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Heat Transfer and Pressure Drop at Single Pins with Three-dimensional Roughnesses

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Abstract

Pressure drop and heat transfer measurements were performed with air with two single rods with 8 mm diameter in two different outer tubes.

The rods were roughened with different three-dimensional roughnesses similar to those used in large scale tests. The results showed similar high friction factors and Stanton numbers as it was found for the large scale roughnesses. The thermal performance (St^3/f) is higher by approximately a factor of two compared with two-dimensional roughnesses.

Wärmeübergang und Druckverlust an Einzelstäben mit dreidimensionalen Rauhigkeiten

Es wurden Messungen des Druckverlustes und Wärmeübergangs mit Luft an zwei Einzelstäben mit einem Durchmesser von 8 mm in zwei Außenrohren durchgeführt. Die Stäbe hatten dreidimensionale Rauhigkeiten, die ähnlich denen waren, die an großen Modellstäben untersucht worden waren. Es ergaben sich ähnlich hohe Reibungskoeffizienten und Stantonzahlen wie für die Modellrauhigkeiten. Die Wärmeübergangseigenschaften, ausgedrückt durch das Verhältnis St^3/f, sind etwa um den Faktor zwei besser, als die von zweidimensionalen Rauhigkeiten.

1. Introduction

A substantial improvement of the thermal performance using three-dimensional roughnesses to enhance heat transfer compared with two dimensional roughnesses, has been demonstrated at large scale model roughnesses /1/. These tests were performed at rods with a diameter of 34 mm in up to four different outer smooth tubes.

Heat transfer tests with bundles of 19 rods /2/ and single pin tests /3/, both using rods of 8 mm diameter with three dimensional roughness did not show the expected high thermal performance, although they showed a better performance than two-dimensional roughnesses. The roughnesses used there were not exactly the same as those used in the large scale experiments, because of their high manufacturing costs. Also, the effect of a small change in the roughness geometry was not known at this time. Only after the completion of a systematic study on the flow resistance of three-dimensional roughnesses /4,5/ it has been realized that the lateral gap between the single ribs was too small.

Therefore, similar roughnesses as in the large scale tests were manufactured on small rods of 8 mm diameter at high costs, to find out whether the same high thermal performance can be obtained in the small scale, inspite of relatively higher geometrical tolerances of the small ribs and the more pronounced rounding of the rib edges.

In this report the results of pressure drop and heat transfer tests at two different rough rods contained in a smooth outer tube are presented. They are compared with the results from large scale tests with similar roughnesses /1/, with results from small scale tests with another three-dimensional roughness /3/ and with results from tests with the two-dimensional roughness which is the reference design for a GCFR /6/.

2. Experiment

2.1 Apparatus and Procedure

The experimental apparatus and the experimental techniques used are similar to those used for large scale tests /1,7,9/ and other small scale tests /3,6/.

Fig.1 shows schematically the experimental setup.

Air is circulated by means of a compressor. The flow oscillations caused by the compressor are dampened by a large vessel. The air is subsequently depurated by the vapor content in a drier and goes to one of various orifice plates for the measurement of the mass flow. These orifice plates are placed in parallel and have been calibrated in the laboratory for the optimum application range to an accuracy of better than 1%. The air flows then through the annular test section, and finally to the atmosphere. By means of a valve placed downstream the test section it is possible to apply a certain back pressure, to increase the air density and therefore the maximum obtainable Reynolds number in the test section.

The arrangement of the test rod in the outer smooth tube is shown in Fig.2.
The rod consists of a tube of stainless steel with 8 mm O.D. and a wall thickness of 0.73 mm before the machining operation to obtain the roughness ribs. The heated length is 780 mm. The rod is heated directly by alternating current (max. 40V, 2000A).

The pressure drop along the test section was measured by 8 static pressure taps in the outer smooth tube spaced 80 mm apart. The absolute and differential pressures were measured by five pressure transducers of the capacitance type (MKS-Baratron) with an accuracy of better than 1% in the whole range between 1 Nm^{-2} and 10^6 Nm^{-2}.
All temperatures were measured by sheathed Ni-Cr/Ni-Al thermocouples There were 14 thermocouples in the wall of the rough rod with up to two at the same axial position in order to check for possible eccentricities in the annulus. 16 thermocouples were inside the wall of the smooth tube, which was insulated by a thick layer of

Kerlane tape to minimize heat losses. The gas temperatures at the inlet and at the outlet of the test section were measured by one respectively three shielded thermocouples. These temperatures were checked by means of a heat balance between the electrical input power and the thermal power. Only runs with heat balances better 5% were considered for the evaluation.

All information from the experiments is transformed into digital data, which are punched on paper tape by a Teletype data logger. The data are translated into BCD-code by computer programms for input into the evaluation program AURIS and storage on magnetic tape.

2.2 Experimental Parameters

Two different roughness shapes were tested (s. Fig.3). The roughness at rod No.3 is similar to roughness No.2 in the large scale test /1/. It was obtained by machining threads into the surface in both directions with the same pitch. The roughness on rod No.2 was obtained by machining an additional thread with a small pitch in such a way that the corners of the rhombus were cut away.

Rod No.3 was tested in one outer tube of 16 mm I.D. and rod No.2 was tested in two outer tubes of 16 mm and 20 mm I.D., respectively. The exact geometrical parameters are listed in Table 1. Each series of tests was run without heating and at two different maximum rod temperatures of 150°C and 350°C.

The test of rod No.2 in the 20 mm diameter outer tube (2/20) was run without spacer. During the performance of the test in the 16 mm outer tube large temperature differences at the same axial position but on opposite sides of the rod occured (up to 25 K). This suggested that the rod was not axisymmetrically mounted or bowing due to asymmetrical heating had occurred. Therefore thin spacers at two positions were welded to the rod by a laser beam. The flow cross section was blocked by 10% at these positions. Both rods were tested with spacers in the 16 mm outer tube. The temperature differences were small (< 10 K) and a series of runs with 550°C wall temperature could be performed.

The influence of the spacer on the axial temperature distribution at high Reynolds numbers is negligible (s. Fig.4). At the minimum Reynolds number of the tests, however, the spacer alters the temperature distribution over a long distance of the rod. Here we have the transition zone of the laminar to the turbulent regime and an additional turbulence production makes itself felt (s. also /15/).

3. Evaluation

The experimental data were evaluated with the computer code AURIS. The main features of this code are described in /7,8/. An alternate Stanton number transformation and methods for the reduction of the entrance and temperature effects are described in /10/. A new Stanton number transformation was developed since then and is described in /1/.

For the determination of the true surface temperature of the rough rods two corrections to the thermocouple readings were applied. Since the position of the thermocouple junctions (r_M) is below the surface, the temperature reading is too high. A correction is made by taking account of the heat conduction in radial direction.

$$T_W = T_{WM} - \frac{q}{k_c} \frac{r_1}{(r_1^2 - r_i^2)} \left(\frac{r_1^2 - r_M^2}{2} + r_i^2 \ln \frac{r_M}{r_1} \right) \qquad (1)$$

with the thermal conductivity of the canning

$$k_c = 7.805 + 0.01582\, T \qquad (2)$$

and r_1 being the outer radius of the rough rod, which is in fact a tube, and r_i being the inner radius of this tube. The position of the hot junction was assumed to be at the center of the tube wall, thus $r_M = (r_1 + r_2)/2$. The maximum correction was 6K at the highest heat flux.

To take account of the fact that the surface temperature is not constant between the ribs and depends on the conductivity of the can material, a Biot number correction is required. Since it is a small correction for the heat fluxes applied in the present experiments a rough estimation formula is applied /10/:

$$T_W = (T_{WM}-T_B)k_\infty + T_B \tag{3}$$

with

$$k_\infty = 1-0.4\ Bi \tag{4}$$

and the Biot number

$$Bi = \frac{q}{(T_{WM}-T_B)k_c} \tag{5}$$

The maximum correction for this effect was 2.2 K.

The heat transfer by radiation was determined by

$$q_r = \varepsilon\sigma S_1 \left[\left(\frac{T_W}{100}\right)^4 - \left(\frac{T_{W2}}{100}\right)^4\right] \tag{6}$$

S_1 being the surface area of the heated rod. The emissivity ε had been measured for a rough rod in the evacuated test section with a 16 mm outer tube with $\varepsilon=0.341$. For the 13 mm outer tube the emissivity was set to $\varepsilon_{13}=0.94\varepsilon$ and for the 20 mm outer tube it was set to $\varepsilon_{20}=1.05\cdot\varepsilon$.

The axial heat flux variation due to a different wall thickness in the smooth part at the entrance of the test section was taken into account in the calculation of the bulk gas temperature T_B.

The hydraulic diameter was determined with a volumetrically defined diameter of the rough rod. The friction factor and Stanton number of the entire annulus were transformed to the rough boundary conditions using the laws of the wall for the velocity and temperature profile. The procedure is fully described in /11/ and /7,8/.

The calculation was performed with constant slopes $A_r=A_H=2.5$ and with variable slopes as it was described in /1/. The slope of the velocity profile in the rough zone was then

$$A_r = 1.7 + 1.3/\log_{10} (h/\hat{y}) + 2/\log_{10} (h^+) \tag{7}$$

and in the smooth zone

$$A_s = 2.55 + 0.4/\ln \left[0.1 \, h/(r_2(1-\beta))\right] \tag{8}$$

The slope of the temperature profile was

$$A_H = 1.4 + 3/\log_{10} (h_W^+) \quad \leq 4.4 \tag{9}$$

The evaluation of friction and heat transfer coefficients and the transformation procedure was performed with local data along the test section. Mean values were evaluated from local results in the section

$22 \leq x/D_h \leq 49$ for 2/20,

$32 \leq x/D_h \leq 72$ for 2/16,

and $32 \leq x/D_h \leq 72$ for 3/16.

These mean values are listed in Table 3 for constant slopes and in Table 4 for variable slopes.

4. Results and Discussion

4.1 Friction Factor

Figures 5A, 6A and 7A show the bulk friction factor f_B versus the bulk Reynolds number. There is no effect of the temperature ratio T_W/T_B at high Reynolds numbers, i.e. for $Re_B \geq 10^5$ in the 20 mm outer tube and for $Re_B \geq 3 \cdot 10^4$ in the 16 mm outer tube.

The friction factors in the laminar regime are slightly above the theoretical value

$$f = \frac{16}{Re} \quad \frac{(1-\alpha)^2}{1+\alpha^2 - \frac{1-\alpha^2}{\ln(1/\alpha)}} \tag{10}$$

which means that the definition of the hydraulic diameter should be changed, as it was done in /1/ for similar roughnesses. The displacement of the origin of the velocity profile ε at the rough rod should be higher than that determined by the volumetric definition, thus reducing the hydraulic diameter.

Figures 5B, 6B and 7B show the transformed friction factor f_1 versus the Reynolds number Re_1. The transformation was performed with variable slopes, which gives, however, only small differences in f_1 compared to a transformation with A_r=2.5 (s. Tables 3 and 4).

Rod No.2 produces friction factors approximately 26% higher than these from Rod No.3, at high Reynolds numbers. Compared to Rod No.6 from /3/ the friction factor is approximately 40% higher in the same outer tube. This fact cannot be attributed to bowing of the rod No.6 since the axial variation of the friction factor in these tests was very small. Thus, for high Reynolds numbers we have:

f_1 = 0.040	for	2/16
f_1 = 0.031	for	3/16
f_1 = 0.027	for	6/16 from /3/
f_1 = 0.018	for	5/16 from /6/

The height of the roughness No.5 was, however, only h=0.112 mm compared to h=0.2 mm of the other roughnesses.

The temperature effect cannot be reduced by the equation from /9/

$$f_{1R} = f_1 \left(\frac{T_W}{T_B}\right)^{0.29} \tag{11}$$

There is practically no temperature effect if f_1 is plotted versus Re_{1W} (s. Fig. 5C,6C,7C).

4.2 Roughness parameter $R(h^+)$

Figure 8 shows the roughness parameter $R(h^+)$ versus the parameter h_W^+ determined with A_r=2.5 while figure 9 shows $R(h^+)$ determined with variable A_r according to equation (7). Equation (7) might not describe the variation of A_r exactly since it was derived for a different roughness. For constant A_r the R-parameter varies with h_W^+ in the entire range while for variable A_r the R-parameter is constant down to h_W^+=20. There is no effect of different outer tubes in neither case. For rod No.2 the R-parameter is $R(h^+)$=4.3 in case of variable A_r. The comparable roughness in the large scale tests /1/ had $R(h^+)$=3.8, while for rod No.6 it is $R(h^+)$=6.2.

4.3 Stanton Number

Figures 10A and 11A show the Stanton number $St_B Pr^{0.6}$ versus the bulk Reynolds number Re_B. The effect of the different temperature ratios T_W/T_B is almost eliminated by plotting

$$St_{BR} = St_B \cdot Pr^{0.6} \left(\frac{T_W}{T_B}\right)^{ex} \tag{12}$$

with

$$ex = -0.243 - \phi\left(\frac{x}{D_h}\right) 0.7 \ \lg\left(\frac{T_W}{T_B}\right) \tag{13}$$

and

$$\phi\left(\frac{x}{D_h}\right) = 0.4 \ \left(1 + \frac{x/D_h}{25}\right) \tag{14}$$

according to /9/ versus Re_W or as it is done in figure 10B and 11B versus h^+_{WR}. The entrance effect is accounted for by the factor

$$\left\{1 + 14\ Re^{-0.35}\ lg\left[4.35\left(\frac{x}{D_h}\right)^{-0.6}\right]\right\}^{-1} \geq 1 \tag{15}$$

The reduction formula is somewhat overcompensating the temperature effect.

Figures 10C and 11C show the Stanton number transformed by

$$St_o = St_{BR}\left(\frac{\alpha^2}{1-\alpha^2}\right)^{-0.3} \tag{16}$$

according to /1/.

Except for the high temperature values the Stanton numbers from two different outer tubes fall on one line.

For a comparison of different roughnesses the Stanton number is transformed to a common h/d-ratio by

$$St_{O1} = St_o\left(\frac{h/r_1}{0.02}\right)^{-0.6} \tag{17}$$

as it was proposed in /1/. Figures 10D and 11D show St_{O1} versus

$$Re^* = h^+_{WR}\ \frac{2r_1}{h} = \frac{u^* d}{\nu_W}\left(\frac{T_W}{T_B}\right)^{0.145} \tag{18}$$

Figure 12 shows a comparison with the results from the large scale tests (Eq.(46) and (48) in /1/) and with rod No.6 from /3/. The agreement of the reduced Stanton numbers of rod 3 and roughness No.2 from the large scale tests is remarkable. Both are roughnesses with a rhombic shape. The difference between rod 2 and roughness No.1 is small while rod No.6 from /3/ gives smaller Stanton numbers. Results from two-dimensional roughnesses from different sources lie close to the curve of rod No.6.

4.4 Roughness Parameter G^+

For a basis of comparison the G-parameter was determined in different ways and is listed in the tables.

Figures 13 and 14 show the parameter G^+ determined by

$$G^+ = \frac{(T_W - T_{W2})\rho_B \; c_{pB} \; u_1^*}{q_1} - 2.5 \; \ln \left(\frac{1-\alpha}{h/r_2}\right) \tag{19}$$

and the reduced parameter

$$GPRT1 = \frac{G^+}{Pr^{0.44} \left(\frac{T_W}{T_B}\right)^{0.68}} \tag{20}$$

The trend of the curves for two different radius ratios is similar to that calculated from the reduced Stanton number (Fig. 91 in /1/).

4.5 Thermal Performance

For a comparison of the different roughnesses the thermal performance $(St_r/St_s)^3/(f_r/f_s)$ is plotted as it was measured in the different test sections (Fig.15,16).

The Stanton number of the rough zone St_r was calculated by

$$St_r = \frac{q}{(T_W - T_1)\rho_1 \; u_1 \; c_{p1}} \tag{21}$$

with T_1 being the untransformed temperature of the inner zone, i.e. St_r is lower than a transformed Stanton number.

The Stanton number St_s was calculated by the equation given by Petukhov and Roizen /12/ and Petukhov et al. /13/ (s. also /9/), and the friction factor f_s was determined by Taylor's equation /14/

$$f_s = 2 \cdot (0.0007 + 0.0625 \; Re_W^{-0.32}) \; (T_W/T_B)^{-0.5} \tag{22}$$

The comparison with rod No.6 from /3/ and the two-dimensional roughness from /6/ shows the superiority of the present three-dimensional roughnesses. The curves and the maximum value of the present roughnesses are similar to those of the large scale tests /1/, especially to test section 10 and 16/70 and 16/85.

5. Conclusion

A series of pressure drop and heat transfer measurements has been performed on two rods roughened with different three-dimensional roughnesses in reactor dimensions of 8 mm O.D. The roughnesses were selected for their expected high thermal performance and were similar to those tested in a large scale experiment with rods of 34 mm O.D. The tests were performed in a 16 mm I.D. smooth tube and one rod was tested in a 20 mm I.D. tube, also. This investigation yielded the following results:

1. The friction factors and Stanton numbers are higher than ever measured with 8 mm pins. They are similar to those measured in the large scale tests /1/.

2. The transformed friction factors f_1 do not show an effect of different temperature ratios T_W/T_B if plotted versus Re_W.

3. The temperature effect on the Stanton number can be correlated by equations which were developed for two-dimensional roughnesses in /9/.

4. The Stanton numbers from tests, in different outer tubes can be transformed to a common correlation by

$$St_O = St_{BR} \left(\frac{\alpha^2}{1-\alpha^2} \right)^{-0.3}$$

as it was proposed in /1/.

5. The Stanton numbers transformed to a common h/d-ratio compare well with those from the large scale tests.

These experiments with small pins together with the large scale experiments have shown that three-dimensional roughnesses designed for a high friction factor have a better thermal performance than two dimensional roughnesses, by approximately a factor of two. It is possible, although at high manufacturing costs, to obtain the same results at small pins with roughnesses only 0.2 mm high as with large rods. The application of the experimental results on the calculation of the thermohydraulic behaviour of rod bundles is possible using functions for A_r and $R(h^+)$ and a simple correlation for the Stanton number.

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Nomenclature

A	area of flow cross-section (m^2)
$A_{r,s}$	slope of the logarithmic velocity profile
A_H	slope of the logarithmic temperature profile
b	width of the ribs (m)
Bi	Biot number ($=\alpha h/k_c$)
c_p	specific heat at constant pressure ($Ws\ kg^{-1}\ K^{-1}$)
D_h, D_1	hydraulic diameter (m)
D_o	diameter of rod (m)
f	friction factor ($=2\tau/\rho u^2$
G	parameter in the logarithmic temperature profile for rough surfaces
h	height of the roughness ribs (m)
h^+	dimensionless height of the rib or roughness Reynolds number ($=hu^*/\nu$)
k_c	thermal conductivity of the test rod ($Wm^{-1}\ K^{-1}$)
l	heated length of the test rods (m)
m	mass flow ($kg\ s^{-1}$)
Nu	Nusselt number
p	pitch of the roughness ribs (m)
Pr	Prandtl number
q	heat flux (Wm^{-2})
r	radius (m)
r_M	position of thermocouple junction (m)
$R(h^+)$	parameter in the logarithmic velocity profile for rough surfaces
Re	Reynolds number ($=u\ D_h/\nu$)
St	Stanton number ($=\alpha/(\rho u c_p)=Nu/RePr$)
S	surfaces of rod or outer tube (m^2)
T	temperature (K)
T^+	dimensionless temperature ($=(T_W-T)\rho c_p\ u^+/q$)
u	gas velocity (ms^{-1})
u^*	friction velocity ($=\sqrt{\tau/\rho}$) (ms^{-1})
u^+	dimensionless velocity ($=u/u^*$)
x	axial length starting at the beginning of the heating of the rod (m)

$\hat{y}$	radial distance of zero shear stress plane from the rough wall (m)
α	convective heat transfer coefficient $(Wm^{-2}\ K^{-1})$
α	r_1/r_2
β	r_o/r_2
ε	emissivity (-)
ε	displacement of origin of velocity profile at rough wall (m)
ν	kinematic viscosity $(m^2\ s^{-1})$
ρ	density of the gas $(kg\ m^{-3})$
σ	Stefan-Boltzmann constant $(Wm^{-2}\ K^{-4})$
τ	shear stress at the wall (Nm^{-2})

<u>Subscripts</u>

B	bulk or total of the annular cross-section
1	inner rough zone of channel or reduced to $T_W/T_B=1$
2	outer smooth zone of channel
W	wall
o	zero shear position
vol	volumetric radius of rough rod
c	corrected
M	measured
R	reduced (for temperature effect)
r	rough
s	smooth

Appendix

Nomenclature of the tables (where not self-explaining)

Reduced Stanton number:

$$STPR = \frac{St_B \, Pr^{0.6}}{1 + 14 \, Re_B^{-0.35} \, lg\left[4.35 \left(\frac{x}{D_h}\right)^{-0.6}\right]} \left(\frac{T_W}{T_B}\right)^{-ex} \quad /9/ \qquad \text{(A-1)}$$

The denominator in (A-1) is set to 1, if it becomes smaller than 1 (ex from Eq. (13)).

Ratio of transformed to bulk Stanton number:

$$ST+/ = \left(\frac{St_1}{St_B}\right)^+ = \frac{1}{St_B} \, \frac{f_1/2}{1+\sqrt{f_1/2}\,(G^+ - R(h^+))} \qquad \text{(A-2)}$$

with G^+ from Eq. (19)

$$ST{*}/ = \left(\frac{St_1}{St_B}\right)^* = \frac{(T_W - T_B)\,\rho_B \, u_B \, c_{pB}}{(T_W - T_1)\,\rho_1 \, u_1 \, c_{p1}} \qquad \text{(A-3)}$$

with T_1, evaluated from the integration of the logarithmic temperature profile. In case of $A_r = A_H = 2.5$ the temperature profile is defined by Eq. (19) with G^+. In case of variable A_r and A_H the temperature profile is defined by Eq. (A-4). This applies to the following transformations, too.

$$ST1{*}/ = \left(\frac{St_1}{St_B}\right)$$

$$STT{*}/ = \left(\frac{St_1}{St_B}\right)$$

$$ST1F/ = \left(\frac{St_1}{St_B}\right)$$

(all three:) see Ref. /1/

A1/AB = ratio of the transformed to the entire flow cross section

G^+ Eq.(19)

GPR1 Eq.(20)

$$G* = G^* = \frac{1}{St_B}\sqrt{\frac{f_1}{2}}\,\frac{u_1}{u_B} - A_H \ln\left(\frac{1-\alpha}{h/r_2}\right) + \frac{A_H}{2}\,\frac{(1+3\alpha)}{(1+\alpha)} \tag{A-4}$$

$$G*R = G^*_R = \frac{1}{St_{PR}}\sqrt{\frac{f_1}{2}}\sqrt{\left(\frac{T_W}{T_1}\right)^{0.29}}\,\frac{u_1}{u_B} - A_H \ln\left(\frac{1-\alpha}{h/r_2}\right) + \frac{A_H}{2}\,\frac{(1+3\alpha)}{(1+\alpha)} \tag{A-5}$$

with St_{PR} according to Eq.(A-1).

For G+1,GT,GTR,GTF,GTFR see Ref./1/

$$X = \ln\left(\frac{\hat{y}}{h}\right) - \frac{1}{2}\,\frac{3+\beta/\alpha}{1+\beta/\alpha}$$

$$YR = \sqrt{2/f_1}$$

TP = Thermal Performance as plotted in Fig. 15 and 16.

<u>Symbols in the plots</u>

<u>Heated tests:</u>

□ isothermal runs

○ ↓ thermal runs, increasing T_W/T_B-ratio
△ with arrow; the exact T_W/T_B-ratios
◇ can be taken from the tables.
⌑

Rod No.	h	b	p	e	g	r_{1vol}	r_1/r_2	$h/(r_2-r_1)$	
2	0.2	0.25	0.61	1.06	0.7	3.839	0.3839 0.4799	0.03246 0.04806	3-D
3	0.2	0.5825	0.61	1.06	0.7	3.868	0.4835	0.048065	3-D
5	0.112	0.332 ÷ 0.548	1.214	-	-	3.93	0.4913	0.02752	2-D /6/
6	0.196	0.25	0.75	0.62	0.40	3.837	0.4796	0.04708	3-D /3/

Table 1: Geometrical parameters of the roughnesses (mm)

	$Re \cdot 10^4$	Rod 2 in 20 ISO	Rod 2 in 20 150^o	Rod 2 in 20 350^o	Rod 2 in 16 ISO	Rod 2 in 16 150^o	Rod 2 in 16 350^o	Rod 2 in 16 550^o	Rod 3 in 16 ISO	Rod 3 in 16 150^o	Rod 3 in 16 350^o
f_B	0.7	3.8	1.8	2.2	3.3	4.9	3.7	2.4	3.4	4.2	3.3
	2.3	2.6	4.6	6.9	2.2	3.4	3.6	8.3+	2.9	4.5	4.8
	7	2.8	4.4	6.6	2.4	3.3	5.6+	8.8+	4.2	4.2	4.7
St_B	0.7		8.5-	16.6-		11.7-	11.7-	10.3-		5.7-	8.0-
	2.3		2.3-	4.7-		2.4	5.3+	14.1+		3.1+	3.2+
	7		3.3+	5.8+		4.8	11.3+	17.0+		2.7+	5.8+
St_W	0.7		8.4-	18.0-		11.7-	16.0-	19.2-		4.4-	13.4-
	2.3		3.4-	9.5-		0.8-	3.2-	2.7-		0.8	4.8-
	7		1.3	2.3-		2.6	2.0	1.3		0.5	3.0-

Table 2: Maximum axial variation of friction factors and Stanton numbers in % of average value ('+' stands for increasing and '-' for decreasing values along the test section).

Table 3: Results evaluated with $A_r = A_H = 2.5$ and A_s according to /7,8/

RUN.NO.	RE*E4	RE1*E4	F	F1	STB	STPR	U1/UB	F1/F2	TW/TB	PR	H/Y	BETA	H+	H+W	H+R	H+RW	RH+	RH+R	AS	AR
2-16- 1	0.30	0.36	.01356	.01748	.00497	.00430	0.99	1.47	1.23	.702	.0989	.734	6.5	4.7	6.7	4.8	7.23	6.94	2.46	2.50
2-16- 2	0.45	0.65	.01552	.02543	.00729	.00626	0.97	2.31	1.22	.700	.0832	.781	11.5	8.4	11.8	8.7	4.86	4.63	2.45	2.50
2-16- 3	0.61	0.97	.01680	.03095	.00859	.00734	0.96	2.99	1.20	.699	.0767	.806	17.2	12.8	17.7	13.1	3.81	3.61	2.45	2.50
2-16- 4	0.84	1.38	.01695	.03289	.00900	.00768	0.96	3.42	1.20	.699	.0738	.819	24.2	18.1	24.8	18.5	3.46	3.27	2.44	2.50
2-16- 5	1.17	2.04	.01725	.03525	.00909	.00774	0.96	3.94	1.19	.700	.0710	.833	35.1	26.4	36.0	27.0	3.08	2.91	2.43	2.50
2-16- 6	1.16	2.02	.01732	.03548	.00910	.00777	0.96	3.96	1.20	.699	.0709	.833	34.9	26.0	35.7	26.7	3.06	2.88	2.43	2.50
2-16- 7	1.66	3.01	.01752	.03748	.00902	.00769	0.96	4.52	1.20	.700	.0686	.845	51.2	38.2	52.5	39.2	2.76	2.59	2.42	2.50
2-16- 8	2.32	4.35	.01758	.03893	.00913	.00779	0.96	5.04	1.20	.700	.0668	.854	73.0	54.3	74.8	55.7	2.55	2.38	2.42	2.50
2-16- 9	4.36	8.53	.01716	.03954	.00845	.00725	0.96	5.85	1.21	.701	.0646	.867	138.2	101.1	141.9	103.7	2.41	2.22	2.40	2.50
2-16- 10	5.78	11.53	.01699	.03973	.00797	.00686	0.96	6.22	1.22	.702	.0637	.872	183.9	133.3	188.9	136.9	2.35	2.16	2.40	2.50
2-16- 11	7.31	14.75	.01661	.03922	.00773	.00666	0.96	6.45	1.22	.701	.0632	.876	231.5	166.5	237.9	171.2	2.38	2.18	2.40	2.50
2-16- 12	11.75	24.53	.01685	.04096	.00709	.00613	0.96	7.35	1.23	.703	.0617	.886	380.7	270.4	391.7	278.2	2.15	1.96	2.39	2.50
2-16- 13	0.28	0.30	.01297	.01610	.00392	.00380	0.98	1.35	1.58	.695	.1041	.722	5.7	2.7	6.0	2.9	7.79	7.11	2.46	2.50
2-16- 14	0.36	0.41	.01302	.01771	.00455	.00433	0.98	1.59	1.53	.695	.0982	.737	7.4	3.8	7.9	4.1	7.13	6.54	2.45	2.50
2-16- 15	0.42	0.51	.01336	.01969	.00524	.00497	0.97	1.84	1.53	.694	.0927	.752	9.2	4.8	9.7	5.1	6.39	5.84	2.45	2.50
2-16- 16	0.57	0.80	.01511	.02644	.00679	.00634	0.96	2.59	1.49	.691	.0817	.787	14.3	7.7	15.1	8.2	4.64	4.19	2.45	2.50
2-16- 17	0.77	1.16	.01549	.02913	.00760	.00704	0.95	3.06	1.47	.691	.0776	.804	20.3	11.2	21.4	11.7	4.08	3.67	2.44	2.50
2-16- 18	1.04	1.67	.01612	.03256	.00831	.00765	0.95	3.64	1.45	.690	.0737	.820	29.1	16.1	30.6	16.9	3.49	3.11	2.43	2.50
2-16- 19	1.04	1.67	.01612	.03255	.00834	.00767	0.95	3.64	1.45	.690	.0737	.820	29.0	16.1	30.5	16.9	3.50	3.11	2.43	2.50
2-16- 20	1.52	2.60	.01682	.03622	.00858	.00788	0.94	4.37	1.44	.690	.0702	.837	44.8	24.8	47.2	26.1	2.95	2.58	2.42	2.50
2-16- 21	2.16	3.89	.01728	.03891	.00882	.00810	0.94	5.05	1.44	.690	.0677	.850	66.4	36.7	69.9	38.6	2.59	2.24	2.42	2.50
2-16- 22	3.14	5.88	.01760	.04085	.00880	.00810	0.95	5.71	1.45	.690	.0658	.861	99.1	54.6	104.4	57.5	2.34	1.99	2.41	2.50
2-16- 23	4.59	8.79	.01752	.04119	.00822	.00761	0.96	6.21	1.47	.691	.0645	.869	145.1	79.3	152.8	83.5	2.26	1.91	2.40	2.50
2-16- 24	6.90	13.60	.01720	.04132	.00789	.00734	0.96	6.77	1.48	.692	.0633	.876	219.4	117.7	231.5	124.1	2.20	1.83	2.39	2.50
2-16- 25	11.45	23.27	.01699	.04166	.00734	.00688	0.96	7.51	1.49	.693	.0620	.884	366.8	193.2	387.6	204.1	2.11	1.74	2.39	2.50
2-16- 26	0.40	0.45	.01302	.01834	.00384	.00405	0.98	1.70	1.83	.688	.0967	.742	8.2	3.3	8.9	3.6	6.89	6.09	2.45	2.50
2-16- 27	0.51	0.61	.01329	.02035	.00471	.00487	0.97	2.00	1.77	.687	.0907	.758	10.9	4.6	11.7	5.0	6.15	5.44	2.45	2.50
2-16- 28	0.69	0.92	.01407	.02456	.00599	.00609	0.96	2.57	1.74	.685	.0832	.783	16.1	7.0	17.3	7.5	5.01	4.38	2.44	2.50
2-16- 29	0.92	1.34	.01487	.02864	.00677	.00680	0.95	3.18	1.70	.685	.0776	.804	23.4	10.4	25.1	11.1	4.16	3.58	2.44	2.50
2-16- 30	0.92	1.34	.01491	.02873	.00687	.00688	0.95	3.19	1.69	.685	.0776	.804	23.4	10.4	25.1	11.2	4.14	3.57	2.44	2.50
2-16- 31	1.29	2.07	.01587	.03338	.00752	.00744	0.94	3.96	1.66	.684	.0728	.825	35.9	16.2	38.5	17.4	3.36	2.84	2.43	2.50
2-16- 32	1.86	3.26	.01734	.03894	.00789	.00777	0.94	4.89	1.65	.685	.0687	.846	56.6	25.4	60.7	27.3	2.66	2.17	2.42	2.50
2-16- 33	2.72	4.91	.01733	.04049	.00817	.00805	0.94	5.56	1.66	.684	.0668	.856	84.1	37.8	90.3	40.5	2.42	1.94	2.41	2.50
2-16- 34	4.13	7.78	.01788	.04290	.00851	.00832	0.94	6.38	1.64	.684	.0647	.868	131.7	60.7	141.1	64.9	2.13	1.68	2.40	2.50
2-16- 35	6.29	12.24	.01822	.04454	.00786	.00780	0.95	7.16	1.68	.685	.0631	.878	204.6	91.6	219.7	98.1	1.93	1.48	2.39	2.50
2-16- 36	9.38	18.60	.01769	.04349	.00750	.00747	0.96	7.58	1.68	.686	.0623	.883	302.1	134.6	324.4	144.3	1.98	1.52	2.39	2.50
2-16- 37	0.07	0.11	.03602	.06612	.0	.0	0.96	3.02	1.00	.708	.0764	.807	2.9	2.9	2.9	2.9	1.26	1.26	2.53	2.50
2-16- 38	0.10	0.15	.02597	.04169	.0	.0	0.98	2.25	1.00	.708	.0828	.782	3.4	3.4	3.4	3.4	2.91	2.91	2.50	2.50
2-16- 39	0.13	0.18	.01940	.02647	.0	.0	0.99	1.65	1.00	.708	.0920	.752	3.7	3.7	3.7	3.7	4.96	4.96	2.49	2.50
2-16- 40	0.18	0.20	.01421	.01515	.0	.0	1.01	1.10	1.00	.708	.1088	.710	3.9	3.9	3.9	3.9	8.21	8.21	2.47	2.50
2-16- 41	0.25	0.23	.01095	.00945	.0	.0	1.03	0.81	1.00	.708	.1259	.679	4.2	4.2	4.2	4.2	11.68	11.68	2.58	2.50
2-16- 42	0.34	0.51	.01655	.02593	.0	.0	0.98	2.15	1.00	.709	.0838	.778	9.2	9.2	9.2	9.2	4.79	4.79	2.46	2.50
2-16- 43	0.34	0.50	.01636	.02536	.0	.0	0.98	2.10	1.00	.709	.0844	.776	9.1	9.1	9.1	9.1	4.91	4.91	2.46	2.50
2-16- 44	0.51	0.82	.01737	.03069	.0	.0	0.97	2.78	1.00	.708	.0772	.804	14.6	14.6	14.6	14.6	3.86	3.86	2.45	2.50
2-16- 45	0.72	1.24	.01827	.03525	.0	.0	0.96	3.44	1.00	.708	.0728	.823	22.0	22.0	22.0	22.0	3.15	3.15	2.44	2.50
2-16- 46	0.99	1.79	.01828	.03695	.0	.0	0.96	3.89	1.00	.709	.0704	.835	31.2	31.2	31.2	31.2	2.89	2.89	2.44	2.50
2-16- 47	1.40	2.59	.01800	.03767	.0	.0	0.96	4.30	1.00	.709	.0687	.844	44.3	44.3	44.3	44.3	2.75	2.75	2.43	2.50
2-16- 48	1.41	2.61	.01795	.03753	.0	.0	0.96	4.29	1.00	.709	.0687	.844	44.5	44.5	44.5	44.5	2.76	2.76	2.43	2.50
2-16- 49	1.90	3.61	.01783	.03839	.0	.0	0.96	4.69	1.00	.709	.0673	.852	60.7	60.7	60.7	60.7	2.62	2.62	2.42	2.50
2-16- 50	2.28	4.42	.01793	.03939	.0	.0	0.96	5.00	1.00	.709	.0663	.857	73.8	73.8	73.8	73.8	2.49	2.49	2.42	2.50

RUN.NO.	RE*E4	Q<KW/M2>	ST+/	ST*/	ST1*/	STT*/	ST1F/	A1/AB	H+	G+	GPR1	G*	G*R	G*1	GT	GTR	GTF	GTFR	X	YR	AH	TP
2-16- 1	0.30	2.6	1.09	1.11	1.28	1.14	1.31	.400	6.5	13.8	14.0	13.2	16.7	11.3	13.1	16.4	10.8	14.3	1.42	10.70	2.50	0.91
2-16- 2	0.45	5.7	1.12	1.13	1.31	1.15	1.33	.492	11.5	9.9	10.1	9.5	12.4	7.8	9.5	12.2	7.6	10.5	1.61	8.87	2.50	2.25
2-16- 3	0.61	8.6	1.11	1.12	1.30	1.13	1.32	.545	17.2	8.9	9.1	8.4	11.2	7.0	8.6	11.3	6.8	9.5	1.69	8.04	2.50	3.28
2-16- 4	0.84	12.1	1.11	1.13	1.29	1.14	1.30	.572	24.2	8.5	8.8	8.2	10.9	6.8	8.2	10.9	6.6	9.4	1.74	7.80	2.50	4.08
2-16- 5	1.17	16.7	1.12	1.13	1.27	1.14	1.27	.601	35.1	8.7	9.0	8.5	11.3	7.1	8.4	11.1	7.1	9.9	1.78	7.53	2.50	4.59
2-16- 6	1.16	16.9	1.11	1.12	1.26	1.13	1.27	.601	34.9	8.7	9.0	8.5	11.3	7.1	8.5	11.2	7.1	9.9	1.78	7.51	2.50	4.57
2-16- 7	1.66	23.8	1.11	1.13	1.24	1.13	1.24	.628	51.2	9.1	9.4	9.0	11.9	7.7	8.9	11.7	7.7	10.6	1.82	7.31	2.50	4.93
2-16- 8	2.32	33.9	1.11	1.12	1.22	1.12	1.23	.649	73.0	9.2	9.5	9.1	12.0	7.9	9.0	11.9	7.9	10.8	1.85	7.17	2.50	5.68
2-16- 9	4.36	61.5	1.11	1.12	1.20	1.12	1.19	.678	138.2	10.3	10.6	10.4	13.5	9.2	10.1	13.2	9.3	12.4	1.88	7.11	2.50	6.04
2-16- 10	5.78	79.0	1.11	1.12	1.19	1.12	1.17	.690	183.9	11.2	11.5	11.4	14.7	10.1	11.0	14.2	10.3	13.6	1.90	7.10	2.50	5.79
2-16- 11	7.31	98.7	1.10	1.11	1.17	1.12	1.17	.697	231.5	11.7	11.9	11.8	15.2	10.7	11.5	14.8	10.8	14.1	1.91	7.14	2.50	5.82
2-16- 12	11.75	149.2	1.10	1.11	1.16	1.11	1.14	.720	380.7	13.6	13.7	13.9	17.6	12.6	13.3	17.0	12.9	16.5	1.93	6.99	2.50	5.26
2-16- 13	0.28	5.8	1.07	1.09	1.27	1.13	1.28	.377	5.7	18.5	16.0	17.3	19.5	15.2	17.5	19.9	14.4	16.6	1.36	11.15	2.50	0.61
2-16- 14	0.36	7.8	1.10	1.14	1.33	1.17	1.31	.404	7.4	15.6	13.7	15.0	17.2	12.4	14.5	16.9	12.2	14.4	1.43	10.63	2.50	0.89
2-16- 15	0.42	11.0	1.11	1.15	1.35	1.18	1.33	.433	9.2	13.5	11.9	13.0	15.0	10.5	12.5	14.9	10.5	12.6	1.49	10.08	2.50	1.27
2-16- 16	0.57	19.1	1.12	1.15	1.34	1.17	1.32	.505	14.3	11.2	10.0	10.7	12.8	8.7	10.5	12.8	8.8	10.8	1.63	8.70	2.50	2.22
2-16- 17	0.77	28.7	1.12	1.15	1.33	1.17	1.32	.539	20.3	10.0	9.1	9.6	11.7	7.7	9.5	11.7	7.8	9.9	1.68	8.29	2.50	3.14
2-16- 18	1.04	41.4	1.11	1.14	1.31	1.15	1.31	.574	29.1	9.5	8.7	9.0	11.1	7.4	9.0	11.3	7.4	9.5	1.74	7.84	2.50	4.04
2-16- 19	1.04	41.3	1.11	1.14	1.31	1.15	1.31	.574	29.0	9.4	8.6	9.0	11.0	7.4	9.0	11.3	7.4	9.4	1.74	7.84	2.50	4.08
2-16- 20	1.52	61.7	1.11	1.13	1.27	1.13	1.27	.611	44.8	9.7	8.9	9.3	11.4	7.8	9.4	11.8	7.8	10.0	1.79	7.43	2.50	4.65
2-16- 21	2.16	91.0	1.10	1.12	1.25	1.13	1.25	.639	66.4	9.8	8.9	9.4	11.6	8.1	9.5	11.9	8.1	10.2	1.83	7.17	2.50	5.52
2-16- 22	3.14	133.0	1.11	1.13	1.23	1.13	1.22	.663	99.1	10.1	9.2	9.9	12.1	8.6	9.8	12.3	8.6	10.8	1.86	7.00	2.50	6.33
2-16- 23	4.59	183.4	1.11	1.14	1.22	1.14	1.19	.680	145.1	11.1	10.0	11.2	13.5	9.6	10.7	13.3	9.9	12.2	1.88	6.97	2.50	6.31
2-16- 24	6.90	268.2	1.10	1.13	1.20	1.13	1.18	.697	219.4	11.8	10.6	11.9	14.2	10.5	11.4	14.1	10.7	13.0	1.90	6.96	2.50	6.58
2-16- 25	11.45	416.1	1.10	1.12	1.18	1.12	1.15	.717	366.8	13.1	11.7	13.4	15.8	11.9	12.7	15.6	12.2	14.6	1.93	6.93	2.50	6.48
2-16- 26	0.40	14.5	1.10	1.15	1.31	1.18	1.27	.413	8.2	19.8	15.5	19.4	19.9	16.1	18.0	19.6	16.1	16.7	1.44	10.44	2.50	0.64
2-16- 27	0.51	21.6	1.11	1.17	1.35	1.20	1.29	.445	10.9	15.8	12.6	15.6	16.4	12.4	14.3	16.0	12.8	13.7	1.51	9.91	2.50	1.12
2-16- 28	0.69	39.2	1.12	1.18	1.37	1.21	1.32	.495	16.1	12.5	10.2	12.2	13.2	9.5	11.4	13.1	10.0	11.0	1.61	9.02	2.50	2.05
2-16- 29	0.92	58.3	1.12	1.16	1.34	1.18	1.31	.539	23.4	11.6	9.5	11.2	12.4	9.0	10.7	12.6	9.3	10.4	1.68	8.36	2.50	2.75
2-16- 30	0.92	58.8	1.12	1.17	1.35	1.19	1.31	.540	23.4	11.4	9.4	11.0	12.2	8.8	10.5	12.4	9.1	10.3	1.68	8.34	2.50	2.86
2-16- 31	1.29	87.6	1.11	1.14	1.31	1.16	1.29	.585	35.9	11.0	9.2	10.6	11.9	8.8	10.5	12.4	9.0	10.3	1.75	7.74	2.50	3.59
2-16- 32	1.86	129.1	1.10	1.11	1.26	1.12	1.24	.630	56.6	11.6	9.8	11.0	12.5	9.5	11.3	13.4	9.7	11.1	1.82	7.17	2.50	4.05
2-16- 33	2.72	201.1	1.11	1.13	1.25	1.13	1.24	.652	84.1	11.2	9.3	10.8	12.2	9.3	10.8	12.8	9.5	10.9	1.85	7.03	2.50	5.22
2-16- 34	4.13	307.4	1.11	1.14	1.24	1.14	1.21	.678	131.7	10.9	9.2	10.8	12.3	9.3	10.5	12.6	9.5	11.0	1.88	6.83	2.50	6.99
2-16- 35	6.29	441.7	1.11	1.14	1.21	1.14	1.18	.701	204.6	12.5	10.4	12.6	14.1	11.0	12.0	14.2	11.3	12.8	1.91	6.70	2.50	6.43
2-16- 36	9.38	615.2	1.10	1.14	1.20	1.14	1.16	.712	302.1	13.1	10.8	13.4	14.8	11.6	12.5	14.8	12.1	13.5	1.92	6.78	2.50	6.76
2-16- 37	0.07	0.0	0.0	0.0	0.0	0.0	0.0	.712	2.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.79	5.50		
2-16- 38	0.10	0.0	0.0	0.0	0.0	0.0	0.0	.712	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.61	6.93		
2-16- 39	0.13	0.0	0.0	0.0	0.0	0.0	0.0	.712	3.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.50	8.69		
2-16- 40	0.18	0.0	0.0	0.0	0.0	0.0	0.0	.712	3.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.31	11.49		
2-16- 41	0.25	0.0	0.0	0.0	0.0	0.0	0.0	.712	4.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.16	14.55		
2-16- 42	0.34	0.0	0.0	0.0	0.0	0.0	0.0	.712	9.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.60	8.78		
2-16- 43	0.34	0.0	0.0	0.0	0.0	0.0	0.0	.712	9.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.59	8.88		
2-16- 44	0.51	0.0	0.0	0.0	0.0	0.0	0.0	.712	14.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.69	8.07		
2-16- 45	0.72	0.0	0.0	0.0	0.0	0.0	0.0	.712	22.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.75	7.53		
2-16- 46	0.99	0.0	0.0	0.0	0.0	0.0	0.0	.712	31.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.79	7.36		
2-16- 47	1.40	0.0	0.0	0.0	0.0	0.0	0.0	.712	44.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.82	7.29		
2-16- 48	1.41	0.0	0.0	0.0	0.0	0.0	0.0	.712	44.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.82	7.30		
2-16- 49	1.90	0.0	0.0	0.0	0.0	0.0	0.0	.712	60.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.84	7.22		
2-16- 50	2.28	0.0	0.0	0.0	0.0	0.0	0.0	.712	73.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.85	7.13		

Table 3 cont.

RUN.NO.	RE*E4	RE1*E4	F	F1	STB	STPR	U1/UB	F1/F2	TW/TB	PR	H/Y	BETA	H+	H+W	H+R	H+RW	RH+	RH+R	AS	AR
2-16- 51	3.57	7.11	.01741	.03937	.0	.0	0.96	5.52	1.00	.709	.0648	.865	115.4	115.4	115.4	115.4	2.43	2.43	2.41	2.50
2-16- 52	4.87	9.90	.01716	.03955	.0	.0	0.96	5.92	1.00	.709	.0639	.871	157.9	157.9	157.9	157.9	2.37	2.37	2.40	2.50
2-16- 53	7.67	16.01	.01694	.04011	.0	.0	0.96	6.57	1.00	.710	.0625	.880	250.2	250.2	250.2	250.2	2.26	2.26	2.40	2.50
2-16- 54	14.08	30.41	.01674	.04090	.0	.0	0.96	7.52	1.00	.713	.0610	.890	464.4	464.4	464.4	464.4	2.13	2.13	2.39	2.50
2-20- 55	0.40	0.39	.01100	.01165	.00436	.00386	1.03	1.10	1.32	.704	.0811	.631	4.6	3.1	4.8	3.2	9.02	8.60	2.44	2.50
2-20- 56	0.55	0.68	.01185	.01647	.00530	.00468	1.00	1.65	1.31	.704	.0673	.682	7.5	5.1	7.8	5.3	6.43	5.07	2.44	2.50
2-20- 57	0.74	1.05	.01235	.02008	.00627	.00550	0.99	2.14	1.29	.703	.0608	.714	11.1	7.6	11.5	7.8	5.11	4.79	2.43	2.50
2-20- 58	0.96	1.48	.01263	.02255	.00682	.00597	0.98	2.54	1.29	.703	.0571	.735	15.4	10.5	15.9	10.8	4.37	4.07	2.43	2.50
2-20- 59	1.35	2.26	.01301	.02566	.00731	.00638	0.97	3.10	1.28	.703	.0535	.759	23.0	15.7	23.8	16.2	3.60	3.32	2.43	2.50
2-20- 60	1.13	1.80	.01279	.02398	.00709	.00620	0.97	2.79	1.28	.703	.0553	.746	18.6	12.7	19.2	13.1	4.00	3.71	2.43	2.50
2-20- 61	1.57	2.69	.01295	.02622	.00736	.00644	0.97	3.28	1.28	.703	.0525	.765	27.1	18.4	28.0	19.0	3.46	3.18	2.42	2.50
2-20- 62	2.43	4.40	.01268	.02720	.00742	.00650	0.96	3.74	1.28	.704	.0505	.781	42.7	28.8	44.1	29.7	3.19	2.91	2.42	2.50
2-20- 63	3.77	7.21	.01265	.02880	.00746	.00655	0.96	4.34	1.29	.704	.0484	.797	68.2	45.5	70.5	47.0	2.83	2.55	2.41	2.50
2-20- 64	5.08	10.07	.01262	.02971	.00729	.00640	0.96	4.75	1.29	.704	.0473	.808	93.5	61.9	96.8	64.1	2.63	2.35	2.41	2.50
2-20- 65	7.47	15.29	.01240	.03007	.00678	.00600	0.96	5.19	1.31	.705	.0462	.818	138.5	89.2	143.7	92.6	2.52	2.22	2.40	2.50
2-20- 66	10.04	21.15	.01231	.03058	.00670	.00590	0.96	5.58	1.30	.706	.0453	.826	188.4	123.2	195.2	127.6	2.40	2.12	2.40	2.50
2-20- 67	14.17	30.68	.01220	.03108	.00631	.00558	0.96	6.04	1.31	.706	.0445	.834	268.4	171.8	278.6	178.3	2.28	1.99	2.39	2.50
2-20- 68	14.48	31.48	.01223	.03123	.00631	.00556	0.96	6.09	1.30	.706	.0444	.835	275.3	178.0	285.5	184.6	2.26	1.97	2.39	2.50
2-20- 69	21.36	47.94	.01221	.03209	.00604	.00533	0.96	6.70	1.31	.707	.0435	.845	412.7	265.4	428.2	275.4	2.09	1.80	2.39	2.50
2-20- 70	0.33	0.30	.01141	.01236	.00356	.00355	1.02	1.12	1.72	.699	.0830	.627	3.7	1.7	4.0	1.8	8.75	7.93	2.45	2.50
2-20- 71	0.43	0.43	.01152	.01420	.00379	.00383	1.01	1.36	1.75	.698	.0754	.651	5.1	2.3	5.5	2.4	7.59	6.80	2.44	2.50
2-20- 72	0.60	0.67	.01125	.01543	.00423	.00424	1.00	1.61	1.73	.699	.0699	.672	7.5	3.4	8.0	3.7	6.90	6.15	2.43	2.50
2-20- 73	0.90	1.15	.01151	.01877	.00512	.00509	0.99	2.14	1.70	.698	.0624	.706	12.3	5.6	13.1	6.0	5.53	4.87	2.43	2.50
2-20- 74	1.27	1.81	.01171	.02150	.00577	.00571	0.97	2.65	1.69	.697	.0578	.732	18.7	8.6	20.0	9.2	4.63	4.01	2.43	2.50
2-20- 75	1.28	1.81	.01164	.02126	.00576	.00570	0.97	2.62	1.69	.697	.0579	.731	18.6	8.6	19.9	9.2	4.70	4.07	2.43	2.50
2-20- 76	1.81	2.71	.01143	.02236	.00635	.00624	0.97	2.99	1.67	.697	.0555	.746	27.1	12.6	28.9	13.4	4.33	3.73	2.42	2.50
2-20- 77	2.34	3.73	.01165	.02423	.00646	.00637	0.96	3.41	1.68	.697	.0531	.762	36.6	16.7	39.1	17.9	3.84	3.25	2.42	2.50
2-20- 78	2.81	4.66	.01168	.02521	.00663	.00651	0.96	3.68	1.67	.697	.0519	.771	45.2	20.6	48.3	22.0	3.59	3.01	2.41	2.50
2-20- 79	4.72	8.66	.01205	.02862	.00675	.00665	0.95	4.61	1.68	.697	.0486	.797	82.0	36.1	87.9	38.7	2.86	2.30	2.41	2.50
2-20- 80	6.61	12.52	.01198	.02901	.00655	.00647	0.95	4.99	1.69	.697	.0475	.807	115.7	50.8	124.1	54.5	2.75	2.18	2.40	2.50
2-20- 81	9.53	19.12	.01234	.03141	.00649	.00643	0.95	5.76	1.69	.698	.0458	.822	174.9	75.4	188.0	81.0	2.32	1.76	2.39	2.50
2-20- 82	13.84	28.53	.01199	.03110	.00628	.00623	0.95	6.12	1.70	.699	.0450	.830	254.1	108.7	273.2	116.9	2.31	1.75	2.39	2.50
2-20- 83	19.51	41.80	.01214	.03228	.00590	.00587	0.95	6.72	1.70	.699	.0440	.840	367.5	155.5	395.5	167.3	2.10	1.54	2.38	2.50
2-20- 84	0.30	0.28	.01035	.00872	.0	.0	1.04	0.79	1.00	.709	.0947	.600	3.3	3.3	3.3	3.3	11.91	11.91	2.56	2.50
2-20- 85	0.39	0.46	.01138	.01274	.0	.0	1.01	1.17	1.00	.709	.0759	.648	5.2	5.2	5.2	5.2	8.29	8.29	2.44	2.50
2-20- 86	0.55	0.81	.01280	.01937	.0	.0	0.99	1.88	1.00	.709	.0621	.706	8.7	8.7	8.7	8.7	5.35	5.35	2.44	2.50
2-20- 87	0.73	1.19	.01344	.02323	.0	.0	0.98	2.39	1.00	.709	.0570	.735	12.5	12.5	12.5	12.5	4.23	4.23	2.44	2.50
2-20- 88	1.04	1.83	.01373	.02620	.0	.0	0.97	2.92	1.00	.709	.0534	.758	18.8	18.8	18.8	18.8	3.51	3.51	2.43	2.50
2-20- 89	1.04	1.83	.01383	.02654	.0	.0	0.97	2.95	1.00	.709	.0533	.759	18.9	18.9	18.9	18.9	3.44	3.44	2.43	2.50
2-20- 90	1.47	2.74	.01383	.02833	.0	.0	0.97	3.40	1.00	.709	.0510	.776	27.5	27.5	27.5	27.5	3.04	3.04	2.42	2.50
2-20- 91	2.30	4.53	.01373	.03005	.0	.0	0.97	3.98	1.00	.710	.0488	.794	44.2	44.2	44.2	44.2	2.68	2.68	2.42	2.50
2-20- 92	3.35	6.77	.01320	.02972	.0	.0	0.96	4.28	1.00	.710	.0479	.802	63.9	63.9	63.9	63.9	2.66	2.66	2.41	2.50
2-20- 93	4.66	9.71	.01304	.03038	.0	.0	0.96	4.68	1.00	.711	.0468	.812	89.8	89.8	89.8	89.8	2.51	2.51	2.41	2.50
2-20- 94	6.82	14.63	.01277	.03071	.0	.0	0.96	5.11	1.00	.711	.0457	.821	132.1	132.1	132.1	132.1	2.41	2.41	2.40	2.50
2-20- 95	9.25	20.28	.01259	.03099	.0	.0	0.96	5.48	1.00	.712	.0450	.828	179.8	179.8	179.8	179.8	2.32	2.32	2.40	2.50
2-20- 96	12.11	27.02	.01241	.03108	.0	.0	0.96	5.79	1.00	.712	.0444	.834	235.8	235.8	235.8	235.8	2.28	2.28	2.39	2.50
2-20- 97	16.32	37.37	.01255	.03232	.0	.0	0.96	6.34	1.00	.712	.0436	.843	323.8	323.8	323.8	323.8	2.06	2.06	2.39	2.50
2-20- 98	17.21	39.48	.01246	.03214	.0	.0	0.96	6.37	1.00	.712	.0435	.844	340.5	340.5	340.5	340.5	2.08	2.08	2.39	2.50
2-20- 99	21.85	50.79	.01229	.03209	.0	.0	0.96	6.65	1.00	.712	.0431	.848	432.2	432.2	432.2	432.2	2.06	2.06	2.39	2.50
2-20-100	26.58	62.45	.01220	.03220	.0	.0	0.96	6.90	1.00	.712	.0428	.852	526.5	526.5	526.5	526.5	2.03	2.03	2.38	2.50

RUN.NO.	RE*E4	Q<KW/M2>	ST+/	ST*/	ST1*/	STT*/	ST1F/	A1/AB	H+	G+	GPRI	G*	G*R	G*1	GT	GTR	GTF	GTFR	X	YR	AH	TP
2-16- 51	3.57	0.0	0.0	0.0	0.0	0.0	0.0	.712	115.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.88	7.13		
2-16- 52	4.87	0.0	0.0	0.0	0.0	0.0	0.0	.712	157.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.90	7.11		
2-16- 53	7.67	0.0	0.0	0.0	0.0	0.0	0.0	.712	250.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.92	7.06		
2-16- 54	14.08	0.0	0.0	0.0	0.0	0.0	0.0	.712	464.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.95	6.99		
2-20- 55	0.40	2.7	1.17	1.23	1.41	1.29	1.34	.294	4.6	10.9	10.5	11.4	14.4	8.4	9.6	12.2	9.0	11.9	1.63	13.10	2.50	1.29
2-20- 56	0.55	4.4	1.16	1.21	1.36	1.25	1.31	.372	7.5	10.2	9.9	10.5	13.5	8.0	9.1	11.7	8.5	11.4	1.84	11.02	2.50	1.70
2-20- 57	0.74	6.8	1.15	1.19	1.34	1.24	1.30	.424	11.1	9.0	8.8	9.2	11.9	7.1	8.1	10.6	7.4	10.1	1.95	9.98	2.50	2.56
2-20- 58	0.96	9.4	1.15	1.18	1.32	1.22	1.29	.460	15.4	8.5	8.4	8.6	11.3	6.8	7.7	10.2	7.0	9.7	2.02	9.42	2.50	3.24
2-20- 59	1.35	13.8	1.14	1.17	1.29	1.20	1.27	.502	23.0	8.4	8.3	8.4	11.1	6.8	7.7	10.2	7.0	9.7	2.09	8.83	2.50	3.99
2-20- 60	1.13	11.1	1.14	1.17	1.30	1.21	1.28	.480	18.6	8.4	8.3	8.4	11.1	6.7	7.6	10.1	6.9	9.6	2.05	9.13	2.50	3.62
2-20- 61	1.57	16.1	1.13	1.16	1.28	1.19	1.26	.513	27.1	8.5	8.4	8.4	11.1	6.9	7.8	10.3	7.1	9.7	2.11	8.73	2.50	4.23
2-20- 62	2.43	25.4	1.13	1.15	1.26	1.18	1.24	.542	42.7	8.6	8.4	8.5	11.3	7.1	7.9	10.5	7.3	10.0	2.16	8.58	2.50	5.07
2-20- 63	3.77	40.2	1.12	1.14	1.24	1.17	1.22	.573	68.2	8.9	8.7	8.8	11.6	7.5	8.2	10.9	7.7	10.4	2.20	8.33	2.50	5.86
2-20- 64	5.08	53.2	1.11	1.13	1.22	1.16	1.20	.592	93.5	9.5	9.3	9.4	12.3	8.2	8.8	11.7	8.4	11.2	2.23	8.21	2.50	5.99
2-20- 65	7.47	77.6	1.11	1.13	1.20	1.15	1.18	.611	138.5	10.7	10.4	10.7	13.8	9.5	10.1	13.1	9.7	12.7	2.26	8.16	2.50	5.64
2-20- 66	10.04	96.8	1.10	1.12	1.18	1.14	1.17	.626	188.4	11.1	10.8	11.1	14.2	9.9	10.5	13.6	10.1	13.2	2.28	8.09	2.50	5.92
2-20- 67	14.17	134.6	1.09	1.11	1.17	1.13	1.15	.643	268.4	12.3	12.0	12.4	15.6	11.2	11.7	15.0	11.4	14.7	2.30	8.02	2.50	5.56
2-20- 68	14.48	134.7	1.09	1.11	1.17	1.13	1.15	.645	275.3	12.4	12.1	12.4	15.7	11.3	11.8	15.1	11.5	14.8	2.30	8.00	2.50	5.54
2-20- 69	21.36	190.2	1.09	1.10	1.15	1.12	1.14	.664	412.7	13.5	13.1	13.5	17.0	12.5	12.9	16.5	12.7	16.1	2.32	7.89	2.50	5.45
2-20- 70	0.33	4.6	1.11	1.20	1.36	1.26	1.30	.287	3.7	16.1	13.1	16.1	17.6	12.4	13.8	15.8	13.0	14.5	1.61	12.72	2.50	0.77
2-20- 71	0.43	6.8	1.12	1.21	1.38	1.26	1.28	.323	5.1	15.8	12.6	16.0	17.3	12.0	13.5	15.5	13.1	14.5	1.71	11.87	2.50	0.85
2-20- 72	0.60	10.3	1.13	1.22	1.39	1.27	1.28	.355	7.5	14.0	11.3	14.3	15.7	10.6	11.9	13.9	11.7	13.0	1.80	11.38	2.50	1.19
2-20- 73	0.90	18.3	1.14	1.22	1.39	1.27	1.29	.411	12.3	11.9	9.7	12.1	13.5	8.9	10.2	12.1	9.8	11.2	1.92	10.32	2.50	2.03
2-20- 74	1.27	29.4	1.13	1.21	1.37	1.26	1.29	.454	18.7	10.9	8.9	10.9	12.3	8.2	9.3	11.2	9.0	10.3	2.01	9.65	2.50	2.99
2-20- 75	1.28	29.4	1.14	1.21	1.37	1.26	1.29	.452	18.6	10.8	8.9	10.8	12.2	8.1	9.2	11.1	8.9	10.2	2.00	9.70	2.50	2.92
2-20- 76	1.81	45.6	1.14	1.21	1.37	1.26	1.30	.479	27.1	9.5	7.9	9.5	10.9	7.0	8.1	9.9	7.7	9.0	2.05	9.46	2.50	4.36
2-20- 77	2.34	60.7	1.13	1.19	1.35	1.24	1.27	.507	36.6	9.8	8.1	9.8	11.2	7.4	8.5	10.4	8.1	9.5	2.10	9.09	2.50	4.70
2-20- 78	2.81	73.6	1.13	1.18	1.32	1.22	1.27	.524	45.2	9.7	8.1	9.6	11.0	7.5	8.5	10.4	8.1	9.5	2.13	8.91	2.50	5.16
2-20- 79	4.72	129.6	1.11	1.15	1.27	1.19	1.23	.572	82.0	10.4	8.6	10.1	11.6	8.5	9.4	11.4	8.9	10.3	2.20	8.36	2.50	5.84
2-20- 80	6.61	175.6	1.11	1.15	1.26	1.19	1.21	.590	115.7	11.0	9.0	10.9	12.4	9.1	9.9	12.0	9.7	11.1	2.22	8.30	2.50	6.15
2-20- 81	9.53	251.5	1.10	1.13	1.23	1.17	1.19	.620	174.9	11.9	9.7	11.7	13.3	10.1	10.9	13.0	10.6	12.1	2.27	7.98	2.50	6.31
2-20- 82	13.84	349.6	1.10	1.13	1.21	1.16	1.18	.634	254.1	12.4	10.1	12.3	13.8	10.7	11.5	13.7	11.2	12.7	2.28	8.02	2.50	6.63
2-20- 83	19.51	457.9	1.09	1.12	1.19	1.14	1.16	.654	367.5	14.0	11.4	13.9	15.6	12.4	13.1	15.5	12.9	14.5	2.31	7.87	2.50	5.97
2-20- 84	0.30	0.0	0.0	0.0	0.0	0.0	0.0	.654	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.48	15.14		
2-20- 85	0.39	0.0	0.0	0.0	0.0	0.0	0.0	.654	5.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.71	12.53		
2-20- 86	0.55	0.0	0.0	0.0	0.0	0.0	0.0	.654	8.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.93	10.16		
2-20- 87	0.73	0.0	0.0	0.0	0.0	0.0	0.0	.654	12.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.02	9.28		
2-20- 88	1.04	0.0	0.0	0.0	0.0	0.0	0.0	.654	18.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.09	8.74		
2-20- 89	1.04	0.0	0.0	0.0	0.0	0.0	0.0	.654	18.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.10	8.68		
2-20- 90	1.47	0.0	0.0	0.0	0.0	0.0	0.0	.654	27.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.14	8.40		
2-20- 91	2.30	0.0	0.0	0.0	0.0	0.0	0.0	.654	44.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.19	8.16		
2-20- 92	3.35	0.0	0.0	0.0	0.0	0.0	0.0	.654	63.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.22	8.20		
2-20- 93	4.66	0.0	0.0	0.0	0.0	0.0	0.0	.654	89.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.24	8.11		
2-20- 94	6.82	0.0	0.0	0.0	0.0	0.0	0.0	.654	132.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.27	8.07		
2-20- 95	9.25	0.0	0.0	0.0	0.0	0.0	0.0	.654	179.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.28	8.03		
2-20- 96	12.11	0.0	0.0	0.0	0.0	0.0	0.0	.654	235.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.30	8.02		
2-20- 97	16.32	0.0	0.0	0.0	0.0	0.0	0.0	.654	323.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.32	7.87		
2-20- 98	17.21	0.0	0.0	0.0	0.0	0.0	0.0	.654	340.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.32	7.89		
2-20- 99	21.85	0.0	0.0	0.0	0.0	0.0	0.0	.654	432.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.33	7.89		
2-20-100	26.58	0.0	0.0	0.0	0.0	0.0	0.0	.654	526.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.34	7.88		

Table 3 cont.

.UN.NO.	RE*E4	RE1*E4	F	F1	STB	STPR	U1/UB	F1/F2	TW/TB	PR	H/Y	BETA	H+	H+W	H+R	H+RW	RH+	RH+R	AS	AR
3-16- 1	0.36	0.37	.01137	.01261	.00415	.00365	1.00	1.15	1.28	.702	.1107	.710	6.6	4.5	6.9	4.6	9.36	8.95	2.45	2.50
3-16- 2	0.47	0.58	.01256	.01721	.00535	.00467	0.98	1.64	1.26	.701	.0949	.748	10.0	6.9	10.3	7.1	7.13	6.81	2.45	2.50
3-16- 3	0.59	0.83	.01383	.02211	.00658	.00569	0.97	2.19	1.24	.701	.0852	.778	14.2	10.1	14.7	10.4	5.56	5.29	2.45	2.50
3-16- 4	0.82	1.25	.01446	.02546	.00729	.00628	0.96	2.70	1.23	.700	.0795	.799	21.1	15.1	21.7	15.6	4.73	4.48	2.44	2.50
3-16- 5	1.12	1.79	.01455	.02700	.00768	.00660	0.96	3.08	1.22	.700	.0763	.811	29.7	21.5	30.5	22.1	4.36	4.13	2.44	2.50
3-16- 6	1.19	1.93	.01486	.02816	.00787	.00675	0.96	3.24	1.22	.700	.0752	.816	32.1	23.4	32.9	24.0	4.14	3.92	2.43	2.50
3-16- 7	1.48	2.50	.01518	.02997	.00808	.00694	0.96	3.61	1.22	.700	.0730	.827	41.3	30.1	42.4	30.9	3.80	3.59	2.43	2.50
3-16- 8	2.08	3.68	.01569	.03275	.00861	.00738	0.96	4.22	1.21	.700	.0701	.841	60.3	44.0	61.9	45.2	3.33	3.13	2.42	2.50
3-16- 9	2.91	5.26	.01516	.03222	.00821	.00705	0.96	4.48	1.22	.700	.0690	.846	83.7	60.7	86.0	62.4	3.35	3.15	2.42	2.50
3-16- 10	4.19	7.80	.01486	.03246	.00779	.00671	0.96	4.87	1.23	.701	.0675	.854	121.4	86.8	124.9	89.3	3.27	3.05	2.41	2.50
3-16- 11	7.32	14.05	.01410	.03152	.00693	.00600	0.96	5.32	1.24	.702	.0661	.862	209.5	147.3	215.7	151.7	3.32	3.09	2.40	2.50
3-16- 12	11.46	22.77	.01396	.03220	.00647	.00562	0.96	5.92	1.25	.703	.0645	.871	332.9	230.3	343.3	237.5	3.17	2.93	2.40	2.50
3-16- 13	0.34	0.34	.01146	.01357	.00345	.00340	0.97	1.23	1.63	.694	.1102	.712	6.3	2.9	6.7	3.1	8.89	8.12	2.45	2.50
3-16- 14	0.43	0.47	.01193	.01572	.00393	.00386	0.98	1.50	1.61	.694	.1010	.733	8.3	4.0	8.9	4.2	7.80	7.10	2.45	2.50
3-16- 15	0.54	0.65	.01231	.01781	.00462	.00447	0.98	1.79	1.58	.693	.0939	.751	11.3	5.6	12.0	5.9	6.92	6.31	2.45	2.50
3-16- 16	0.75	0.99	.01280	.02081	.00570	.00543	0.97	2.24	1.54	.692	.0864	.774	16.7	8.6	17.7	9.1	5.90	5.36	2.44	2.50
3-16- 17	1.02	1.48	.01343	.02430	.00669	.00627	0.95	2.79	1.49	.691	.0802	.797	24.7	13.2	26.1	13.9	4.96	4.49	2.44	2.50
3-16- 18	1.02	1.47	.01344	.02430	.00664	.00624	0.95	2.78	1.50	.691	.0803	.796	24.6	13.0	26.0	13.7	4.96	4.48	2.44	2.50
3-16- 19	1.36	2.11	.01397	.02710	.00711	.00664	0.95	3.29	1.49	.691	.0762	.813	34.9	18.6	36.9	19.6	4.34	3.89	2.43	2.50
3-16- 20	1.97	3.28	.01491	.03103	.00787	.00730	0.95	4.04	1.47	.690	.0719	.832	54.0	29.4	56.9	30.9	3.62	3.21	2.42	2.50
3-16- 21	2.87	5.07	.01564	.03426	.00827	.00763	0.95	4.79	1.46	.690	.0688	.848	83.0	45.9	87.3	48.3	3.11	2.73	2.41	2.50
3-16- 22	4.30	7.76	.01491	.03317	.00773	.00720	0.95	5.07	1.48	.691	.0678	.854	122.7	65.9	129.4	69.5	3.20	2.79	2.41	2.50
3-16- 23	6.61	12.24	.01430	.03246	.00715	.00672	0.95	5.43	1.50	.692	.0666	.860	187.4	97.7	198.2	103.3	3.23	2.81	2.40	2.50
3-16- 24	9.91	18.83	.01388	.03206	.00662	.00627	0.95	5.81	1.53	.693	.0655	.866	280.4	141.9	297.3	150.4	3.23	2.79	2.40	2.50
3-16- 25	0.07	0.12	.03421	.06140	.0	.0	0.96	2.88	1.00	.709	.0778	.805	3.0	3.0	3.0	3.0	1.53	1.53	2.52	2.50
3-16- 26	0.10	0.15	.02568	.04092	.0	.0	0.98	2.23	1.00	.709	.0836	.783	3.4	3.4	3.4	3.4	3.00	3.00	2.50	2.50
3-16- 27	0.13	0.17	.01893	.02516	.0	.0	0.99	1.58	1.00	.709	.0941	.749	3.6	3.6	3.6	3.6	5.25	5.25	2.49	2.50
3-16- 28	0.18	0.19	.01378	.01406	.0	.0	1.02	1.03	1.00	.709	.1126	.706	3.7	3.7	3.7	3.7	8.74	8.74	2.49	2.50
3-16- 29	0.24	0.23	.01097	.00946	.0	.0	1.03	0.81	1.00	.709	.1268	.681	4.2	4.2	4.2	4.2	11.71	11.71	2.58	2.50
3-16- 30	0.32	0.35	.01192	.01276	.0	.0	1.01	1.11	1.00	.709	.1095	.712	6.2	6.2	6.2	6.2	9.27	9.27	2.46	2.50
3-16- 31	0.32	0.32	.01102	.01070	.0	.0	1.02	0.95	1.00	.709	.1251	.691	5.8	5.8	5.8	5.8	11.48	11.48	2.48	2.50
3-16- 32	0.50	0.72	.01440	.02204	.0	.0	0.98	2.05	1.00	.709	.0854	.776	12.5	12.5	12.5	12.5	5.59	5.59	2.45	2.50
3-16- 33	0.69	1.10	.01542	.02663	.0	.0	0.97	2.65	1.00	.709	.0786	.801	18.7	18.7	18.7	18.7	4.50	4.50	2.45	2.50
3-16- 34	0.97	1.63	.01574	.02922	.0	.0	0.97	3.14	1.00	.709	.0748	.818	27.5	27.5	27.5	27.5	3.97	3.97	2.44	2.50
3-16- 35	1.34	2.33	.01553	.02999	.0	.0	0.97	3.47	1.00	.709	.0727	.827	38.2	38.2	38.2	38.2	3.79	3.79	2.43	2.50
3-16- 36	1.34	2.33	.01549	.02988	.0	.0	0.97	3.46	1.00	.709	.0728	.827	38.2	38.2	38.2	38.2	3.81	3.81	2.43	2.50
3-16- 37	1.95	3.55	.01559	.03166	.0	.0	0.96	3.98	1.00	.709	.0702	.840	57.3	57.3	57.3	57.3	3.47	3.47	2.43	2.50
3-16- 38	2.94	5.52	.01517	.03183	.0	.0	0.96	4.38	1.00	.710	.0685	.848	86.6	86.6	86.6	86.6	3.38	3.38	2.42	2.50
3-16- 39	4.28	8.20	.01459	.03125	.0	.0	0.96	4.67	1.00	.710	.0674	.854	124.8	124.8	124.8	124.8	3.41	3.41	2.41	2.50
3-16- 40	5.69	11.04	.01417	.03076	.0	.0	0.96	4.88	1.00	.710	.0667	.858	164.5	164.5	164.5	164.5	3.44	3.44	2.41	2.50
3-16- 41	6.81	13.41	.01413	.03112	.0	.0	0.96	5.12	1.00	.710	.0660	.862	198.1	198.1	198.1	198.1	3.37	3.37	2.41	2.50
3-16- 42	12.33	24.97	.01346	.03048	.0	.0	0.96	5.64	1.00	.712	.0645	.871	354.9	354.9	354.9	354.9	3.39	3.39	2.40	2.50

RUN.NO.	RE*E4	Q<KW/M2>	ST+/	ST*/	ST1*/	STT*/	ST1F/	A1/AB	H+	G+	GPR1	G*	G*R	G*1	GT	GTR	GTF	GTFR	X	YR	AH	TP
3-16- 1	0.36	3.2	1.09	1.12	1.32	1.15	1.33	.352	6.6	14.4	14.1	13.6	17.0	11.3	13.4	16.6	11.1	14.4	1.30	12.59	2.50	0.76
3-16- 2	0.47	5.0	1.11	1.13	1.32	1.16	1.33	.424	10.0	12.0	12.0	11.6	14.7	9.5	11.3	14.3	9.4	12.4	1.46	10.78	2.50	1.28
3-16- 3	0.59	7.3	1.10	1.12	1.30	1.14	1.33	.484	14.2	10.6	10.7	10.0	12.9	8.4	10.1	12.9	8.1	11.0	1.58	9.51	2.50	1.97
3-16- 4	0.82	10.8	1.11	1.12	1.29	1.14	1.31	.527	21.1	9.9	10.0	9.4	12.3	7.9	9.5	12.3	7.7	10.6	1.66	8.86	2.50	2.68
3-16- 5	1.12	15.3	1.11	1.13	1.28	1.14	1.29	.554	29.7	9.4	9.6	9.1	11.9	7.6	9.0	11.7	7.5	10.3	1.70	8.61	2.50	3.47
3-16- 6	1.19	16.1	1.11	1.13	1.27	1.14	1.29	.564	32.1	9.3	9.5	9.0	11.9	7.5	9.0	11.7	7.4	10.3	1.72	8.43	2.50	3.66
3-16- 7	1.48	20.9	1.11	1.13	1.27	1.14	1.27	.586	41.3	9.3	9.5	9.1	11.9	7.6	8.9	11.7	7.6	10.4	1.75	8.17	2.50	4.17
3-16- 8	2.08	30.9	1.11	1.12	1.25	1.13	1.25	.617	60.3	8.9	9.2	8.7	11.6	7.4	8.7	11.4	7.4	10.2	1.79	7.81	2.50	5.35
3-16- 9	2.91	42.1	1.11	1.12	1.23	1.13	1.23	.630	83.7	9.4	9.6	9.3	12.2	8.0	9.1	12.0	8.0	10.9	1.81	7.88	2.50	5.57
3-16- 10	4.19	58.6	1.10	1.11	1.20	1.12	1.21	.647	121.4	10.3	10.5	10.2	13.2	9.0	10.1	13.1	8.9	11.9	1.83	7.85	2.50	5.41
3-16- 11	7.32	94.4	1.09	1.11	1.18	1.11	1.18	.665	209.5	11.9	12.0	11.9	15.2	10.7	11.6	14.9	10.7	14.0	1.86	7.97	2.50	5.05
3-16- 12	11.46	140.9	1.08	1.09	1.15	1.10	1.16	.686	332.9	13.4	13.5	13.3	15.8	12.3	13.2	16.7	12.2	15.7	1.88	7.88	2.50	4.71
3-16- 13	0.34	6.9	1.08	1.11	1.31	1.15	1.30	.355	6.3	19.1	16.1	17.9	19.8	15.3	17.8	19.9	15.1	17.0	1.30	12.14	2.50	0.49
3-16- 14	0.43	9.7	1.09	1.13	1.32	1.17	1.29	.394	8.3	17.3	14.7	16.6	18.4	13.7	15.9	18.2	14.0	15.8	1.39	11.28	2.50	0.65
3-16- 15	0.54	13.9	1.11	1.15	1.32	1.18	1.30	.430	11.3	14.8	12.8	14.5	16.4	11.8	13.6	15.9	12.0	13.9	1.47	10.60	2.50	1.01
3-16- 16	0.75	23.1	1.12	1.16	1.35	1.19	1.32	.476	16.7	12.1	10.7	11.8	13.7	9.4	11.2	13.4	9.6	11.5	1.56	9.82	2.50	1.85
3-16- 17	1.02	34.6	1.11	1.14	1.33	1.16	1.32	.522	24.7	10.7	9.6	10.2	12.2	8.3	10.1	12.3	8.3	10.3	1.64	9.07	2.50	2.79
3-16- 18	1.02	35.1	1.11	1.14	1.33	1.17	1.32	.522	24.6	10.8	9.7	10.3	12.3	8.4	10.1	12.4	8.5	10.4	1.64	9.07	2.50	2.75
3-16- 19	1.36	49.5	1.11	1.13	1.30	1.15	1.30	.557	34.9	10.5	9.5	10.0	12.1	8.3	10.0	12.3	8.3	10.3	1.70	8.59	2.50	3.39
3-16- 20	1.97	78.6	1.11	1.14	1.29	1.15	1.27	.598	54.0	9.8	8.9	9.5	11.6	7.8	9.3	11.6	8.0	10.0	1.76	8.03	2.50	4.85
3-16- 21	2.87	116.5	1.11	1.14	1.27	1.15	1.25	.633	83.0	9.7	8.8	9.6	11.7	7.9	9.3	11.6	8.2	10.2	1.81	7.64	2.50	6.11
3-16- 22	4.30	170.8	1.11	1.14	1.25	1.14	1.23	.645	122.7	10.5	9.4	10.4	12.5	8.8	10.0	12.4	9.0	11.1	1.83	7.77	2.50	6.29
3-16- 23	6.61	246.3	1.10	1.12	1.22	1.13	1.20	.660	187.4	11.6	10.3	11.5	13.6	10.0	11.1	13.7	10.2	12.3	1.85	7.85	2.50	5.95
3-16- 24	9.91	349.3	1.09	1.11	1.20	1.12	1.18	.674	280.4	12.9	11.3	12.8	14.9	11.3	12.4	15.0	11.5	13.6	1.87	7.98	2.50	5.63
3-16- 25	0.07	0.0	0.0	0.0	0.0	0.0	0.0	.674	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.68	5.71		
3-16- 26	0.10	0.0	0.0	0.0	0.0	0.0	0.0	.674	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.60	6.99		
3-16- 27	0.13	0.0	0.0	0.0	0.0	0.0	0.0	.674	3.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.47	8.92		
3-16- 28	0.18	0.0	0.0	0.0	0.0	0.0	0.0	.674	3.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.28	11.93		
3-16- 29	0.24	0.0	0.0	0.0	0.0	0.0	0.0	.674	4.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.15	14.54		
3-16- 30	0.32	0.0	0.0	0.0	0.0	0.0	0.0	.674	6.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.31	12.52		
3-16- 31	0.32	0.0	0.0	0.0	0.0	0.0	0.0	.674	5.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.19	13.67		
3-16- 32	0.50	0.0	0.0	0.0	0.0	0.0	0.0	.674	12.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.58	9.53		
3-16- 33	0.69	0.0	0.0	0.0	0.0	0.0	0.0	.674	18.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.67	8.67		
3-16- 34	0.97	0.0	0.0	0.0	0.0	0.0	0.0	.674	27.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.72	8.27		
3-16- 35	1.34	0.0	0.0	0.0	0.0	0.0	0.0	.674	38.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.75	8.17		
3-16- 36	1.34	0.0	0.0	0.0	0.0	0.0	0.0	.674	38.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.75	8.18		
3-16- 37	1.95	0.0	0.0	0.0	0.0	0.0	0.0	.674	57.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.79	7.95		
3-16- 38	2.94	0.0	0.0	0.0	0.0	0.0	0.0	.674	86.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.82	7.93		
3-16- 39	4.28	0.0	0.0	0.0	0.0	0.0	0.0	.674	124.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.84	8.00		
3-16- 40	5.69	0.0	0.0	0.0	0.0	0.0	0.0	.674	164.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.85	8.06		
3-16- 41	6.81	0.0	0.0	0.0	0.0	0.0	0.0	.674	198.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.86	8.02		
3-16- 42	12.33	0.0	0.0	0.0	0.0	0.0	0.0	.674	354.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.88	8.10		

Table 4: Results evaluated with A_r, A_s and A_H according to Eq.(7),(8) and (9).

RUN.NO.	RE*E4	REI*E4	F	F1	STB	STPR	U1/UB	F1/F2	TW/TB	PR	H/Y	BETA	H+	H+W	H+R	H+RW	RH+	RH+R	AS	AR
2-16- 1	0.30	0.33	.01356	.01783	.00497	.00430	0.98	1.53	1.23	.702	.1019	.727	6.2	4.7	6.4	4.8	6.63	6.38	2.46	2.92
2-16- 2	0.45	0.63	.01552	.02554	.00729	.00626	0.98	2.35	1.22	.700	.0833	.780	11.2	8.5	11.5	8.7	5.01	4.80	2.46	2.40
2-16- 3	0.61	0.97	.01680	.03061	.00859	.00734	0.98	2.96	1.20	.699	.0760	.809	17.0	13.0	17.4	13.3	4.40	4.22	2.46	2.16
2-16- 4	0.84	1.42	.01695	.03236	.00900	.00768	0.98	3.35	1.20	.699	.0725	.825	24.1	18.4	24.7	18.8	4.34	4.16	2.46	2.01
2-16- 5	1.17	2.14	.01725	.03457	.00909	.00774	0.99	3.83	1.19	.700	.0692	.841	35.4	26.9	36.2	27.5	4.23	4.05	2.45	1.87
2-16- 6	1.16	2.12	.01732	.03475	.00910	.00777	0.99	3.84	1.20	.699	.0692	.841	35.1	26.5	35.9	27.1	4.20	4.03	2.45	1.87
2-16- 7	1.66	3.20	.01752	.03665	.00902	.00769	0.99	4.35	1.20	.700	.0666	.855	51.9	39.0	53.2	40.0	4.13	3.96	2.45	1.76
2-16- 8	2.32	4.67	.01758	.03797	.00913	.00779	0.99	4.83	1.20	.700	.0648	.866	74.2	55.5	76.1	56.9	4.11	3.93	2.45	1.68
2-16- 9	4.36	9.26	.01716	.03865	.00845	.00725	0.99	5.61	1.21	.701	.0624	.881	141.6	103.3	145.4	106.1	4.21	4.03	2.45	1.55
2-16- 10	5.78	12.55	.01699	.03891	.00797	.00686	0.99	5.98	1.22	.702	.0615	.887	189.0	136.3	194.3	140.0	4.25	4.06	2.45	1.51
2-16- 11	7.31	16.08	.01661	.03837	.00773	.00666	0.99	6.19	1.22	.701	.0610	.890	237.8	170.3	244.6	175.1	4.35	4.16	2.44	1.47
2-16- 12	11.75	26.80	.01685	.04015	.00709	.00613	0.99	7.06	1.23	.703	.0594	.901	392.3	276.4	403.9	284.6	4.27	4.07	2.44	1.41
2-16- 13	0.28	0.25	.01297	.01689	.00392	.00380	0.96	1.47	1.58	.695	.1102	.709	5.0	2.7	5.3	2.9	6.75	6.19	2.47	3.21
2-16- 14	0.36	0.36	.01302	.01823	.00455	.00433	0.97	1.67	1.53	.695	.1016	.729	6.9	3.9	7.2	4.1	6.68	6.17	2.46	2.80
2-16- 15	0.42	0.46	.01336	.02018	.00524	.00497	0.97	1.92	1.53	.694	.0945	.747	8.6	4.9	9.0	5.1	6.22	5.74	2.46	2.58
2-16- 16	0.57	0.76	.01511	.02670	.00679	.00634	0.97	2.67	1.49	.691	.0818	.787	13.7	7.9	14.3	8.3	4.98	4.58	2.46	2.27
2-16- 17	0.77	1.13	.01549	.02905	.00760	.00704	0.98	3.09	1.47	.691	.0769	.806	19.6	11.4	20.6	12.0	4.78	4.40	2.46	2.08
2-16- 18	1.04	1.68	.01612	.03184	.00831	.00765	0.98	3.58	1.45	.690	.0726	.825	28.4	16.5	29.7	17.3	4.53	4.17	2.46	1.94
2-16- 19	1.04	1.68	.01612	.03184	.00834	.00767	0.98	3.57	1.45	.690	.0726	.825	28.3	16.5	29.6	17.3	4.53	4.17	2.46	1.94
2-16- 20	1.52	2.69	.01682	.03506	.00858	.00788	0.98	4.22	1.44	.690	.0686	.846	44.4	25.4	46.6	26.7	4.29	3.94	2.45	1.80
2-16- 21	2.16	4.10	.01728	.03752	.00882	.00810	0.98	4.82	1.44	.690	.0659	.860	66.3	37.6	69.7	39.5	4.14	3.80	2.45	1.70
2-16- 22	3.14	6.29	.01760	.03953	.00880	.00810	0.99	5.46	1.45	.690	.0637	.873	100.2	55.9	105.3	58.8	4.05	3.71	2.45	1.61
2-16- 23	4.59	9.56	.01752	.04029	.00822	.00761	0.99	5.99	1.47	.691	.0622	.883	149.0	81.0	157.0	85.4	4.08	3.72	2.45	1.54
2-16- 24	6.90	14.83	.01720	.04033	.00789	.00734	0.99	6.50	1.48	.692	.0610	.891	225.5	120.3	238.1	127.0	4.17	3.80	2.44	1.48
2-16- 25	11.45	25.54	.01699	.04080	.00734	.00688	0.99	7.23	1.49	.693	.0597	.900	379.2	197.3	401.0	208.6	4.22	3.84	2.44	1.41
2-16- 26	0.40	0.40	.01302	.01944	.00384	.00405	0.97	1.85	1.83	.688	.0986	.737	7.6	3.3	8.2	3.6	6.41	5.69	2.46	2.69
2-16- 27	0.51	0.56	.01329	.02151	.00471	.00487	0.97	2.17	1.77	.687	.0911	.757	10.3	4.7	11.0	5.1	6.01	5.37	2.46	2.43
2-16- 28	0.69	0.86	.01407	.02546	.00599	.00609	0.97	2.74	1.74	.685	.0828	.784	15.3	7.2	16.3	7.7	5.34	4.78	2.46	2.19
2-16- 29	0.92	1.29	.01487	.02893	.00677	.00680	0.97	3.28	1.70	.685	.0769	.807	22.3	10.7	23.8	11.4	4.91	4.39	2.46	2.02
2-16- 30	0.92	1.29	.01491	.02904	.00687	.00688	0.97	3.29	1.69	.685	.0768	.808	22.4	10.7	23.9	11.5	4.89	4.37	2.46	2.02
2-16- 31	1.29	2.07	.01587	.03262	.00752	.00744	0.98	3.91	1.66	.684	.0716	.831	34.9	16.6	37.2	17.8	4.54	4.05	2.46	1.86
2-16- 32	1.86	3.33	.01734	.03785	.00789	.00777	0.98	4.77	1.65	.685	.0673	.854	55.4	26.2	59.2	27.9	4.12	3.65	2.45	1.74
2-16- 33	2.72	5.16	.01733	.03885	.00817	.00805	0.98	5.30	1.66	.684	.0650	.866	83.7	38.8	89.5	41.5	4.09	3.62	2.45	1.65
2-16- 34	4.13	8.36	.01788	.04152	.00851	.00832	0.98	6.11	1.64	.684	.0627	.881	133.5	62.2	142.7	66.4	3.95	3.50	2.45	1.56
2-16- 35	6.29	13.35	.01822	.04345	.00786	.00780	0.99	6.89	1.68	.685	.0609	.892	210.2	93.5	225.7	100.3	3.88	3.42	2.44	1.49
2-16- 36	9.38	20.47	.01769	.04272	.00750	.00747	0.99	7.33	1.68	.686	.0603	.898	313.6	137.2	337.1	147.4	4.02	3.54	2.44	1.44
2-16- 37	0.07	0.08	.03602	.08562	.0	.0	0.78	4.33	1.00	.708	.0864	.770	2.7	2.7	2.7	2.7	-3.10	-3.10	2.46	5.07
2-16- 38	0.10	0.12	.02597	.04783	.0	.0	0.86	2.75	1.00	.708	.0911	.754	3.2	3.2	3.2	3.2	-0.24	-0.24	2.46	4.46
2-16- 39	0.13	0.15	.01940	.02873	.0	.0	0.91	1.86	1.00	.708	.0994	.731	3.5	3.5	3.5	3.5	2.58	2.58	2.46	4.09
2-16- 40	0.18	0.18	.01421	.01592	.0	.0	0.95	1.18	1.00	.708	.1155	.696	3.7	3.7	3.7	3.7	6.46	6.46	2.47	3.80
2-16- 41	0.25	0.23	.01095	.01058	.0	.0	1.00	0.95	1.00	.708	.1229	.685	4.3	4.3	4.3	4.3	9.65	9.65	2.71	3.45
2-16- 42	0.34	0.50	.01655	.02600	.0	.0	0.98	2.16	1.00	.709	.0840	.777	9.2	9.2	9.2	9.2	4.68	4.68	2.46	2.57
2-16- 43	0.34	0.50	.01636	.02544	.0	.0	0.98	2.11	1.00	.709	.0847	.775	9.0	9.0	9.0	9.0	4.78	4.78	2.46	2.58
2-16- 44	0.51	0.84	.01737	.03044	.0	.0	0.98	2.74	1.00	.708	.0763	.807	14.7	14.7	14.7	14.7	4.29	4.29	2.46	2.25
2-16- 45	0.72	1.29	.01827	.03474	.0	.0	0.98	3.34	1.00	.708	.0713	.830	22.3	22.3	22.3	22.3	3.95	3.95	2.46	2.05
2-16- 46	0.99	1.89	.01828	.03629	.0	.0	0.99	3.76	1.00	.709	.0687	.844	31.7	31.7	31.7	31.7	3.95	3.95	2.45	1.91
2-16- 47	1.40	2.77	.01800	.03692	.0	.0	0.99	4.13	1.00	.709	.0667	.854	45.1	45.1	45.1	45.1	4.03	4.03	2.45	1.80
2-16- 48	1.41	2.78	.01795	.03679	.0	.0	0.99	4.12	1.00	.709	.0663	.854	45.3	45.3	45.3	45.3	4.05	4.05	2.45	1.80
2-16- 49	1.90	3.88	.01783	.03759	.0	.0	0.99	4.50	1.00	.709	.0652	.863	61.9	61.9	61.9	61.9	4.07	4.07	2.45	1.72
2-16- 50	2.28	4.76	.01793	.03853	.0	.0	0.99	4.79	1.00	.709	.0642	.869	75.4	75.4	75.4	75.4	4.04	4.04	2.45	1.68

RUN.NO.	RE*E4	Q<KW/M2>	ST +/	ST*/	ST1*/	STT*/	ST1F/	A1/AB	H+	G+	GPR1	G*	G*R	G*1	GT	GTR	GTF	GTFR	X	YR	AH	TP
2-16- 1	0.30	2.6	1.16	1.33	1.53	1.36	1.37	.387	6.2	12.4	12.6	8.9	12.3	8.4	10.0	12.9	9.8	13.2	1.39	10.59	4.40	1.47
2-16- 2	0.45	5.7	1.09	1.29	1.48	1.32	1.33	.492	11.2	10.4	10.6	5.5	8.4	6.6	7.9	10.4	7.8	10.6	1.60	8.85	4.40	3.18
2-16- 3	0.61	8.6	1.05	1.23	1.40	1.26	1.29	.552	17.0	10.1	10.4	5.1	7.9	6.6	7.8	10.2	7.5	10.2	1.70	8.08	4.10	4.29
2-16- 4	0.84	12.1	1.03	1.19	1.33	1.21	1.26	.585	24.1	10.2	10.6	5.6	8.3	7.1	8.1	10.6	7.7	10.4	1.76	7.86	3.77	4.84
2-16- 5	1.17	16.7	1.02	1.15	1.26	1.17	1.22	.620	35.4	10.9	11.3	6.5	9.4	8.1	9.0	11.6	8.5	11.3	1.81	7.61	3.50	4.98
2-16- 6	1.16	16.9	1.01	1.15	1.27	1.17	1.22	.620	35.1	10.9	11.3	6.5	9.4	8.1	9.0	11.6	8.5	11.3	1.81	7.59	3.51	4.98
2-16- 7	1.66	23.8	1.00	1.12	1.22	1.14	1.18	.651	51.9	11.7	12.1	7.6	10.5	9.1	9.9	12.7	9.4	12.4	1.85	7.39	3.29	5.07
2-16- 8	2.32	33.9	0.99	1.10	1.19	1.12	1.17	.676	74.2	12.1	12.5	8.0	11.0	9.6	10.3	13.1	9.8	12.8	1.88	7.26	3.12	5.72
2-16- 9	4.36	61.5	0.99	1.08	1.14	1.10	1.13	.709	141.6	13.6	14.0	9.9	13.1	11.4	12.0	15.2	11.6	14.8	1.92	7.19	2.89	5.65
2-16- 10	5.78	79.0	1.00	1.07	1.12	1.08	1.11	.723	189.0	14.7	15.0	11.1	14.5	12.7	13.2	16.5	12.8	16.1	1.94	7.17	2.81	5.24
2-16- 11	7.31	98.7	0.99	1.06	1.11	1.08	1.11	.731	237.8	15.3	15.5	11.7	15.1	13.2	13.7	17.1	13.3	16.7	1.95	7.22	2.74	5.31
2-16- 12	11.75	149.2	0.99	1.05	1.09	1.06	1.09	.756	392.3	17.3	17.6	14.0	17.8	15.6	16.0	19.8	15.6	19.4	1.98	7.06	2.63	4.68
2-16- 13	0.28	5.8	1.17	1.39	1.62	1.42	1.39	.352	5.0	16.4	14.1	13.1	15.0	10.6	12.6	15.0	12.6	14.5	1.30	10.88	4.40	1.10
2-16- 14	0.36	7.8	1.14	1.36	1.58	1.40	1.38	.389	6.9	14.9	13.0	10.9	12.9	9.6	11.3	13.7	11.4	13.4	1.39	10.47	4.40	1.37
2-16- 15	0.42	11.0	1.11	1.35	1.58	1.40	1.37	.424	8.6	13.6	12.0	9.0	11.0	8.4	10.0	12.2	10.2	12.0	1.47	9.96	4.40	1.90
2-16- 16	0.57	19.1	1.07	1.30	1.51	1.35	1.33	.505	13.7	12.3	11.0	6.9	8.9	7.6	9.0	11.2	9.1	11.1	1.62	8.65	4.40	3.06
2-16- 17	0.77	28.7	1.04	1.27	1.45	1.31	1.30	.545	19.6	11.7	10.6	6.1	8.1	7.4	8.6	10.7	8.6	10.6	1.69	8.30	4.24	4.09
2-16- 18	1.04	41.4	1.01	1.21	1.38	1.26	1.27	.585	28.4	11.6	10.6	6.3	8.4	7.6	8.7	10.9	8.6	10.6	1.75	7.92	3.86	4.98
2-16- 19	1.04	41.3	1.01	1.22	1.38	1.26	1.27	.585	28.3	11.5	10.6	6.3	8.3	7.6	8.6	10.8	8.5	10.5	1.75	7.93	3.87	5.03
2-16- 20	1.52	61.7	0.99	1.16	1.29	1.20	1.22	.629	44.4	12.3	11.3	7.4	9.5	8.7	9.6	11.9	9.4	11.5	1.82	7.55	3.53	5.32
2-16- 21	2.16	91.0	0.98	1.13	1.24	1.16	1.19	.662	66.3	12.6	11.6	8.0	10.2	9.3	10.2	12.6	9.9	12.1	1.86	7.30	3.30	6.00
2-16- 22	3.14	133.0	0.99	1.11	1.20	1.14	1.16	.691	100.2	13.2	12.1	8.9	11.1	10.2	11.0	13.5	10.7	12.9	1.90	7.11	3.12	6.41
2-16- 23	4.59	183.4	1.00	1.09	1.17	1.11	1.13	.713	149.0	14.4	13.0	10.5	12.9	11.9	12.6	15.2	12.3	14.6	1.92	7.05	2.97	5.86
2-16- 24	6.90	268.2	0.99	1.08	1.14	1.10	1.12	.731	225.5	15.3	13.8	11.5	13.9	12.9	13.5	16.2	13.2	15.6	1.95	7.04	2.84	6.05
2-16- 25	11.45	416.1	0.99	1.06	1.12	1.08	1.10	.753	379.2	16.9	15.1	13.3	15.8	14.7	15.2	18.1	15.0	17.4	1.97	7.00	2.71	5.81
2-16- 26	0.40	14.5	1.12	1.33	1.51	1.37	1.33	.404	7.6	19.6	15.3	15.6	15.9	13.6	15.3	17.2	15.6	16.0	1.42	10.14	4.40	0.87
2-16- 27	0.51	21.6	1.11	1.33	1.53	1.38	1.33	.443	10.3	16.5	13.2	11.8	12.5	11.0	12.5	14.4	12.9	13.6	1.51	9.64	4.40	1.46
2-16- 28	0.69	39.2	1.08	1.32	1.53	1.38	1.33	.498	15.3	14.0	11.3	8.5	9.4	8.8	10.1	11.9	10.6	11.4	1.61	8.86	4.40	2.66
2-16- 29	0.92	58.3	1.05	1.28	1.47	1.34	1.30	.546	22.3	13.6	11.2	7.7	8.8	8.7	9.8	11.7	10.2	11.3	1.69	8.32	4.32	3.50
2-16- 30	0.92	58.8	1.05	1.28	1.47	1.34	1.30	.547	22.4	13.4	11.0	7.5	8.6	8.5	9.7	11.5	10.1	11.1	1.69	8.30	4.31	3.63
2-16- 31	1.29	87.6	1.01	1.21	1.37	1.26	1.25	.597	34.9	13.5	11.3	8.1	9.3	9.1	10.2	12.2	10.3	11.6	1.77	7.83	3.86	4.27
2-16- 32	1.86	129.1	0.99	1.16	1.29	1.19	1.20	.647	55.4	14.5	12.2	9.3	10.7	10.3	11.4	13.5	11.4	12.8	1.84	7.27	3.52	4.64
2-16- 33	2.72	201.1	0.99	1.13	1.24	1.17	1.17	.675	83.7	14.3	11.9	9.5	10.9	10.7	11.6	13.7	11.4	12.8	1.88	7.17	3.29	5.54
2-16- 34	4.13	307.4	0.99	1.11	1.20	1.14	1.15	.708	133.5	14.2	11.9	9.9	11.4	11.1	12.0	14.1	11.7	13.2	1.92	6.94	3.07	6.72
2-16- 35	6.29	441.7	1.00	1.08	1.16	1.11	1.12	.734	210.2	16.0	13.3	12.1	13.6	13.3	14.0	16.3	13.8	15.3	1.95	6.78	2.92	5.90
2-16- 36	9.38	615.2	1.00	1.07	1.14	1.10	1.11	.748	313.6	16.7	13.8	13.1	14.6	14.3	15.0	17.3	14.8	16.3	1.96	6.84	2.80	6.03
2-16- 37	0.07	0.0	0.0	0.0	0.0	0.0	0.0	.748	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.57	4.83		
2-16- 38	0.10	0.0	0.0	0.0	0.0	0.0	0.0	.748	3.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.51	6.47		
2-16- 39	0.13	0.0	0.0	0.0	0.0	0.0	0.0	.748	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.41	8.34		
2-16- 40	0.18	0.0	0.0	0.0	0.0	0.0	0.0	.748	3.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.25	11.21		
2-16- 41	0.25	0.0	0.0	0.0	0.0	0.0	0.0	.748	4.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.19	13.75		
2-16- 42	0.34	0.0	0.0	0.0	0.0	0.0	0.0	.748	9.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.60	8.77		
2-16- 43	0.34	0.0	0.0	0.0	0.0	0.0	0.0	.748	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.59	8.87		
2-16- 44	0.51	0.0	0.0	0.0	0.0	0.0	0.0	.748	14.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.70	8.11		
2-16- 45	0.72	0.0	0.0	0.0	0.0	0.0	0.0	.748	22.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.77	7.59		
2-16- 46	0.99	0.0	0.0	0.0	0.0	0.0	0.0	.748	31.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.82	7.42		
2-16- 47	1.40	0.0	0.0	0.0	0.0	0.0	0.0	.748	45.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.85	7.36		
2-16- 48	1.41	0.0	0.0	0.0	0.0	0.0	0.0	.748	45.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.85	7.37		
2-16- 49	1.90	0.0	0.0	0.0	0.0	0.0	0.0	.748	61.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.87	7.29		
2-16- 50	2.28	0.0	0.0	0.0	0.0	0.0	0.0	.748	75.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.89	7.20		

Table 4 cont.

RUN.NO.	RE*E4	RE1*E4	F	F1	STB	STPR	U1/UB	F1/F2	TW/TB	PR	H/Y	BETA	H+	H+W	H+R	H+RW	RH+	RH+R	AS	AR
2-16- 51	3.57	7.68	.01741	.03851	.0	.0	0.99	5.27	1.00	.709	.0627	.879	117.9	117.9	117.9	117.9	4.17	4.17	2.45	1.58
2-16- 52	4.87	10.72	.01716	.03869	.0	.0	0.99	5.65	1.00	.709	.0617	.885	161.6	161.6	161.6	161.6	4.23	4.23	2.45	1.53
2-16- 53	7.67	17.35	.01694	.03925	.0	.0	0.99	6.28	1.00	.710	.0603	.894	256.1	256.1	256.1	256.1	4.27	4.27	2.44	1.46
2-16- 54	14.08	32.98	.01674	.04005	.0	.0	0.99	7.20	1.00	.713	.0588	.905	475.5	475.5	475.5	475.5	4.30	4.30	2.44	1.39
2-20- 55	0.40	0.34	.01100	.01333	.00436	.00386	0.96	1.30	1.32	.704	.0826	.627	4.4	3.1	4.5	3.2	6.44	6.09	2.47	3.60
2-20- 56	0.55	0.64	.01185	.01782	.00530	.00468	0.97	1.83	1.31	.704	.0675	.681	7.3	5.1	7.5	5.3	5.27	4.95	2.47	2.90
2-20- 57	0.74	1.01	.01235	.02108	.00627	.00550	0.98	2.30	1.29	.703	.0604	.716	10.9	7.7	11.3	7.9	4.73	4.45	2.47	2.56
2-20- 58	0.96	1.46	.01263	.02329	.00682	.00597	0.98	2.68	1.29	.703	.0564	.739	15.2	10.7	15.7	11.0	4.49	4.22	2.47	2.35
2-20- 59	1.35	2.31	.01301	.02597	.00731	.00638	0.98	3.18	1.28	.703	.0524	.766	23.0	16.0	23.7	16.5	4.22	3.96	2.47	2.15
2-20- 60	1.13	1.81	.01279	.02447	.00709	.00620	0.98	2.90	1.28	.703	.0544	.752	18.5	12.9	19.0	13.3	4.38	4.11	2.47	2.25
2-20- 61	1.57	2.77	.01295	.02637	.00736	.00644	0.98	3.34	1.28	.703	.0514	.774	27.1	18.8	28.0	19.3	4.25	3.99	2.47	2.09
2-20- 62	2.43	4.63	.01268	.02714	.00742	.00650	0.99	3.77	1.28	.704	.0491	.792	43.2	29.4	44.6	30.4	4.36	4.09	2.46	1.93
2-20- 63	3.77	7.70	.01265	.02854	.00746	.00655	0.99	4.32	1.29	.704	.0469	.811	69.3	46.5	71.7	48.1	4.33	4.05	2.46	1.81
2-20- 64	5.08	10.83	.01262	.02938	.00729	.00640	0.99	4.71	1.29	.704	.0457	.822	95.5	63.5	98.8	65.7	4.31	4.03	2.46	1.74
2-20- 65	7.47	16.56	.01240	.02973	.00678	.00600	0.99	5.14	1.31	.705	.0445	.833	142.0	91.4	147.3	94.9	4.38	4.08	2.46	1.67
2-20- 66	10.04	22.98	.01231	.03019	.00670	.00590	0.99	5.52	1.30	.706	.0437	.842	193.3	126.3	200.3	130.9	4.39	4.11	2.46	1.62
2-20- 67	14.17	33.42	.01220	.03066	.00631	.00558	0.99	5.97	1.31	.706	.0428	.851	275.9	176.2	286.4	182.9	4.41	4.11	2.46	1.57
2-20- 68	14.48	34.30	.01223	.03080	.00631	.00556	0.99	6.02	1.30	.706	.0428	.852	282.9	182.6	293.4	189.4	4.39	4.10	2.46	1.57
2-20- 69	21.36	52.31	.01221	.03163	.00604	.00533	0.99	6.62	1.31	.707	.0418	.862	424.4	272.2	440.4	282.5	4.36	4.07	2.46	1.52
2-20- 70	0.33	0.22	.01141	.01504	.00356	.00355	0.91	1.41	1.72	.699	.0892	.611	3.3	1.7	3.5	1.8	4.95	4.30	2.47	4.37
2-20- 71	0.43	0.36	.01152	.01681	.00379	.00383	0.94	1.68	1.75	.698	.0767	.646	4.8	2.3	5.1	2.5	5.01	4.35	2.47	3.48
2-20- 72	0.60	0.60	.01125	.01773	.00423	.00424	0.96	1.92	1.73	.699	.0695	.673	7.2	3.5	7.7	3.7	5.38	4.74	2.47	2.91
2-20- 73	0.90	1.08	.01151	.02066	.00512	.00509	0.97	2.44	1.70	.698	.0616	.710	11.9	5.8	12.6	6.2	5.03	4.44	2.47	2.49
2-20- 74	1.27	1.73	.01171	.02297	.00577	.00571	0.97	2.92	1.69	.697	.0568	.738	18.1	8.8	19.3	9.4	4.78	4.23	2.47	2.25
2-20- 75	1.28	1.73	.01164	.02274	.00576	.00570	0.97	2.90	1.69	.697	.0569	.737	18.1	8.8	19.2	9.4	4.84	4.28	2.47	2.25
2-20- 76	1.81	2.67	.01143	.02335	.00635	.00624	0.97	3.21	1.67	.697	.0543	.754	26.5	13.0	28.2	13.8	4.95	4.39	2.47	2.08
2-20- 77	2.34	3.77	.01165	.02479	.00646	.00637	0.98	3.57	1.68	.697	.0518	.771	36.2	17.2	38.6	18.3	4.79	4.24	2.47	1.97
2-20- 78	2.81	4.76	.01168	.02539	.00663	.00651	0.98	3.78	1.67	.697	.0505	.781	44.8	21.2	47.8	22.6	4.76	4.21	2.46	1.91
2-20- 79	4.72	9.07	.01205	.02808	.00675	.00665	0.98	4.59	1.68	.697	.0472	.809	81.8	37.1	87.6	39.7	4.50	3.95	2.46	1.77
2-20- 80	6.61	13.40	.01198	.02865	.00655	.00647	0.98	4.98	1.69	.697	.0459	.821	117.5	52.2	125.9	55.9	4.52	3.96	2.46	1.70
2-20- 81	9.53	20.60	.01234	.03075	.00649	.00643	0.99	5.68	1.69	.698	.0442	.838	177.9	77.5	191.0	83.2	4.31	3.76	2.46	1.63
2-20- 82	13.84	30.93	.01199	.03039	.00628	.00623	0.99	6.02	1.70	.699	.0434	.846	259.2	111.7	278.6	120.0	4.46	3.89	2.46	1.57
2-20- 83	19.51	45.56	.01214	.03155	.00590	.00587	0.99	6.62	1.70	.699	.0424	.857	376.3	159.6	404.9	171.8	4.37	3.81	2.46	1.53
2-20- 84	0.30	0.27	.01035	.01031	.0	.0	0.97	0.99	1.00	.709	.0899	.607	3.3	3.3	3.3	3.3	7.45	7.45	2.71	4.28
2-20- 85	0.39	0.43	.01138	.01338	.0	.0	0.98	1.26	1.00	.709	.0774	.643	5.1	5.1	5.1	5.1	6.61	6.61	2.47	3.35
2-20- 86	0.55	0.80	.01280	.01980	.0	.0	0.98	1.95	1.00	.709	.0621	.706	8.7	8.7	8.7	8.7	4.75	4.75	2.47	2.75
2-20- 87	0.73	1.20	.01344	.02347	.0	.0	0.98	2.44	1.00	.709	.0564	.738	12.6	12.6	12.6	12.6	4.20	4.20	2.47	2.48
2-20- 88	1.04	1.89	.01373	.02625	.0	.0	0.98	2.94	1.00	.709	.0525	.765	19.0	19.0	19.0	19.0	3.98	3.98	2.47	2.25
2-20- 89	1.04	1.90	.01383	.02659	.0	.0	0.98	2.97	1.00	.709	.0523	.766	19.1	19.1	19.1	19.1	3.92	3.92	2.47	2.25
2-20- 90	1.47	2.88	.01383	.02823	.0	.0	0.99	3.40	1.00	.709	.0498	.785	28.0	28.0	28.0	28.0	3.89	3.89	2.46	2.08
2-20- 91	2.30	4.83	.01373	.02983	.0	.0	0.99	3.95	1.00	.710	.0474	.806	45.1	45.1	45.1	45.1	3.90	3.90	2.46	1.93
2-20- 92	3.35	7.26	.01320	.02946	.0	.0	0.99	4.23	1.00	.710	.0463	.815	65.3	65.3	65.3	65.3	4.13	4.13	2.46	1.83
2-20- 93	4.66	10.46	.01304	.03008	.0	.0	0.99	4.63	1.00	.711	.0452	.826	91.9	91.9	91.9	91.9	4.16	4.16	2.46	1.75
2-20- 94	6.82	15.82	.01277	.03039	.0	.0	0.99	5.05	1.00	.711	.0441	.837	135.3	135.3	135.3	135.3	4.24	4.24	2.46	1.68
2-20- 95	9.25	21.97	.01259	.03065	.0	.0	0.99	5.41	1.00	.712	.0434	.845	184.4	184.4	184.4	184.4	4.29	4.29	2.46	1.63
2-20- 96	12.11	29.31	.01241	.03075	.0	.0	0.99	5.72	1.00	.712	.0428	.851	241.9	241.9	241.9	241.9	4.35	4.35	2.46	1.59
2-20- 97	16.32	40.57	.01255	.03196	.0	.0	0.99	6.26	1.00	.712	.0420	.860	332.1	332.1	332.1	332.1	4.25	4.25	2.46	1.55
2-20- 98	17.21	42.87	.01246	.03178	.0	.0	0.99	6.29	1.00	.712	.0419	.861	349.3	349.3	349.3	349.3	4.29	4.29	2.46	1.54
2-20- 99	21.85	55.17	.01229	.03173	.0	.0	0.99	6.57	1.00	.712	.0415	.865	443.4	443.4	443.4	443.4	4.34	4.34	2.45	1.51
2-20-100	26.58	67.85	.01220	.03184	.0	.0	0.99	6.83	1.00	.712	.0412	.869	540.3	540.3	540.3	540.3	4.37	4.37	2.45	1.49

RUN.NO.	RE*E4	Q<KW/M2>	ST+/	ST*/	ST1*/	STT*/	ST1F/	A1/AB	H+	G+	GPR1	G*	G*R	G*1	GT	GTR	GTF	GTFR	X	YR	AH	TP
2-16- 51	3.57	0.0	0.0	0.0	0.0	0.0	0.0	.748	117.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.92	7.21		
2-16- 52	4.87	0.0	0.0	0.0	0.0	0.0	0.0	.748	161.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.93	7.19		
2-16- 53	7.67	0.0	0.0	0.0	0.0	0.0	0.0	.748	256.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.96	7.14		
2-16- 54	14.08	0.0	0.0	0.0	0.0	0.0	0.0	.748	475.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.99	7.07		
2-20- 55	0.40	2.7	1.45	1.51	1.74	1.57	1.47	.287	4.4	7.2	6.9	6.4	9.3	5.0	6.2	8.5	7.0	9.8	1.61	12.25	4.40	1.99
2-20- 56	0.55	4.4	1.25	1.38	1.55	1.45	1.36	.371	7.3	9.0	8.7	5.6	8.6	6.2	7.0	9.4	7.7	10.6	1.84	10.59	4.40	2.27
2-20- 57	0.74	6.8	1.17	1.33	1.49	1.41	1.32	.428	10.9	9.0	8.8	4.3	7.1	6.0	6.6	8.9	7.4	10.0	1.96	9.74	4.40	3.31
2-20- 58	0.96	9.4	1.12	1.29	1.42	1.37	1.29	.468	15.2	9.3	9.2	4.1	6.8	6.4	6.8	9.1	7.5	10.2	2.03	9.27	4.32	4.01
2-20- 59	1.35	13.8	1.08	1.22	1.33	1.29	1.24	.515	23.0	9.9	9.8	5.0	7.8	7.2	7.5	10.0	8.0	10.7	2.11	8.77	3.89	4.52
2-20- 60	1.13	11.1	1.10	1.26	1.38	1.33	1.27	.490	18.5	9.6	9.4	4.5	7.2	6.7	7.1	9.4	7.6	10.3	2.07	9.04	4.10	4.32
2-20- 61	1.57	16.1	1.06	1.20	1.30	1.27	1.23	.529	27.1	10.2	10.1	5.4	8.1	7.5	7.8	10.3	8.2	10.9	2.14	8.71	3.76	4.72
2-20- 62	2.43	25.4	1.04	1.16	1.24	1.22	1.20	.563	43.2	10.9	10.7	6.4	9.2	8.4	8.6	11.2	8.9	11.6	2.19	8.58	3.44	5.30
2-20- 63	3.77	40.2	1.02	1.13	1.20	1.18	1.17	.598	69.3	11.7	11.5	7.3	10.2	9.3	9.5	12.1	9.6	12.4	2.24	8.37	3.20	5.91
2-20- 64	5.08	53.2	1.01	1.11	1.17	1.16	1.15	.620	95.5	12.5	12.3	8.3	11.3	10.3	10.4	13.2	10.5	13.4	2.27	8.25	3.06	5.89
2-20- 65	7.47	77.6	1.01	1.09	1.14	1.14	1.13	.642	142.0	14.1	13.6	10.0	13.1	11.9	12.0	15.0	12.1	15.2	2.30	8.20	2.93	5.38
2-20- 66	10.04	96.8	1.00	1.08	1.13	1.12	1.11	.659	193.3	14.6	14.3	10.7	13.9	12.6	12.6	15.8	12.7	15.9	2.32	8.14	2.83	5.60
2-20- 67	14.17	134.6	0.99	1.07	1.11	1.11	1.10	.677	275.9	16.1	15.6	12.2	15.6	14.1	14.1	17.4	14.2	17.5	2.34	8.08	2.74	5.21
2-20- 68	14.48	134.7	0.99	1.07	1.11	1.11	1.10	.679	282.9	16.1	15.7	12.3	15.7	14.1	14.1	17.5	14.3	17.7	2.34	8.06	2.73	5.20
2-20- 69	21.36	190.2	0.99	1.06	1.09	1.09	1.09	.699	424.4	17.5	17.0	13.7	17.3	15.5	15.5	19.1	15.6	19.2	2.37	7.95	2.63	5.09
2-20- 70	0.33	4.6	1.52	1.61	1.85	1.64	1.53	.264	3.3	9.4	7.6	10.8	12.1	6.6	8.3	10.3	9.2	10.4	1.53	11.53	4.40	1.43
2-20- 71	0.43	6.8	1.31	1.48	1.70	1.53	1.42	.316	4.8	12.7	10.2	11.2	12.4	8.5	10.0	12.1	11.2	12.4	1.69	10.91	4.40	1.23
2-20- 72	0.60	10.3	1.22	1.42	1.61	1.49	1.37	.358	7.2	13.1	10.6	9.8	11.0	8.6	9.7	11.7	11.0	12.2	1.80	10.62	4.40	1.55
2-20- 73	0.90	18.3	1.15	1.37	1.55	1.47	1.33	.418	11.9	12.5	10.2	7.6	8.9	8.0	8.7	10.7	10.1	11.3	1.94	9.84	4.40	2.52
2-20- 74	1.27	29.4	1.11	1.34	1.50	1.44	1.30	.465	18.1	12.3	10.1	6.4	7.7	7.9	8.4	10.2	9.7	11.0	2.03	9.33	4.40	3.56
2-20- 75	1.28	29.4	1.11	1.34	1.50	1.44	1.31	.463	18.1	12.2	10.0	6.3	7.7	7.8	8.3	10.2	9.6	10.9	2.02	9.38	4.40	3.59
2-20- 76	1.81	45.6	1.08	1.30	1.45	1.41	1.29	.493	26.5	11.5	9.5	5.7	7.1	7.4	7.8	9.5	8.9	10.1	2.07	9.26	4.10	5.13
2-20- 77	2.34	60.7	1.06	1.25	1.38	1.34	1.25	.524	36.2	12.1	10.0	6.7	8.1	8.3	8.6	10.5	9.6	10.9	2.13	8.98	3.83	5.24
2-20- 78	2.81	73.6	1.04	1.22	1.34	1.31	1.23	.542	44.8	12.3	10.2	7.0	8.4	8.6	8.8	10.7	9.7	11.0	2.15	8.88	3.66	5.69
2-20- 79	4.72	129.6	1.01	1.16	1.25	1.24	1.18	.595	81.8	13.5	11.1	8.5	10.0	10.1	10.2	12.2	10.9	12.3	2.23	8.44	3.31	6.21
2-20- 80	6.61	175.6	1.01	1.14	1.21	1.20	1.16	.618	117.5	14.3	11.7	9.7	11.2	11.2	11.4	13.4	12.0	13.4	2.26	8.35	3.15	6.12
2-20- 81	9.53	251.5	1.00	1.11	1.18	1.17	1.13	.650	177.9	15.4	12.6	10.9	12.5	12.5	12.6	14.8	13.1	14.7	2.30	8.06	2.99	6.22
2-20- 82	13.84	349.6	0.99	1.10	1.15	1.15	1.12	.666	259.2	16.1	13.2	11.8	13.4	13.3	13.4	15.6	13.9	15.5	2.32	8.11	2.87	6.44
2-20- 83	19.51	457.9	0.99	1.08	1.13	1.13	1.10	.688	376.3	17.9	14.6	13.7	15.5	15.3	15.3	17.7	15.8	17.5	2.35	7.96	2.76	5.70
2-20- 84	0.30	0.0	0.0	0.0	0.0	0.0	0.0	.688	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.52	13.93		
2-20- 85	0.39	0.0	0.0	0.0	0.0	0.0	0.0	.688	5.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.68	12.23		
2-20- 86	0.55	0.0	0.0	0.0	0.0	0.0	0.0	.688	8.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.93	10.05		
2-20- 87	0.73	0.0	0.0	0.0	0.0	0.0	0.0	.688	12.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.03	9.23		
2-20- 88	1.04	0.0	0.0	0.0	0.0	0.0	0.0	.688	19.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.11	8.73		
2-20- 89	1.04	0.0	0.0	0.0	0.0	0.0	0.0	.688	19.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.12	8.67		
2-20- 90	1.47	0.0	0.0	0.0	0.0	0.0	0.0	.688	28.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.17	8.42		
2-20- 91	2.30	0.0	0.0	0.0	0.0	0.0	0.0	.688	45.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.23	8.19		
2-20- 92	3.35	0.0	0.0	0.0	0.0	0.0	0.0	.688	65.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.25	8.24		
2-20- 93	4.66	0.0	0.0	0.0	0.0	0.0	0.0	.688	91.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.28	8.15		
2-20- 94	6.82	0.0	0.0	0.0	0.0	0.0	0.0	.688	135.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.31	8.11		
2-20- 95	9.25	0.0	0.0	0.0	0.0	0.0	0.0	.688	184.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.33	8.08		
2-20- 96	12.11	0.0	0.0	0.0	0.0	0.0	0.0	.688	241.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.34	8.07		
2-20- 97	16.32	0.0	0.0	0.0	0.0	0.0	0.0	.688	332.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.36	7.91		
2-20- 98	17.21	0.0	0.0	0.0	0.0	0.0	0.0	.688	349.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.36	7.93		
2-20- 99	21.85	0.0	0.0	0.0	0.0	0.0	0.0	.688	443.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.37	7.94		
2-20-100	26.58	0.0	0.0	0.0	0.0	0.0	0.0	.688	540.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.38	7.92		

Table 4 cont.

RUN.NO.	RE*E4	RE1*E4	F	F1	STB	STPR	U1/UB	F1/F2	TW/TB	PR	H/Y	BETA	H+	H+W	H+R	H+RW	RH+	RH+R	AS	AR
3-16- 1	0.36	0.34	.01137	.01282	.00415	.00365	0.99	1.19	1.28	.702	.1137	.704	6.3	4.5	6.4	4.6	8.90	8.56	2.47	2.83
3-16- 2	0.47	0.55	.01256	.01734	.00535	.00467	0.99	1.68	1.26	.701	.0955	.746	9.6	7.0	9.9	7.2	7.16	6.88	2.46	2.46
3-16- 3	0.59	0.81	.01383	.02197	.00658	.00569	0.99	2.20	1.24	.701	.0849	.779	13.9	10.2	14.2	10.5	6.00	5.76	2.46	2.24
3-16- 4	0.82	1.27	.01446	.02508	.00729	.00628	0.99	2.67	1.23	.700	.0783	.804	20.9	15.4	21.4	15.8	5.52	5.29	2.46	2.04
3-16- 5	1.12	1.86	.01455	.02654	.00768	.00660	0.99	3.01	1.22	.700	.0746	.819	29.7	21.9	30.5	22.5	5.40	5.18	2.46	1.90
3-16- 6	1.19	2.01	.01486	.02763	.00787	.00675	0.99	3.16	1.22	.700	.0734	.824	32.2	23.9	33.0	24.5	5.23	5.02	2.46	1.88
3-16- 7	1.48	2.64	.01518	.02937	.00808	.00694	0.99	3.50	1.22	.700	.0710	.836	41.6	30.7	42.7	31.5	5.05	4.84	2.45	1.80
3-16- 8	2.08	3.92	.01569	.03197	.00861	.00738	0.99	4.07	1.21	.700	.0680	.852	61.1	45.0	62.7	46.2	4.79	4.59	2.45	1.71
3-16- 9	2.91	5.66	.01516	.03151	.00821	.00705	0.99	4.32	1.22	.700	.0667	.859	85.3	62.1	87.6	63.8	4.96	4.75	2.45	1.63
3-16- 10	4.19	8.43	.01486	.03163	.00779	.00671	0.99	4.67	1.23	.701	.0652	.867	123.8	88.9	127.2	91.4	5.03	4.82	2.45	1.56
3-16- 11	7.32	15.28	.01410	.03083	.00693	.00600	0.99	5.11	1.24	.702	.0636	.877	214.7	150.9	221.1	155.4	5.26	5.03	2.45	1.47
3-16- 12	11.46	24.77	.01396	.03142	.00647	.00562	1.00	5.67	1.25	.703	.0621	.886	340.7	236.1	351.3	243.4	5.26	5.02	2.45	1.41
3-16- 13	0.34	0.28	.01146	.01364	.00345	.00340	0.97	1.27	1.63	.694	.1169	.699	5.5	2.9	5.8	3.1	8.40	7.75	2.47	3.01
3-16- 14	0.43	0.41	.01193	.01601	.00393	.00386	0.98	1.56	1.61	.694	.1037	.727	7.7	4.0	8.1	4.2	7.57	6.97	2.46	2.64
3-16- 15	0.54	0.60	.01231	.01823	.00462	.00447	0.98	1.87	1.58	.693	.0944	.750	10.7	5.7	11.2	6.0	6.99	6.44	2.46	2.38
3-16- 16	0.75	0.94	.01280	.02111	.00570	.00543	0.98	2.31	1.54	.692	.0859	.776	16.0	8.8	16.8	9.3	6.37	5.89	2.46	2.14
3-16- 17	1.02	1.46	.01343	.02393	.00669	.00627	0.98	2.77	1.49	.691	.0793	.800	23.8	13.5	25.0	14.2	5.88	5.44	2.46	1.97
3-16- 18	1.02	1.45	.01344	.02398	.00664	.00624	0.98	2.78	1.50	.691	.0793	.800	23.7	13.3	25.0	14.0	5.87	5.42	2.46	1.97
3-16- 19	1.36	2.14	.01397	.02640	.00711	.00664	0.99	3.22	1.49	.691	.0748	.819	34.2	19.1	35.9	20.0	5.52	5.10	2.46	1.85
3-16- 20	1.97	3.43	.01491	.03023	.00787	.00730	0.99	3.92	1.47	.590	.0700	.842	54.0	30.1	56.7	31.6	5.03	4.64	2.45	1.73
3-16- 21	2.87	5.41	.01564	.03337	.00827	.00763	0.99	4.62	1.46	.690	.0666	.860	84.0	47.0	88.3	49.4	4.72	4.35	2.45	1.63
3-16- 22	4.30	8.37	.01491	.03232	.00773	.00720	0.99	4.89	1.48	.691	.0655	.867	124.9	67.4	131.7	71.1	4.96	4.56	2.45	1.56
3-16- 23	6.61	13.28	.01430	.03154	.00715	.00672	0.99	5.21	1.50	.692	.0642	.874	191.1	100.1	202.1	105.8	5.16	4.73	2.45	1.49
3-16- 24	9.91	20.49	.01388	.03116	.00662	.00627	0.99	5.57	1.53	.693	.0631	.881	286.7	145.4	303.9	154.1	5.28	4.83	2.45	1.43
3-16- 25	0.07	0.08	.03421	.07722	.0	.0	0.80	3.97	1.00	.709	.0875	.769	2.8	2.8	2.8	2.8	-2.56	-2.56	2.46	4.94
3-16- 26	0.10	0.12	.02568	.04667	.0	.0	0.86	2.69	1.00	.709	.0918	.756	3.2	3.2	3.2	3.2	-0.05	-0.05	2.46	4.41
3-16- 27	0.13	0.15	.01893	.02729	.0	.0	0.91	1.78	1.00	.709	.1019	.729	3.4	3.4	3.4	3.4	2.86	2.86	2.46	4.12
3-16- 28	0.18	0.17	.01378	.01463	.0	.0	0.95	1.09	1.00	.709	.1215	.689	3.5	3.5	3.5	3.5	7.02	7.02	2.47	3.92
3-16- 29	0.24	0.22	.01097	.01018	.0	.0	1.00	0.90	1.00	.709	.1271	.681	4.2	4.2	4.2	4.2	10.06	10.06	2.65	3.47
3-16- 30	0.32	0.34	.01192	.01296	.0	.0	1.00	1.13	1.00	.709	.1108	.709	6.2	6.2	6.2	6.2	8.73	8.73	2.47	2.86
3-16- 31	0.32	0.31	.01102	.01084	.0	.0	1.01	0.97	1.00	.709	.1273	.688	5.7	5.7	5.7	5.7	10.92	10.92	2.49	2.95
3-16- 32	0.50	0.74	.01440	.02195	.0	.0	0.99	2.04	1.00	.709	.0845	.779	12.5	12.5	12.5	12.5	5.88	5.88	2.46	2.31
3-16- 33	0.69	1.14	.01542	.02633	.0	.0	0.99	2.60	1.00	.709	.0772	.807	18.9	18.9	18.9	18.9	5.18	5.18	2.46	2.10
3-16- 34	0.97	1.73	.01574	.02878	.0	.0	0.99	3.05	1.00	.709	.0730	.826	27.9	27.9	27.9	27.9	4.95	4.95	2.46	1.94
3-16- 35	1.34	2.48	.01553	.02949	.0	.0	0.99	3.35	1.00	.709	.0707	.837	38.9	38.9	38.9	38.9	4.98	4.98	2.45	1.83
3-16- 36	1.34	2.48	.01549	.02937	.0	.0	0.99	3.34	1.00	.709	.0707	.837	38.9	38.9	38.9	38.9	4.99	4.99	2.45	1.83
3-16- 37	1.95	3.81	.01559	.03107	.0	.0	0.99	3.83	1.00	.709	.0680	.851	58.4	58.4	58.4	58.4	4.89	4.89	2.45	1.72
3-16- 38	2.94	5.96	.01517	.03121	.0	.0	0.99	4.21	1.00	.710	.0662	.861	88.5	88.5	88.5	88.5	4.99	4.99	2.45	1.62
3-16- 39	4.28	8.87	.01459	.03065	.0	.0	1.00	4.49	1.00	.710	.0650	.868	127.8	127.8	127.8	127.8	5.16	5.16	2.45	1.55
3-16- 40	5.69	11.97	.01417	.03019	.0	.0	1.00	4.70	1.00	.710	.0642	.873	168.4	168.4	168.4	168.4	5.29	5.29	2.45	1.51
3-16- 41	6.81	14.54	.01413	.03054	.0	.0	1.00	4.92	1.00	.710	.0636	.877	202.9	202.9	202.9	202.9	5.28	5.28	2.45	1.48
3-16- 42	12.33	27.12	.01346	.02994	.0	.0	1.00	5.44	1.00	.712	.0621	.886	363.7	363.7	363.7	363.7	5.47	5.47	2.45	1.4[illegible]

RUN.NO.	RE*E4	Q<KW/M2>	ST+/	ST*/	ST1*/	STT*/	ST1F/	A1/AB	H+	G+	GPR1	G*	G*R	G*1	GT	GTR	GTF	GTFR	X	YR	AH	TP
3-16- 1	0.36	3.2	1.14	1.36	1.63	1.41	1.38	.341	6.3	13.4	13.2	9.5	12.7	8.3	10.1	12.9	10.4	13.5	1.27	12.49	4.40	1.30
3-16- 2	0.47	5.0	1.09	1.31	1.53	1.35	1.35	.421	9.6	12.4	12.3	7.5	10.6	7.8	9.3	11.9	9.3	12.3	1.46	10.74	4.40	1.92
3-16- 3	0.59	7.3	1.05	1.27	1.46	1.31	1.32	.486	13.9	11.6	11.8	6.1	9.0	7.4	8.6	11.1	8.6	11.4	1.58	9.54	4.37	2.84
3-16- 4	0.82	10.8	1.03	1.21	1.36	1.24	1.27	.537	20.9	11.6	11.8	6.6	9.4	7.9	8.9	11.5	8.7	11.5	1.67	8.93	3.93	3.38
3-16- 5	1.12	15.3	1.01	1.17	1.31	1.21	1.25	.570	29.7	11.5	11.7	6.9	9.7	8.2	9.2	11.7	8.8	11.6	1.72	8.68	3.64	3.99
3-16- 6	1.19	16.1	1.01	1.16	1.29	1.20	1.24	.582	32.2	11.5	11.8	6.9	9.8	8.3	9.2	11.8	8.8	11.6	1.74	8.51	3.58	4.15
3-16- 7	1.48	20.9	1.01	1.14	1.26	1.17	1.22	.607	41.6	11.7	12.0	7.3	10.2	8.7	9.6	12.3	9.1	12.0	1.78	8.25	3.42	4.49
3-16- 8	2.08	30.9	0.99	1.12	1.22	1.15	1.19	.642	61.1	11.7	12.0	7.5	10.3	8.9	9.7	12.4	9.2	12.0	1.83	7.91	3.21	5.59
3-16- 9	2.91	42.1	0.99	1.10	1.19	1.13	1.17	.657	85.3	12.4	12.7	8.4	11.4	9.8	10.5	13.3	10.0	13.0	1.85	7.97	3.07	5.53
3-16- 10	4.19	58.6	0.98	1.09	1.16	1.11	1.15	.677	123.8	13.6	13.9	9.6	12.7	11.0	11.6	14.6	11.1	14.2	1.87	7.95	2.94	5.38
3-16- 11	7.32	94.4	0.98	1.07	1.12	1.09	1.12	.698	214.7	15.5	15.7	11.7	15.1	13.1	13.6	16.9	13.2	16.5	1.90	8.05	2.78	4.79
3-16- 12	11.46	140.9	0.97	1.05	1.10	1.08	1.10	.720	340.7	17.3	17.4	13.4	17.0	14.9	15.3	18.8	14.9	18.4	1.93	7.98	2.66	4.52
3-16- 13	0.34	6.9	1.13	1.39	1.65	1.44	1.38	.331	5.5	17.6	14.9	13.8	15.4	10.9	13.0	15.3	13.6	15.2	1.24	12.11	4.40	0.89
3-16- 14	0.43	9.7	1.10	1.34	1.57	1.39	1.34	.382	7.7	17.2	14.6	12.7	14.4	10.9	12.8	15.1	13.4	15.0	1.37	11.18	4.40	1.00
3-16- 15	0.54	13.9	1.08	1.31	1.53	1.37	1.32	.428	10.7	15.6	13.5	10.7	12.5	10.1	11.6	13.9	12.1	13.9	1.47	10.47	4.40	1.42
3-16- 16	0.75	23.1	1.06	1.30	1.51	1.36	1.32	.480	16.0	13.7	12.0	8.1	9.9	8.6	9.9	12.1	10.3	12.1	1.57	9.73	4.40	2.48
3-16- 17	1.02	34.6	1.02	1.25	1.44	1.31	1.30	.529	23.8	12.8	11.5	7.2	9.1	8.1	9.3	11.4	9.4	11.2	1.66	9.14	4.05	3.63
3-16- 18	1.02	35.1	1.02	1.25	1.44	1.31	1.29	.529	23.7	12.9	11.5	7.3	9.2	8.2	9.4	11.5	9.5	11.3	1.66	9.13	4.07	3.55
3-16- 19	1.36	49.5	1.00	1.20	1.36	1.25	1.26	.570	34.2	13.0	11.6	7.7	9.7	8.7	9.8	12.0	9.7	11.6	1.72	8.70	3.74	4.09
3-16- 20	1.97	78.6	1.00	1.16	1.29	1.20	1.22	.619	54.0	12.6	11.4	7.9	9.9	9.0	9.9	12.2	9.7	11.7	1.79	8.13	3.43	5.28
3-16- 21	2.87	116.5	0.99	1.13	1.24	1.16	1.19	.659	84.0	12.7	11.5	8.4	10.5	9.6	10.4	12.8	10.2	12.3	1.85	7.74	3.19	6.20
3-16- 22	4.30	170.8	0.99	1.11	1.20	1.14	1.16	.674	124.9	13.8	12.4	9.6	11.7	10.8	11.5	13.9	11.2	13.4	1.87	7.87	3.04	6.09
3-16- 23	6.61	246.3	0.98	1.09	1.17	1.12	1.14	.691	191.1	15.2	13.5	11.0	13.2	12.2	12.9	15.4	12.6	14.8	1.89	7.96	2.90	5.78
3-16- 24	9.91	349.3	0.98	1.08	1.14	1.11	1.12	.707	286.7	16.6	14.7	12.6	14.8	13.8	14.3	17.0	14.1	16.3	1.91	8.01	2.79	5.39
3-16- 25	0.07	0.0	0.0	0.0	0.0	0.0	0.0	.707	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.55	5.09		
3-16- 26	0.10	0.0	0.0	0.0	0.0	0.0	0.0	.707	3.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.50	6.55		
3-16- 27	0.13	0.0	0.0	0.0	0.0	0.0	0.0	.707	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.39	8.56		
3-16- 28	0.18	0.0	0.0	0.0	0.0	0.0	0.0	.707	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.20	11.69		
3-16- 29	0.24	0.0	0.0	0.0	0.0	0.0	0.0	.707	4.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.15	14.02		
3-16- 30	0.32	0.0	0.0	0.0	0.0	0.0	0.0	.707	6.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.29	12.42		
3-16- 31	0.32	0.0	0.0	0.0	0.0	0.0	0.0	.707	5.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.17	13.58		
3-16- 32	0.50	0.0	0.0	0.0	0.0	0.0	0.0	.707	12.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.59	9.55		
3-16- 33	0.69	0.0	0.0	0.0	0.0	0.0	0.0	.707	18.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.69	8.71		
3-16- 34	0.97	0.0	0.0	0.0	0.0	0.0	0.0	.707	27.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.75	8.34		
3-16- 35	1.34	0.0	0.0	0.0	0.0	0.0	0.0	.707	38.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.78	8.24		
3-16- 36	1.34	0.0	0.0	0.0	0.0	0.0	0.0	.707	38.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.78	8.25		
3-16- 37	1.95	0.0	0.0	0.0	0.0	0.0	0.0	.707	58.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.83	8.02		
3-16- 38	2.94	0.0	0.0	0.0	0.0	0.0	0.0	.707	88.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.86	8.00		
3-16- 39	4.28	0.0	0.0	0.0	0.0	0.0	0.0	.707	127.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.88	8.08		
3-16- 40	5.69	0.0	0.0	0.0	0.0	0.0	0.0	.707	168.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.89	8.14		
3-16- 41	6.81	0.0	0.0	0.0	0.0	0.0	0.0	.707	202.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.90	8.09		
3-16- 42	12.33	0.0	0.0	0.0	0.0	0.0	0.0	.707	363.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.93	8.17		

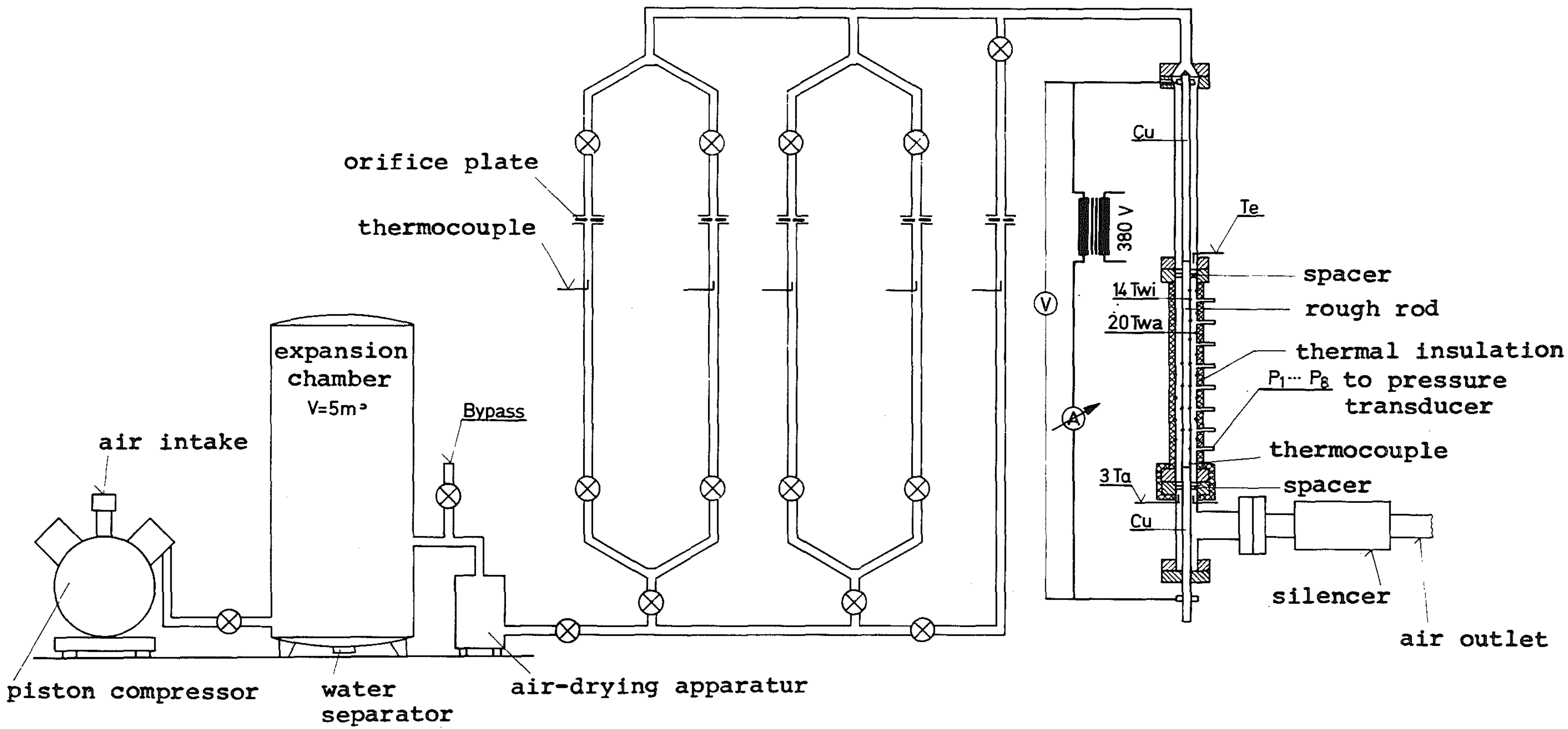
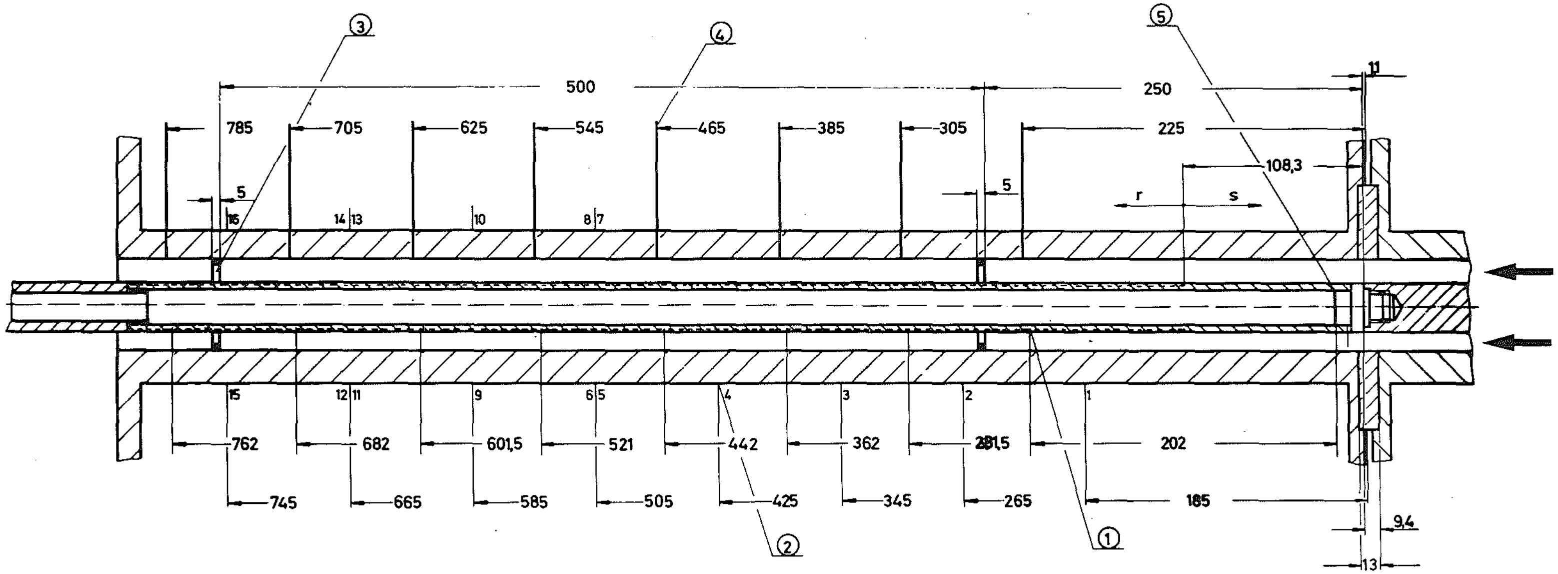


Fig.1: Experimental setup



1 thermocouples inner tube

2 thermocouples outer tube

3 spacer

4 pressure tappings

5 start of heating

s smooth

r rough

Fig.2: Test section

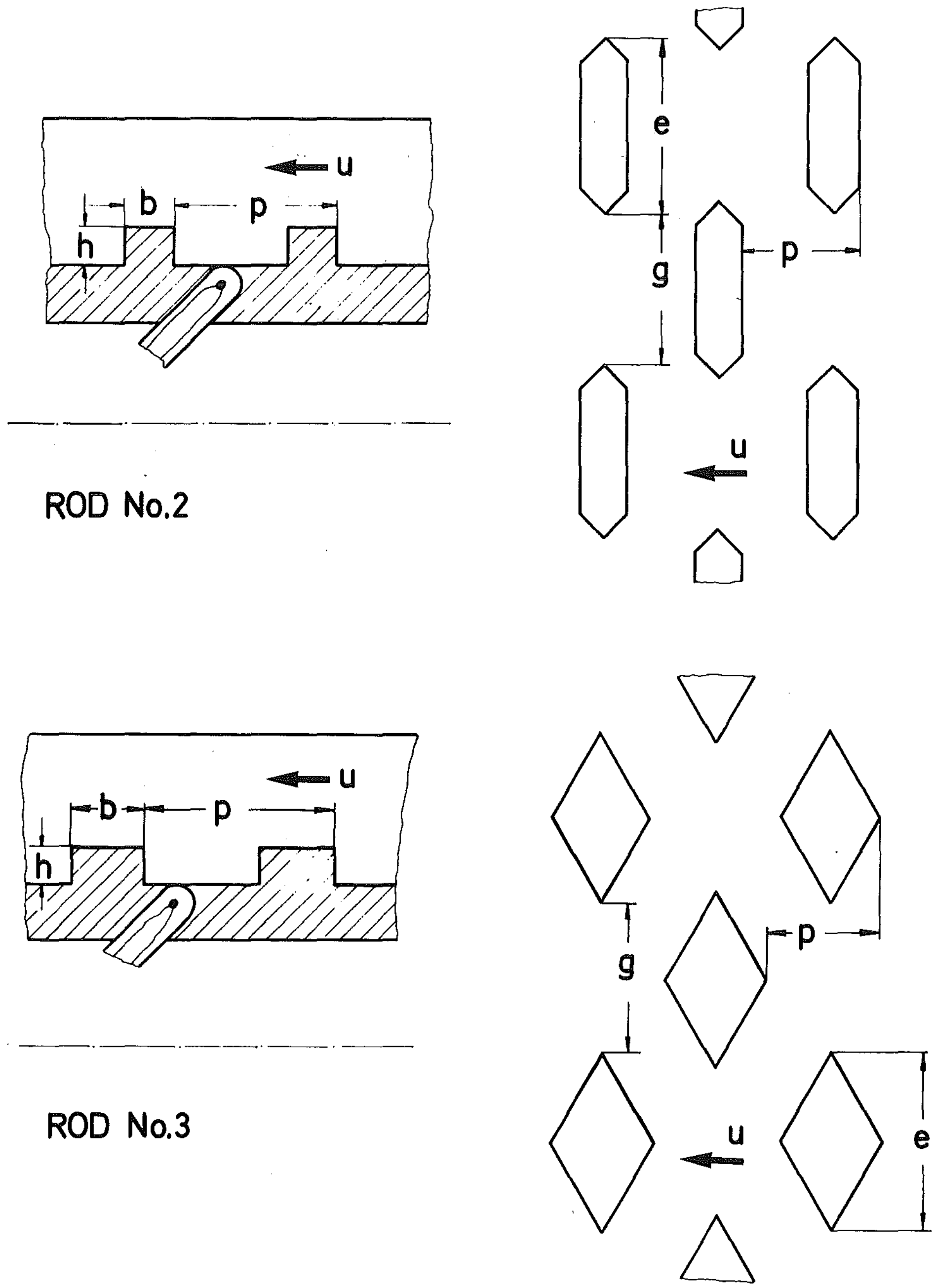


Fig.3: Roughness geometry

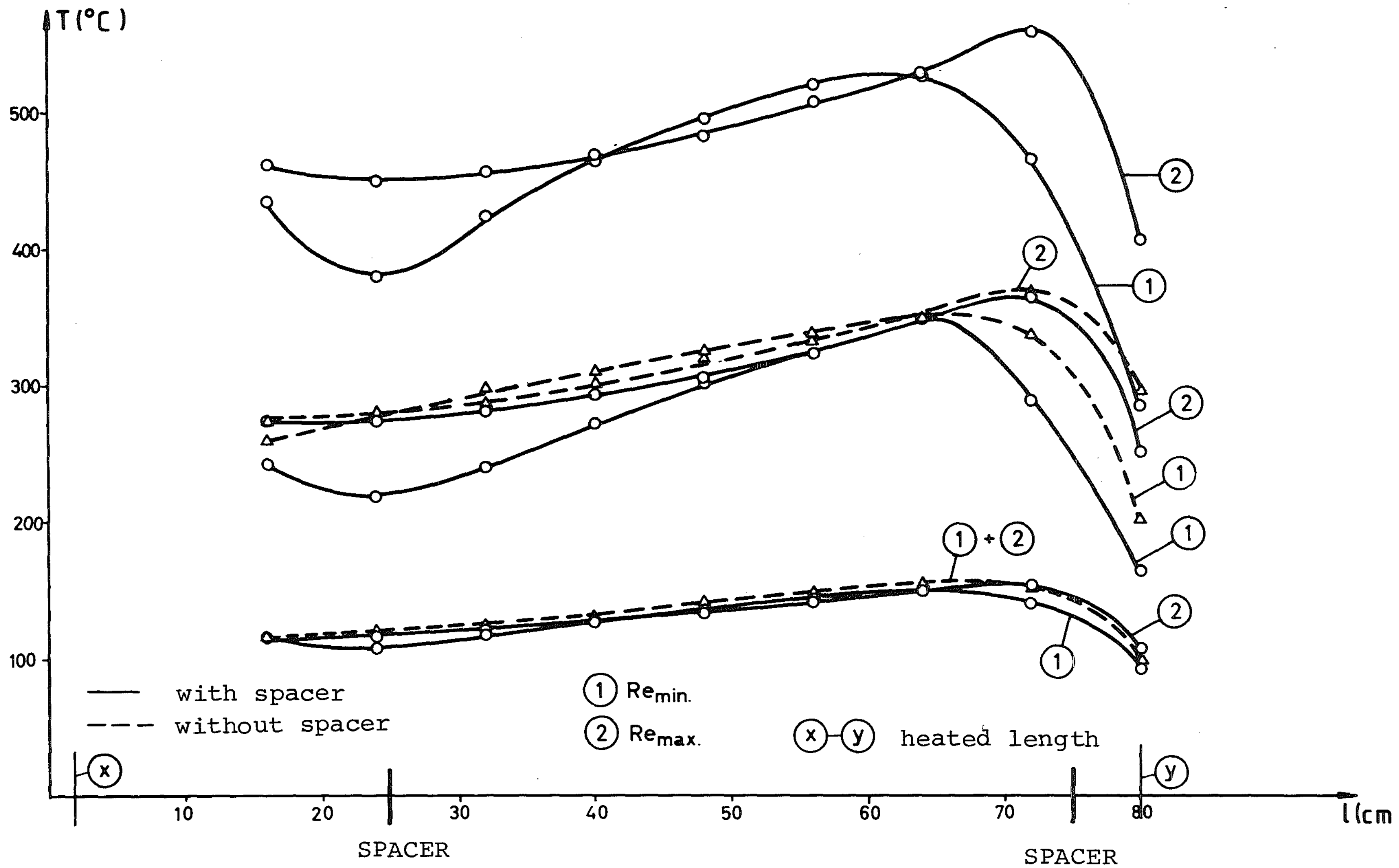


Fig.4: Axial temperature distribution

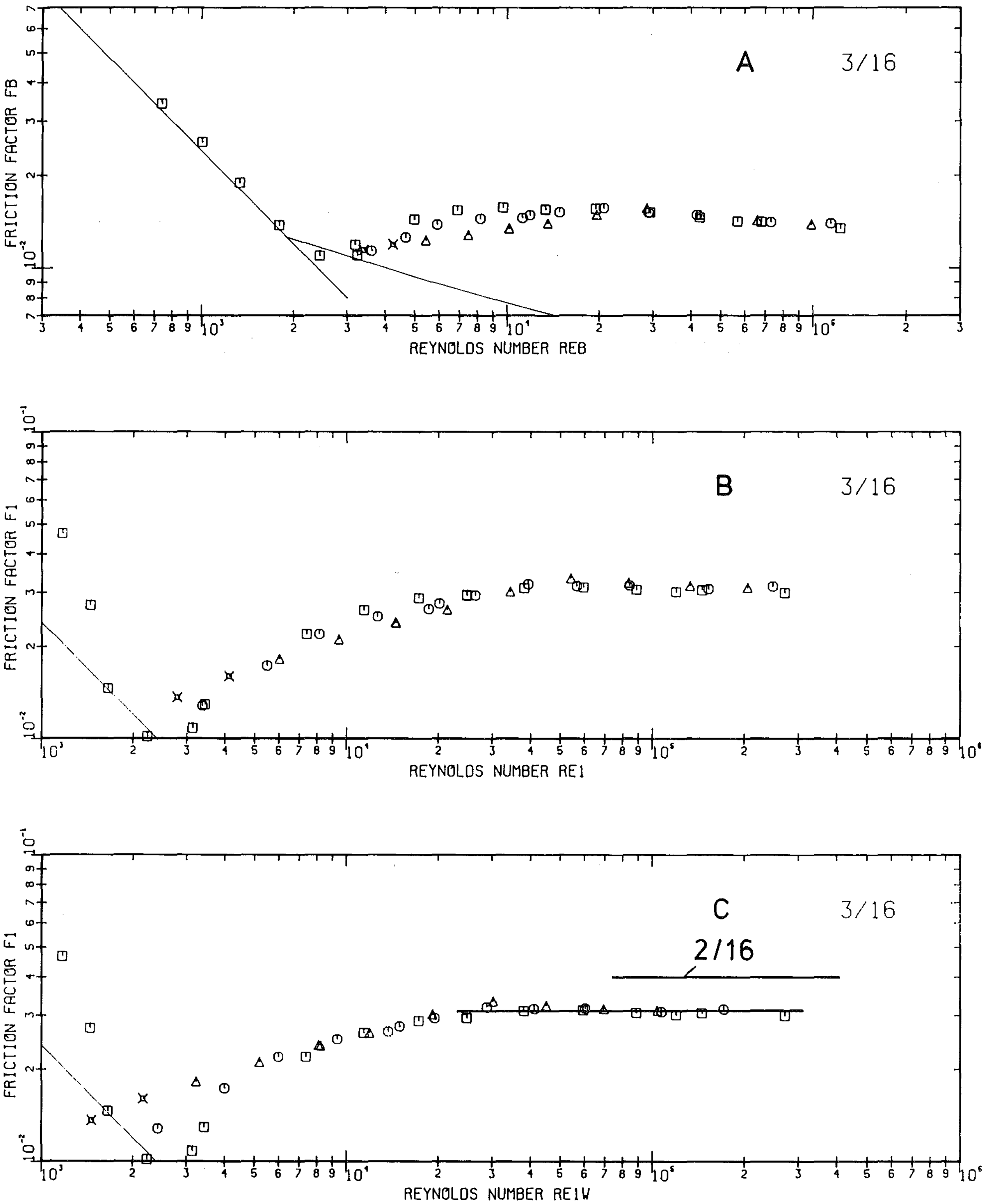


Fig.5: Friction factor versus Reynolds number

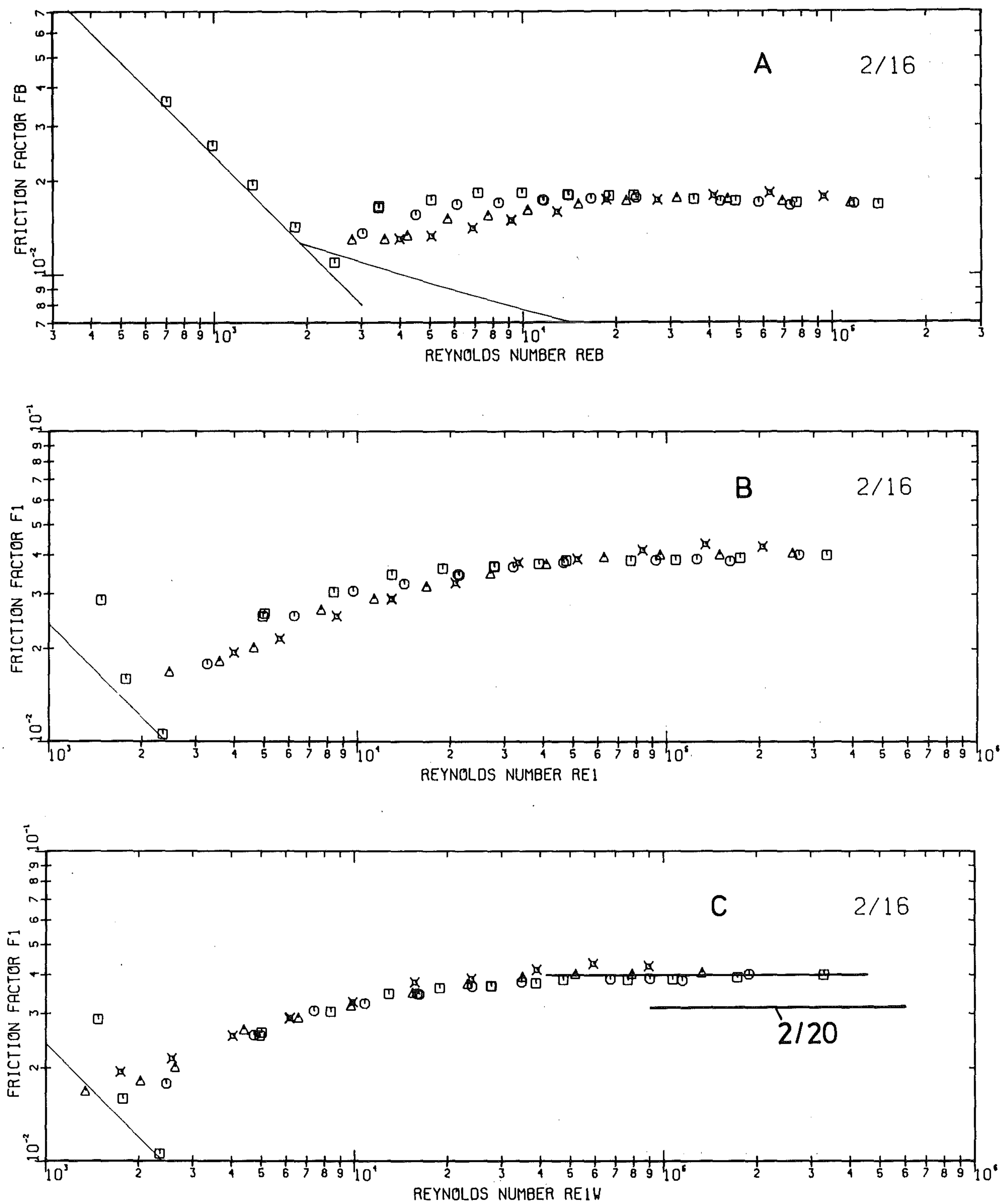


Fig.6: Friction factor versus Reynolds number

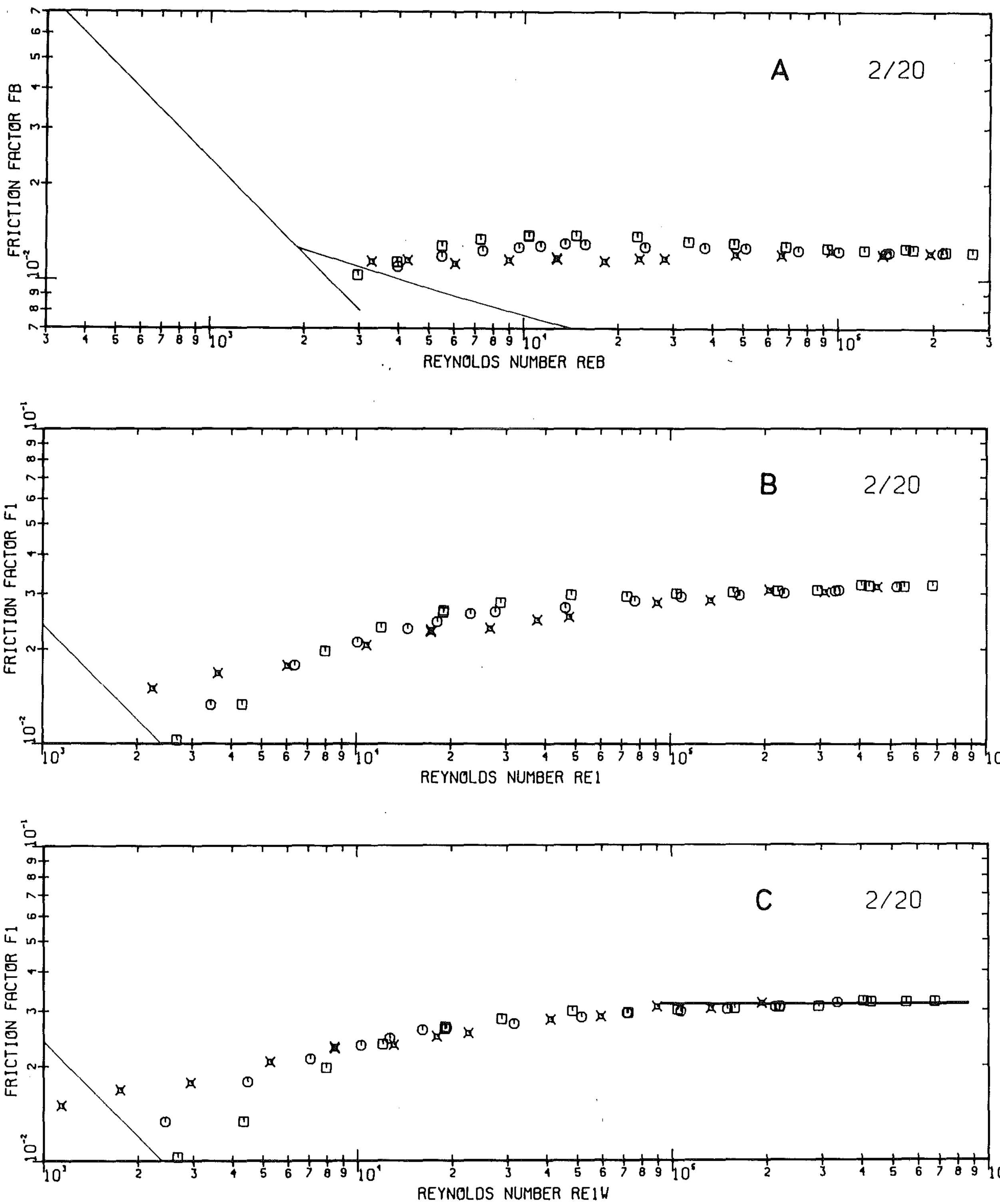


Fig.7: Friction factor versus Reynolds number

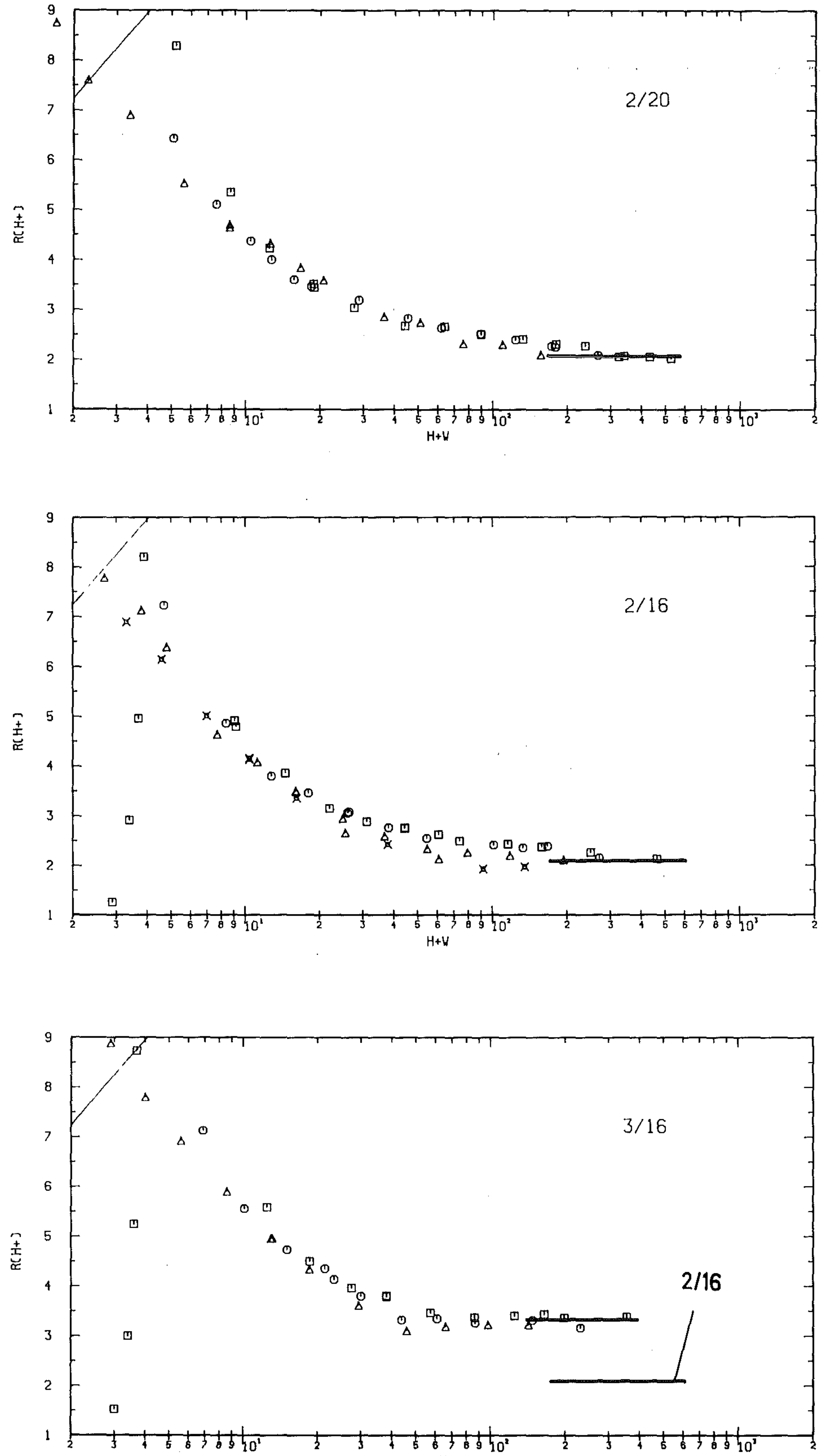


Fig.8: Roughness parameter $R(h^{+})$ evaluated with $A_r = A_H = 2.5$ and A_s according to /7,8/

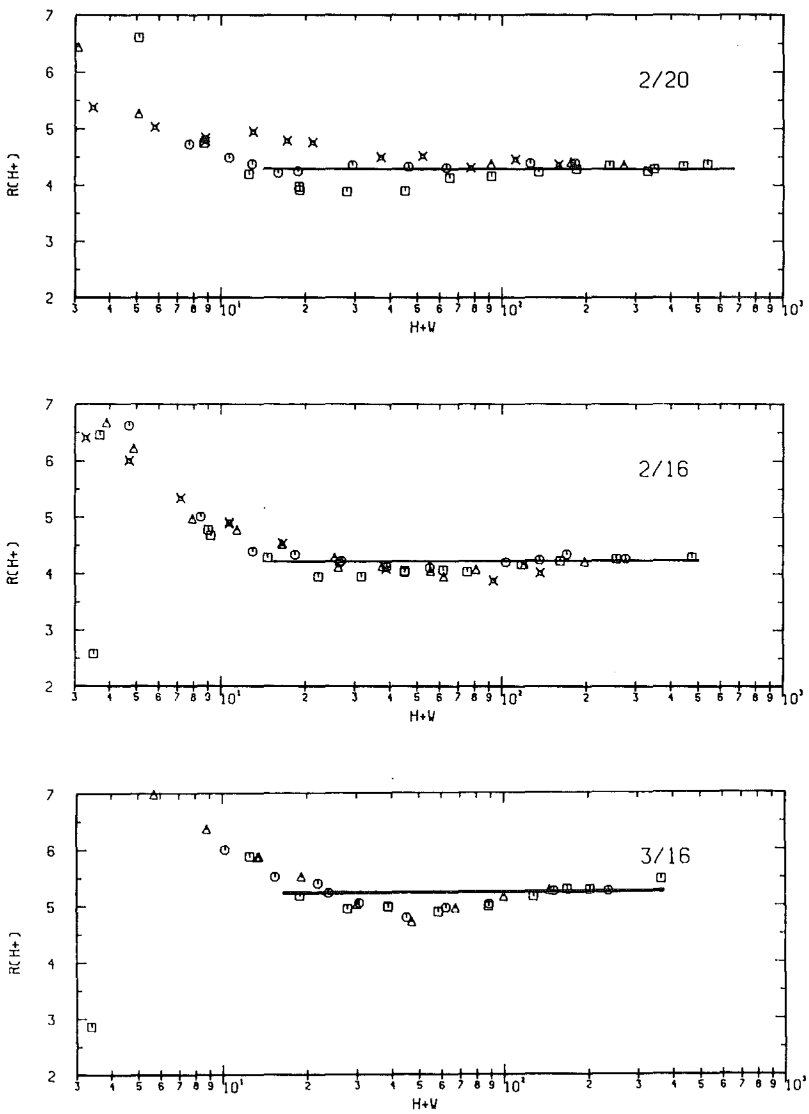


Fig.9: Roughness parameter $R(h^+)$ evaluated with A_r, A_s and A_H according to Eq.(7),(8) and (9)

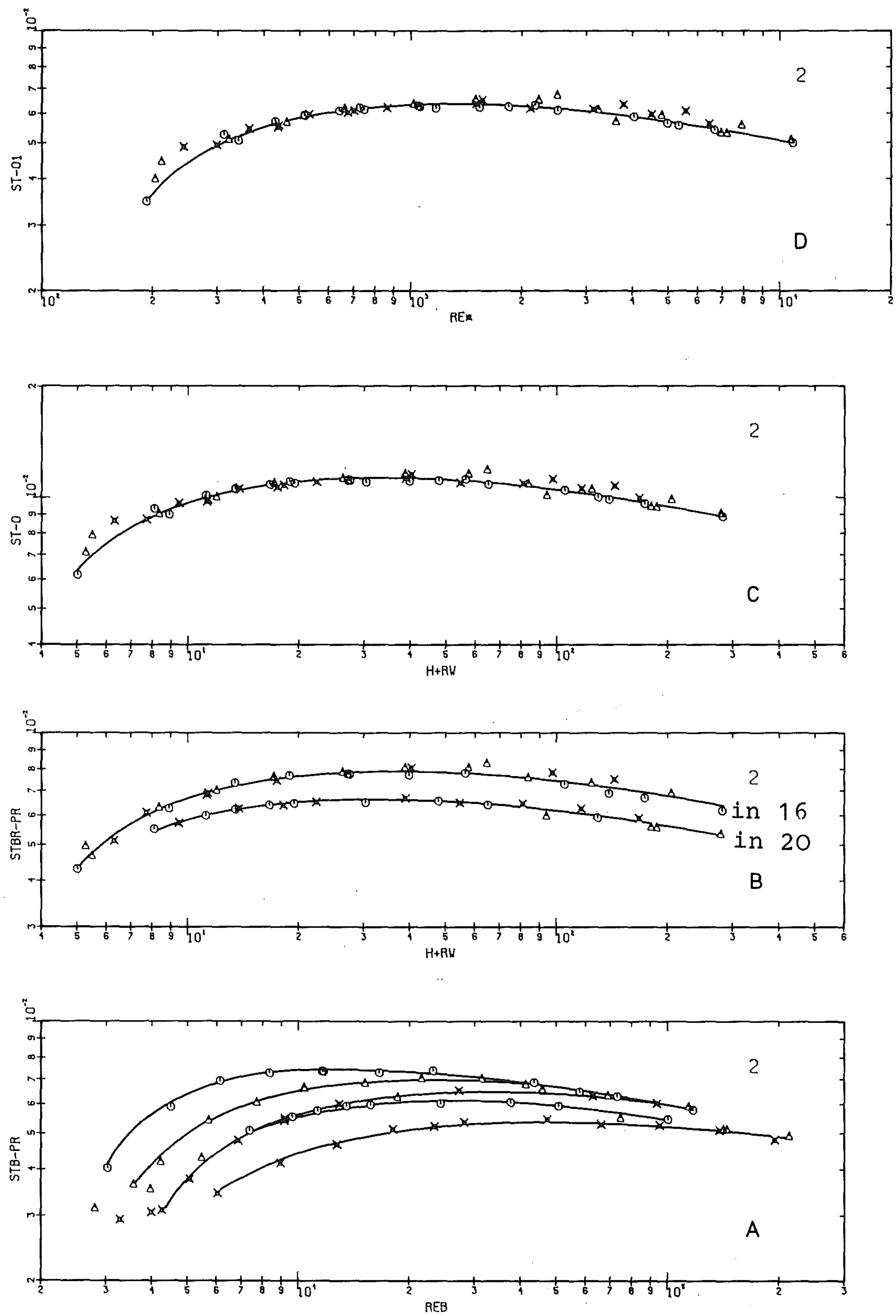


Fig.10: Stanton number, reduced and transformed Stanton number, for rod 2 in two outer tubes

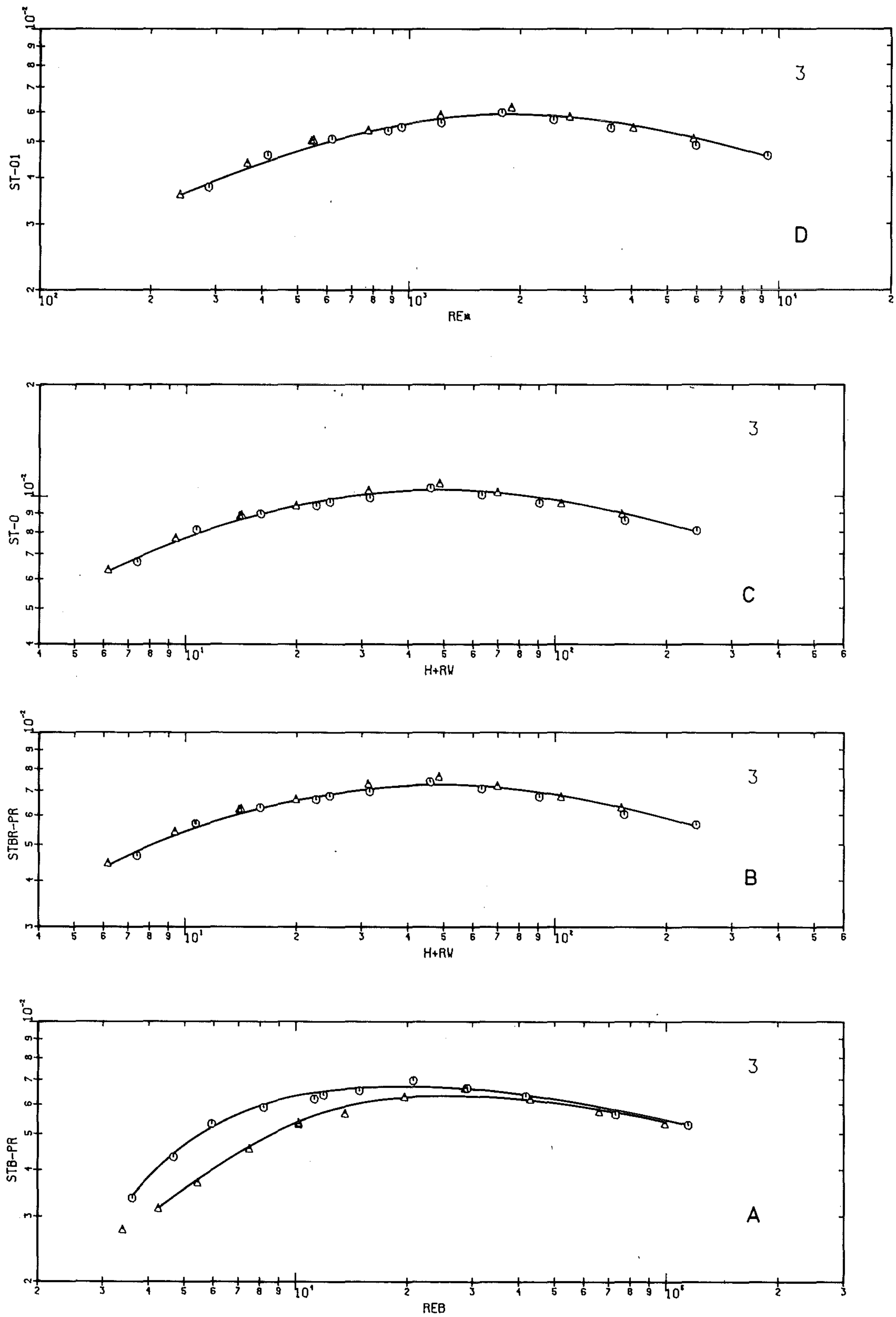


Fig.11: Stanton number, reduced and transformed Stanton number, for rod 3 in one outer tube

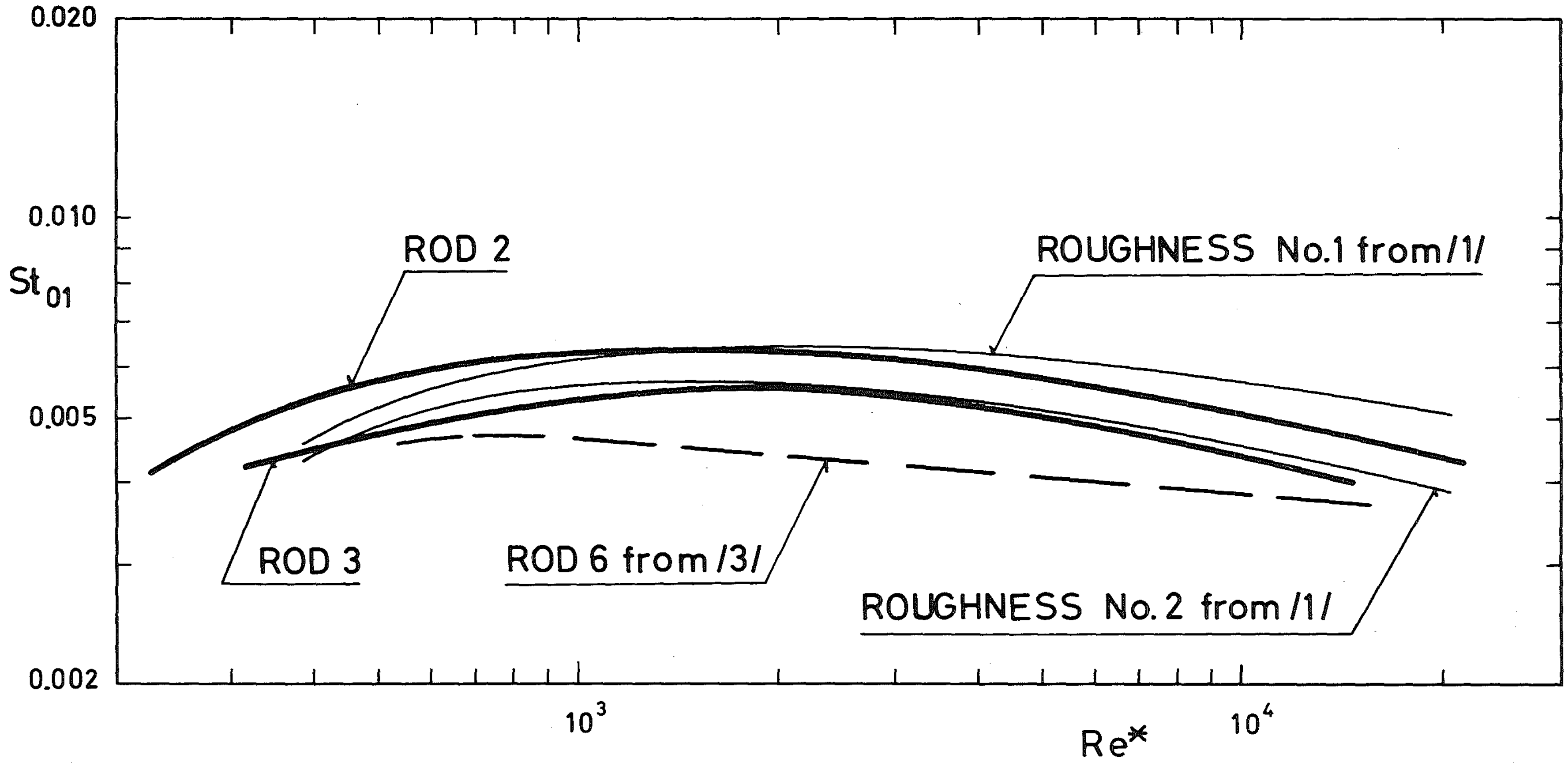


Fig.12: Comparison of Stanton numbers transformed to h/d=0.01 by Eq.(16) and (17) versus a wall Reynolds number

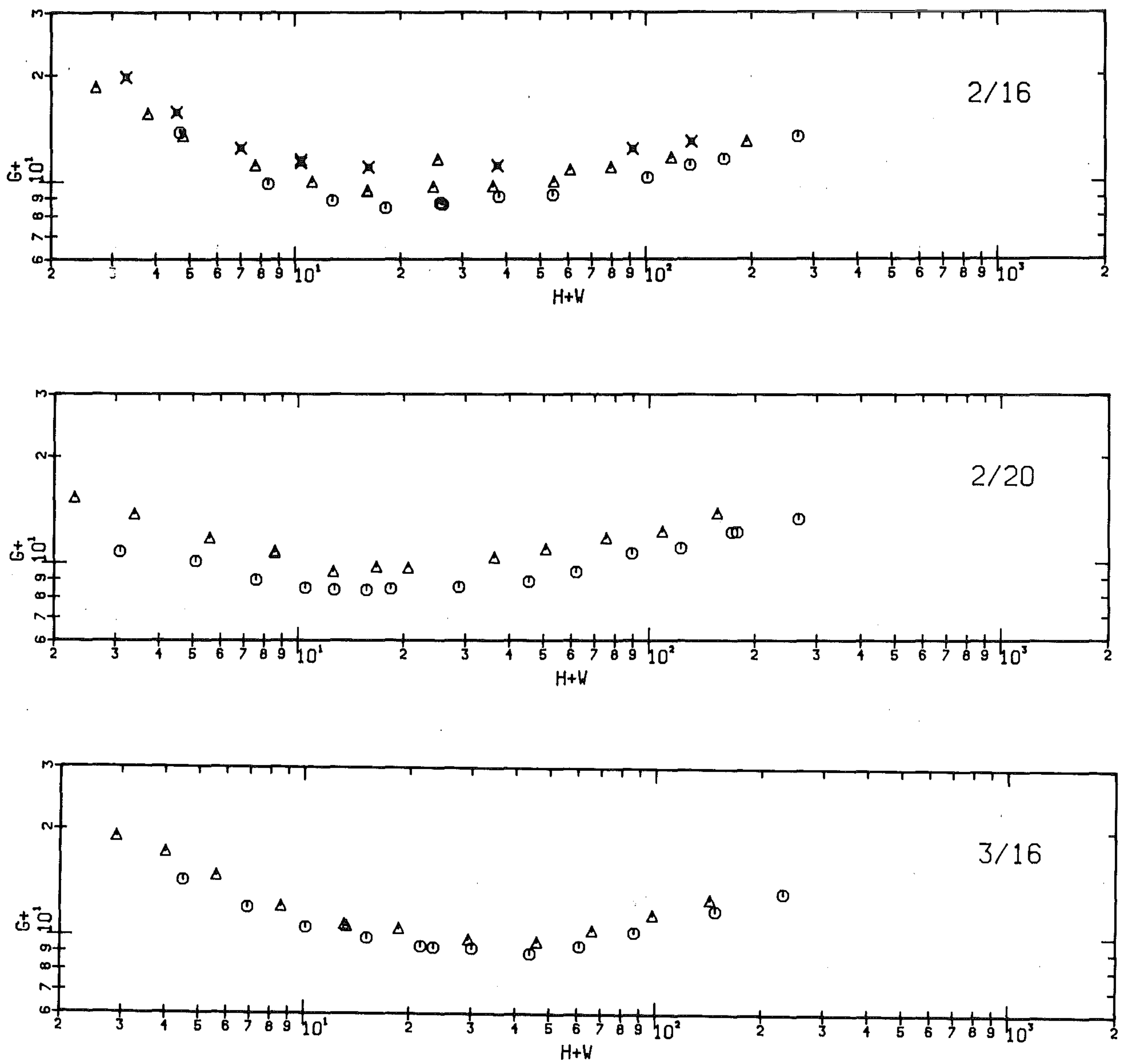


Fig.13: Roughness parameter G^{+} determined by Eq.(19)

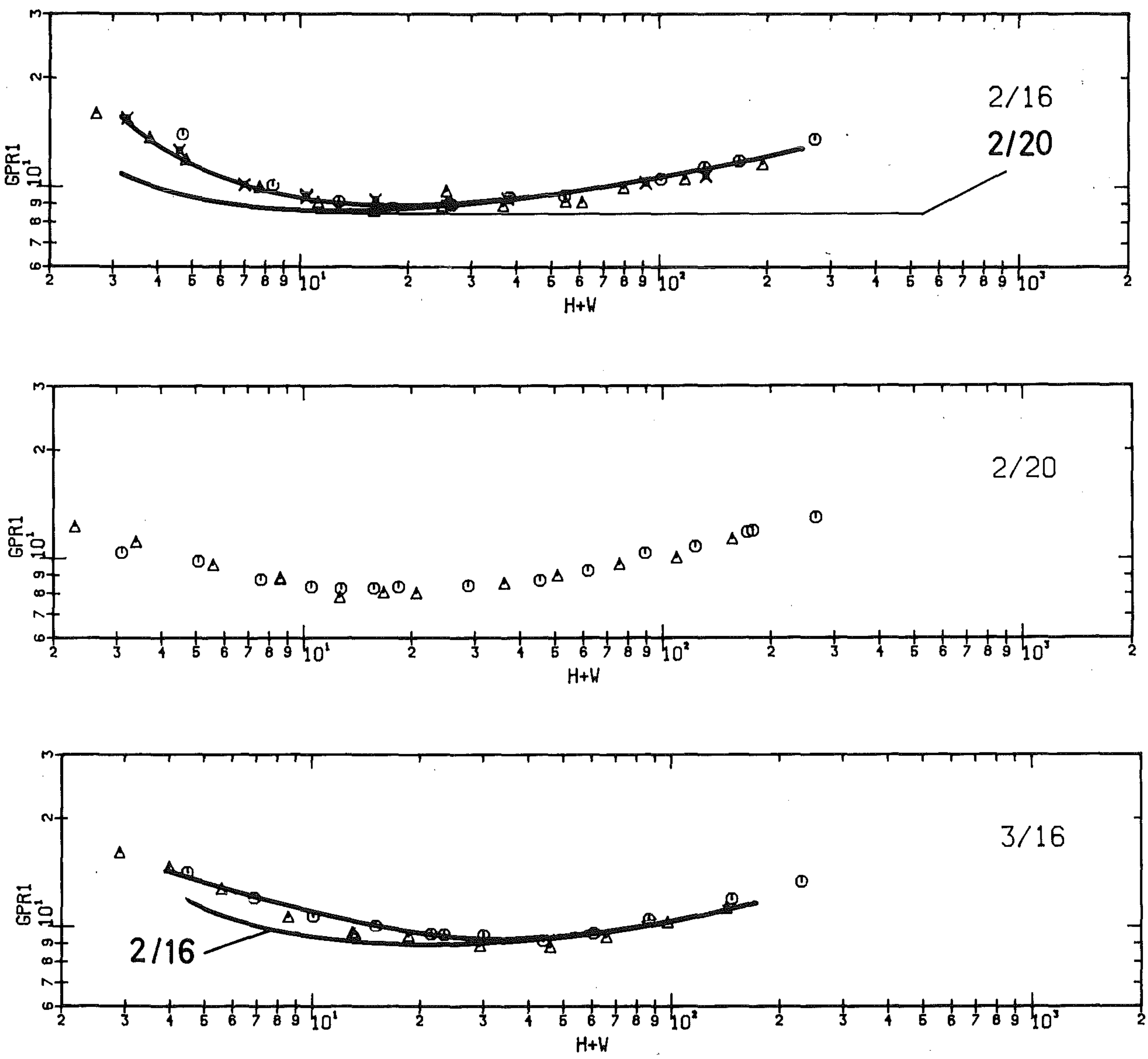


Fig.14: Roughness parameter G^+ reduced for the temperature effect by Eq.(20)

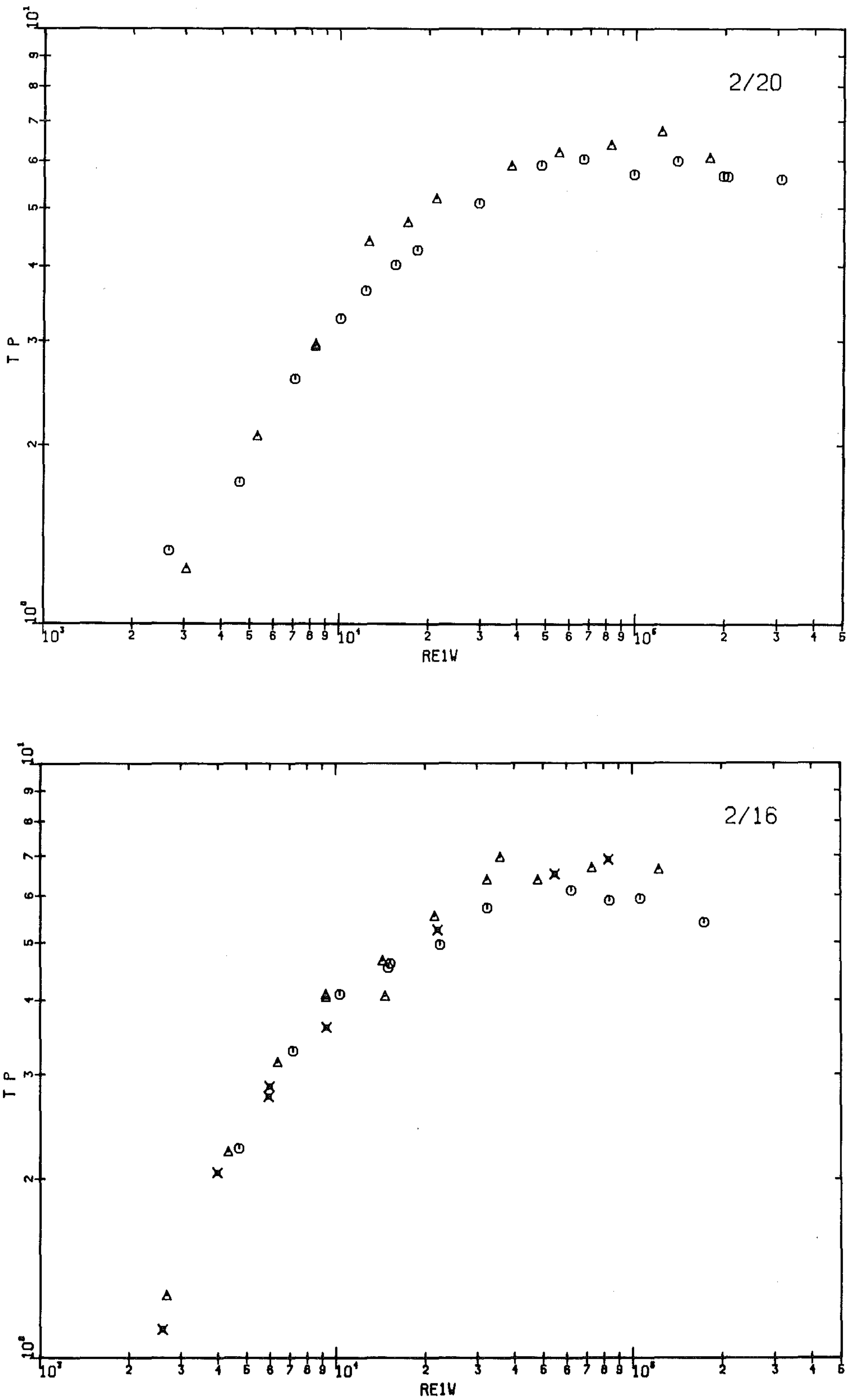


Fig.15: Thermal performance

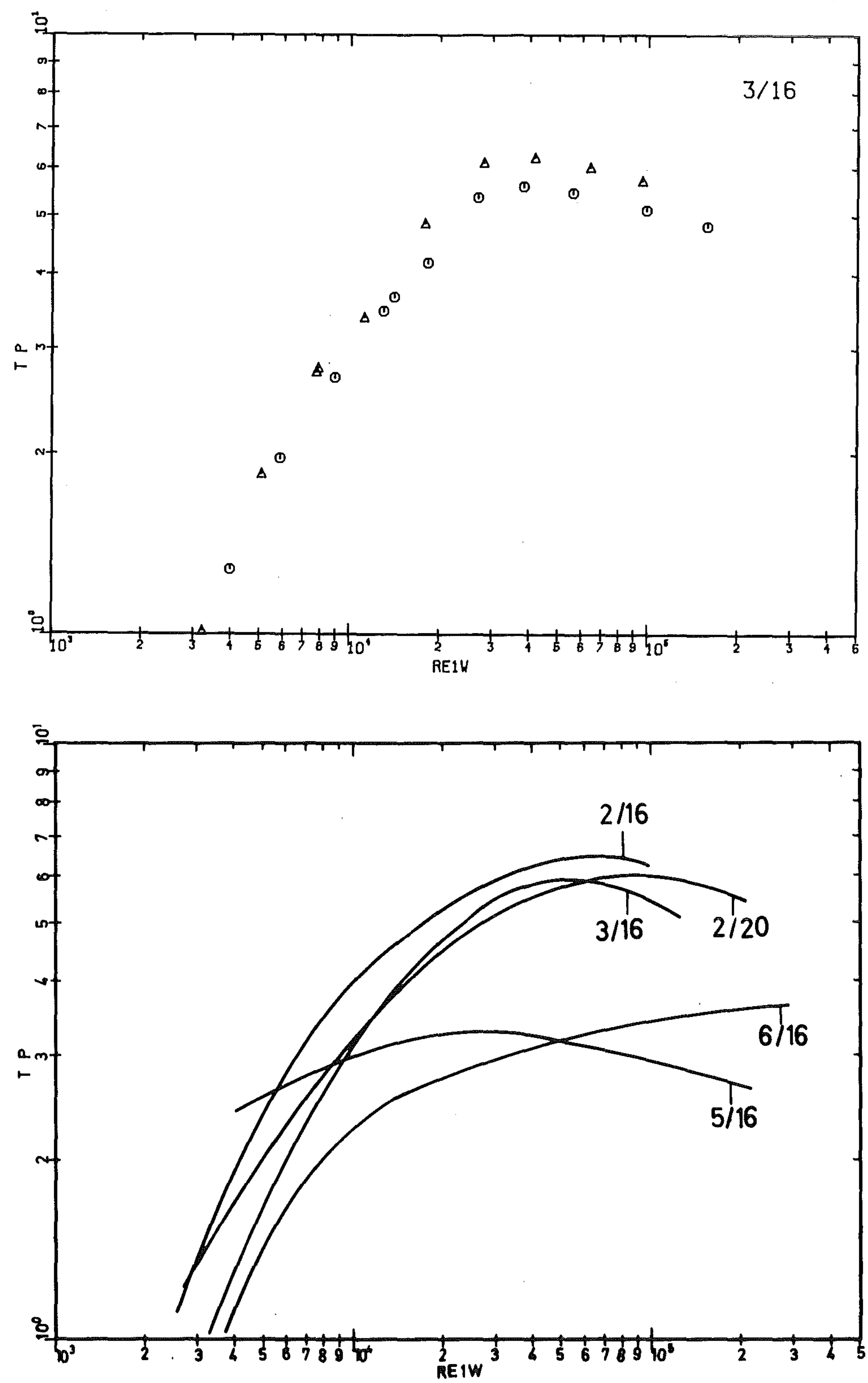


Fig.16: Thermal performance, comparison with another 3-D roughness (6/16 from /3/) and a 2-D roughness (5/16 from /6/)