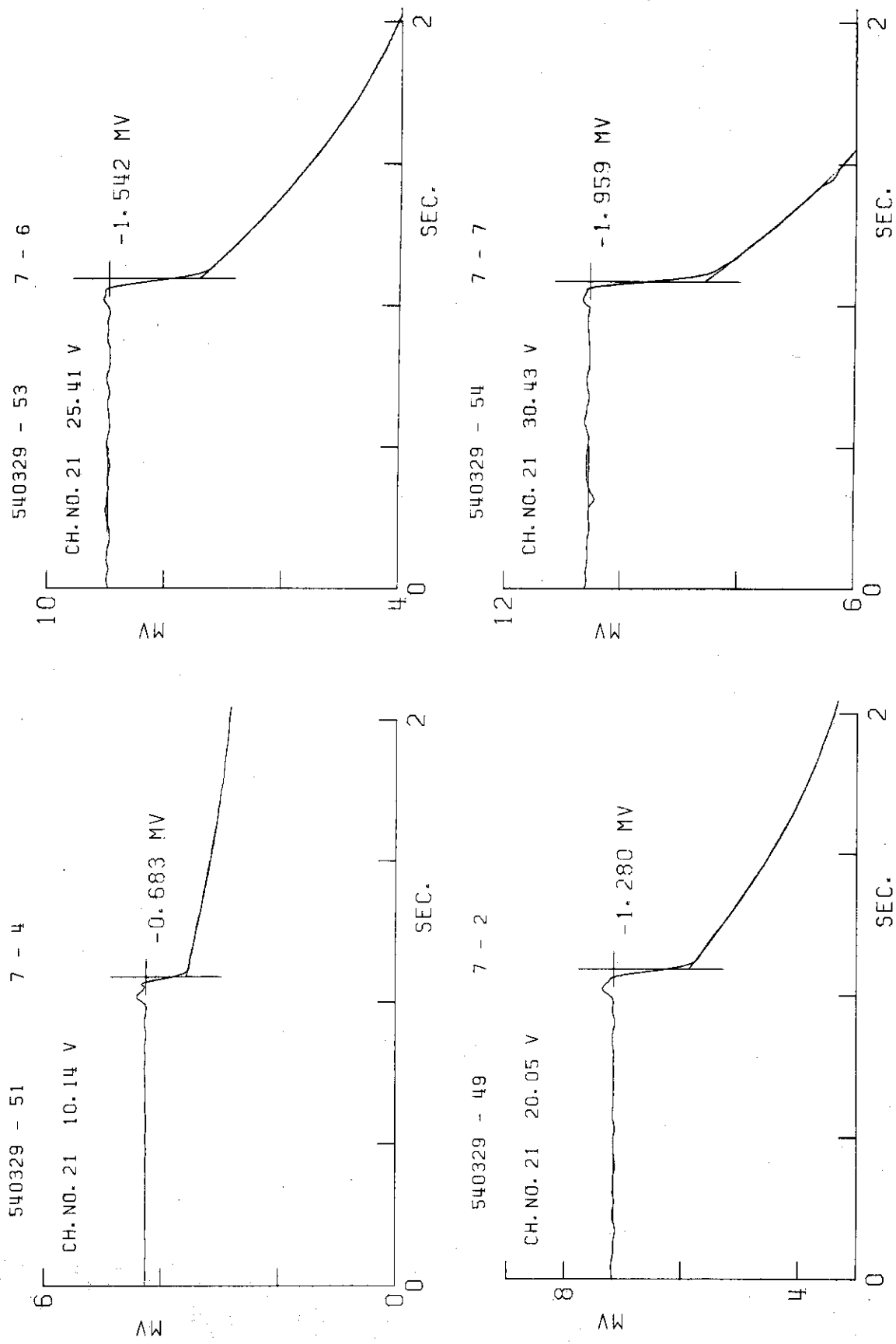


Fig. 3.2 Examples of TO deviation due to heating current

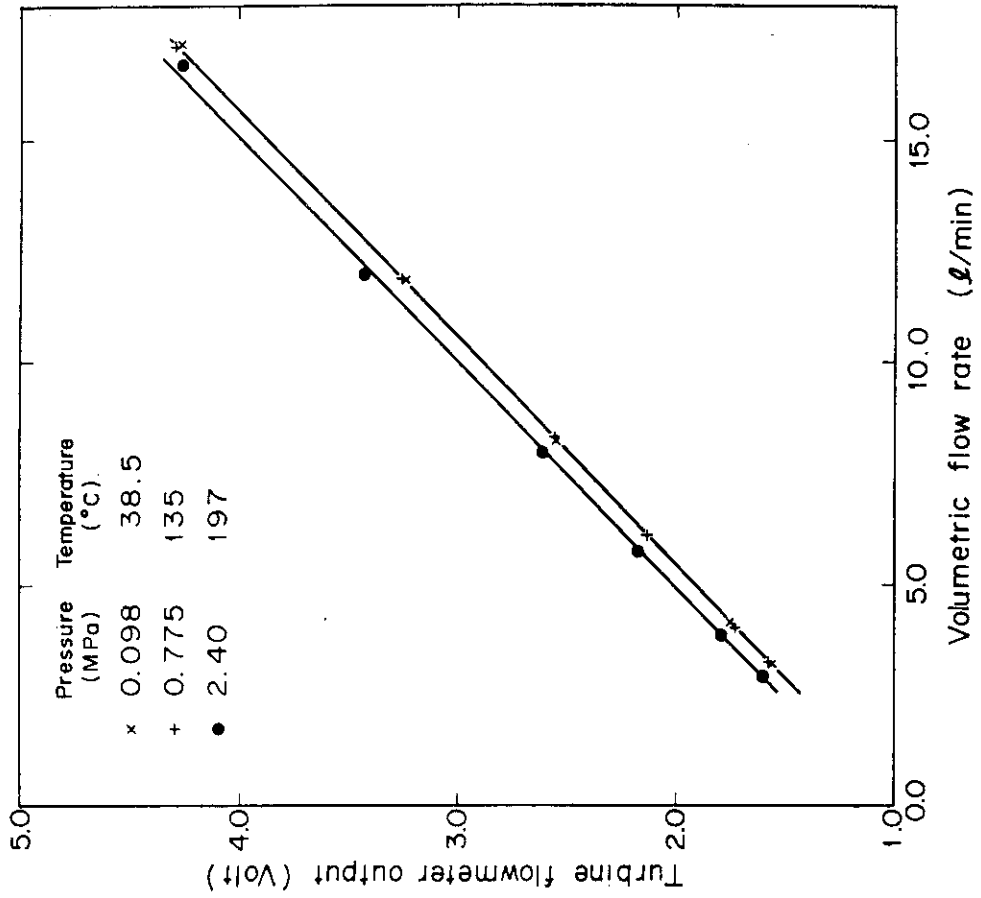


Fig. 3.4 Turbine flowmeter output vs. volumetric flow rate

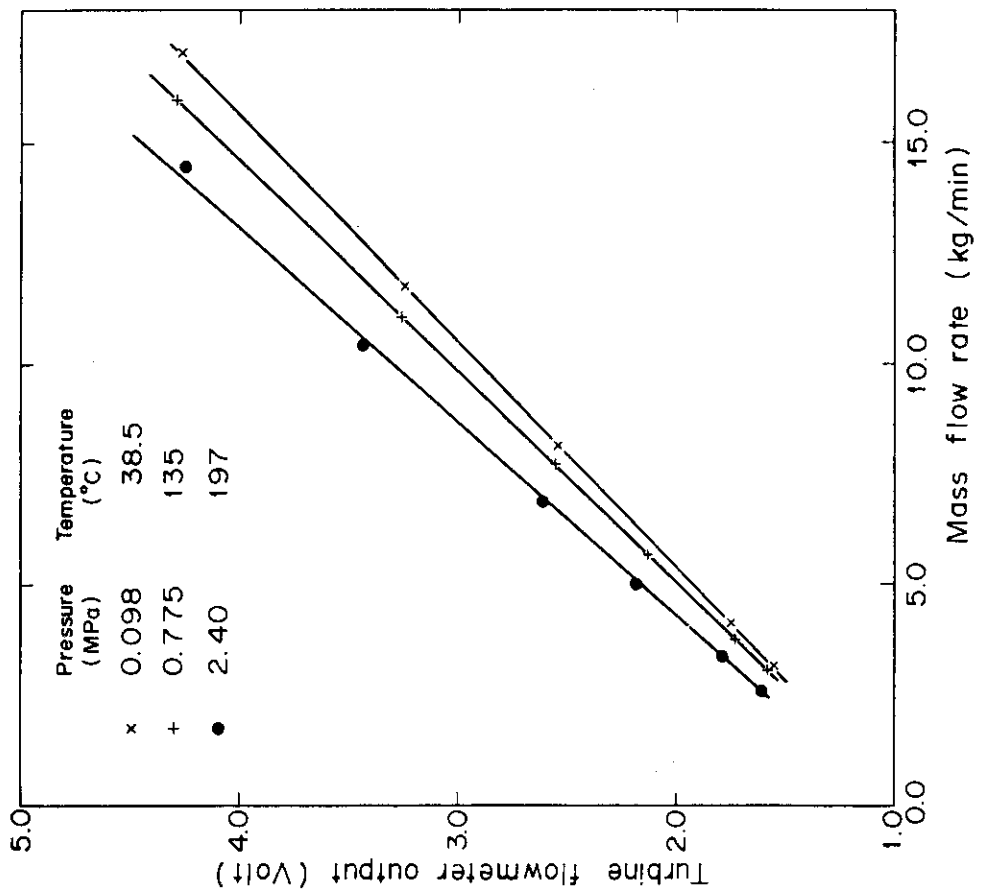


Fig. 3.3 Turbine flowmeter output vs. mass flow rate

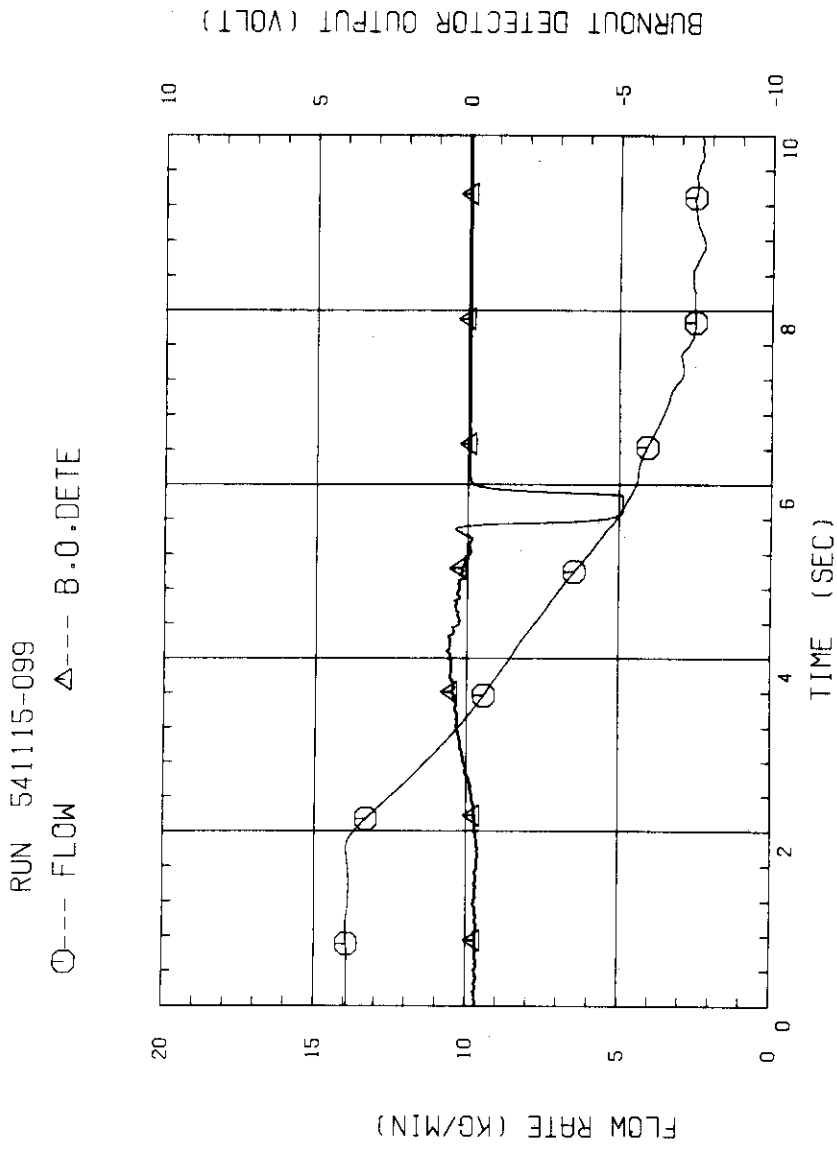


Fig. 3.5 Example of burnout detector signal

## 4. 考 察

### 4.1 実験データの検討

#### 4.1.1 圧力および壁温の挙動

本実験で集録したデータのうち、圧力および差圧挙動と壁温挙動の概要を述べる。

テスト部圧力および差圧の振動は、系圧力が同一でも入口温度や熱流束の相異により異なった挙動を示しているが、一般に系圧力が高い程、圧力および差圧振動の振巾は小さくなっている。また、バーンアウト発生時点近くでの差圧振動の振巾は、圧力 0.5 ~ 1.0 MPa では入口温度、熱流束等の条件により大きくなったり小さくなったりしているが、2.0 MPa 以上の圧力下ではバーンアウト発生時の圧力振巾はそれ以前よりも小さくなっている。このようにバーンアウト近傍での圧力挙動が系圧力によりかなり相異なることは、低圧の場合と高圧の場合とはバーンアウト発生時の管内流動状況に差があるためと考えられる。

次に圧力振動の周波数は高圧程大きくなり、例えば 0.6 MPa では約 10 Hz に対して 3.0 MPa では約 20 ~ 25 Hz となっている。また各圧力下で、バーンアウト発生近傍では、圧力振動の周波数が小さくなる傾向が見られた。

一方、バーンアウト近傍での壁温挙動については、圧力の影響は特に認められなかった。なお、データによってはバーンアウト発生直前に壁温が約 10°C 程度ステップ状に低下する現象が生じる場合と生じない場合がある。

この壁温低下現象は、かなりクオリティの高いバーンアウト近傍で生じており、沸騰開始時に見られる壁温低下現象とは異なる種類の流動状況急変に起因すると考えられるが、壁温低下現象の発生が不規則的なことから、この流動領域はかなり不安定と思われる。

#### 4.1.2 定常バーンアウト熱流束測定値と CHF 相関式による計算値との比較

本実験で求めたバーンアウト熱流束の値の妥当性を確認するため、本実験の定常バーンアウト熱流束測定値と、同一条件下において Thompson-Macbeth の式<sup>(5)</sup> および Becker の式<sup>(6)</sup> による計算値とを比較した結果をそれぞれ Fig. 4.1, 4.2 に示す。なお、両者の CHF 相関式はいずれも本実験範囲をその適用範囲内に含んでいる。

Fig. 4.1, 4.2 より、実験値は圧力が高い程計算値より高くなり、サブクール度が大きい方が計算値により近づく傾向があることがわかる。いずれにせよ、全体として実験値は Becker の式よりかなり高くなっているが、Thompson-Macbeth の式とは約 ± 20% 以内でほぼ一致しており、本実験におけるバーンアウト熱流束の実験値は、従来の定常バーンアウト熱流束実験値と大差なく、ほぼ妥当な値と言える。

## 4.2 流量低下バーンアウト時入口質量速度と流速減少率の関係

流量低下バーンアウト発生における非定常性を示す量として、初期流速  $V_i$  に対する流速低下速度 ( $\Delta V / \Delta t$ ) の割合をとり、これを流速減少率 ( $100 \Delta V / (V_i \Delta t)$ ) と定義し、 $\% / \text{sec}$  の単位で表現した。一方、流量低下過渡時のバーンアウト発生時入口質量速度  $G_{BO}^i$  は、一般に流速減少率がある値以上となると、流速減少率が大きい程小さくなる傾向にあるが、 $G_{BO}^i$  の値は圧力、入口温度、熱流束等に依存するので、 $G_{BO}^i$  の定常値  $G_{BO}^s$  (流速減少率の十分小さな時の  $G_{BO}^i$ ) からのずれを一般化して表示するため、過渡時と定常時のバーンアウト発生時入口質量速度比 ( $G_{BO}^i / G_{BO}^s$ ) をとり、この値と上述の流速減少率の関係を各圧力、入口温度、熱流束等の条件下で求めた。Fig. 4.3 ~ 4.12 にその結果を示す。

以下、 $G_{BO}^i / G_{BO}^s$  と流速減少率との関係について、まず実験データの精度について述べ、続いて一定圧力下での各パラメータの影響および圧力の影響について述べる。

### 4.2.1 実験データの精度の検討

バーンアウト現象はバーンアウト直前の流動状態のわずかな変動にも影響されるので、データにある程度のバラツキが生じるのは当然と思われるが、Fig. 4.3 ~ 4.12 に見られるように、本実験でのバーンアウト時入口質量速度のバラツキは極めて大きく、特に入口サブクール度が大きい程、熱流束が高い程、このバラツキは大きくなる傾向にある。

このように、実験データ間に大きなバラツキが生じた原因として以下の原因が考えられる。

#### 1) 実験中の電圧変動

データにバラツキが生じる最大の原因は、実験中に加熱電圧が変動するため、バーンアウト発生時の熱流束が初期熱流束とかなり異なる場合があるためと考えられる。付録 B の Fig. B1-8-1 ~ B1-8-4 および Fig. B5-1-1 ~ B5-3-3 は、電圧のスケールを拡大して電圧変動の状況を示す。これらのデータより、通常でも 0.1 ~ 0.2 V 程度の電圧変動が存在し、時には約 0.5 V 程度の電圧変動が発生する場合もある (Fig. B1-8-2)。例えば圧力 3.9 MPa の場合、加熱電圧 4.6 V (熱流束  $3.86 \times 10^6 \text{ W/m}^2$ ) および 4.4 V ( $3.38 \times 10^6 \text{ W/m}^2$ ) で定常時のバーンアウト時入口質量速度はそれぞれ約 9.49, 7.30  $\text{kg/s} \cdot \text{m}^2$  となり、0.2 V の電圧変動は約 2.2  $\text{kg/s} \cdot \text{m}^2$  の質量速度変化に相当すると考えられる。これは 4.4 V の場合の  $G_{BO}^i / G_{BO}^s$  に対し約 0.03 程度の誤差となり、Fig. 4.12 のように 1.0 ~ 0.9 の範囲で  $G_{BO}^i / G_{BO}^s$  の変動を問題にする場合には、かなり大きな誤差要因となりうる。

#### 2) その他の実験条件の不一致

上記の加熱電圧 (熱流束) 以外の実験条件 (入口温度、圧力、等) の初期値も厳密には一定でなく (Table 3.3 ~ 3.7 参照)、しかも実験中にかなり変動する。これらの実験条件の不一致もデータのバラツキの一因と考えられるが、各実験パラメータの変動が、 $G_{BO}^i / G_{BO}^s$  の値にどの程度影響するかは明らかでない。

#### 3) バーンアウト発生前後の壁温挙動の相異

4.1 節で述べたように、流量低下中に壁温が約 10°C 程度ステップ状に低下してからバ

ーンアウトに到る場合と、壁温低下がほとんどないままでバーンアウトに到る場合があり、前者の方がバーンアウト時の入口質量速度が小さくなる傾向がある。また、流速減少率がほぼ同程度でも、バーンアウト発生時に急上昇する壁温熱電対の数や電源遮断後の高温維持時間等に差が見られ、バーンアウト発生時の流動状態が同一とは考えられない場合もある。

#### 4) バーンアウト発生時刻の決定誤差

3.2節で述べたように、バーンアウト発生時刻は、熱電対間の不一致を避けるため、バーンアウト検出器出力信号の急変時刻により求めたが、流速減少率が比較的大きい場合には、このバーンアウト発生時刻を決定する際のわずかな誤差が、 $G_{BO}^1$ の値にかなり影響する。

#### 4.2.2 初期流量，熱流速，入口サブクール度の影響

初期流量の影響は、例えば Fig. 4.3, 4.6, 等に見られるように、初期流量の大きい方が  $G_{BO}^1/G_{BO}^5$  も大きくなるような傾向も見られるが、データのバラツキを考えると、必ずしも影響があるとは言えない。

熱流束の影響については、例えば Fig. 4.3, 4.9 等に見られるように、熱流束が大きい方が、流速減少率増大時の  $G_{BO}^1/G_{BO}^5$  の低下率は小さくなっているが、圧力 3.9 MPa の場合 (Fig. 4.12) は逆の傾向を示しており、必ずしも熱流束の大小が  $G_{BO}^1/G_{BO}^5$  の低下率に系統的な影響を及ぼすとは認めがたい。

入口サブクール度の影響については、例えば Fig. 4.3 と 4.5, Fig. 4.6 と 4.8, Fig. 4.10 と 4.11 を比較すると、サブクール度が大きい方、すなわち入口温度が低い方が、流速減少率増大時の  $G_{BO}^1/G_{BO}^5$  の低下率は小さくなる傾向にあるらしいが、それほど明白ではない。

一方、 $G_{BO}^1/G_{BO}^5$  が低下し始める流速減少率については、初期流量、熱流束、入口サブクール度等の影響による差は特に認められなかった。

以上の結果より、本実験範囲内での初期流量、熱流束、入口サブクール度等の変化が、流量低下バーンアウト時の入口質量速度の低下率に、特に有意な影響をおよぼすとは認められなかった。

#### 4.2.3 圧力の影響

Fig. 4.3 ~ 4.12 より、一般に圧力が高い程、流速減少率増大時の  $G_{BO}^1/G_{BO}^5$  の低下率は小さくなり、 $G_{BO}^1/G_{BO}^5$  が低下し始める流速減少率の値は大きくなる傾向が見られる。Fig. 4.3 ~ 4.12 より各種実験条件下で得られた  $G_{BO}^1/G_{BO}^5$  の値と圧力の関係を、流速減少率が 2.5, 5.0, 10.0, 25.0 %/sec の場合について、それぞれ Fig. 4.13 ~ 4.16 に示す。なお、Fig. 4.3 ~ 4.12 に見られるように、ある流速減少率における  $G_{BO}^1/G_{BO}^5$  のバラツキは少なくとも  $\pm 0.02$  程度はあるので、このバラツキを考慮して実験データを包含する線を Fig. 4.13 ~ 4.16 において点線で示す。Fig. 4.13 ~ 4.16 の各データ記号の説明は Table 4.1 に示す。

流速減少率が 2.5 %/sec の場合 (Fig. 4.13) について見ると、圧力 2.0 MPa 以上では

$G_{BO}^i / G_{BO}^s$  は約 0.97 ~ 1.0 程度であるが、圧力 0.5 MPa では条件によっては  $G_{BO}^i / G_{BO}^s$  が約 0.9 程度まで低下する場合もある。流速減少率が 5 %/sec (Fig. 4.14), 10 %/sec (Fig. 4.15) と増大すると、1.0 MPa 以下の低圧における  $G_{BO}^i / G_{BO}^s$  の低下率が大きくなり、2.0 MPa 以上でも  $G_{BO}^i / G_{BO}^s$  の明らかな低下が認められる。流速減少率が比較的大きな 25 %/sec (Fig. 4.16) の場合においては、 $G_{BO}^i / G_{BO}^s$  は圧力 2.0 MPa 以上では約 0.92 ~ 0.96 であるのに対し、1.0 MPa では約 0.84 ~ 0.88、0.5 MPa では約 0.7 ~ 0.8 程度となっている。

また、 $G_{BO}^i / G_{BO}^s$  が低下を示し始める流速減少率の値も、圧力が高い程大きくなる傾向にあり、例えば圧力 0.5 MPa (Fig. 4.3 ~ 4.5) では 1 ~ 2 %/sec 程度であるのに対して、圧力 3.9 MPa (Fig. 4.12) では 3 ~ 5 %/sec 程度となっている。

以上の結果より、4.2.2 節で述べたような同一圧力下における熱流束、入口温度、初期流量等が流量低下バーンアウト時入口質量速度におよぼす影響に比べ、圧力の影響の方がより顕著であることがわかる。この圧力効果は、1.0 MPa 以下の低圧で著しく、圧力が高くなるほど圧力による影響は小さくなる。すなわち、圧力が高い程、バーンアウト時入口質量速度に対する流量低下過渡効果の影響は一般に小さくなることがわかる。

### 4.3 常圧ループ実験との比較

前節に述べた本実験結果と比較するため、既に実施した常圧ループによる流量低下バーンアウト実験データの一部を、本報と同じように  $G_{BO}^i / G_{BO}^s$  と流速減少率との関係で整理した結果を Fig. 4.17, 4.18 に示す。

Fig. 4.17 は内径 8 mm、加熱長さ 800 mm の管内流テスト部の場合<sup>(1)</sup>、Fig. 4.18 は加熱管外径 10 mm、ガラス管シュラウド内径 14 mm (ギャップ 2 mm)、加熱長さ 800 mm の環状流路テスト部の場合<sup>(2)</sup>であり、いずれも入口温度は 30°C、上端大気開放で入口圧力は約 0.2 ~ 0.3 MPa である。両図のデータの流路形状はいずれも本実験と異なるため、直接比較はできないが、明らかに流速減少率増大時の  $G_{BO}^i / G_{BO}^s$  の低下率は本実験の場合よりもかなり大きく、4.2.3 節で述べた圧力効果をさらに低圧まで延長した結果を示している。



Table 4.1 Mean value of  $G_{BO}^t / G_{BO}^s$  at five flow reduction rates

P (MPa)	Symbol of Fig 4.13~4.16	$T_{in}$ ( $^{\circ}C$ )	$q$ $\times 10^6$ ( $W/m^2$ )	$G_{BO}^s$ ( $kg/s \cdot m^2$ )	$G_i$ ( $kg/s \cdot m^2$ )	mean value of $G_{BO}^t / G_{BO}^s$					
						Flow reduction rate (%/sec)	1	2.5	5	10	25
0.51	○	120	2.16	806	1290 - 2480		1.0	0.94	0.82	0.75	—
0.52	□	"	2.67	983	1240 - 2490		0.98	0.91	0.84	0.78	0.70
0.51	△	"	3.22	1220	2220		1.0	0.98	0.92	0.85	0.80
0.50	▽	118	3.81	1230	1800 - 2000		1.0	0.98	0.95	0.88	0.81
0.57	●	66	2.71	770	2980 - 3050		1.0	0.99	0.91	0.86	—
"		"	3.56	1230	2910 - 3030		Too much scattering data				
1.06	○	140	3.20	817	1240 - 2550		1.0	0.96	0.94	0.88	0.88
1.08	□	"	3.79	1180	1970 - 2530		1.0	0.99	0.95	0.90	0.87
0.95	●	91	3.22	853	1710 - 2960		1.0	0.96	0.90	0.89	0.88
"		"	3.81	1310	1730 - 2600		Too much scattering data				
1.97	○	161	3.45	775	1350 - 2550		1.0	0.98	0.96	0.94	0.92
"	□	162	3.75	925	1760 - 2470		1.0	0.99	0.98	0.97	0.95
3.01	○	181	3.71	838	1295 - 2600		1.0	0.99	0.97	0.95	0.93
2.95	●	132	3.71	764	2040 - 2980		1.0	0.99	0.98	0.97	0.95
3.87	○	201	3.38	730	1710 - 2520		1.0	0.995	0.985	0.97	0.96
"	□	201	3.86	949	1720 - 2500		1.0	0.995	0.98	0.96	0.95

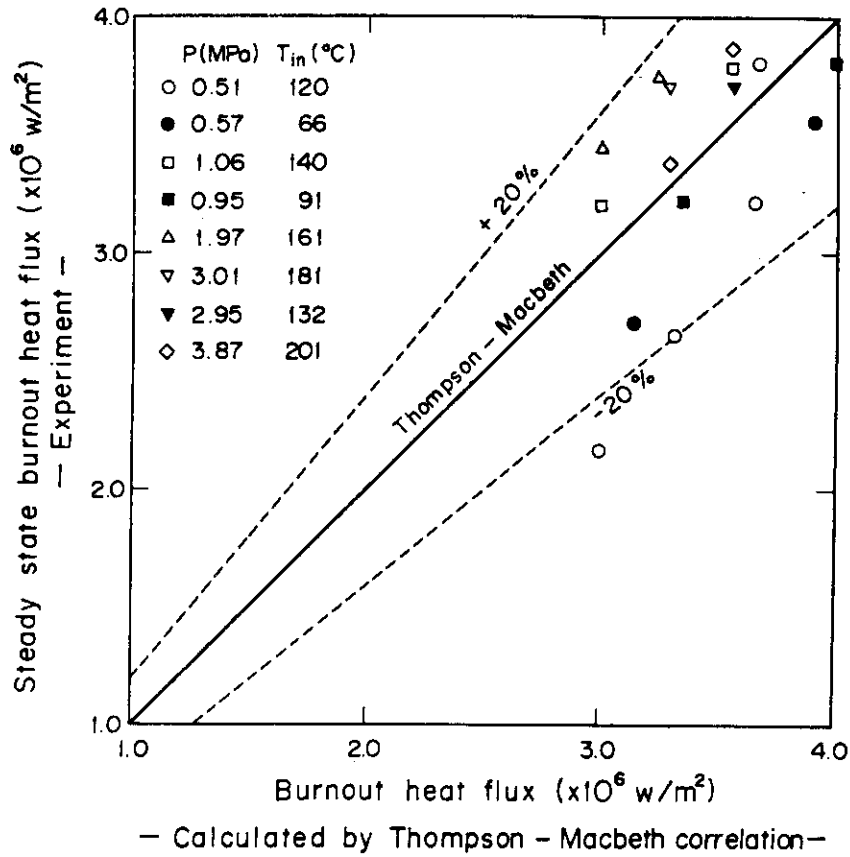


Fig. 4.1 Comparison of experimental burnout heat flux with Thompson-Macbeth correlation

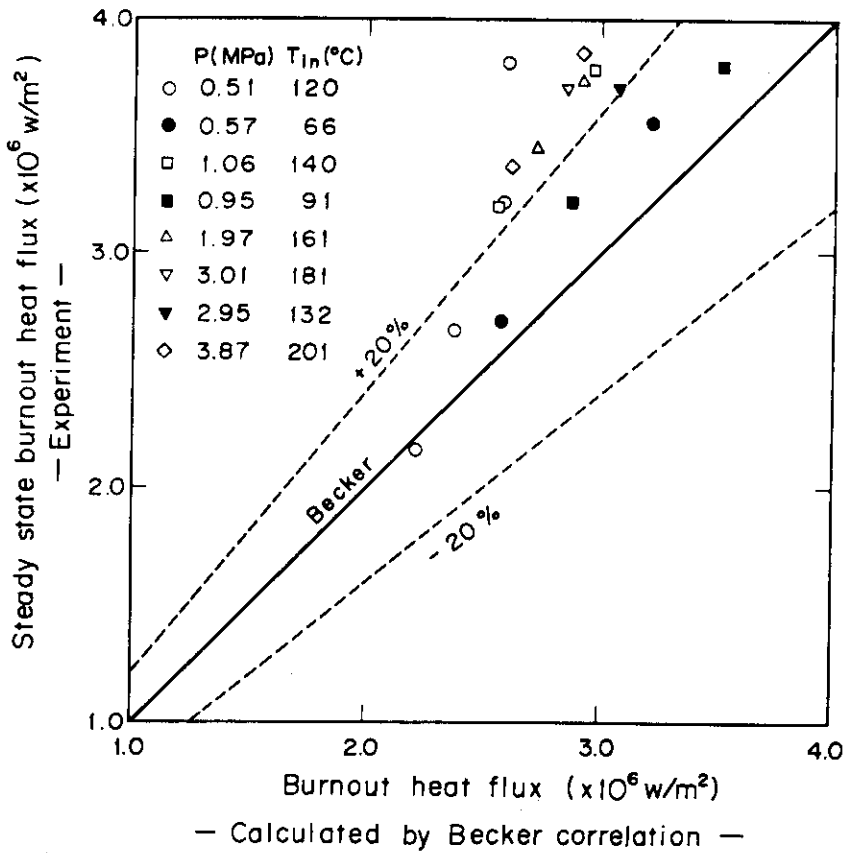


Fig. 4.2 Comparison of experimental burnout heat flux with Becker correlation

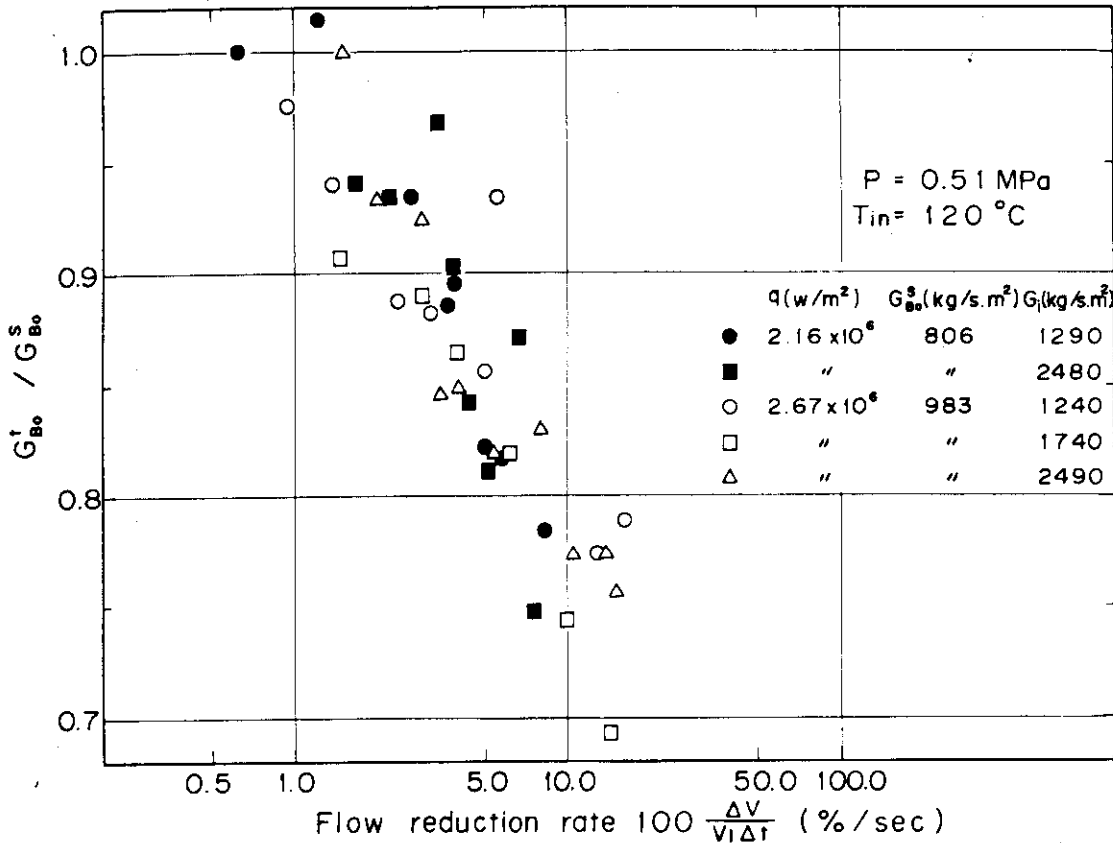


Fig.4.3 Dimensionless burnout mass velocity vs. flow reduction rate (P=0.51Mpa, T<sub>in</sub>=120°C)

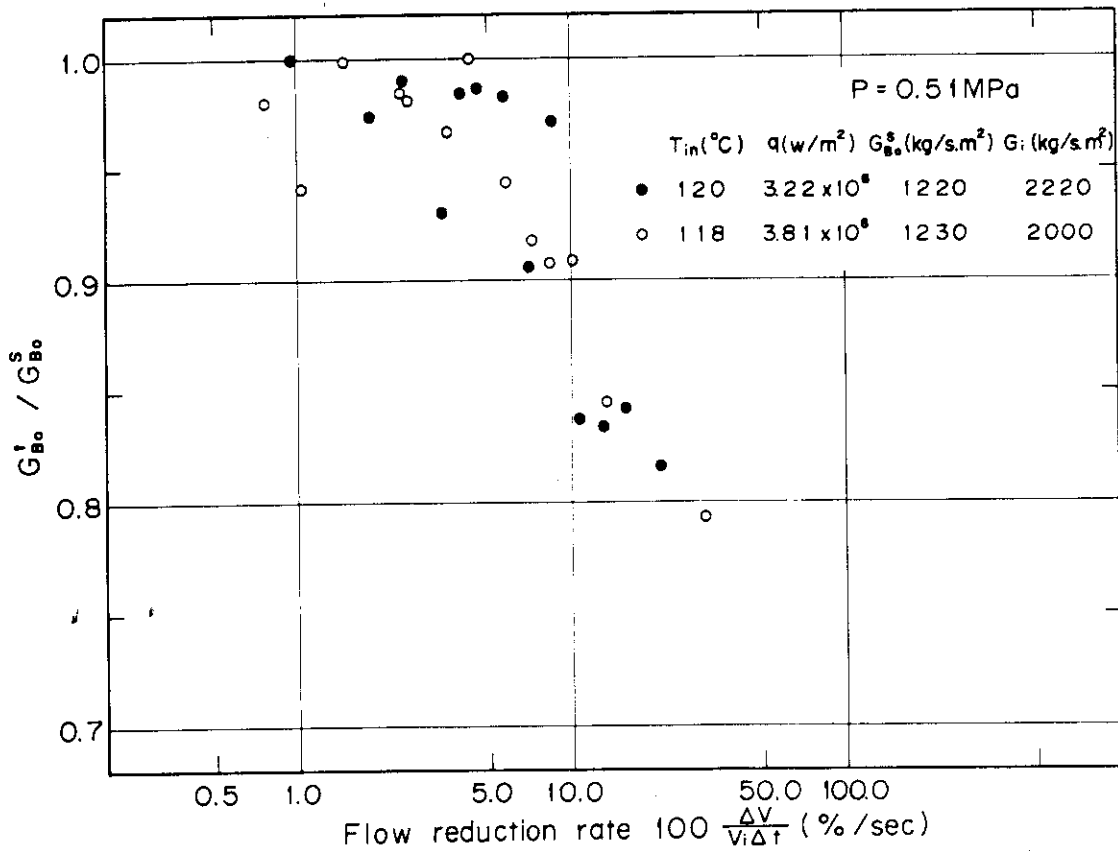


Fig. 4.4 Dimensionless burnout mass velocity vs. flow reduction rate (P=0.51Mpa, T<sub>in</sub>=120°C)

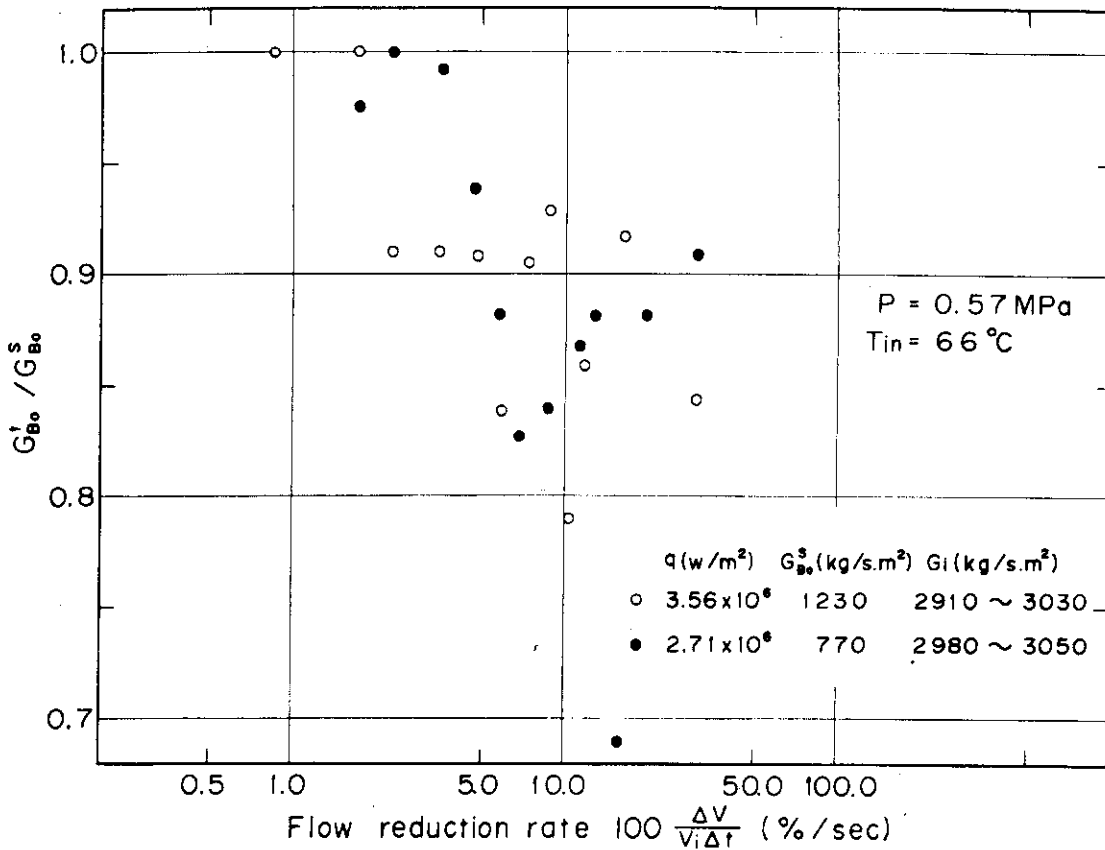


Fig. 4.5 Dimensionless burnout mass velocity vs. flow reduction rate (P=0.57Mpa, Tin=66°C)

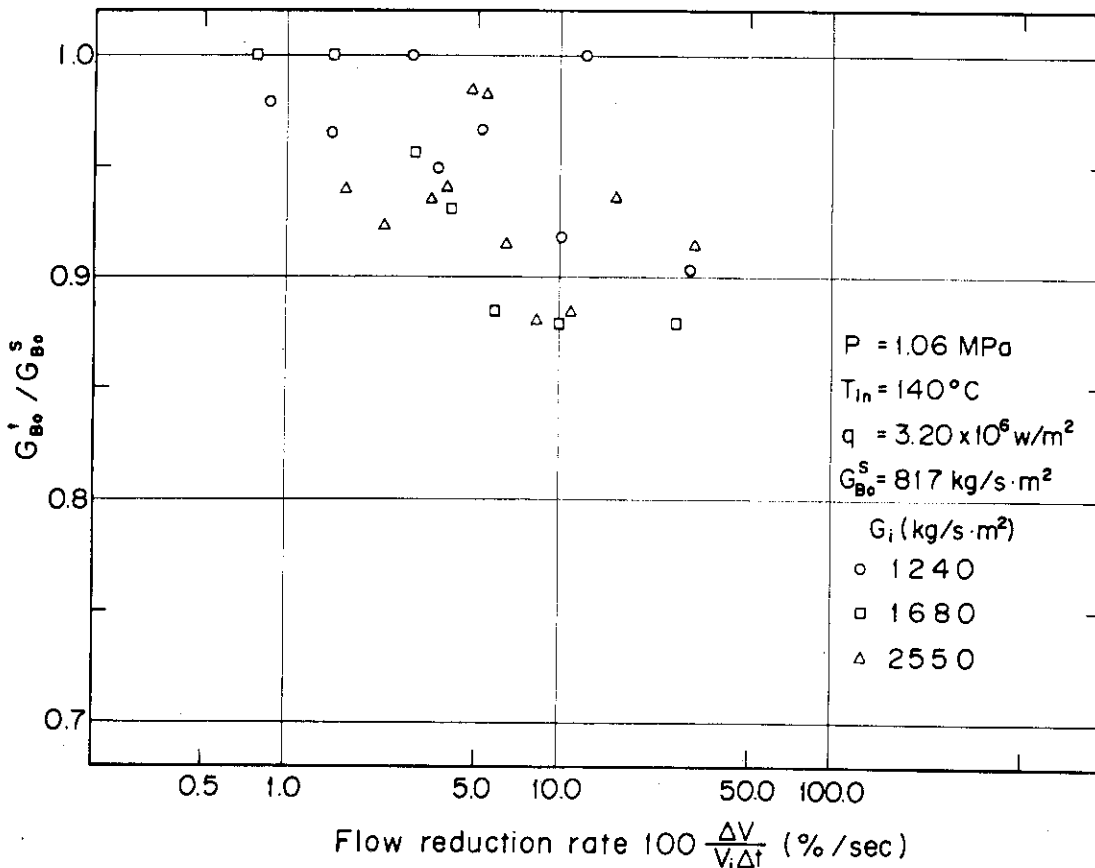


Fig. 4.6 Dimensionless burnout mass velocity vs. flow reduction rate (P=1.06Mpa, Tin=140°C)

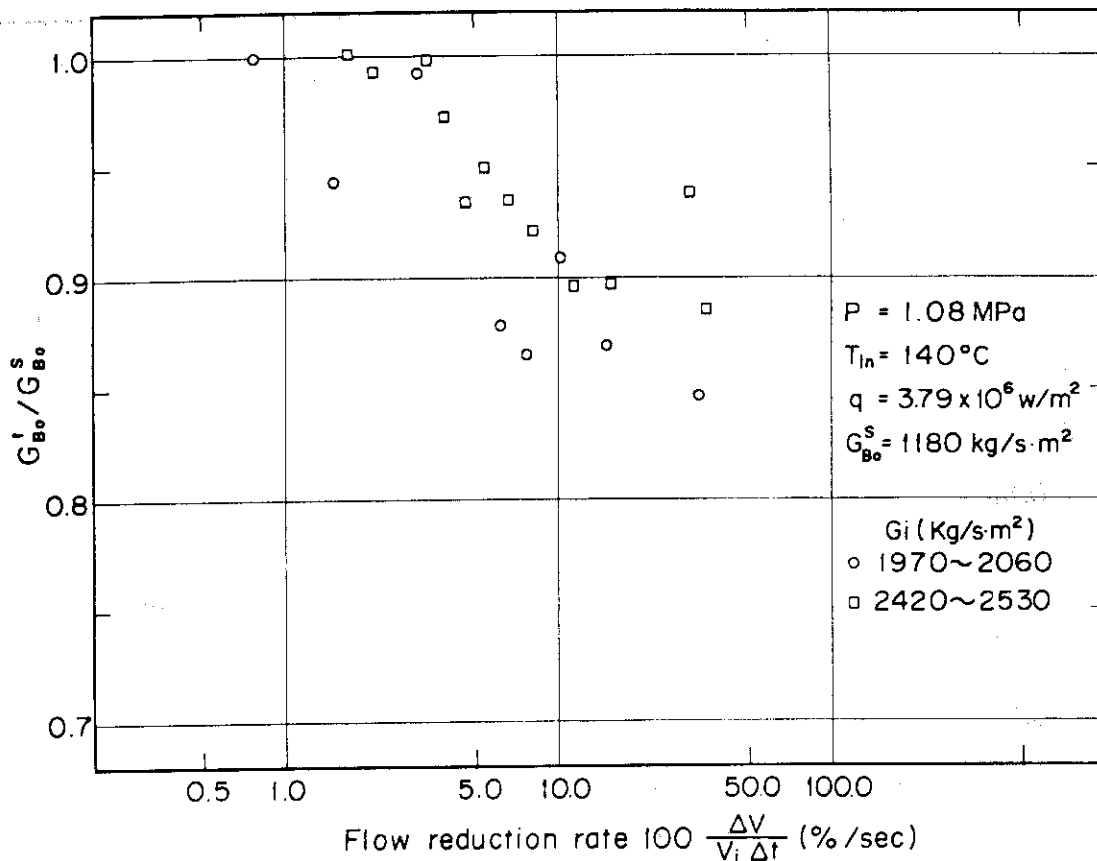


Fig. 4.7 Dimensionless burnout mass velocity vs. flow reduction rate (P=1.08Mpa, Tin=140°C)

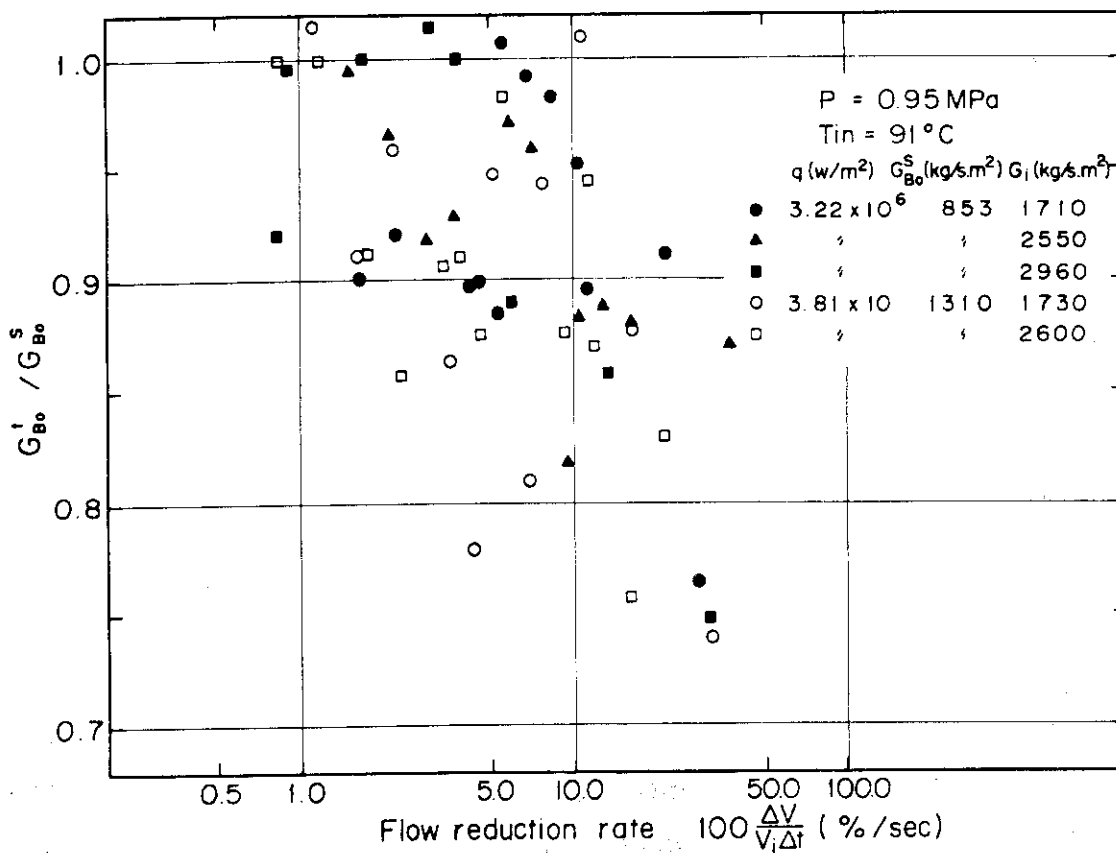


Fig. 4.8 Dimensionless burnout mass velocity vs. flow reduction rate (P=0.95Mpa, Tin=91°C)

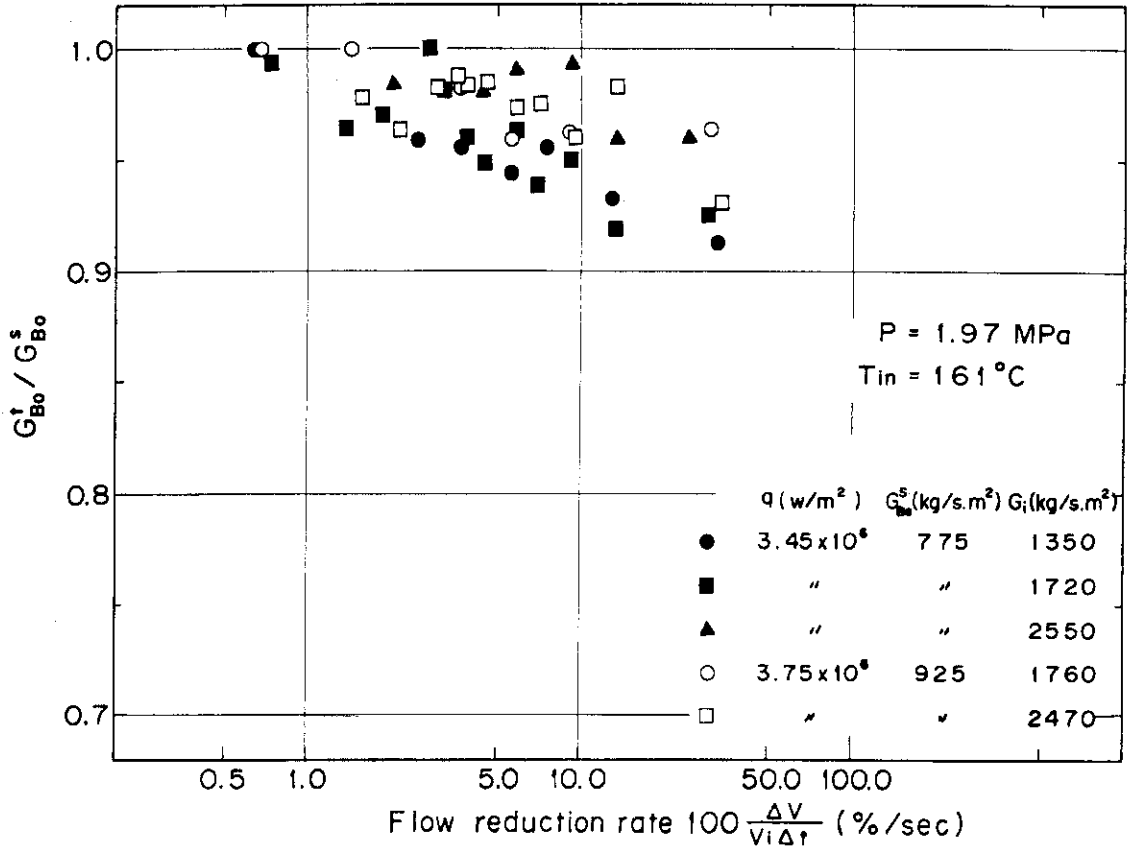


Fig. 4.9 Dimensionless burnout mass velocity vs. flow reduction rate  
( $P=1.97\text{Mpa}$ ,  $T_{in}=161^\circ\text{C}$ )

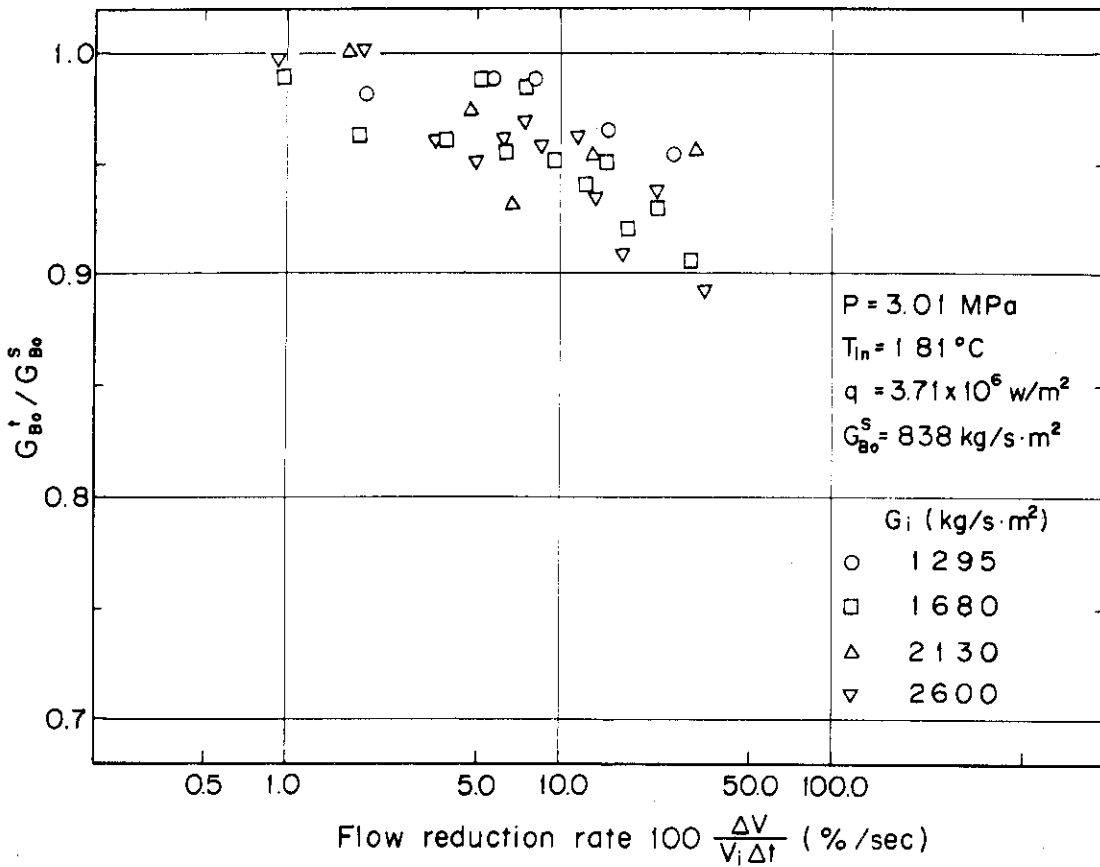


Fig. 4.10 Dimensionless burnout mass velocity vs. flow reduction rate  
( $P=3.01\text{Mpa}$ ,  $T_{in}=181^\circ\text{C}$ )

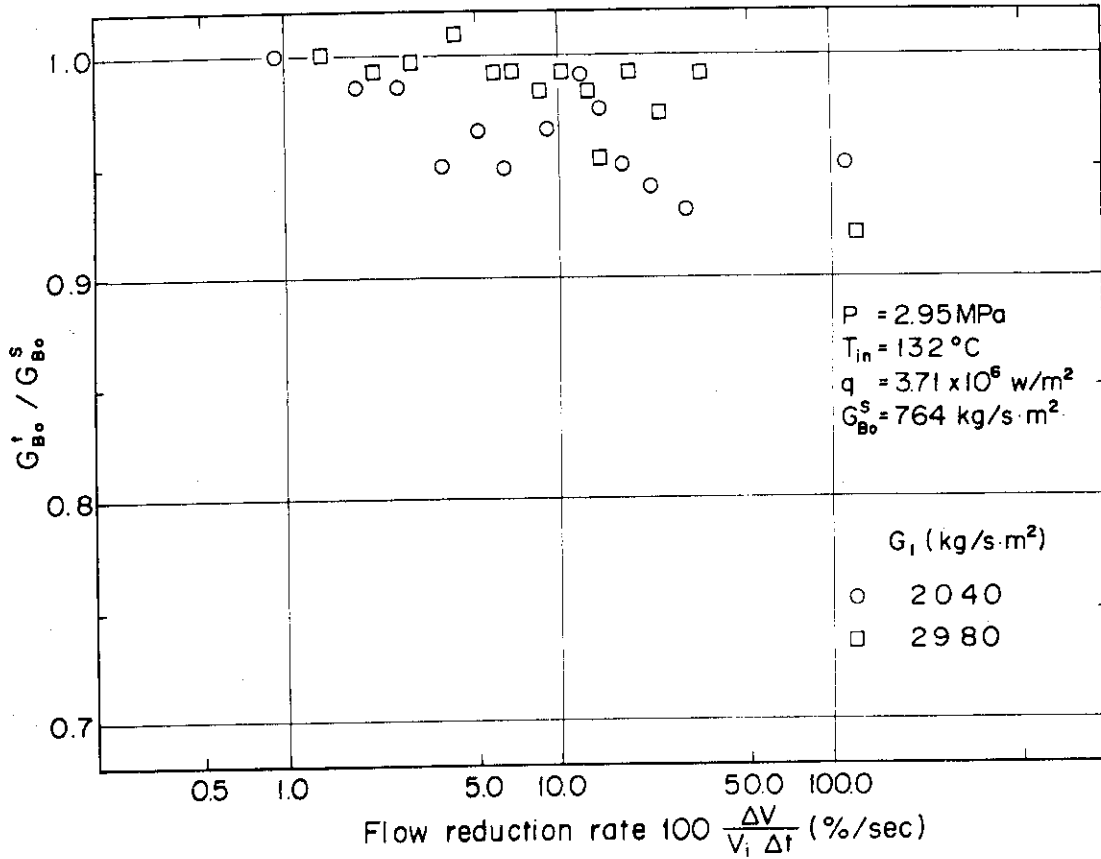


Fig. 4.11 Dimensionless burnout mass velocity vs. flow reduction rate  
( $P=2.95\text{Mpa}$ ,  $T_{in}=132^\circ\text{C}$ )

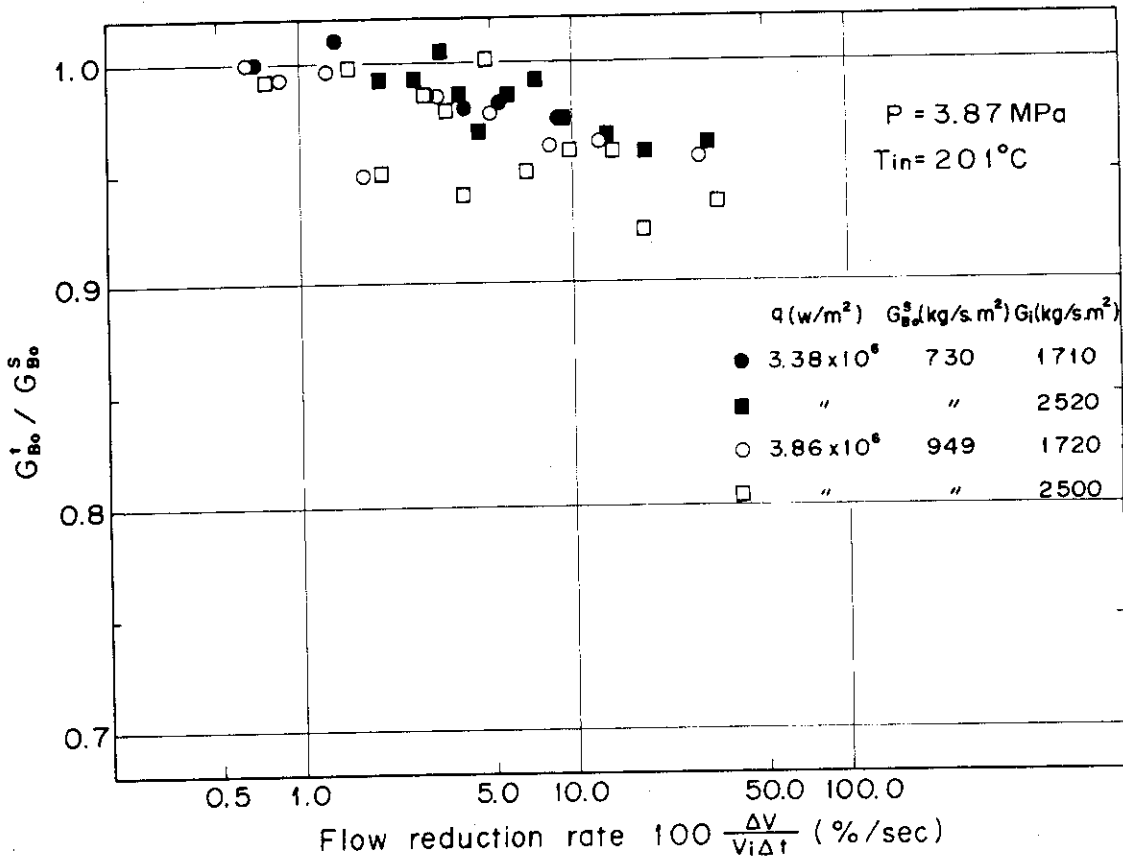


Fig. 4.12 Dimensionless burnout mass velocity vs. flow reduction rate  
( $P=3.87\text{Mpa}$ ,  $T_{in}=201^\circ\text{C}$ )

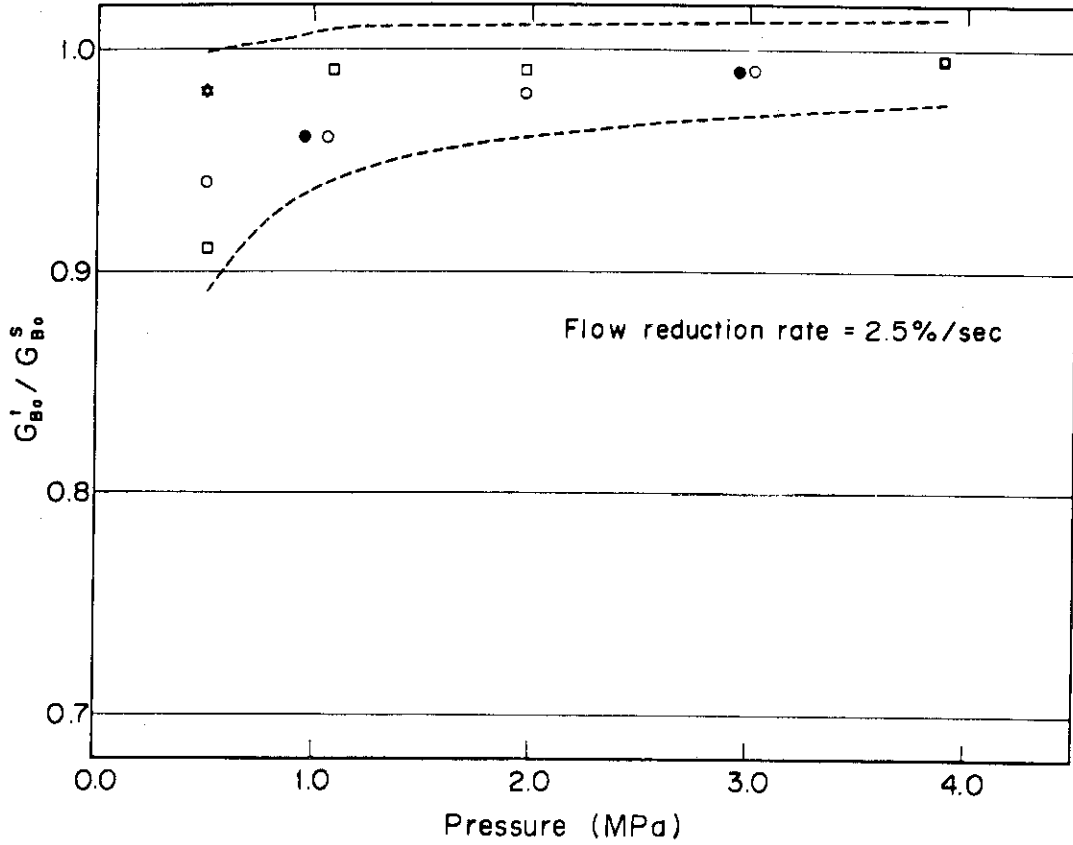


Fig. 4.13 Dimensionless burnout mass velocity vs. pressure (flow reduction rate = 2.5 %/sec)

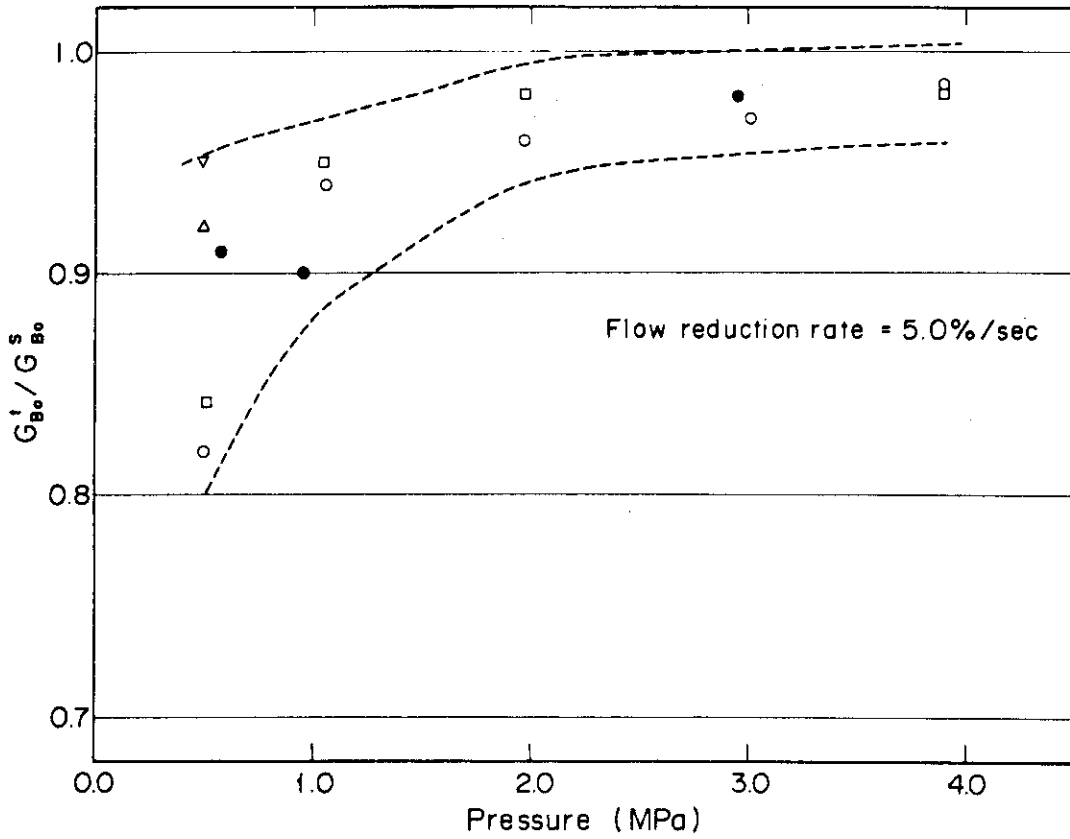


Fig. 4.14 Dimensionless burnout mass velocity vs. pressure (flow reduction rate = 5%/sec)



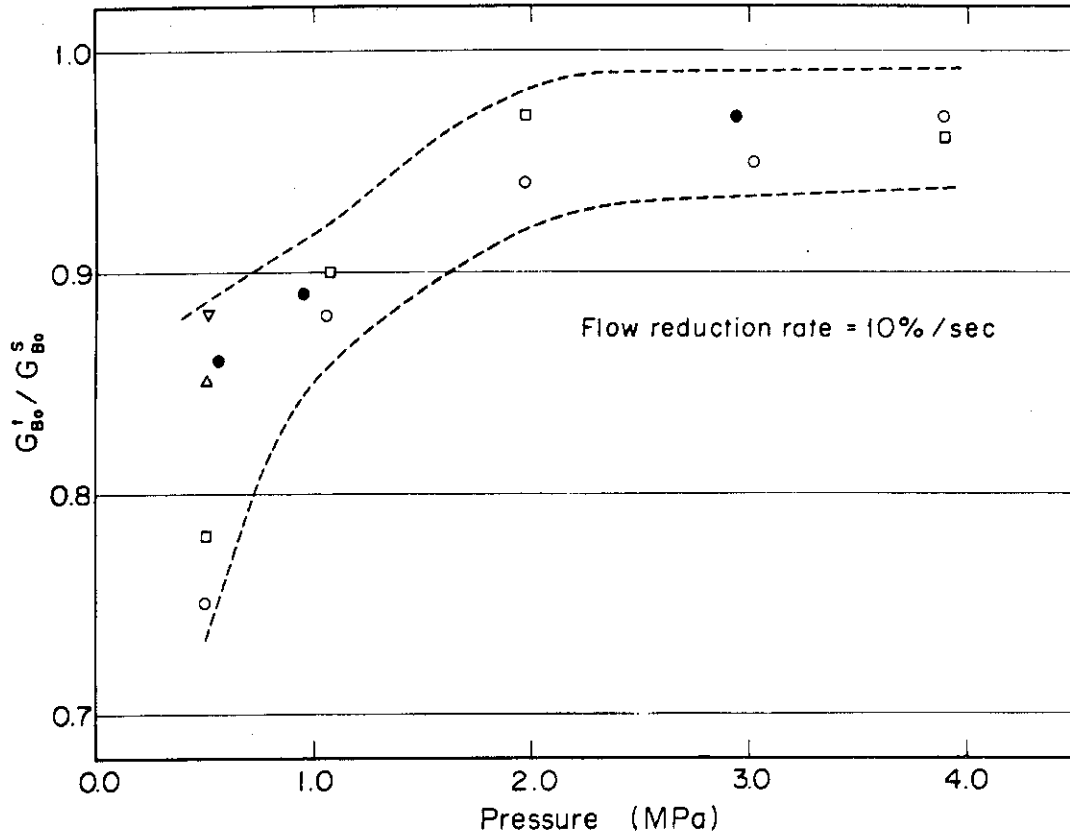


Fig. 4.15 Dimensionless burnout mass velocity vs. pressure (flow reduction rate = 10%/sec)

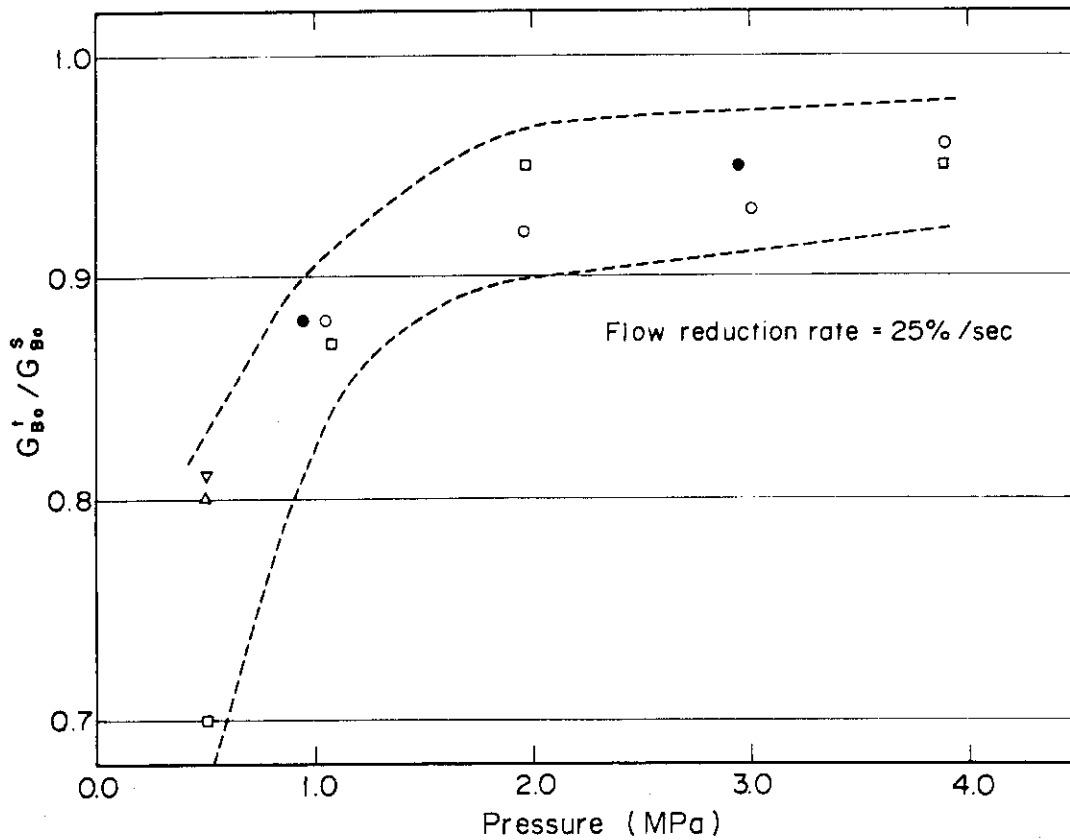


Fig. 4.16 Dimensionless burnout mass velocity vs. pressure (flow reduction rate = 25%/sec)

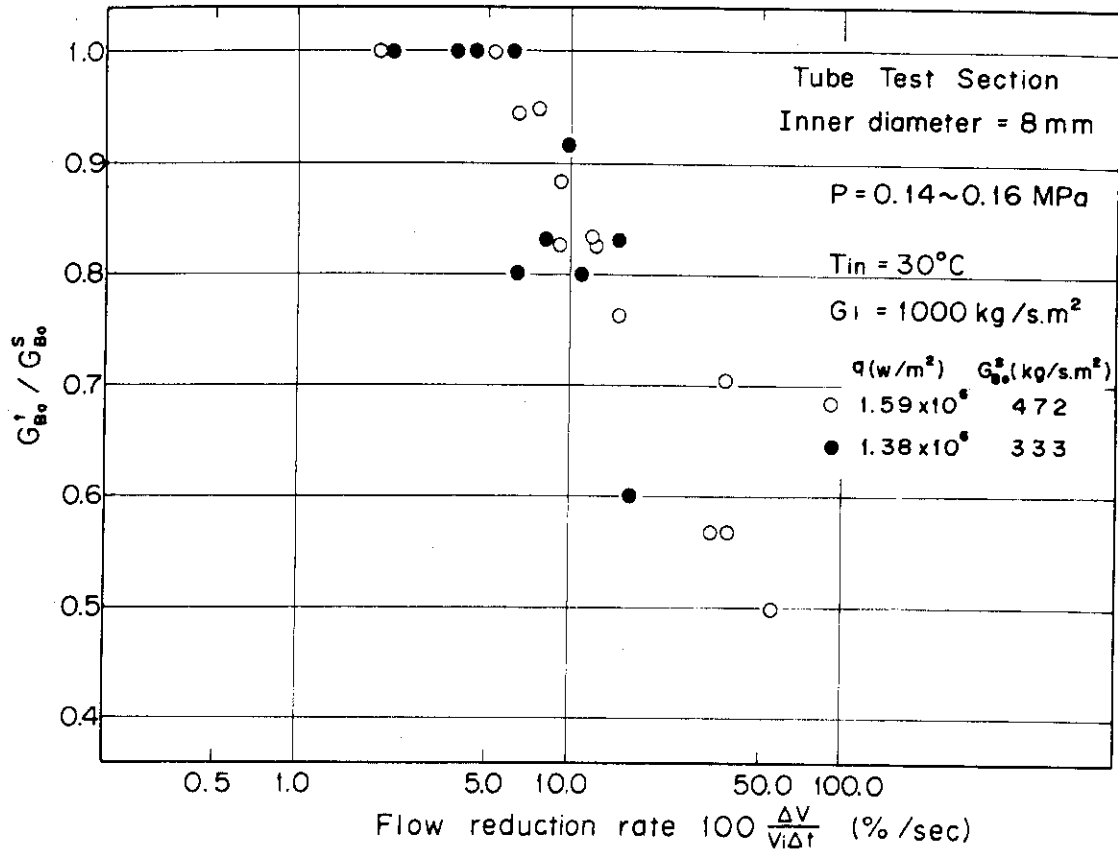


Fig.4.17 Dimensionless burnout mass velocity vs. flow Reduction rate at atmospheric pressure (tube)

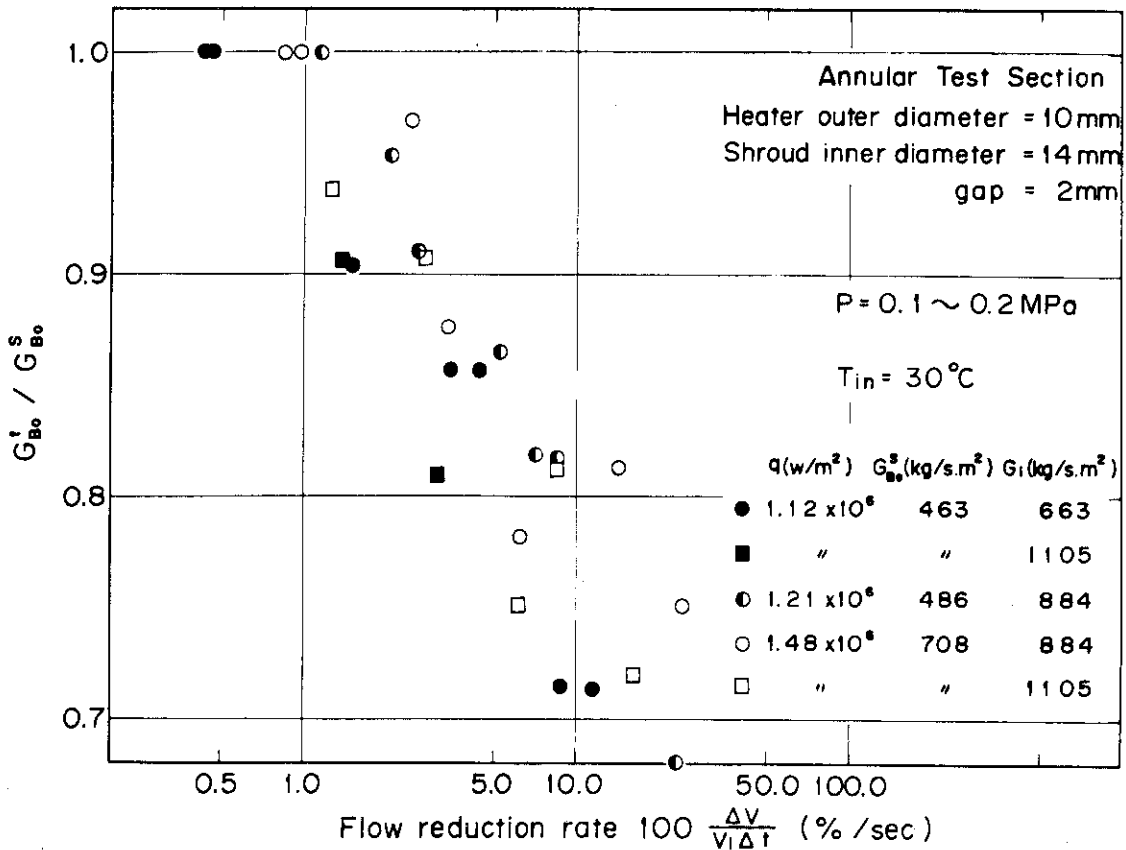


Fig.4.18 Dimensionless burnout mass velocity vs. flow reduction rate at atmospheric pressure (annular)

## 5. ま と め

加熱長さ800mm, 内径10mmの管内流テスト部を用いて, 主として圧力が流量低下過渡時のバーンアウト質量速度の低下率におよぼす影響を調べるため, 0.5~3.9MPaの圧力下で流量低下バーンアウト実験を行なった。そして各種条件下で, 過渡時と定常時のバーンアウト発生時入口質量速度比( $G_{BO}^i/G_{BO}^s$ )と流速減少率の関係を求めたところ, 以下の諸点が明らかとなった。

- 1)  $G_{BO}^i/G_{BO}^s$ が低下し始める流速減少率は, 圧力が高い程大きくなる傾向にあり, 圧力0.5MPaでは約1%/sec, 3.9MPaでは約3%/sec程度である。
- 2) 流速減少率増大時の $G_{BO}^i/G_{BO}^s$ の低下率は高圧程小さくなり, 例えば10%/secの流速減少率において $G_{BO}^i/G_{BO}^s$ は, 圧力0.51, 1.08, 1.97, 3.0, 3.9MPaにおいてそれぞれ約0.75~0.88, 0.90~0.95, 0.96~0.98, 0.95~0.97, 0.96~0.97となる。
- 3) 入口サブクール度, 熱流束, 初期流量等の変化が, 流速減少率増大時の $G_{BO}^i/G_{BO}^s$ の低下率におよぼす影響は, 本実験範囲内ではほとんど認められなかった。
- 4) 本実験においてはデータのバラツキが大きいため, 流速減少率増大時のバーンアウト時入口質量速度の低下率を, 各実験パラメータの影響を含めて定量的に求めることはできなかった。

ところで, 軽水炉の流量低下PCM事故として考えられる流速減少率は約2~50%/secの範囲にあると思われるので, 本実験における<sup>(7)</sup>0.6~160%/secの流速減少率範囲はこれを十分カバーしていると言える。一方, 本実験の加熱長さ800mmは実炉よりかなり短く, 熱流束範囲 $2.16\sim 3.86\times 10^6\text{W/m}^2$ は実炉よりかなり高いので, 実炉の流量低下PCM条件下でのバーンアウト発生条件を予測するためには, 今後より長いテスト部を用いて, より低い熱流束による流量低下バーンアウト実験を行なう必要がある。

今後の課題として具体的には以下の点が考えられる。

- 1) データのバラツキを少なくするため電源等の改良を行ない, さらにデータの取捨選択を厳密にする。
- 2) 管径および加熱長さをパラメータとした実験を行ない, 本実験結果と比較する。
- 3) バーンアウト熱流束を下げるため, より低流量の測定が可能ないようにタービン流量計の改造を行なう。
- 4) バーンアウトは局所的な現象であり, 流量低下過渡効果を本報のように入口質量速度の変化で評価するのは必ずしも適切でないので, バーンアウト発生点の局所質量速度等を計算にて求め, 定常バーンアウト条件との比較を行なう。

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- (7) 星蔦雄 他, “PCM研究の現状”, JAERI-M 6927, 1977年2月

## 付録 A. 実験条件一覧表

昭和54年11月から55年1月までに過渡沸騰試験装置を用いて実施され、磁気テープに集録された各実験データのうち、内径10mmテスト部による流量低下バーンアウト実験の実験条件一覧表を圧力0.5, 1.0, 2.0, 3.0, 3.9, MPaの各場合についてそれぞれTable A.1~A.5に示す。

以下の各表には、各実験ごとに実験番号 (RUN NO.), 実験開始時刻 (TIME), 磁気テープボリューム番号 (MTVOL. NO.), 磁気テープ内ファイル番号 (MT FILE NO.) データ集録間隔 (SAMPLING INTERVAL), データ集録時間 (RECORDING TIME) 加熱電圧 (VOLTAGE), 加熱電力 (POWER), 熱流束 (HEAT FLUX), 入口水温 (INLET TEMP.), 初期流量 (INITIAL FLOW RATE), 初期質量速度 (INITIAL MASS VEL.) 初期圧力 (INITIAL PRESSURE), 初期出口クオリティ (INITIAL EXIT QUALITY) の各項目について表示してある。このうち、加熱電圧~初期出口クオリティについては、いずれも集録データの先頭32点 (データ集録間隔5msecなら0.16秒) の平均値を示す。

Table A1 Summary of experiments - I (0.5 Mpa)

RUN NO.	TIME	MT VOL. NO.	MT FILE NO.	SAMPLING INTERVAL (MSEC)	RECORDING TIME (SEC)	VOLTAGE (VOLT)	POWER (KW)	HEAT FLUX (W/SQM)	INLET TEMP. (CENT)	INITIAL FLOW RATE (KG/MIN)	INITIAL MASS VEL. (KG/S.SQM)	INITIAL PRESSURE (MPA)	INITIAL EXIT QUALITY
541115 - 91	16.40	12	1	5.00	20.160	44.0	89.5	3.56 E+6	65.4	14.3	3028.8	0.60	-0.009
541115 - 92	16.49	12	2	5.00	40.160	44.2	89.8	3.57 E+6	65.3	14.1	2990.0	0.58	-0.003
541115 - 93	16.54	12	3	5.00	30.080	44.0	89.5	3.56 E+6	65.3	14.1	2996.7	0.58	-0.004
541115 - 94	16.57	12	4	5.00	25.120	44.0	89.4	3.56 E+6	65.3	14.2	3007.2	0.58	-0.006
541115 - 95	17.02	12	5	5.00	20.160	43.9	89.2	3.55 E+6	65.3	14.1	2989.2	0.58	-0.005
541115 - 96	17.05	12	6	5.00	15.040	44.0	89.3	3.55 E+6	65.5	14.0	2965.5	0.56	0.002
541115 - 97	17.09	12	7	5.00	15.040	44.0	89.3	3.55 E+6	65.6	13.8	2928.5	0.53	0.007
541115 - 98	17.12	12	8	5.00	15.040	44.0	89.2	3.55 E+6	65.5	13.7	2911.9	0.53	0.008
541115 - 99	17.15	12	9	5.00	10.080	44.0	89.3	3.55 E+6	65.5	13.9	2952.9	0.55	0.003
541115 -100	17.18	12	10	5.00	10.080	44.0	89.2	3.55 E+6	65.5	13.9	2946.9	0.55	0.004
541115 -101	17.21	12	11	5.00	5.120	44.0	89.6	3.56 E+6	65.5	14.0	2965.2	0.55	0.003
541115 -102	17.25	12	12	5.00	5.120	44.2	90.3	3.59 E+6	65.2	14.0	2966.4	0.56	0.002
541115 -103	17.36	12	13	5.00	50.080	44.0	89.4	3.56 E+6	65.4	14.3	3026.9	0.62	-0.012
541115 -104	17.53	12	14	5.00	100.160	43.9	88.9	3.54 E+6	65.4	14.2	3005.8	0.59	-0.008
541115 -105	18.03	12	15	5.00	20.160	37.9	67.7	2.69 E+6	66.1	14.4	3049.2	0.59	-0.051
541115 -106	18.09	12	16	5.00	50.080	38.0	67.9	2.70 E+6	65.5	14.2	3011.5	0.58	-0.048
541115 -107	18.16	12	17	5.00	10.080	38.1	68.1	2.71 E+6	66.1	14.0	2981.1	0.52	-0.037
541115 -108	18.21	12	18	5.00	40.160	38.0	67.9	2.70 E+6	65.9	14.1	2994.5	0.55	-0.043
541115 -109	18.27	12	19	5.00	30.080	38.0	67.8	2.70 E+6	65.4	14.0	2973.9	0.58	-0.048
541115 -110	18.31	12	20	5.00	25.120	38.0	67.7	2.69 E+6	65.4	14.0	2967.3	0.56	-0.044

Table A1 (continued)

RUN NO.	MT VOL. NO.	TIME	MT FILE NO.	SAMPLING INTERVAL (MSEC)	RECORDING TIME (SEC)	VOLTAGE (VOLT)	POWER (KW)	HEAT FLUX (W/SQM)	INLET TEMP. (CENT)	INITIAL FLOW RATE (KG/MIN)	INITIAL MASS VEL. (KG/S.SQM)	INITIAL PRESSURE (MPA)	INITIAL EXIT QUALITY
541115	-111	18.35	12	5.00	20.160	38.0	67.9	2.70 E+6	65.4	14.1	2988.8	0.56	-0.045
541115	-112	18.39	12	5.00	15.040	38.0	67.8	2.70 E+6	65.3	14.1	2996.0	0.58	-0.048
541115	-113	18.43	12	5.00	15.040	38.1	67.9	2.70 E+6	65.6	14.1	2989.0	0.54	-0.041
541115	-114	18.46	12	5.00	15.040	38.1	68.2	2.71 E+6	65.4	14.0	2977.2	0.52	-0.038
541115	-115	18.50	12	5.00	10.080	38.0	67.9	2.70 E+6	65.3	14.1	2989.2	0.53	-0.040
541115	-116	18.53	12	5.00	5.120	38.1	68.4	2.72 E+6	65.5	14.1	2985.7	0.52	-0.038
541115	-117	18.56	12	5.00	5.120	38.0	68.1	2.71 E+6	65.5	14.0	2975.4	0.51	-0.036
541206	- 1	11.56	12	5.00	10.080	38.4	68.1	2.71 E+6	120.3	11.4	2425.2	0.53	0.102
541206	- 2	12.01	12	5.00	50.080	38.1	67.2	2.67 E+6	122.0	11.3	2408.0	0.52	0.106
541206	- 3	12.49	12	5.00	40.160	38.0	67.1	2.67 E+6	119.3	11.9	2514.8	0.56	0.089
541206	- 4	12.58	12	5.00	30.080	38.1	67.2	2.67 E+6	119.5	11.8	2513.0	0.56	0.089
541206	- 5	13.03	12	5.00	30.080	38.0	66.8	2.66 E+6	118.2	12.1	2570.3	0.56	0.082
541206	- 6	13.08	12	5.00	25.120	38.1	67.2	2.68 E+6	120.7	11.6	2463.4	0.53	0.098
541206	- 7	13.16	12	5.00	20.160	38.0	66.7	2.66 E+6	119.2	12.1	2558.4	0.56	0.084
541206	- 8	13.20	12	5.00	15.040	37.9	66.7	2.65 E+6	122.4	11.6	2459.0	0.54	0.099
541206	- 9	13.24	12	5.00	15.040	38.0	67.0	2.67 E+6	121.9	11.3	2399.6	0.51	0.108
541206	- 10	13.28	12	5.00	10.080	38.0	66.8	2.66 E+6	121.4	11.6	2471.3	0.54	0.097
541206	- 11	13.31	12	5.00	5.120	38.0	67.0	2.67 E+6	121.4	11.4	2421.2	0.52	0.103



Table A1 (continued)

RUN NO.	TIME	MT VOL. NO.	MT FILE NO.	SAMPLING INTERVAL (MSEC)	RECORDING TIME (SEC)	VOLTAGE (VOLT)	POWER (KW)	HEAT FLUX (W/SQM)	INLET TEMP. (CENT)	INITIAL FLOW RATE (KG/MIN)	INITIAL MASS VEL. (KG/S.SQM)	INITIAL PRESSURE (MPA)	INITIAL EXIT QUALITY
541206 - 12	13.34	12	39	5.00	5.120	38.1	67.2	2.68 E+6	121.2	11.4	2420.8	0.52	0.103
541206 - 13	13.40	12	40	5.00	100.160	38.0	67.0	2.67 E+6	120.8	8.1	1709.3	0.52	0.172
541206 - 14	13.49	12	41	5.00	49.120	38.1	67.2	2.67 E+6	119.3	8.4	1777.6	0.56	0.155
541206 - 15	13.55	12	42	5.00	30.080	38.1	67.2	2.67 E+6	118.9	8.3	1763.8	0.55	0.157
541206 - 16	14.16	13	1	5.00	25.120	37.9	66.8	2.66 E+6	120.3	8.2	1742.3	0.54	0.162
541206 - 17	14.20	13	2	5.00	20.160	38.0	66.9	2.66 E+6	120.6	8.1	1728.4	0.54	0.166
541206 - 18	14.25	13	3	5.00	15.040	38.0	66.9	2.66 E+6	120.6	8.1	1717.1	0.53	0.169
541206 - 19	14.29	13	4	5.00	10.080	38.0	67.0	2.67 E+6	120.7	8.3	1764.1	0.57	0.157
541206 - 20	14.32	13	5	5.00	5.120	38.2	67.8	2.70 E+6	120.7	8.2	1740.7	0.56	0.165
541206 - 21	14.43	13	6	5.00	20.160	42.0	80.7	3.21 E+6	119.0	10.6	2251.5	0.50	0.150
541206 - 22	14.49	13	7	5.00	50.080	42.0	80.7	3.21 E+6	119.9	10.3	2194.2	0.50	0.157
541206 - 23	14.54	13	8	5.00	40.160	42.0	80.6	3.21 E+6	120.8	10.7	2278.6	0.54	0.146
541206 - 24	15.01	13	9	5.00	30.080	42.0	80.7	3.21 E+6	120.9	10.3	2183.8	0.50	0.162
541206 - 25	15.06	13	10	5.00	30.080	42.0	80.9	3.22 E+6	120.6	10.5	2218.8	0.51	0.156
541206 - 26	15.11	13	11	5.00	25.120	41.9	80.6	3.21 E+6	119.6	10.8	2283.1	0.53	0.145
541206 - 27	15.16	13	12	5.00	20.160	42.0	80.9	3.22 E+6	122.1	10.6	2239.7	0.53	0.155
541206 - 28	15.19	13	13	5.00	15.040	42.0	81.0	3.22 E+6	121.1	10.4	2206.5	0.51	0.158
541206 - 29	15.23	13	14	5.00	15.040	42.1	81.1	3.23 E+6	120.9	10.5	2230.4	0.52	0.155
541206 - 30	15.27	13	15	5.00	10.080	42.0	80.9	3.22 E+6	121.0	10.5	2219.7	0.51	0.157
541206 - 31	15.30	13	16	5.00	10.080	42.0	80.6	3.21 E+6	121.2	10.4	2205.6	0.50	0.159
541206 - 32	15.36	13	17	5.00	5.120	42.0	80.7	3.21 E+6	119.9	10.4	2202.3	0.50	0.157
541206 - 33	15.41	13	18	5.00	68.320	42.1	81.0	3.22 E+6	120.3	10.2	2172.0	0.49	0.163
541206 - 34	15.48	13	19	5.00	15.040	41.9	80.5	3.20 E+6	121.6	10.4	2213.3	0.52	0.156
541206 - 35	15.52	13	20	5.00	5.120	42.1	81.0	3.23 E+6	120.9	10.2	2161.1	0.49	0.165

Table A1 (continued)

RUN NO.	TIME	MT VOL. NO.	FILE NO.	SAMPLING INTERVAL (MSEC)	RECORDING TIME (SEC)	VOLTAGE (VOLT)	POWER (KW)	HEAT FLUX (W/SQCM)	INLET TEMP. (CENT)	INITIAL FLOW RATE (KG/MIN)	INITIAL MASS VEL. (KG/S.SQCM)	INITIAL PRESSURE (MPA)	INITIAL EXIT QUALITY
541206 - 36	16.21	13	21	5.00	20.160	34.0	54.4	2.16 E+6	121.6	11.5	2450.5	0.51	0.072
541206 - 37	16.25	13	22	5.00	50.080	34.0	54.1	2.15 E+6	122.2	11.7	2479.3	0.53	0.068
541206 - 38	16.30	13	23	5.00	40.160	34.1	54.4	2.17 E+6	119.0	11.7	2481.4	0.51	0.065
541206 - 39	16.35	13	24	5.00	30.080	34.0	54.2	2.16 E+6	121.1	11.6	2468.2	0.52	0.068
541206 - 40	16.39	13	25	5.00	5.120	34.0	54.3	2.16 E+6	121.4	11.4	2425.4	0.50	0.074
541206 - 41	16.45	13	26	5.00	30.080	34.0	54.2	2.16 E+6	119.8	11.7	2473.9	0.51	0.067
541206 - 42	16.50	13	27	5.00	25.120	34.1	54.3	2.16 E+6	121.2	11.7	2485.4	0.53	0.066
541206 - 43	16.53	13	28	5.00	20.160	34.2	54.7	2.18 E+6	119.9	11.7	2483.2	0.52	0.066
541206 - 44	16.57	13	29	5.00	15.040	34.0	54.3	2.16 E+6	119.6	11.9	2516.1	0.53	0.061
541206 - 45	17.06	13	30	5.00	100.160	34.0	54.5	2.17 E+6	120.1	6.1	1297.1	0.51	0.188
541206 - 46	17.15	13	31	5.00	50.080	34.0	54.3	2.16 E+6	119.6	6.1	1287.6	0.51	0.188
541206 - 47	17.20	13	32	5.00	30.080	34.0	54.4	2.17 E+6	120.3	6.1	1293.6	0.53	0.188
541206 - 48	17.37	14	1	5.00	25.120	34.0	54.1	2.15 E+6	120.4	6.1	1299.4	0.54	0.183
541206 - 49	17.41	14	2	5.00	20.160	34.1	54.5	2.17 E+6	120.2	6.0	1281.3	0.51	0.192
541206 - 50	17.45	14	3	5.00	15.040	34.1	54.5	2.17 E+6	120.0	6.1	1291.7	0.53	0.187
541206 - 51	17.48	14	4	5.00	20.160	34.0	54.3	2.16 E+6	119.7	6.2	1309.0	0.55	0.180
541206 - 52	17.53	14	5	5.00	30.080	34.0	54.4	2.16 E+6	120.5	6.1	1285.1	0.52	0.190
541206 - 53	18.01	14	6	5.00	50.080	38.1	67.3	2.68 E+6	119.5	5.8	1228.1	0.51	0.265
541206 - 54	18.06	14	7	5.00	30.080	38.0	67.0	2.66 E+6	120.8	5.9	1250.9	0.54	0.255
541206 - 55	18.11	14	8	5.00	20.160	38.1	67.2	2.67 E+6	120.9	5.9	1260.1	0.55	0.254
541206 - 56	18.15	14	9	5.00	10.080	38.0	67.0	2.67 E+6	120.0	5.9	1252.4	0.53	0.256
541206 - 57	18.19	14	10	5.00	5.120	38.0	67.2	2.67 E+6	119.9	5.9	1245.5	0.52	0.259
541206 - 58	18.23	14	11	5.00	40.160	38.0	67.1	2.67 E+6	119.5	5.9	1244.2	0.52	0.259

Table A1 (continued)

RUN NO.	MT VOL. NO.	TIME	MT FILE NO.	SAMPLING INTERVAL (MSEC)	RECORDING TIME (SEC)	VOLTAGE (VOLT)	POWER (KW)	HEAT FLUX (W/SQM)	INLET TEMP. (CENT)	INITIAL FLOW RATE (KG/MIN)	INITIAL MASS VEL. (KG/S.SQM)	INITIAL PRESSURE (MPA)	INITIAL EXIT QUALITY
541206 - 59	14	18.28	12	5.00	25.120	38.0	67.4	2.68 E+6	120.2	5.9	1241.9	0.53	0.260
541206 - 60	14	18.33	13	5.00	15.040	38.0	67.2	2.67 E+6	119.5	5.8	1239.9	0.52	0.260
541206 - 61	14	18.36	14	5.00	10.080	38.0	67.2	2.68 E+6	119.9	5.8	1231.1	0.51	0.265
541206 - 62	14	18.40	15	5.00	69.120	38.1	67.3	2.68 E+6	119.9	5.7	1213.8	0.49	0.272

RUN NO.	MT VOL. NO.	TIME	MT FILE NO.	SAMPLING INTERVAL (MSEC)	RECORDING TIME (SEC)	VOLTAGE (VOLT)	POWER (KW)	HEAT FLUX (W/SQM)	INLET TEMP. (CENT)	INITIAL FLOW RATE (KG/MIN)	INITIAL MASS VEL. (KG/S.SQM)	INITIAL PRESSURE (MPA)	INITIAL EXIT QUALITY
550124 - 1	14	11.13	16	5.00	20.160	46.1	95.8	3.81 E+6	120.4	8.3	1759.4	0.49	0.267
550124 - 2	14	11.25	17	5.00	15.040	45.9	95.6	3.81 E+6	118.7	8.5	1801.4	0.48	0.256
550124 - 3	14	11.32	18	5.00	15.040	46.1	96.0	3.82 E+6	117.2	8.5	1807.1	0.47	0.254
550124 - 4	14	11.36	19	5.00	15.040	46.0	95.9	3.82 E+6	119.5	8.4	1787.1	0.48	0.261
550124 - 5	14	11.41	20	5.00	10.080	46.0	95.6	3.80 E+6	117.0	8.5	1807.2	0.47	0.253
550124 - 6	14	11.44	21	5.00	10.080	46.0	95.8	3.81 E+6	119.7	8.5	1808.7	0.48	0.257
550124 - 7	14	11.48	22	5.00	5.120	46.0	95.9	3.82 E+6	116.8	9.1	1937.5	0.51	0.227
550124 - 8	14	11.52	23	5.00	5.120	46.0	95.9	3.82 E+6	118.7	8.9	1884.7	0.52	0.238
550124 - 9	14	11.57	24	5.00	20.160	45.9	94.9	3.78 E+6	118.8	9.4	1997.5	0.55	0.214
550124 - 10	14	12.01	25	5.00	25.120	46.0	95.9	3.82 E+6	116.0	9.3	1971.1	0.52	0.219
550124 - 11	14	12.05	26	5.00	24.160	46.1	95.8	3.81 E+6	118.5	9.2	1948.0	0.54	0.225
550124 - 12	14	12.09	27	5.00	24.160	46.0	95.6	3.81 E+6	116.2	9.2	1953.3	0.52	0.221
550124 - 13	14	12.14	28	5.00	40.160	46.0	95.8	3.81 E+6	118.4	9.2	1951.5	0.54	0.224
550124 - 14	14	12.19	29	5.00	50.080	46.1	95.9	3.82 E+6	120.2	8.7	1846.2	0.51	0.249
550124 - 15	14	12.28	30	5.00	59.360	46.1	96.0	3.82 E+6	117.3	9.1	1927.6	0.53	0.228
550124 - 16	14	12.34	31	5.00	73.280	46.1	96.0	3.82 E+6	119.7	9.1	1939.5	0.54	0.230

Table A2 Summary of experiments - II (1.0 Mpa)

RUN NO.	MT VOL. NO.	MT FILE NO.	TIME	(MSEC)	SAMPLING INTERVAL	RECORDING TIME	VOLTAGE	POWER	HEAT FLUX	INLET TEMP.	INITIAL FLOW RATE	INITIAL MASS VEL.	INITIAL PRESSURE	INITIAL EXIT QUALITY
						(SEC)	(VOLT)	(KW)	(W/SQM)	(CENT)	(KG/MIN)	(KG/S.SQM)	(MPA)	
541207 -101	16	1	16.50	5.10	5.059	42.0	80.2	3.19 E+6	136.9	12.1	2559.5	1.04	0.102	
541207 -102	16	2	16.55	5.10	50.100	42.0	80.2	3.19 E+6	140.6	11.7	2483.2	0.99	0.120	
541207 -103	16	3	17.04	5.10	40.145	42.1	80.8	3.21 E+6	141.3	12.0	2549.6	1.06	0.111	
541207 -104	16	4	17.14	5.10	30.027	42.2	81.1	3.23 E+6	142.1	12.0	2554.3	1.09	0.112	
541207 -105	16	5	17.21	5.10	30.027	42.0	80.3	3.19 E+6	140.8	12.0	2551.1	1.08	0.107	
541207 -106	16	6	17.25	5.10	25.132	42.1	80.5	3.20 E+6	140.1	11.9	2529.5	1.05	0.111	
541207 -107	16	7	17.30	5.10	20.073	42.0	80.2	3.19 E+6	140.5	12.0	2541.5	1.06	0.109	
541207 -108	16	8	17.34	5.10	20.073	42.0	80.3	3.20 E+6	141.5	11.9	2524.9	1.08	0.111	
541207 -109	16	9	17.37	5.10	15.014	42.0	80.2	3.19 E+6	139.0	11.9	2533.5	1.08	0.105	
541207 -110	16	10	17.40	5.10	15.014	42.0	80.2	3.19 E+6	141.7	12.0	2550.7	1.07	0.110	
541207 -111	16	11	17.43	5.10	10.118	42.0	80.2	3.19 E+6	139.5	12.0	2542.8	1.05	0.108	
541207 -112	16	12	17.46	5.10	5.059	42.0	80.3	3.19 E+6	139.8	12.1	2562.4	1.07	0.105	
541207 -113	16	13	18.06	5.10	50.100	42.2	81.0	3.22 E+6	141.9	7.7	1637.7	1.01	0.230	
541207 -114	16	14	18.12	5.10	30.027	42.0	80.2	3.19 E+6	140.2	7.9	1676.5	1.04	0.214	
541207 -115	16	15	18.16	5.10	25.132	42.0	80.4	3.20 E+6	141.7	7.8	1662.1	1.04	0.220	
541207 -116	16	16	18.20	5.10	20.073	42.0	80.2	3.19 E+6	140.3	8.0	1708.2	1.09	0.204	
541207 -117	16	17	18.23	5.10	15.014	42.1	80.5	3.20 E+6	141.5	8.0	1703.7	1.09	0.209	
541207 -118	16	18	18.26	5.10	5.059	42.1	80.6	3.21 E+6	141.4	8.0	1690.5	1.07	0.212	
541207 -119	16	19	18.29	5.10	100.037	42.1	80.5	3.20 E+6	141.1	8.0	1693.8	1.07	0.211	
541210 - 1	16	20	13.31	5.00	5.120	46.0	95.4	3.80 E+6	138.7	11.1	2358.4	1.02	0.165	
541210 - 2	16	21	13.35	5.00	20.160	46.0	95.0	3.78 E+6	142.2	11.2	2384.5	1.11	0.161	
541210 - 3	16	22	13.39	5.00	50.080	46.0	95.3	3.79 E+6	139.8	11.7	2493.0	1.08	0.148	
541210 - 4	16	23	13.45	5.00	40.160	45.9	94.9	3.78 E+6	140.2	11.4	2420.8	1.00	0.162	
541210 - 5	16	24	13.51	5.00	30.080	46.0	95.2	3.79 E+6	140.6	11.8	2511.4	1.08	0.148	
541210 - 6	16	25	13.55	5.00	30.080	46.0	95.3	3.79 E+6	139.5	11.8	2513.8	1.08	0.145	

Table A2 (continued)

RUN NO.	TIME	MT VOL. NO.	MT FILE NO.	SAMPLING INTERVAL (MSEC)	RECORDING TIME (SEC)	VOLTAGE (VOLT)	POWER (KW)	HEAT FLUX (W/SQM)	INLET TEMP. (CENT)	INITIAL FLOW RATE (KG/MIN)	INITIAL MASS VEL. (KG/S.SQM)	INITIAL PRESSURE (MPA)	INITIAL EXIT QUALITY
541210 - 7	14.03	16	26	5.00	25.120	45.9	94.7	3.77 E+6	140.3	11.8	2509.4	1.08	0.147
541210 - 8	14.07	16	27	5.00	20.160	46.0	95.3	3.79 E+6	140.3	11.8	2500.3	1.07	0.150
541210 - 9	14.29	16	28	5.00	20.160	46.0	95.3	3.79 E+6	139.1	11.7	2485.0	1.04	0.151
541210 - 10	14.34	16	29	5.00	15.040	46.1	95.5	3.80 E+6	140.8	11.5	2448.7	1.06	0.157
541210 - 11	14.37	16	30	5.00	15.040	46.0	95.2	3.79 E+6	140.9	11.8	2509.7	1.10	0.148
541210 - 12	14.41	16	31	5.00	10.080	45.9	95.0	3.78 E+6	138.7	11.9	2524.7	1.07	0.143
541210 - 13	14.43	16	32	5.00	5.120	46.0	95.5	3.80 E+6	141.7	11.7	2475.2	1.08	0.155
541210 - 14	14.46	16	33	5.00	5.120	46.1	95.5	3.80 E+6	138.9	11.9	2533.8	1.09	0.142
541210 - 15	14.51	16	34	5.00	81.120	46.0	95.2	3.79 E+6	139.3	9.5	2019.6	1.06	0.206
541210 - 16	15.00	16	35	5.00	50.080	46.0	95.4	3.80 E+6	139.1	9.4	1997.9	1.01	0.213
541210 - 17	15.05	16	36	5.00	15.040	46.1	95.5	3.80 E+6	141.2	9.5	2010.1	1.06	0.212
541210 - 18	15.31	17	1	5.00	30.080	46.0	95.4	3.80 E+6	141.3	9.6	2043.1	1.10	0.204
541210 - 19	15.35	17	2	5.00	25.120	45.9	95.1	3.79 E+6	137.3	9.7	2063.7	1.07	0.194
541210 - 20	15.41	17	3	5.00	20.160	46.1	95.5	3.80 E+6	142.2	9.3	1970.6	1.02	0.223
541210 - 21	15.44	17	4	5.00	15.040	46.1	95.6	3.80 E+6	142.2	9.4	1990.3	1.06	0.218
541210 - 22	15.48	17	5	5.00	10.080	45.8	94.5	3.76 E+6	140.8	9.5	2009.5	1.03	0.210
541210 - 23	15.51	17	6	5.00	5.120	46.1	95.5	3.80 E+6	139.2	9.5	2012.6	1.01	0.211
541210 - 24	15.55	17	7	5.00	10.080	42.0	80.5	3.20 E+6	141.6	5.8	1236.7	1.04	0.326
541210 - 25	15.59	17	8	5.00	50.080	42.0	80.3	3.20 E+6	141.8	5.8	1239.1	1.05	0.324
541210 - 26	16.04	17	9	5.00	30.080	41.9	80.2	3.19 E+6	141.6	5.8	1229.0	1.00	0.330
541210 - 27	16.08	17	10	5.00	25.120	42.0	80.4	3.20 E+6	140.1	5.9	1255.0	1.08	0.313
541210 - 28	16.12	17	11	5.00	20.160	41.9	80.1	3.19 E+6	138.7	5.9	1259.3	1.09	0.306
541210 - 29	16.16	17	12	5.00	15.040	42.0	80.3	3.20 E+6	138.4	5.9	1254.1	1.10	0.308
541210 - 30	16.19	17	13	5.00	5.120	41.9	80.1	3.19 E+6	138.0	5.9	1252.0	1.06	0.310
541210 - 31	16.22	17	14	5.00	100.160	42.0	80.4	3.20 E+6	136.5	5.9	1254.4	1.05	0.308

Table A2 (continued)

RUN NO.	MT VOL. NO.	TIME	MT FILE NO.	SAMPLING INTERVAL (MSEC)	RECORDING TIME (SEC)	VOLTAGE (VOLT)	POWER (KW)	HEAT FLUX (W/SQM)	INLET TEMP. (CENT)	INITIAL FLOW RATE (KG/MIN)	INITIAL MASS VEL. (KG/S.SQM)	INITIAL PRESSURE (MPA)	INITIAL EXIT QUALITY
550108	-101	17*05	17	5*00	20*160	41*8	80*1	3*19 E+6	91*4	14*1	2990*7	0*99	-0*019
550108	-102	17*17	17	5*00	15*040	42*0	80*7	3*21 E+6	91*7	14*0	2980*8	0*96	-0*014
550108	-103	17*21	17	5*00	15*040	42*1	81*3	3*23 E+6	91*2	14*0	2971*6	0*94	-0*010
550108	-104	17*26	17	5*00	15*040	42*0	80*8	3*22 E+6	90*5	14*1	2983*2	0*92	-0*011
550108	-105	17*30	17	5*00	10*080	42*0	81*3	3*23 E+6	90*6	14*1	2993*2	0*90	-0*009
550108	-106	17*35	17	5*00	10*080	42*0	81*1	3*23 E+6	92*1	13*9	2947*8	0*90	-0*003
550108	-107	17*40	17	5*00	5*120	42*1	81*2	3*23 E+6	91*8	14*0	2960*3	0*90	-0*005
550108	-108	17*44	17	5*00	5*120	42*0	81*0	3*22 E+6	90*9	14*0	2977*5	0*89	-0*007
550108	-109	17*49	17	5*00	20*160	42*1	81*2	3*23 E+6	90*9	13*9	2957*0	0*89	-0*006
550108	-110	17*58	17	5*00	25*120	42*0	80*9	3*22 E+6	91*7	13*8	2936*4	0*89	-0*004
550108	-111	18*04	17	5*00	30*080	42*0	81*1	3*23 E+6	89*8	14*0	2966*6	0*90	-0*009
550108	-112	18*09	17	5*00	30*080	42*0	81*3	3*23 E+6	91*6	14*0	2964*6	0*90	-0*005
550108	-113	18*14	17	5*00	40*160	42*0	81*1	3*23 E+6	92*0	14*0	2962*6	0*91	-0*006
550108	-114	18*19	17	5*00	50*080	42*1	81*1	3*23 E+6	91*7	13*9	2958*2	0*91	-0*006
550109	- 1	11*20	17	5*00	20*160	41*9	80*4	3*20 E+6	89*2	12*1	2566*6	0*93	0*012
550109	- 2	11*27	17	5*00	15*040	42*0	80*8	3*22 E+6	89*7	12*1	2560*5	0*96	0*012
550109	- 3	11*33	17	5*00	10*080	42*0	80*8	3*21 E+6	90*3	12*0	2555*5	0*94	0*015
550109	- 4	11*40	17	5*00	5*120	41*9	80*4	3*20 E+6	89*8	12*1	2571*8	0*97	0*009
550109	- 5	11*45	17	5*00	20*160	42*0	80*6	3*21 E+6	90*3	12*0	2543*0	0*96	0*014
550109	- 6	11*50	17	5*00	25*120	42*1	80*9	3*22 E+6	89*3	12*0	2552*8	0*95	0*012
550109	- 7	11*55	17	5*00	30*080	42*0	80*9	3*22 E+6	91*4	11*9	2527*7	0*93	0*021

Table A2 (continued)

RUN NO.	TIME	MT VOL. NO.	MT FILE NO.	SAMPLING INTERVAL (NSEC)	RECORDING TIME (SEC)	VOLTAGE (VOLT)	POWER (KW)	HEAT FLUX (W/SQM)	INLET TEMP. (CENT)	INITIAL FLOW RATE (KG/MIN)	INITIAL MASS VEL. (KG/S.SQM)	INITIAL PRESSURE (MPA)	INITIAL EXIT QUALITY
550109 - 8	12.06	17	36	5.00	50.080	42.0	80.8	3.22 E+6	92.5	11.9	2523.8	0.95	0.022
550109 - 9	12.13	17	37	5.00	100.160	42.1	81.1	3.23 E+6	90.4	12.0	2550.1	0.95	0.015
550109 - 10	13.19	21	1	5.00	20.160	41.9	80.2	3.19 E+6	91.1	8.0	1705.5	0.95	0.113
550109 - 11	13.25	21	2	5.00	20.160	42.1	81.0	3.22 E+6	90.5	8.0	1700.0	0.94	0.116
550109 - 12	13.31	21	3	5.00	50.080	42.0	80.3	3.20 E+6	92.2	8.0	1705.3	0.95	0.115
550109 - 13	13.36	21	4	5.00	40.160	42.0	80.5	3.20 E+6	92.0	8.1	1711.9	0.96	0.113
550109 - 14	13.42	21	5	5.00	30.080	42.0	80.7	3.21 E+6	89.4	8.1	1710.5	0.95	0.110
550109 - 15	13.46	21	6	5.00	25.120	42.0	80.5	3.20 E+6	88.7	8.1	1717.8	0.93	0.108
550109 - 16	13.55	21	7	5.00	20.160	42.1	80.7	3.21 E+6	89.5	8.1	1726.0	0.96	0.107
550109 - 17	13.59	21	8	5.00	15.040	42.0	80.5	3.20 E+6	88.7	8.1	1713.2	0.91	0.111
550109 - 18	14.03	21	9	5.00	15.040	42.0	80.6	3.21 E+6	91.4	8.1	1711.5	0.95	0.114
550109 - 19	14.10	21	10	5.00	10.080	42.0	80.3	3.20 E+6	90.1	8.0	1702.2	0.92	0.114
550109 - 20	14.17	21	11	5.00	5.120	42.0	80.4	3.20 E+6	90.1	8.1	1710.7	0.95	0.110
550109 - 21	14.21	21	12	5.00	5.120	41.9	80.3	3.19 E+6	89.1	8.0	1691.3	0.92	0.113
550109 - 22	14.25	21	13	5.00	75.040	41.9	80.2	3.19 E+6	93.2	8.0	1692.0	0.95	0.119
550109 - 23	14.30	21	14	5.00	100.160	42.0	80.5	3.21 E+6	90.9	8.0	1708.1	0.96	0.112
550109 - 24	15.03	21	15	5.00	20.160	46.3	96.8	3.85 E+6	89.9	8.0	1705.1	0.93	0.173
550109 - 25	15.07	21	16	5.00	15.040	46.0	95.5	3.80 E+6	88.6	8.2	1739.2	0.94	0.157
550109 - 26	15.12	21	17	5.00	10.080	46.1	96.0	3.82 E+6	90.6	8.2	1731.0	0.94	0.165
550109 - 27	15.16	21	18	5.00	5.120	46.1	95.9	3.82 E+6	92.6	8.1	1726.4	0.96	0.168
550109 - 28	15.22	21	19	5.00	5.120	46.0	95.6	3.80 E+6	90.4	8.2	1744.5	0.99	0.157
550109 - 29	15.28	21	20	5.00	15.040	46.1	95.9	3.82 E+6	90.2	8.1	1722.9	0.93	0.167
550109 - 30	15.34	21	21	5.00	20.160	46.0	95.6	3.80 E+6	90.0	8.1	1722.1	0.93	0.165
550109 - 31	15.39	21	22	5.00	25.120	46.1	96.0	3.82 E+6	89.4	8.1	1721.5	0.91	0.168

Table A2 (continued)

RUN NO.	TIME	MT VOL. NO.	MT FILE NO.	SAMPLING INTERVAL (MSEC)	RECORDING TIME (SEC)	VOLTAGE (VOLT)	POWER (KW)	HEAT FLUX (W/SQM)	INLET TEMP. (CENT)	INITIAL FLOW RATE (KG/MIN)	INITIAL MASS VEL. (KG/S.SQM)	INITIAL PRESSURE (MPA)	INITIAL EXIT QUALITY
550109 - 32	15.44	21	23	5.00	22.560	46.1	95.8	3.81 E+6	92.3	8.1	1727.6	0.95	0.168
550109 - 33	15.51	21	24	5.00	23.040	45.9	95.1	3.79 E+6	91.8	8.1	1722.5	0.95	0.166
550109 - 34	15.57	21	25	5.00	28.640	45.9	95.4	3.80 E+6	93.1	8.1	1723.0	0.94	0.170
550109 - 35	16.01	21	26	5.00	49.120	46.0	95.6	3.80 E+6	92.7	8.1	1722.1	0.93	0.170
550109 - 36	16.25	21	27	5.00	20.160	46.0	95.7	3.81 E+6	91.4	12.2	2583.4	0.94	0.052
550109 - 37	16.31	21	28	5.00	15.040	46.0	95.7	3.81 E+6	91.2	12.2	2583.1	0.94	0.051
550109 - 38	16.44	21	29	5.00	15.040	46.0	95.9	3.82 E+6	90.8	12.3	2615.8	0.95	0.047
550109 - 39	16.51	21	30	5.00	10.080	46.0	95.7	3.81 E+6	93.0	12.1	2576.8	0.94	0.055
550109 - 40	16.57	21	31	5.00	10.080	46.0	95.6	3.80 E+6	93.4	12.2	2585.0	0.96	0.054
550109 - 41	17.03	21	32	5.00	5.120	46.0	95.9	3.82 E+6	92.0	12.2	2599.0	0.96	0.050
550109 - 42	17.08	21	33	5.00	5.120	46.0	95.9	3.82 E+6	92.1	12.2	2588.0	0.95	0.052
550109 - 43	17.13	21	34	5.00	20.160	46.0	95.6	3.81 E+6	91.1	12.2	2588.0	0.93	0.051
550109 - 44	17.19	21	35	5.00	25.120	46.1	95.8	3.81 E+6	91.0	12.2	2589.3	0.94	0.051
550109 - 45	17.25	21	36	5.00	23.040	46.0	95.8	3.81 E+6	92.6	12.2	2586.6	0.96	0.052
550109 - 46	17.30	21	37	5.00	24.320	46.0	95.6	3.81 E+6	92.8	12.1	2576.3	0.96	0.053
550109 - 47	17.36	21	38	5.00	40.160	46.0	95.6	3.80 E+6	90.5	12.4	2630.2	0.94	0.045
550109 - 48	17.42	21	39	5.00	39.360	45.9	95.1	3.78 E+6	92.0	12.3	2615.3	0.96	0.047
550109 - 49	17.47	21	40	5.00	58.720	46.2	96.3	3.83 E+6	91.9	12.2	2592.2	0.95	0.052
550109 - 50	17.53	21	41	5.00	78.720	46.1	95.8	3.81 E+6	90.7	12.4	2626.6	0.96	0.045



Table A3 Summary of experiments - III (2.0 Mpa)

RUN NO.	HT VOL. NO.	TIME	HT VOL. NO.	MT FILE NO.	SAMPLING INTERVAL (MSEC)	RECORDING TIME (SEC)	VOLTAGE (VOLT)	POWER (KW)	HEAT FLUX (W/SQM)	INLET TEMP. (CENT)	INITIAL FLOW RATE (KG/MIN)	INITIAL MASS VEL. (KG/S.SQM)	INITIAL PRESSURE (MPA)	INITIAL EXIT QUALITY
541211	-101	17.24	19	1	5.00	20.160	44.0	86.7	3.45 E+6	160.9	8.1	1710.3	2.01	0.220
541211	-102	17.27	19	2	5.00	50.080	44.1	86.9	3.46 E+6	161.0	8.0	1707.0	1.95	0.224
541211	-103	17.32	19	3	5.00	40.160	44.0	86.6	3.45 E+6	161.0	8.0	1703.4	1.96	0.223
541211	-104	17.37	19	4	5.00	30.080	44.1	87.2	3.47 E+6	160.9	8.0	1699.8	1.94	0.227
541211	-105	17.41	19	5	5.00	30.080	44.1	87.3	3.47 E+6	161.2	8.1	1711.6	1.92	0.227
541211	-106	17.45	19	6	5.00	25.120	44.0	87.0	3.46 E+6	161.1	8.1	1711.0	1.93	0.225
541211	-107	17.49	19	7	5.00	20.160	43.9	86.4	3.44 E+6	161.0	8.1	1722.2	1.94	0.220
541211	-108	17.53	19	8	5.00	15.040	43.9	86.5	3.44 E+6	161.0	8.2	1741.2	1.98	0.214
541211	-109	17.56	19	9	5.00	15.040	44.0	86.8	3.46 E+6	160.5	8.1	1724.0	1.96	0.219
541211	-110	17.59	19	10	5.00	10.080	44.1	87.1	3.47 E+6	160.7	8.2	1729.8	1.99	0.218
541211	-111	18.02	19	11	5.00	5.120	44.0	86.5	3.44 E+6	161.1	8.2	1745.9	1.99	0.213
541211	-112	18.04	19	12	5.00	5.120	44.1	86.9	3.46 E+6	160.7	8.2	1730.0	1.96	0.218
541211	-113	18.07	19	13	5.00	100.160	44.1	87.0	3.46 E+6	160.9	8.2	1729.5	1.95	0.220
541211	-114	18.27	19	14	5.00	50.080	44.2	87.3	3.48 E+6	160.7	6.3	1343.4	1.98	0.317
541211	-115	18.32	19	15	5.00	30.080	44.0	86.8	3.45 E+6	160.4	6.3	1344.8	1.97	0.313
541211	-116	18.36	19	16	5.00	25.120	44.0	86.8	3.45 E+6	161.0	6.3	1342.3	1.92	0.318
541211	-117	18.39	19	17	5.00	20.160	44.1	87.0	3.46 E+6	159.7	6.4	1353.1	1.96	0.311
541211	-118	18.43	19	18	5.00	10.080	44.1	87.2	3.47 E+6	160.5	6.4	1349.0	1.95	0.315
541211	-119	18.45	19	19	5.00	15.040	44.1	86.9	3.46 E+6	160.4	6.4	1356.0	1.98	0.310
541211	-120	18.49	19	20	5.00	5.120	44.0	86.7	3.45 E+6	160.0	6.3	1344.4	1.96	0.312
541211	-121	18.51	19	21	5.00	100.160	44.0	86.8	3.45 E+6	160.4	6.4	1347.5	1.96	0.313

Table A3 (continued)

RUN NO.	TIME	MT VOL. NO.	MT FILE NO.	SAMPLING INTERVAL (MSEC)	RECORDING TIME (SEC)	VOLTAGE (VOLT)	POWER (KW)	HEAT FLUX (W/SQCM)	INLET TEMP. (CENT)	INITIAL FLOW RATE (KG/MIH)	INITIAL MASS VEL. (KG/S.SQCM)	INITIAL PRESSURE (MPA)	INITIAL EXIT QUALITY
541212 - 1	13.59	19	22	5.00	20.160	44.1	86.9	3.46 E+6	161.8	12.0	2536.5	1.99	0.112
541212 - 2	14.10	19	23	5.00	25.120	44.0	86.4	3.44 E+6	162.3	12.0	2553.1	1.99	0.110
541212 - 3	14.14	19	24	5.00	20.160	44.0	86.5	3.44 E+6	161.3	12.1	2568.4	1.96	0.108
541212 - 4	14.17	19	25	5.00	15.040	44.0	86.5	3.44 E+6	162.8	11.9	2533.9	1.96	0.115
541212 - 5	14.20	19	26	5.00	15.040	44.0	86.5	3.44 E+6	160.7	12.0	2555.4	1.95	0.109
541212 - 6	14.24	19	27	5.00	10.080	44.0	86.5	3.44 E+6	161.7	12.1	2568.7	1.96	0.109
541212 - 7	14.27	19	28	5.00	5.120	44.2	87.4	3.48 E+6	161.9	12.0	2542.6	1.94	0.116
541212 - 8	14.29	19	29	5.00	10.080	44.0	86.4	3.44 E+6	162.7	12.0	2538.8	1.95	0.115
541212 - 9	14.32	19	30	5.00	5.120	44.0	86.6	3.45 E+6	161.2	11.9	2528.3	1.95	0.113
541212 - 10	14.38	19	31	5.00	30.090	44.1	87.0	3.46 E+6	162.7	12.0	2550.2	1.97	0.114
541212 - 11	14.42	19	32	5.00	30.080	44.1	87.1	3.47 E+6	162.8	12.0	2549.8	1.97	0.114
541212 - 12	14.45	19	33	5.00	40.160	44.0	86.4	3.44 E+6	162.0	12.0	2546.0	1.97	0.111
541212 - 13	14.50	19	34	5.00	50.080	44.0	86.8	3.45 E+6	162.5	12.1	2562.9	1.98	0.112
541212 - 14	15.08	19	35	5.00	5.120	44.2	87.2	3.47 E+6	161.2	12.1	2562.8	1.98	0.109
541212 - 15	15.11	19	36	5.00	25.120	46.0	94.0	3.74 E+6	162.1	11.8	2497.5	1.96	0.137
541212 - 16	15.15	19	37	5.00	20.160	46.1	94.6	3.77 E+6	162.0	11.6	2470.0	1.94	0.143
541212 - 17	15.19	19	38	5.00	20.160	46.0	94.6	3.76 E+6	161.0	11.8	2496.4	1.97	0.135
541212 - 18	15.23	19	39	5.00	15.040	46.0	94.3	3.75 E+6	163.3	11.7	2476.0	1.96	0.143
541212 - 19	15.26	19	40	5.00	15.040	46.1	94.6	3.77 E+6	163.2	11.4	2425.3	1.98	0.147
541212 - 20	15.48	20	1	5.00	10.080	46.0	94.6	3.76 E+6	161.2	11.7	2477.1	1.96	0.138

Table A3 (continued)

RUN NO.	TIME	MT VOL. NO.	MT FILE NO.	SAMPLING INTERVAL (MSEC)	RECORDING TIME (SEC)	VOLTAGE (VOLT)	POWER (KW)	HEAT FLUX (W/SQCM)	INLET TEMP. (CENT)	INITIAL FLOW RATE (KG/MIN)	INITIAL MASS VEL. (KG/S.SQM)	INITIAL PRESSURE (MPA)	INITIAL EXIT QUALITY
541212 - 21	15.51	20	2	5.00	5.120	46.0	94.5	3.76 E+6	162.4	11.6	2468.8	1.94	0.143
541212 - 22	15.56	20	3	5.00	30.080	46.1	94.7	3.77 E+6	162.4	11.8	2495.1	1.99	0.130
541212 - 23	16.00	20	4	5.00	30.080	46.0	94.4	3.76 E+6	163.8	11.7	2481.6	1.97	0.143
541212 - 24	16.04	20	5	5.00	40.160	46.0	94.4	3.76 E+6	162.9	11.8	2497.6	1.99	0.138
541212 - 25	16.08	20	6	5.00	50.080	45.9	93.8	3.73 E+6	163.5	11.6	2464.4	1.97	0.143
541212 - 26	16.14	20	7	5.00	5.120	45.9	93.7	3.73 E+6	164.4	11.7	2475.8	2.00	0.142
541212 - 27	16.16	20	8	5.00	50.080	46.0	94.3	3.75 E+6	162.2	8.3	1769.4	1.97	0.242
541212 - 28	16.28	20	9	5.00	25.120	46.0	94.3	3.75 E+6	160.6	8.3	1758.2	1.94	0.242
541212 - 29	16.32	20	10	5.00	20.160	46.1	94.8	3.77 E+6	160.3	8.3	1766.7	1.98	0.239
541212 - 30	16.38	20	11	5.00	15.040	45.8	93.6	3.72 E+6	161.9	8.3	1766.3	1.99	0.238
541212 - 31	16.41	20	12	5.00	5.120	46.1	94.5	3.76 E+6	162.1	8.3	1765.3	1.98	0.243
541212 - 32	16.44	20	13	5.00	100.160	46.1	94.8	3.77 E+6	163.0	8.3	1761.6	1.96	0.248

Table A4 Summary of experiments - IV (3.0 Mpa)

RUN NO.	MT VOL. NO.	MT FILE NO.	TIME	SAMPLING INTERVAL (MSEC)	RECORDING TIME (SEC)	VOLTAGE (VOLT)	POWER (KW)	HEAT FLUX (W/SQM)	INLET TEMP. (CENT)	INITIAL FLOW RATE (KG/MIN)	INITIAL MASS VEL. (KG/S.SQM)	INITIAL PRESSURE (MPA)	INITIAL EXIT QUALITY
541102 -101	9	1	17.00	5.00	20.160	46.0	93.4	3.72 E+6	130.0	9.9	2103.4	2.97	0.059
541102 -102	9	2	17.09	5.00	50.080	46.0	93.3	3.71 E+6	129.9	9.7	2047.9	3.02	0.064
541102 -103	9	3	17.46	5.00	40.160	46.0	93.5	3.72 E+6	131.3	9.6	2038.3	2.92	0.075
541102 -104	9	4	18.03	5.00	30.080	46.0	93.4	3.72 E+6	130.6	9.6	2043.3	2.98	0.069
541102 -105	9	5	18.16	5.00	25.120	46.0	92.8	3.69 E+6	130.4	9.6	2034.7	2.98	0.068
541102 -106	9	6	18.21	5.00	20.160	46.0	93.3	3.71 E+6	130.7	9.6	2031.3	3.01	0.069
541102 -107	9	7	18.25	5.00	15.040	46.0	93.3	3.71 E+6	130.5	9.6	2040.8	2.96	0.069
541102 -108	9	8	18.29	5.00	15.040	46.0	93.3	3.71 E+6	130.7	9.6	2038.0	2.97	0.070
541102 -109	9	9	18.32	5.00	15.040	46.0	93.0	3.70 E+6	130.8	9.6	2035.1	2.97	0.070
541102 -110	9	10	18.36	5.00	10.080	46.1	93.5	3.72 E+6	130.9	9.6	2039.5	2.96	0.072
541102 -111	9	11	18.39	5.00	10.080	46.0	93.2	3.71 E+6	130.8	9.6	2031.5	2.96	0.072
541102 -112	9	12	18.45	5.00	5.120	46.0	93.2	3.71 E+6	130.6	9.6	2040.4	2.96	0.070
541102 -113	9	13	18.48	5.00	5.120	46.0	93.4	3.72 E+6	130.9	9.6	2038.0	2.95	0.071
541102 -114	9	14	18.52	5.00	100.160	46.0	92.9	3.70 E+6	130.8	9.6	2033.5	3.04	0.066
541107 - 1	9	15	17.48	5.00	20.160	45.9	93.0	3.70 E+6	133.1	14.1	2986.2	2.92	-0.026
541107 - 2	9	16	17.56	5.00	50.080	46.0	93.2	3.71 E+6	131.5	13.9	2951.5	2.91	-0.026
541107 - 3	9	17	18.01	5.00	40.160	46.0	93.4	3.72 E+6	131.6	14.1	2984.1	2.91	-0.028
541107 - 4	9	18	18.06	5.00	30.080	46.0	93.4	3.72 E+6	132.6	14.1	2992.0	2.97	-0.028
541107 - 5	9	19	18.10	5.00	25.120	46.1	93.6	3.73 E+6	133.0	14.1	2982.0	2.94	-0.025
541107 - 6	9	20	18.13	5.00	20.160	46.1	93.6	3.72 E+6	133.0	14.0	2977.1	2.94	-0.025
541107 - 7	9	21	18.17	5.00	15.040	46.0	93.3	3.71 E+6	133.6	14.0	2964.6	2.94	-0.023
541107 - 8	9	22	18.22	5.00	15.040	46.0	93.5	3.72 E+6	132.4	14.0	2980.6	2.95	-0.027
541107 - 9	9	23	18.25	5.00	15.040	46.0	93.4	3.72 E+6	132.5	14.1	2987.5	2.95	-0.028

Table A4 (continued)

RUN NO.	MT VOL. NO.	TIME	MT FILE NO.	SAMPLING INTERVAL (MSEC)	RECORDING TIME (SEC)	VOLTAGE (VOLT)	POWER (KW)	HEAT FLUX (W/SQCM)	INLET TEMP. (CENT)	INITIAL FLOW RATE (KG/MIN)	INITIAL MASS VEL. (KG/S.SQCM)	INITIAL PRESSURE (MPA)	INITIAL EXIT QUALITY
541107 - 10	18.29	9	24	5.00	10.080	46.0	93.4	3.72 E+6	132.0	14.0	2973.8	2.92	-0.026
541107 - 11	18.33	9	25	5.00	10.080	46.0	93.2	3.71 E+6	132.7	13.9	2959.2	2.93	-0.025
541107 - 12	18.37	9	26	5.00	5.120	46.1	93.7	3.73 E+6	132.2	13.9	2949.9	2.94	-0.024
541107 - 13	18.42	9	27	5.00	5.120	46.0	93.3	3.71 E+6	132.8	14.3	3026.8	2.95	-0.030
541107 - 14	18.47	9	28	8.00	75.006	46.0	93.3	3.71 E+6	132.7	14.0	2975.9	2.97	-0.027
RUN NO.	MT VOL. NO.	TIME	MT FILE NO.	SAMPLING INTERVAL (MSEC)	RECORDING TIME (SEC)	VOLTAGE (VOLT)	POWER (KW)	HEAT FLUX (W/SQCM)	INLET TEMP. (CENT)	INITIAL FLOW RATE (KG/MIN)	INITIAL MASS VEL. (KG/S.SQCM)	INITIAL PRESSURE (MPA)	INITIAL EXIT QUALITY
541109 -106	17.45	10	1	5.00	20.160	46.0	93.0	3.70 E+6	183.7	7.7	1642.0	3.00	0.275
541109 -107	17.49	10	2	5.00	50.080	46.0	93.4	3.72 E+6	181.6	7.9	1667.1	3.01	0.264
541109 -108	17.59	10	3	5.00	30.080	46.0	93.0	3.70 E+6	182.6	7.8	1651.9	3.00	0.269
541109 -109	18.04	10	4	5.00	25.120	46.0	92.9	3.70 E+6	180.0	8.0	1692.0	3.00	0.253
541109 -110	18.10	10	5	5.00	20.160	45.9	92.8	3.69 E+6	179.5	8.0	1703.3	3.03	0.247
541109 -111	18.14	10	6	5.00	15.040	46.1	93.5	3.72 E+6	180.0	8.0	1692.1	3.02	0.255
541109 -112	18.20	10	7	5.00	15.040	46.0	92.9	3.70 E+6	179.7	8.0	1688.7	3.04	0.251
541109 -113	18.31	10	8	5.00	15.040	46.1	93.4	3.72 E+6	182.7	7.9	1683.8	3.01	0.263
541109 -114	18.34	10	9	5.00	10.080	45.9	92.8	3.69 E+6	182.1	8.0	1689.2	3.00	0.258
541109 -115	18.37	10	10	5.00	10.080	46.1	93.5	3.72 E+6	178.9	7.9	1679.9	3.01	0.255
541109 -116	18.45	10	11	5.00	5.120	46.0	93.0	3.70 E+6	179.9	8.1	1710.0	3.04	0.248
541109 -117	18.48	10	12	5.00	100.160	46.1	93.3	3.71 E+6	180.7	8.0	1707.1	3.04	0.252
541109 -118	18.56	10	13	5.00	5.120	46.0	93.2	3.71 E+6	179.9	8.0	1698.8	3.01	0.252

Table A4 (continued)

RUN NO.	MT VOL. NO.	MT FILE NO.	TIME	SAMPLING INTERVAL (MSEC)	RECORDING TIME (SEC)	VOLTAGE (VOLT)	POWER (KW)	HEAT FLUX (W/SQM)	INLET TEMP. (CENT)	INITIAL FLOW RATE (KG/MIN)	INITIAL MASS VEL. (KG/S.SQM)	INITIAL PRESSURE (MPA)	INITIAL EXIT QUALITY
541113 - 1	10	14	15.08	5.00	20.160	46.0	93.6	3.73 E+6	180.4	12.3	2605.1	3.00	0.119
541113 - 2	10	15	15.14	5.00	50.080	46.0	93.2	3.71 E+6	180.7	12.1	2560.9	2.98	0.124
541113 - 3	10	16	15.20	5.00	30.080	46.0	92.9	3.70 E+6	180.1	12.1	2575.2	3.01	0.119
541113 - 4	10	17	15.26	5.00	25.120	46.0	93.1	3.70 E+6	180.2	12.3	2612.9	3.00	0.117
541113 - 5	10	18	15.32	5.00	20.160	46.0	93.3	3.71 E+6	179.7	12.4	2629.1	3.02	0.114
541113 - 6	10	19	15.36	5.00	15.040	46.2	93.9	3.74 E+6	180.3	12.2	2599.3	3.01	0.120
541113 - 7	10	20	15.40	5.00	15.040	46.1	93.1	3.70 E+6	182.9	12.2	2592.7	3.00	0.126
541113 - 8	10	21	15.44	5.00	15.040	46.0	92.9	3.70 E+6	180.5	12.3	2612.3	3.00	0.117
541113 - 9	10	22	15.57	5.00	10.080	45.9	92.9	3.70 E+6	179.7	12.4	2638.9	3.00	0.112
541113 - 10	10	23	16.01	5.00	10.080	46.0	93.3	3.71 E+6	180.8	12.4	2630.9	3.00	0.117
541113 - 11	10	24	16.05	5.00	5.120	45.9	92.2	3.67 E+6	180.1	12.3	2617.3	3.01	0.113
541113 - 12	10	25	16.13	5.00	5.120	45.7	92.3	3.67 E+6	180.2	12.4	2625.6	3.01	0.113
541113 - 13	10	26	16.17	5.00	100.160	46.0	92.9	3.70 E+6	180.9	12.2	2585.1	2.99	0.121
541113 - 14	10	27	16.44	5.00	20.160	46.0	93.1	3.71 E+6	179.2	10.0	2127.2	3.00	0.172
541113 - 15	10	28	16.56	5.00	50.080	46.0	93.3	3.71 E+6	182.4	10.1	2142.7	2.98	0.179
541113 - 16	10	29	17.00	5.00	25.120	46.1	93.4	3.72 E+6	179.9	10.1	2134.6	2.99	0.174
541113 - 17	10	30	17.14	5.00	15.040	46.1	93.4	3.72 E+6	180.3	10.1	2149.2	2.98	0.173
541113 - 18	10	31	17.17	5.00	5.120	46.0	93.4	3.72 E+6	181.3	9.9	2105.1	2.97	0.183
541113 - 19	10	32	17.52	5.00	50.080	46.0	93.2	3.71 E+6	182.1	6.1	1291.4	3.00	0.381
541113 - 20	10	33	17.57	5.00	25.120	46.1	93.5	3.72 E+6	182.5	6.1	1293.1	3.00	0.383
541113 - 21	10	34	18.00	5.00	20.160	45.9	93.0	3.70 E+6	180.7	6.1	1293.5	2.99	0.375
541113 - 22	10	35	18.04	5.00	15.040	46.0	93.3	3.71 E+6	180.5	6.1	1294.3	3.00	0.376
541113 - 23	10	36	18.08	5.00	5.120	46.0	93.5	3.72 E+6	182.1	6.1	1299.2	3.01	0.379

Table A5 Summary of experiments - V (3.9 Mpa)

RUN NO.	TIME	MT VOL. NO.	MT FILE NO.	SAMPLING INTERVAL (MSEC)	RECORDING TIME (SEC)	VOLTAGE (VOLT)	POWER (KW)	HEAT FLUX (W/SQCM)	INLET TEMP. (CENT)	INITIAL FLOW RATE (KG/MIN)	INITIAL MASS VEL. (KG/S.SQCM)	INITIAL PRESSURE (MPA)	INITIAL EXIT QUALITY
550122 - 1	13.12	22	1	5.00	20.160	46.1	92.7	3.69 E+6	194.2	11.8	2506.9	3.77	0.132
550122 - 2	13.18	22	2	5.00	15.040	45.9	92.1	3.66 E+6	200.2	11.8	2495.0	3.85	0.143
550122 - 3	13.23	22	3	5.00	15.040	46.1	92.6	3.69 E+6	200.5	11.8	2502.8	3.90	0.143
550122 - 4	13.27	22	4	5.00	10.080	46.0	92.6	3.69 E+6	202.0	11.8	2495.3	3.82	0.150
550122 - 5	13.31	22	5	5.00	10.080	46.0	92.6	3.69 E+6	198.9	11.8	2512.7	3.82	0.141
550122 - 6	13.37	22	6	5.00	5.120	45.8	91.8	3.65 E+6	202.4	11.7	2492.4	3.86	0.148
550122 - 7	13.42	22	7	5.00	5.120	46.2	93.5	3.72 E+6	200.3	11.8	2503.4	3.83	0.147
550122 - 8	13.46	22	8	5.00	20.160	46.0	92.7	3.69 E+6	202.7	11.8	2500.2	3.85	0.151
550122 - 9	13.53	22	9	5.00	25.120	46.1	92.7	3.69 E+6	199.5	12.0	2538.1	3.83	0.139
550122 - 10	13.57	22	10	5.00	30.080	46.0	92.3	3.67 E+6	201.0	11.8	2501.9	3.86	0.145
550122 - 11	14.02	22	11	5.00	30.080	46.1	93.0	3.70 E+6	201.0	11.8	2507.0	3.85	0.147
550122 - 12	14.07	22	12	5.00	40.160	46.0	92.6	3.69 E+6	200.3	11.8	2495.5	3.85	0.145
550122 - 13	14.12	22	13	5.00	50.080	46.1	92.9	3.70 E+6	202.1	11.8	2506.6	3.86	0.149
550122 - 14	14.17	22	14	5.00	100.160	46.1	92.9	3.70 E+6	202.0	11.8	2502.1	3.85	0.149
550122 - 15	14.44	22	15	5.00	20.160	46.0	92.5	3.68 E+6	199.0	8.1	1712.4	3.82	0.267
550122 - 16	14.48	22	16	5.00	15.040	46.0	92.6	3.68 E+6	200.2	8.1	1719.2	3.85	0.268
550122 - 17	14.52	22	17	5.00	10.080	45.9	92.0	3.66 E+6	202.5	8.1	1729.3	3.86	0.269
550122 - 18	14.55	22	18	5.00	5.120	46.1	92.8	3.69 E+6	201.9	8.1	1725.0	3.87	0.272
550122 - 19	14.59	22	19	5.00	20.160	46.0	92.4	3.68 E+6	202.4	8.1	1720.6	3.86	0.272
550122 - 20	15.03	22	20	5.00	25.120	46.0	92.7	3.69 E+6	201.8	8.1	1717.0	3.93	0.271

Table A5 (continued)

RUN NO.	MT VOL. NO.	MT FILE NO.	TIME	SAMPLING INTERVAL (MSEC)	RECORDING TIME (SEC)	VOLTAGE (VOLT)	POWER (KW)	HEAT FLUX (W/SQCM)	INLET TEMP. (CENT)	INITIAL FLOW RATE (KG/MIN)	INITIAL MASS VEL. (KG/S.SQCM)	INITIAL PRESSURE (MPA)	INITIAL EXIT QUALITY
550122 - 21	22	21	15.07	5.00	30.080	46.1	93.0	3.70 E+6	201.2	8.1	1720.1	3.85	0.272
550122 - 22	22	22	15.13	5.00	40.160	45.9	92.1	3.67 E+6	200.4	8.1	1726.0	3.90	0.263
550122 - 23	22	23	15.19	5.00	50.080	46.0	92.6	3.68 E+6	202.9	8.1	1723.2	3.88	0.273
550122 - 24	22	24	15.25	5.00	75.040	46.0	92.7	3.69 E+6	200.2	8.1	1723.6	3.87	0.267
550122 - 25	22	25	15.30	5.00	100.160	46.0	92.3	3.67 E+6	199.6	8.1	1727.7	3.88	0.262
550122 - 26	22	26	15.45	5.00	20.160	44.0	85.1	3.39 E+6	203.1	8.1	1712.9	3.92	0.242
550122 - 27	22	27	15.49	5.00	15.040	44.0	84.9	3.38 E+6	201.7	8.1	1708.7	3.87	0.241
550122 - 28	22	28	15.53	5.00	10.080	43.9	84.8	3.37 E+6	205.6	8.0	1705.3	3.87	0.251
550122 - 29	22	29	15.57	5.00	20.160	43.9	84.7	3.37 E+6	200.8	8.0	1706.2	3.83	0.239
550122 - 30	22	30	16.01	5.00	25.120	44.0	84.8	3.38 E+6	200.5	8.1	1715.6	3.86	0.236
550122 - 31	22	31	16.07	5.00	40.160	44.1	85.5	3.40 E+6	202.9	8.1	1708.5	3.84	0.247
550122 - 32	22	32	16.32	5.00	50.080	44.0	84.9	3.38 E+6	200.9	8.0	1706.2	3.87	0.239
550122 - 33	22	33	16.38	5.00	100.160	43.9	84.7	3.37 E+6	200.1	8.1	1708.3	3.84	0.237
550122 - 34	23	1	16.46	5.00	20.160	44.0	84.9	3.38 E+6	203.5	11.9	2516.8	3.83	0.129
550122 - 35	23	2	16.51	5.00	15.040	44.0	85.0	3.38 E+6	201.5	11.9	2526.9	3.83	0.123
550122 - 36	23	3	16.56	5.00	15.040	44.0	85.0	3.38 E+6	199.3	11.9	2521.8	3.83	0.118
550122 - 37	23	4	17.02	5.00	10.080	44.0	84.9	3.38 E+6	202.4	11.9	2516.4	3.79	0.128
550122 - 38	23	5	17.07	5.00	10.080	44.1	85.3	3.40 E+6	200.2	12.0	2545.0	3.88	0.117
550122 - 39	23	6	17.11	5.00	5.120	44.0	85.2	3.39 E+6	202.4	11.8	2506.7	3.87	0.126
550122 - 40	23	7	17.16	5.00	5.120	44.0	85.0	3.38 E+6	198.5	12.0	2552.5	3.87	0.111
550122 - 41	23	8	17.22	5.00	20.160	43.9	84.7	3.37 E+6	201.3	11.9	2526.1	3.87	0.120
550122 - 42	23	9	17.26	5.00	25.120	43.9	84.7	3.37 E+6	200.9	12.0	2536.0	3.87	0.118
550122 - 43	23	10	17.31	5.00	30.080	44.1	85.4	3.40 E+6	202.2	11.9	2517.7	3.88	0.125
550122 - 44	23	11	17.36	5.00	30.080	44.0	85.2	3.39 E+6	200.7	11.9	2517.8	3.90	0.120
550122 - 45	23	12	17.41	5.00	40.160	44.0	84.9	3.38 E+6	202.2	11.9	2534.9	3.89	0.122



## 付録 B. 実験データの例

昭和54年11月から昭和55年1月の間に実施された流量低下バーンアウト実験は総計381ケースで、以下に各実験条件ごとに代表的流速減少率について、計111ケースの実験データを収録する。

以下、1ページに2Runのデータを載せ、左上に実験条件の表、左下に入口質量速度と入口出口温度、右上に入口・出口圧力とテスト部差圧、右下に壁温および加熱電圧の過渡記録をそれぞれ示す。

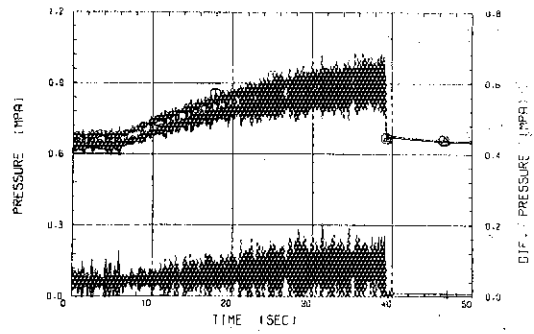
各データのFig. NOと実験条件および実験結果との対応はTable 3.3~3.7に示してある。

RUN NO 541115-103

MT VOL. NUMBER = 12  
 MT FILE NUMBER = 13  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 44.0 (VOLT)  
 HEATING POWER = 89.4 (KW)  
 HEAT FLUX = 3.557 E+6 (W/CM<sup>2</sup>)  
 INLET TEMPERATURE = 65.4 (DEG-C)  
 INITIAL MASS VELOCITY = 3026.9 (KG/S, SQMM)  
 PRESSURE = 0.62 (MPA)  
 INITIAL EXIT QUALITY = -0.012

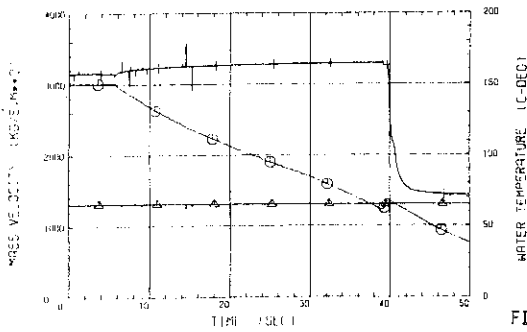
RUN 541115-103

○--- P-IN    △--- P-OUT    +--- DIF. PRES



RUN 541115-103

○--- G-IN    △--- T-IN    +--- T-OUT



RUN 541115-103

○--- 10 MM    △--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◇--- 200 MM    +--- VOLT

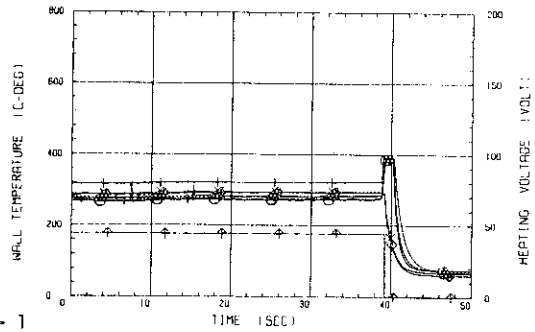


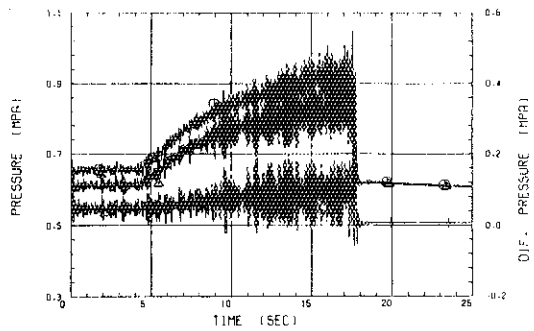
FIG. B1- 1 - 1

RUN NO 541115 - 94

MT VOL. NUMBER = 12  
 MT FILE NUMBER = 4  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 44.0 (VOLT)  
 HEATING POWER = 89.4 (KW)  
 HEAT FLUX = 3.558 E+6 (W/CM<sup>2</sup>)  
 INLET TEMPERATURE = 65.3 (DEG-C)  
 INITIAL MASS VELOCITY = 3007.2 (KG/S, SQMM)  
 PRESSURE = 0.58 (MPA)  
 INITIAL EXIT QUALITY = -0.006

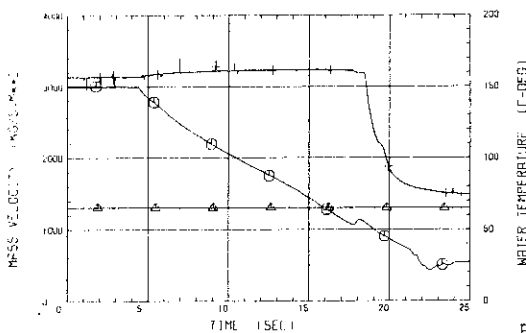
RUN 541115-094

○--- P-IN    △--- P-OUT    +--- DIF. PRES



RUN 541115-094

○--- G-IN    △--- T-IN    +--- T-OUT



RUN 541115-094

○--- 10 MM    △--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◇--- 200 MM    +--- VOLT

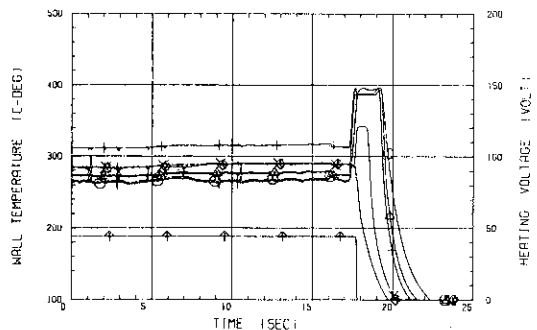


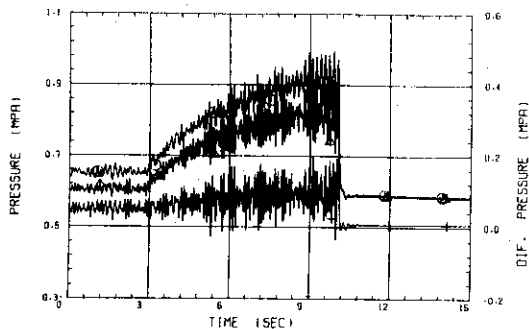
FIG. B1- 1 - 2

RUN NO 541115 - 96

MT VOL. NUMBER = 12  
 MT FILE NUMBER = 6  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 44.0 (VOLT)  
 HEATING POWER = 89.3 (KW)  
 HEAT FLUX = 3.554 E+6 (W/SQM)  
 INLET TEMPERATURE = 65.5 (DEG-C)  
 INITIAL MASS VELOCITY = 2965.5 (KG/S.SQM)  
 PRESSURE = 0.56 (MPA)  
 INITIAL EXIT QUALITY = 0.002

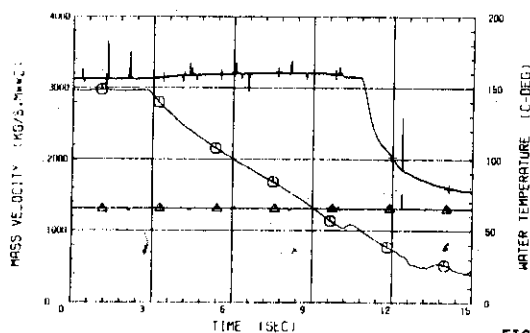
RUN 541115-096

○--- P-IN    △--- P-OUT    +--- DIF.PRES



RUN 541115-096

○--- G-IN    △--- T-IN    +--- T-OUT



RUN 541115-096

○--- 10 MM    △--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◇--- 200 MM    \*--- VOLT

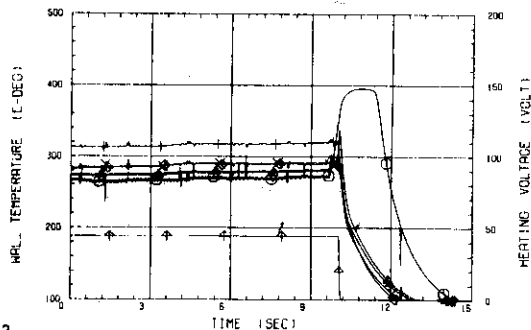


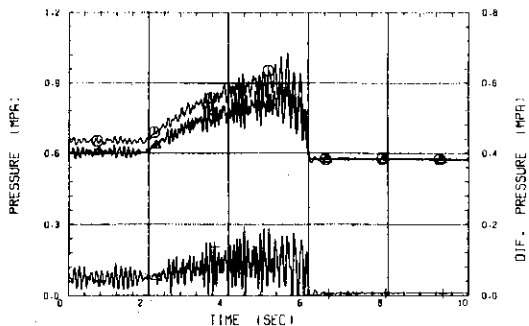
FIG. B1-1-3

RUN NO 541115 - 99

MT VOL. NUMBER = 12  
 MT FILE NUMBER = 9  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 44.0 (VOLT)  
 HEATING POWER = 89.3 (KW)  
 HEAT FLUX = 3.552 E+6 (W/SQM)  
 INLET TEMPERATURE = 65.5 (DEG-C)  
 INITIAL MASS VELOCITY = 2952.9 (KG/S.SQM)  
 PRESSURE = 0.55 (MPA)  
 INITIAL EXIT QUALITY = 0.003

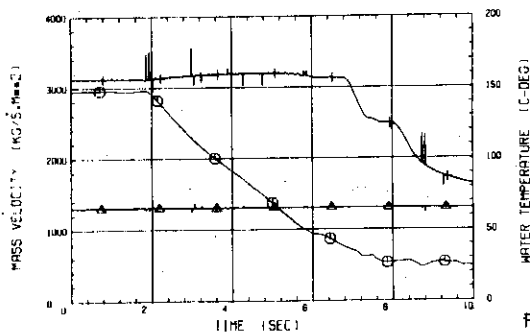
RUN 541115-099

○--- P-IN    △--- P-OUT    +--- DIF.PRES



RUN 541115-099

○--- G-IN    △--- T-IN    +--- T-OUT



RUN 541115-099

○--- 10 MM    △--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◇--- 200 MM    \*--- VOLT

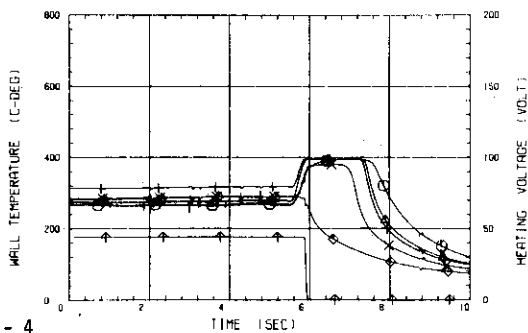
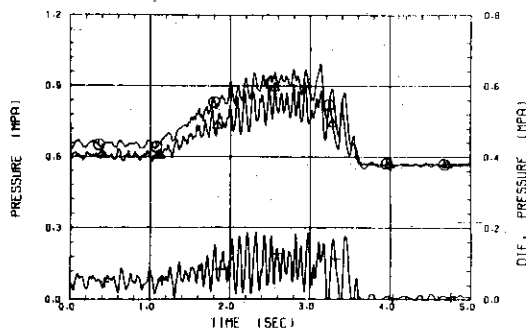


FIG. B1-1-4

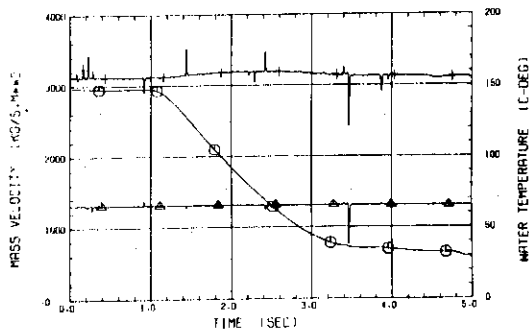
RUN NO 541115-101

MT VOL. NUMBER = 12  
 MT FILE NUMBER = 11  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 44.0 (VOLT)  
 HEATING POWER = 89.6 (KW)  
 HEAT FLUX = 3.563 E+6 (W/SQM)  
 INLET TEMPERATURE = 65.5 (DEG-C)  
 INITIAL MASS VELOCITY = 2965.2 (KG/S.SQM)  
 PRESSURE = 0.55 (MPA)  
 INITIAL EXIT QUALITY = 0.003

RUN 541115-101  
 O--- P-IN    Δ--- P-OUT    +--- DIF.PRES



RUN 541115-101  
 O--- C-IN    Δ--- T-IN    +--- T-OUT



RUN 541115-101  
 O--- 10 MM    Δ--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◊--- 200 MM    ◊--- VOLT

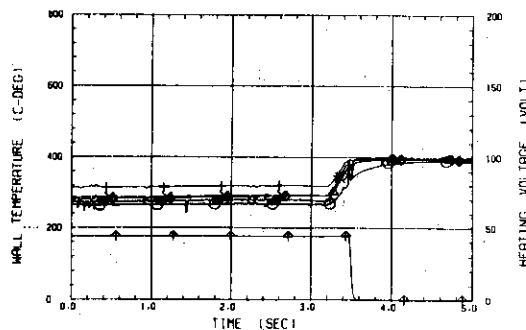
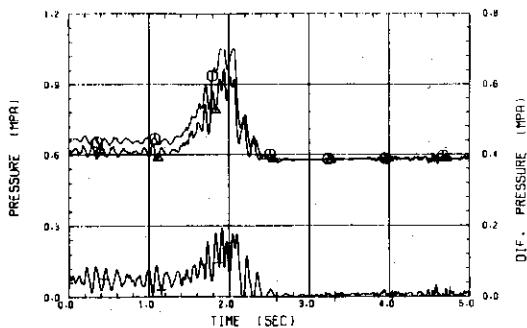


FIG. B1- 1- 5

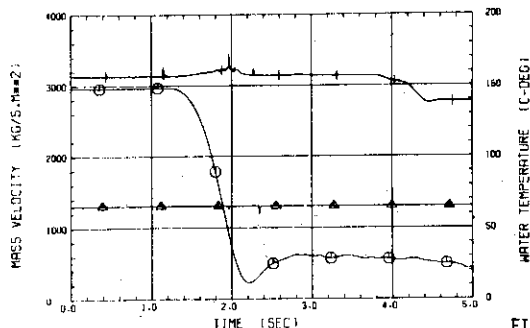
RUN NO 541115-102

MT VOL. NUMBER = 12  
 MT FILE NUMBER = 12  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 44.2 (VOLT)  
 HEATING POWER = 90.3 (KW)  
 HEAT FLUX = 3.593 E+6 (W/SQM)  
 INLET TEMPERATURE = 65.2 (DEG-C)  
 INITIAL MASS VELOCITY = 2966.4 (KG/S.SQM)  
 PRESSURE = 0.56 (MPA)  
 INITIAL EXIT QUALITY = 0.002

RUN 541115-102  
 O--- P-IN    Δ--- P-OUT    +--- DIF.PRES



RUN 541115-102  
 O--- C-IN    Δ--- T-IN    +--- T-OUT



RUN 541115-102  
 O--- 10 MM    Δ--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◊--- 200 MM    ◊--- VOLT

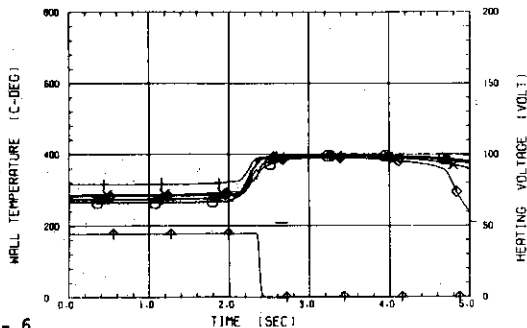
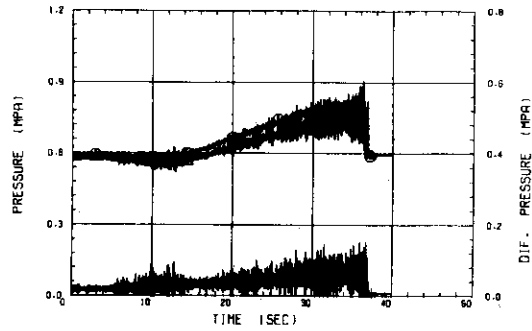


FIG. B1- 1- 6

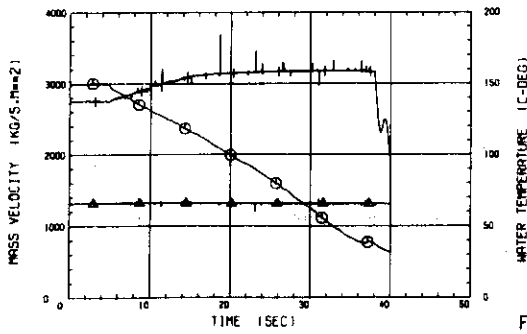
RUN NO 541115-108

MT VOL. NUMBER = 12  
 MT FILE NUMBER = 18  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 38.0 (VOLT)  
 HEATING POWER = 67.9 (KW)  
 HEAT FLUX = 2.704 E+6 (W/SQM)  
 INLET TEMPERATURE = 65.9 (DEG-C)  
 INITIAL MASS VELOCITY = 2994.5 (KG/S.SQM)  
 PRESSURE = 0.55 (MPA)  
 INITIAL EXIT QUALITY = -0.043

RUN 541115-108  
 ○--- P-IN    △--- P-OUT    +--- DIF.PRES



RUN 541115-108  
 ○--- G-IN    △--- T-IN    +--- T-OUT



RUN 541115-108  
 ○--- 10 MM    △--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◇--- 200 MM    +--- VOLT

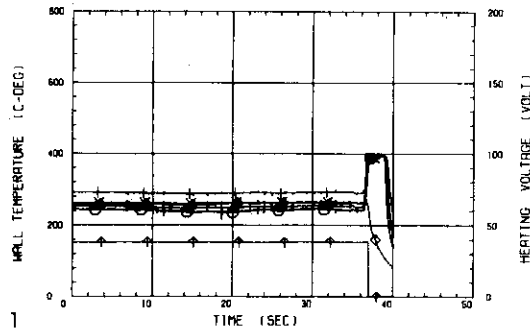
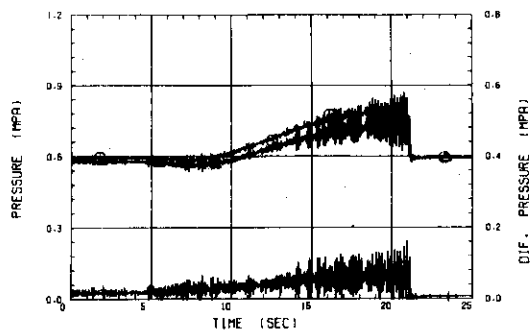


FIG. B1- 2- 1

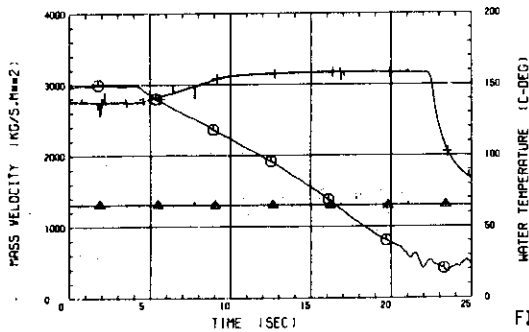
RUN NO 541115-110

MT VOL. NUMBER = 12  
 MT FILE NUMBER = 20  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 38.0 (VOLT)  
 HEATING POWER = 67.7 (KW)  
 HEAT FLUX = 2.694 E+6 (W/SQM)  
 INLET TEMPERATURE = 65.4 (DEG-C)  
 INITIAL MASS VELOCITY = 2967.3 (KG/S.SQM)  
 PRESSURE = 0.56 (MPA)  
 INITIAL EXIT QUALITY = -0.044

RUN 541115-110  
 ○--- P-IN    △--- P-OUT    +--- DIF.PRES



RUN 541115-110  
 ○--- G-IN    △--- T-IN    +--- T-OUT



RUN 541115-110  
 ○--- 10 MM    △--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◇--- 200 MM    +--- VOLT

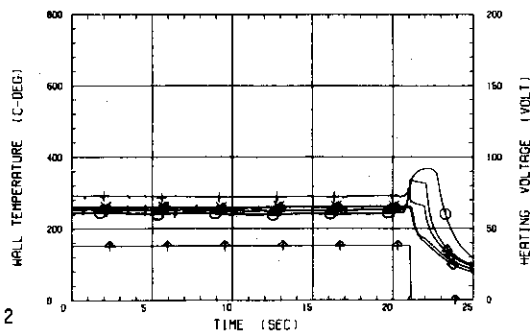
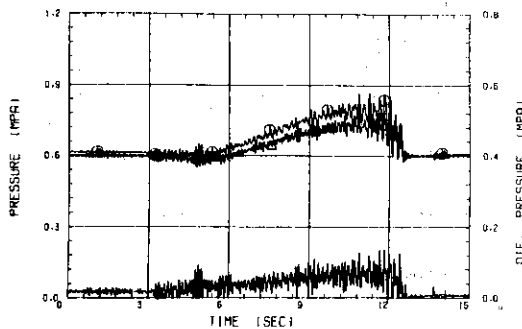


FIG. B1- 2- 2

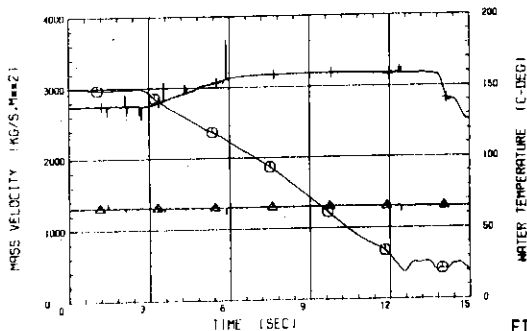
RUN NO 541115-112

HT VOL. NUMBER = 12  
 HT FILE NUMBER = 22  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 38.0 (VOLT)  
 HEATING POWER = 67.8 (KW)  
 HEAT FLUX = 2.69E+6 (W/SQCM)  
 INLET TEMPERATURE = 65.3 (DEG-C)  
 INITIAL MASS VELOCITY = 2996.0 (KG/S.SQCM)  
 PRESSURE = 0.58 (MPA)  
 INITIAL EXIT QUALITY = -0.048

RUN 541115-112  
 O--- P-IN    Δ--- P-OUT    +--- DIF.PRES



RUN 541115-112  
 O--- G-IN    Δ--- T-IN    +--- T-OUT



RUN 541115-112  
 O--- 10 MM    Δ--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◊--- 200 MM    ◄--- VOLT

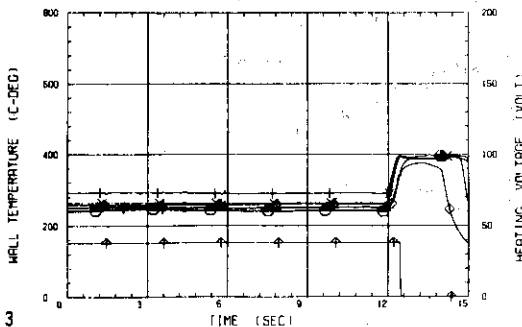
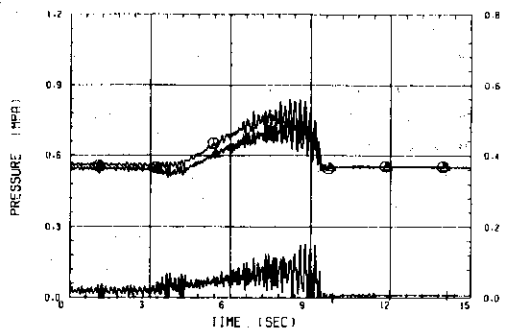


FIG. B1-2-3

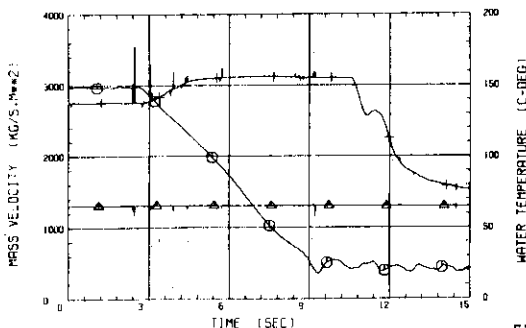
RUN NO 541115-114

HT VOL. NUMBER = 12  
 HT FILE NUMBER = 24  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 38.1 (VOLT)  
 HEATING POWER = 68.2 (KW)  
 HEAT FLUX = 2.71E+6 (W/SQCM)  
 INLET TEMPERATURE = 65.4 (DEG-C)  
 INITIAL MASS VELOCITY = 2977.2 (KG/S.SQCM)  
 PRESSURE = 0.52 (MPA)  
 INITIAL EXIT QUALITY = -0.038

RUN 541115-114  
 O--- P-IN    Δ--- P-OUT    +--- DIF.PRES



RUN 541115-114  
 O--- G-IN    Δ--- T-IN    +--- T-OUT



RUN 541115-114  
 O--- 10 MM    Δ--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◊--- 200 MM    ◄--- VOLT

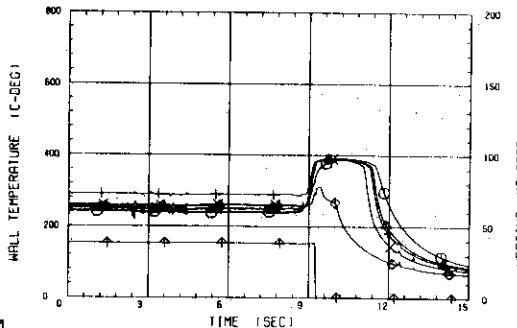
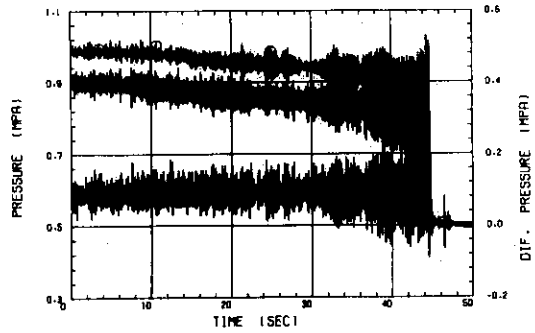


FIG. B1-2-4

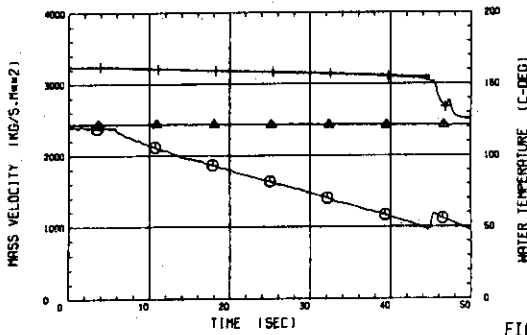
RUN NO 541206 - 2

MT VOL. NUMBER = 12  
 MT FILE NUMBER = 29  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 38.1 (VOLT)  
 HEATING POWER = 67.2 (KW)  
 HEAT FLUX = 2.673 E+6 (W/SQM)  
 INLET TEMPERATURE = 122.0 (DEG-C)  
 INITIAL MASS VELOCITY = 2408.0 (KG/S,SQM)  
 PRESSURE = 0.52 (MPA)  
 INITIAL EXIT QUALITY = 0.106

RUN 541206-002  
 ○--- P-IN    △--- P-OUT    +--- DIF.PRES



RUN 541206-002  
 ○--- G-IN    △--- T-IN    +--- T-OUT



RUN 541206-002  
 ○--- 10 MM    △--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◇--- 200 MM    ♣--- VOLT

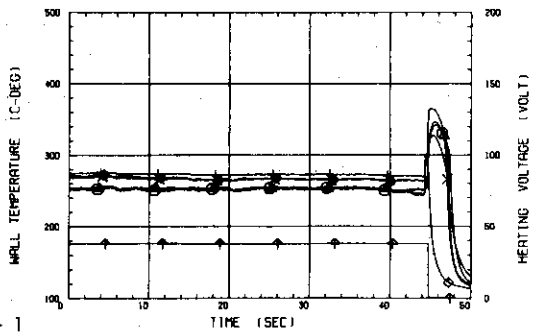
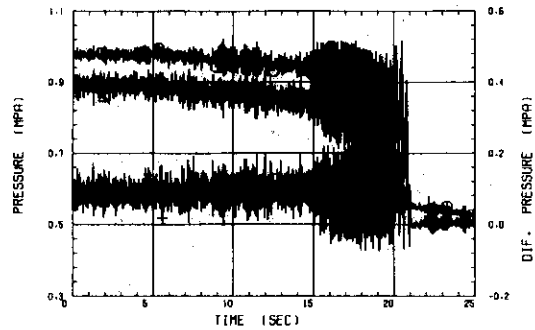


FIG. B1-3-1

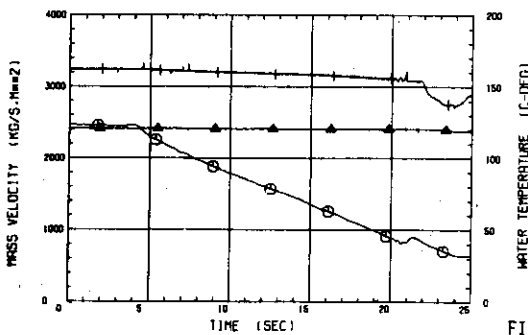
RUN NO 541206 - 6

MT VOL. NUMBER = 12  
 MT FILE NUMBER = 33  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 38.1 (VOLT)  
 HEATING POWER = 67.2 (KW)  
 HEAT FLUX = 2.673 E+6 (W/SQM)  
 INLET TEMPERATURE = 120.7 (DEG-C)  
 INITIAL MASS VELOCITY = 2463.4 (KG/S,SQM)  
 PRESSURE = 0.53 (MPA)  
 INITIAL EXIT QUALITY = 0.098

RUN 541206-006  
 ○--- P-IN    △--- P-OUT    +--- DIF.PRES



RUN 541206-006  
 ○--- G-IN    △--- T-IN    +--- T-OUT



RUN 541206-006  
 ○--- 10 MM    △--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◇--- 200 MM    ♣--- VOLT

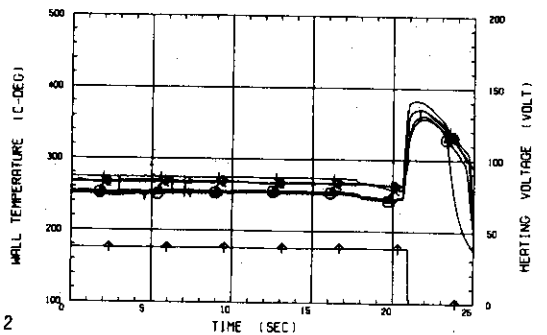
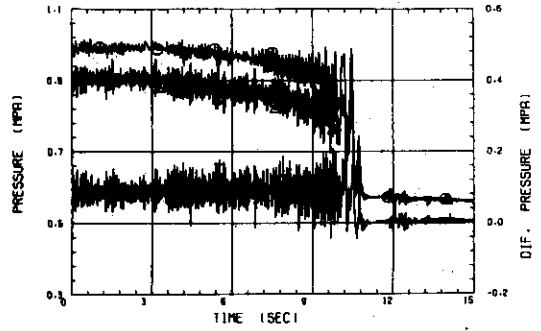


FIG. B1-3-2

RUN NO 541206 - 8

MT VOL. NUMBER = 12  
 MT FILE NUMBER = 33  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 37.9 (VOLT)  
 HEATING POWER = 66.7 (KW)  
 HEAT FLUX = 2.652 E+6 (W/SQM)  
 INLET TEMPERATURE = 122.4 (DEG-C)  
 INITIAL MASS VELOCITY = 2459.0 (KG/S.SQM)  
 PRESSURE = 0.54 (MPA)  
 INITIAL EXIT QUALITY = 0.099

RUN 541206-008  
 O--- P-IN    ▲--- P-OUT    +--- DIF.PRES



RUN 541206-008  
 O--- G-IN    ▲--- T-IN    +--- T-OUT

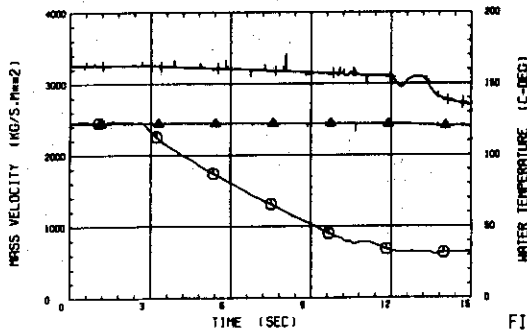
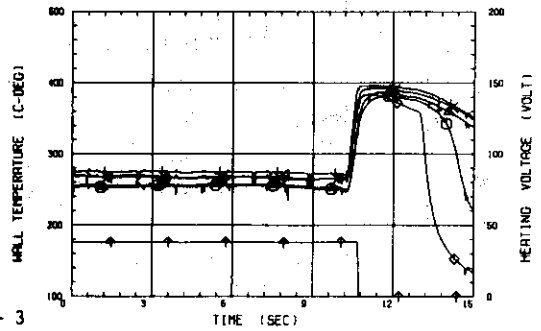


FIG. B1-3-3

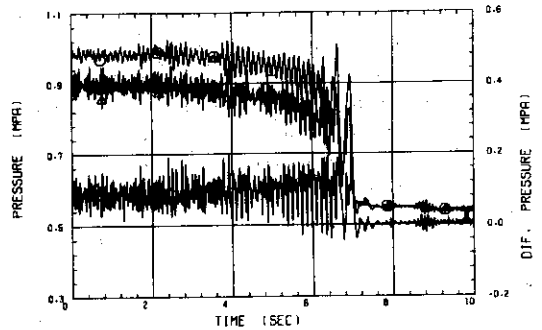
RUN 541206-008  
 O--- 10 MM    ▲--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◆--- 200 MM    +--- VOLT



RUN NO 541206 - 1

MT VOL. NUMBER = 12  
 MT FILE NUMBER = 28  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 38.4 (VOLT)  
 HEATING POWER = 68.1 (KW)  
 HEAT FLUX = 2.709 E+6 (W/SQM)  
 INLET TEMPERATURE = 120.3 (DEG-C)  
 INITIAL MASS VELOCITY = 2425.2 (KG/S.SQM)  
 PRESSURE = 0.53 (MPA)  
 INITIAL EXIT QUALITY = 0.102

RUN 541206-001  
 O--- P-IN    ▲--- P-OUT    +--- DIF.PRES



RUN 541206-001  
 O--- G-IN    ▲--- T-IN    +--- T-OUT

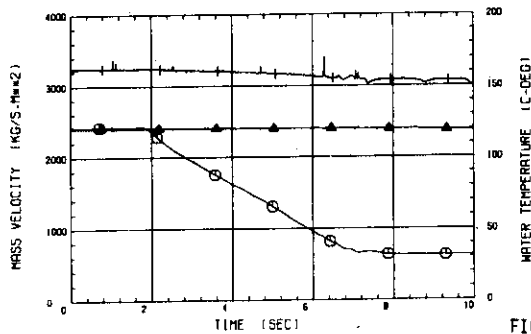
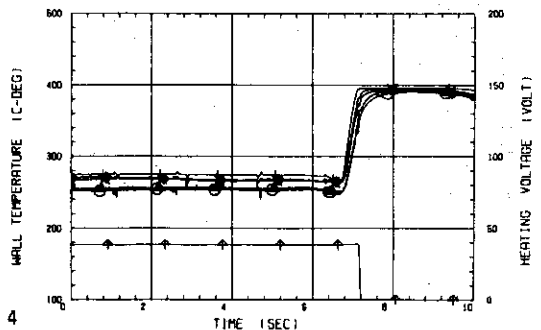


FIG. B1-3-4

RUN 541206-001  
 O--- 10 MM    ▲--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◆--- 200 MM    +--- VOLT

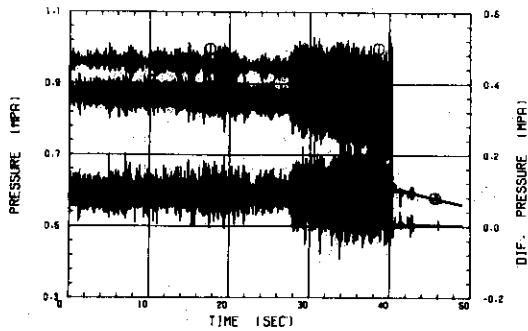




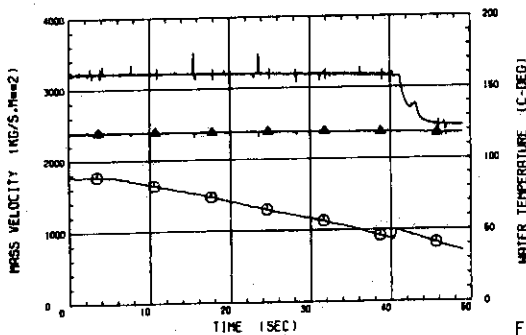
RUN NO 541206 - 14

MT VOL. NUMBER = 12  
 MT FILE NUMBER = 41  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 38.1 (VOLT)  
 HEATING POWER = 67.2 (KW)  
 HEAT FLUX = 2.679 E+6 (W/SQM)  
 INLET TEMPERATURE = 119.3 (DEG-C)  
 INITIAL MASS VELOCITY = 1777.6 (KG/S,SQM)  
 PRESSURE = 0.56 (MPA)  
 INITIAL EXIT QUALITY = 0.155

RUN 541206-014  
 O--- P-IN    Δ--- P-OUT    +--- DIF.PRES



RUN 541206-014  
 O--- Q-IN    Δ--- T-IN    +--- T-OUT



RUN 541206-014  
 O--- 10 MM    Δ--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◊--- 200 MM    +--- VOLT

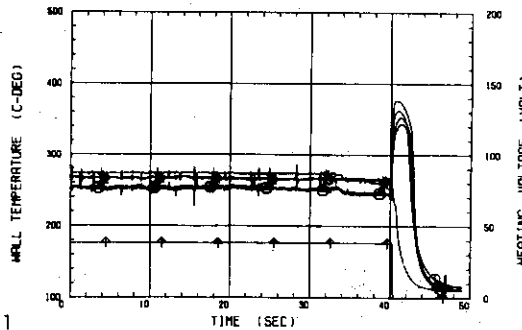
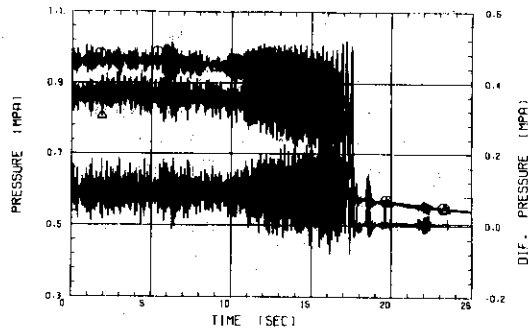


FIG. B1- 4- 1

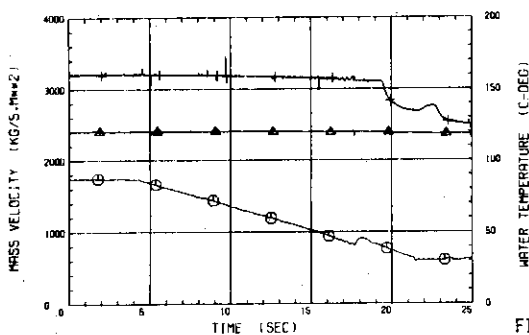
RUN NO 541206 - 16

MT VOL. NUMBER = 13  
 MT FILE NUMBER = 1  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 37.9 (VOLT)  
 HEATING POWER = 66.8 (KW)  
 HEAT FLUX = 2.657 E+6 (W/SQM)  
 INLET TEMPERATURE = 120.3 (DEG-C)  
 INITIAL MASS VELOCITY = 1742.3 (KG/S,SQM)  
 PRESSURE = 0.54 (MPA)  
 INITIAL EXIT QUALITY = 0.162

RUN 541206-016  
 O--- P-IN    Δ--- P-OUT    +--- DIF.PRES



RUN 541206-016  
 O--- Q-IN    Δ--- T-IN    +--- T-OUT



RUN 541206-016  
 O--- 10 MM    Δ--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◊--- 200 MM    +--- VOLT

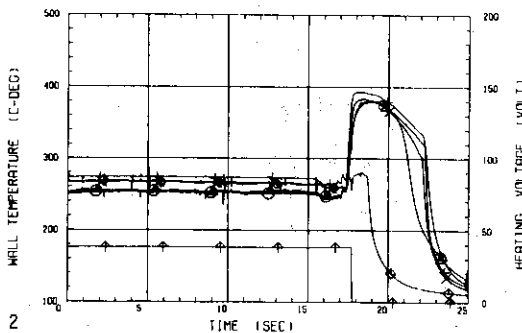


FIG. B1- 4- 2

RUN NO 541206 - 17

MT VOL. NUMBER = 13  
 MT FILE NUMBER = 2  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 38.0 (VOLT)  
 HEATING POWER = 66.9 (KW)  
 HEAT FLUX = 2.662 E+6 (W/SQM)  
 INLET TEMPERATURE = 120.6 (DEG-C)  
 INITIAL MASS VELOCITY = 1728.9 (KG/S.SQM)  
 PRESSURE = 0.54 (MPA)  
 INITIAL EXIT QUALITY = 0.166

RUN 541206-017  
 O--- P-IN    Δ--- P-OUT    +--- DIF.PRES

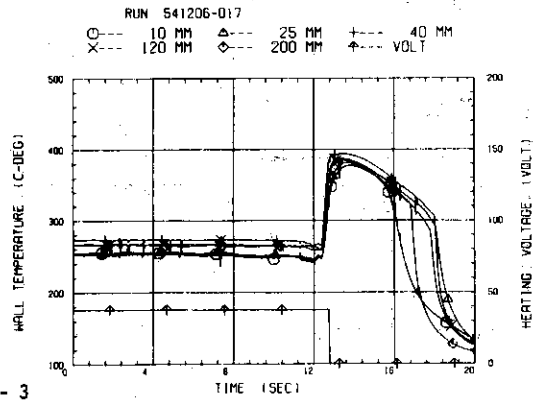
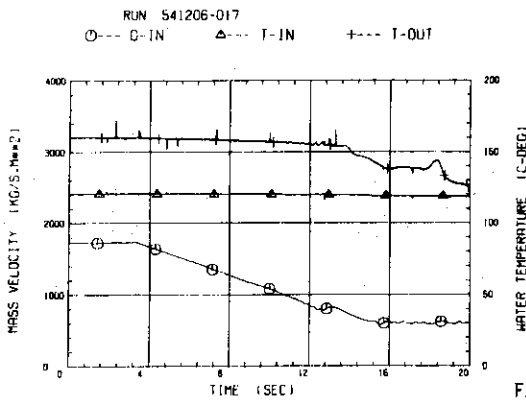
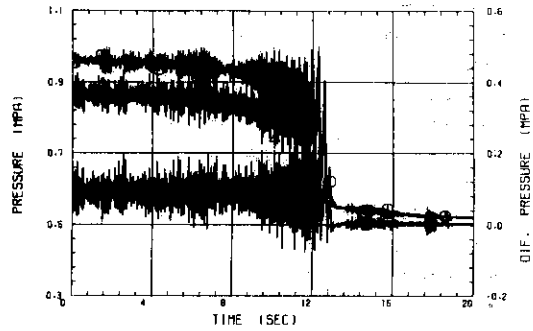


FIG. B1- 4- 3

RUN NO 541206 - 19

MT VOL. NUMBER = 13  
 MT FILE NUMBER = 4  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 38.0 (VOLT)  
 HEATING POWER = 67.0 (KW)  
 HEAT FLUX = 2.667 E+6 (W/SQM)  
 INLET TEMPERATURE = 120.7 (DEG-C)  
 INITIAL MASS VELOCITY = 1769.1 (KG/S.SQM)  
 PRESSURE = 0.57 (MPA)  
 INITIAL EXIT QUALITY = 0.157

RUN 541206-019  
 O--- P-IN    Δ--- P-OUT    +--- DIF.PRES

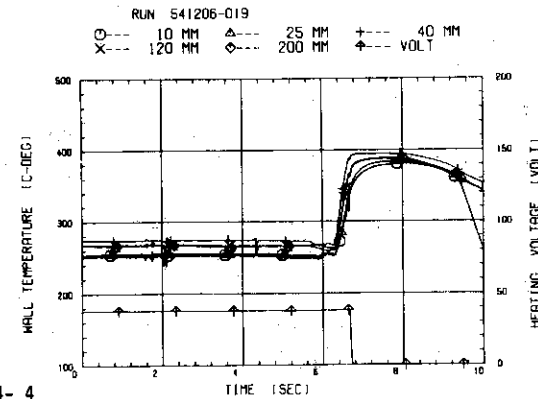
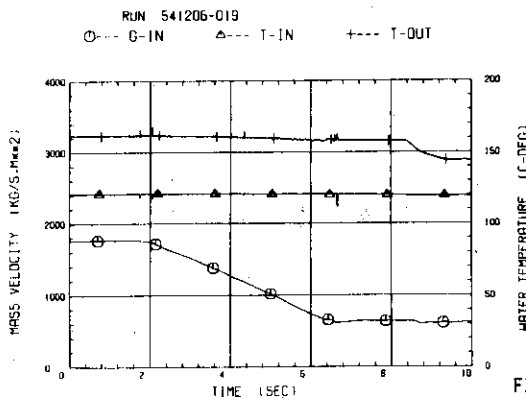
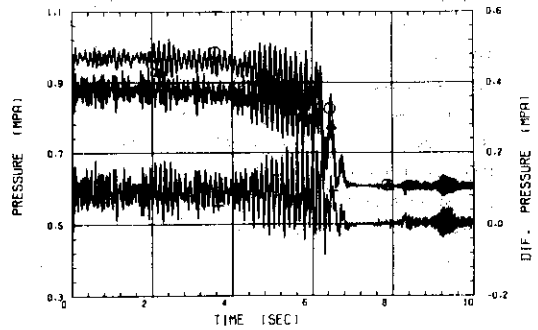


FIG. B1- 4- 4

RUN NO 541206 - 22

MT VOL. NUMBER = 13  
 MT FILE NUMBER = 7  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 42.0 (VOLT)  
 HEATING POWER = 80.7 (KW)  
 HEAT FLUX = 3.210 E+6 (W/SQM)  
 INLET TEMPERATURE = 119.9 (DEG-C)  
 INITIAL MASS VELOCITY = 2194.2 (KG/S, SQM)  
 PRESSURE = 0.50 (MPA)  
 INITIAL EXIT QUALITY = 0.157

RUN 541206-022  
 O--- P-IN    Δ--- P-OUT    +--- DIF.PRES

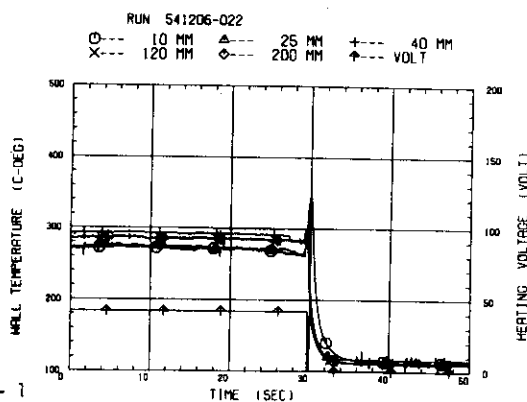
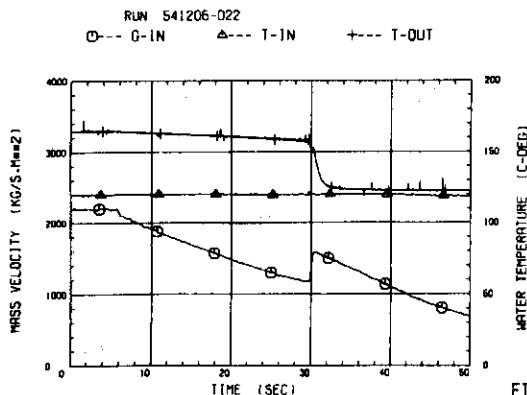
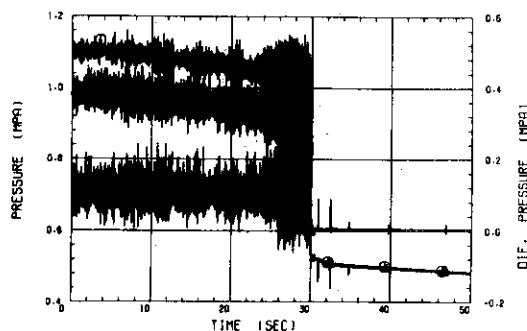


FIG. B1- 5- 1

RUN NO 541206 - 26

MT VOL. NUMBER = 13  
 MT FILE NUMBER = 11  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 41.9 (VOLT)  
 HEATING POWER = 80.6 (KW)  
 HEAT FLUX = 3.206 E+6 (W/SQM)  
 INLET TEMPERATURE = 119.6 (DEG-C)  
 INITIAL MASS VELOCITY = 2263.1 (KG/S, SQM)  
 PRESSURE = 0.53 (MPA)  
 INITIAL EXIT QUALITY = 0.145

RUN 541206-026  
 O--- P-IN    Δ--- P-OUT    +--- DIF.PRES

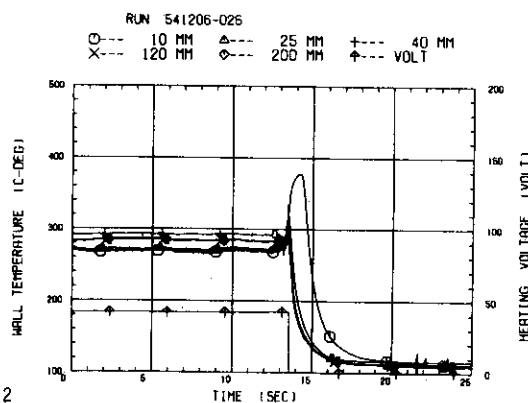
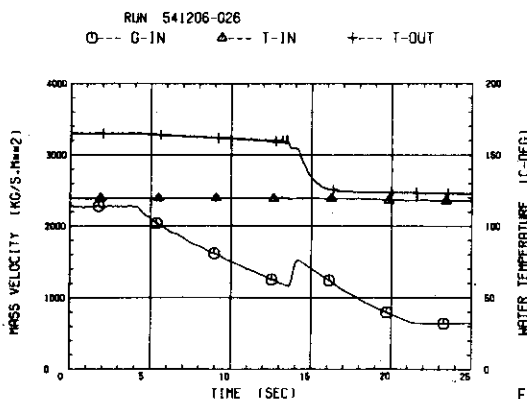
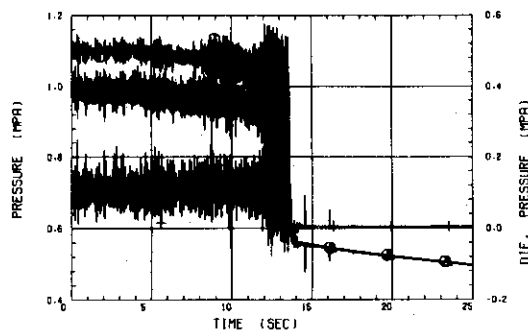
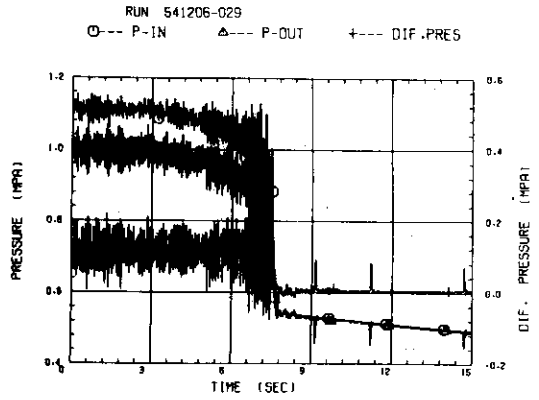


FIG. B1- 5- 2

RUN NO 541206 - 29

MT VOL. NUMBER = 13  
 MT FILE NUMBER = 14  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 42.1 (VOLT)  
 HEATING POWER = 81.1 (KW)  
 HEAT FLUX = 3.227 E+6 (W/SQM)  
 INLET TEMPERATURE = 120.9 (DEG-C)  
 INITIAL MASS VELOCITY = 2230.4 (KG/S.SQM)  
 PRESSURE = 0.52 (MPA)  
 INITIAL EXIT QUALITY = 0.155



RUN 541206-029  
 O--- G-IN    Δ--- T-IN    +--- T-OUT

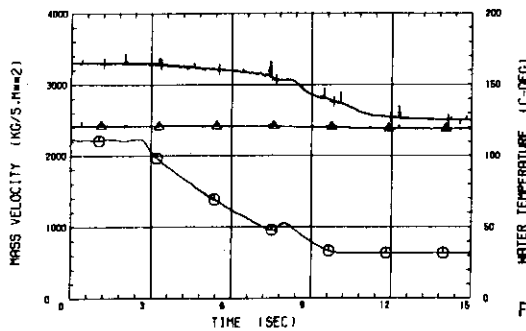
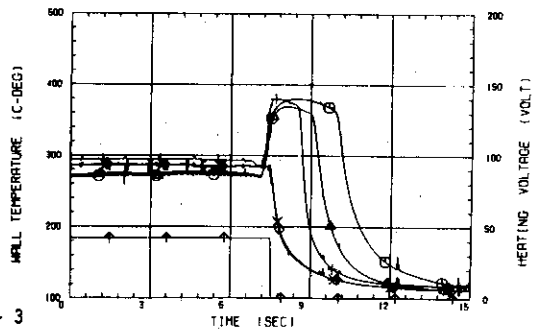


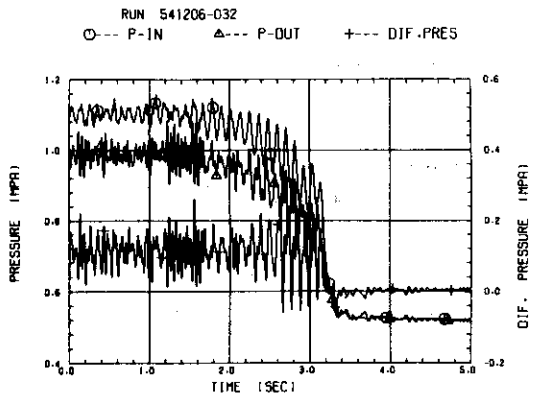
FIG. B1- 5- 3

RUN 541206-029  
 O--- 10 MM    Δ--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◊--- 200 MM    \*--- VOLT



RUN NO 541206 - 32

MT VOL. NUMBER = 15  
 MT FILE NUMBER = 17  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 42.0 (VOLT)  
 HEATING POWER = 80.7 (KW)  
 HEAT FLUX = 3.210 E+6 (W/SQM)  
 INLET TEMPERATURE = 119.9 (DEG-C)  
 INITIAL MASS VELOCITY = 2202.3 (KG/S.SQM)  
 PRESSURE = 0.50 (MPA)  
 INITIAL EXIT QUALITY = 0.127



RUN 541206-032  
 O--- G-IN    Δ--- T-IN    +--- T-OUT

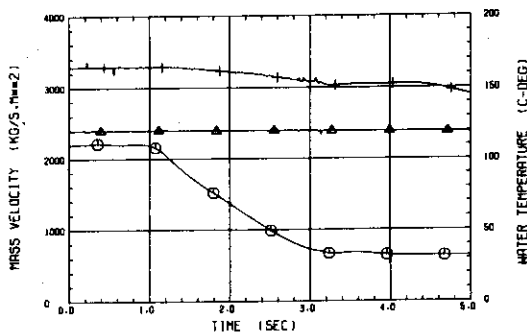
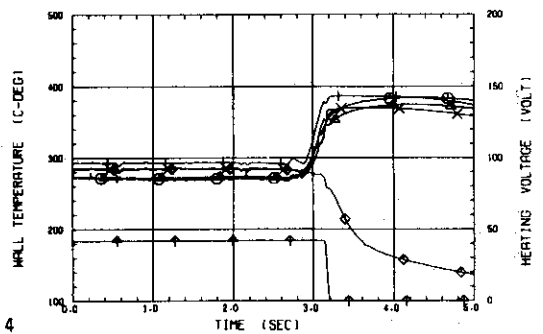


FIG. B1- 5- 4

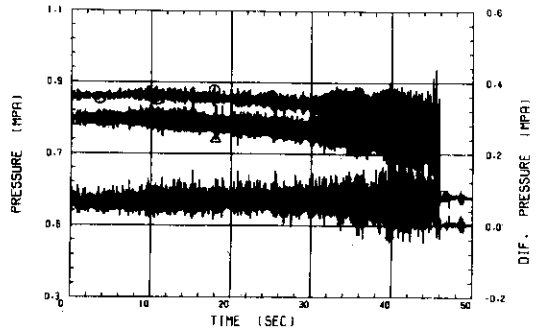
RUN 541206-032  
 O--- 10 MM    Δ--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◊--- 200 MM    \*--- VOLT



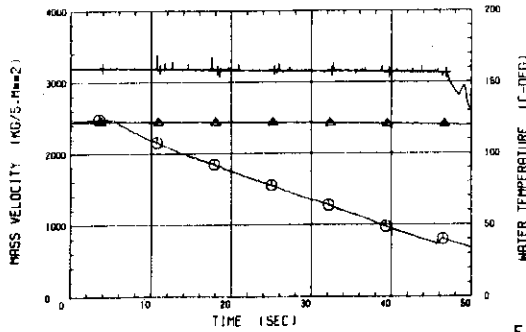
RUN NO 541206 - 37

MT VOL, NUMBER = 13  
 MT FILE NUMBER = 22  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 34.0 (VOLT)  
 HEATING POWER = 54.1 (KW)  
 HEAT FLUX = 2.154 E+6 (W/SQM)  
 INLET TEMPERATURE = 122.2 (DEG-C)  
 INITIAL MASS VELOCITY = 2479.3 (KG/S.SQM)  
 PRESSURE = 0.53 (MPA)  
 INITIAL EXIT QUALITY = 0.068

RUN 541206-037  
 O--- P-IN    Δ--- P-OUT    +--- DIF.PRES



RUN 541206-037  
 O--- G-IN    Δ--- T-IN    +--- T-OUT



RUN 541206-037  
 O--- 10 MM    Δ--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◊--- 200 MM    ♣--- VOLT

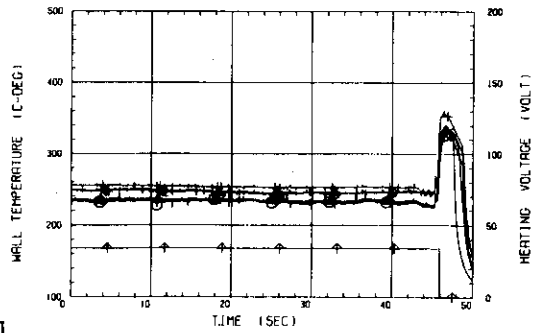
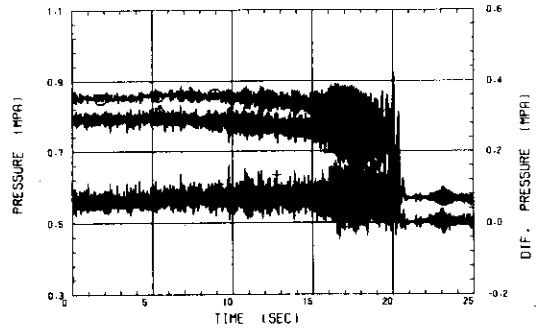


FIG. B1- 6- 1

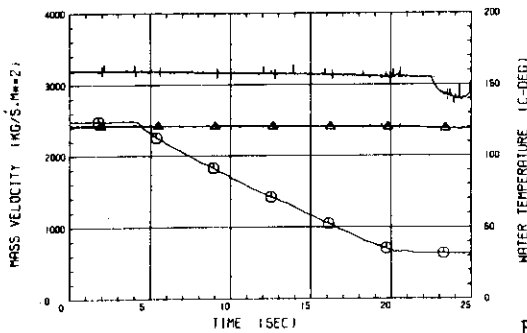
RUN NO 541206 - 42

MT VOL, NUMBER = 13  
 MT FILE NUMBER = 27  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 34.1 (VOLT)  
 HEATING POWER = 54.3 (KW)  
 HEAT FLUX = 2.161 E+6 (W/SQM)  
 INLET TEMPERATURE = 121.2 (DEG-C)  
 INITIAL MASS VELOCITY = 2485.4 (KG/S.SQM)  
 PRESSURE = 0.53 (MPA)  
 INITIAL EXIT QUALITY = 0.066

RUN 541206-042  
 O--- P-IN    Δ--- P-OUT    +--- DIF.PRES



RUN 541206-042  
 O--- G-IN    Δ--- T-IN    +--- T-OUT



RUN 541206-042  
 O--- 10 MM    Δ--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◊--- 200 MM    ♣--- VOLT

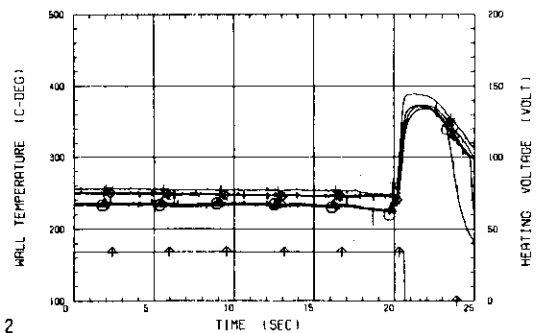
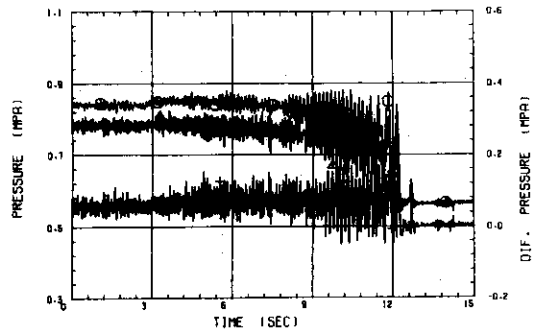


FIG. B1- 6- 2

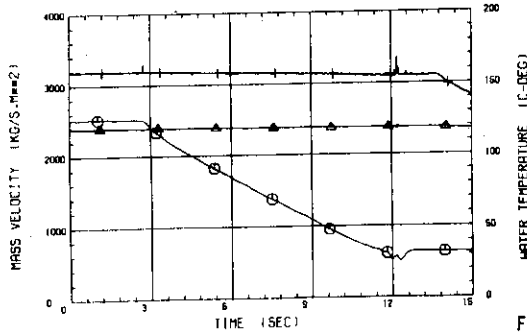
RUN NO 541206 - 44

MT VOL. NUMBER = 13  
 MT FILE NUMBER = 29  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 34.0 (VOLT)  
 HEATING POWER = 54.3 (KW)  
 HEAT FLUX = 2.162 E+6 (W/SQM)  
 INLET TEMPERATURE = 119.6 (DEG-C)  
 INITIAL MASS VELOCITY = 2516.1 (KG/S, SQM)  
 PRESSURE = 0.53 (MPA)  
 INITIAL EXIT QUALITY = 0.061

RUN 541206-044  
 ○--- P-IN    △--- P-OUT    +--- DIF.PRES



RUN 541206-044  
 ○--- G-IN    △--- T-IN    +--- T-OUT



RUN 541206-044  
 ○--- 10 MM    △--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◇--- 200 MM    +--- VOLT

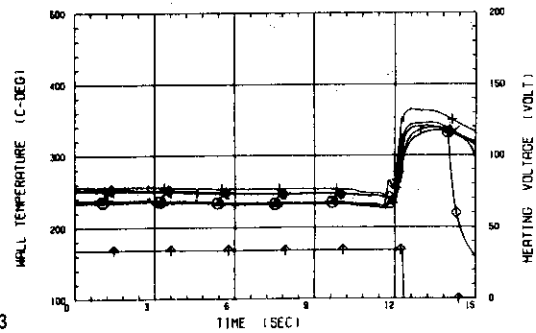
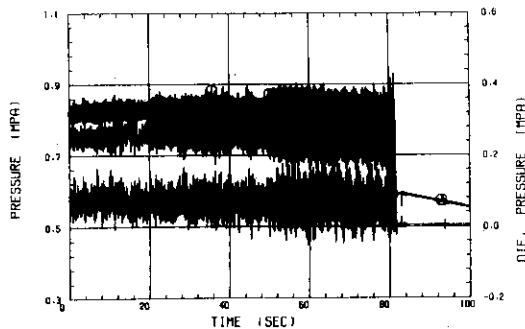


FIG. B1- 6- 3

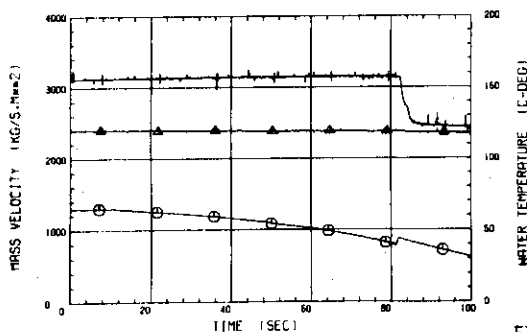
RUN NO 541206 - 45

MT VOL. NUMBER = 13  
 MT FILE NUMBER = 30  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 34.0 (VOLT)  
 HEATING POWER = 54.5 (KW)  
 HEAT FLUX = 2.167 E+6 (W/SQM)  
 INLET TEMPERATURE = 120.1 (DEG-C)  
 INITIAL MASS VELOCITY = 1297.1 (KG/S.SQM)  
 PRESSURE = 0.51 (MPA)  
 INITIAL EXIT QUALITY = 0.188

RUN 541206-045  
 O--- P-IN    Δ--- P-OUT    +--- DIF.PRES



RUN 541206-045  
 O--- G-IN    Δ--- T-IN    +--- T-OUT



RUN 541206-045  
 O--- 10 MM    Δ--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◊--- 200 MM    ◆--- VOLT

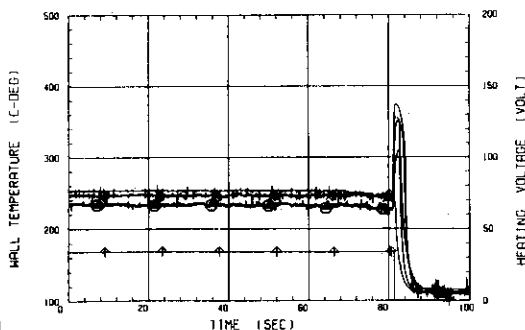
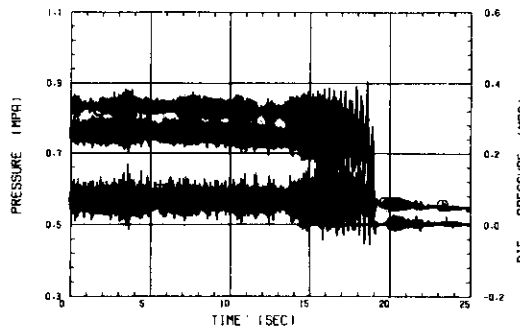


FIG. B1- 7- 1

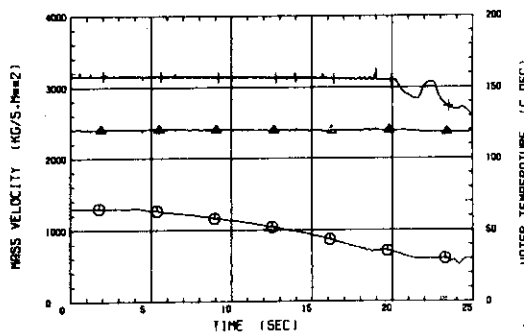
RUN NO 541206 - 48

MT VOL. NUMBER = 14  
 MT FILE NUMBER = 1  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 34.0 (VOLT)  
 HEATING POWER = 54.1 (KW)  
 HEAT FLUX = 2.153 E+6 (W/SQM)  
 INLET TEMPERATURE = 120.4 (DEG-C)  
 INITIAL MASS VELOCITY = 1299.4 (KG/S.SQM)  
 PRESSURE = 0.54 (MPA)  
 INITIAL EXIT QUALITY = 0.183

RUN 541206-048  
 O--- P-IN    Δ--- P-OUT    +--- DIF.PRES



RUN 541206-048  
 O--- G-IN    Δ--- T-IN    +--- T-OUT



RUN 541206-048  
 O--- 10 MM    Δ--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◊--- 200 MM    ◆--- VOLT

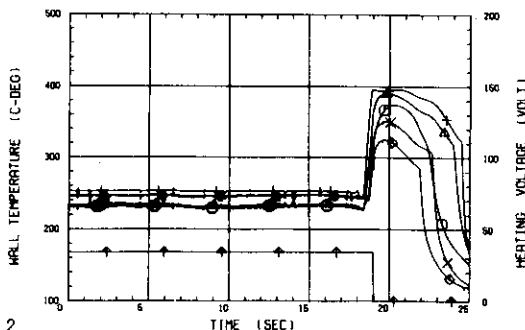


FIG. B1- 7- 2

RUN NO 541206 - 50

MT VOL. NUMBER = 14  
 MT FILE NUMBER = 3  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 34.1 (VOLT)  
 HEATING POWER = 54.5 (KW)  
 HEAT FLUX = 2.168 E+6 (W/SQM)  
 INLET TEMPERATURE = 120.0 (DEG-C)  
 INITIAL MASS VELOCITY = 1291.7 (KG/S.SQM)  
 PRESSURE = 0.53 (MPA)  
 INITIAL EXIT QUALITY = 0.187

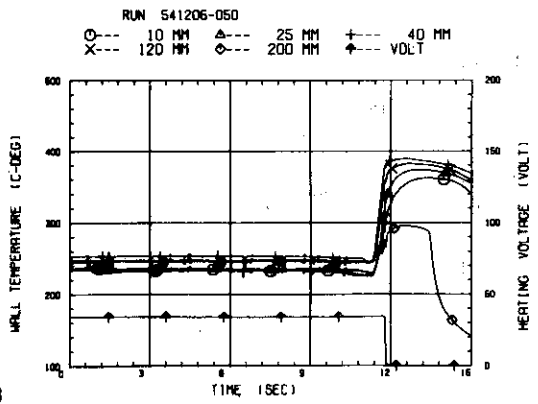
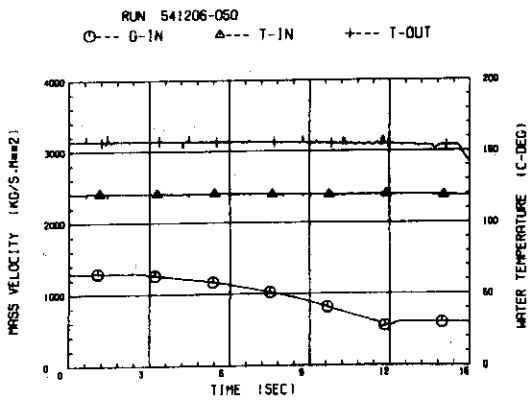
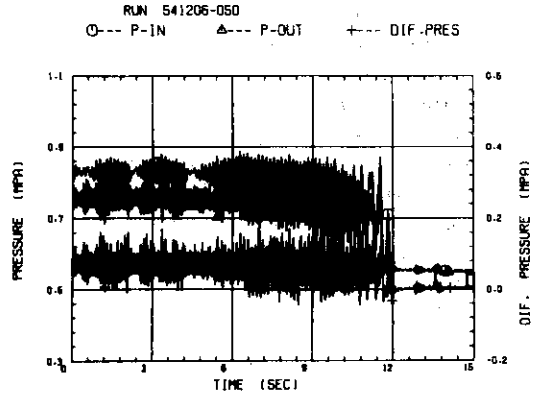


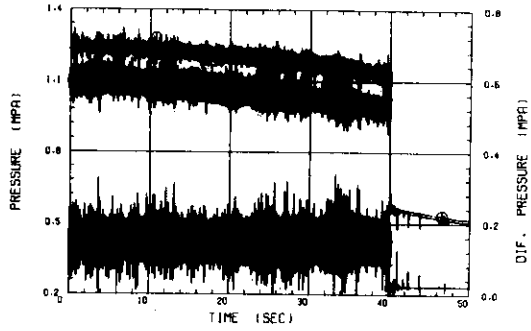
FIG. B1- 7- 3



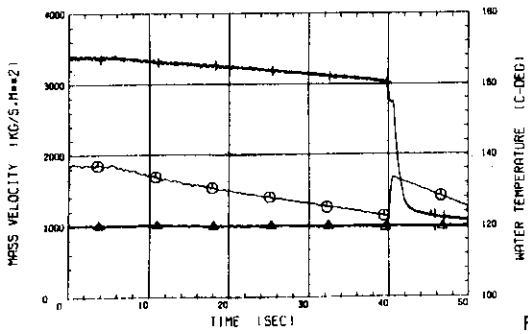
RUN NO 550124 - 14

MT VOL. NUMBER = 14  
 MT FILE NUMBER = 29  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 46.1 (VOLT)  
 HEATING POWER = 95.9 (KW)  
 HEAT FLUX = 3.816 E+6 (W/SQM)  
 INLET TEMPERATURE = 120.2 (DEG-C)  
 INITIAL MASS VELOCITY = 1846.2 (KG/S,SQM)  
 PRESSURE = 0.51 (MPA)  
 INITIAL EXIT QUALITY = 0.249

RUN 550124-014  
 ○--- P-IN    △--- P-OUT    +--- DIF.PRES



RUN 550124-014  
 ○--- G-IN    △--- T-IN    +--- T-OUT



RUN 550124-014  
 ○--- 10 MM    △--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◇--- 200 MM    +--- VOLT

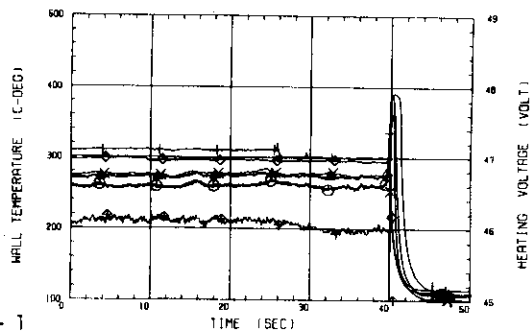
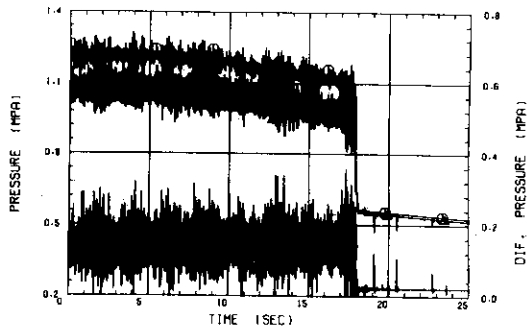


FIG. B1- 8- 1

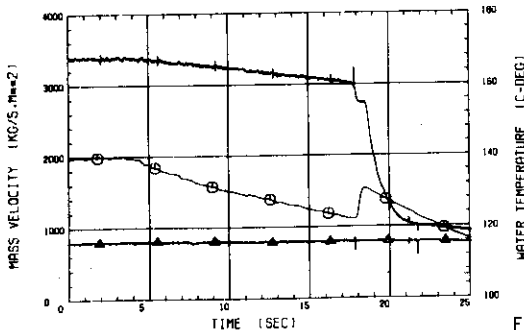
RUN NO 550124 - 10

MT VOL. NUMBER = 14  
 MT FILE NUMBER = 29  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 46.0 (VOLT)  
 HEATING POWER = 95.9 (KW)  
 HEAT FLUX = 3.818 E+6 (W/SQM)  
 INLET TEMPERATURE = 116.0 (DEG-C)  
 INITIAL MASS VELOCITY = 1971.1 (KG/S,SQM)  
 PRESSURE = 0.52 (MPA)  
 INITIAL EXIT QUALITY = 0.219

RUN 550124-010  
 ○--- P-IN    △--- P-OUT    +--- DIF.PRES



RUN 550124-010  
 ○--- G-IN    △--- T-IN    +--- T-OUT



RUN 550124-010  
 ○--- 10 MM    △--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◇--- 200 MM    +--- VOLT

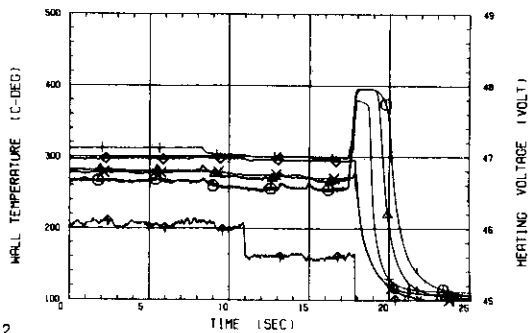
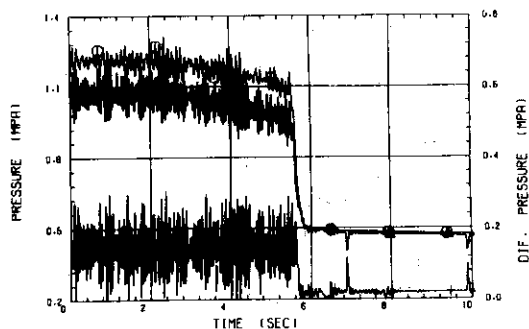


FIG. B1- 8- 2

RUN NO 550124 - 5

MT VOL. NUMBER = 14  
 MT FILE NUMBER = 20  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 46.0 (VOLT)  
 HEATING POWER = 95.6 (KW)  
 HEAT FLUX = 3.803 E+6 (W/SQM)  
 INLET TEMPERATURE = 117.0 (DEG-C)  
 INITIAL MASS VELOCITY = 1807.2 (KG/S,MM2)  
 PRESSURE = 0.47 (MPA)  
 INITIAL EXIT QUALITY = 0.253

RUN 550124-005  
 O--- P-IN    Δ--- P-OUT    +--- DIF.PRES



RUN 550124-005  
 O--- G-IN    Δ--- T-IN    +--- T-OUT

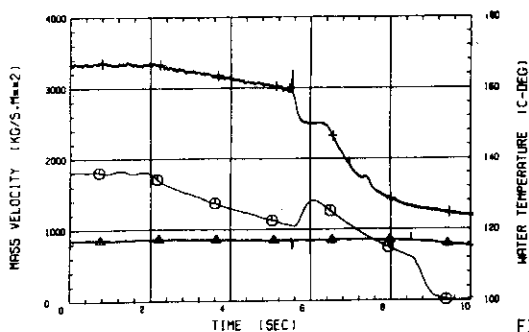
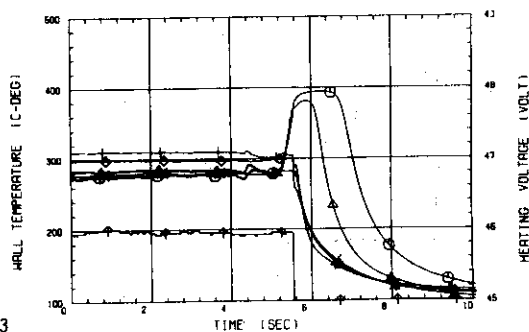


FIG. B1-8-3

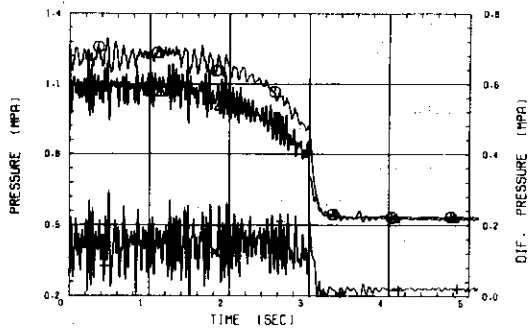
RUN 550124-005  
 O--- 10 MM    Δ--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◊--- 200 MM    \*--- VOLT



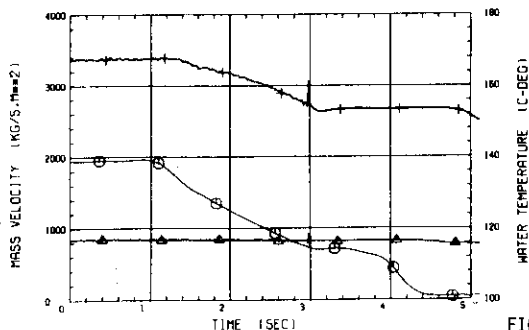
RUN NO 550124 - 7

MT VOL. NUMBER = 14  
 MT FILE NUMBER = 24  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 46.0 (VOLT)  
 HEATING POWER = 95.9 (KW)  
 HEAT FLUX = 3.815 E+6 (W/SQM)  
 INLET TEMPERATURE = 116.8 (DEG-C)  
 INITIAL MASS VELOCITY = 1937.5 (KG/S,MM2)  
 PRESSURE = 0.51 (MPA)  
 INITIAL EXIT QUALITY = 0.227

RUN 550124-007  
 O--- P-IN    Δ--- P-OUT    +--- DIF.PRES



RUN 550124-007  
 O--- G-IN    Δ--- T-IN    +--- T-OUT



RUN 550124-007  
 O--- 10 MM    Δ--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◊--- 200 MM    \*--- VOLT

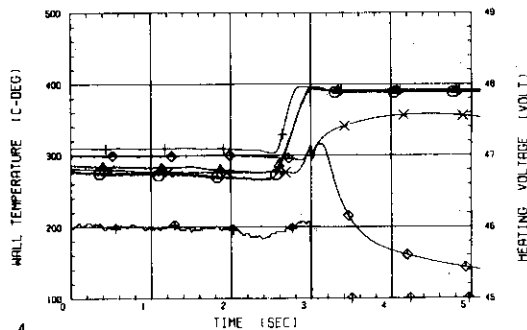


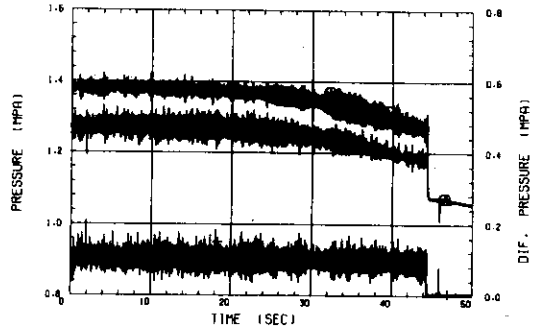
FIG. B1-8-4

附录 B

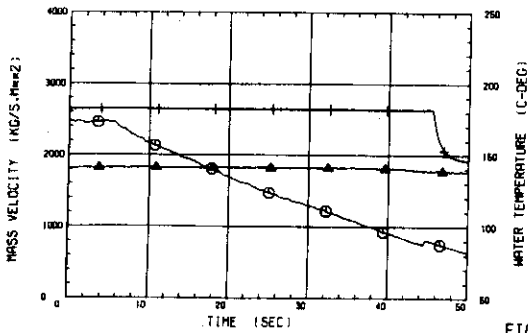
RUN NO 541207-102

MT VOL. NUMBER = 16  
 MT FILE NUMBER = 2  
 SAMPLING INTERVAL = 5.1 (MSEC)  
 HEATING VOLTAGE = 42.0 (VOLT)  
 HEATING POWER = 80.2 (KW)  
 HEAT FLUX = 3.190 E+6 (W/SQM)  
 INLET TEMPERATURE = 140.6 (DEG-C)  
 INITIAL MASS VELOCITY = 2483.2 (KG/S.SQM)  
 PRESSURE = 0.99 (MPA)  
 INITIAL EXIT QUALITY = 0.120

RUN 541207-102  
 O--- P-IN    Δ--- P-OUT    +--- DIF.PRES



RUN 541207-102  
 O--- G-IN    Δ--- T-IN    +--- T-OUT



RUN 541207-102  
 O--- 10 MM    Δ--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◊--- 200 MM    ◆--- VOLT

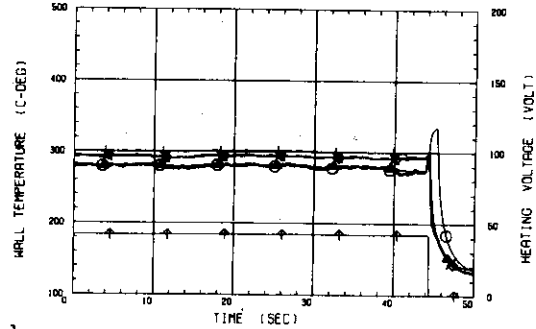
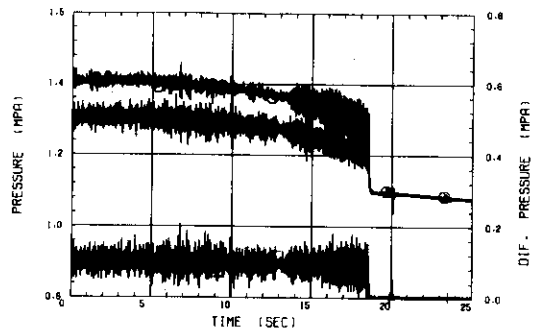


FIG. B2-1-1

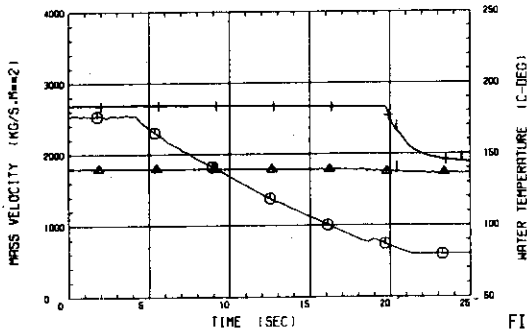
RUN NO 541207-106

MT VOL. NUMBER = 16  
 MT FILE NUMBER = 6  
 SAMPLING INTERVAL = 5.1 (MSEC)  
 HEATING VOLTAGE = 42.1 (VOLT)  
 HEATING POWER = 80.5 (KW)  
 HEAT FLUX = 3.203 E+6 (W/SQM)  
 INLET TEMPERATURE = 140.1 (DEG-C)  
 INITIAL MASS VELOCITY = 2529.5 (KG/S.SQM)  
 PRESSURE = 1.05 (MPA)  
 INITIAL EXIT QUALITY = 0.111

RUN 541207-106  
 O--- P-IN    Δ--- P-OUT    +--- DIF.PRES



RUN 541207-106  
 O--- G-IN    Δ--- T-IN    +--- T-OUT



RUN 541207-106  
 O--- 10 MM    Δ--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◊--- 200 MM    ◆--- VOLT

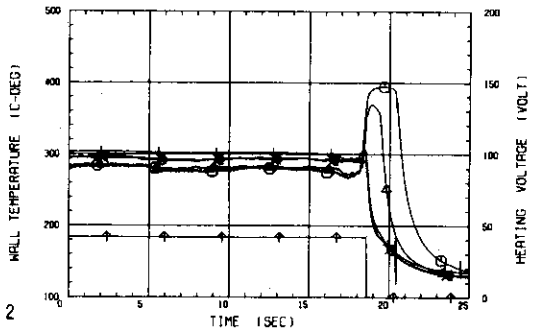
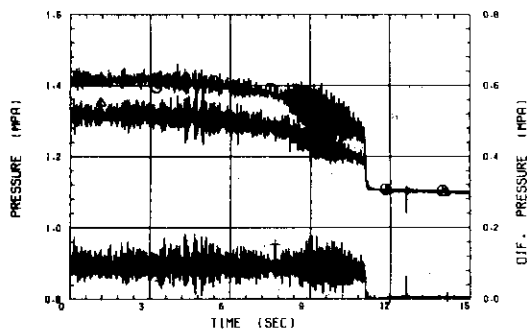


FIG. B2-1-2

RUN NO 541207-109

MT VOL. NUMBER = 16  
 MT FILE NUMBER = 9  
 SAMPLING INTERVAL = 5.1 (MSEC)  
 HEATING VOLTAGE = 42.0 (VOLT)  
 HEATING POWER = 80.2 (KW)  
 HEAT FLUX = 3.190 E+6 (W/SQM)  
 INLET TEMPERATURE = 139.0 (DEG-C)  
 INITIAL MASS VELOCITY = 2533.5 (KG/S.SQM)  
 PRESSURE = 1.03 (MPA)  
 INITIAL EXIT QUALITY = 0.103

RUN 541207-109  
 O--- P-IN    Δ--- P-OUT    +--- DIF.PRES



RUN 541207-109  
 O--- G-IN    Δ--- T-IN    +--- T-OUT

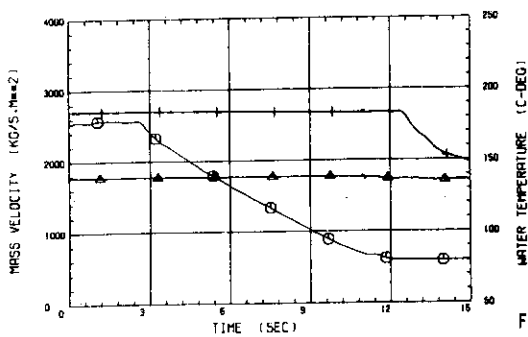
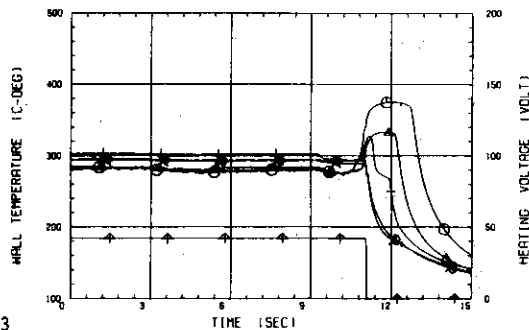


FIG. B2-1-3

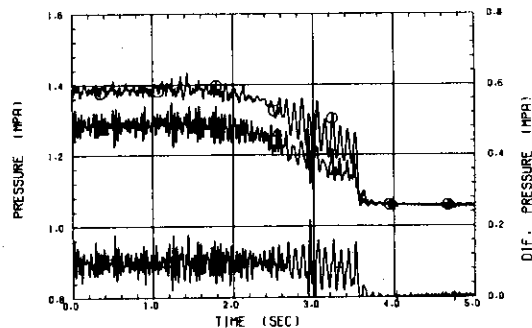
RUN 541207-109  
 O--- 10 MM    Δ--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◊--- 200 MM    \*--- VOLT



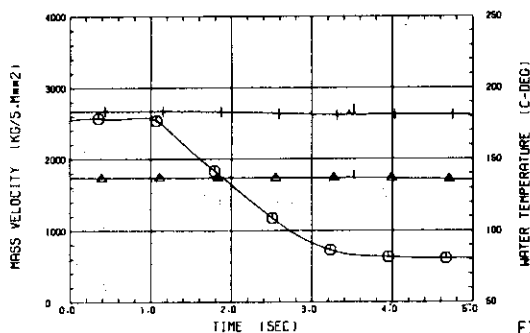
RUN 541207-101

MT VOL. NUMBER = 16  
 MT FILE NUMBER = 1  
 SAMPLING INTERVAL = 5.1 (MSEC)  
 HEATING VOLTAGE = 42.0 (VOLT)  
 HEATING POWER = 80.2 (KW)  
 HEAT FLUX = 3.192 E+6 (W/SQM)  
 INLET TEMPERATURE = 136.9 (DEG-C)  
 INITIAL MASS VELOCITY = 2559.5 (KG/S.SQM)  
 PRESSURE = 1.04 (MPA)  
 INITIAL EXIT QUALITY = 0.102

RUN 541207-101  
 O--- P-IN    Δ--- P-OUT    +--- DIF.PRES



RUN 541207-101  
 O--- G-IN    Δ--- T-IN    +--- T-OUT



RUN 541207-101  
 O--- 10 MM    Δ--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◊--- 200 MM    \*--- VOLT

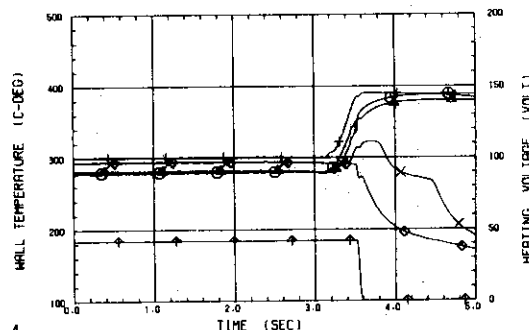
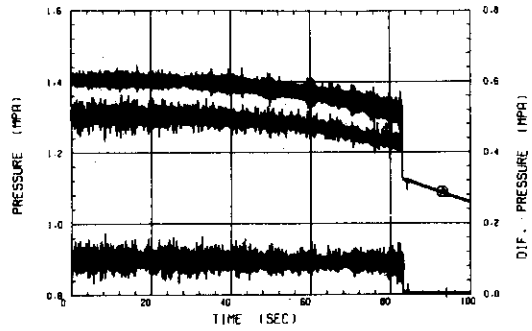


FIG. B2-1-4

RUN NO 541207-119

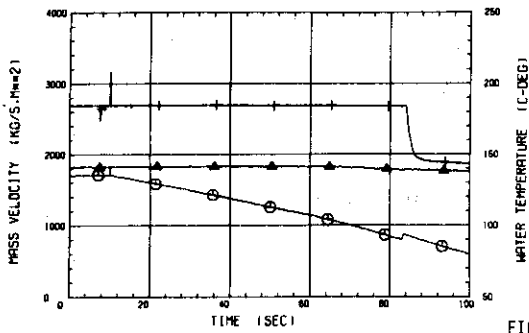
MT VOL. NUMBER = 16  
 MT FILE NUMBER = 19  
 SAMPLING INTERVAL = 5.1 (MSEC)  
 HEATING VOLTAGE = 42.1 (VOLT)  
 HEATING POWER = 80.3 (KW)  
 HEAT FLUX = 3.203 E+6 (W/SQM)  
 INLET TEMPERATURE = 141.1 (DEG-C)  
 INITIAL MASS VELOCITY = 1693.8 (KG/S.SQM)  
 PRESSURE = 1.07 (MPA)  
 INITIAL EXIT QUALITY = 0.211

RUN 541207-119  
 ○--- P-IN    △--- P-OUT    +--- DIF.PRES



RUN 541207-119

○--- C-IN    △--- T-IN    +--- T-OUT



RUN 541207-119

○--- 10 MM    △--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◇--- 200 MM    ↑--- VOLT

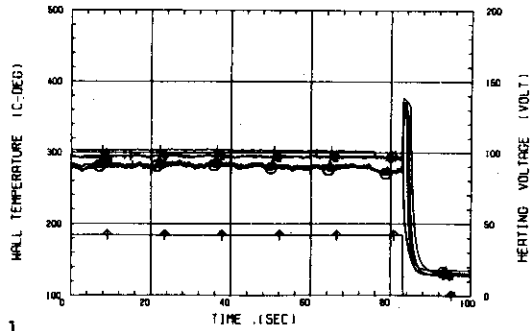
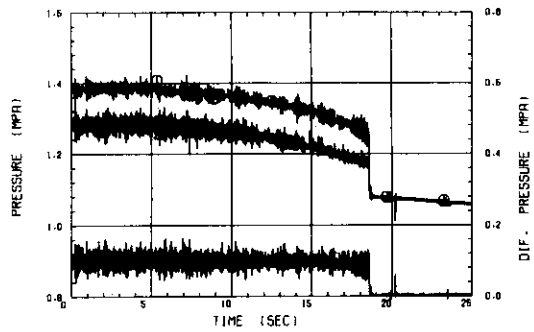


FIG. B2-2-1

RUN NO 541207-115

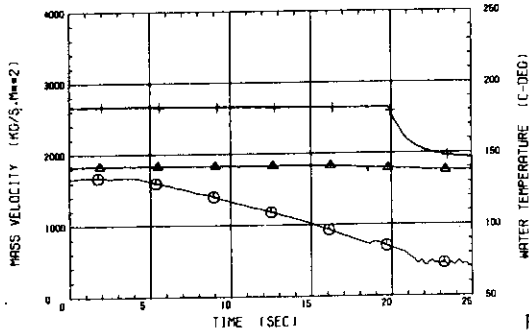
MT VOL. NUMBER = 16  
 MT FILE NUMBER = 15  
 SAMPLING INTERVAL = 5.1 (MSEC)  
 HEATING VOLTAGE = 42.0 (VOLT)  
 HEATING POWER = 80.4 (KW)  
 HEAT FLUX = 3.197 E+6 (W/SQM)  
 INLET TEMPERATURE = 141.7 (DEG-C)  
 INITIAL MASS VELOCITY = 1662.1 (KG/S.SQM)  
 PRESSURE = 1.04 (MPA)  
 INITIAL EXIT QUALITY = 0.270

RUN 541207-115  
 ○--- P-IN    △--- P-OUT    +--- DIF.PRES



RUN 541207-115

○--- C-IN    △--- T-IN    +--- T-OUT



RUN 541207-115

○--- 10 MM    △--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◇--- 200 MM    ↑--- VOLT

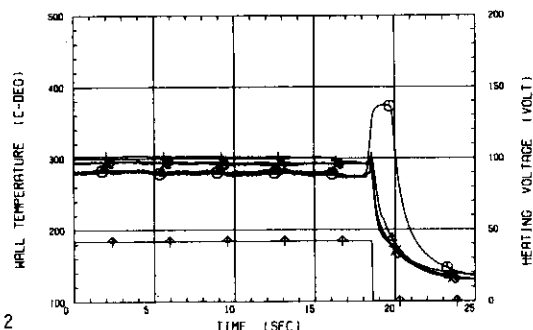


FIG. B2-2-2

RUN NO 541207-118

MT VOL. NUMBER = 16  
 MT FILE NUMBER = 18  
 SAMPLING INTERVAL = 5.1 (MSEC)  
 HEATING VOLTAGE = 42.1 (VOLT)  
 HEATING POWER = 80.6 (KW)  
 HEAT FLUX = 3.205 E+6 (W/SQM)  
 INLET TEMPERATURE = 141.4 (DEG-C)  
 INITIAL MASS VELOCITY = 1690.5 (KG/S,SQM)  
 PRESSURE = 1.07 (MPA)  
 INITIAL EXIT QUALITY = 0.212

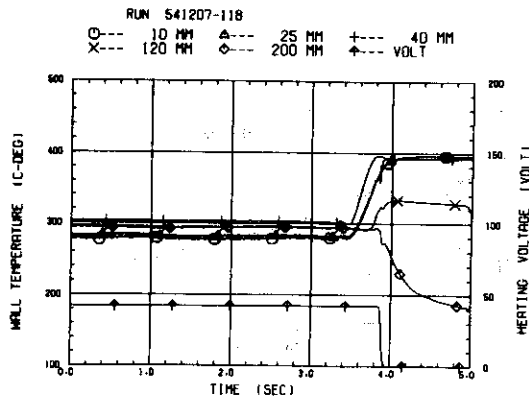
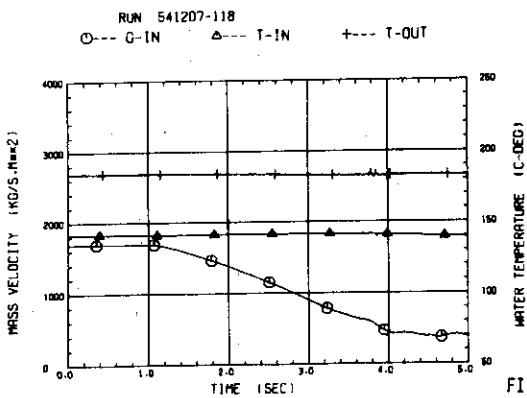
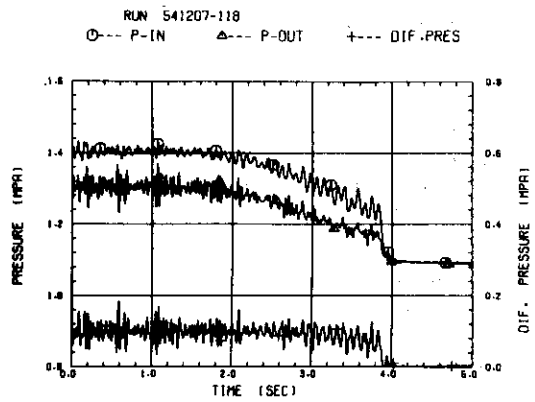
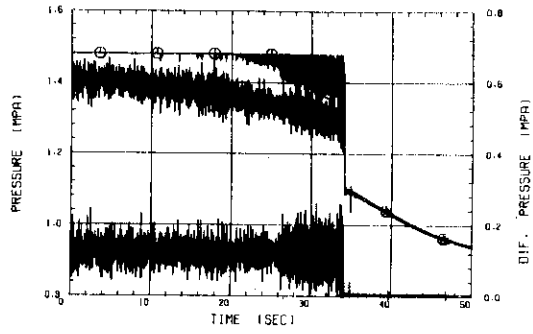


FIG. B2- 2- 3

RUN NO 541210 - 3

MT VOL. NUMBER = 16  
 MT FILE NUMBER = 22  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 46.0 (VOLT)  
 HEATING POWER = 95.3 (KW)  
 HEAT FLUX = 3.790 E+6 (W/SQM)  
 INLET TEMPERATURE = 139.8 (DEG-C)  
 INITIAL MASS VELOCITY = 2493.0 (KG/S,SQM)  
 PRESSURE = 1.08 (MPA)  
 INITIAL EXIT QUALITY = 0.148

RUN 541210-003  
 ○--- P-IN    △--- P-OUT    +--- DIF.PRES



RUN 541210-003  
 ○--- C-IN    △--- T-IN    +--- T-OUT

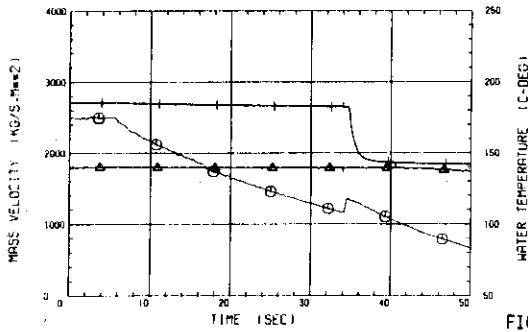
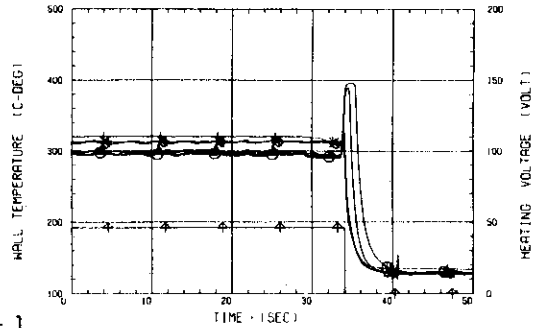


FIG. B2- 3- 1

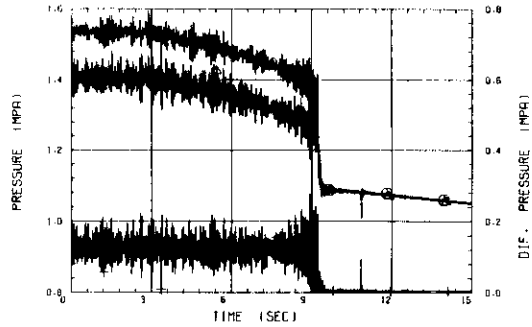
RUN 541210-003  
 ○--- 10 MM    △--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◇--- 200 MM    +--- VOLT



RUN NO 541210 - 10

MT VOL. NUMBER = 16  
 MT FILE NUMBER = 29  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 46.1 (VOLT)  
 HEATING POWER = 95.5 (KW)  
 HEAT FLUX = 3.800 E+6 (W/SQM)  
 INLET TEMPERATURE = 140.8 (DEG-C)  
 INITIAL MASS VELOCITY = 2448.7 (KG/S,SQM)  
 PRESSURE = 1.06 (MPA)  
 INITIAL EXIT QUALITY = 0.157

RUN 541210-010  
 ○--- P-IN    △--- P-OUT    +--- DIF.PRES



RUN 541210-010  
 ○--- C-IN    △--- T-IN    +--- T-OUT

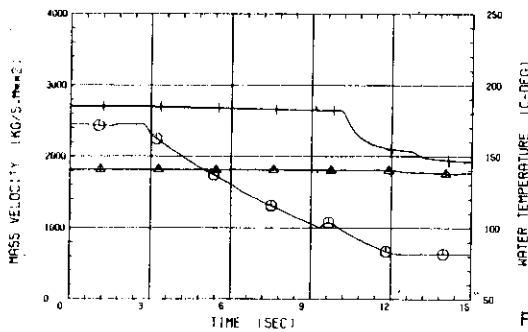
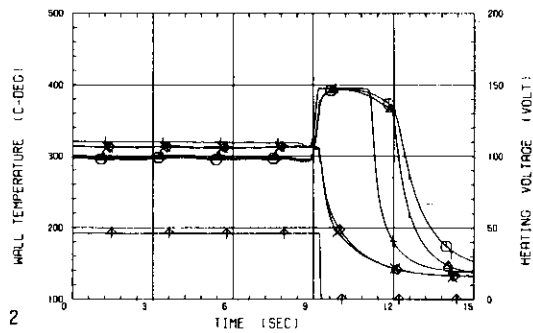


FIG. B2- 3- 2

RUN 541210-010  
 ○--- 10 MM    △--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◇--- 200 MM    +--- VOLT



RUN NO 541210 - 13

MT VOL. NUMBER = 16  
 MT FILE NUMBER = 32  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 46.0 (VOLT)  
 HEATING POWER = 95.5 (KW)  
 HEAT FLUX = 3.799 E+6 (W/50M)  
 INLET TEMPERATURE = 141.7 (DEG-C)  
 INITIAL MASS VELOCITY = 2475.2 (KG/S,50M)  
 PRESSURE = 1.08 (MPA)  
 INITIAL EXIT QUALITY = 0.155

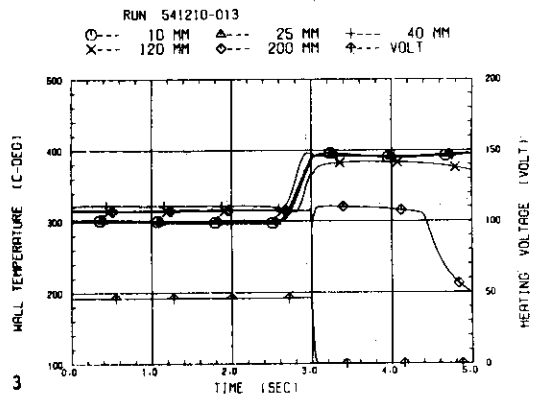
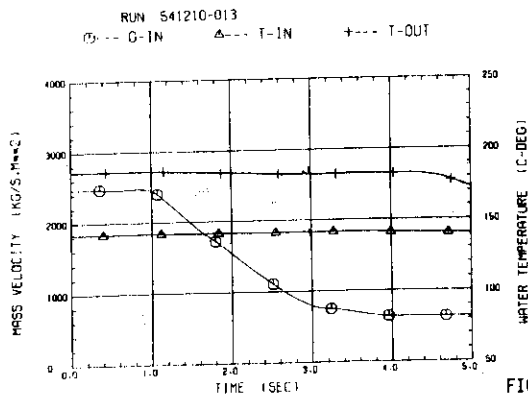
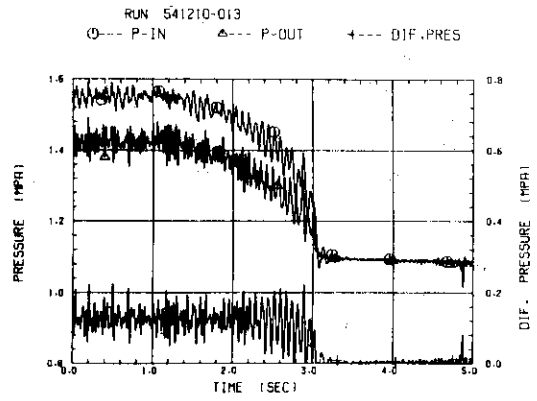


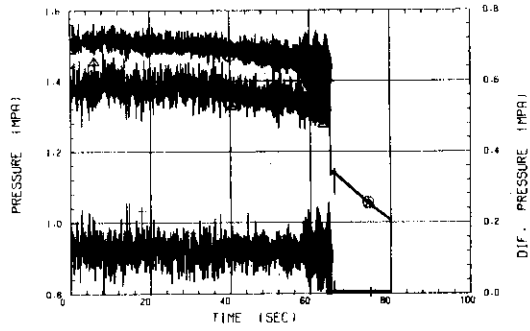
FIG. B2- 3- 3



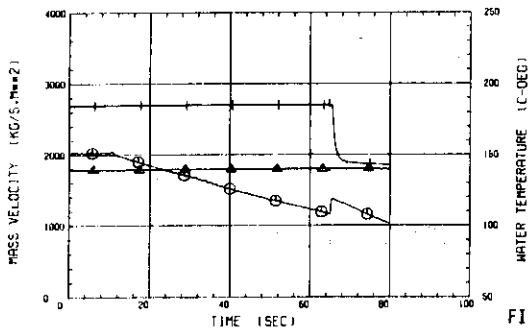
RUN NO 541210 - 15

MT VOL. NUMBER = 16  
 MT FILE NUMBER = 34  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 46.0 (VOLT)  
 HEATING POWER = 95.2 (KW)  
 HEAT FLUX = 3.790 E+6 (W/SM)  
 INLET TEMPERATURE = 139.3 (DEG-C)  
 INITIAL MASS VELOCITY = 2019.6 (KG/S.SQM)  
 PRESSURE = 1.06 (MPA)  
 INITIAL EXIT QUALITY = 0.206

RUN 541210-015  
 O--- P-IN    Δ--- P-OUT    +--- DIF.PRES



RUN 541210-015  
 O--- G-IN    Δ--- T-IN    +--- T-OUT



RUN 541210-015  
 O--- 10 MM    Δ--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◊--- 200 MM    +--- VOLT

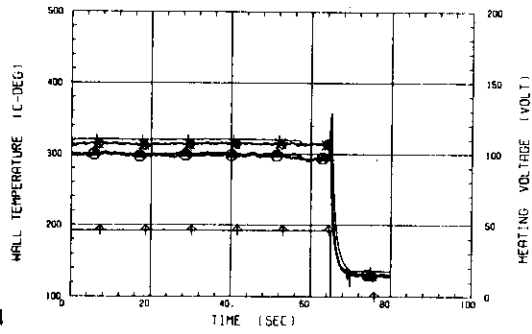
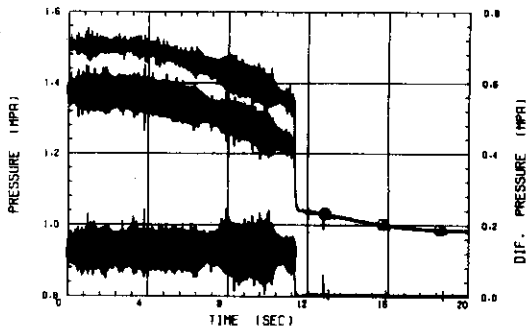


FIG. B2- 4- 1

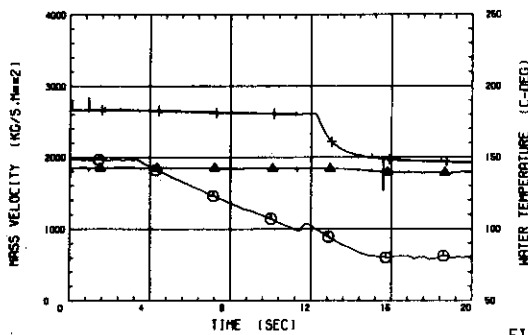
RUN NO 541210 - 20

MT VOL. NUMBER = 17  
 MT FILE NUMBER = 3  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 46.1 (VOLT)  
 HEATING POWER = 95.5 (KW)  
 HEAT FLUX = 3.801 E+6 (W/SM)  
 INLET TEMPERATURE = 142.2 (DEG-C)  
 INITIAL MASS VELOCITY = 1970.6 (KG/S.SQM)  
 PRESSURE = 1.02 (MPA)  
 INITIAL EXIT QUALITY = 0.223

RUN 541210-020  
 O--- P-IN    Δ--- P-OUT    +--- DIF.PRES



RUN 541210-020  
 O--- G-IN    Δ--- T-IN    +--- T-OUT



RUN 541210-020  
 O--- 10 MM    Δ--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◊--- 200 MM    +--- VOLT

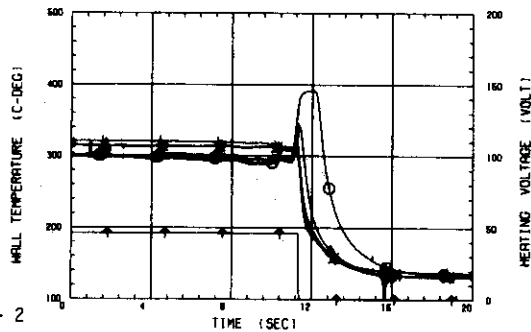


FIG. B2- 4- 2

RUN NO 541210 - 23

MT VOL. NUMBER = 17  
 MT FILE NUMBER = 6  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 46.1 (VOLT)  
 HEATING POWER = 95.5 (KW)  
 HEAT FLUX = 5.798 E+6 (W/SQM)  
 INLET TEMPERATURE = 139.2 (DEG-C)  
 INITIAL MASS VELOCITY = 2012.6 (KG/S.SQM)  
 PRESSURE = 1.01 (MPA)  
 INITIAL EXIT QUALITY = 0.211

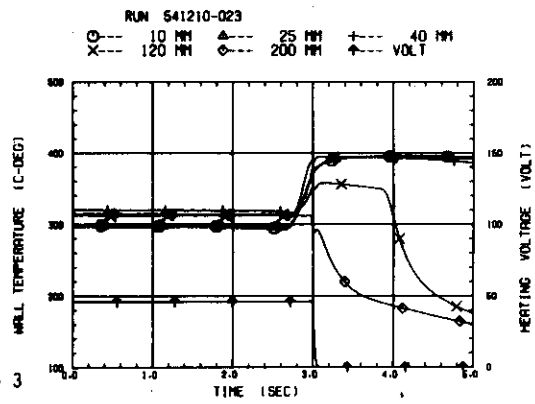
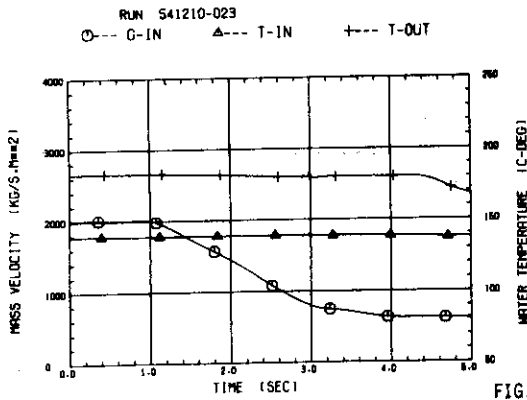
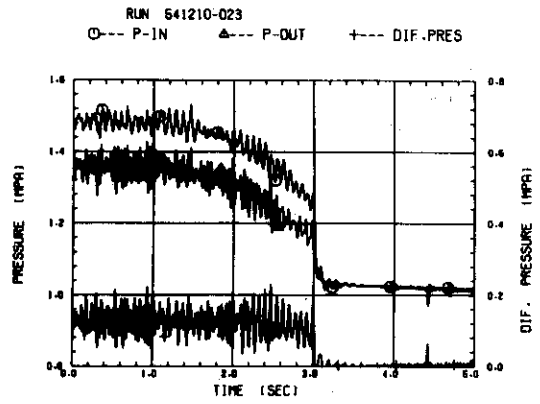


FIG. B2- 4- 3

RUN NO 541210 - 27

MT VOL. NUMBER = 17  
 MT FILE NUMBER = 10  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 42.0 (VOLT)  
 HEATING POWER = 80.4 (KW)  
 HEAT FLUX = 3.200 E+6 (W/SGM)  
 INLET TEMPERATURE = 140.1 (DEG-C)  
 INITIAL MASS VELOCITY = 1255.0 (KG/S.SGM)  
 PRESSURE = 1.06 (MPA)  
 INITIAL EXIT QUALITY = 0.313

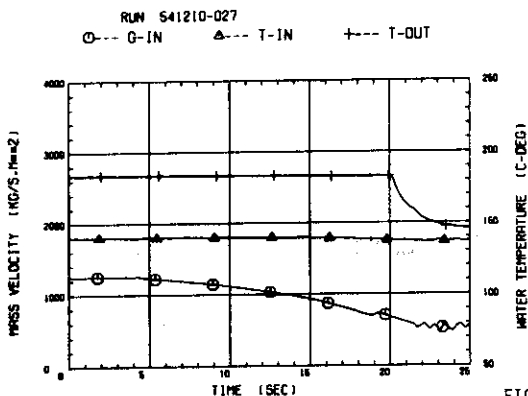
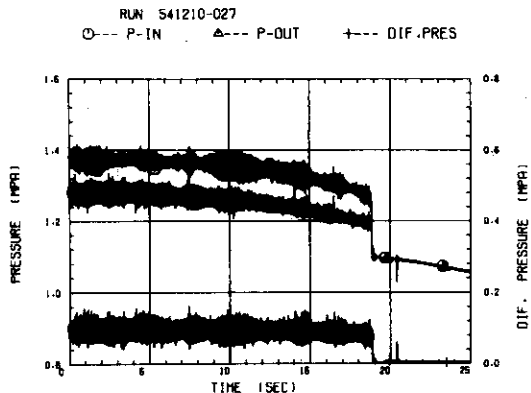
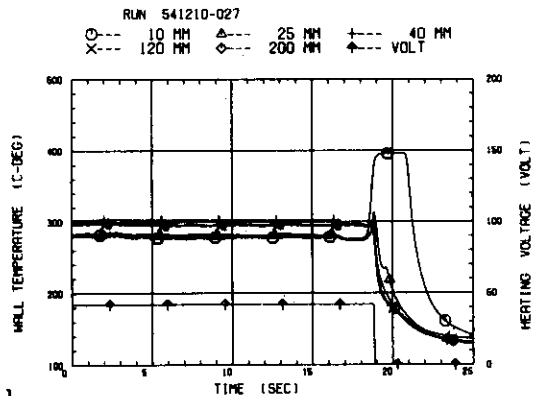


FIG. B2- 5- 1



RUN NO 541210 - 30

MT VOL. NUMBER = 17  
 MT FILE NUMBER = 13  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 41.9 (VOLT)  
 HEATING POWER = 80.1 (KW)  
 HEAT FLUX = 3.188 E+6 (W/SGM)  
 INLET TEMPERATURE = 138.0 (DEG-C)  
 INITIAL MASS VELOCITY = 1252.0 (KG/S.SGM)  
 PRESSURE = 1.06 (MPA)  
 INITIAL EXIT QUALITY = 0.310

RUN 541210-030  
 O--- P-IN    Δ--- P-OUT    +--- DIF.PRES

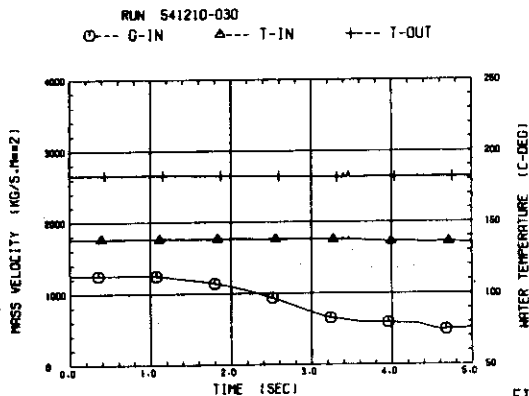
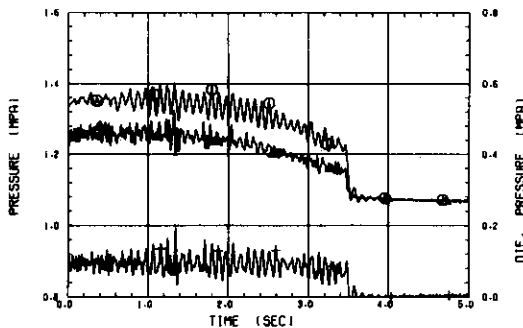
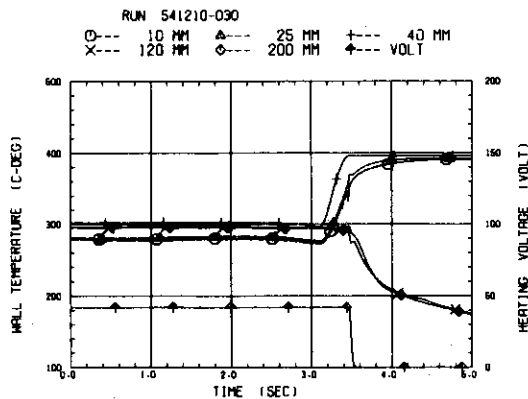


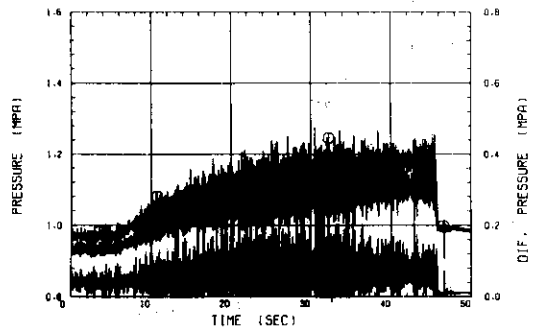
FIG. B2- 5- 2



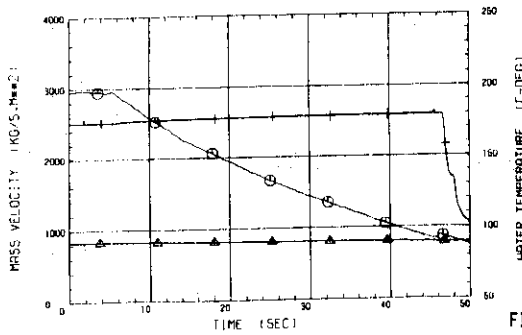
RUN NO 550108-114

MT VOL. NUMBER = 17  
 MT FILE NUMBER = 28  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 42.1 (VOLT)  
 HEATING POWER = 81.1 (KW)  
 HEAT FLUX = 3.229 E+6 (W/SQM)  
 INLET TEMPERATURE = 91.7 (DEG-C)  
 INITIAL MASS VELOCITY = 2958.2 (KG/S,SQM)  
 PRESSURE = 0.91 (MPA)  
 INITIAL EXIT QUALITY = -0.006

RUN 550108-114  
 ○--- P-IN    △--- P-OUT    +--- DIF.PRES



RUN 550108-114  
 ○--- G-IN    △--- T-IN    +--- T-OUT



RUN 550108-114  
 ○--- 10 MM    △--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◇--- 200 MM    ♣--- VOLT

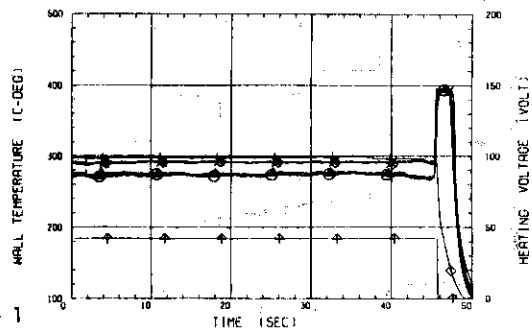
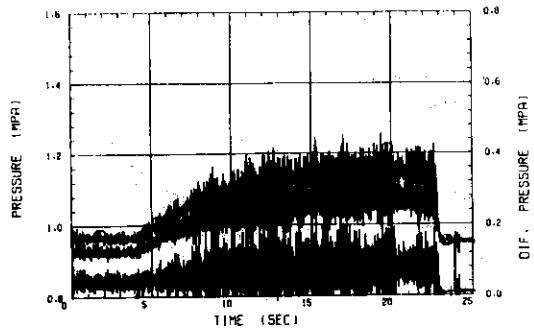


FIG. 82- 6- 1

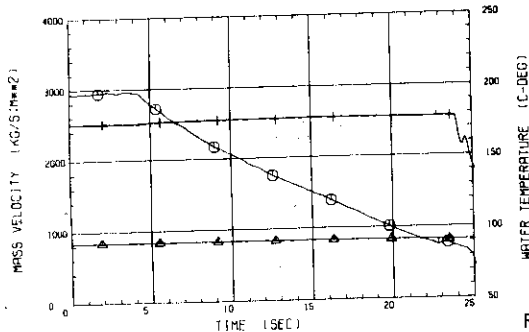
RUN NO 550108-110

MT VOL. NUMBER = 17  
 MT FILE NUMBER = 24  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 42.0 (VOLT)  
 HEATING POWER = 80.9 (KW)  
 HEAT FLUX = 3.217 E+6 (W/SQM)  
 INLET TEMPERATURE = 91.7 (DEG-C)  
 INITIAL MASS VELOCITY = 2936.4 (KG/S,SQM)  
 PRESSURE = 0.89 (MPA)  
 INITIAL EXIT QUALITY = -0.004

RUN 550108-110  
 ○--- P-IN    △--- P-OUT    +--- DIF.PRES



RUN 550108-110  
 ○--- G-IN    △--- T-IN    +--- T-OUT



RUN 550108-110  
 ○--- 10 MM    △--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◇--- 200 MM    ♣--- VOLT

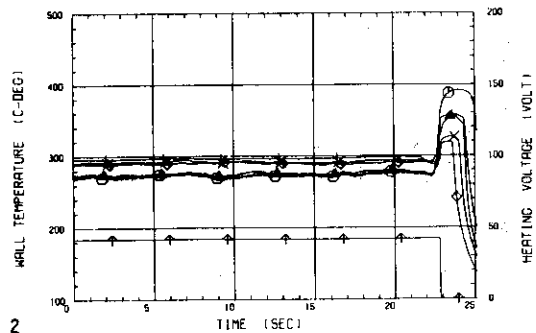
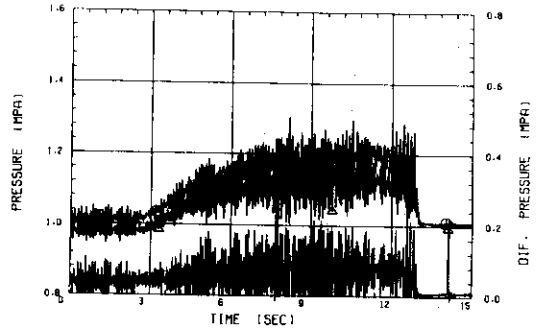


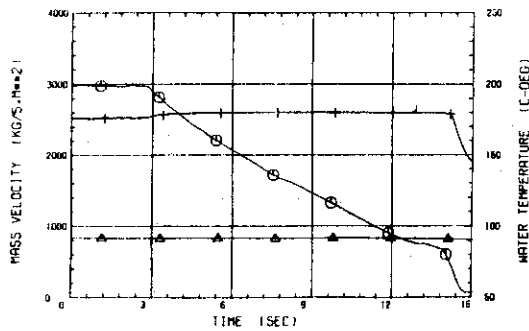
FIG. 82- 6- 2

RUN NO 550108-102  
 MT VOL. NUMBER = 17  
 MT FILE NUMBER = 16  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 42.0 (VOLT)  
 HEATING POWER = 80.7 (KW)  
 HEAT FLUX =  $3.212 \times 10^6$  (W/SQM)  
 INLET TEMPERATURE = 91.7 (DEG-C)  
 INITIAL MASS VELOCITY = 2980.8 (KG/S.SQM)  
 PRESSURE = 0.96 (MPA)  
 INITIAL EXIT QUALITY = -0.014

RUN 550108-102  
 ○--- P-IN    △--- P-OUT    +--- DIF.PRES



RUN 550108-102  
 ○--- G-IN    △--- T-IN    +--- T-OUT



RUN 550108-102  
 ○--- 10 MM    △--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◇--- 200 MM    +--- VOLT

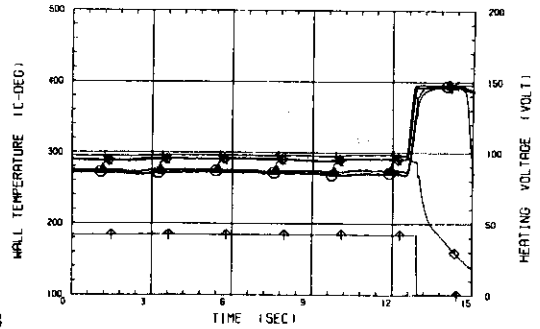
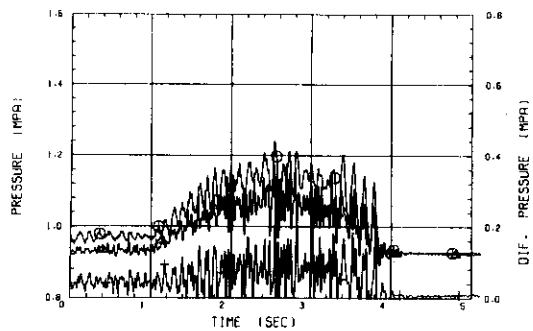


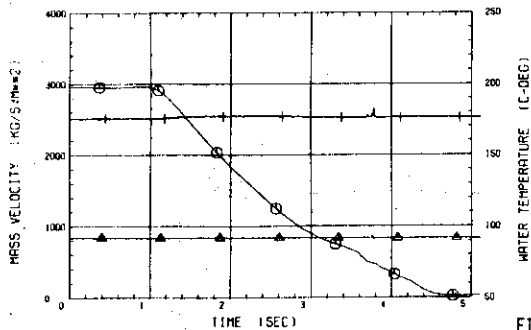
FIG. B2-6-3

RUN NO 550108-107  
 MT VOL. NUMBER = 17  
 MT FILE NUMBER = 21  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 42.1 (VOLT)  
 HEATING POWER = 81.2 (KW)  
 HEAT FLUX =  $3.230 \times 10^6$  (W/SQM)  
 INLET TEMPERATURE = 91.8 (DEG-C)  
 INITIAL MASS VELOCITY = 2960.3 (KG/S.SQM)  
 PRESSURE = 0.90 (MPA)  
 INITIAL EXIT QUALITY = -0.005

RUN 550108-107  
 ○--- P-IN    △--- P-OUT    +--- DIF.PRES



RUN 550108-107  
 ○--- G-IN    △--- T-IN    +--- T-OUT



RUN 550108-107  
 ○--- 10 MM    △--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◇--- 200 MM    +--- VOLT

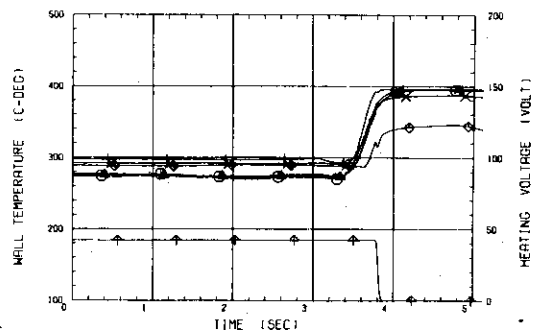
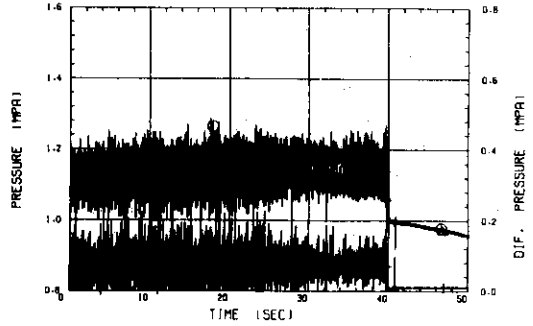


FIG. B2-6-4

RUN NO 550109 - 12

MT VOL. NUMBER = 21  
 MT FILE NUMBER = 3  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 92.0 (VOLT)  
 HEATING POWER = 80.3 (KW)  
 HEAT FLUX = 3.190 E+6 (W/SQM)  
 INLET TEMPERATURE = 92.2 (DEG-C)  
 INITIAL MASS VELOCITY = 1705.3 (KG/S.SQM)  
 PRESSURE = 0.95 (MPA)  
 INITIAL EXIT QUALITY = 0.115

RUN 550109-012  
 O--- P-IN    Δ--- P-OUT    +--- DIF.PRES



RUN 550109-012  
 O--- G-IN    Δ--- T-IN    +--- T-OUT

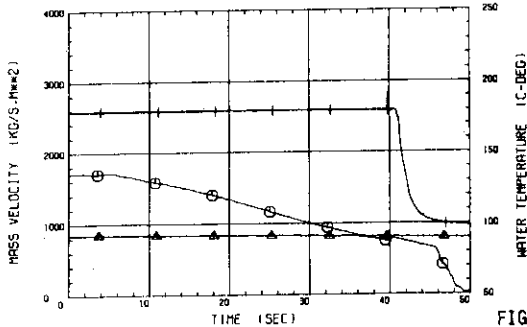
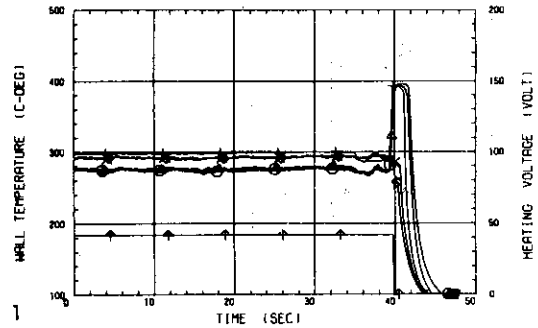


FIG. B2- 7- 1

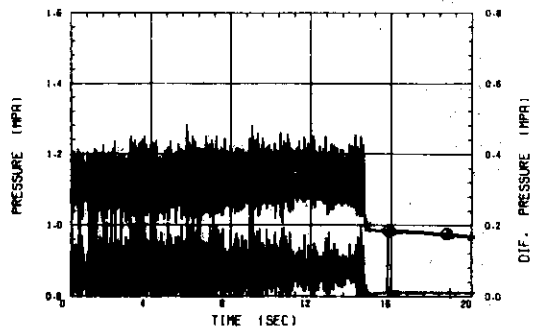
RUN 550109-012  
 O--- 10 MM    Δ--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◊--- 200 MM    \*--- VOLT



RUN NO 550109 - 16

MT VOL. NUMBER = 21  
 MT FILE NUMBER = 7  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 92.1 (VOLT)  
 HEATING POWER = 80.7 (KW)  
 HEAT FLUX = 3.211 E+6 (W/SQM)  
 INLET TEMPERATURE = 89.3 (DEG-C)  
 INITIAL MASS VELOCITY = 1726.0 (KG/S.SQM)  
 PRESSURE = 0.96 (MPA)  
 INITIAL EXIT QUALITY = 0.107

RUN 550109-016  
 O--- P-IN    Δ--- P-OUT    +--- DIF.PRES



RUN 550109-016  
 O--- G-IN    Δ--- T-IN    +--- T-OUT

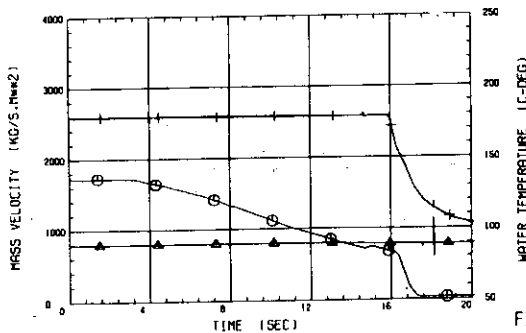
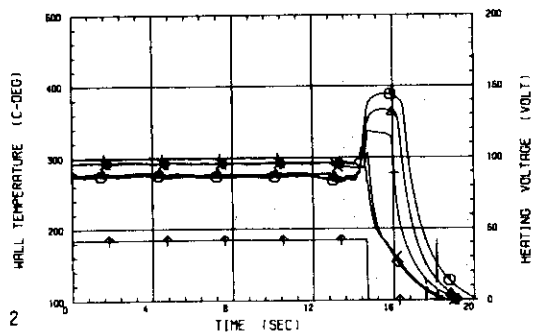


FIG. B2- 7- 2

RUN 550109-016  
 O--- 10 MM    Δ--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◊--- 200 MM    \*--- VOLT



RUN NO 550109 - 18

HT VOL. NUMBER = 21  
 HT FILE NUMBER = 9  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 42.0 (VOLT)  
 HEATING POWER = 80.6 (KW)  
 HEAT FLUX = 3,208 ± 66 (W/50MM)  
 INLET TEMPERATURE = 91.4 (DEG-C)  
 INITIAL MASS VELOCITY = 1711.5 (KG/S.50MM)  
 PRESSURE = 0.95 (MPA)  
 INITIAL EXIT QUALITY = 0.114

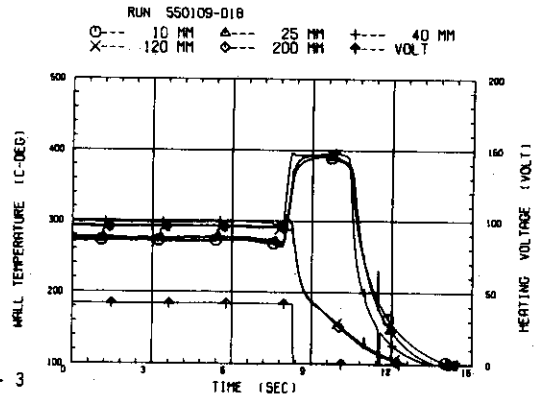
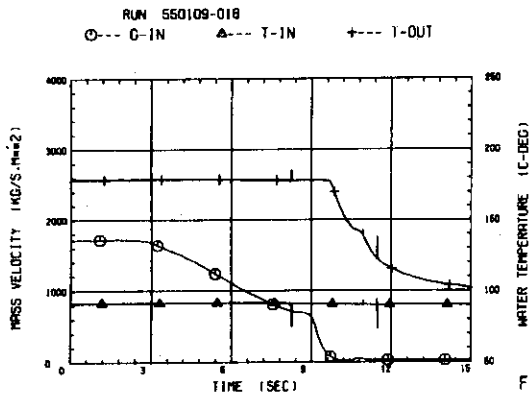
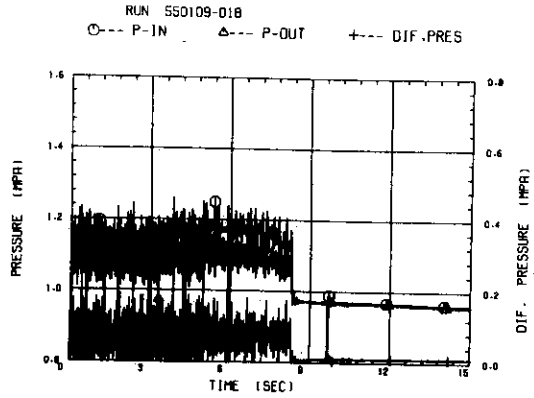


FIG. B2- 7- 3

RUN NO 550109 - 20

HT VOL. NUMBER = 21  
 HT FILE NUMBER = 11  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 42.0 (VOLT)  
 HEATING POWER = 80.4 (KW)  
 HEAT FLUX = 3,199 ± 66 (W/50MM)  
 INLET TEMPERATURE = 90.1 (DEG-C)  
 INITIAL MASS VELOCITY = 1710.7 (KG/S.50MM)  
 PRESSURE = 0.95 (MPA)  
 INITIAL EXIT QUALITY = 0.110

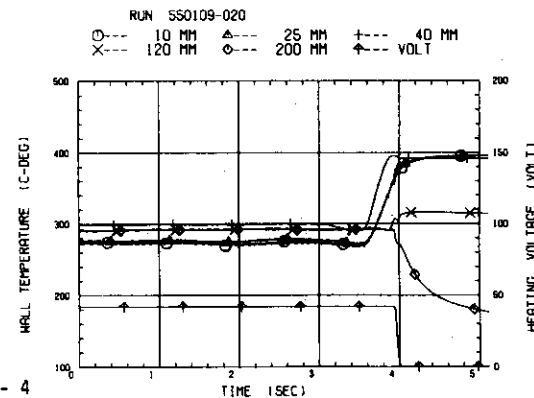
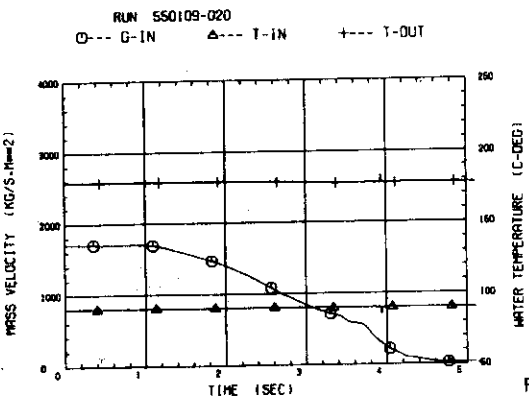
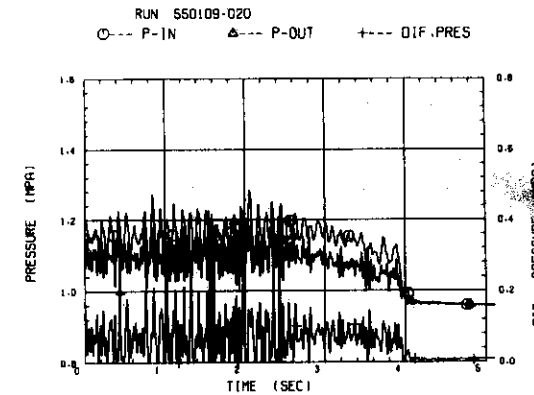
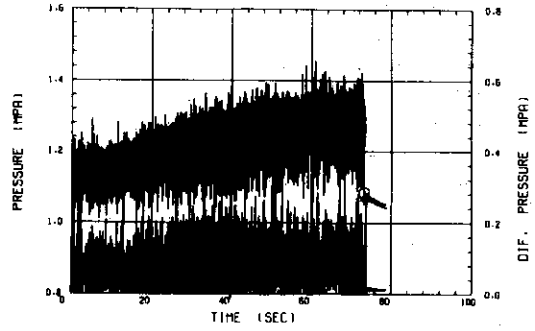


FIG. B2- 7- 4

RUN NO 550109 - 00

MT VOL. NUMBER = 21  
 MT FILE NUMBER = 41  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 46.1 (VOLT)  
 HEATING POWER = 95.8 (KW)  
 HEAT FLUX = 3.812 E+6 (W/SM)  
 INLET TEMPERATURE = 90.7 (DEG-C)  
 INITIAL MASS VELOCITY = 2626.6 (KG/S.SQM)  
 PRESSURE = 0.96 (MPA)  
 INITIAL EXIT QUALITY = 0.045

RUN 550109-050  
 ○--- P-IN    △--- P-OUT    +--- DIF.PRES



RUN 550109-050  
 ○--- G-IN    △--- T-IN    +--- T-OUT

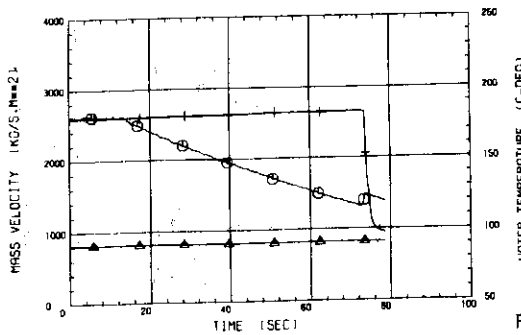
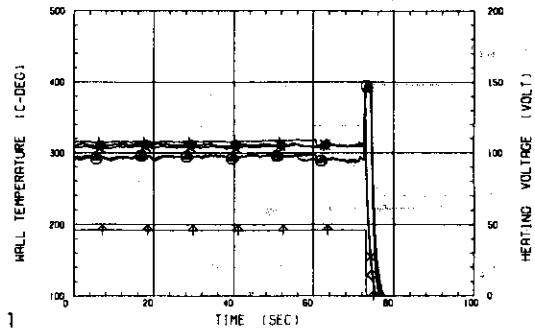


FIG. B2- 8- 1

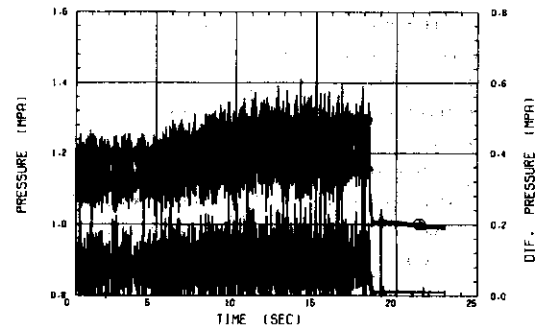
RUN 550109-050  
 ○--- 10 MM    △--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◇--- 200 MM    \*--- VOLT



RUN NO 550109 - 05

MT VOL. NUMBER = 21  
 MT FILE NUMBER = 36  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 46.0 (VOLT)  
 HEATING POWER = 95.8 (KW)  
 HEAT FLUX = 3.812 E+6 (W/SM)  
 INLET TEMPERATURE = 92.6 (DEG-C)  
 INITIAL MASS VELOCITY = 2586.6 (KG/S.SQM)  
 PRESSURE = 0.96 (MPA)  
 INITIAL EXIT QUALITY = 0.052

RUN 550109-045  
 ○--- P-IN    △--- P-OUT    +--- DIF.PRES



RUN 550109-045  
 ○--- G-IN    △--- T-IN    +--- T-OUT

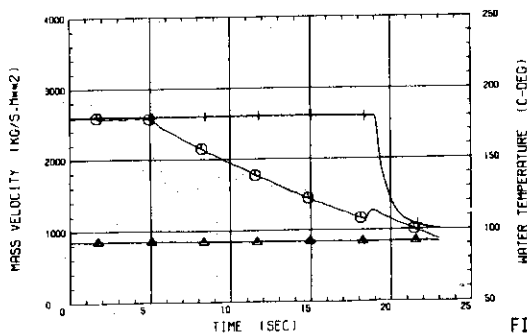
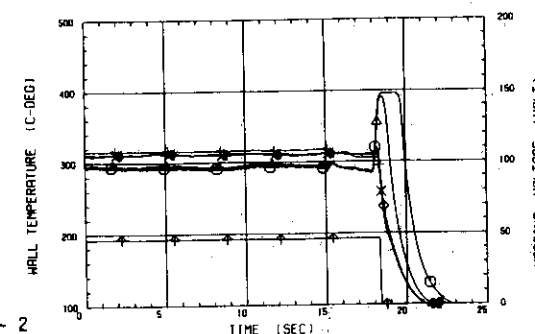


FIG. B2- 8- 2

RUN 550109-045  
 ○--- 10 MM    △--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◇--- 200 MM    \*--- VOLT

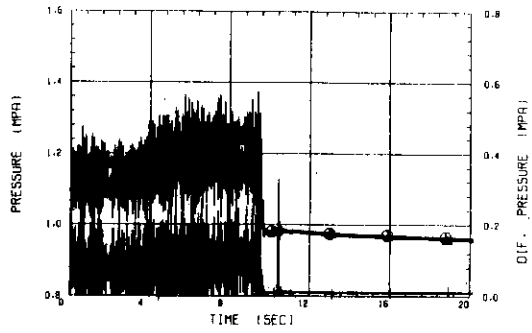




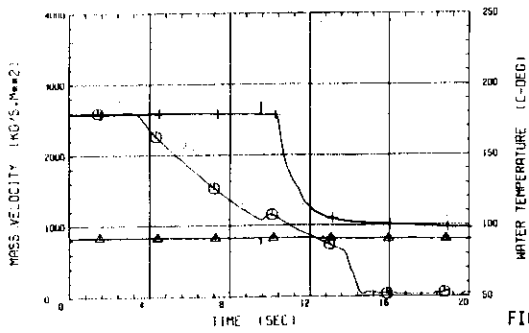
RUN NO 550109 - 35

MT VOL. NUMBER = 21  
 MT FILE NUMBER = 27  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 46.0 (VOLT)  
 HEATING POWER = 93.7 (KW)  
 HEAT FLUX = 3.809 E+6 (W/SQM)  
 INLET TEMPERATURE = 91.4 (DEG-C)  
 INITIAL MASS VELOCITY = 2583.4 (KG/S.SQM)  
 PRESSURE = 0.94 (MPA)  
 INITIAL EXIT QUALITY = 0.052

RUN 550109-036  
 ○--- P-IN    △--- P-OUT    +--- DIF.PRES



RUN 550109-036  
 ○--- G-IN    △--- T-IN    +--- T-OUT



RUN 550109-036  
 ○--- 10 MM    △--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◇--- 200 MM    +--- VOLT

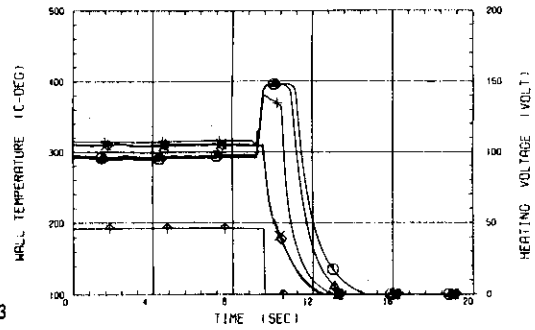
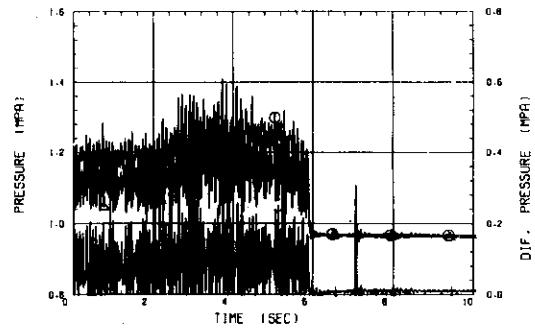


FIG. B2- 8- 3

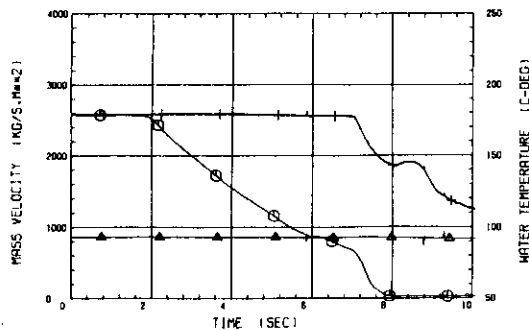
RUN NO 550109 - 39

MT VOL. NUMBER = 21  
 MT FILE NUMBER = 30  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 46.0 (VOLT)  
 HEATING POWER = 93.7 (KW)  
 HEAT FLUX = 3.606 E+6 (W/SQM)  
 INLET TEMPERATURE = 93.0 (DEG-C)  
 INITIAL MASS VELOCITY = 2376.8 (KG/S.SQM)  
 PRESSURE = 0.94 (MPA)  
 INITIAL EXIT QUALITY = 0.055

RUN 550109-039  
 ○--- P-IN    △--- P-OUT    +--- DIF.PRES



RUN 550109-039  
 ○--- G-IN    △--- T-IN    +--- T-OUT



RUN 550109-039  
 ○--- 10 MM    △--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◇--- 200 MM    +--- VOLT

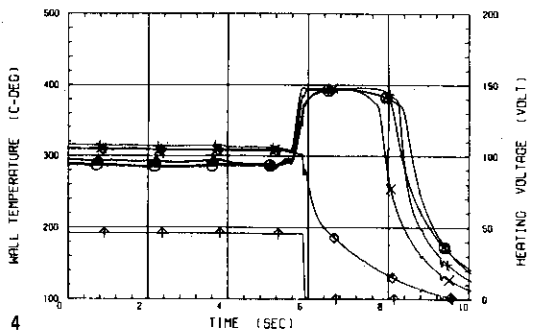
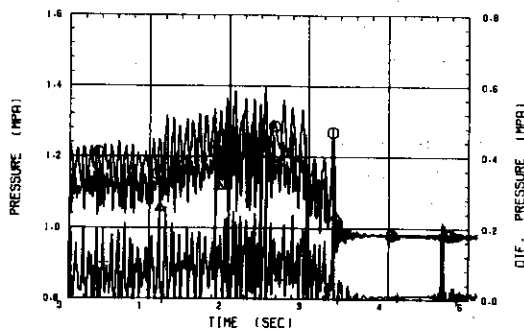


FIG. B2- 8- 4

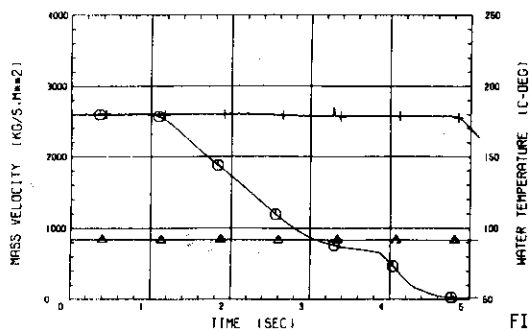
RUN NO 550109 - 41

MT VOL. NUMBER = 21  
 MT FILE NUMBER = 32  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 46.0 (VOLT)  
 HEATING POWER = 95.9 (KW)  
 HEAT FLUX =  $3.816 \times 10^6$  (#/SQMM)  
 INLET TEMPERATURE = 92.0 (DEG-C)  
 INITIAL MASS VELOCITY = 2799.0 (KG/S.SQM)  
 PRESSURE = 0.96 (MPA)  
 INITIAL EXIT QUALITY = 0.050

RUN 550109-041  
 O--- P-IN    Δ--- P-OUT    +--- DIF.PRES



RUN 550109-041  
 O--- G-IN    Δ--- T-IN    +--- T-OUT



RUN 550109-041  
 O--- 10 MM    Δ--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◊--- 200 MM    ↑--- VOLT

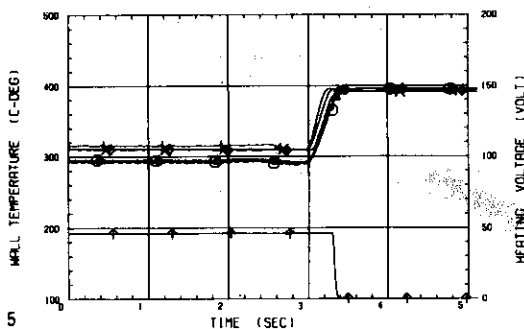


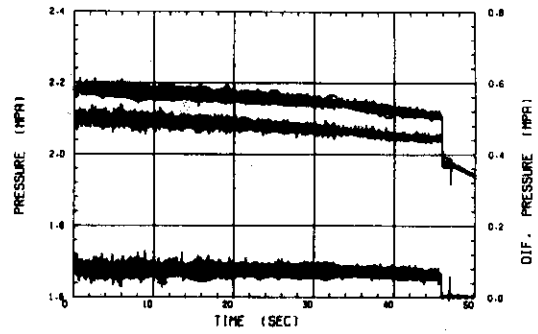
FIG. B2-8-5

RUN NO 541211-102

HT VOL. NUMBER = 19  
 HT FILE NUMBER = 2  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 49.1 (VOLT)  
 HEATING POWER = 66.9 (KW)  
 HEAT FLUX = 3.459 E+6 (W/SQCM)  
 INLET TEMPERATURE = 161.0 (DEG-C)  
 INITIAL MASS VELOCITY = 1707.0 (KG/S, SQCM)  
 PRESSURE = 1.95 (MPA)  
 INITIAL EXIT QUALITY = 0.224

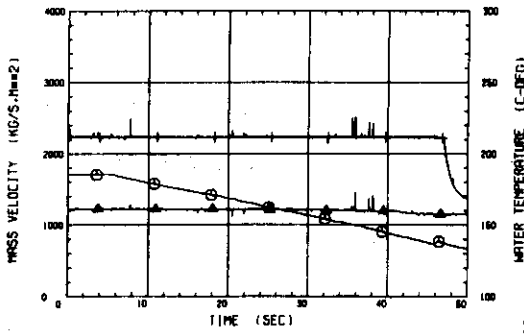
RUN 541211-102

○--- P-IN    △--- P-OUT    +--- DIF.PRES



RUN 541211-102

○--- G-IN    △--- T-IN    +--- T-OUT



RUN 541211-102

○--- 10 MM    △--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◇--- 200 MM    ↑--- VOLT

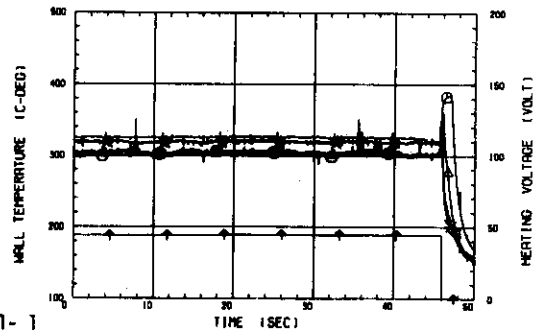


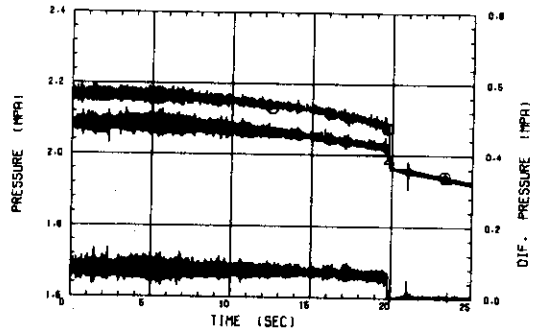
FIG. B3-1-1

RUN NO 541211-106

HT VOL. NUMBER = 19  
 HT FILE NUMBER = 0  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 49.0 (VOLT)  
 HEATING POWER = 87.0 (KW)  
 HEAT FLUX = 3.461 E+6 (W/SQCM)  
 INLET TEMPERATURE = 161.1 (DEG-C)  
 INITIAL MASS VELOCITY = 1711.0 (KG/S, SQCM)  
 PRESSURE = 1.93 (MPA)  
 INITIAL EXIT QUALITY = 0.225

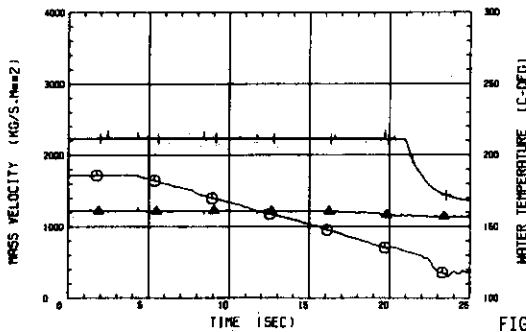
RUN 541211-106

○--- P-IN    △--- P-OUT    +--- DIF.PRES



RUN 541211-106

○--- G-IN    △--- T-IN    +--- T-OUT



RUN 541211-106

○--- 10 MM    △--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◇--- 200 MM    ↑--- VOLT

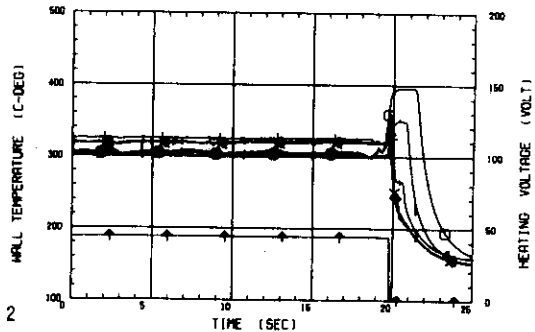


FIG. B3-1-2

RUN NO 541211-108

HT VOL. NUMBER = 19  
 HT FILE NUMBER = 8  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 43.9 (VOLT)  
 HEATING POWER = 86.5 (KW)  
 HEAT FLUX = 3.440 E+6 (W/SQM)  
 INLET TEMPERATURE = 161.0 (DEG-C)  
 INITIAL MASS VELOCITY = 1741.2 (KG/S.SQM)  
 PRESSURE = 1.98 (MPA)  
 INITIAL EXIT QUALITY = 0.214

RUN 541211-108  
 O--- P-IN    Δ--- P-OUT    +--- DIF.PRES

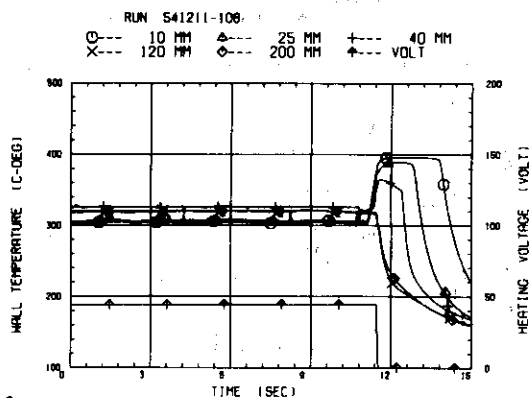
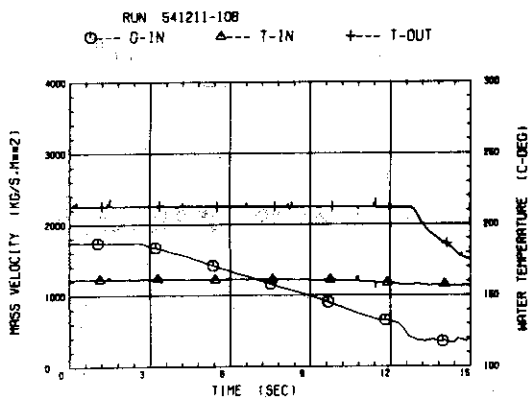
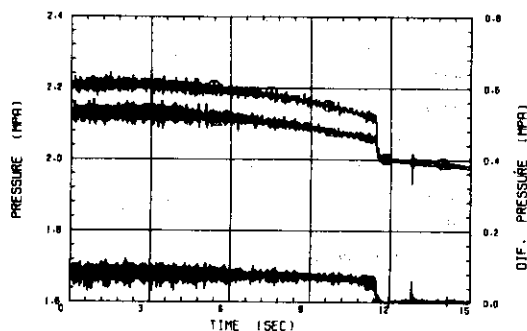


FIG. B3- 1- 3

RUN NO 541211-111

HT VOL. NUMBER = 19  
 HT FILE NUMBER = 11  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 44.0 (VOLT)  
 HEATING POWER = 88.5 (KW)  
 HEAT FLUX = 3.443 E+6 (W/SQM)  
 INLET TEMPERATURE = 161.1 (DEG-C)  
 INITIAL MASS VELOCITY = 1745.9 (KG/S.SQM)  
 PRESSURE = 1.99 (MPA)  
 INITIAL EXIT QUALITY = 0.215

RUN 541211-111  
 O--- P-IN    Δ--- P-OUT    +--- DIF.PRES

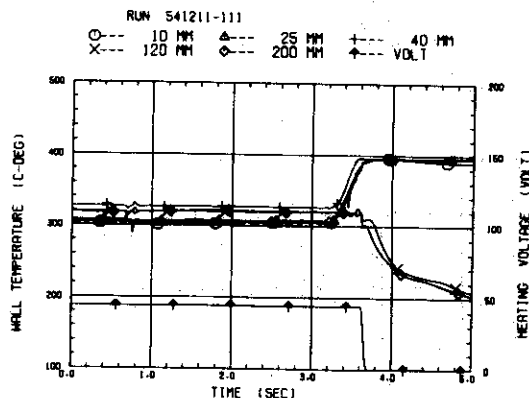
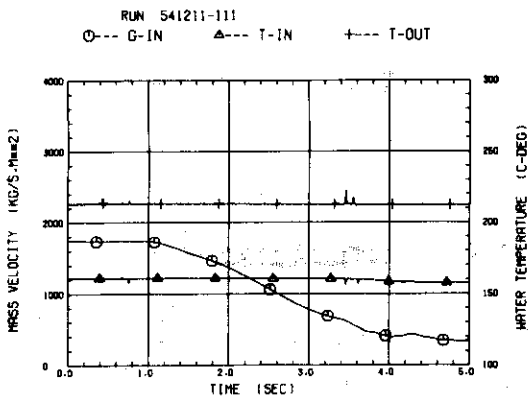
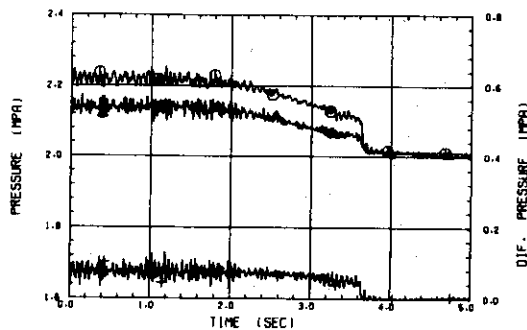
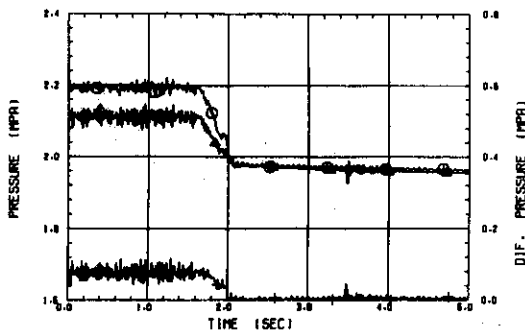


FIG. B3- 1- 4

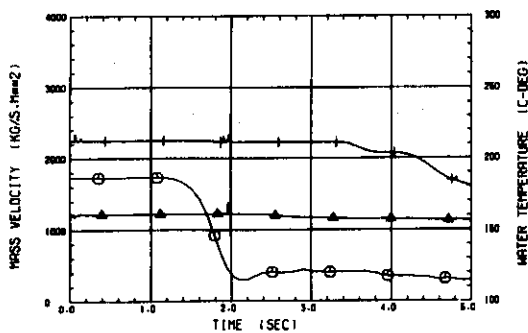
RUN NO 541211-112

RT VOL# NUMBER = 19  
 RT FILE NUMBER = 12  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 49.1 (VOLT)  
 HEATING POWER = 66.9 (KW)  
 HEAT FLUX =  $3.45 \times 10^6$  (W/SQM)  
 INLET TEMPERATURE = 160.7 (DEG-C)  
 INITIAL MASS VELOCITY = 1730.0 (KG/S.SQM)  
 PRESSURE = 1.96 (MPA)  
 INITIAL EXIT QUALITY = 0.218

RUN 541211-112  
 O--- P-IN    Δ--- P-OUT    +--- DIF.PRES



RUN 541211-112  
 O--- D-IN    Δ--- T-IN    +--- T-OUT



RUN 541211-112  
 O--- 10 MM    Δ--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◊--- 200 MM    +--- VOLT

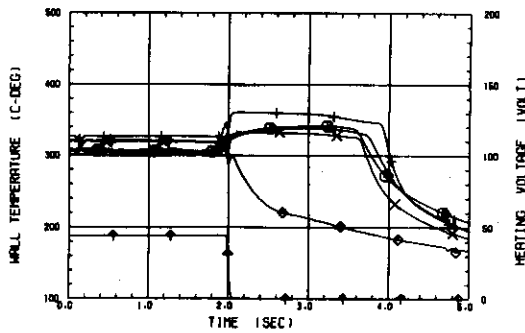
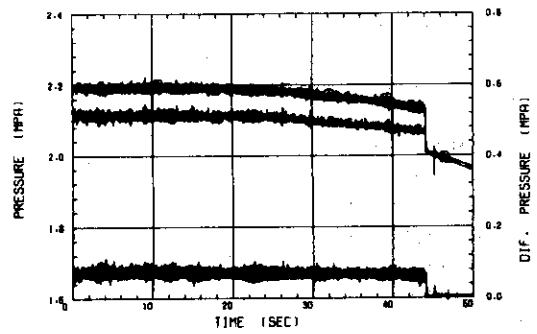


FIG. B3- 1- 5

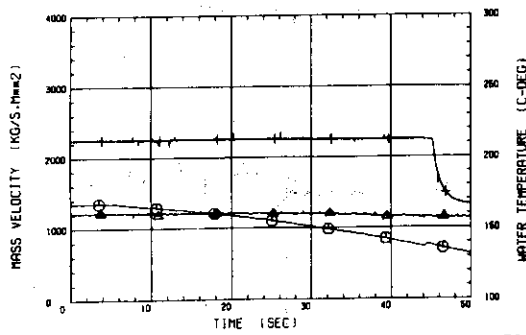
RUN NO 541211-114

RT VOL. NUMBER = 17  
 RT FILE NUMBER = 14  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 44.2 (VOLT)  
 HEATING POWER = 67.3 (KW)  
 HEAT FLUX =  $3.475 \times 10^6$  (W/SQM)  
 INLET TEMPERATURE = 150.7 (DEG-C)  
 INITIAL MASS VELOCITY = 1343.4 (KG/S.SQM)  
 PRESSURE = 1.98 (MPA)  
 INITIAL EXIT QUALITY = 0.317

RUN 541211-114  
 O--- P-IN    Δ--- P-OUT    +--- DIF.PRES



RUN 541211-114  
 O--- G-IN    Δ--- T-IN    +--- T-OUT



RUN 541211-114  
 O--- 10 MM    Δ--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◊--- 200 MM    ↑--- VOLT

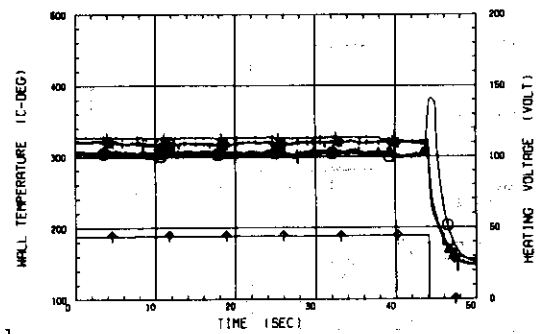
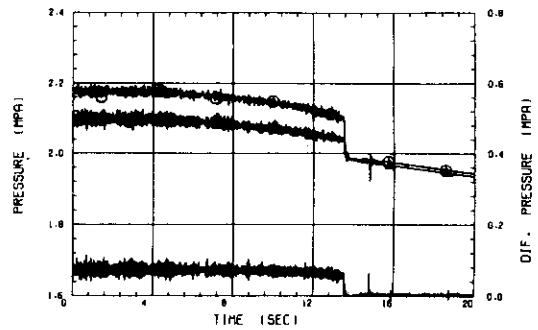


FIG. B3- 2- 1

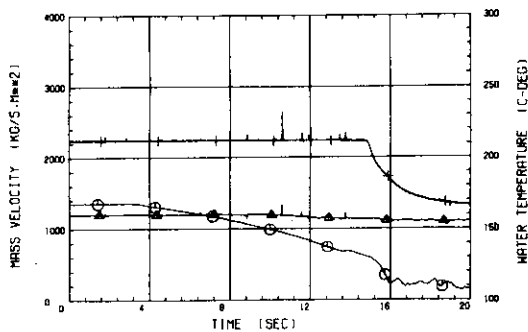
RUN NO 541211-117

RT VOL. NUMBER = 17  
 RT FILE NUMBER = 17  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 44.1 (VOLT)  
 HEATING POWER = 67.0 (KW)  
 HEAT FLUX =  $3.462 \times 10^6$  (W/SQM)  
 INLET TEMPERATURE = 152.7 (DEG-C)  
 INITIAL MASS VELOCITY = 1323.1 (KG/S.SQM)  
 PRESSURE = 1.96 (MPA)  
 INITIAL EXIT QUALITY = 0.311

RUN 541211-117  
 O--- P-IN    Δ--- P-OUT    +--- DIF.PRES



RUN 541211-117  
 O--- G-IN    Δ--- T-IN    +--- T-OUT



RUN 541211-117  
 O--- 10 MM    Δ--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◊--- 200 MM    ↑--- VOLT

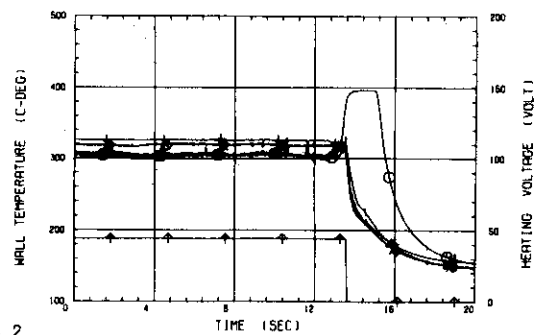
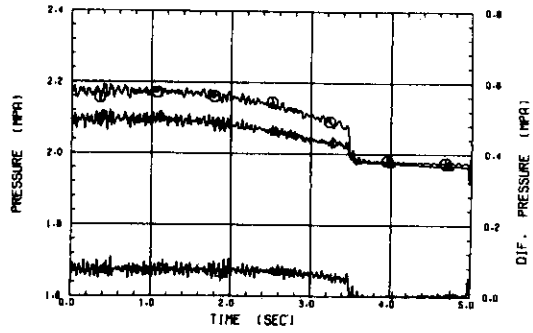


FIG. B3- 2- 2

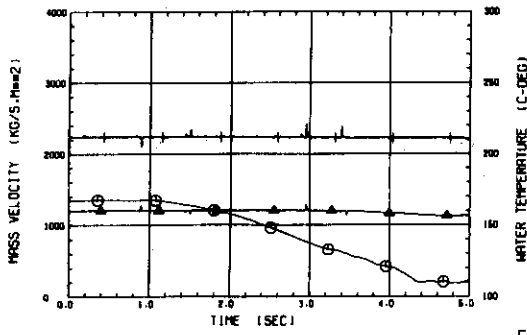
RUN NO 541211-120

RT VOL. NUMBER = 19  
 RT FILE NUMBER = 20  
 SAMPLING INTERVAL = 0.0 (4SEC)  
 HEATING VOLTAGE = 44.0 (VOLT)  
 HEATING POWER = 86.7 (KW)  
 HEAT FLUX =  $3.443 \times 10^6$  (W/CM<sup>2</sup>)  
 INLET TEMPERATURE = 160.0 (DEG-C)  
 INITIAL MASS VELOCITY = 1344.4 (KG/S, SQM)  
 PRESSURE = 1.96 (MPA)  
 INITIAL EXIT QUALITY = 0.312

RUN 541211-120  
 ○--- P-IN    △--- P-OUT    +--- DIF.PRES



RUN 541211-120  
 ○--- G-IN    △--- T-IN    +--- T-OUT



RUN 541211-120  
 ○--- 10 MM    △--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◇--- 200 MM    \*--- VOLT

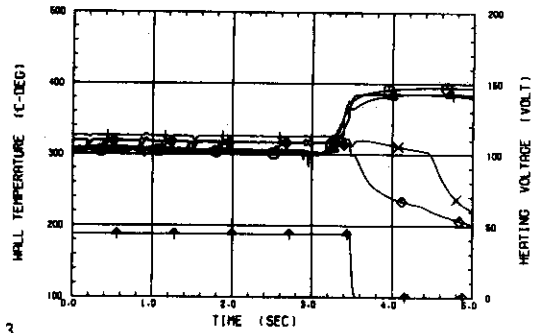
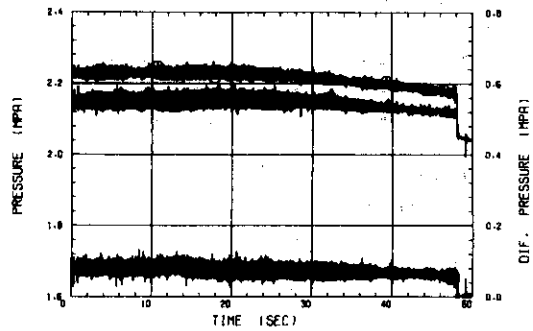


FIG. B3-2-3

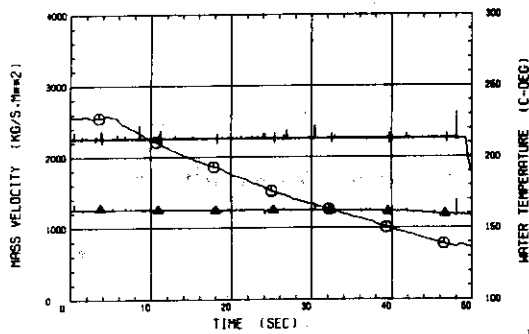
RUN NO 541212 - 13

MT VOL. NUMBER = 19  
 MT FILE NUMBER = 34  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 44.0 (VOLT)  
 HEATING POWER = 86.5 (KW)  
 HEAT FLUX = 3.452 E+6 (W/SQM)  
 INLET TEMPERATURE = 162.5 (DEG-C)  
 INITIAL MASS VELOCITY = 2562.9 (KG/S.SQM)  
 PRESSURE = 1.98 (MPA)  
 INITIAL EXIT QUALITY = 0.112

RUN 541212-013  
 O--- P-IN    Δ--- P-OUT    +--- DIF.PRES



RUN 541212-013  
 O--- G-IN    Δ--- T-IN    +--- T-OUT



RUN 541212-013  
 O--- 10 MM    Δ--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◊--- 200 MM    ↑--- VOLT

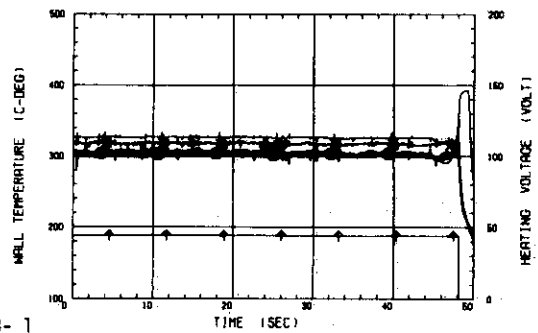
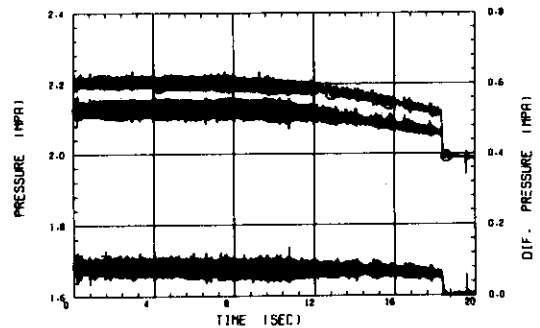


FIG. B3- 3- 1

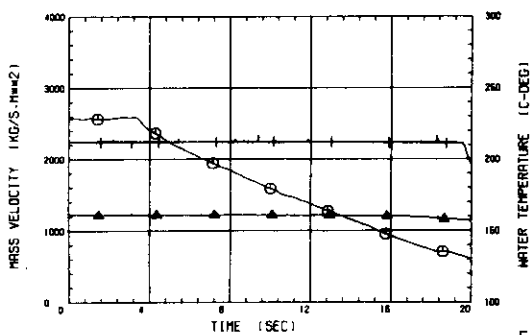
RUN NO 541212 - 3

MT VOL. NUMBER = 19  
 MT FILE NUMBER = 24  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 44.0 (VOLT)  
 HEATING POWER = 86.5 (KW)  
 HEAT FLUX = 3.443 E+6 (W/SQM)  
 INLET TEMPERATURE = 161.3 (DEG-C)  
 INITIAL MASS VELOCITY = 2568.4 (KG/S.SQM)  
 PRESSURE = 1.96 (MPA)  
 INITIAL EXIT QUALITY = 0.108

RUN 541212-003  
 O--- P-IN    Δ--- P-OUT    +--- DIF.PRES



RUN 541212-003  
 O--- G-IN    Δ--- T-IN    +--- T-OUT



RUN 541212-003  
 O--- 10 MM    Δ--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◊--- 200 MM    ↑--- VOLT

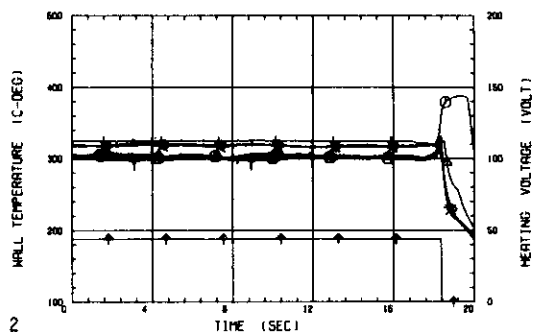


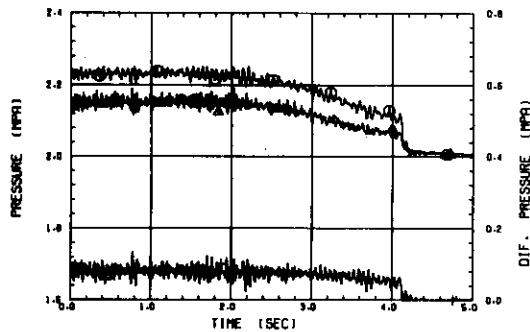
FIG. B3- 3- 2



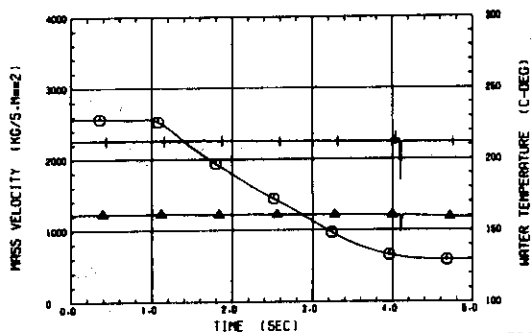
RUN NO 541212 - 14

MT VOL. NUMBER = 19  
 MT FILE NUMBER = 35  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 44.2 (VOLT)  
 HEATING POWER = 87.2 (KW)  
 HEAT FLUX = 3.471 E+6 (W/SQM)  
 INLET TEMPERATURE = 161.2 (DEG-C)  
 INITIAL MASS VELOCITY = 2562.8 (KG/S,SQM)  
 PRESSURE = 1.98 (MPA)  
 INITIAL EXIT QUALITY = 0.109

RUN 541212-014  
 O--- P-IN    Δ--- P-OUT    +--- DIF.PRES



RUN 541212-014  
 O--- G-IN    Δ--- T-IN    +--- T-OUT



RUN 541212-014  
 O--- 10 MM    Δ--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◊--- 200 MM    ◆--- VOLT

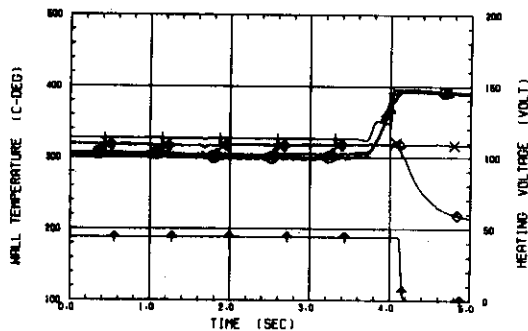
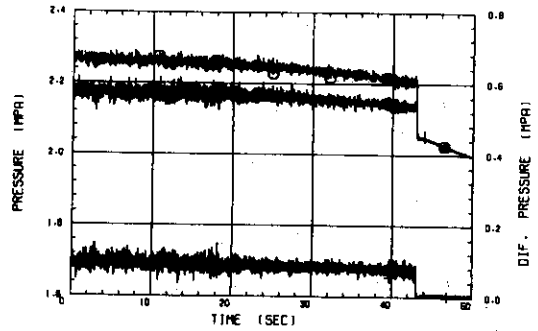


FIG. B3- 3- 3

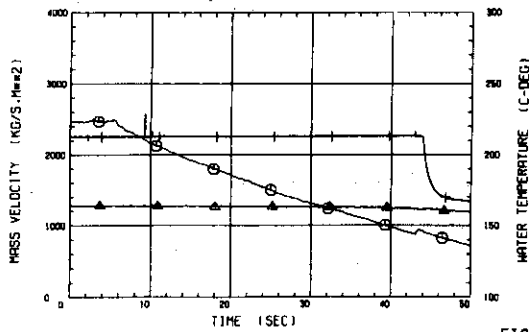
RUN NO 541212 - 25

MT VOL. NUMBER = 20  
 MT FILE NUMBER = 6  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 45.9 (VOLT)  
 HEATING POWER = 93.8 (KW)  
 HEAT FLUX = 3.732 E+6 (W/SQM)  
 INLET TEMPERATURE = 163.5 (DEG-C)  
 INITIAL MASS VELOCITY = 2464.4 (KG/S.SQM)  
 PRESSURE = 1.97 (MPA)  
 INITIAL EXIT QUALITY = 0.143

RUN 541212-025  
 ○--- P-IN    △--- P-OUT    +--- DIF.PRES



RUN 541212-025  
 ○--- G-IN    △--- T-IN    +--- T-OUT



RUN 541212-025  
 ○--- 10 MM    △--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◇--- 200 MM    +--- VOLT

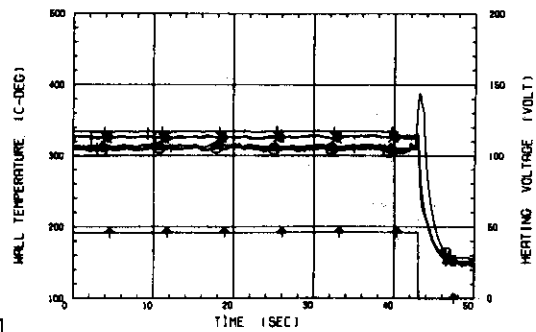
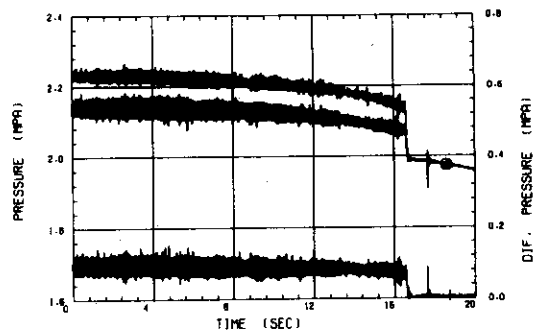


FIG. B3- 4- 1

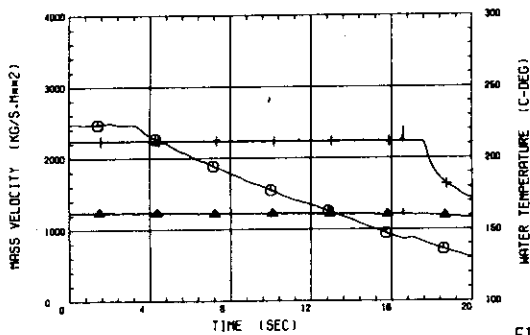
RUN NO 541212 - 16

MT VOL. NUMBER = 19  
 MT FILE NUMBER = 37  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 46.1 (VOLT)  
 HEATING POWER = 94.6 (KW)  
 HEAT FLUX = 3.766 E+6 (W/SQM)  
 INLET TEMPERATURE = 162.0 (DEG-C)  
 INITIAL MASS VELOCITY = 2470.0 (KG/S.SQM)  
 PRESSURE = 1.94 (MPA)  
 INITIAL EXIT QUALITY = 0.143

RUN 541212-016  
 ○--- P-IN    △--- P-OUT    +--- DIF.PRES



RUN 541212-016  
 ○--- G-IN    △--- T-IN    +--- T-OUT



RUN 541212-016  
 ○--- 10 MM    △--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◇--- 200 MM    +--- VOLT

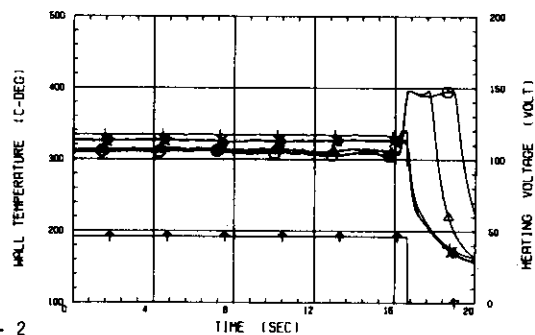
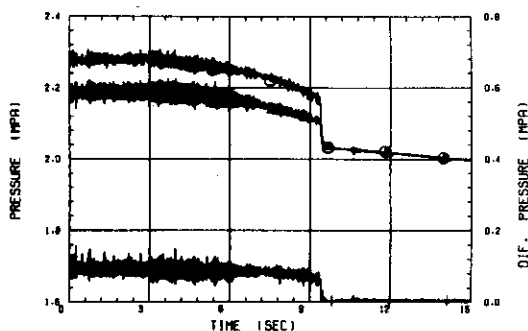


FIG. B3- 4- 2

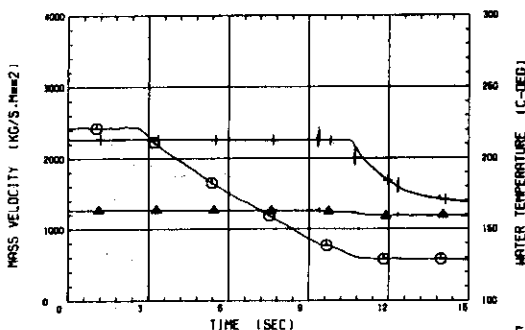
RUN NO 541212 - 19

MT VOL. NUMBER = 19  
 MT FILE NUMBER = 40  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 46.1 (VOLT)  
 HEATING POWER = 94.6 (KW)  
 HEAT FLUX = 3.765 E+6 (W/SQM)  
 INLET TEMPERATURE = 163.2 (DEG-C)  
 INITIAL MASS VELOCITY = 2425.3 (KG/S.SQM)  
 PRESSURE = 1.98 (MPA)  
 INITIAL EXIT QUALITY = 0.147

RUN 541212-019  
 ○--- P-IN    △--- P-OUT    +--- DIF.PRES



RUN 541212-019  
 ○--- G-IN    △--- T-IN    +--- T-OUT



RUN 541212-019  
 ○--- 10 MM    △--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◇--- 200 MM    ◆--- VOLT

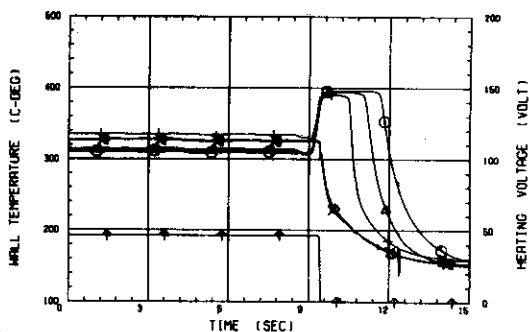
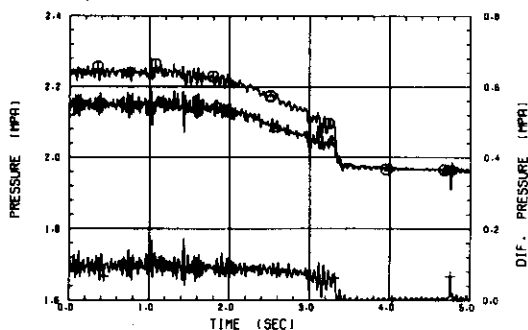


FIG. B3- 4- 3

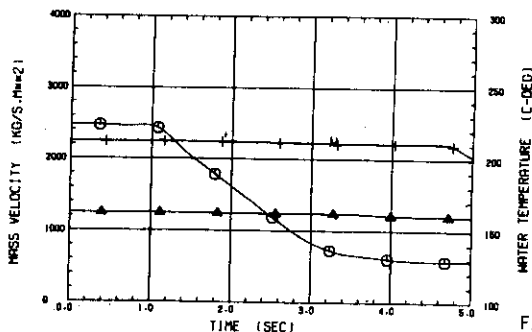
RUN NO 541212 - 21

MT VOL. NUMBER = 20  
 MT FILE NUMBER = 2  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 46.0 (VOLT)  
 HEATING POWER = 94.5 (KW)  
 HEAT FLUX = 3.760 E+6 (W/SQM)  
 INLET TEMPERATURE = 162.4 (DEG-C)  
 INITIAL MASS VELOCITY = 2968.8 (KG/S.SQM)  
 PRESSURE = 1.94 (MPA)  
 INITIAL EXIT QUALITY = 0.143

RUN 541212-021  
 ○--- P-IN    △--- P-OUT    +--- DIF.PRES



RUN 541212-021  
 ○--- G-IN    △--- T-IN    +--- T-OUT



RUN 541212-021  
 ○--- 10 MM    △--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◇--- 200 MM    ◆--- VOLT

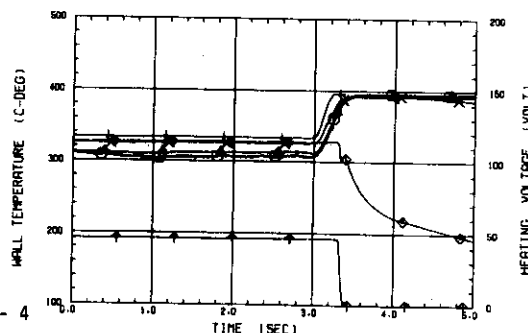
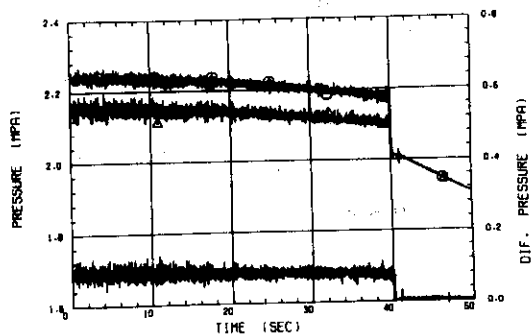


FIG. B3- 4- 4

RUN NO 541212 - 27

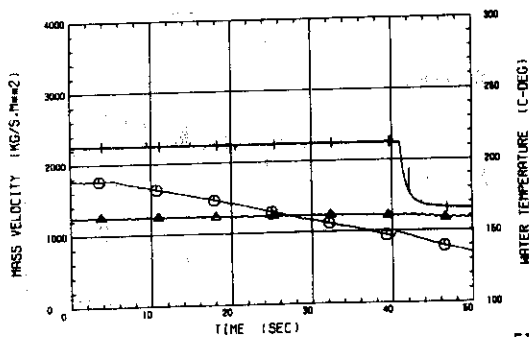
HT VOL. NUMBER = 20  
 HT FILE NUMBER = 8  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 46.0 (VOLT)  
 HEATING POWER = 94.3 (KW)  
 HEAT FLUX =  $3.753 \times 10^6$  (W/SQM)  
 INLET TEMPERATURE = 162.2 (DEG-C)  
 INITIAL MASS VELOCITY = 1769.4 (KG/S.SQM)  
 PRESSURE = 1.97 (MPA)  
 INITIAL EXIT QUALITY = 0.242

RUN 541212-027  
 ○--- P-IN    △--- P-OUT    +--- DIF.PRES



RUN 541212-027

○--- G-IN    △--- T-IN    +--- T-OUT



RUN 541212-027

○--- 10 MM    △--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◇--- 200 MM    \*--- VOLT

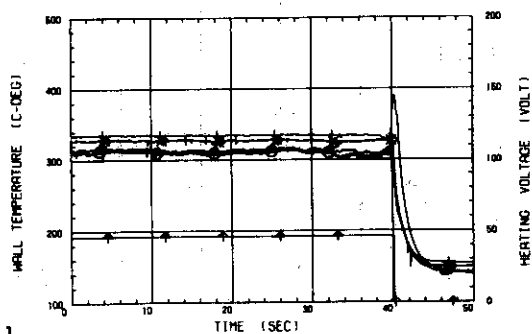
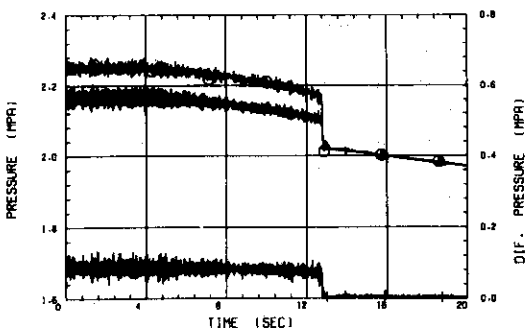


FIG. B3- 5- 1

RUN NO 541212 - 29

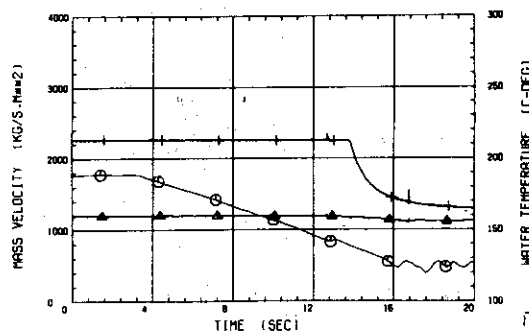
HT VOL. NUMBER = 20  
 HT FILE NUMBER = 10  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 46.1 (VOLT)  
 HEATING POWER = 94.8 (KW)  
 HEAT FLUX =  $3.772 \times 10^6$  (W/SQM)  
 INLET TEMPERATURE = 160.3 (DEG-C)  
 INITIAL MASS VELOCITY = 1766.7 (KG/S.SQM)  
 PRESSURE = 1.98 (MPA)  
 INITIAL EXIT QUALITY = 0.239

RUN 541212-029  
 ○--- P-IN    △--- P-OUT    +--- DIF.PRES



RUN 541212-029

○--- G-IN    △--- T-IN    +--- T-OUT



RUN 541212-029

○--- 10 MM    △--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◇--- 200 MM    \*--- VOLT

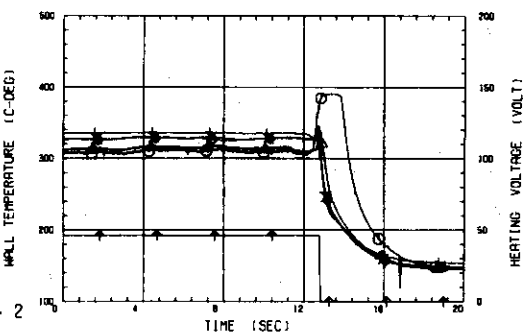
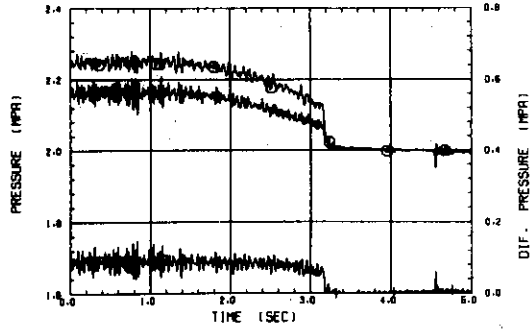


FIG. B3- 5- 2

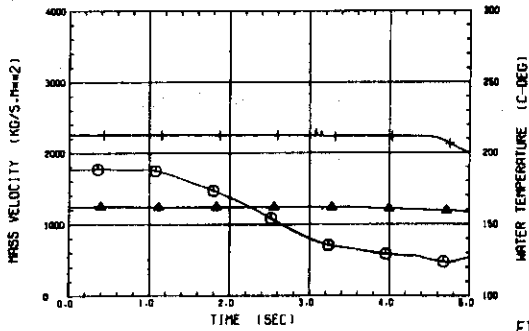
RUN NO 541212 - 31

HT VOL. NUMBER = 20  
 HT FILE NUMBER = 12  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 46.1 (VOLT)  
 HEATING POWER = 94.5 (KW)  
 HEAT FLUX = 3.762 E+6 (W/CM<sup>2</sup>)  
 INLET TEMPERATURE = 162.1 (DEG-C)  
 INITIAL MASS VELOCITY = 1765.3 (KG/S-CM)  
 PRESSURE = 1.98 (MPA)  
 INITIAL EXIT QUALITY = 0.243

RUN 541212-031  
 O--- P-IN    Δ--- P-OUT    +--- DIF.PRES



RUN 541212-031  
 O--- G-IN    Δ--- T-IN    +--- T-OUT



RUN 541212-031  
 O--- 10 MM    Δ--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◊--- 200 MM    \*--- VOLT

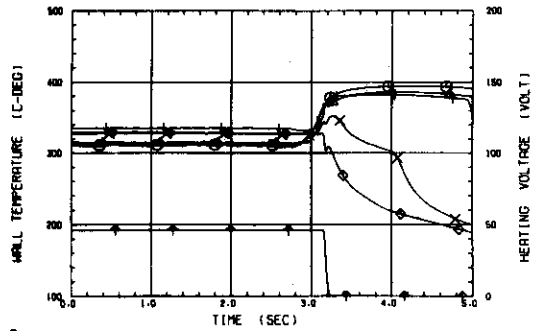
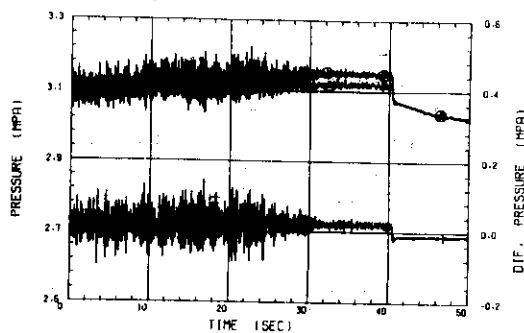


FIG. B3- 5- 3

RUN NO 541102-102

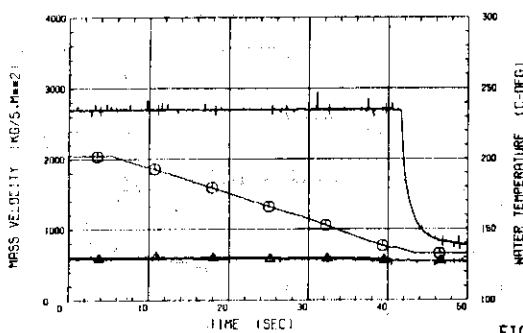
MT VOL. NUMBER = 9  
 MT FILE NUMBER = 2  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 46.0 (VOLT)  
 HEATING POWER = 93.3 (KW)  
 HEAT FLUX = 3.711 E+6 (W/SQM)  
 INLET TEMPERATURE = 129.9 (DEG-C)  
 INITIAL MASS VELOCITY = 2047.9 (KG/S,SQM)  
 PRESSURE = 3.02 (MPA)  
 INITIAL EXIT QUALITY = 0.064

RUN 541102-102  
 O--- P-IN    Δ--- P-OUT    +--- DIF.PRES



RUN 541102-102

○--- G-IN    Δ--- T-IN    +--- T-OUT



RUN 541102-102

○--- 10 MM    Δ--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◇--- 200 MM    ♣--- VOLT

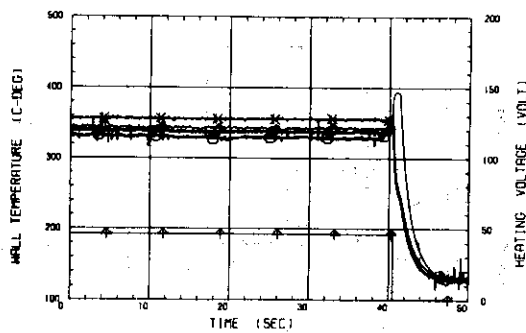
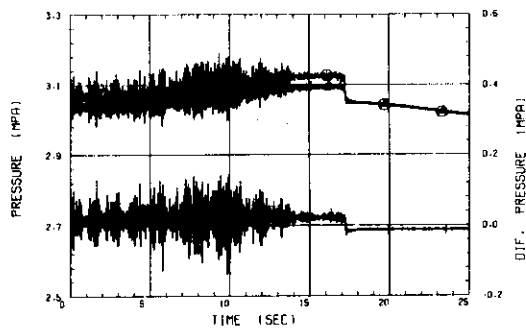


FIG. B4- 1- 1

RUN NO 541102-105

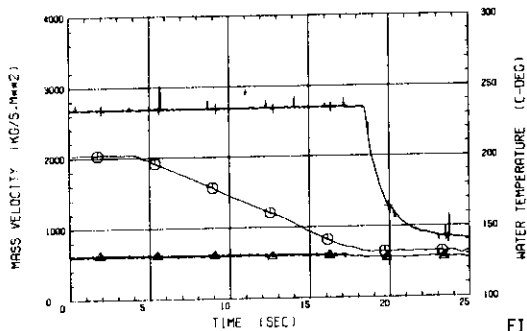
MT VOL. NUMBER = 9  
 MT FILE NUMBER = 5  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 46.0 (VOLT)  
 HEATING POWER = 92.8 (KW)  
 HEAT FLUX = 3.694 E+6 (W/SQM)  
 INLET TEMPERATURE = 130.4 (DEG-C)  
 INITIAL MASS VELOCITY = 2034.7 (KG/S,SQM)  
 PRESSURE = 2.98 (MPA)  
 INITIAL EXIT QUALITY = 0.068

RUN 541102-105  
 ○--- P-IN    Δ--- P-OUT    +--- DIF.PRES



RUN 541102-105

○--- G-IN    Δ--- T-IN    +--- T-OUT



RUN 541102-105  
 ○--- 10 MM    Δ--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◇--- 200 MM    ♣--- VOLT

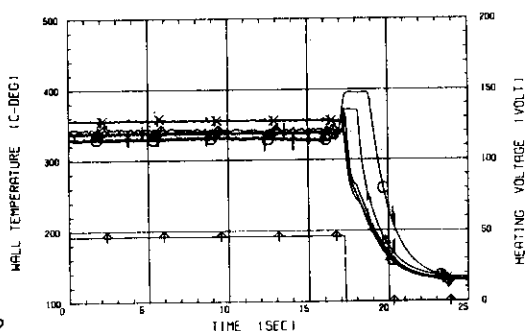
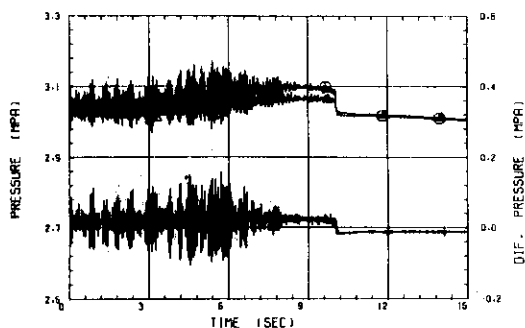


FIG. B4- 1- 2

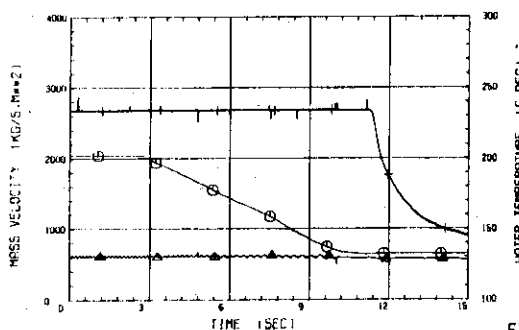
RUN NO 541102-107

NF VOL. NUMBER = 9  
 MT FILE NUMBER = 7  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 46.0 (VOLT)  
 HEATING POWER = 93.3 (KW)  
 HEAT FLUX = 3.711 E+6 (W/SQM)  
 INLET TEMPERATURE = 130.5 (DEG-C)  
 INITIAL MASS VELOCITY = 2040.8 (KG/S.SQM)  
 PRESSURE = 2.96 (MPA)  
 INITIAL EXIT QUALITY = 0.069

RUN 541102-107  
 O --- P-IN    Δ --- P-OUT    + --- DIF.PRES



RUN 541102-107  
 O --- G-IN    Δ --- T-IN    + --- T-OUT



RUN 541102-107  
 O --- 10 MM    Δ --- 25 MM    + --- 40 MM  
 X --- 120 MM    ◊ --- 200 MM    ◊ --- VOLT

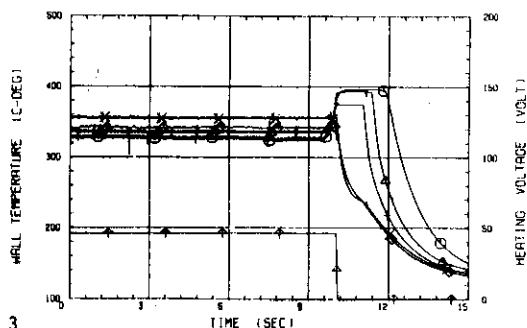
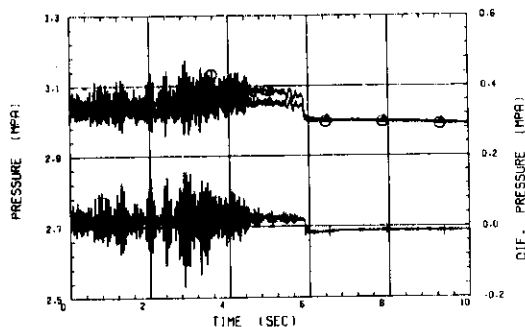


FIG. 84-1-3

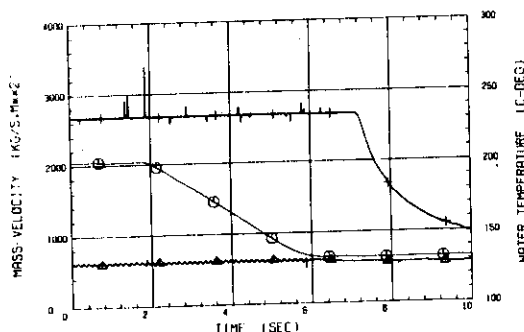
RUN NO 541102-110

MT VOL. NUMBER = 9  
 MT FILE NUMBER = 10  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 46.1 (VOLT)  
 HEATING POWER = 93.5 (KW)  
 HEAT FLUX = 3.772 E+6 (W/SQM)  
 INLET TEMPERATURE = 130.9 (DEG-C)  
 INITIAL MASS VELOCITY = 2039.5 (KG/S.SQM)  
 PRESSURE = 2.96 (MPA)  
 INITIAL EXIT QUALITY = 0.072

RUN 541102-110  
 O --- P-IN    Δ --- P-OUT    + --- DIF.PRES



RUN 541102-110  
 O --- G-IN    Δ --- T-IN    + --- T-OUT



RUN 541102-110  
 O --- 10 MM    Δ --- 25 MM    + --- 40 MM  
 X --- 120 MM    ◊ --- 200 MM    ◊ --- VOLT

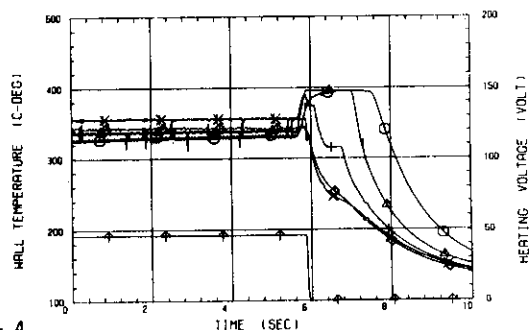
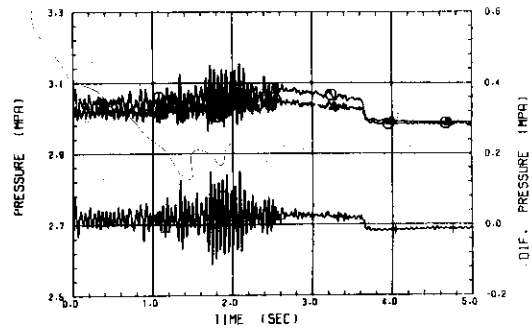


FIG. 84-1-4

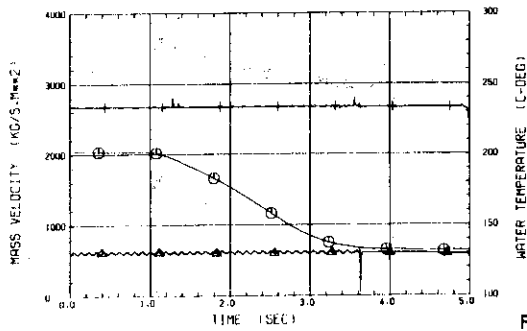
RUN NO 541102-112

MT VOL. NUMBER = 9  
 MT FILE NUMBER = 12  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 46.0 (VOLT)  
 HEATING POWER = 93.2 (KW)  
 HEAT FLUX = 3.710 E+6 (W/50MM)  
 INLET TEMPERATURE = 130.6 (DEG-C)  
 INITIAL MASS VELOCITY = 2040.4 (KG/S.50MM)  
 PRESSURE = 2.96 (MPA)  
 INITIAL EXIT QUALITY = 0.070

RUN 541102-112  
 O--- P-IN    Δ--- P-OUT    +--- DIF.PRES



RUN 541102-112  
 O--- G-IN    Δ--- T-IN    +--- T-OUT



RUN 541102-112  
 O--- 10 MM    Δ--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◊--- 200 MM    +--- VOLT

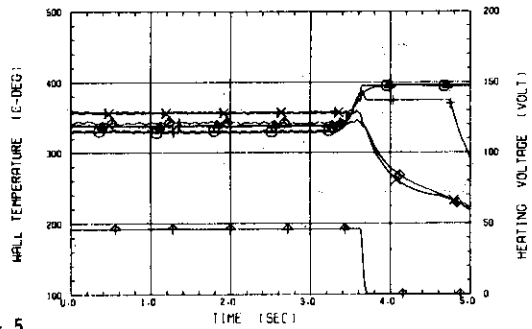


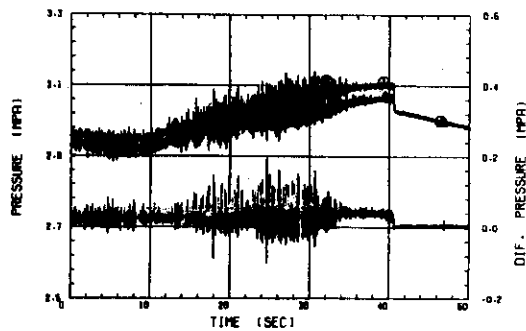
FIG. B4-1-5



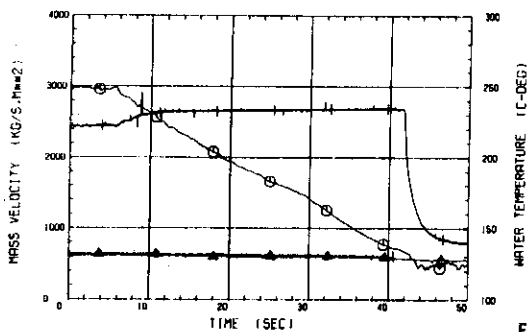
RUN NO 541107 - 2

MT VOL. NUMBER = 9  
 MT FILE NUMBER = 16  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 46.0 (VOLT)  
 HEATING POWER = 93.2 (KW)  
 HEAT FLUX = 3.710 E+6 (W/50MM)  
 INLET TEMPERATURE = 131.5 (DEG-C)  
 INITIAL MASS VELOCITY = 2951.5 (KG/S,50MM)  
 PRESSURE = 2.91 (MPA)  
 INITIAL EXIT QUALITY = -0.026

RUN 541107-002  
 O--- P-IN    A--- P-OUT    +--- DIF.PRES



RUN 541107-002  
 O--- G-IN    A--- T-IN    +--- T-OUT



RUN 541107-002  
 O--- 10 MM    A--- 25 MM    +--- 40 MM  
 X--- 120 MM    O--- 200 MM    +--- VOLT

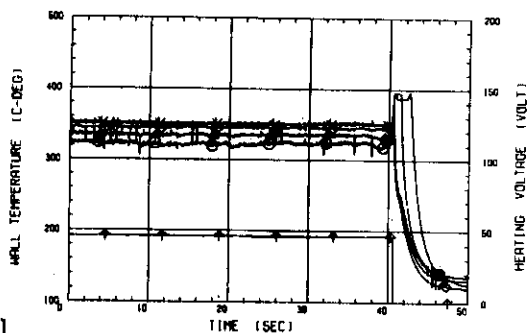
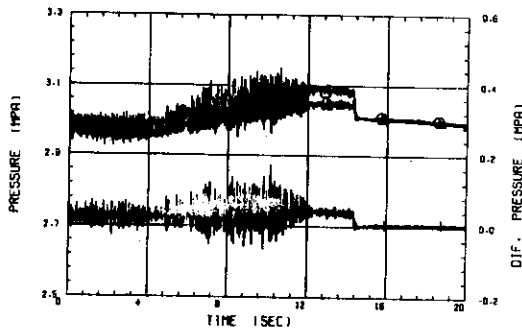


FIG. 84- 2- 1

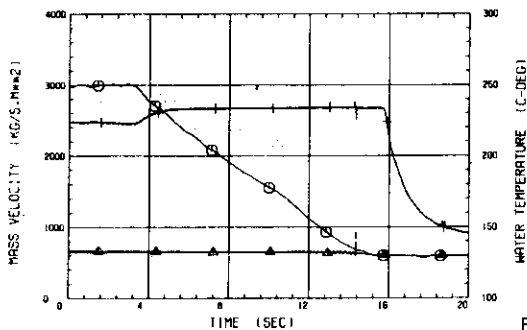
RUN NO 541107 - 6

MT VOL. NUMBER = 9  
 MT FILE NUMBER = 20  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 46.1 (VOLT)  
 HEATING POWER = 93.6 (KW)  
 HEAT FLUX = 3.723 E+6 (W/50MM)  
 INLET TEMPERATURE = 133.0 (DEG-C)  
 INITIAL MASS VELOCITY = 2977.1 (KG/S,50MM)  
 PRESSURE = 2.94 (MPA)  
 INITIAL EXIT QUALITY = -0.025

RUN 541107-006  
 O--- P-IN    A--- P-OUT    +--- DIF.PRES



RUN 541107-006  
 O--- G-IN    A--- T-IN    +--- T-OUT



RUN 541107-006  
 O--- 10 MM    A--- 25 MM    +--- 40 MM  
 X--- 120 MM    O--- 200 MM    +--- VOLT

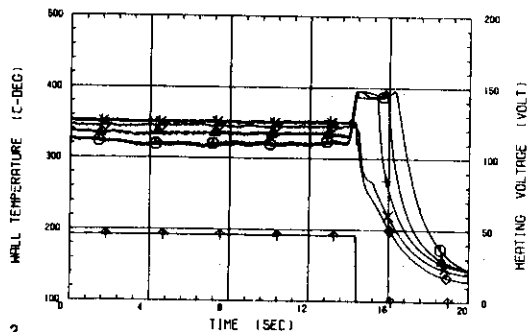


FIG. 84- 2- 2

RUN NO 541107 - 8

MT VOL. NUMBER = 9  
 MT FILE NUMBER = 22  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 46.0 (VOLT)  
 HEATING POWER = 93.5 (KW)  
 HEAT FLUX = 3.720 E+6 (W/SQM)  
 INLET TEMPERATURE = 132.4 (DEG-C)  
 INITIAL MASS VELOCITY = 2980.6 (KG/S, SQM)  
 PRESSURE = 2.95 (MPA)  
 INITIAL EXIT QUALITY = -0.027

RUN 541107-008  
 O--- P-IN    Δ--- P-OUT    +--- DIF.PRES

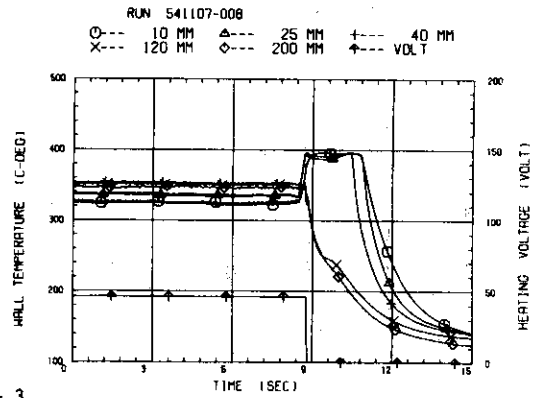
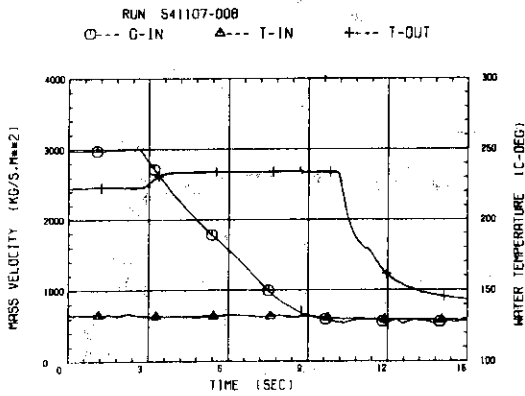
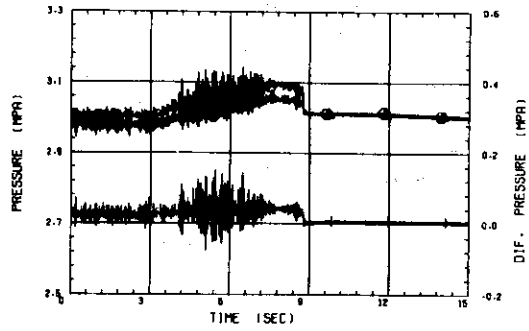


FIG. B4- 2- 3

RUN NO 541107 - 12

MT VOL. NUMBER = 9  
 MT FILE NUMBER = 26  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 46.1 (VOLT)  
 HEATING POWER = 93.7 (KW)  
 HEAT FLUX = 3.726 E+6 (W/SQM)  
 INLET TEMPERATURE = 132.2 (DEG-C)  
 INITIAL MASS VELOCITY = 2949.9 (KG/S, SQM)  
 PRESSURE = 2.94 (MPA)  
 INITIAL EXIT QUALITY = -0.024

RUN 541107-012  
 O--- P-IN    Δ--- P-OUT    +--- DIF.PRES

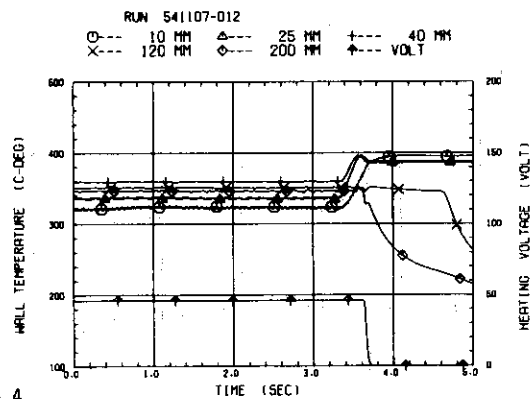
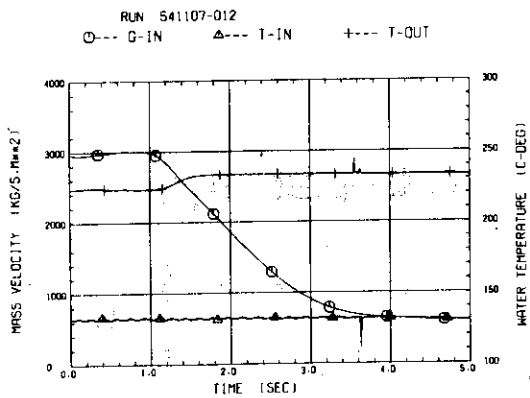
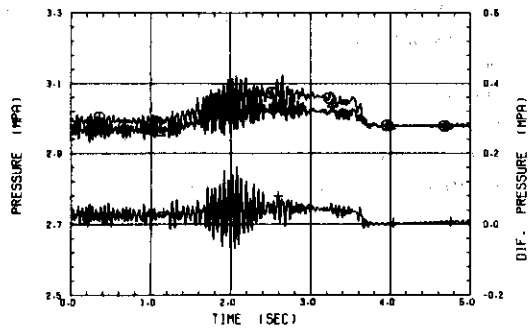


FIG. B4- 2- 4

RUN NO 541107 - 13

HT VOL. NUMBER = 9  
 HT FILE NUMBER = 27  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 46.0 (VOLT)  
 HEATING POWER = 95.3 (KW)  
 HEAT FLUX = 3.710 E+6 (W/SQM)  
 INLET TEMPERATURE = 137.8 (DEG-C)  
 INITIAL MASS VELOCITY = 3026.8 (KG/S.SQM)  
 PRESSURE = 2.95 (MPA)  
 INITIAL EXIT QUALITY = -0.030

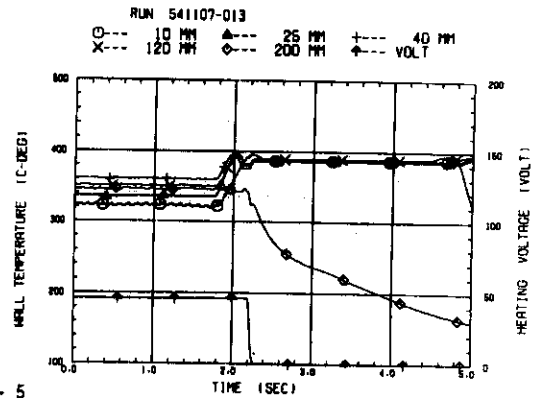
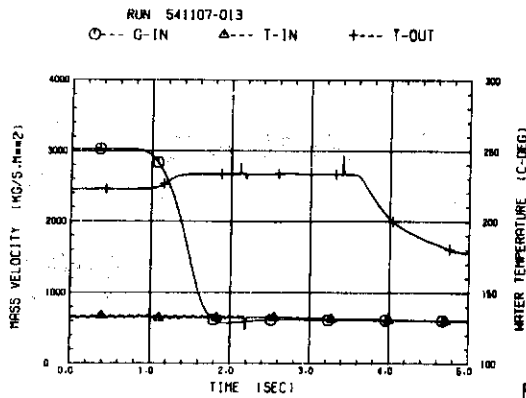
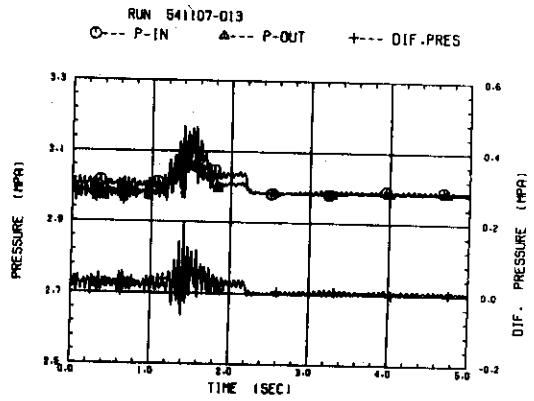
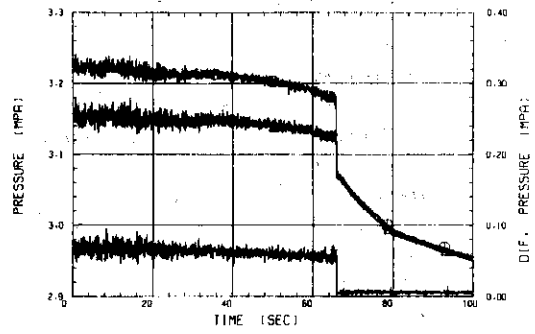


FIG. B4- 2- 5

RUN NO 541109-117

- HT VOL. NUMBER = 10
- HT FILE NUMBER = 17
- SAMPLING INTERVAL = 5.0 (MSEC)
- HEATING VOLTAGE = 46.1 (VOLT)
- HEATING POWER = 93.3 (KW)
- HEAT FLUX = 3.713 E+6 (W/SQM)
- INLET TEMPERATURE = 160.7 (DEG-C)
- INITIAL MASS VELOCITY = 1707.1 (KG/S.SQM)
- PRESSURE = 3.04 (MPA)
- INITIAL EXIT QUALITY = 0.252

RUN 541109-117  
 O--- P-IN    Δ--- P-OUT    I--- DIF-PRES



RUN 541109-117

O--- G-IN    Δ--- T-IN    +--- T-OUT

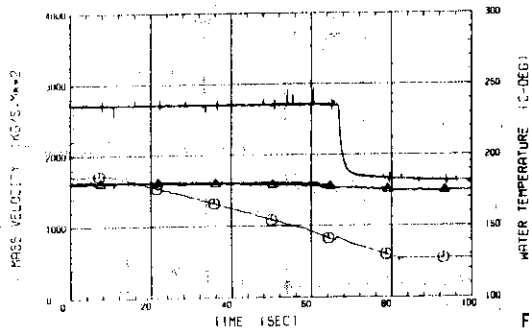
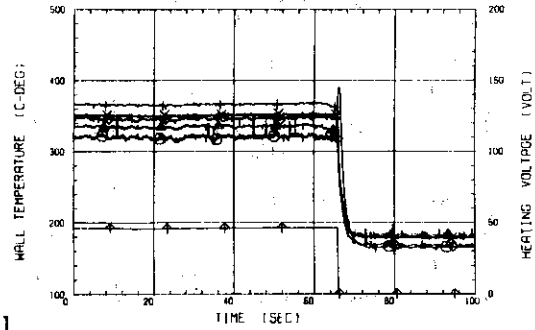


FIG. B4- 3- 1

RUN 541109-117

O--- 10 MM    Δ--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◊--- 200 MM    +--- VOLT

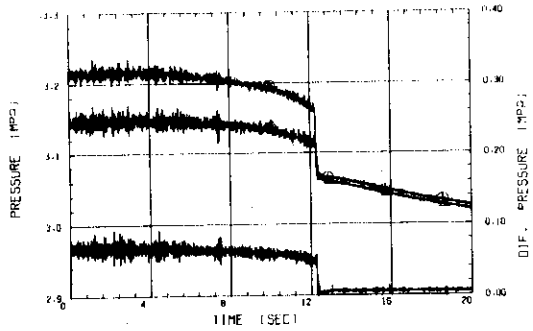


RUN NO 541109-110

- HT VOL. NUMBER = 10
- HT FILE NUMBER = 5
- SAMPLING INTERVAL = 5.0 (MSEC)
- HEATING VOLTAGE = 65.9 (VOLT)
- HEATING POWER = 92.8 (KW)
- HEAT FLUX = 3.601 E+6 (W/SQM)
- INLET TEMPERATURE = 179.5 (DEG-C)
- INITIAL MASS VELOCITY = 1703.3 (KG/S.SQM)
- PRESSURE = 3.03 (MPA)
- INITIAL EXIT QUALITY = 0.247

RUN 541109-110

O--- P-IN    Δ--- P-OUT    I--- DIF-PRES



RUN 541109-110

O--- G-IN    Δ--- T-IN    +--- T-OUT

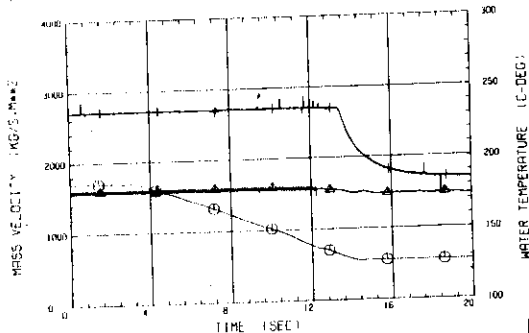
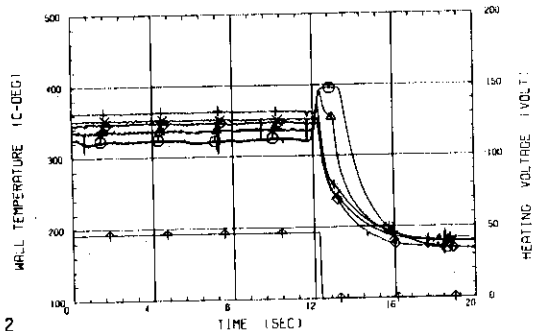


FIG. B4-3- 2

RUN 541109-110

O--- 10 MM    Δ--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◊--- 200 MM    +--- VOLT



RUN NO 541109-113

MT VOL. NUMBER = 10  
 MT FILE NUMBER = 8  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 44.1 (VOLT)  
 HEATING POWER = 93.4 (KW)  
 HEAT FLUX =  $3.717 \times 10^6$  (KW/SQM)  
 INLET TEMPERATURE = 182.7 (DEG-C)  
 INITIAL MASS VELOCITY = 1683.8 (KG/S.SQM)  
 PRESSURE = 3.01 (MPA)  
 INITIAL EXIT QUALITY = 0.263

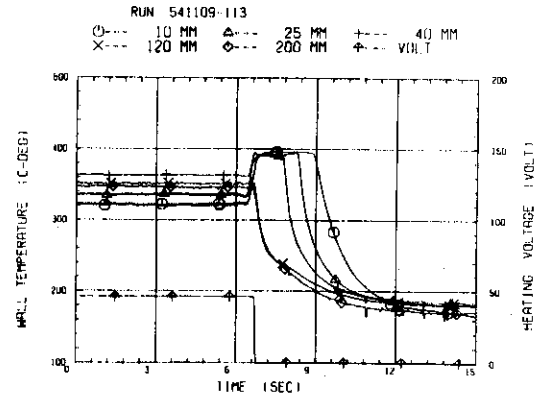
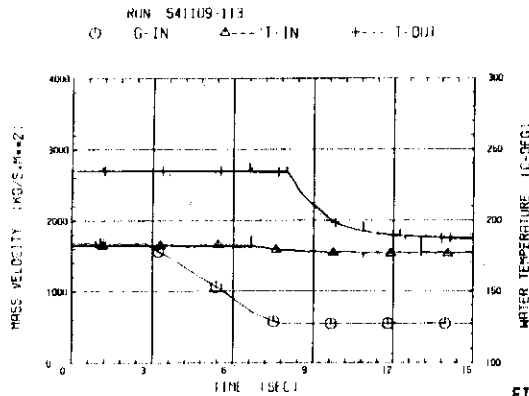
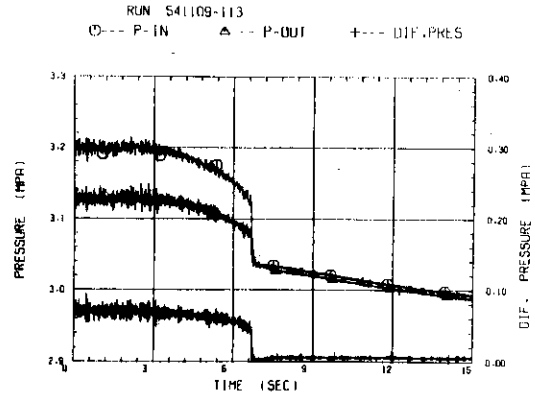


FIG. B4- 3- 3

RUN NO 541109-116

MT VOL. NUMBER = 10  
 MT FILE NUMBER = 11  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 46.0 (VOLT)  
 HEATING POWER = 93.0 (KW)  
 HEAT FLUX =  $3.701 \times 10^6$  (KW/SQM)  
 INLET TEMPERATURE = 179.9 (DEG-C)  
 INITIAL MASS VELOCITY = 1710.0 (KG/S.SQM)  
 PRESSURE = 3.04 (MPA)  
 INITIAL EXIT QUALITY = 0.248

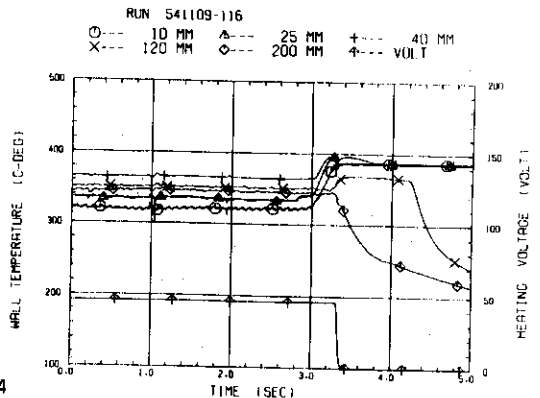
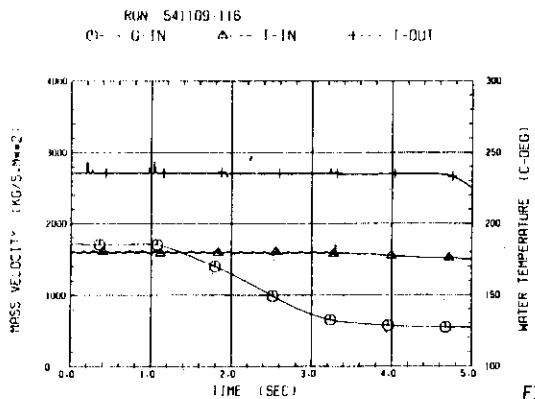
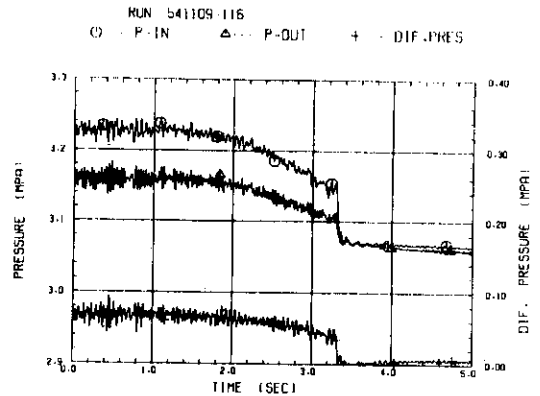
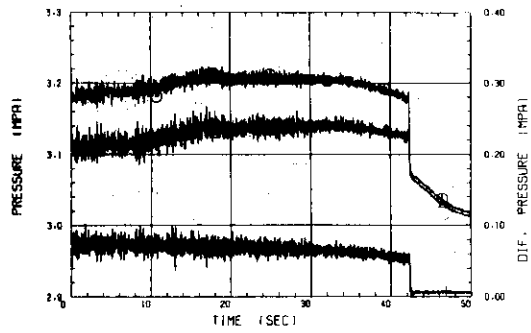


FIG. B4- 3- 4

RUN NO 541113 - 2

RE VOL. NUMBER    =    10  
 RE FILE NUMBER    =    15  
 SAMPLING INTERVAL   =    5.0 (MSEC)  
 HEATING VOLTAGE    =    46.0 (VOLT)  
 HEATING POWER      =    93.2 (KW)  
 HEAT FLUX          =    3.710 E+6 (W/SQCM)  
 INLET TEMPERATURE   =    186.7 (DEG-C)  
 INITIAL MASS VELOCITY =   2560.9 (KG/S,50MM)  
 PRESSURE           =    2.98 (MPA)  
 INITIAL EXIT QUALITY =    0.124

RUN 541113- 2  
 O--- P-IN    Δ--- P-OUT    +--- DIF.PRES



RUN 541113- 2  
 O--- G-IN    Δ--- T-IN    +--- T-OUT

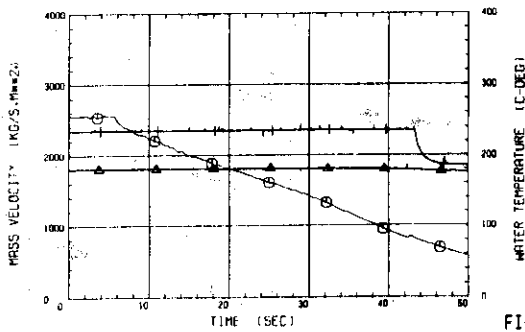
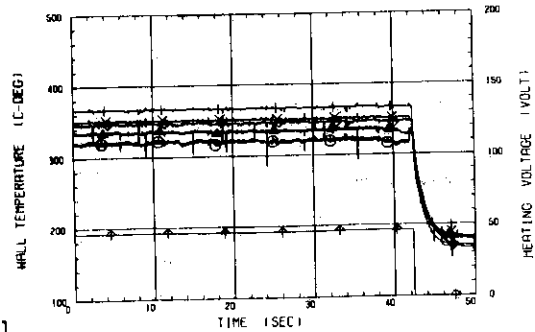


FIG. B4- 4- 1

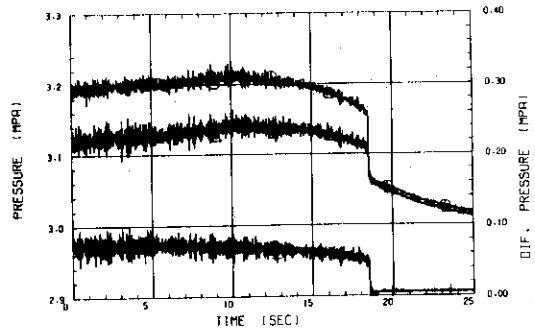
RUN 541113- 2  
 O--- 10 MM    Δ--- 25 MM    +--- 40 MM  
 X--- 120 MM   ◇--- 200 MM   +--- VOLT



RUN NO 541113 - 4

RE VOL. NUMBER    =    10  
 RE FILE NUMBER    =    17  
 SAMPLING INTERVAL   =    5.0 (MSEC)  
 HEATING VOLTAGE    =    46.0 (VOLT)  
 HEATING POWER      =    93.1 (KW)  
 HEAT FLUX          =    3.704 E+6 (W/SQCM)  
 INLET TEMPERATURE   =    180.2 (DEG-C)  
 INITIAL MASS VELOCITY =   2612.9 (KG/S,50MM)  
 PRESSURE           =    3.00 (MPA)  
 INITIAL EXIT QUALITY =    0.117

RUN 541113-004  
 O--- P-IN    Δ--- P-OUT    +--- DIF.PRES



RUN 541113-004  
 O--- G-IN    Δ--- T-IN    +--- T-OUT

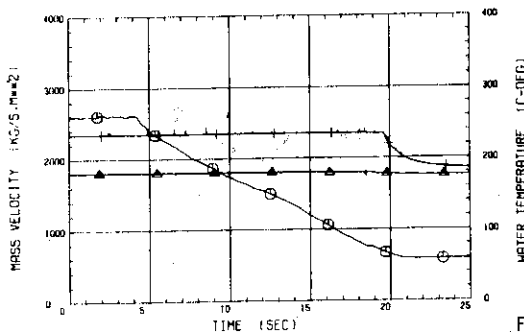
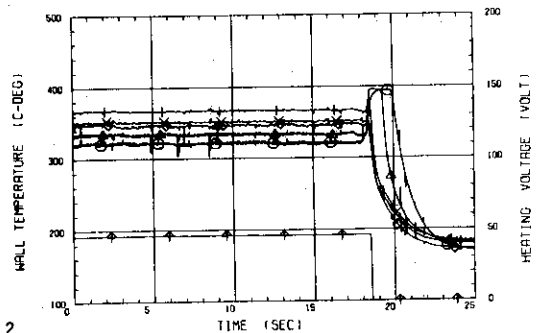


FIG. B4- 4- 2

RUN 541113-004  
 O--- 10 MM    Δ--- 25 MM    +--- 40 MM  
 X--- 120 MM   ◇--- 200 MM   +--- VOLT



RUN NO 541113 - 6  
 HT VOL. NUMBER = 10  
 HT FILE NUMBER = 19  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 46.2 (VOLT)  
 HEATING POWER = 93.9 (KW)  
 HEAT FLUX = 3.737 E+6 (W/SQM)  
 INLET TEMPERATURE = 180.3 (DEG-C)  
 INITIAL MASS VELOCITY = 2599.3 (KG/S,SQM)  
 PRESSURE = 3.01 (MPA)  
 INITIAL EXIT QUALITY = 0.120

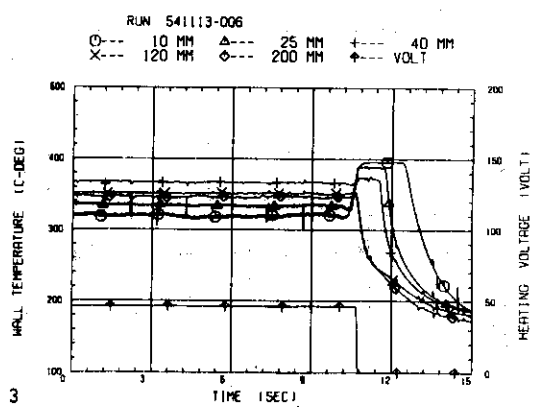
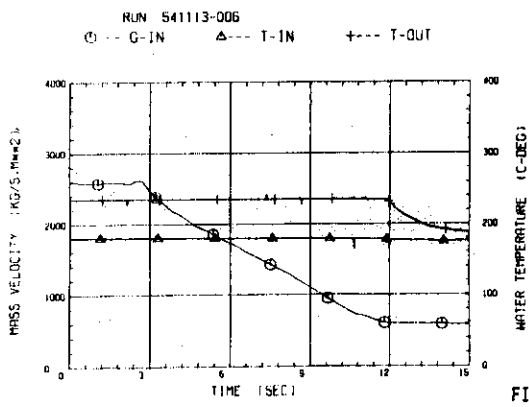
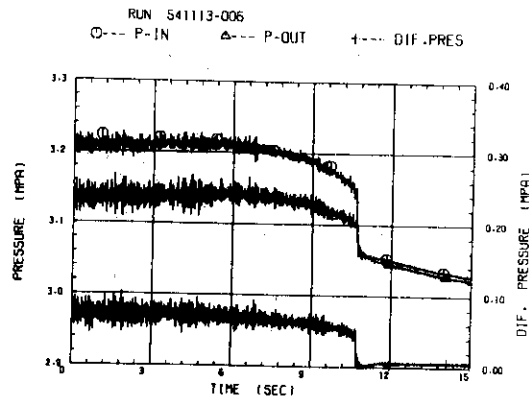


FIG. B4- 4- 3

RUN NO 541113 - 11  
 HT VOL. NUMBER = 11  
 HT FILE NUMBER = 24  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 45.9 (VOLT)  
 HEATING POWER = 92.2 (KW)  
 HEAT FLUX = 3.670 E+6 (W/SQM)  
 INLET TEMPERATURE = 180.1 (DEG-C)  
 INITIAL MASS VELOCITY = 2617.3 (KG/S,SQM)  
 PRESSURE = 3.01 (MPA)  
 INITIAL EXIT QUALITY = 0.113

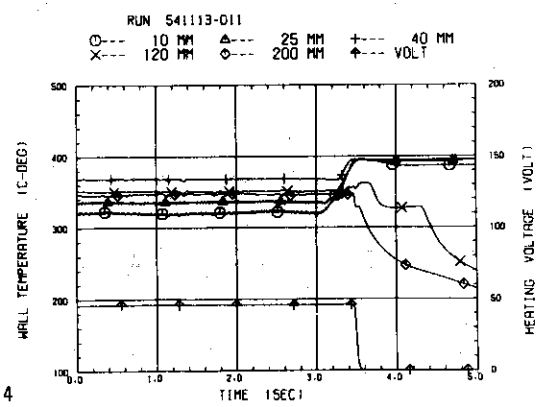
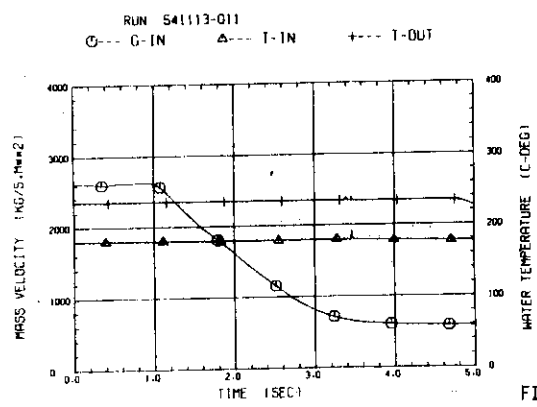
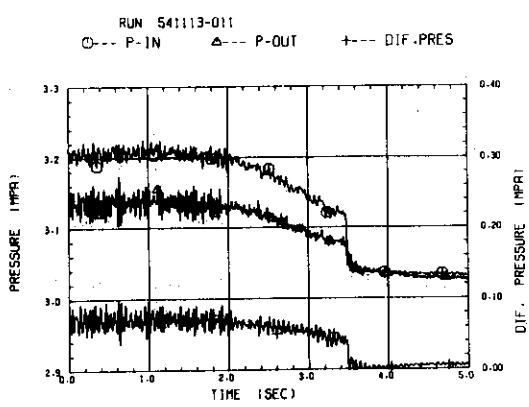


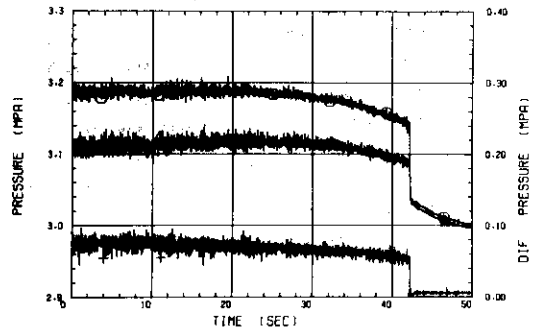
FIG. B4- 4- 4

RUN NO 541113 - 15

MT VOL. NUMBER = 10  
 MT FILE NUMBER = 28  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 46.0 (VOLT)  
 HEATING POWER = 93.3 (KW)  
 HEAT FLUX = 3.714 E+6 (W/SM)  
 INLET TEMPERATURE = 182.4 (DEG-C)  
 INITIAL MASS VELOCITY = 2142.7 (KG/S,SM)  
 PRESSURE = 2.98 (MPA)  
 INITIAL EXIT QUALITY = 0.179

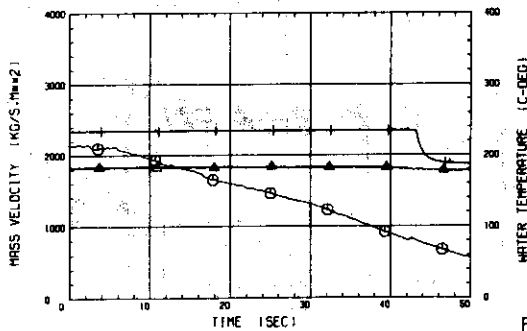
RUN 541113-015

○--- P-IN    △--- P-OUT    +--- DIF.PRES



RUN 541113-015

○--- G-IN    △--- T-IN    +--- T-OUT



RUN 541113-015

○--- 10 MM    △--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◇--- 200 MM    +--- VOLT

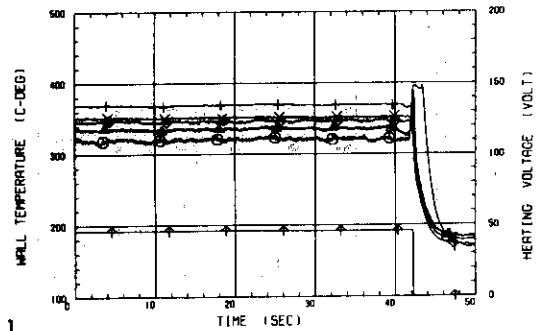


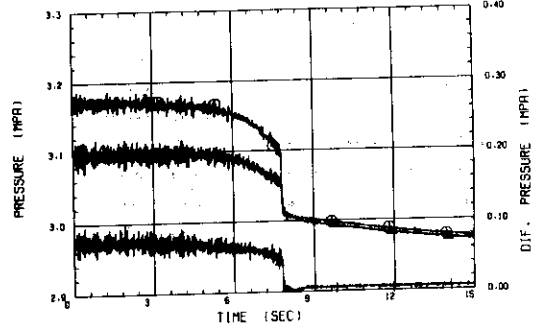
FIG. B4- 5- 1

RUN NO 541113 - 17

MT VOL. NUMBER = 10  
 MT FILE NUMBER = 30  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 46.1 (VOLT)  
 HEATING POWER = 93.6 (KW)  
 HEAT FLUX = 3.715 E+6 (W/SM)  
 INLET TEMPERATURE = 180.3 (DEG-C)  
 INITIAL MASS VELOCITY = 2149.2 (KG/S,SM)  
 PRESSURE = 2.98 (MPA)  
 INITIAL EXIT QUALITY = 0.173

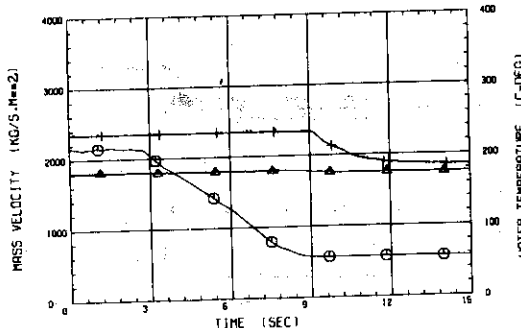
RUN 541113-017

○--- P-IN    △--- P-OUT    +--- DIF.PRES



RUN 541113-017

○--- G-IN    △--- T-IN    +--- T-OUT



RUN 541113-017

○--- 10 MM    △--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◇--- 200 MM    +--- VOLT

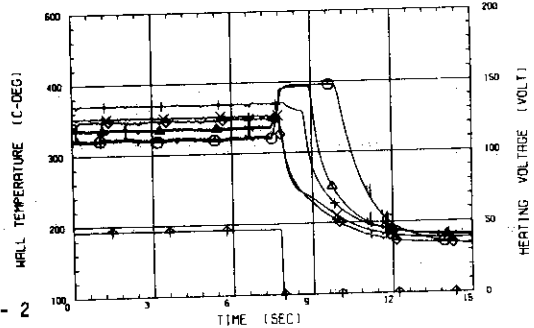


FIG. B4- 5- 2



RUN NO 541113 - 18

MT VOL. NUMBER = 10  
 MT FILE NUMBER = 31  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 46.0 (VOLT)  
 HEATING POWER = 93.4 (KW)  
 HEAT FLUX = 3.715 E+6 (W/SQM)  
 INLET TEMPERATURE = 181.3 (DEG-C)  
 INITIAL MASS VELOCITY = 2105.1 (KG/S, SQMM)  
 PRESSURE = 2.97 (MPA)  
 INITIAL EXIT QUALITY = 0.183

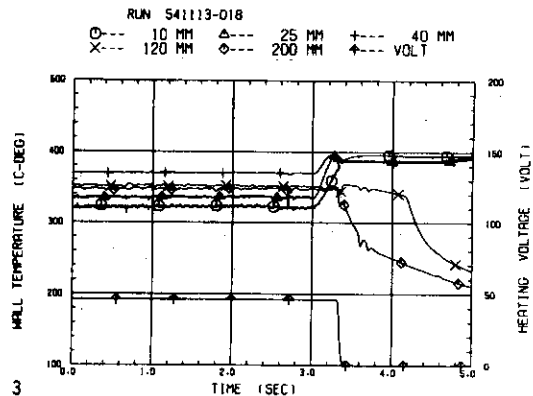
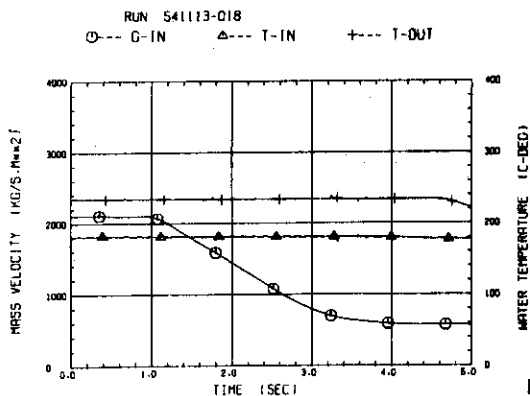
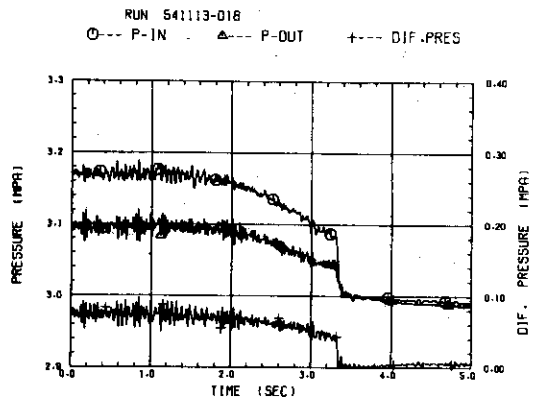
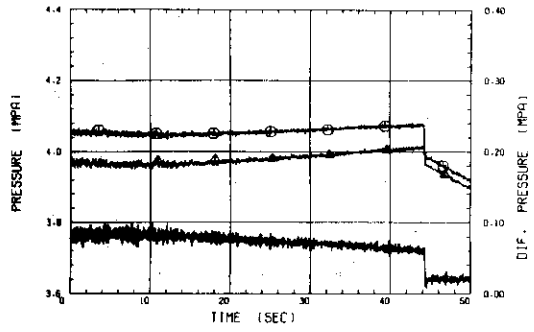


FIG. B4- 5- 3

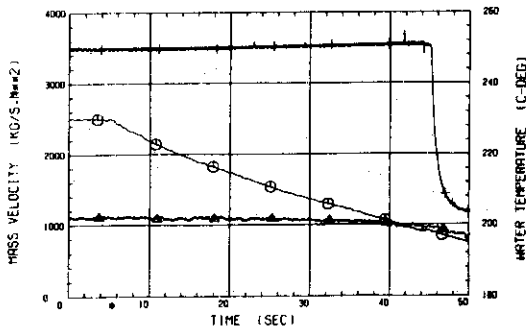
RUN NO 550122 - 13

MT VOL. NUMBER = 22  
 MT FILE NUMBER = 13  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 46.1 (VOLT)  
 HEATING POWER = 92.9 (KW)  
 HEAT FLUX = 3.697 E+6 (W/SQM)  
 INLET TEMPERATURE = 202.1 (DEG-C)  
 INITIAL MASS VELOCITY = 2509.6 (KG/S.SQM)  
 PRESSURE = 3.86 (MPA)  
 INITIAL EXIT QUALITY = 0.149

RUN 550122-013  
 O--- P-IN    Δ--- P-OUT    +--- DIF.PRES



RUN 550122-013  
 O--- G-IN    Δ--- T-IN    +--- T-OUT



RUN 550122-013  
 O--- 10 MM    Δ--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◊--- 200 MM    ◊--- VOLT

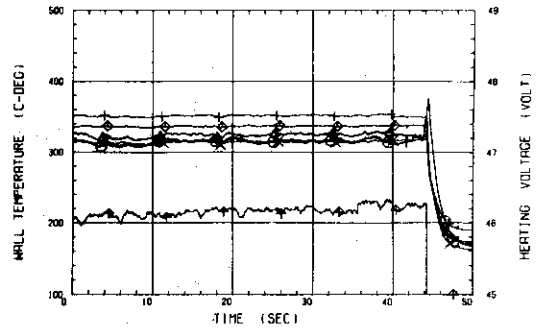
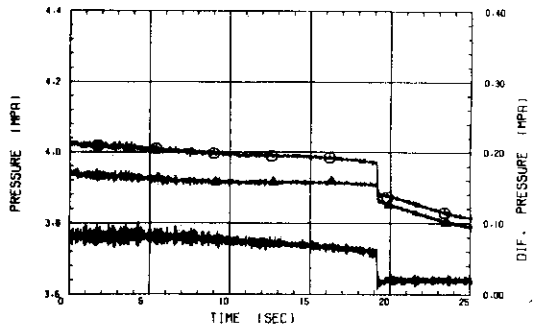


FIG. B5-1-1

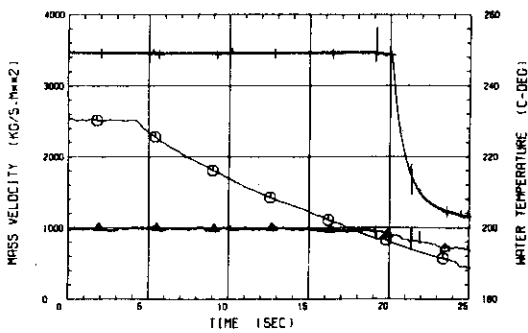
RUN NO 550122 - 9

MT VOL. NUMBER = 22  
 MT FILE NUMBER = 9  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 46.1 (VOLT)  
 HEATING POWER = 92.7 (KW)  
 HEAT FLUX = 3.689 E+6 (W/SQM)  
 INLET TEMPERATURE = 199.5 (DEG-C)  
 INITIAL MASS VELOCITY = 2538.1 (KG/S.SQM)  
 PRESSURE = 3.83 (MPA)  
 INITIAL EXIT QUALITY = 0.139

RUN 550122-009  
 O--- P-IN    Δ--- P-OUT    +--- DIF.PRES



RUN 550122-009  
 O--- G-IN    Δ--- T-IN    +--- T-OUT



RUN 550122-009  
 O--- 10 MM    Δ--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◊--- 200 MM    ◊--- VOLT

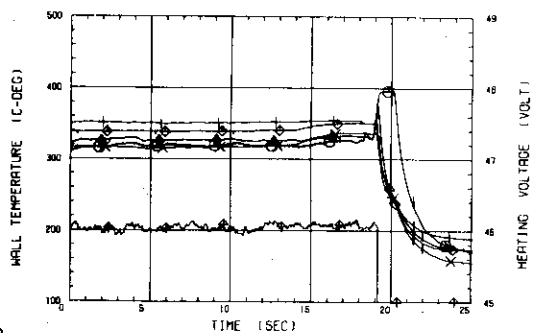
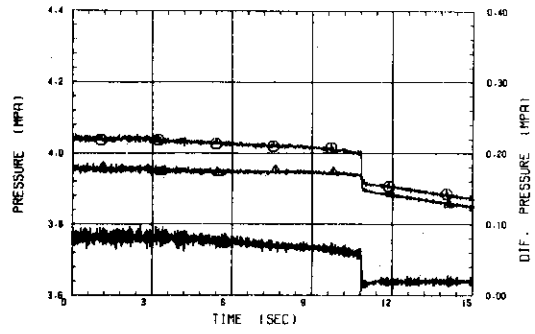


FIG. B5-1-2

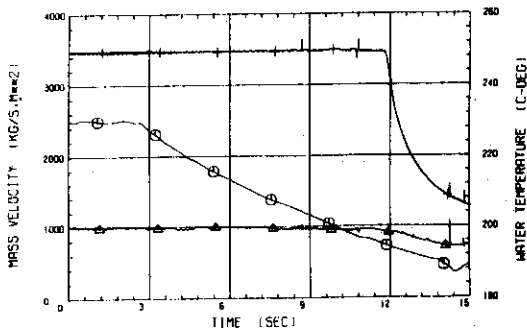
RUN NO 550122 - 2

MT VOL. NUMBER = 22  
 MT FILE NUMBER = 3  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 45.9 (VOLT)  
 HEATING POWER = 92.1 (KW)  
 HEAT FLUX = 3.663 E+6 (W/CM<sup>2</sup>)  
 INLET TEMPERATURE = 200.2 (DEG-C)  
 INITIAL MASS VELOCITY = 2695.0 (KG/S.CM<sup>2</sup>)  
 PRESSURE = 3.85 (MPA)  
 INITIAL EXIT QUALITY = 0.143

RUN 550122-002  
 ○--- P-IN    △--- P-OUT    +--- DIF.PRES



RUN 550122-002  
 ○--- G-IN    △--- T-IN    +--- T-OUT



RUN 550122-002  
 ○--- 10 MM    △--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◇--- 200 MM    +--- VOLT

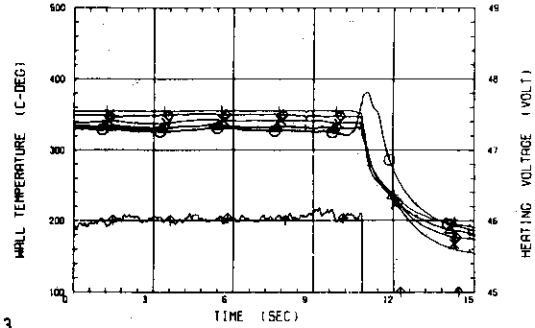
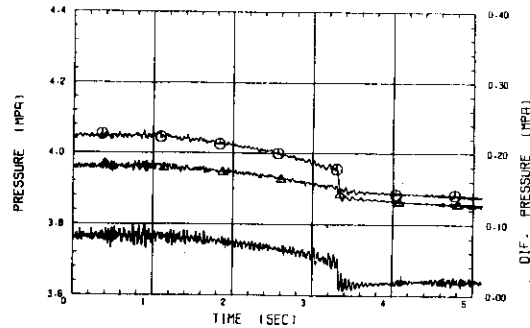


FIG. B5-1-3

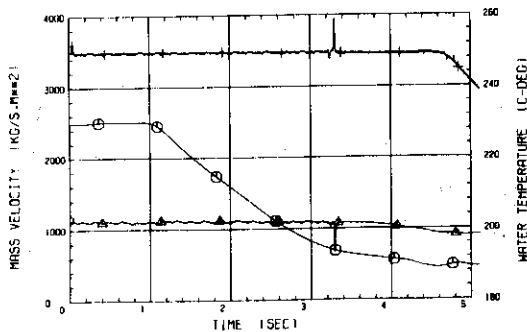
RUN NO 550122 - 5

MT VOL. NUMBER = 22  
 MT FILE NUMBER = 4  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 45.4 (VOLT)  
 HEATING POWER = 91.8 (KW)  
 HEAT FLUX = 3.654 E+6 (W/CM<sup>2</sup>)  
 INLET TEMPERATURE = 202.4 (DEG-C)  
 INITIAL MASS VELOCITY = 2492.4 (KG/S.CM<sup>2</sup>)  
 PRESSURE = 3.86 (MPA)  
 INITIAL EXIT QUALITY = 0.148

RUN 550122-006  
 ○--- P-IN    △--- P-OUT    +--- DIF.PRES



RUN 550122-006  
 ○--- G-IN    △--- T-IN    +--- T-OUT



RUN 550122-006  
 ○--- 10 MM    △--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◇--- 200 MM    +--- VOLT

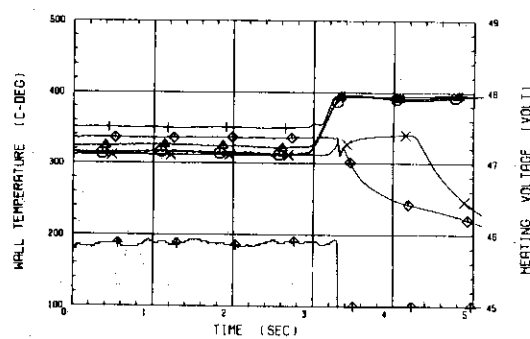
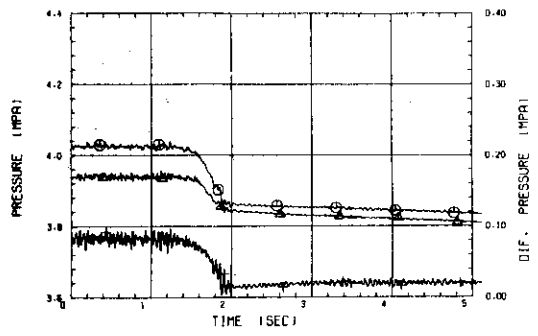


FIG. B5-1-4

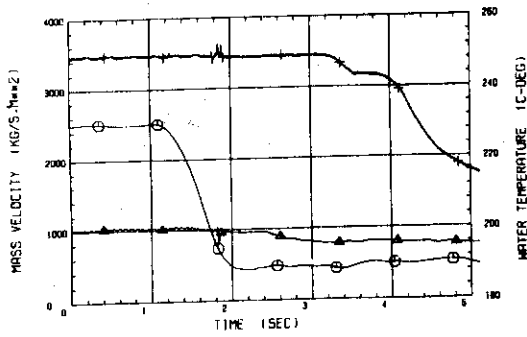
RUN NO 550122 - 7

MT VOL. NUMBER = 22  
 MT FILE NUMBER = 7  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 46.2 (VOLT)  
 HEATING POWER = 93.4 (KW)  
 HEAT FLUX = 3.720 E+6 (W/50MM)  
 INLET TEMPERATURE = 200.3 (DEG-C)  
 INITIAL MASS VELOCITY = 2503.4 (KG/S.50MM)  
 PRESSURE = 3.83 (MPA)  
 INITIAL EXIT QUALITY = 0.147

RUN 550122-007  
 ○--- P-IN    △--- P-OUT    +--- DIF.PRES



RUN 550122-007  
 ○--- G-IN    △--- T-IN    +--- T-OUT



RUN 550122-007  
 ○--- 10 MM    △--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◇--- 200 MM    ♣--- VOLT

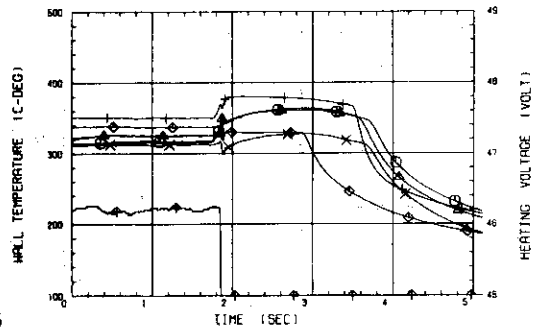


FIG. B5- 1- 5

RUN NO 550122 - 25

MT VOL. NUMBER = 22  
 MT FILE NUMBER = 25  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 46.0 (VOLT)  
 HEATING POWER = 92.3 (KW)  
 HEAT FLUX = 3.674 E+6 (W/SQM)  
 INLET TEMPERATURE = 199.6 (DEG-C)  
 INITIAL MASS VELOCITY = 1727.7 (KG/S, SQM)  
 PRESSURE = 3.88 (MPA)  
 INITIAL EXIT QUALITY = 0.262

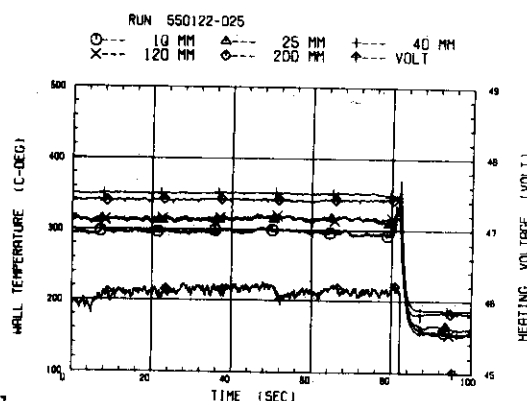
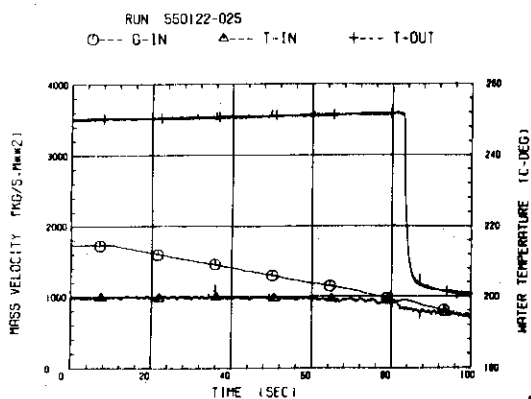
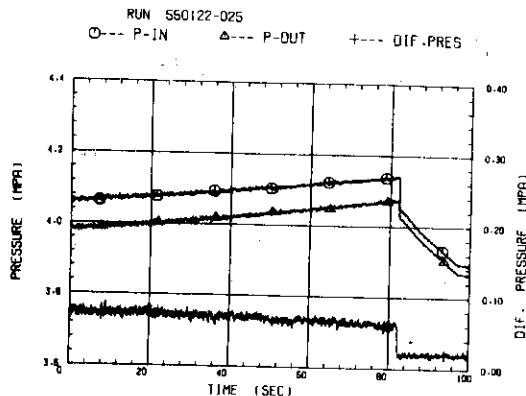


FIG. B5- 2- 1

RUN NO 550122 - 20

MT VOL. NUMBER = 22  
 MT FILE NUMBER = 20  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 46.0 (VOLT)  
 HEATING POWER = 92.7 (KW)  
 HEAT FLUX = 3.688 E+6 (W/SQM)  
 INLET TEMPERATURE = 201.8 (DEG-C)  
 INITIAL MASS VELOCITY = 1717.0 (KG/S, SQM)  
 PRESSURE = 3.93 (MPA)  
 INITIAL EXIT QUALITY = 0.271

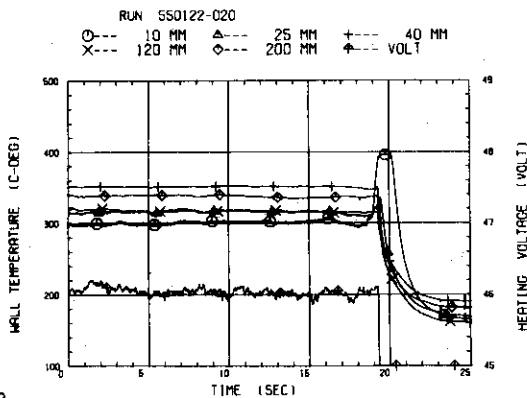
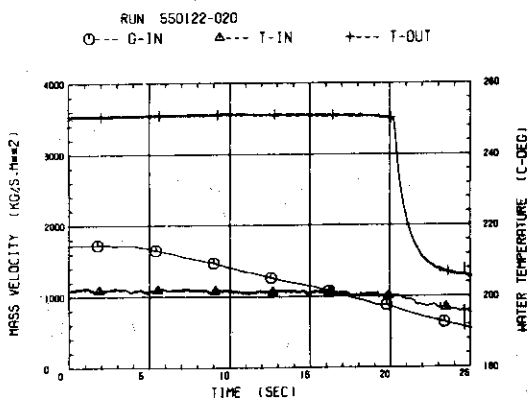
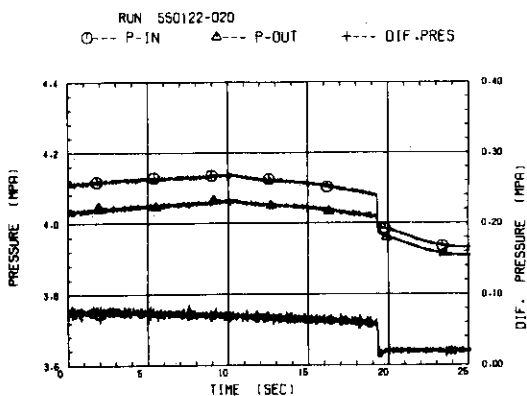


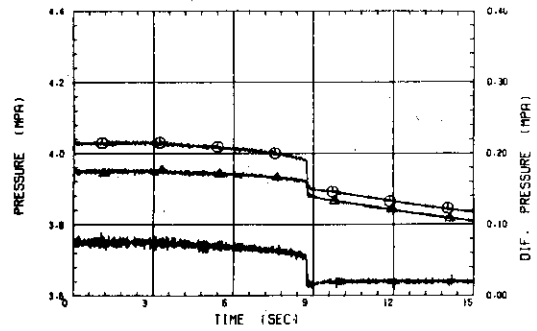
FIG. B5- 2- 2

RUN NO 550122 - 16

MT VOL. NUMBER = 22  
 MT FILE NUMBER = 16  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 46.0 (VOLT)  
 HEATING POWER = 92.6 (KW)  
 HEAT FLUX = 3.683 E+6 (W/CM<sup>2</sup>)  
 INLET TEMPERATURE = 200.2 (DEG-C)  
 INITIAL MASS VELOCITY = 1719.2 (KG/S,CM<sup>2</sup>)  
 PRESSURE = 3.85 (MPA)  
 INITIAL EXIT QUALITY = 0.268

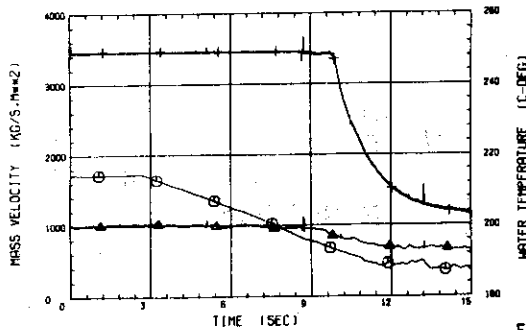
RUN 550122-016

○--- P-IN    △--- P-OUT    +--- DIF.PRES



RUN 550122-016

○--- G-IN    △--- T-IN    +--- T-OUT



RUN 550122-016

○--- 10 MM    △--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◇--- 200 MM    \*--- VOLT

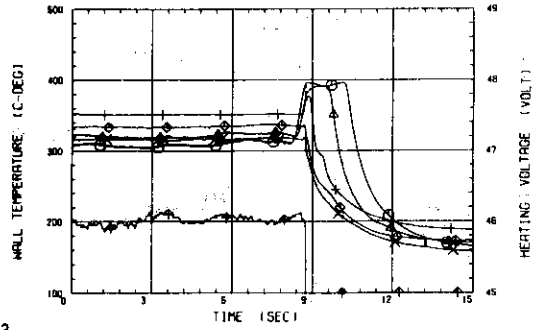


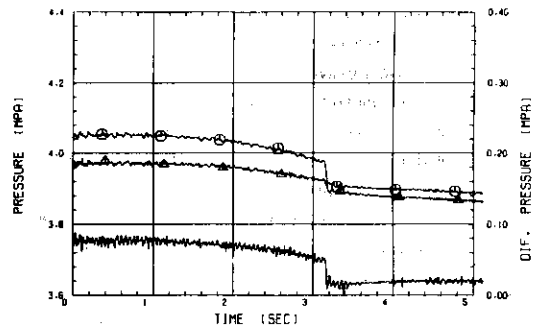
FIG. B5- 2- 3

RUN NO. 550122 - 18

MT VOL. NUMBER = 22  
 MT FILE NUMBER = 18  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 46.1 (VOLT)  
 HEATING POWER = 92.8 (KW)  
 HEAT FLUX = 3.693 E+6 (W/CM<sup>2</sup>)  
 INLET TEMPERATURE = 201.9 (DEG-C)  
 INITIAL MASS VELOCITY = 1725.0 (KG/S,CM<sup>2</sup>)  
 PRESSURE = 3.87 (MPA)  
 INITIAL EXIT QUALITY = 0.272

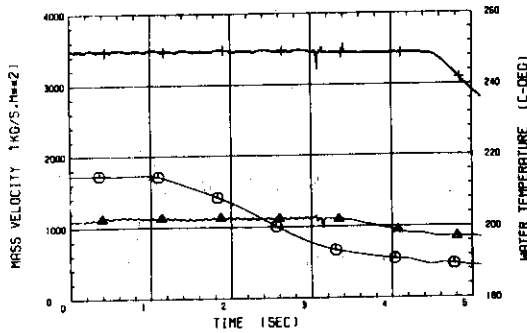
RUN 550122-018

○--- P-IN    △--- P-OUT    +--- DIF.PRES



RUN 550122-018

○--- G-IN    △--- T-IN    +--- T-OUT



RUN 550122-018

○--- 10 MM    △--- 25 MM    +--- 40 MM  
 X--- 120 MM    ◇--- 200 MM    \*--- VOLT

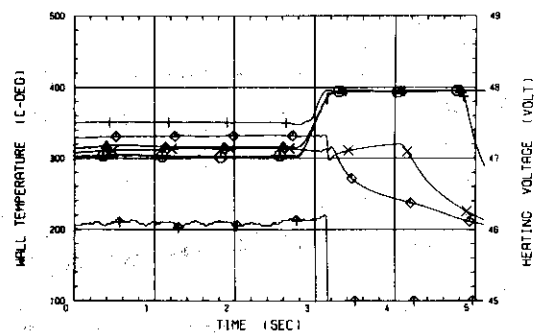


FIG. B5- 2- 4

RUN NO 550122-32

HT VOL. NUMBER = 22  
 HT FILE NUMBER = 32  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 44.0 (VOLT)  
 HEATING POWER = 84.9 (KW)  
 HEAT FLUX = 3.376 E+6 (W/SQM)  
 INLET TEMPERATURE = 200.9 (DEG-C)  
 INITIAL MASS VELOCITY = 1706.2 (KG/S.SQM)  
 PRESSURE = 3.87 (MPA)  
 INITIAL EXIT QUALITY = 0.239

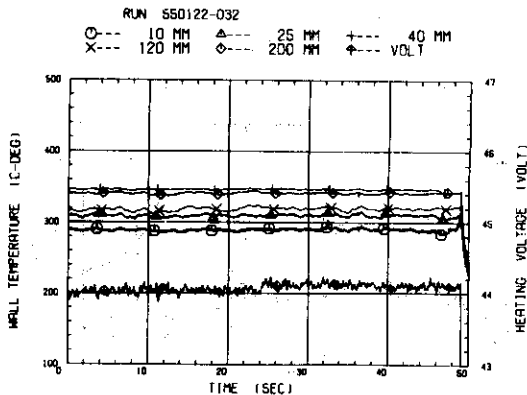
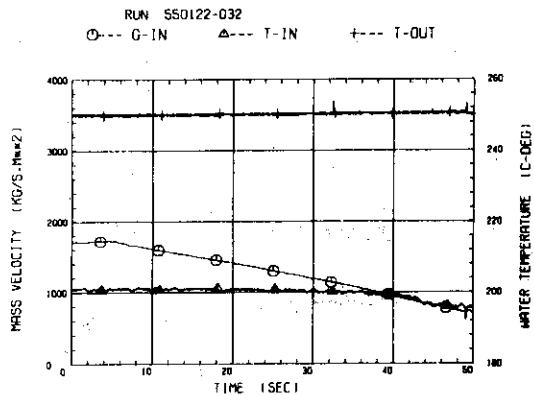
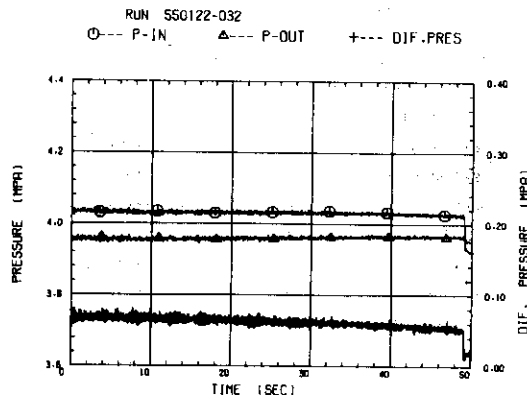


FIG. B5- 3- 1

RUN NO 550122-29

HT VOL. NUMBER = 22  
 HT FILE NUMBER = 29  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 43.4 (VOLT)  
 HEATING POWER = 84.7 (KW)  
 HEAT FLUX = 3.371 E+6 (W/SQM)  
 INLET TEMPERATURE = 200.8 (DEG-C)  
 INITIAL MASS VELOCITY = 1706.2 (KG/S.SQM)  
 PRESSURE = 3.83 (MPA)  
 INITIAL EXIT QUALITY = 0.239

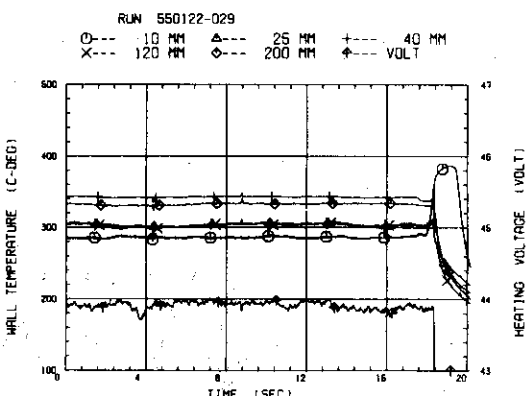
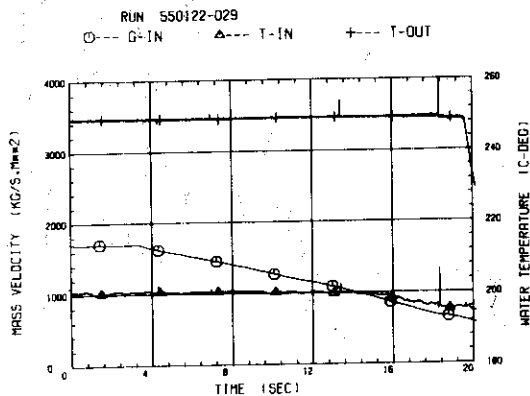
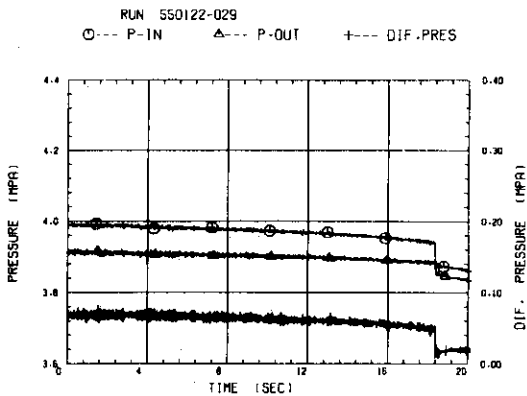


FIG. B5- 3- 2

Run ID: 55012-27

MT VOL. NUMBER = 22  
 MT FILE NUMBER = 27  
 SAMPLING INTERVAL = 5.0 (MSEC)  
 HEATING VOLTAGE = 44.0 (VOLT)  
 HEATING POWER = 84.9 (KW)  
 HEAT FLUX = 5.380 E+6 (W/CM<sup>2</sup>)  
 INLET TEMPERATURE = 201.7 (DEG-C)  
 INITIAL MASS VELOCITY = 1708.7 (KG/S.CM<sup>2</sup>)  
 PRESSURE = 3.87 (MPA)  
 INITIAL EXIT QUALITY = 0.241

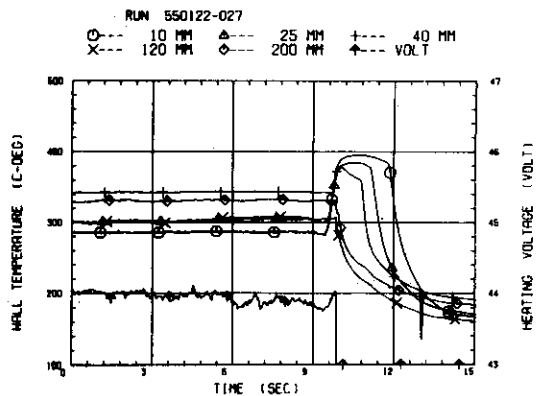
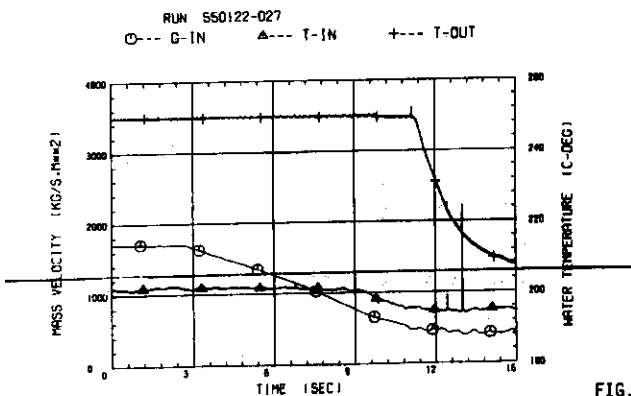
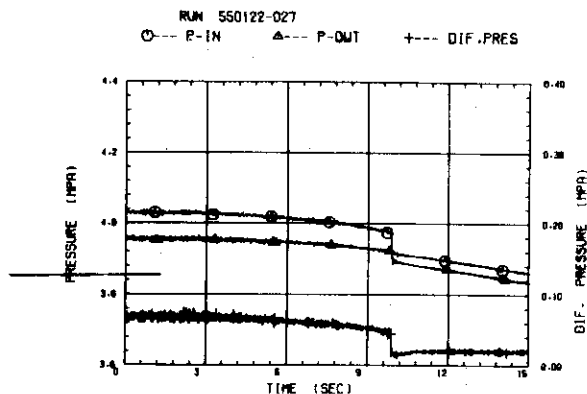


FIG. B5- 3- 3