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Abstract

Velocity and temperature profiles were measured in an annular flow cross section. Three different rough rods in two outer tubes each were investigated. The slopes of the nondimensional logarithmic velocity profile in both the inner 'rough' zone and the outer 'smooth' zone vary with the Reynolds number. The slopes of the nondimensional temperature profile deviate from a logarithmic line in a large portion of the flow cross section. The turbulent Prandtl number is smaller than one and varies with the distance from the wall.

Geschwindigkeits- und Temperaturprofile in rauhen Ringspalten

Zusammenfassung

In einem Ringspalt wurden Geschwindigkeits- und Temperaturprofile gemessen. Dabei wurden drei verschiedene rauhe Stäbe jeweils in zwei glatten Außenrohren untersucht. Die Steigung des logarithmischen Geschwindigkeitsprofils ändert sich sowohl in der 'glatten' Außen- als auch in der 'rauhen' Innenzone mit der Reynoldszahl. Die Steigung des logarithmischen Temperaturprofils weicht im größten Teil des Strömungsquerschnittes von einer logarithmischen Geraden ab. Die turbulente Prandtlzahl ist kleiner als eins und ändert sich mit dem Wandabstand.

1. Introduction

From measurements in rectangular channels /1,2,3,5/, and other investigations /4,14/ it is known that the velocity profiles at artificial roughnesses do not obey the 'law of the rough wall'

$$u^+ = A_r \ln \frac{y}{h} + R \tag{1}$$

with a constant value for A_r. The present investigation was undertaken to find out, whether we get the same results in annular geometry and whether the nondimensional temperature profile can be described by

$$T^+ = A_r \ln \frac{y}{h} + G \tag{2}$$

In an annular geometry the heat transfer and pressure drop measurements at single rough rods are normally performed /6,7,8,9/. The experimental results are transformed to eliminate the effect of the smooth outer tube, by methods which are based on equations (1) and (2) /10,6,7/.

Since the largest deviations of the nondimensional velocity profile from the 'law of the wall' occured at roughnesses which produced the highest friction factors, the present investigation was performed at such roughnesses, namely a roughness with two-dimensional ribs (p/h=9) and one with three-dimensional ribs.

2. The experiment

The basic experimental apparatus was the same as it was used before /6,7/. It is run with air at pressures only little above atmospheric pressure. The heated rough rods are up to 2000 mm long. At the lower end of the test section a measuring device was inserted which could be rotated and carried three cross slides for a Pitot tube and two temperature probes. The circular Pitot tube had an outer diameter of 0.6 mm and a length of 10 mm. The temperature was measured by means of Chromel/Alumel thermocouples with a sheath-diameter of 0.36 mm. The details can be seen in figure 1. Since three different outer tubes were tested,the measuring device had to be adapted to the respective diameter. The geometrical parameters of the roughnesses and the annuli can be taken from table 1. The range of Reynolds numbers was limited at the upper bound by the Mach-number or the capacity of the compressor and at the lower bound by the difficulties to measure a stable velocity profile. The experimental parameters are listed together with the results in table 2 and 3.

The pressure drop and the wall temperatures along the test section were measured together with the velocity and temperature profiles. Since the three cross slides for the temperature probes and the Pitot tube were mounted 120^{o} apart in circumferential direction the temperature and the velocity profiles were measured at different positions. Before each test series the velocity profiles at different circumferential positions were measured. It was not possible to get an axisymmetrical velocity distribution in any test section, fabrication tolerances were obviously toolarge. Therefore,the measurements were taken at a circumferential position were the velocity distribution was similar to the average one. Measurements were also taken at different positions. This explains partly the scatter of the results.

3. Evaluation

The bulk measurements of the pressure drop and heat transfer were evaluated as described before /6,8,10/. The transformation of the bulk data to the rough zone was performed with the methods based on equations (1) and (2) using a constant A_r=2.5. The hydraulic diameter was defined volumetrically for all calculations.

The shear stress at the smooth outer wall τ_2 was determined from the differential pressure between the Preston tube and the static pressure hole in the smooth wall. The density of the air was calculated with the temperature at this position.

The shear stress at the rough rod was determined from the total shear stress τ_m, which is known from the axial pressure drop, and the shear stress at the smooth wall τ_2:

$$\tau_1 = \frac{\beta^2 - \alpha^2}{\alpha\ (1-\beta^2)} \quad \tau_2 \tag{3}$$

with

$$\beta = \left[1 - \frac{\tau_2}{\tau_m}\ (1-\alpha) \right]^{1/2} \tag{4}$$

The mean velocities u(r) were calculated with the differential pressure between Pitot tube and the wall tapping on the same plane. For non-isothermal conditions the density of the air was determined with the temperature at the respective radial position.

No corrections on the Pitot tube readings were applied. Neither were any corrections applied to the temperature readings.

Average velocities and temperatures for the smooth and rough zone and the whole flow cross section were determined by integrating numerically over the respective areas:

$$\bar{u} = \frac{2\pi \sum_i u(r_i)\rho(r_i) (r_i^2 - r_{i-1}^2)}{A \bar{\rho}} \tag{5}$$

$$\bar{T} = \frac{2\pi \sum_i T(r_i)u(r_i)\rho(r_i) c_p(r_i) (r_i^2 - r_{i-1}^2)}{A \bar{u} \bar{\rho} \bar{c_p}} \tag{6}$$

with A being the respective cross section of the zones or the total annulus and the bar denoting the average value in the respective area. The calculation was performed iteratively over $\bar{T}$.

The non-dimensional velocity u^+ and temperature T^+ was formed with the friction velocity u_τ, which was determined at the average temperature of the smooth or rough zone, respectively.

$$u_{\tau 2} = (\tau_2/\rho_s)^{1/2} \tag{7}$$

and

$$u_{\tau 1} = (\tau_1/\rho_r)^{1/2} \tag{8}$$

$$u^+ = u/u_{\tau 1} \tag{9}$$

$$T^+ = \frac{(T_{w1} - T)}{q} \rho_r c_{pr} u_{\tau 1} \tag{10}$$

From the velocity and temperature traverses the quantities eddy viscosity and eddy conductivity can be determined, if the shear stress distribution and heat flux distribution are known.

By a force balance and the condition $\partial p/\partial r = 0$ the shear stress distribution in the inner rough zone is given by

$$\frac{\tau}{\tau_1} = \frac{\beta^2 - (r/r_2)^2}{\beta^2 - \alpha^2} \frac{\alpha}{(r/r_2)} \tag{11}$$

and for the outer smooth zone it is

$$\frac{\tau}{\tau_2} = \frac{(r/r_2)^2 - \beta^2}{1-\beta^2} \frac{1}{r/r_2} \tag{12}$$

Neglecting the kinematic viscosity ν the eddy viscosity is defined by

$$\tau = \rho \varepsilon \frac{\partial u}{\partial r} . \tag{13}$$

A non-dimensional eddy viscosity ε^+ can be derived from (11), (12) and (13):

$$\varepsilon_r^+ = \frac{\varepsilon_r}{u_{\tau 1} \hat{y}_r} = \frac{\beta^2 - (r/r_2)^2}{\beta^2 - \alpha^2} \frac{\alpha}{(r/r_2)} \frac{\partial (\frac{y}{\hat{y}_r})}{\partial u^+} \tag{14}$$

and

$$\varepsilon_s^+ = \frac{\varepsilon_s}{u_{\tau 2} \hat{y}_s} = \frac{(r/r_2)^2 - \beta^2}{1-\beta^2} \frac{r_2}{r} \frac{\partial (\frac{y}{\hat{y}_s})}{\partial u^+} \tag{15}$$

For a fully developed flow the heat flux distribution in the annulus is similar to the shear stress distribution. With the condition $\partial T/\partial x$=const. and q_2=0, the heat flux distribution is given by

$$\frac{q}{q_1} = \frac{r_1}{r} \frac{1 - (r/r_2)^2}{1 - \alpha^2} \tag{16}$$

The eddy conductivity is defined by

$$q = \varepsilon_H \rho c_p \frac{\partial T}{\partial r} . \tag{17}$$

From (16) and (17) a non-dimensional eddy conductivity is derived

$$\varepsilon_H^+ = \frac{\varepsilon_H}{u_{\tau 1} \hat{y}_r} = \frac{q_1}{u_{\tau 1} \bar{c}_p \bar{\rho}} \frac{\alpha \left[1 - (r/r_2)^2\right]}{(\beta - \alpha)(1 - \alpha^2)} \frac{1}{r} \frac{\partial r}{\partial T} \tag{18}$$

An alternative assumption about the heat flux distribution leads to

$$\frac{q}{q_1} = \frac{r_1}{r} \; \frac{m_B - m(r)}{m_B} \tag{19}$$

and to

$$\varepsilon_H^+ = \frac{\varepsilon_H}{u_{\tau 1}\, \hat{y}_r} = \frac{q_1}{\bar{\rho}\; \bar{c}_p\; u_{\tau 1}} \; \frac{\alpha}{\beta-\alpha} \; \frac{m_B - m(r)}{m_B} \; \frac{1}{r} \; \frac{\partial r}{\partial T} \tag{20}$$

For the final evaluation equation (20) was used although the differences of the results using equation (18) were small.

The values of the eddy viscosity and the eddy conductivity were calculated directly from the measured velocities and temperatures.

The velocity profile parameters A_s, A_r and R were determined from integral quantities such as the bulk velocities. By the conditions that the integration of equations (1) and the corresponding equation for the smooth zone

$$u_s^+ = A_s \ln y_s^+ + B \tag{21}$$

over the respective zones must yield the bulk velocities, and that the zero shear stress plane is given by the intersection of the two velocity profiles originating at the respective walls, the profile parameters are determined:

$$A_s = \frac{(\bar{u}_s^+ - B)}{\ln \hat{y}_s^+} - \frac{1}{2}\,\frac{3+\beta}{1+\beta} \tag{22}$$

$$A_r = \frac{(A_s \ln \hat{y}_s^+ + B)\dfrac{u_{\tau 2}}{u_{\tau 1}} - \bar{u}_r^+}{\dfrac{1}{2}\,\dfrac{3+\beta/\alpha}{1+\beta/\alpha}} \tag{23}$$

$$R = (A_s \ln \hat{y}_s^+ + B)\; \frac{u_{\tau 2}}{u_{\tau 1}} - A_r \ln(\hat{y}_r/h) \tag{24}$$

The parameter B was set to B=5.5

Similar to the evaluation of the slope of the velocity profile A_r from integral quantities, a slope of the temperature profile A_H can be determined.

There are two conditions which have to be met by an artificial temperature profile:

(1) integration over the entire annular flow cross section must yield the gas bulk temperature T_B,

(2) integration over the inner 'rough' zone must yield the bulk temperature of that zone T_1.

The temperature T_1 is determined by numerical integration of the measured temperature and velocity profiles according to equation (6).
Condition (1) can be written as

$$\frac{(T_W-T_B)\,\rho_B\,c_{pB}\,u_B}{q_1}\,\frac{u_{\tau 1}}{u_B} = A_H \ln\left(\frac{1-\alpha}{h/r_2}\right) - \frac{A_H}{2}\,\frac{3+1/\alpha}{1+1/\alpha} + G^* \qquad (25)$$

and condition (2) is

$$\frac{(T_W-T_1)\,\rho_B\,c_{pB}\,u_{\tau 1}}{q_1} = A_H \ln\left(\frac{\beta-\alpha}{h/r_2}\right) - \frac{A_H}{2}\,\frac{3+\beta/\alpha}{1+\beta/\alpha} + G^* \qquad (26)$$

Equation (25) and (26) combined give

$$A_H = \frac{(T_1-T_B)\,\rho_B\,c_{pB}\,u_{\tau 1}}{q_1\left[\ln\left(\frac{1-\alpha}{h/r_2}\right) - \ln\left(\frac{\beta-\alpha}{h/r_2}\right) + \frac{1}{2}\left\{\frac{3+\beta/\alpha}{1+\beta/\alpha} - \frac{3+1/\alpha}{1+1/\alpha}\right\}\right]} \qquad (27)$$

4. Results

Parameters evaluated from point data

From the large amount of data only a sample fraction is presented in diagrams. All results are tabulated in table 2 and 3.

Figures 3 and 4 show the velocity distribution in the two extreme flow channels with α=0.262 and α=0.468, seperate for isothermal flow and one respectively two temperature ratios T_W/T_B. The symbols are rotated by 45^o for different runs, which means different Reynolds numbers, and the pertinent parameters can be found in table 2 and 3 by the corresponding test number.

Temperature profiles for two test sections are shown in figures 5 and 6.

Mean velocity profiles of the smooth zone are plotted in figure 7 in non-dimensional form, together with a straight line representing the 'law of the smooth wall' according to equation (19) with A_s=2.5 and B=5.5. Most measured points are below this line but the slope is very close to 2.5. This was the case for all test sections.

Figures 8,9 and 10 show non-dimensional velocity profiles in the rough zone together with a best fit line representing the 'law of the rough wall'. The corresponding parameters A_r and R are listed in table 3 (ARP, RHP). The slope A_r is generally below 2.5. There is no effect of the Reynolds number in the fully rough regime, but at low Reynolds numbers, respectively h^+-values, the slope A_r increases. Unfortunately the fluctuations of the flow became too big at low mass flow rates which made further measurements impossible. A compilation of all slopes A_r is shown in figures 11 and 12. There is no definite effect of the relative roughness height, neither is the effect of the temperature clear cut, although for nonisothermal flow the slope A_r is higher in most cases. The slopes at the 3-dimensional roughness are at the lower bound of the range of scatter.

Samples of non-dimensional temperature profiles are shown in the figures 13,14 and 15. A straight line with the slope A_r of the corresponding velocity profile is drawn through one of the measured points. For most of the profiles there is a region close to the wall, where this line fits quite well.

For small radius ratios α, such as in test section 23-70, the logarithmic 'law of the wall' describes the temperature distribution up to the smooth wall with sufficient accuracy, taking the same slope A_r as for the velocity profile. For bigger radius ratios (test section 23-50) the deviation of the temperature profile from a straight line far away from the rough rod increases. This deviation is very large for the other test sections with a r_1=16.3. Those temperature profiles look all similar to those shown in figure 15. Here an additional line with a slope of 2.5 is shown. This line and the straight line of the upper profile intersect at the same G-value at y/h=1. The line with the slope 2.5 comes very close to the measured temperature at the smooth wall. This might explain, why the G-value determined by the temperature of the smooth wall together with a slope A_r=2.5, namely

$$G^+ = \frac{(T_{W1}-T_{W2})\,\bar{\rho}\,\overline{c_p}\,u_{\tau 1}}{q_1} - A_r \ln\left(\frac{1-\alpha}{h/r_2}\right), \qquad (28)$$

as it was proposed in /6/, yields reasonable results.

The next seven figures show samples of the eddy diffusivities of momentum and heat in non-dimensional form. Figures 16 shows the eddy viscosity in the smooth zone together with a best fit line. There was no appreciable difference between the different test sections. The maximum value of ε_s^+ was between 0.10 and 0.11 at a $y_s/\hat{y}_s$ between 0.5 and 0.6 for all test sections, with the exception of test section 12-71 (not shown) where the maximum was between 0.11 and 0.12.

The eddy viscosity in the rough zone is shown in the figures 17,18 and 19. The general trend for the maximum is to be higher for higher relative roughness heights and to be higher for the 3-dimensional roughness. The difference between test section 23-70 and 22-70 (minimum and maximum $h/\hat{y}_r$) is approximately 0.015 and between 22-70 and 12-70 (2-dimensional and 3-dimensional roughness) again approximately 0.015.

The eddy diffusivity of heat is shown in the figures 20, 21 and 22 for the same three test sections. Its distribution is more uniform than that of the eddy viscosity.

From these results a turbulent Prandtl number can be found which is defined by

$$Pr_t = \frac{\varepsilon_M}{\varepsilon_H} \quad . \tag{29}$$

Its reciprocal value is shown in figure 23 together with some data from the literature for turbulent flow in smooth tubes. The disparity of Pr_t measurements or analytical functions in the literature is very large, so only the minimum and the maximum data are shown, besides one of the more recent measurements by Mc Eligot /11/. The results for test section 12 and 22 in both outer tubes fall together in a narrow band.

Parameters evaluated from integral data

The slopes of the smooth and of the rough profiles, A_s and A_r, determined by equations (22) and (23) are plotted in figure 24 and 25.

The value of A_s was reduced by the $h/\hat{y}_s$-effect as it was found for flow at high Reynolds numbers in a rectangular channel /1,3,5/,

$$A_{SO} = A_S - 0.4/\ln\ (0.1\ \frac{h}{\hat{y}_s}) \qquad (30)$$

The value of A_{SO} decreases at lower Reynolds numbers in all test sections. The amount of the decrease is smaller in the test sections with small relative roughness height (23-72 and 23-50). A mean function

$$A_{SO} = 2.55 - 55/Re_S^{0.56} \qquad (31)$$

is plotted in figure 24.

The parameter A_r of the rough profile is plotted versus h^+ in figure 25 together with a function

$$A_r = 1.5 + 20/h^+ \quad \leq 2.5 \qquad (32)$$

which describes the general trend of the data, but does not fit for all measurements.

A systematic effect of the different roughnesses or the different relative roughness heights can not be detected. The effect of different relative roughness heights which was found at higher values of $h/\hat{y}_r$ in a rectangular channel /1/ was given by

$$A_r = 2.5 + E/\ln\ (\frac{h}{\hat{y}_r})\ . \qquad (33)$$

The maximum difference for the present measurements between test section 23-72 and 22-71 would be ΔA_r=0.17 (with E=2.09 for p-b/h=8), a value which is within the uncertainty of the experiment. However, the slopes A_r at high Reynolds numbers are generally lower by approximately 0.4 than the prediction by equation (33).

The slope A_H of the temperature profile evaluated by equation (27) is plotted versus h_W^+ in figure 25c. For the rods 12 and 22 in both outer tubes there is a general trend of A_H to increase with decreasing h_W^+. The line A_H=1.4+3/log(h_W^+) of test section 22/85 is shown as a reference in all plots. The slopes A_H for rod 23 are constant with approximately A_H=1.75.

Transformation of bulk data

The following figures show the data evaluated from the pressure drop and wall temperature measurements along the test section.

The bulk friction factor, the transformed friction factor f_1 and the temperature corrected friction factor f_{1R} are shown in figures 26-31. The transformation was performed with A_r=2.5 and a variable A_s as developed in /6/. The temperature effect was reduced by

$$f_{1R} = f_1 \left(\frac{T_W}{T_r}\right)^{0.29} \qquad (34)$$

taken from /8/.

The bulk Stanton number, the temperature reduced Stanton number and the transformed Stanton number are plotted in figures 32-37. The temperature reduction and transformation which was applied was proposed in /8/.

The roughness parameters R and G of the velocity profile and of the temperature profile, respectively were evaluated with a constant slope A_r=2.5 and are shown in figures 38-43. The G-parameter was determined by the bulk temperature (G^*) and by the outer wall temperature (G^+) (see Eq.(A-4) and (A-7) in the appendix).

In order to see the effect of the different slopes A_S and A_r, as they resulted from the present measurements the calculations were repeated with

$$A_S = 2.55 + \frac{0.4}{\ln(0.1\ h/(r_2(1-\beta))} - \frac{55}{Re_2^{0.56}} \qquad (35)$$

and

$$A_r = 2.5 + \frac{3.0}{\ln(h/(r_2(\beta-\alpha))} + \frac{20}{h^+} \qquad (36)$$

The parameter E from equation (33) was increased to E=3.0 to take account of the lower slopes in the present experiment compared to the experiments performed in the rectangular channel.

The results are listed in table 3 and the new G^+,G^* and R-values are plotted in the figures 44-49. A comparison of the transformed friction factors shows that they are generally smaller with the new A_S- and A_r-functions by 1-6%. The difference is small at high Reynolds numbers (1-2%) and for small radius ratios (23-72). Large differences occur at small Reynolds numbers due to the decreasing value of A_s. The magnitude of A_r does not change the friction factor f_1 considerably in the region of $h/\hat{y}_r < 0.04$. This was found in the rectangular flow channel, too /1,3,5/. The R- and G-functions, however, are quite different. Due to the increasing A_r with decreasing h^+ the R-functions are no longer increasing. For the test sections 23-35 and 23-37 the resulting R-functions are not constant, the applied A_S- and A_r-functions need to be improved.

In figure 50 it can be seen that the new functions A_s and A_r improve the correlation of the R-parameter at different relative roughness heights. Here the R-parameter is plotted, which resulted of pressure drop measurements at test rod No.12 in four outer tubes of 40,50,70, and 85 mm I.D. The improvement is obvious, the R-function is constant down to $h^+ = 20$.

5. Conclusions

Because it was not possible to obtain an axis-symmetric flow in any of the annular test sections the uncertainty of the results is rather large. The effects of different relative roughness heights, the curvature of the flow channel, the temperature ratios and different roughnesses, on the velocity and temperature distribution could not or only partially be detected. There are, however, some new facts which can be derived from the measurements with a high degree of certainty.

The influence of the roughness on the flow in the smooth zone of a partially rough flow channel was confirmed. The slope A_S of the non-dimensional velocity profile at the smooth wall is lower than 2.5 and decreases further with decreasing Reynolds number. The slope A_r of the rough profile is approximately 1.5 at high h^+-values, for the roughnesses tested, and increases with falling h^+-values up to A_r=2.5. The effect on the transformed friction factor f_1 of the rough zone by the changed slope A_s is bigger than that of a different A_r (A_r=1.5 versus A_r=2.5). In the range $h/\hat{y}_r \leq 0.04$ the friction factor f_1 decreases on the average by 1-2% at high h^+-values and up to 6% at low h^+. The R-functions of different relative roughness heights can be correlated better than before.

The slopes of the rough velocity profile describe the non-dimensional temperature profile only in a limited range of distances from the rough wall. The deviation from a logarithmic straight line is large far from the wall, especially for high roughnesses. In this case a slope of A_r=2.5 fits quite well for the temperature T_{W2} at the opposite smooth wall, but not for the temperature distribution in the rest of the flow cross section.

The eddy diffusivities of momentum and heat are somewhat higher than for smooth channel flow, but the difference is small. The turbulent Prandtl number is smaller than 1 with a maximum near 1 at $y/\hat{y} = 0.5$.

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Nomenclature

A	area of flow cross-section (m^2)
A_r, A_S	slopes of the logarithmic velocity profiles
B	constant of the logarithmic velocity profile at smooth walls;
b	width of the roughness rib (m)
c_p	specific heat at constant pressure (Ws kg^{-1} K^{-1})
d_h	hydraulic diameter (m)
e	length (z-direction) of a rib (m)
f	friction factor = $2\tau/\rho u^2$
f_o	friction factor of a smooth tube
G	parameter in the logarithmic temperature profile
g	gap (z-direction) between two ribs (m)
h	height of roughness ribs (m)
h^+	dimensionless height of roughness rib = $h\, u_\tau/\nu$
p	axial pitch of the repeated roughness rib (m)
p	pressure (Nm^{-2})
Pr	Prandtl number
q	heat flux (Wm^{-2})
R	parameter of the logarithmic velocity profile at rough walls
r	radius (m)
Re	Reynolds number = $\bar{u} d_h/\nu$.
St	Stanton number (=Nu/RePr)

T	temperature (K)
T^+	dimensionless temperature $(=(T_W-T)\rho c_p u_\tau/q)$
u	mean velocity (ms^{-1})
u_τ	friction velocity = $(\tau/\rho)^{1/2}$ (ms^{-1})
u^+	dimensionless velocity = u/u_τ
$\bar{u}$	average velocity in a section (ms^{-1})
y	radial distance (m)
y^+	dimensionless distance from the wall = yu_τ/ν
$\hat{y}$	radial distance between wall and the zero shear stress plane (m)
x	axial distance

Greek symbols

α	r_1/r_2
β	r_o/r_2 (m)
ε_M	eddy diffusivity for momentum $(m^2\ s^{-1})$
ε_H	eddy diffusivity for heat $(m^2\ s^{-1})$
ε^+	non-dimensional eddy diffusivity
ν	kinematic viscosity $(m^2 s^{-1})$
ρ	density (kgm^{-3})
τ	shear stress (Nm^{-2})

Subscipts

max	maximum
r	pertaining to the rough zone
s	pertaining to the smooth zone

vol	volumetric definition of origin of velocity profil
B	bulk
W	wall
1	refers to the inner rough rod
2	refers to the outer smooth tube
o	position of zero shear stress

Appendix

Nomenclature of the tables (where not self-explaining)

Reduced Stanton number:

$$STPR = \frac{St_B}{1 + 14\ Re_B^{-0.35}\ \lg\left[4.35\left(\frac{x}{D_h}\right)^{-0.6}\right]}\left(\frac{T_W}{T_B}\right)^{-ex} Pr^{0.6} \quad /8/ \quad (A-1)$$

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

Ratio of transformed to bulk Stanton number:

$$ST1+/ = \left(\frac{St_1}{St_B}\right)^{+} = \frac{\frac{1}{St_B}\sqrt{\frac{f_1}{2}}}{G^{+} + 2.5\ \ln\left(\frac{\beta-\alpha}{h/r_2}\right) - \frac{A_r}{2}\frac{(1+3\alpha/\beta)}{(1+\alpha/\beta)}} \quad /6/ \quad (A-2)$$

$$ST1*/ = \left(\frac{St_1}{St_B}\right)^{*} = \frac{\frac{1}{St_B}\sqrt{\frac{f_1}{2}}}{G^{*} + 2.5\ \ln\left(\frac{\beta-\alpha}{h/r_2}\right) - \frac{A_r}{2}\frac{(1+3\alpha/\beta)}{(1+\alpha/\beta)}} \quad /6/ \quad (A-3)$$

STT+/ = St_{1T}/St_B, transformed with $G(h^+)$ /8/

STT*/ = St_{1T}/St_B, transformed with $G(h^+)^*$ /8/

St1F = St_{1F}/St_B St_{1F} obtained with Firth transformation /15/

$$G^{+} = \frac{(T_W - T_{W2})\ \rho_B\ c_{pB}\ u_1^*}{q_1} - A_r\ \ln\left(\frac{1-\alpha}{h/r_2}\right) \quad (A-4)$$

$$GPR1 = \frac{G^{+}}{Pr^{0.44}\left(\frac{T_W}{T_B}\right)^{0.5}\left(\frac{h}{0.01(r_2-r_1)}\right)^{0.053}} \quad (A-5)$$

$$G = \frac{\dfrac{G(h^+)}{Pr^{0.44}} - g'}{(T_W/T_B)^{0.68}} \quad \text{with } g'=10^{(1.4872-0.1212\, h_w^+)} \quad /16/ \qquad \text{(A-6)}$$

$$G^* = \frac{1}{St_B} \sqrt{\frac{f_1}{2}} \frac{u_1}{u_B} - A_r \ln\left(\frac{1-\alpha}{h/r_2}\right) + \frac{A_r}{2} \frac{(1+3\alpha)}{(1+\alpha)} \qquad \text{(A-7)}$$

$$G_R^* = \frac{1}{St_{BR}} \sqrt{\frac{f_1}{2}} \sqrt{\left(\frac{T_W}{T_1}\right)^{0.29}} \frac{u_1}{u_B} - A_r \ln\left(\frac{1-\alpha}{h/r_2}\right) + \frac{A_r}{2} \frac{(1+3\alpha)}{(1+\alpha)} \qquad \text{(A-8)}$$

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

$$G_T = \frac{\sqrt{f_{1/2}}}{St_{1T}} - A_r \ln\left(\frac{\beta-\alpha}{h/r_2}\right) + \frac{A_r}{2} \frac{(1+3\alpha/\beta)}{(1+\alpha/\beta)} \qquad \text{(A-9)}$$

St_{1T} is the Stanton number transformed with the method proposed in /8/.

$$G_{TR} = \frac{\sqrt{\frac{f_{1R}}{2}}}{St_{1TR}} - A_r \ln\left(\frac{\beta-\alpha}{h/r_2}\right) + \frac{A_r}{2} \frac{(1+3\alpha/\beta)}{(1+\alpha/\beta)} \qquad \text{(A-10)}$$

with

$$St_{1TR} = \frac{St_{1T}}{1 + 14Re_1^{-0.35}\left[\lg 4.35 \left(\frac{x}{D_1}\right)^{-.6}\right]} \left(\frac{T_W}{T_1}\right)^{-ex} Pr^{0.6} \qquad \text{(A-11)}$$

$$\text{and } f_{1R} = f_1\left(\frac{T_W}{T_1}\right)^{0.29} \qquad \text{(A-12)}$$

$$G_{TF} = \frac{\sqrt{f_{1/2}}}{St_{1F}} - A_r \ln\left(\frac{\beta-\alpha}{h/r_2}\right) + \frac{A_r}{2} \frac{(1+3\alpha/\beta)}{(1+\alpha/\beta)} \qquad \text{(A-13)}$$

with /15/:

$$St_{1F} = St \left[\frac{f_1 D_h}{D_1 F} \right]^{0.5} \left[1 + \frac{9}{(1+D_1/8r_1)} St_1 \frac{(1-\beta^2)}{(1-\alpha^2)} \sqrt{\frac{2}{f_1}} \right] \qquad \text{(A-14)}$$

G_{TFR} is calculated with St_{1F}.

$$H{+}W = h_W^+ = \frac{h \; u_1^+}{\nu_W} \qquad \text{(A-15)}$$

$$H{+}RW = h_{WR}^+ = \frac{h \; u_{1R}^*}{\nu_W} = h_W^+ \sqrt{\left(\frac{T_W}{T_1}\right)^{0.29}} \qquad \text{(A-16)}$$

$$RH{+} = R(h^+) = \sqrt{\frac{2}{f_1}} - A_r \ln \left(\frac{\hat{y}}{h}\right) + \frac{A_r}{2} \frac{1+3\alpha/\beta)}{1+\alpha/\beta)} \qquad \text{(A-17)}$$

$$RH{+}R = R(h^+)_R = \sqrt{\frac{2}{f_{1R}}} - A_r \ln \left(\frac{\hat{y}}{h}\right) + \frac{A_r}{2} \frac{1+3\alpha/\beta}{1+\alpha/\beta} \qquad \text{(A-18)}$$

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

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

$$Y_G = \sqrt{2/f_1}/St_{1F}$$

ASI = A_s (Eq.22)

ARI = A_r (Eq.23)

RHI = R (Eq.24)

ARP = A_r
RHP = R
G(H+)
} from least square fit

Symbols in the plots

□ 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,

Test section	r_2	r_1 vol	$\frac{r_1 \text{ vol}}{r_2}$	$h/(r_2-r_1)$	Roughness	p	h	b	e	g
23-72	35.0	9.18	0.262	0.0116	2-dimensional	2.7	0.3	0.3		
23-50	25.0	9.18	0.368	0.0190		2.7	0.3	0.3		
22-85	42.45	16.38	0.386	0.0268		6.3	0.7	0.7		
22-71	35.0	16.38	0.468	0.0376		6.3	0.7	0.7		
12-85	42.45	16.26	0.383	0.0229	3-dim.	1.6	0.6	0.3	0.3	0.29
12-71	35.0	16.26	0.465	0.0320		1.6	0.6	0.3	0.3	0.29

Table 1: Testparameter

VERS.NR.	RE*E4	RE1*E4	F	F1	STB	STPR	F1/F2	TW/TB	TW/T1	PR	H/Y	BETA	H+	H+W	H+R	H+RW	RH+	RH+R	AS	AR
23-72- 1	4.43	7.53	.00839	.01656	.00512	.00456	2.74	1.38	1.30	.708	.0217	.658	21.2	13.4	22.1	13.9	3.38	2.97	2.41	2.50
23-72- 2	5.94	10.28	.00798	.01609	.00518	.00462	2.83	1.38	1.30	.708	.0214	.663	28.0	17.7	29.1	18.4	3.52	3.10	2.40	2.50
23-72- 3	7.88	14.77	.00777	.01647	.00517	.00462	3.06	1.39	1.34	.708	.0207	.677	38.7	23.4	40.4	24.4	3.28	2.82	2.40	2.50
23-72- 4	16.85	34.11	.00713	.01627	.00477	.00423	3.50	1.36	1.32	.707	.0197	.699	82.7	51.0	86.1	53.1	3.20	2.76	2.40	2.50
23-72- 5	22.42	46.08	.00685	.01584	.00453	.00402	3.60	1.36	1.32	.706	.0195	.703	108.6	67.1	113.1	69.8	3.32	2.88	2.40	2.50
23-72- 6	31.68	68.67	.00682	.01659	.00424	.00375	4.00	1.35	1.31	.706	.0188	.719	157.4	98.6	163.7	102.5	2.96	2.54	2.39	2.50
23-72- 7	13.32	24.42	.00711	.01521	.00484	.00435	3.16	1.40	1.32	.709	.0206	.680	61.1	37.7	63.6	39.2	3.71	3.25	2.40	2.50
23-72- 8	9.05	16.24	.00754	.01575	.00506	.00452	3.03	1.38	1.30	.708	.0209	.673	42.3	26.7	43.9	27.8	3.55	3.13	2.40	2.50
23-72- 9	9.81	13.07	.00678	.01217	.00442	.00458	2.45	1.97	1.69	.706	.0235	.628	35.5	14.6	38.3	15.7	5.44	4.50	2.40	2.50
23-72- 10	12.32	19.49	.00670	.01292	.00435	.00451	2.69	1.98	1.80	.707	.0222	.650	49.9	18.3	54.4	19.9	4.90	3.89	2.40	2.50
23-72- 11	16.60	25.64	.00668	.01361	.00436	.00446	3.00	1.93	1.70	.705	.0216	.661	65.5	26.5	70.8	28.7	4.50	3.59	2.40	2.50
23-72- 12	21.43	34.43	.00649	.01351	.00426	.00435	3.13	1.92	1.70	.704	.0212	.668	84.8	34.5	91.6	37.2	4.49	3.59	2.40	2.50
23-72- 13	30.68	53.76	.00646	.01437	.00405	.00413	3.53	1.92	1.72	.703	.0202	.688	127.5	51.0	137.9	55.1	3.99	3.10	2.39	2.50
23-72- 14	14.19	30.92	.00748	.01754	.0	.0	3.61	1.00	1.00	.711	.0192	.708	75.3	75.3	75.3	75.3	2.73	2.73	2.40	2.50
23-72- 15	10.34	21.96	.00775	.01765	.0	.0	3.42	1.00	1.00	.710	.0196	.700	55.2	55.2	55.2	55.2	2.75	2.75	2.40	2.50
23-72- 16	7.77	16.04	.00797	.01754	.0	.0	3.21	1.00	1.00	.710	.0200	.691	41.4	41.4	41.4	41.4	2.84	2.84	2.40	2.50
23-72- 17	6.01	12.19	.00826	.01783	.0	.0	3.09	1.00	1.00	.710	.0203	.685	32.3	32.3	32.3	32.3	2.79	2.79	2.41	2.50
23-72- 18	4.54	8.88	.00847	.01752	.0	.0	2.87	1.00	1.00	.710	.0208	.674	24.3	24.3	24.3	24.3	2.96	2.96	2.41	2.50
23-72- 19	33.34	79.66	.00716	.01866	.0	.0	4.47	1.00	1.00	.707	.0180	.738	181.8	181.8	181.8	181.8	2.22	2.22	2.39	2.50
23-72- 20	24.58	55.91	.00707	.01739	.0	.0	3.97	1.00	1.00	.707	.0187	.722	129.7	129.7	129.7	129.7	2.69	2.69	2.40	2.50
23-72- 21	19.94	44.22	.00713	.01703	.0	.0	3.75	1.00	1.00	.708	.0190	.713	104.3	104.3	104.3	104.3	2.85	2.85	2.40	2.50
23-72- 22	32.24	77.28	.00725	.01897	.0	.0	4.51	1.00	1.00	.706	.0180	.739	177.2	177.2	177.2	177.2	2.13	2.13	2.39	2.50
23-72- 23	21.89	49.43	.00717	.01748	.0	.0	3.91	1.00	1.00	.707	.0188	.719	115.9	115.9	115.9	115.9	2.68	2.68	2.40	2.50
23-72- 24	17.31	38.82	.00746	.01808	.0	.0	3.86	1.00	1.00	.708	.0188	.717	93.2	93.2	93.2	93.2	2.51	2.51	2.40	2.50
23-72- 25	12.71	27.75	.00769	.01809	.0	.0	3.64	1.00	1.00	.710	.0192	.709	68.5	68.5	68.5	68.5	2.56	2.56	2.40	2.50
23-72- 26	13.33	28.58	.00755	.01767	.0	.0	3.59	1.00	1.00	.711	.0193	.707	71.1	71.1	71.1	71.1	2.70	2.70	2.40	2.50
23-72- 27	8.98	19.06	.00799	.01821	.0	.0	3.42	1.00	1.00	.711	.0196	.699	48.6	48.6	48.6	48.6	2.59	2.59	2.40	2.50
23-72- 28	6.60	13.69	.00833	.01851	.0	.0	3.26	1.00	1.00	.710	.0199	.692	36.0	36.0	36.0	36.0	2.56	2.56	2.40	2.50

VERS.NR.	RE*E4	Q<KW/M2>	ST1+/	ST1*/	STT+/	STT*/	ST1F/	H+	G+	GPR1	G	G*	G*R	GT	GTR	GTF	GTFR	X	YR	YG
23-72- 1	4.43	9.0	1.19	1.10	1.28	1.18	1.19	21.2	7.4	7.3	6.3	8.5	11.4	6.3	9.6	7.4	10.2	3.04	10.99	15.0
23-72- 2	5.94	12.2	1.19	1.11	1.28	1.19	1.19	28.0	6.9	6.8	6.3	8.0	10.9	5.9	9.0	6.9	9.7	3.06	11.15	14.5
23-72- 3	7.88	16.4	1.19	1.11	1.29	1.19	1.18	38.7	7.0	6.9	6.5	8.1	11.0	5.9	9.1	7.2	10.0	3.10	11.02	14.9
23-72- 4	16.85	31.6	1.17	1.10	1.26	1.17	1.15	82.7	8.2	8.1	7.7	9.3	12.6	7.1	10.5	8.5	11.7	3.16	11.09	16.4
23-72- 5	22.42	40.2	1.17	1.09	1.25	1.16	1.14	108.6	8.9	8.8	8.4	10.1	13.5	7.8	11.3	9.3	12.6	3.17	11.24	17.2
23-72- 6	31.68	52.2	1.16	1.08	1.24	1.14	1.12	157.4	10.5	10.4	9.9	11.9	15.6	9.3	13.2	11.1	14.8	3.21	10.98	19.1
23-72- 7	13.32	26.4	1.18	1.10	1.27	1.18	1.17	61.1	7.6	7.4	7.0	8.7	11.6	6.4	9.6	7.6	10.4	3.10	11.47	15.4
23-72- 8	9.05	18.1	1.19	1.10	1.28	1.18	1.18	42.3	7.1	7.0	6.6	8.2	11.1	6.0	9.1	7.1	10.0	3.09	11.27	14.9
23-72- 9	9.81	46.0	1.16	1.08	1.25	1.15	1.23	35.5	7.9	6.5	5.4	9.0	9.8	6.8	8.9	6.9	7.7	2.95	12.82	14.3
23-72- 10	12.32	57.2	1.16	1.09	1.25	1.16	1.19	49.9	8.3	6.8	6.0	9.5	10.4	7.2	9.5	7.9	8.8	3.02	12.44	15.5
23-72- 11	16.60	77.1	1.14	1.07	1.22	1.14	1.19	65.5	9.0	7.5	6.7	10.1	11.2	7.9	10.3	8.3	9.3	3.05	12.12	15.9
23-72- 12	21.43	97.5	1.14	1.06	1.22	1.13	1.18	84.8	9.3	7.8	7.0	10.5	11.6	8.2	10.7	8.7	9.8	3.07	12.17	16.4
23-72- 13	30.68	133.6	1.12	1.06	1.19	1.12	1.15	127.5	10.8	9.1	8.1	12.0	13.3	9.7	12.3	10.3	11.6	3.13	11.80	18.1
23-72- 14	14.19	0.0	0.0	0.0	0.0	0.0	0.0	75.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.18	10.68	0.0
23-72- 15	10.34	0.0	0.0	0.0	0.0	0.0	0.0	55.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.16	10.64	0.0
23-72- 16	7.77	0.0	0.0	0.0	0.0	0.0	0.0	41.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.14	10.68	0.0
23-72- 17	6.01	0.0	0.0	0.0	0.0	0.0	0.0	32.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.12	10.59	0.0
23-72- 18	4.54	0.0	0.0	0.0	0.0	0.0	0.0	24.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.09	10.68	0.0
23-72- 19	33.34	0.0	0.0	0.0	0.0	0.0	0.0	181.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.25	10.35	0.0
23-72- 20	24.58	0.0	0.0	0.0	0.0	0.0	0.0	129.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.21	10.72	0.0
23-72- 21	19.94	0.0	0.0	0.0	0.0	0.0	0.0	104.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.19	10.84	0.0
23-72- 22	32.24	0.0	0.0	0.0	0.0	0.0	0.0	177.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.26	10.27	0.0
23-72- 23	21.89	0.0	0.0	0.0	0.0	0.0	0.0	115.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.21	10.70	0.0
23-72- 24	17.31	0.0	0.0	0.0	0.0	0.0	0.0	93.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.20	10.52	0.0
23-72- 25	12.71	0.0	0.0	0.0	0.0	0.0	0.0	68.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.18	10.51	0.0
23-72- 26	13.33	0.0	0.0	0.0	0.0	0.0	0.0	71.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.18	10.64	0.0
23-72- 27	8.98	0.0	0.0	0.0	0.0	0.0	0.0	48.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.16	10.48	0.0
23-72- 28	6.60	0.0	0.0	0.0	0.0	0.0	0.0	36.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.14	10.39	0.0

Table 2: Results with $A_r=2.5$ and A_s = function (f_1/f_2)

VERS.NR.	RE*E4	RE1*E4	F	F1	STB	STPR	F1/F2	TW/TB	TW/T1	PR	H/Y	BETA	H+	H+W	H+R	H+RW	RH+	RH+R	AS	AR
23-50- 1	1.95	2.96	.01021	.01780	.00523	.00462	2.42	1.32	1.27	.705	.0342	.719	16.2	10.6	16.7	11.0	4.27	3.91	2.42	2.50
23-50- 2	2.83	4.74	.01053	.02047	.00545	.00482	2.99	1.32	1.28	.705	.0318	.746	25.2	16.4	26.1	17.0	3.36	3.01	2.42	2.50
23-50- 3	4.27	7.59	.01040	.02162	.00550	.00486	3.43	1.33	1.29	.705	.0304	.763	39.1	25.1	40.5	26.0	2.97	2.62	2.41	2.50
23-50- 4	5.79	10.44	.00992	.02092	.00544	.00483	3.55	1.34	1.30	.706	.0301	.767	52.1	33.0	54.1	34.2	3.09	2.72	2.41	2.50
23-50- 5	8.76	16.34	.00953	.02075	.00515	.00459	3.83	1.35	1.31	.706	.0294	.777	78.6	48.9	81.8	50.9	3.07	2.69	2.41	2.50
23-50- 6	12.25	23.50	.00929	.02080	.00500	.00447	4.10	1.36	1.32	.706	.0288	.785	110.1	67.7	114.7	70.5	3.00	2.61	2.40	2.50
23-50- 7	17.38	34.00	.00889	.02022	.00460	.00412	4.27	1.37	1.33	.707	.0285	.790	154.5	93.8	161.1	97.8	3.13	2.72	2.40	2.50
23-50- 8	3.95	5.79	.00936	.01776	.00470	.00480	2.87	1.85	1.70	.701	.0332	.731	30.3	12.3	32.7	13.3	4.21	3.42	2.41	2.50
23-50- 9	8.13	13.16	.00888	.01848	.00467	.00479	3.46	1.86	1.73	.702	.0311	.756	64.5	25.3	69.8	27.4	3.81	3.01	2.41	2.50
23-50- 10	11.84	19.63	.00846	.01796	.00446	.00461	3.62	1.89	1.76	.702	.0306	.762	92.8	35.6	100.7	38.6	3.92	3.09	2.40	2.50
23-50- 11	16.85	35.84	.00952	.02231	.0	.0	4.58	1.00	1.00	.710	.0275	.803	163.5	163.5	163.5	163.5	2.54	2.54	2.40	2.50
23-50- 12	11.31	23.49	.00987	.02257	.0	.0	4.29	1.00	1.00	.711	.0280	.796	110.4	110.4	110.4	110.4	2.53	2.53	2.40	2.50
23-50- 13	7.80	15.82	.01025	.02287	.0	.0	4.04	1.00	1.00	.710	.0285	.789	76.7	76.7	76.7	76.7	2.51	2.51	2.41	2.50
23-50- 14	5.73	11.33	.01048	.02271	.0	.0	3.77	1.00	1.00	.710	.0291	.780	56.2	56.2	56.2	56.2	2.59	2.59	2.41	2.50
23-50- 15	4.06	7.69	.01050	.02164	.0	.0	3.36	1.00	1.00	.709	.0301	.767	39.0	39.0	39.0	39.0	2.91	2.91	2.41	2.50
23-50- 16	2.88	5.35	.01103	.02219	.0	.0	3.19	1.00	1.00	.708	.0306	.760	28.0	28.0	28.0	28.0	2.84	2.84	2.42	2.50
23-50- 17	2.58	4.74	.01117	.02224	.0	.0	3.12	1.00	1.00	.709	.0308	.757	25.2	25.2	25.2	25.2	2.85	2.85	2.42	2.50
23-50- 18	1.80	3.09	.01103	.02021	.0	.0	2.63	1.00	1.00	.708	.0325	.737	16.8	16.8	16.8	16.8	3.47	3.47	2.42	2.50
23-50- 19	31.70	71.22	.00958	.02398	.0	.0	5.47	1.00	1.00	.706	.0265	.822	317.2	317.2	317.2	317.2	2.17	2.17	2.39	2.50
23-50- 20	18.90	40.76	.00960	.02288	.0	.0	4.79	1.00	1.00	.707	.0272	.808	185.4	185.4	185.4	185.4	2.40	2.40	2.40	2.50
23-50- 21	12.01	25.04	.00983	.02257	.0	.0	4.34	1.00	1.00	.707	.0279	.797	117.2	117.2	117.2	117.2	2.52	2.52	2.40	2.50
23-50- 22	8.78	17.87	.01002	.02239	.0	.0	4.05	1.00	1.00	.710	.0285	.789	85.5	85.5	85.5	85.5	2.60	2.60	2.41	2.50
23-50- 23	5.95	11.93	.01067	.02354	.0	.0	3.92	1.00	1.00	.710	.0288	.785	59.3	59.3	59.3	59.3	2.41	2.41	2.41	2.50
23-50- 24	4.26	8.29	.01092	.02327	.0	.0	3.62	1.00	1.00	.709	.0294	.775	42.3	42.3	42.3	42.3	2.53	2.53	2.41	2.50
23-50- 25	2.93	5.50	.01128	.02312	.0	.0	3.32	1.00	1.00	.709	.0303	.765	29.0	29.0	29.0	29.0	2.64	2.64	2.42	2.50
23-50- 26	1.95	3.38	.01096	.02032	.0	.0	2.69	1.00	1.00	.708	.0323	.740	18.2	18.2	18.2	18.2	3.42	3.42	2.42	2.50
23-50- 27	1.49	2.17	.00947	.01405	.0	.0	1.81	1.00	1.00	.708	.0373	.690	11.8	11.8	11.8	11.8	5.83	5.83	2.43	2.50

VERS.NR.	RE*E4	Q<KW/M2>	ST1+/	ST1*/	STT+/	STT*/	ST1F/	H+	G+	GPR1	G	G*	G*R	GT	GTR	GTF	GTFR	X	YR	YG
23-50- 1	1.95	6.1	1.15	1.11	1.20	1.16	1.24	16.2	9.4	9.2	7.7	9.9	13.0	8.7	11.7	8.2	11.2	2.54	10.60	14.6
23-50- 2	2.83	9.2	1.14	1.11	1.18	1.15	1.21	25.2	9.8	9.6	9.2	10.2	13.4	9.1	12.3	8.7	11.8	2.62	9.89	15.3
23-50- 3	4.27	14.2	1.12	1.10	1.17	1.15	1.20	39.1	10.1	9.9	9.7	10.4	13.6	9.5	12.7	9.1	12.3	2.67	9.62	15.8
23-50- 4	5.79	19.4	1.13	1.10	1.17	1.15	1.19	52.1	10.0	9.7	9.6	10.3	13.5	9.3	12.5	9.0	12.1	2.68	9.78	15.7
23-50- 5	8.76	28.3	1.12	1.09	1.16	1.14	1.18	78.6	10.9	10.6	10.4	11.3	14.5	10.3	13.6	10.0	13.2	2.71	9.82	16.8
23-50- 6	12.25	39.2	1.11	1.09	1.15	1.13	1.17	110.1	11.5	11.1	10.9	11.9	15.2	10.8	14.2	10.6	13.9	2.73	9.81	17.5
23-50- 7	17.38	52.0	1.10	1.08	1.14	1.12	1.15	154.5	12.9	12.4	12.2	13.3	16.8	12.2	15.9	12.1	15.5	2.74	9.94	18.9
23-50- 8	3.95	31.5	1.13	1.09	1.17	1.14	1.23	30.3	11.4	9.5	8.1	11.9	13.0	10.7	12.8	9.8	10.9	2.57	10.61	16.2
23-50- 9	8.13	65.4	1.11	1.09	1.16	1.14	1.21	64.5	11.9	9.8	9.1	12.2	13.3	11.2	13.3	10.4	11.5	2.64	10.40	17.0
23-50- 10	11.84	92.2	1.11	1.09	1.15	1.13	1.20	92.8	12.5	10.3	9.5	12.9	13.9	11.8	13.8	11.1	12.1	2.66	10.55	17.7
23-50- 11	16.85	0.0	0.0	0.0	0.0	0.0	0.0	163.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.78	9.47	0.0
23-50- 12	11.31	0.0	0.0	0.0	0.0	0.0	0.0	110.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.76	9.41	0.0
23-50- 13	7.80	0.0	0.0	0.0	0.0	0.0	0.0	76.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.74	9.35	0.0
23-50- 14	5.73	0.0	0.0	0.0	0.0	0.0	0.0	56.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.72	9.38	0.0
23-50- 15	4.06	0.0	0.0	0.0	0.0	0.0	0.0	39.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.68	9.61	0.0
23-50- 16	2.88	0.0	0.0	0.0	0.0	0.0	0.0	28.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.66	9.49	0.0
23-50- 17	2.58	0.0	0.0	0.0	0.0	0.0	0.0	25.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.65	9.48	0.0
23-50- 18	1.80	0.0	0.0	0.0	0.0	0.0	0.0	16.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.59	9.95	0.0
23-50- 19	31.70	0.0	0.0	0.0	0.0	0.0	0.0	317.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.82	9.13	0.0
23-50- 20	18.90	0.0	0.0	0.0	0.0	0.0	0.0	185.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.79	9.35	0.0
23-50- 21	12.01	0.0	0.0	0.0	0.0	0.0	0.0	117.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.76	9.41	0.0
23-50- 22	8.78	0.0	0.0	0.0	0.0	0.0	0.0	85.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.74	9.45	0.0
23-50- 23	5.95	0.0	0.0	0.0	0.0	0.0	0.0	59.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.73	9.22	0.0
23-50- 24	4.26	0.0	0.0	0.0	0.0	0.0	0.0	42.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.70	9.27	0.0
23-50- 25	2.93	0.0	0.0	0.0	0.0	0.0	0.0	29.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.67	9.30	0.0
23-50- 26	1.95	0.0	0.0	0.0	0.0	0.0	0.0	18.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.60	9.92	0.0
23-50- 27	1.49	0.0	0.0	0.0	0.0	0.0	0.0	11.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.44	11.93	0.0

Table 2 cont.

VERS.NR.	RE*E4	RE1*E4	F	F1	STB	STPR	F1/F2	TW/TB	TW/T1	PR	H/Y	BETA	H+	H+W	H+R	H+RW	RH+	RH+R	AS	AR
22-85- 1	4.96	9.21	.01115	.02423	.00534	.00473	3.92	1.34	1.31	.705	.0410	.789	68.3	42.9	71.0	44.6	3.17	2.83	2.41	2.50
22-85- 2	6.75	12.93	.01090	.02431	.00491	.00436	4.19	1.34	1.31	.705	.0402	.797	93.5	58.1	97.2	60.5	3.10	2.75	2.41	2.50
22-85- 3	9.13	17.73	.01044	.02356	.00467	.00416	4.32	1.35	1.33	.705	.0398	.801	124.6	76.3	129.8	79.5	3.22	2.85	2.40	2.50
22-85- 4	11.32	22.34	.01016	.02319	.00457	.00404	4.44	1.33	1.31	.704	.0394	.805	153.9	96.5	160.0	100.4	3.27	2.91	2.40	2.50
22-85- 5	15.83	32.07	.00997	.02329	.00429	.00380	4.75	1.33	1.31	.704	.0387	.812	215.9	134.6	224.6	140.0	3.20	2.84	2.40	2.50
22-85- 6	16.29	33.13	.00993	.02327	.00427	.00377	4.77	1.33	1.31	.704	.0387	.813	222.5	139.9	231.3	145.4	3.19	2.84	2.40	2.50
22-85- 7	12.73	25.17	.00994	.02268	.00441	.00390	4.45	1.33	1.31	.705	.0394	.805	171.2	107.4	178.0	111.7	3.37	3.01	2.40	2.50
22-85- 8	20.45	41.82	.00950	.02230	.00402	.00355	4.78	1.33	1.31	.704	.0386	.814	274.2	171.7	285.1	178.6	3.39	3.03	2.40	2.50
22-85- 9	26.89	57.58	.00998	.02450	.00406	.00356	5.47	1.31	1.29	.703	.0373	.828	378.4	242.3	392.8	251.5	2.86	2.53	2.39	2.50
22-85- 10	23.19	49.13	.01004	.02448	.00429	.00377	5.32	1.31	1.30	.704	.0376	.825	325.9	207.2	338.5	215.1	2.88	2.55	2.39	2.50
22-85- 11	2.61	4.09	.01101	.02131	.00407	.00409	3.07	1.80	1.70	.700	.0449	.755	32.1	13.1	34.7	14.1	4.03	3.31	2.42	2.50
22-85- 12	3.69	5.93	.01058	.02124	.00429	.00435	3.31	1.82	1.71	.701	.0439	.763	45.2	18.1	48.8	19.6	3.98	3.25	2.41	2.50
22-85- 13	4.76	8.14	.01067	.02290	.00434	.00441	3.75	1.83	1.75	.701	.0422	.778	61.2	23.7	66.3	25.7	3.52	2.79	2.41	2.50
22-85- 14	6.70	11.43	.01002	.02136	.00428	.00437	3.77	1.84	1.74	.701	.0421	.779	82.6	32.2	89.6	34.9	3.85	3.10	2.41	2.50
22-85- 15	8.60	15.20	.01000	.02201	.00423	.00432	4.07	1.85	1.76	.701	.0412	.788	108.2	41.6	117.4	45.1	3.63	2.89	2.41	2.50
22-85- 16	9.83	17.69	.00997	.02226	.00417	.00425	4.22	1.85	1.76	.702	.0407	.793	124.7	47.8	135.4	51.9	3.55	2.80	2.40	2.50
22-85- 17	12.18	22.04	.00951	.02134	.00423	.00428	4.24	1.82	1.74	.701	.0406	.793	151.8	59.3	164.5	64.2	3.74	3.00	2.40	2.50
22-85- 18	15.61	29.12	.00943	.02161	.00409	.00412	4.49	1.80	1.73	.700	.0399	.801	197.0	77.7	213.3	84.1	3.63	2.90	2.40	2.50
22-85- 19	20.00	38.53	.00942	.02208	.00385	.00389	4.78	1.81	1.74	.701	.0392	.809	256.8	99.7	278.4	108.1	3.48	2.74	2.40	2.50
22-85- 20	25.52	51.26	.00963	.02337	.00375	.00377	5.25	1.80	1.74	.700	.0382	.819	339.6	132.2	368.1	143.3	3.14	2.42	2.39	2.50
22-85- 21	12.96	27.31	.01051	.02453	.0	.0	4.74	1.00	1.00	.710	.0383	.816	186.2	186.2	186.2	186.2	2.93	2.93	2.40	2.50
22-85- 22	9.56	19.71	.01070	.02440	.0	.0	4.45	1.00	1.00	.710	.0390	.809	137.0	137.0	137.0	137.0	3.00	3.00	2.40	2.50
22-85- 23	7.33	14.99	.01119	.02535	.0	.0	4.37	1.00	1.00	.710	.0392	.806	107.0	107.0	107.0	107.0	2.84	2.84	2.41	2.50
22-85- 24	5.24	10.46	.01150	.02536	.0	.0	4.08	1.00	1.00	.710	.0399	.799	76.6	76.6	76.6	76.6	2.89	2.89	2.41	2.50
22-85- 25	3.98	7.78	.01177	.02536	.0	.0	3.85	1.00	1.00	.710	.0406	.792	58.2	58.2	58.2	58.2	2.94	2.94	2.41	2.50
22-85- 26	2.91	5.55	.01213	.02545	.0	.0	3.61	1.00	1.00	.710	.0414	.785	42.7	42.7	42.7	42.7	2.98	2.98	2.42	2.50
22-85- 27	29.16	63.89	.00967	.02343	.0	.0	5.28	1.00	1.00	.706	.0373	.828	409.6	409.6	409.6	409.6	3.06	3.06	2.39	2.50
22-85- 28	20.85	45.12	.01009	.02418	.0	.0	5.11	1.00	1.00	.706	.0376	.824	297.3	297.3	297.3	297.3	2.94	2.94	2.40	2.50
22-85- 29	15.81	33.61	.01025	.02412	.0	.0	4.85	1.00	1.00	.708	.0381	.818	225.3	225.3	225.3	225.3	2.99	2.99	2.40	2.50
22-85- 30	2.14	3.85	.01182	.02314	.0	.0	3.09	1.00	1.00	.709	.0433	.767	30.0	30.0	30.0	30.0	3.53	3.53	2.42	2.50

VERS.NR.	RE*E4	Q<KW/M2>	ST1+/	ST1*/	STT+/	STT*/	ST1F/	H+	G+	GPR1	G	G*	G*R	GT	GTR	GTF	GTFR	X	YR	YG
22-85- 1	4.96	9.5	1.11	1.10	1.13	1.12	1.18	68.3	12.7	12.2	12.2	12.9	16.4	12.3	15.9	11.6	15.0	2.37	9.09	17.5
22-85- 2	6.75	12.6	1.10	1.09	1.12	1.11	1.16	93.5	14.5	13.8	13.8	14.7	18.4	14.0	17.9	13.4	17.1	2.39	9.07	19.4
22-85- 3	9.13	16.6	1.10	1.08	1.12	1.11	1.15	124.6	15.2	14.5	14.5	15.4	19.3	14.8	18.8	14.2	18.0	2.40	9.21	20.2
22-85- 4	11.32	19.7	1.09	1.08	1.11	1.11	1.15	153.9	15.6	15.0	15.0	15.7	19.8	15.2	19.4	14.6	18.6	2.41	9.29	20.6
22-85- 5	15.83	25.7	1.09	1.08	1.11	1.10	1.13	215.9	17.1	16.4	16.4	17.2	21.5	16.6	21.1	16.1	20.3	2.43	9.27	22.2
22-85- 6	16.29	25.8	1.08	1.08	1.10	1.10	1.13	222.5	17.2	16.6	16.6	17.3	21.6	16.8	21.3	16.2	20.5	2.43	9.27	22.3
22-85- 7	12.73	20.9	1.09	1.08	1.11	1.10	1.14	171.2	16.2	15.5	15.5	16.3	20.4	15.7	20.0	15.2	19.2	2.41	9.39	21.2
22-85- 8	20.45	30.5	1.08	1.08	1.10	1.10	1.13	274.2	18.3	17.6	17.6	18.3	22.8	17.8	22.5	17.2	21.7	2.43	9.47	23.3
22-85- 9	26.89	38.9	1.07	1.07	1.09	1.09	1.12	378.4	19.2	18.6	18.7	19.2	24.0	18.7	23.7	18.2	23.0	2.47	9.03	24.4
22-85- 10	23.19	35.7	1.07	1.08	1.09	1.10	1.12	325.9	17.9	17.3	17.3	17.8	22.3	17.4	22.1	16.8	21.3	2.46	9.04	22.9
22-85- 11	2.61	10.9	1.10	1.08	1.12	1.10	1.18	32.1	17.5	14.5	13.2	18.0	19.8	17.0	19.8	15.9	17.7	2.27	9.69	21.6
22-85- 12	3.69	16.2	1.10	1.08	1.13	1.10	1.18	45.2	16.1	13.2	12.4	16.5	18.1	15.6	18.2	14.6	16.1	2.29	9.70	20.3
22-85- 13	4.76	21.1	1.10	1.09	1.12	1.11	1.18	61.2	16.7	13.7	12.9	16.8	18.4	16.3	18.8	15.1	16.7	2.33	9.35	20.9
22-85- 14	6.70	29.6	1.10	1.08	1.12	1.10	1.17	82.6	16.1	13.2	12.5	16.5	18.0	15.7	18.2	14.7	16.2	2.33	9.68	20.5
22-85- 15	8.60	37.6	1.09	1.08	1.12	1.10	1.16	108.2	16.8	13.7	12.9	17.1	18.6	16.3	18.9	15.4	16.9	2.36	9.53	21.3
22-85- 16	9.83	42.2	1.09	1.08	1.11	1.10	1.16	124.7	17.3	14.1	13.3	17.6	19.1	16.8	19.4	15.9	17.4	2.37	9.48	21.9
22-85- 17	12.18	52.5	1.09	1.08	1.12	1.11	1.16	151.8	16.4	13.5	12.8	16.6	18.3	15.9	18.6	15.0	16.6	2.38	9.68	21.0
22-85- 18	15.61	64.3	1.09	1.08	1.11	1.10	1.15	197.0	17.3	14.3	13.6	17.6	19.4	16.9	19.7	16.0	17.9	2.40	9.62	22.0
22-85- 19	20.00	77.6	1.08	1.07	1.10	1.09	1.14	256.8	19.2	15.8	15.0	19.4	21.3	18.7	21.7	17.9	19.8	2.42	9.52	24.0
22-85- 20	25.52	96.2	1.08	1.07	1.10	1.09	1.13	339.6	20.7	17.1	16.2	20.8	23.0	20.2	23.4	19.4	21.6	2.44	9.25	25.6
22-85- 21	12.96	0.0	0.0	0.0	0.0	0.0	0.0	186.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.44	9.03	0.0
22-85- 22	9.56	0.0	0.0	0.0	0.0	0.0	0.0	137.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.42	9.05	0.0
22-85- 23	7.33	0.0	0.0	0.0	0.0	0.0	0.0	107.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.42	8.88	0.0
22-85- 24	5.24	0.0	0.0	0.0	0.0	0.0	0.0	76.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.39	8.88	0.0
22-85- 25	3.98	0.0	0.0	0.0	0.0	0.0	0.0	58.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.38	8.88	0.0
22-85- 26	2.91	0.0	0.0	0.0	0.0	0.0	0.0	42.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.36	8.87	0.0
22-85- 27	29.16	0.0	0.0	0.0	0.0	0.0	0.0	409.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.47	9.24	0.0
22-85- 28	20.85	0.0	0.0	0.0	0.0	0.0	0.0	297.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.46	9.10	0.0
22-85- 29	15.81	0.0	0.0	0.0	0.0	0.0	0.0	225.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.45	9.11	0.0
22-85- 30	2.14	0.0	0.0	0.0	0.0	0.0	0.0	30.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.31	9.30	0.0

Table 2 cont.

VERS.NR.	RE*E4	RE1*E4	F	F1	STB	STPR	F1/F2	TW/TB	TW/T1	PR	H/Y	BETA	H+	H+W	H+R	H+RW	RH+	RH+R	AS	AR
22-71- 1	2.18	3.72	.01390	.02793	.00577	.00508	3.70	1.30	1.28	.703	.0568	.821	45.2	29.3	46.9	30.4	3.51	3.21	2.42	2.50
22-71- 2	3.18	5.65	.01370	.02857	.00562	.00496	4.10	1.31	1.29	.704	.0552	.832	66.9	42.8	69.4	44.5	3.34	3.03	2.42	2.50
22-71- 3	3.87	7.01	.01365	.02897	.00558	.00493	4.34	1.31	1.29	.704	.0542	.838	82.0	52.4	85.1	54.4	3.19	2.88	2.42	2.50
22-71- 4	5.32	9.84	.01335	.02885	.00517	.00459	4.61	1.33	1.31	.704	.0534	.844	112.5	70.5	117.0	73.3	3.16	2.84	2.41	2.50
22-71- 5	6.97	13.15	.01305	.02875	.00524	.00467	4.87	1.34	1.32	.704	.0526	.849	147.6	91.0	153.7	94.8	3.12	2.79	2.41	2.50
22-71- 6	9.57	18.27	.01244	.02764	.00481	.00430	5.00	1.35	1.34	.704	.0522	.852	199.1	120.5	207.7	125.6	3.27	2.92	2.40	2.50
22-71- 7	11.27	21.81	.01237	.02772	.00465	.00413	5.16	1.33	1.32	.705	.0518	.855	235.3	146.2	244.8	152.1	3.23	2.90	2.40	2.50
22-71- 8	2.23	3.85	.01430	.02901	.00593	.00519	3.84	1.29	1.26	.703	.0561	.825	47.0	31.4	48.7	32.5	3.31	3.04	2.42	2.50
22-71- 9	8.90	17.07	.01257	.02795	.00489	.00432	4.97	1.31	1.30	.705	.0522	.852	187.1	119.1	194.3	123.7	3.22	2.91	2.41	2.50
22-71- 10	15.40	30.62	.01230	.02810	.00448	.00393	5.53	1.29	1.28	.703	.0509	.862	325.1	211.8	337.0	219.5	3.12	2.83	2.40	2.50
22-71- 11	22.44	45.96	.01217	.02850	.00416	.00364	6.00	1.28	1.27	.702	.0499	.869	479.7	314.8	496.9	326.1	3.02	2.73	2.39	2.50
22-71- 12	7.43	14.76	.01353	.03006	.0	.0	5.06	1.00	1.00	.710	.0516	.856	164.9	164.9	164.9	164.9	2.88	2.88	2.41	2.50
22-71- 13	5.65	11.06	.01385	.03032	.0	.0	4.82	1.00	1.00	.711	.0522	.851	125.9	125.9	125.9	125.9	2.88	2.88	2.41	2.50
22-71- 14	4.09	7.79	.01388	.02948	.0	.0	4.39	1.00	1.00	.710	.0533	.843	90.0	90.0	90.0	90.0	3.06	3.06	2.42	2.50
22-71- 15	3.23	6.07	.01428	.02997	.0	.0	4.24	1.00	1.00	.710	.0539	.839	71.6	71.6	71.6	71.6	3.04	3.04	2.42	2.50
22-71- 16	2.32	4.23	.01439	.02920	.0	.0	3.85	1.00	1.00	.710	.0554	.830	50.8	50.8	50.8	50.8	3.25	3.25	2.42	2.50
22-71- 17	2.40	4.44	.01477	.03048	.0	.0	4.03	1.00	1.00	.710	.0547	.834	53.7	53.7	53.7	53.7	3.04	3.04	2.42	2.50
22-71- 18	1.72	3.07	.01494	.02974	.0	.0	3.65	1.00	1.00	.710	.0561	.825	38.0	38.0	38.0	38.0	3.20	3.20	2.43	2.50
22-71- 19	23.96	50.33	.01233	.02885	.0	.0	6.09	1.00	1.00	.707	.0494	.872	521.6	521.6	521.6	521.6	2.94	2.94	2.39	2.50
22-71- 20	17.30	35.78	.01258	.02903	.0	.0	5.77	1.00	1.00	.707	.0500	.868	377.7	377.7	377.7	377.7	2.94	2.94	2.40	2.50
22-71- 21	12.78	25.84	.01253	.02822	.0	.0	5.31	1.00	1.00	.708	.0509	.861	275.1	275.1	275.1	275.1	3.11	3.11	2.40	2.50
22-71- 22	9.18	18.39	.01319	.02952	.0	.0	5.19	1.00	1.00	.709	.0512	.858	202.0	202.0	202.0	202.0	2.94	2.94	2.40	2.50

VERS.NR.	RE*E4	Q<KW/M2>	ST1+/	ST1*/	STT+/	STT*/	ST1F/	H+	G+	GPR1	G	G*	G*R	GT	GTR	GTF	GTFR	X	YR	YG
22-71- 1	2.18	6.2	1.10	1.10	1.11	1.12	1.20	45.2	13.6	13.0	13.3	13.6	17.1	13.4	16.9	12.0	15.5	2.01	8.46	17.1
22-71- 2	3.18	9.0	1.09	1.10	1.11	1.11	1.18	66.9	14.3	13.6	13.9	14.3	17.9	14.1	17.8	12.9	16.4	2.04	8.37	18.0
22-71- 3	3.87	10.9	1.09	1.09	1.10	1.10	1.17	82.0	14.6	13.9	14.2	14.6	18.3	14.4	18.1	13.2	16.9	2.06	8.31	18.4
22-71- 4	5.32	14.5	1.09	1.08	1.10	1.09	1.16	112.5	16.1	15.2	15.4	16.2	20.1	15.9	19.8	14.9	18.7	2.07	8.33	20.1
22-71- 5	6.97	19.8	1.08	1.09	1.10	1.10	1.16	147.6	15.9	14.9	15.2	15.8	19.6	15.6	19.5	14.6	18.3	2.09	8.34	19.8
22-71- 6	9.57	25.8	1.08	1.08	1.09	1.09	1.14	199.1	17.4	16.3	16.5	17.4	21.3	17.2	21.2	16.1	20.0	2.10	8.51	21.4
22-71- 7	11.27	27.4	1.08	1.08	1.09	1.09	1.14	235.3	18.2	17.1	17.4	18.2	22.4	18.0	22.2	17.0	21.1	2.11	8.49	22.3
22-71- 8	2.23	6.1	1.11	1.10	1.12	1.11	1.19	47.0	13.2	12.7	13.0	13.5	17.0	13.0	16.5	12.0	15.5	2.02	8.30	17.0
22-71- 9	8.90	21.2	1.07	1.08	1.08	1.10	1.15	187.1	17.3	16.4	16.8	17.0	21.1	17.1	21.2	15.8	19.9	2.10	8.46	21.1
22-71- 10	15.40	33.2	1.08	1.07	1.09	1.08	1.13	325.1	19.3	18.4	18.9	19.3	24.0	19.0	23.7	18.2	22.8	2.13	8.44	23.5
22-71- 11	22.44	43.9	1.06	1.07	1.07	1.08	1.11	479.7	21.6	20.8	21.4	21.4	26.5	21.4	26.6	20.3	25.4	2.15	8.38	25.7
22-71- 12	7.43	0.0	0.0	0.0	0.0	0.0	0.0	164.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.11	8.16	0.0
22-71- 13	5.65	0.0	0.0	0.0	0.0	0.0	0.0	125.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.10	8.12	0.0
22-71- 14	4.09	0.0	0.0	0.0	0.0	0.0	0.0	90.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.07	8.24	0.0
22-71- 15	3.23	0.0	0.0	0.0	0.0	0.0	0.0	71.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.06	8.17	0.0
22-71- 16	2.32	0.0	0.0	0.0	0.0	0.0	0.0	50.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.03	8.28	0.0
22-71- 17	2.40	0.0	0.0	0.0	0.0	0.0	0.0	53.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.05	8.10	0.0
22-71- 18	1.72	0.0	0.0	0.0	0.0	0.0	0.0	38.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.02	8.20	0.0
22-71- 19	23.96	0.0	0.0	0.0	0.0	0.0	0.0	521.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.16	8.33	0.0
22-71- 20	17.30	0.0	0.0	0.0	0.0	0.0	0.0	377.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.14	8.30	0.0
22-71- 21	12.78	0.0	0.0	0.0	0.0	0.0	0.0	275.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.13	8.42	0.0
22-71- 22	9.18	0.0	0.0	0.0	0.0	0.0	0.0	202.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.12	8.23	0.0

Table 2 cont.

VERS.NR.	RE*E4	RE1*E4	F	F1	STB	STPR	F1/F2	TW/TB	TW/T1	PR	H/Y	BETA	H+	H+W	H+R	H+RW	RH+	RH+R	AS	AR
12-85- 1	9.04	18.46	.01143	.02700	.00613	.00528	4.87	1.23	1.21	.707	.0329	.813	113.2	81.1	116.3	83.4	2.13	1.89	2.40	2.50
12-85- 2	12.19	25.27	.01105	.02638	.00583	.00501	5.05	1.22	1.20	.706	.0326	.817	150.9	109.2	155.0	112.2	2.20	1.97	2.40	2.50
12-85- 3	21.50	47.40	.01111	.02810	.00539	.00461	5.93	1.21	1.19	.705	.0313	.835	276.8	202.8	284.1	208.1	1.82	1.60	2.39	2.50
12-85- 4	15.95	34.45	.01104	.02764	.00647	.00554	5.55	1.21	1.21	.705	.0319	.827	204.3	146.8	210.0	150.9	1.94	1.71	2.39	2.50
12-85- 5	13.50	28.07	.01097	.02667	.00563	.00494	5.22	1.31	1.29	.703	.0324	.820	167.5	107.6	173.8	111.7	2.14	1.82	2.40	2.50
12-85- 6	4.55	8.45	.01148	.02516	.00620	.00548	3.99	1.33	1.29	.704	.0349	.788	54.1	34.6	56.2	35.9	2.60	2.27	2.41	2.50
12-85- 7	3.93	7.16	.01148	.02468	.00612	.00542	3.81	1.33	1.30	.705	.0354	.783	46.3	29.4	48.1	30.6	2.72	2.39	2.41	2.50
12-85- 8	2.98	5.24	.01155	.02382	.00609	.00536	3.47	1.31	1.28	.704	.0364	.772	34.5	22.6	35.7	23.4	2.96	2.64	2.42	2.50
12-85- 9	2.33	3.94	.01153	.02272	.00589	.00518	3.14	1.31	1.27	.704	.0375	.761	26.3	17.3	27.3	17.9	3.26	2.94	2.42	2.50
12-85- 10	11.58	21.63	.01027	.02388	.00536	.00524	4.65	1.70	1.62	.701	.0339	.802	129.8	57.1	139.2	61.3	2.75	2.14	2.40	2.50
12-85- 11	9.28	17.12	.01056	.02427	.00548	.00534	4.52	1.68	1.61	.701	.0342	.798	104.7	46.7	112.2	50.0	2.70	2.10	2.40	2.50
12-85- 12	6.90	12.30	.01068	.02378	.00545	.00531	4.18	1.68	1.60	.701	.0349	.789	76.7	34.5	82.1	36.9	2.86	2.26	2.41	2.50
12-85- 13	23.09	48.10	.01075	.02726	.00508	.00491	5.94	1.66	1.61	.699	.0318	.829	282.3	125.2	302.6	134.2	1.99	1.41	2.39	2.50
12-85- 14	17.07	34.02	.01047	.02555	.00523	.00504	5.30	1.65	1.60	.700	.0327	.817	200.7	90.6	214.8	96.9	2.35	1.77	2.39	2.50
12-85- 15	13.25	25.36	.01033	.02443	.00537	.00520	4.86	1.67	1.60	.700	.0334	.807	151.2	67.9	161.8	72.7	2.62	2.02	2.40	2.50
12-85- 16	5.60	9.68	.01071	.02329	.00551	.00538	3.94	1.69	1.60	.702	.0356	.781	61.3	27.4	65.7	29.3	3.01	2.40	2.41	2.50
12-85- 17	4.47	7.45	.01070	.02240	.00543	.00529	3.62	1.69	1.59	.701	.0365	.772	47.8	21.8	51.1	23.3	3.26	2.65	2.41	2.50
12-85- 18	3.75	6.06	.01070	.02162	.00537	.00522	3.38	1.68	1.57	.701	.0373	.764	39.3	18.2	41.9	19.4	3.49	2.88	2.41	2.50
12-85- 19	3.01	4.69	.01067	.02064	.00521	.00504	3.08	1.66	1.55	.701	.0383	.753	30.9	14.6	32.9	15.6	3.79	3.19	2.42	2.50
12-85- 20	12.09	26.42	.01163	.02837	.0	.0	5.33	1.00	1.00	.709	.0319	.826	159.0	159.0	159.0	159.0	1.83	1.83	2.40	2.50
12-85- 21	9.11	19.49	.01177	.02808	.0	.0	5.00	1.00	1.00	.709	.0324	.819	119.2	119.2	119.2	119.2	1.91	1.91	2.40	2.50
12-85- 22	6.76	14.19	.01208	.02829	.0	.0	4.74	1.00	1.00	.710	.0328	.813	88.7	88.7	88.7	88.7	1.92	1.92	2.40	2.50
12-85- 23	5.07	10.38	.01221	.02781	.0	.0	4.40	1.00	1.00	.709	.0335	.805	66.1	66.1	66.1	66.1	2.05	2.05	2.41	2.50
12-85- 24	3.85	7.68	.01231	.02720	.0	.0	4.07	1.00	1.00	.709	.0342	.796	49.7	49.7	49.7	49.7	2.20	2.20	2.41	2.50
12-85- 25	2.94	5.66	.01227	.02605	.0	.0	3.69	1.00	1.00	.709	.0351	.786	37.2	37.2	37.2	37.2	2.46	2.46	2.42	2.50
12-85- 26	2.14	3.92	.01206	.02405	.0	.0	3.20	1.00	1.00	.709	.0366	.769	26.1	26.1	26.1	26.1	2.93	2.93	2.42	2.50
12-85- 27	21.83	49.58	.01134	.02880	.0	.0	6.03	1.00	1.00	.707	.0310	.839	289.0	289.0	289.0	289.0	1.68	1.68	2.39	2.50
12-85- 28	18.71	42.03	.01137	.02854	.0	.0	5.82	1.00	1.00	.706	.0312	.835	246.6	246.6	246.6	246.6	1.75	1.75	2.39	2.50
12-85- 29	20.66	46.74	.01136	.02873	.0	.0	5.96	1.00	1.00	.706	.0311	.838	273.1	273.1	273.1	273.1	1.70	1.70	2.39	2.50

VERS.NR.	RE*E4	Q<KW/M2>	ST1+/	ST1*/	STT+/	STT*/	ST1F/	H+	G+	GPR1	G	G*	G*R	GT	GTR	GTF	GTFR	X	YR	YG
12-85- 1	9.04	13.5	1.11	1.10	1.14	1.13	1.17	113.2	10.6	10.6	10.7	10.8	14.4	10.1	13.6	9.8	13.3	2.59	8.61	16.3
12-85- 2	12.19	17.0	1.12	1.09	1.15	1.12	1.15	150.9	11.2	11.3	11.3	11.6	15.3	10.7	14.4	10.6	14.2	2.60	8.71	17.1
12-85- 3	21.50	26.2	1.08	1.08	1.11	1.11	1.13	276.8	13.7	13.9	14.0	13.7	17.9	13.2	17.5	12.8	17.0	2.65	8.44	19.4
12-85- 4	15.95	23.9	1.06	1.11	1.09	1.14	1.17	204.3	10.6	10.8	10.9	9.8	13.3	10.1	13.7	9.0	12.5	2.63	8.51	15.6
12-85- 5	13.50	27.2	1.09	1.09	1.12	1.12	1.15	167.5	12.3	12.0	11.9	12.3	15.8	11.8	15.5	11.2	14.8	2.61	8.66	17.8
12-85- 6	4.55	10.5	1.12	1.11	1.16	1.14	1.20	54.1	9.8	9.5	9.4	10.0	13.1	9.3	12.4	8.8	11.8	2.53	8.92	15.1
12-85- 7	3.93	8.9	1.12	1.11	1.16	1.14	1.20	46.3	9.9	9.6	9.5	10.1	13.2	9.4	12.5	8.8	11.8	2.51	9.00	15.1
12-85- 8	2.98	6.4	1.13	1.11	1.17	1.14	1.21	34.5	9.6	9.4	9.3	10.0	13.1	9.1	12.2	8.6	11.6	2.48	9.16	14.8
12-85- 9	2.33	4.9	1.14	1.11	1.18	1.15	1.22	26.3	9.8	9.6	9.3	10.2	13.3	9.3	12.4	8.7	11.8	2.45	9.38	14.8
12-85- 10	11.58	52.7	1.11	1.09	1.14	1.12	1.18	129.8	12.0	10.3	9.8	12.3	14.2	11.5	14.1	10.9	12.7	2.56	9.15	17.3
12-85- 11	9.28	42.8	1.11	1.09	1.14	1.12	1.19	104.7	11.7	10.1	9.6	12.0	14.0	11.2	13.8	10.6	12.5	2.55	9.08	17.0
12-85- 12	6.90	31.6	1.11	1.09	1.15	1.12	1.19	76.7	11.6	10.0	9.5	12.0	13.9	11.1	13.7	10.5	12.3	2.53	9.17	16.8
12-85- 13	23.09	100.3	1.09	1.08	1.12	1.11	1.14	282.3	14.5	12.6	12.0	14.6	17.1	14.0	17.1	13.5	15.8	2.63	8.57	20.1
12-85- 14	17.07	73.8	1.10	1.09	1.13	1.11	1.16	200.7	13.2	11.5	11.0	13.4	15.7	12.7	15.6	12.1	14.4	2.60	8.85	18.6
12-85- 15	13.25	60.4	1.10	1.09	1.14	1.12	1.17	151.2	12.2	10.6	10.1	12.5	14.5	11.7	14.4	11.1	13.1	2.58	9.05	17.5
12-85- 16	5.60	25.9	1.12	1.10	1.15	1.13	1.20	61.3	11.3	9.7	9.2	11.6	13.5	10.8	13.2	10.0	11.8	2.51	9.27	16.3
12-85- 17	4.47	20.3	1.12	1.09	1.16	1.13	1.21	47.8	11.2	9.6	9.1	11.6	13.5	10.6	13.1	9.9	11.7	2.48	9.45	16.1
12-85- 18	3.75	16.7	1.13	1.09	1.17	1.13	1.21	39.3	11.0	9.5	8.9	11.6	13.5	10.5	13.0	9.8	11.6	2.45	9.62	15.9
12-85- 19	3.01	12.8	1.13	1.09	1.17	1.12	1.22	30.9	11.2	9.7	8.9	11.8	13.8	10.6	13.2	9.9	11.8	2.42	9.84	16.0
12-85- 20	12.09	0.0	0.0	0.0	0.0	0.0	0.0	159.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.63	8.40	0.0
12-85- 21	9.11	0.0	0.0	0.0	0.0	0.0	0.0	119.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.61	8.44	0.0
12-85- 22	6.76	0.0	0.0	0.0	0.0	0.0	0.0	88.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.60	8.41	0.0
12-85- 23	5.07	0.0	0.0	0.0	0.0	0.0	0.0	66.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.57	8.48	0.0
12-85- 24	3.85	0.0	0.0	0.0	0.0	0.0	0.0	49.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.55	8.57	0.0
12-85- 25	2.94	0.0	0.0	0.0	0.0	0.0	0.0	37.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.52	8.76	0.0
12-85- 26	2.14	0.0	0.0	0.0	0.0	0.0	0.0	26.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.48	9.12	0.0
12-85- 27	21.83	0.0	0.0	0.0	0.0	0.0	0.0	289.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.66	8.33	0.0
12-85- 28	18.71	0.0	0.0	0.0	0.0	0.0	0.0	246.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.65	8.37	0.0
12-85- 29	20.66	0.0	0.0	0.0	0.0	0.0	0.0	273.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.66	8.34	0.0

Table 2 cont.

VERS.NR.	RE*E4	RE1*E4	F	F1	STB	STPR	F1/F2	TW/TB	TW/T1	PR	H/Y	BETA	H+	H+W	H+R	H+RW	RH+	RH+R	AS	AR
12-71- 1	3.07	5.59	.01458	.03144	.00715	.00626	4.45	1.29	1.27	.703	.0461	.837	57.6	38.2	59.6	39.5	2.44	2.17	2.42	2.50
12-71- 2	3.07	5.60	.01465	.03158	.00713	.00624	4.47	1.28	1.26	.703	.0460	.838	57.7	38.4	59.7	39.7	2.41	2.14	2.42	2.50
12-71- 3	4.06	7.62	.01470	.03264	.00707	.00620	4.89	1.29	1.28	.703	.0450	.846	77.7	50.9	80.5	52.7	2.22	1.95	2.41	2.50
12-71- 4	5.38	10.36	.01469	.03336	.00697	.00610	5.28	1.29	1.27	.703	.0442	.853	104.2	68.7	107.9	71.2	2.08	1.82	2.41	2.50
12-71- 5	7.30	14.43	.01470	.03419	.00671	.00589	5.74	1.30	1.28	.703	.0433	.861	143.4	93.5	148.6	96.9	1.93	1.67	2.40	2.50
12-71- 6	9.95	19.78	.01387	.03230	.00636	.00559	5.79	1.30	1.29	.703	.0432	.862	190.2	123.0	197.2	127.5	2.14	1.86	2.40	2.50
12-71- 7	12.65	25.35	.01349	.03154	.00616	.00542	5.93	1.30	1.28	.703	.0429	.865	238.9	155.1	247.7	160.8	2.22	1.94	2.40	2.50
12-71- 8	16.91	35.19	.01405	.03398	.00600	.00524	6.69	1.28	1.27	.702	.0419	.875	333.3	220.1	345.1	227.8	1.86	1.60	2.39	2.50
12-71- 9	22.91	47.66	.01296	.03112	.00550	.00479	6.53	1.28	1.27	.702	.0420	.874	433.3	288.2	448.3	298.2	2.21	1.94	2.39	2.50
12-71- 10	2.89	4.73	.01316	.02727	.00602	.00589	3.93	1.68	1.61	.695	.0484	.821	48.4	21.6	51.8	23.2	3.16	2.58	2.42	2.50
12-71- 11	3.73	6.39	.01348	.02919	.00620	.00608	4.42	1.68	1.62	.695	.0469	.832	65.0	28.7	69.7	30.8	2.78	2.22	2.41	2.50
12-71- 12	4.98	8.86	.01361	.03059	.00635	.00623	4.90	1.68	1.63	.695	.0457	.842	89.2	39.1	95.8	41.9	2.52	1.97	2.41	2.50
12-71- 13	6.63	12.17	.01370	.03162	.00629	.00619	5.35	1.69	1.64	.695	.0447	.850	121.3	52.3	130.3	56.2	2.33	1.77	2.40	2.50
12-71- 14	8.96	16.62	.01320	.03060	.00606	.00600	5.51	1.71	1.66	.695	.0444	.853	161.1	68.5	173.4	73.7	2.44	1.86	2.40	2.50
12-71- 15	11.27	21.25	.01305	.03054	.00591	.00585	5.74	1.71	1.66	.695	.0439	.857	203.0	86.2	218.5	92.8	2.41	1.84	2.40	2.50
12-71- 16	2.52	4.07	.01330	.02711	.00594	.00580	3.79	1.66	1.59	.695	.0488	.818	42.0	19.1	45.0	20.5	3.21	2.64	2.42	2.50
12-71- 17	15.04	29.50	.01339	.03226	.00580	.00570	6.35	1.69	1.65	.695	.0429	.866	281.0	120.7	302.1	129.8	2.13	1.58	2.39	2.50
12-71- 18	22.97	50.47	.01476	.03649	.0	.0	7.44	1.00	1.00	.707	.0407	.885	477.4	477.4	477.4	477.4	1.51	1.51	2.38	2.50
12-71- 19	16.56	35.51	.01442	.03478	.0	.0	6.72	1.00	1.00	.708	.0415	.878	336.1	336.1	336.1	336.1	1.75	1.75	2.39	2.50
12-71- 20	12.56	26.56	.01463	.03483	.0	.0	6.39	1.00	1.00	.708	.0419	.874	255.0	255.0	255.0	255.0	1.77	1.77	2.39	2.50
12-71- 21	10.17	21.22	.01467	.03447	.0	.0	6.08	1.00	1.00	.710	.0423	.869	205.4	205.4	205.4	205.4	1.84	1.84	2.40	2.50
12-71- 22	14.47	30.86	.01460	.03504	.0	.0	6.60	1.00	1.00	.710	.0417	.876	294.7	294.7	294.7	294.7	1.73	1.73	2.39	2.50
12-71- 23	10.81	22.66	.01469	.03467	.0	.0	6.18	1.00	1.00	.710	.0422	.871	218.9	218.9	218.9	218.9	1.80	1.80	2.40	2.50
12-71- 24	7.95	16.49	.01527	.03573	.0	.0	5.98	1.00	1.00	.711	.0425	.868	163.4	163.4	163.4	163.4	1.71	1.71	2.40	2.50
12-71- 25	5.84	11.81	.01511	.03443	.0	.0	5.44	1.00	1.00	.710	.0434	.860	117.9	117.9	117.9	117.9	1.91	1.91	2.41	2.50
12-71- 26	4.34	8.63	.01540	.03445	.0	.0	5.12	1.00	1.00	.710	.0440	.854	87.7	87.7	87.7	87.7	1.95	1.95	2.41	2.50
12-71- 27	3.20	6.17	.01531	.03319	.0	.0	4.63	1.00	1.00	.709	.0450	.845	63.4	63.4	63.4	63.4	2.16	2.16	2.42	2.50
12-71- 28	2.29	4.21	.01476	.03038	.0	.0	3.98	1.00	1.00	.709	.0468	.831	43.5	43.5	43.5	43.5	2.66	2.66	2.42	2.50
12-71- 29	14.10	29.91	.01435	.03423	.0	.0	6.43	1.00	1.00	.710	.0418	.874	284.1	284.1	284.1	284.1	1.83	1.83	2.39	2.50
12-71- 30	22.74	49.92	.01474	.03642	.0	.0	7.42	1.00	1.00	.707	.0407	.885	472.2	472.2	472.2	472.2	1.52	1.52	2.38	2.50

VERS.NR.	RE*E4	Q<KW/M2>	ST1+/	ST1*/	STT+/	STT*/	ST1F/	H+	G+	GPR1	G	G*	G*R	GT	GTR	GTF	GTFR	X	YR	YG
12-71- 1	3.07	10.3	1.10	1.11	1.12	1.13	1.21	57.6	10.4	10.1	10.2	10.2	13.3	10.2	13.2	8.9	12.0	2.22	7.98	14.5
12-71- 2	3.07	10.1	1.10	1.11	1.12	1.13	1.21	57.7	10.4	10.1	10.3	10.3	13.4	10.2	13.3	9.0	12.1	2.22	7.96	14.6
12-71- 3	4.06	13.8	1.10	1.10	1.11	1.12	1.20	77.7	10.9	10.5	10.6	10.7	13.9	10.6	13.8	9.5	12.6	2.25	7.83	15.1
12-71- 4	5.38	17.5	1.09	1.10	1.11	1.11	1.18	104.2	11.3	10.9	11.1	11.2	14.4	11.1	14.3	10.0	13.2	2.27	7.74	15.7
12-71- 5	7.30	23.4	1.09	1.09	1.10	1.11	1.17	143.4	12.2	11.7	11.9	12.1	15.5	11.9	15.3	11.0	14.3	2.29	7.65	16.7
12-71- 6	9.95	30.9	1.09	1.09	1.10	1.10	1.16	190.2	12.6	12.1	12.3	12.6	16.1	12.4	15.9	11.5	14.9	2.29	7.87	17.2
12-71- 7	12.65	37.9	1.09	1.08	1.10	1.10	1.15	238.9	12.9	12.4	12.6	13.0	16.6	12.7	16.2	11.9	15.4	2.30	7.96	17.7
12-71- 8	16.91	47.8	1.08	1.08	1.09	1.09	1.14	333.3	14.3	13.9	14.1	14.3	18.1	14.1	18.0	13.3	17.1	2.33	7.67	19.1
12-71- 9	22.91	58.5	1.07	1.08	1.09	1.09	1.13	433.3	15.3	14.9	15.1	15.2	19.3	15.1	19.2	14.2	18.3	2.32	8.02	20.0
12-71- 10	2.89	23.8	1.11	1.11	1.13	1.13	1.23	48.4	12.1	10.3	9.9	12.1	13.8	11.8	14.1	10.4	12.1	2.17	8.56	15.8
12-71- 11	3.73	31.8	1.10	1.11	1.12	1.13	1.22	65.0	12.1	10.3	10.0	12.1	13.8	11.8	14.2	10.5	12.2	2.20	8.28	16.0
12-71- 12	4.98	43.7	1.10	1.11	1.12	1.13	1.21	89.2	12.1	10.3	10.0	12.0	13.7	11.9	14.2	10.5	12.2	2.23	8.09	16.1
12-71- 13	6.63	58.5	1.10	1.11	1.11	1.12	1.20	121.3	12.6	10.7	10.3	12.4	14.2	12.3	14.7	11.1	12.8	2.25	7.95	16.7
12-71- 14	8.96	76.7	1.09	1.10	1.11	1.11	1.19	161.1	13.0	11.0	10.6	12.9	14.6	12.7	15.1	11.6	13.2	2.26	8.08	17.2
12-71- 15	11.27	94.3	1.09	1.09	1.11	1.11	1.18	203.0	13.5	11.4	11.0	13.4	15.2	13.2	15.6	12.1	13.8	2.27	8.09	17.8
12-71- 16	2.52	20.0	1.11	1.11	1.13	1.13	1.23	42.0	12.2	10.5	10.1	12.3	14.1	11.9	14.3	10.6	12.3	2.16	8.59	15.9
12-71- 17	15.04	122.3	1.09	1.09	1.10	1.10	1.16	281.0	14.4	12.3	11.9	14.4	16.3	14.2	16.8	13.1	15.1	2.30	7.87	18.9
12-71- 18	22.97	0.0	0.0	0.0	0.0	0.0	0.0	477.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.36	7.40	0.0
12-71- 19	16.56	0.0	0.0	0.0	0.0	0.0	0.0	336.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.34	7.58	0.0
12-71- 20	12.56	0.0	0.0	0.0	0.0	0.0	0.0	255.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.33	7.58	0.0
12-71- 21	10.17	0.0	0.0	0.0	0.0	0.0	0.0	205.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.31	7.62	0.0
12-71- 22	14.47	0.0	0.0	0.0	0.0	0.0	0.0	294.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.33	7.55	0.0
12-71- 23	10.81	0.0	0.0	0.0	0.0	0.0	0.0	218.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.32	7.60	0.0
12-71- 24	7.95	0.0	0.0	0.0	0.0	0.0	0.0	163.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.31	7.48	0.0
12-71- 25	5.84	0.0	0.0	0.0	0.0	0.0	0.0	117.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.29	7.62	0.0
12-71- 26	4.34	0.0	0.0	0.0	0.0	0.0	0.0	87.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.27	7.62	0.0
12-71- 27	3.20	0.0	0.0	0.0	0.0	0.0	0.0	63.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.25	7.76	0.0
12-71- 28	2.29	0.0	0.0	0.0	0.0	0.0	0.0	43.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.20	8.11	0.0
12-71- 29	14.10	0.0	0.0	0.0	0.0	0.0	0.0	284.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.33	7.64	0.0
12-71- 30	22.74	0.0	0.0	0.0	0.0	0.0	0.0	472.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.36	7.41	0.0

Table 2 cont.

VERS.NR.	RE*E4	RE1*E4	F	FI	STB	STPR	F1/F2	TW/TB	TW/T1	PR	H/Y	BETA	H+	H+M	H+R	H+RM	RH+	RH+R	AS	AR
23-72- 1	4.43	7.22	.00839	.01595	.00512	.00456	2.57	1.38	1.30	.708	.0223	.647	20.8	13.2	21.6	13.7	3.66	3.25	2.35	2.50
23-72- 2	5.94	10.11	.00798	.01572	.00518	.00462	2.72	1.38	1.30	.708	.0217	.658	27.8	17.6	28.9	18.3	3.88	3.45	2.37	2.44
23-72- 3	7.88	14.51	.00777	.01610	.00517	.00462	2.97	1.39	1.32	.708	.0208	.675	37.9	23.4	39.4	24.4	4.18	3.75	2.39	2.25
23-72- 4	16.85	35.77	.00713	.01625	.00477	.00423	3.52	1.36	1.32	.707	.0192	.709	83.8	52.0	87.2	54.1	4.80	4.36	2.42	1.98
23-72- 5	22.42	50.16	.00685	.01605	.00453	.00402	3.67	1.36	1.33	.706	.0188	.719	113.0	68.5	117.8	71.4	5.00	4.54	2.43	1.92
23-72- 6	31.68	75.12	.00682	.01686	.00424	.00375	4.11	1.35	1.32	.706	.0181	.737	164.0	100.9	170.8	105.1	4.80	4.37	2.44	1.87
23-72- 7	13.32	26.30	.00711	.01529	.00484	.00435	3.17	1.40	1.34	.709	.0200	.691	63.5	38.1	66.2	39.8	5.02	4.54	2.41	2.05
23-72- 8	9.05	17.58	.00754	.01579	.00506	.00452	2.99	1.38	1.34	.708	.0205	.682	44.4	26.8	46.4	27.9	4.48	4.01	2.39	2.18
23-72- 9	9.81	13.98	.00678	.01226	.00442	.00458	2.46	1.97	1.73	.706	.0230	.636	37.0	14.6	40.0	15.8	6.09	5.11	2.40	2.25
23-72- 10	12.32	19.32	.00670	.01285	.00435	.00451	2.69	1.98	1.77	.707	.0220	.654	48.9	18.6	53.1	20.1	6.04	5.05	2.41	2.12
23-72- 11	16.60	29.44	.00668	.01396	.00436	.00446	3.09	1.93	1.77	.705	.0206	.680	70.8	26.9	76.9	29.2	5.74	4.79	2.43	2.01
23-72- 12	21.43	39.87	.00649	.01395	.00426	.00435	3.25	1.92	1.77	.704	.0201	.690	92.6	35.1	100.6	38.1	5.88	4.92	2.43	1.95
23-72- 13	30.68	62.67	.00646	.01489	.00405	.00413	3.69	1.92	1.79	.703	.0191	.712	139.5	52.0	151.8	56.6	5.58	4.65	2.45	1.89
23-72- 14	14.19	32.41	.00748	.01745	.0	.0	3.59	1.00	1.00	.711	.0189	.717	76.5	76.5	76.5	76.5	4.28	4.28	2.41	2.01
23-72- 15	10.34	22.67	.00775	.01744	.0	.0	3.35	1.00	1.00	.710	.0194	.705	55.6	55.6	55.6	55.6	4.05	4.05	2.40	2.10
23-72- 16	7.77	16.25	.00797	.01721	.0	.0	3.11	1.00	1.00	.710	.0200	.691	41.4	41.4	41.4	41.4	3.83	3.83	2.38	2.22
23-72- 17	6.01	12.07	.00826	.01736	.0	.0	2.95	1.00	1.00	.710	.0205	.681	32.1	32.1	32.1	32.1	3.43	3.43	2.36	2.35
23-72- 18	4.54	8.57	.00847	.01689	.0	.0	2.69	1.00	1.00	.710	.0214	.664	23.8	23.8	23.8	23.8	3.23	3.23	2.34	2.50
23-72- 19	33.34	85.45	.00716	.01878	.0	.0	4.56	1.00	1.00	.707	.0174	.754	186.3	186.3	186.3	186.3	4.18	4.18	2.44	1.87
23-72- 20	24.58	59.65	.00707	.01746	.0	.0	4.02	1.00	1.00	.707	.0181	.736	132.7	132.7	132.7	132.7	4.52	4.52	2.43	1.90
23-72- 21	19.94	46.92	.00713	.01706	.0	.0	3.77	1.00	1.00	.708	.0185	.726	106.4	106.4	106.4	106.4	4.58	4.58	2.43	1.94
23-72- 22	32.24	82.83	.00725	.01909	.0	.0	4.60	1.00	1.00	.706	.0174	.755	181.5	181.5	181.5	181.5	4.08	4.08	2.44	1.87
23-72- 23	21.89	52.58	.00717	.01753	.0	.0	3.94	1.00	1.00	.707	.0182	.732	118.3	118.3	118.3	118.3	4.46	4.46	2.43	1.92
23-72- 24	17.31	41.00	.00746	.01805	.0	.0	3.86	1.00	1.00	.708	.0184	.728	94.9	94.9	94.9	94.9	4.19	4.19	2.42	1.96
23-72- 25	12.71	28.95	.00769	.01795	.0	.0	3.59	1.00	1.00	.710	.0189	.717	69.4	69.4	69.4	69.4	4.05	4.05	2.41	2.03
23-72- 26	13.33	30.30	.00755	.01755	.0	.0	3.56	1.00	1.00	.711	.0189	.715	72.1	72.1	72.1	72.1	4.21	4.21	2.41	2.02
23-72- 27	8.98	19.51	.00799	.01793	.0	.0	3.33	1.00	1.00	.711	.0195	.703	48.9	48.9	48.9	48.9	3.77	3.77	2.39	2.15
23-72- 28	6.60	13.69	.00833	.01808	.0	.0	3.13	1.00	1.00	.710	.0200	.690	35.9	35.9	35.9	35.9	3.36	3.36	2.37	2.29

VERS.NR.	RE*E4	Q<KW/M2>	ST1+/	ST1*/	STT+/	STT*/	ST1F/	h+	G+	G*	ASI	BSI	H+	ARP	RHP	ARI	RHI	G(H+)
23-72- 1	4.43	9.0	1.20	1.11	1.29	1.19	1.20	20.8	7.1	8.2	2.35	5.50	19.4	1.96	6.58	1.82	6.67	12.1
23-72- 2	5.94	12.2	1.18	1.11	1.28	1.19	1.19	27.8	7.1	8.1	2.33	5.50	25.7	2.04	6.26	1.75	6.86	11.1
23-72- 3	7.88	16.4	1.15	1.08	1.23	1.16	1.17	37.9	8.1	9.0	2.39	5.50	34.9	2.01	6.10	1.60	7.11	11.3
23-72- 4	16.85	31.6	1.10	1.05	1.16	1.11	1.12	83.8	10.9	11.6	2.41	5.50	76.3	1.94	5.80	1.55	6.82	12.7
23-72- 5	22.42	40.2	1.10	1.05	1.16	1.11	1.11	113.0	11.9	12.7	2.42	5.50	100.8	1.94	5.36	1.65	6.56	13.1
23-72- 6	31.68	52.2	1.09	1.04	1.15	1.09	1.09	164.0	13.8	14.7	2.45	5.50	147.2	1.95	5.52	1.61	6.43	14.7
23-72- 7	13.32	26.4	1.11	1.06	1.19	1.13	1.14	63.5	9.8	10.6	2.46	5.50	58.5	2.10	5.83	1.43	7.69	11.7
23-72- 8	9.05	18.1	1.15	1.08	1.23	1.15	1.15	44.4	8.5	9.4	2.46	5.50	40.4	2.21	5.41	1.54	7.27	11.1
23-72- 9	9.81	46.0	1.12	1.06	1.20	1.13	1.21	37.0	9.1	10.1	2.37	5.50	31.2	2.11	7.07	1.93	7.27	12.2
23-72- 10	12.32	57.2	1.10	1.05	1.17	1.11	1.18	48.9	10.3	11.2	2.36	5.50	39.7	2.13	6.78	2.02	6.82	12.3
23-72- 11	16.60	77.1	1.08	1.04	1.15	1.10	1.15	70.8	11.5	12.2	2.37	5.50	56.0	2.10	6.29	1.97	6.43	12.7
23-72- 12	21.43	97.5	1.08	1.03	1.14	1.09	1.13	92.6	12.2	12.9	2.44	5.50	75.0	2.12	5.87	1.88	6.39	13.1
23-72- 13	30.68	133.6	1.06	1.03	1.12	1.08	1.11	139.5	14.0	14.8	2.40	5.50	139.9	2.12	5.69	2.09	5.57	14.0
23-72- 14	14.19	0.0	0.0	0.0	0.0	0.0	0.0	76.5	0.0	0.0	2.42	5.50	76.4	1.90	5.33	1.36	6.86	0.0
23-72- 15	10.34	0.0	0.0	0.0	0.0	0.0	0.0	55.6	0.0	0.0	2.41	5.55	55.7	1.92	5.39	1.36	6.97	0.0
23-72- 16	7.77	0.0	0.0	0.0	0.0	0.0	0.0	41.4	0.0	0.0	2.41	5.50	41.4	1.98	5.43	1.47	6.84	0.0
23-72- 17	6.01	0.0	0.0	0.0	0.0	0.0	0.0	32.1	0.0	0.0	2.34	5.50	31.5	2.03	5.52	1.66	6.47	0.0
23-72- 18	4.54	0.0	0.0	0.0	0.0	0.0	0.0	23.8	0.0	0.0	2.31	5.50	22.9	2.13	5.77	2.13	5.59	0.0
23-72- 19	33.34	0.0	0.0	0.0	0.0	0.0	0.0	186.3	0.0	0.0	2.46	5.50	182.4	1.93	5.06	1.50	6.32	0.0
23-72- 20	24.58	0.0	0.0	0.0	0.0	0.0	0.0	132.7	0.0	0.0	2.43	5.50	130.6	1.92	5.35	1.52	6.47	0.0
23-72- 21	19.94	0.0	0.0	0.0	0.0	0.0	0.0	106.4	0.0	0.0	2.43	5.50	106.3	1.92	5.22	1.44	6.59	0.0
23-72- 22	32.24	0.0	0.0	0.0	0.0	0.0	0.0	181.5	0.0	0.0	2.46	5.50	176.7	2.05	4.23	1.69	5.29	0.0
23-72- 23	21.89	0.0	0.0	0.0	0.0	0.0	0.0	118.3	0.0	0.0	2.43	5.50	117.2	2.09	4.43	1.79	5.26	0.0
23-72- 24	17.31	0.0	0.0	0.0	0.0	0.0	0.0	94.9	0.0	0.0	2.43	5.50	94.3	2.07	4.36	1.69	5.42	0.0
23-72- 25	12.71	0.0	0.0	0.0	0.0	0.0	0.0	69.4	0.0	0.0	2.42	5.50	69.3	2.09	4.30	1.73	5.31	0.0
23-72- 26	13.33	0.0	0.0	0.0	0.0	0.0	0.0	72.1	0.0	0.0	2.46	5.50	72.3	2.10	4.57	1.50	6.33	0.0
23-72- 27	8.98	0.0	0.0	0.0	0.0	0.0	0.0	48.9	0.0	0.0	2.42	5.50	49.1	2.07	4.71	1.45	6.50	0.0
23-72- 28	6.60	0.0	0.0	0.0	0.0	0.0	0.0	35.9	0.0	0.0	2.37	5.50	35.4	2.21	4.56	1.76	5.81	0.0

Table 3: Results with equations (30) and (31) for A_r and A_s, and results of the velocity and temperature traverses.

VERS.NR.	RE*E4	RE1*E4	F	F1	STB	STPR	F1/F2	TW/TB	TW/T1	PR	H/Y	BETA	H+	H+W	H+R	H+RW	RH+	RH+R	AS	AR
23-50- 1	1.95	2.70	.01021	.01645	.00523	.00462	2.10	1.32	1.27	.705	.0364	.698	15.4	10.2	15.9	10.6	4.88	4.50	2.26	2.50
23-50- 2	2.83	4.52	.01053	.01949	.00545	.00482	2.71	1.32	1.28	.705	.0330	.732	24.5	16.0	25.4	16.6	3.87	3.51	2.30	2.44
23-50- 3	4.27	7.69	.01040	.02090	.00550	.00486	3.18	1.33	1.30	.705	.0306	.760	39.2	24.8	40.8	25.8	4.08	3.72	2.33	2.15
23-50- 4	5.79	10.86	.00992	.02040	.00544	.00483	3.34	1.34	1.32	.706	.0299	.770	53.0	32.9	55.2	34.2	4.48	4.09	2.35	2.02
23-50- 5	8.76	17.43	.00953	.02045	.00515	.00459	3.68	1.35	1.33	.706	.0288	.785	81.1	49.2	84.5	51.3	4.72	4.31	2.38	1.90
23-50- 6	12.25	25.40	.00929	.02064	.00500	.00447	3.99	1.36	1.34	.706	.0281	.796	114.4	68.4	119.4	71.4	4.80	4.38	2.40	1.84
23-50- 7	17.38	37.07	.00889	.02018	.00460	.00412	4.21	1.37	1.35	.707	.0276	.804	161.1	95.1	168.4	99.3	5.02	4.59	2.42	1.79
23-50- 8	3.95	5.80	.00936	.01718	.00470	.00480	2.67	1.85	1.72	.701	.0336	.727	30.4	12.1	32.9	13.1	5.00	4.18	2.34	2.28
23-50- 9	8.13	14.47	.00888	.01836	.00467	.00479	3.34	1.86	1.79	.702	.0303	.766	63.3	25.3	74.3	27.6	5.28	4.43	2.38	1.94
23-50- 10	11.84	22.09	.00846	.01802	.00446	.00461	3.57	1.89	1.83	.702	.0295	.776	99.6	35.8	108.7	39.0	5.56	4.68	2.40	1.85
23-50- 11	16.85	37.90	.00952	.02202	.0	.0	4.47	1.00	1.00	.710	.0269	.814	166.2	166.2	166.2	166.2	4.53	4.53	2.41	1.79
23-50- 12	11.31	24.62	.00987	.02213	.0	.0	4.12	1.00	1.00	.711	.0275	.804	111.8	111.8	111.8	111.8	4.39	4.39	2.39	1.84
23-50- 13	7.80	16.37	.01025	.02227	.0	.0	3.81	1.00	1.00	.710	.0282	.793	77.2	77.2	77.2	77.2	4.21	4.21	2.37	1.92
23-50- 14	5.73	11.55	.01048	.02197	.0	.0	3.51	1.00	1.00	.710	.0290	.781	56.2	56.2	56.2	56.2	4.08	4.08	2.35	2.01
23-50- 15	4.06	7.65	.01050	.02075	.0	.0	3.07	1.00	1.00	.709	.0305	.761	38.6	38.6	38.6	38.6	4.07	4.07	2.32	2.16
23-50- 16	2.88	5.15	.01103	.02109	.0	.0	2.87	1.00	1.00	.708	.0315	.748	27.5	27.5	27.5	27.5	3.54	3.54	2.29	2.36
23-50- 17	2.58	4.51	.01117	.02107	.0	.0	2.79	1.00	1.00	.709	.0320	.743	24.5	24.5	24.5	24.5	3.36	3.36	2.28	2.44
23-50- 18	1.80	2.84	.01103	.01866	.0	.0	2.26	1.00	1.00	.708	.0346	.715	16.1	16.1	16.1	16.1	4.05	4.05	2.24	2.50
23-50- 19	31.70	75.93	.00958	.02382	.0	.0	5.45	1.00	1.00	.706	.0257	.835	323.7	323.7	323.7	323.7	4.28	4.28	2.43	1.74
23-50- 20	18.90	43.18	.00960	.02260	.0	.0	4.68	1.00	1.00	.707	.0266	.819	188.6	188.6	188.6	188.6	4.42	4.42	2.42	1.78
23-50- 21	12.01	26.28	.00983	.02216	.0	.0	4.18	1.00	1.00	.707	.0274	.805	118.7	118.7	118.7	118.7	4.40	4.40	2.39	1.83
23-50- 22	8.78	18.57	.01002	.02186	.0	.0	3.85	1.00	1.00	.710	.0281	.795	86.2	86.2	86.2	86.2	4.36	4.36	2.38	1.89
23-50- 23	5.95	12.19	.01067	.02280	.0	.0	3.66	1.00	1.00	.710	.0287	.786	59.4	59.4	59.4	59.4	3.94	3.94	2.35	1.99
23-50- 24	4.26	8.29	.01092	.02236	.0	.0	3.32	1.00	1.00	.709	.0297	.771	42.0	42.0	42.0	42.0	3.76	3.76	2.32	2.12
23-50- 25	2.93	5.32	.01128	.02201	.0	.0	2.99	1.00	1.00	.709	.0312	.753	28.4	28.4	28.4	28.4	3.38	3.38	2.29	2.34
23-50- 26	1.95	3.13	.01096	.01888	.0	.0	2.34	1.00	1.00	.708	.0341	.719	17.6	17.6	17.6	17.6	3.95	3.95	2.25	2.50
23-50- 27	1.49	1.91	.00947	.01239	.0	.0	1.48	1.00	1.00	.708	.0410	.660	11.0	11.0	11.0	11.0	6.87	6.87	2.23	2.50

VERS.NR.	RE*E4	Q<KW/M2>	ST1+/	ST1*/	STT+/	STT*/	ST1F/	H+	G+	G*
23-50- 1	1.95	6.1	1.17	1.13	1.23	1.18	1.28	15.4	8.6	9.2
23-50- 2	2.83	9.2	1.14	1.11	1.19	1.16	1.23	24.5	9.6	10.0
23-50- 3	4.27	14.2	1.09	1.09	1.13	1.13	1.19	39.2	11.4	11.4
23-50- 4	5.79	19.4	1.07	1.07	1.11	1.11	1.17	53.0	11.9	11.8
23-50- 5	8.76	28.3	1.06	1.06	1.09	1.10	1.15	81.1	13.4	13.3
23-50- 6	12.25	39.2	1.05	1.05	1.08	1.09	1.13	114.4	14.3	14.2
23-50- 7	17.38	52.0	1.04	1.05	1.07	1.08	1.12	161.1	16.0	15.8
23-50- 8	3.95	31.9	1.11	1.09	1.15	1.13	1.23	30.4	12.0	12.3
23-50- 9	8.13	65.4	1.06	1.07	1.10	1.10	1.17	68.3	14.1	14.0
23-50- 10	11.84	92.2	1.05	1.06	1.09	1.09	1.16	99.6	15.2	15.1
23-50- 11	16.85	0.0	0.0	0.0	0.0	0.0	0.0	166.2	0.0	0.0
23-50- 12	11.31	0.0	0.0	0.0	0.0	0.0	0.0	111.8	0.0	0.0
23-50- 13	7.80	0.0	0.0	0.0	0.0	0.0	0.0	77.2	0.0	0.0
23-50- 14	5.73	0.0	0.0	0.0	0.0	0.0	0.0	56.2	0.0	0.0
23-50- 15	4.06	0.0	0.0	0.0	0.0	0.0	0.0	38.6	0.0	0.0
23-50- 16	2.88	0.0	0.0	0.0	0.0	0.0	0.0	27.5	0.0	0.0
23-50- 17	2.58	0.0	0.0	0.0	0.0	0.0	0.0	24.5	0.0	0.0
23-50- 18	1.80	0.0	0.0	0.0	0.0	0.0	0.0	16.1	0.0	0.0
23-50- 19	31.70	0.0	0.0	0.0	0.0	0.0	0.0	323.7	0.0	0.0
23-50- 20	18.90	0.0	0.0	0.0	0.0	0.0	0.0	188.6	0.0	0.0
23-50- 21	12.01	0.0	0.0	0.0	0.0	0.0	0.0	118.7	0.0	0.0
23-50- 22	8.78	0.0	0.0	0.0	0.0	0.0	0.0	86.2	0.0	0.0
23-50- 23	5.95	0.0	0.0	0.0	0.0	0.0	0.0	59.4	0.0	0.0
23-50- 24	4.26	0.0	0.0	0.0	0.0	0.0	0.0	42.0	0.0	0.0
23-50- 25	2.93	0.0	0.0	0.0	0.0	0.0	0.0	28.4	0.0	0.0
23-50- 26	1.95	0.0	0.0	0.0	0.0	0.0	0.0	17.6	0.0	0.0
23-50- 27	1.49	0.0	0.0	0.0	0.0	0.0	0.0	11.0	0.0	0.0

ASI	BSI	H+	ARP	RHP	ARI	RHI	G(H+)
2.32	5.50	15.4	1.93	6.24	2.36	4.74	13.4
2.31	5.50	23.8	2.29	4.19	2.28	3.94	12.7
2.37	5.50	37.6	2.21	3.45	1.94	3.97	13.2
2.40	5.50	50.3	2.18	3.54	1.91	4.09	12.8
2.43	5.50	74.6	2.34	3.37	2.11	3.82	12.8
2.41	5.50	105.2	2.19	3.73	1.95	4.18	14.0
2.42	5.50	149.3	2.14	3.66	1.82	4.36	15.7
2.38	5.50	27.0	2.41	4.09	2.33	4.04	14.5
2.43	5.50	54.9	2.40	4.29	2.34	4.20	13.2
2.40	5.50	79.0	2.23	4.61	2.10	4.70	14.0
2.43	5.50	165.5	2.09	4.28	1.58	5.49	0.0
2.42	5.50	110.6	2.17	4.21	1.75	5.16	0.0
2.45	5.50	77.7	2.14	4.07	1.63	5.26	0.0
2.41	5.50	56.1	2.24	4.06	1.90	4.76	0.0
2.41	5.50	38.9	2.36	3.92	2.08	4.44	0.0
2.31	5.50	26.9	2.28	4.63	2.42	4.01	0.0
2.35	5.50	24.1	2.35	4.03	2.48	4.01	0.0
2.39	5.50	15.9	2.05	6.40	2.56	4.75	0.0
2.42	5.50	327.2	1.93	3.83	1.38	5.24	0.0
2.43	5.50	189.9	2.03	3.84	1.57	4.97	0.0
2.41	5.50	118.7	2.11	3.87	1.83	4.45	0.0
2.42	5.50	87.7	2.08	3.68	1.70	4.57	0.0
2.42	5.50	60.8	2.11	3.45	1.69	4.43	0.0
2.41	5.50	43.5	2.12	3.50	1.69	4.48	0.0
2.38	5.50	29.0	2.18	3.92	2.08	3.97	0.0
2.30	5.50	17.7	2.04	3.51	2.31	4.48	0.0
2.37	5.50	12.2	1.78	7.26	2.15	5.73	0.0

Table 3 cont.

VERS.NR.	RE*E4	REL*E4	F	F1	STB	STPR	F1/F2	TW/TB	TW/T1	PR	H/Y	BETA	H+	H+W	H+R	H+RW	RH+	RH+R	AS	AR
22-85- 1	4.96	9.72	.01115	.02347	.00534	.00473	3.61	1.34	1.33	.705	.0406	.793	70.0	42.9	72.9	44.7	4.83	4.46	2.33	1.85
22-85- 2	6.75	13.83	.01090	.02373	.00491	.00436	3.92	1.34	1.33	.705	.0394	.805	96.4	58.4	100.5	60.9	4.90	4.52	2.36	1.78
22-85- 3	9.13	19.22	.01044	.02301	.00467	.00416	4.07	1.35	1.35	.705	.0388	.811	129.2	76.9	134.9	80.3	5.12	4.73	2.38	1.73
22-85- 4	11.32	24.35	.01016	.02261	.00457	.00404	4.19	1.33	1.33	.704	.0384	.816	159.6	97.6	166.3	101.7	5.25	4.87	2.39	1.71
22-85- 5	15.83	35.13	.00997	.02286	.00429	.00380	4.55	1.33	1.33	.704	.0375	.826	224.6	136.5	234.1	142.3	5.23	4.85	2.40	1.68
22-85- 6	16.29	36.22	.00993	.02297	.00427	.00377	4.61	1.33	1.33	.704	.0374	.827	231.5	141.9	241.1	147.8	5.21	4.83	2.41	1.67
22-85- 7	12.73	27.51	.00994	.02219	.00441	.00390	4.23	1.33	1.33	.705	.0383	.817	177.9	108.8	185.3	113.3	5.36	4.98	2.39	1.69
22-85- 8	20.45	45.81	.00950	.02208	.00402	.00355	4.66	1.33	1.33	.704	.0373	.829	285.4	174.5	297.4	181.8	5.42	5.04	2.42	1.66
22-85- 9	26.89	62.98	.00998	.02432	.00406	.00356	5.37	1.31	1.31	.703	.0361	.844	393.4	246.5	409.1	256.3	4.94	4.59	2.43	1.65
22-85- 10	23.19	53.81	.01004	.02428	.00429	.00377	5.21	1.31	1.32	.704	.0363	.840	339.3	210.6	353.1	219.1	4.94	4.59	2.42	1.65
22-85- 11	2.61	4.08	.01101	.02024	.00407	.00409	2.74	1.80	1.72	.700	.0458	.747	32.1	12.8	34.7	13.9	5.12	4.37	2.29	2.15
22-85- 12	3.69	6.24	.01058	.02050	.00429	.00435	3.02	1.82	1.75	.701	.0438	.764	46.5	17.9	50.4	19.5	5.36	4.59	2.32	1.97
22-85- 13	4.76	8.79	.01067	.02234	.00434	.00441	3.48	1.83	1.80	.701	.0416	.784	64.0	23.6	69.6	25.7	5.07	4.30	2.34	1.87
22-85- 14	6.70	12.64	.01002	.02105	.00428	.00437	3.57	1.84	1.80	.701	.0410	.789	87.6	32.2	95.4	35.1	5.52	4.73	2.36	1.79
22-85- 15	8.60	16.99	.01000	.02183	.00423	.00432	3.90	1.85	1.82	.701	.0399	.801	115.3	41.7	125.8	45.5	5.40	4.61	2.38	1.74
22-85- 16	9.83	19.84	.00997	.02213	.00417	.00425	4.06	1.85	1.82	.702	.0393	.807	133.2	48.1	145.3	52.4	5.36	4.56	2.39	1.72
22-85- 17	12.18	25.05	.00951	.02102	.00423	.00428	4.04	1.82	1.80	.701	.0391	.809	162.8	59.7	177.4	65.0	5.65	4.86	2.40	1.70
22-85- 18	15.61	33.12	.00943	.02140	.00409	.00412	4.33	1.80	1.79	.700	.0384	.817	211.3	78.5	229.9	85.4	5.58	4.80	2.41	1.67
22-85- 19	20.00	43.78	.00942	.02195	.00385	.00389	4.65	1.81	1.80	.701	.0376	.826	275.2	100.8	299.8	109.8	5.46	4.68	2.42	1.66
22-85- 20	25.52	58.06	.00963	.02330	.00375	.00377	5.16	1.80	1.80	.700	.0366	.838	363.1	133.9	395.3	145.7	5.16	4.41	2.43	1.65
22-85- 21	12.96	28.95	.01051	.02402	.0	.0	4.53	1.00	1.00	.710	.0375	.826	189.1	189.1	189.1	189.1	4.96	4.96	2.39	1.69
22-85- 22	9.56	20.75	.01070	.02376	.0	.0	4.19	1.00	1.00	.710	.0383	.817	138.8	138.8	138.8	138.8	4.96	4.96	2.38	1.72
22-85- 23	7.33	15.67	.01119	.02456	.0	.0	4.06	1.00	1.00	.710	.0387	.812	108.1	108.1	108.1	108.1	4.74	4.74	2.36	1.76
22-85- 24	5.24	10.79	.01150	.02438	.0	.0	3.73	1.00	1.00	.710	.0397	.801	76.9	76.9	76.9	76.9	4.66	4.66	2.33	1.83
22-85- 25	3.98	7.91	.01177	.02420	.0	.0	3.47	1.00	1.00	.710	.0407	.791	58.1	58.1	58.1	58.1	4.57	4.57	2.31	1.91
22-85- 26	2.91	5.52	.01213	.02405	.0	.0	3.19	1.00	1.00	.710	.0420	.778	42.2	42.2	42.2	42.2	4.38	4.38	2.28	2.03
22-85- 27	29.16	68.39	.00967	.02319	.0	.0	5.20	1.00	1.00	.706	.0362	.842	418.3	418.3	418.3	418.3	5.17	5.17	2.43	1.64
22-85- 28	20.85	48.14	.01009	.02383	.0	.0	4.98	1.00	1.00	.706	.0366	.837	303.1	303.1	303.1	303.1	5.02	5.02	2.42	1.66
22-85- 29	15.81	35.74	.01025	.02369	.0	.0	4.67	1.00	1.00	.708	.0371	.830	229.3	229.3	229.3	229.3	5.04	5.04	2.40	1.68
22-85- 30	2.14	3.70	.01182	.02158	.0	.0	2.68	1.00	1.00	.709	.0449	.753	29.3	29.3	29.3	29.3	4.61	4.61	2.25	2.22

VERS.NR.	RE*E4	Q<KW/M2>	ST1+/	ST1*/	STT+/	STT*/	ST1F/	H+	G+	G*	ASI	BSI	H+	ARP	RHP	ARI	RHI	G(H+)
22-85- 1	4.96	9.9	1.04	1.06	1.07	1.09	1.15	70.0	15.1	14.8	2.25	5.50	57.4	2.04	5.45	1.64	6.34	12.8
22-85- 2	6.75	12.6	1.03	1.05	1.05	1.07	1.12	96.4	17.2	16.6	2.32	5.50	80.9	2.12	4.84	1.50	6.20	14.5
22-85- 3	9.13	16.6	1.03	1.04	1.05	1.07	1.11	129.2	18.2	17.8	2.35	5.50	109.0	2.09	5.00	1.38	6.56	15.1
22-85- 4	11.32	19.7	1.02	1.04	1.03	1.06	1.10	159.6	18.8	18.2	2.35	5.50	136.0	2.06	5.25	1.37	6.78	15.9
22-85- 5	15.83	25.7	1.01	1.04	1.03	1.05	1.09	224.6	20.4	19.9	2.45	5.50	195.6	1.86	5.55	1.63	6.01	18.3
22-85- 6	16.29	25.8	1.01	1.04	1.03	1.06	1.09	231.5	20.6	20.0	2.50	5.50	200.5	1.98	5.44	1.62	6.22	17.7
22-85- 7	12.73	20.9	1.02	1.04	1.04	1.06	1.10	177.9	19.4	18.9	2.41	5.50	154.0	1.92	5.05	1.80	5.27	16.7
22-85- 8	20.45	30.5	1.01	1.04	1.03	1.06	1.09	285.4	21.8	21.1	2.37	5.50	246.0	2.02	5.42	1.73	6.00	18.3
22-85- 9	26.89	38.9	1.01	1.04	1.03	1.05	1.08	393.4	22.8	22.1	2.46	5.50	348.3	1.79	5.33	1.71	5.45	20.2
22-85- 10	23.19	35.7	1.01	1.04	1.02	1.06	1.08	339.3	21.4	20.6	2.46	5.50	266.4	1.83	5.40	1.65	5.75	18.4
22-85- 11	2.61	10.9	1.08	1.06	1.10	1.09	1.17	32.1	18.3	18.5	2.09	5.50	20.6	2.07	7.18	2.63	6.19	17.1
22-85- 12	3.69	16.2	1.06	1.06	1.09	1.08	1.16	46.5	17.8	17.8	2.23	5.50	30.3	2.41	6.27	1.94	7.15	15.3
22-85- 13	4.76	21.1	1.05	1.07	1.07	1.09	1.15	64.0	18.9	18.5	2.30	5.50	42.6	2.27	5.78	1.64	7.12	16.4
22-85- 14	6.70	29.6	1.04	1.05	1.07	1.07	1.14	87.6	18.7	18.5	2.26	5.50	53.0	2.27	6.31	1.76	7.36	15.4
22-85- 15	8.60	37.6	1.04	1.05	1.06	1.07	1.12	115.3	19.6	19.3	2.36	5.50	79.9	2.16	5.83	1.44	7.36	17.2
22-85- 16	9.83	42.2	1.04	1.05	1.06	1.07	1.12	133.2	20.2	19.9	2.37	5.50	89.0	2.12	5.94	1.18	7.98	17.5
22-85- 17	12.18	52.5	1.03	1.05	1.05	1.07	1.11	162.8	19.5	19.0	2.45	5.50	121.3	1.92	6.87	1.57	7.56	18.0
22-85- 18	15.61	64.3	1.02	1.04	1.04	1.06	1.10	211.3	20.6	20.1	2.46	5.50	161.7	1.78	7.24	1.49	7.74	19.5
22-85- 19	20.00	77.6	1.02	1.04	1.04	1.06	1.09	275.2	22.5	22.1	2.46	5.50	211.6	1.74	7.40	1.45	7.94	21.3
22-85- 20	25.52	96.2	1.02	1.04	1.04	1.06	1.08	363.1	24.1	23.6	2.47	5.50	283.4	1.70	6.98	1.45	7.47	22.7
22-85- 21	12.96	0.0	0.0	0.0	0.0	0.0	0.0	189.1	0.0	0.0	2.36	5.50	189.4	1.76	4.93	1.26	6.20	0.0
22-85- 22	9.56	0.0	0.0	0.0	0.0	0.0	0.0	138.8	0.0	0.0	2.36	5.50	139.2	1.79	4.83	1.39	5.87	0.0
22-85- 23	7.33	0.0	0.0	0.0	0.0	0.0	0.0	108.1	0.0	0.0	2.32	5.50	107.5	1.81	4.77	1.53	5.54	0.0
22-85- 24	5.24	0.0	0.0	0.0	0.0	0.0	0.0	76.9	0.0	0.0	2.31	5.50	76.0	1.73	5.24	1.62	5.63	0.0
22-85- 25	3.98	0.0	0.0	0.0	0.0	0.0	0.0	58.1	0.0	0.0	2.22	5.50	56.3	1.90	5.13	1.86	5.37	0.0
22-85- 26	2.91	0.0	0.0	0.0	0.0	0.0	0.0	42.2	0.0	0.0	2.18	5.50	40.1	1.92	5.71	2.05	5.54	0.0
22-85- 27	29.16	0.0	0.0	0.0	0.0	0.0	0.0	418.3	0.0	0.0	2.37	5.50	417.3	1.73	5.07	1.35	6.08	0.0
22-85- 28	20.85	0.0	0.0	0.0	0.0	0.0	0.0	303.1	0.0	0.0	2.38	5.50	301.6	1.76	5.11	1.31	6.26	0.0
22-85- 29	15.81	0.0	0.0	0.0	0.0	0.0	0.0	229.3	0.0	0.0	2.38	5.50	229.5	1.77	4.99	1.25	6.32	0.0
22-85- 30	2.14	0.0	0.0	0.0	0.0	0.0	0.0	29.3	0.0	0.0	2.06	5.50	26.5	1.53	6.79	2.54	5.77	0.0

Table 3 cont.

VERS.NR.	RE*E4	RE1*E4	F	F1	STB	STPR	F1/F2	TW/TB	TW/T1	PR	H/Y	BETA	H+	H+W	H+R	H+RW	RH+	RH+R	AS	AR
22-71- 1	2.18	3.79	.01390	.02640	.00577	.00508	3.19	1.30	1.30	.703	.0575	.817	45.5	28.9	47.2	30.0	5.01	4.68	2.24	1.89
22-71- 2	3.18	5.96	.01370	.02693	.00562	.00496	3.54	1.31	1.31	.704	.0550	.833	68.2	42.6	70.9	44.3	5.08	4.75	2.28	1.76
22-71- 3	3.87	7.45	.01365	.02760	.00558	.00493	3.81	1.31	1.31	.704	.0537	.841	84.0	52.3	87.4	54.4	4.99	4.66	2.30	1.71
22-71- 4	5.32	10.62	.01335	.02759	.00517	.00455	4.10	1.33	1.33	.704	.0524	.850	116.1	70.7	121.0	73.7	5.06	4.72	2.32	1.66
22-71- 5	6.97	14.25	.01305	.02796	.00524	.00467	4.46	1.34	1.34	.704	.0514	.858	153.1	91.6	159.8	95.6	5.04	4.68	2.35	1.62
22-71- 6	9.57	19.90	.01244	.02712	.00481	.00430	4.68	1.35	1.36	.704	.0508	.863	207.2	121.6	216.6	127.1	5.21	4.83	2.37	1.59
22-71- 7	11.27	23.74	.01237	.02724	.00465	.00413	4.87	1.33	1.34	.705	.0503	.866	244.5	147.8	255.0	154.1	5.20	4.84	2.38	1.58
22-71- 8	2.23	3.93	.01430	.02745	.00593	.00519	3.31	1.29	1.28	.703	.0568	.821	47.3	31.0	49.0	32.1	4.83	4.53	2.24	1.88
22-71- 9	8.90	18.51	.01257	.02737	.00489	.00432	4.64	1.31	1.32	.705	.0509	.862	194.0	120.2	201.9	125.1	5.16	4.82	2.37	1.60
22-71- 10	15.40	33.31	.01230	.02771	.00448	.00393	5.28	1.29	1.30	.703	.0493	.874	337.4	214.7	350.3	222.9	5.12	4.81	2.40	1.56
22-71- 11	22.44	49.98	.01217	.02821	.00416	.00364	5.81	1.28	1.29	.702	.0483	.882	497.5	319.7	516.2	331.7	5.04	4.73	2.41	1.55
22-71- 12	7.43	15.55	.01353	.02907	.0	.0	4.63	1.00	1.00	.710	.0506	.863	166.9	166.9	166.9	166.9	4.86	4.86	2.35	1.61
22-71- 13	5.65	11.57	.01385	.02916	.0	.0	4.35	1.00	1.00	.711	.0515	.857	127.0	127.0	127.0	127.0	4.81	4.81	2.33	1.65
22-71- 14	4.09	8.06	.01388	.02814	.0	.0	3.90	1.00	1.00	.710	.0530	.845	90.3	90.3	90.3	90.3	4.90	4.90	2.30	1.70
22-71- 15	3.23	6.22	.01428	.02844	.0	.0	3.71	1.00	1.00	.710	.0540	.839	71.5	71.5	71.5	71.5	4.80	4.80	2.27	1.75
22-71- 16	2.32	4.25	.01439	.02742	.0	.0	3.30	1.00	1.00	.710	.0562	.825	50.4	50.4	50.4	50.4	4.85	4.85	2.24	1.86
22-71- 17	2.40	4.47	.01477	.02868	.0	.0	3.46	1.00	1.00	.710	.0554	.829	53.3	53.3	53.3	53.3	4.67	4.67	2.24	1.84
22-71- 18	1.72	3.01	.01494	.02769	.0	.0	3.07	1.00	1.00	.710	.0578	.814	37.3	37.3	37.3	37.3	4.61	4.61	2.20	1.99
22-71- 19	23.96	53.75	.01233	.02835	.0	.0	5.87	1.00	1.00	.707	.0480	.884	531.6	531.6	531.6	531.6	5.01	5.01	2.42	1.55
22-71- 20	17.30	38.14	.01258	.02843	.0	.0	5.49	1.00	1.00	.707	.0487	.879	384.5	384.5	384.5	384.5	5.00	5.00	2.40	1.56
22-71- 21	12.78	27.46	.01253	.02753	.0	.0	5.00	1.00	1.00	.708	.0497	.871	279.6	279.6	279.6	279.6	5.14	5.14	2.38	1.57
22-71- 22	9.18	19.45	.01319	.02865	.0	.0	4.80	1.00	1.00	.709	.0502	.867	204.8	204.8	204.8	204.8	4.94	4.94	2.36	1.60

VERS.NR.	RE*E4	Q<KW/M2>	ST1+/	ST1*/	STT+/	STT*/	ST1F/	H+	G+	G*	ASI	BSI	H+	ARP	RHP	ARI	RHI	G(H+)
22-71- 1	2.18	6.2	1.04	1.07	1.06	1.09	1.18	45.5	15.3	14.8	2.07	5.50	38.7	2.26	4.65	2.61	3.77	13.3
22-71- 2	3.18	9.0	1.02	1.05	1.04	1.07	1.15	68.2	16.7	16.0	2.13	5.50	58.4	2.30	4.17	2.39	3.75	13.9
22-71- 3	3.87	10.9	1.02	1.05	1.03	1.06	1.13	84.0	17.2	16.5	2.05	5.50	72.3	2.21	4.05	2.30	3.66	14.9
22-71- 4	5.32	14.5	1.01	1.04	1.03	1.05	1.11	116.1	18.9	18.4	2.15	5.50	102.7	2.10	3.89	1.94	3.99	16.6
22-71- 5	6.97	19.8	1.01	1.04	1.02	1.06	1.11	153.1	18.9	18.2	2.12	5.50	136.2	2.07	3.83	1.94	3.87	16.9
22-71- 6	9.57	25.8	1.01	1.04	1.02	1.06	1.10	207.2	20.6	19.8	2.08	5.50	185.3	2.03	3.83	1.89	3.90	18.6
22-71- 7	11.27	27.4	1.01	1.04	1.02	1.05	1.10	244.5	21.5	20.8	2.11	5.50	221.5	2.06	3.74	1.90	3.87	19.7
22-71- 8	2.23	6.1	1.05	1.07	1.07	1.08	1.18	47.3	15.0	14.8	2.11	5.50	41.3	2.22	4.51	2.61	3.41	13.7
22-71- 9	8.90	21.2	1.00	1.05	1.01	1.06	1.11	194.0	20.5	19.5	2.14	5.50	165.3	2.08	4.65	2.56	3.47	16.4
22-71- 10	15.40	33.2	1.01	1.04	1.02	1.05	1.09	337.4	22.7	22.0	2.10	5.50	293.1	2.03	4.68	2.57	3.37	18.9
22-71- 11	22.44	43.9	1.00	1.04	1.01	1.05	1.08	497.5	25.2	24.2	2.18	5.50	442.6	2.07	4.43	2.47	3.43	21.5
22-71- 12	7.43	0.0	0.0	0.0	0.0	0.0	0.0	166.9	0.0	0.0	2.30	5.50	165.6	2.03	4.08	1.83	4.29	0.0
22-71- 13	5.65	0.0	0.0	0.0	0.0	0.0	0.0	127.0	0.0	0.0	2.27	5.50	125.8	2.06	4.05	1.89	4.18	0.0
22-71- 14	4.09	0.0	0.0	0.0	0.0	0.0	0.0	90.3	0.0	0.0	2.23	5.50	89.1	2.18	4.02	2.07	4.01	0.0
22-71- 15	3.23	0.0	0.0	0.0	0.0	0.0	0.0	71.5	0.0	0.0	2.23	5.50	70.0	2.27	4.09	2.26	3.84	0.0
22-71- 16	2.32	0.0	0.0	0.0	0.0	0.0	0.0	50.4	0.0	0.0	2.22	5.50	49.7	2.49	3.76	2.26	3.98	0.0
22-71- 17	2.40	0.0	0.0	0.0	0.0	0.0	0.0	53.3	0.0	0.0	2.17	5.50	51.4	2.33	4.24	2.48	3.69	0.0
22-71- 18	1.72	0.0	0.0	0.0	0.0	0.0	0.0	37.3	0.0	0.0	2.03	5.50	34.8	2.05	5.64	2.77	3.84	0.0
22-71- 19	23.96	0.0	0.0	0.0	0.0	0.0	0.0	531.6	0.0	0.0	2.33	5.50	528.9	1.98	4.23	1.68	4.69	0.0
22-71- 20	17.30	0.0	0.0	0.0	0.0	0.0	0.0	384.5	0.0	0.0	2.32	5.50	382.2	1.99	4.23	1.70	4.64	0.0
22-71- 21	12.78	0.0	0.0	0.0	0.0	0.0	0.0	279.6	0.0	0.0	2.27	5.50	278.3	1.97	4.30	1.70	4.64	0.0
22-71- 22	9.18	0.0	0.0	0.0	0.0	0.0	0.0	204.8	0.0	0.0	2.28	5.50	203.7	1.97	4.21	1.73	4.48	0.0

Table 3 cont.

VERS.NR.	RE*E4	REI*E4	F	F1	STB	STPR	F1/F2	TW/TB	TW/T1	PR	H/Y	BETA	H+	H+W	H+R	H+RW	RH+	RH+R	AS	AR
12-85- 1	9.04	19.71	.01143	.02650	.00613	.00528	4.62	1.23	1.22	.707	.0322	.822	116.4	81.8	119.8	84.2	3.99	3.74	2.37	1.80
12-85- 2	12.19	27.16	.01105	.02601	.00583	.00501	4.85	1.22	1.22	.706	.0318	.828	155.7	110.5	160.1	113.7	4.14	3.90	2.39	1.76
12-85- 3	21.50	51.28	.01111	.02779	.00539	.00461	5.78	1.21	1.21	.705	.0304	.848	285.9	206.1	293.8	211.7	3.90	3.67	2.42	1.71
12-85- 4	15.95	37.30	.01104	.02725	.00647	.00554	5.36	1.21	1.22	.705	.0310	.840	211.3	148.8	217.6	153.2	3.97	3.72	2.40	1.73
12-85- 5	13.50	30.51	.01097	.02625	.00563	.00494	5.00	1.31	1.31	.703	.0315	.832	173.9	108.9	180.8	113.2	4.12	3.78	2.40	1.75
12-85- 6	4.55	8.79	.01148	.02437	.00620	.00548	3.68	1.33	1.31	.704	.0348	.790	55.1	34.5	57.3	35.8	4.07	3.73	2.33	1.97
12-85- 7	3.93	7.36	.01148	.02380	.00612	.00542	3.48	1.33	1.31	.705	.0355	.782	46.9	29.2	48.7	30.4	4.08	3.72	2.32	2.03
12-85- 8	2.98	5.21	.01155	.02274	.00609	.00536	3.12	1.31	1.28	.704	.0370	.765	34.3	22.3	35.6	23.1	4.03	3.70	2.29	2.17
12-85- 9	2.33	3.76	.01153	.02147	.00589	.00518	2.79	1.31	1.27	.704	.0389	.747	25.7	16.9	26.6	17.5	3.99	3.65	2.27	2.35
12-85- 10	11.58	24.16	.01027	.02381	.00536	.00524	4.51	1.70	1.67	.701	.0328	.816	138.3	57.5	149.0	61.9	4.58	3.92	2.39	1.77
12-85- 11	9.28	18.96	.01056	.02409	.00548	.00534	4.34	1.68	1.66	.701	.0332	.810	111.1	46.9	119.5	50.5	4.47	3.82	2.38	1.80
12-85- 12	6.90	13.43	.01068	.02345	.00545	.00531	3.97	1.68	1.64	.701	.0341	.798	80.7	34.5	86.7	37.1	4.50	3.85	2.36	1.86
12-85- 13	23.09	54.00	.01075	.02708	.00508	.00491	5.80	1.66	1.66	.699	.0306	.846	300.2	126.6	323.1	136.2	4.04	3.43	2.42	1.71
12-85- 14	17.07	38.03	.01047	.02557	.00523	.00504	5.21	1.65	1.64	.700	.0315	.833	213.7	91.4	229.7	98.2	4.29	3.67	2.41	1.73
12-85- 15	13.25	28.50	.01033	.02409	.00537	.00520	4.66	1.67	1.65	.700	.0323	.822	161.0	68.4	173.1	73.6	4.54	3.90	2.40	1.75
12-85- 16	5.60	10.44	.01071	.02284	.00551	.00538	3.70	1.69	1.65	.702	.0350	.788	64.1	27.3	68.9	29.4	4.53	3.87	2.35	1.92
12-85- 17	4.47	7.86	.01070	.02180	.00543	.00529	3.36	1.69	1.62	.701	.0363	.774	49.3	21.6	52.9	23.2	4.61	3.96	2.33	2.00
12-85- 18	3.75	6.25	.01070	.02089	.00537	.00522	3.10	1.68	1.60	.701	.0374	.762	40.0	18.0	42.8	19.3	4.68	4.03	2.32	2.09
12-85- 19	3.01	4.66	.01067	.01974	.00521	.00504	2.79	1.66	1.56	.701	.0391	.746	30.8	14.4	32.8	15.3	4.73	4.10	2.30	2.22
12-85- 20	12.09	27.86	.01163	.02777	.0	.0	5.09	1.00	1.00	.709	.0313	.835	161.2	161.2	161.2	161.2	3.83	3.83	2.39	1.76
12-85- 21	9.11	20.42	.01177	.02737	.0	.0	4.72	1.00	1.00	.709	.0319	.826	120.6	120.6	120.6	120.6	3.83	3.83	2.37	1.80
12-85- 22	6.76	14.73	.01208	.02742	.0	.0	4.41	1.00	1.00	.710	.0325	.818	89.4	89.4	89.4	89.4	3.72	3.72	2.35	1.85
12-85- 23	5.07	10.64	.01221	.02679	.0	.0	4.04	1.00	1.00	.709	.0334	.806	66.2	66.2	66.2	66.2	3.69	3.69	2.33	1.92
12-85- 24	3.85	7.74	.01231	.02603	.0	.0	3.68	1.00	1.00	.709	.0344	.794	49.4	49.4	49.4	49.4	3.64	3.64	2.31	2.01
12-85- 25	2.94	5.58	.01227	.02474	.0	.0	3.29	1.00	1.00	.709	.0358	.778	36.7	36.7	36.7	36.7	3.63	3.63	2.28	2.14
12-85- 26	2.14	3.72	.01206	.02259	.0	.0	2.80	1.00	1.00	.709	.0381	.753	25.4	25.4	25.4	25.4	3.66	3.66	2.25	2.37
12-85- 27	21.83	52.73	.01134	.02840	.0	.0	5.88	1.00	1.00	.707	.0302	.851	294.3	294.3	294.3	294.3	3.79	3.79	2.42	1.71
12-85- 28	18.71	44.62	.01137	.02809	.0	.0	5.64	1.00	1.00	.706	.0305	.847	250.9	250.9	250.9	250.9	3.83	3.83	2.41	1.72
12-85- 29	20.66	49.68	.01136	.02831	.0	.0	5.80	1.00	1.00	.706	.0303	.850	278.0	278.0	278.0	278.0	3.80	3.80	2.41	1.71

VERS.NR.	RE*E4	Q<KW/M2>	ST1+/	ST1*/	STT+/	STT*/	ST1F/	H+	G+	G*	ASI	BSI	h+	ARP	RHP	ARI	RHI	G(H+)
12-85- 1	9.04	13.5	1.04	1.06	1.07	1.08	1.13	116.4	13.4	13.1	2.30	5.50	100.8	1.84	3.83	1.59	4.44	11.1
12-85- 2	12.19	17.0	1.04	1.05	1.07	1.08	1.12	155.7	14.2	14.0	2.23	5.50	135.8	1.82	3.66	1.84	3.64	12.6
12-85- 3	21.50	26.2	1.01	1.04	1.03	1.07	1.09	285.9	17.0	16.4	2.38	5.50	254.4	1.80	4.36	1.00	6.33	15.0
12-85- 4	15.95	23.9	0.98	1.06	1.01	1.09	1.12	211.3	13.8	12.4	2.45	5.50	188.7	1.82	4.11	0.96	6.27	14.2
12-85- 5	13.50	27.2	1.02	1.05	1.04	1.08	1.11	173.9	15.4	14.7	2.43	5.50	148.0	1.82	3.59	1.52	4.32	12.8
12-85- 6	4.55	10.5	1.07	1.07	1.10	1.11	1.17	55.1	11.7	11.6	2.25	5.50	45.4	2.00	3.92	1.92	4.06	9.9
12-85- 7	3.93	8.9	1.07	1.08	1.11	1.11	1.18	46.9	11.5	11.4								
12-85- 8	2.98	6.4	1.10	1.09	1.14	1.13	1.21	34.2	10.6	10.7								
12-85- 9	2.33	4.9	1.13	1.11	1.17	1.15	1.23	25.7	9.9	10.2								
12-85- 10	11.58	52.7	1.04	1.06	1.07	1.09	1.14	138.3	14.9	14.6	2.40	5.50	97.3	1.91	3.74	1.70	4.18	12.2
12-85- 11	9.28	42.8	1.05	1.06	1.08	1.09	1.14	111.1	14.5	14.2	2.39	5.50	77.3	1.90	3.62	1.76	3.89	11.7
12-85- 12	6.90	31.6	1.06	1.06	1.08	1.09	1.16	80.7	14.1	13.9	2.39	5.50	56.7	1.96	3.76	1.77	4.17	11.3
12-85- 13	23.09	100.3	1.03	1.05	1.05	1.07	1.10	300.2	17.8	17.3	2.37	5.50	185.2	1.70	4.06	1.31	4.99	15.3
12-85- 14	17.07	73.8	1.03	1.06	1.06	1.08	1.12	213.7	16.4	15.9	2.33	5.50	150.8	1.87	3.83	1.62	4.38	13.5
12-85- 15	13.25	60.4	1.03	1.05	1.06	1.08	1.13	161.0	15.2	14.9	2.43	5.50	117.9	1.87	3.79	1.67	4.25	13.0
12-85- 16	5.60	25.9	1.06	1.07	1.09	1.10	1.17	64.1	13.4	13.3	2.34	5.50	45.2	1.90	4.60	1.60	4.75	11.1
12-85- 17	4.47	20.3	1.08	1.07	1.11	1.10	1.19	49.3	12.9	13.0	2.17	5.50	34.0	1.93	5.28	2.13	4.63	10.7
12-85- 18	3.75	16.7	1.09	1.07	1.12	1.10	1.20	40.0	12.4	12.7	2.23	5.50	28.6	1.82	5.45	1.98	4.95	11.6
12-85- 19	3.01	12.8	1.11	1.08	1.15	1.11	1.22	30.8	11.9	12.3	2.14	5.50	21.7	2.25	5.31	2.61	4.32	10.6
12-85- 20	12.09	0.0	0.0	0.0	0.0	0.0	0.0	161.2	0.0	0.0	2.38	5.50	162.3	1.76	3.88	1.33	5.02	0.0
12-85- 21	9.11	0.0	0.0	0.0	0.0	0.0	0.0	120.6	0.0	0.0	2.39	5.50	121.8	1.79	3.73	1.44	4.67	0.0
12-85- 22	6.76	0.0	0.0	0.0	0.0	0.0	0.0	89.4	0.0	0.0	2.34	5.50	89.2	1.84	3.81	1.67	4.29	0.0
12-85- 23	5.07	0.0	0.0	0.0	0.0	0.0	0.0	66.2	0.0	0.0	2.29	5.50	65.1	1.92	3.97	1.98	3.85	0.0
12-85- 24	3.85	0.0	0.0	0.0	0.0	0.0	0.0	49.4	0.0	0.0	2.29	5.50	48.1	2.05	4.14	2.16	3.90	0.0
12-85- 25	2.94	0.0	0.0	0.0	0.0	0.0	0.0	36.7	0.0	0.0	2.16	5.50	34.8	2.21	4.16	2.56	3.44	0.0
12-85- 26	2.14	0.0	0.0	0.0	0.0	0.0	0.0	25.4	0.0	0.0	1.99	5.50	22.5	2.56	4.57	3.47	2.74	0.0
12-85- 27	21.83	0.0	0.0	0.0	0.0	0.0	0.0	294.3	0.0	0.0	2.44	5.50	296.2	1.73	4.08	1.13	5.67	0.0
12-85- 28	18.71	0.0	0.0	0.0	0.0	0.0	0.0	250.9	0.0	0.0	2.45	5.50	253.3	1.77	3.95	1.18	5.53	0.0
12-85- 29	20.66	0.0	0.0	0.0	0.0	0.0	0.0	278.0	0.0	0.0	2.41	5.50	279.4	1.80	3.57	1.52	4.28	0.0

Table 3 cont.

VERS.NR.	RE*E4	RE1*E4	F	F1	STB	STPR	F1/F2	TW/TB	TW/TI	PR	H/Y	BETA	H+	H+W	H+R	H+RW	RH+	RH+R	AS	AR
12-71- 1	3.07	5.82	.01458	.02992	.00715	.00626	3.90	1.29	1.28	.703	.0460	.838	58.5	37.9	60.7	39.2	4.04	3.75	2.27	1.87
12-71- 2	3.07	5.84	.01465	.03006	.00713	.00624	3.91	1.28	1.28	.703	.0460	.838	58.7	38.2	60.8	39.6	4.02	3.73	2.27	1.87
12-71- 3	4.06	8.06	.01470	.03144	.00707	.00620	4.37	1.29	1.29	.703	.0446	.850	79.7	50.9	82.7	52.8	3.95	3.66	2.30	1.79
12-71- 4	5.38	11.11	.01469	.03214	.00697	.00610	4.74	1.29	1.29	.703	.0435	.860	107.3	68.9	111.4	71.5	3.94	3.66	2.32	1.73
12-71- 5	7.30	15.55	.01470	.03333	.00671	.00589	5.29	1.30	1.30	.703	.0424	.869	148.3	94.1	154.0	97.7	3.86	3.57	2.35	1.69
12-71- 6	9.95	21.45	.01387	.03165	.00636	.00559	5.42	1.30	1.31	.703	.0421	.873	197.4	124.0	205.2	128.9	4.12	3.81	2.37	1.65
12-71- 7	12.65	27.57	.01349	.03102	.00616	.00542	5.62	1.30	1.30	.703	.0417	.876	248.4	156.7	258.1	162.8	4.22	3.92	2.38	1.64
12-71- 8	16.91	38.20	.01405	.03357	.00600	.00524	6.41	1.28	1.29	.702	.0406	.887	345.9	222.8	358.9	231.1	3.90	3.62	2.40	1.62
12-71- 9	22.91	51.81	.01296	.03085	.00550	.00479	6.34	1.28	1.28	.702	.0407	.887	450.0	292.2	466.5	303.0	4.26	3.98	2.41	1.61
12-71- 10	2.89	4.99	.01316	.02631	.00602	.00589	3.51	1.68	1.65	.695	.0483	.822	50.0	21.4	53.8	23.0	4.58	3.97	2.28	1.91
12-71- 11	3.73	6.93	.01348	.02815	.00620	.00608	3.95	1.68	1.67	.695	.0463	.837	68.1	28.5	73.3	30.7	4.41	3.81	2.30	1.82
12-71- 12	4.98	9.78	.01361	.02975	.00635	.00623	4.45	1.68	1.69	.695	.0447	.850	94.4	38.9	101.9	42.0	4.27	3.67	2.33	1.75
12-71- 13	6.63	13.63	.01370	.03075	.00629	.00619	4.88	1.69	1.71	.695	.0435	.861	129.1	52.3	139.5	56.5	4.20	3.60	2.35	1.70
12-71- 14	8.96	18.68	.01320	.03015	.00606	.00600	5.15	1.71	1.72	.695	.0429	.866	172.4	68.7	186.5	74.3	4.33	3.72	2.37	1.66
12-71- 15	11.27	23.94	.01305	.03021	.00551	.00585	5.43	1.71	1.72	.695	.0424	.871	217.4	86.5	235.3	93.6	4.35	3.73	2.38	1.64
12-71- 16	2.52	4.23	.01330	.02601	.00554	.00580	3.36	1.66	1.63	.695	.0491	.816	43.0	18.9	46.2	20.2	4.54	3.94	2.27	1.97
12-71- 17	15.04	33.07	.01339	.03217	.00580	.00570	6.12	1.69	1.71	.695	.0414	.881	300.3	121.4	324.5	131.2	4.09	3.50	2.40	1.62
12-71- 18	22.97	53.68	.01476	.03584	.0	.0	7.17	1.00	1.00	.707	.0396	.897	485.8	485.8	485.8	485.8	3.63	3.63	2.41	1.61
12-71- 19	16.56	37.69	.01442	.03406	.0	.0	6.39	1.00	1.00	.708	.0405	.888	341.6	341.6	341.6	341.6	3.83	3.83	2.39	1.62
12-71- 20	12.56	28.12	.01463	.03400	.0	.0	6.01	1.00	1.00	.708	.0410	.883	258.8	258.8	258.8	258.8	3.82	3.82	2.38	1.64
12-71- 21	10.17	22.40	.01467	.03355	.0	.0	5.67	1.00	1.00	.710	.0415	.878	208.1	208.1	208.1	208.1	3.86	3.86	2.37	1.65
12-71- 22	14.47	32.72	.01460	.03426	.0	.0	6.24	1.00	1.00	.710	.0407	.886	299.4	299.4	299.4	299.4	3.80	3.80	2.39	1.63
12-71- 23	10.81	23.94	.01469	.03377	.0	.0	5.78	1.00	1.00	.710	.0413	.880	222.0	222.0	222.0	222.0	3.84	3.84	2.37	1.65
12-71- 24	7.95	17.34	.01527	.03465	.0	.0	5.51	1.00	1.00	.711	.0418	.875	165.3	165.3	165.3	165.3	3.70	3.70	2.35	1.68
12-71- 25	5.84	12.32	.01511	.03322	.0	.0	4.94	1.00	1.00	.710	.0428	.865	118.8	118.8	118.8	118.8	3.82	3.82	2.33	1.72
12-71- 26	4.34	8.92	.01540	.03306	.0	.0	4.58	1.00	1.00	.710	.0437	.857	88.1	88.1	88.1	88.1	3.75	3.75	2.30	1.77
12-71- 27	3.20	6.28	.01531	.03164	.0	.0	4.08	1.00	1.00	.709	.0451	.844	63.3	63.3	63.3	63.3	3.82	3.82	2.27	1.85
12-71- 28	2.29	4.19	.01476	.02867	.0	.0	3.43	1.00	1.00	.709	.0477	.824	43.0	43.0	43.0	43.0	4.08	4.08	2.24	1.98
12-71- 29	14.10	31.71	.01435	.03346	.0	.0	6.08	1.00	1.00	.710	.0409	.884	288.5	288.5	288.5	288.5	3.90	3.90	2.39	1.63
12-71- 30	22.74	53.10	.01474	.03577	.0	.0	7.14	1.00	1.00	.707	.0397	.897	480.5	480.5	480.5	480.5	3.63	3.63	2.41	1.61

VERS.NR.	RE*E4	Q<KW/M2>	ST1+/	ST1*/	STT+/	STT*/	ST1F/	H+	G+	G*	ASI	BSI	H+	ARP	RHP	ARI	RHI	G(H+)
12-71- 1	3.07	10.3	1.03	1.07	1.05	1.09	1.18	58.5	12.5	11.8	2.20	5.50	50.5	2.02	4.21	1.95	4.15	10.7
12-71- 2	3.07	10.1	1.03	1.07	1.05	1.09	1.18	58.7	12.5	11.9	2.19	5.50	50.7	1.88	4.44	2.13	3.60	11.0
12-71- 3	4.06	13.8	1.02	1.07	1.04	1.09	1.16	79.7	13.3	12.6	2.20	5.50	68.9	1.93	4.04	1.86	3.96	11.6
12-71- 4	5.38	17.5	1.01	1.06	1.03	1.07	1.14	107.3	14.0	13.3	2.22	5.50	92.8	1.82	4.04	1.83	3.79	12.1
12-71- 5	7.30	23.4	1.01	1.05	1.03	1.07	1.13	148.3	15.1	14.4	2.23	5.50	129.9	1.71	4.07	1.69	3.91	13.9
12-71- 6	9.95	30.9	1.01	1.05	1.03	1.07	1.12	197.4	15.7	15.0	2.24	5.50	173.1	1.74	4.09	1.70	3.96	14.1
12-71- 7	12.65	37.9	1.01	1.05	1.03	1.06	1.11	248.4	16.1	15.5	2.21	5.50	220.1	1.64	4.30	1.57	4.25	15.1
12-71- 8	16.91	47.8	1.01	1.04	1.02	1.06	1.10	345.9	17.6	16.8	2.30	5.50	308.5	1.62	4.33	1.70	3.93	16.9
12-71- 9	22.91	58.5	1.00	1.04	1.02	1.06	1.09	450.0	18.7	17.9	2.29	5.50	412.2	1.60	4.28	1.43	4.48	18.4
12-71- 10	2.89	23.8	1.06	1.09	1.08	1.11	1.20	50.0	13.9	13.4	2.18	5.50	37.4	2.34	4.09	2.31	3.88	11.8
12-71- 11	3.73	31.8	1.04	1.08	1.06	1.10	1.18	68.1	14.3	13.7	2.23	5.50	51.1	2.23	3.75	2.02	3.96	11.8
12-71- 12	4.98	43.7	1.03	1.08	1.05	1.10	1.17	94.4	14.6	13.9	2.25	5.50	70.7	2.08	3.78	1.87	4.00	12.2
12-71- 13	6.63	58.5	1.02	1.07	1.04	1.09	1.15	129.1	15.3	14.5	2.24	5.50	97.1	2.00	3.75	1.78	3.97	13.2
12-71- 14	8.96	76.7	1.03	1.07	1.04	1.08	1.14	172.4	15.9	15.2	2.29	5.50	131.7	2.06	3.68	1.78	4.10	13.8
12-71- 15	11.27	94.3	1.02	1.06	1.04	1.08	1.13	217.4	16.5	15.7	2.22	5.50	156.7	1.89	4.08	1.74	4.19	14.5
12-71- 16	2.52	20.0	1.07	1.09	1.09	1.11	1.21	43.0	13.8	13.4	2.19	5.50	32.3	2.34	3.98	2.45	3.53	11.7
12-71- 17	15.04	122.3	1.02	1.06	1.04	1.08	1.12	300.3	17.6	16.8	2.24	5.50	235.0	1.82	3.94	1.54	4.34	15.9
12-71- 18	22.97	0.0	0.0	0.0	0.0	0.0	0.0	485.8	0.0	0.0	2.35	5.50	484.8	1.59	4.20	1.11	5.19	0.0
12-71- 19	16.56	0.0	0.0	0.0	0.0	0.0	0.0	341.6	0.0	0.0	2.36	5.50	339.7	1.73	4.09	1.36	4.82	0.0
12-71- 20	12.56	0.0	0.0	0.0	0.0	0.0	0.0	258.8	0.0	0.0	2.31	5.50	257.9	1.68	4.11	1.32	4.79	0.0
12-71- 21	10.17	0.0	0.0	0.0	0.0	0.0	0.0	208.1	0.0	0.0	2.49	5.50	207.8	2.15	3.59	1.25	5.56	0.0
12-71- 22	14.47	0.0	0.0	0.0	0.0	0.0	0.0	299.4	0.0	0.0	2.28	5.50	297.5	1.61	4.21	1.33	4.72	0.0
12-71- 23	10.81	0.0	0.0	0.0	0.0	0.0	0.0	222.0	0.0	0.0	2.28	5.50	220.7	1.70	4.02	1.43	4.50	0.0
12-71- 24	7.95	0.0	0.0	0.0	0.0	0.0	0.0	165.3	0.0	0.0	2.25	5.50	164.1	1.65	4.04	1.49	4.25	0.0
12-71- 25	5.84	0.0	0.0	0.0	0.0	0.0	0.0	118.8	0.0	0.0	2.26	5.50	118.0	1.76	3.94	1.67	4.01	0.0
12-71- 26	4.34	0.0	0.0	0.0	0.0	0.0	0.0	88.1	0.0	0.0	2.22	5.50	86.9	1.77	4.14	1.74	4.04	0.0
12-71- 27	3.20	0.0	0.0	0.0	0.0	0.0	0.0	63.3	0.0	0.0	2.22	5.50	62.2	1.80	4.47	1.90	4.04	0.0
12-71- 28	2.29	0.0	0.0	0.0	0.0	0.0	0.0	43.0	0.0	0.0	2.28	5.50	42.9	1.96	4.47	1.96	4.30	0.0
12-71- 29	14.10	0.0	0.0	0.0	0.0	0.0	0.0	288.5	0.0	0.0	2.24	5.50	285.1	1.62	4.31	1.45	4.55	0.0
12-71- 30	22.74	0.0	0.0	0.0	0.0	0.0	0.0	480.5	0.0	0.0	2.33	5.50	478.4	1.60	4.14	1.24	4.83	0.0

Table 3 cont.

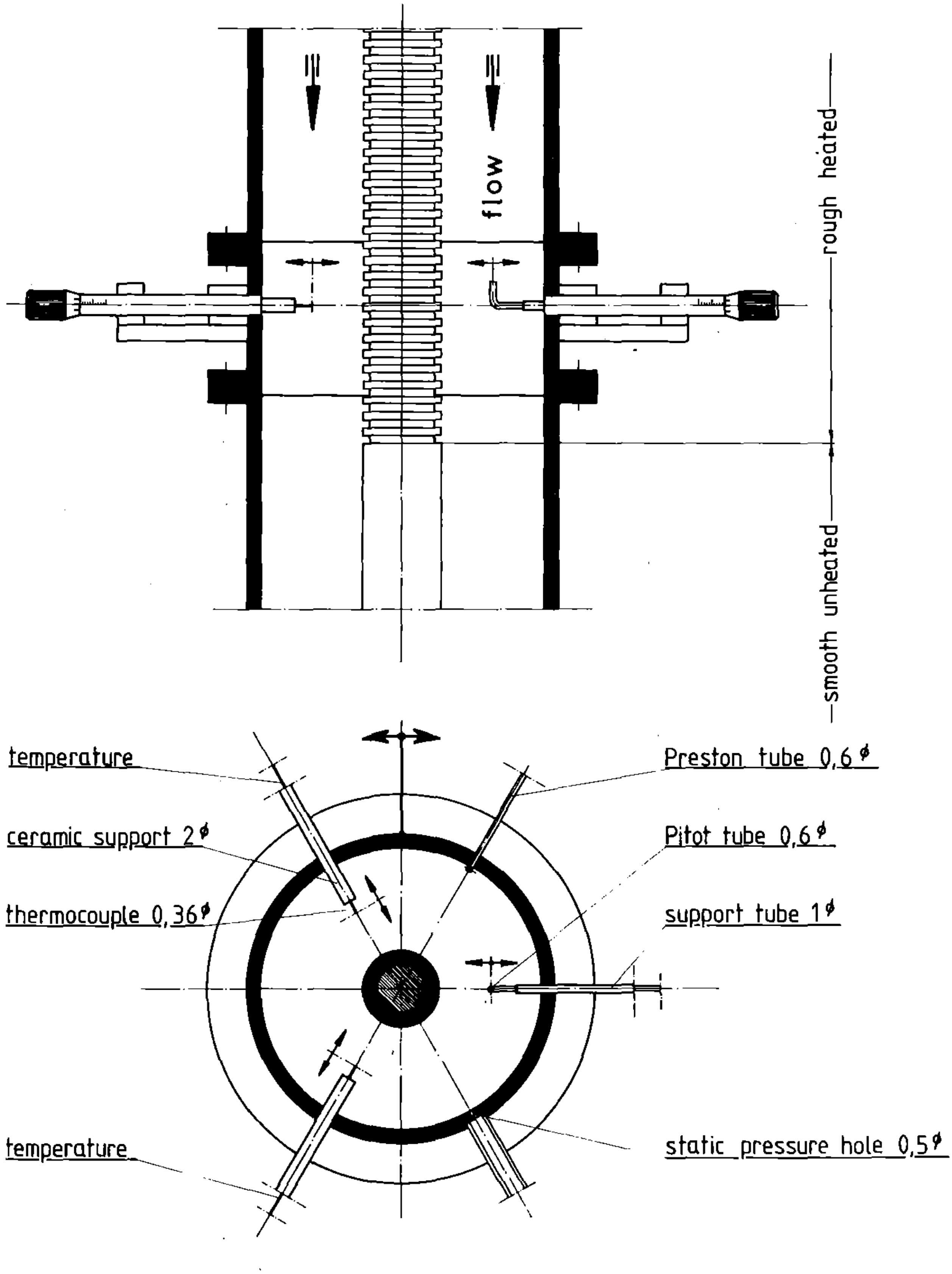


Fig.1: Measuring device

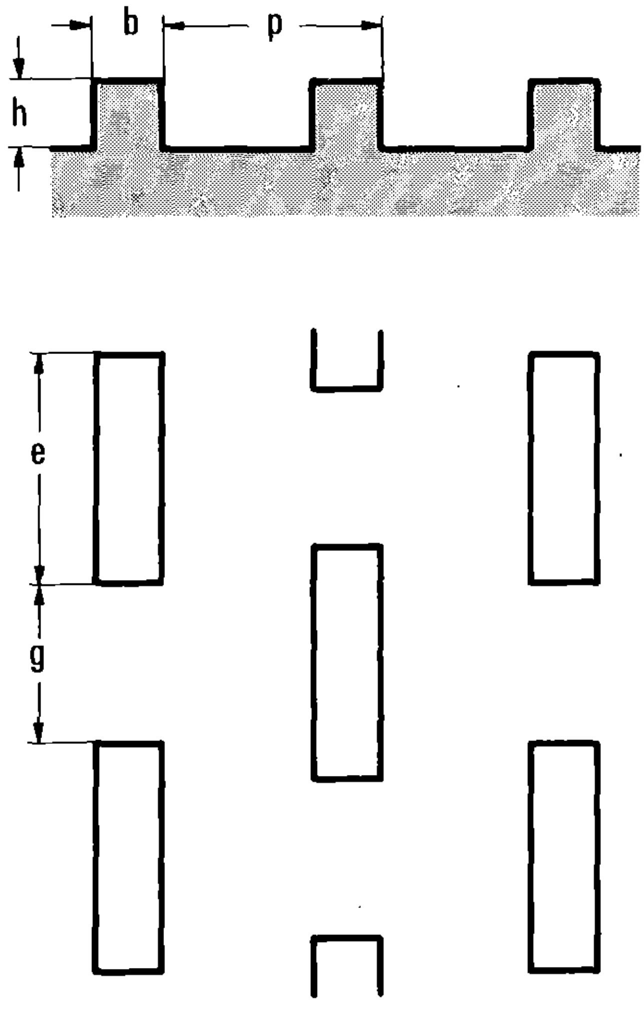


Fig.2: Parameters of the roughnesses

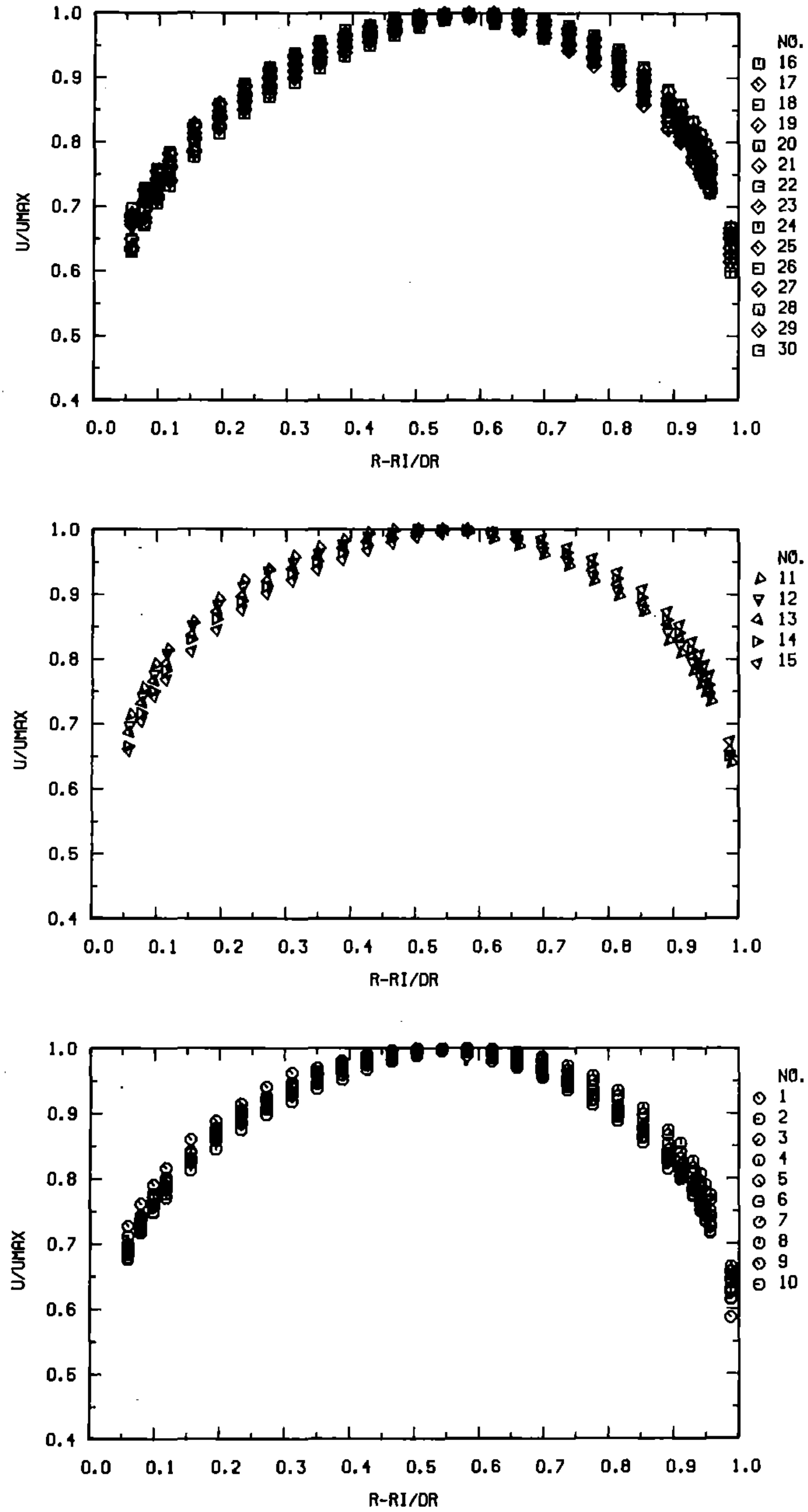


Fig.3: Velocity profiles for test section 23-72 (2-dim. roughness, α = 0.262)

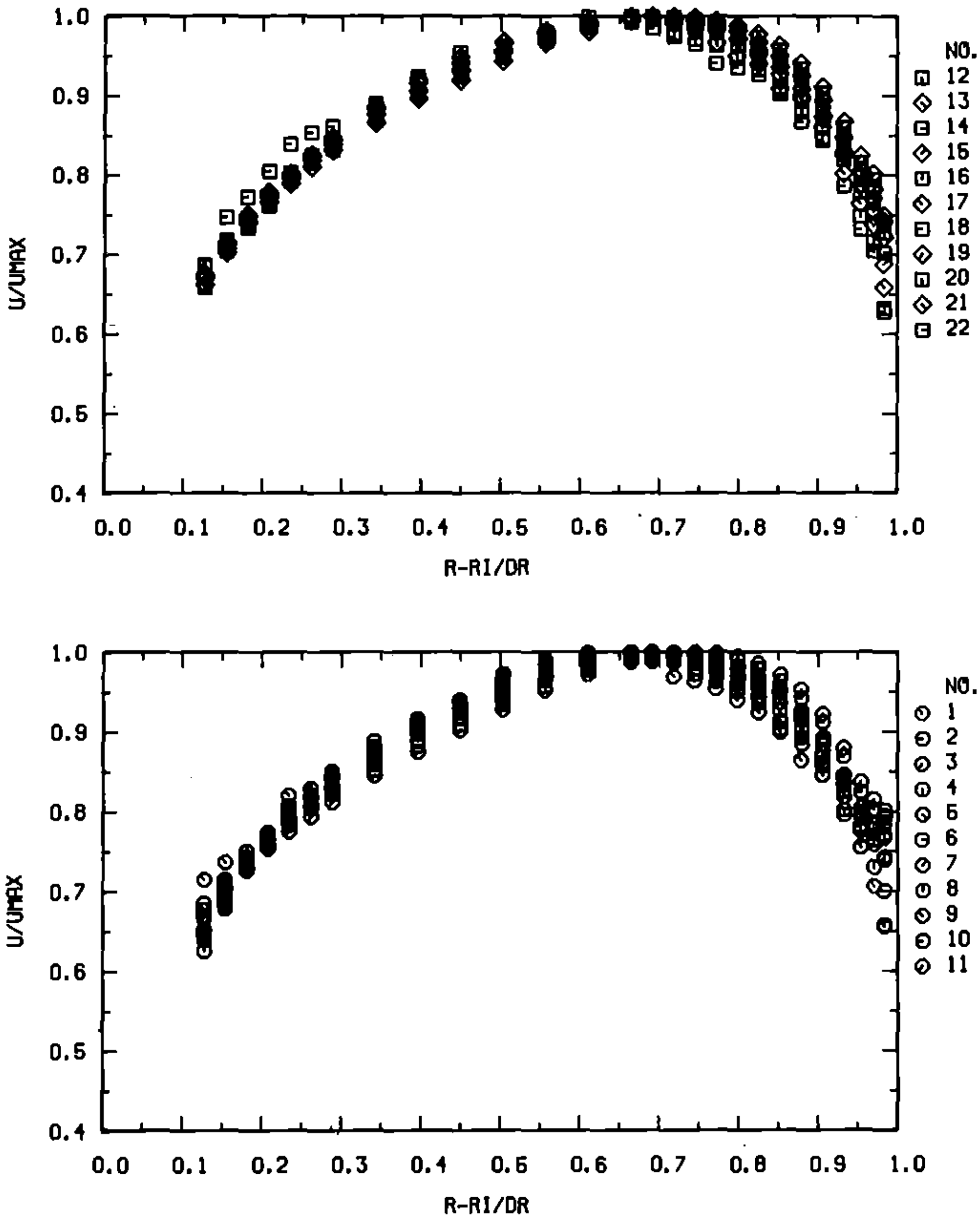


Fig.4: Velocity profiles for test section 22-71 (2-dim. roughness, $\alpha = 0.468$)

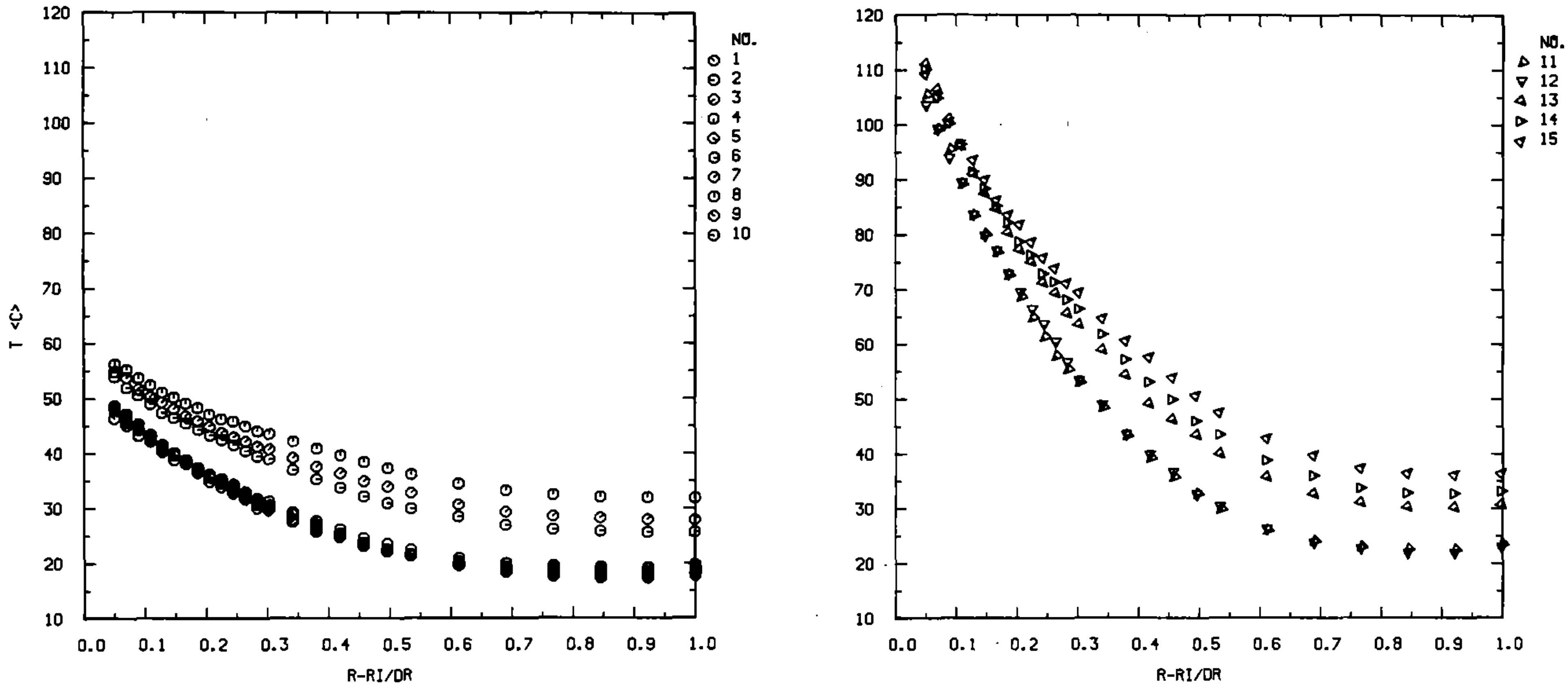


Fig.5: Temperature profiles for test section 23-72 (2-dim. roughness, α = 0.262)

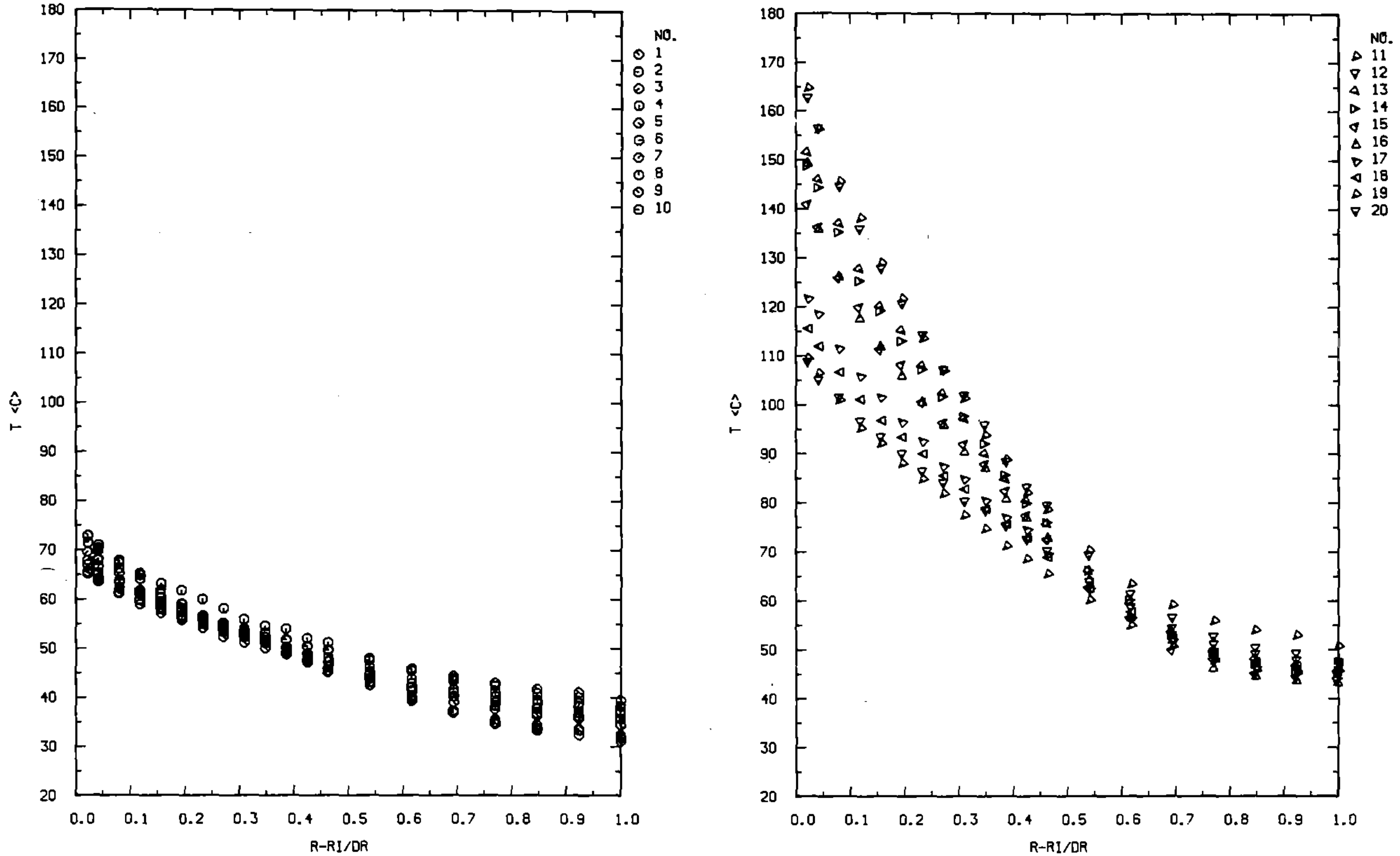


Fig.6: Temperature profiles for test section 22-85 (2-dim. roughness, $\alpha = 0.386$)

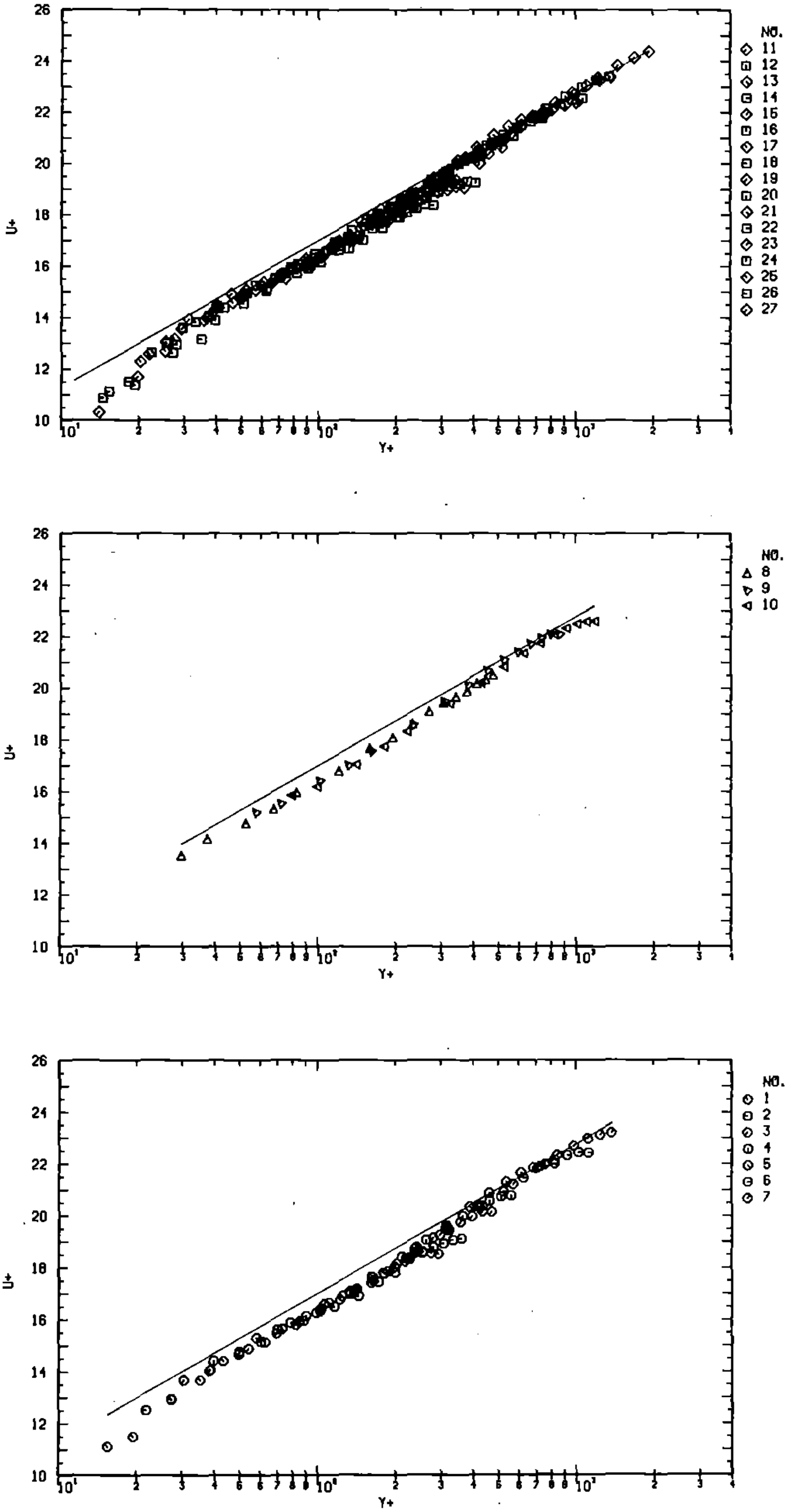


Fig.7: Non-dimensional velocity profiles at the smooth outer tube in test section 23-50 (2-dim. roughness, α = 0.0190)

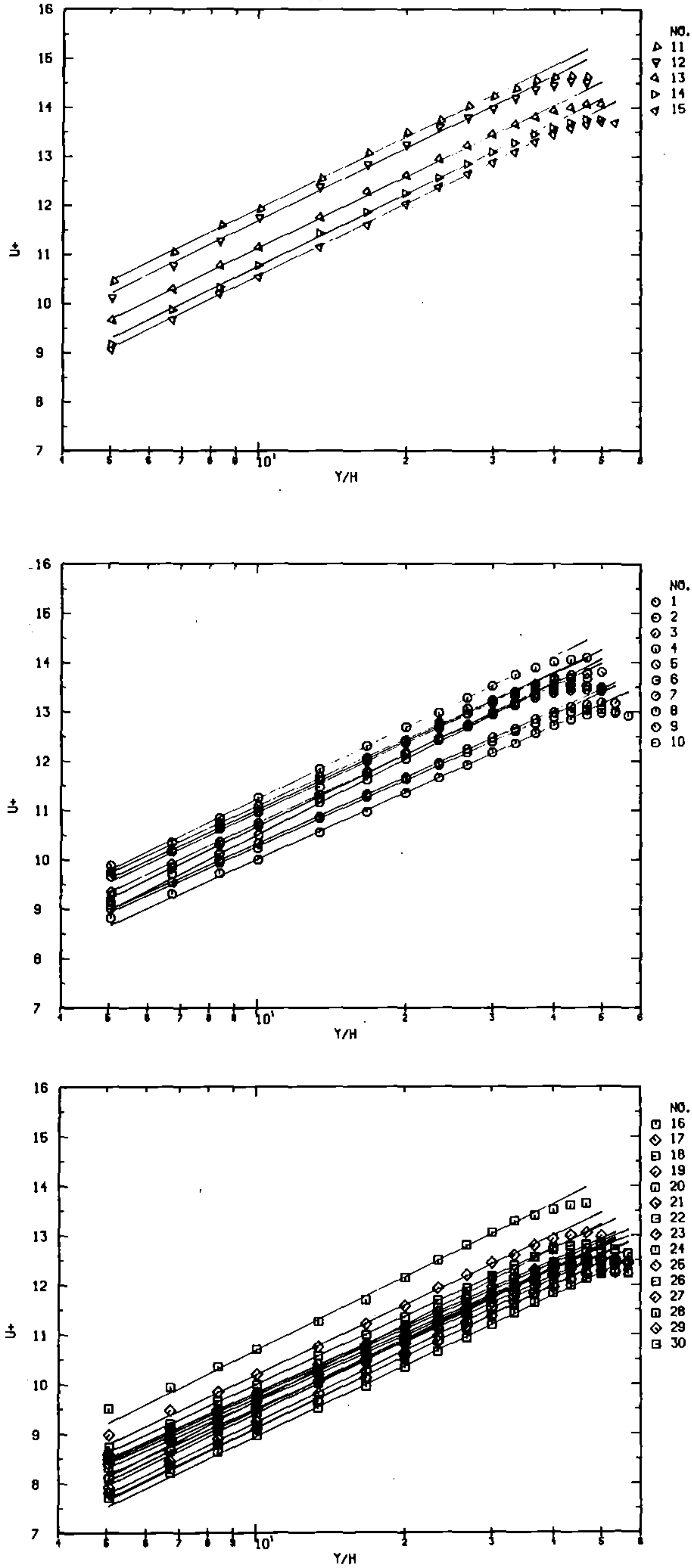


Fig.8: Non-dimensional velocity profiles in the rough zone in test section 23-72 (2-dim. roughness, $\alpha = 0.262$)

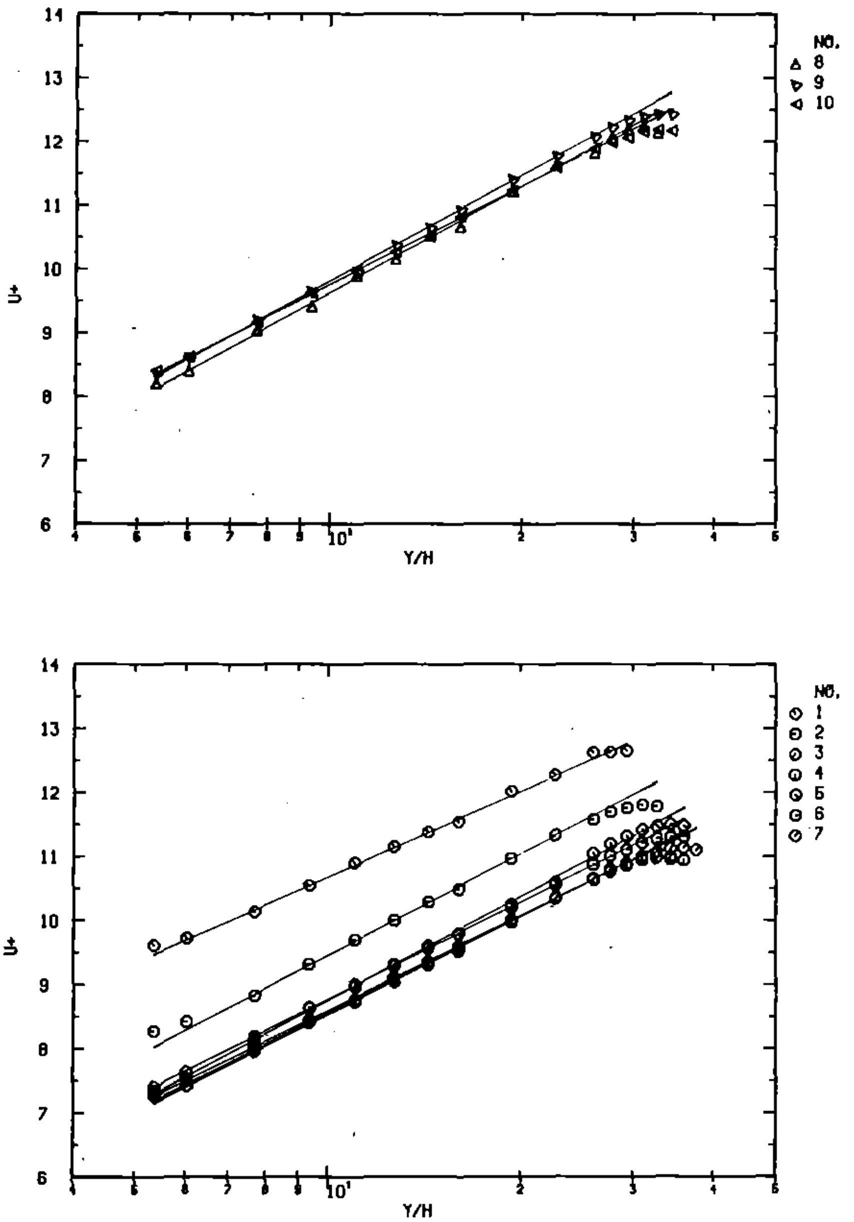


Fig.9: Non-dimensional velocity profiles in the rough zone in test section 23-50 (2-dim. roughness, α =0.190)

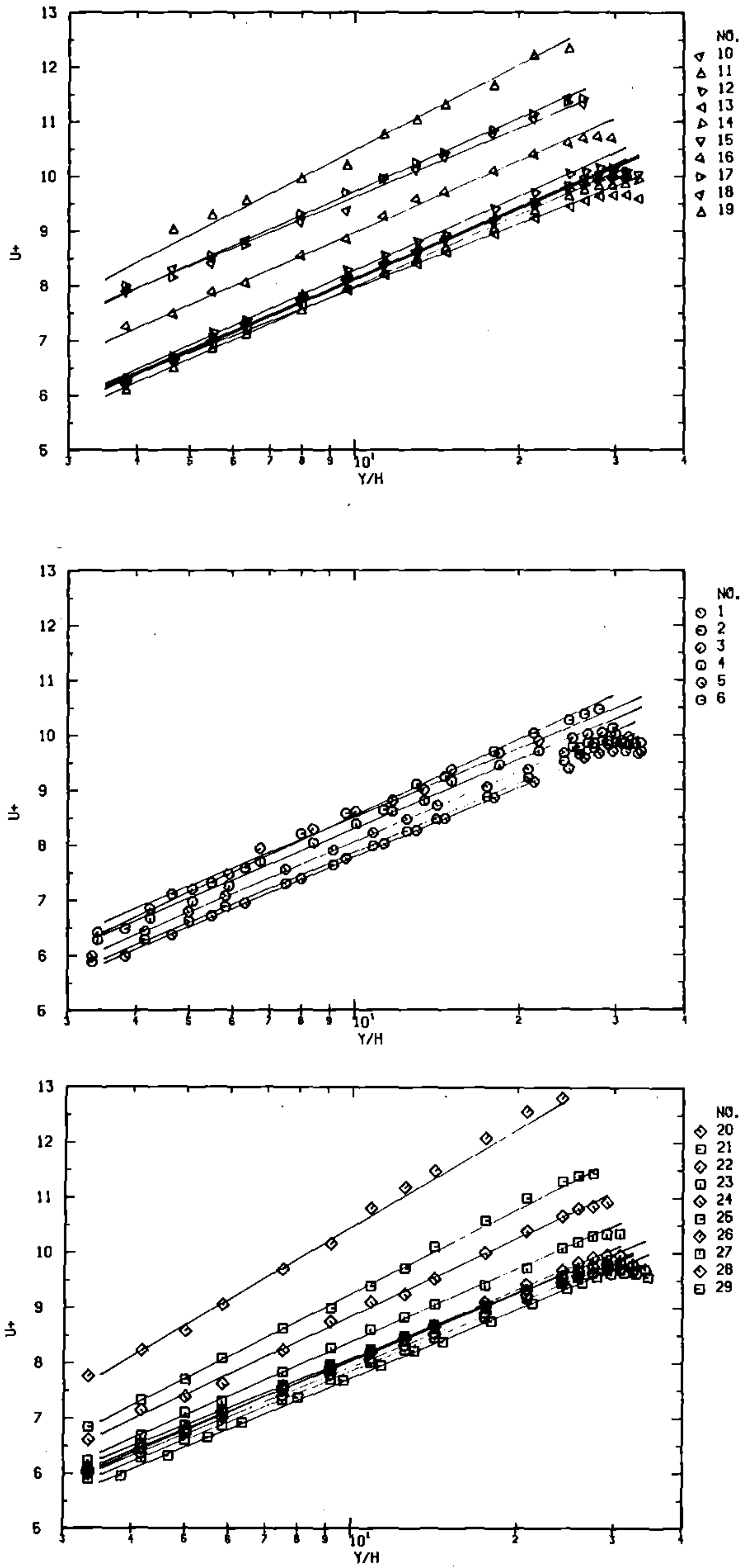


Fig.10: Non-dimensional velocity profiles in the rough zone in test section 12-85 (3-dim. roughness, α = 0.386)

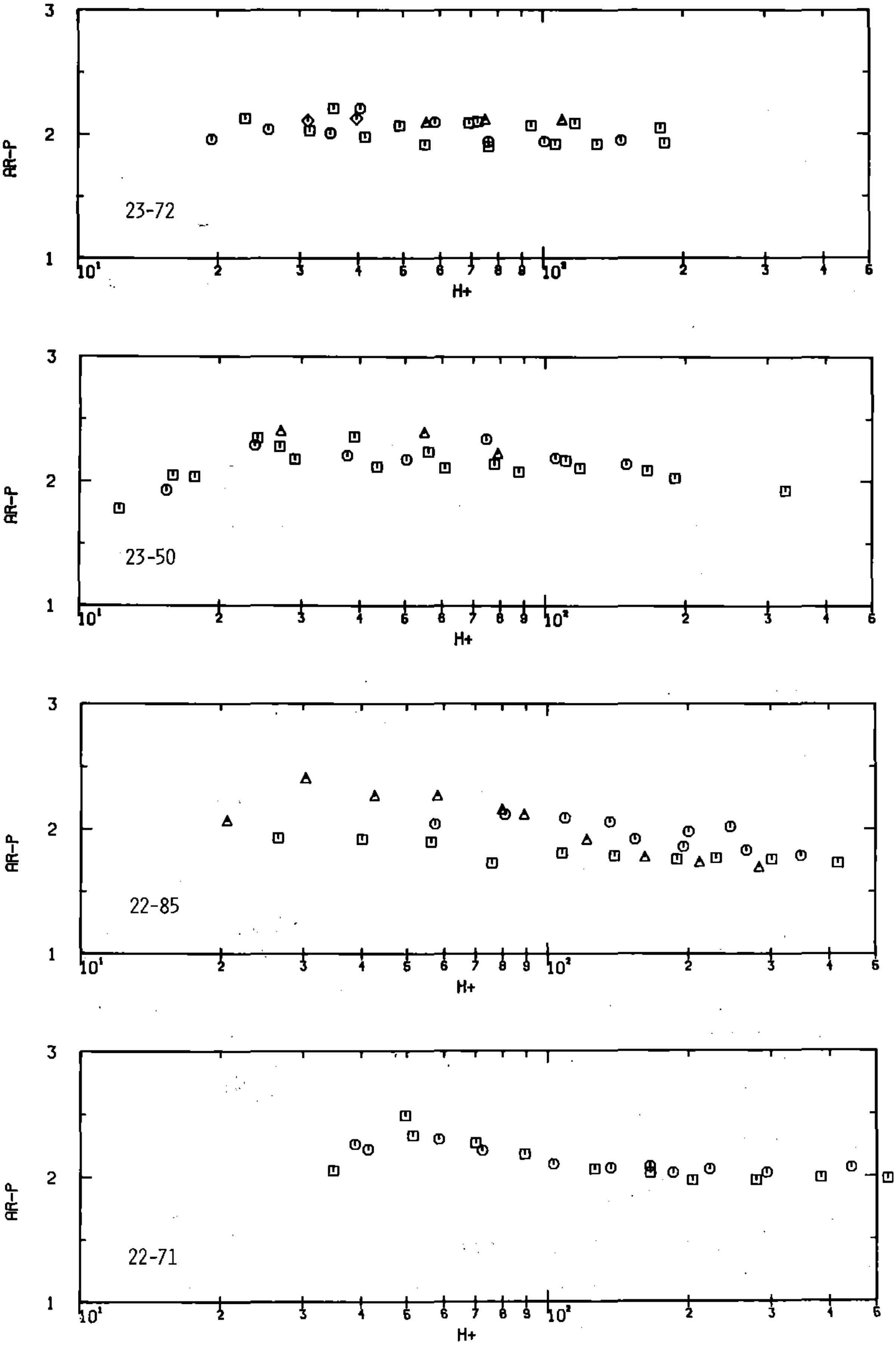


Fig.11: The slope A_r of the non-dimensional velocity profile in the rough zone with 2-dimensional roughness, determined by a least square fit.

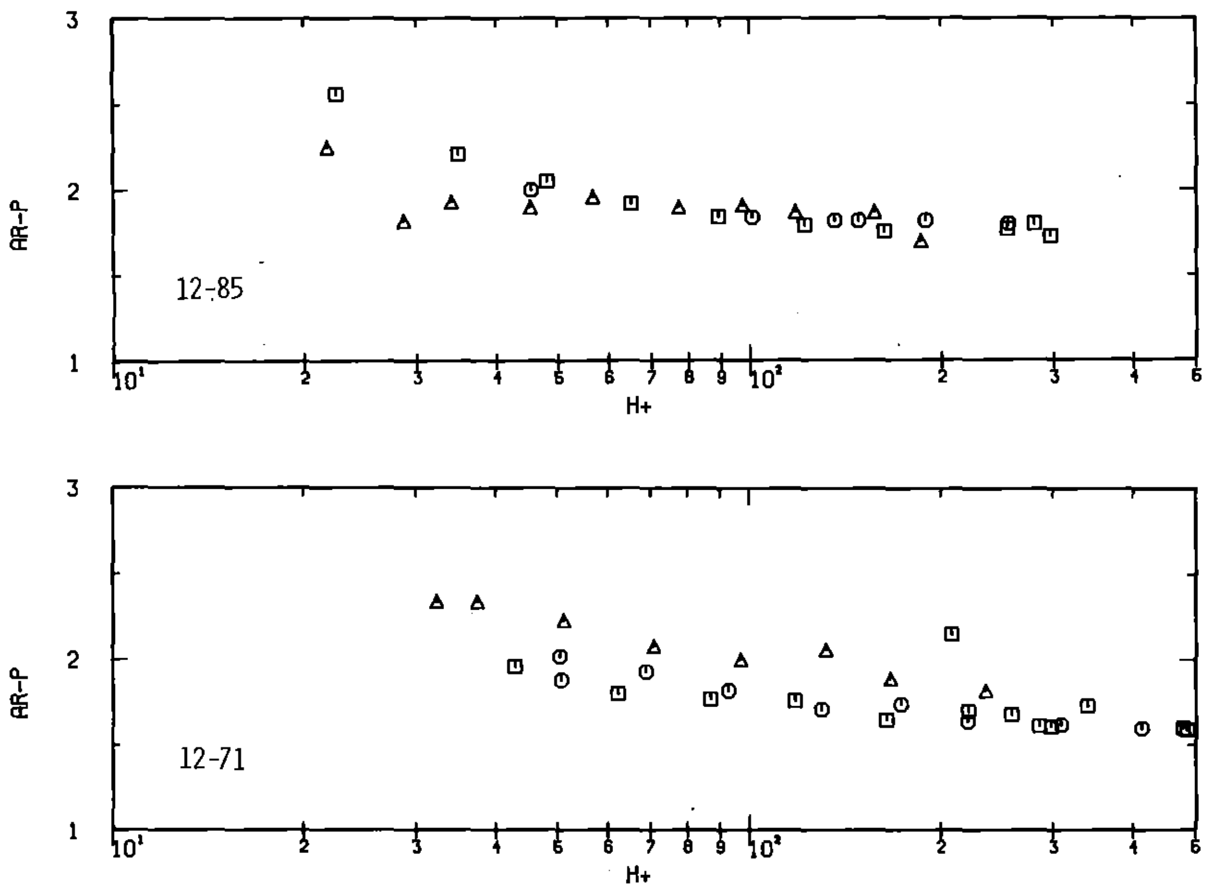
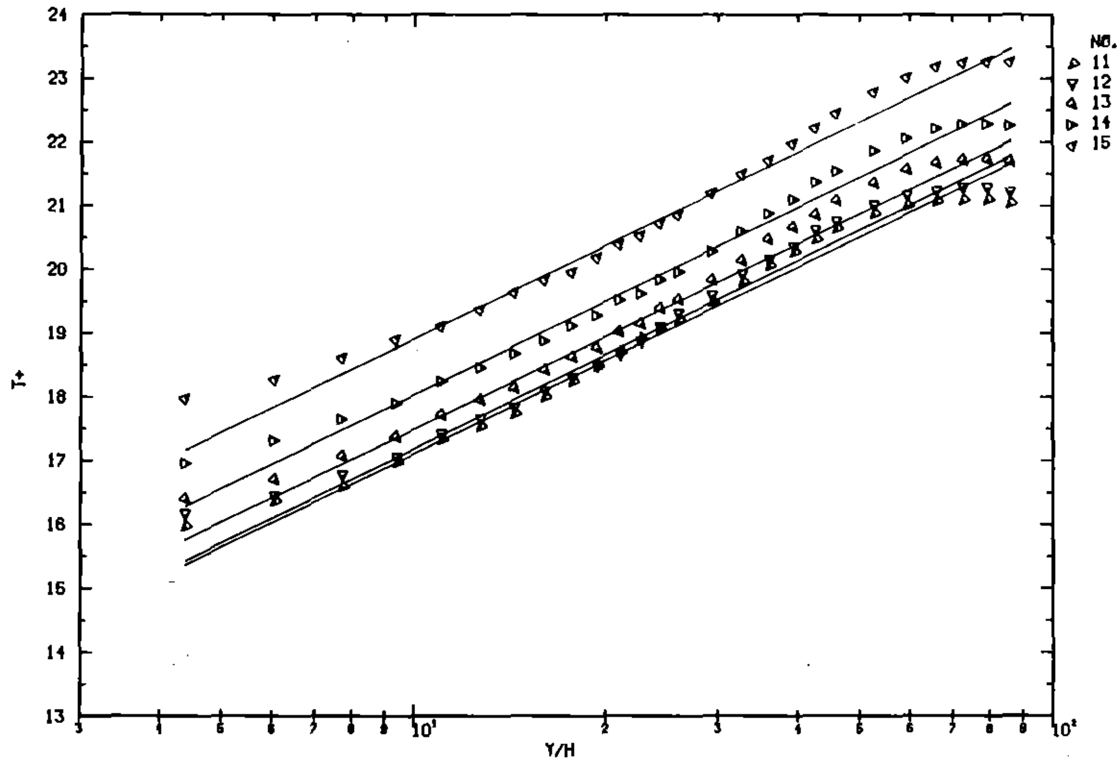


Fig.12: The slope A_r of the non-dimensional velocity profile in the rough zone with 3-dimensional roughness, determined by a least square fit



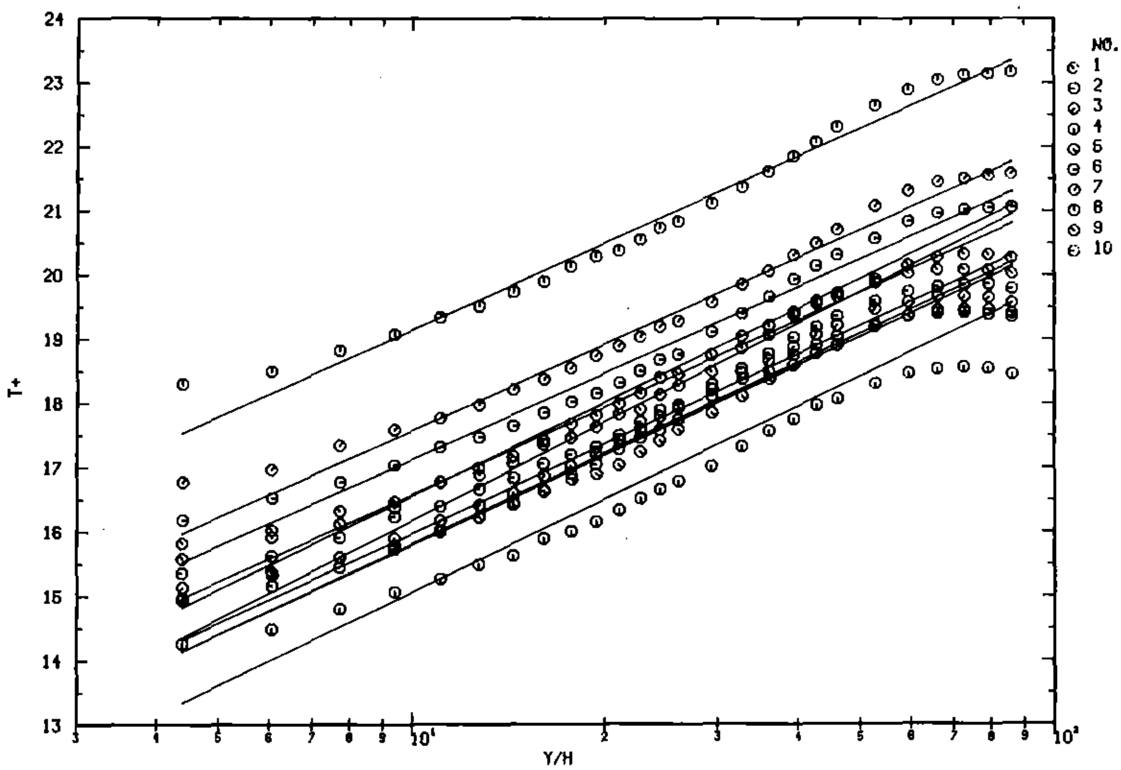
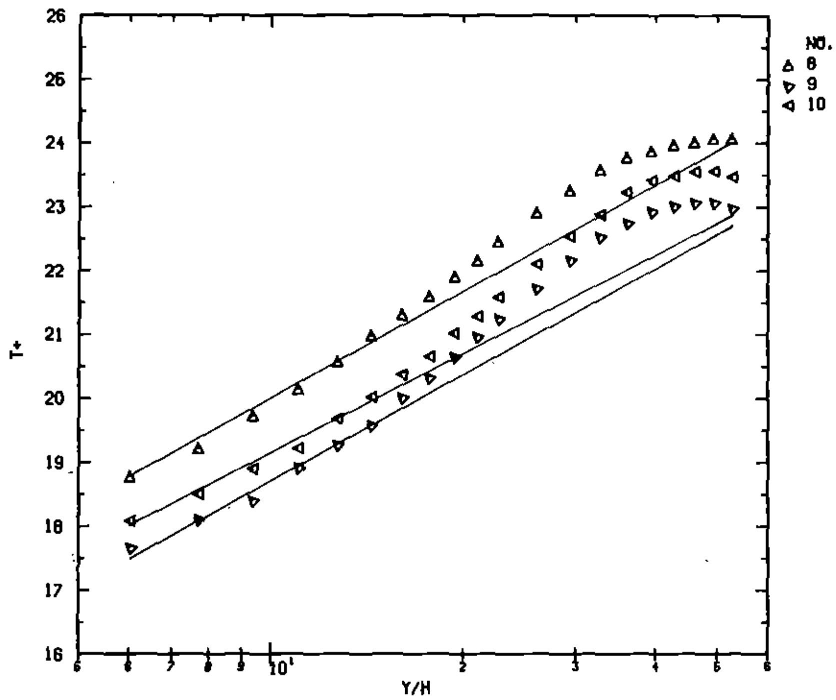


Fig.13: Non-dimensional temperature profiles in test section 23-70



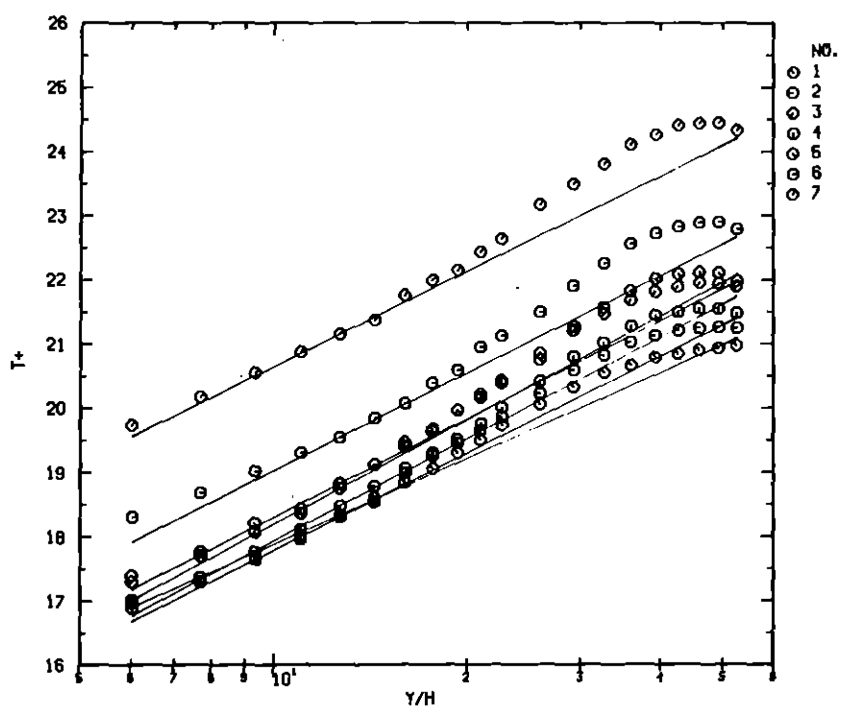
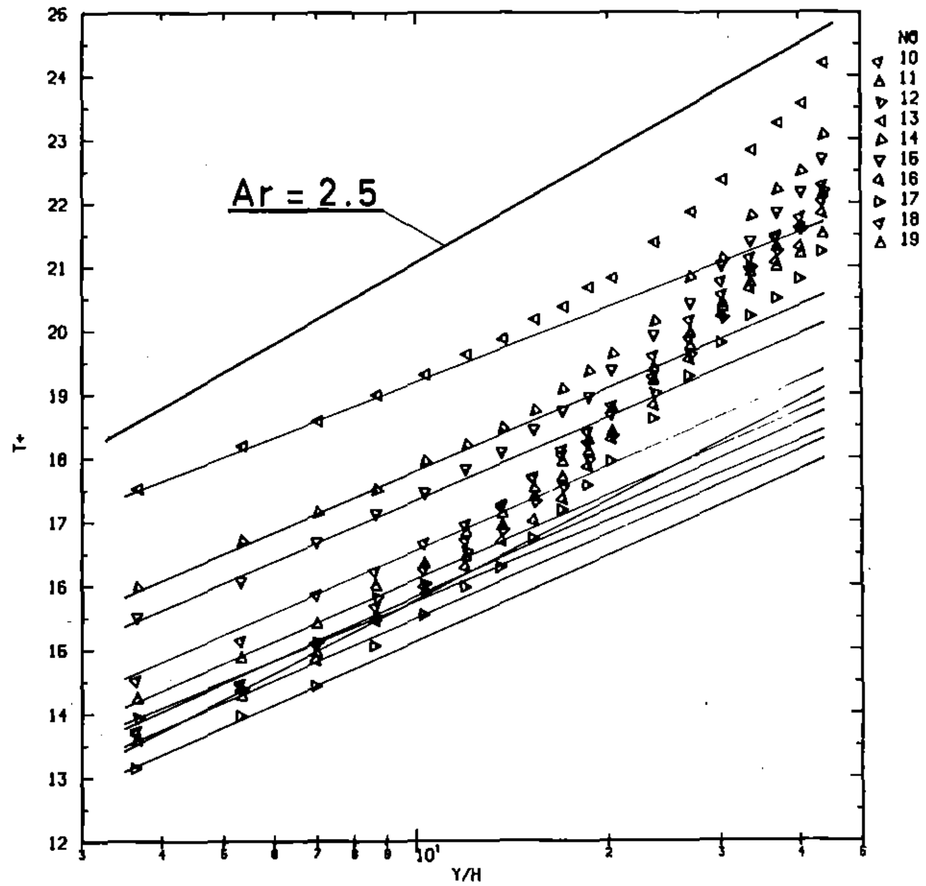


Fig.14: Non-dimensional temperature profiles in test section 23-50



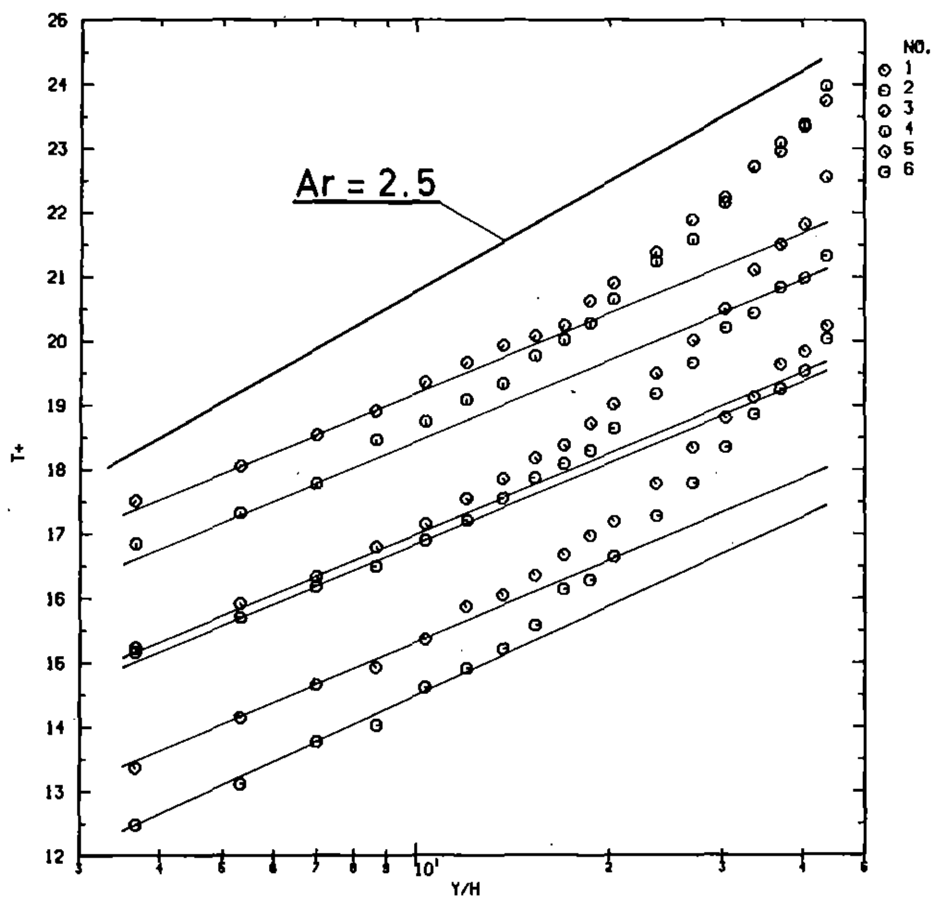


Fig.15: Non-dimensional temperature profiles in test section 12-85

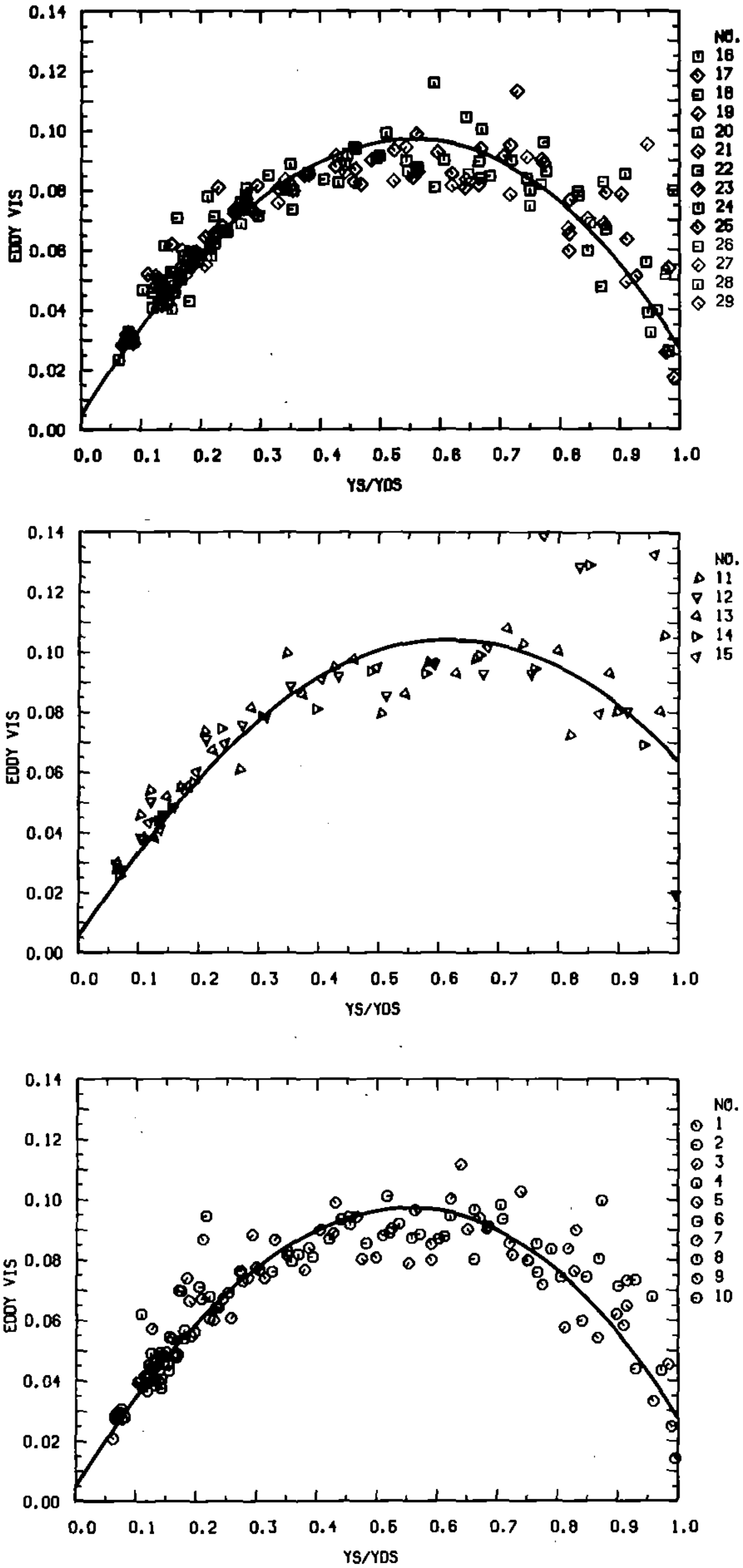


Fig.16: Non-dimensional eddy viscosity ε_s^+ in the smooth zone in test section 23-72, with least square fit line, YS/YDS = $y_s/\hat{y}_s$

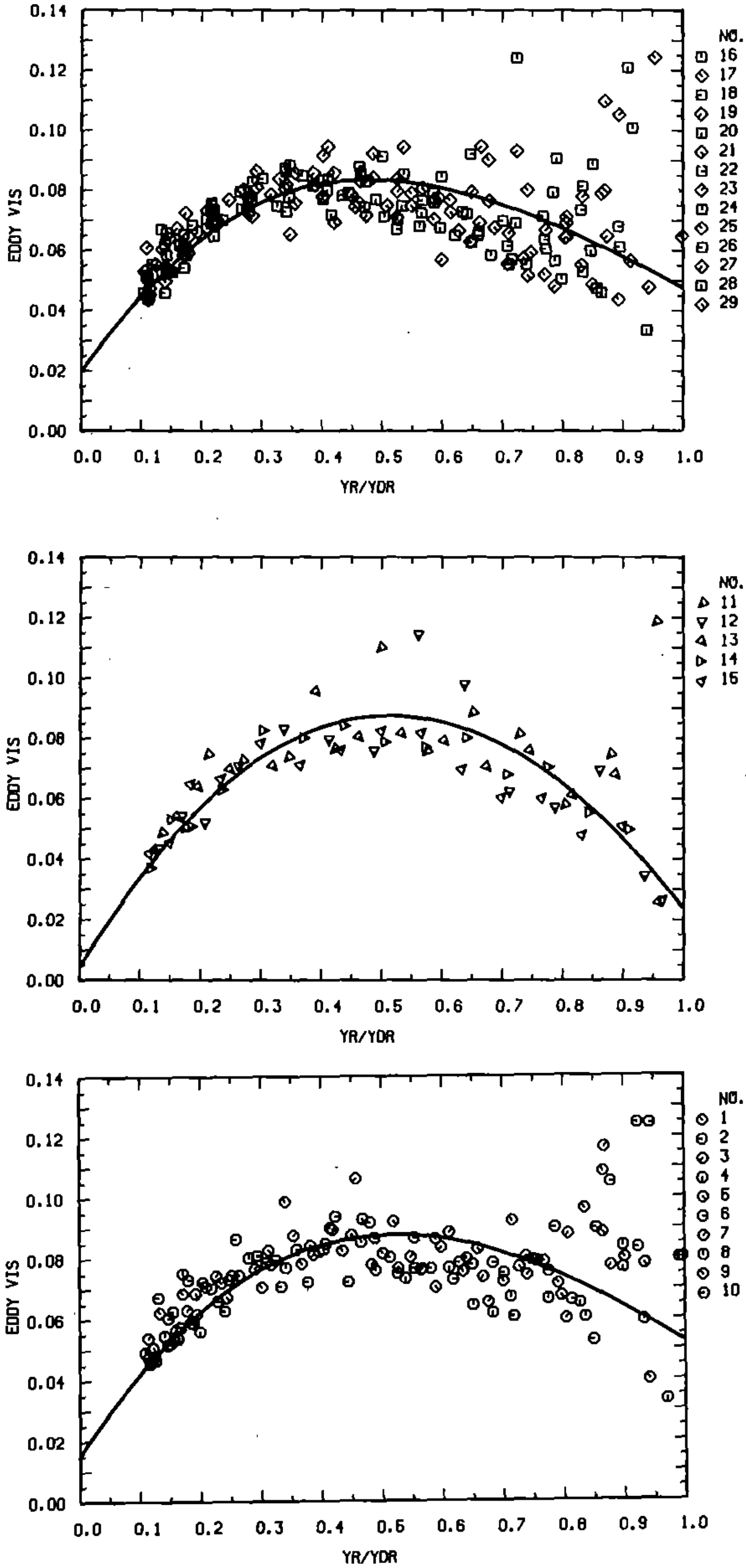


Fig.17: Non-dimensional eddy viscosity ε_r^+ in the rough zone in test section 23-72 with least square fit line, YR/YDR = $y_r/\hat{y}_r$

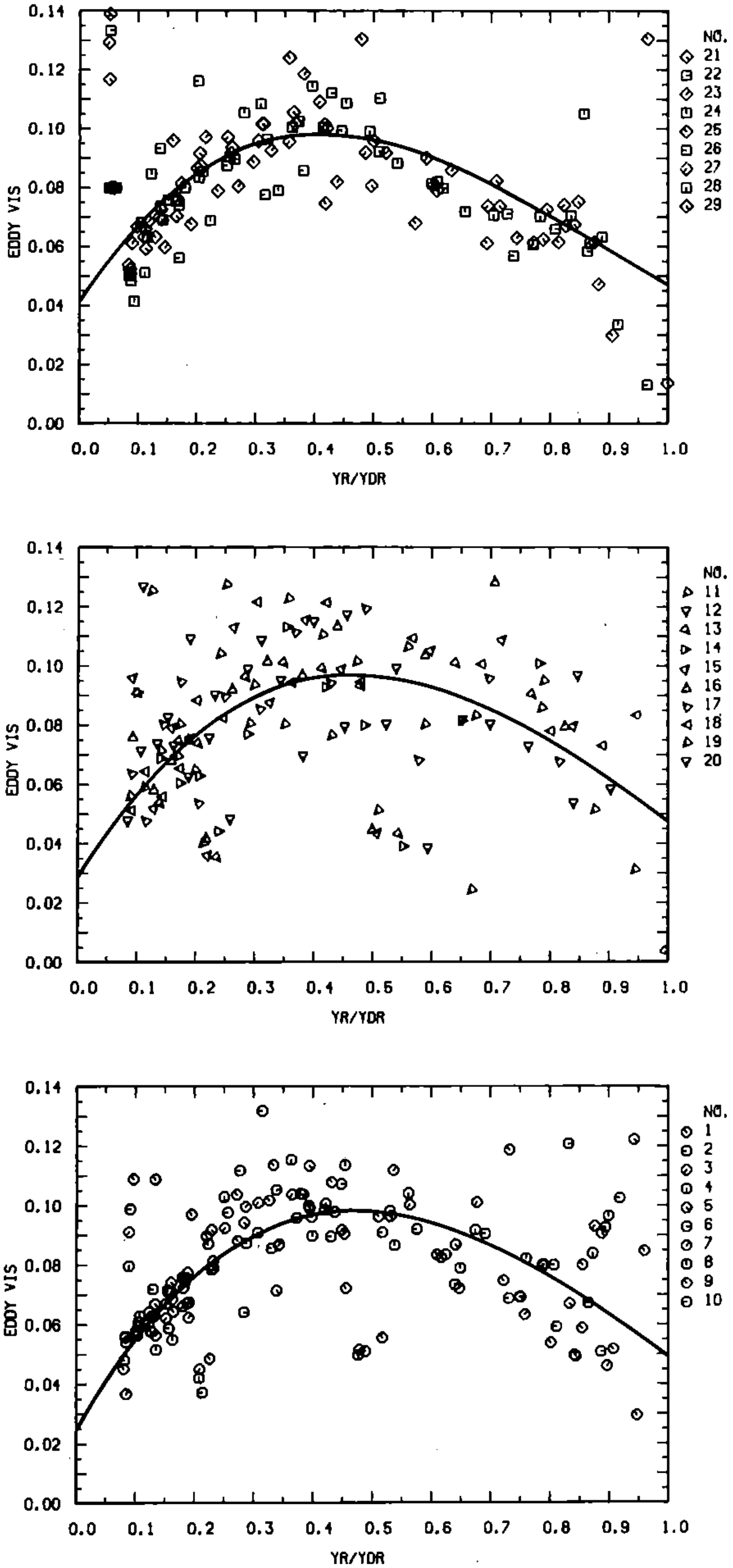


Fig.18: Non-dimensional eddy viscosity ε_r^+ in the rough zone in test section 22-85 with least square fit line

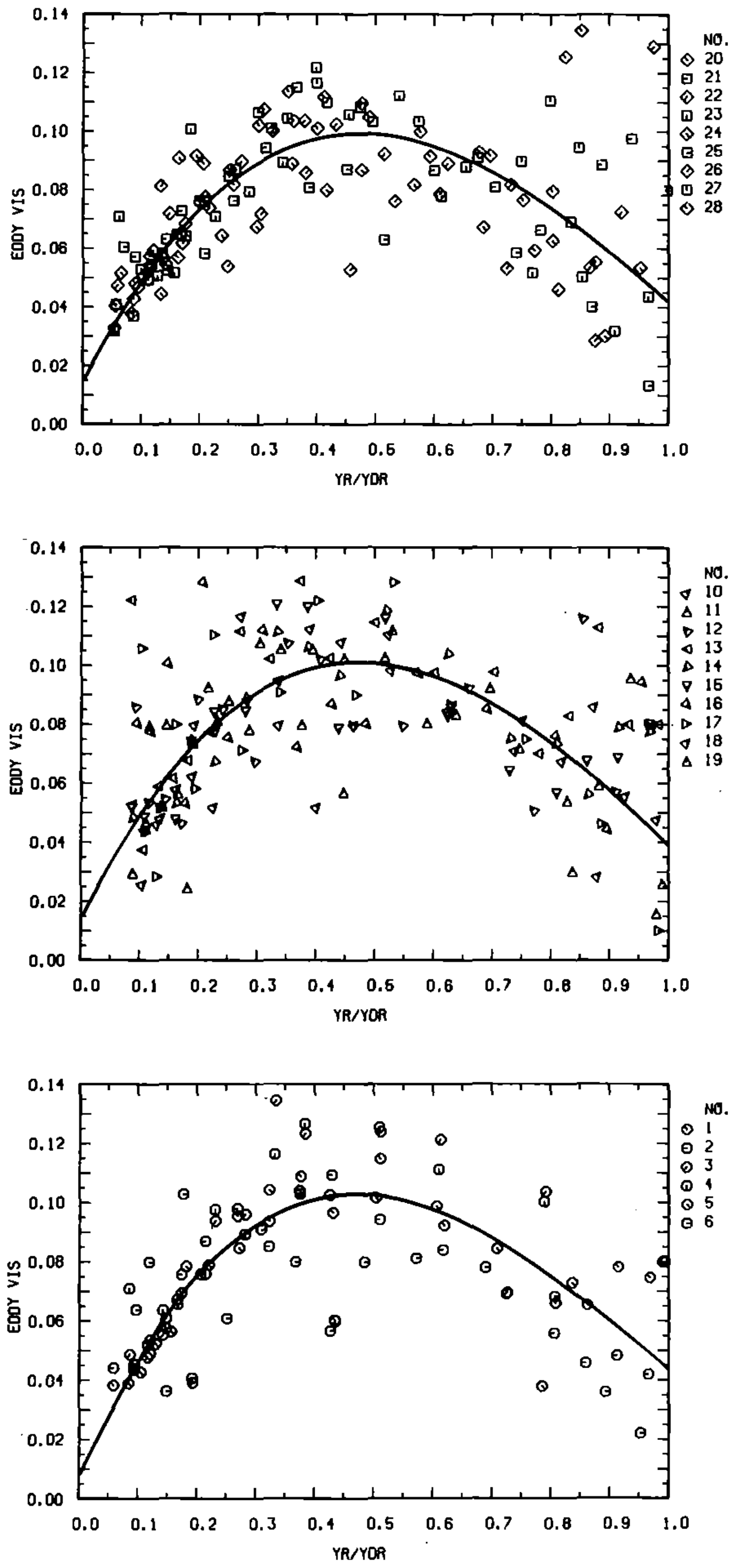
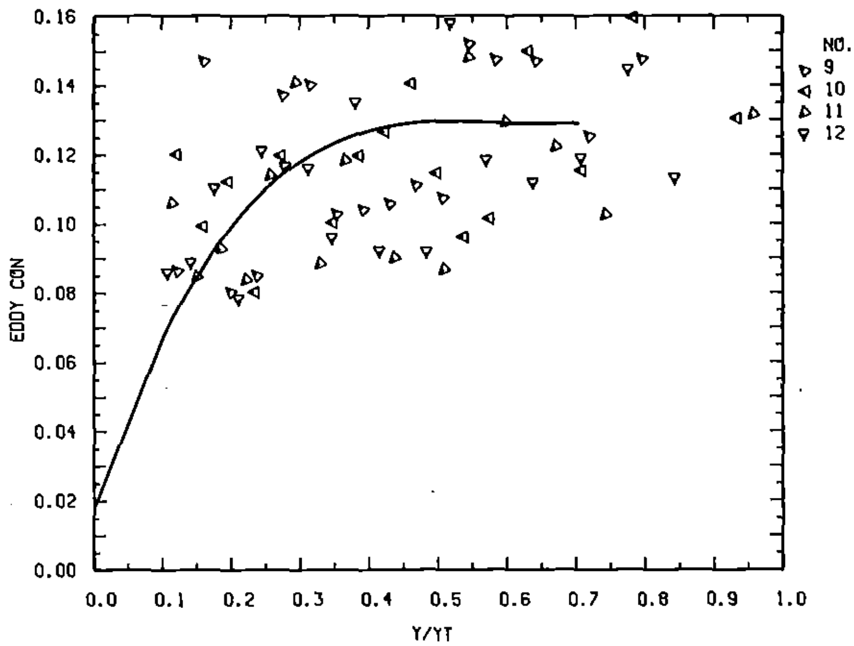


Fig.19: Non-dimensional eddy viscosity ε_r^+ in the rough zone in test section 12-85 with least square fit line



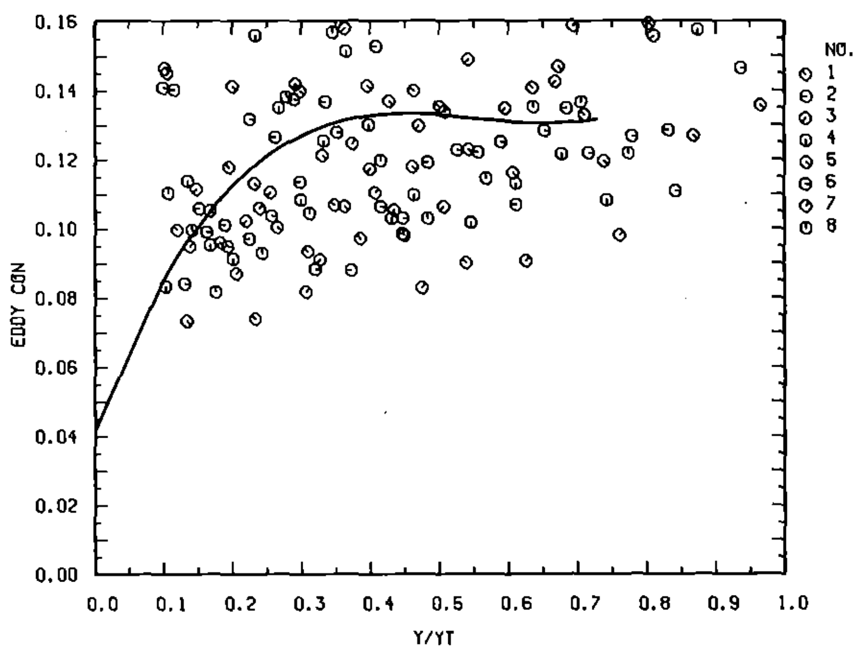


Fig.20: Non-dimensional eddy conductivity ε_H^+ in test section 23-72 with least square fit line, $Y/YT = y_r/\hat{y}_r$

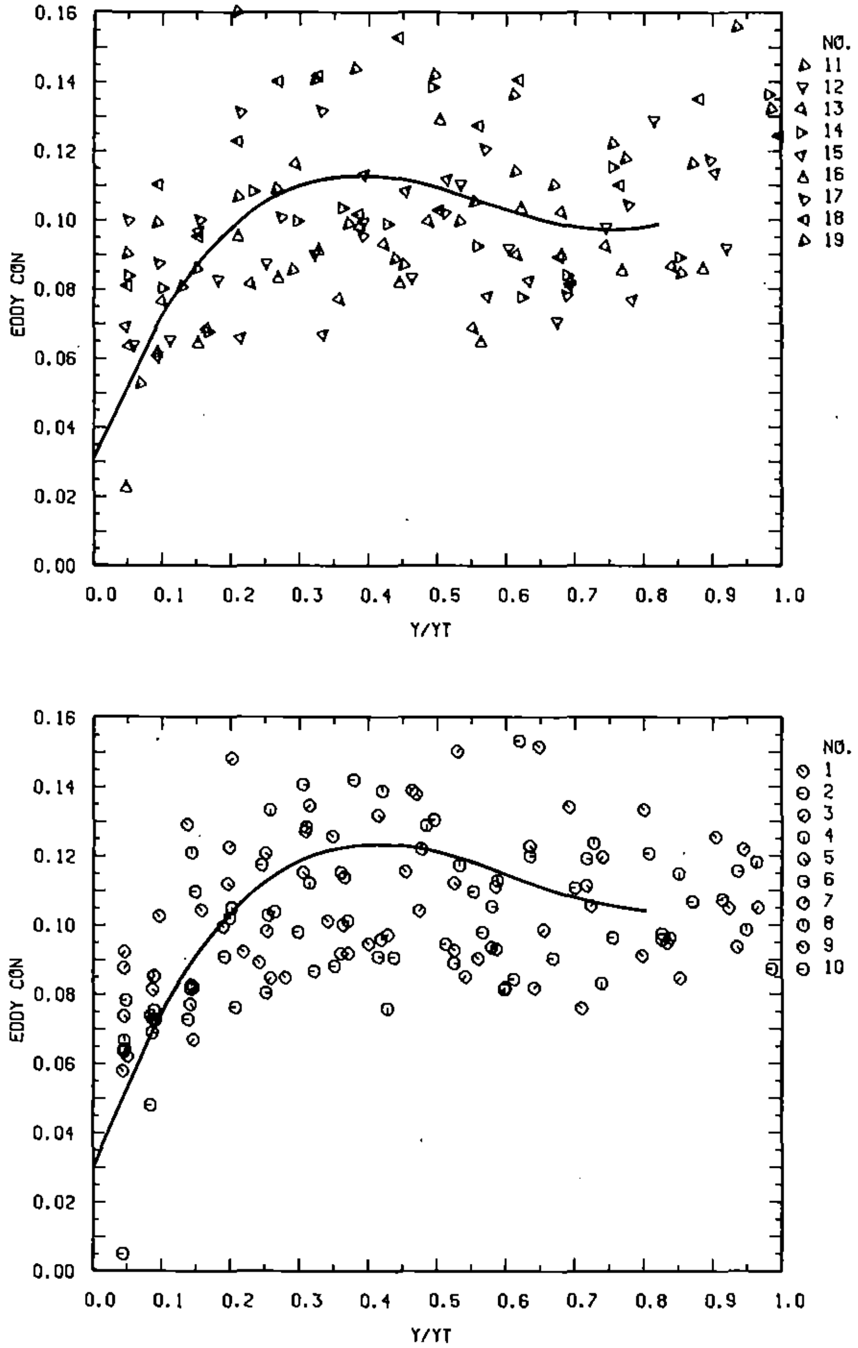


Fig.21: Non-dimensional eddy conductivity ε_H^+ in test section 22-85 with least square fit line

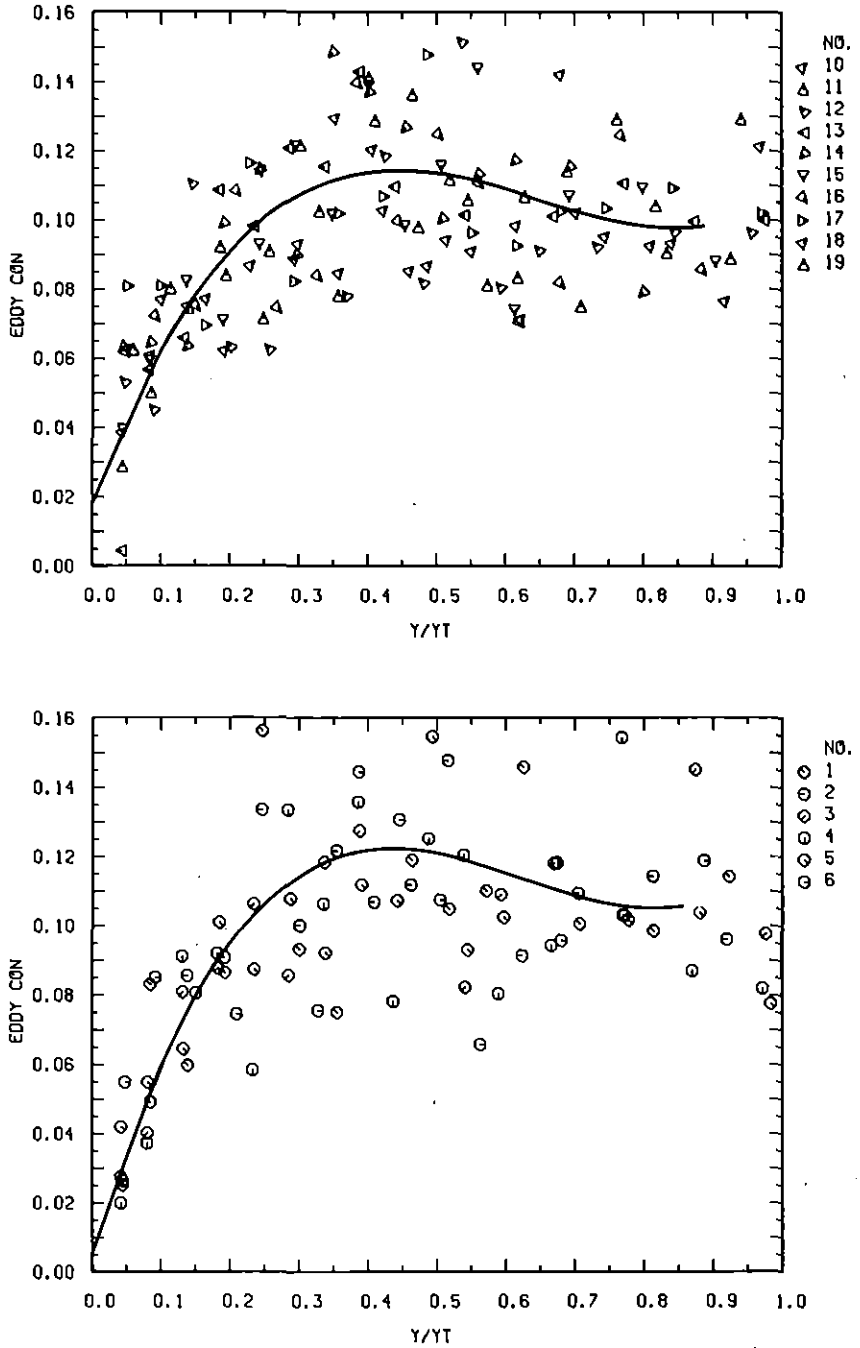


Fig.22: Non-dimensional eddy conductivity ε_H^+ in test section 12-85 with least square fit line

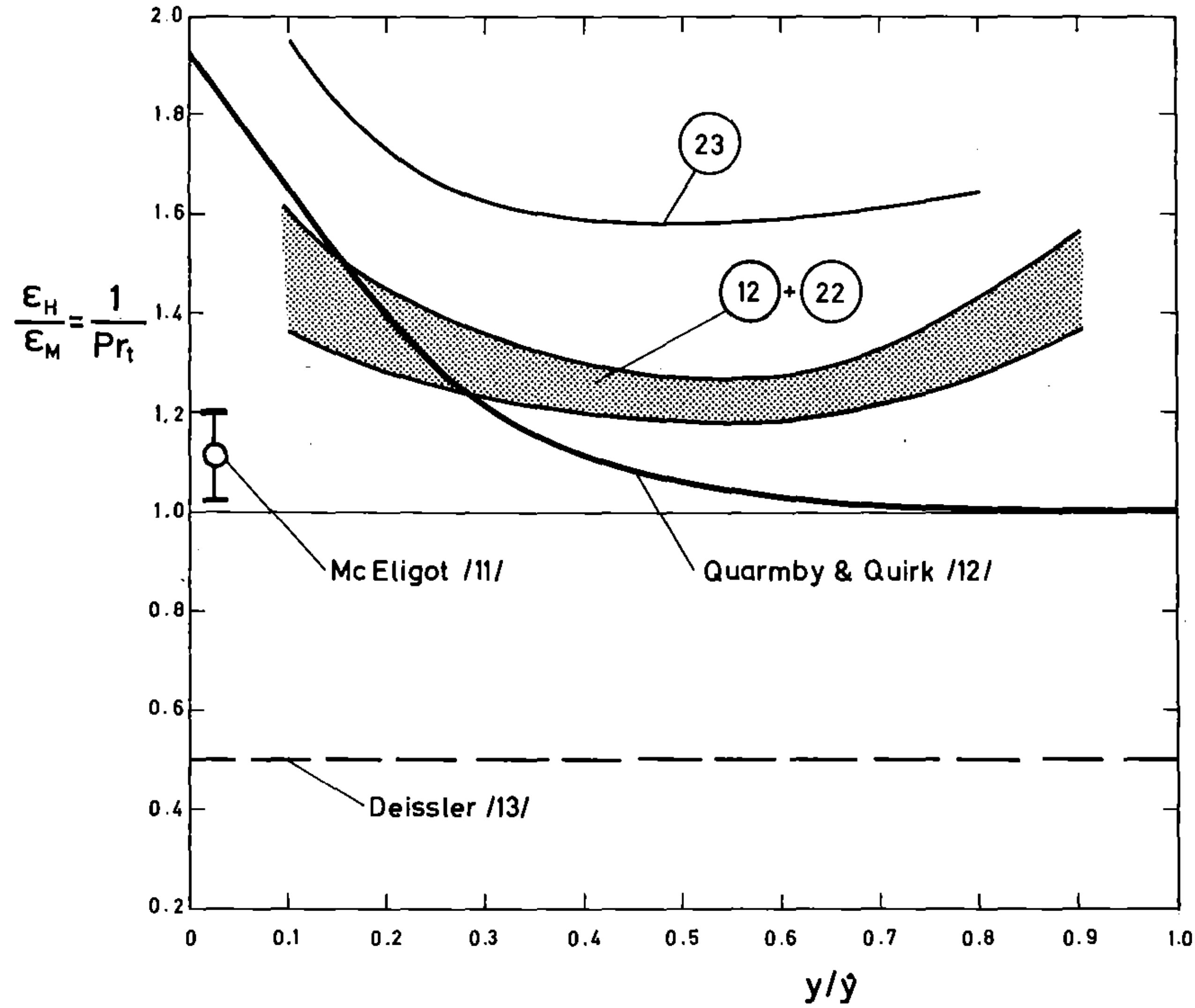


Fig. 23: Variation of Pr_t in rough annuli compared with data suggested by various authors for gas flow in smooth tubes

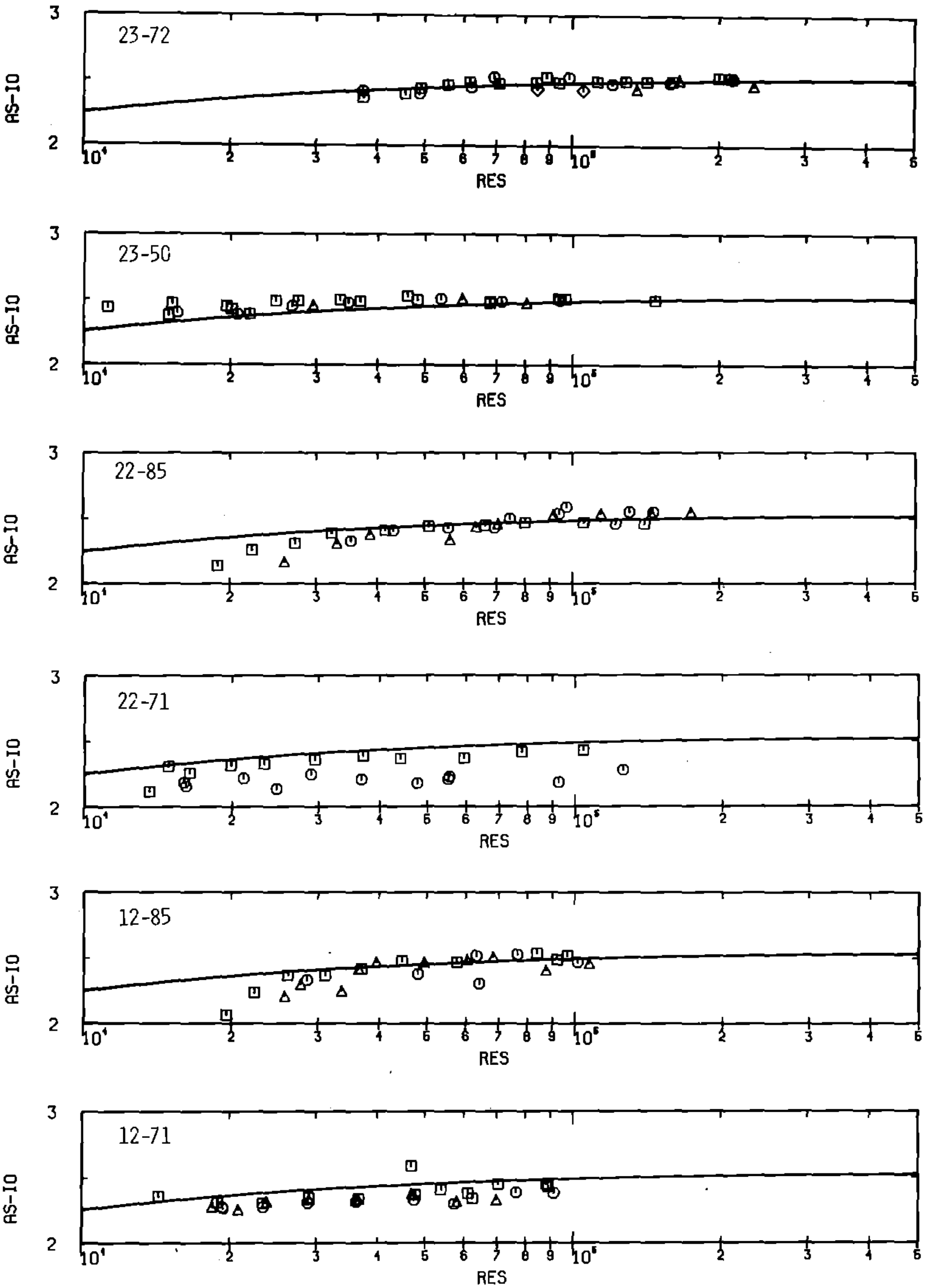


Fig.24: Variation of A_{SO} with Reynolds number, determined by Eq. (22) and (30), with a line according to Eq. (31)

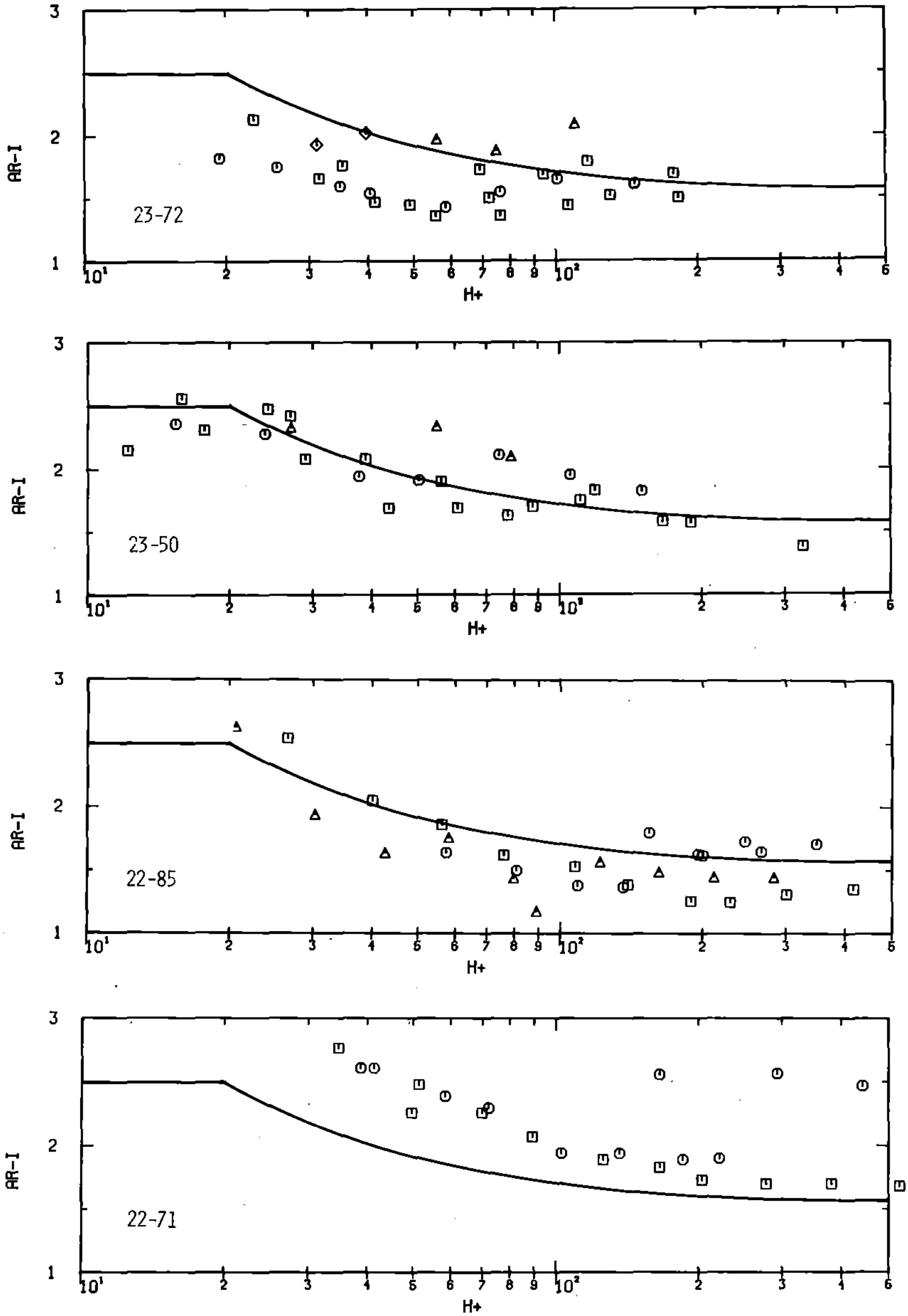


Fig.25a: Variation of A_r with h^+, determined by Eq.(23), with a line according to Eq.(32), (2-dimensional roughness)

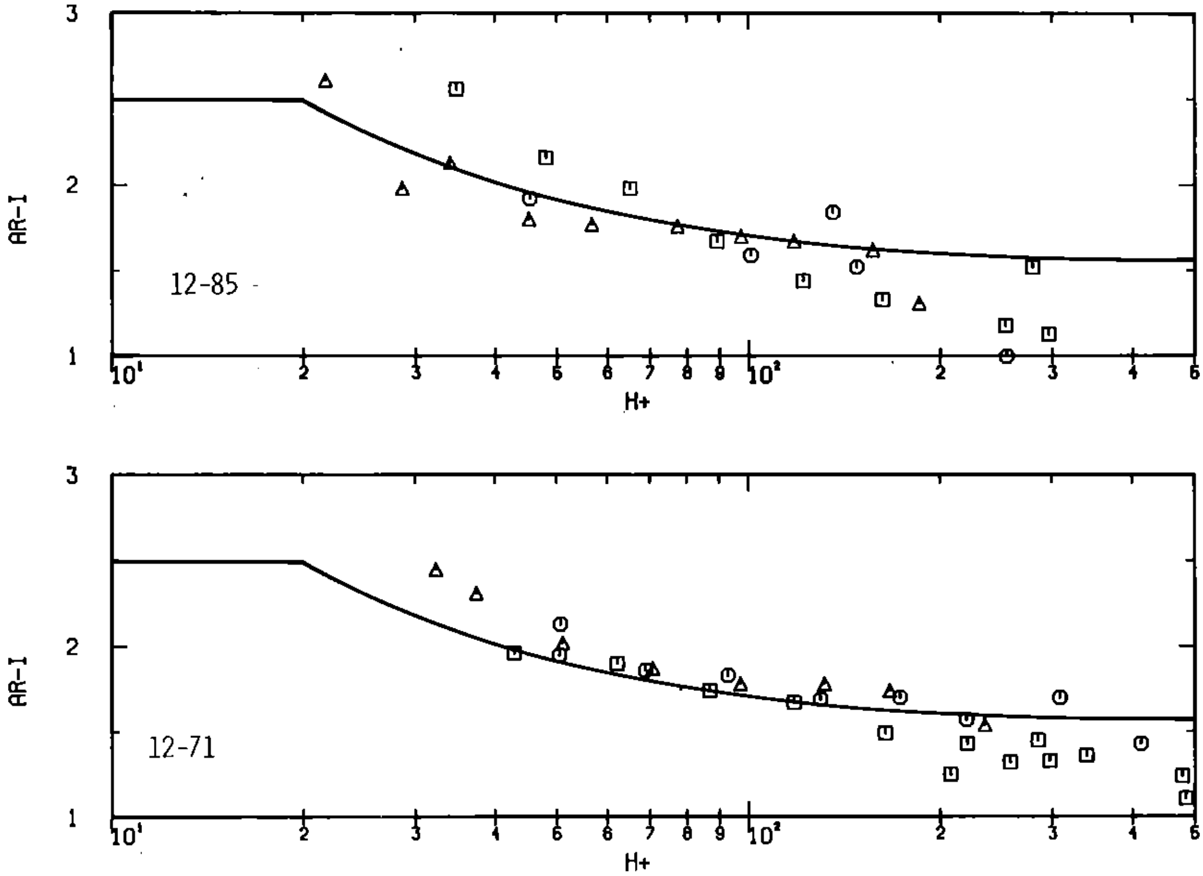


Fig.25b: Variation of A_r with h^+, determined by Eq.(23), with a line according to Eq.(32), (3-dimensional roughness)

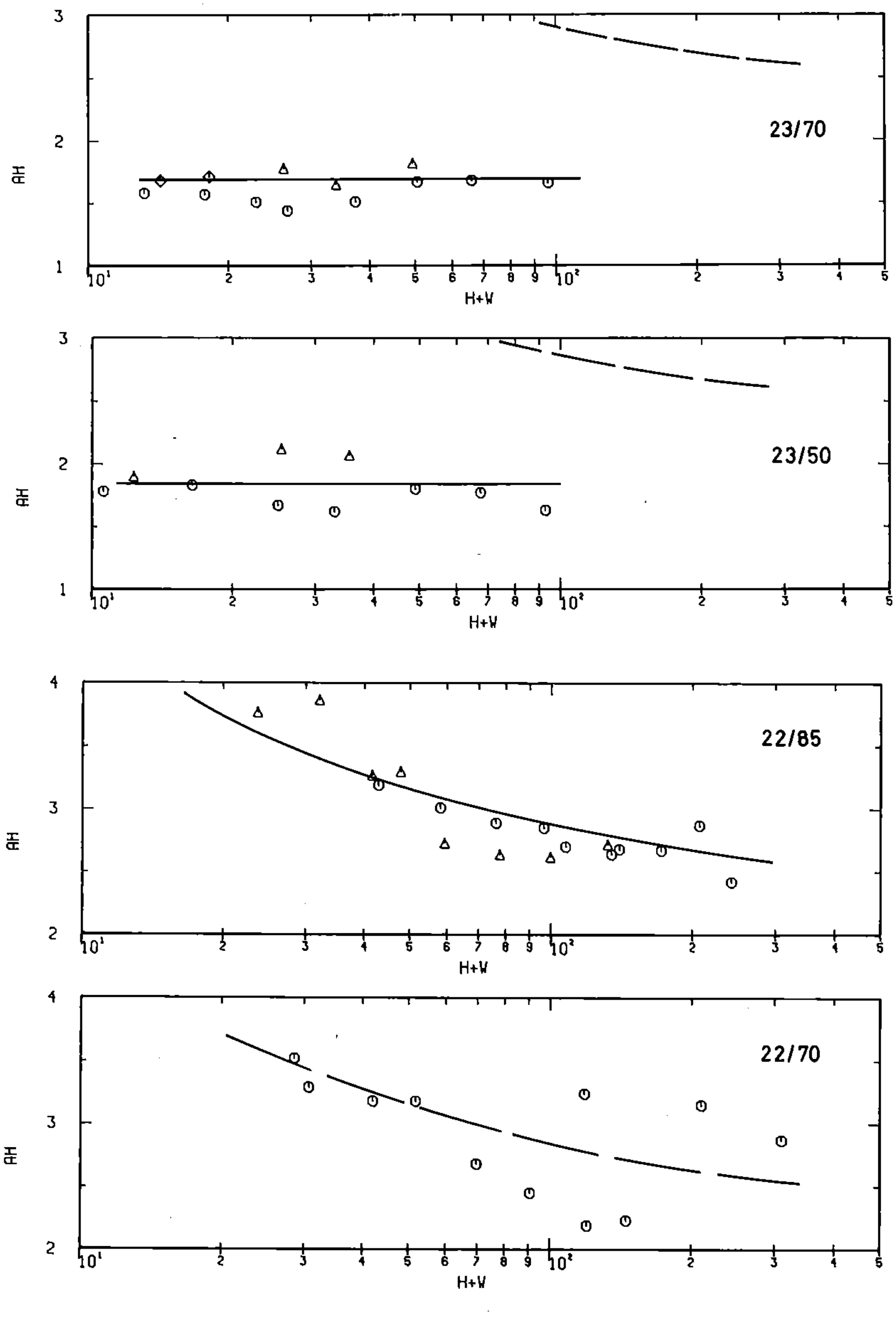


Fig. 25c: The slope of the temperature profile determined by Eq.(27)

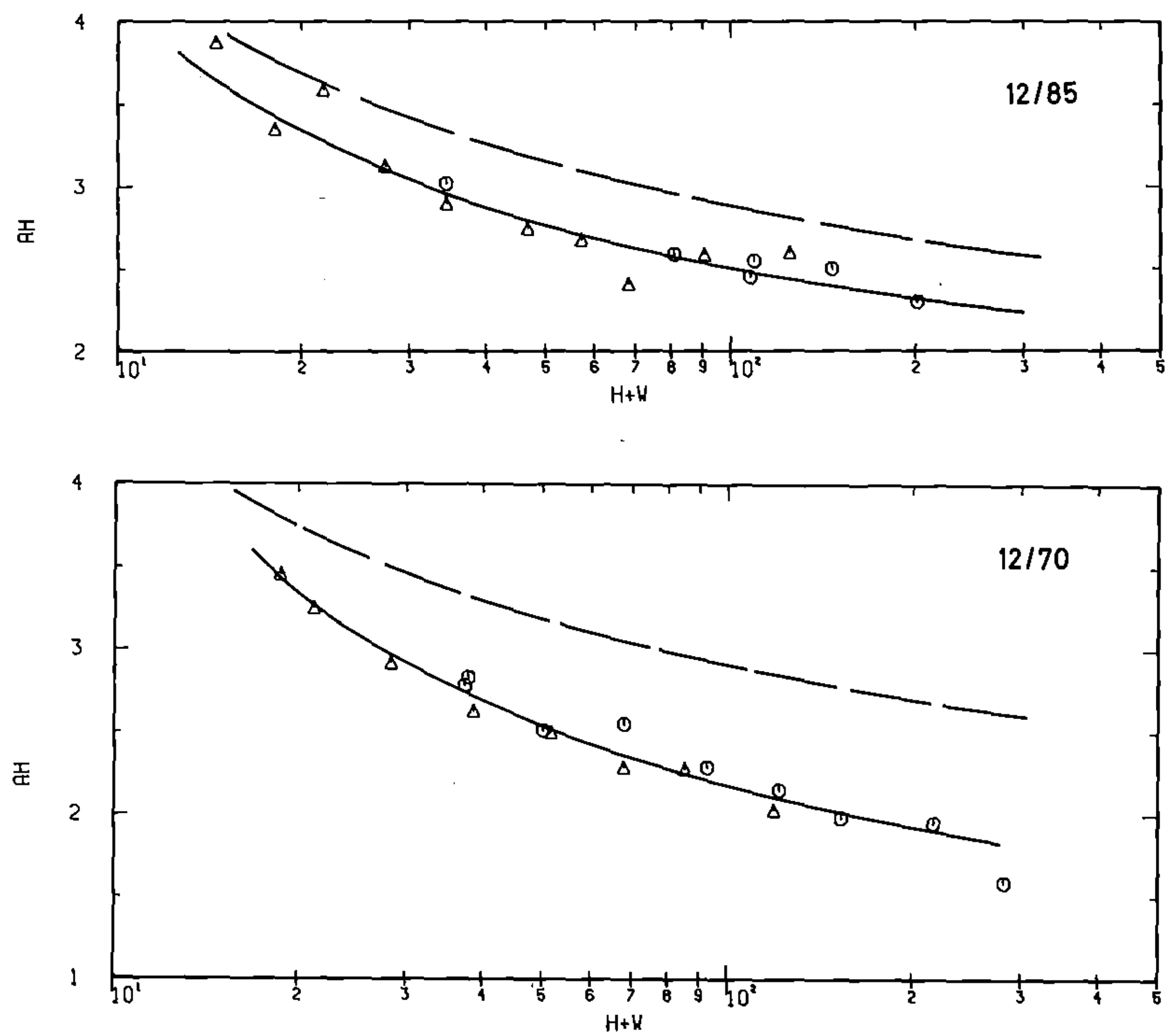


Fig. 25d: The slope of the temperature profile determined by Eq.(27)

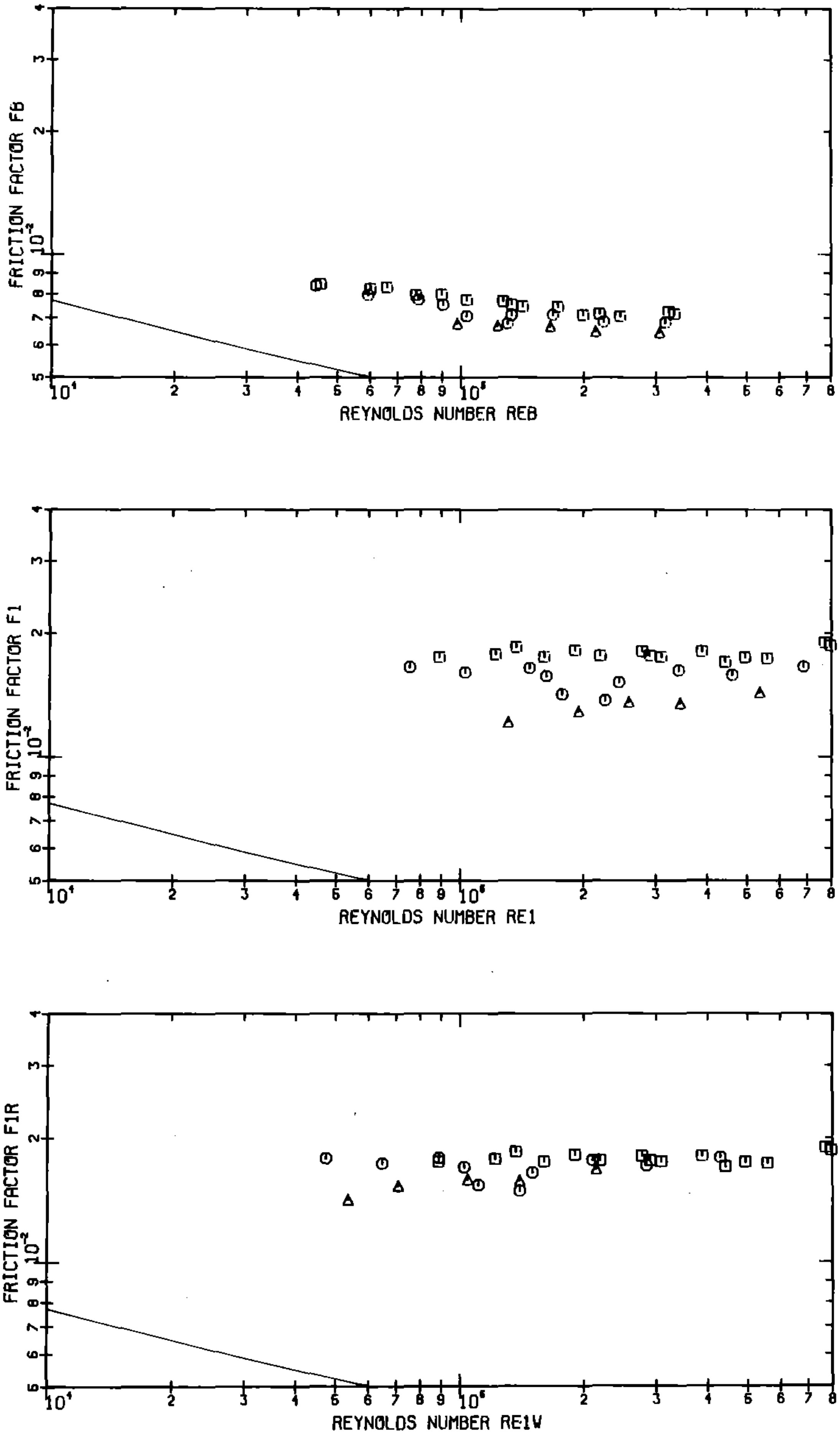


Fig.26: Friction factor versus Reynolds number (23-72)

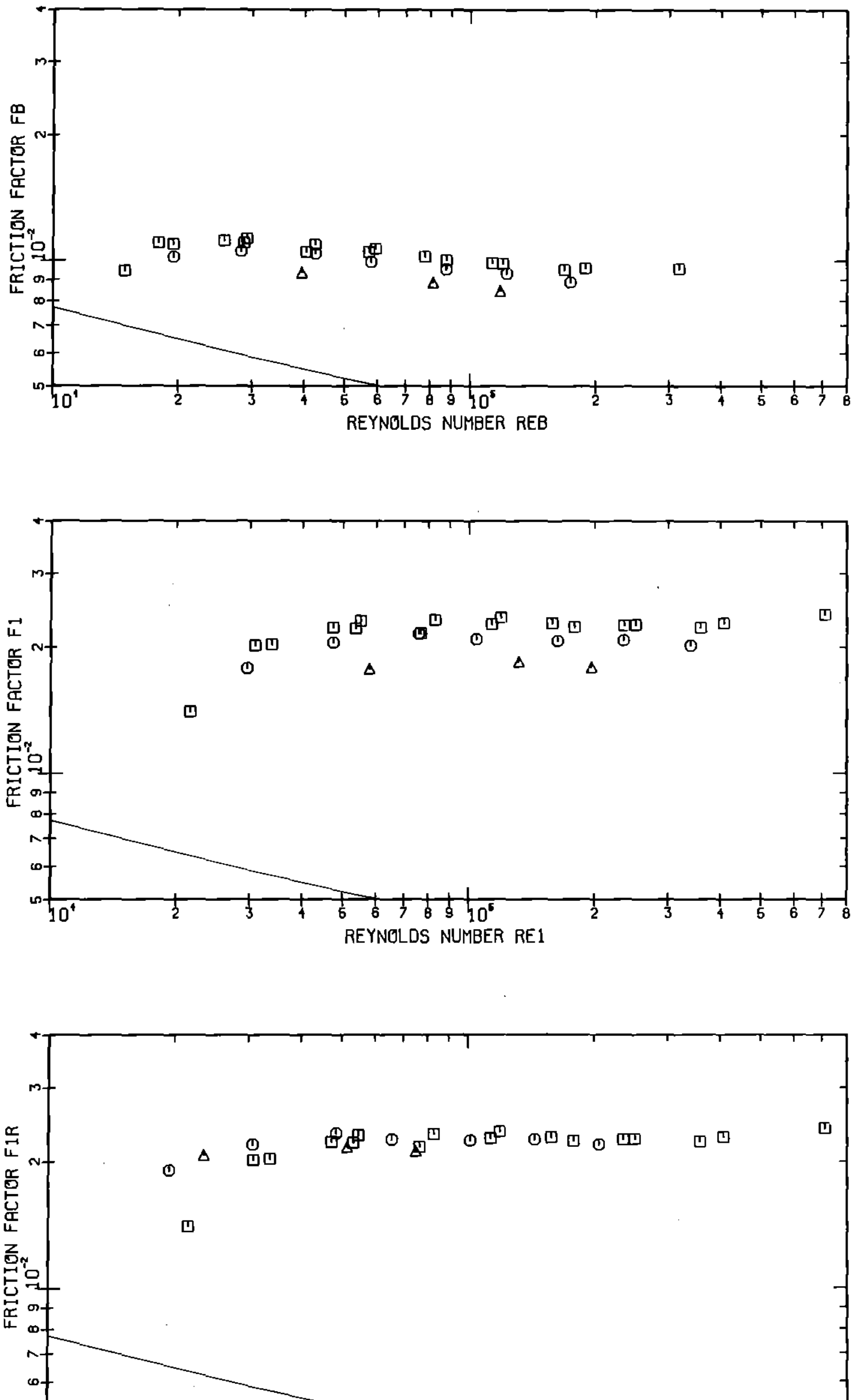


Fig.27: Friction factor versus Reynolds number (23-50)

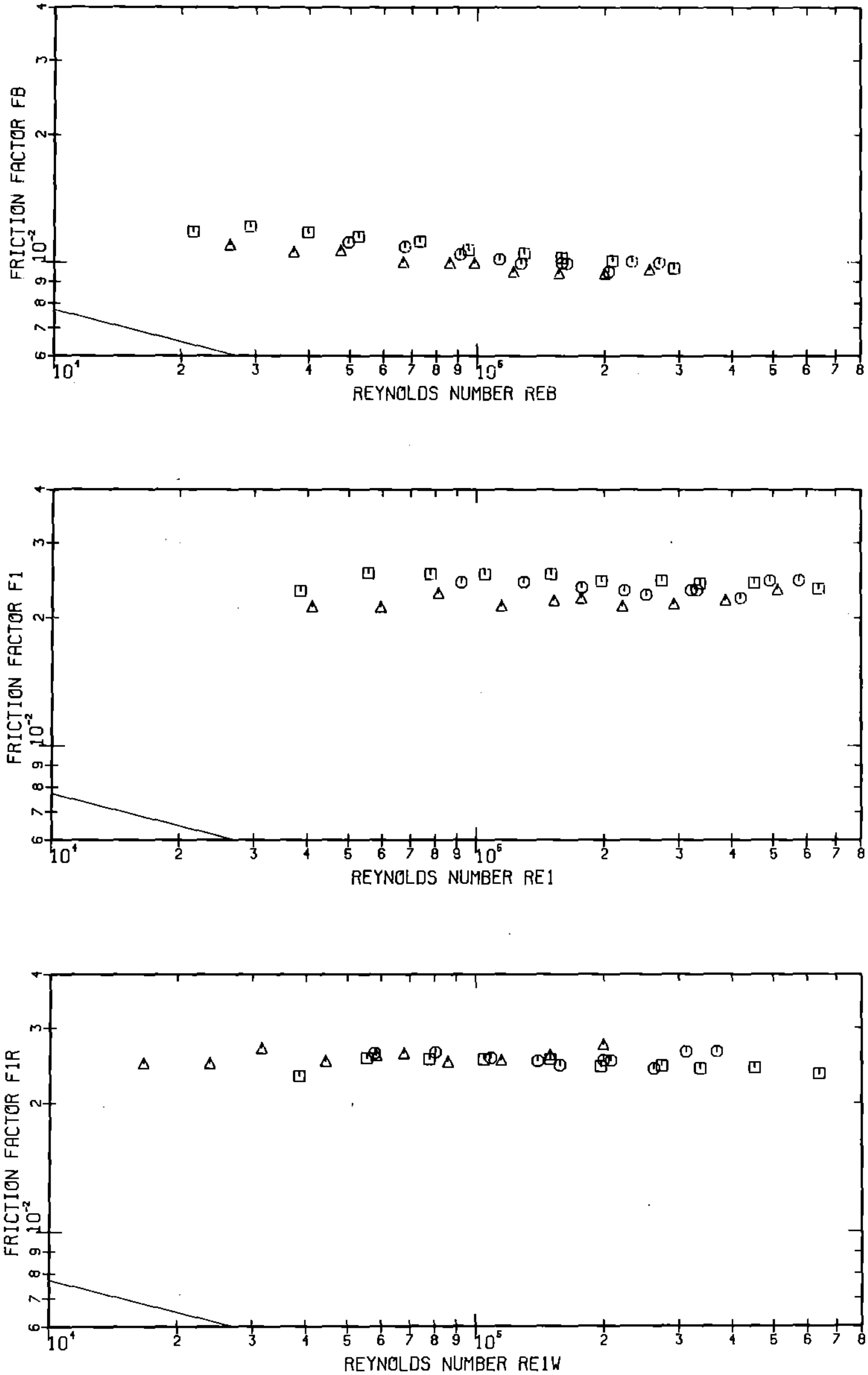


Fig.28: Friction factor versus Reynolds number (22-85)

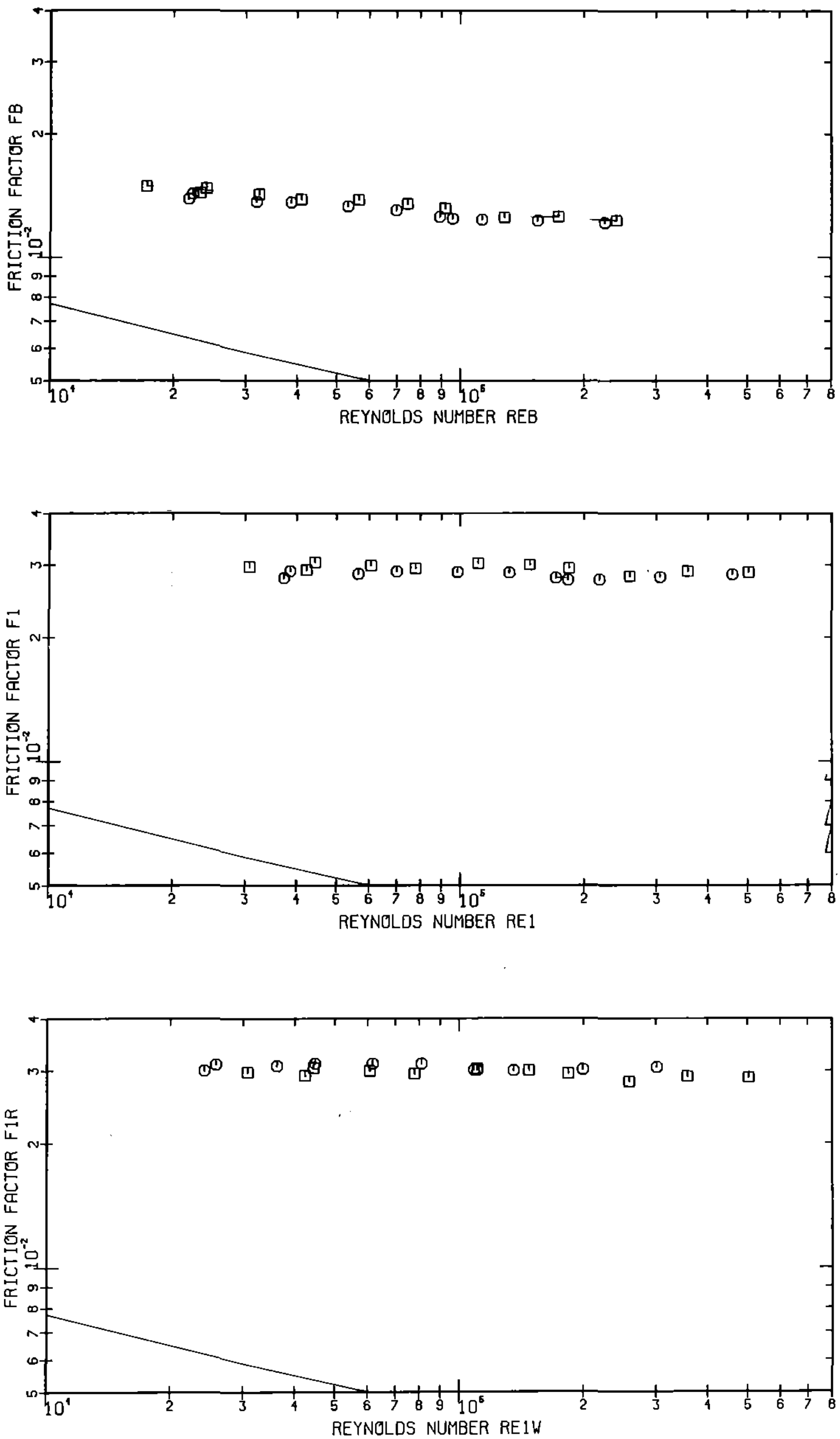
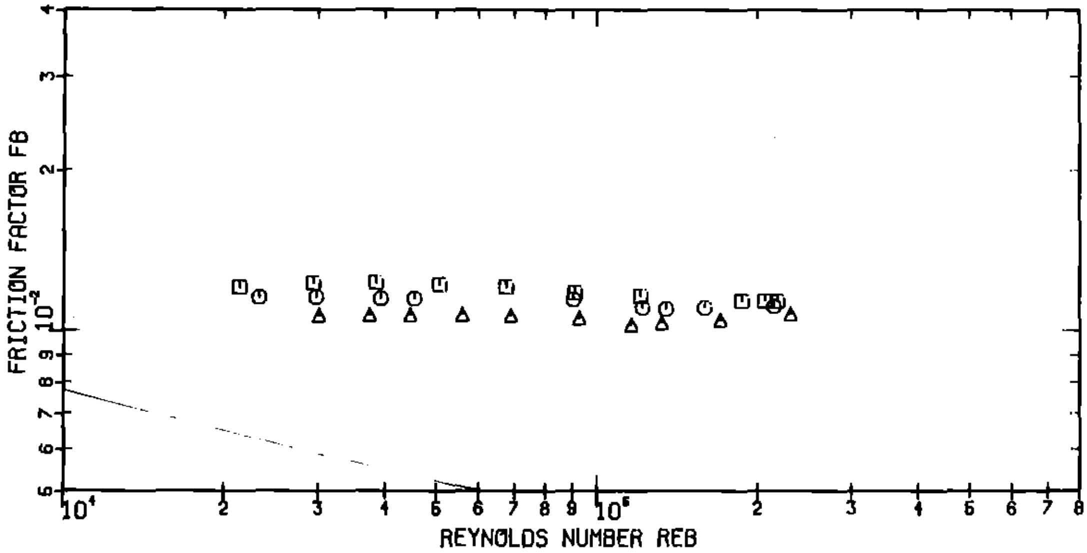
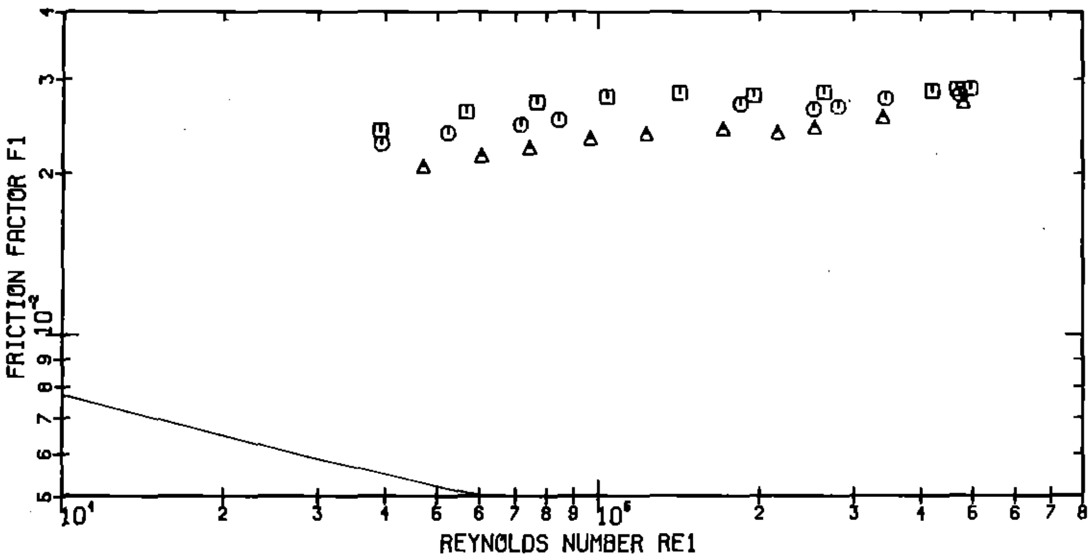


Fig.29: Friction factor versus Reynolds number (22-71)





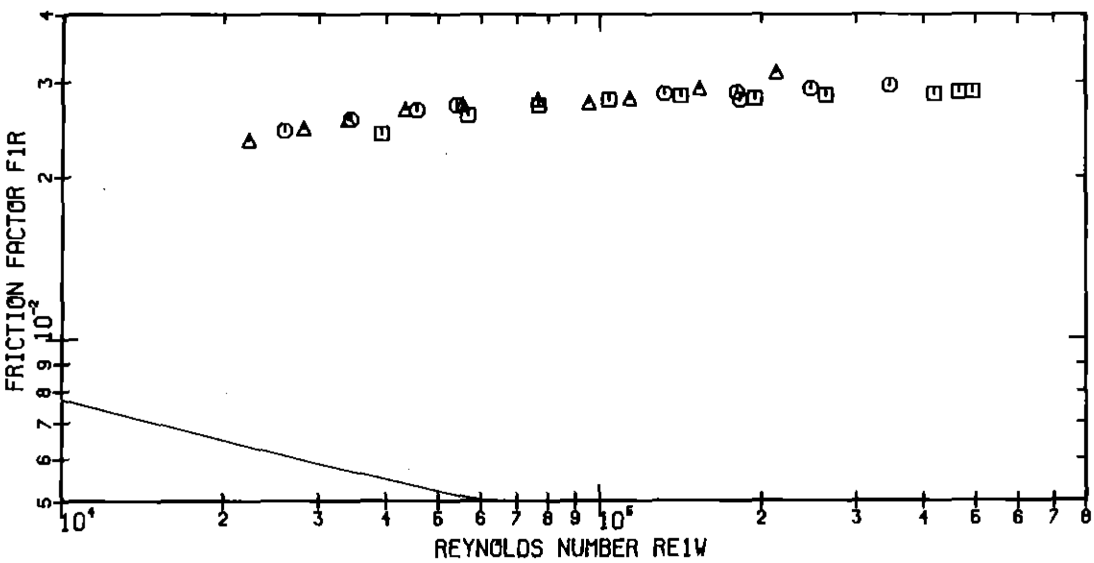
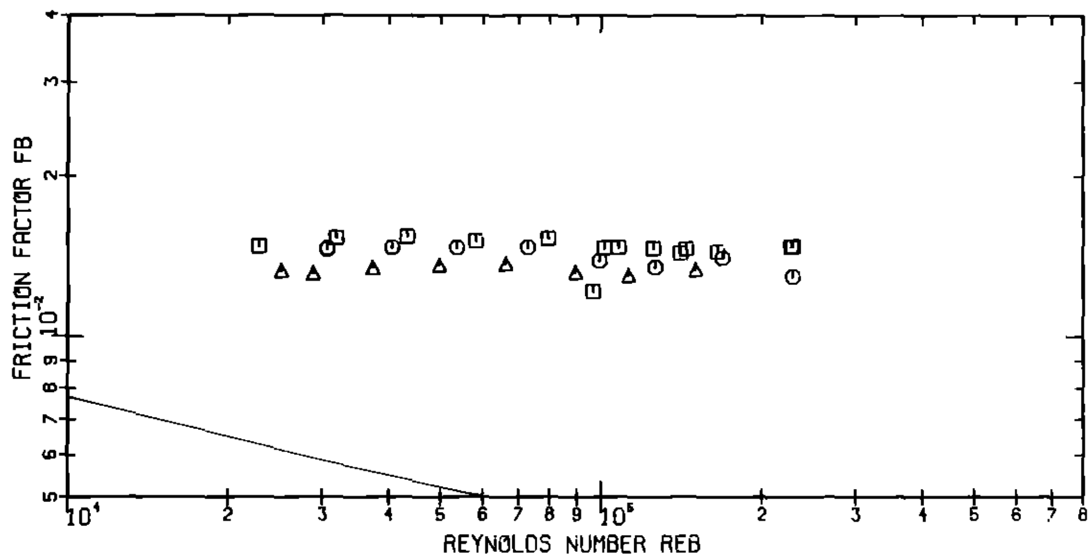
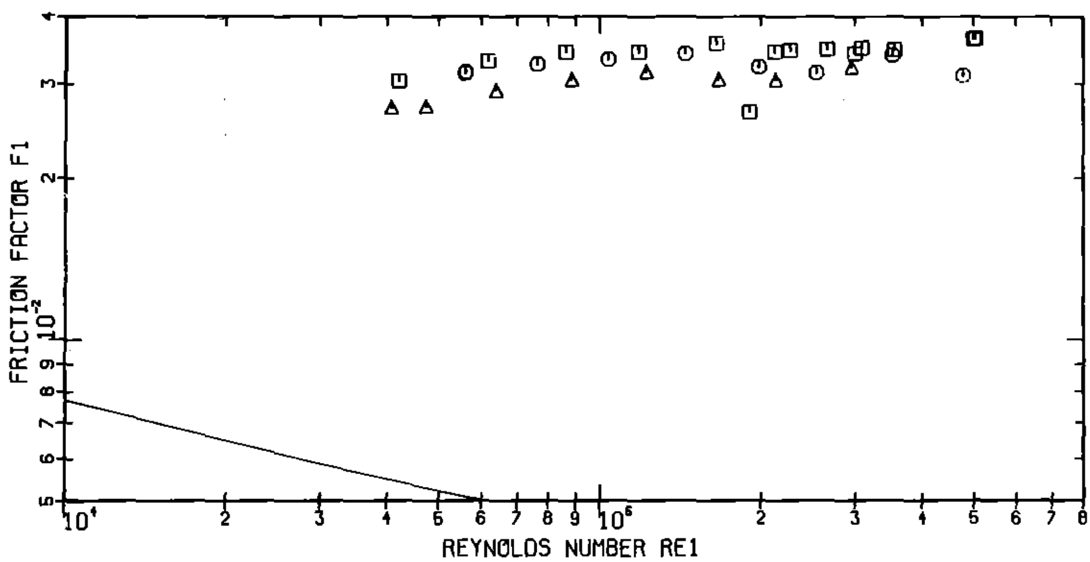


Fig.30: Friction factor versus Reynolds number (12-85)





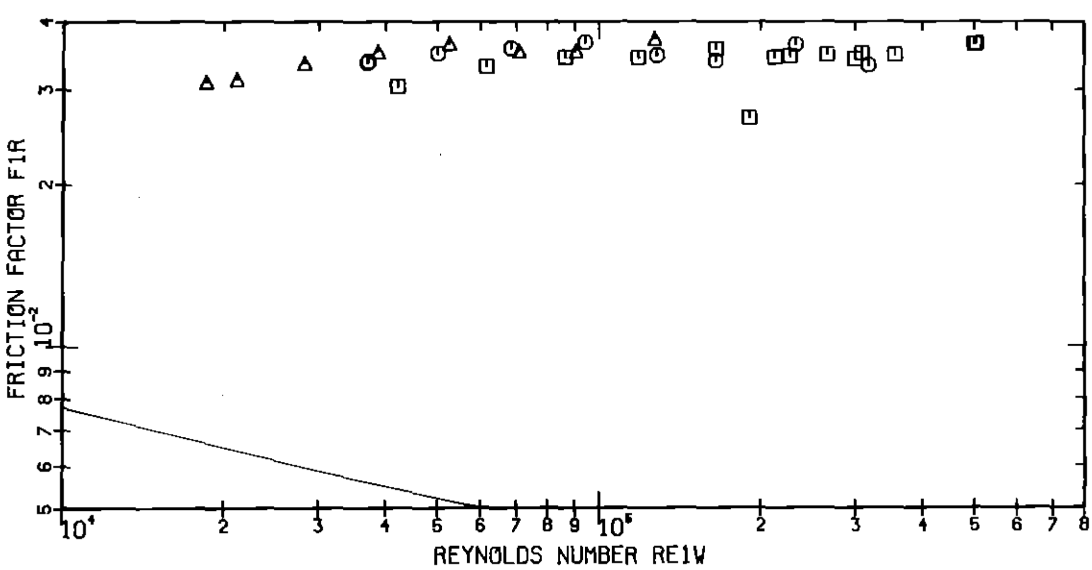


Fig.31: Friction factor versus Reynolds number (12-71)

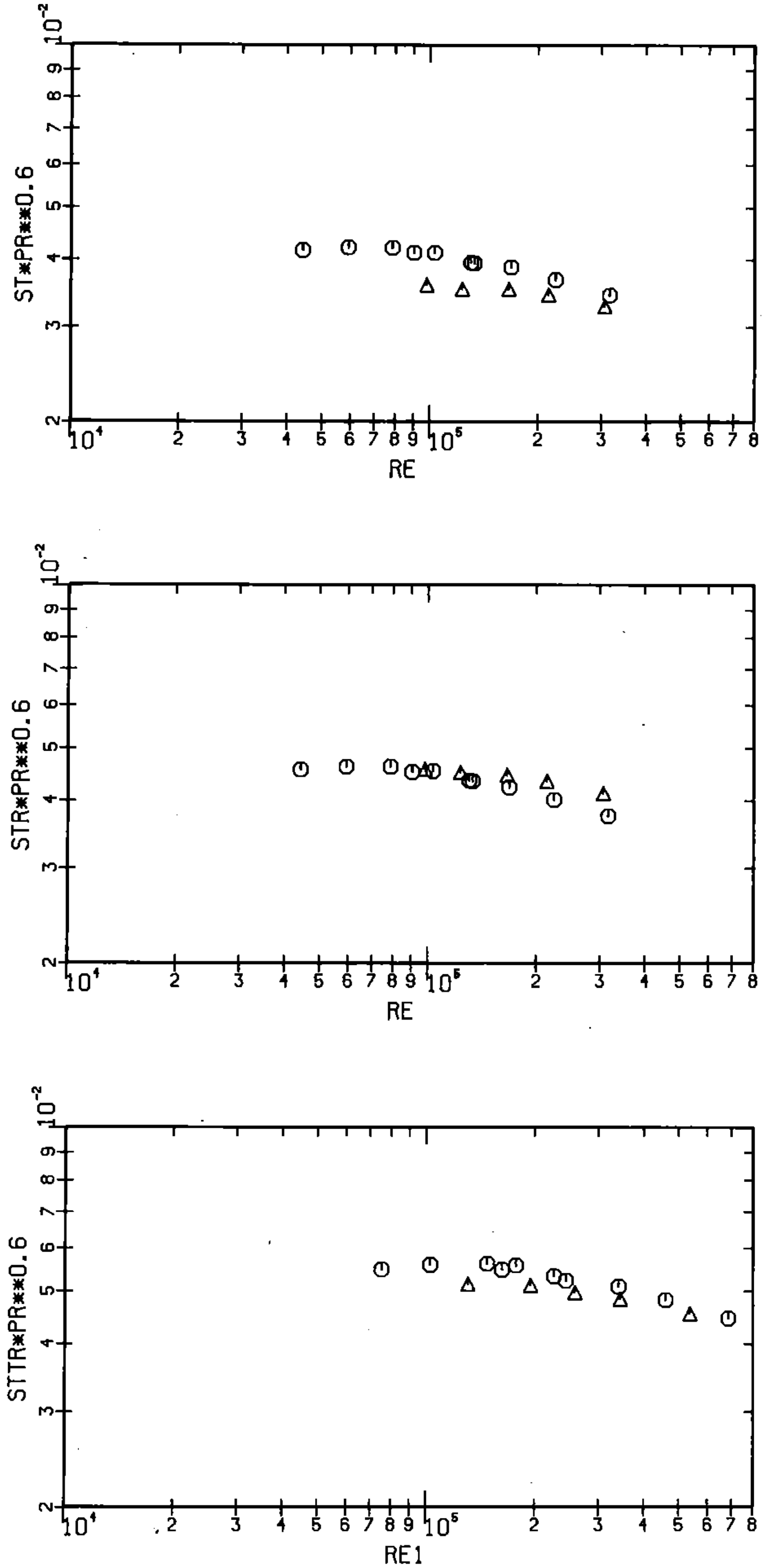


Fig.32: Stanton number versus Reynolds number (23-72)

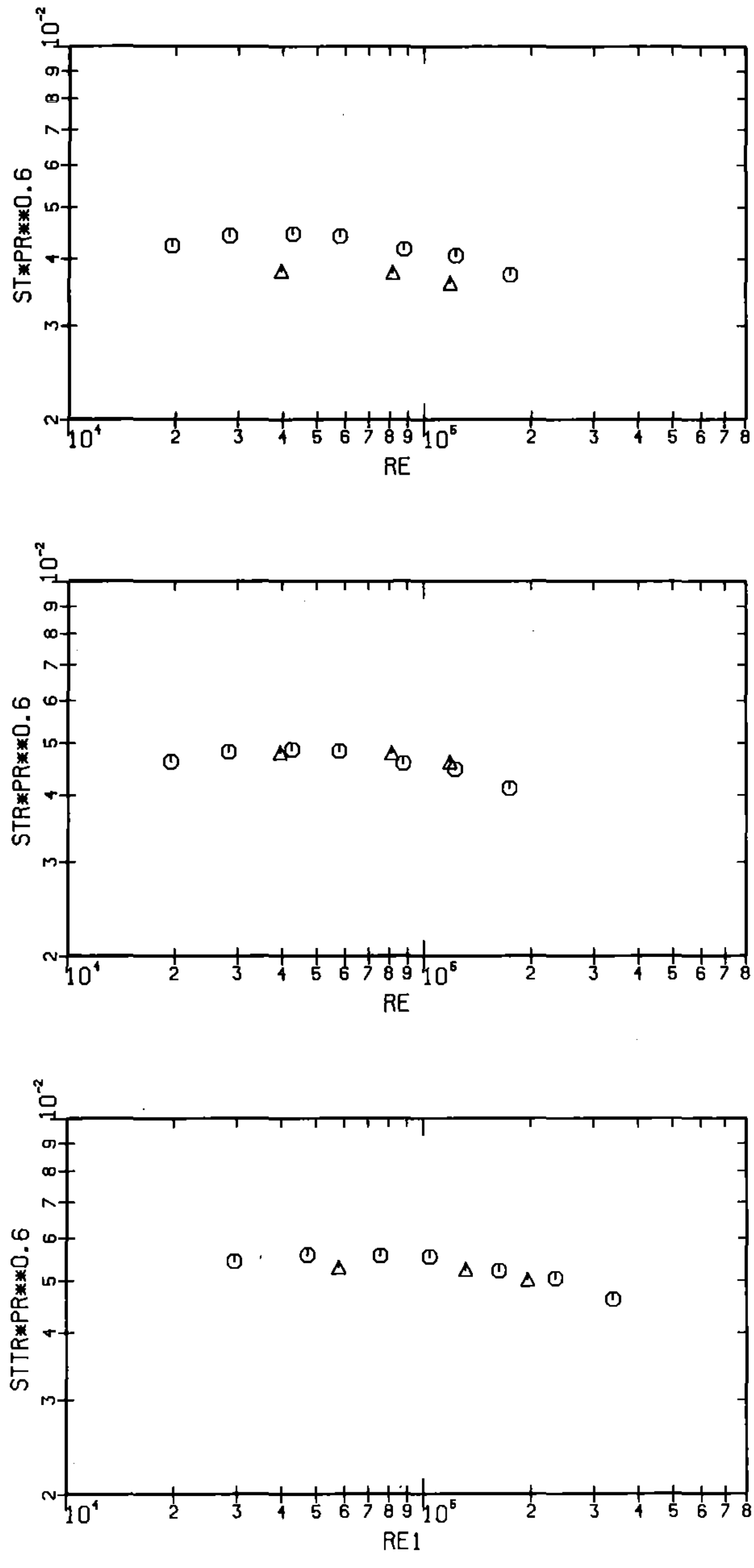


Fig.33: Stanton number versus Reynolds number (23-50)

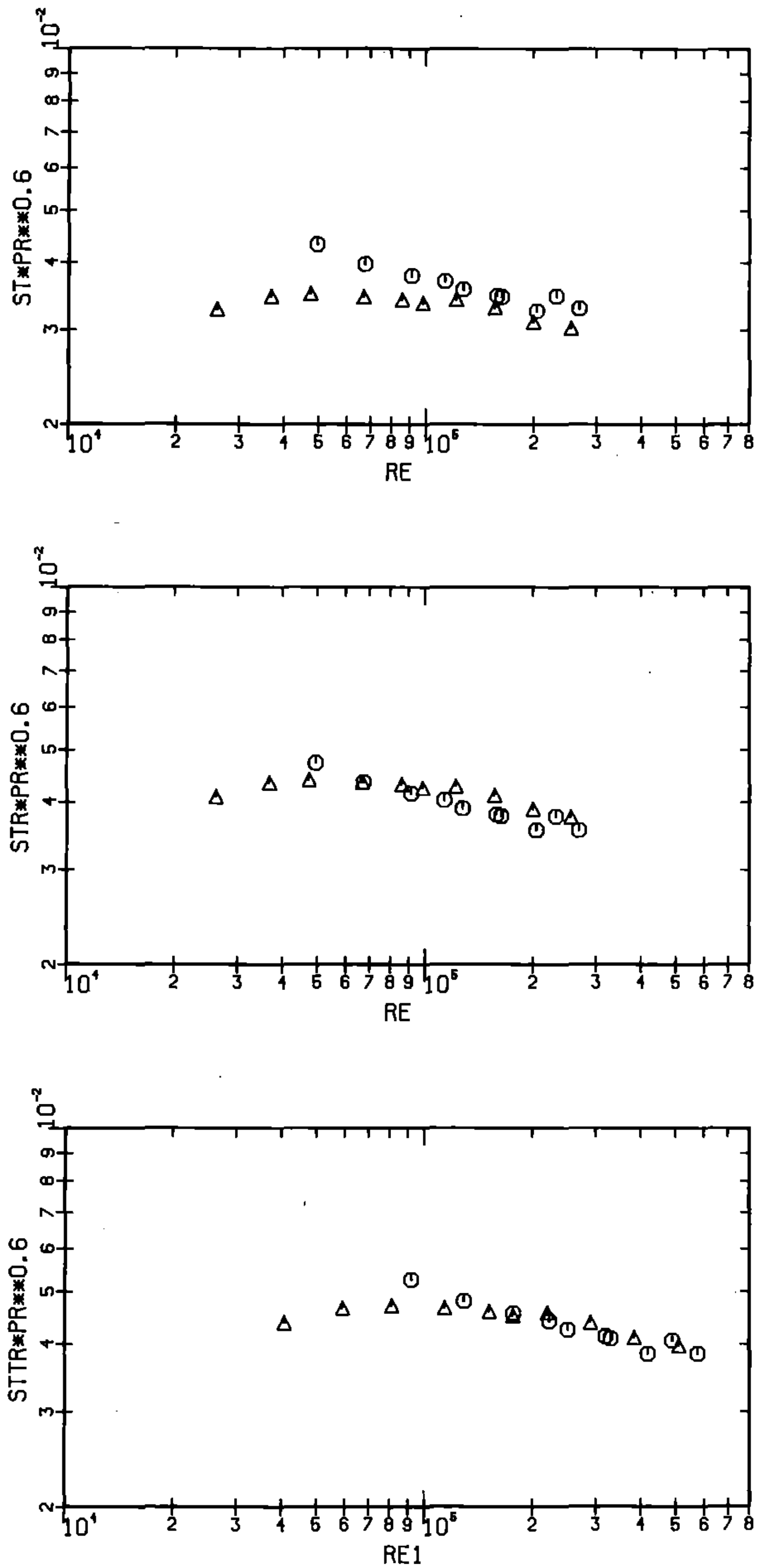


Fig.34: Stanton number versus Reynolds number (22-85)

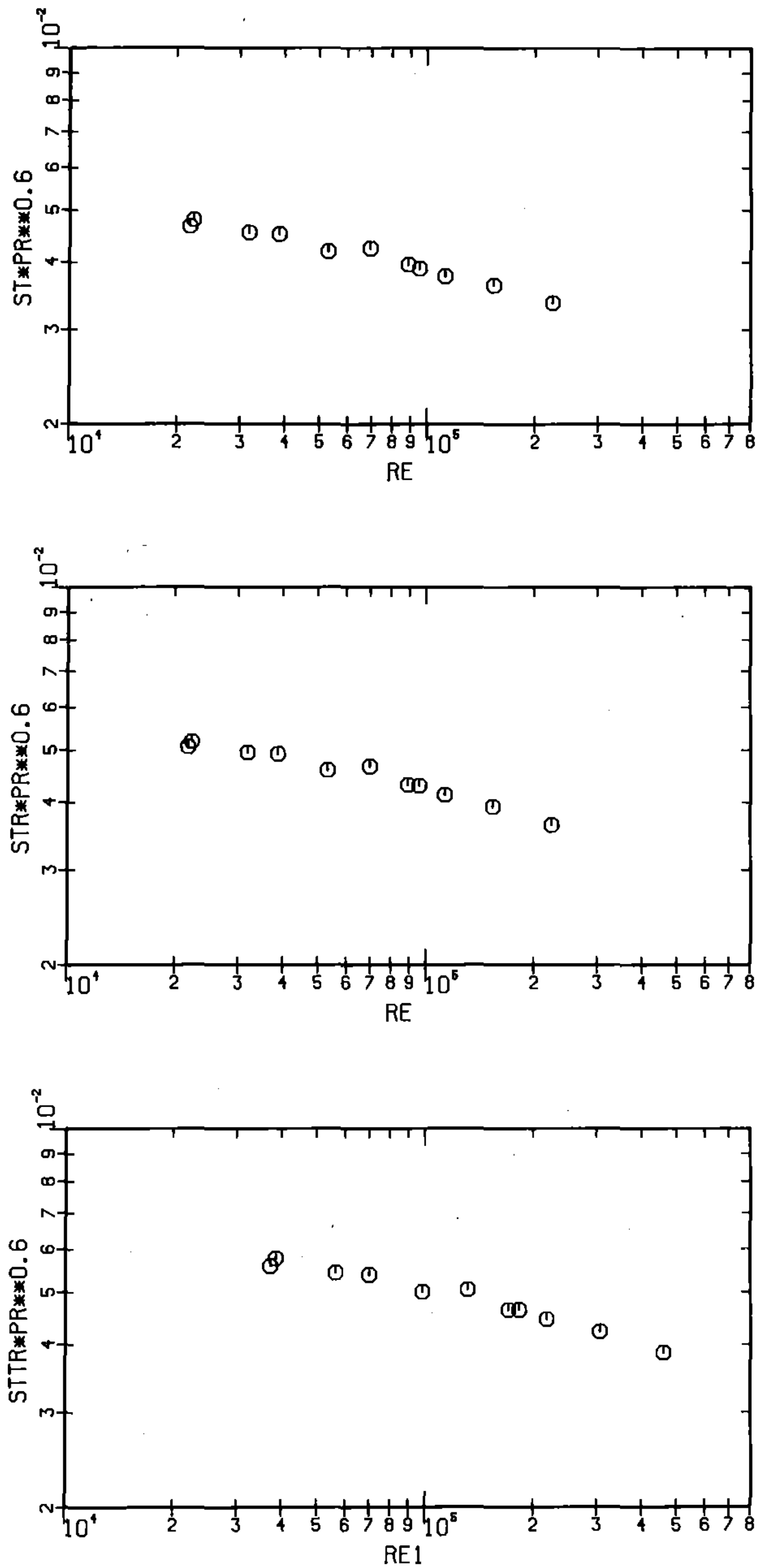


Fig.35: Stanton number versus Reynolds number (22-71)

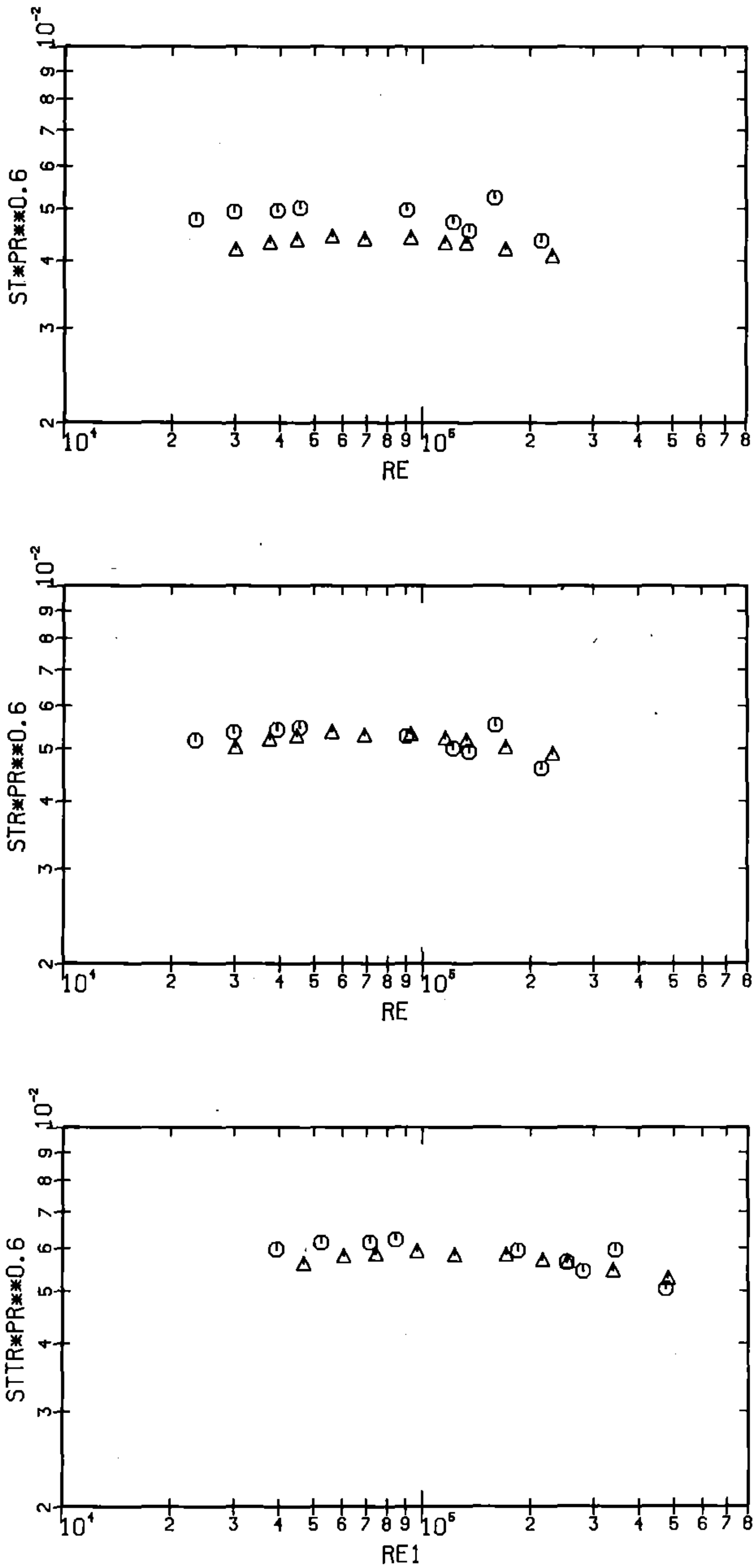


Fig.36: Stanton number versus Reynolds number (12-85)

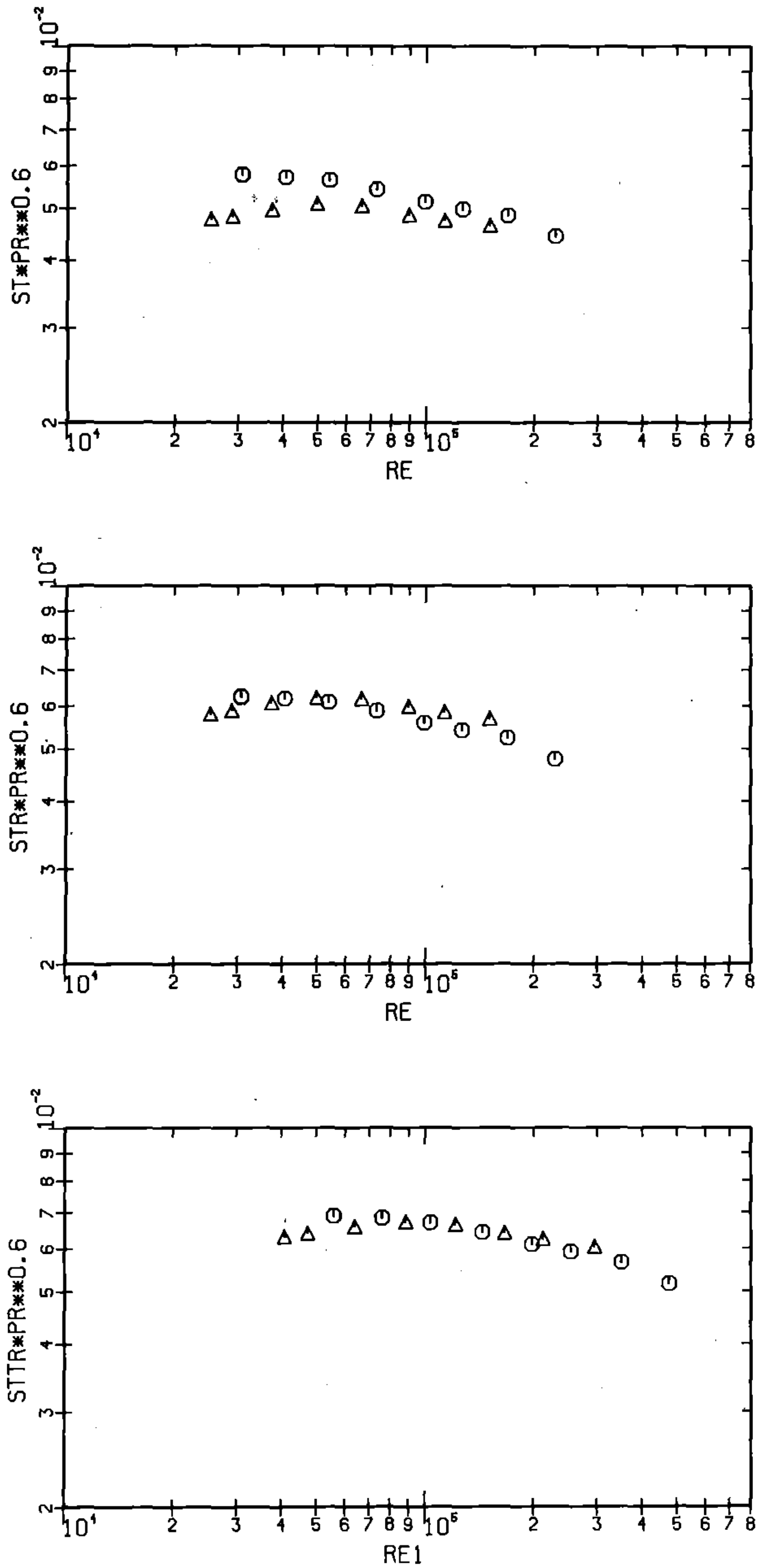


Fig.37: Stanton number versus Reynolds number (12-71)

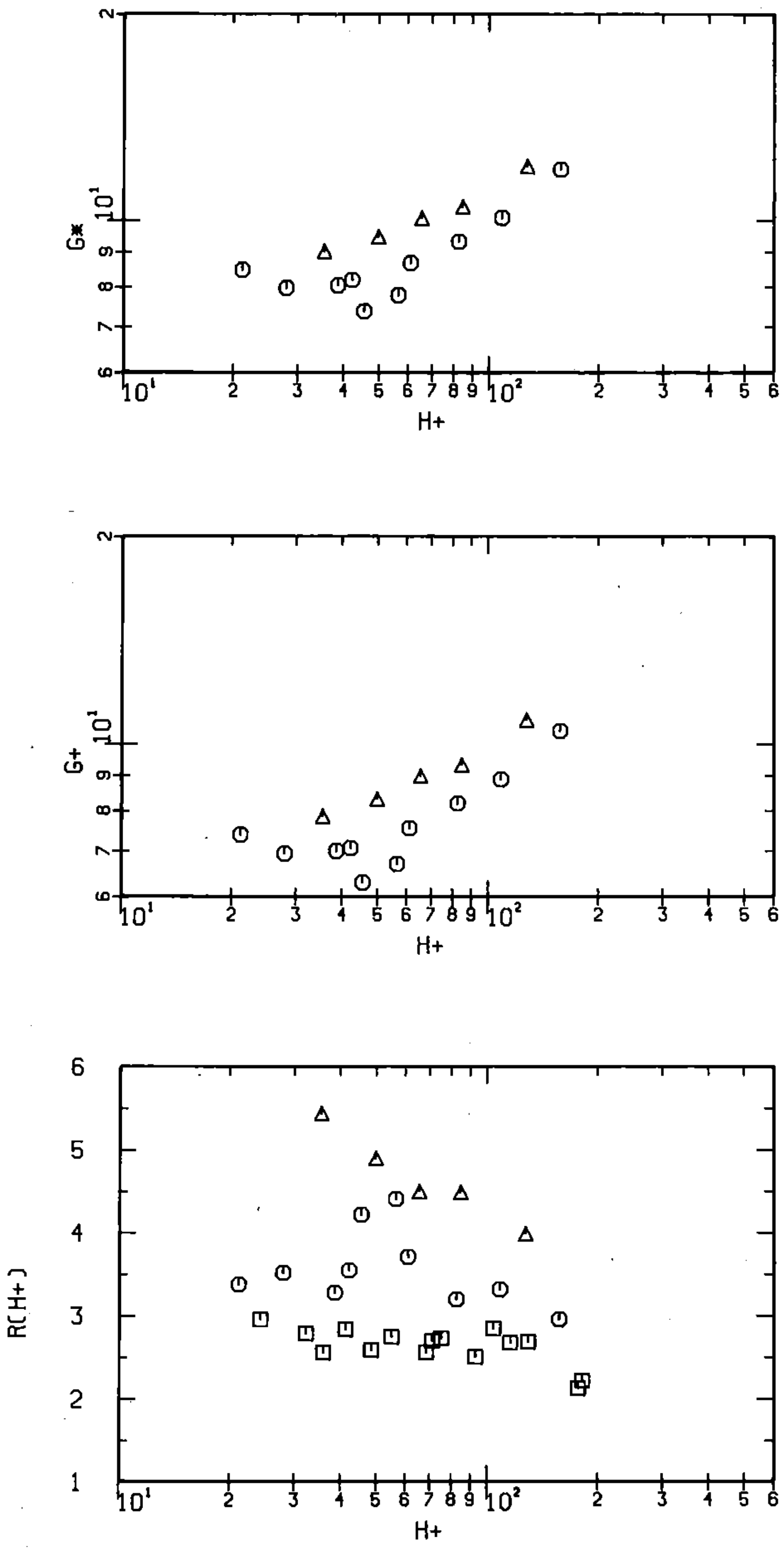


Fig.38: The roughness parameter R and G evaluated from bulk data with A_r=2.5 and A_S=function (f_1/f_2) (23-72)

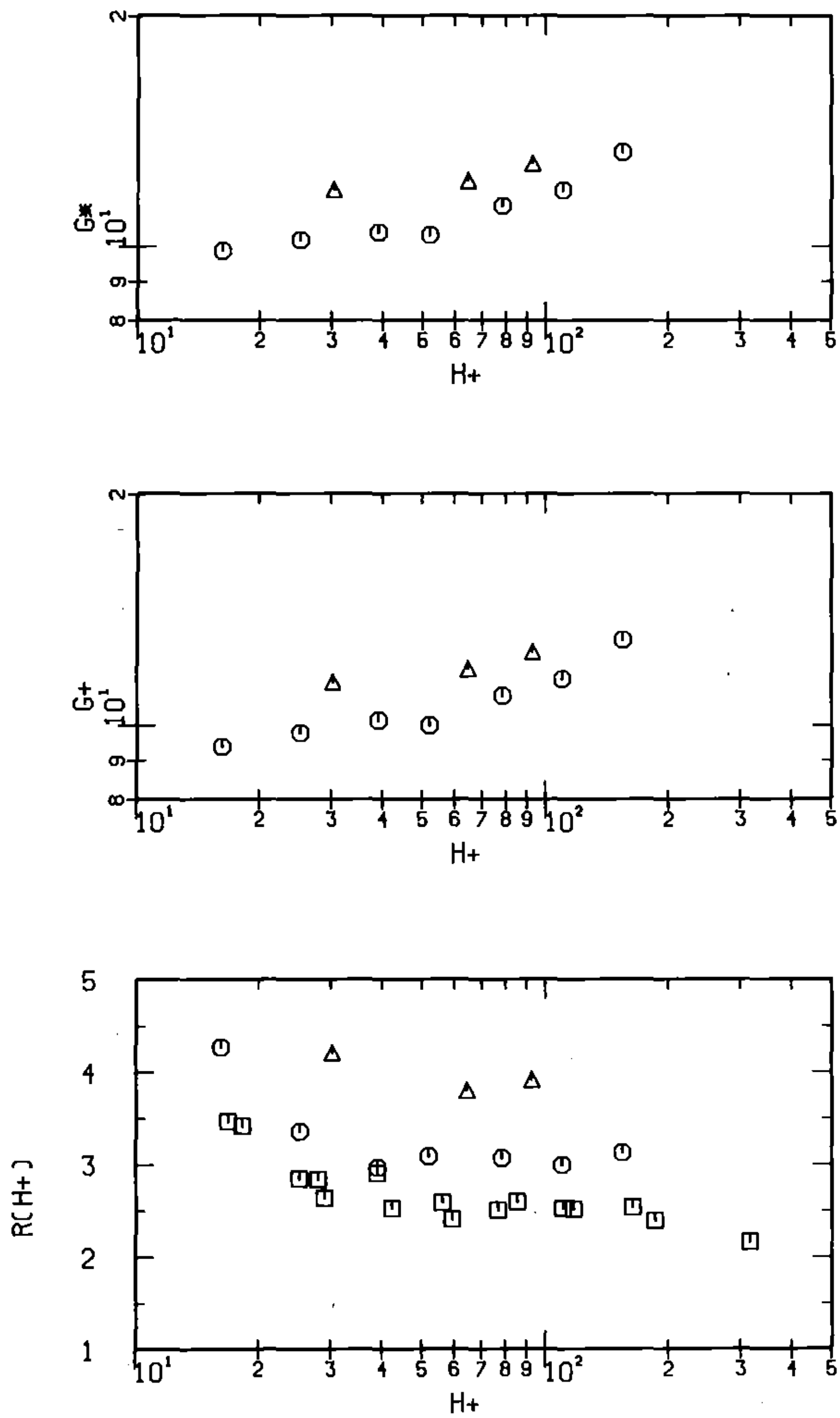


Fig.39: The roughness parameter R and G evaluated from bulk data with A_r=2.5 and A_S=function (f_1/f_2) (23-50)

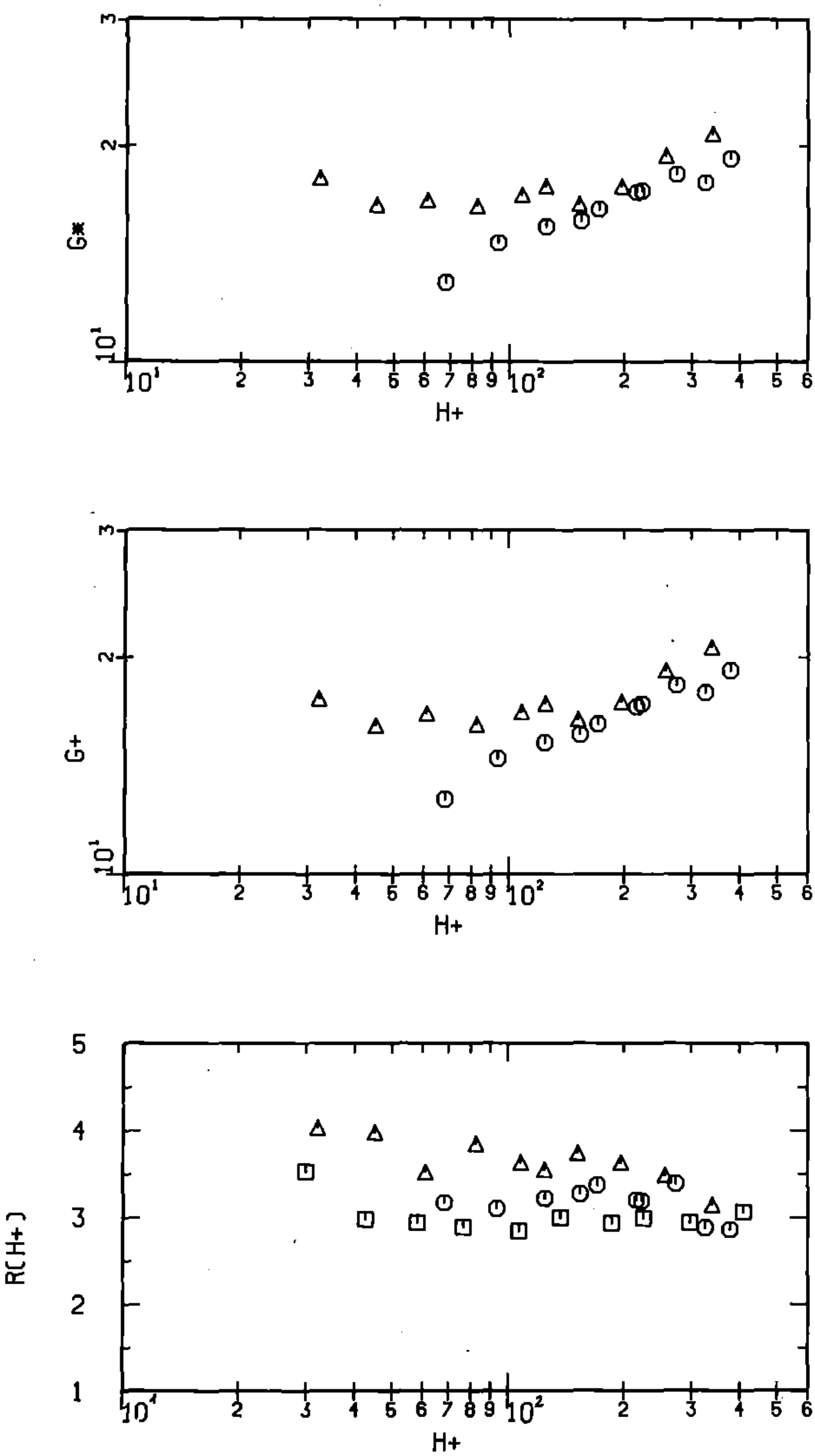


Fig.40: The roughness parameter R and G evaluated from bulk data with A_r= 2.5 and A_S=function (f_1/f_2) (22-85)

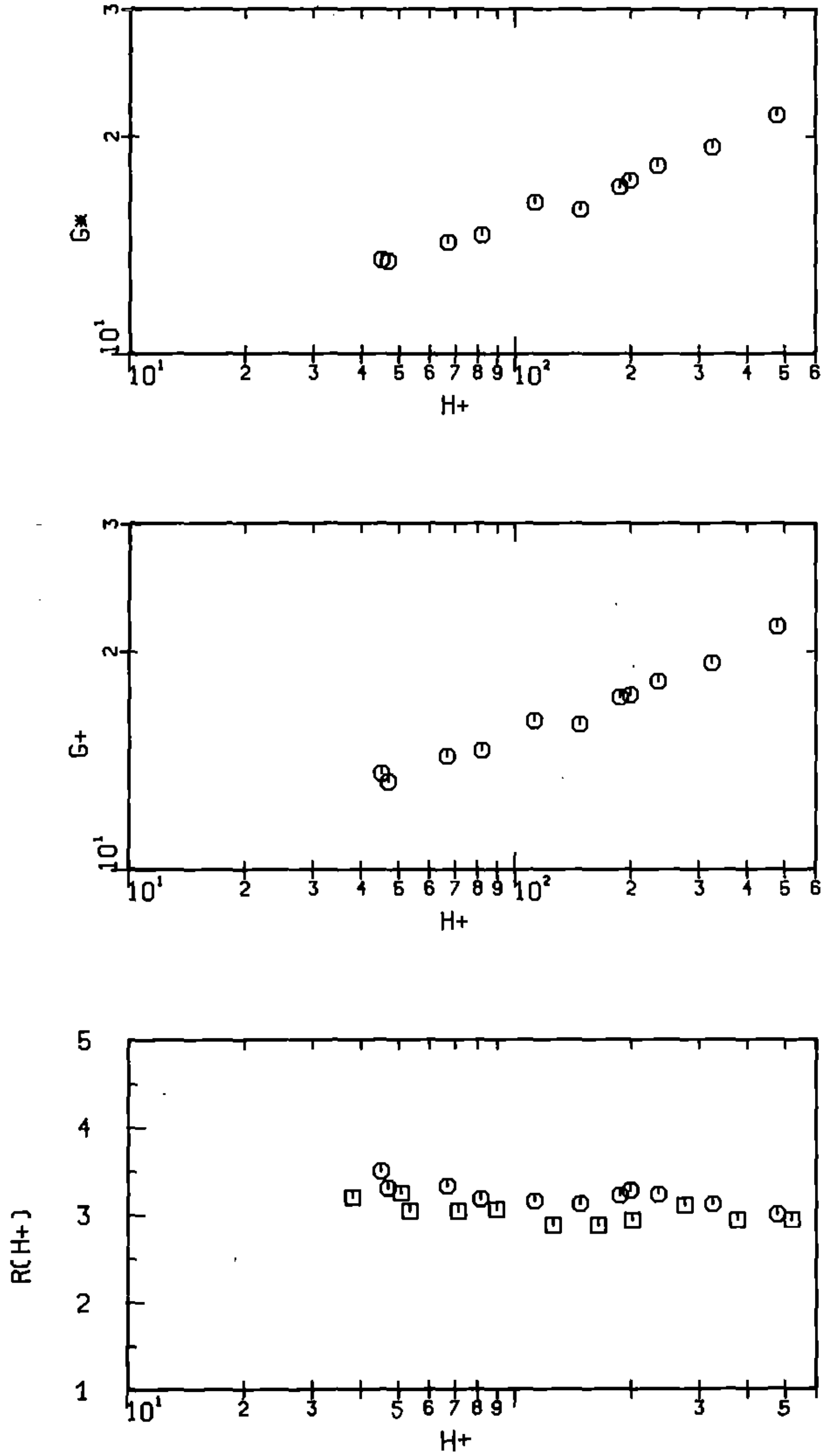
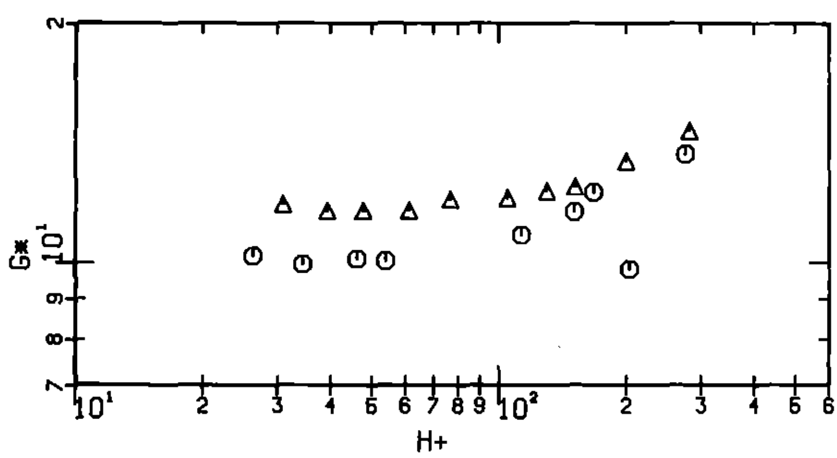
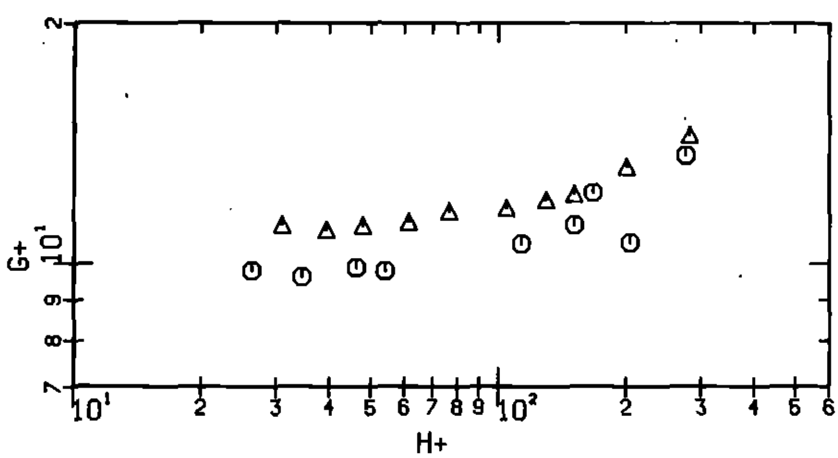


Fig.41: The roughness parameter R and G evaluated from bulk data with A_r=2.5 and A_S=function (f_1/f_2) (22-71)





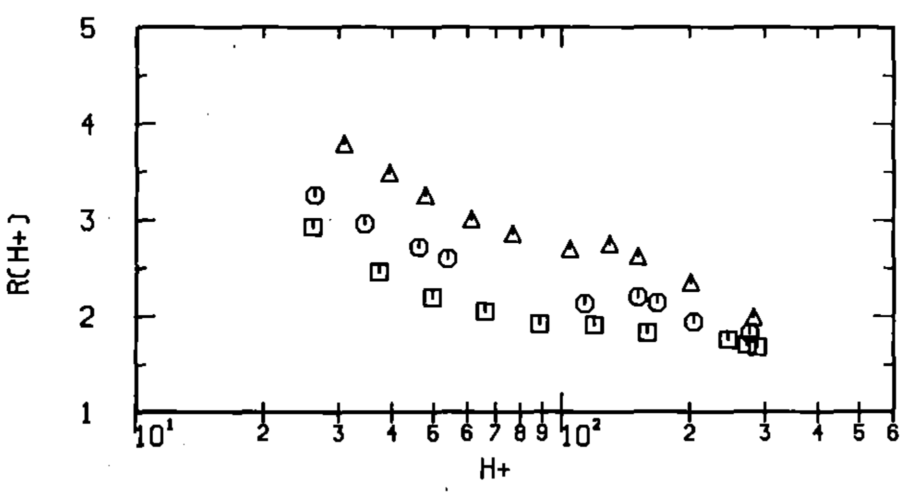


Fig.42: The roughness parameter R and G evaluated from bulk data with $A_r=2.5$ and A_S=function (f_1/f_2) (12-85)

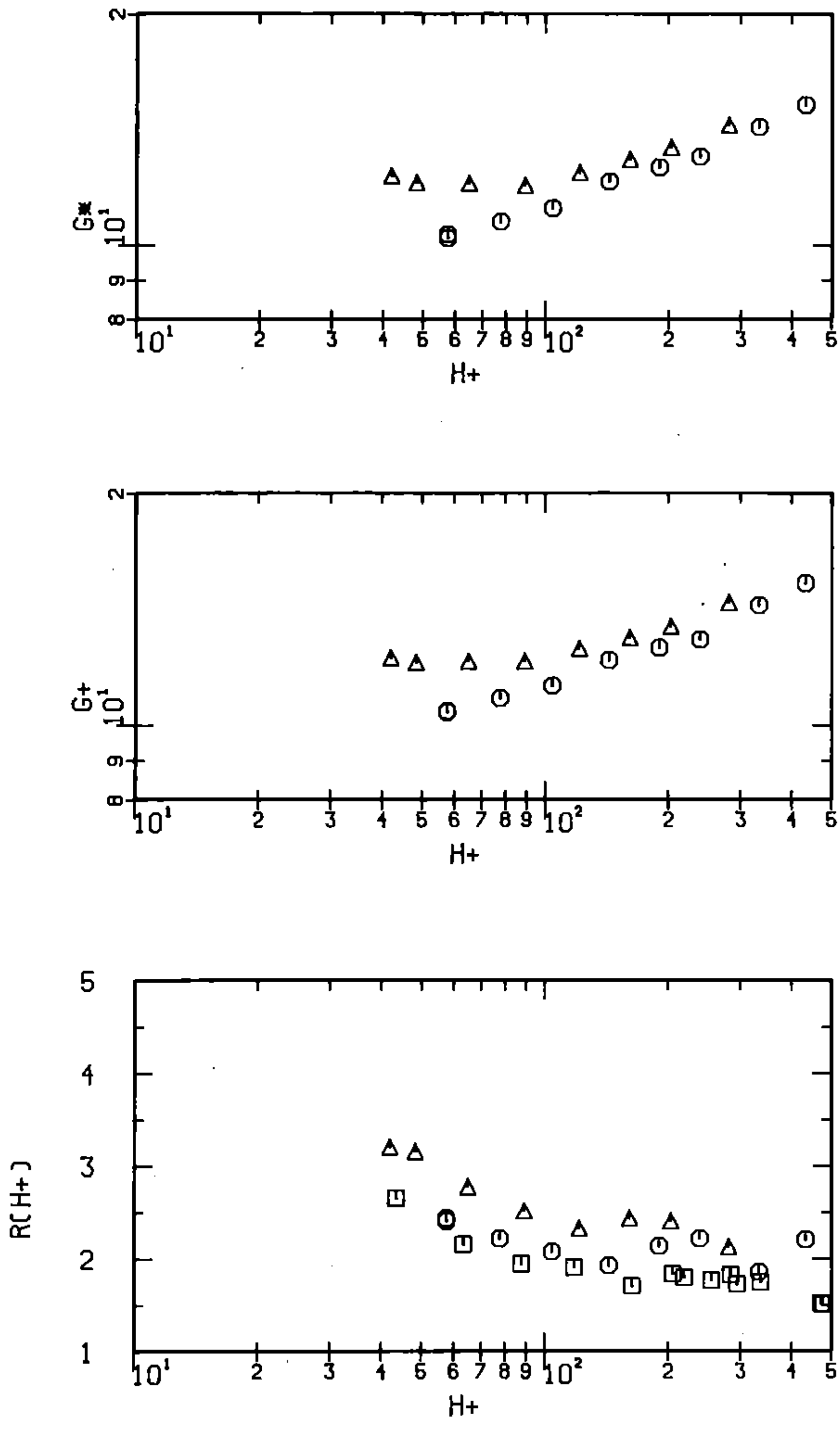


Fig.43: The roughness parameter R and G evaluated from bulk data with A_r=2.5 and A_S=function (f_1/f_2) (12-71)

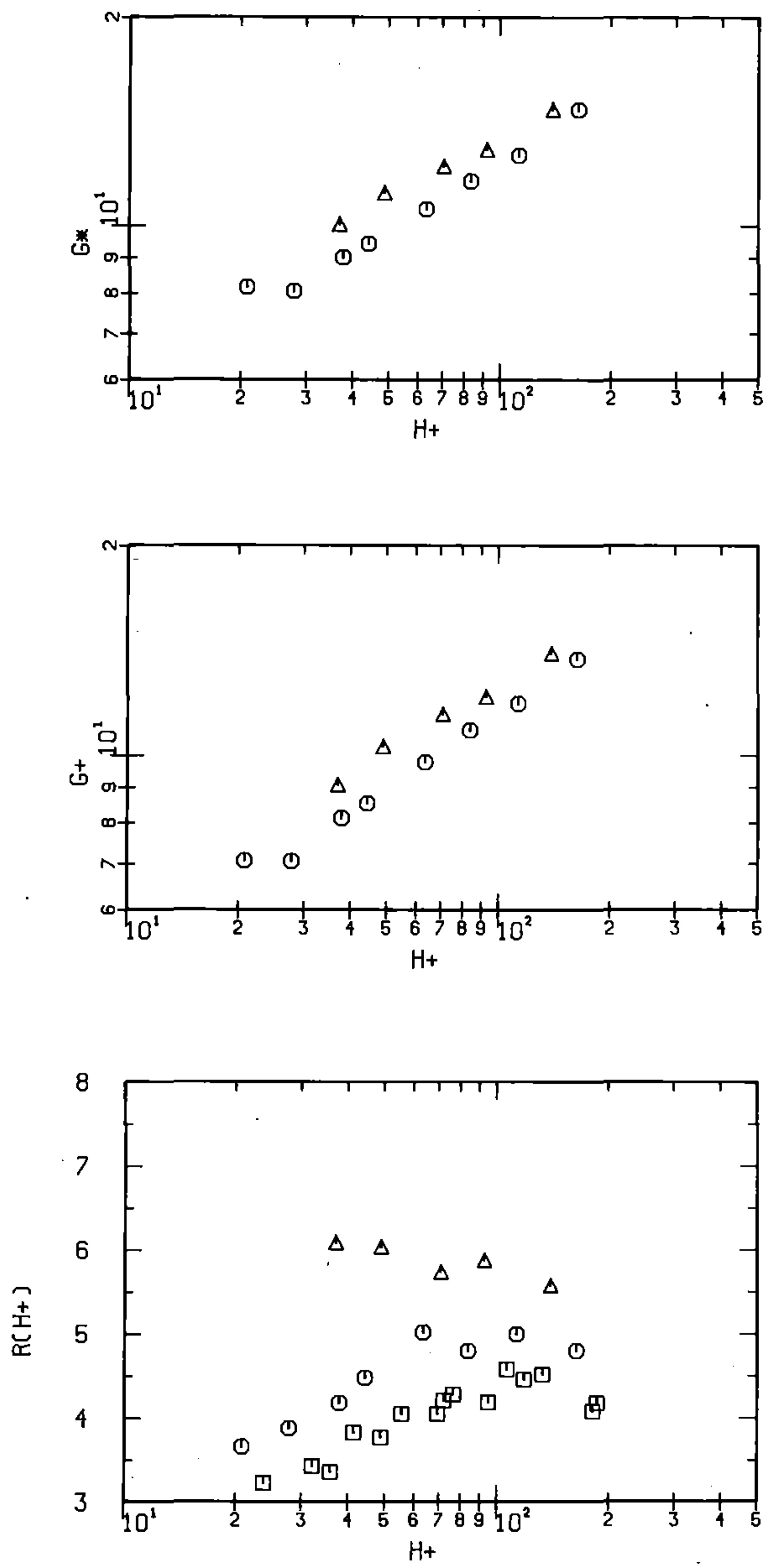
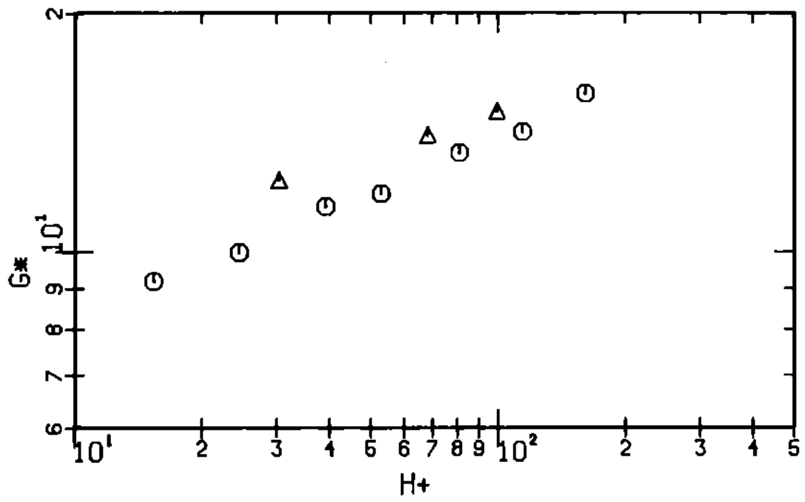
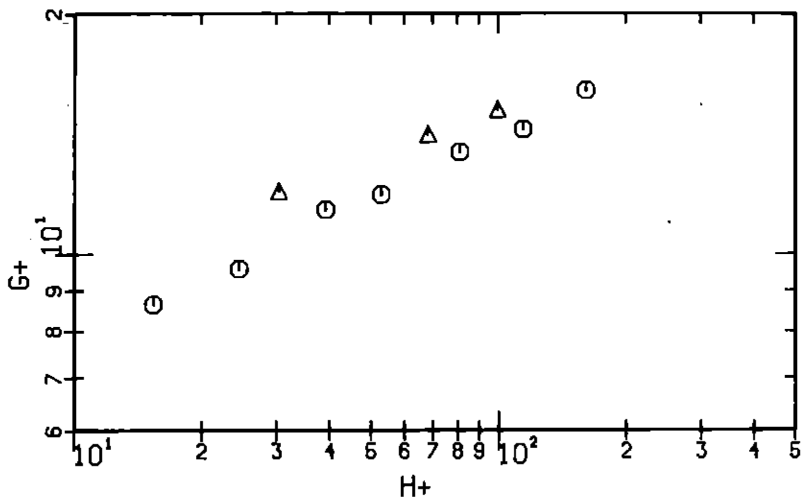


Fig.44: The roughness parameters R and G evaluated from bulk data with A_S and A_r by Eq.(35) and (36) (23-72)





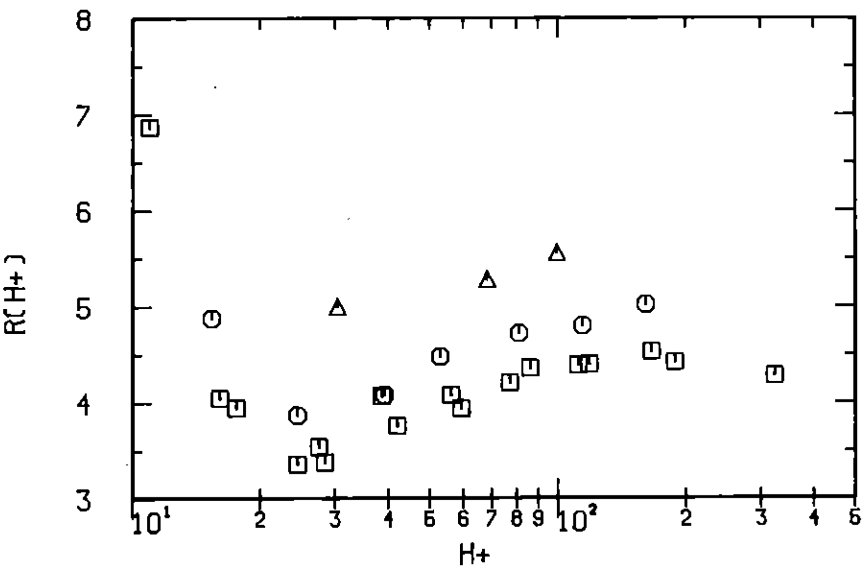


Fig.45: The roughness parameters R and G evaluated from bulk data with A_S and A_r by Eq.(35) and (36) (23-50)

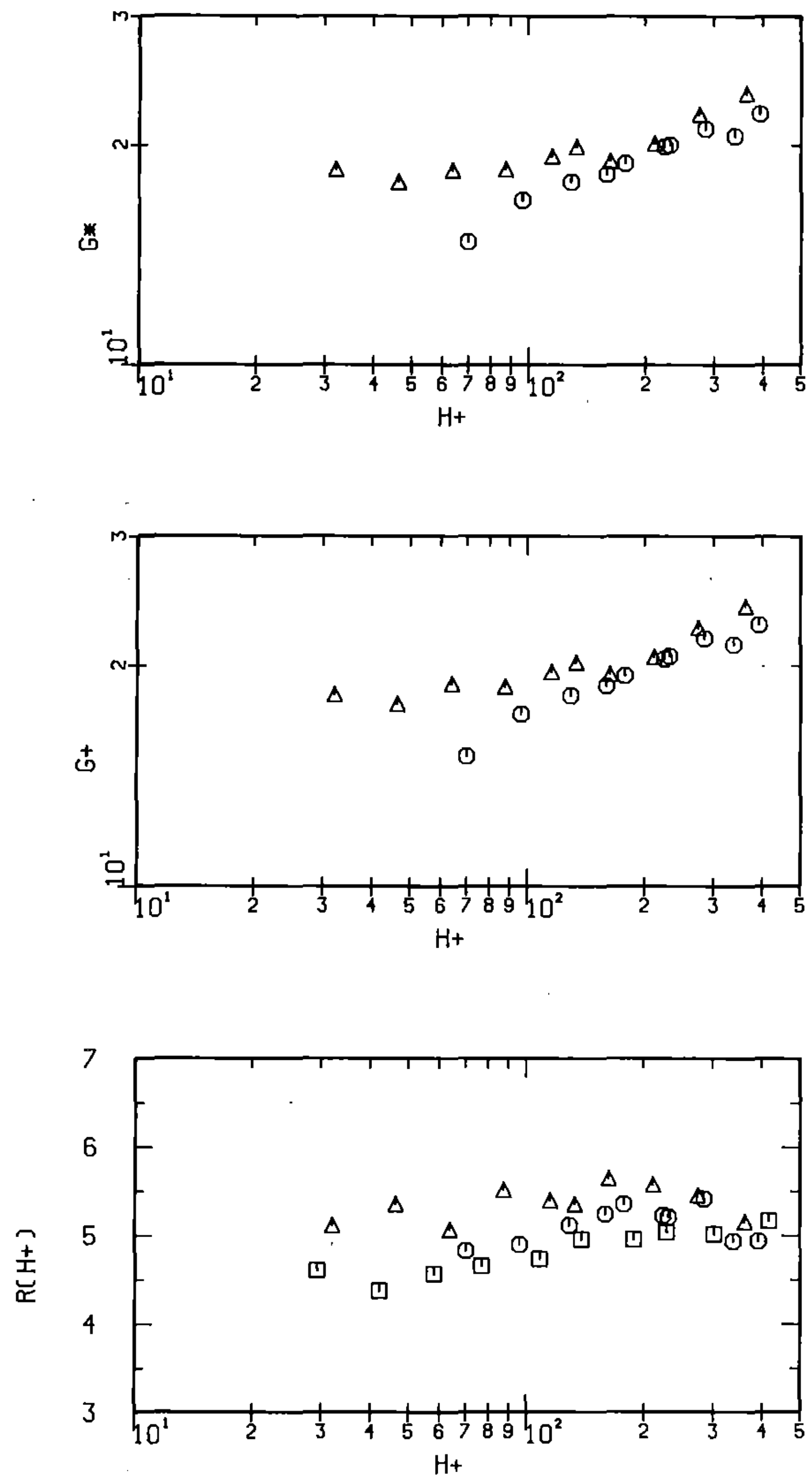


Fig.46: The roughness parameters R and G evaluated from bulk data with A_s and A_r by Eq.(35) and (36) (22-85)

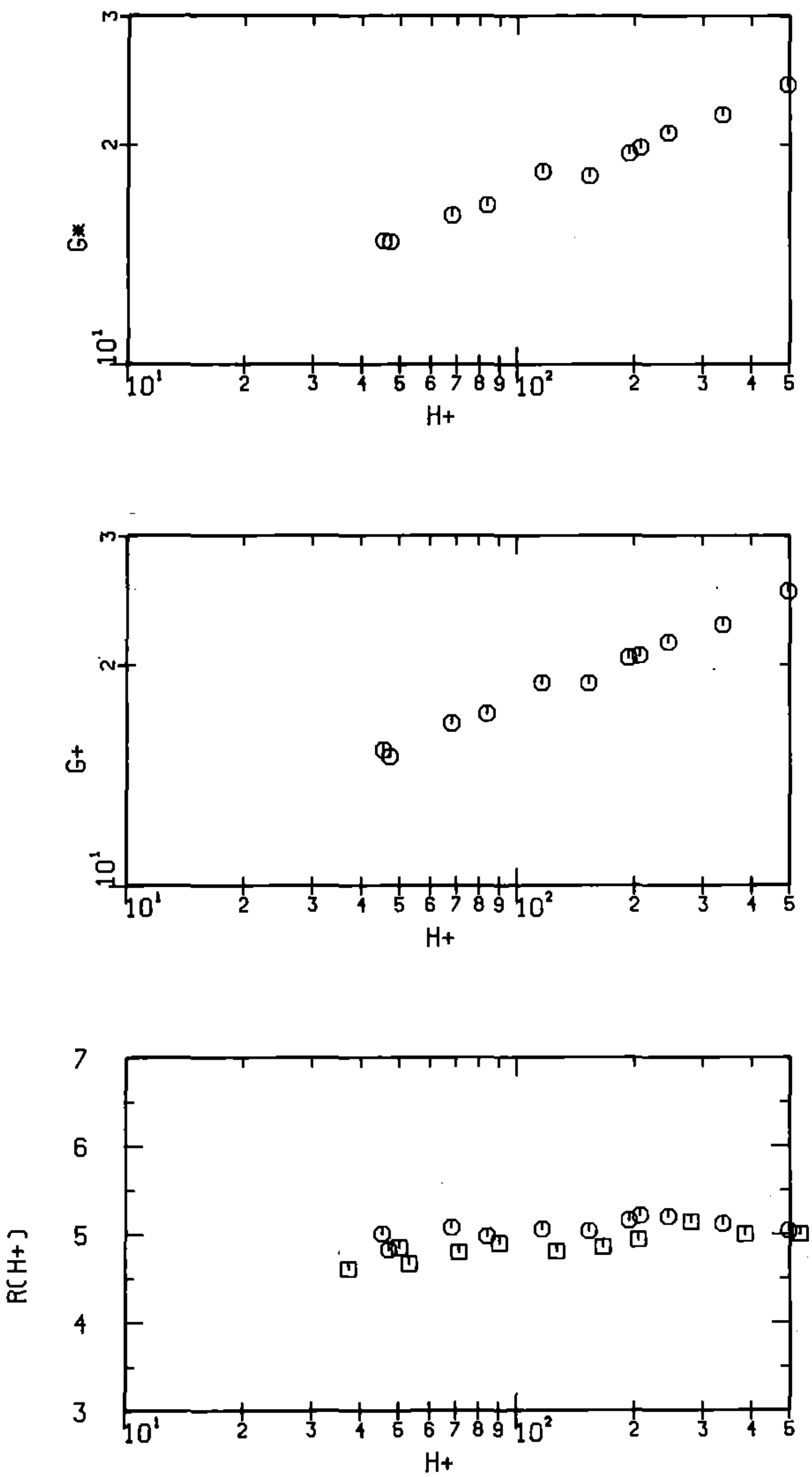


Fig.47: The roughness parameters R and G evaluated from bulk data with A_S and A_r by Eq.(35) and (36) (22-71)

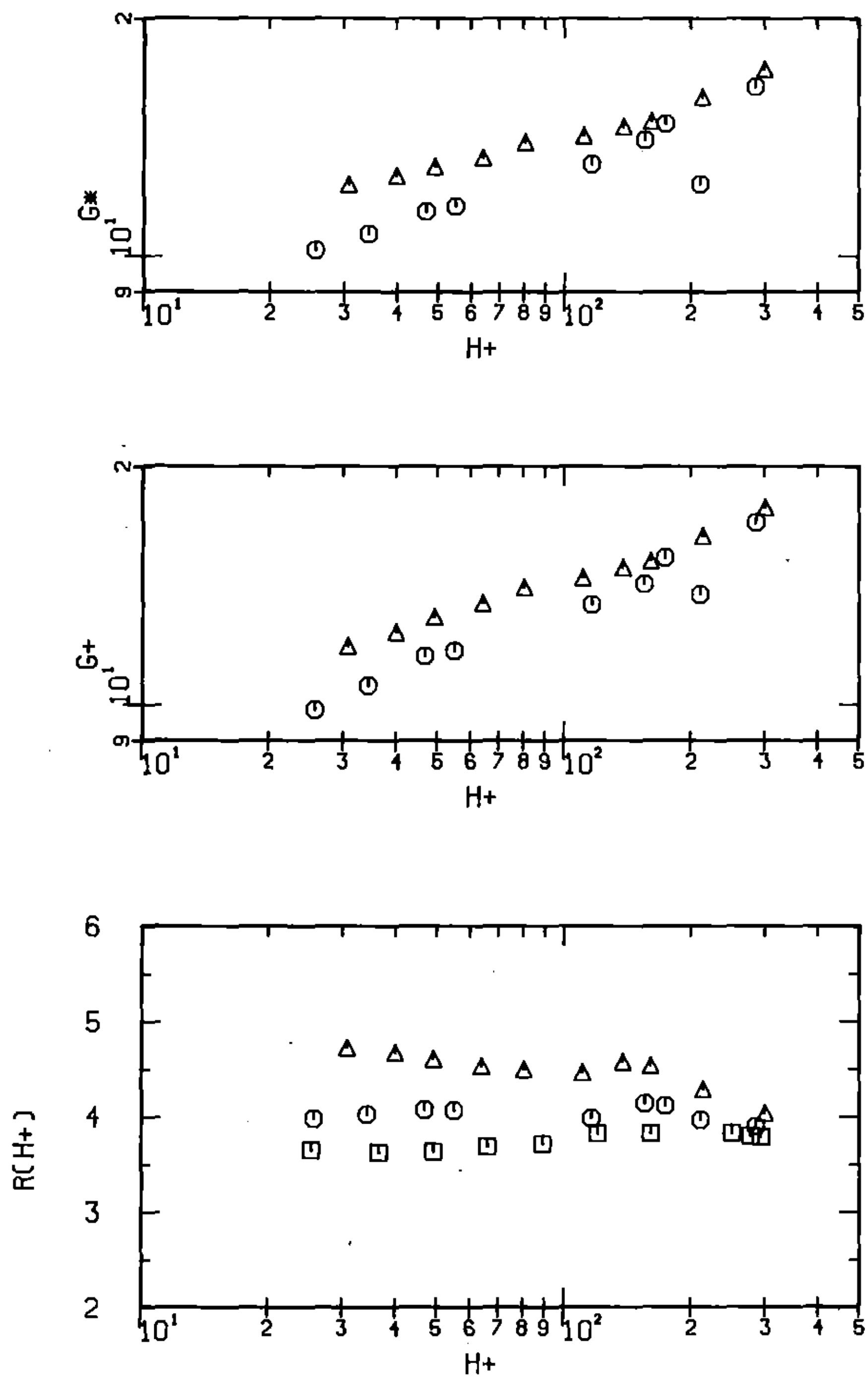


Fig.48: The roughness parameters R and G evaluated from bulk data with A_s and A_r by Eq. (35) and (36) (12-85)

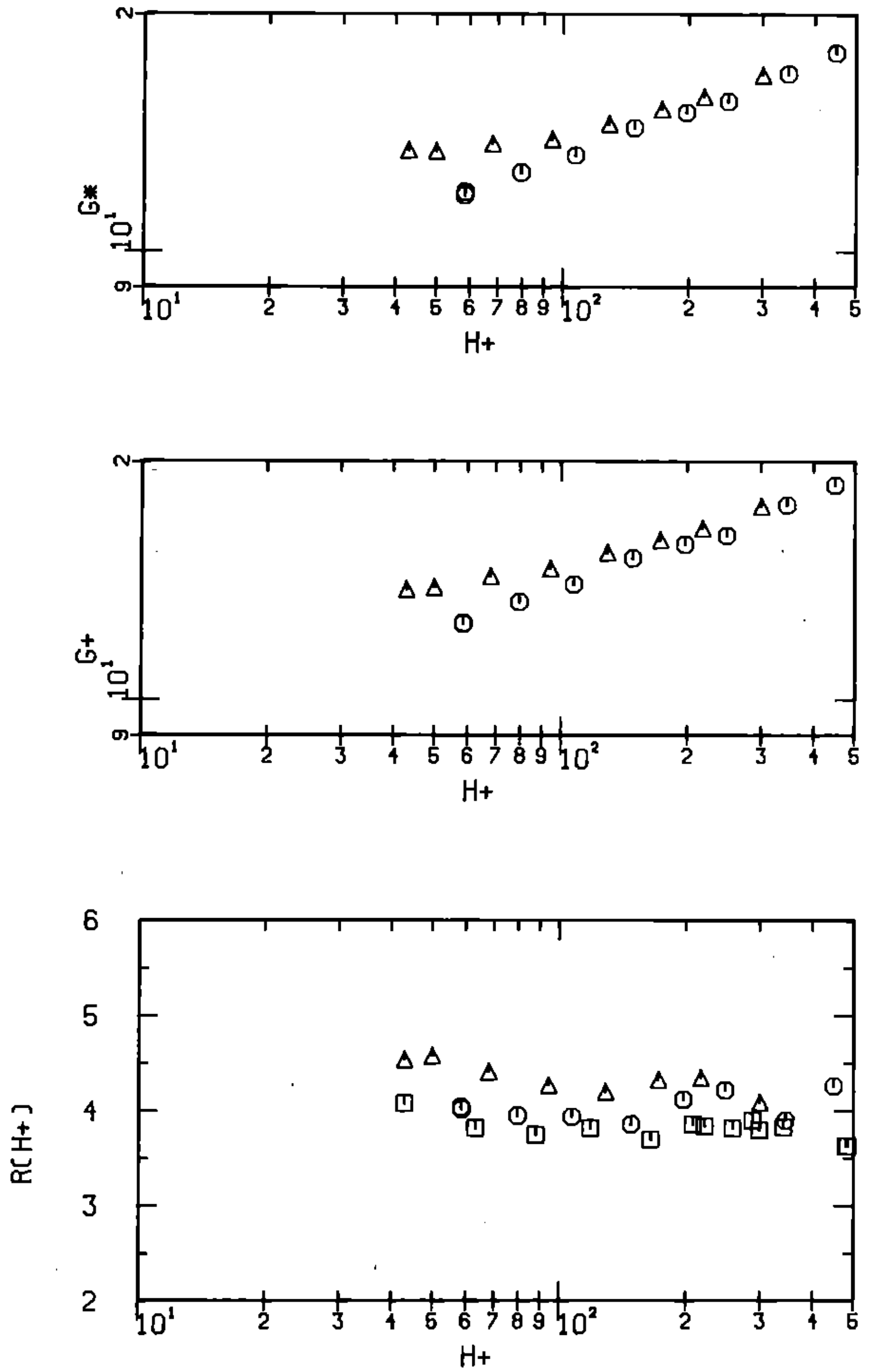


Fig.49: The roughness parameters R and G evaluated from bulk data with A_S and A_r by Eq.(35) and (36) (12-71)

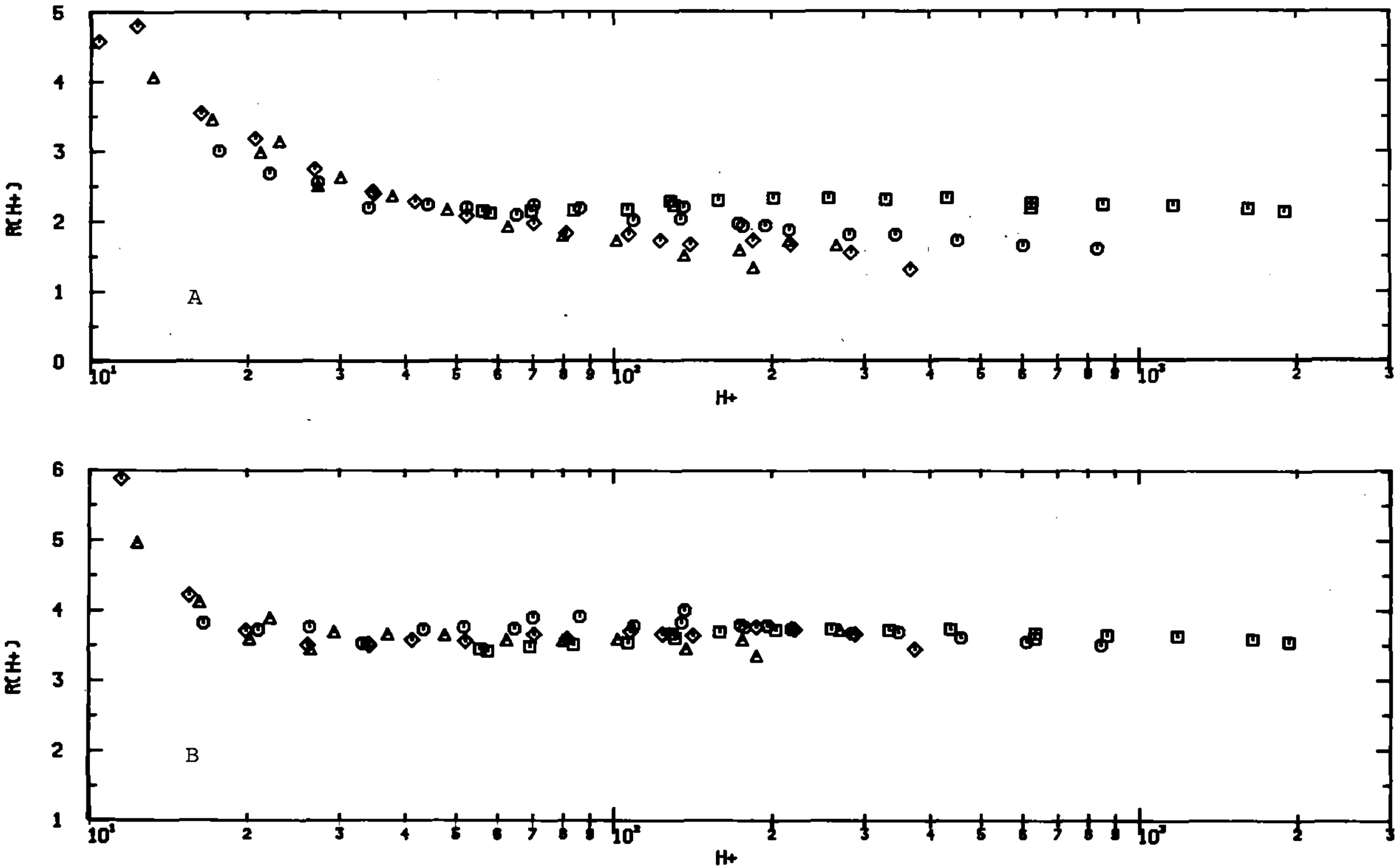


Fig.50: The R-parameter for test rod No.12 (3-dimensional roughness) evaluated with $A_S = f(f_1/f_2)$ and $A_r = 2.5$ (A), and with A_S and A_r from Eq.(35) and (36) (B).