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Horizontal Convective Condensation of Alternative Refrigerants within a Micro-Fin Tube

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TABLE OF CONTENTS

ABSTRACT

This paper presents local convective condensation measurements for four refrigerants: R134a, R410A(R32/R125, 50/50 % mass), R125, and R32 in a micro-fin tube[1]. Both heat transfer and pressure drop measurements are provided. The heat transfer degradation associated with R410A was shown to be relatively small and believed to be mostly due to nonlinear property effects. The measured convective condensation Nusselt numbers for all of the test refrigerants were correlated to a single expression consisting of a product of dimensionless properties. The correlation was shown to predict some existing data from the literature within acceptable limits. The correlation poorly predicted the heat transfer performance of cross-grooved, micro-fin tubes. The pressure drop measurements for the micro-fin tube were predicted satisfactorily by an existing correlation for flow boiling pressure drop in a smooth tube. Correlation of the pressure drop measurements suggested that the heat transfer enhancement was due to the fins behaving as a surface roughness.

Keywords: Enhanced heat transfer, micro-fin, refrigerant mixtures, fluid heating, condensation, pressure drop

[1]In order to describe materials and experimental procedures adequately, it is occasionally necessary to identify commercial products by manufacturers' name or label. In no instance does such identification imply endorsement by the National Institute of Standards and Technology, nor does it imply that the particular product or equipment is necessarily the best available for the purpose.

NOMENCLATURE

English symbols

A_c	cross sectional flow area inside tube (m^2)
A_i	actual inner surface area of tube (m^2)
c_p	specific heat (J/kg•K)
d	number of model parameters
D	tube diameter (m)
D_e	equivalent inner diameter of smooth tube, $\sqrt{\frac{4A_c}{\pi}}$ (m)
D_h	hydraulic diameter of micro-fin tube, (m)
E_h	heat-transfer enhancement ratio
f	Fanning friction factor
g	gravitational acceleration, 9.8 m/s^2
G	Mass velocity (kg/m^2•s)
$h_{2\phi}$	local two-phase heat-transfer coefficient ($W/m^2 \cdot K$)
h_L	h from linear fit between pure components ($W/m^2 \cdot K$)
i	enthalpy (J/kg)
i_{fg}	latent heat of vaporization (J/kg)
Ja	refrigerant Jacob Number $\frac{i_{fg}}{c_{p_{r,l}} \Delta T_s}$
k	refrigerant thermal conductivity (W/m·K)
L	tube length (m)
Nu	local Nusselt number based on D_h
N_f	number of fins
$\dot{m}$	mass flow rate (kg/s)
M	molecular weight (g/mole)
n	number of data points
p	wetted perimeter of inner micro-fin tube (m)
P	local fluid pressure (Pa)
Pr	liquid refrigerant Prandtl number $\frac{c_p \mu}{k}\Big|_{r,l}$
q"	local heat flux (W/m^2)
Re	all liquid, refrigerant Reynolds number based on $D_h = \frac{G D_h}{\mu_{r,l}}$
S	perimeter of one fin and channel (m)
Sv	non-dimensional refrigerant specific volume $\frac{v_v - v_l}{v}\Big|_r$
T	temperature (K)
U	expanded relative uncertainty
x_q	thermodynamic mass quality
z	axial distance (m)

Greek symbols

α	helix angle between micro fin and tube axis
β	exponent on correlation
$\Delta h_{2\phi}$	heat transfer degradation ($W/m^2 \cdot K$)
ΔP	pressure drop (Pa)
ΔT_s	$T_s - T_w$ (K)

Φ	two-phase number, $\frac{\Delta x_q \, i_{fg}}{\Delta L \, g}$
μ	dynamic viscosity (kg/m·s)
ν	specific volume, $x_q \nu_v + (1-x_q)\nu_l$ (m^3/kg)

<u>subscripts</u>

b	bulk condition
c	critical condition
f	water
i	inlet, inner
l	liquid
o	outside
p	plain or smooth tube
r	refrigerant
s	saturated state
w	heat transfer surface
v	vapor

INTRODUCTION

Most evaporators and condensers of new unitary refrigeration and air-conditioning equipment are manufactured with micro fin tubes. The micro-fin tube dominates unitary equipment design because it provides the highest heat transfer with the lowest pressure drop of the commercially available internal enhancements (Webb, 1994). Together, R134a, R22, and R22 replacements constitute by mass nearly all the refrigerants used in unitary products (Muir, 1989). Consequently, two phase heat transfer data for the micro-fin tube with R134a, R22, and R22 replacements are essential for the design of evaporators and condensers for unitary applications.

Although the study of R134a, R22 and R22 replacements in micro-fin tubes is important, the work available in the open literature is limited. For example, there are surprisingly few studies on R22 replacements and micro-fin tubes. Wang et al. (1996) present quasi-local condensation heat transfer coefficients for R22 and R407C. Also, Kaul et al. (1996) present local flow boiling heat transfer measurements for R410B and R407C. Most of the available literature focuses on the heat transfer of R134a and R22. A survey by Schlager et al. (1990), which was later updated by Eckels et al. (1992), on all the refrigerant heat transfer with micro-fin tubes, showed that of the 22 studies, five were with R113, 15 were with R22, and two examined both fluids. The survey also revealed that condensation research has been neglected relative to evaporation research. For example, 17 of the surveyed studies did not investigate condensation. With help from the Bergles et al. (1995) survey and our own search, we were able to find only ten additional papers on convective condensation in micro-fin tubes. Four of these studies were for R134a, five were for R22, and one was the Wang et al. (1996) paper on R407C. Most of the recent R134a studies were of global heat transfer measurements as done by Eckels et al. (1994). However, only four studies - Chamra and Webb (1995), Chiang (1993), Mori and Nakayama (1983), and Khanpara et al. (1986) - that present local condensation measurements in a micro-fin tube were found.

Local condensation measurements will prove most useful to the refrigeration industry. An accurate sizing of a micro-fin tubed condenser requires an accurate local heat-transfer correlation. Unfortunately, neither Ghaderi et al. (1995) nor Webb (1994) were able to find a convective condensation correlation for the micro-fin tube in the literature. The absence of a universal condensation correlation may be partly due to the many variants of the micro-fin geometry and the common practice of using the root diameter area instead of the actual surface area and the hydraulic diameter to calculate the heat transfer. A single local heat transfer correlation that can be used for different micro-fin geometries would be useful to the refrigeration industry.

Considering the shortage of convective condensation data for R22 replacements in a micro-fin tube and the absence of a heat transfer correlation, there were two main objectives of the study. The first was to characterize the convective condensation performance of two R22 alternatives in a micro-fin tube. Specifically, the local convective condensation pressure drop and heat transfer coefficient of R134a and the near-azeotropic refrigerant mixture R410A along with its pure components R32 and R125 were experimentally determined. The experimental measurements for the fluids were correlated to a single correlation as a function of non-dimensional parameters. The second objective was to fundamentally characterize the heat transfer degradation of R410A relative to the performance of the pure components. Convective condensation heat transfer coefficients for the mixtures' pure components were measured to establish a baseline for the heat transfer degradation calculations. A fundamental understanding of mixture heat transfer mechanisms can be used to refine the selection of mixture composition and/or mixtures for alternative refrigerants.

EXPERIMENTAL APPARATUS

Figure 1 shows a sketch of the experimental apparatus used to establish and measure the convective condensation. The refrigerant flow rate, pressure, and superheat were fixed at the inlet to the test section. The water flow rate and the inlet temperature were fixed to establish the overall refrigerant quality change in the test section. The water temperature drop, the tube wall temperature, the refrigerant temperatures, pressures, and pressure drops were measured at several axial locations along the test section. These measurements were used to calculate the local heat-transfer coefficient for the micro-fin tube.

The test section consisted of a pair of 3.34 m long, horizontal tubes connected by a U-bend. A fixed test pressure was maintained by balancing the refrigerant duty between the subcooler, the test section, and the evaporator. A magnetically coupled gear pump delivered the test refrigerant to the entrance of the test section with a few degrees of vapor superheat. Another magnetically coupled gear pump supplied a steady flow of water to the test section. The inlet temperature of the water loop was held constant for each test with a water chilled heat exchanger and variable electric heaters. The refrigerant and water flow rates were controlled by varying the pump speeds using frequency inverters. Redundant flow rate measurements were made with Coriolis flowmeters and with turbine flowmeters for both the refrigerant and water sides.

Figure 2 shows a cross section of the test section with a detail of the micro-fin tube geometry. The test refrigerant flowed inside a micro fin tube, while distilled water flowed either in counterflow or parallel flow to the refrigerant in the annulus that surrounded the micro-fin tube. The annulus gap was 2.2 mm, and the micro-fin tube wall thickness was 0.3 mm. The micro fin tube had 60, 0.2 mm high fins with 18 degree helix angle. For this geometry, the cross sectional flow area was 60.8 mm^2 giving an equivalent smooth diameter (D_e) of 8.8 mm. The root diameter of the micro-fin tube was 8.91 mm. The inside-surface area per unit length of the tube was estimated to be 44.6 mm. The hydraulic diameter (D_h) of the micro-fin tube was estimated to be 5.45 mm. The ratio of the inner surface area of the micro fin tube to the surface area of a smooth tube of the same D_e was 1.6. The fins rifled down the axis of the tube at a helix angle of 18° with respect to the tube axis.

Figure 3 provides a detailed description of the test section. The annulus was constructed by connecting a series of tubes with 14 pairs of stainless steel flanges. This construction permitted the measurement of both the outer micro-fin wall temperature and the water temperature drop as discussed in the following two paragraphs. The design also avoided abrupt discontinuities such as unheated portions of the test section and tube-wall "fins" between thermopile ends.

Figure 3 shows that thermocouple wires pass between 12 of the gasketed flange pairs to measure the refrigerant-tube wall temperature at ten locations on the top, side, and bottom of the tube wall. These locations were separated by 0.6 m on average, and they were located near the intersection of the shell flanges. In addition to these, thermocouples were also mounted near the middle pressure taps. The thermocouple junction was soldered to the outside surface and was sanded to a thickness of 0.5 mm. The leads were strapped to a thin non-electrically-conducting epoxy layer on the wall for a distance of 14.3 mm before they passed between a pair of the shell flanges. The wall temperature was corrected for a heat flux dependent fin effect. The correction was typically 0.05 K.

Figure 3 also shows that a chain of thermopiles was used to measure the water temperature drop between each flange location. Each thermopile consisted of ten thermocouples in series, with the ten junctions at each end evenly spaced around the circumference of the annulus. Because the upstream junctions of one thermopile and the downstream junctions of another enter the annulus at the same axial location (except at the water inlet and outlet), the junctions of the adjacent piles were alternated around the circumference. A series of teflon half-rings attached to the inner refrigerant tube centered the tube in the annulus. The half-rings were circumferentially baffled to mix the water flow. Mixing was further ensured by a high water Reynolds number (Kattan et al. 1995).

As shown in Fig. 3, six refrigerant pressure taps along the test section allowed the measurement of the upstream absolute pressure and five pressure drops along the test section. Two sets of two water pressure taps were used to measure the water pressure drop along each tube. Also, a sheathed thermocouple measured the refrigerant temperature at each end of the two refrigerant tubes, with the junction of each centered radially. Only the thermocouple at the inlet of the first tube was used in the calculations. The entire test section was wrapped with 5 cm of foam insulation to minimize heat transfer between the water and the ambient.

HEAT TRANSFER COEFFICIENTS

The convective condensation heat transfer coefficient based on the actual inner surface area ($h_{2\phi}$) was calculated as:

$$h_{2\phi} = \frac{q''}{T_r - T_w} \tag{1}$$

where the measured wall temperatures (T_w) were fitted to their axial position to reduce the uncertainty in the measurement. The best fits for the wall temperature for parallel flow and counterflow differed. The measured wall temperatures for counterflow were fitted to:

$$T_w = A_0 + A_1 z^2 \tag{2}$$

The measured wall temperatures for parallel flow were fitted to:

$$T_w = A_0 + A_1 z + A_2 z^2 \tag{3}$$

Figure 4 shows the estimated expanded uncertainty of the wall temperature fit for all the measured data as a function of thermodynamic quality. Figure 4 includes some data that was omitted from the correlation of the data as explained in the Results section. Circles and squares are used to designate counterflow and parallel flow, respectively. The uncertainty of most of the fitted wall temperatures was less than 0.5 K. The median of the uncertainty in T_w as shown in Table 1 was 0.35 K.

The water temperature (T_f) was determined from the measured temperature change obtained from each thermopile and the inlet water temperature measurement. The water temperature was regressed to the axial location of the thermopiles along the z-coordinate. As shown for the T_w regressions, the best fits for the water temperatures differed for parallel flow and counterflow. The water temperatures for counterflow were fitted to:

$$T_f = A_0 + A_1 z^2 + A_2 z^3 \tag{4}$$

The measured water temperatures for parallel flow were fitted to:

$$T_f = A_0 + A_1 z + A_2 z^2 + A_3 z^3 \tag{5}$$

The water temperature fits, the measured water mass flow rate ($\dot{m}_f$), and the properties of the water were used to calculate the local heat flux (q") to the micro-fin tube based on the actual inner surface area:

$$q'' = \frac{\dot{m}_f}{\pi p}\left(c_{p_f}\frac{dT_f}{dz} + v_f\frac{dP_f}{dz}\right) \tag{6}$$

where p is the wetted perimeter of the inside of the micro-fin tube. The specific heat (c_p) and the specific volume (ν_f) of the water were calculated locally as a function of the water temperature. The local, axial water temperature gradient (dT_f/dz) was calculated from a derivative of either eqn. 4 or eqn. 5 depending on the corresponding flow configuration. The water pressure gradient (dP_f/dz) was linearly interpolated between the pressure taps to the location of the wall thermocouples. The pressure gradient term was typically less than 3% of the temperature gradient term.

Figure 5 shows an example plot of the local heat flux as calculated from eqn. 6 versus thermodynamic quality. Counterflow and parallel flow heat flux profiles are compared for R134a at a Reynolds number of 15100 and a refrigerant pressure of 1160 kPa. The form of the counterflow and parallel flow differ, as suggested by the use of two different water temperature fits for the two flow conditions. The two flow conditions provided for a wider range of heat fluxes at a given thermodynamic quality. In this way, the sensitivity of the heat-transfer coefficient to the heat flux could be thoroughly investigated as a function of quality.

Figure 6 plots the relative uncertainty in the water temperature gradient (which is roughly equal to the uncertainty in the heat flux) versus thermodynamic quality. As shown in Fig. 6, the larger values of heat flux exhibit smaller relative uncertainties than the lower heat fluxes. For example, at low quality (low q") much of the parallel flow data exhibits relative uncertainties greater than 20%. Similarly, the relative uncertainty of the counterflow data tends to increase for high quality (low q").

The equilibrium refrigerant temperature (T_r) and all other thermodynamic and transport properties were calculated with version five of REFPROP (Huber et al. 1995) with enthalpy and pressure as inputs. The enthalpy of the refrigerant vapor at the inlet of the test section was calculated from its measured temperature and pressure. The subsequent drop in refrigerant enthalpy along the test section was calculated from the local heat flux and the measured refrigerant mass flow rate. The refrigerant pressures were measured at six pressure taps along the test section. The pressure was linearly interpolated between the taps. The average T_r was varied between 30 °C and 50 °C with approximately 5 K of superheat at the test section inlet.

Figures 7 and 8 illustrate the results of the above-described measurement procedure for counterflow and parallel flow conditions, respectively. The difference between the appearances of the water and refrigerant temperature profiles for parallel flow and counterflow demonstrates the need for different temperature versus distance regression forms for the two flow conditions. Figures 7 and 8 also show representative results of refrigerant and water pressure profiles for counterflow and parallel flow conditions, respectively.

The local Nusselt number (Nu) was calculated based on the actual inner surface area of the tube as:

$$Nu = \frac{h_{2\phi} D_h}{k_l} \tag{7}$$

Figure 9 shows the relative uncertainty of the Nu versus thermodynamic quality. Testing the two flow conditions also benefitted the correlation of data by providing complimentary uncertainty profiles with thermodynamic quality. For example, the uncertainty of the low quality, parallel flow Nusselt number data exhibits high uncertainties, while the low quality, counterflow data exhibits low uncertainties. Consequently, by testing with both flow conditions, much of the parallel flow data can be omitted from the correlation due to its high uncertainty, while still maintaining sufficient counterflow data in the low quality region to produce a valid correlation. Figure 9 shows that a similar, but opposite, scenario exists in the high quality region.

The cubic fit of the wall and water temperature profiles were within ± 0.8 K and ± 0.2 K, respectively, of the measured temperatures. On average, the residual standard deviation of the wall and water temperature fits was 0.5 K and 0.1 K, respectively. The refrigerant temperatures were obtained from pressure measurements and the REFPROP (Huber et al. 1995) equation of state.

Figure 10 provides corroboration of the present local heat flux and wall temperature measurements with the Wiegand (1945) correlation for single phase turbulent heat transfer in a smooth annulus. The local heat flux, measured wall and water temperatures were used to calculate the local water-side heat transfer coefficient for the annulus. Figure 10 shows that approximately 80% of the measured water-side heat transfer coefficients are within ± 25% of the Wiegand (1945) correlation. The range of the difference between measurements and Wiegand's (1945) correlation is nearly centered about the correlation and lies within $\pm$ 36% which was the range given by E. L. McMillen for his data in the "Written Discussion" section of Wiegand's (1945) paper. This provides an independent validation of the wall temperature and heat flux measurements.

Table 1 shows the expanded measurement uncertainty (U) of the various measurements along with the range of each parameter in this study. The U was estimated with the law of propagation of uncertainty. All expanded measurement uncertainties are reported for a 95% confidence interval and are evaluated by statistical methods. The estimates shown in Table 1 are median values of U for the correlated data.

RESULTS

The 1367 data points generated in this study for R32, R125, R410A, and R134a are tabulated in three separate appendices. Appendix A contains the pressure drop data. Appendix B contains the Nusselt and Reynolds numbers and other reduced data that were used in the correlation of the data. Appendix C contains the raw data measurements including the heat flux and the wall and water temperatures and locations. The column entitled, "flow," provides a "C" or a "P" for counterflow or parallel flow, respectively. All the parameters are defined in the nomenclature.

Heat Transfer

The present heat-transfer measurements concur with the approximate magnitude of the heat transfer enhancement reported by Webb (1994). Webb (1994) states that the micro-fin tube provides anywhere from 100% to 200% improvement over smooth tube R22 condensation performance. Figure 11 shows a graph of the condensation heat-transfer enhancement ratio (E_h),

$$E_h = \frac{h_{2\phi} A_i}{h_p \pi D_e L} \tag{8}$$

versus Reynolds number. The heat-transfer coefficient of the plain surface (h_p) was calculated from the smooth tube convective condensation correlation of Ackers and Rosson (1960) using the equivalent diameter (D_e) to calculate the Reynolds and Nusselt numbers. The h_p was calculated using the same mass velocity and fluid properties that were used for the experimental data.

The enhancement ratio shown in Fig. 11 varies from approximately 0.6 to 3.6 for the micro-fin tube. Approximately half of the enhancement factors are greater than 1.6. Enhancement ratios below 1.6 indicate that the micro-fin heat transfer coefficient based on the surface area is less than that of a smooth tube. Enhancement ratios greater than 1.6 suggest that the enhancement caused by the micro-fin surface is due to more than just the 60% surface area increase over the smooth surface with the same cross sectional flow area.

Regression of dimensionless parameters against E_h was used to assist in the investigation of the mechanism that was responsible for the heat transfer enhancement. The E_h was found to be primarily a function of Reynolds number and thermodynamic quality:

$$E_h = 9.777\ Re^{-0.162}\ x_q^{0.411} \tag{9}$$

The relative magnitude of the exponents in eqn. 9 shows that the quality has more influence on the E_h than does the Re. The negative exponent on the Reynolds number shows that the effectiveness of the micro-fin enhancement mechanism decreases for increasing Reynolds numbers. Conversely, eqn. 9 shows that the micro-fin enhancement mechanism is more effective for larger values of quality. The enhancement mechanism with respect to increasing quality may result from an interaction between the fins and the liquid-vapor interface of the fluid in the tube. At very high vapor qualities and very thin liquid films on the surface, the fins may be very effective at mixing the liquid-vapor interface due to their proximity to the liquid-vapor interface. It is also possible to obtain an additional enhancement at very high qualities from surface-tension drainage forces on the fin-tips. However, as the liquid accumulates on the surface, both the liquid-vapor interface mixing and the surface-tension effects diminish. Consequently, the E_h is larger at higher qualities. The heat transfer enhancement with respect to the Reynolds number may result from an interaction between the fins and the turbulence in the liquid film. Smaller eddies transfer momentum more efficiently than larger eddies. Low Reynolds number flows may be enhanced more readily than high Reynolds number flows due to the reduction in the size of the turbulent eddies at the wall by the interaction of the flow with the fins. High Reynolds number flows are not enhanced as readily as low Reynolds number flows because there are fewer large eddies to be reduced at higher Reynolds numbers.

The enhancement ratio that Schlager et al. (1989) obtained for the same micro-fin tube as used in this study is presented as solid, white lines in Fig. 11. They used a global micro-fin heat transfer coefficient measurement over a 0.6 to 0.8 quality change to calculate E_h. For the reference case, Schlager et al. (1989) measured smooth tube heat transfer coefficients for an 8 mm inner diameter tube. The solid white line shows the enhancement ratio as reported by Schlager et al. (1989) using the 8 mm diameter tube in its calculation. The dashed line shows the E_h after the smooth tube conductance was multiplied by $(8/8.8)^{0.8}$ to convert to an E_h based on a 8.8 mm smooth inner diameter, i.e., D_e for the micro-fin. The Reynolds number and quality dependence of the Schlager et al. (1989) E_h roughly agrees with the present E_h measurement. The slope of the Schlager et al. (1989) is consistent with the mean slope of the measurements. Considering that the Schlager et al. (1989) E_h is for average heat transfer conditions, their data would be expected to lie close to the middle of the data range. The Schlager et al. (1989) enhancement ratio that was adjusted to the 8.8 mm diameter lies relatively close to the median of the data.

Figure 12 includes a comparison of the experimental micro-fin Nusselt numbers to the smooth tube convective condensation correlation of Ackers and Rosson (1960) using the hydraulic diameter to calculate the Reynolds and Nusselt numbers. The figure shows that use of the hydraulic diameter in a smooth tube condensation correlation predicts most of the present micro-fin data to within +20% and -40%. The majority of the data is under-predict with the Ackers and Rosson (1960) correlation. Apparently, the smooth tube correlation does not account for the flow enhancement provided by the fins. Consequently, a new correlation is needed to account for the heat transfer enhancement due to the micro fins.

The convective condensation Nusselt numbers (Nu) were correlated following the law of Corresponding States philosophy presented by Cooper (1984). Cooper (1984) suggested that the fluid properties that govern nucleate pool boiling can be well represented by a product of the reduced pressure (P_r/P_c), the acentric factor ($-\log_{10}(P_r/P_c)$), and other dimensionless variables to various powers. The above reduced pressure terms and several other locally evaluated terms were used to correlate the 1358 (see table 2) measured local Nu for all condensing flow conditions and refrigerants in this study to:

$$Nu = \frac{h_{2\phi} D_h}{k_l} = 2.256\, Re^{\beta_1}\, Ja^{\beta_2}\, Pr^{\beta_3} \left(\frac{P_r}{P_c}\right)^{\beta_4} \left(-\log_{10}\frac{P_r}{P_c}\right)^{\beta_5} Sv^{\beta_6}$$

where:

$$\begin{aligned}\beta_1 &= 0.303\\ \beta_2 &= 0.232x_q\\ \beta_3 &= 0.393\\ \beta_4 &= -0.578x_q^2\\ \beta_5 &= -0.474x_q^2\\ \beta_6 &= 2.531x_q\end{aligned} \tag{10}$$

where the Reynolds number (Re), the Jacob number (Ja), the Prandtl number (Pr), the reduced pressure (P_r/P_c), the dimensionless specific volume (Sv) and the quality (x_q) are all evaluated locally. Baker's (1954) flow map for smooth tubes was used to approximately determine the flow conditions. The results showed that 79%, 18%, 2%, and 1% of the data were in annular, slug, bubbly, and wavy flow, respectively.

The search for the above form of the correlation began with quadratic exponents in quality for each dimensionless variable. The quadratic exponent form was used with good results by Kedzierski and Kim (1997) to correlate several other pure refrigerants and mixtures for a wide range of qualities for both evaporative and condensing flows. The number of dimensionless variables and constants in the exponents were reduced to only those with significant influence on the residual standard deviation of the fit. For example, because R410A is a near-azeotrope, the composition difference between vapor and liquid phases had a negligible influence on the fit of the correlation. Consequently, the composition difference was not used in the fit of the data.

Not all of the 1367 data points were used in the regression of eqn. 10. Table 2 shows the number of data points for each refrigerant that were not used in the fit. Measurements with large uncertainties, and measurements that had high influence, or high leverage on the model were all candidates for exclusion from the regression. The last column in Appendix B shows the data points that were included and excluded from the fit. The letter I signifies that the data point was included in the fit. The letters HI identifies that data point as being omitted for exhibiting high influence on the regression. The letters HL stand for omitted data points associated with high leverage. The letters HC represent high influence and high leverage data points.

The process that was used to determine which measurements were not to be included in the regression is outlined below. First, the form of eqn. 10 was determined using only those data points with an estimated expanded uncertainty less than 25% and qualities less than 1. This process removed 686 data points, leaving no data with Nusselt numbers greater than approximately 300 in the included data set. Next, the 686 measurements that were omitted from the first regression were predicted with that same regression using the dimensionless parameters. Those excluded measurements that were predicted to within $\pm$ 25% of the first correlation were reintroduced into the regression data set. This process reintroduced Nusselt numbers greater than 300 to the regression data set. New coefficients were generated for eqn. 10 using the 1417 measurements of the regression data set. Measurements that were omitted from the regression with this first pass are designated with "O2" in the last column of Appendix B. The hat matrix and Cook's distance were generated for the second regression and used to determine which data had high-leverage and influence on the model, respectively. The diagonal elements of the hat matrix that were greater than approximately 2d/n, where d is the number of model parameters, and n is the number of data points, were designated as high-leverage points (Belsley et al., 1980). The elements of the Cook array that were greater than 4/n were considered to be influential observations. The third stage of data filtering was performed by removing data: (1) that exhibited both high influence (i.e., $4/n > 0.01$) and great leverage (i.e., $2d/n > 0.003$) or (2) where the estimated uncertainty was greater than 25%, and where the data had a large influence on the fit (shown as CU in last column of Appendix).

Most of the data that satisfied the last two criteria were data at or near the inlet and exit of the test section. There were nearly as many outliers at the inlet as there were for the outlet of the test section. Outliers at the inlet and outlet of the test section are consistent with the largest uncertainties in the water and wall temperature fits being located at the inlet and outlet. Also, the ΔT_s can be less than the uncertainty of the measurement at the refrigerant inlet and outlet of the test section for counterflow and parallel flow, respectively.

Figure 13 compares the measured condensation Nusselt numbers for the micro-fin tube to the Nusselt numbers predicted with equation 10. Equation 10 correlates 95% of the pure component and near-azeotropic convective condensation Nusselt numbers to within approximately $\pm$ 21%. The mean of the correlation has an average uncertainty of $\pm$ 3% over the entire range of Nusselt numbers. Only random trends were observed in the residual plots against each of the parameters of eqn. 10. The residual standard deviation of eqn. 10 and that for the separate fits for each fluid were nearly the same. This suggests that the scatter in the data is not caused by the different fluids.

A simpler form of eqn. 10 with a larger uncertainty is:

$$Nu = \frac{h_{2\phi} D_h}{k_l} = 4.94\, Re^{\beta_1}\, Pr^{\beta_3} \left(\frac{P_r}{P_c}\right)^{\beta_4} \left(-\log_{10}\frac{P_r}{P_c}\right)^{\beta_5} Sv^{\beta_6}$$

where:

$$\beta_1 = 0.235 \qquad (11)$$
$$\beta_3 = 0.308$$
$$\beta_4 = -1.16 x_q^2$$
$$\beta_5 = -0.887 x_q^2$$
$$\beta_6 = 2.708 x_q$$

Equation 11 does not require an iteration procedure on the ΔT_s to evaluate the Jacob number. However, the uncertainty of fit is approximately 23.5% which is larger than that of eqn. 10.

Figure 14 shows the heat transfer coefficient versus quality for each of the four test fluids at T_r = 40 °C, ΔT_s = 5 K, and G_r = 250 kg/(m^2•s). The solid lines are predictions for the present micro-fin tube geometry which were obtained from the correlation of the data given as eqn. 10. In general, the measured condensation heat-transfer coefficient decreases for decreasing qualities. Apparently, thin liquid films and high vapor velocities at the entrance of the tube provide for high heat-transfer coefficients. As the liquid accumulates on the tube wall for decreasing quality, the heat-transfer coefficient diminishes. The refrigerant R32 exhibits the highest heat transfer performance of the four test fluids. R32 owes much of its heat transfer performance to its high thermal conductivity. As expected, the performance of the near-azeotropic mixture R410A is between that of its pure components R32 and R125. The predicted performance of R22 is near that of its proposed replacement R410A. The R125 exhibits lower condensation Nusselt numbers than that for R134a for the above conditions. Conversely, as shown by Kaul et al. (1996), the flow boiling performance of R125 is greater than that of R134a in the identical tube.

Over 140 figures would be required to depict the Nusselt number versus thermodynamic quality relationships for each test. Consequently, only representative plots of Nu versus x_q are given in Figs. 15 through 18. Each figure compares counterflow to parallel flow for nominally the same Reynolds number and reduced pressure. The solid lines are predictions for the present micro-fin tube geometry which were obtained from the correlation of the data given as eqn. 10. The symbols are the measured data points. In general, parallel flow exhibits larger Nusselt numbers for the 0.3 to 0.7 quality range. Below and above this range, the Nusselt numbers for counterflow and parallel flow nearly coincide. Both the Nussult number measurements and the predictions for counterflow are concave with respect to quality. By contrast, the parallel flow Nusselt number measurements and predictions are convex with respect to quality. The difference in the Nusselt numbers in the mid-quality range may be due to the difference in the heat flux versus quality relationship between counterflow and parallel flow. The exact mechanism that is responsible for the difference between counterflow and parallel flow is not fully understood. Although the correlation predicts both the concave and convex trends with respect to quality, it, apparently, does not account for the entire difference between Nusselt numbers for the two flow conditions. Equation 10 consistently under-predicts the counterflow Nusselt numbers and over-predicts the parallel flow Nusselt numbers.

Figure 19 compares the predictions of eqn. 4 to the local condensation heat transfer data that was available in the literature. All of the heat transfer coefficients taken from the literature were read from graphs and given based on the root-diameter area. Consequently, all of the heat transfer coefficients from the literature had to be adjusted so that they were based on the actual inner surface area of the tube in order to compare the literature data with eqn. 10. Cross-sectional schematics and tabulated dimensions of the tubes were used to calculate the surface areas and the hydraulic diameters of the micro-fin tubes from:

$$D_h = \frac{4A_c \cos\alpha}{N_f\, S} \tag{12}$$

where S is the perimeter of one fin and channel taken perpendicular to the axis of the fin, N_f is the number of fins, A_c is the cross-sectional flow area, and α is the helix angle of the fin.

Mori and Nakayama (1983) measured R113 quasi-local condensation heat transfer coefficients for three different micro-fin tube geometries. The Mori and Nakayama (1983) data for a 9.5 mm outer diameter tube with 60, 0.16 mm high micro fins at a 20° helix angle are presented as closed circles in Fig. 19. The Mori and Nakayama (1983) data presented in Fig. 19 are for a mass velocity of 160 kg/m²•s. Most of this data lies within ± 20% of the predictions. Chiang (1993) graphically presented measured quasi-local condensation heat transfer coefficient for one of four micro-fin tube geometries that he tested. The local heat flux was estimated from dx_q/dz = 0.09/m which was given by Chiang (1993). The Chiang (1993) data for R22 in a 10 mm outer diameter tube with 60, 0.18 mm high micro fins at a 18° helix angle and a mass velocity of 600 kg/m²•s are presented as closed rectangles in Fig. 19. Most of the Chiang (1993) data lies just below the 20% under-prediction line. The quasi-local condensation heat transfer measurements of Khanpara et al. (1986) for three different mass velocities(223 kg/m²•s, 378 kg/m²•s, and 570 kg/m²•s) are shown as closed diamonds in Fig. 19. The local heat flux was estimated from quality change over the test section which was given as from 0.2 to 0.3. The measured Nusselt numbers of Khanpara et al. (1986) for their intermediate mass velocity of 378 kg/m²•s lie very close to those predicted by eqn. 10. However, the high-quality region of the low mass velocity data (223 kg/m²•s) are over-predicted by more than 20%. Similarly, nearly all of the high mass velocity (570 kg/m²•s) Nusselt numbers are under-predicted by approximately 30%.

The data from the literature are all within the mass velocity limits for which the correlation was developed. Also, the e/D_i ratios for the tubes from the literature, with the exception of the Mori and Nakayama (1983) data, are approximately equivalent to the present tube (0.02). However, considering the wide range of tube diameters, helix angles, fluids, fin shapes, and estimates made for the literature data, the agreement between eqn. 10 and Nusselt numbers from the literature is to be expected. Also, it is very difficult to estimate the hydraulic diameter not knowing the exact pattern of the fins. This is especially true for the Chiang (1993) data which was for mechanically expanded micro-fin tubes. Certainly, the mechanical expansion process altered the fin profiles and increased the overall diameter of the tube. If a larger hydraulic diameter were to be used in the predictions, the Chiang (1993) agreement between the predictions and measurements would improve.

Although, eqn. 10 predicts the micro-fin data fairly well, the predictions of the cross-grooved micro-fin data of Chamra and Webb (1995) are under-predicted on average by 40%. Possibly, the cross grooves provide an additional enhancement that is not accounted for by eqn. 10. The process of forming the cross groove creates a bump or a spill over into the major groove. The additional enhancement could be due to the high heat transfer that would occur on the leading edge of the bump. Equation 4 cannot account for the enhancement due to the bump. Also, the cross groove tubes were created from flat stock with a "W-shaped" fin axis then seam welded. Consequently, the main fin axis of the cross grooved tube did not rifle down the axis. Possibly, the non-spiraling fin also contributed to a difference in performance from the eqn. 10 prediction.

Figure 20 shows the heat transfer degradation ($\Delta h_{2\phi}$) as a function of heat flux for the R410A mixture at a mass flux of 246 kg/m^2 s. The $\Delta h_{2\phi}$ was calculated from the correlations using the same definition as given in Kedzierski et al. (1992):

$$\Delta h_{2\phi} = h_L - h_{2\phi} \tag{13}$$

where h_L is the heat transfer coefficient obtained from a linear interpolation of the pure components at a given composition. The heat transfer degradation is independent of heat flux and no greater than 2.5%. The average difference between the vapor and liquid concentration was 0.02 mole, suggesting that the degradation was mostly due to property effects.

Pressure Drop

Pierre (1964) developed the following semi-empirical equation to predict the pressure drop for flow boiling in a horizontal smooth tube:

$$\Delta P = \left(0.0185\left(\frac{\Phi}{Re}\right)^{1/4} + \frac{\Delta x_q D_h}{x_{q_m}\Delta L}\right)\frac{\Delta L}{D_h}G^2 x_{qm} v_v \tag{14}$$

where the specific volume of the vapor (ν_v), the Reynolds number, the mass velocity (G), and the two-phase number ($\Phi = \frac{\Delta x_q\, i_{fg}}{\Delta L\, g}$) are evaluated at the average temperature of the refrigerant. The average quality over length ΔL is x_{qm}. The above correlation originates from the first law of thermodynamics. The first term within the bracket represents the dimensionless friction factor. The second term is from the acceleration portion of the pressure drop. Pierre (1964) fitted his pressure drop measurements to eqn. 6 to obtain an expression for the friction factor. With the exception of the friction factor which may be germane to flow boiling, eqn. 6 applies to condensation as well as to evaporation. One might expect that pressure drops due to flow boiling (in the absence of nucleate boiling) and condensation may be governed by the same physical phenomenon. If so, then the Pierre (1964) correlation should work as well for convective condensation as it does for convective evaporation.

Figure 21 compares the micro-fin condensation pressure drop to Pierre (1964) flow boiling pressure drop correlation. The hydraulic diameter was used in the Pierre (1964) correlation to predict most of the condensation pressure drop measurements in the present micro-fin tube to within ± 20%. Pierre recommends that eqn. 14 not be used for values of $\frac{Re\, L}{\Delta x_q i_{fg}}$ greater than 1. Only three data points in the present data set violated this criteria. Overall, the Pierre (1964) correlation predicts the present convective condensation pressure drop measurements for the micro-fin tube acceptably well. However, the mean of the predictions lies slightly below the ideal prediction line.

Following the development of the Pierre (1964) pressure drop equation, the Fanning friction factor for the present data was calculated as:

$$f_r = \frac{D_h}{(v_o + v_i)\Delta L}\left(\frac{(P_i - P_o)}{G^2} - (v_o - v_i)\right) \tag{15}$$

where specific volume of the fluid (ν) was calculated from a thermodynamic quality weighted average of the liquid and vapor specific volumes. Only the two central portions of the test section (Fig. 3) were used to ensure that all of the correlated data were for two-phase flow. Appendix A shows the data that was used to calculate the friction factor from eqn. 14.

In order to center the friction factor predictions about the data, the measured friction factors were regressed to the following:

$$f_r = 0.00228\ Re^{-0.062}\Phi^{0.211} \tag{16}$$

Twenty-six data points were removed from the fit because they had high influence and high leverage on the fit. The deleted data were for somewhat low pressure drop values which are associated with larger relative measurement uncertainties.

The exponent on the two-phase number given in eqn. 16, 0.211, is consistent with that given by Pierre (1964): 0.24. However, the exponent on the Reynolds number, -0.062, is very different from that given by Pierre (1964): -0.24. The exponent on the Reynolds number of eqn. 16 is approximately equivalent to -0.06 which is the exponent that one would calculate from the transition zone of the Moody (1944) chart using the fin height (2mm) for the roughness height. Consequently, the new friction factor should be more appropriate for micro-fins because it accounts for the influence of the fins on the flow.

The fact that the Reynolds number exponent is consistent with that obtained from the Moody (1944) chart suggests that the fins of a micro-fin tube act like a roughness to enhance the convective condensation heat transfer. If roughness mixing dominates the enhancement mechanism, neither swirl effects nor surface-tension drainage have much influence on the heat transfer. The lack of importance of surface-tension and swirl flow may be a consequence of the flow conditions and surface geometry. It may be possible that the roughness effect would not dominate for other flow conditions and micro-fin tubes with larger heights.

The corroboration between the present Re exponent and Moody's (1944) also suggests that the frictional pressure drop of micro-fin tubes should depend on the fin-height-to-root-tube-diameter (e/D_i) ratio. If it is assumed that the fins act purely as a roughness, the Moody (1944) chart can be used to interpolate between the eqn. 16 friction factor and Pierre's (1964) smooth tube friction factor for a given e/D_i ratio as follows:

$$f_r = \left(0.002275+0.00933\exp\left(\frac{e/D_i}{-0.003}\right)\right)Re^{\frac{-1}{4.16+532\frac{e}{D_i}}}\Phi^{0.211} \tag{17}$$

In the above equation, the functional forms of the leading coefficient and the Reynolds number exponent with respect to e/D_i were determined from the Moody (1944) chart. Also, Pierre's (1964) friction factor equation was modified for use in the interpolation. Namely, the exponent on the two-phase number of Pierre's (1964) friction factor correlation was set equal to that of eqn. 16 and the leading coefficient on Pierre's correlation was adjusted to give approximately the same results, for our data set, as the original equation.

The pressure drop equation for which eqns. 16 and 17 are valid is:

$$\Delta P = \left(\frac{f_r(v_o + v_i)\Delta L}{D_h} + (v_o - v_i)\right)G^2 \tag{18}$$

This is essentially the same equation as given by Pierre (1964) with the exception that the specific volume of the liquid is not neglected. The uncertainty of the fit was reduced when the liquid specific volume was included.

CONCLUSIONS

Local convective condensation measurements for four refrigerant fluids: R134a, R410A(R32/R125, 50/50 % mass), R125, and R32 in a micro-fin tube were presented. Both heat transfer and pressure drop measurements were provided. The measured convective condensation Nusselt numbers for all of the test refrigerants were correlated to a single expression consisting of a product of dimensionless properties. The correlation was shown to predict existing condensation Nusselt numbers for micro-fins from the literature acceptably well. However, the correlation poorly predicted the Nusselt numbers for micro-fins with cross-grooves. It was speculated that bumps from the cross-grooves caused an additional enhancement that could not be accounted for by the correlation. The hydraulic diameter was used in an existing flow boiling correlation from the literature to predict most of the condensation pressure drop measurements in the present micro-fin tube to within $\pm$ 20%.

In general, the measured condensation heat-transfer coefficient decreased with decreasing qualities. The refrigerant R32 exhibited the highest heat transfer performance due to its high thermal conductivity. As expected, the performance of the near-azeotropic mixture R410A was between that of its pure components R32 and R125. The heat transfer degradation associated with R410A was shown to be relatively small and believed to be mostly due to nonlinear property effects.

The enhancement ratio was shown to span from 3.6 at low Re to 0.6 at high Re. It was speculated that the micro-fins enhanced the heat transfer with a combination of liquid-vapor interface mixing and turbulent mixing near the wall. The surface behaves as a roughness in the enhancement of the heat transfer. Surface-tension drainage and swirl effects are presumed to have little influence on the heat transfer. At high vapor qualities and thin liquid films on the surface, the fins act to mix the liquid-vapor interface. At lower vapor qualities and thicker liquid films on the surface, the fins have less influence on the liquid-vapor interface. The heat transfer enhancement with respect to the Reynolds number may result from an interaction between the fins and the turbulence in the liquid film. Low Reynolds number flows may be enhanced more readily than high Reynolds number flows due to the reduction in the size of the turbulent eddies at the wall by the interaction of the flow with the fins. High Reynolds number flows are not enhanced as readily as low Reynolds number flows because there are fewer large eddies to be reduced.

The condensation pressure drop for the micro-fin tube was predicted acceptably well with a modified form of the Pierre (1964) pressure drop correlation for convective evaporation. The hydraulic diameter was used and a new friction factor was developed to account for the fin effect on the flow. The influence of the fin height on the Reynolds number exponent was consist with the Moody chart, suggesting that the surface behaves like a roughness in enhancing the heat transfer.

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REFERENCES

Ackers, W. W. and Rosson, H. F., 1960, Condensation inside a horizontal tube. Chemical Engineering Process Symposium Series, Vol. 56, No.30, pp. 145-149.

Baker, O., 1954, Simultaneous flow of oil and gas, The Oil and Gas Journal, Vol. 53, pp. 85-195.

Belsley, D. A., Kuh, E., and Welsch, R. E., 1980, Regression Diagnostics: Identifying Influential Data and Sources of Collinearity, New York: Wiley.

Bergles, A. E., Jensen, M. K., and Shome, B., 1995, "Bibliography on Enhancement of Convective Heat and Mass Transfer," HTL-23, Rensselaer Polytechnic Institute, Troy, NY.

Chiang, R., 1993, "Heat Transfer and Pressure Drop During Evaporation and Condensation of Refrigerant-22 in 7.5 mm Diameter Axial and Helical Grooved Tubes," AIChE Symposium Series No. 295, Vol. 89, pp. 205-210.

Chamra, L. M., and Webb, R. L., 1995, "Condensation and Evaporation in Micro-Fin Tubes at Equal Saturation Temperatures," J. or Enhanced Heat Transfer, Vol. 2, pp. 219-229.

Cooper, M.G., 1984, Saturation Nucleate Pool Boiling- A Simple Correlation Vol. 86, Department of Engineering Science, Oxford University, England, pp. 785-793.

Dittus, F. W. and Boelter, L. M. K., 1930, U. CA, Publ. Eng., Vol. 2, p. 443.

Eckels, S. J., Pate, M. B., and Bemisderfer, C. H., 1992, "Evaporation heat transfer coefficients for R-22 in micro fin tubes of different configuration," Enhanced Heat Transfer, ASME, HTD-Vol. 202, pp. 117-126.

Eckels, S. J., Doerr, T. B., and Pate, M. B., 1994, "In-Tube Heat Transfer and Pressure Drop of R134a and Ester Lubricant Mixtures in a Smooth Tube and Micro-Fin Tube:Part II - Condensation," ASHRAE Trans., Vol. 100, pp. 283-294.

Ghaderi, M., Salehi, M., Saeedi, M. H., 1995, Review of in-tube condensation heat transfer correlations for smooth and enhanced tubes, Advances in Enhanced Heat/Mass Transfer and Energy Efficiency ASME, HTD-Vol.320/PID-Vol.1, pp. 83-94.

Huber, M., Gallagher, J., McLinden, M., and Morrison, G., 1995, NIST Standard Reference Database 23, Version 5.0. Standard Reference Data Program, National Institute of Standards and Technology, Gaithersburg, MD.

Kattan, N., Favret, D., and Thome, J. R., 1995, "R-502 and Two Near-Azeotropic Alternatives: Part I - In Tube Flow-Boiling Tests," ASHRAE Trans., Vol. 101, Pt. 1, pp. 491-508.

Kaul, M. P., Kedzierski, M. A., and Didion, D. A., 1996, "Horizontal Flow Boiling of Alternative Refrigerants within a Fluid Heated Micro-Fin Tube," Process, Enhanced, and Multiphase Heat Transfer: A Festschrift for A. E. Bergles, Begell House, Inc., New York, pp. 167-173.

Kedzierski, M. A., and Kim, M. S., 1997, "Convective Boiling and Condensation Heat Transfer with a Twisted-Tape Insert for R12, R22, R152a, R134a, R290, R32/R134a, R32/R152a, R290/R134a, R134a/R600a," NISTIR 5905, U.S. Department of Commerce, Washington, D.C.

Khanpara, J. C., Bergles, A. E., and Pate, M. B., 1986, "Augmentation of R-113 In-Tube Condensation with Micro-Fin Tubes," Heat Transfer in Air Conditioning and Refrigeration Equipment, ASME, HTD-

Vol. 65, pp. 21-32.

Koyiama, S., Miyara, A., Takamatsu, H., Fujii, T., 1990, Condensation heat transfer of binary refrigerant mixtures of R22 and R114 inside a horizontal tube with internal spiral grooves, International Journal of Refrigeration, Vol. 13, July, pp. 256-263.

Moody, L. F., 1944, "Friction Factors for Pipe Flow," ASME Trans., Vol. 66, pp. 671-684.

Mori, Y., and Nakayama, W., 1983, "High-Performance Mist Cooled Condensers for Geothermal Binary Cycle Plants," Heat Transfer in Energy Problems, Hemisphere, Washington, DC, pp. 211-218.

Muir, E. B., 1989, "Commercial Refrigerants and CFCs," CFCs: Today's Options- Tomorrow's Solutions, Proceedings of ASHRAE's 1989 CFC Technology Conference, pp. 81-86.

Pierre, B., 1964, "Flow Resistance with Boiling Refrigerants-Part 1," ASHRAE Journal, Vol. 6, No. 9, pp. 58-65.

Schlager, L. M., Pate, M. B., and Bergles, A. E., 1989, "Heat Transfer and Pressure Drop During Evaporation and Condensation of R22 in Horizontal Micro-Fin Tubes," Int. J. Refig., Vol. 12, pp. 6-14.

Schlager, L. M., Pate, M. B., and Bergles, A. E., 1990, "Evaporation and Condensation Heat Transfer and Pressure Drop in Horizontal, 12.7-mm Microfin Tubes with Refrigerant 22," J. Heat Transfer, Vol. 112, pp. 1041-1047.

Shah, M. M., 1979, A general correlation for heat transfer during film condensation inside pipes, International Journal of Heat and Mass Transfer, Vol. 22, pp. 547-556.

Wang, C., Kuo, C. S., Chang, Y., and Lu, D. C., 1996, "Two-Phase Flow Heat Transfer and Friction Characteristics of R-22 and R-407C," ASHRAE Transactions, Vol. 102, Pt. 1, pp. 830-838.

Webb, R. L., 1994, Principles of Enhanced Heat Transfer, Wiley Interscience.

Wiegand, J. H., 1945 "Discussion of Paper by McMillen and Larson, Trans. AIChE, Vol. 41, p. 147.

Table 1 Median estimated 95% relative expanded uncertainties for eqn. 10 data

Parameter	Minimum	Maximum	U %
G_r [kg/m^2•s]	57	552	2.0
T_r [K]	293.0	323.0	0.1 (0.3 K)
P [kPa]	600	2000	1.5
T_w [K]	288.0	318.0	0.1 (0.35 K)
$\dot{m}_f$ [kg/s]	0.0150	0.0450	2.0
T_f [K]	278.0	318.0	0.1
P_f [kPa]	200	110	1.0
q" [kW/m^2]	0.72	39	5.1
dT_f/dz [K/m]	0.014	0.57	5.2
ΔT_s [K]	0.41	12.6	15.2 (0.44 K)
Nu	58	508	16.4
Re	3500	24000	4.0
Ja	6	256	16.4
Pr	1.7	3.6	2.0
P_r/Pc	0.22	0.62	2.0
Sv	0.86	10.3	3.0
x_q	0.06	1.0	8.0

Table 2 Data distribution

	R134a	R410A	R125	R32	Total
# tests	46	28	30	38	142
# points	552	336	360	456	1704
# pts used in fit	447	269	309	342	1367

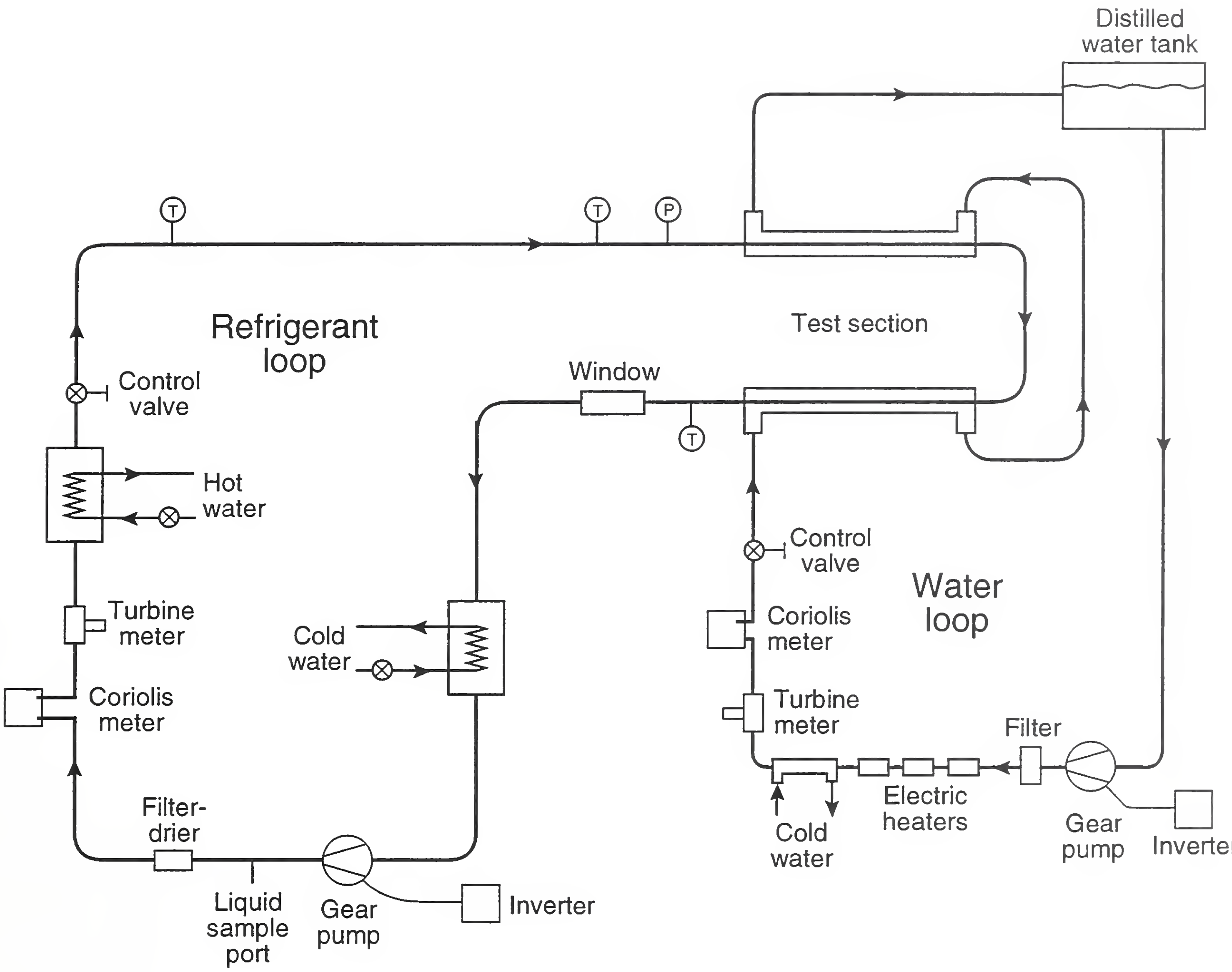

Fig. 1 Schematic of test rig

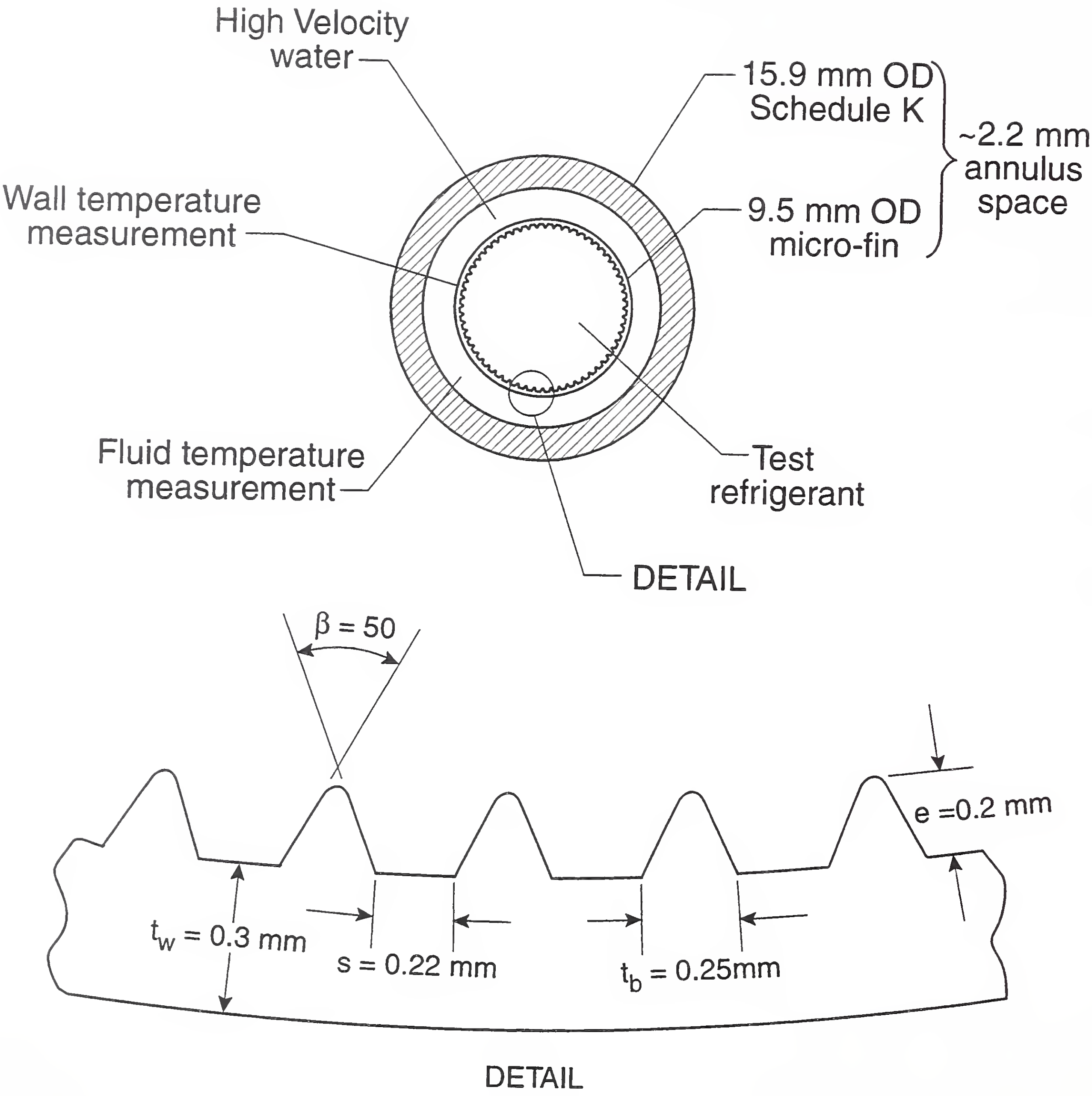

Fig. 2 Test section cross section

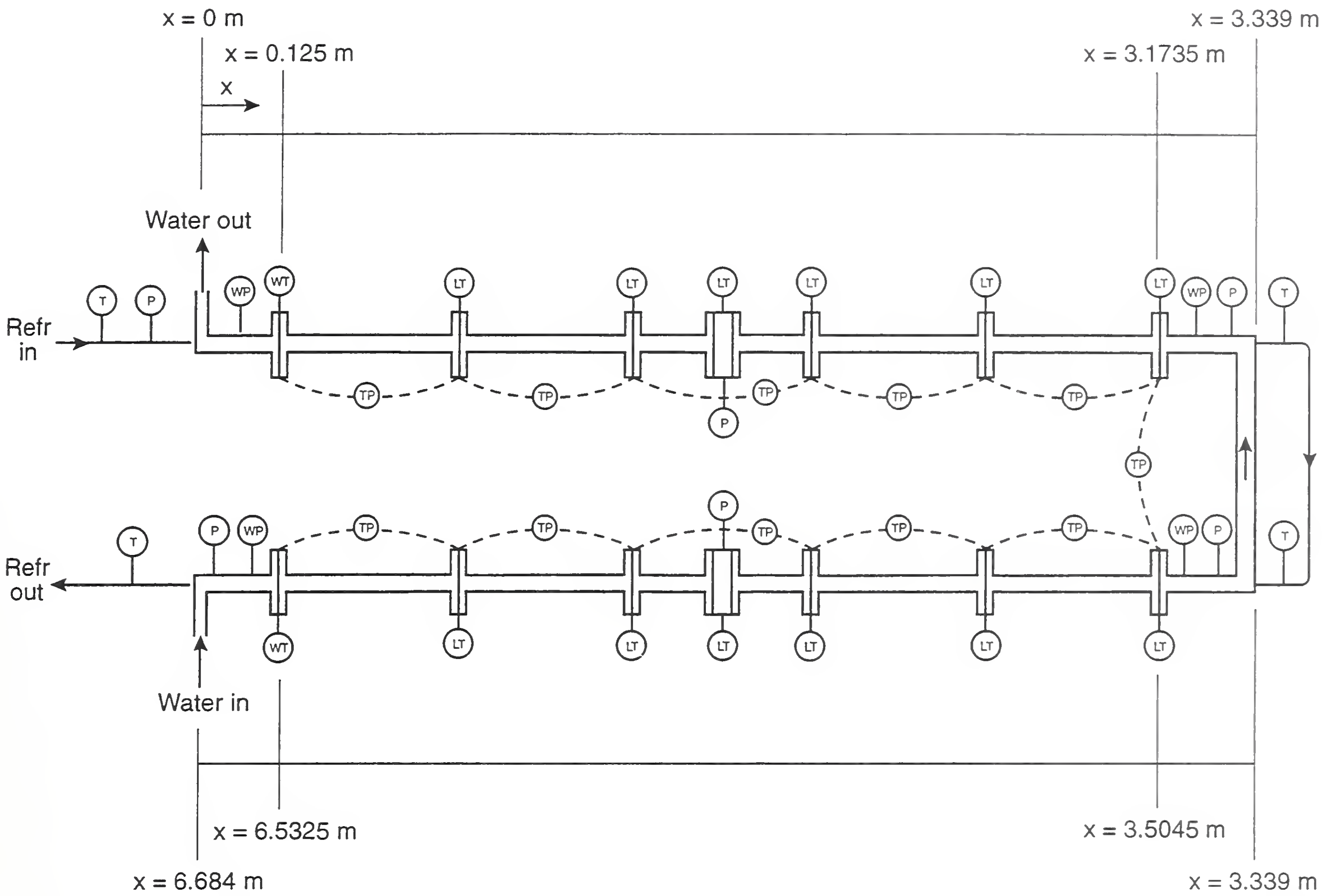

Fig. 3 Detailed schematic of test section

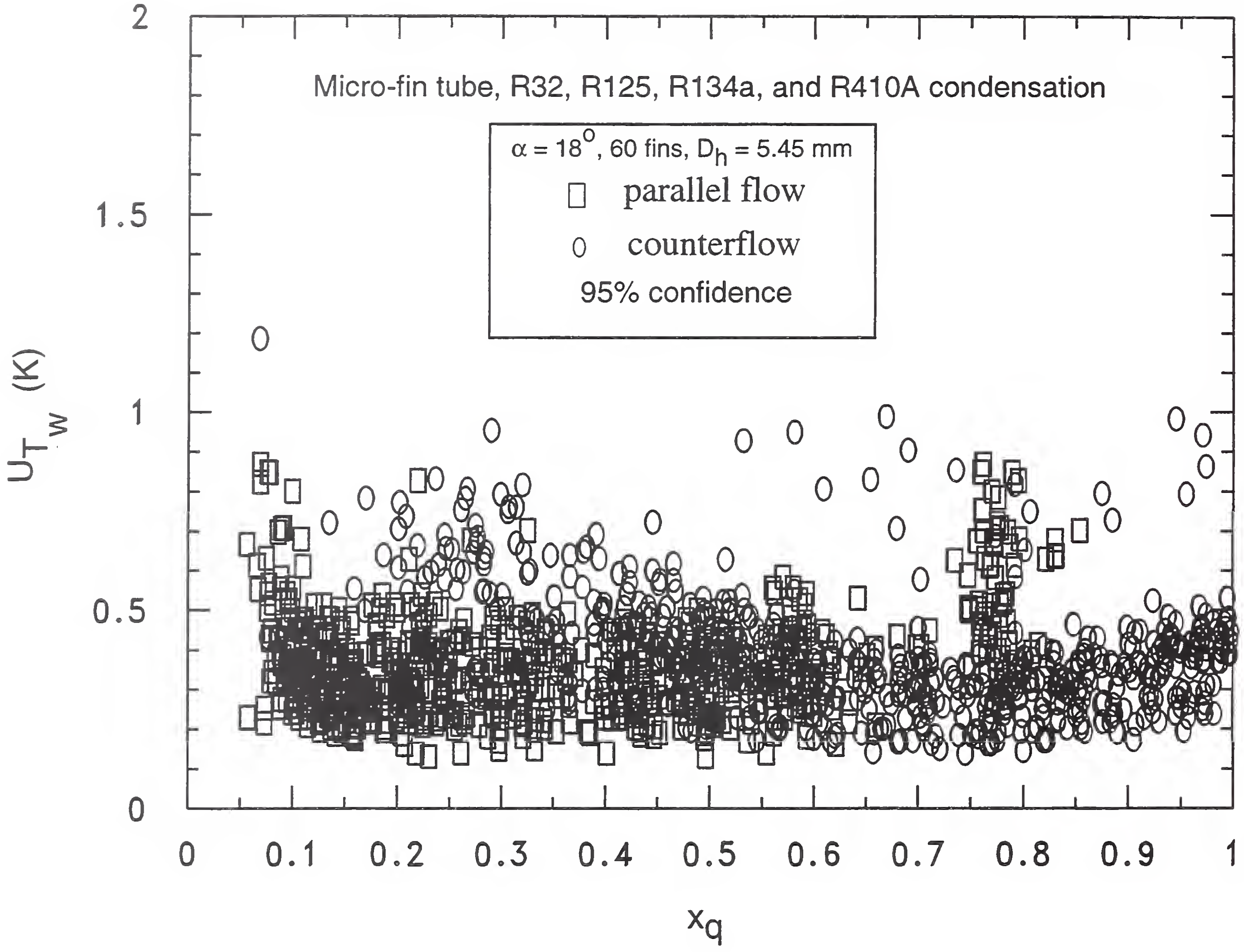

Fig. 4 Relative uncertainty of inner root surface temperature

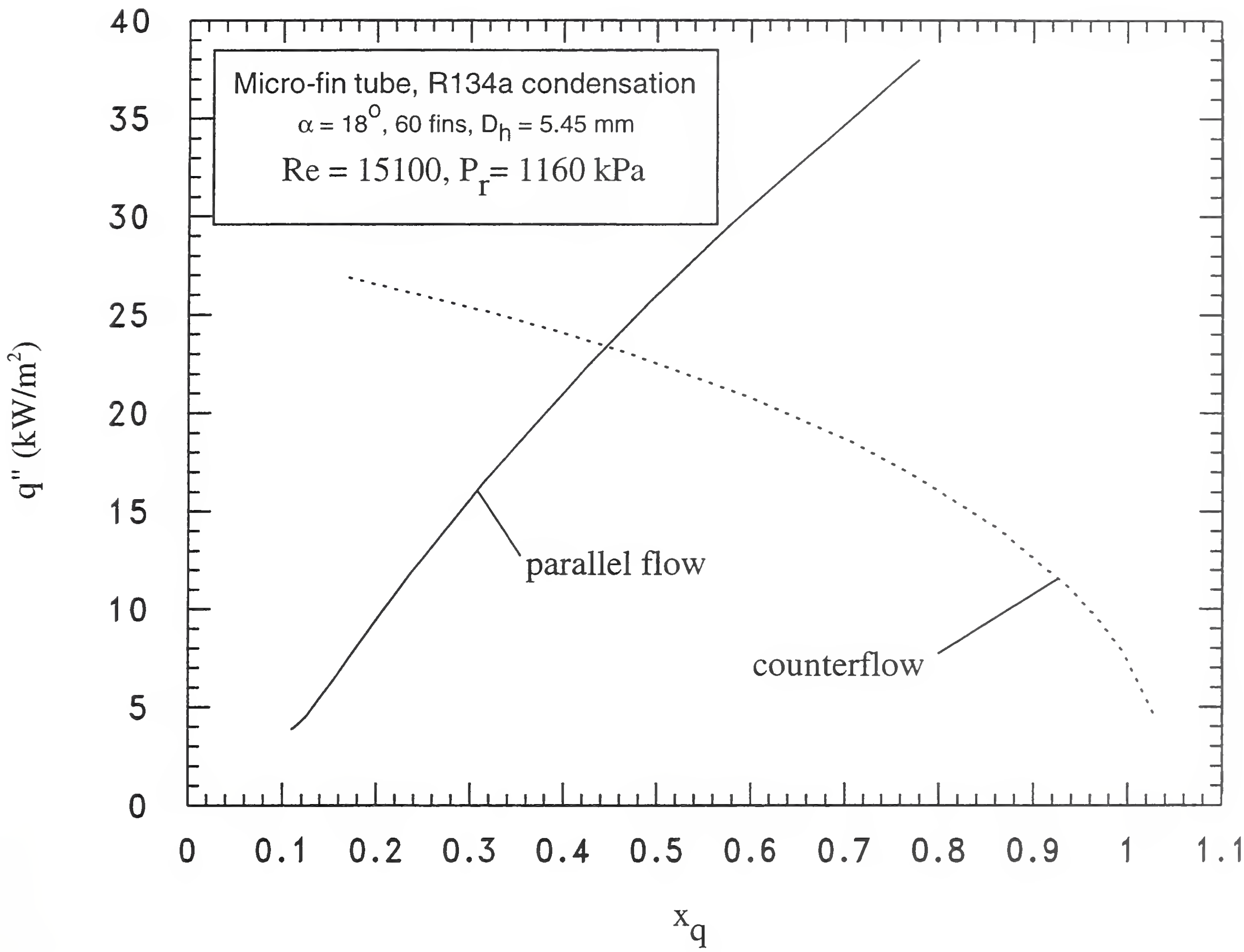

Fig. 5 Comparison of counterflow and parallel flow heat flux distributions

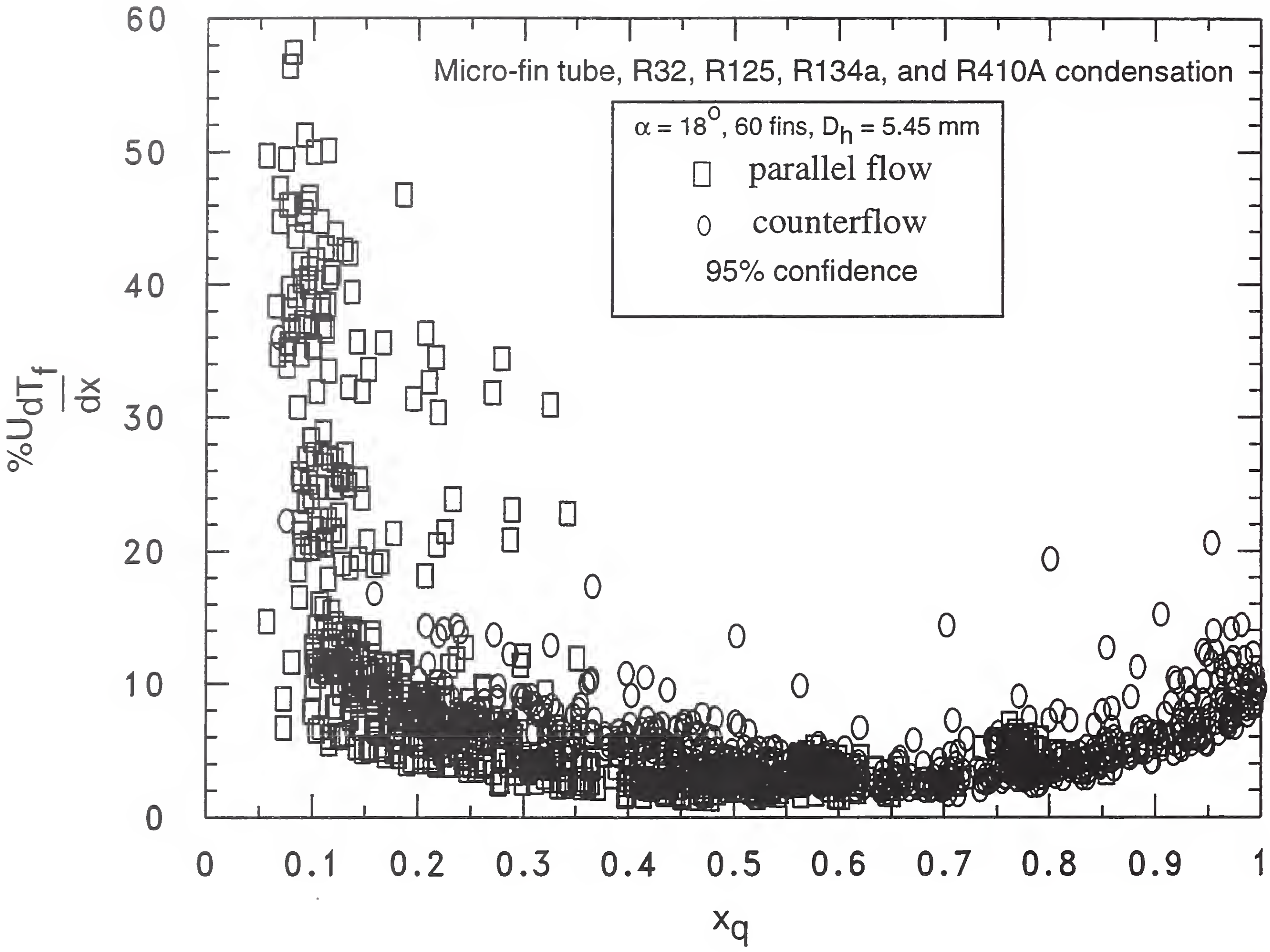

Fig. 6 Relative uncertainty of water temperature gradient with respect to quality

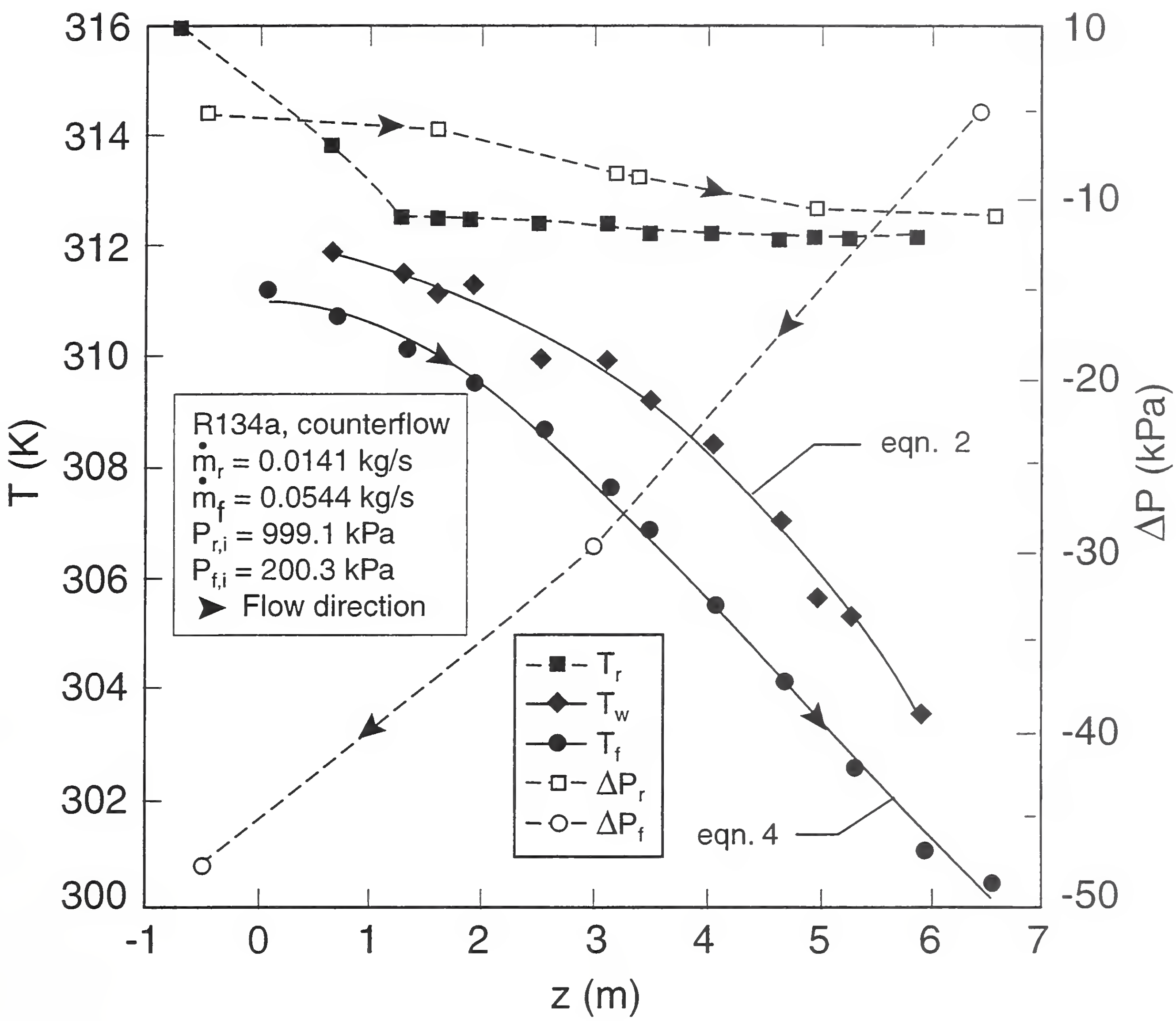

Fig. 7 Counterflow temperature and pressure profiles for a R134a test

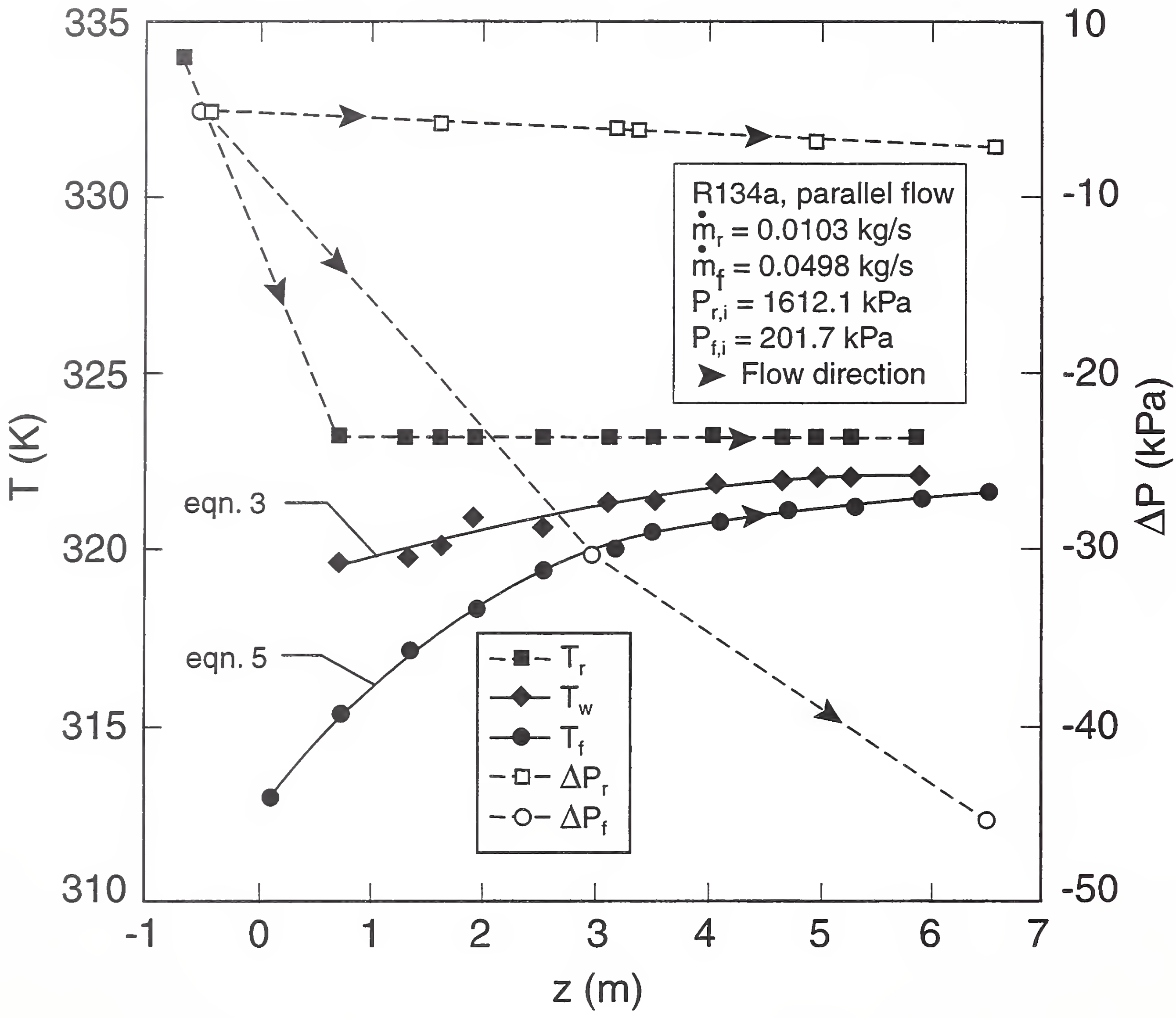

Fig. 8 Parallel flow temperature and pressure profiles for a R134a test

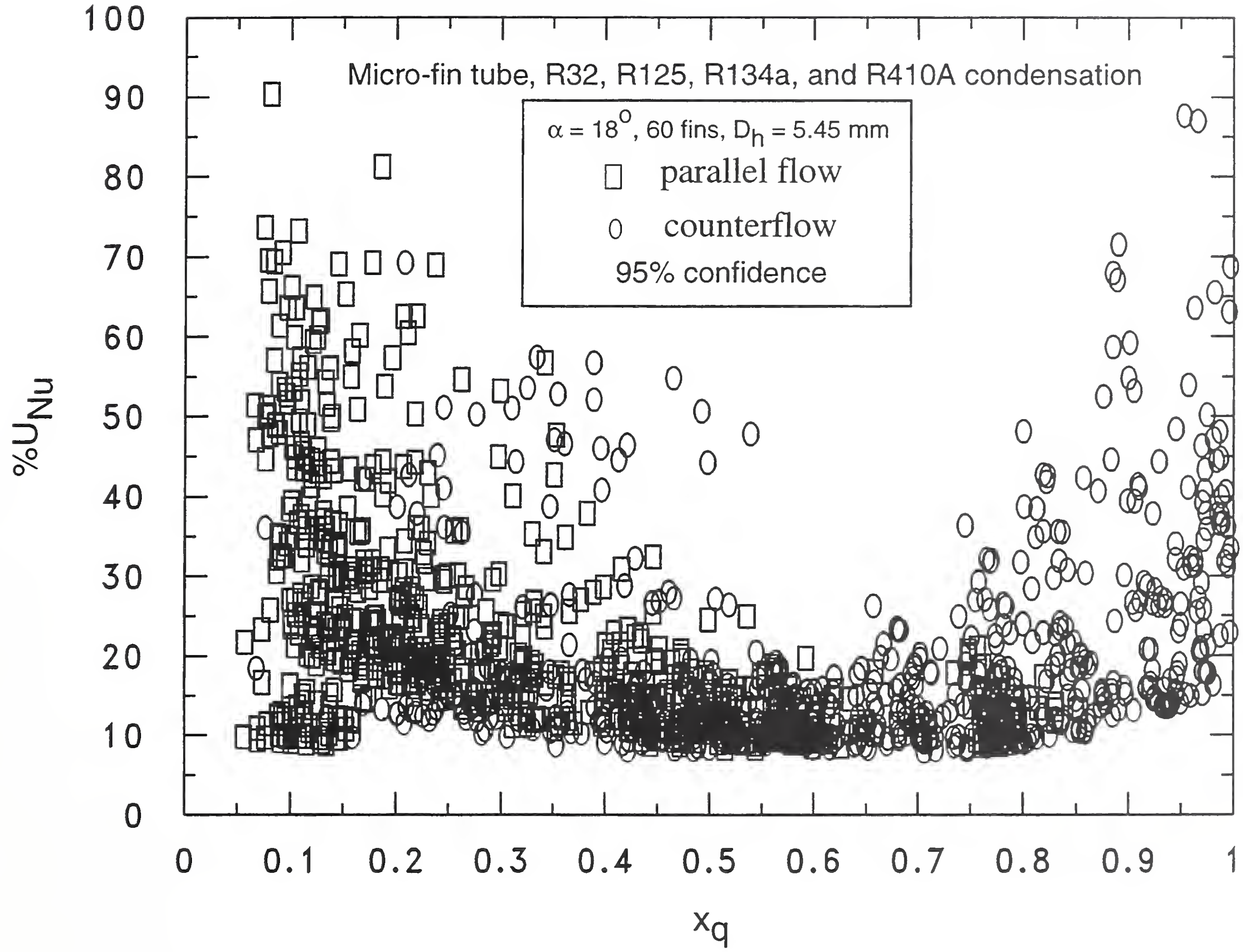

Fig. 9 Relative uncertainty of the Nusselt number with respect to the quality

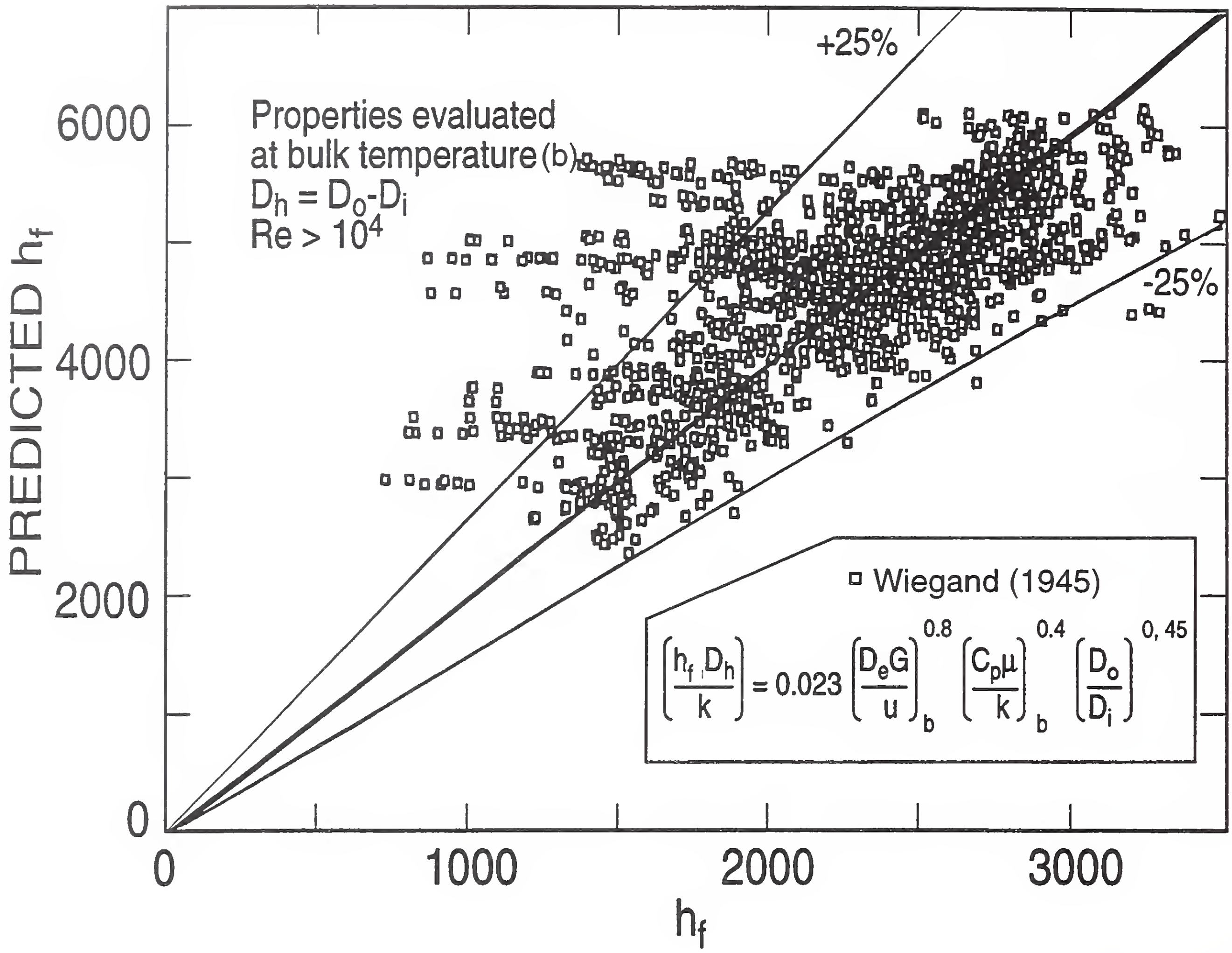

Fig. 10 Corroboration of measurement procedure

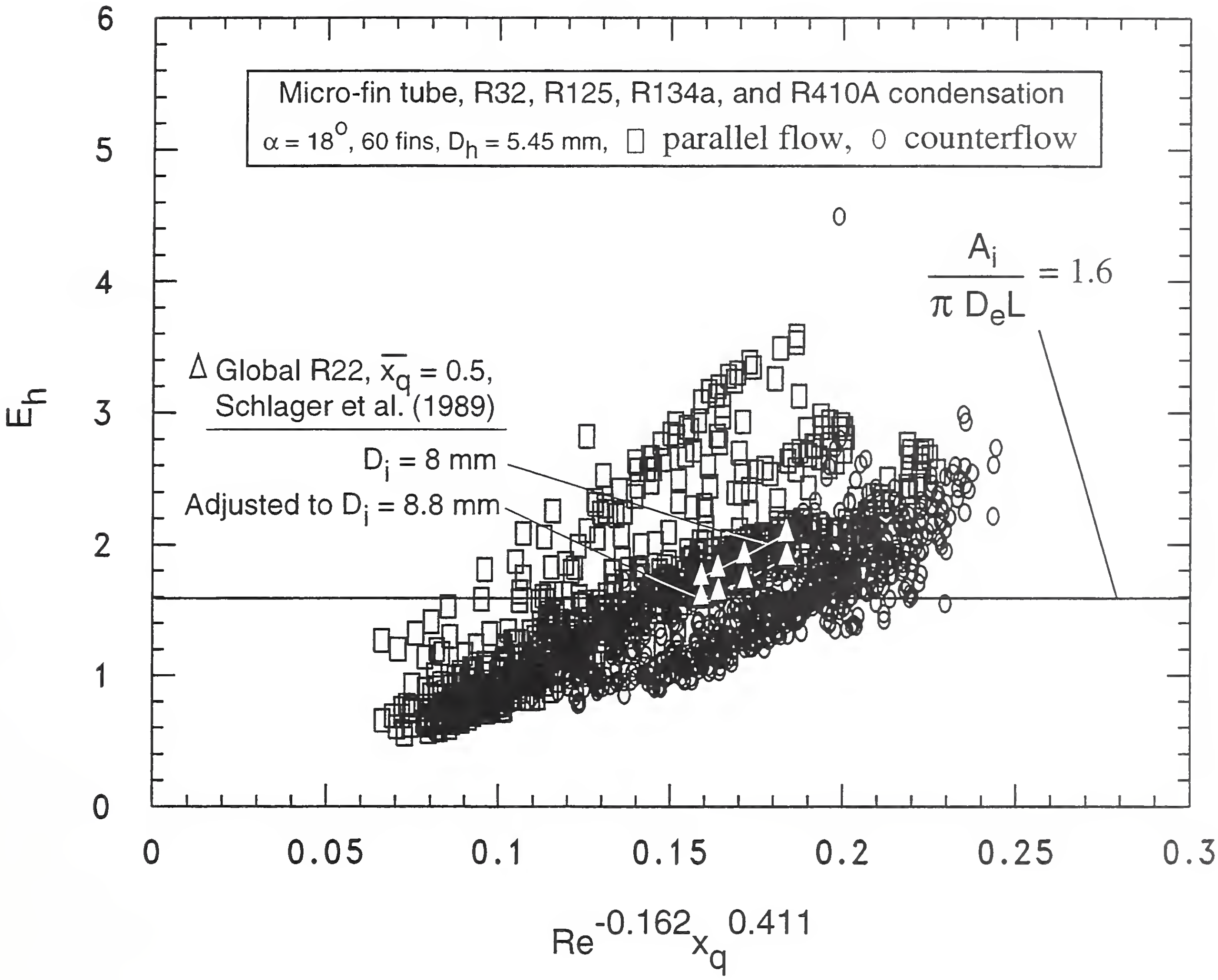

Fig. 11 Condensation heat transfer enhancement ratio for micro-fin tube

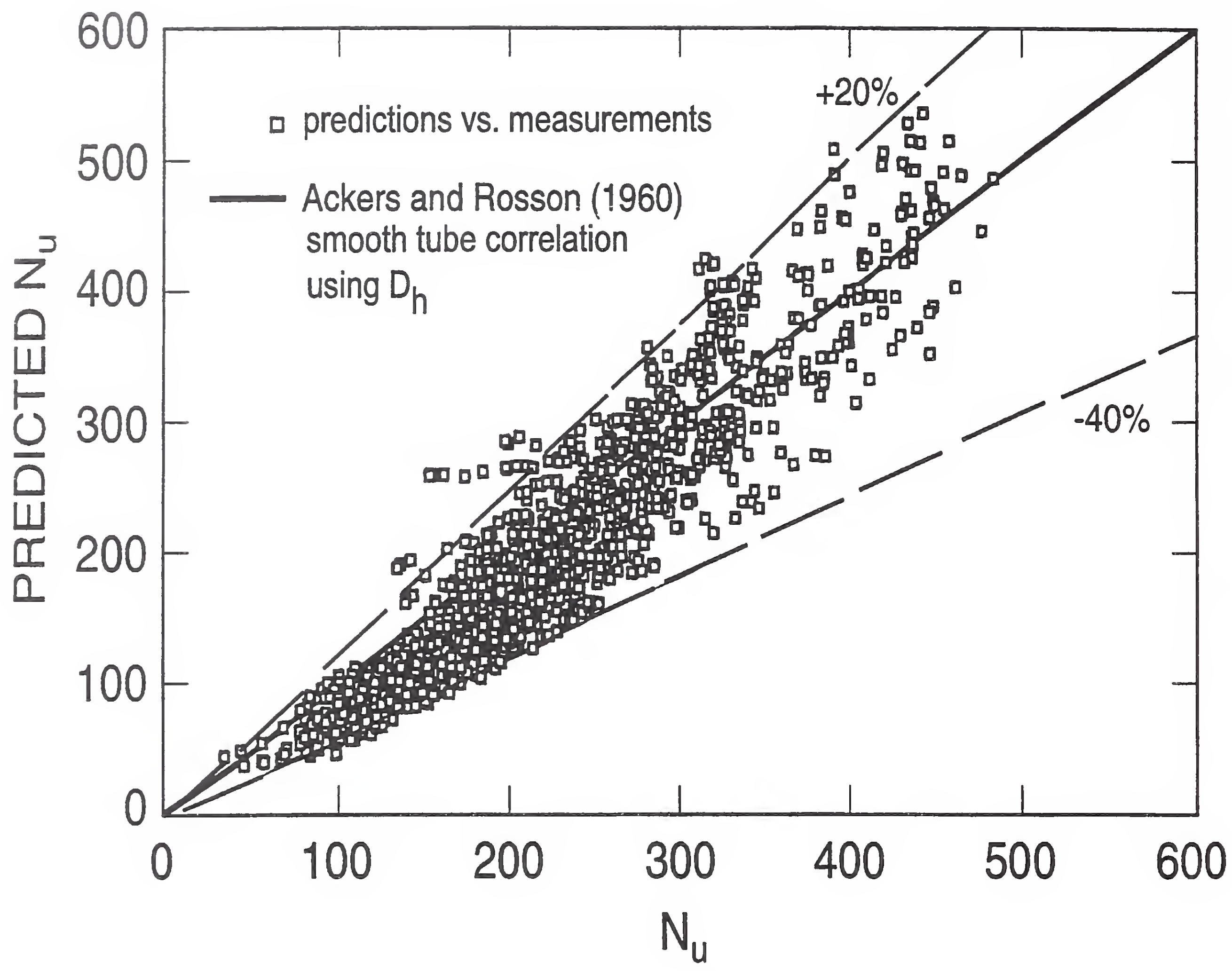

Fig. 12 Comparison of measured convective condensation Nusselt numbers to those predicted with Ackers and Rosen (1960) using D_h

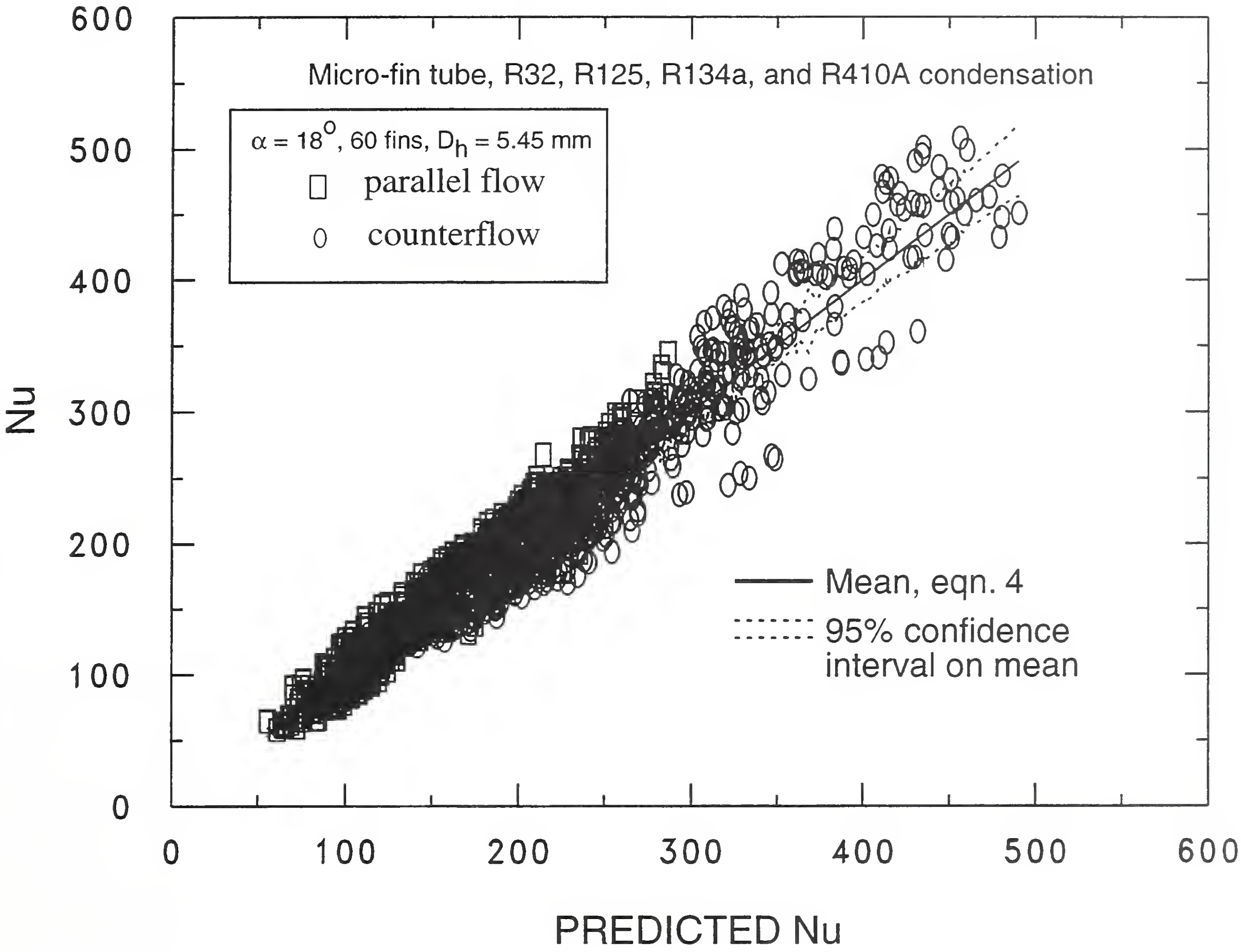

Fig. 13 Comparison of measured and predicted convective condensation Nusselt numbers

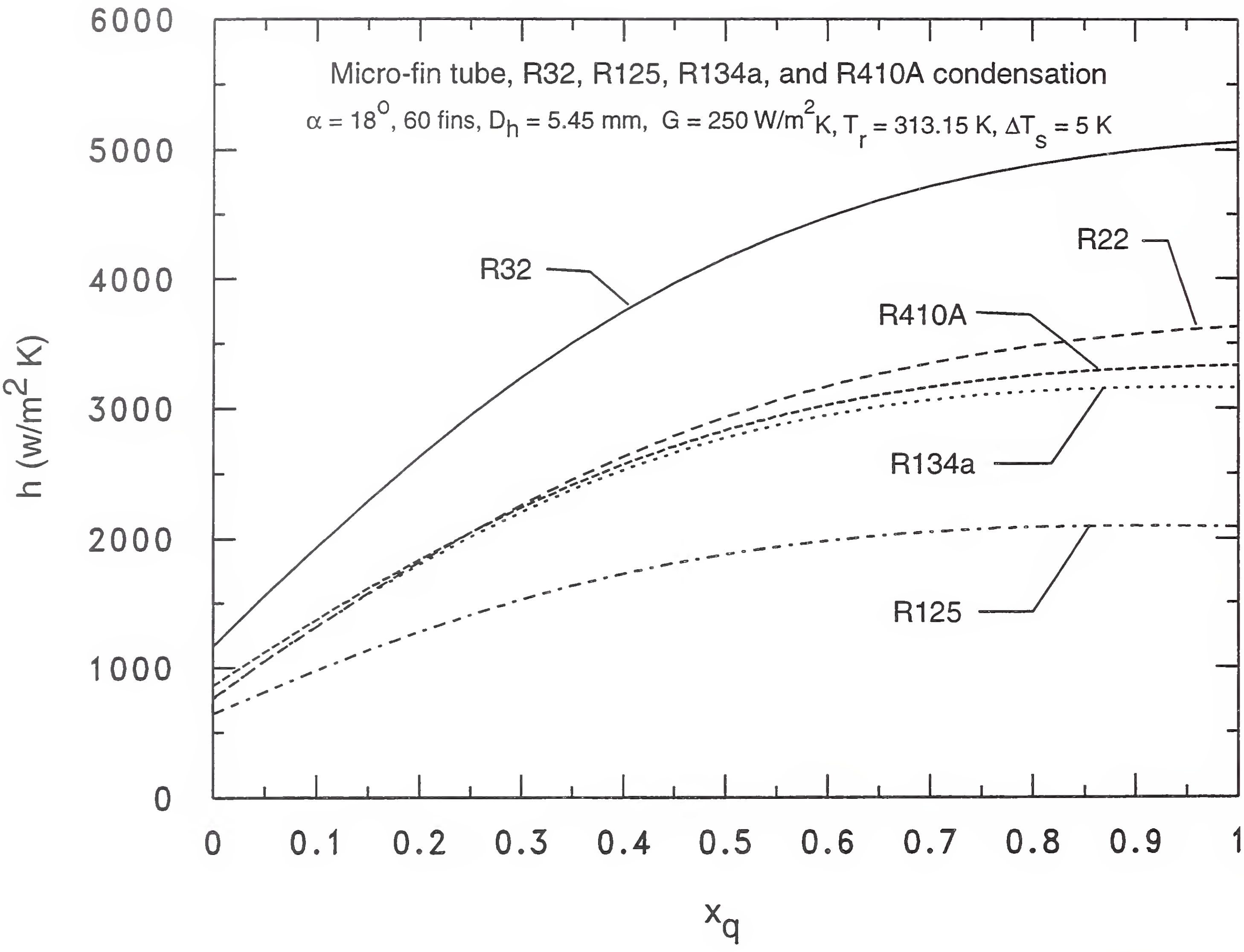

Fig. 14 Comparison of the heat-transfer coefficient for different fluids versus thermodynamic quality

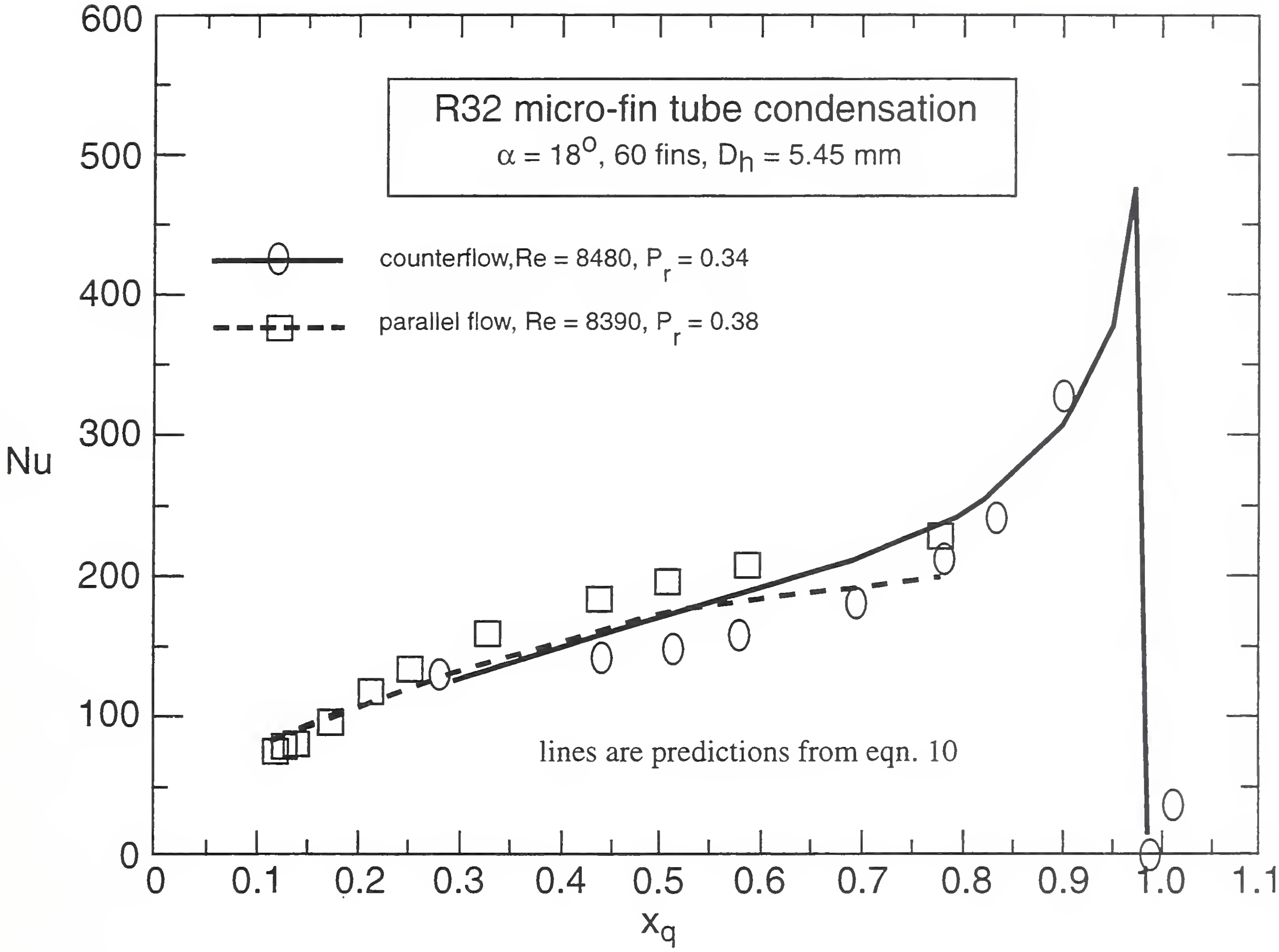

Fig. 15 Condensation Nusselt numbers versus thermodynamic quality for R32

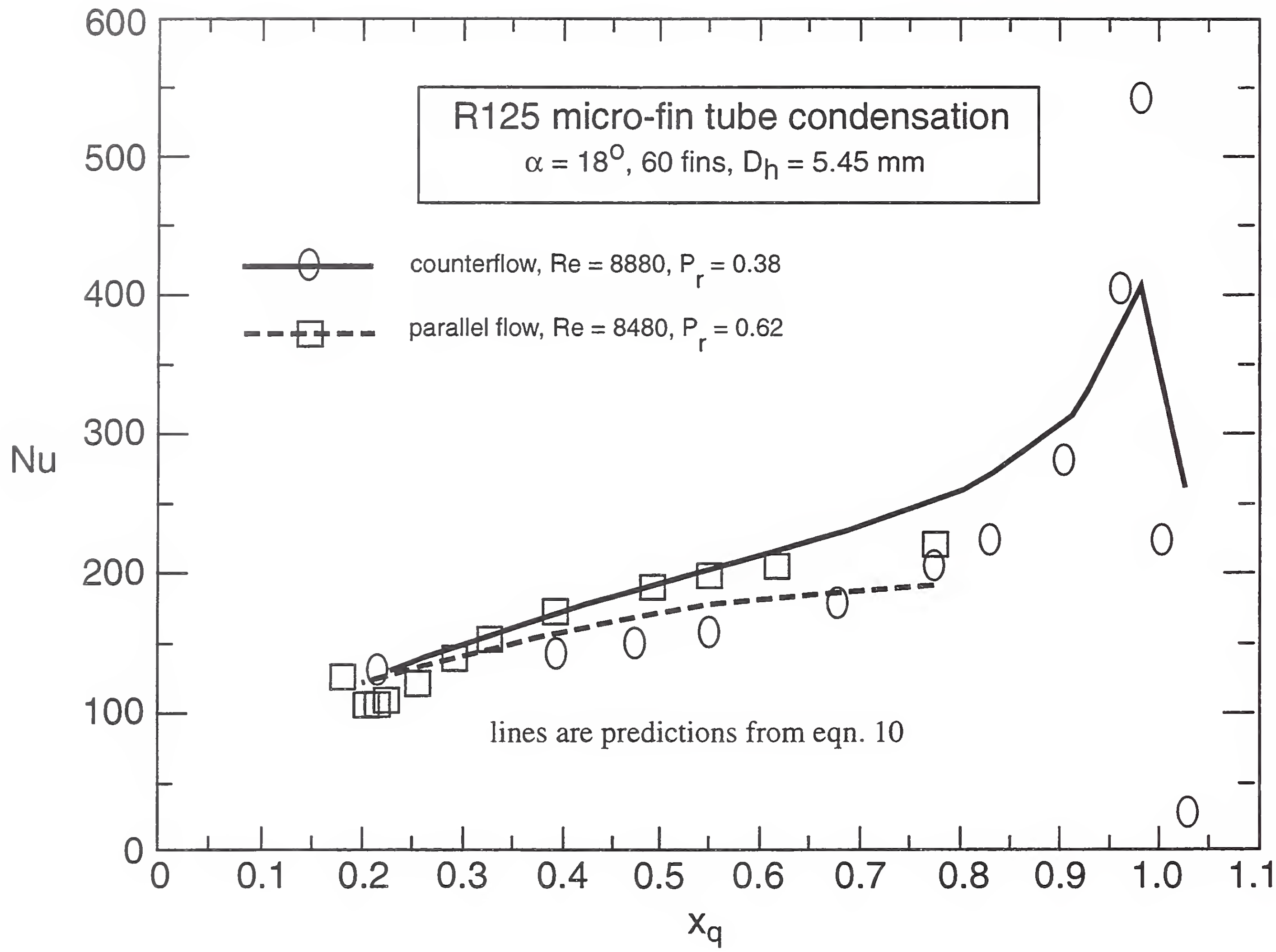

Fig 16 Condensation Nusselt numbers versus thermodynamic quality for R125

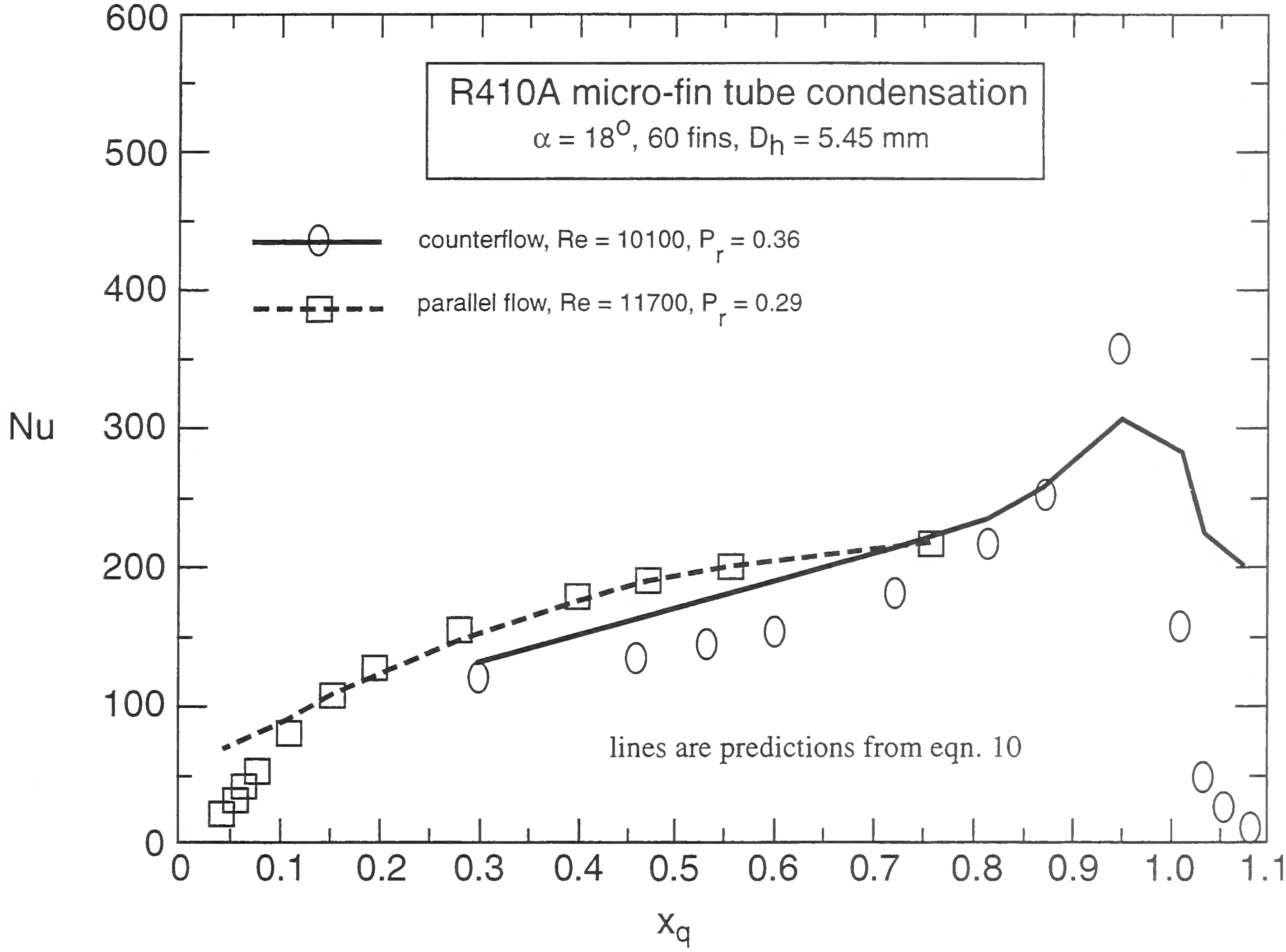

Fig. 17 Condensation Nusselt numbers versus thermodynamic quality for R410A

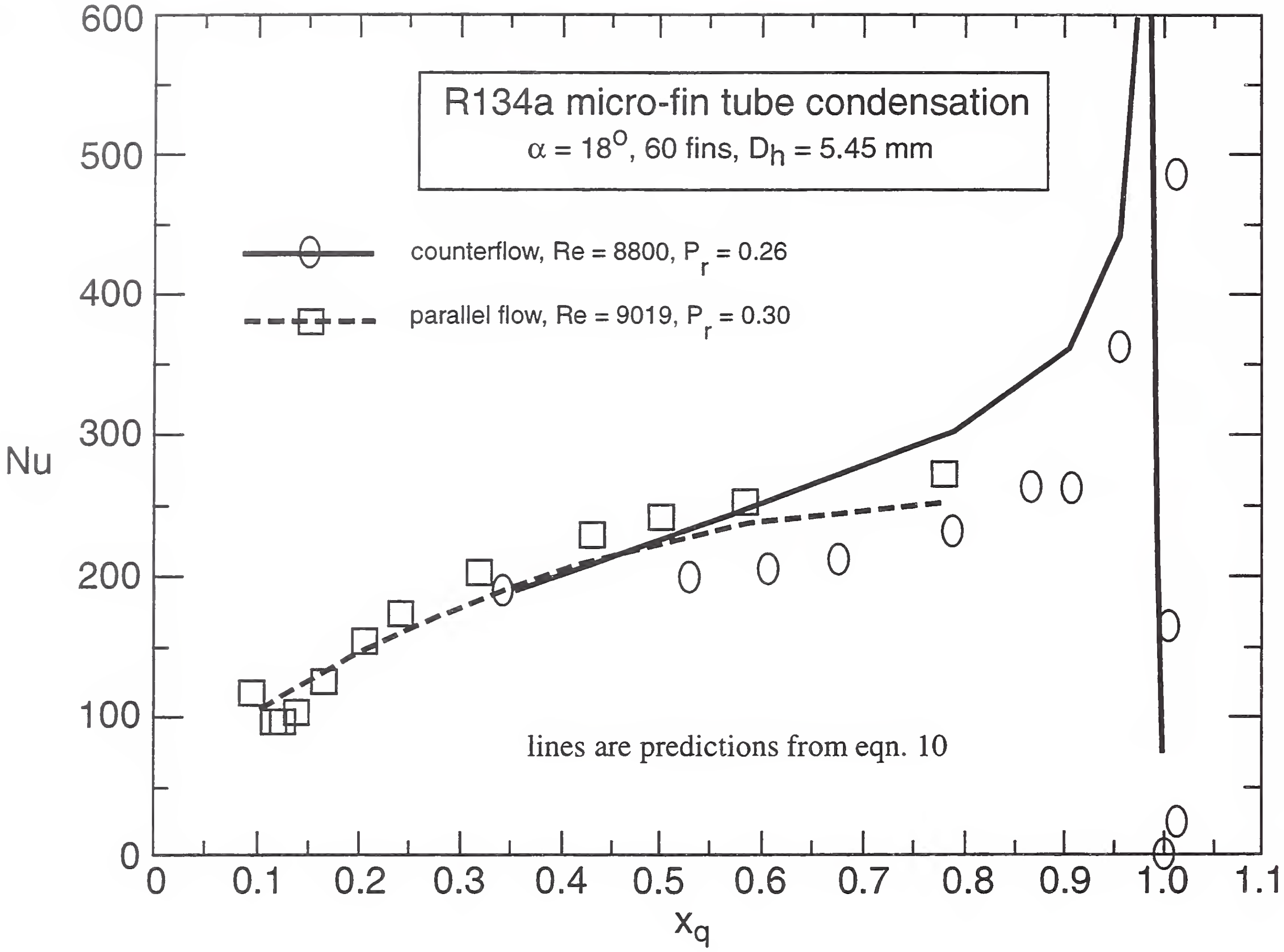

Fig. 18 Condensation Nusselt numbers versus thermodynamic quality for R134a

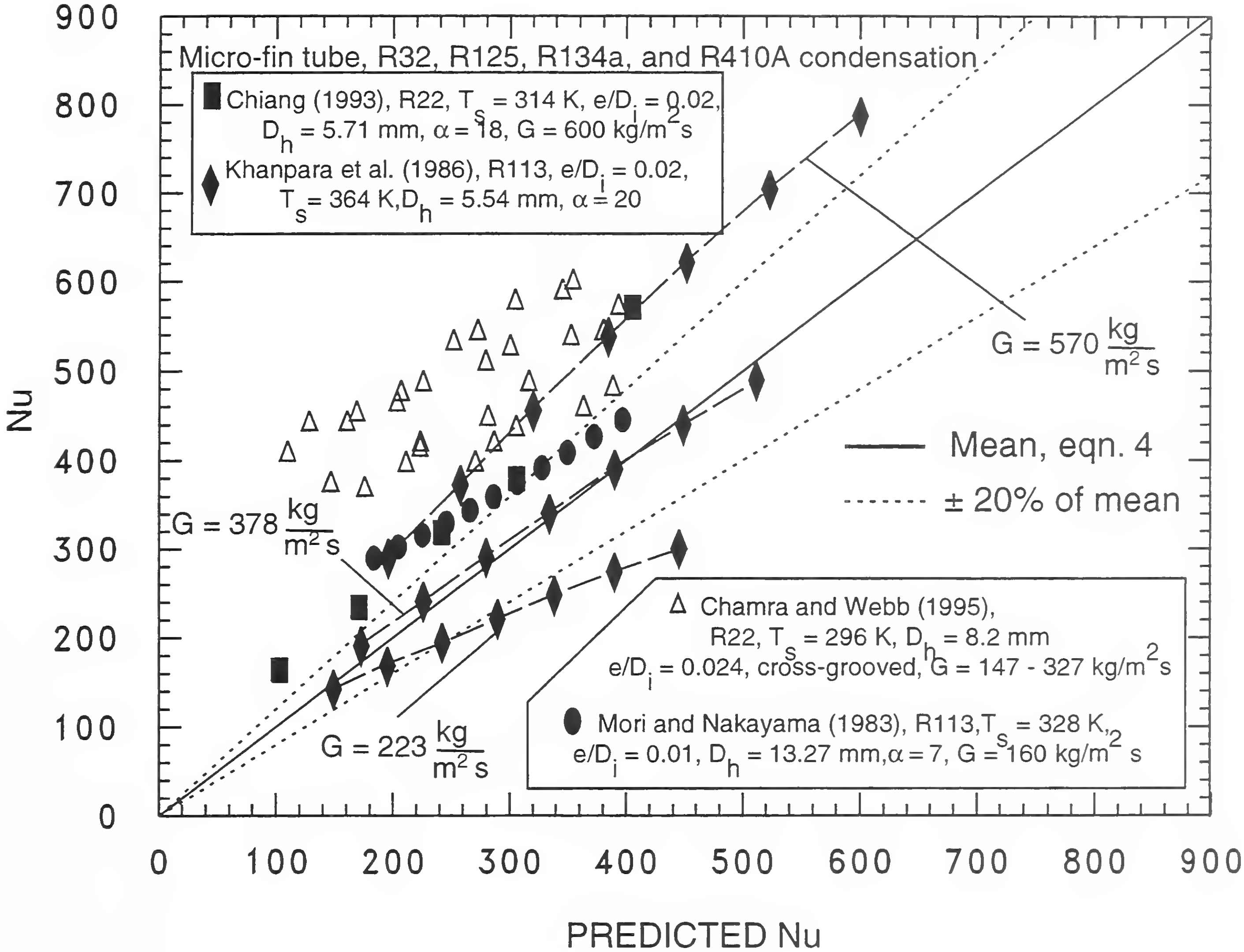

Fig. 19 Comparison of eqn. 10 to data available in the literature

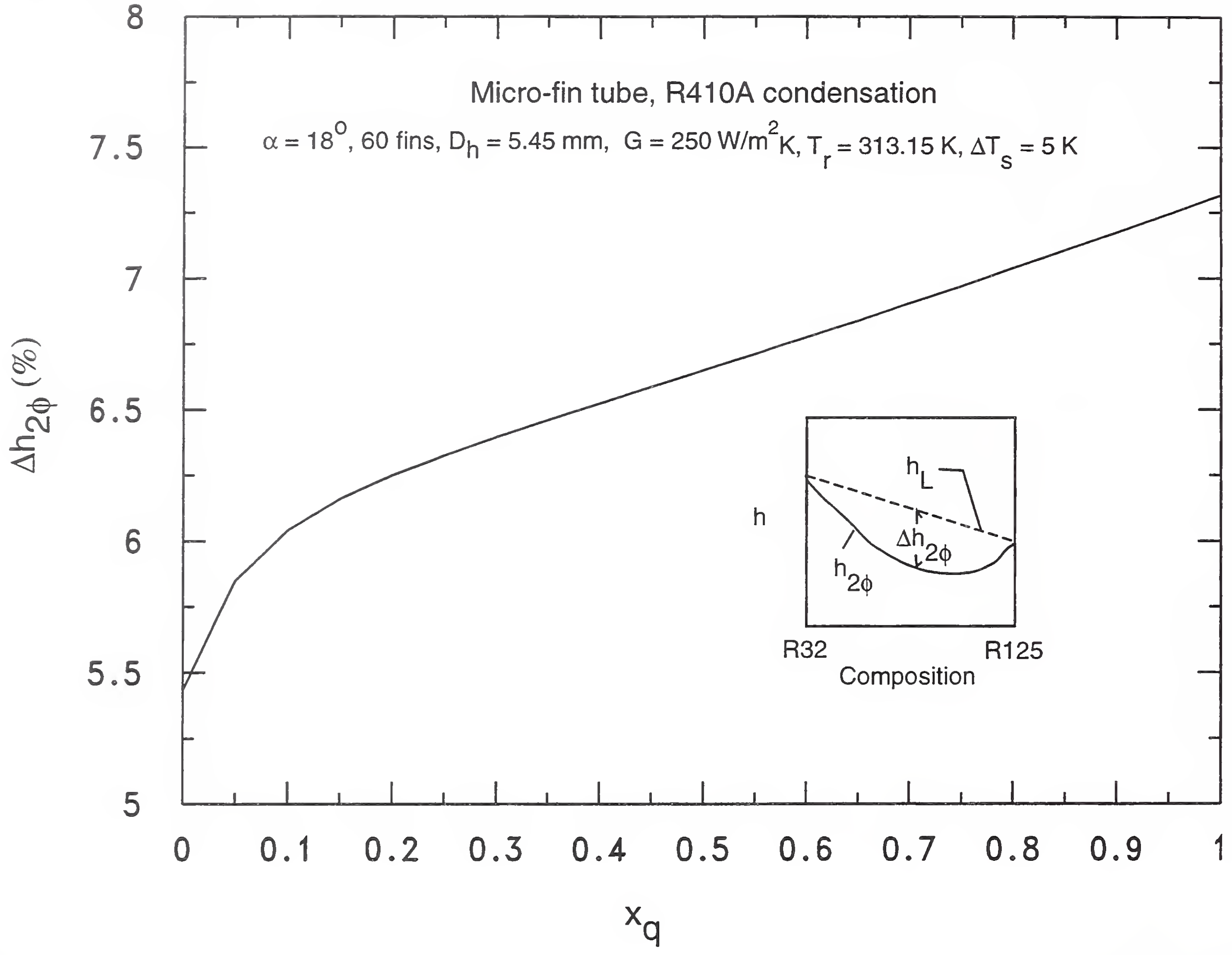

Fig. 20 Heat transfer degradation for the R410A mixture

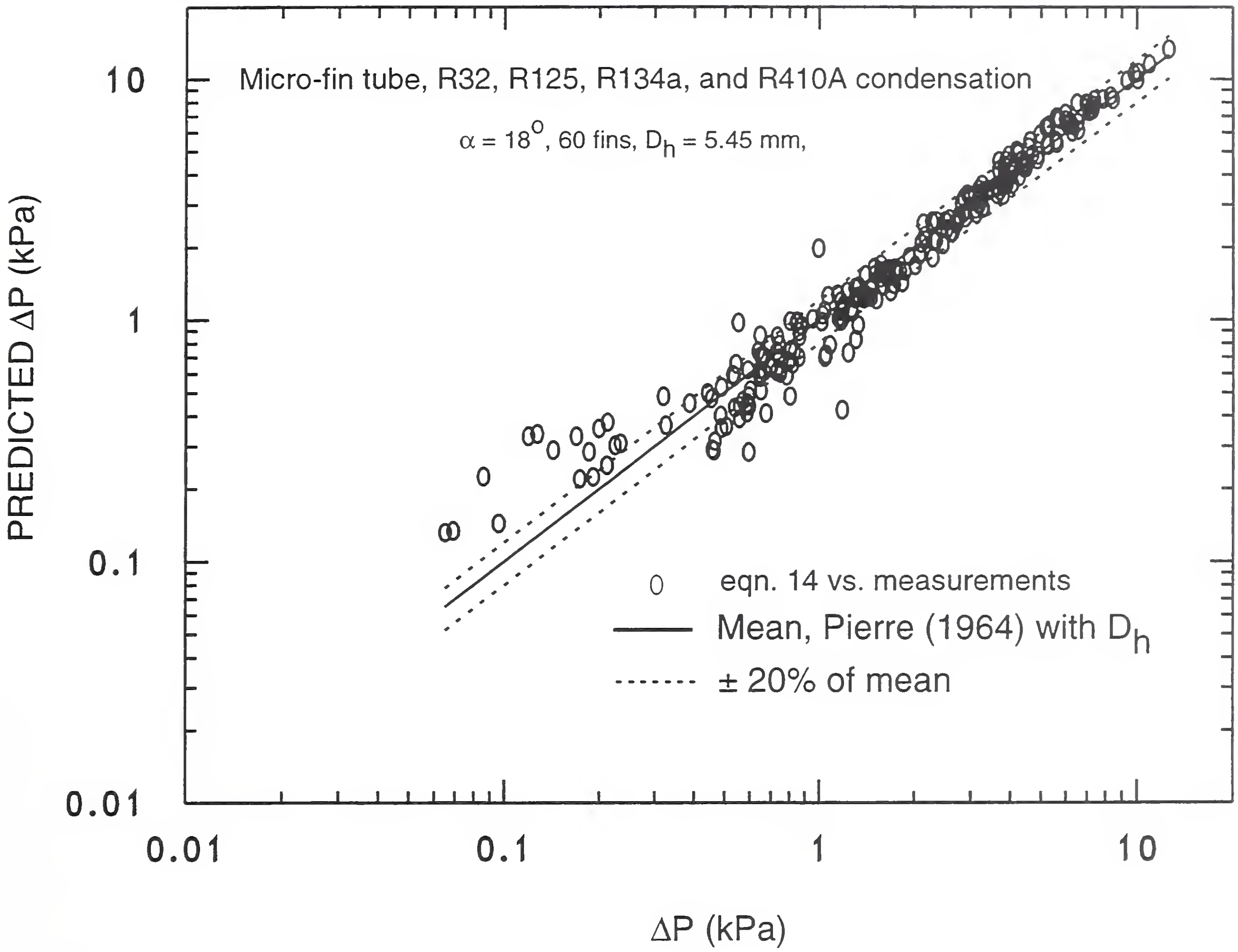

Fig. 21 Comparison of micro-fin condensation pressure drop to Pierre (1964) boiling pressure drop correlation

APPENDIX A
CONVECTIVE CONDENSATION PRESSURE DROP DATA WITHIN A MICRO-FIN TUBE

APPENDIX A1

R32 convective condensation pressure drop
data within a micro-fin tube

(file: tapres.tbl)

ΔP (Pa)	ΔL (m)	x_{qi}	x_{qo}	$\dot{m}_r$ (kg/s)	T_{ri} (°C)	T_{ro} (°C)	f	M (g/mole)	
551.	1.587	0.485	0.233	0.01033	296.30	296.30	0.00483	52.02	I
1180.	1.588	0.214	0.119	0.01033	296.30	296.30	0.01603	52.02	I
1184.	1.587	0.487	0.223	0.01164	299.00	299.00	0.00804	52.02	I
454.	1.588	0.204	0.107	0.01164	299.00	299.00	0.00600	52.02	I
650.	1.587	0.494	0.232	0.00836	305.40	305.30	0.00958	52.02	I
86.	1.588	0.213	0.112	0.00836	305.30	305.30	0.00287	52.02	I
753.	1.587	0.505	0.244	0.00957	308.60	308.60	0.00898	52.02	I
143.	1.588	0.225	0.131	0.00957	308.60	308.60	0.00334	52.02	I
1927.	1.587	0.488	0.211	0.01632	304.50	304.40	0.00785	52.02	I
729.	1.588	0.191	0.087	0.01632	304.40	304.40	0.00604	52.02	I
2165.	1.587	0.505	0.230	0.01867	309.80	309.80	0.00737	52.02	I
1324.	1.588	0.210	0.108	0.01867	309.80	309.70	0.00798	52.02	I
1638.	1.587	0.482	0.212	0.01414	301.20	301.20	0.00817	52.02	I
666.	1.588	0.192	0.091	0.01414	301.20	301.20	0.00667	52.02	I
1513.	1.587	0.974	0.823	0.00886	306.80	306.70	0.00846	52.02	I
805.	1.588	0.798	0.509	0.00886	306.70	306.70	0.00651	52.02	I
1168.	1.587	0.965	0.820	0.00887	306.70	306.60	0.00660	52.02	I
1166.	1.588	0.795	0.513	0.00887	306.60	306.60	0.00908	52.02	I
1659.	1.587	0.985	0.828	0.01054	309.90	309.90	0.00717	52.02	I
1063.	1.588	0.802	0.504	0.01054	309.90	309.90	0.00664	52.02	I
2132.	1.587	0.975	0.815	0.01114	297.80	297.80	0.00596	52.02	I
994.	1.588	0.788	0.490	0.01114	297.80	297.70	0.00435	52.02	I
1563.	1.587	0.972	0.821	0.01005	303.60	303.50	0.00629	52.02	I
1331.	1.588	0.795	0.508	0.01005	303.50	303.50	0.00756	52.02	I
595.	1.587	0.963	0.808	0.00538	304.80	304.80	0.00868	52.02	I
239.	1.588	0.783	0.495	0.00538	304.80	304.80	0.00526	52.02	HL
488.	1.587	0.952	0.786	0.00489	308.60	308.60	0.00975	52.02	I
120.	1.588	0.759	0.477	0.00489	308.60	308.60	0.00387	52.02	HC
576.	1.587	0.963	0.810	0.00555	307.90	307.90	0.00860	52.02	I
212.	1.588	0.784	0.497	0.00555	307.90	307.80	0.00481	52.02	I
556.	1.587	0.961	0.806	0.00560	310.10	310.10	0.00874	52.02	I
199.	1.588	0.780	0.499	0.00560	310.10	310.10	0.00472	52.02	I
1183.	1.588	0.778	0.483	0.00761	295.30	295.20	0.00943	52.02	I
1320.	1.588	0.772	0.475	0.00604	296.10	296.00	0.01664	52.02	HC
5207.	1.587	1.004	0.834	0.02038	308.00	307.00	0.00555	52.02	I
4373.	1.588	0.807	0.510	0.02038	306.90	306.80	0.00667	52.02	I
3181.	1.587	0.987	0.793	0.01532	307.90	307.90	0.00636	52.02	I
2521.	1.588	0.762	0.436	0.01532	307.80	307.80	0.00764	52.02	I
2854.	1.587	0.987	0.826	0.01473	307.70	307.70	0.00599	52.02	I
2341.	1.588	0.800	0.520	0.01473	307.60	307.60	0.00689	52.02	I
2996.	1.587	0.989	0.821	0.01531	309.60	309.50	0.00616	52.02	I
2498.	1.588	0.794	0.497	0.01531	309.50	309.50	0.00733	52.02	I
3831.	1.587	0.988	0.803	0.01553	301.60	301.50	0.00616	52.02	I
3269.	1.588	0.774	0.461	0.01553	301.40	301.30	0.00778	52.02	I
3990.	1.587	0.988	0.816	0.01710	306.60	306.50	0.00606	52.02	I
3390.	1.588	0.789	0.489	0.01710	306.50	306.40	0.00741	52.02	I
4351.	1.587	0.948	0.786	0.01635	301.30	301.10	0.00639	52.02	I
3779.	1.588	0.760	0.476	0.01635	301.10	301.00	0.00793	52.02	I
1016.	1.587	0.961	0.783	0.00731	301.50	301.50	0.00749	52.02	I
638.	1.588	0.755	0.455	0.00731	301.50	301.50	0.00709	52.02	I
1295.	1.587	0.958	0.752	0.00842	300.10	300.10	0.00711	52.02	I
872.	1.588	0.720	0.393	0.00842	300.10	300.00	0.00764	52.02	I
864.	1.587	0.966	0.797	0.00668	300.60	300.60	0.00732	52.02	I
542.	1.588	0.770	0.475	0.00668	300.60	300.60	0.00681	52.02	I
1371.	1.587	0.486	0.212	0.01255	299.80	299.80	0.00831	52.02	I
441.	1.588	0.192	0.089	0.01255	299.80	299.80	0.00564	52.02	I
1146.	1.587	0.502	0.237	0.01192	305.90	305.80	0.00842	52.02	I
387.	1.588	0.217	0.114	0.01192	305.80	305.80	0.00541	52.02	I
1392.	1.587	0.489	0.218	0.01290	301.10	301.10	0.00818	52.02	I
488.	1.588	0.198	0.096	0.01290	301.10	301.10	0.00582	52.02	I
1270.	1.587	0.540	0.312	0.01205	308.70	308.60	0.00843	52.02	I
530.	1.588	0.295	0.207	0.01205	308.60	308.60	0.00536	52.02	I
602.	1.587	0.431	0.150	0.00828	296.50	296.50	0.00919	52.02	I
505.	1.587	0.468	0.202	0.00667	299.00	299.00	0.01065	52.02	I
96.	1.588	0.183	0.088	0.00667	299.00	299.00	0.00455	52.02	I
537.	1.587	0.475	0.212	0.00745	301.20	301.20	0.00949	52.02	I
61.	1.588	0.194	0.107	0.00745	301.20	301.20	0.00253	52.02	HI
465.	1.587	0.467	0.206	0.00671	304.60	304.60	0.01104	52.02	I
69.	1.588	0.188	0.101	0.00671	304.60	304.60	0.00353	52.02	I
457.	1.587	0.478	0.220	0.00670	308.60	308.60	0.01153	52.02	I
65.	1.588	0.202	0.115	0.00670	308.60	308.60	0.00335	52.02	I
462.	1.587	0.462	0.198	0.00658	305.90	305.90	0.01190	52.02	I
44.	1.588	0.180	0.093	0.00658	305.90	305.90	0.00274	52.02	HI

APPENDIX A2

R125 convective condensation pressure drop data within a micro-fin tube

(file: tapres.tbl)

ΔP (Pa)	ΔL (m)	x_{qi}	x_{qo}	$\dot{m}_r$ (kg/s)	T_{ri} (°C)	T_{ro} (°C)	f	M (g/mole)	
1639.	1.587	1.031	0.873	0.01379	305.70	302.80	0.00615	120.00	I
1296.	1.588	0.847	0.549	0.01379	302.70	302.70	0.00681	120.00	I
1430.	1.587	1.042	0.894	0.01379	312.00	308.60	0.00624	120.00	I
1022.	1.588	0.869	0.581	0.01379	308.60	308.60	0.00615	120.00	I
2454.	1.587	0.942	0.741	0.01818	307.00	307.00	0.00683	120.00	I
1562.	1.588	0.711	0.420	0.01818	307.00	306.90	0.00649	120.00	I
4074.	1.587	0.962	0.757	0.02847	312.60	312.50	0.00541	120.00	I
2811.	1.588	0.727	0.412	0.02847	312.40	312.40	0.00564	120.00	I
3411.	1.587	0.957	0.757	0.02787	316.90	316.80	0.00539	120.00	I
2271.	1.588	0.727	0.418	0.02787	316.80	316.70	0.00534	120.00	I
5599.	1.587	0.942	0.714	0.02649	299.90	299.70	0.00613	120.00	I
3659.	1.588	0.680	0.347	0.02649	299.60	299.40	0.00658	120.00	I
4880.	1.587	0.958	0.744	0.02702	305.00	304.80	0.00579	120.00	I
3256.	1.588	0.713	0.395	0.02702	304.80	304.60	0.00604	120.00	I
4506.	1.587	0.962	0.764	0.02726	308.00	307.80	0.00564	120.00	I
3090.	1.588	0.734	0.430	0.02726	307.70	307.60	0.00580	120.00	I
1079.	1.587	0.955	0.759	0.01180	311.10	311.10	0.00783	120.00	I
535.	1.588	0.729	0.427	0.01180	311.10	311.00	0.00588	120.00	I
556.	1.587	0.970	0.833	0.00900	315.90	315.90	0.00756	120.00	I
127.	1.588	0.810	0.558	0.00900	315.90	315.90	0.00261	120.00	I
675.	1.587	0.964	0.794	0.00955	318.10	318.00	0.00895	120.00	I
119.	1.588	0.766	0.465	0.00955	318.00	318.00	0.00267	120.00	I
1868.	1.587	0.986	0.820	0.01360	298.60	298.50	0.00673	120.00	I
1397.	1.588	0.793	0.472	0.01360	298.50	298.50	0.00739	120.00	I
3871.	1.587	0.995	0.833	0.02132	300.40	300.20	0.00592	120.00	I
3285.	1.588	0.806	0.510	0.02132	300.10	300.00	0.00707	120.00	I
3696.	1.587	0.994	0.806	0.02178	303.70	303.60	0.00611	120.00	I
2734.	1.588	0.776	0.449	0.02178	303.50	303.40	0.00676	120.00	I
2281.	1.587	0.962	0.821	0.01803	310.20	310.10	0.00661	120.00	I
1600.	1.588	0.797	0.531	0.01803	310.10	310.00	0.00630	120.00	I
2340.	1.587	1.012	0.827	0.02019	314.90	314.00	0.00598	120.00	I
1492.	1.588	0.797	0.473	0.02019	313.90	313.90	0.00564	120.00	I
2076.	1.587	1.001	0.840	0.02021	317.50	317.30	0.00585	120.00	I
1398.	1.588	0.813	0.519	0.02021	317.30	317.20	0.00549	120.00	I
1233.	1.587	0.502	0.205	0.01725	313.80	313.80	0.00965	120.00	I
169.	1.588	0.182	0.056	0.01725	313.80	313.80	0.00299	120.00	I
1048.	1.587	0.555	0.289	0.01693	318.10	318.10	0.00825	120.00	I
485.	1.588	0.267	0.140	0.01693	318.10	318.10	0.00596	120.00	I
1833.	1.587	0.515	0.244	0.02035	302.70	302.70	0.00766	120.00	I
799.	1.588	0.224	0.111	0.02035	302.60	302.60	0.00596	120.00	I
2012.	1.587	0.515	0.236	0.02110	299.00	299.00	0.00732	120.00	I
832.	1.588	0.215	0.100	0.02110	299.00	298.90	0.00573	120.00	I
1682.	1.587	0.532	0.275	0.02076	309.20	309.10	0.00745	120.00	I
742.	1.588	0.255	0.146	0.02076	309.10	309.10	0.00530	120.00	I
2640.	1.587	0.537	0.281	0.02773	309.10	309.00	0.00657	120.00	I
1458.	1.588	0.261	0.149	0.02773	309.00	309.00	0.00570	120.00	I
3268.	1.587	0.526	0.261	0.02789	300.20	300.10	0.00671	120.00	I
1724.	1.588	0.241	0.124	0.02789	300.00	300.00	0.00613	120.00	I
730.	1.587	0.478	0.207	0.01300	298.60	298.60	0.00749	120.00	I
786.	1.587	0.466	0.179	0.01336	299.90	299.90	0.00827	120.00	I
680.	1.588	0.159	0.061	0.01336	299.90	299.90	0.01351	120.00	HI
805.	1.587	0.497	0.229	0.01328	311.00	310.90	0.00966	120.00	I
714.	1.588	0.210	0.114	0.01328	310.90	310.90	0.01353	120.00	HC
595.	1.587	0.549	0.323	0.01042	318.10	318.10	0.01162	120.00	I
496.	1.588	0.307	0.217	0.01042	318.10	318.10	0.01304	120.00	HC
1446.	1.587	0.510	0.232	0.02401	315.80	315.80	0.00620	120.00	I
1041.	1.588	0.212	0.109	0.02401	315.80	315.80	0.00681	120.00	HL
1803.	1.587	0.538	0.251	0.02573	316.60	316.50	0.00650	120.00	I
1303.	1.588	0.229	0.107	0.02573	316.50	316.50	0.00736	120.00	HL

APPENDIX A3

R410A convective condensation pressure drop data within a micro-fin tube

(file: tapres.tbl)

ΔP (Pa)	ΔL (m)	x_{qi}	x_{qo}	$\dot{m}_r$ (kg/s)	T_{ri} (°C)	T_{ro} (°C)	f	M (g/mole)	
285.	1.587	0.507	0.245	0.01858	302.00	301.90	0.00188	72.59	HI
25.	1.588	0.225	0.121	0.01858	301.90	301.90	0.00086	72.59	HI
288.	1.587	0.573	0.355	0.02750	304.50	304.40	0.00105	72.59	HI
14.	1.588	0.338	0.249	0.02750	304.40	304.40	0.00044	72.59	HI
291.	1.587	0.641	0.456	0.02744	308.80	308.70	0.00085	72.59	HI
6.	1.588	0.443	0.370	0.02744	308.70	308.70	0.00026	72.59	HI
293.	1.587	0.586	0.356	0.02209	309.50	309.50	0.00134	72.59	HI
1.	1.588	0.339	0.244	0.02209	309.50	309.40	0.00042	72.59	HI
2041.	1.587	0.530	0.268	0.01971	306.90	306.80	0.00702	72.59	I
842.	1.588	0.249	0.142	0.01971	306.80	306.80	0.00495	72.59	I
6000.	1.587	0.646	0.466	0.02695	299.40	299.20	0.00640	72.59	I
4266.	1.588	0.453	0.382	0.02695	299.10	298.90	0.00560	72.59	I
5493.	1.587	0.646	0.444	0.02767	302.20	302.00	0.00619	72.59	I
4059.	1.588	0.430	0.351	0.02767	301.90	301.80	0.00580	72.59	I
3987.	1.587	0.613	0.401	0.02253	299.60	299.50	0.00677	72.59	I
2526.	1.588	0.385	0.299	0.02253	299.40	299.30	0.00578	72.59	I
589.	1.587	0.507	0.257	0.00837	298.90	298.90	0.00920	72.59	I
173.	1.588	0.240	0.151	0.00837	298.90	298.90	0.00473	72.59	I
597.	1.587	0.535	0.282	0.00837	302.20	302.20	0.00951	72.59	I
191.	1.588	0.265	0.177	0.00837	302.20	302.10	0.00502	72.59	I
587.	1.587	0.588	0.375	0.00838	309.10	309.00	0.00945	72.59	I
211.	1.588	0.361	0.287	0.00838	309.00	309.00	0.00464	72.59	I
820.	1.587	0.556	0.321	0.01053	305.70	305.60	0.00848	72.59	I
325.	1.588	0.305	0.226	0.01053	305.60	305.60	0.00494	72.59	I
3262.	1.587	1.007	0.821	0.01607	299.70	298.30	0.00590	72.59	I
2847.	1.588	0.793	0.492	0.01607	298.20	298.10	0.00745	72.59	I
2764.	1.587	0.959	0.806	0.01648	306.90	306.80	0.00624	72.59	I
2156.	1.588	0.782	0.522	0.01648	306.80	306.70	0.00666	72.59	I
7245.	1.587	0.965	0.824	0.02640	302.30	302.10	0.00552	72.59	I
6190.	1.588	0.801	0.558	0.02640	302.00	301.80	0.00626	72.59	I
4617.	1.587	1.035	0.830	0.02052	306.50	301.60	0.00554	72.59	I
3833.	1.588	0.799	0.485	0.02052	301.50	301.30	0.00683	72.59	I
6938.	1.587	0.995	0.849	0.02781	306.00	305.80	0.00517	72.59	I
5969.	1.588	0.825	0.574	0.02781	305.70	305.50	0.00592	72.59	I
6492.	1.587	1.021	0.845	0.02847	311.50	308.90	0.00502	72.59	I
5165.	1.588	0.817	0.526	0.02847	308.80	308.60	0.00566	72.59	I
6045.	1.587	0.968	0.819	0.02289	300.00	299.70	0.00573	72.59	I
5212.	1.588	0.795	0.545	0.02289	299.60	299.40	0.00664	72.59	I
1222.	1.587	1.006	0.828	0.01002	302.60	301.60	0.00620	72.59	I
952.	1.588	0.799	0.487	0.01002	301.60	301.50	0.00709	72.59	I
1039.	1.587	1.031	0.861	0.01014	312.80	309.20	0.00617	72.59	I
646.	1.588	0.833	0.528	0.01014	309.20	309.10	0.00562	72.59	I
3678.	1.587	1.013	0.838	0.02120	312.50	310.80	0.00543	72.59	I
2931.	1.588	0.811	0.526	0.02120	310.80	310.70	0.00608	72.59	I
5597.	1.587	1.035	0.842	0.02402	308.70	303.90	0.00522	72.59	I
4571.	1.588	0.813	0.508	0.02402	303.80	303.60	0.00621	72.59	I
5295.	1.587	1.031	0.843	0.02447	311.20	307.20	0.00524	72.59	I
4227.	1.588	0.814	0.514	0.02447	307.20	307.00	0.00604	72.59	I
4958.	1.587	1.020	0.838	0.02488	312.60	310.20	0.00522	72.59	I
3868.	1.588	0.809	0.513	0.02488	310.10	310.00	0.00584	72.59	I
1378.	1.587	0.464	0.183	0.01557	300.60	300.50	0.00791	72.59	I
570.	1.588	0.163	0.064	0.01557	300.50	300.50	0.00685	72.59	I
2098.	1.587	0.512	0.253	0.01946	302.50	302.40	0.00692	72.59	I
849.	1.588	0.234	0.129	0.01946	302.40	302.30	0.00498	72.59	I
2572.	1.587	0.510	0.254	0.02279	305.20	305.10	0.00664	72.59	I
1141.	1.588	0.235	0.132	0.02279	305.10	305.00	0.00507	72.59	I

APPENDIX A4

R134a convective condensation pressure drop
data within a micro-fin tube

(file: tapres.tbl)

ΔP	ΔL	x_{qi}	x_{qo}	$\dot{m}_r$	T_{ri}	T_{ro}	f	M	
(Pa)	(m)			(kg/s)	(°C)	(°C)		(g/mole)	
3687.	1.587	0.999	0.900	0.01685	313.90	313.70	0.00458	102.00	I
4477.	1.588	0.880	0.604	0.01685	313.50	313.30	0.00730	102.00	I
3949.	1.587	1.002	0.890	0.01887	320.50	319.90	0.00468	102.00	I
4382.	1.588	0.868	0.575	0.01887	319.80	319.60	0.00701	102.00	I
4189.	1.587	1.000	0.869	0.01918	320.10	319.80	0.00488	102.00	I
4418.	1.588	0.844	0.512	0.01918	319.70	319.50	0.00734	102.00	I
5711.	1.587	1.014	0.915	0.02366	324.80	322.90	0.00456	102.00	I
6299.	1.588	0.895	0.613	0.02366	322.70	322.40	0.00664	102.00	I
5965.	1.587	1.014	0.908	0.02381	323.80	321.70	0.00458	102.00	I
6532.	1.588	0.887	0.588	0.02381	321.50	321.30	0.00677	102.00	I
7004.	1.587	0.970	0.793	0.02135	312.00	311.70	0.00562	102.00	I
6269.	1.588	0.766	0.479	0.02135	311.50	311.10	0.00722	102.00	I
7365.	1.587	0.964	0.781	0.02122	310.30	309.90	0.00576	102.00	I
6553.	1.588	0.754	0.459	0.02122	309.70	309.30	0.00747	102.00	I
9801.	1.587	1.001	0.840	0.02856	322.60	321.80	0.00555	102.00	I
8279.	1.588	0.814	0.528	0.02856	321.50	321.20	0.00654	102.00	I
4865.	1.587	0.948	0.750	0.01642	312.10	311.90	0.00686	102.00	I
3793.	1.588	0.720	0.416	0.01642	311.80	311.60	0.00817	102.00	I
3898.	1.587	0.946	0.751	0.01765	324.80	324.60	0.00676	102.00	I
2751.	1.588	0.722	0.422	0.01765	324.60	324.50	0.00724	102.00	I
3640.	1.587	0.914	0.651	0.01414	312.50	312.30	0.00769	102.00	I
2076.	1.588	0.613	0.270	0.01414	312.20	312.10	0.00810	102.00	I
1177.	1.587	0.916	0.683	0.00825	317.20	317.10	0.00806	102.00	I
646.	1.588	0.648	0.298	0.00825	317.10	317.10	0.00788	102.00	I
879.	1.587	1.024	0.930	0.00734	317.00	313.50	0.00549	102.00	HL
860.	1.588	0.911	0.636	0.00734	313.50	313.40	0.00711	102.00	HL
733.	1.587	1.022	0.922	0.00689	316.40	313.10	0.00517	102.00	HL
694.	1.588	0.901	0.614	0.00689	313.10	313.00	0.00664	102.00	HL
10950.	1.587	0.968	0.764	0.02666	313.90	313.40	0.00606	102.00	I
8421.	1.588	0.734	0.417	0.02666	313.10	312.60	0.00715	102.00	I
12610.	1.587	0.967	0.778	0.02791	312.00	311.40	0.00596	102.00	I
10060.	1.588	0.750	0.451	0.02791	311.00	310.40	0.00699	102.00	I
10100.	1.587	0.966	0.754	0.02797	319.60	319.10	0.00602	102.00	I
7170.	1.588	0.723	0.393	0.02797	318.90	318.50	0.00677	102.00	I
9323.	1.587	0.974	0.791	0.02829	322.90	322.50	0.00575	102.00	I
7276.	1.588	0.762	0.461	0.02829	322.30	322.00	0.00662	102.00	I
7086.	1.587	0.995	0.810	0.02389	322.70	322.40	0.00596	102.00	I
5564.	1.588	0.781	0.478	0.02389	322.20	322.00	0.00685	102.00	I
7836.	1.587	0.985	0.792	0.02347	317.40	317.00	0.00600	102.00	I
6421.	1.588	0.763	0.454	0.02347	316.80	316.50	0.00730	102.00	I
7787.	1.587	0.970	0.782	0.02218	314.00	313.60	0.00615	102.00	I
6475.	1.588	0.753	0.453	0.02218	313.40	313.10	0.00754	102.00	I
3963.	1.587	0.948	0.761	0.01543	314.90	314.70	0.00678	102.00	I
3130.	1.588	0.732	0.438	0.01543	314.60	314.40	0.00797	102.00	I
1554.	1.587	0.984	0.869	0.00994	315.80	315.70	0.00598	102.00	I
1467.	1.588	0.847	0.567	0.00994	315.70	315.60	0.00766	102.00	I
1262.	1.587	0.945	0.755	0.00912	321.60	321.50	0.00747	102.00	I
743.	1.588	0.724	0.397	0.00912	321.50	321.50	0.00702	102.00	I
3819.	1.587	0.474	0.210	0.02482	315.10	314.90	0.00673	102.00	I
1559.	1.588	0.192	0.104	0.02482	314.90	314.80	0.00526	102.00	I
3826.	1.587	0.471	0.203	0.02507	315.30	315.10	0.00675	102.00	I
1498.	1.588	0.186	0.096	0.02507	315.10	315.00	0.00522	102.00	I
1175.	1.587	0.487	0.231	0.01338	319.60	319.60	0.00741	102.00	I
319.	1.588	0.212	0.121	0.01338	319.60	319.50	0.00391	102.00	I
646.	1.587	0.472	0.202	0.00993	319.20	319.20	0.00781	102.00	I
84.	1.588	0.183	0.103	0.00993	319.20	319.20	0.00239	102.00	HC
702.	1.587	0.492	0.250	0.00971	317.50	317.50	0.00763	102.00	I
224.	1.588	0.233	0.146	0.00971	317.50	317.50	0.00432	102.00	HL
1659.	1.587	0.468	0.187	0.01605	314.00	314.00	0.00713	102.00	I
644.	1.588	0.168	0.079	0.01605	313.90	313.90	0.00587	102.00	I
1595.	1.587	0.501	0.246	0.01418	316.10	316.10	0.00783	102.00	I
592.	1.588	0.227	0.127	0.01418	316.10	316.00	0.00545	102.00	I
4029.	1.587	0.496	0.220	0.02502	315.60	315.50	0.00680	102.00	I
1734.	1.588	0.201	0.102	0.02502	315.40	315.30	0.00575	102.00	I
3603.	1.587	0.501	0.239	0.02452	319.80	319.70	0.00672	102.00	I
1610.	1.588	0.221	0.124	0.02452	319.60	319.50	0.00542	102.00	I
4370.	1.587	0.497	0.250	0.02802	321.80	321.70	0.00647	102.00	I
2298.	1.588	0.233	0.144	0.02802	321.60	321.50	0.00562	102.00	I
4694.	1.587	0.493	0.225	0.02841	317.70	317.60	0.00647	102.00	I
2104.	1.588	0.207	0.112	0.02841	317.50	317.40	0.00541	102.00	I
5258.	1.587	0.482	0.214	0.02809	312.60	312.40	0.00670	102.00	I
2194.	1.588	0.195	0.099	0.02809	312.30	312.10	0.00554	102.00	I
2886.	1.587	0.492	0.226	0.01959	313.80	313.60	0.00739	102.00	I
1163.	1.588	0.207	0.106	0.01959	313.60	313.50	0.00590	102.00	I
3115.	1.587	0.484	0.209	0.01976	310.10	309.90	0.00743	102.00	I
1187.	1.588	0.190	0.089	0.01976	309.90	309.80	0.00605	102.00	I
2711.	1.587	0.517	0.275	0.01974	319.90	319.80	0.00713	102.00	I
1336.	1.588	0.258	0.164	0.01974	319.80	319.80	0.00577	102.00	I
2599.	1.587	0.517	0.270	0.02032	324.70	324.60	0.00731	102.00	I
1193.	1.588	0.252	0.158	0.02032	324.60	324.50	0.00554	102.00	I
3189.	1.587	0.502	0.230	0.02109	315.40	315.30	0.00725	102.00	I
1328.	1.588	0.211	0.111	0.02109	315.30	315.20	0.00585	102.00	I
808.	1.587	0.481	0.208	0.00985	310.00	310.00	0.00775	102.00	I
113.	1.588	0.189	0.095	0.00985	310.00	310.00	0.00280	102.0	HC
859.	1.587	0.490	0.236	0.00976	313.60	313.60	0.00849	102.00	I
233.	1.588	0.218	0.124	0.00976	313.60	313.60	0.00453	102.00	HL
749.	1.587	0.515	0.255	0.01002	323.20	323.20	0.00844	102.00	I
185.	1.588	0.237	0.144	0.01002	323.20	323.20	0.00385	102.00	I
1762.	1.587	0.497	0.234	0.01633	320.60	320.50	0.00751	102.00	I
650.	1.588	0.216	0.127	0.01633	320.50	320.50	0.00505	102.00	I
1739.	1.587	0.496	0.233	0.01632	320.50	320.50	0.00745	102.00	I
666.	1.588	0.215	0.126	0.01632	320.40	320.40	0.00517	102.00	I

APPENDIX B
CONVECTIVE CONDENSATION HEAT TRANSFER DATA WITHIN A MICRO-FIN TUBE

APPENDIX B1

Convective condensation of R125 within a micro-fin tube

(file: tacond.tbl)

Nu	Re	x_q	Ja	P/P_c	T/T_c	M	Sv	Pr	flow	E_h	u_{Nu}	
217.7	7719.	0.747	35.38	0.278	0.843	52.02	1.26	1.70	P	2.114	17.10	I
197.6	7717.	0.566	40.80	0.278	0.843	52.02	1.63	1.70	P	1.919	14.20	I
186.9	7717.	0.490	43.99	0.278	0.843	52.02	1.86	1.70	P	1.815	13.70	I
175.9	7717.	0.425	47.43	0.278	0.843	52.02	2.11	1.70	P	1.708	14.30	I
153.1	7716.	0.318	55.54	0.278	0.843	52.02	2.73	1.70	P	1.487	17.50	I
130.5	7716.	0.242	65.36	0.278	0.843	52.02	3.44	1.70	P	1.267	21.80	I
116.7	7715.	0.204	72.98	0.278	0.843	52.02	3.96	1.70	P	1.134	24.50	I
98.8	7714.	0.164	86.07	0.278	0.843	52.02	4.71	1.70	P	0.959	28.10	I
84.5	7713.	0.133	104.20	0.278	0.843	52.02	5.53	1.70	P	0.821	33.00	I
81.4	7713.	0.120	115.00	0.277	0.843	52.02	5.94	1.70	P	0.791	41.30	I
81.9	7713.	0.109	126.10	0.278	0.843	52.02	6.36	1.70	P	0.795	57.20	I
100.1	7713.	0.088	150.90	0.278	0.843	52.02	7.36	1.70	P	0.972	84.30	O2
217.7	8996.	0.763	28.69	0.298	0.851	52.02	1.23	1.71	P	2.001	15.30	I
197.8	8997.	0.572	33.19	0.298	0.851	52.02	1.60	1.71	P	1.818	12.60	I
187.0	8997.	0.492	35.80	0.298	0.851	52.02	1.83	1.71	P	1.720	12.10	I
176.3	8996.	0.423	38.72	0.298	0.851	52.02	2.10	1.71	P	1.620	12.50	I
153.4	8995.	0.312	45.56	0.298	0.851	52.02	2.74	1.71	P	1.411	15.50	I
130.1	8994.	0.233	53.71	0.298	0.851	52.02	3.50	1.71	P	1.196	19.50	I
115.4	8993.	0.193	59.84	0.298	0.851	52.02	4.06	1.71	P	1.061	21.90	I
95.3	8993.	0.152	69.68	0.298	0.851	52.02	4.88	1.71	P	0.876	24.90	I
78.1	8992.	0.120	82.14	0.298	0.851	52.02	5.78	1.71	P	0.718	28.50	I
73.0	8992.	0.107	88.90	0.298	0.851	52.02	6.23	1.71	P	0.671	36.70	I
71.7	8992.	0.096	95.63	0.298	0.851	52.02	6.69	1.71	P	0.659	52.60	I
83.3	8991.	0.075	108.50	0.298	0.851	52.02	7.78	1.71	P	0.766	73.60	I
227.1	7022.	0.762	39.01	0.352	0.869	52.02	1.21	1.74	P	2.497	18.70	I
206.3	7022.	0.577	44.72	0.352	0.869	52.02	1.55	1.74	P	2.679	15.90	I
195.2	7023.	0.499	48.03	0.352	0.869	52.02	1.77	1.74	P	2.534	15.50	I
184.2	7022.	0.432	51.71	0.352	0.869	52.02	2.00	1.74	P	2.391	16.10	I
161.2	7022.	0.322	60.34	0.352	0.869	52.02	2.57	1.74	P	2.093	19.60	I
138.2	7022.	0.243	70.69	0.352	0.869	52.02	3.23	1.74	P	1.794	24.30	I
123.4	7022.	0.202	78.22	0.352	0.869	52.02	3.71	1.74	P	1.602	27.00	I
103.9	7022.	0.160	91.03	0.352	0.869	52.02	4.42	1.74	P	1.349	30.90	I
87.0	7022.	0.126	108.10	0.352	0.869	52.02	5.20	1.74	P	1.130	35.90	I
81.9	7022.	0.112	117.90	0.352	0.869	52.02	5.58	1.74	P	1.064	45.30	I
80.3	7022.	0.101	128.30	0.352	0.869	52.02	5.97	1.74	P	1.043	66.10	I
91.5	7021.	0.079	151.20	0.352	0.869	52.02	6.84	1.74	P	1.188	94.20	O2
230.8	8393.	0.781	31.42	0.383	0.878	52.02	1.17	1.77	P	2.375	17.20	I
208.1	8392.	0.590	36.18	0.383	0.878	52.02	1.50	1.77	P	2.142	14.50	I
196.0	8392.	0.511	38.97	0.383	0.878	52.02	1.71	1.77	P	2.017	14.00	I
183.7	8392.	0.442	42.01	0.383	0.878	52.02	1.93	1.77	P	1.891	14.60	I
158.2	8391.	0.332	49.14	0.383	0.878	52.02	2.46	1.77	P	1.628	17.80	I
132.8	8391.	0.254	57.72	0.382	0.878	52.02	3.04	1.77	P	1.367	22.30	I
117.0	8391.	0.215	64.08	0.382	0.878	52.02	3.44	1.77	P	1.205	24.90	I
96.4	8391.	0.175	74.75	0.382	0.878	52.02	4.00	1.77	P	0.993	28.50	I
80.0	8390.	0.144	88.91	0.382	0.878	52.02	4.57	1.77	P	0.823	33.20	I
76.0	8390.	0.131	97.01	0.382	0.878	52.02	4.84	1.77	P	0.783	42.40	I
76.5	8390.	0.121	105.60	0.382	0.878	52.02	5.11	1.77	P	0.787	59.30	I
95.2	8390.	0.099	124.00	0.382	0.878	52.02	5.73	1.77	P	0.980	82.90	CU
240.3	13550.	0.776	19.86	0.345	0.867	52.02	1.19	1.74	P	1.870	13.70	I
218.5	13550.	0.577	22.93	0.344	0.867	52.02	1.56	1.74	P	1.701	10.90	I
206.8	13540.	0.494	24.72	0.344	0.867	52.02	1.79	1.74	P	1.609	10.30	I
194.7	13540.	0.422	26.64	0.344	0.866	52.02	2.05	1.74	P	1.515	10.60	I
169.2	13540.	0.305	31.13	0.344	0.866	52.02	2.70	1.74	P	1.316	13.20	I
143.4	13540.	0.221	36.43	0.344	0.866	52.02	3.50	1.74	P	1.116	16.50	I
127.7	13530.	0.180	40.55	0.344	0.866	52.02	4.09	1.74	P	0.994	18.50	I
105.7	13530.	0.136	46.94	0.344	0.866	52.02	5.00	1.74	P	0.822	20.80	I
86.7	13530.	0.101	55.06	0.344	0.866	52.02	6.04	1.74	P	0.675	23.60	I
81.0	13530.	0.087	59.50	0.344	0.866	52.02	6.58	1.74	P	0.630	30.50	I
79.1	13530.	0.076	63.97	0.344	0.866	52.02	7.14	1.74	P	0.615	44.60	I
90.1	13530.	0.053	72.81	0.344	0.866	52.02	8.49	1.74	P	0.701	64.00	HC
241.4	16650.	0.789	16.12	0.395	0.882	52.02	1.15	1.79	P	1.878	13.30	I
221.6	16640.	0.593	18.72	0.395	0.882	52.02	1.49	1.79	P	1.725	10.50	I
210.7	16640.	0.511	20.23	0.394	0.882	52.02	1.70	1.79	P	1.640	9.80	I
199.2	16640.	0.440	21.85	0.394	0.882	52.02	1.93	1.79	P	1.550	10.10	I
174.3	16630.	0.324	25.59	0.394	0.882	52.02	2.48	1.78	P	1.356	12.60	I
148.0	16630.	0.241	29.93	0.394	0.882	52.02	3.13	1.78	P	1.152	15.90	I
131.1	16630.	0.200	33.15	0.394	0.882	52.02	3.59	1.78	P	1.021	17.80	I
106.9	16630.	0.156	38.04	0.394	0.882	52.02	4.27	1.78	P	0.832	19.90	I
83.9	16620.	0.122	43.78	0.394	0.882	52.02	4.99	1.78	P	0.653	22.50	I
75.4	16620.	0.109	46.65	0.394	0.882	52.02	5.34	1.78	P	0.587	31.00	CU
69.9	16620.	0.098	49.23	0.394	0.882	52.02	5.67	1.78	P	0.544	50.10	O2
70.9	16620.	0.078	53.39	0.394	0.882	52.02	6.38	1.78	P	0.552	69.50	I
231.4	11260.	0.762	23.95	0.317	0.857	52.02	1.22	1.72	P	1.934	14.40	I
209.6	11260.	0.568	27.54	0.317	0.857	52.02	1.60	1.72	P	1.752	11.60	I
198.0	11260.	0.487	29.63	0.317	0.857	52.02	1.84	1.72	P	1.655	11.00	I
186.1	11260.	0.417	31.89	0.317	0.857	52.02	2.11	1.72	P	1.556	11.30	I
161.2	11250.	0.304	37.14	0.317	0.857	52.02	2.77	1.72	P	1.348	13.90	I
136.4	11250.	0.222	43.37	0.316	0.857	52.02	3.58	1.72	P	1.141	17.40	I
121.4	11250.	0.182	48.17	0.316	0.857	52.02	4.18	1.72	P	1.015	19.50	I
100.7	11250.	0.139	55.78	0.316	0.857	52.02	5.10	1.72	P	0.842	22.00	I
83.2	11250.	0.105	65.64	0.316	0.857	52.02	6.17	1.72	P	0.696	25.10	I
78.2	11250.	0.091	71.18	0.316	0.857	52.02	6.72	1.72	P	0.654	32.60	I
76.8	11250.	0.080	76.86	0.316	0.857	52.02	7.29	1.72	P	0.642	47.60	I
89.1	11250.	0.058	88.67	0.316	0.857	52.02	8.68	1.72	P	0.745	68.30	O2
31.0	7825.	1.013	67.15	0.366	0.879	52.02	0.92	1.78	C	0.241	31.40	O2
-977.4	7587.	0.992	*******	0.365	0.873	52.02	0.94	1.76	C	-4.971	435.80	O2
4576.0	7587.	0.976	4133.00	0.365	0.873	52.02	0.96	1.76	C	18.890	******	O2
849.1	7586.	0.956	632.10	0.365	0.873	52.02	0.97	1.76	C	4.864	227.40	O2
370.4	7585.	0.904	200.80	0.365	0.873	52.02	1.03	1.76	C	2.665	69.00	O2
257.2	7584.	0.837	108.50	0.365	0.873	52.02	1.10	1.76	C	2.157	35.50	I
222.6	7581.	0.784	81.69	0.365	0.873	52.02	1.17	1.76	C	2.046	26.10	I
186.3	7581.	0.697	57.16	0.365	0.873	52.02	1.30	1.76	C	1.964	18.50	I
160.4	7580.	0.581	41.27	0.365	0.873	52.02	1.54	1.76	C	1.692	14.70	I
150.7	7580.	0.514	35.71	0.365	0.873	52.02	1.71	1.76	C	1.589	13.90	I
142.5	7580.	0.443	31.27	0.365	0.873	52.02	1.95	1.76	C	1.503	13.70	I
129.3	7580.	0.283	24.57	0.365	0.873	52.02	2.83	1.76	C	1.364	13.70	I
450.3	7622.	1.002	1063.00	0.365	0.874	52.02	0.93	1.76	C	2.277	409.80	O2
-1177.0	7579.	0.982	*******	0.365	0.873	52.02	0.95	1.76	C	-5.783	527.70	O2
2710.0	7579.	0.967	2571.00	0.364	0.873	52.02	0.96	1.76	C	12.180	926.80	O2
760.8	7579.	0.948	592.80	0.364	0.873	52.02	0.98	1.76	C	4.427	214.70	O2
356.6	7578.	0.898	200.90	0.364	0.873	52.02	1.03	1.76	C	2.581	68.40	O2
252.9	7577.	0.833	110.20	0.364	0.873	52.02	1.11	1.76	C	2.121	35.50	I
221.0	7574.	0.782	83.50	0.364	0.873	52.02	1.17	1.75	C	2.024	26.40	I
186.9	7573.	0.697	58.77	0.364	0.873	52.02	1.30	1.75	C	1.963	18.80	I
162.4	7573.	0.583	42.59	0.364	0.873	52.02	1.53	1.75	C	1.705	15.00	I
153.1	7572.	0.518	36.90	0.364	0.873	52.02	1.70	1.75	C	1.608	14.20	I
145.3	7572.	0.448	32.36	0.364	0.873	52.02	1.93	1.75	C	1.526	13.90	I
132.6	7572.	0.289	25.47	0.364	0.873	52.02	2.78	1.75	C	1.393	13.80	I
19.3	9972.	1.026	32.51	0.396	0.893	52.02	0.91	1.72	C	0.149	23.70	O2
361.1	9480.	1.003	308.40	0.396	0.884	52.02	0.92	1.79	C	1.997	140.70	O2
2636.0	9412.	0.986	1801.00	0.396	0.882	52.02	0.94	1.79	C	11.070	738.90	O2
774.3	9411.	0.965	437.20	0.396	0.882	52.02	0.96	1.79	C	4.185	185.70	O2
362.8	9410.	0.911	149.80	0.395	0.882	52.02	1.01	1.79	C	2.434	60.00	O2
255.3	9409.	0.842	82.35	0.395	0.882	52.02	1.09	1.79	C	1.998	30.70	I
221.7	9404.	0.788	62.39	0.395	0.882	52.02	1.15	1.79	C	1.896	22.80	I
185.9	9404.	0.698	43.89	0.395	0.882	52.02	1.29	1.79	C	1.833	16.20	I
160.2	9403.	0.578	31.80	0.395	0.882	52.02	1.52	1.79	C	1.579	13.20	I
150.4	9402.	0.510	27.55	0.395	0.882	52.02	1.70	1.79	C	1.483	12.80	I
142.2	9402.	0.437	24.16	0.395	0.882	52.02	1.94	1.79	C	1.402	13.00	I
128.9	9402.	0.273	19.01	0.395	0.882	52.02	2.84	1.79	C	1.271	13.50	I
23.7	8912.	1.018	42.04	0.289	0.858	52.02	0.94	1.72	C	0.166	24.60	O2
69030.0	8481.	0.995	*******	0.289	0.848	52.02	0.96	1.70	C	******	******	O2
982.0	8481.	0.977	753.40	0.289	0.848	52.02	0.97	1.70	C	4.563	302.70	O2
554.9	8480.	0.955	353.30	0.289	0.848	52.02	0.99	1.70	C	2.968	139.00	O2
320.6	8478.	0.900	150.60	0.289	0.848	52.02	1.05	1.70	C	2.060	54.70	I
237.2	8476.	0.829	87.71	0.289	0.848	52.02	1.14	1.70	C	1.761	29.70	I
210.9	8469.	0.774	68.41	0.289	0.847	52.02	1.21	1.70	C	1.708	22.50	I
177.8	8468.	0.683	48.67	0.289	0.847	52.02	1.36	1.70	C	1.658	16.20	I
153.3	8468.	0.564	35.53	0.288	0.847	52.02	1.63	1.70	C	1.430	13.50	I
143.8	8467.	0.495	30.86	0.288	0.847	52.02	1.83	1.70	C	1.342	13.20	I
135.9	8467.	0.423	27.12	0.288	0.847	52.02	2.11	1.70	C	1.268	13.40	I
123.0	8466.	0.261	21.43	0.288	0.847	52.02	3.21	1.70	C	1.147	14.00	I
38.3	8476.	1.011	76.97	0.337	0.870	52.02	0.93	1.75	C	0.267	36.40	O2
-4402.0	8248.	0.990	*******	0.337	0.864	52.02	0.95	1.73	C	******	******	O2
1204.0	8247.	0.973	1010.00	0.337	0.864	52.02	0.97	1.73	C	5.773	391.80	O2
601.5	8247.	0.953	416.10	0.337	0.864	52.02	0.98	1.73	C	3.393	159.40	O2
331.0	8245.	0.901	167.10	0.337	0.864	52.02	1.04	1.73	C	2.256	59.10	I
243.1	8244.	0.834	95.67	0.336	0.864	52.02	1.12	1.73	C	1.915	31.90	I
214.1	8241.	0.782	73.39	0.336	0.864	52.02	1.18	1.73	C	1.837	23.80	I
182.0	8240.	0.695	52.26	0.336	0.864	52.02	1.32	1.73	C	1.795	17.10	I
158.3	8239.	0.579	38.17	0.336	0.864	52.02	1.56	1.73	C	1.561	14.00	I
149.2	8238.	0.513	33.15	0.336	0.864	52.02	1.74	1.73	C	1.471	13.50	I
141.4	8238.	0.442	29.13	0.336	0.864	52.02	1.98	1.73	C	1.395	13.60	I
128.8	8238.	0.283	23.00	0.336	0.864	52.02	2.89	1.73	C	1.270	13.90	I
60.6	4528.	1.004	215.30	0.348	0.870	52.02	0.94	1.75	C	0.555	68.50	O2

1458.0	4486.	0.981	2704.00	0.348	0.868	52.02	0.96	1.74	C	8.966	764.40	O2
636.9	4485.	0.964	941.70	0.348	0.868	52.02	0.97	1.74	C	4.728	269.00	O2
434.1	4485.	0.944	532.20	0.348	0.868	52.02	0.99	1.74	C	3.595	154.40	O2
280.6	4485.	0.890	253.40	0.348	0.868	52.02	1.05	1.74	C	2.735	71.50	1
215.9	4485.	0.822	153.40	0.348	0.868	52.02	1.13	1.74	C	2.415	41.80	1
189.8	4485.	0.769	118.10	0.348	0.868	52.02	1.20	1.74	C	2.313	31.70	1
163.6	4485.	0.681	85.80	0.348	0.868	52.02	1.34	1.74	C	1.677	23.10	1
143.2	4485.	0.566	63.56	0.348	0.868	52.02	1.58	1.74	C	1.602	18.20	1
135.2	4485.	0.500	55.50	0.348	0.868	52.02	1.77	1.74	C	1.587	16.90	1
128.3	4484.	0.430	48.99	0.348	0.868	52.02	2.02	1.74	C	1.586	16.40	1
116.9	4484.	0.274	38.98	0.348	0.868	52.02	2.94	1.74	C	1.445	15.80	1
-410.2	4291.	0.999	*******	0.383	0.878	52.02	0.93	1.77	C	-3.019	409.50	O2
6792.0	4291.	0.973	*******	0.383	0.878	52.02	0.95	1.77	C	35.380	******	O2
1013.0	4291.	0.953	1362.00	0.383	0.878	52.02	0.97	1.77	C	7.607	396.90	O2
589.4	4290.	0.930	668.50	0.383	0.878	52.02	0.99	1.77	C	5.076	196.00	O2
338.2	4290.	0.872	292.00	0.383	0.878	52.02	1.06	1.77	C	3.481	83.90	O2
245.0	4290.	0.800	171.70	0.383	0.878	52.02	1.14	1.77	C	2.931	48.10	1
208.5	4290.	0.745	130.40	0.383	0.878	52.02	1.22	1.77	C	1.987	36.30	1
173.3	4290.	0.657	94.04	0.383	0.878	52.02	1.37	1.77	C	1.791	26.20	1
146.4	4290.	0.545	69.27	0.383	0.878	52.02	1.61	1.77	C	1.652	20.40	1
135.9	4290.	0.482	60.37	0.383	0.878	52.02	1.80	1.77	C	1.610	19.40	1
126.9	4290.	0.416	53.22	0.383	0.878	52.02	2.04	1.77	C	1.584	19.60	1
112.1	4290.	0.272	42.24	0.383	0.878	52.02	2.88	1.77	C	1.400	20.10	1
78.8	4861.	1.004	260.60	0.376	0.878	52.02	0.93	1.77	C	0.686	85.70	O2
1000.0	4819.	0.981	5000.00	0.376	0.876	52.02	0.95	1.77	C	9.999	******	O2
985.6	4819.	0.965	1350.00	0.376	0.876	52.02	0.96	1.77	C	6.754	421.70	O2
538.1	4819.	0.944	610.70	0.376	0.876	52.02	0.98	1.77	C	4.277	186.60	O2
306.8	4819.	0.891	256.00	0.376	0.876	52.02	1.04	1.77	C	2.925	74.90	HC
226.9	4818.	0.823	148.60	0.376	0.876	52.02	1.12	1.77	C	2.505	42.50	1
196.9	4818.	0.770	112.80	0.376	0.876	52.02	1.19	1.77	C	2.377	31.90	1
167.8	4818.	0.683	80.92	0.375	0.876	52.02	1.32	1.77	C	2.318	23.10	1
145.9	4818.	0.568	59.42	0.375	0.876	52.02	1.56	1.77	C	1.639	17.90	1
137.3	4818.	0.502	51.72	0.375	0.876	52.02	1.74	1.77	C	1.613	16.70	1
130.2	4818.	0.432	45.55	0.375	0.876	52.02	1.98	1.77	C	1.609	16.20	1
118.3	4818.	0.276	36.11	0.375	0.876	52.02	2.87	1.77	C	1.463	15.60	1
85.0	5051.	1.004	252.10	0.398	0.884	52.02	0.92	1.80	C	0.742	88.90	O2
3973.0	5009.	0.980	6229.00	0.398	0.883	52.02	0.94	1.79	C	20.820	******	O2
853.7	5009.	0.963	1073.00	0.398	0.883	52.02	0.96	1.79	C	6.076	343.00	O2
517.3	5009.	0.942	542.60	0.398	0.883	52.02	0.98	1.79	C	4.176	168.90	O2
308.4	5008.	0.888	241.00	0.398	0.883	52.02	1.03	1.79	C	2.973	73.50	HC
229.4	5008.	0.819	142.50	0.398	0.883	52.02	1.11	1.79	C	2.544	42.70	1
198.7	5008.	0.766	108.70	0.398	0.883	52.02	1.18	1.79	C	2.410	32.10	1
168.5	5008.	0.680	78.48	0.398	0.883	52.02	1.32	1.79	C	2.340	23.40	1
145.4	5008.	0.568	57.87	0.398	0.883	52.02	1.54	1.79	C	1.633	18.40	1
136.4	5008.	0.504	50.45	0.398	0.883	52.02	1.71	1.79	C	1.601	17.70	1
128.7	5008.	0.437	44.48	0.398	0.883	52.02	1.94	1.79	C	1.591	17.90	1
116.0	5008.	0.287	35.32	0.398	0.883	52.02	2.73	1.79	C	1.434	18.50	1
45.8	5712.	1.007	127.80	0.270	0.844	52.02	0.95	1.70	C	0.353	46.20	O2
-2857.0	5608.	0.983	*******	0.270	0.840	52.02	0.97	1.71	C	******	******	O2
1397.0	5608.	0.965	1629.00	0.270	0.840	52.02	0.99	1.71	C	7.366	521.00	O2
611.1	5608.	0.944	591.40	0.270	0.840	52.02	1.01	1.71	C	3.870	182.50	O2
317.4	5608.	0.889	226.50	0.270	0.840	52.02	1.07	1.71	C	2.455	67.00	1
228.5	5608.	0.819	128.40	0.270	0.840	52.02	1.16	1.71	C	2.057	35.60	1
201.6	5606.	0.764	99.26	0.270	0.840	52.02	1.23	1.71	C	1.980	27.00	1
170.3	5605.	0.674	70.82	0.270	0.840	52.02	1.39	1.71	C	1.921	19.50	1
147.0	5605.	0.556	51.78	0.270	0.840	52.02	1.66	1.71	C	1.989	15.70	1
138.0	5604.	0.488	45.00	0.270	0.840	52.02	1.87	1.71	C	2.085	15.00	1
130.2	5604.	0.417	39.51	0.270	0.840	52.02	2.16	1.71	C	1.968	14.80	1
117.6	5604.	0.256	31.17	0.270	0.840	52.02	3.30	1.71	C	1.777	14.90	1
45.6	4564.	1.005	154.00	0.276	0.846	52.02	0.95	1.70	C	0.400	47.30	O2
3716.0	4499.	0.981	6597.00	0.276	0.843	52.02	0.97	1.71	C	17.940	******	O2
848.8	4499.	0.963	1205.00	0.276	0.843	52.02	0.99	1.71	C	5.510	339.00	O2
498.3	4499.	0.941	588.60	0.276	0.843	52.02	1.01	1.71	C	3.699	159.30	O2
293.6	4499.	0.885	257.00	0.276	0.843	52.02	1.07	1.71	C	2.606	67.90	1
219.0	4500.	0.813	151.60	0.276	0.843	52.02	1.16	1.71	C	2.245	38.40	1
193.0	4499.	0.758	117.40	0.276	0.843	52.02	1.24	1.71	C	2.168	29.20	1
165.8	4499.	0.667	85.48	0.276	0.843	52.02	1.40	1.71	C	2.142	21.40	1
144.5	4498.	0.548	63.37	0.276	0.843	52.02	1.68	1.71	C	1.589	17.10	1
136.1	4498.	0.481	55.34	0.276	0.843	52.02	1.89	1.71	C	1.576	16.00	1
128.5	4498.	0.409	48.73	0.276	0.843	52.02	2.19	1.71	C	1.566	15.50	1
116.1	4498.	0.249	38.60	0.276	0.843	52.02	3.37	1.71	C	1.415	15.00	1
20.1	19950.	1.052	13.73	0.369	0.899	52.02	0.89	1.81	C	0.245	15.10	O2
73.2	18610.	1.026	27.77	0.369	0.886	52.02	0.91	1.81	C	0.892	19.40	O2
263.2	17760.	1.006	84.90	0.369	0.877	52.02	0.93	1.77	C	3.207	48.30	O2
536.5	17520.	0.982	147.30	0.368	0.874	52.02	0.95	1.76	C	6.538	79.10	O2
368.7	17510.	0.923	76.48	0.368	0.874	52.02	1.01	1.76	C	4.493	37.80	1
285.8	17510.	0.848	47.74	0.368	0.874	52.02	1.09	1.76	C	1.564	21.60	1
260.5	17470.	0.792	38.79	0.366	0.873	52.02	1.16	1.76	C	1.426	17.00	1
219.6	17460.	0.700	28.14	0.366	0.873	52.02	1.30	1.76	C	1.202	12.50	1
187.8	17460.	0.581	20.81	0.366	0.873	52.02	1.53	1.76	C	1.028	10.80	1
175.2	17450.	0.515	18.16	0.366	0.873	52.02	1.71	1.76	C	0.959	10.80	1
164.3	17450.	0.445	16.01	0.366	0.873	52.02	1.94	1.76	C	0.899	11.30	1
146.3	17450.	0.290	12.70	0.365	0.873	52.02	2.77	1.76	C	0.801	12.20	1
21.6	14810.	1.044	16.72	0.377	0.897	52.02	0.90	1.78	C	0.135	16.10	O2
127.9	13710.	1.013	55.89	0.376	0.882	52.02	0.92	1.79	C	0.712	30.20	O2
772.2	13320.	0.990	282.80	0.376	0.876	52.02	0.94	1.77	C	3.433	136.50	O2
558.6	13320.	0.962	173.10	0.376	0.876	52.02	0.97	1.77	C	2.744	81.00	O2
367.2	13310.	0.894	87.22	0.376	0.876	52.02	1.03	1.77	C	2.127	37.80	O2
277.6	13310.	0.809	53.86	0.376	0.876	52.02	1.13	1.77	C	1.863	21.70	1
246.2	13290.	0.746	42.90	0.375	0.876	52.02	1.22	1.77	C	1.652	16.80	1
205.1	13290.	0.643	31.16	0.375	0.876	52.02	1.40	1.77	C	1.376	12.40	1
173.1	13290.	0.514	23.07	0.375	0.876	52.02	1.70	1.76	C	1.161	10.50	1
160.3	13290.	0.441	20.14	0.375	0.876	52.02	1.94	1.76	C	1.076	10.70	1
149.4	13290.	0.366	17.76	0.375	0.876	52.02	2.28	1.76	C	1.003	11.50	1
131.3	13280.	0.202	14.11	0.375	0.876	52.02	3.64	1.76	C	0.881	12.70	1
18.9	13800.	1.033	23.17	0.375	0.891	52.02	0.91	1.51	C	0.126	17.90	O2
158.3	12990.	1.008	90.88	0.375	0.879	52.02	0.93	1.78	C	0.847	42.30	O2
718.9	12770.	0.989	339.40	0.374	0.876	52.02	0.94	1.76	C	3.186	147.30	O2
521.7	12770.	0.967	207.00	0.374	0.876	52.02	0.96	1.76	C	2.548	87.10	O2
346.5	12760.	0.910	103.90	0.374	0.876	52.02	1.02	1.76	C	1.976	41.00	1
265.1	12760.	0.840	64.08	0.374	0.876	52.02	1.10	1.76	C	1.729	23.50	1
237.2	12750.	0.786	51.05	0.373	0.876	52.02	1.16	1.76	C	1.679	18.30	1
199.9	12740.	0.700	37.05	0.373	0.875	52.02	1.30	1.76	C	1.415	13.50	1
170.8	12740.	0.588	27.41	0.373	0.875	52.02	1.51	1.76	C	1.209	11.30	1
159.3	12740.	0.525	23.92	0.373	0.875	52.02	1.67	1.76	C	1.128	11.20	1
149.4	12740.	0.459	21.10	0.373	0.875	52.02	1.88	1.76	C	1.058	11.70	1
133.1	12740.	0.314	16.75	0.373	0.875	52.02	2.59	1.76	C	0.942	12.60	1
22.3	14800.	1.037	20.91	0.393	0.897	52.02	0.90	1.78	C	0.138	16.30	O2
135.3	13920.	1.011	68.98	0.393	0.886	52.02	0.92	1.80	C	0.733	34.20	O2
803.5	13610.	0.991	338.50	0.393	0.881	52.02	0.94	1.78	C	3.471	153.70	O2
568.5	13610.	0.968	200.90	0.392	0.881	52.02	0.96	1.78	C	2.720	88.30	O2
371.4	13600.	0.909	98.80	0.392	0.881	52.02	1.01	1.78	C	2.086	40.40	O2
283.0	13600.	0.835	60.45	0.392	0.881	52.02	1.09	1.78	C	1.823	23.30	1
253.1	13590.	0.779	48.03	0.391	0.881	52.02	1.17	1.78	C	1.777	18.00	1
213.5	13580.	0.687	34.77	0.391	0.881	52.02	1.31	1.78	C	1.499	13.20	1
182.9	13580.	0.569	25.69	0.391	0.881	52.02	1.55	1.78	C	1.284	11.00	1
170.8	13580.	0.502	22.40	0.391	0.881	52.02	1.72	1.78	C	1.199	10.80	1
160.4	13580.	0.432	19.75	0.391	0.881	52.02	1.96	1.78	C	1.126	11.10	1
143.2	13580.	0.277	15.67	0.391	0.881	52.02	2.82	1.78	C	1.006	11.80	1
19.5	13890.	1.042	16.85	0.320	0.881	52.02	0.91	1.80	C	0.137	14.60	O2
108.1	12810.	1.012	54.99	0.320	0.865	52.02	0.94	1.74	C	0.594	28.20	O2
682.0	12420.	0.990	290.20	0.320	0.858	52.02	0.95	1.72	C	2.966	134.90	O2
513.9	12410.	0.964	184.80	0.320	0.858	52.02	0.98	1.72	C	2.454	82.00	O2
349.1	12410.	0.899	96.01	0.319	0.858	52.02	1.04	1.72	C	1.948	39.40	1
267.6	12410.	0.819	59.95	0.319	0.858	52.02	1.14	1.72	C	1.719	22.80	1
241.0	12390.	0.758	48.45	0.318	0.858	52.02	1.23	1.72	C	1.692	17.80	1
201.3	12380.	0.660	35.21	0.318	0.858	52.02	1.39	1.72	C	1.413	13.20	1
170.3	12380.	0.536	26.07	0.318	0.858	52.02	1.68	1.72	C	1.195	11.20	1
157.9	12380.	0.467	22.76	0.318	0.858	52.02	1.91	1.72	C	1.109	11.20	1
147.3	12370.	0.394	20.06	0.318	0.858	52.02	2.21	1.72	C	1.034	11.70	1
129.7	12370.	0.236	15.92	0.317	0.858	52.02	3.40	1.72	C	0.910	12.70	1
24.8	15980.	1.037	20.30	0.365	0.890	52.02	0.91	1.84	C	0.174	16.20	O2
147.6	14950.	1.010	69.48	0.364	0.877	52.02	0.93	1.77	C	0.742	36.40	O2
742.5	14610.	0.990	288.90	0.364	0.873	52.02	0.94	1.76	C	3.055	140.80	O2
547.2	14610.	0.966	178.90	0.364	0.873	52.02	0.97	1.76	C	2.476	84.70	O2
367.8	14610.	0.906	90.79	0.364	0.873	52.02	1.02	1.75	C	1.947	39.30	1
282.7	14600.	0.831	56.19	0.364	0.873	52.02	1.11	1.75	C	1.714	22.60	1
255.4	14580.	0.774	45.21	0.363	0.872	52.02	1.19	1.75	C	1.549	17.60	1
215.1	14580.	0.681	32.77	0.362	0.872	52.02	1.33	1.75	C	1.305	13.00	1
183.9	14570.	0.561	24.22	0.362	0.872	52.02	1.59	1.75	C	1.115	10.90	1
171.5	14570.	0.494	21.13	0.362	0.872	52.02	1.78	1.75	C	1.040	10.90	1
160.9	14570.	0.423	18.62	0.362	0.872	52.02	2.03	1.75	C	0.976	11.30	1
143.3	14560.	0.267	14.77	0.362	0.872	52.02	2.97	1.75	C	0.869	12.00	1
8069.0	13030.	0.994	8962.00	0.317	0.858	52.02	0.95	1.72	C	19.110	******	O2
829.2	13020.	0.968	489.10	0.317	0.857	52.02	0.97	1.72	C	3.241	218.00	O2
599.7	13020.	0.950	285.40	0.317	0.857	52.02	0.99	1.72	C	2.600	126.10	O2
478.6	13020.	0.928	191.10	0.317	0.857	52.02	1.02	1.72	C	2.252	80.60	O2
344.5	13010.	0.871	103.60	0.317	0.857	52.02	1.08	1.72	C	1.874	40.60	1
272.4	13010.	0.800	65.79	0.316	0.857	52.02	1.17	1.72	C	1.692	23.90	1
251.4	12980.	0.746	53.99	0.315	0.857	52.02	1.24	1.72	C	1.561	19.00	1
213.4	12980.	0.658	39.36	0.315	0.857	52.02	1.40	1.72	C	1.325	14.00	1
183.5	12970.	0.545	29.19	0.315	0.857	52.02	1.66	1.72	C	1.140	11.90	1
171.6	12970.	0.481	25.49	0.315	0.857	52.02	1.86	1.72	C	1.066	11.80	1
161.2	12970.	0.413	22.48	0.315	0.857	52.02	2.13	1.72	C	1.001	12.10	1
144.0	12970.	0.265	17.85	0.314	0.857	52.02	3.11	1.72	C	0.895	12.80	1
27.9	6030.	1.013	58.41	0.319	0.865	52.02	0.93	1.74	C	0.250	20.60	O2
855.1	5838.	0.984	992.40	0.319	0.858	52.02	0.96	1.72	C	5.032	288.30	O2
569.2	5838.	0.963	536.70	0.319	0.858	52.02	0.98	1.72	C	3.770	158.60	O2
442.2	5838.	0.938	352.30	0.319	0.858	52.02	1.00	1.72	C	3.191	102.30	O2
309.5	5837.	0.876	188.50	0.319	0.858	52.02	1.07	1.72	C	2.596	52.40	1
240.5	5836.	0.798	119.40	0.319	0.858	52.02	1.17	1.72	C	2.318	31.70	1
212.4	5835.	0.739	94.39	0.319	0.858	52.02	1.25	1.72	C	2.240	24.90	1
179.5	5835.	0.646	69.44	0.319	0.858	52.02	1.42	1.72	C	2.188	18.30	1
153.2	5834.	0.526	51.87	0.319	0.858	52.02	1.71	1.72	C	2.248	14.70	1
142.5	5834.	0.460	45.43	0.319	0.858	52.02	1.93	1.72	C	2.092	13.80	1
133.3	5834.	0.390	40.20	0.319	0.858	52.02	2.23	1.72	C	1.957	13.50	1
118.0	5834.	0.239	32.08	0.319	0.858	52.02	3.37	1.72	C	1.731	13.30	1
23.6	6976.	1.021	34.78	0.308	0.865	52.02	0.93	1.74	C	0.204	16.70	O2
777.9	6605.	0.986	661.60	0.308	0.854	52.02	0.96	1.71	C	4.446	215.80	O2
552.0	6605.	0.960	385.50	0.308	0.854	52.02	0.98	1.71	C	3.512	123.20	O2
434.5	6605.	0.931	259.10	0.308	0.854	52.02	1.01	1.71	C	3.018	81.60	O2
303.9	6604.	0.857	141.50	0.307	0.854	52.02	1.10	1.71	C	2.461	42.30	1
233.2	6603.	0.769	90.40	0.307	0.854	52.02	1.21	1.71	C	2.190	25.70	1
204.4	6600.	0.702	71.99	0.307	0.854	52.02	1.32	1.71	C	2.121	20.10	1
169.7	6600.	0.598	53.10	0.307	0.854	52.02	1.53	1.71	C	2.058	15.00	1
141.6	6599.	0.469	39.73	0.307	0.854	52.02	1.91	1.71	C	1.718	12.40	1

130.2	6599.	0.398	34.82	0.307	0.854	52.02	2.21	1.71	C	1.580	12.20	I
120.4	6599.	0.325	30.82	0.307	0.854	52.02	2.63	1.71	C	1.460	12.80	I
103.9	6598.	0.169	24.62	0.307	0.854	52.02	4.46	1.71	C	1.260	13.90	I
22.5	5458.	1.013	57.17	0.312	0.862	52.02	0.94	1.73	C	0.214	23.30	O2
1054.0	5276.	0.987	1470.00	0.312	0.856	52.02	0.96	1.71	C	6.147	460.70	O2
599.3	5276.	0.967	675.00	0.312	0.856	52.02	0.98	1.71	C	4.032	203.60	O2
438.0	5276.	0.944	414.10	0.311	0.856	52.02	1.00	1.71	C	3.251	120.80	O2
293.4	5275.	0.885	209.30	0.311	0.856	52.02	1.06	1.71	C	2.544	58.60	I
225.7	5275.	0.812	129.50	0.311	0.856	52.02	1.15	1.71	C	2.251	34.90	I
198.9	5274.	0.755	101.40	0.311	0.855	52.02	1.23	1.71	C	2.169	26.90	I
169.0	5274.	0.664	74.04	0.311	0.855	52.02	1.39	1.71	C	2.119	19.70	I
145.4	5273.	0.546	55.03	0.311	0.855	52.02	1.66	1.71	C	2.183	15.80	I
135.9	5273.	0.480	48.11	0.311	0.855	52.02	1.87	1.71	C	1.582	15.00	I
127.8	5273.	0.410	42.50	0.311	0.855	52.02	2.14	1.71	C	1.487	15.00	I
114.3	5273.	0.257	33.85	0.311	0.855	52.02	3.19	1.71	C	1.331	15.10	I
231.1	9810.	0.772	27.02	0.305	0.853	52.02	1.21	1.71	P	2.031	15.50	I
208.9	9808.	0.575	31.05	0.305	0.853	52.02	1.59	1.71	P	1.836	12.50	I
197.1	9807.	0.492	33.40	0.305	0.853	52.02	1.83	1.71	P	1.732	11.90	I
185.0	9806.	0.421	35.93	0.305	0.853	52.02	2.10	1.71	P	1.626	12.20	I
159.9	9805.	0.306	41.82	0.305	0.853	52.02	2.78	1.71	P	1.405	15.10	I
134.8	9803.	0.223	48.79	0.305	0.853	52.02	3.60	1.71	P	1.185	18.80	I
119.7	9802.	0.182	54.13	0.305	0.853	52.02	4.23	1.71	P	1.052	21.00	I
99.0	9801.	0.138	62.55	0.305	0.853	52.02	5.19	1.71	P	0.870	23.70	I
81.9	9801.	0.104	73.40	0.305	0.853	52.02	6.31	1.71	P	0.719	26.90	I
77.1	9800.	0.090	79.44	0.305	0.853	52.02	6.90	1.71	P	0.678	34.80	I
76.3	9800.	0.078	85.66	0.305	0.853	52.02	7.51	1.71	P	0.670	50.10	I
89.7	9800.	0.056	98.47	0.305	0.853	52.02	9.07	1.71	P	0.788	71.30	O2
228.0	10090.	0.773	26.85	0.357	0.871	52.02	1.19	1.75	P	2.089	15.20	I
208.5	10080.	0.586	31.02	0.357	0.871	52.02	1.53	1.75	P	1.910	12.60	I
198.0	10080.	0.507	33.44	0.357	0.871	52.02	1.74	1.75	P	1.814	12.00	I
187.2	10080.	0.439	36.08	0.357	0.871	52.02	1.97	1.75	P	1.715	12.40	I
164.4	10080.	0.328	42.23	0.357	0.870	52.02	2.52	1.75	P	1.506	15.30	I
141.1	10080.	0.248	49.52	0.357	0.870	52.02	3.17	1.75	P	1.293	19.20	I
126.6	10080.	0.207	54.99	0.357	0.870	52.02	3.64	1.75	P	1.160	21.40	I
106.5	10080.	0.163	63.75	0.357	0.870	52.02	4.32	1.75	P	0.976	24.30	I
88.9	10080.	0.129	74.90	0.357	0.870	52.02	5.08	1.75	P	0.815	27.80	I
83.5	10080.	0.115	80.99	0.357	0.870	52.02	5.46	1.75	P	0.765	36.00	I
81.3	10080.	0.103	87.13	0.357	0.870	52.02	5.84	1.75	P	0.745	53.40	I
90.5	10080.	0.081	99.21	0.357	0.870	52.02	6.72	1.75	P	0.829	75.50	CU
229.0	10260.	0.772	25.74	0.316	0.857	52.02	1.20	1.72	P	1.992	15.00	I
207.7	10250.	0.577	29.68	0.316	0.857	52.02	1.58	1.72	P	1.807	12.20	I
196.3	10250.	0.495	31.97	0.316	0.857	52.02	1.81	1.72	P	1.708	11.60	I
184.6	10250.	0.425	34.45	0.316	0.857	52.02	2.07	1.72	P	1.606	11.90	I
160.0	10250.	0.310	40.23	0.316	0.857	52.02	2.72	1.72	P	1.392	14.70	I
135.4	10250.	0.228	47.07	0.316	0.857	52.02	3.50	1.72	P	1.178	18.40	I
120.3	10250.	0.187	52.26	0.316	0.857	52.02	4.09	1.72	P	1.047	20.60	I
99.7	10250.	0.144	60.49	0.316	0.857	52.02	4.97	1.72	P	0.868	23.30	I
82.5	10250.	0.110	70.98	0.316	0.857	52.02	5.98	1.72	P	0.718	26.50	I
77.7	10250.	0.097	76.76	0.316	0.857	52.02	6.50	1.72	P	0.676	34.00	I
76.7	10250.	0.085	82.61	0.316	0.857	52.02	7.04	1.72	P	0.667	48.80	I
89.6	10250.	0.062	94.33	0.316	0.857	52.02	8.38	1.72	P	0.779	69.40	O2
245.7	10580.	0.777	30.87	0.384	0.879	52.02	1.17	1.77	P	2.181	15.50	I
226.5	10580.	0.613	36.20	0.383	0.879	52.02	1.45	1.77	P	2.011	13.60	I
216.1	10580.	0.545	39.40	0.383	0.879	52.02	1.61	1.77	P	1.919	13.40	I
205.5	10580.	0.486	42.94	0.383	0.879	52.02	1.78	1.77	P	1.825	14.10	I
183.2	10570.	0.389	51.50	0.383	0.879	52.02	2.15	1.77	P	1.626	17.60	I
160.7	10570.	0.321	62.27	0.383	0.878	52.02	2.53	1.77	P	1.427	22.30	I
147.5	10570.	0.286	71.01	0.383	0.878	52.02	2.77	1.77	P	1.310	25.50	I
129.5	10570.	0.249	85.80	0.383	0.878	52.02	3.08	1.77	P	1.150	30.00	I
117.2	10570.	0.219	106.70	0.383	0.878	52.02	3.39	1.77	P	1.040	36.00	I
116.7	10570.	0.207	119.30	0.383	0.878	52.02	3.54	1.77	P	1.036	43.70	I
122.2	10570.	0.196	133.10	0.383	0.878	52.02	3.68	1.77	P	1.085	57.30	I
159.5	10570.	0.175	164.10	0.383	0.878	52.02	3.99	1.77	P	1.416	87.60	O2
202.8	6200.	0.735	35.26	0.280	0.844	52.02	1.28	1.70	P	2.308	17.80	I
184.8	6200.	0.524	41.16	0.280	0.844	52.02	1.75	1.70	P	2.567	14.80	I
174.2	6200.	0.437	44.45	0.280	0.844	52.02	2.06	1.70	P	2.419	14.30	I
162.5	6200.	0.362	47.90	0.280	0.844	52.02	2.43	1.70	P	2.257	14.90	I
135.9	6199.	0.243	55.22	0.280	0.844	52.02	3.43	1.70	P	1.887	18.00	I
106.4	6199.	0.160	62.38	0.279	0.844	52.02	4.80	1.70	P	1.477	21.70	I
86.7	6199.	0.120	66.49	0.279	0.844	52.02	5.92	1.70	P	1.204	23.50	I
60.4	6196.	0.081	72.27	0.279	0.844	52.02	7.69	1.70	P	0.839	25.70	I
35.7	6193.	0.055	76.28	0.279	0.844	52.02	9.61	1.70	P	0.496	29.20	O2
26.4	6192.	0.047	77.01	0.279	0.844	52.02	10.43	1.70	P	0.366	53.40	O2
19.7	6192.	0.041	75.91	0.279	0.844	52.02	11.14	1.70	P	0.273	107.70	O2
15.1	6193.	0.032	71.14	0.279	0.844	52.02	12.41	1.70	P	0.210	115.60	O2
208.1	5161.	0.748	47.19	0.299	0.851	52.02	1.25	1.71	P	2.597	20.50	I
189.2	5161.	0.554	54.70	0.299	0.851	52.02	1.65	1.71	P	2.810	17.80	I
178.9	5161.	0.473	59.06	0.299	0.851	52.02	1.90	1.71	P	2.019	17.50	I
168.4	5161.	0.404	63.84	0.299	0.851	52.02	2.19	1.71	P	1.933	18.40	I
145.7	5161.	0.291	74.96	0.299	0.851	52.02	2.90	1.71	P	1.673	22.30	I
122.2	5160.	0.212	88.02	0.299	0.851	52.02	3.77	1.71	P	1.403	27.50	I
106.5	5161.	0.172	96.94	0.299	0.851	52.02	4.43	1.71	P	1.223	30.50	I
85.6	5161.	0.132	111.80	0.299	0.851	52.02	5.41	1.71	P	0.983	34.40	I
66.9	5161.	0.101	129.80	0.299	0.851	52.02	6.49	1.71	P	0.768	39.20	I
60.7	5161.	0.089	139.10	0.299	0.851	52.02	7.03	1.71	P	0.697	48.00	I
57.8	5161.	0.079	148.10	0.299	0.851	52.02	7.57	1.71	P	0.664	65.60	I
64.3	5160.	0.060	164.00	0.299	0.851	52.02	8.82	1.71	P	0.738	89.00	HC
206.0	5921.	0.758	39.73	0.316	0.857	52.02	1.23	1.72	P	2.441	18.50	I
188.2	5921.	0.561	46.68	0.316	0.857	52.02	1.62	1.72	P	2.657	16.10	I
178.4	5921.	0.480	50.79	0.316	0.857	52.02	1.86	1.72	P	2.012	15.80	I
168.1	5921.	0.411	55.32	0.316	0.857	52.02	2.14	1.72	P	1.896	16.70	I
145.7	5920.	0.299	66.06	0.316	0.857	52.02	2.80	1.72	P	1.644	20.80	I
122.0	5920.	0.222	79.01	0.316	0.857	52.02	3.58	1.72	P	1.376	26.10	I
106.0	5920.	0.185	88.26	0.316	0.857	52.02	4.13	1.72	P	1.196	29.40	I
84.5	5920.	0.146	103.70	0.316	0.857	52.02	4.91	1.72	P	0.953	34.00	I
65.6	5920.	0.118	122.60	0.316	0.857	52.02	5.69	1.72	P	0.740	39.60	I
59.9	5920.	0.108	132.30	0.316	0.857	52.02	6.06	1.72	P	0.676	50.40	CU
58.2	5920.	0.099	141.60	0.316	0.857	52.02	6.41	1.72	P	0.657	68.90	CU
70.0	5920.	0.081	157.10	0.316	0.857	52.02	7.23	1.72	P	0.790	90.30	I
209.1	5586.	0.748	42.47	0.346	0.867	52.02	1.23	1.74	P	2.661	20.20	I
190.1	5586.	0.553	49.64	0.346	0.867	52.02	1.62	1.74	P	2.889	17.60	I
179.7	5586.	0.472	53.89	0.346	0.867	52.02	1.86	1.74	P	2.054	17.40	I
169.0	5585.	0.403	58.58	0.346	0.867	52.02	2.13	1.74	P	1.932	18.30	I
146.0	5585.	0.293	69.74	0.346	0.867	52.02	2.79	1.74	P	1.669	22.60	I
122.2	5585.	0.216	83.33	0.346	0.867	52.02	3.56	1.74	P	1.397	28.30	I
106.3	5585.	0.178	93.11	0.346	0.867	52.02	4.11	1.74	P	1.216	31.80	I
85.4	5585.	0.140	110.00	0.346	0.867	52.02	4.87	1.74	P	0.977	36.70	I
67.6	5585.	0.112	131.90	0.346	0.867	52.02	5.64	1.74	P	0.773	43.40	I
62.8	5585.	0.102	143.90	0.346	0.867	52.02	6.00	1.74	P	0.718	53.40	I
62.2	5585.	0.092	156.20	0.346	0.867	52.02	6.35	1.74	P	0.711	70.50	I
78.0	5585.	0.074	179.80	0.346	0.867	52.02	7.17	1.74	P	0.892	97.80	O2
217.1	5878.	0.757	41.47	0.383	0.878	52.02	1.20	1.77	P	2.762	20.90	I
197.3	5878.	0.563	48.48	0.383	0.878	52.02	1.57	1.77	P	2.980	18.20	I
186.5	5878.	0.483	52.64	0.383	0.878	52.02	1.79	1.77	P	2.122	18.10	I
175.4	5877.	0.415	57.23	0.383	0.878	52.02	2.04	1.77	P	1.996	19.10	I
151.7	5877.	0.305	68.21	0.383	0.878	52.02	2.63	1.77	P	1.726	23.60	I
127.2	5877.	0.229	81.70	0.383	0.878	52.02	3.29	1.77	P	1.448	29.60	I
111.0	5877.	0.192	91.52	0.383	0.878	52.02	3.74	1.77	P	1.264	33.30	I
89.9	5877.	0.154	108.70	0.383	0.878	52.02	4.35	1.77	P	1.023	38.50	I
72.3	5877.	0.126	131.50	0.383	0.878	52.02	4.96	1.77	P	0.822	45.90	I
67.9	5877.	0.116	144.40	0.383	0.878	52.02	5.23	1.77	P	0.772	56.10	I
68.1	5877.	0.107	157.90	0.383	0.878	52.02	5.50	1.77	P	0.775	73.20	I
87.8	5877.	0.088	185.20	0.383	0.878	52.02	6.12	1.77	P	1.000	103.70	O2
209.8	5572.	0.749	41.58	0.358	0.871	52.02	1.22	1.75	P	2.710	19.90	I
190.6	5572.	0.549	48.71	0.358	0.871	52.02	1.62	1.75	P	2.150	17.40	I
180.0	5572.	0.467	52.93	0.358	0.871	52.02	1.87	1.75	P	2.067	17.30	I
169.1	5572.	0.397	57.60	0.358	0.871	52.02	2.15	1.75	P	1.942	18.30	I
145.8	5572.	0.285	68.71	0.358	0.871	52.02	2.83	1.75	P	1.674	22.60	O2
121.6	5572.	0.207	82.27	0.358	0.871	52.02	3.63	1.75	P	1.396	28.30	I
105.5	5572.	0.170	92.03	0.358	0.871	52.02	4.20	1.75	P	1.211	31.70	I
84.4	5572.	0.132	108.80	0.358	0.871	52.02	4.99	1.75	P	0.969	37.00	I
66.9	5572.	0.104	130.60	0.358	0.871	52.02	5.80	1.75	P	0.768	43.50	I
62.4	5572.	0.094	142.40	0.358	0.871	52.02	6.18	1.75	P	0.717	53.30	I
62.5	5572.	0.084	154.40	0.358	0.871	52.02	6.55	1.75	P	0.718	69.30	I
80.7	5572.	0.066	177.10	0.358	0.871	52.02	7.46	1.75	P	0.927	95.20	O2

APPENDIX B2

Convective condensation of R125 within a micro-fin tube

(file: tacond.tbl)

Nu	Re	x_q	Ja	P/P_c	T/T_c	M	Sv	Pr	flow	E_a	u_{Nu}	
12.0	10210.	1.073	10.54	0.428	0.913	120.00	0.86	3.34	C	0.091	20.20	O2
32.4	9826.	1.050	15.02	0.428	0.906	120.00	0.87	3.30	C	0.242	18.10	O2
58.0	9562.	1.033	21.72	0.428	0.901	120.00	0.89	3.28	C	0.422	18.00	O2
146.6	9265.	1.012	46.11	0.428	0.896	120.00	0.90	3.27	C	0.981	28.80	O2
314.6	9109.	0.957	72.92	0.428	0.892	120.00	0.95	3.26	C	2.058	41.00	I
248.2	9107.	0.887	44.98	0.428	0.892	120.00	1.01	3.26	C	1.853	24.30	I
225.4	9101.	0.833	35.67	0.427	0.892	120.00	1.07	3.26	C	1.820	18.90	I
195.2	9100.	0.743	25.93	0.427	0.892	120.00	1.19	3.26	C	1.795	13.80	I
171.8	9098.	0.623	19.20	0.427	0.892	120.00	1.39	3.26	C	1.579	11.20	I
162.5	9097.	0.554	16.76	0.427	0.892	120.00	1.53	3.26	C	1.494	11.00	I
154.5	9097.	0.481	14.79	0.427	0.892	120.00	1.73	3.26	C	1.420	11.30	I
141.3	9096.	0.317	11.75	0.427	0.892	120.00	2.41	3.26	C	1.299	11.90	I
11.1	11120.	1.080	9.55	0.496	0.929	120.00	0.84	3.47	C	0.084	23.60	O2
28.2	10740.	1.059	12.80	0.496	0.924	120.00	0.85	3.40	C	0.215	20.20	O2
46.2	10470.	1.043	16.92	0.495	0.920	120.00	0.86	3.36	C	0.348	18.10	O2
88.5	10180.	1.024	27.17	0.495	0.915	120.00	0.87	3.32	C	0.640	20.30	O2
313.8	9858.	0.973	71.04	0.495	0.910	120.00	0.91	3.29	C	2.068	43.30	I
249.4	9856.	0.907	43.71	0.495	0.910	120.00	0.97	3.29	C	1.868	25.70	I
226.4	9852.	0.855	34.42	0.495	0.909	120.00	1.02	3.29	C	1.834	19.80	I
197.8	9850.	0.768	25.03	0.495	0.909	120.00	1.12	3.29	C	1.819	14.50	I
175.6	9849.	0.653	18.55	0.494	0.909	120.00	1.29	3.29	C	1.615	11.70	I
166.9	9849.	0.586	16.20	0.494	0.909	120.00	1.41	3.29	C	1.534	11.40	I
159.4	9848.	0.514	14.30	0.494	0.909	120.00	1.57	3.29	C	1.465	11.80	I
146.9	9847.	0.353	11.37	0.494	0.909	120.00	2.10	3.29	C	1.351	12.30	I
115.7	12850.	1.007	45.76	0.477	0.907	120.00	0.89	3.28	C	0.658	30.40	O2
283.8	12720.	0.971	63.49	0.476	0.905	120.00	0.92	3.28	C	1.584	39.20	I
300.8	12720.	0.945	55.97	0.476	0.905	120.00	0.94	3.28	C	1.742	34.00	I
304.9	12720.	0.915	49.10	0.476	0.905	120.00	0.97	3.28	C	1.845	29.20	I
289.0	12710.	0.842	37.38	0.476	0.905	120.00	1.04	3.28	C	1.934	21.50	I
259.3	12710.	0.757	28.77	0.476	0.905	120.00	1.15	3.28	C	1.947	16.00	I
243.3	12700.	0.695	25.04	0.475	0.905	120.00	1.23	3.28	C	1.827	13.70	I
212.1	12700.	0.600	20.02	0.475	0.904	120.00	1.40	3.28	C	1.593	10.90	I
181.1	12690.	0.486	15.93	0.474	0.904	120.00	1.66	3.28	C	1.360	9.70	I
167.0	12690.	0.425	14.29	0.474	0.904	120.00	1.85	3.28	C	1.254	10.60	I
154.0	12690.	0.364	12.89	0.474	0.904	120.00	2.09	3.28	C	1.156	12.80	I
130.6	12690.	0.237	10.62	0.474	0.904	120.00	2.84	3.28	C	0.981	16.20	I
83.2	22210.	1.026	19.43	0.546	0.927	120.00	0.86	3.39	C	0.625	21.50	O2
301.5	21490.	0.990	40.01	0.546	0.921	120.00	0.88	3.34	C	1.345	36.70	I
318.9	21480.	0.964	34.91	0.546	0.921	120.00	0.90	3.33	C	1.482	31.20	I
322.8	21480.	0.935	30.31	0.545	0.921	120.00	0.93	3.33	C	1.568	26.20	I
306.5	21470.	0.861	22.69	0.545	0.921	120.00	0.99	3.33	C	1.650	18.50	I
277.3	21460.	0.774	17.25	0.545	0.921	120.00	1.09	3.33	C	1.492	13.20	I
263.6	21420.	0.710	15.04	0.543	0.921	120.00	1.17	3.33	C	1.419	11.20	I
233.3	21420.	0.609	11.93	0.543	0.921	120.00	1.33	3.33	C	1.255	8.90	I
203.5	21410.	0.485	9.43	0.542	0.921	120.00	1.59	3.33	C	1.095	8.10	I
190.0	21410.	0.417	8.44	0.542	0.921	120.00	1.78	3.33	C	1.022	8.80	I
177.6	21400.	0.348	7.60	0.542	0.920	120.00	2.03	3.33	C	0.956	10.40	I
155.5	21400.	0.201	6.24	0.542	0.920	120.00	2.90	3.33	C	0.837	12.60	I
100.8	22830.	1.020	22.66	0.605	0.937	120.00	0.84	3.49	C	0.482	25.90	O2
302.3	22310.	0.985	38.46	0.604	0.934	120.00	0.86	3.43	C	1.390	37.80	I
319.9	22310.	0.960	33.56	0.604	0.934	120.00	0.88	3.43	C	1.530	32.30	I
323.9	22300.	0.931	29.13	0.604	0.934	120.00	0.90	3.43	C	1.622	27.20	I
307.8	22290.	0.859	21.81	0.604	0.934	120.00	0.97	3.43	C	1.541	19.20	I
278.9	22290.	0.773	16.59	0.603	0.934	120.00	1.05	3.43	C	1.396	13.90	I
264.2	22260.	0.711	14.39	0.602	0.933	120.00	1.13	3.43	C	1.323	11.70	I
234.4	22250.	0.612	11.44	0.602	0.933	120.00	1.27	3.43	C	1.173	9.30	I
205.0	22250.	0.489	9.06	0.601	0.933	120.00	1.50	3.42	C	1.026	8.40	I
191.6	22250.	0.423	8.11	0.601	0.933	120.00	1.67	3.42	C	0.959	9.30	I
179.4	22240.	0.355	7.31	0.601	0.933	120.00	1.88	3.42	C	0.898	11.10	I
157.4	22240.	0.210	6.01	0.601	0.933	120.00	2.59	3.42	C	0.788	13.60	I
103.0	17250.	1.016	27.06	0.398	0.889	120.00	0.91	3.27	C	0.516	23.10	O2
327.6	16830.	0.974	48.89	0.397	0.884	120.00	0.94	3.27	C	1.452	37.90	I
342.3	16820.	0.945	42.48	0.397	0.884	120.00	0.97	3.27	C	1.585	32.10	I
342.4	16820.	0.911	36.75	0.397	0.884	120.00	1.00	3.27	C	1.666	26.80	I
317.0	16800.	0.828	27.29	0.396	0.883	120.00	1.09	3.27	C	1.724	18.50	I
279.5	16790.	0.731	20.61	0.395	0.883	120.00	1.22	3.27	C	1.520	13.00	I
265.6	16740.	0.662	18.19	0.393	0.883	120.00	1.34	3.27	C	1.444	11.10	I
228.2	16730.	0.554	14.29	0.393	0.883	120.00	1.56	3.27	C	1.241	8.80	I
192.8	16730.	0.422	11.21	0.392	0.882	120.00	1.97	3.27	C	1.048	8.00	I
177.1	16720.	0.353	10.00	0.392	0.882	120.00	2.28	3.27	C	0.963	8.60	I
162.8	16720.	0.282	8.97	0.392	0.882	120.00	2.72	3.27	C	0.885	10.10	I
137.5	16720.	0.135	7.32	0.392	0.882	120.00	4.52	3.27	C	0.748	12.40	I
77.4	19070.	1.025	20.20	0.453	0.905	120.00	0.89	3.29	C	0.421	19.60	O2
310.2	18390.	0.987	46.13	0.453	0.899	120.00	0.91	3.27	C	1.377	36.50	I
327.2	18390.	0.960	40.32	0.452	0.899	120.00	0.94	3.27	C	1.515	31.20	I
330.1	18380.	0.929	35.06	0.452	0.899	120.00	0.97	3.27	C	1.600	26.20	I
310.6	18370.	0.852	26.27	0.452	0.899	120.00	1.04	3.27	C	1.672	18.50	I
278.1	18360.	0.761	19.97	0.451	0.898	120.00	1.15	3.27	C	1.497	13.20	I
264.9	18320.	0.696	17.57	0.449	0.898	120.00	1.25	3.27	C	1.425	11.20	I
231.0	18310.	0.593	13.89	0.449	0.898	120.00	1.43	3.27	C	1.243	8.90	I
198.2	18300.	0.467	10.95	0.448	0.898	120.00	1.75	3.27	C	1.067	8.10	I
183.5	18300.	0.400	9.79	0.448	0.898	120.00	1.98	3.27	C	0.988	9.00	I
170.0	18300.	0.331	8.80	0.448	0.898	120.00	2.29	3.27	C	0.915	10.70	I
146.1	18290.	0.187	7.21	0.448	0.898	120.00	3.42	3.27	C	0.787	13.20	I
78.5	19950.	1.024	21.40	0.488	0.913	120.00	0.88	3.31	C	0.422	20.50	O2
306.4	19310.	0.989	47.24	0.487	0.908	120.00	0.90	3.28	C	1.355	37.60	I
324.2	19310.	0.964	41.26	0.487	0.908	120.00	0.92	3.28	C	1.493	32.00	I
328.1	19300.	0.935	35.85	0.487	0.907	120.00	0.95	3.28	C	1.579	26.90	I
311.2	19290.	0.864	26.84	0.486	0.907	120.00	1.02	3.28	C	1.654	19.00	I
281.0	19280.	0.779	20.40	0.486	0.907	120.00	1.11	3.28	C	1.494	13.60	I
268.7	19240.	0.718	17.90	0.484	0.907	120.00	1.19	3.28	C	1.429	11.60	I
236.8	19240.	0.620	14.17	0.484	0.907	120.00	1.35	3.28	C	1.259	9.20	I
205.7	19230.	0.500	11.17	0.483	0.907	120.00	1.62	3.28	C	1.093	8.30	I
191.7	19230.	0.435	9.99	0.483	0.907	120.00	1.81	3.28	C	1.019	8.90	I
178.8	19220.	0.368	8.99	0.483	0.907	120.00	2.05	3.28	C	0.951	10.30	I
156.0	19220.	0.226	7.36	0.483	0.907	120.00	2.90	3.28	C	0.829	12.40	I
61.6	8899.	1.016	37.66	0.526	0.920	120.00	0.87	3.34	C	0.479	29.40	O2
294.1	8720.	0.982	101.10	0.526	0.917	120.00	0.89	3.31	C	2.026	65.50	I
296.5	8720.	0.957	84.04	0.526	0.917	120.00	0.91	3.31	C	2.146	53.80	I
288.4	8719.	0.929	70.13	0.526	0.917	120.00	0.94	3.31	C	2.192	44.30	I
257.7	8718.	0.859	49.38	0.526	0.917	120.00	1.00	3.31	C	2.190	30.30	I
224.1	8717.	0.775	36.08	0.526	0.917	120.00	1.10	3.31	C	2.152	21.50	I
204.8	8715.	0.713	30.13	0.526	0.917	120.00	1.18	3.31	C	2.142	17.70	I
178.5	8715.	0.616	23.56	0.525	0.917	120.00	1.33	3.31	C	1.867	13.90	I
153.8	8714.	0.497	18.41	0.525	0.917	120.00	1.58	3.31	C	1.609	11.90	I
143.0	8714.	0.432	16.40	0.525	0.917	120.00	1.76	3.31	C	1.495	12.40	I
133.2	8714.	0.365	14.72	0.525	0.917	120.00	1.99	3.31	C	1.393	14.20	I
115.9	8714.	0.225	12.02	0.525	0.917	120.00	2.77	3.31	C	1.212	16.80	I
75.0	7170.	1.007	94.91	0.590	0.932	120.00	0.85	3.42	C	0.615	78.60	O2
356.6	7109.	0.987	237.10	0.590	0.931	120.00	0.86	3.40	C	2.566	170.50	O2
319.0	7109.	0.971	169.60	0.590	0.931	120.00	0.88	3.40	C	2.453	120.10	O2
287.0	7108.	0.953	127.00	0.590	0.931	120.00	0.89	3.40	C	2.347	87.60	I
236.7	7108.	0.905	77.57	0.590	0.931	120.00	0.93	3.40	C	2.176	53.10	I
201.8	7108.	0.845	52.27	0.590	0.931	120.00	0.99	3.40	C	2.077	35.00	HC
184.5	7107.	0.798	41.97	0.590	0.931	120.00	1.03	3.40	C	2.046	27.70	HC
164.5	7107.	0.721	31.69	0.590	0.931	120.00	1.12	3.40	C	2.043	20.90	I
147.4	7107.	0.620	24.12	0.590	0.931	120.00	1.27	3.40	C	1.511	17.30	I
140.2	7107.	0.563	21.28	0.590	0.931	120.00	1.37	3.40	C	1.437	17.60	I
134.0	7107.	0.502	18.95	0.590	0.931	120.00	1.49	3.40	C	1.373	19.30	I
123.2	7107.	0.366	15.28	0.590	0.931	120.00	1.87	3.40	C	1.263	21.40	I
75.0	7873.	1.012	65.03	0.621	0.939	120.00	0.84	3.51	C	0.625	61.40	O2
435.6	7768.	0.985	202.90	0.621	0.937	120.00	0.85	3.47	C	3.109	169.70	O2
360.8	7768.	0.966	135.50	0.621	0.937	120.00	0.87	3.47	C	2.791	111.70	O2
309.1	7767.	0.942	97.33	0.621	0.937	120.00	0.89	3.47	C	2.568	79.10	HC
240.1	7767.	0.883	56.83	0.621	0.937	120.00	0.93	3.47	C	2.280	44.60	I
197.3	7766.	0.808	37.45	0.621	0.937	120.00	1.00	3.47	C	2.133	28.40	I
177.2	7766.	0.751	29.79	0.621	0.937	120.00	1.07	3.47	C	2.091	22.20	I
154.8	7766.	0.658	22.30	0.621	0.937	120.00	1.18	3.47	C	2.093	16.70	I
136.0	7766.	0.538	16.87	0.621	0.937	120.00	1.38	3.47	C	1.840	13.90	I
128.2	7766.	0.470	14.85	0.621	0.937	120.00	1.52	3.47	C	1.735	14.20	I
121.5	7766.	0.398	13.19	0.621	0.937	120.00	1.71	3.47	C	1.644	15.60	I
110.1	7766.	0.240	10.60	0.620	0.937	120.00	2.34	3.47	C	1.489	17.50	I
28.6	8879.	1.029	27.73	0.384	0.889	120.00	0.90	3.27	C	0.201	29.70	O2
224.7	8559.	1.005	112.40	0.384	0.882	120.00	0.92	3.27	C	1.310	80.40	O2
543.9	8491.	0.987	215.50	0.384	0.880	120.00	0.93	3.27	C	2.897	146.80	O2
405.8	8490.	0.966	132.30	0.384	0.880	120.00	0.95	3.27	C	2.382	86.90	I
282.5	8487.	0.909	66.75	0.384	0.880	120.00	1.01	3.27	C	1.936	41.40	I
225.2	8485.	0.835	41.24	0.383	0.880	120.00	1.09	3.27	C	1.768	24.00	I
205.9	8478.	0.778	32.75	0.383	0.880	120.00	1.16	3.27	C	1.761	18.60	I
179.6	8476.	0.681	23.81	0.383	0.880	120.00	1.31	3.27	C	1.771	13.60	I
159.2	8475.	0.552	17.63	0.382	0.880	120.00	1.57	3.27	C	1.569	11.50	I
151.1	8474.	0.477	15.39	0.382	0.880	120.00	1.78	3.27	C	1.490	11.40	I
144.1	8473.	0.398	13.58	0.382	0.880	120.00	2.08	3.27	C	1.421	12.00	I
132.7	8473.	0.219	10.79	0.382	0.879	120.00	3.31	3.27	C	1.308	12.80	I

32.4	14500.	1.040	18.13	0.402	0.897	120.00	0.89	3.28	C	0.177	19.20	O2
124.8	13950.	1.015	37.33	0.402	0.889	120.00	0.91	3.27	C	0.639	28.70	O2
408.2	13630.	0.997	98.62	0.402	0.885	120.00	0.92	3.27	C	1.834	68.70	I
369.3	13630.	0.975	74.38	0.402	0.885	120.00	0.94	3.27	C	1.767	50.10	I
305.0	13620.	0.918	45.67	0.401	0.885	120.00	0.99	3.27	C	1.645	28.70	I
259.0	13610.	0.846	30.77	0.401	0.885	120.00	1.07	3.27	C	1.578	18.10	I
246.3	13580.	0.792	25.82	0.399	0.884	120.00	1.14	3.27	C	1.611	14.80	I
216.3	13580.	0.701	19.26	0.399	0.884	120.00	1.27	3.27	C	1.414	11.10	I
191.3	13570.	0.583	14.52	0.398	0.884	120.00	1.49	3.27	C	1.251	9.50	I
181.0	13570.	0.515	12.76	0.398	0.884	120.00	1.66	3.27	C	1.184	9.50	I
171.9	13570.	0.444	11.31	0.398	0.884	120.00	1.88	3.27	C	1.124	9.90	I
156.5	13570.	0.285	9.05	0.398	0.884	120.00	2.68	3.27	C	1.024	10.60	I
35.5	15650.	1.047	15.13	0.438	0.908	120.00	0.87	3.30	C	0.197	19.80	O2
133.4	14950.	1.018	31.17	0.438	0.900	120.00	0.89	3.27	C	0.696	28.60	O2
406.4	14570.	0.996	77.63	0.438	0.895	120.00	0.91	3.26	C	1.892	63.00	I
366.1	14560.	0.970	58.78	0.438	0.895	120.00	0.93	3.26	C	1.819	46.30	I
299.0	14560.	0.904	36.31	0.437	0.895	120.00	0.99	3.26	C	1.687	26.60	I
250.9	14550.	0.822	24.56	0.437	0.895	120.00	1.08	3.26	C	1.609	16.80	I
233.8	14530.	0.761	20.39	0.436	0.894	120.00	1.16	3.26	C	1.499	13.50	I
203.5	14520.	0.659	15.29	0.435	0.894	120.00	1.32	3.26	C	1.305	10.20	I
178.0	14520.	0.528	11.57	0.435	0.894	120.00	1.59	3.26	C	1.141	8.90	I
167.4	14510.	0.455	10.18	0.435	0.894	120.00	1.80	3.26	C	1.073	9.30	I
158.1	14510.	0.378	9.04	0.435	0.894	120.00	2.09	3.26	C	1.013	10.20	I
142.3	14510.	0.208	7.25	0.435	0.894	120.00	3.24	3.26	C	0.912	11.40	I
278.4	13170.	1.000	197.70	0.515	0.914	120.00	0.88	3.30	C	1.275	143.20	O2
324.6	13170.	0.979	118.90	0.514	0.914	120.00	0.90	3.30	C	1.641	83.50	HC
314.6	13160.	0.963	91.68	0.514	0.914	120.00	0.91	3.30	C	1.679	63.60	I
299.2	13160.	0.945	72.14	0.514	0.914	120.00	0.93	3.30	C	1.684	48.40	I
264.5	13160.	0.896	46.77	0.514	0.914	120.00	0.97	3.30	C	1.659	30.10	I
234.6	13160.	0.833	32.48	0.514	0.914	120.00	1.04	3.30	C	1.642	20.00	I
222.8	13150.	0.785	26.97	0.513	0.914	120.00	1.09	3.30	C	1.673	16.30	I
201.6	13140.	0.704	20.51	0.513	0.914	120.00	1.20	3.30	C	1.514	12.40	I
183.0	13140.	0.597	15.69	0.513	0.914	120.00	1.37	3.30	C	1.374	10.40	I
175.1	13140.	0.536	13.86	0.513	0.914	120.00	1.50	3.30	C	1.315	10.20	I
168.0	13140.	0.470	12.35	0.513	0.914	120.00	1.66	3.30	C	1.262	10.50	I
155.9	13140.	0.324	9.96	0.512	0.914	120.00	2.20	3.30	C	1.170	11.00	I
29.9	16960.	1.064	11.34	0.564	0.938	120.00	0.83	3.57	C	0.179	20.30	O2
86.9	16240.	1.035	18.45	0.564	0.932	120.00	0.84	3.45	C	0.514	22.20	O2
181.4	15790.	1.014	31.87	0.564	0.928	120.00	0.86	3.39	C	1.023	30.50	O2
342.8	15530.	0.988	51.17	0.564	0.925	120.00	0.87	3.36	C	1.853	44.70	I
284.8	15520.	0.923	32.06	0.564	0.925	120.00	0.93	3.36	C	1.739	26.50	I
241.7	15520.	0.842	21.87	0.563	0.925	120.00	1.00	3.36	C	1.674	17.10	I
223.2	15510.	0.781	17.95	0.563	0.925	120.00	1.07	3.36	C	1.546	13.70	I
196.3	15510.	0.681	13.57	0.563	0.925	120.00	1.20	3.36	C	1.360	10.40	I
173.3	15500.	0.551	10.34	0.562	0.925	120.00	1.42	3.36	C	1.200	9.00	I
163.6	15500.	0.478	9.12	0.562	0.925	120.00	1.58	3.36	C	1.133	9.40	I
155.1	15500.	0.402	8.12	0.562	0.925	120.00	1.80	3.36	C	1.074	10.50	I
140.5	15500.	0.232	6.54	0.562	0.925	120.00	2.58	3.36	C	0.973	11.90	I
37.2	17240.	1.046	16.09	0.611	0.943	120.00	0.82	3.62	C	0.220	25.10	O2
118.1	16690.	1.021	27.84	0.611	0.939	120.00	0.83	3.51	C	0.673	30.30	O2
289.3	16330.	1.003	55.79	0.610	0.936	120.00	0.84	3.45	C	1.525	51.10	O2
331.2	16270.	0.981	53.39	0.610	0.935	120.00	0.86	3.44	C	1.794	47.20	I
280.9	16270.	0.925	33.68	0.610	0.935	120.00	0.90	3.44	C	1.708	28.30	I
242.5	16270.	0.854	23.07	0.610	0.935	120.00	0.97	3.44	C	1.657	18.50	I
226.0	16260.	0.799	18.95	0.609	0.935	120.00	1.02	3.44	C	1.544	14.90	I
201.5	16250.	0.709	14.35	0.609	0.935	120.00	1.12	3.44	C	1.377	11.30	I
180.3	16250.	0.591	10.95	0.609	0.935	120.00	1.30	3.44	C	1.232	9.70	I
171.3	16250.	0.524	9.66	0.609	0.935	120.00	1.42	3.44	C	1.171	9.90	I
163.5	16250.	0.453	8.61	0.609	0.935	120.00	1.58	3.44	C	1.117	10.90	I
149.9	16250.	0.296	6.94	0.609	0.935	120.00	2.10	3.44	C	1.025	12.10	I
232.4	13230.	0.786	10.60	0.561	0.925	120.00	1.06	3.36	P	2.114	10.50	I
217.9	13230.	0.592	12.20	0.561	0.925	120.00	1.34	3.36	P	1.982	9.20	I
209.4	13230.	0.508	13.09	0.561	0.925	120.00	1.51	3.36	P	1.905	9.00	I
200.1	13230.	0.434	14.04	0.561	0.925	120.00	1.70	3.36	P	1.821	9.40	I
178.9	13230.	0.311	16.10	0.561	0.925	120.00	2.15	3.36	P	1.627	11.10	I
154.7	13230.	0.218	18.26	0.561	0.925	120.00	2.69	3.36	P	1.408	13.20	I
138.2	13220.	0.170	19.70	0.561	0.925	120.00	3.09	3.35	P	1.257	14.30	I
112.5	13220.	0.116	21.55	0.561	0.925	120.00	3.70	3.35	P	1.023	15.50	I
84.6	13220.	0.073	23.23	0.561	0.925	120.00	4.40	3.35	P	0.770	16.60	I
71.8	13220.	0.057	23.83	0.561	0.925	120.00	4.74	3.35	P	0.653	21.70	I
60.7	13220.	0.044	24.22	0.561	0.925	120.00	5.06	3.35	P	0.552	41.00	O2
44.1	13220.	0.023	24.32	0.561	0.925	120.00	5.66	3.35	P	0.401	72.40	O2
232.9	13790.	0.806	11.22	0.622	0.938	120.00	1.01	3.47	P	2.104	11.50	HC
219.2	13790.	0.634	12.91	0.622	0.938	120.00	1.22	3.47	P	1.980	10.40	I
211.6	13790.	0.561	13.87	0.622	0.937	120.00	1.34	3.47	P	1.911	10.30	I
203.7	13780.	0.495	14.91	0.622	0.937	120.00	1.46	3.47	P	1.840	10.70	I
186.4	13780.	0.385	17.27	0.621	0.937	120.00	1.75	3.47	P	1.683	12.80	I
167.9	13780.	0.300	19.96	0.621	0.937	120.00	2.05	3.47	P	1.517	15.30	I
155.9	13780.	0.255	21.88	0.621	0.937	120.00	2.26	3.47	P	1.408	16.90	I
138.1	13780.	0.204	24.78	0.621	0.937	120.00	2.55	3.47	P	1.247	18.80	I
119.9	13780.	0.160	28.14	0.621	0.937	120.00	2.88	3.47	P	1.083	21.00	I
112.2	13780.	0.141	29.79	0.621	0.937	120.00	3.04	3.47	P	1.014	24.60	I
106.1	13780.	0.125	31.32	0.621	0.937	120.00	3.20	3.47	P	0.959	34.80	I
100.3	13780.	0.097	33.85	0.621	0.937	120.00	3.52	3.47	P	0.906	51.70	I
246.3	13440.	0.784	11.87	0.427	0.892	120.00	1.13	3.26	P	1.923	10.70	I
233.7	13430.	0.599	14.05	0.427	0.892	120.00	1.44	3.26	P	1.824	9.30	I
226.3	13430.	0.521	15.33	0.427	0.892	120.00	1.62	3.26	P	1.766	9.10	I
218.3	13430.	0.452	16.73	0.427	0.892	120.00	1.82	3.26	P	1.703	9.60	I
199.7	13430.	0.339	20.01	0.427	0.892	120.00	2.29	3.26	P	1.558	11.90	I
178.4	13420.	0.255	23.87	0.426	0.892	120.00	2.84	3.26	P	1.393	14.90	I
164.6	13420.	0.213	26.84	0.426	0.892	120.00	3.22	3.26	P	1.285	16.80	I
141.6	13420.	0.166	31.11	0.426	0.892	120.00	3.80	3.26	P	1.105	18.90	I
117.3	13420.	0.128	35.80	0.426	0.892	120.00	4.44	3.26	P	0.915	21.10	I
107.0	13410.	0.112	37.91	0.426	0.892	120.00	4.77	3.26	P	0.835	25.00	I
99.1	13410.	0.099	39.61	0.426	0.892	120.00	5.08	3.26	P	0.774	34.80	I
92.9	13410.	0.076	41.46	0.426	0.892	120.00	5.76	3.26	P	0.725	49.90	I
249.7	13260.	0.791	11.84	0.389	0.881	120.00	1.14	3.27	P	1.870	11.00	I
236.2	13250.	0.601	13.96	0.388	0.881	120.00	1.46	3.27	P	1.769	9.30	I
228.4	13250.	0.520	15.20	0.388	0.881	120.00	1.65	3.27	P	1.710	9.00	I
219.7	13250.	0.450	16.55	0.388	0.881	120.00	1.87	3.27	P	1.645	9.50	I
199.8	13250.	0.333	19.67	0.388	0.881	120.00	2.39	3.27	P	1.496	11.80	I
176.9	13240.	0.247	23.28	0.388	0.881	120.00	3.02	3.27	P	1.325	14.60	I
162.1	13240.	0.203	26.06	0.387	0.881	120.00	3.47	3.27	P	1.214	16.40	I
137.1	13230.	0.155	29.89	0.387	0.881	120.00	4.17	3.27	P	1.027	18.20	I
110.5	13230.	0.116	33.97	0.387	0.881	120.00	4.97	3.27	P	0.828	20.10	I
99.0	13230.	0.101	35.74	0.387	0.881	120.00	5.38	3.27	P	0.741	24.20	I
89.8	13230.	0.088	37.13	0.387	0.881	120.00	5.78	3.27	P	0.673	35.10	I
80.6	13230.	0.066	38.49	0.387	0.881	120.00	6.63	3.27	P	0.604	51.30	I
245.5	14950.	0.785	11.22	0.502	0.911	120.00	1.10	3.29	P	1.839	10.60	I
232.9	14950.	0.611	13.23	0.502	0.911	120.00	1.36	3.29	P	1.744	9.30	I
225.6	14950.	0.537	14.42	0.502	0.911	120.00	1.51	3.29	P	1.689	9.20	I
217.8	14950.	0.473	15.72	0.502	0.911	120.00	1.67	3.29	P	1.631	9.70	I
200.0	14940.	0.365	18.78	0.502	0.911	120.00	2.03	3.29	P	1.497	12.00	I
180.0	14940.	0.285	22.41	0.501	0.911	120.00	2.43	3.29	P	1.348	15.00	I
167.2	14930.	0.245	25.24	0.501	0.911	120.00	2.70	3.29	P	1.252	16.90	I
146.3	14930.	0.199	29.42	0.501	0.911	120.00	3.07	3.29	P	1.095	19.20	I
124.4	14930.	0.162	34.24	0.501	0.911	120.00	3.47	3.29	P	0.932	21.80	I
115.3	14930.	0.147	36.55	0.501	0.911	120.00	3.67	3.29	P	0.864	25.90	I
108.7	14930.	0.134	38.58	0.501	0.911	120.00	3.85	3.29	P	0.814	36.00	I
104.7	14930.	0.110	41.34	0.501	0.911	120.00	4.23	3.29	P	0.784	51.80	I
278.8	19970.	0.788	9.62	0.502	0.911	120.00	1.09	3.29	P	2.087	10.80	HC
263.1	19960.	0.615	11.29	0.501	0.911	120.00	1.35	3.29	P	1.970	9.10	I
254.3	19960.	0.542	12.27	0.501	0.911	120.00	1.50	3.29	P	1.904	8.80	I
244.9	19950.	0.478	13.33	0.501	0.911	120.00	1.66	3.29	P	1.834	9.20	I
224.1	19950.	0.371	15.82	0.501	0.911	120.00	2.01	3.29	P	1.678	11.50	I
201.6	19940.	0.291	18.76	0.501	0.911	120.00	2.40	3.29	P	1.510	14.20	I
189.2	19920.	0.250	21.22	0.500	0.911	120.00	2.66	3.29	P	1.417	16.10	I
167.3	19920.	0.204	24.66	0.500	0.911	120.00	3.03	3.29	P	1.253	18.10	I
146.1	19920.	0.166	28.73	0.500	0.911	120.00	3.43	3.29	P	1.094	20.30	I
138.0	19920.	0.150	30.73	0.499	0.911	120.00	3.63	3.29	P	1.034	23.70	I
133.0	19920.	0.136	32.55	0.499	0.911	120.00	3.83	3.29	P	0.996	31.40	I
134.0	19910.	0.110	35.30	0.499	0.911	120.00	4.24	3.29	P	1.004	46.60	I
289.5	17810.	0.785	10.97	0.401	0.885	120.00	1.14	3.27	P	2.168	11.50	I
270.6	17800.	0.608	12.71	0.400	0.885	120.00	1.44	3.27	P	2.026	9.40	I
260.2	17790.	0.532	13.72	0.400	0.885	120.00	1.61	3.27	P	1.949	9.00	I
249.2	17790.	0.465	14.81	0.400	0.885	120.00	1.80	3.27	P	1.866	9.30	I
225.3	17780.	0.355	17.31	0.400	0.884	120.00	2.26	3.27	P	1.687	11.40	I
200.3	17770.	0.272	20.23	0.399	0.884	120.00	2.78	3.27	P	1.500	14.10	I
187.4	17750.	0.230	22.81	0.398	0.884	120.00	3.15	3.27	P	1.403	15.80	I
163.6	17750.	0.182	26.23	0.398	0.884	120.00	3.71	3.27	P	1.225	17.50	I
140.4	17740.	0.142	30.36	0.398	0.884	120.00	4.35	3.27	P	1.052	19.50	I
131.4	17740.	0.125	32.50	0.398	0.884	120.00	4.68	3.27	P	0.984	23.10	I
125.2	17740.	0.111	34.52	0.398	0.884	120.00	5.02	3.27	P	0.938	31.90	I
123.8	17740.	0.086	38.05	0.398	0.884	120.00	5.75	3.27	P	0.927	49.00	I
224.9	8127.	0.759	16.99	0.384	0.880	120.00	1.19	3.27	P	2.252	12.60	I
211.9	8126.	0.565	20.22	0.384	0.880	120.00	1.54	3.27	P	2.122	11.30	I
204.2	8126.	0.484	22.14	0.384	0.880	120.00	1.76	3.27	P	2.045	11.40	I
195.8	8125.	0.414	24.26	0.384	0.880	120.00	2.01	3.27	P	1.961	12.10	I
176.2	8124.	0.299	29.23	0.384	0.880	120.00	2.61	3.27	P	1.764	15.10	I
153.3	8123.	0.217	35.08	0.384	0.880	120.00	3.33	3.27	P	1.536	18.80	I
137.0	8123.	0.177	39.29	0.384	0.880	120.00	3.84	3.27	P	1.372	21.20	I
111.7	8123.	0.133	45.45	0.384	0.880	120.00	4.61	3.27	P	1.119	24.00	I
85.3	8124.	0.100	51.85	0.384	0.880	120.00	5.43	3.27	P	0.854	26.90	I
74.4	8124.	0.088	54.47	0.384	0.880	120.00	5.82	3.27	P	0.745	32.20	I
66.6	8124.	0.078	56.56	0.384	0.880	120.00	6.19	3.27	P	0.667	45.40	CU
61.8	8123.	0.060	58.19	0.384	0.880	120.00	6.96	3.27	P	0.619	60.70	CU
223.1	8489.	0.764	15.18	0.397	0.884	120.00	1.17	3.27	P	2.234	12.00	I
210.2	8488.	0.558	18.09	0.397	0.884	120.00	1.55	3.27	P	2.105	10.60	I
202.2	8488.	0.472	19.79	0.397	0.884	120.00	1.79	3.27	P	2.025	10.60	I
193.2	8487.	0.397	21.64	0.397	0.884	120.00	2.06	3.27	P	1.935	11.30	I
171.5	8486.	0.276	25.87	0.397	0.884	120.00	2.75	3.27	P	1.717	14.00	I
145.1	8485.	0.190	30.56	0.397	0.884	120.00	3.60	3.27	P	1.453	17.30	I
125.9	8485.	0.148	33.69	0.397	0.884	120.00	4.24	3.27	P	1.261	19.10	I
96.7	8484.	0.104	37.94	0.397	0.884	120.00	5.21	3.27	P	0.968	21.20	I
65.8	8483.	0.073	41.54	0.397	0.884	120.00	6.24	3.27	P	0.659	23.30	I
52.8	8483.	0.062	42.58	0.397	0.884	120.00	6.70	3.27	P	0.528	31.00	O2
42.7	8483.	0.053	42.95	0.397	0.884	120.00	7.11	3.27	P	0.428	54.40	O2
32.9	8482.	0.040	41.67	0.397	0.884	120.00	7.86	3.27	P	0.329	71.50	O2
227.1	9794.	0.780	13.86	0.524	0.916	120.00	1.09	3.31	P	2.347	11.80	I
212.6	9794.	0.585	16.54	0.524	0.916	120.00	1.39	3.31	P	2.197	11.00	I
204.2	9793.	0.503	18.14	0.524	0.916	120.00	1.56	3.31	P	2.110	11.10	I
195.1	9793.	0.433	19.91	0.524	0.916	120.00	1.76	3.31	P	2.016	11.90	I
174.3	9792.	0.320	24.12	0.524	0.916	120.00	2.19	3.31	P	1.802	14.90	I
150.9	9791.	0.239	29.16	0.524	0.916	120.00	2.66	3.31	P	1.559	18.70	I
134.7	9790.	0.200	32.86	0.524	0.916	120.00	2.97	3.31	P	1.392	21.20	I
111.2	9790.	0.159	38.58	0.524	0.916	120.00	3.39	3.31	P	1.149	24.50	I

88.6	9789.	0.127	44.90	0.524	0.916	120.00	3.80	3.31	P	0.916	28.10 I
80.8	9788.	0.115	47.68	0.524	0.916	120.00	3.99	3.31	P	0.835	33.90 I
76.6	9788.	0.104	49.84	0.524	0.916	120.00	4.16	3.31	P	0.791	44.90 I
81.4	9787.	0.084	51.74	0.524	0.916	120.00	4.55	3.31	P	0.841	57.00 I
221.6	8482.	0.782	18.18	0.622	0.938	120.00	1.03	3.47	P	2.602	15.70 HC
207.0	8481.	0.621	21.51	0.622	0.938	120.00	1.24	3.47	P	2.431	15.60 I
198.9	8481.	0.554	23.50	0.622	0.938	120.00	1.35	3.47	P	2.336	16.10 I
190.5	8481.	0.496	25.73	0.622	0.937	120.00	1.46	3.47	P	2.237	17.30 I
172.2	8480.	0.401	31.08	0.622	0.937	120.00	1.70	3.47	P	2.023	21.30 I
153.0	8480.	0.332	37.71	0.622	0.937	120.00	1.92	3.47	P	1.796	26.60 I
139.9	8480.	0.298	42.60	0.622	0.937	120.00	2.06	3.47	P	1.643	30.20 I
122.9	8480.	0.261	51.06	0.621	0.937	120.00	2.23	3.47	P	1.444	35.80 I
109.3	8479.	0.230	61.98	0.621	0.937	120.00	2.39	3.47	P	1.283	42.90 I
106.4	8479.	0.218	67.86	0.621	0.937	120.00	2.46	3.47	P	1.249	50.20 I
107.6	8479.	0.207	73.63	0.621	0.937	120.00	2.53	3.47	P	1.264	62.40 I
126.4	8478.	0.186	83.71	0.621	0.937	120.00	2.68	3.47	P	1.484	81.20 I
250.1	18940.	0.800	7.48	0.589	0.931	120.00	1.03	3.40	P	2.937	9.80 HC
236.2	18940.	0.599	8.99	0.589	0.931	120.00	1.30	3.40	P	2.774	8.40 I
228.1	18930.	0.515	9.90	0.589	0.931	120.00	1.46	3.40	P	2.679	8.30 I
219.2	18930.	0.443	10.91	0.589	0.931	120.00	1.63	3.40	P	2.574	8.80 I
198.7	18930.	0.326	13.33	0.589	0.931	120.00	2.02	3.40	P	2.333	11.20 I
175.0	18930.	0.242	16.28	0.589	0.931	120.00	2.43	3.40	P	2.056	14.50 I
159.2	18920.	0.201	18.57	0.588	0.931	120.00	2.70	3.40	P	1.869	16.60 I
134.5	18920.	0.158	22.09	0.588	0.931	120.00	3.07	3.40	P	1.580	19.20 I
110.4	18920.	0.123	26.06	0.588	0.931	120.00	3.43	3.40	P	1.296	22.10 I
101.8	18920.	0.110	27.84	0.588	0.931	120.00	3.59	3.40	P	1.195	27.50 I
97.0	18920.	0.099	29.23	0.588	0.931	120.00	3.75	3.40	P	1.139	38.40 I
102.1	18920.	0.077	30.43	0.588	0.931	120.00	4.08	3.40	P	1.199	51.10 I
267.4	20510.	0.820	7.68	0.600	0.933	120.00	1.00	3.42	P	3.140	10.10 HC
252.8	20510.	0.626	9.03	0.600	0.933	120.00	1.25	3.42	P	2.968	8.50 I
244.4	20510.	0.544	9.83	0.600	0.933	120.00	1.39	3.42	P	2.870	8.30 I
235.3	20500.	0.472	10.69	0.600	0.933	120.00	1.55	3.42	P	2.764	8.70 I
214.8	20500.	0.352	12.70	0.599	0.933	120.00	1.90	3.42	P	2.523	10.80 I
191.9	20500.	0.263	15.04	0.599	0.933	120.00	2.29	3.42	P	2.253	13.40 I
177.4	20490.	0.218	16.86	0.599	0.933	120.00	2.55	3.42	P	2.083	15.10 I
153.9	20490.	0.167	19.47	0.599	0.933	120.00	2.93	3.42	P	1.807	16.90 I
129.9	20480.	0.125	22.39	0.599	0.933	120.00	3.34	3.42	P	1.525	18.90 I
120.0	20480.	0.108	23.72	0.598	0.933	120.00	3.54	3.42	P	1.409	22.80 I
112.6	20480.	0.094	24.81	0.598	0.933	120.00	3.73	3.42	P	1.322	32.40 I
107.8	20480.	0.067	26.12	0.598	0.933	120.00	4.14	3.42	P	1.266	47.00 I

APPENDIX B3

Convective condensation of R410A within a micro-fin tube

(file: tacond.tbl)

Nu	Re	x_q	Ja	P/P_c	T/T_c	M	Sv	Pr	flow	E_a	u_{Nu}	
234.3	14240.	0.775	16.07	0.302	0.844	72.59	1.18	2.20	P	2.751	12.10	I
217.4	14250.	0.590	18.85	0.302	0.843	72.59	1.51	2.20	P	2.553	9.90	I
208.0	14250.	0.513	20.45	0.302	0.843	72.59	1.71	2.19	P	2.442	9.40	I
198.1	14250.	0.446	22.19	0.302	0.843	72.59	1.93	2.19	P	2.326	9.80	I
176.4	14260.	0.336	26.17	0.302	0.843	72.59	2.45	2.19	P	2.071	12.10	I
152.9	14260.	0.255	30.72	0.302	0.843	72.59	3.05	2.18	P	1.796	15.10	I
136.6	14270.	0.215	33.77	0.302	0.843	72.59	3.48	2.18	P	1.604	16.70	I
114.2	14270.	0.171	38.61	0.302	0.843	72.59	4.11	2.18	P	1.342	18.40	I
92.4	14270.	0.136	43.94	0.302	0.843	72.59	4.81	2.18	P	1.085	20.30	I
83.9	14270.	0.122	46.37	0.302	0.843	72.59	5.15	2.18	P	0.985	25.30	I
78.1	14270.	0.110	48.49	0.302	0.843	72.59	5.49	2.18	P	0.917	37.50	I
76.1	14270.	0.089	51.38	0.302	0.843	72.59	6.22	2.18	P	0.894	54.00	I
277.6	21810.	0.795	14.95	0.322	0.851	72.59	1.14	2.22	P	3.260	13.10	I
260.0	21820.	0.642	17.66	0.322	0.850	72.59	1.39	2.22	P	3.053	10.60	I
250.3	21830.	0.578	19.26	0.322	0.850	72.59	1.52	2.21	P	2.940	10.20	I
240.3	21830.	0.522	21.03	0.322	0.850	72.59	1.66	2.21	P	2.822	10.60	I
218.5	21840.	0.431	25.25	0.322	0.850	72.59	1.96	2.21	P	2.566	13.40	I
195.5	21840.	0.364	30.38	0.322	0.850	72.59	2.26	2.20	P	2.295	17.10	I
179.4	21850.	0.330	34.09	0.322	0.850	72.59	2.44	2.20	P	2.107	19.10	I
158.0	21850.	0.292	40.47	0.322	0.850	72.59	2.69	2.20	P	1.855	21.70	I
138.3	21860.	0.262	48.62	0.322	0.850	72.59	2.93	2.20	P	1.624	24.80	I
131.9	21860.	0.250	53.02	0.322	0.850	72.59	3.04	2.20	P	1.549	29.70	CU
129.3	21860.	0.239	57.38	0.322	0.850	72.59	3.14	2.20	P	1.519	39.70	CU
139.5	21860.	0.219	65.27	0.322	0.850	72.59	3.35	2.20	P	1.638	62.50	I
297.1	23100.	0.830	17.28	0.359	0.863	72.59	1.08	2.27	P	3.489	13.10	I
281.2	23110.	0.699	20.72	0.359	0.862	72.59	1.26	2.26	P	3.302	11.20	I
272.2	23120.	0.645	22.79	0.359	0.862	72.59	1.35	2.26	P	3.197	11.00	I
262.8	23120.	0.597	25.11	0.359	0.862	72.59	1.45	2.26	P	3.086	11.70	I
241.8	23120.	0.520	30.75	0.359	0.862	72.59	1.63	2.25	P	2.839	14.90	I
218.6	23130.	0.464	37.83	0.359	0.862	72.59	1.80	2.25	P	2.567	19.20	I
201.6	23130.	0.435	43.03	0.359	0.862	72.59	1.89	2.25	P	2.367	21.80	I
178.6	23140.	0.405	52.16	0.359	0.862	72.59	2.01	2.25	P	2.097	25.40	CU
157.0	23140.	0.380	63.96	0.359	0.862	72.59	2.11	2.25	P	1.844	30.10	O2
150.1	23140.	0.370	70.25	0.359	0.862	72.59	2.16	2.25	P	1.763	35.50	O2
147.7	23140.	0.362	76.28	0.359	0.862	72.59	2.20	2.25	P	1.735	46.00	O2
161.4	23140.	0.346	86.09	0.359	0.862	72.59	2.28	2.25	P	1.895	69.60	CU
266.1	18790.	0.821	15.35	0.366	0.865	72.59	1.09	2.28	P	3.125	12.00	I
249.5	18800.	0.659	18.19	0.366	0.864	72.59	1.32	2.27	P	2.930	10.00	I
240.4	18810.	0.591	19.88	0.366	0.864	72.59	1.45	2.27	P	2.823	9.70	I
231.0	18810.	0.532	21.75	0.366	0.864	72.59	1.59	2.26	P	2.713	10.20	I
210.7	18810.	0.436	26.22	0.365	0.864	72.59	1.88	2.26	P	2.474	12.90	I
189.2	18820.	0.365	31.71	0.365	0.864	72.59	2.17	2.26	P	2.222	16.40	I
174.4	18820.	0.330	35.70	0.366	0.864	72.59	2.35	2.25	P	2.048	18.50	I
155.1	18830.	0.290	42.62	0.366	0.864	72.59	2.59	2.25	P	1.822	21.30	I
138.5	18830.	0.258	51.57	0.366	0.864	72.59	2.83	2.25	P	1.627	24.70	I
134.0	18830.	0.245	56.45	0.366	0.864	72.59	2.94	2.25	P	1.574	29.70	I
133.6	18830.	0.233	61.26	0.366	0.864	72.59	3.04	2.25	P	1.569	40.00	I
149.0	18830.	0.211	70.07	0.366	0.864	72.59	3.26	2.25	P	1.750	60.40	I
244.7	16170.	0.796	14.62	0.343	0.857	72.59	1.13	2.24	P	2.874	11.70	I
229.3	16180.	0.612	17.30	0.343	0.857	72.59	1.43	2.24	P	2.693	9.60	I
220.7	16180.	0.535	18.88	0.343	0.857	72.59	1.61	2.23	P	2.592	9.20	I
211.6	16180.	0.469	20.60	0.343	0.857	72.59	1.80	2.23	P	2.485	9.60	I
191.4	16190.	0.359	24.61	0.342	0.857	72.59	2.24	2.23	P	2.247	12.10	I
169.3	16190.	0.279	29.35	0.342	0.857	72.59	2.74	2.22	P	1.989	15.20	I
155.3	16180.	0.238	32.98	0.342	0.857	72.59	3.08	2.22	P	1.824	17.20	I
133.6	16180.	0.194	38.39	0.342	0.857	72.59	3.57	2.22	P	1.569	19.30	I
112.4	16190.	0.158	44.67	0.342	0.857	72.59	4.10	2.22	P	1.319	21.60	I
104.2	16190.	0.143	47.71	0.342	0.857	72.59	4.36	2.22	P	1.224	26.60	I
99.0	16190.	0.131	50.42	0.342	0.857	72.59	4.61	2.22	P	1.162	37.90	I
99.4	16190.	0.108	54.21	0.342	0.857	72.59	5.15	2.22	P	1.167	55.20	I
300.9	19930.	0.831	21.47	0.283	0.837	72.59	1.11	2.19	P	3.534	13.90	I
284.7	19930.	0.703	25.71	0.283	0.836	72.59	1.30	2.19	P	3.344	11.80	I
276.0	19920.	0.650	28.30	0.282	0.836	72.59	1.40	2.18	P	3.241	11.70	I
266.6	19920.	0.603	31.18	0.282	0.836	72.59	1.49	2.18	P	3.131	12.40	I
246.4	19910.	0.528	38.31	0.282	0.836	72.59	1.69	2.18	P	2.893	15.80	I
225.0	19900.	0.473	47.55	0.281	0.836	72.59	1.86	2.18	P	2.642	20.60	I
226.6	19850.	0.446	59.28	0.280	0.835	72.59	1.96	2.17	P	2.660	25.40	I
207.9	19850.	0.416	74.59	0.280	0.835	72.59	2.08	2.17	P	2.442	30.80	I
193.2	19840.	0.392	97.51	0.280	0.835	72.59	2.19	2.17	P	2.269	38.50	CU
191.2	19840.	0.383	111.90	0.279	0.835	72.59	2.23	2.17	P	2.246	46.80	HC
198.3	19830.	0.375	129.60	0.279	0.835	72.59	2.28	2.17	P	2.329	62.10	HC
248.8	19810.	0.360	173.00	0.279	0.835	72.59	2.35	2.17	P	2.921	111.60	O2
305.3	21280.	0.854	18.02	0.305	0.844	72.59	1.08	2.21	P	3.585	13.20	I
288.3	21280.	0.711	21.57	0.304	0.844	72.59	1.28	2.20	P	3.386	11.10	I
279.1	21270.	0.651	23.74	0.304	0.844	72.59	1.38	2.20	P	3.278	10.80	I
269.4	21270.	0.599	26.15	0.304	0.844	72.59	1.49	2.20	P	3.164	11.50	I
248.5	21260.	0.514	32.11	0.303	0.844	72.59	1.70	2.19	P	2.919	14.70	I
226.7	21260.	0.452	39.83	0.303	0.844	72.59	1.90	2.19	P	2.662	19.10	I
224.0	21210.	0.422	48.71	0.302	0.843	72.59	2.02	2.19	P	2.630	23.30	I
205.5	21210.	0.389	61.18	0.302	0.843	72.59	2.17	2.19	P	2.413	27.90	I
191.6	21200.	0.362	79.89	0.301	0.843	72.59	2.30	2.19	P	2.250	34.80	I
190.6	21200.	0.351	91.73	0.301	0.843	72.59	2.36	2.19	P	2.238	42.60	I
196.3	21190.	0.342	104.90	0.301	0.843	72.59	2.41	2.18	P	2.305	56.60	I
240.2	21180.	0.325	134.70	0.301	0.843	72.59	2.52	2.18	P	2.821	99.00	I
280.4	16710.	0.830	20.44	0.285	0.837	72.59	1.12	2.19	P	1.693	14.00	I
262.8	16710.	0.680	24.20	0.284	0.837	72.59	1.34	2.19	P	1.586	11.70	I
253.4	16710.	0.618	26.46	0.284	0.837	72.59	1.46	2.18	P	1.529	11.40	I
243.6	16710.	0.564	28.96	0.284	0.837	72.59	1.59	2.18	P	1.471	12.00	I
223.1	16710.	0.474	35.07	0.284	0.837	72.59	1.85	2.18	P	1.347	15.10	I
202.4	16710.	0.409	42.85	0.283	0.837	72.59	2.10	2.18	P	1.222	19.40	I
195.8	16690.	0.377	50.83	0.283	0.836	72.59	2.26	2.17	P	1.182	22.80	I
178.8	16690.	0.341	62.52	0.283	0.836	72.59	2.46	2.17	P	1.079	27.00	I
166.7	16680.	0.311	79.72	0.282	0.836	72.59	2.65	2.17	P	1.006	33.00	I
166.1	16680.	0.299	90.55	0.282	0.836	72.59	2.74	2.17	P	1.003	40.00	I
171.3	16680.	0.289	102.60	0.282	0.836	72.59	2.82	2.17	P	1.034	53.10	I
210.0	16680.	0.270	131.30	0.282	0.836	72.59	2.98	2.17	P	1.267	91.70	I
213.2	6149.	0.776	33.46	0.279	0.835	72.59	1.19	2.19	P	2.394	15.50	I
197.4	6153.	0.590	39.94	0.279	0.835	72.59	1.53	2.18	P	2.589	14.30	I
188.8	6155.	0.513	43.84	0.279	0.835	72.59	1.73	2.18	P	2.680	14.50	I
179.9	6156.	0.447	48.22	0.279	0.835	72.59	1.95	2.17	P	2.554	15.60	I
160.7	6158.	0.341	58.90	0.279	0.835	72.59	2.46	2.17	P	2.281	19.50	I
140.6	6159.	0.267	72.50	0.279	0.835	72.59	3.02	2.17	P	1.995	25.00	I
126.8	6161.	0.230	82.81	0.279	0.835	72.59	3.39	2.17	P	1.799	28.50	I
108.8	6162.	0.192	101.40	0.279	0.835	72.59	3.89	2.16	P	1.544	34.10	I
94.3	6162.	0.163	127.50	0.279	0.835	72.59	4.39	2.16	P	1.338	41.90	I
91.6	6162.	0.152	143.00	0.279	0.835	72.59	4.62	2.16	P	1.301	50.80	I
94.0	6162.	0.142	159.40	0.279	0.835	72.59	4.84	2.16	P	1.334	65.20	I
121.2	6163.	0.123	194.10	0.279	0.835	72.59	5.35	2.16	P	1.720	94.80	O2
222.0	6434.	0.808	32.42	0.304	0.844	72.59	1.13	2.21	P	2.451	15.70	I
205.2	6439.	0.618	38.76	0.304	0.844	72.59	1.45	2.20	P	2.625	14.50	I
196.1	6440.	0.540	42.58	0.304	0.844	72.59	1.63	2.20	P	2.709	14.80	I
186.7	6442.	0.473	46.89	0.304	0.844	72.59	1.83	2.19	P	2.579	15.80	I
166.5	6444.	0.366	57.46	0.304	0.844	72.59	2.28	2.19	P	2.300	19.90	I
145.5	6445.	0.292	71.07	0.304	0.844	72.59	2.74	2.19	P	2.011	25.50	I
131.3	6446.	0.255	81.52	0.304	0.844	72.59	3.05	2.18	P	1.814	29.50	I
113.2	6447.	0.218	100.80	0.304	0.844	72.59	3.44	2.18	P	1.564	35.60	I
99.9	6448.	0.189	128.80	0.304	0.844	72.59	3.82	2.18	P	1.380	44.20	I
98.8	6448.	0.177	145.90	0.304	0.844	72.59	4.00	2.18	P	1.366	53.70	I
104.1	6448.	0.167	165.00	0.304	0.844	72.59	4.17	2.18	P	1.438	69.20	I
143.5	6448.	0.147	208.10	0.304	0.844	72.59	4.54	2.18	P	1.982	104.10	O2
240.0	7088.	0.819	36.65	0.362	0.863	72.59	1.09	2.27	P	2.584	17.70	I
224.3	7091.	0.659	44.30	0.362	0.863	72.59	1.33	2.26	P	2.708	17.30	I
215.7	7092.	0.593	49.01	0.362	0.863	72.59	1.45	2.26	P	2.745	18.00	I
206.8	7093.	0.536	54.37	0.362	0.863	72.59	1.58	2.26	P	2.632	19.70	I
187.7	7095.	0.446	67.89	0.362	0.863	72.59	1.85	2.25	P	2.388	24.90	I
167.6	7096.	0.383	86.05	0.362	0.863	72.59	2.09	2.25	P	2.133	32.40	I
153.8	7097.	0.353	100.60	0.362	0.863	72.59	2.24	2.25	P	1.958	37.80	I
137.0	7098.	0.321	128.70	0.362	0.863	72.59	2.41	2.25	P	1.743	47.60	I
127.1	7098.	0.297	173.20	0.362	0.863	72.59	2.56	2.25	P	1.618	62.50	I
130.1	7098.	0.287	202.80	0.362	0.863	72.59	2.62	2.25	P	1.656	75.70	I
142.8	7098.	0.279	238.00	0.362	0.863	72.59	2.68	2.25	P	1.817	95.60	I
217.1	7098.	0.262	327.30	0.362	0.863	72.59	2.81	2.25	P	2.763	158.40	O2
229.4	8491.	0.814	26.53	0.332	0.854	72.59	1.11	2.23	P	2.245	14.10	I
214.5	8496.	0.635	32.23	0.332	0.854	72.59	1.39	2.23	P	2.099	13.10	I
206.2	8497.	0.561	35.73	0.332	0.854	72.59	1.55	2.22	P	2.018	13.40	I
197.6	8499.	0.499	39.71	0.332	0.854	72.59	1.72	2.22	P	1.934	14.50	I
178.5	8501.	0.399	49.68	0.332	0.854	72.59	2.07	2.22	P	1.747	18.60	I
158.0	8502.	0.330	62.84	0.332	0.854	72.59	2.42	2.21	P	1.546	24.50	I
144.1	8503.	0.297	73.46	0.332	0.854	72.59	2.63	2.21	P	1.410	28.60	I
125.3	8504.	0.262	92.74	0.332	0.854	72.59	2.90	2.21	P	1.227	35.30	I
111.6	8504.	0.237	120.50	0.332	0.854	72.59	3.13	2.21	P	1.092	44.90	I
111.1	8504.	0.226	137.10	0.332	0.854	72.59	3.23	2.21	P	1.088	54.50	I

117.9	8504.	0.217	154.40	0.332	0.854	72.59	3.33	2.21	P	1.154	68.90	I
162.6	8505.	0.199	187.50	0.332	0.854	72.59	3.55	2.21	P	1.591	101.00	O2
16.3	13580.	1.064	11.94	0.275	0.860	72.59	0.89	2.30	C	0.159	11.70	O2
53.5	12580.	1.032	23.06	0.275	0.847	72.59	0.92	2.23	C	0.316	13.50	O2
168.3	11940.	1.009	61.80	0.275	0.837	72.59	0.93	2.20	C	0.897	27.30	O2
473.7	11700.	0.983	144.10	0.275	0.833	72.59	0.96	2.19	C	2.305	61.70	O2
346.7	11700.	0.917	81.55	0.275	0.833	72.59	1.02	2.19	C	1.943	32.90	I
272.5	11700.	0.837	52.89	0.274	0.833	72.59	1.11	2.19	C	1.743	20.00	I
247.0	11680.	0.777	43.34	0.274	0.833	72.59	1.19	2.19	C	1.715	15.90	I
206.8	11690.	0.682	31.98	0.273	0.833	72.59	1.34	2.18	C	1.436	11.90	I
174.4	11690.	0.563	23.94	0.273	0.833	72.59	1.60	2.18	C	1.211	10.00	I
161.2	11690.	0.497	20.99	0.273	0.833	72.59	1.79	2.17	C	1.120	9.90	I
149.7	11690.	0.429	18.56	0.273	0.833	72.59	2.03	2.17	C	1.039	10.30	I
130.4	11700.	0.283	14.81	0.273	0.833	72.59	2.90	2.16	C	0.906	11.20	I
220.4	13580.	1.003	199.50	0.342	0.858	72.59	0.92	2.26	C	0.977	88.10	O2
535.0	13500.	0.978	249.40	0.342	0.857	72.59	0.94	2.25	C	2.363	110.60	O2
467.1	13500.	0.961	176.40	0.342	0.857	72.59	0.95	2.25	C	2.214	77.40	O2
412.1	13500.	0.939	131.10	0.342	0.857	72.59	0.97	2.25	C	2.083	55.70	HC
328.1	13500.	0.886	79.35	0.342	0.857	72.59	1.03	2.25	C	1.875	32.20	I
271.1	13500.	0.819	53.17	0.342	0.857	72.59	1.10	2.24	C	1.746	20.50	I
249.6	13490.	0.769	43.75	0.341	0.857	72.59	1.17	2.24	C	1.608	16.50	I
215.6	13490.	0.688	32.77	0.341	0.857	72.59	1.29	2.24	C	1.389	12.50	I
187.1	13490.	0.584	24.80	0.341	0.857	72.59	1.49	2.23	C	1.205	10.30	I
175.3	13490.	0.527	21.83	0.341	0.857	72.59	1.63	2.23	C	1.129	10.00	I
164.9	13490.	0.466	19.40	0.341	0.857	72.59	1.81	2.23	C	1.063	10.30	I
147.4	13500.	0.334	15.59	0.341	0.856	72.59	2.38	2.22	C	0.949	10.80	I
129.8	20580.	1.006	85.14	0.305	0.847	72.59	0.93	2.22	C	0.836	43.80	O2
434.8	20310.	0.984	147.70	0.305	0.845	72.59	0.95	2.22	C	2.801	75.30	I
423.5	20300.	0.967	116.50	0.305	0.844	72.59	0.96	2.21	C	2.728	57.30	I
402.1	20290.	0.947	93.13	0.304	0.844	72.59	0.98	2.21	C	2.591	44.40	I
349.2	20280.	0.897	61.41	0.304	0.844	72.59	1.03	2.21	C	2.250	27.20	I
301.6	20270.	0.836	42.95	0.304	0.844	72.59	1.10	2.21	C	1.943	17.80	I
294.8	20210.	0.789	37.61	0.302	0.843	72.59	1.16	2.20	C	1.899	15.10	I
256.2	20200.	0.713	28.31	0.301	0.843	72.59	1.27	2.20	C	1.651	11.40	I
223.3	20190.	0.617	21.49	0.301	0.843	72.59	1.45	2.20	C	1.439	9.70	I
209.6	20190.	0.563	18.94	0.301	0.843	72.59	1.58	2.19	C	1.350	9.60	I
197.3	20190.	0.506	16.81	0.301	0.843	72.59	1.73	2.19	C	1.271	9.90	I
176.5	20190.	0.382	13.50	0.300	0.843	72.59	2.20	2.19	C	1.137	10.40	I
17.1	19820.	1.099	7.12	0.300	0.882	72.59	0.86	2.50	C	0.110	11.90	O2
44.0	18000.	1.063	11.53	0.300	0.868	72.59	0.89	2.33	C	0.284	11.50	O2
80.6	16940.	1.037	18.56	0.300	0.857	72.59	0.91	2.27	C	0.519	12.50	O2
256.7	15870.	1.007	53.64	0.300	0.845	72.59	0.93	2.22	C	1.654	26.40	O2
364.3	15630.	0.934	58.05	0.299	0.843	72.59	0.99	2.21	C	1.821	27.10	I
293.4	15630.	0.847	39.20	0.299	0.842	72.59	1.09	2.20	C	1.670	17.00	I
268.0	15600.	0.783	32.77	0.298	0.842	72.59	1.17	2.20	C	1.525	13.80	I
224.2	15600.	0.682	24.54	0.298	0.842	72.59	1.33	2.20	C	1.276	10.40	I
187.6	15600.	0.558	18.57	0.298	0.842	72.59	1.59	2.19	C	1.067	9.10	I
172.4	15600.	0.490	16.34	0.297	0.842	72.59	1.78	2.19	C	0.981	9.40	I
159.1	15600.	0.421	14.51	0.297	0.842	72.59	2.03	2.19	C	0.906	10.50	I
136.7	15610.	0.275	11.65	0.297	0.842	72.59	2.90	2.18	C	0.778	12.10	I
37.6	24290.	1.038	20.13	0.335	0.868	72.59	0.90	2.32	C	0.214	16.40	O2
144.6	23130.	1.014	43.32	0.335	0.860	72.59	0.91	2.27	C	0.823	25.20	O2
473.9	22500.	0.997	112.80	0.335	0.855	72.59	0.92	2.24	C	2.697	61.30	HC
441.0	22490.	0.976	88.30	0.334	0.855	72.59	0.94	2.24	C	2.510	46.30	I
373.7	22480.	0.925	56.73	0.334	0.855	72.59	0.99	2.24	C	2.126	27.60	I
318.8	22470.	0.861	39.14	0.334	0.854	72.59	1.06	2.24	C	1.814	17.70	I
307.6	22410.	0.813	33.82	0.332	0.854	72.59	1.12	2.23	C	1.751	14.80	I
266.9	22400.	0.734	25.37	0.331	0.854	72.59	1.22	2.23	C	1.519	11.20	I
232.4	22390.	0.634	19.22	0.331	0.853	72.59	1.39	2.22	C	1.323	9.60	I
218.1	22390.	0.578	16.92	0.331	0.853	72.59	1.51	2.22	C	1.241	9.60	I
205.4	22390.	0.519	15.02	0.331	0.853	72.59	1.66	2.22	C	1.169	10.10	I
183.9	22390.	0.391	12.06	0.330	0.853	72.59	2.11	2.21	C	1.046	10.90	I
28.8	27960.	1.073	10.20	0.362	0.888	72.59	0.86	2.52	C	0.164	15.10	O2
78.5	26180.	1.044	16.51	0.361	0.878	72.59	0.88	2.39	C	0.447	15.60	O2
152.1	25070.	1.023	27.39	0.361	0.871	72.59	0.90	2.33	C	0.866	19.50	O2
477.4	24030.	0.997	72.63	0.361	0.863	72.59	0.92	2.28	C	2.716	45.50	O2
388.1	24020.	0.935	45.35	0.361	0.863	72.59	0.97	2.27	C	2.209	26.30	I
322.4	24010.	0.859	30.86	0.360	0.863	72.59	1.05	2.27	C	1.835	16.60	I
301.8	23950.	0.802	26.06	0.359	0.862	72.59	1.12	2.26	C	1.717	13.50	I
258.6	23950.	0.711	19.54	0.358	0.862	72.59	1.24	2.26	C	1.472	10.20	I
222.4	23940.	0.595	14.80	0.358	0.862	72.59	1.45	2.26	C	1.266	9.00	I
207.4	23940.	0.531	13.03	0.358	0.862	72.59	1.60	2.25	C	1.180	9.30	I
194.2	23940.	0.465	11.58	0.358	0.862	72.59	1.79	2.25	C	1.105	10.30	I
171.7	23950.	0.320	9.30	0.357	0.862	72.59	2.42	2.24	C	0.977	11.60	I
77.7	17470.	1.012	56.30	0.287	0.843	72.59	0.93	2.21	C	0.442	28.30	O2
459.1	17030.	0.987	175.20	0.286	0.838	72.59	0.95	2.20	C	2.612	84.00	I
437.5	17030.	0.970	135.60	0.286	0.838	72.59	0.96	2.20	C	2.490	62.90	I
408.8	17020.	0.949	107.10	0.286	0.838	72.59	0.98	2.20	C	2.326	48.00	I
346.9	17010.	0.896	69.52	0.286	0.838	72.59	1.04	2.20	C	1.603	29.10	I
294.8	17010.	0.831	48.20	0.285	0.837	72.59	1.11	2.19	C	1.523	18.90	I
284.3	16960.	0.783	41.81	0.284	0.837	72.59	1.18	2.19	C	1.469	15.90	I
244.9	16960.	0.704	31.39	0.283	0.837	72.59	1.30	2.19	C	1.266	12.00	I
211.6	16950.	0.605	23.79	0.283	0.836	72.59	1.49	2.18	C	1.093	10.20	I
197.7	16950.	0.549	20.95	0.283	0.836	72.59	1.62	2.18	C	1.021	10.00	I
185.3	16950.	0.492	18.59	0.283	0.836	72.59	1.79	2.18	C	0.958	10.30	I
164.4	16950.	0.366	14.92	0.283	0.836	72.59	2.31	2.17	C	0.849	10.80	I
11.1	8638.	1.056	14.44	0.299	0.865	72.59	0.89	2.31	C	0.091	18.00	O2
39.4	8099.	1.028	28.97	0.299	0.853	72.59	0.91	2.25	C	0.312	19.20	O2
155.1	7747.	1.008	95.35	0.299	0.845	72.59	0.93	2.22	C	1.065	43.30	O2
598.9	7627.	0.983	299.40	0.299	0.843	72.59	0.95	2.21	C	3.549	133.30	O2
325.8	7628.	0.921	122.30	0.299	0.842	72.59	1.01	2.21	C	2.345	50.60	I
234.5	7629.	0.843	70.49	0.299	0.842	72.59	1.09	2.20	C	1.960	27.60	I
203.0	7628.	0.784	54.07	0.299	0.842	72.59	1.17	2.20	C	1.860	20.70	I
169.2	7630.	0.688	38.67	0.299	0.842	72.59	1.32	2.20	C	1.792	14.90	I
143.9	7633.	0.563	28.36	0.299	0.842	72.59	1.58	2.19	C	1.524	12.30	I
134.1	7634.	0.493	24.68	0.299	0.842	72.59	1.77	2.19	C	1.420	12.10	I
125.8	7636.	0.419	21.74	0.299	0.842	72.59	2.04	2.19	C	1.332	12.50	I
112.1	7640.	0.257	17.24	0.299	0.842	72.59	3.05	2.18	C	1.187	13.30	I
9.2	10120.	1.079	10.04	0.363	0.890	72.59	0.86	2.56	C	0.074	20.40	O2
24.9	9518.	1.053	15.70	0.363	0.881	72.59	0.88	2.43	C	0.204	18.20	O2
47.0	9137.	1.033	24.97	0.363	0.874	72.59	0.89	2.36	C	0.376	17.80	O2
155.8	8733.	1.009	72.47	0.363	0.867	72.59	0.91	2.30	C	1.112	34.60	O2
357.2	8584.	0.950	120.60	0.363	0.864	72.59	0.96	2.28	C	2.514	53.90	CU
251.8	8586.	0.875	67.68	0.363	0.864	72.59	1.03	2.27	C	2.065	28.80	I
216.3	8585.	0.818	51.29	0.362	0.864	72.59	1.09	2.27	C	1.940	21.40	I
180.1	8587.	0.724	36.44	0.362	0.864	72.59	1.22	2.27	C	1.854	15.30	I
153.4	8590.	0.602	26.62	0.362	0.863	72.59	1.43	2.26	C	1.579	12.40	I
143.1	8592.	0.533	23.14	0.362	0.863	72.59	1.59	2.26	C	1.473	12.30	I
134.5	8593.	0.461	20.36	0.362	0.863	72.59	1.80	2.26	C	1.384	12.80	I
120.3	8597.	0.301	16.13	0.362	0.863	72.59	2.53	2.25	C	1.238	13.70	I
25.1	20940.	1.066	11.64	0.379	0.890	72.59	0.86	2.53	C	0.259	14.40	O2
74.0	19680.	1.037	20.37	0.378	0.880	72.59	0.88	2.40	C	0.762	15.50	O2
167.2	18890.	1.015	39.36	0.378	0.873	72.59	0.90	2.34	C	1.721	22.30	O2
466.1	18380.	0.990	91.64	0.378	0.869	72.59	0.92	2.30	C	2.044	48.30	O2
371.0	18380.	0.928	56.32	0.378	0.868	72.59	0.97	2.30	C	1.843	27.90	I
304.3	18370.	0.853	38.04	0.378	0.868	72.59	1.05	2.30	C	1.709	17.80	I
278.6	18350.	0.796	31.45	0.377	0.868	72.59	1.11	2.29	C	1.565	14.30	I
238.0	18350.	0.706	23.64	0.377	0.868	72.59	1.24	2.29	C	1.337	10.80	I
203.9	18360.	0.593	17.94	0.377	0.868	72.59	1.44	2.28	C	1.145	9.30	I
189.6	18360.	0.531	15.81	0.376	0.868	72.59	1.58	2.28	C	1.065	9.50	I
177.2	18360.	0.466	14.05	0.376	0.868	72.59	1.76	2.28	C	0.995	10.30	I
156.0	18360.	0.327	11.31	0.376	0.868	72.59	2.34	2.27	C	0.876	11.60	I
20.1	23540.	1.095	7.50	0.319	0.885	72.59	0.86	2.53	C	0.113	13.20	O2
51.0	21600.	1.061	11.82	0.319	0.872	72.59	0.88	2.36	C	0.286	12.70	O2
90.4	20450.	1.037	18.30	0.319	0.863	72.59	0.90	2.29	C	0.507	13.60	O2
244.1	19270.	1.009	44.58	0.319	0.853	72.59	0.92	2.24	C	1.371	24.80	O2
377.2	18910.	0.941	52.26	0.318	0.849	72.59	0.98	2.22	C	2.119	27.20	I
306.9	18900.	0.858	35.34	0.318	0.849	72.59	1.07	2.22	C	1.592	17.00	I
283.6	18860.	0.797	29.72	0.316	0.848	72.59	1.14	2.22	C	1.471	13.80	I
239.1	18860.	0.700	22.23	0.316	0.848	72.59	1.29	2.21	C	1.240	10.50	I
201.9	18860.	0.579	16.81	0.316	0.848	72.59	1.52	2.21	C	1.048	9.20	I
186.6	18850.	0.513	14.80	0.316	0.848	72.59	1.69	2.20	C	0.968	9.60	I
173.1	18860.	0.445	13.13	0.316	0.848	72.59	1.92	2.20	C	0.898	10.60	I
150.4	18860.	0.299	10.54	0.315	0.848	72.59	2.66	2.20	C	0.780	12.20	I
22.3	24520.	1.089	8.09	0.347	0.890	72.59	0.86	2.58	C	0.116	14.10	O2
57.5	22660.	1.057	12.85	0.347	0.878	72.59	0.88	2.41	C	0.298	13.70	O2
103.5	21550.	1.034	20.13	0.346	0.870	72.59	0.90	2.33	C	0.537	15.00	O2
294.0	20420.	1.006	51.40	0.346	0.861	72.59	0.92	2.27	C	1.525	29.10	O2
376.0	20170.	0.940	49.44	0.346	0.858	72.59	0.97	2.25	C	1.951	26.50	I
308.5	20160.	0.859	33.59	0.346	0.858	72.59	1.06	2.25	C	1.597	16.80	I
284.7	20120.	0.799	28.16	0.344	0.858	72.59	1.13	2.25	C	1.474	13.60	I
241.7	20120.	0.704	21.14	0.344	0.858	72.59	1.26	2.24	C	1.252	10.30	I
205.5	20120.	0.585	16.03	0.344	0.858	72.59	1.49	2.24	C	1.064	9.10	I
190.5	20120.	0.519	14.13	0.344	0.857	72.59	1.65	2.23	C	0.986	9.50	I
177.3	20120.	0.452	12.55	0.344	0.857	72.59	1.85	2.23	C	0.918	10.60	I
154.9	20130.	0.307	10.09	0.343	0.857	72.59	2.54	2.22	C	0.802	12.30	I
26.8	24930.	1.075	9.96	0.373	0.891	72.59	0.86	2.57	C	0.139	14.60	O2
74.1	23280.	1.044	16.55	0.373	0.881	72.59	0.88	2.42	C	0.384	15.30	O2
147.7	22270.	1.022	28.41	0.373	0.874	72.59	0.90	2.35	C	0.765	19.40	O2
473.7	21390.	0.996	77.18	0.373	0.867	72.59	0.91	2.29	C	2.453	46.60	O2
379.7	21380.	0.932	47.78	0.372	0.867	72.59	0.97	2.29	C	1.966	26.70	I
312.4	21380.	0.853	32.38	0.372	0.867	72.59	1.05	2.29	C	1.618	16.90	I
288.0	21340.	0.794	27.00	0.371	0.866	72.59	1.12	2.28	C	1.491	13.60	I
245.9	21340.	0.701	20.28	0.371	0.866	72.59	1.25	2.28	C	1.273	10.30	I
210.4	21340.	0.583	15.38	0.370	0.866	72.59	1.47	2.27	C	1.089	9.00	I
195.7	21340.	0.518	13.55	0.370	0.866	72.59	1.62	2.27	C	1.013	9.40	I
182.8	21340.	0.451	12.05	0.370	0.866	72.59	1.82	2.27	C	0.946	10.40	I
160.8	21350.	0.306	9.69	0.370	0.866	72.59	2.47	2.26	C	0.832	11.80	I
219.7	11710.	0.756	16.86	0.292	0.840	72.59	1.21	2.20	P	1.867	11.90	I
202.4	11720.	0.554	19.68	0.292	0.840	72.59	1.60	2.19	P	1.720	9.70	I
192.3	11720.	0.470	21.24	0.292	0.840	72.59	1.85	2.18	P	1.634	9.30	I
181.2	11720.	0.398	22.86	0.292	0.840	72.59	2.14	2.18	P	1.540	9.60	I
155.7	11730.	0.279	26.31	0.292	0.839	72.59	2.88	2.18	P	1.324	11.60	I
127.3	11730.	0.194	29.73	0.292	0.839	72.59	3.81	2.17	P	1.082	13.90	I
107.9	11730.	0.152	31.76	0.291	0.839	72.59	4.54	2.17	P	0.917	15.00	I
80.0	11730.	0.108	34.13	0.291	0.839	72.59	5.67	2.17	P	0.680	16.00	I
52.3	11730.	0.076	35.73	0.291	0.839	72.59	6.94	2.17	P	0.444	17.20	O2
40.8	11730.	0.065	35.99	0.291	0.839	72.59	7.52	2.17	P	0.347	27.30	O2
31.7	11730.	0.056	35.85	0.291	0.839	72.59	8.04	2.17	P	0.269	61.90	O2
21.1	11730.	0.043	34.45	0.291	0.839	72.59	8.99	2.17	P	0.179	93.40	O2
237.1	15020.	0.775	15.74	0.307	0.845	72.59	1.18	2.21	P	2.015	12.00	I
220.4	15030.	0.594	18.43	0.306	0.845	72.59	1.50	2.20	P	1.873	9.80	I
211.0	15030.	0.518	19.99	0.306	0.845	72.59	1.69	2.20	P	1.794	9.40	I
201.2	15030.	0.452	21.65	0.306	0.845	72.59	1.90	2.19	P	1.710	9.70	I
179.4	15030.	0.343	25.46	0.306	0.845	72.59	2.40	2.19	P	1.525	12.00	I
156.0	15030.	0.263	29.79	0.306	0.845	72.59	2.97	2.19	P	1.325	14.90	I

141.0	15030.	0.223	33.04	0.306	0.845	72.59	3.37	2.18	P	1.199	16.50	I
118.1	15030.	0.179	37.64	0.306	0.845	72.59	3.96	2.18	P	1.004	18.20	I
95.3	15030.	0.144	42.73	0.306	0.845	72.59	4.60	2.18	P	0.810	20.00	I
86.0	15030.	0.130	45.12	0.306	0.844	72.59	4.92	2.18	P	0.731	24.70	I
79.3	15030.	0.118	47.10	0.306	0.844	72.59	5.22	2.18	P	0.674	36.80	O2
74.9	15030.	0.098	49.89	0.306	0.844	72.59	5.86	2.18	P	0.636	54.00	CU
248.3	18270.	0.770	13.59	0.329	0.853	72.59	1.17	2.23	P	2.110	11.90	I
231.4	18270.	0.591	15.96	0.328	0.852	72.59	1.49	2.22	P	1.967	9.60	I
222.1	18270.	0.516	17.34	0.328	0.852	72.59	1.67	2.22	P	1.887	9.10	I
212.1	18270.	0.450	18.83	0.328	0.852	72.59	1.88	2.21	P	1.803	9.40	I
190.3	18280.	0.343	22.26	0.328	0.852	72.59	2.36	2.21	P	1.617	11.70	I
166.7	18280.	0.264	26.25	0.328	0.852	72.59	2.89	2.21	P	1.416	14.70	I
151.8	18270.	0.225	29.33	0.328	0.852	72.59	3.27	2.20	P	1.290	16.40	I
128.7	18270.	0.181	33.77	0.327	0.852	72.59	3.81	2.20	P	1.094	18.20	I
105.6	18270.	0.146	38.85	0.327	0.852	72.59	4.40	2.20	P	0.898	20.10	I
96.4	18270.	0.133	41.30	0.327	0.852	72.59	4.69	2.20	P	0.819	24.80	I
89.8	18270.	0.121	43.47	0.327	0.852	72.59	4.96	2.20	P	0.764	36.50	I
86.8	18270.	0.100	46.63	0.327	0.852	72.59	5.54	2.20	P	0.737	54.20	I

APPENDIX B4

Convective condensation of R134a within a micro-fin tube

(file: tacond.tbl)

Nu	Re	x_q	Ja	P/P_c	T/T_c	M	Sv	Pr	flow	E_a	u_{Na}	
22.5	8805.	1.014	86.66	0.255	0.844	102.00	0.94	3.61	C	0.108	213.60	O2
161.9	8686.	1.007	198.80	0.255	0.841	102.00	0.95	3.61	C	0.685	172.90	O2
-805.7	8581.	1.000	-668.00	0.255	0.839	102.00	0.96	3.62	C	-2.824	532.80	O2
1486.0	8578.	0.990	889.10	0.255	0.839	102.00	0.96	3.62	C	4.999	680.00	O2
360.9	8573.	0.959	127.40	0.254	0.838	102.00	0.99	3.62	C	1.714	87.20	HC
261.3	8567.	0.911	61.32	0.254	0.838	102.00	1.04	3.62	C	1.452	38.30	CU
261.8	8538.	0.870	49.37	0.252	0.838	102.00	1.09	3.62	C	1.555	29.40	CU
229.4	8532.	0.792	32.65	0.252	0.837	102.00	1.19	3.62	C	1.552	19.90	I
209.8	8526.	0.679	22.74	0.251	0.837	102.00	1.38	3.62	C	1.668	16.20	I
203.0	8522.	0.609	19.42	0.251	0.837	102.00	1.53	3.62	C	1.614	15.70	I
197.3	8521.	0.532	16.81	0.251	0.837	102.00	1.73	3.62	C	1.569	15.70	I
188.8	8517.	0.347	12.97	0.251	0.837	102.00	2.54	3.62	C	1.501	15.90	I
23.3	10780.	1.022	46.91	0.300	0.863	102.00	0.93	3.59	C	0.114	128.00	O2
105.5	10590.	1.012	81.82	0.300	0.860	102.00	0.94	3.59	C	0.483	102.80	O2
533.0	10420.	1.003	294.40	0.300	0.856	102.00	0.94	3.60	C	2.007	291.70	O2
955.3	10360.	0.991	396.20	0.300	0.855	102.00	0.95	3.60	C	3.466	377.30	O2
339.7	10350.	0.955	87.57	0.299	0.855	102.00	0.99	3.60	C	1.625	74.90	I
249.9	10340.	0.901	44.31	0.299	0.855	102.00	1.04	3.60	C	1.391	34.50	CU
241.6	10310.	0.856	35.00	0.297	0.854	102.00	1.10	3.60	C	1.448	26.10	CU
212.4	10300.	0.773	23.65	0.296	0.854	102.00	1.20	3.60	C	1.456	17.90	I
193.7	10300.	0.654	16.70	0.296	0.854	102.00	1.41	3.60	C	1.328	15.10	I
187.2	10290.	0.581	14.33	0.296	0.854	102.00	1.57	3.60	C	1.283	15.10	I
181.6	10290.	0.501	12.46	0.296	0.854	102.00	1.79	3.60	C	1.244	15.60	I
173.1	10290.	0.311	9.68	0.296	0.854	102.00	2.72	3.60	C	1.186	16.40	I
29.4	10980.	1.023	47.44	0.300	0.863	102.00	0.93	3.59	C	0.142	111.60	O2
154.1	10740.	1.011	98.85	0.300	0.859	102.00	0.94	3.59	C	0.676	132.70	O2
-7759.0	10540.	1.001	*******	0.299	0.855	102.00	0.94	3.60	C	******	******	O2
1018.0	10520.	0.987	355.10	0.299	0.855	102.00	0.96	3.60	C	3.734	410.40	O2
337.6	10510.	0.945	74.07	0.299	0.855	102.00	1.00	3.60	C	1.655	76.60	I
244.6	10510.	0.883	37.21	0.298	0.855	102.00	1.06	3.60	C	1.408	34.80	CU
232.6	10470.	0.831	29.02	0.296	0.854	102.00	1.13	3.60	C	1.452	25.90	CU
203.9	10460.	0.736	19.64	0.296	0.854	102.00	1.26	3.60	C	1.472	17.80	I
185.5	10460.	0.601	13.88	0.296	0.854	102.00	1.52	3.60	C	1.339	15.10	I
179.0	10450.	0.518	11.92	0.295	0.854	102.00	1.74	3.60	C	1.292	15.10	I
173.5	10450.	0.427	10.37	0.295	0.854	102.00	2.07	3.60	C	1.252	15.60	I
165.1	10450.	0.213	8.06	0.295	0.854	102.00	3.72	3.60	C	1.191	16.30	I
12.8	14150.	1.027	36.92	0.324	0.873	102.00	0.92	3.59	C	0.056	612.70	O2
52.2	13980.	1.021	43.33	0.324	0.870	102.00	0.92	3.59	C	0.226	96.30	O2
103.2	13820.	1.014	56.56	0.324	0.868	102.00	0.93	3.59	C	0.433	72.30	O2
278.7	13580.	1.005	109.30	0.323	0.865	102.00	0.94	3.59	C	1.070	116.10	O2
341.0	13460.	0.974	77.50	0.323	0.863	102.00	0.96	3.59	C	1.423	74.00	I
264.4	13450.	0.926	39.47	0.322	0.863	102.00	1.01	3.59	C	1.279	34.00	CU
266.8	13390.	0.885	31.88	0.319	0.862	102.00	1.06	3.59	C	1.376	26.20	I
239.3	13380.	0.806	21.43	0.319	0.862	102.00	1.15	3.59	C	1.405	17.90	I
222.2	13370.	0.690	15.08	0.318	0.861	102.00	1.33	3.59	C	1.305	15.00	I
216.3	13360.	0.619	12.93	0.318	0.861	102.00	1.47	3.59	C	1.270	14.80	I
211.2	13360.	0.539	11.22	0.318	0.861	102.00	1.66	3.59	C	1.240	15.00	I
203.6	13350.	0.348	8.70	0.318	0.861	102.00	2.44	3.59	C	1.196	15.40	I
14.4	14120.	1.030	33.67	0.315	0.871	102.00	0.92	3.59	C	0.063	284.10	O2
55.4	13930.	1.023	40.70	0.315	0.868	102.00	0.92	3.59	C	0.239	86.60	O2
110.6	13740.	1.015	54.72	0.315	0.865	102.00	0.93	3.59	C	0.462	72.90	O2
322.9	13480.	1.004	115.80	0.314	0.862	102.00	0.94	3.59	C	1.220	131.30	O2
352.3	13370.	0.971	74.49	0.314	0.860	102.00	0.97	3.59	C	1.473	75.70	I
266.7	13350.	0.919	37.42	0.313	0.860	102.00	1.02	3.59	C	1.298	34.40	CU
267.1	13290.	0.875	30.15	0.310	0.859	102.00	1.07	3.59	C	1.391	26.30	I
237.4	13280.	0.792	20.20	0.310	0.859	102.00	1.17	3.59	C	1.413	18.00	I
218.9	13270.	0.669	14.18	0.309	0.858	102.00	1.37	3.59	C	1.303	15.00	I
212.6	13260.	0.594	12.15	0.309	0.858	102.00	1.53	3.59	C	1.265	14.80	I
207.1	13260.	0.510	10.53	0.309	0.858	102.00	1.76	3.59	C	1.233	15.00	I
199.0	13250.	0.310	8.16	0.308	0.858	102.00	2.71	3.59	C	1.184	15.50	I
52.6	11110.	1.023	27.83	0.244	0.843	102.00	0.94	3.61	C	0.253	20.00	O2
432.6	10640.	0.993	127.20	0.243	0.834	102.00	0.96	3.62	C	1.706	64.40	I
432.4	10630.	0.972	104.00	0.243	0.834	102.00	0.98	3.62	C	1.787	51.00	I
417.3	10630.	0.946	85.38	0.242	0.834	102.00	1.01	3.62	C	1.815	40.60	I
366.3	10620.	0.884	58.08	0.242	0.833	102.00	1.08	3.62	C	1.779	25.80	I
314.6	10600.	0.807	41.20	0.241	0.833	102.00	1.18	3.63	C	1.718	17.20	I
326.6	10540.	0.752	38.89	0.238	0.832	102.00	1.26	3.63	C	1.883	15.60	I
274.8	10530.	0.661	28.85	0.237	0.832	102.00	1.42	3.63	C	1.585	11.70	I
232.1	10520.	0.546	21.63	0.237	0.831	102.00	1.70	3.63	C	1.338	10.10	I
214.5	10510.	0.483	18.95	0.236	0.831	102.00	1.90	3.63	C	1.237	10.40	I
198.6	10510.	0.418	16.71	0.236	0.831	102.00	2.17	3.63	C	1.146	11.50	I
172.2	10510.	0.276	13.26	0.236	0.831	102.00	3.13	3.63	C	0.993	13.10	I
60.5	10770.	1.019	31.48	0.233	0.837	102.00	0.94	3.62	C	0.287	19.20	O2
450.9	10360.	0.989	130.40	0.232	0.829	102.00	0.97	3.63	C	1.773	63.00	I
450.1	10360.	0.966	106.60	0.232	0.829	102.00	0.99	3.63	C	1.858	50.20	I
434.0	10350.	0.940	87.58	0.231	0.829	102.00	1.02	3.63	C	1.884	39.90	I
379.6	10340.	0.875	59.53	0.231	0.829	102.00	1.09	3.63	C	1.844	25.40	I
324.7	10320.	0.796	42.17	0.230	0.828	102.00	1.19	3.63	C	1.781	16.90	I
340.5	10260.	0.739	40.31	0.227	0.827	102.00	1.28	3.64	C	1.972	15.50	I
284.3	10250.	0.645	29.75	0.226	0.827	102.00	1.46	3.64	C	1.647	11.60	I
238.4	10240.	0.528	22.21	0.225	0.826	102.00	1.76	3.64	C	1.381	9.80	I
219.7	10230.	0.464	19.44	0.225	0.826	102.00	1.99	3.64	C	1.272	9.90	I
202.7	10230.	0.397	17.11	0.225	0.826	102.00	2.29	3.64	C	1.174	10.60	I
174.8	10220.	0.252	13.54	0.225	0.826	102.00	3.42	3.64	C	1.012	11.80	I
36.0	17530.	1.047	14.75	0.317	0.877	102.00	0.90	3.60	C	0.209	18.00	O2
119.4	16720.	1.022	26.59	0.317	0.868	102.00	0.92	3.59	C	0.692	20.70	O2
347.9	16180.	1.003	63.38	0.316	0.862	102.00	0.94	3.59	C	2.015	38.80	O2
457.0	16070.	0.981	70.00	0.316	0.861	102.00	0.96	3.59	C	2.647	40.80	I
403.3	16050.	0.924	46.52	0.315	0.860	102.00	1.01	3.59	C	1.673	25.20	I
351.4	16030.	0.853	32.54	0.314	0.860	102.00	1.09	3.59	C	1.630	16.30	I
362.9	15930.	0.800	30.04	0.310	0.859	102.00	1.16	3.59	C	1.683	14.40	I
312.5	15910.	0.712	22.21	0.309	0.858	102.00	1.30	3.59	C	1.450	10.80	I
271.2	15890.	0.597	16.61	0.308	0.858	102.00	1.52	3.59	C	1.258	9.30	I
254.4	15880.	0.533	14.55	0.308	0.858	102.00	1.69	3.59	C	1.180	9.60	I
239.2	15880.	0.465	12.83	0.308	0.858	102.00	1.91	3.59	C	1.109	10.30	I
213.9	15870.	0.314	10.18	0.307	0.858	102.00	2.68	3.59	C	0.992	11.50	I
95.5	8341.	1.009	56.33	0.244	0.838	102.00	0.95	3.62	C	0.502	25.00	O2
415.1	8193.	0.975	136.80	0.243	0.834	102.00	0.98	3.62	C	1.950	54.70	I
416.9	8190.	0.950	113.30	0.243	0.834	102.00	1.01	3.62	C	2.055	44.30	I
404.2	8187.	0.921	94.34	0.243	0.834	102.00	1.04	3.62	C	2.097	35.90	I
356.5	8180.	0.850	65.65	0.243	0.834	102.00	1.12	3.62	C	2.074	23.90	I
305.2	8173.	0.765	47.30	0.242	0.833	102.00	1.24	3.62	C	2.012	16.50	I
297.3	8148.	0.704	42.28	0.240	0.833	102.00	1.34	3.63	C	2.110	14.40	I
251.0	8144.	0.606	32.06	0.240	0.833	102.00	1.54	3.63	C	1.782	11.00	I
210.8	8138.	0.486	24.45	0.240	0.833	102.00	1.89	3.63	C	1.496	9.30	I
193.9	8136.	0.420	21.57	0.240	0.832	102.00	2.16	3.63	C	1.376	9.40	I
178.6	8134.	0.354	19.14	0.240	0.832	102.00	2.52	3.63	C	1.267	10.40	I
152.5	8132.	0.212	15.35	0.239	0.832	102.00	3.92	3.63	C	1.082	11.90	I
148.9	10380.	1.004	72.68	0.338	0.870	102.00	0.93	3.59	C	0.746	36.40	O2
426.0	10280.	0.972	115.70	0.338	0.868	102.00	0.96	3.59	C	2.034	52.70	I
423.3	10270.	0.948	94.85	0.338	0.868	102.00	0.98	3.59	C	2.124	42.60	I
407.1	10270.	0.920	78.21	0.337	0.868	102.00	1.01	3.59	C	2.155	34.50	I
356.4	10270.	0.850	53.92	0.337	0.868	102.00	1.09	3.59	C	2.116	23.00	I
304.9	10260.	0.767	38.75	0.337	0.867	102.00	1.20	3.59	C	2.046	16.00	I
286.9	10240.	0.706	33.38	0.335	0.867	102.00	1.29	3.59	C	2.088	13.40	I
245.3	10240.	0.610	25.58	0.335	0.867	102.00	1.48	3.59	C	1.785	10.30	I
208.3	10230.	0.491	19.67	0.335	0.867	102.00	1.79	3.59	C	1.516	9.10	I
192.4	10230.	0.427	17.41	0.335	0.867	102.00	2.03	3.59	C	1.400	10.10	I
178.2	10230.	0.361	15.52	0.335	0.867	102.00	2.34	3.59	C	1.297	12.30	I
153.7	10230.	0.220	12.53	0.335	0.867	102.00	3.48	3.59	C	1.119	15.20	I
188.4	7138.	1.004	85.94	0.246	0.837	102.00	0.95	3.62	C	1.031	36.00	O2
449.3	7080.	0.953	118.30	0.246	0.835	102.00	1.00	3.62	C	2.428	46.50	I
438.9	7079.	0.918	97.32	0.245	0.835	102.00	1.04	3.62	C	2.514	37.80	I
414.5	7076.	0.877	80.52	0.245	0.835	102.00	1.09	3.62	C	2.525	30.90	I
347.5	7072.	0.781	55.77	0.245	0.835	102.00	1.21	3.62	C	2.433	20.80	I
282.9	7068.	0.671	40.18	0.245	0.835	102.00	1.40	3.62	C	2.313	14.60	I
256.3	7054.	0.593	34.55	0.244	0.834	102.00	1.57	3.62	C	2.331	12.30	I
206.4	7052.	0.477	26.47	0.243	0.834	102.00	1.92	3.62	C	1.878	9.50	I
162.4	7049.	0.344	20.35	0.243	0.834	102.00	2.58	3.62	C	1.478	8.80	I
143.7	7048.	0.275	18.01	0.243	0.834	102.00	3.13	3.62	C	1.307	11.00	I
127.0	7048.	0.208	16.06	0.243	0.834	102.00	3.96	3.62	C	1.155	15.70	I
98.3	7047.	0.076	12.97	0.243	0.834	102.00	8.31	3.62	C	0.894	23.10	I
-229.3	4374.	0.990	-214.20	0.278	0.847	102.00	0.96	3.60	C	-1.592	188.00	O2
-1231.0	4374.	0.948	-642.80	0.278	0.847	102.00	1.00	3.60	C	-7.310	537.80	O2
3116.0	4374.	0.919	1347.00	0.278	0.847	102.00	1.03	3.60	C	16.700	******	O2
777.2	4373.	0.885	289.30	0.278	0.847	102.00	1.07	3.60	C	5.532	221.90	O2
327.3	4372.	0.801	96.74	0.278	0.847	102.00	1.17	3.60	C	2.988	69.20	I
211.3	4372.	0.702	52.89	0.278	0.847	102.00	1.33	3.60	C	2.333	36.00	I
172.6	4370.	0.629	39.69	0.278	0.847	102.00	1.47	3.60	C	1.576	26.60	CU
134.3	4370.	0.516	27.93	0.278	0.847	102.00	1.76	3.60	C	1.355	19.30	O2
106.3	4369.	0.378	20.25	0.278	0.847	102.00	2.32	3.60	C	1.205	18.10	O2
95.6	4369.	0.304	17.54	0.278	0.847	102.00	2.81	3.60	C	1.159	22.30	O2

86.5	4369.	0.228	15.39	0.278	0.847	102.00	3.57	3.60	C	1.050	29.50	O2
71.8	4369.	0.068	12.12	0.277	0.847	102.00	8.30	3.60	C	0.871	38.70	I
1.8	3983.	1.036	22.12	0.253	0.852	102.00	0.93	3.60	C	0.017	******	O2
7.8	3940.	1.031	25.57	0.252	0.850	102.00	0.93	3.60	C	0.076	80.90	O2
14.7	3893.	1.024	31.23	0.252	0.847	102.00	0.94	3.61	C	0.141	36.40	O2
31.1	3828.	1.016	46.75	0.252	0.844	102.00	0.94	3.61	C	0.286	27.90	O2
294.6	3718.	0.987	254.60	0.252	0.838	102.00	0.97	3.62	C	2.126	108.90	O2
219.8	3718.	0.941	123.50	0.252	0.838	102.00	1.01	3.62	C	1.850	49.80	O2
203.3	3717.	0.900	90.40	0.252	0.837	102.00	1.06	3.62	C	1.856	35.60	O2
186.1	3716.	0.824	61.69	0.252	0.837	102.00	1.15	3.62	C	1.923	24.60	O2
175.4	3716.	0.712	43.83	0.252	0.837	102.00	1.32	3.62	C	2.117	19.50	I
171.7	3715.	0.642	37.71	0.252	0.837	102.00	1.45	3.62	C	1.607	18.40	I
168.7	3715.	0.564	32.88	0.252	0.837	102.00	1.64	3.62	C	1.657	17.90	I
164.3	3715.	0.379	25.67	0.252	0.837	102.00	2.35	3.62	C	1.822	17.60	I
2.1	3730.	1.037	21.60	0.250	0.851	102.00	0.93	3.60	C	0.022	321.30	O2
8.5	3680.	1.030	25.86	0.250	0.848	102.00	0.93	3.60	C	0.087	64.70	O2
16.2	3631.	1.023	32.84	0.250	0.846	102.00	0.94	3.61	C	0.161	33.50	O2
37.1	3564.	1.013	54.13	0.250	0.842	102.00	0.94	3.61	C	0.348	29.70	O2
293.0	3476.	0.982	251.40	0.250	0.836	102.00	0.97	3.62	C	2.214	107.90	O2
216.8	3475.	0.933	122.60	0.250	0.836	102.00	1.02	3.62	C	1.911	48.90	O2
198.2	3475.	0.890	89.27	0.249	0.836	102.00	1.07	3.62	C	1.903	34.80	O2
180.8	3474.	0.810	61.13	0.249	0.836	102.00	1.17	3.62	C	1.970	24.10	O2
169.7	3474.	0.693	43.53	0.249	0.836	102.00	1.36	3.62	C	1.549	19.10	I
165.9	3474.	0.620	37.48	0.249	0.836	102.00	1.50	3.62	C	1.587	18.00	I
162.8	3474.	0.539	32.70	0.249	0.836	102.00	1.71	3.62	C	1.636	17.60	I
158.1	3473.	0.347	25.56	0.249	0.836	102.00	2.55	3.62	C	1.807	17.30	I
59.2	14420.	1.031	20.22	0.256	0.851	102.00	0.93	3.60	C	0.677	14.40	O2
463.3	13590.	0.995	89.75	0.256	0.839	102.00	0.96	3.62	C	5.296	47.80	I
468.5	13580.	0.970	74.80	0.255	0.839	102.00	0.98	3.62	C	5.356	38.70	I
457.2	13570.	0.940	62.56	0.255	0.838	102.00	1.01	3.62	C	1.823	31.20	I
405.5	13550.	0.867	43.66	0.254	0.838	102.00	1.09	3.62	C	1.813	20.30	I
347.8	13520.	0.780	31.41	0.253	0.838	102.00	1.21	3.62	C	1.762	13.60	I
359.4	13420.	0.717	29.88	0.248	0.836	102.00	1.31	3.62	C	1.820	12.40	I
298.5	13400.	0.616	22.20	0.248	0.836	102.00	1.51	3.62	C	1.512	9.40	I
248.0	13380.	0.490	16.67	0.247	0.835	102.00	1.87	3.62	C	1.256	8.10	I
227.2	13370.	0.422	14.62	0.246	0.835	102.00	2.14	3.62	C	1.151	8.30	I
208.5	13370.	0.351	12.89	0.246	0.835	102.00	2.53	3.62	C	1.056	9.20	I
177.4	13360.	0.201	10.23	0.246	0.835	102.00	4.07	3.62	C	0.899	10.50	I
65.8	14600.	1.025	24.02	0.244	0.844	102.00	0.94	3.61	C	0.333	15.60	O2
447.7	13910.	0.992	91.79	0.243	0.834	102.00	0.96	3.62	C	2.268	47.00	I
460.6	13900.	0.969	77.65	0.243	0.834	102.00	0.99	3.62	C	2.333	38.60	I
456.4	13880.	0.942	65.81	0.242	0.833	102.00	1.01	3.62	C	2.312	31.80	I
413.5	13850.	0.874	46.69	0.241	0.833	102.00	1.09	3.63	C	1.754	20.90	I
359.0	13820.	0.792	33.85	0.240	0.832	102.00	1.20	3.63	C	1.714	14.10	I
390.1	13700.	0.735	33.81	0.235	0.830	102.00	1.29	3.63	C	1.863	13.50	I
322.1	13670.	0.639	24.86	0.234	0.830	102.00	1.47	3.63	C	1.538	10.10	I
266.8	13650.	0.521	18.51	0.233	0.830	102.00	1.78	3.63	C	1.274	8.50	I
244.5	13640.	0.456	16.18	0.232	0.829	102.00	2.01	3.63	C	1.167	8.70	I
224.2	13630.	0.389	14.21	0.232	0.829	102.00	2.32	3.63	C	1.070	9.30	I
190.8	13620.	0.245	11.20	0.232	0.829	102.00	3.49	3.63	C	0.911	10.40	I
68.5	16170.	1.031	20.19	0.297	0.865	102.00	0.92	3.59	C	0.327	16.30	O2
508.3	15270.	0.995	85.01	0.296	0.854	102.00	0.95	3.60	C	2.428	52.00	I
501.3	15260.	0.968	69.08	0.296	0.854	102.00	0.98	3.60	C	2.394	40.90	I
479.1	15250.	0.938	56.58	0.295	0.854	102.00	1.01	3.60	C	1.916	32.50	I
413.7	15220.	0.862	38.44	0.294	0.853	102.00	1.09	3.60	C	1.869	20.50	I
350.0	15200.	0.771	27.27	0.294	0.853	102.00	1.21	3.60	C	1.581	13.50	I
346.1	15110.	0.706	24.79	0.290	0.852	102.00	1.31	3.60	C	1.563	11.80	I
289.0	15090.	0.600	18.52	0.289	0.851	102.00	1.53	3.60	C	1.305	8.90	I
241.3	15070.	0.470	13.97	0.288	0.851	102.00	1.91	3.60	C	1.090	7.80	I
221.6	15070.	0.399	12.27	0.288	0.851	102.00	2.21	3.60	C	1.001	8.30	I
203.9	15060.	0.325	10.85	0.288	0.851	102.00	2.63	3.60	C	0.921	9.40	I
174.2	15060.	0.170	8.65	0.288	0.851	102.00	4.46	3.60	C	0.787	11.10	I
66.5	16910.	1.028	22.83	0.323	0.873	102.00	0.92	3.59	C	0.300	17.10	O2
499.0	16080.	0.998	95.29	0.322	0.863	102.00	0.94	3.59	C	2.254	53.50	I
495.5	16080.	0.976	77.27	0.322	0.863	102.00	0.96	3.59	C	2.238	42.20	I
477.3	16060.	0.950	63.19	0.321	0.863	102.00	0.99	3.59	C	2.156	33.40	I
419.1	16040.	0.885	42.82	0.321	0.862	102.00	1.06	3.59	C	1.829	21.20	I
361.0	16020.	0.805	30.34	0.320	0.862	102.00	1.15	3.59	C	1.575	14.10	I
363.4	15930.	0.747	27.70	0.316	0.861	102.00	1.24	3.59	C	1.586	12.40	I
309.2	15920.	0.652	20.68	0.315	0.860	102.00	1.40	3.59	C	1.349	9.30	I
263.8	15900.	0.532	15.59	0.315	0.860	102.00	1.68	3.59	C	1.151	8.00	I
245.0	15890.	0.466	13.69	0.314	0.860	102.00	1.90	3.59	C	1.069	8.20	I
228.1	15890.	0.396	12.11	0.314	0.860	102.00	2.19	3.59	C	0.996	9.00	I
199.8	15880.	0.246	9.65	0.314	0.860	102.00	3.25	3.59	C	0.872	10.20	I
35.4	14840.	1.051	13.89	0.321	0.880	102.00	0.90	3.60	C	0.154	14.70	O2
131.8	14010.	1.020	29.04	0.320	0.869	102.00	0.92	3.59	C	0.606	18.60	O2
490.8	13540.	0.997	89.69	0.320	0.862	102.00	0.94	3.59	C	1.954	46.00	I
467.2	13530.	0.971	72.55	0.320	0.862	102.00	0.97	3.59	C	1.962	36.10	I
404.0	13520.	0.905	48.50	0.319	0.862	102.00	1.03	3.59	C	1.901	22.90	I
344.9	13500.	0.825	34.13	0.318	0.862	102.00	1.13	3.59	C	1.830	15.10	I
338.7	13450.	0.766	30.37	0.316	0.861	102.00	1.21	3.59	C	1.797	13.10	I
288.7	13440.	0.670	22.76	0.315	0.860	102.00	1.37	3.59	C	1.531	9.90	I
246.4	13430.	0.549	17.20	0.315	0.860	102.00	1.64	3.59	C	1.307	8.50	I
228.8	13420.	0.483	15.13	0.315	0.860	102.00	1.84	3.59	C	1.214	8.80	I
213.1	13420.	0.413	13.40	0.314	0.860	102.00	2.11	3.59	C	1.131	9.90	I
186.6	13410.	0.263	10.71	0.314	0.860	102.00	3.08	3.59	C	0.990	11.30	I
38.6	13530.	1.044	15.56	0.280	0.864	102.00	0.91	3.60	C	0.205	12.90	O2
185.8	12720.	1.011	42.21	0.280	0.852	102.00	0.94	3.60	C	0.816	22.60	O2
486.8	12460.	0.988	91.43	0.279	0.848	102.00	0.96	3.60	C	1.941	44.50	I
466.0	12450.	0.960	74.63	0.279	0.848	102.00	0.99	3.60	C	1.958	35.40	I
404.4	12440.	0.891	50.44	0.278	0.847	102.00	1.06	3.60	C	1.906	22.40	I
344.4	12420.	0.808	35.66	0.277	0.847	102.00	1.16	3.60	C	1.835	14.90	I
344.4	12360.	0.747	32.50	0.274	0.846	102.00	1.25	3.61	C	1.834	13.10	I
290.2	12350.	0.649	24.26	0.274	0.846	102.00	1.43	3.61	C	1.546	9.90	I
244.8	12340.	0.526	18.27	0.273	0.846	102.00	1.73	3.61	C	1.304	8.40	I
226.1	12330.	0.459	16.05	0.273	0.846	102.00	1.96	3.61	C	1.204	8.60	I
209.2	12330.	0.389	14.18	0.273	0.845	102.00	2.27	3.61	C	1.115	9.30	I
181.0	12320.	0.239	11.30	0.273	0.845	102.00	3.45	3.61	C	0.964	10.50	I
51.6	11920.	1.027	23.60	0.256	0.850	102.00	0.93	3.60	C	0.248	14.70	O2
479.5	11310.	0.995	122.90	0.256	0.839	102.00	0.96	3.61	C	1.863	56.60	I
476.6	11310.	0.972	100.30	0.256	0.839	102.00	0.98	3.62	C	1.945	45.10	I
459.3	11300.	0.945	82.52	0.255	0.839	102.00	1.01	3.62	C	1.971	36.10	I
401.6	11290.	0.878	56.29	0.254	0.838	102.00	1.08	3.62	C	1.928	23.20	I
342.8	11270.	0.797	39.97	0.254	0.838	102.00	1.19	3.62	C	1.861	15.50	I
348.3	11210.	0.738	37.06	0.251	0.837	102.00	1.28	3.62	C	2.013	14.00	I
292.0	11200.	0.642	27.57	0.250	0.837	102.00	1.45	3.62	C	1.688	10.50	I
245.1	11190.	0.523	20.71	0.250	0.837	102.00	1.76	3.62	C	1.417	8.80	I
225.8	11180.	0.457	18.17	0.249	0.836	102.00	1.99	3.62	C	1.305	8.90	I
208.4	11180.	0.390	16.04	0.249	0.836	102.00	2.30	3.62	C	1.205	9.50	I
179.4	11170.	0.245	12.74	0.249	0.836	102.00	3.45	3.62	C	1.037	10.50	I
134.7	8032.	1.005	89.20	0.262	0.843	102.00	0.95	3.61	C	0.695	35.70	O2
461.8	7950.	0.973	169.10	0.262	0.841	102.00	0.98	3.61	C	2.205	64.20	I
453.5	7948.	0.950	136.60	0.262	0.841	102.00	1.00	3.61	C	2.279	51.00	I
432.4	7946.	0.923	111.40	0.261	0.841	102.00	1.03	3.61	C	2.294	40.70	I
373.4	7940.	0.856	75.35	0.261	0.841	102.00	1.11	3.61	C	2.223	26.40	I
316.9	7935.	0.776	53.41	0.261	0.841	102.00	1.21	3.61	C	2.132	18.10	I
305.1	7917.	0.717	46.90	0.259	0.840	102.00	1.31	3.61	C	2.208	15.60	I
258.5	7913.	0.623	35.41	0.259	0.840	102.00	1.49	3.61	C	2.154	11.80	I
218.3	7909.	0.507	26.92	0.259	0.840	102.00	1.80	3.61	C	1.820	9.70	I
201.5	7907.	0.443	23.72	0.259	0.840	102.00	2.04	3.61	C	1.679	9.60	I
186.4	7906.	0.378	21.05	0.259	0.840	102.00	2.35	3.61	C	1.554	10.20	I
160.8	7904.	0.238	16.88	0.258	0.840	102.00	3.50	3.61	C	1.340	11.10	I
55.3	5237.	1.006	181.40	0.268	0.846	102.00	0.95	3.61	C	0.340	107.80	O2
-599.1	5176.	0.995	-832.00	0.268	0.844	102.00	0.96	3.61	C	-2.904	410.20	O2
6030.0	5175.	0.985	6130.00	0.268	0.844	102.00	0.97	3.61	C	21.110	******	O2
721.1	5175.	0.972	563.90	0.268	0.844	102.00	0.98	3.61	C	3.787	264.00	O2
336.2	5173.	0.934	170.10	0.268	0.844	102.00	1.02	3.61	C	2.216	75.60	I
253.5	5172.	0.881	90.73	0.268	0.844	102.00	1.08	3.61	C	1.932	37.60	CU
235.1	5168.	0.836	69.44	0.267	0.843	102.00	1.13	3.61	C	1.941	28.00	CU
208.6	5167.	0.755	48.15	0.267	0.843	102.00	1.24	3.61	C	1.953	19.70	I
190.6	5166.	0.641	34.55	0.267	0.843	102.00	1.45	3.61	C	2.104	15.80	I
184.0	5165.	0.573	29.82	0.267	0.843	102.00	1.61	3.61	C	2.253	15.10	I
178.5	5165.	0.498	26.06	0.267	0.843	102.00	1.83	3.61	C	1.767	14.90	I
169.8	5164.	0.321	20.40	0.267	0.843	102.00	2.70	3.61	C	1.681	15.00	I
-1452.0	5099.	1.000	*******	0.311	0.859	102.00	0.94	3.59	C	-6.747	831.50	O2
1218.0	5096.	0.970	729.70	0.311	0.859	102.00	0.97	3.59	C	6.612	344.80	O2
667.7	5096.	0.948	324.20	0.311	0.859	102.00	0.99	3.59	C	4.217	152.90	O2
478.5	5096.	0.921	195.80	0.311	0.859	102.00	1.02	3.59	C	3.350	91.00	O2
313.9	5095.	0.854	97.69	0.311	0.859	102.00	1.09	3.59	C	2.591	44.20	I
238.3	5094.	0.771	60.10	0.311	0.859	102.00	1.20	3.59	C	2.289	26.10	I
209.2	5092.	0.708	47.06	0.311	0.859	102.00	1.30	3.59	C	2.215	20.10	I
175.9	5091.	0.606	34.25	0.311	0.859	102.00	1.50	3.59	C	2.174	14.70	I
149.8	5091.	0.476	25.39	0.311	0.859	102.00	1.86	3.59	C	1.536	12.70	I
139.5	5090.	0.403	22.18	0.311	0.859	102.00	2.16	3.59	C	1.514	13.90	I
130.6	5090.	0.326	19.57	0.310	0.859	102.00	2.59	3.59	C	1.417	16.40	I
115.8	5090.	0.159	15.57	0.310	0.859	102.00	4.56	3.59	C	1.257	19.50	I
312.1	12840.	0.760	13.00	0.264	0.842	102.00	1.24	3.61	P	1.962	12.00	I
285.2	12830.	0.562	15.32	0.263	0.842	102.00	1.64	3.61	P	1.793	9.70	I
270.4	12820.	0.480	16.71	0.263	0.842	102.00	1.89	3.61	P	1.700	9.00	I
254.4	12820.	0.409	18.19	0.263	0.842	102.00	2.18	3.61	P	1.599	9.30	I
219.6	12810.	0.297	21.69	0.262	0.842	102.00	2.89	3.61	P	1.380	11.90	I
183.4	12800.	0.219	25.90	0.262	0.841	102.00	3.73	3.61	P	1.153	15.60	I
163.3	12780.	0.183	29.68	0.261	0.841	102.00	4.32	3.61	P	1.026	18.00	I
130.6	12780.	0.145	34.81	0.261	0.841	102.00	5.19	3.61	P	0.821	20.90	I
103.1	12780.	0.116	41.09	0.261	0.841	102.00	6.09	3.61	P	0.648	24.30	I
95.8	12780.	0.105	44.33	0.261	0.841	102.00	6.53	3.61	P	0.602	33.80	I
94.7	12770.	0.095	47.33	0.261	0.841	102.00	6.96	3.61	P	0.595	48.90	I
116.7	12770.	0.076	52.25	0.261	0.841	102.00	8.04	3.61	P	0.734	63.60	I
313.3	13000.	0.762	12.73	0.266	0.843	102.00	1.23	3.61	P	1.970	12.00	I
286.3	12990.	0.560	15.00	0.265	0.842	102.00	1.64	3.61	P	1.800	9.60	I
271.5	12980.	0.477	16.35	0.265	0.842	102.00	1.90	3.61	P	1.707	9.00	I
255.3	12980.	0.406	17.78	0.264	0.842	102.00	2.20	3.61	P	1.605	9.30	I
220.1	12970.	0.292	21.16	0.264	0.842	102.00	2.93	3.61	P	1.384	11.90	I
183.4	12960.	0.213	25.20	0.264	0.842	102.00	3.82	3.61	P	1.153	15.40	I
162.8	12940.	0.176	28.79	0.263	0.842	102.00	4.45	3.61	P	1.023	17.80	I
129.4	12940.	0.137	33.61	0.263	0.842	102.00	5.39	3.61	P	0.813	20.60	I
100.8	12940.	0.108	39.45	0.263	0.842	102.00	6.38	3.61	P	0.634	23.90	I
92.6	12940.	0.097	42.42	0.263	0.842	102.00	6.86	3.61	P	0.582	33.60	I
90.5	12940.	0.088	45.14	0.263	0.842	102.00	7.35	3.61	P	0.569	49.40	I
109.4	12930.	0.069	49.50	0.262	0.842	102.00	8.53	3.61	P	0.688	63.50	I
265.1	7303.	0.760	20.62	0.296	0.854	102.00	1.22	3.60	P	2.362	12.30	I
244.7	7302.	0.571	24.35	0.296	0.854	102.00	1.59	3.60	P	2.180	10.80	I
233.2	7301.	0.493	26.56	0.296	0.854	102.00	1.82	3.60	P	2.077	10.60	I
220.9	7300.	0.426	28.96	0.296	0.854	102.00	2.07	3.60	P	1.968	11.10	I
193.7	7299.	0.317	34.62	0.296	0.854	102.00	2.68	3.60	P	1.726	13.90	I
164.6	7297.	0.240	41.33	0.296	0.854	102.00	3.37	3.60	P	1.466	17.70	I

145.1	7297.	0.203	46.18	0.296	0.854	102.00	3.86	3.60	P	1.293	20.10 I
117.9	7297.	0.164	53.70	0.296	0.854	102.00	4.54	3.60	P	1.050	23.10 I
93.6	7296.	0.134	62.30	0.296	0.854	102.00	5.26	3.60	P	0.834	26.70 I
86.1	7296.	0.122	66.37	0.296	0.854	102.00	5.60	3.60	P	0.767	35.40 I
83.1	7296.	0.112	69.90	0.296	0.854	102.00	5.93	3.60	P	0.740	51.50 I
93.7	7295.	0.092	74.61	0.296	0.854	102.00	6.72	3.60	P	0.835	64.90 I
252.3	5393.	0.766	24.58	0.293	0.853	102.00	1.22	3.60	P	2.650	14.10 I
233.8	5392.	0.562	29.25	0.293	0.853	102.00	1.62	3.60	P	2.932	12.60 I
222.5	5392.	0.478	31.98	0.293	0.853	102.00	1.87	3.60	P	2.153	12.40 I
209.9	5392.	0.406	34.90	0.293	0.853	102.00	2.17	3.60	P	2.031	13.10 I
180.1	5391.	0.291	41.49	0.293	0.853	102.00	2.89	3.60	P	1.742	16.40 I
145.3	5391.	0.211	48.59	0.293	0.853	102.00	3.75	3.60	P	1.406	20.50 I
120.0	5392.	0.174	52.67	0.293	0.853	102.00	4.36	3.60	P	1.161	22.70 I
84.8	5392.	0.137	58.28	0.293	0.853	102.00	5.20	3.60	P	0.821	26.10 I
51.2	5392.	0.112	62.37	0.293	0.853	102.00	5.97	3.60	P	0.495	31.30 O2
38.6	5391.	0.104	63.19	0.293	0.853	102.00	6.27	3.60	P	0.373	59.40 O2
30.2	5391.	0.098	63.13	0.293	0.853	102.00	6.51	3.60	P	0.292	111.20 O2
26.1	5391.	0.088	60.30	0.293	0.853	102.00	6.94	3.60	P	0.253	115.90 O2
258.9	5168.	0.751	29.84	0.281	0.848	102.00	1.24	3.60	P	2.697	14.50 I
237.6	5167.	0.572	35.15	0.281	0.848	102.00	1.60	3.60	P	2.881	13.40 I
225.9	5167.	0.497	38.33	0.281	0.848	102.00	1.82	3.60	P	2.107	13.50 I
213.7	5167.	0.434	41.83	0.281	0.848	102.00	2.06	3.60	P	2.023	14.40 I
187.6	5166.	0.331	50.23	0.281	0.848	102.00	2.60	3.60	P	1.776	17.80 I
160.7	5165.	0.259	60.63	0.280	0.848	102.00	3.21	3.60	P	1.521	22.50 I
142.4	5166.	0.224	68.04	0.281	0.848	102.00	3.62	3.60	P	1.348	25.60 I
119.4	5166.	0.187	81.14	0.281	0.848	102.00	4.17	3.60	P	1.130	30.10 I
101.6	5166.	0.158	98.35	0.281	0.848	102.00	4.74	3.60	P	0.962	36.00 I
98.5	5165.	0.147	107.90	0.281	0.848	102.00	5.01	3.60	P	0.932	44.30 I
101.2	5165.	0.137	117.70	0.280	0.848	102.00	5.28	3.60	P	0.958	58.10 I
130.2	5165.	0.116	136.60	0.280	0.848	102.00	5.92	3.60	P	1.232	76.90 O2
266.5	8193.	0.768	16.76	0.256	0.839	102.00	1.23	3.61	P	2.132	12.10 I
247.4	8189.	0.561	19.86	0.256	0.839	102.00	1.65	3.61	P	1.978	10.10 I
235.9	8186.	0.474	21.67	0.256	0.839	102.00	1.92	3.62	P	1.887	9.50 I
222.9	8185.	0.400	23.58	0.256	0.839	102.00	2.24	3.62	P	1.783	9.90 I
192.4	8183.	0.281	27.87	0.255	0.839	102.00	3.05	3.62	P	1.539	12.50 I
157.4	8181.	0.198	32.52	0.255	0.839	102.00	4.09	3.62	P	1.259	16.00 I
133.5	8179.	0.158	35.65	0.255	0.839	102.00	4.88	3.62	P	1.067	18.00 I
97.7	8178.	0.118	39.57	0.255	0.839	102.00	6.09	3.62	P	0.782	20.80 I
62.7	8177.	0.089	42.75	0.255	0.839	102.00	7.35	3.62	P	0.502	24.90 O2
49.1	8177.	0.080	43.62	0.255	0.839	102.00	7.90	3.62	P	0.393	47.60 O2
39.5	8177.	0.073	43.84	0.255	0.839	102.00	8.38	3.62	P	0.316	94.80 O2
32.9	8176.	0.061	42.46	0.255	0.839	102.00	9.29	3.62	P	0.263	110.30 O2
278.3	7421.	0.765	22.09	0.271	0.845	102.00	1.23	3.61	P	2.327	11.90 I
255.6	7418.	0.582	25.75	0.271	0.845	102.00	1.58	3.61	P	2.137	10.50 I
243.2	7417.	0.506	27.90	0.270	0.845	102.00	1.80	3.61	P	2.034	10.20 I
230.2	7416.	0.440	30.21	0.270	0.845	102.00	2.04	3.61	P	1.925	10.70 I
202.6	7414.	0.333	35.63	0.270	0.844	102.00	2.61	3.61	P	1.694	13.20 I
174.5	7412.	0.256	42.07	0.270	0.844	102.00	3.27	3.61	P	1.459	16.50 I
157.5	7410.	0.217	47.02	0.270	0.844	102.00	3.74	3.61	P	1.317	18.70 I
133.4	7410.	0.175	54.51	0.270	0.844	102.00	4.44	3.61	P	1.115	21.40 I
113.7	7409.	0.141	63.68	0.270	0.844	102.00	5.22	3.61	P	0.951	24.40 I
108.7	7409.	0.128	68.44	0.270	0.844	102.00	5.62	3.61	P	0.909	30.80 I
108.3	7408.	0.115	72.97	0.270	0.844	102.00	6.04	3.61	P	0.906	43.20 I
125.1	7408.	0.091	80.91	0.270	0.844	102.00	7.07	3.61	P	1.046	57.70 O2
329.0	13030.	0.790	13.26	0.268	0.844	102.00	1.19	3.61	P	2.005	12.00 HC
299.2	13020.	0.586	15.44	0.267	0.843	102.00	1.57	3.61	P	1.823	9.60 I
283.1	13010.	0.502	16.73	0.267	0.843	102.00	1.81	3.61	P	1.725	8.90 I
265.7	13010.	0.429	18.08	0.267	0.843	102.00	2.09	3.61	P	1.619	9.20 I
229.0	13000.	0.312	21.22	0.266	0.843	102.00	2.76	3.61	P	1.395	11.50 I
191.7	12990.	0.230	24.93	0.266	0.843	102.00	3.58	3.61	P	1.168	14.70 I
171.9	12970.	0.190	28.31	0.265	0.843	102.00	4.18	3.61	P	1.047	16.90 I
139.6	12970.	0.148	32.70	0.265	0.843	102.00	5.08	3.61	P	0.851	19.20 I
112.7	12960.	0.115	38.08	0.265	0.842	102.00	6.08	3.61	P	0.687	21.90 I
105.3	12960.	0.103	40.89	0.265	0.842	102.00	6.60	3.61	P	0.642	30.00 I
103.6	12960.	0.091	43.57	0.265	0.842	102.00	7.13	3.61	P	0.632	44.60 I
122.5	12960.	0.069	48.33	0.265	0.842	102.00	8.46	3.61	P	0.746	59.90 I
319.9	13430.	0.778	13.36	0.298	0.855	102.00	1.20	3.60	P	2.016	11.40 I
293.6	13420.	0.586	15.66	0.298	0.854	102.00	1.55	3.60	P	1.850	9.30 I
279.3	13410.	0.507	17.03	0.298	0.854	102.00	1.77	3.60	P	1.760	8.70 I
263.9	13410.	0.438	18.49	0.297	0.854	102.00	2.02	3.60	P	1.663	9.00 I
230.8	13400.	0.328	21.91	0.297	0.854	102.00	2.60	3.60	P	1.454	11.30 I
196.7	13400.	0.249	26.00	0.297	0.854	102.00	3.27	3.60	P	1.240	14.60 I
178.5	13380.	0.211	29.67	0.296	0.854	102.00	3.74	3.60	P	1.125	16.90 I
148.4	13380.	0.170	34.63	0.296	0.854	102.00	4.42	3.60	P	0.935	19.30 I
123.1	13370.	0.138	40.76	0.296	0.854	102.00	5.15	3.60	P	0.776	22.10 I
116.3	13370.	0.125	43.95	0.296	0.854	102.00	5.52	3.60	P	0.733	29.90 I
115.1	13370.	0.113	46.97	0.296	0.854	102.00	5.88	3.60	P	0.726	44.30 I
134.8	13370.	0.091	52.17	0.295	0.854	102.00	6.76	3.60	P	0.850	59.80 I
333.9	15740.	0.761	12.44	0.314	0.860	102.00	1.22	3.59	P	2.104	11.30 I
307.4	15720.	0.578	14.70	0.314	0.860	102.00	1.57	3.59	P	1.937	9.20 I
293.0	15720.	0.502	16.06	0.313	0.860	102.00	1.78	3.59	P	1.846	8.60 I
277.4	15710.	0.437	17.52	0.313	0.860	102.00	2.01	3.59	P	1.748	9.00 I
243.9	15700.	0.333	21.02	0.313	0.860	102.00	2.54	3.59	P	1.537	11.50 I
209.4	15690.	0.259	25.34	0.312	0.859	102.00	3.13	3.59	P	1.320	14.90 I
193.0	15660.	0.224	29.55	0.311	0.859	102.00	3.52	3.59	P	1.216	17.50 I
163.1	15660.	0.186	35.26	0.311	0.859	102.00	4.06	3.59	P	1.028	20.30 I
139.8	15650.	0.156	42.69	0.311	0.859	102.00	4.62	3.59	P	0.881	23.70 I
135.6	15650.	0.144	46.76	0.311	0.859	102.00	4.88	3.59	P	0.854	30.90 I
138.6	15650.	0.134	50.73	0.311	0.859	102.00	5.15	3.59	P	0.874	43.40 I
174.2	15650.	0.112	57.96	0.310	0.859	102.00	5.79	3.59	P	1.097	61.00 O2
344.5	15180.	0.779	12.25	0.283	0.849	102.00	1.20	3.60	P	2.171	11.90 HC
313.9	15170.	0.580	14.31	0.283	0.849	102.00	1.58	3.60	P	1.978	9.50 I
297.4	15160.	0.498	15.54	0.282	0.849	102.00	1.81	3.60	P	1.874	8.80 I
279.6	15150.	0.428	16.84	0.282	0.849	102.00	2.08	3.60	P	1.762	9.10 I
241.8	15140.	0.315	19.88	0.282	0.849	102.00	2.72	3.60	P	1.523	11.50 I
203.4	15130.	0.235	23.54	0.281	0.849	102.00	3.48	3.60	P	1.282	14.80 I
184.3	15100.	0.197	27.07	0.280	0.848	102.00	4.01	3.60	P	1.161	17.10 I
151.0	15100.	0.156	31.62	0.280	0.848	102.00	4.79	3.60	P	0.952	19.60 I
123.9	15090.	0.125	37.39	0.280	0.848	102.00	5.64	3.60	P	0.781	22.40 I
117.1	15090.	0.112	40.50	0.280	0.848	102.00	6.06	3.60	P	0.738	30.20 I
117.0	15090.	0.101	43.54	0.279	0.848	102.00	6.49	3.60	P	0.737	44.00 I
142.8	15080.	0.080	49.20	0.279	0.848	102.00	7.55	3.60	P	0.900	60.50 CU
344.1	14120.	0.768	13.09	0.248	0.836	102.00	1.23	3.62	P	2.168	12.40 HC
312.3	14100.	0.570	15.22	0.247	0.835	102.00	1.63	3.62	P	1.968	9.80 I
295.2	14080.	0.488	16.48	0.246	0.835	102.00	1.88	3.62	P	1.860	9.10 I
276.8	14080.	0.417	17.79	0.246	0.835	102.00	2.16	3.62	P	1.744	9.30 I
237.9	14060.	0.304	20.83	0.245	0.835	102.00	2.87	3.62	P	1.499	11.70 I
198.9	14050.	0.223	24.46	0.245	0.835	102.00	3.73	3.62	P	1.253	14.90 I
180.3	14020.	0.186	28.10	0.244	0.834	102.00	4.35	3.62	P	1.136	17.20 I
146.5	14020.	0.144	32.51	0.244	0.834	102.00	5.31	3.62	P	0.923	19.40 I
118.7	14010.	0.113	38.03	0.243	0.834	102.00	6.38	3.62	P	0.748	22.10 I
111.2	14010.	0.100	41.00	0.243	0.834	102.00	6.93	3.62	P	0.701	29.70 I
109.9	14010.	0.089	43.89	0.243	0.834	102.00	7.49	3.62	P	0.692	43.40 I
131.4	14000.	0.068	49.35	0.243	0.834	102.00	8.93	3.62	P	0.828	59.90 CU
307.0	9968.	0.769	17.18	0.255	0.839	102.00	1.23	3.62	P	2.132	12.10 I
279.5	9961.	0.578	19.89	0.254	0.838	102.00	1.60	3.62	P	1.941	10.00 I
264.7	9957.	0.498	21.48	0.254	0.838	102.00	1.84	3.62	P	1.838	9.40 I
249.1	9955.	0.429	23.15	0.254	0.838	102.00	2.10	3.62	P	1.730	9.70 I
216.2	9950.	0.316	27.04	0.254	0.838	102.00	2.76	3.62	P	1.502	12.00 I
183.3	9945.	0.236	31.64	0.253	0.838	102.00	3.54	3.62	P	1.273	15.10 I
165.0	9937.	0.196	35.56	0.253	0.838	102.00	4.12	3.62	P	1.146	17.20 I
136.8	9935.	0.154	40.96	0.253	0.838	102.00	5.00	3.62	P	0.950	19.50 I
113.2	9933.	0.120	47.66	0.253	0.838	102.00	6.02	3.62	P	0.786	22.20 I
106.5	9932.	0.106	51.25	0.253	0.838	102.00	6.55	3.62	P	0.740	29.70 I
104.8	9932.	0.095	54.73	0.253	0.838	102.00	7.10	3.62	P	0.728	44.40 I
120.4	9930.	0.072	61.27	0.253	0.838	102.00	8.48	3.62	P	0.836	60.40 CU
305.0	9625.	0.772	16.95	0.231	0.829	102.00	1.23	3.63	P	2.084	12.20 I
276.7	9616.	0.573	19.58	0.230	0.829	102.00	1.63	3.63	P	1.891	9.90 I
261.5	9611.	0.490	21.11	0.230	0.828	102.00	1.88	3.63	P	1.787	9.30 I
245.3	9609.	0.418	22.71	0.230	0.828	102.00	2.18	3.63	P	1.676	9.50 I
211.0	9603.	0.303	26.39	0.229	0.828	102.00	2.91	3.63	P	1.442	11.80 I
176.6	9598.	0.220	30.66	0.229	0.828	102.00	3.83	3.63	P	1.207	14.90 I
157.3	9589.	0.179	34.29	0.229	0.828	102.00	4.54	3.64	P	1.075	16.90 I
127.4	9587.	0.136	39.06	0.229	0.828	102.00	5.65	3.64	P	0.870	19.00 I
101.6	9585.	0.102	44.78	0.228	0.828	102.00	6.98	3.64	P	0.695	21.50 I
93.6	9584.	0.089	47.73	0.228	0.828	102.00	7.68	3.64	P	0.640	29.80 I
90.2	9584.	0.078	50.47	0.228	0.828	102.00	8.43	3.64	P	0.616	46.10 I
100.6	9583.	0.056	55.32	0.228	0.828	102.00	10.33	3.64	P	0.688	61.30 I
297.6	10830.	0.768	17.05	0.299	0.855	102.00	1.21	3.60	P	2.100	11.40 I
274.6	10820.	0.595	20.00	0.299	0.855	102.00	1.53	3.60	P	1.938	9.70 I
262.1	10820.	0.522	21.75	0.299	0.855	102.00	1.73	3.60	P	1.850	9.30 I
248.9	10820.	0.460	23.64	0.299	0.855	102.00	1.93	3.60	P	1.757	9.70 I
220.6	10810.	0.358	28.13	0.298	0.855	102.00	2.41	3.60	P	1.557	12.10 I
191.8	10810.	0.285	33.58	0.298	0.855	102.00	2.92	3.60	P	1.354	15.50 I
176.7	10800.	0.249	38.39	0.298	0.854	102.00	3.27	3.60	P	1.247	17.80 I
151.8	10800.	0.209	45.27	0.297	0.854	102.00	3.76	3.60	P	1.072	20.60 I
132.2	10800.	0.178	54.09	0.297	0.854	102.00	4.27	3.60	P	0.933	23.80 I
127.9	10790.	0.165	58.90	0.297	0.854	102.00	4.51	3.60	P	0.903	30.60 I
129.2	10790.	0.153	63.61	0.297	0.854	102.00	4.76	3.60	P	0.912	43.60 I
153.5	10790.	0.130	72.34	0.297	0.854	102.00	5.34	3.60	P	1.084	60.10 I
297.4	11820.	0.778	14.99	0.337	0.868	102.00	1.18	3.59	P	2.110	10.70 I
275.1	11820.	0.597	17.71	0.337	0.868	102.00	1.50	3.59	P	1.952	9.10 I
262.8	11810.	0.522	19.34	0.337	0.867	102.00	1.70	3.59	P	1.865	8.80 I
249.8	11810.	0.458	21.12	0.337	0.867	102.00	1.90	3.59	P	1.773	9.20 I
221.7	11810.	0.353	25.37	0.336	0.867	102.00	2.38	3.59	P	1.574	11.60 I
192.6	11800.	0.279	30.59	0.336	0.867	102.00	2.89	3.59	P	1.367	15.00 I
176.5	11790.	0.242	35.06	0.336	0.867	102.00	3.23	3.59	P	1.253	17.40 I
151.3	11790.	0.203	41.66	0.336	0.867	102.00	3.70	3.59	P	1.074	20.20 I
131.7	11790.	0.172	50.02	0.336	0.867	102.00	4.19	3.59	P	0.935	23.60 I
128.0	11790.	0.159	54.46	0.335	0.867	102.00	4.43	3.59	P	0.909	30.10 I
130.5	11790.	0.147	58.72	0.335	0.867	102.00	4.67	3.59	P	0.926	42.10 I
158.8	11790.	0.124	66.03	0.335	0.867	102.00	5.23	3.59	P	1.127	57.00 O2
311.9	10960.	0.787	15.40	0.266	0.843	102.00	1.20	3.61	P	2.082	11.70 I
283.7	10950.	0.590	17.88	0.266	0.843	102.00	1.57	3.61	P	1.894	9.60 I
268.5	10940.	0.507	19.35	0.266	0.843	102.00	1.80	3.61	P	1.793	9.00 I
252.5	10940.	0.437	20.90	0.265	0.843	102.00	2.06	3.61	P	1.685	9.20 I
218.5	10930.	0.322	24.50	0.265	0.843	102.00	2.69	3.61	P	1.459	11.50 I
184.5	10930.	0.241	28.78	0.265	0.842	102.00	3.45	3.61	P	1.231	14.70 I
166.1	10920.	0.201	32.55	0.264	0.842	102.00	4.00	3.61	P	1.109	16.80 I
137.1	10920.	0.158	37.64	0.264	0.842	102.00	4.83	3.61	P	0.915	19.10 I
113.4	10910.	0.125	43.98	0.264	0.842	102.00	5.76	3.61	P	0.757	21.80 I
107.3	10910.	0.112	47.35	0.264	0.842	102.00	6.23	3.61	P	0.716	29.20 I
106.6	10910.	0.100	50.63	0.264	0.842	102.00	6.73	3.61	P	0.712	43.10 I
126.4	10910.	0.076	56.72	0.264	0.842	102.00	7.98	3.61	P	0.844	58.10 CU
255.4	4793.	0.768	28.55	0.230	0.828	102.00	1.24	3.63	P	2.558	14.90 I
237.4	4792.	0.569	33.79	0.230	0.828	102.00	1.64	3.63	P	2.813	13.30 I

226.8	4792.	0.486	36.88	0.230	0.828	102.00	1.90	3.63	P	2.115	13.10	I
215.2	4791.	0.415	40.21	0.230	0.828	102.00	2.19	3.63	P	2.044	13.80	I
188.6	4791.	0.300	47.88	0.230	0.828	102.00	2.93	3.63	P	1.792	17.10	I
158.6	4790.	0.219	56.62	0.229	0.828	102.00	3.85	3.63	P	1.507	21.50	I
137.0	4790.	0.179	62.19	0.230	0.828	102.00	4.55	3.63	P	1.301	23.80	I
106.5	4790.	0.138	70.51	0.230	0.828	102.00	5.60	3.63	P	1.012	27.20	I
76.9	4790.	0.107	78.55	0.230	0.828	102.00	6.75	3.63	P	0.730	30.80	I
65.6	4790.	0.096	81.58	0.230	0.828	102.00	7.29	3.63	P	0.623	43.80	O2
58.2	4790.	0.087	83.72	0.229	0.828	102.00	7.82	3.63	P	0.553	71.30	O2
56.2	4790.	0.070	84.53	0.229	0.828	102.00	8.97	3.63	P	0.533	88.10	O2
263.2	4956.	0.759	30.44	0.253	0.838	102.00	1.24	3.62	P	2.667	15.00	I
242.0	4955.	0.573	35.77	0.253	0.838	102.00	1.61	3.62	P	2.881	13.60	I
230.3	4955.	0.496	38.95	0.253	0.838	102.00	1.84	3.62	P	2.133	13.60	I
218.1	4955.	0.429	42.44	0.253	0.838	102.00	2.10	3.62	P	2.049	14.40	I
192.0	4954.	0.322	50.75	0.253	0.838	102.00	2.72	3.62	P	1.804	17.90	I
165.0	4953.	0.246	60.91	0.253	0.838	102.00	3.43	3.62	P	1.550	22.40	I
146.5	4954.	0.208	68.02	0.253	0.838	102.00	3.93	3.62	P	1.376	25.20	I
122.8	4953.	0.168	80.25	0.253	0.838	102.00	4.66	3.62	P	1.154	29.30	I
103.8	4953.	0.137	95.75	0.253	0.838	102.00	5.45	3.62	P	0.975	34.40	I
99.4	4953.	0.125	104.00	0.253	0.838	102.00	5.84	3.62	P	0.934	42.10	I
100.4	4953.	0.114	112.20	0.253	0.838	102.00	6.24	3.62	P	0.943	56.00	I
122.6	4953.	0.092	127.00	0.253	0.838	102.00	7.24	3.62	P	1.152	74.50	O2
265.6	5720.	0.792	25.95	0.325	0.864	102.00	1.17	3.59	P	2.713	14.00	I
243.4	5719.	0.600	30.50	0.325	0.864	102.00	1.51	3.59	P	2.911	12.80	I
231.1	5719.	0.520	33.18	0.325	0.864	102.00	1.71	3.59	P	2.187	12.70	I
218.2	5718.	0.452	36.13	0.325	0.864	102.00	1.94	3.59	P	2.065	13.50	I
190.2	5718.	0.342	43.07	0.325	0.864	102.00	2.46	3.59	P	1.800	16.70	I
160.9	5717.	0.265	51.36	0.325	0.864	102.00	3.04	3.59	P	1.523	20.90	I
141.0	5718.	0.227	57.10	0.325	0.864	102.00	3.44	3.59	P	1.335	23.50	I
115.1	5718.	0.187	66.58	0.325	0.864	102.00	3.98	3.59	P	1.089	27.40	I
93.3	5717.	0.157	77.86	0.325	0.864	102.00	4.52	3.59	P	0.883	31.80	I
87.5	5717.	0.145	83.46	0.325	0.864	102.00	4.78	3.59	P	0.828	40.20	I
86.7	5717.	0.135	88.63	0.325	0.864	102.00	5.03	3.59	P	0.820	54.90	I
103.4	5717.	0.114	96.64	0.325	0.864	102.00	5.63	3.59	P	0.978	69.00	I
274.6	9019.	0.782	16.47	0.304	0.857	102.00	1.19	3.59	P	2.190	11.40	I
254.3	9016.	0.584	19.67	0.304	0.856	102.00	1.56	3.59	P	2.028	9.80	I
242.9	9014.	0.502	21.61	0.303	0.856	102.00	1.78	3.59	P	1.936	9.40	I
230.4	9013.	0.432	23.73	0.303	0.856	102.00	2.04	3.59	P	1.837	9.90	I
202.8	9010.	0.321	28.84	0.303	0.856	102.00	2.63	3.59	P	1.617	12.80	I
172.7	9008.	0.244	35.08	0.303	0.856	102.00	3.31	3.59	P	1.377	16.70	I
153.3	9006.	0.207	39.93	0.303	0.856	102.00	3.77	3.59	P	1.223	19.30	I
125.2	9005.	0.168	47.36	0.303	0.856	102.00	4.42	3.59	P	0.998	22.70	I
101.4	9004.	0.139	56.09	0.303	0.856	102.00	5.07	3.59	P	0.809	26.60	I
95.4	9003.	0.128	60.24	0.303	0.856	102.00	5.38	3.59	P	0.761	35.80	I
95.2	9003.	0.118	63.74	0.303	0.856	102.00	5.69	3.59	P	0.759	49.90	I
115.8	9003.	0.097	67.95	0.303	0.856	102.00	6.45	3.59	P	0.924	62.00	I
274.7	9009.	0.781	16.46	0.303	0.856	102.00	1.19	3.59	P	2.190	11.30	I
254.2	9005.	0.583	19.66	0.303	0.856	102.00	1.56	3.59	P	2.027	9.70	I
242.7	9004.	0.502	21.58	0.303	0.856	102.00	1.79	3.59	P	1.935	9.40	I
230.2	9002.	0.432	23.70	0.303	0.856	102.00	2.04	3.59	P	1.835	9.80	I
202.4	9000.	0.320	28.78	0.303	0.856	102.00	2.64	3.59	P	1.614	12.70	I
172.3	8998.	0.243	34.99	0.303	0.856	102.00	3.32	3.59	P	1.374	16.60	I
153.1	8995.	0.206	39.86	0.302	0.856	102.00	3.79	3.60	P	1.221	19.10	I
125.0	8994.	0.167	47.30	0.302	0.856	102.00	4.44	3.60	P	0.997	22.60	I
101.4	8993.	0.138	56.09	0.302	0.856	102.00	5.10	3.60	P	0.809	26.50	I
95.5	8993.	0.127	60.31	0.302	0.856	102.00	5.41	3.60	P	0.762	35.50	I
95.5	8993.	0.116	63.94	0.302	0.856	102.00	5.73	3.60	P	0.761	49.50	I
116.8	8992.	0.096	68.50	0.302	0.856	102.00	6.50	3.60	P	0.931	61.80	I

APPENDIX C
CONVECTIVE CONDENSATION RAW HEAT TRANSFER AND PRESSURE DROP DATA WITHIN A MICRO-FIN TUBE

APPENDIX C1

Convective condensation of R32 within a micro-fin tube

(file: taraw.tbl)

q" (W/m^2)	ΔT_s (K)	x_q	$\dot{m}_r$ (kg/s)	P_r (Pa)	T_r (°C)	z_f (m)	T_f (°C)	z_w (m)	T_w (°C)	M (g/mole)	flow
21946.	4.072	0.747	0.01033	1610640.	23.186	0.125	9.186	0.712	19.364	52.02	P
17275.	3.531	0.566	0.01033	1610171.	23.175	0.738	12.544	1.325	19.309	52.02	P
15161.	3.276	0.490	0.01033	1609934.	23.170	1.352	14.904	1.634	19.660	52.02	P
13235.	3.038	0.425	0.01033	1609819.	23.167	1.964	16.764	1.939	20.732	52.02	P
9838.	2.595	0.318	0.01033	1609606.	23.163	2.577	18.217	2.550	20.046	52.02	P
7124.	2.205	0.242	0.01033	1609399.	23.158	3.174	19.067	3.148	20.994	52.02	P
5709.	1.975	0.204	0.01033	1609132.	23.152	3.504	19.636	3.530	21.037	52.02	P
4097.	1.675	0.164	0.01033	1608724.	23.142	4.103	20.235	4.078	21.869	52.02	P
2897.	1.384	0.133	0.01033	1608272.	23.132	4.714	20.739	4.688	21.789	52.02	P
2527.	1.253	0.120	0.01033	1608042.	23.127	5.325	21.118	4.997	21.920	52.02	P
2319.	1.143	0.109	0.01033	1608116.	23.128	5.938	21.389	5.301	21.968	52.02	P
2370.	0.955	0.088	0.01033	1608312.	23.133	6.532	21.552	5.913	22.043	52.02	P
25608.	4.852	0.763	0.01164	1729295.	25.829	0.125	9.537	0.712	21.192	52.02	P
20116.	4.194	0.572	0.01164	1729511.	25.834	0.738	13.459	1.325	21.331	52.02	P
17630.	3.888	0.492	0.01164	1729620.	25.836	1.352	16.225	1.634	21.700	52.02	P
15365.	3.595	0.423	0.01164	1729419.	25.832	1.964	18.384	1.939	22.934	52.02	P
11370.	3.056	0.312	0.01164	1728963.	25.822	2.577	20.070	2.550	22.204	52.02	P
8179.	2.592	0.233	0.01164	1728517.	25.812	3.174	21.058	3.148	23.225	52.02	P
6514.	2.327	0.193	0.01164	1728172.	25.805	3.504	21.720	3.530	23.316	52.02	P
4619.	1.998	0.152	0.01164	1728015.	25.801	4.103	22.389	4.078	24.203	52.02	P
3210.	1.695	0.120	0.01164	1727841.	25.798	4.714	22.967	4.688	24.108	52.02	P
2775.	1.566	0.107	0.01164	1727753.	25.796	5.325	23.372	4.997	24.320	52.02	P
2531.	1.456	0.096	0.01164	1727670.	25.794	5.938	23.667	5.301	24.381	52.02	P
2593.	1.283	0.075	0.01164	1727505.	25.790	6.532	23.852	5.913	24.331	52.02	P
16787.	3.252	0.762	0.00836	2041944.	32.192	0.125	20.962	0.712	29.239	52.02	P
13299.	2.837	0.577	0.00836	2042132.	32.195	0.738	23.494	1.325	29.023	52.02	P
11715.	2.641	0.499	0.00836	2042227.	32.197	1.352	25.419	1.634	29.319	52.02	P
10268.	2.453	0.432	0.00836	2042120.	32.195	1.964	26.739	1.939	30.142	52.02	P
7702.	2.103	0.322	0.00836	2041869.	32.190	2.577	27.850	2.550	29.703	52.02	P
5636.	1.795	0.243	0.00836	2041625.	32.186	3.174	28.551	3.148	30.455	52.02	P
4549.	1.622	0.202	0.00836	2041791.	32.189	3.504	29.162	3.530	30.506	52.02	P
3291.	1.394	0.160	0.00836	2041761.	32.188	4.103	29.514	4.078	31.136	52.02	P
2322.	1.174	0.126	0.00836	2041728.	32.188	4.714	30.014	4.688	31.045	52.02	P
2004.	1.076	0.112	0.00836	2041711.	32.187	5.325	30.139	4.997	31.129	52.02	P
1805.	0.989	0.101	0.00836	2041666.	32.187	5.938	30.386	5.301	31.181	52.02	P
1745.	0.839	0.079	0.00836	2041569.	32.185	6.532	30.587	5.913	31.227	52.02	P
19375.	3.826	0.781	0.00957	2217378.	35.445	0.125	22.801	0.712	31.946	52.02	P
15169.	3.322	0.590	0.00957	2217148.	35.441	0.738	25.793	1.325	31.738	52.02	P
13267.	3.085	0.511	0.00957	2217032.	35.439	1.352	27.957	1.634	32.064	52.02	P
11537.	2.862	0.442	0.00957	2216890.	35.436	1.964	29.525	1.939	33.074	52.02	P
8493.	2.446	0.332	0.00957	2216600.	35.431	2.577	30.763	2.550	32.580	52.02	P
6074.	2.083	0.254	0.00957	2216317.	35.426	3.174	31.519	3.148	33.373	52.02	P
4820.	1.876	0.215	0.00957	2216330.	35.426	3.504	32.124	3.530	33.498	52.02	P
3404.	1.608	0.175	0.00957	2216281.	35.425	4.103	32.545	4.078	34.166	52.02	P
2374.	1.352	0.144	0.00957	2216226.	35.424	4.714	33.050	4.688	34.096	52.02	P
2069.	1.239	0.131	0.00957	2216198.	35.424	5.325	33.235	4.997	34.214	52.02	P
1912.	1.139	0.121	0.00957	2216162.	35.423	5.938	33.486	5.301	34.298	52.02	P
2028.	0.970	0.099	0.00957	2216087.	35.422	6.532	33.699	5.913	34.307	52.02	P
35681.	6.474	0.776	0.01632	1997201.	31.328	0.125	10.505	0.712	25.075	52.02	P
28121.	5.610	0.577	0.01632	1996111.	31.307	0.738	15.445	1.325	25.309	52.02	P
24695.	5.205	0.494	0.01632	1995562.	31.297	1.352	18.971	1.634	25.752	52.02	P
21570.	4.829	0.422	0.01632	1995178.	31.289	1.964	21.768	1.939	27.420	52.02	P
16049.	4.135	0.305	0.01632	1994436.	31.275	2.577	23.928	2.550	26.444	52.02	P
11625.	3.533	0.221	0.01632	1993711.	31.261	3.174	25.245	3.148	27.730	52.02	P
9308.	3.175	0.180	0.01632	1992569.	31.238	3.504	26.093	3.530	28.037	52.02	P
6656.	2.743	0.136	0.01632	1992317.	31.233	4.103	26.985	4.078	28.890	52.02	P
4657.	2.339	0.101	0.01632	1992037.	31.228	4.714	27.657	4.688	28.825	52.02	P
4025.	2.164	0.087	0.01632	1991896.	31.225	5.325	28.241	4.997	29.041	52.02	P
3654.	2.013	0.076	0.01632	1991788.	31.223	5.938	28.618	5.301	29.256	52.02	P
3659.	1.769	0.053	0.01632	1991576.	31.219	6.532	28.884	5.913	29.354	52.02	P
38106.	7.293	0.789	0.01867	2287434.	36.690	0.125	13.494	0.712	29.635	52.02	P
30155.	6.284	0.593	0.01867	2286253.	36.669	0.738	18.745	1.325	29.970	52.02	P
26538.	5.816	0.511	0.01867	2285657.	36.659	1.352	22.616	1.634	30.471	52.02	P
23231.	5.385	0.440	0.01867	2285228.	36.651	1.964	25.534	1.939	32.314	52.02	P
17357.	4.598	0.324	0.01867	2284394.	36.637	2.577	27.838	2.550	31.311	52.02	P
12609.	3.933	0.241	0.01867	2283579.	36.622	3.174	29.294	3.148	32.620	52.02	P
10093.	3.552	0.200	0.01867	2282555.	36.604	3.504	30.428	3.530	33.020	52.02	P
7171.	3.096	0.156	0.01867	2282098.	36.596	4.103	31.220	4.078	33.953	52.02	P
4892.	2.690	0.122	0.01867	2281590.	36.587	4.714	32.094	4.688	33.911	52.02	P
4125.	2.525	0.109	0.01867	2281333.	36.583	5.325	32.433	4.997	34.002	52.02	P
3626.	2.393	0.098	0.01867	2281270.	36.582	5.938	32.846	5.301	34.210	52.02	P
3391.	2.206	0.078	0.01867	2281175.	36.580	6.532	33.202	5.913	34.272	52.02	P
30885.	5.631	0.762	0.01414	1836843.	28.109	0.125	10.043	0.712	22.689	52.02	P
24339.	4.899	0.568	0.01414	1835993.	28.091	0.738	14.336	1.325	22.845	52.02	P
21374.	4.554	0.487	0.01414	1835565.	28.083	1.352	17.354	1.634	23.222	52.02	P
18670.	4.232	0.417	0.01414	1835242.	28.076	1.964	19.766	1.939	24.690	52.02	P
13894.	3.634	0.304	0.01414	1834611.	28.063	2.577	21.637	2.550	23.803	52.02	P
10069.	3.112	0.222	0.01414	1833994.	28.050	3.174	22.761	3.148	24.982	52.02	P
8069.	2.803	0.182	0.01414	1833230.	28.034	3.504	23.482	3.530	25.131	52.02	P
5780.	2.421	0.139	0.01414	1833000.	28.029	4.103	24.255	4.078	25.947	52.02	P
4060.	2.057	0.105	0.01414	1832744.	28.024	4.714	24.854	4.688	25.974	52.02	P
3518.	1.897	0.091	0.01414	1832615.	28.021	5.325	25.376	4.997	26.129	52.02	P
3203.	1.757	0.080	0.01414	1832542.	28.020	5.938	25.696	5.301	26.322	52.02	P
3221.	1.523	0.058	0.01414	1832403.	28.017	6.532	25.913	5.913	26.364	52.02	P
1243.	1.834	1.013	0.00886	2118251.	35.768	0.125	33.262	0.712	33.727	52.02	C
2433.	-0.111	0.992	0.00886	2117952.	33.626	0.738	32.965	1.325	33.459	52.02	C
3072.	0.030	0.976	0.00886	2117801.	33.623	1.352	32.695	1.634	33.322	52.02	C
3728.	0.196	0.956	0.00886	2117523.	33.618	1.964	32.342	1.939	33.410	52.02	C
5121.	0.618	0.904	0.00886	2116940.	33.607	2.577	31.754	2.550	32.672	52.02	C
6582.	1.143	0.837	0.00886	2116370.	33.597	3.174	31.082	3.148	32.964	52.02	C
7570.	1.519	0.784	0.00886	2114927.	33.570	3.504	30.447	3.530	32.436	52.02	C
9055.	2.171	0.697	0.00886	2114650.	33.565	4.103	29.357	4.078	31.977	52.02	C
10804.	3.007	0.581	0.00886	2114341.	33.559	4.714	27.951	4.688	30.912	52.02	C
11729.	3.475	0.514	0.00886	2114184.	33.556	5.325	26.166	4.997	29.808	52.02	C
12666.	3.968	0.443	0.00886	2114189.	33.556	5.938	24.265	5.301	29.665	52.02	C
14628.	5.050	0.283	0.00886	2114225.	33.557	6.532	22.435	5.913	27.953	52.02	C
1172.	0.117	1.002	0.00887	2112634.	33.916	0.125	33.167	0.712	33.586	52.02	C
2314.	-0.088	0.982	0.00887	2112325.	33.521	0.738	32.885	1.325	33.335	52.02	C
2933.	0.048	0.967	0.00887	2112169.	33.519	1.352	32.628	1.634	33.210	52.02	C
3572.	0.209	0.948	0.00887	2111951.	33.514	1.964	32.290	1.939	33.289	52.02	C
4940.	0.618	0.898	0.00887	2111501.	33.506	2.577	31.728	2.550	32.583	52.02	C
6388.	1.127	0.833	0.00887	2111061.	33.498	3.174	31.075	3.148	32.880	52.02	C
7373.	1.488	0.782	0.00887	2109616.	33.471	3.504	30.449	3.530	32.359	52.02	C
8863.	2.115	0.697	0.00887	2109214.	33.463	4.103	29.389	4.078	31.914	52.02	C
10626.	2.918	0.583	0.00887	2108766.	33.455	4.714	28.012	4.688	30.893	52.02	C
11564.	3.369	0.518	0.00887	2108539.	33.451	5.325	26.268	4.997	29.800	52.02	C
12515.	3.842	0.448	0.00887	2108421.	33.449	5.938	24.377	5.301	29.694	52.02	C
14516.	4.881	0.289	0.00887	2108199.	33.444	6.532	22.541	5.913	28.018	52.02	C
1515.	3.547	1.026	0.01054	2293237.	40.679	0.125	36.239	0.712	36.883	52.02	C
2949.	0.380	1.003	0.01054	2292875.	37.273	0.738	35.837	1.325	36.598	52.02	C
3714.	0.065	0.986	0.01054	2292692.	36.782	1.352	35.506	1.634	36.393	52.02	C
4496.	0.269	0.965	0.01054	2292385.	36.777	1.964	35.072	1.939	36.490	52.02	C
6150.	0.784	0.911	0.01054	2291746.	36.766	2.577	34.362	2.550	35.597	52.02	C
7874.	1.426	0.842	0.01054	2291122.	36.755	3.174	33.568	3.148	35.924	52.02	C
9034.	1.884	0.788	0.01054	2289261.	36.722	3.504	32.869	3.530	35.295	52.02	C
10773.	2.678	0.698	0.01054	2288894.	36.716	4.103	31.545	4.078	34.692	52.02	C
12811.	3.696	0.578	0.01054	2288486.	36.709	4.714	29.894	4.688	33.458	52.02	C
13887.	4.266	0.510	0.01054	2288279.	36.705	5.325	27.742	4.997	32.098	52.02	C
14973.	4.866	0.437	0.01054	2288240.	36.704	5.938	25.478	5.301	31.957	52.02	C
17243.	6.182	0.273	0.01054	2288186.	36.703	6.532	23.402	5.913	29.863	52.02	C
1871.	3.341	1.018	0.01114	1677273.	28.279	0.125	24.107	0.712	24.579	52.02	C
3603.	0.002	0.995	0.01114	1677259.	24.687	0.738	23.791	1.325	24.373	52.02	C
4517.	0.188	0.977	0.01114	1677252.	24.687	1.352	23.377	1.634	24.169	52.02	C
5444.	0.400	0.955	0.01114	1676875.	24.679	1.964	22.884	1.939	24.258	52.02	C
7383.	0.939	0.900	0.01114	1676053.	24.661	2.577	22.122	2.550	23.219	52.02	C
9381.	1.612	0.829	0.01114	1675250.	24.643	3.174	21.170	3.148	23.827	52.02	C
10712.	2.069	0.774	0.01114	1672468.	24.581	3.504	20.112	3.530	23.186	52.02	C
12693.	2.908	0.683	0.01114	1672124.	24.573	4.103	18.649	4.078	22.342	52.02	C
14995.	3.984	0.564	0.01114	1671743.	24.565	4.714	16.688	4.688	21.020	52.02	C
16202.	4.587	0.495	0.01114	1671549.	24.561	5.325	14.299	4.997	19.474	52.02	C
17417.	5.219	0.423	0.01114	1671390.	24.557	5.938	11.741	5.301	19.361	52.02	C
19944.	6.605	0.261	0.01114	1671074.	24.550	6.532	9.337	5.913	17.361	52.02	C
1462.	1.686	1.011	0.01005	1951837.	32.365	0.125	29.913	0.712	30.370	52.02	C
2854.	-0.028	0.990	0.01005	1951585.	30.433	0.738	29.592	1.325	30.182	52.02	C
3599.	0.129	0.973	0.01005	1951457.	30.431	1.352	29.269	1.634	29.990	52.02	C
4362.	0.313	0.953	0.01005	1951172.	30.425	1.964	28.864	1.939	30.117	52.02	C
5981.	0.781	0.901	0.01005	1950570.	30.413	2.577	28.222	2.550	29.260	52.02	C
7673.	1.363	0.834	0.01005	1949981.	30.401	3.174	27.449	3.148	29.698	52.02	C
8814.	1.778	0.782	0.01005	1948406.	30.370	3.504	26.690	3.530	29.080	52.02	C
10529.	2.497	0.695	0.01005	1947946.	30.361	4.103	25.450	4.078	28.457	52.02	C
12543.	3.420	0.579	0.01005	1947435.	30.351	4.714	23.842	4.688	27.332	52.02	C
13608.	3.937	0.513	0.01005	1947176.	30.346	5.325	21.798	4.997	26.055	52.02	C

14684.	4.482	0.442	0.01005	1947085.	30.344	5.938	19.624	5.301	25.917	52.02	C
16938.	5.677	0.283	0.01005	1946926.	30.341	6.532	17.589	5.913	24.089	52.02	C
815.	0.593	1.004	0.00538	2016100.	32.361	0.125	31.317	0.712	31.645	52.02	C
1575.	0.047	0.981	0.00538	2015991.	31.693	0.738	31.080	1.325	31.510	52.02	C
1976.	0.136	0.964	0.00538	2015936.	31.692	1.352	30.886	1.634	31.395	52.02	C
2383.	0.240	0.944	0.00538	2015827.	31.690	1.964	30.633	1.939	31.453	52.02	C
3235.	0.505	0.890	0.00538	2015598.	31.685	2.577	30.265	2.550	30.917	52.02	C
4113.	0.834	0.822	0.00538	2015374.	31.681	3.174	29.869	3.148	31.218	52.02	C
4699.	1.083	0.769	0.00538	2015337.	31.680	3.504	29.514	3.530	30.816	52.02	C
5571.	1.491	0.681	0.00538	2015254.	31.679	4.103	28.833	4.078	30.606	52.02	C
6585.	2.012	0.566	0.00538	2015162.	31.677	4.714	27.991	4.688	29.817	52.02	C
7116.	2.304	0.500	0.00538	2015116.	31.676	5.325	26.900	4.997	29.121	52.02	C
7651.	2.610	0.430	0.00538	2015077.	31.675	5.938	25.742	5.301	29.061	52.02	C
8763.	3.281	0.274	0.00538	2015000.	31.674	6.532	24.674	5.913	28.166	52.02	C
853.	-0.095	0.999	0.00489	2218042.	35.457	0.125	35.034	0.712	35.547	52.02	C
1590.	0.011	0.973	0.00489	2217956.	35.456	0.738	34.741	1.325	35.313	52.02	C
1961.	0.088	0.953	0.00489	2217912.	35.455	1.352	34.546	1.634	35.200	52.02	C
2325.	0.180	0.930	0.00489	2217823.	35.453	1.964	34.283	1.939	35.248	52.02	C
3054.	0.412	0.872	0.00489	2217635.	35.450	2.577	33.900	2.550	34.790	52.02	C
3763.	0.700	0.800	0.00489	2217451.	35.447	3.174	33.534	3.148	35.059	52.02	C
4215.	0.921	0.745	0.00489	2217599.	35.449	3.504	33.349	3.530	34.686	52.02	C
4861.	1.278	0.657	0.00489	2217558.	35.448	4.103	32.657	4.078	34.505	52.02	C
5576.	1.735	0.545	0.00489	2217511.	35.448	4.714	31.983	4.688	33.861	52.02	C
5937.	1.991	0.482	0.00489	2217488.	35.447	5.325	30.933	4.997	33.261	52.02	C
6291.	2.259	0.416	0.00489	2217455.	35.447	5.938	30.021	5.301	33.229	52.02	C
7002.	2.845	0.272	0.00489	2217387.	35.445	6.532	29.258	5.913	32.377	52.02	C
808.	0.466	1.004	0.00555	2176792.	35.304	0.125	34.394	0.712	34.779	52.02	C
1565.	-0.002	0.981	0.00555	2176679.	34.708	0.738	34.144	1.325	34.555	52.02	C
1965.	0.090	0.965	0.00555	2176622.	34.707	1.352	33.953	1.634	34.427	52.02	C
2373.	0.199	0.944	0.00555	2176516.	34.705	1.964	33.703	1.939	34.487	52.02	C
3228.	0.476	0.891	0.00555	2176294.	34.701	2.577	33.340	2.550	33.954	52.02	C
4113.	0.819	0.823	0.00555	2176077.	34.697	3.174	32.942	3.148	34.252	52.02	C
4704.	1.080	0.770	0.00555	2176038.	34.697	3.504	32.578	3.530	33.825	52.02	C
5586.	1.505	0.683	0.00555	2175965.	34.695	4.103	31.891	4.078	33.622	52.02	C
6613.	2.049	0.568	0.00555	2175883.	34.694	4.714	31.031	4.688	32.814	52.02	C
7153.	2.354	0.502	0.00555	2175842.	34.693	5.325	29.956	4.997	32.088	52.02	C
7697.	2.673	0.432	0.00555	2175794.	34.692	5.938	28.768	5.301	32.017	52.02	C
8829.	3.372	0.276	0.00555	2175697.	34.690	6.532	27.684	5.913	31.082	52.02	C
843.	0.463	1.004	0.00560	2304611.	37.558	0.125	36.487	0.712	37.055	52.02	C
1609.	0.019	0.980	0.00560	2304507.	36.989	0.738	36.169	1.325	36.816	52.02	C
2007.	0.109	0.963	0.00560	2304455.	36.988	1.352	35.970	1.634	36.695	52.02	C
2406.	0.216	0.942	0.00560	2304353.	36.986	1.964	35.695	1.939	36.745	52.02	C
3229.	0.485	0.888	0.00560	2304139.	36.983	2.577	35.305	2.550	36.222	52.02	C
4063.	0.821	0.819	0.00560	2303930.	36.979	3.174	34.922	3.148	36.520	52.02	C
4611.	1.076	0.766	0.00560	2303958.	36.980	3.504	34.691	3.530	36.107	52.02	C
5418.	1.490	0.680	0.00560	2303889.	36.978	4.103	33.953	4.078	35.905	52.02	C
6342.	2.021	0.568	0.00560	2303813.	36.977	4.714	33.169	4.688	35.117	52.02	C
6822.	2.319	0.504	0.00560	2303774.	36.976	5.325	32.005	4.997	34.406	52.02	C
7302.	2.630	0.437	0.00560	2303720.	36.975	5.938	30.895	5.301	34.375	52.02	C
8290.	3.311	0.287	0.00560	2303608.	36.973	6.532	29.976	5.913	33.419	52.02	C
1290.	1.140	1.007	0.00761	1566603.	23.508	0.125	21.824	0.712	22.110	52.02	C
2486.	-0.035	0.983	0.00761	1566004.	22.154	0.738	21.636	1.325	21.929	52.02	C
3117.	0.090	0.965	0.00761	1565703.	22.147	1.352	21.350	1.634	21.810	52.02	C
3756.	0.247	0.944	0.00761	1565730.	22.148	1.964	21.016	1.939	21.902	52.02	C
5092.	0.644	0.889	0.00761	1565842.	22.150	2.577	20.491	2.550	21.161	52.02	C
6467.	1.137	0.819	0.00761	1565951.	22.153	3.174	19.826	3.148	21.574	52.02	C
7384.	1.471	0.764	0.00761	1564516.	22.119	3.504	19.049	3.530	21.066	52.02	C
8746.	2.062	0.674	0.00761	1564108.	22.110	4.103	18.067	4.078	20.627	52.02	C
10328.	2.820	0.556	0.00761	1563654.	22.099	4.714	16.696	4.688	19.610	52.02	C
11157.	3.245	0.488	0.00761	1563424.	22.094	5.325	15.088	4.997	18.534	52.02	C
11991.	3.696	0.417	0.00761	1563437.	22.094	5.938	13.343	5.301	18.415	52.02	C
13724.	4.685	0.256	0.00761	1563502.	22.095	6.532	11.625	5.913	16.929	52.02	C
1052.	0.937	1.005	0.00604	1599801.	23.983	0.125	22.554	0.712	22.882	52.02	C
2019.	0.022	0.981	0.00604	1599366.	22.927	0.738	22.361	1.325	22.740	52.02	C
2524.	0.120	0.963	0.00604	1599146.	22.922	1.352	22.120	1.634	22.604	52.02	C
3034.	0.246	0.941	0.00604	1599280.	22.926	1.964	21.828	1.939	22.701	52.02	C
4094.	0.562	0.885	0.00604	1599611.	22.933	2.577	21.379	2.550	22.073	52.02	C
5177.	0.953	0.813	0.00604	1599934.	22.941	3.174	20.855	3.148	22.410	52.02	C
5893.	1.231	0.758	0.00604	1599505.	22.931	3.504	20.314	3.530	21.994	52.02	C
6954.	1.691	0.667	0.00604	1599049.	22.920	4.103	19.505	4.078	21.721	52.02	C
8178.	2.282	0.548	0.00604	1598543.	22.909	4.714	18.459	4.688	20.852	52.02	C
8817.	2.613	0.481	0.00604	1598286.	22.903	5.325	17.134	4.997	19.949	52.02	C
9457.	2.967	0.409	0.00604	1598359.	22.904	5.938	15.751	5.301	19.881	52.02	C
10783.	3.745	0.249	0.00604	1598559.	22.909	6.532	14.425	5.913	18.931	52.02	C
3617.	8.560	1.052	0.02038	2138438.	42.634	0.125	33.039	0.712	33.890	52.02	C
6792.	4.370	1.026	0.02038	2136986.	38.074	0.738	32.336	1.325	33.354	52.02	C
8410.	1.448	1.006	0.02038	2136255.	34.881	1.352	31.664	1.634	33.000	52.02	C
10015.	0.837	0.982	0.02038	2135278.	33.948	1.964	30.852	1.939	33.145	52.02	C
13271.	1.613	0.923	0.02038	2133272.	33.911	2.577	29.673	2.550	31.382	52.02	C
16495.	2.586	0.848	0.02038	2131311.	33.874	3.174	28.265	3.148	32.311	52.02	C
18581.	3.191	0.792	0.02038	2123135.	33.723	3.504	26.904	3.530	31.210	52.02	C
21603.	4.399	0.700	0.02038	2121625.	33.695	4.103	24.827	4.078	30.122	52.02	C
25003.	5.951	0.581	0.02038	2119946.	33.663	4.714	22.172	4.688	28.302	52.02	C
26743.	6.822	0.515	0.02038	2119096.	33.648	5.325	18.975	4.997	26.085	52.02	C
28467.	7.742	0.445	0.02038	2118675.	33.640	5.938	15.478	5.301	25.998	52.02	C
31972.	9.761	0.290	0.02038	2117894.	33.625	6.532	12.257	5.913	23.236	52.02	C
3225.	7.008	1.044	0.01532	2182092.	41.926	0.125	33.925	0.712	34.746	52.02	C
5969.	2.161	1.013	0.01532	2181269.	36.754	0.738	33.326	1.325	34.292	52.02	C
7336.	0.430	0.990	0.01532	2180854.	34.784	1.352	32.750	1.634	33.983	52.02	C
8672.	0.702	0.962	0.01532	2180260.	34.774	1.964	32.044	1.939	34.113	52.02	C
11324.	1.395	0.894	0.01532	2179035.	34.751	2.577	31.012	2.550	32.658	52.02	C
13872.	2.259	0.809	0.01532	2177837.	34.729	3.174	29.819	3.148	33.387	52.02	C
15483.	2.841	0.746	0.01532	2173255.	34.646	3.504	28.762	3.530	32.355	52.02	C
17762.	3.911	0.643	0.01532	2172384.	34.630	4.103	26.998	4.078	31.285	52.02	C
20255.	5.285	0.514	0.01532	2171416.	34.612	4.714	24.845	4.688	29.797	52.02	C
21502.	6.055	0.441	0.01532	2170926.	34.603	5.325	22.149	4.997	27.934	52.02	C
22719.	6.866	0.366	0.01532	2170692.	34.599	5.938	19.381	5.301	27.840	52.02	C
25136.	8.645	0.202	0.01532	2170259.	34.591	6.532	17.056	5.913	25.450	52.02	C
2463.	5.146	1.033	0.01473	2171324.	39.853	0.125	33.500	0.712	34.555	52.02	C
4624.	1.337	1.008	0.01473	2170573.	35.769	0.738	32.937	1.325	34.169	52.02	C
5723.	0.359	0.989	0.01473	2170195.	34.590	1.352	32.487	1.634	33.905	52.02	C
6811.	0.589	0.967	0.01473	2169662.	34.580	1.964	31.900	1.939	34.026	52.02	C
9015.	1.174	0.910	0.01473	2168562.	34.560	2.577	31.045	2.550	32.787	52.02	C
11191.	1.905	0.840	0.01473	2167487.	34.540	3.174	30.090	3.148	33.415	52.02	C
12597.	2.394	0.786	0.01473	2163465.	34.467	3.504	29.338	3.530	32.561	52.02	C
14629.	3.299	0.700	0.01473	2162656.	34.452	4.103	27.863	4.078	31.664	52.02	C
16909.	4.461	0.588	0.01473	2161758.	34.435	4.714	26.087	4.688	30.377	52.02	C
18074.	5.112	0.525	0.01473	2161303.	34.427	5.325	23.845	4.997	28.785	52.02	C
19227.	5.798	0.459	0.01473	2161072.	34.423	5.938	21.463	5.301	28.712	52.02	C
21566.	7.303	0.314	0.01473	2160642.	34.415	6.532	19.331	5.913	26.677	52.02	C
2601.	5.483	1.037	0.01531	2276256.	42.102	0.125	35.719	0.712	36.465	52.02	C
4903.	1.702	1.011	0.01531	2275469.	38.035	0.738	35.195	1.325	36.062	52.02	C
6080.	0.349	0.991	0.01531	2275072.	36.473	1.352	34.703	1.634	35.795	52.02	C
7250.	0.588	0.968	0.01531	2274512.	36.463	1.964	34.107	1.939	35.892	52.02	C
9634.	1.195	0.909	0.01531	2273358.	36.442	2.577	33.219	2.550	34.643	52.02	C
12007.	1.954	0.835	0.01531	2272230.	36.422	3.174	32.187	3.148	35.286	52.02	C
13547.	2.463	0.779	0.01531	2267965.	36.347	3.504	31.270	3.530	34.390	52.02	C
15787.	3.403	0.687	0.01531	2267102.	36.332	4.103	29.713	4.078	33.422	52.02	C
18317.	4.608	0.569	0.01531	2266144.	36.315	4.714	27.784	4.688	32.125	52.02	C
19617.	5.285	0.502	0.01531	2265658.	36.306	5.325	25.404	4.997	30.484	52.02	C
20906.	5.996	0.432	0.01531	2265394.	36.302	5.938	22.816	5.301	30.396	52.02	C
23536.	7.558	0.277	0.01531	2264898.	36.293	6.532	20.435	5.913	28.288	52.02	C
3265.	7.754	1.042	0.01553	1854116.	36.282	0.125	27.571	0.712	28.277	52.02	C
6058.	2.430	1.012	0.01553	1853143.	30.637	0.738	27.046	1.325	27.920	52.02	C
7454.	0.463	0.990	0.01553	1852653.	28.436	1.352	26.450	1.634	27.620	52.02	C
8822.	0.727	0.964	0.01553	1851938.	28.421	1.964	25.763	1.939	27.747	52.02	C
11546.	1.399	0.899	0.01553	1850462.	28.391	2.577	24.739	2.550	26.221	52.02	C
14179.	2.242	0.819	0.01553	1849019.	28.361	3.174	23.509	3.148	27.065	52.02	C
15849.	2.778	0.758	0.01553	1843336.	28.243	3.504	22.291	3.530	26.136	52.02	C
18224.	3.824	0.660	0.01553	1842207.	28.220	4.103	20.535	4.078	25.009	52.02	C
20834.	5.167	0.536	0.01553	1840952.	28.194	4.714	18.288	4.688	23.511	52.02	C
22147.	5.920	0.467	0.01553	1840316.	28.181	5.325	15.636	4.997	21.554	52.02	C
23430.	6.716	0.394	0.01553	1840023.	28.175	5.938	12.795	5.301	21.543	52.02	C
25995.	8.463	0.236	0.01553	1839485.	28.164	6.532	10.269	5.913	19.217	52.02	C
3076.	5.960	1.037	0.01710	2112909.	39.587	0.125	32.628	0.712	33.443	52.02	C
5778.	1.779	1.010	0.01710	2111823.	35.086	0.738	32.070	1.325	33.001	52.02	C
7154.	0.430	0.990	0.01710	2111275.	33.502	1.352	31.494	1.634	32.704	52.02	C
8519.	0.695	0.966	0.01710	2110528.	33.488	1.964	30.807	1.939	32.829	52.02	C
11289.	1.369	0.906	0.01710	2108990.	33.459	2.577	29.787	2.550	31.345	52.02	C
14031.	2.213	0.831	0.01710	2107488.	33.431	3.174	28.589	3.148	32.143	52.02	C
15804.	2.755	0.774	0.01710	2101506.	33.319	3.504	27.466	3.530	31.168	52.02	C
18373.	3.802	0.681	0.01710	2100335.	33.297	4.103	25.685	4.078	30.108	52.02	C
21262.	5.147	0.561	0.01710	2099034.	33.273	4.714	23.442	4.688	28.618	52.02	C
22741.	5.901	0.494	0.01710	2098374.	33.261	5.325	20.707	4.997	26.706	52.02	C
24205.	6.697	0.423	0.01710	2098035.	33.254	5.938	17.754	5.301	26.643	52.02	C
27181.	8.443	0.267	0.01710	2097400.	33.242	6.532	15.034	5.913	24.301	52.02	C
2875.	0.015	0.994	0.01635	1839027.	28.154	0.125	27.709	0.712	27.846	52.02	C
5417.	0.276	0.968	0.01635	1837733.	28.128	0.738	27.403	1.325	27.573	52.02	C
6717.	0.473	0.950	0.01635	1837080.	28.114	1.352	26.877	1.634	27.309	52.02	C
8011.	0.706	0.928	0.01635	1836261.	28.097	1.964	26.302	1.939	27.463	52.02	C
10644.	1.303	0.871	0.01635	1834584.	28.062	2.577	25.392	2.550	26.087	52.02	C
13263.	2.053	0.800	0.01635	1832946.	28.028	3.174	24.211	3.148	26.845	52.02	C
14964.	2.506	0.746	0.01635	1826457.	27.893	3.504	22.856	3.530	25.988	52.02	C
17437.	3.439	0.658	0.01635	1825152.	27.866	4.103	21.283	4.078	25.099	52.02	C
20231.	4.639	0.545	0.01635	1823701.	27.836	4.714	19.058	4.688	23.646	52.02	C
21666.	5.312	0.481	0.01635	1822966.	27.821	5.325	16.655	4.997	21.839	52.02	C
23090.	6.025	0.413	0.01635	1822590.	27.813	5.938	13.834	5.301	21.817	52.02	C
25996.	7.590	0.265	0.01635	1821888.	27.798	6.532	11.120	5.913	19.761	52.02	C
1472.	2.289	1.013	0.00731	1850022.	30.693	0.125	27.940	0.712	28.280	52.02	C
2736.	0.135	0.984	0.00731	1850198.	28.385	0.738	27.691	1.325	28.101	52.02	C
3367.	0.250	0.963	0.00731	1850286.	28.387	1.352	27.427	1.634	27.942	52.02	C
3985.	0.381	0.938	0.00731	1850114.	28.383	1.964	27.109	1.939	28.050	52.02	C
5215.	0.713	0.876	0.00731	1849722.	28.375	2.577	26.621	2.550	27.330	52.02	C
6400.	1.126	0.798	0.00731	1849340.	28.367	3.174	26.059	3.148	27.654	52.02	C
7151.	1.424	0.739	0.00731	1848483.	28.350	3.504	25.541	3.530	27.156	52.02	C
8217.	1.936	0.646	0.00731	1848262.	28.345	4.103	24.739	4.078	26.861	52.02	C
9387.	2.591	0.526	0.00731	1848017.	28.340	4.714	23.717	4.688	25.968	52.02	C
9974.	2.959	0.460	0.00731	1847893.	28.338	5.325	22.527	4.997	25.075	52.02	C
10547.	3.345	0.390	0.00731	1847816.	28.336	5.938	21.272	5.301	24.972	52.02	C
11690.	4.190	0.239	0.00731	1847669.	28.333	6.532	20.071	5.913	23.904	52.02	C
2123.	3.907	1.021	0.00842	1782524.	30.872	0.125	26.366	0.712	26.811	52.02	C
3864.	0.207	0.986	0.00842	1782373.	26.967	0.738	26.058	1.325	26.567	52.02	C
4705.	0.356	0.960	0.00842	1782298.	26.966	1.352	25.700	1.634	26.378	52.02	C
5511.	0.529	0.931	0.00842	1782063.	26.961	1.964	25.277	1.939	26.515	52.02	C
7059.	0.969	0.857	0.00842	1781564.	26.950	2.577	24.632	2.550	25.551	52.02	C
8481.	1.517	0.769	0.00842	1781077.	26.940	3.174	23.878	3.148	25.960	52.02	C

9344.	1.905	0.702	0.00842	1779653.	26.910	3.504	23.169	3.530	25.303	52.02	C
10517.	2.583	0.598	0.00842	1779351.	26.903	4.103	22.135	4.078	24.843	52.02	C
11732.	3.453	0.469	0.00842	1779017.	26.896	4.714	20.809	4.688	23.724	52.02	C
12312.	3.940	0.398	0.00842	1778847.	26.892	5.325	19.323	4.997	22.523	52.02	C
12860.	4.451	0.325	0.00842	1778759.	26.891	5.938	17.789	5.301	22.402	52.02	C
13892.	5.574	0.169	0.00842	1778594.	26.887	6.532	16.543	5.913	21.067	52.02	C
1237.	2.370	1.013	0.00668	1805227.	29.876	0.125	26.894	0.712	27.355	52.02	C
2328.	0.093	0.987	0.00668	1805186.	27.449	0.738	26.615	1.325	27.188	52.02	C
2884.	0.202	0.967	0.00668	1805166.	27.448	1.352	26.354	1.634	27.043	52.02	C
3436.	0.329	0.944	0.00668	1805012.	27.445	1.964	26.024	1.939	27.146	52.02	C
4555.	0.651	0.885	0.00668	1804679.	27.438	2.577	25.518	2.550	26.469	52.02	C
5663.	1.051	0.812	0.00668	1804354.	27.431	3.174	24.975	3.148	26.801	52.02	C
6381.	1.344	0.755	0.00668	1803703.	27.418	3.504	24.535	3.530	26.351	52.02	C
7419.	1.840	0.664	0.00668	1803516.	27.414	4.103	23.662	4.078	26.064	52.02	C
8588.	2.475	0.546	0.00668	1803308.	27.409	4.714	22.631	4.688	25.162	52.02	C
9187.	2.831	0.480	0.00668	1803202.	27.407	5.325	21.250	4.997	24.265	52.02	C
9779.	3.205	0.410	0.00668	1803133.	27.405	5.938	19.925	5.301	24.183	52.02	C
10984.	4.024	0.257	0.00668	1802999.	27.403	6.532	18.695	5.913	23.102	52.02	C
28299.	5.093	0.772	0.01255	1769243.	26.688	0.125	10.081	0.712	21.836	52.02	P
22265.	4.432	0.575	0.01255	1768557.	26.674	0.738	14.056	1.325	21.927	52.02	P
19534.	4.121	0.492	0.01255	1768211.	26.666	1.352	16.822	1.634	22.229	52.02	P
17046.	3.830	0.421	0.01255	1767942.	26.660	1.964	19.050	1.939	23.582	52.02	P
12656.	3.292	0.306	0.01255	1767413.	26.649	2.577	20.755	2.550	22.745	52.02	P
9151.	2.822	0.223	0.01255	1766897.	26.638	3.174	21.783	3.148	23.872	52.02	P
7325.	2.544	0.182	0.01255	1766244.	26.624	3.504	22.416	3.530	23.920	52.02	P
5243.	2.201	0.138	0.01255	1766092.	26.621	4.103	23.138	4.078	24.806	52.02	P
3695.	1.876	0.104	0.01255	1765923.	26.617	4.714	23.699	4.688	24.789	52.02	P
3218.	1.734	0.090	0.01255	1765837.	26.615	5.325	24.184	4.997	24.968	52.02	P
2950.	1.608	0.078	0.01255	1765754.	26.614	5.938	24.485	5.301	25.002	52.02	P
3019.	1.399	0.056	0.01255	1765587.	26.610	6.532	24.672	5.913	25.050	52.02	P
24134.	4.685	0.773	0.01192	2069719.	32.721	0.125	17.775	0.712	28.262	52.02	P
19116.	4.056	0.586	0.01192	2069239.	32.712	0.738	21.105	1.325	28.333	52.02	P
16837.	3.762	0.507	0.01192	2068997.	32.707	1.352	23.578	1.634	28.659	52.02	P
14757.	3.488	0.439	0.01192	2068776.	32.703	1.964	25.380	1.939	29.869	52.02	P
11072.	2.980	0.328	0.01192	2068334.	32.694	2.577	26.838	2.550	29.234	52.02	P
8109.	2.542	0.248	0.01192	2067903.	32.686	3.174	27.771	3.148	30.220	52.02	P
6552.	2.289	0.207	0.01192	2067547.	32.679	3.504	28.540	3.530	30.262	52.02	P
4755.	1.975	0.163	0.01192	2067413.	32.677	4.103	29.004	4.078	31.049	52.02	P
3380.	1.681	0.129	0.01192	2067265.	32.674	4.714	29.641	4.688	30.990	52.02	P
2933.	1.554	0.115	0.01192	2067190.	32.673	5.325	29.862	4.997	31.123	52.02	P
2657.	1.445	0.103	0.01192	2067129.	32.672	5.938	30.183	5.301	31.237	52.02	P
2596.	1.269	0.081	0.01192	2067010.	32.669	6.532	30.450	5.913	31.304	52.02	P
28506.	5.247	0.772	0.01290	1832715.	28.023	0.125	11.228	0.712	22.998	52.02	P
22432.	4.551	0.577	0.01290	1832014.	28.009	0.738	15.223	1.325	23.150	52.02	P
19683.	4.225	0.495	0.01290	1831661.	28.002	1.352	18.019	1.634	23.450	52.02	P
17178.	3.921	0.425	0.01290	1831388.	27.996	1.964	20.247	1.939	24.853	52.02	P
12758.	3.359	0.310	0.01290	1830851.	27.985	2.577	21.960	2.550	24.032	52.02	P
9228.	2.871	0.228	0.01290	1830327.	27.974	3.174	22.999	3.148	25.156	52.02	P
7388.	2.586	0.187	0.01290	1829760.	27.962	3.504	23.670	3.530	25.222	52.02	P
5291.	2.235	0.144	0.01290	1829592.	27.959	4.103	24.370	4.078	26.099	52.02	P
3731.	1.904	0.110	0.01290	1829405.	27.955	4.714	24.951	4.688	26.061	52.02	P
3250.	1.761	0.097	0.01290	1829310.	27.953	5.325	25.411	4.997	26.291	52.02	P
2980.	1.636	0.085	0.01290	1829224.	27.951	5.938	25.722	5.301	26.296	52.02	P
3047.	1.433	0.062	0.01290	1829052.	27.947	6.532	25.929	5.913	26.377	52.02	P
20936.	3.887	0.777	0.01205	2222794.	35.542	0.125	23.181	0.712	31.884	52.02	P
16460.	3.315	0.613	0.01205	2222246.	35.533	0.738	26.122	1.325	31.913	52.02	P
14437.	3.046	0.545	0.01205	2221969.	35.528	1.352	28.239	1.634	32.208	52.02	P
12598.	2.795	0.486	0.01205	2221723.	35.523	1.964	29.833	1.939	33.240	52.02	P
9364.	2.331	0.389	0.01205	2221234.	35.514	2.577	31.086	2.550	32.789	52.02	P
6797.	1.928	0.321	0.01205	2220756.	35.506	3.174	31.883	3.148	33.714	52.02	P
5471.	1.691	0.286	0.01205	2220151.	35.495	3.504	32.464	3.530	33.760	52.02	P
3976.	1.400	0.249	0.01205	2219968.	35.492	4.103	32.920	4.078	34.351	52.02	P
2893.	1.126	0.219	0.01205	2219764.	35.488	4.714	33.407	4.688	34.336	52.02	P
2577.	1.007	0.207	0.01205	2219661.	35.486	5.325	33.682	4.997	34.432	52.02	P
2419.	0.902	0.196	0.01205	2219545.	35.484	5.938	33.966	5.301	34.571	52.02	P
2562.	0.732	0.175	0.01205	2219309.	35.480	6.532	34.221	5.913	34.712	52.02	P
20432.	4.075	0.735	0.00828	1620458.	23.410	0.125	9.402	0.712	19.770	52.02	P
15957.	3.491	0.524	0.00828	1620272.	23.406	0.738	12.889	1.325	19.482	52.02	P
13921.	3.232	0.437	0.00828	1620178.	23.404	1.352	15.295	1.634	19.839	52.02	P
12058.	3.000	0.362	0.00828	1620064.	23.401	1.964	17.225	1.939	20.795	52.02	P
8745.	2.602	0.243	0.00828	1619832.	23.396	2.577	18.658	2.550	20.237	52.02	P
6061.	2.304	0.160	0.00828	1619606.	23.391	3.174	19.479	3.148	21.353	52.02	P
4635.	2.161	0.120	0.00828	1619553.	23.390	3.504	20.027	3.530	21.274	52.02	P
2973.	1.989	0.081	0.00828	1618115.	23.357	4.103	20.599	4.078	21.783	52.02	P
1665.	1.885	0.055	0.00828	1616516.	23.320	4.714	20.917	4.688	21.407	52.02	P
1219.	1.868	0.047	0.00828	1615706.	23.302	5.325	21.150	4.997	21.360	52.02	P
923.	1.895	0.041	0.00828	1615818.	23.305	5.938	21.212	5.301	21.349	52.02	P
756.	2.022	0.032	0.00828	1616185.	23.313	6.532	21.235	5.913	21.224	52.02	P
14858.	2.947	0.748	0.00667	1732440.	25.897	0.125	15.649	0.712	23.336	52.02	P
11660.	2.542	0.554	0.00667	1732408.	25.897	0.738	18.179	1.325	22.999	52.02	P
10210.	2.355	0.473	0.00667	1732391.	25.896	1.352	19.953	1.634	23.244	52.02	P
8888.	2.178	0.404	0.00667	1732301.	25.894	1.964	21.321	1.939	23.988	52.02	P
6552.	1.855	0.291	0.00667	1732106.	25.890	2.577	22.386	2.550	23.646	52.02	P
4680.	1.580	0.212	0.00667	1731916.	25.886	3.174	23.020	3.148	24.507	52.02	P
3702.	1.435	0.172	0.00667	1732240.	25.893	3.504	23.466	3.530	24.440	52.02	P
2581.	1.244	0.132	0.00667	1732207.	25.892	4.103	23.887	4.078	25.000	52.02	P
1737.	1.071	0.101	0.00667	1732171.	25.891	4.714	24.222	4.688	24.779	52.02	P
1471.	1.000	0.089	0.00667	1732152.	25.891	5.325	24.454	4.997	24.975	52.02	P
1315.	0.939	0.079	0.00667	1732103.	25.890	5.938	24.616	5.301	24.850	52.02	P
1321.	0.848	0.060	0.00667	1732000.	25.888	6.532	24.729	5.913	24.947	52.02	P
16606.	3.399	0.758	0.00745	1832874.	28.027	0.125	15.564	0.712	24.993	52.02	P
12916.	2.893	0.561	0.00745	1832750.	28.024	0.738	18.732	1.325	24.759	52.02	P
11249.	2.659	0.480	0.00745	1832688.	28.023	1.352	20.967	1.634	25.109	52.02	P
9733.	2.441	0.411	0.00745	1832588.	28.021	1.964	22.635	1.939	25.904	52.02	P
7066.	2.044	0.299	0.00745	1832381.	28.017	2.577	23.913	2.550	25.544	52.02	P
4948.	1.709	0.222	0.00745	1832179.	28.012	3.174	24.659	3.148	26.492	52.02	P
3849.	1.530	0.185	0.00745	1832420.	28.017	3.504	25.221	3.530	26.415	52.02	P
2612.	1.303	0.146	0.00745	1832399.	28.017	4.103	25.675	4.078	27.096	52.02	P
1715.	1.102	0.118	0.00745	1832376.	28.016	4.714	26.095	4.688	26.979	52.02	P
1451.	1.021	0.108	0.00745	1832364.	28.016	5.325	26.325	4.997	26.934	52.02	P
1318.	0.954	0.099	0.00745	1832316.	28.015	5.938	26.516	5.301	27.023	52.02	P
1428.	0.860	0.081	0.00745	1832212.	28.013	6.532	26.659	5.913	27.055	52.02	P
14453.	3.020	0.748	0.00671	2006084.	31.501	0.125	20.715	0.712	28.886	52.02	P
11240.	2.583	0.553	0.00671	2006020.	31.500	0.738	23.458	1.325	28.531	52.02	P
9788.	2.380	0.472	0.00671	2005988.	31.499	1.352	25.401	1.634	28.780	52.02	P
8468.	2.189	0.403	0.00671	2005903.	31.498	1.964	26.851	1.939	29.597	52.02	P
6148.	1.839	0.293	0.00671	2005724.	31.494	2.577	27.970	2.550	29.318	52.02	P
4307.	1.539	0.216	0.00671	2005549.	31.491	3.174	28.630	3.148	30.177	52.02	P
3353.	1.377	0.178	0.00671	2005868.	31.497	3.504	29.114	3.530	30.091	52.02	P
2281.	1.166	0.140	0.00671	2005844.	31.496	4.103	29.506	4.078	30.657	52.02	P
1506.	0.973	0.112	0.00671	2005817.	31.496	4.714	29.861	4.688	30.525	52.02	P
1280.	0.891	0.102	0.00671	2005804.	31.496	5.325	30.065	4.997	30.589	52.02	P
1168.	0.821	0.092	0.00671	2005763.	31.495	5.938	30.240	5.301	30.604	52.02	P
1273.	0.713	0.074	0.00671	2005676.	31.493	6.532	30.379	5.913	30.707	52.02	P
13801.	2.898	0.757	0.00670	2218118.	35.458	0.125	25.016	0.712	32.981	52.02	P
10728.	2.479	0.563	0.00670	2218019.	35.457	0.738	27.627	1.325	32.568	52.02	P
9341.	2.283	0.483	0.00670	2217969.	35.456	1.352	29.516	1.634	32.837	52.02	P
8079.	2.100	0.415	0.00670	2217884.	35.454	1.964	30.886	1.939	33.630	52.02	P
5863.	1.762	0.305	0.00670	2217708.	35.451	2.577	31.955	2.550	33.387	52.02	P
4107.	1.471	0.229	0.00670	2217536.	35.448	3.174	32.592	3.148	34.184	52.02	P
3199.	1.313	0.192	0.00670	2217857.	35.454	3.504	33.092	3.530	34.113	52.02	P
2181.	1.106	0.154	0.00670	2217835.	35.453	4.103	33.428	4.078	34.671	52.02	P
1449.	0.914	0.126	0.00670	2217810.	35.453	4.714	33.802	4.688	34.522	52.02	P
1239.	0.832	0.116	0.00670	2217797.	35.453	5.325	33.956	4.997	34.644	52.02	P
1138.	0.761	0.107	0.00670	2217761.	35.452	5.938	34.138	5.301	34.617	52.02	P
1251.	0.649	0.088	0.00670	2217684.	35.451	6.532	34.303	5.913	34.719	52.02	P
14319.	3.022	0.749	0.00658	2073059.	32.784	0.125	22.253	0.712	30.154	52.02	P
11103.	2.580	0.549	0.00658	2072982.	32.782	0.738	24.990	1.325	29.817	52.02	P
9652.	2.374	0.467	0.00658	2072943.	32.782	1.352	26.892	1.634	30.066	52.02	P
8334.	2.182	0.397	0.00658	2072858.	32.780	1.964	28.354	1.939	30.904	52.02	P
6022.	1.829	0.285	0.00658	2072680.	32.777	2.577	29.459	2.550	30.631	52.02	P
4194.	1.528	0.207	0.00658	2072506.	32.773	3.174	30.097	3.148	31.448	52.02	P
3252.	1.366	0.170	0.00658	2072833.	32.780	3.504	30.552	3.530	31.405	52.02	P
2200.	1.155	0.132	0.00658	2072817.	32.779	4.103	30.955	4.078	31.937	52.02	P
1453.	0.963	0.104	0.00658	2072800.	32.779	4.714	31.275	4.688	31.786	52.02	P
1244.	0.882	0.094	0.00658	2072792.	32.779	5.325	31.506	4.997	31.912	52.02	P
1150.	0.814	0.084	0.00658	2072749.	32.778	5.938	31.668	5.301	31.876	52.02	P
1294.	0.710	0.066	0.00658	2072658.	32.776	6.532	31.812	5.913	32.008	52.02	P

APPENDIX C2

Convective condensation of R125 within a micro-fin tube

(file: taraw.tbl)

q" (W/m^2)	ΔT_s (K)	x_q	$\dot{m}_r$ (kg/s)	P_r (Pa)	T_r (°C)	z_f (m)	T_f (°C)	z_w (m)	T_w (°C)	M (g/mole)	flow
858.	6.763	1.073	0.01379	1553765.	36.522	0.125	29.346	0.712	29.555	120.02	C
1665.	4.788	1.050	0.01379	1553473.	34.316	0.738	28.882	1.325	29.328	120.02	C
2096.	3.320	1.033	0.01379	1553326.	32.679	1.352	28.553	1.634	29.120	120.02	C
2536.	1.564	1.012	0.01379	1553025.	30.722	1.964	28.142	1.939	29.132	120.02	C
3466.	0.988	0.957	0.01379	1552393.	29.638	2.577	27.556	2.550	28.358	120.02	C
4433.	1.602	0.887	0.01379	1551776.	29.623	3.174	26.759	3.148	28.486	120.02	C
5085.	2.022	0.833	0.01379	1549710.	29.571	3.504	26.016	3.530	27.925	120.02	C
6059.	2.783	0.743	0.01379	1549262.	29.559	4.103	24.875	4.078	27.256	120.02	C
7201.	3.758	0.623	0.01379	1548765.	29.547	4.714	23.310	4.688	26.147	120.02	C
7803.	4.305	0.554	0.01379	1548513.	29.540	5.325	21.321	4.997	24.939	120.02	C
8411.	4.880	0.481	0.01379	1548344.	29.536	5.938	19.144	5.301	24.650	120.02	C
9681.	6.141	0.317	0.01379	1548018.	29.528	6.532	17.176	5.913	22.972	120.02	C
724.	6.471	1.080	0.01379	1798569.	42.071	0.125	35.248	0.712	35.442	120.02	C
1426.	4.917	1.059	0.01379	1798280.	40.306	0.738	34.730	1.325	35.209	120.02	C
1807.	3.751	1.043	0.01379	1798134.	38.985	1.352	34.430	1.634	35.008	120.02	C
2199.	2.350	1.024	0.01379	1797870.	37.400	1.964	34.058	1.939	35.011	120.02	C
3039.	0.901	0.973	0.01379	1797319.	35.486	2.577	33.523	2.550	34.319	120.02	C
3927.	1.464	0.907	0.01379	1796781.	35.474	3.174	32.826	3.148	34.396	120.02	C
4532.	1.861	0.855	0.01379	1795221.	35.439	3.504	32.255	3.530	33.916	120.02	C
5445.	2.559	0.768	0.01379	1794868.	35.431	4.103	31.199	4.078	33.334	120.02	C
6526.	3.454	0.653	0.01379	1794476.	35.422	4.714	29.809	4.688	32.290	120.02	C
7100.	3.955	0.586	0.01379	1794277.	35.417	5.325	27.978	4.997	31.227	120.02	C
7683.	4.481	0.514	0.01379	1794125.	35.414	5.938	25.980	5.301	30.924	120.02	C
8908.	5.635	0.353	0.01379	1793826.	35.407	6.532	24.070	5.913	29.378	120.02	C
1810.	1.447	1.007	0.01818	1729308.	34.517	0.125	32.588	0.712	33.124	120.02	C
3215.	1.043	0.971	0.01818	1728603.	33.910	0.738	32.079	1.325	32.821	120.02	C
3866.	1.183	0.945	0.01818	1728247.	33.901	1.352	31.641	1.634	32.496	120.02	C
4469.	1.349	0.915	0.01818	1727786.	33.891	1.964	31.124	1.939	32.653	120.02	C
5566.	1.773	0.842	0.01818	1726841.	33.869	2.577	30.456	2.550	31.636	120.02	C
6492.	2.304	0.757	0.01818	1725917.	33.847	3.174	29.736	3.148	31.893	120.02	C
7013.	2.652	0.695	0.01818	1723023.	33.780	3.504	29.309	3.530	31.300	120.02	C
7650.	3.317	0.600	0.01818	1722484.	33.767	4.103	28.330	4.078	30.731	120.02	C
8214.	4.171	0.486	0.01818	1721884.	33.753	4.714	27.294	4.688	29.742	120.02	C
8442.	4.650	0.425	0.01818	1721580.	33.746	5.325	25.952	4.997	28.705	120.02	C
8629.	5.154	0.364	0.01818	1721380.	33.741	5.938	24.708	5.301	28.647	120.02	C
8891.	6.260	0.237	0.01818	1720994.	33.732	6.532	23.659	5.913	27.399	120.02	C
2541.	2.966	1.026	0.02847	1981893.	41.303	0.125	37.712	0.712	38.323	120.02	C
4582.	1.450	0.990	0.02847	1980581.	39.478	0.738	37.038	1.325	37.880	120.02	C
5556.	1.662	0.964	0.02847	1979919.	39.464	1.352	36.448	1.634	37.438	120.02	C
6481.	1.915	0.935	0.02847	1979148.	39.448	1.964	35.743	1.939	37.673	120.02	C
8230.	2.561	0.861	0.02847	1977578.	39.415	2.577	34.809	2.550	36.172	120.02	C
9802.	3.371	0.774	0.02847	1976044.	39.382	3.174	33.816	3.148	36.658	120.02	C
10736.	3.881	0.710	0.02847	1970214.	39.260	3.504	33.020	3.530	35.744	120.02	C
11979.	4.893	0.609	0.02847	1969244.	39.239	4.103	31.550	4.078	34.804	120.02	C
13225.	6.192	0.485	0.02847	1968165.	39.216	4.714	29.823	4.688	33.363	120.02	C
13803.	6.921	0.417	0.02847	1967618.	39.205	5.325	27.803	4.997	31.721	120.02	C
14336.	7.688	0.348	0.02847	1967271.	39.197	5.938	25.722	5.301	31.580	120.02	C
15301.	9.372	0.201	0.02847	1966604.	39.183	6.532	23.925	5.913	29.560	120.02	C
2266.	2.235	1.020	0.02787	2193984.	44.949	0.125	42.112	0.712	42.776	120.02	C
4088.	1.328	0.985	0.02787	2192884.	43.762	0.738	41.462	1.325	42.282	120.02	C
4960.	1.523	0.960	0.02787	2192329.	43.751	1.352	40.933	1.634	41.874	120.02	C
5787.	1.755	0.931	0.02787	2191684.	43.739	1.964	40.284	1.939	42.072	120.02	C
7356.	2.346	0.859	0.02787	2190370.	43.713	2.577	39.434	2.550	40.755	120.02	C
8768.	3.087	0.773	0.02787	2189086.	43.688	3.174	38.552	3.148	41.189	120.02	C
9609.	3.568	0.711	0.02787	2184337.	43.596	3.504	37.890	3.530	40.385	120.02	C
10731.	4.491	0.612	0.02787	2183552.	43.581	4.103	36.517	4.078	39.478	120.02	C
11859.	5.675	0.489	0.02787	2182680.	43.564	4.714	34.987	4.688	38.172	120.02	C
12384.	6.340	0.423	0.02787	2182238.	43.555	5.325	33.111	4.997	36.715	120.02	C
12870.	7.037	0.355	0.02787	2181918.	43.549	5.938	31.227	5.301	36.576	120.02	C
13753.	8.568	0.210	0.02787	2181291.	43.537	6.532	29.621	5.913	34.755	120.02	C
3242.	2.806	1.016	0.02649	1442728.	28.353	0.125	25.006	0.712	25.531	120.02	C
5760.	1.550	0.974	0.02649	1440944.	26.745	0.738	24.400	1.325	25.043	120.02	C
6931.	1.785	0.945	0.02649	1440045.	26.720	1.352	23.663	1.634	24.539	120.02	C
8019.	2.064	0.911	0.02649	1438986.	26.692	1.964	22.857	1.939	24.857	120.02	C
10011.	2.782	0.828	0.02649	1436828.	26.635	2.577	21.778	2.550	22.985	120.02	C
11707.	3.688	0.731	0.02649	1434720.	26.578	3.174	20.548	3.148	23.655	120.02	C
12662.	4.194	0.662	0.02649	1426665.	26.362	3.504	19.309	3.530	22.539	120.02	C
13856.	5.340	0.554	0.02649	1425401.	26.328	4.103	17.734	4.078	21.521	120.02	C
14937.	6.812	0.422	0.02649	1423997.	26.290	4.714	15.699	4.688	19.870	120.02	C
15387.	7.639	0.353	0.02649	1423285.	26.271	5.325	13.534	4.997	17.948	120.02	C
15766.	8.516	0.282	0.02649	1422959.	26.262	5.938	11.287	5.301	17.806	120.02	C
16335.	10.440	0.135	0.02649	1422364.	26.246	6.532	9.460	5.913	15.572	120.02	C
2858.	3.418	1.025	0.02702	1643882.	34.104	0.125	29.920	0.712	30.704	120.02	C
5109.	1.497	0.987	0.02702	1642290.	31.861	0.738	29.230	1.325	30.226	120.02	C
6167.	1.713	0.960	0.02702	1641488.	31.841	1.352	28.572	1.634	29.765	120.02	C
7160.	1.972	0.929	0.02702	1640563.	31.819	1.964	27.799	1.939	30.037	120.02	C
9004.	2.634	0.852	0.02702	1638683.	31.773	2.577	26.771	2.550	28.367	120.02	C
10612.	3.467	0.761	0.02702	1636846.	31.729	3.174	25.694	3.148	28.931	120.02	C
11541.	3.954	0.696	0.02702	1629794.	31.557	3.504	24.815	3.530	27.942	120.02	C
12736.	5.003	0.593	0.02702	1628670.	31.530	4.103	23.273	4.078	27.001	120.02	C
13876.	6.350	0.467	0.02702	1627420.	31.500	4.714	21.471	4.688	25.481	120.02	C
14377.	7.106	0.400	0.02702	1626786.	31.484	5.325	19.314	4.997	23.765	120.02	C
14821.	7.905	0.331	0.02702	1626444.	31.476	5.938	17.205	5.301	23.643	120.02	C
15564.	9.659	0.187	0.02702	1625799.	31.460	6.532	15.458	5.913	21.595	120.02	C
2525.	3.028	1.024	0.02726	1769504.	36.770	0.125	33.087	0.712	33.752	120.02	C
4547.	1.374	0.989	0.02726	1768033.	34.820	0.738	32.446	1.325	33.319	120.02	C
5511.	1.574	0.964	0.02726	1767292.	34.803	1.352	31.855	1.634	32.895	120.02	C
6424.	1.812	0.935	0.02726	1766438.	34.784	1.964	31.156	1.939	33.132	120.02	C
8148.	2.423	0.864	0.02726	1764702.	34.744	2.577	30.222	2.550	31.633	120.02	C
9691.	3.191	0.779	0.02726	1763005.	34.705	3.174	29.237	3.148	32.137	120.02	C
10604.	3.648	0.718	0.02726	1756545.	34.556	3.504	28.444	3.530	31.208	120.02	C
11815.	4.612	0.620	0.02726	1755478.	34.532	4.103	27.017	4.078	30.361	120.02	C
13022.	5.851	0.500	0.02726	1754292.	34.505	4.714	25.336	4.688	28.956	120.02	C
13578.	6.547	0.435	0.02726	1753691.	34.491	5.325	23.335	4.997	27.379	120.02	C
14089.	7.280	0.368	0.02726	1753316.	34.482	5.938	21.322	5.301	27.269	120.02	C
15007.	8.890	0.226	0.02726	1752595.	34.465	6.532	19.530	5.913	25.384	120.02	C
1031.	1.599	1.016	0.01180	1909153.	39.122	0.125	37.090	0.712	37.483	120.02	C
1859.	0.597	0.982	0.01180	1908909.	37.952	0.738	36.690	1.325	37.258	120.02	C
2253.	0.718	0.957	0.01180	1908786.	37.949	1.352	36.389	1.634	37.001	120.02	C
2628.	0.861	0.929	0.01180	1908586.	37.945	1.964	36.025	1.939	37.094	120.02	C
3335.	1.222	0.859	0.01180	1908170.	37.936	2.577	35.528	2.550	36.393	120.02	C
3969.	1.673	0.775	0.01180	1907764.	37.927	3.174	35.022	3.148	36.627	120.02	C
4346.	2.004	0.713	0.01180	1907116.	37.913	3.504	34.683	3.530	36.129	120.02	C
4845.	2.564	0.616	0.01180	1906931.	37.909	4.103	33.862	4.078	35.719	120.02	C
5345.	3.282	0.497	0.01180	1906726.	37.904	4.714	32.954	4.688	34.797	120.02	C
5576.	3.684	0.432	0.01180	1906622.	37.902	5.325	31.817	4.997	33.951	120.02	C
5788.	4.105	0.365	0.01180	1906539.	37.900	5.938	30.742	5.301	33.799	120.02	C
6172.	5.028	0.225	0.01180	1906376.	37.897	6.532	29.915	5.913	32.667	120.02	C
425.	0.555	1.007	0.00900	2141500.	43.208	0.125	41.974	0.712	42.622	120.02	C
814.	0.223	0.987	0.00900	2141391.	42.753	0.738	41.599	1.325	42.374	120.02	C
1017.	0.311	0.971	0.00900	2141336.	42.752	1.352	41.406	1.634	42.243	120.02	C
1223.	0.416	0.953	0.00900	2141234.	42.750	1.964	41.154	1.939	42.300	120.02	C
1652.	0.680	0.905	0.00900	2141020.	42.746	2.577	40.735	2.550	41.854	120.02	C
2090.	1.010	0.845	0.00900	2140810.	42.742	3.174	40.392	3.148	42.000	120.02	C
2380.	1.258	0.798	0.00900	2140691.	42.739	3.504	40.391	3.530	41.728	120.02	C
2810.	1.666	0.721	0.00900	2140647.	42.739	4.103	39.678	4.078	41.436	120.02	C
3308.	2.189	0.620	0.00900	2140598.	42.738	4.714	38.969	4.688	40.731	120.02	C
3567.	2.482	0.563	0.00900	2140573.	42.737	5.325	37.880	4.997	40.100	120.02	C
3828.	2.787	0.502	0.00900	2140493.	42.735	5.938	36.860	5.301	39.952	120.02	C
4367.	3.456	0.366	0.00900	2140321.	42.732	6.532	36.006	5.913	38.999	120.02	C
565.	0.751	1.012	0.00955	2252887.	45.588	0.125	44.219	0.712	44.753	120.02	C
1065.	0.242	0.985	0.00955	2252772.	44.912	0.738	43.849	1.325	44.468	120.02	C
1321.	0.362	0.966	0.00955	2252713.	44.911	1.352	43.633	1.634	44.305	120.02	C
1576.	0.505	0.942	0.00955	2252589.	44.909	1.964	43.347	1.939	44.366	120.02	C
2096.	0.865	0.883	0.00955	2252329.	44.904	2.577	42.901	2.550	43.805	120.02	C
2615.	1.312	0.808	0.00955	2252075.	44.899	3.174	42.461	3.148	43.954	120.02	C
2953.	1.650	0.751	0.00955	2251971.	44.897	3.504	42.224	3.530	43.553	120.02	C
3445.	2.204	0.658	0.00955	2251930.	44.896	4.103	41.387	4.078	43.152	120.02	C
4002.	2.913	0.538	0.00955	2251884.	44.895	4.714	40.437	4.688	42.209	120.02	C
4288.	3.310	0.470	0.00955	2251861.	44.895	5.325	39.189	4.997	41.376	120.02	C
4573.	3.725	0.398	0.00955	2251807.	44.894	5.938	37.952	5.301	41.163	120.02	C
5154.	4.635	0.240	0.00955	2251693.	44.892	6.532	37.046	5.913	39.914	120.02	C
899.	2.803	1.029	0.01360	1393465.	28.359	0.125	24.897	0.712	25.225	120.02	C
1765.	0.690	1.005	0.01360	1393118.	25.975	0.738	24.573	1.325	24.994	120.02	C
2233.	0.359	0.987	0.01360	1392944.	25.446	1.352	24.203	1.634	24.750	120.02	C
2716.	0.586	0.966	0.01360	1392600.	25.437	1.964	23.701	1.939	24.824	120.02	C
3748.	1.160	0.909	0.01360	1391881.	25.417	2.577	22.964	2.550	23.905	120.02	C
4837.	1.879	0.835	0.01360	1391177.	25.398	3.174	22.140	3.148	24.173	120.02	C
5576.	2.368	0.778	0.01360	1388845.	25.334	3.504	21.115	3.530	23.499	120.02	C
6693.	3.259	0.681	0.01360	1388362.	25.321	4.103	19.709	4.078	22.666	120.02	C
8014.	4.402	0.552	0.01360	1387826.	25.306	4.714	17.728	4.688	21.398	120.02	C
8716.	5.042	0.477	0.01360	1387554.	25.298	5.325	15.233	4.997	19.942	120.02	C

9427.	5.717	0.398	0.01360	1387402.	25.294	5.938	12.574	5.301	19.590	120.02	C
10924.	7.195	0.219	0.01360	1387115.	25.286	6.532	10.219	5.913	17.445	120.02	C
1479.	4.159	1.040	0.02132	1459475.	31.127	0.125	26.304	0.712	26.816	120.02	C
2821.	2.019	1.015	0.02132	1458480.	28.679	0.738	25.812	1.325	26.415	120.02	C
3521.	0.763	0.997	0.02132	1457978.	27.197	1.352	25.282	1.634	26.070	120.02	C
4227.	1.011	0.975	0.02132	1457255.	27.178	1.964	24.650	1.939	26.198	120.02	C
5689.	1.648	0.918	0.02132	1455764.	27.139	2.577	23.753	2.550	24.937	120.02	C
7177.	2.448	0.846	0.02132	1454306.	27.100	3.174	22.717	3.148	25.384	120.02	C
8161.	2.925	0.792	0.02132	1448540.	26.947	3.504	21.593	3.530	24.560	120.02	C
9614.	3.923	0.701	0.02132	1447406.	26.917	4.103	20.029	4.078	23.484	120.02	C
11286.	5.206	0.583	0.02132	1446145.	26.883	4.714	17.898	4.688	22.098	120.02	C
12158.	5.926	0.515	0.02132	1445506.	26.866	5.325	15.265	4.997	20.455	120.02	C
13031.	6.688	0.444	0.02132	1445153.	26.857	5.938	12.408	5.301	20.154	120.02	C
14837.	8.362	0.285	0.02132	1444486.	26.839	6.532	9.689	5.913	18.081	120.02	C
1773.	4.667	1.047	0.02178	1591035.	34.940	0.125	29.489	0.712	30.112	120.02	C
3322.	2.275	1.018	0.02178	1590072.	32.192	0.738	28.880	1.325	29.630	120.02	C
4110.	0.912	0.996	0.02178	1589587.	30.569	1.352	28.275	1.634	29.224	120.02	C
4891.	1.205	0.970	0.02178	1588897.	30.552	1.964	27.560	1.939	29.397	120.02	C
6473.	1.952	0.904	0.02178	1587472.	30.517	2.577	26.535	2.550	27.943	120.02	C
8038.	2.887	0.822	0.02178	1586081.	30.482	3.174	25.372	3.148	28.369	120.02	C
9048.	3.486	0.761	0.02178	1580881.	30.353	3.504	24.205	3.530	27.449	120.02	C
10511.	4.652	0.659	0.02178	1579937.	30.329	4.103	22.437	4.078	26.302	120.02	C
12153.	6.149	0.528	0.02178	1578887.	30.303	4.714	20.097	4.688	24.657	120.02	C
12993.	6.988	0.455	0.02178	1578355.	30.290	5.325	17.233	4.997	22.782	120.02	C
13824.	7.874	0.378	0.02178	1578076.	30.283	5.938	14.221	5.301	22.410	120.02	C
15513.	9.816	0.208	0.02178	1577551.	30.270	6.532	11.597	5.913	19.944	120.02	C
925.	0.312	1.000	0.01803	1867675.	37.054	0.125	36.192	0.712	36.601	120.02	C
1793.	0.519	0.979	0.01803	1867062.	37.040	0.738	35.778	1.325	36.344	120.02	C
2255.	0.673	0.963	0.01803	1866752.	37.033	1.352	35.434	1.634	36.106	120.02	C
2726.	0.856	0.945	0.01803	1866325.	37.024	1.964	35.001	1.939	36.212	120.02	C
3720.	1.321	0.896	0.01803	1865446.	37.005	2.577	34.371	2.550	35.337	120.02	C
4752.	1.902	0.833	0.01803	1864587.	36.986	3.174	33.681	3.148	35.510	120.02	C
5445.	2.294	0.785	0.01803	1861922.	36.927	3.504	33.112	3.530	34.986	120.02	C
6483.	3.018	0.704	0.01803	1861369.	36.915	4.103	31.992	4.078	34.332	120.02	C
7696.	3.947	0.597	0.01803	1860755.	36.902	4.714	30.580	4.688	33.259	120.02	C
8335.	4.468	0.536	0.01803	1860443.	36.895	5.325	28.736	4.997	32.115	120.02	C
8980.	5.015	0.470	0.01803	1860227.	36.890	5.938	26.743	5.301	31.892	120.02	C
10326.	6.216	0.324	0.01803	1859807.	36.881	6.532	24.806	5.913	30.320	120.02	C
1401.	4.737	1.064	0.02019	2048019.	45.288	0.125	39.963	0.712	40.477	120.02	C
2633.	2.988	1.035	0.02019	2047430.	43.234	0.738	39.323	1.325	40.010	120.02	C
3262.	1.747	1.014	0.02019	2047132.	41.769	1.352	38.819	1.634	39.643	120.02	C
3887.	1.092	0.988	0.02019	2046696.	40.848	1.964	38.233	1.939	39.764	120.02	C
5157.	1.744	0.923	0.02019	2045794.	40.830	2.577	37.396	2.550	38.594	120.02	C
6419.	2.557	0.842	0.02019	2044913.	40.812	3.174	36.467	3.148	38.817	120.02	C
7238.	3.120	0.781	0.02019	2041956.	40.751	3.504	35.672	3.530	38.098	120.02	C
8425.	4.129	0.681	0.02019	2041441.	40.741	4.103	34.186	4.078	37.184	120.02	C
9765.	5.422	0.551	0.02019	2040868.	40.729	4.714	32.341	4.688	35.706	120.02	C
10452.	6.147	0.478	0.02019	2040578.	40.723	5.325	30.012	4.997	34.166	120.02	C
11134.	6.908	0.402	0.02019	2040380.	40.719	5.938	27.557	5.301	33.840	120.02	C
12521.	8.576	0.232	0.02019	2039994.	40.711	6.532	25.375	5.913	31.687	120.02	C
1110.	3.034	1.046	0.02021	2216140.	46.953	0.125	43.283	0.712	43.924	120.02	C
2117.	1.791	1.021	0.02021	2215617.	45.451	0.738	42.710	1.325	43.441	120.02	C
2642.	0.902	1.003	0.02021	2215353.	44.372	1.352	42.284	1.634	43.130	120.02	C
3171.	0.943	0.981	0.02021	2214966.	44.189	1.964	41.778	1.939	43.245	120.02	C
4266.	1.496	0.925	0.02021	2214166.	44.174	2.577	41.047	2.550	42.257	120.02	C
5380.	2.186	0.854	0.02021	2213385.	44.158	3.174	40.269	3.148	42.436	120.02	C
6116.	2.665	0.799	0.02021	2210818.	44.109	3.504	39.701	3.530	41.829	120.02	C
7202.	3.519	0.709	0.02021	2210335.	44.100	4.103	38.389	4.078	41.055	120.02	C
8452.	4.615	0.591	0.02021	2209799.	44.089	4.714	36.837	4.688	39.812	120.02	C
9102.	5.229	0.524	0.02021	2209527.	44.084	5.325	34.767	4.997	38.510	120.02	C
9754.	5.873	0.453	0.02021	2209311.	44.080	5.938	32.582	5.301	38.237	120.02	C
11099.	7.285	0.296	0.02021	2208886.	44.072	6.532	30.556	5.913	36.417	120.02	C
12802.	5.298	0.786	0.01725	2037196.	40.653	0.125	29.316	0.712	35.461	120.02	P
10438.	4.606	0.592	0.01725	2036813.	40.646	0.738	31.367	1.325	35.791	120.02	P
9346.	4.292	0.508	0.01725	2036619.	40.642	1.352	33.015	1.634	36.174	120.02	P
8334.	4.004	0.434	0.01725	2036386.	40.637	1.964	34.305	1.939	37.168	120.02	P
6498.	3.492	0.311	0.01725	2035911.	40.627	2.577	35.383	2.550	36.882	120.02	P
4956.	3.079	0.218	0.01725	2035447.	40.618	3.174	36.053	3.148	37.512	120.02	P
4104.	2.856	0.170	0.01725	2034947.	40.607	3.504	36.583	3.530	37.647	120.02	P
3054.	2.610	0.116	0.01725	2034889.	40.606	4.103	36.992	4.078	38.258	120.02	P
2132.	2.422	0.073	0.01725	2034824.	40.605	4.714	37.420	4.688	38.162	120.02	P
1763.	2.360	0.057	0.01725	2034791.	40.604	5.325	37.603	4.997	38.182	120.02	P
1466.	2.322	0.044	0.01725	2034758.	40.603	5.938	37.791	5.301	38.263	120.02	P
1062.	2.313	0.023	0.01725	2034691.	40.602	6.532	37.936	5.913	38.295	120.02	P
10267.	4.366	0.806	0.01693	2256267.	44.979	0.125	35.584	0.712	40.719	120.02	P
8404.	3.797	0.634	0.01693	2255921.	44.972	0.738	37.234	1.325	40.954	120.02	P
7548.	3.533	0.561	0.01693	2255747.	44.969	1.352	38.620	1.634	41.277	120.02	P
6760.	3.288	0.495	0.01693	2255548.	44.965	1.964	39.674	1.939	42.099	120.02	P
5342.	2.839	0.385	0.01693	2255145.	44.957	2.577	40.584	2.550	41.930	120.02	P
4168.	2.458	0.300	0.01693	2254750.	44.950	3.174	41.173	3.148	42.499	120.02	P
3531.	2.242	0.255	0.01693	2254430.	44.944	3.504	41.647	3.530	42.610	120.02	P
2761.	1.980	0.204	0.01693	2254263.	44.941	4.103	41.988	4.078	43.179	120.02	P
2112.	1.744	0.160	0.01693	2254077.	44.937	4.714	42.412	4.688	43.157	120.02	P
1867.	1.647	0.141	0.01693	2253982.	44.935	5.325	42.597	4.997	43.240	120.02	P
1680.	1.567	0.125	0.01693	2253892.	44.934	5.938	42.835	5.301	43.347	120.02	P
1468.	1.450	0.097	0.01693	2253712.	44.930	6.532	43.092	5.913	43.492	120.02	P
16679.	6.071	0.784	0.02035	1550752.	29.597	0.125	14.308	0.712	23.463	120.02	P
13384.	5.135	0.599	0.02035	1549854.	29.574	0.738	17.540	1.325	24.219	120.02	P
11879.	4.705	0.521	0.02035	1549401.	29.563	1.352	19.986	1.634	24.832	120.02	P
10499.	4.312	0.452	0.02035	1549042.	29.554	1.964	21.974	1.939	25.989	120.02	P
8034.	3.607	0.339	0.02035	1548336.	29.536	2.577	23.554	2.550	25.539	120.02	P
6022.	3.025	0.255	0.02035	1547646.	29.518	3.174	24.511	3.148	26.477	120.02	P
4942.	2.691	0.213	0.02035	1546513.	29.490	3.504	25.181	3.530	26.579	120.02	P
3669.	2.322	0.166	0.02035	1546237.	29.483	4.103	25.830	4.078	27.444	120.02	P
2641.	2.018	0.128	0.02035	1545931.	29.475	4.714	26.396	4.688	27.367	120.02	P
2276.	1.906	0.112	0.02035	1545776.	29.471	5.325	26.805	4.997	27.507	120.02	P
2018.	1.824	0.099	0.02035	1545637.	29.467	5.938	27.105	5.301	27.637	120.02	P
1806.	1.743	0.076	0.02035	1545360.	29.460	6.532	27.343	5.913	27.774	120.02	P
18462.	6.486	0.791	0.02110	1410543.	25.926	0.125	9.019	0.712	19.369	120.02	P
14826.	5.505	0.601	0.02110	1409530.	25.899	0.738	12.588	1.325	20.146	120.02	P
13164.	5.056	0.520	0.02110	1409019.	25.885	1.352	15.289	1.634	20.821	120.02	P
11638.	4.645	0.450	0.02110	1408623.	25.874	1.964	17.534	1.939	22.058	120.02	P
8907.	3.910	0.333	0.02110	1407848.	25.853	2.577	19.289	2.550	21.476	120.02	P
6668.	3.305	0.247	0.02110	1407091.	25.832	3.174	20.342	3.148	22.529	120.02	P
5462.	2.954	0.203	0.02110	1405757.	25.796	3.504	21.051	3.530	22.585	120.02	P
4030.	2.576	0.155	0.02110	1405470.	25.788	4.103	21.802	4.078	23.540	120.02	P
2858.	2.267	0.116	0.02110	1405150.	25.780	4.714	22.397	4.688	23.416	120.02	P
2433.	2.155	0.101	0.02110	1404988.	25.775	5.325	22.865	4.997	23.563	120.02	P
2126.	2.074	0.088	0.02110	1404845.	25.771	5.938	23.169	5.301	23.682	120.02	P
1840.	2.001	0.066	0.02110	1404559.	25.763	6.532	23.390	5.913	23.824	120.02	P
14810.	5.629	0.785	0.02076	1822186.	36.046	0.125	22.157	0.712	30.393	120.02	P
11917.	4.775	0.611	0.02076	1821414.	36.028	0.738	24.991	1.325	31.045	120.02	P
10595.	4.382	0.537	0.02076	1821025.	36.020	1.352	27.226	1.634	31.554	120.02	P
9383.	4.020	0.473	0.02076	1820698.	36.012	1.964	28.930	1.939	32.659	120.02	P
7216.	3.367	0.365	0.02076	1820049.	35.998	2.577	30.337	2.550	32.331	120.02	P
5446.	2.822	0.285	0.02076	1819416.	35.984	3.174	31.222	3.148	33.127	120.02	P
4496.	2.507	0.245	0.02076	1818324.	35.959	3.504	31.886	3.530	33.276	120.02	P
3374.	2.152	0.199	0.02076	1818068.	35.953	4.103	32.415	4.078	34.044	120.02	P
2466.	1.849	0.162	0.02076	1817783.	35.947	4.714	32.991	4.688	34.026	120.02	P
2142.	1.732	0.147	0.02076	1817639.	35.944	5.325	33.289	4.997	34.165	120.02	P
1913.	1.641	0.134	0.02076	1817482.	35.940	5.938	33.607	5.301	34.287	120.02	P
1720.	1.532	0.110	0.02076	1817164.	35.933	6.532	33.865	5.913	34.448	120.02	P
19624.	6.569	0.788	0.02773	1820884.	36.016	0.125	20.351	0.712	29.267	120.02	P
15803.	5.604	0.615	0.02773	1819567.	35.987	0.738	23.534	1.325	30.289	120.02	P
14060.	5.157	0.542	0.02773	1818903.	35.972	1.352	25.977	1.634	30.755	120.02	P
12464.	4.747	0.478	0.02773	1818384.	35.960	1.964	27.974	1.939	32.112	120.02	P
9618.	4.003	0.371	0.02773	1817367.	35.938	2.577	29.529	2.550	31.526	120.02	P
7303.	3.378	0.291	0.02773	1816373.	35.915	3.174	30.522	3.148	32.383	120.02	P
6068.	2.989	0.250	0.02773	1813899.	35.860	3.504	31.205	3.530	32.676	120.02	P
4619.	2.573	0.204	0.02773	1813395.	35.848	4.103	31.883	4.078	33.520	120.02	P
3463.	2.209	0.166	0.02773	1812835.	35.836	4.714	32.504	4.688	33.556	120.02	P
3059.	2.065	0.150	0.02773	1812552.	35.830	5.325	32.945	4.997	33.720	120.02	P
2783.	1.951	0.136	0.02773	1812299.	35.824	5.938	33.310	5.301	33.874	120.02	P
2587.	1.799	0.110	0.02773	1811793.	35.813	6.532	33.620	5.913	34.077	120.02	P
22505.	6.866	0.785	0.02789	1454394.	27.102	0.125	9.202	0.712	20.117	120.02	P
18173.	5.932	0.608	0.02789	1452699.	27.058	0.738	12.830	1.325	20.939	120.02	P
16195.	5.496	0.532	0.02789	1451845.	27.035	1.352	15.588	1.634	21.495	120.02	P
14378.	5.095	0.465	0.02789	1451201.	27.018	1.964	17.916	1.939	22.899	120.02	P
11130.	4.361	0.355	0.02789	1449942.	26.984	2.577	19.715	2.550	22.072	120.02	P
8472.	3.733	0.272	0.02789	1448711.	26.952	3.174	20.848	3.148	23.095	120.02	P
7042.	3.315	0.230	0.02789	1445589.	26.868	3.504	21.590	3.530	23.322	120.02	P
5348.	2.884	0.182	0.02789	1444994.	26.853	4.103	22.406	4.078	24.316	120.02	P
3968.	2.492	0.142	0.02789	1444332.	26.835	4.714	23.088	4.688	24.285	120.02	P
3470.	2.329	0.125	0.02789	1443997.	26.826	5.325	23.634	4.997	24.460	120.02	P
3114.	2.193	0.111	0.02789	1443729.	26.819	5.938	24.029	5.301	24.634	120.02	P
2794.	1.990	0.086	0.02789	1443200.	26.805	6.532	24.319	5.913	24.836	120.02	P
11694.	4.551	0.759	0.01300	1395225.	25.509	0.125	12.117	0.712	21.026	120.02	P
9260.	3.825	0.565	0.01300	1394965.	25.502	0.738	15.094	1.325	21.324	120.02	P
8151.	3.493	0.484	0.01300	1394835.	25.498	1.352	17.428	1.634	21.952	120.02	P
7136.	3.189	0.414	0.01300	1394696.	25.494	1.964	19.342	1.939	22.903	120.02	P
5330.	2.647	0.299	0.01300	1394414.	25.486	2.577	20.735	2.550	22.603	120.02	P
3866.	2.206	0.217	0.01300	1394139.	25.479	3.174	21.535	3.148	23.323	120.02	P
3084.	1.969	0.177	0.01300	1393977.	25.475	3.504	22.121	3.530	23.276	120.02	P
2174.	1.703	0.133	0.01300	1394101.	25.478	4.103	22.657	4.078	24.021	120.02	P
1454.	1.492	0.100	0.01300	1394238.	25.482	4.714	23.091	4.688	23.925	120.02	P
1207.	1.421	0.088	0.01300	1394307.	25.484	5.325	23.410	4.997	24.020	120.02	P
1041.	1.368	0.078	0.01300	1394205.	25.481	5.938	23.615	5.301	24.084	120.02	P
939.	1.330	0.060	0.01300	1393973.	25.474	6.532	23.762	5.913	24.191	120.02	P
12623.	4.988	0.764	0.01336	1442236.	26.779	0.125	12.294	0.712	21.868	120.02	P
9984.	4.188	0.558	0.01336	1441982.	26.772	0.738	15.496	1.325	22.192	120.02	P
8779.	3.828	0.472	0.01336	1441855.	26.769	1.352	18.018	1.634	22.904	120.02	P
7673.	3.501	0.397	0.01336	1441706.	26.765	1.964	20.060	1.939	23.893	120.02	P
5697.	2.929	0.276	0.01336	1441403.	26.757	2.577	21.553	2.550	23.587	120.02	P
4082.	2.480	0.190	0.01336	1441107.	26.749	3.174	22.402	3.148	24.307	120.02	P
3214.	2.250	0.148	0.01336	1440929.	26.744	3.504	23.016	3.530	24.258	120.02	P
2191.	1.998	0.104	0.01336	1440694.	26.738	4.103	23.566	4.078	24.991	120.02	P
1362.	1.825	0.073	0.01336	1440433.	26.731	4.714	23.993	4.688	24.847	120.02	P
1066.	1.780	0.062	0.01336	1440301.	26.727	5.325	24.272	4.997	24.880	120.02	P
856.	1.765	0.053	0.01336	1440178.	26.724	5.938	24.436	5.301	24.963	120.02	P
679.	1.820	0.040	0.01336	1439932.	26.717	6.532	24.505	5.913	24.933	120.02	P
10511.	4.369	0.780	0.01328	1902336.	37.809	0.125	25.800	0.712	33.519	120.02	P
8247.	3.662	0.585	0.01328	1902083.	37.804	0.738	28.545	1.325	33.819	120.02	P
7222.	3.338	0.503	0.01328	1901956.	37.801	1.352	30.671	1.634	34.414	120.02	P
6288.	3.042	0.433	0.01328	1901804.	37.798	1.964	32.242	1.939	35.231	120.02	P
4639.	2.511	0.320	0.01328	1901494.	37.791	2.577	33.479	2.550	35.115	120.02	P
3323.	2.078	0.239	0.01328	1901191.	37.785	3.174	34.184	3.148	35.759	120.02	P

2633.	1.844	0.200	0.01328	1900960.	37.780	3.504	34.749	3.530	35.768	120.02	P
1851.	1.571	0.159	0.01328	1900713.	37.774	4.103	35.161	4.078	36.402	120.02	P
1268.	1.350	0.127	0.01328	1900439.	37.768	4.714	35.588	4.688	36.362	120.02	P
1088.	1.272	0.115	0.01328	1900300.	37.765	5.325	35.805	4.997	36.414	120.02	P
987.	1.217	0.104	0.01328	1900177.	37.763	5.938	36.025	5.301	36.526	120.02	P
1011.	1.172	0.084	0.01328	1899932.	37.757	6.532	36.230	5.913	36.643	120.02	P
6031.	2.696	0.782	0.01042	2256177.	44.977	0.125	37.498	0.712	42.412	120.02	P
4761.	2.278	0.621	0.01042	2256055.	44.975	0.738	39.072	1.325	42.453	120.02	P
4187.	2.085	0.554	0.01042	2255994.	44.973	1.352	40.388	1.634	42.786	120.02	P
3664.	1.905	0.496	0.01042	2255884.	44.971	1.964	41.275	1.939	43.317	120.02	P
2743.	1.577	0.401	0.01042	2255655.	44.967	2.577	42.025	2.550	43.312	120.02	P
2008.	1.300	0.332	0.01042	2255431.	44.963	3.174	42.483	3.148	43.742	120.02	P
1625.	1.151	0.298	0.01042	2255569.	44.965	3.504	42.885	3.530	43.705	120.02	P
1192.	0.960	0.261	0.01042	2255398.	44.962	4.103	43.079	4.078	44.143	120.02	P
873.	0.791	0.230	0.01042	2255207.	44.958	4.714	43.431	4.688	44.148	120.02	P
776.	0.723	0.218	0.01042	2255111.	44.957	5.325	43.508	4.997	44.191	120.02	P
724.	0.666	0.207	0.01042	2255003.	44.955	5.938	43.693	5.301	44.270	120.02	P
748.	0.586	0.186	0.01042	2254783.	44.950	6.532	43.905	5.913	44.378	120.02	P
18113.	7.062	0.800	0.02401	2138906.	42.704	0.125	24.651	0.712	35.569	120.02	P
14253.	5.883	0.599	0.02401	2138146.	42.689	0.738	28.836	1.325	36.535	120.02	P
12504.	5.344	0.515	0.02401	2137763.	42.682	1.352	31.984	1.634	37.279	120.02	P
10909.	4.851	0.443	0.02401	2137477.	42.676	1.964	34.440	1.939	38.659	120.02	P
8093.	3.971	0.326	0.02401	2136920.	42.665	2.577	36.310	2.550	38.433	120.02	P
5839.	3.252	0.242	0.02401	2136375.	42.654	3.174	37.409	3.148	39.261	120.02	P
4657.	2.852	0.201	0.02401	2135379.	42.634	3.504	38.174	3.530	39.605	120.02	P
3312.	2.399	0.158	0.02401	2135019.	42.627	4.103	38.913	4.078	40.475	120.02	P
2303.	2.033	0.123	0.02401	2134620.	42.619	4.714	39.518	4.688	40.497	120.02	P
1988.	1.903	0.110	0.02401	2134417.	42.615	5.325	39.965	4.997	40.618	120.02	P
1806.	1.814	0.099	0.02401	2134294.	42.613	5.938	40.276	5.301	40.788	120.02	P
1826.	1.742	0.077	0.02401	2134059.	42.608	6.532	40.566	5.913	40.963	120.02	P
18333.	6.720	0.820	0.02573	2177632.	43.465	0.125	27.629	0.712	36.643	120.02	P
14741.	5.715	0.626	0.02573	2176777.	43.448	0.738	30.820	1.325	37.556	120.02	P
13102.	5.253	0.544	0.02573	2176345.	43.440	1.352	33.367	1.634	38.094	120.02	P
11599.	4.830	0.472	0.02573	2175993.	43.433	1.964	35.303	1.939	39.428	120.02	P
8916.	4.067	0.352	0.02573	2175298.	43.420	2.577	36.863	2.550	39.064	120.02	P
6728.	3.436	0.263	0.02573	2174619.	43.406	3.174	37.862	3.148	39.809	120.02	P
5556.	3.068	0.218	0.02573	2173025.	43.375	3.504	38.604	3.530	40.133	120.02	P
4176.	2.657	0.167	0.02573	2172575.	43.366	4.103	39.232	4.078	40.951	120.02	P
3066.	2.313	0.125	0.02573	2172075.	43.357	4.714	39.871	4.688	40.970	120.02	P
2674.	2.183	0.108	0.02573	2171821.	43.352	5.325	40.224	4.997	41.106	120.02	P
2399.	2.087	0.094	0.02573	2171706.	43.349	5.938	40.564	5.301	41.264	120.02	P
2184.	1.983	0.067	0.02573	2171494.	43.345	6.532	40.882	5.913	41.428	120.02	P

APPENDIX C3

Convective condensation of R410A within a micro-fin tube

(file: taraw.tbl)

q'' (W/m^2)	ΔT_s (K)	x_q	$\dot{m}_r$ (kg/s)	P_r (Pa)	T_r (°C)	z_f (m)	T_f (°C)	z_w (m)	T_w (°C)	M (g/mole)	flow
26759.	6.719	0.775	0.01858	1836296.	28.862	0.125	10.385	0.712	22.162	72.59	P
21346.	5.751	0.590	0.01858	1836294.	28.833	0.738	14.428	1.325	22.814	72.59	P
18881.	5.308	0.513	0.01858	1836293.	28.821	1.352	17.386	1.634	23.342	72.59	P
16623.	4.898	0.446	0.01858	1836242.	28.810	1.964	19.788	1.939	24.854	72.59	P
12606.	4.162	0.336	0.01858	1836133.	28.792	2.577	21.681	2.550	24.013	72.59	P
9344.	3.551	0.255	0.01858	1836026.	28.778	3.174	22.821	3.148	25.278	72.59	P
7607.	3.233	0.215	0.01858	1836761.	28.788	3.504	23.606	3.530	25.376	72.59	P
5576.	2.831	0.171	0.01858	1836753.	28.781	4.103	24.402	4.078	26.299	72.59	P
3968.	2.490	0.136	0.01858	1836743.	28.776	4.714	25.044	4.688	26.212	72.59	P
3414.	2.358	0.122	0.01858	1836738.	28.774	5.325	25.528	4.997	26.344	72.59	P
3039.	2.255	0.110	0.01858	1836709.	28.772	5.938	25.876	5.301	26.516	72.59	P
2801.	2.131	0.089	0.01858	1836646.	28.768	6.532	26.137	5.913	26.659	72.59	P
31919.	6.936	0.795	0.02750	1956997.	31.344	0.125	10.832	0.712	24.361	72.59	P
25481.	5.891	0.642	0.02750	1956996.	31.320	0.738	15.389	1.325	25.136	72.59	P
22553.	5.407	0.578	0.02750	1956995.	31.310	1.352	18.797	1.634	25.764	72.59	P
19875.	4.958	0.522	0.02750	1956945.	31.300	1.964	21.586	1.939	27.509	72.59	P
15117.	4.138	0.431	0.02750	1956834.	31.284	2.577	23.717	2.550	26.411	72.59	P
11269.	3.444	0.364	0.02750	1956725.	31.272	3.174	25.071	3.148	27.831	72.59	P
9228.	3.070	0.330	0.02750	1957471.	31.282	3.504	25.960	3.530	28.043	72.59	P
6857.	2.589	0.292	0.02750	1957466.	31.277	4.103	26.864	4.078	28.959	72.59	P
5003.	2.156	0.262	0.02750	1957461.	31.272	4.714	27.645	4.688	29.060	72.59	P
4378.	1.977	0.250	0.02750	1957459.	31.270	5.325	28.228	4.997	29.283	72.59	P
3969.	1.828	0.239	0.02750	1957429.	31.268	5.938	28.683	5.301	29.436	72.59	P
3766.	1.608	0.219	0.02750	1957364.	31.264	6.532	29.043	5.913	29.670	72.59	P
26134.	5.551	0.830	0.02744	2179801.	35.640	0.125	19.199	0.712	30.076	72.59	P
20753.	4.644	0.699	0.02744	2179802.	35.619	0.738	22.960	1.325	30.745	72.59	P
18308.	4.227	0.645	0.02744	2179802.	35.610	1.352	25.786	1.634	31.221	72.59	P
16074.	3.840	0.597	0.02744	2179751.	35.601	1.964	28.006	1.939	32.663	72.59	P
12115.	3.141	0.520	0.02744	2179638.	35.587	2.577	29.725	2.550	31.889	72.59	P
8926.	2.557	0.464	0.02744	2179529.	35.577	3.174	30.833	3.148	33.052	72.59	P
7243.	2.248	0.435	0.02744	2180286.	35.586	3.504	31.553	3.530	33.231	72.59	P
5300.	1.856	0.405	0.02744	2180283.	35.582	4.103	32.238	4.078	33.908	72.59	P
3805.	1.514	0.380	0.02744	2180281.	35.578	4.714	32.867	4.688	34.010	72.59	P
3313.	1.379	0.370	0.02744	2180280.	35.576	5.325	33.283	4.997	34.195	72.59	P
3004.	1.270	0.362	0.02744	2180251.	35.575	5.938	33.636	5.301	34.294	72.59	P
2910.	1.126	0.346	0.02744	2180188.	35.571	6.532	33.928	5.913	34.462	72.59	P
25786.	6.163	0.821	0.02209	2219802.	36.373	0.125	19.519	0.712	30.197	72.59	P
20550.	5.219	0.659	0.02209	2219803.	36.347	0.738	23.270	1.325	30.922	72.59	P
18173.	4.783	0.591	0.02209	2219803.	36.336	1.352	26.053	1.634	31.382	72.59	P
16001.	4.377	0.532	0.02209	2219752.	36.326	1.964	28.254	1.939	32.830	72.59	P
12152.	3.638	0.436	0.02209	2219639.	36.309	2.577	29.983	2.550	32.139	72.59	P
9055.	3.013	0.365	0.02209	2219529.	36.297	3.174	31.078	3.148	33.286	72.59	P
7422.	2.677	0.330	0.02209	2220288.	36.305	3.504	31.838	3.530	33.478	72.59	P
5539.	2.245	0.290	0.02209	2220287.	36.299	4.103	32.549	4.078	34.313	72.59	P
4093.	1.856	0.258	0.02209	2220287.	36.294	4.714	33.214	4.688	34.388	72.59	P
3620.	1.697	0.245	0.02209	2220287.	36.293	5.325	33.672	4.997	34.577	72.59	P
3326.	1.563	0.233	0.02209	2220258.	36.290	5.938	34.058	5.301	34.717	72.59	P
3247.	1.367	0.211	0.02209	2220196.	36.286	6.532	34.390	5.913	34.930	72.59	P
26872.	6.794	0.796	0.01971	2082562.	33.805	0.125	15.934	0.712	27.020	72.59	P
21466.	5.766	0.612	0.01971	2081559.	33.756	0.738	19.829	1.325	27.740	72.59	P
19005.	5.294	0.535	0.01971	2081054.	33.734	1.352	22.692	1.634	28.270	72.59	P
16752.	4.860	0.469	0.01971	2080653.	33.716	1.964	24.982	1.939	29.774	72.59	P
12744.	4.078	0.359	0.01971	2079867.	33.685	2.577	26.803	2.550	29.026	72.59	P
9495.	3.426	0.279	0.01971	2079098.	33.658	3.174	27.925	3.148	30.260	72.59	P
7767.	3.052	0.238	0.01971	2077812.	33.628	3.504	28.710	3.530	30.398	72.59	P
5752.	2.624	0.194	0.01971	2077521.	33.616	4.103	29.471	4.078	31.330	72.59	P
4163.	2.257	0.158	0.01971	2077198.	33.604	4.714	30.130	4.688	31.287	72.59	P
3619.	2.114	0.143	0.01971	2077034.	33.599	5.325	30.594	4.997	31.423	72.59	P
3256.	2.003	0.131	0.01971	2076891.	33.594	5.938	30.957	5.301	31.566	72.59	P
3041.	1.862	0.108	0.01971	2076605.	33.586	6.532	31.250	5.913	31.755	72.59	P
27335.	5.221	0.831	0.02695	1718574.	26.333	0.125	9.385	0.712	21.050	72.59	P
21750.	4.374	0.703	0.02695	1715942.	26.254	0.738	13.228	1.325	21.738	72.59	P
19209.	3.980	0.650	0.02695	1714615.	26.217	1.352	16.131	1.634	22.171	72.59	P
16886.	3.616	0.603	0.02695	1713451.	26.184	1.964	18.457	1.939	23.401	72.59	P
12759.	2.950	0.528	0.02695	1711140.	26.121	2.577	20.216	2.550	22.487	72.59	P
9421.	2.381	0.473	0.02695	1708881.	26.063	3.174	21.364	3.148	23.737	72.59	P
7651.	1.916	0.446	0.02695	1701009.	25.884	3.504	22.081	3.530	23.850	72.59	P
5592.	1.524	0.416	0.02695	1699535.	25.847	4.103	22.819	4.078	24.543	72.59	P
3981.	1.167	0.392	0.02695	1697898.	25.807	4.714	23.439	4.688	24.609	72.59	P
3437.	1.017	0.383	0.02695	1697068.	25.787	5.325	23.906	4.997	24.784	72.59	P
3081.	0.879	0.375	0.02695	1695721.	25.756	5.938	24.249	5.301	24.872	72.59	P
2901.	0.659	0.360	0.02695	1692927.	25.691	6.532	24.504	5.913	25.018	72.59	P
30763.	5.956	0.854	0.02767	1849486.	29.152	0.125	9.977	0.712	23.155	72.59	P
24458.	4.994	0.711	0.02767	1847024.	29.077	0.738	14.353	1.325	23.884	72.59	P
21592.	4.546	0.651	0.02767	1845783.	29.042	1.352	17.666	1.634	24.416	72.59	P
18973.	4.132	0.599	0.02767	1844715.	29.011	1.964	20.294	1.939	25.805	72.59	P
14324.	3.374	0.514	0.02767	1842599.	28.954	2.577	22.303	2.550	24.852	72.59	P
10571.	2.725	0.452	0.02767	1840530.	28.901	3.174	23.603	3.148	26.208	72.59	P
8585.	2.235	0.422	0.02767	1833406.	28.747	3.504	24.414	3.530	26.393	72.59	P
6283.	1.781	0.389	0.02767	1832004.	28.713	4.103	25.257	4.078	27.184	72.59	P
4495.	1.365	0.362	0.02767	1830446.	28.676	4.714	25.964	4.688	27.270	72.59	P
3898.	1.190	0.351	0.02767	1829656.	28.658	5.325	26.494	4.997	27.480	72.59	P
3514.	1.041	0.342	0.02767	1828926.	28.641	5.938	26.894	5.301	27.614	72.59	P
3353.	0.811	0.325	0.02767	1827462.	28.608	6.532	27.199	5.913	27.768	72.59	P
26619.	5.467	0.830	0.02253	1728048.	26.541	0.125	9.648	0.712	21.078	72.59	P
21230.	4.634	0.680	0.02253	1726275.	26.479	0.738	13.439	1.325	21.625	72.59	P
18782.	4.244	0.618	0.02253	1725381.	26.450	1.352	16.274	1.634	22.052	72.59	P
16543.	3.882	0.564	0.02253	1724606.	26.424	1.964	18.564	1.939	23.457	72.59	P
12571.	3.213	0.474	0.02253	1723070.	26.377	2.577	20.327	2.550	22.523	72.59	P
9365.	2.634	0.409	0.02253	1721569.	26.334	3.174	21.442	3.148	23.703	72.59	P
7669.	2.225	0.377	0.02253	1717169.	26.232	3.504	22.163	3.530	23.870	72.59	P
5703.	1.811	0.341	0.02253	1716296.	26.208	4.103	22.929	4.078	24.667	72.59	P
4177.	1.421	0.311	0.02253	1715327.	26.182	4.714	23.566	4.688	24.732	72.59	P
3667.	1.252	0.299	0.02253	1714835.	26.170	5.325	24.079	4.997	24.930	72.59	P
3340.	1.105	0.289	0.02253	1714403.	26.159	5.938	24.451	5.301	25.073	72.59	P
3204.	0.864	0.270	0.02253	1713541.	26.137	6.532	24.739	5.913	25.230	72.59	P
12607.	3.378	0.776	0.00837	1695396.	25.809	0.125	14.640	0.712	22.611	72.59	P
9862.	2.840	0.590	0.00837	1695285.	25.777	0.738	17.398	1.325	22.607	72.59	P
8621.	2.591	0.513	0.00837	1695229.	25.765	1.352	19.396	1.634	23.105	72.59	P
7492.	2.359	0.447	0.00837	1695121.	25.753	1.964	20.936	1.939	23.785	72.59	P
5504.	1.936	0.341	0.00837	1694894.	25.732	2.577	22.133	2.550	23.470	72.59	P
3924.	1.575	0.267	0.00837	1694672.	25.717	3.174	22.803	3.148	24.235	72.59	P
3103.	1.380	0.230	0.00837	1694912.	25.717	3.504	23.283	3.530	24.218	72.59	P
2178.	1.128	0.192	0.00837	1694853.	25.711	4.103	23.737	4.078	24.824	72.59	P
1503.	0.897	0.163	0.00837	1694786.	25.705	4.714	24.112	4.688	24.800	72.59	P
1303.	0.800	0.152	0.00837	1694752.	25.703	5.325	24.404	4.997	24.914	72.59	P
1200.	0.718	0.142	0.00837	1694731.	25.701	5.938	24.602	5.301	24.978	72.59	P
1272.	0.590	0.123	0.00837	1694689.	25.697	6.532	24.756	5.913	25.047	72.59	P
12477.	3.316	0.808	0.00837	1847804.	29.109	0.125	18.080	0.712	25.973	72.59	P
9729.	2.785	0.618	0.00837	1847698.	29.077	0.738	20.826	1.325	25.971	72.59	P
8489.	2.538	0.540	0.00837	1847644.	29.064	1.352	22.816	1.634	26.418	72.59	P
7361.	2.309	0.473	0.00837	1847534.	29.051	1.964	24.306	1.939	27.149	72.59	P
5382.	1.888	0.366	0.00837	1847304.	29.031	2.577	25.479	2.550	26.838	72.59	P
3816.	1.528	0.292	0.00837	1847079.	29.015	3.174	26.143	3.148	27.584	72.59	P
3006.	1.333	0.255	0.00837	1847350.	29.016	3.504	26.633	3.530	27.576	72.59	P
2100.	1.080	0.218	0.00837	1847284.	29.009	4.103	27.048	4.078	28.156	72.59	P
1453.	0.846	0.189	0.00837	1847211.	29.003	4.714	27.433	4.688	28.137	72.59	P
1268.	0.746	0.177	0.00837	1847173.	29.001	5.325	27.691	4.997	28.245	72.59	P
1182.	0.660	0.167	0.00837	1847116.	28.998	5.938	27.900	5.301	28.346	72.59	P
1293.	0.524	0.147	0.00837	1846998.	28.993	6.532	28.069	5.913	28.419	72.59	P
9864.	2.602	0.819	0.00838	2197672.	35.968	0.125	27.174	0.712	33.568	72.59	P
7681.	2.160	0.659	0.00838	2197548.	35.939	0.738	29.351	1.325	33.479	72.59	P
6696.	1.956	0.593	0.00838	2197485.	35.928	1.352	30.975	1.634	33.835	72.59	P
5801.	1.765	0.536	0.00838	2197377.	35.917	1.964	32.145	1.939	34.452	72.59	P
4232.	1.416	0.446	0.00838	2197150.	35.899	2.577	33.078	2.550	34.267	72.59	P
2991.	1.119	0.383	0.00838	2196929.	35.885	3.174	33.623	3.148	34.877	72.59	P
2351.	0.958	0.353	0.00838	2197171.	35.885	3.504	34.054	3.530	34.871	72.59	P
1638.	0.749	0.321	0.00838	2197098.	35.879	4.103	34.334	4.078	35.297	72.59	P
1131.	0.557	0.297	0.00838	2197017.	35.874	4.714	34.670	4.688	35.305	72.59	P
989.	0.476	0.287	0.00838	2196976.	35.872	5.325	34.824	4.997	35.378	72.59	P
925.	0.406	0.279	0.00838	2196910.	35.869	5.938	35.000	5.301	35.460	72.59	P
1024.	0.295	0.262	0.00838	2196772.	35.864	6.532	35.177	5.913	35.533	72.59	P
14360.	3.826	0.814	0.01053	2018906.	32.575	0.125	20.034	0.712	28.875	72.59	P
11145.	3.162	0.635	0.01053	2018692.	32.542	0.738	23.228	1.325	29.072	72.59	P
9697.	2.856	0.561	0.01053	2018584.	32.528	1.352	25.531	1.634	29.575	72.59	P
8383.	2.574	0.499	0.01053	2018430.	32.516	1.964	27.257	1.939	30.433	72.59	P
6080.	2.061	0.399	0.01053	2018114.	32.494	2.577	28.589	2.550	30.112	72.59	P
4267.	1.632	0.330	0.01053	2017805.	32.478	3.174	29.353	3.148	30.945	72.59	P
3334.	1.397	0.297	0.01053	2017791.	32.473	3.504	29.912	3.530	30.965	72.59	P
2300.	1.107	0.262	0.01053	2017678.	32.466	4.103	30.364	4.078	31.557	72.59	P
1578.	0.853	0.237	0.01053	2017554.	32.459	4.714	30.792	4.688	31.566	72.59	P
1383.	0.750	0.226	0.01053	2017491.	32.457	5.325	31.075	4.997	31.675	72.59	P
1303.	0.666	0.217	0.01053	2017407.	32.454	5.938	31.307	5.301	31.791	72.59	P
1480.	0.548	0.199	0.01053	2017235.	32.448	6.532	31.521	5.913	31.890	72.59	P

2460.	9.619	1.064	0.01607	1670956.	34.849	0.125	24.629	0.712	25.123	72.59 C
4528.	5.085	1.032	0.01607	1670168.	30.021	0.738	24.112	1.325	24.748	72.59 C
5548.	1.910	1.009	0.01607	1669771.	26.630	1.352	23.579	1.634	24.441	72.59 C
6538.	0.788	0.983	0.01607	1669164.	25.253	1.964	22.981	1.939	24.530	72.59 C
8483.	1.394	0.917	0.01607	1667907.	25.214	2.577	22.101	2.550	23.202	72.59 C
10327.	2.154	0.837	0.01607	1666680.	25.173	3.174	20.940	3.148	23.731	72.59 C
11483.	2.636	0.777	0.01607	1661847.	25.054	3.504	19.851	3.530	22.863	72.59 C
13094.	3.581	0.682	0.01607	1660864.	25.017	4.103	18.411	4.078	21.893	72.59 C
14828.	4.795	0.563	0.01607	1659771.	24.974	4.714	16.508	4.688	20.507	72.59 C
15686.	5.476	0.497	0.01607	1659217.	24.952	5.325	14.311	4.997	18.863	72.59 C
16515.	6.201	0.429	0.01607	1659135.	24.940	5.938	11.915	5.301	18.750	72.59 C
18143.	7.792	0.283	0.01607	1659042.	24.917	6.532	9.713	5.913	16.910	72.59 C
1830.	0.518	1.003	0.01648	2079270.	34.117	0.125	32.949	0.712	33.481	72.59 C
3425.	0.397	0.978	0.01648	2078545.	33.758	0.738	32.502	1.325	33.194	72.59 C
4231.	0.562	0.961	0.01648	2078180.	33.748	1.352	32.095	1.634	32.946	72.59 C
5028.	0.757	0.939	0.01648	2077663.	33.734	1.964	31.590	1.939	33.086	72.59 C
6634.	1.252	0.886	0.01648	2076598.	33.705	2.577	30.863	2.550	32.018	72.59 C
8210.	1.872	0.819	0.01648	2075557.	33.674	3.174	29.968	3.148	32.331	72.59 C
9226.	2.281	0.769	0.01648	2071817.	33.594	3.504	29.287	3.530	31.600	72.59 C
10683.	3.051	0.688	0.01648	2071073.	33.567	4.103	28.059	4.078	30.917	72.59 C
12308.	4.041	0.584	0.01648	2070245.	33.534	4.714	26.553	4.688	29.769	72.59 C
13135.	4.596	0.527	0.01648	2069826.	33.517	5.325	24.645	4.997	28.461	72.59 C
13951.	5.180	0.466	0.01648	2069559.	33.503	5.938	22.618	5.301	28.369	72.59 C
15597.	6.463	0.334	0.01648	2069047.	33.473	6.532	20.719	5.913	26.784	72.59 C
2831.	1.307	1.006	0.02640	1853786.	30.101	0.125	28.146	0.712	28.695	72.59 C
5309.	0.724	0.984	0.02640	1851543.	29.216	0.738	27.623	1.325	28.300	72.59 C
6566.	0.919	0.967	0.02640	1850412.	29.190	1.352	27.033	1.634	27.944	72.59 C
7811.	1.151	0.947	0.02640	1849044.	29.158	1.964	26.360	1.939	28.167	72.59 C
10326.	1.748	0.897	0.02640	1846252.	29.091	2.577	25.394	2.550	26.630	72.59 C
12806.	2.505	0.836	0.02640	1843524.	29.024	3.174	24.111	3.148	27.284	72.59 C
14409.	2.874	0.789	0.02640	1832030.	28.775	3.504	22.938	3.530	26.302	72.59 C
16716.	3.827	0.713	0.02640	1829891.	28.717	4.103	21.308	4.078	25.415	72.59 C
19301.	5.055	0.617	0.02640	1827515.	28.652	4.714	19.175	4.688	23.882	72.59 C
20620.	5.746	0.563	0.02640	1826311.	28.618	5.325	16.613	4.997	22.245	72.59 C
21923.	6.480	0.506	0.02640	1825583.	28.595	5.938	13.720	5.301	22.169	72.59 C
24566.	8.093	0.382	0.02640	1824191.	28.547	6.532	10.902	5.913	20.222	72.59 C
3501.	14.431	1.099	0.02052	1823306.	42.767	0.125	27.826	0.712	28.416	72.59 C
6351.	9.442	1.063	0.02052	1822109.	37.429	0.738	27.011	1.325	27.793	72.59 C
7724.	5.991	1.037	0.02052	1821506.	33.721	1.352	26.295	1.634	27.360	72.59 C
9035.	2.097	1.007	0.02052	1820644.	29.522	1.964	25.531	1.939	27.513	72.59 C
11544.	1.865	0.934	0.02052	1818865.	28.520	2.577	24.478	2.550	25.822	72.59 C
13835.	2.768	0.847	0.02052	1817126.	28.469	3.174	23.094	3.148	26.497	72.59 C
15223.	3.324	0.783	0.02052	1810066.	28.309	3.504	21.859	3.530	25.419	72.59 C
17092.	4.449	0.682	0.02052	1808742.	28.265	4.103	20.166	4.078	24.286	72.59 C
19012.	5.897	0.558	0.02052	1807271.	28.214	4.714	17.979	4.688	22.698	72.59 C
19923.	6.710	0.490	0.02052	1806525.	28.188	5.325	15.475	4.997	20.766	72.59 C
20778.	7.569	0.421	0.02052	1806152.	28.170	5.938	12.804	5.301	20.664	72.59 C
22376.	9.457	0.275	0.02052	1805459.	28.134	6.532	10.363	5.913	18.474	72.59 C
2957.	5.125	1.038	0.02781	2035292.	37.651	0.125	31.768	0.712	32.520	72.59 C
5552.	2.413	1.014	0.02781	2033324.	34.621	0.738	31.110	1.325	32.001	72.59 C
6872.	0.892	0.997	0.02781	2032332.	32.868	1.352	30.479	1.634	31.613	72.59 C
8181.	1.141	0.976	0.02781	2031030.	32.839	1.964	29.749	1.939	31.805	72.59 C
10831.	1.779	0.925	0.02781	2028356.	32.778	2.577	28.724	2.550	30.254	72.59 C
13451.	2.585	0.861	0.02781	2025744.	32.716	3.174	27.410	3.148	30.920	72.59 C
15148.	3.006	0.813	0.02781	2014419.	32.487	3.504	26.310	3.530	29.887	72.59 C
17596.	4.017	0.734	0.02781	2012357.	32.433	4.103	24.547	4.078	28.957	72.59 C
20345.	5.317	0.634	0.02781	2010066.	32.372	4.714	22.350	4.688	27.362	72.59 C
21750.	6.048	0.578	0.02781	2008904.	32.341	5.325	19.535	4.997	25.603	72.59 C
23141.	6.823	0.519	0.02781	2008193.	32.318	5.938	16.486	5.301	25.602	72.59 C
25965.	8.525	0.391	0.02781	2006828.	32.271	6.532	13.588	5.913	23.500	72.59 C
3651.	9.102	1.073	0.02847	2196802.	44.706	0.125	34.808	0.712	35.763	72.59 C
6766.	5.857	1.044	0.02847	2194949.	41.074	0.738	33.900	1.325	34.940	72.59 C
8322.	3.591	1.023	0.02847	2194015.	38.525	1.352	33.133	1.634	34.459	72.59 C
9845.	1.310	0.997	0.02847	2192796.	35.908	1.964	32.268	1.939	34.661	72.59 C
12874.	2.103	0.935	0.02847	2190294.	35.851	2.577	31.067	2.550	32.840	72.59 C
15795.	3.099	0.859	0.02847	2187850.	35.793	3.174	29.541	3.148	33.594	72.59 C
17650.	3.687	0.802	0.02847	2177428.	35.591	3.504	28.268	3.530	32.332	72.59 C
20276.	4.931	0.711	0.02847	2175644.	35.543	4.103	26.225	4.078	31.181	72.59 C
23156.	6.529	0.595	0.02847	2173662.	35.488	4.714	23.670	4.688	29.486	72.59 C
24602.	7.427	0.531	0.02847	2172656.	35.460	5.325	20.451	4.997	27.308	72.59 C
26014.	8.375	0.465	0.02847	2172101.	35.439	5.938	17.049	5.301	27.174	72.59 C
28829.	10.458	0.320	0.02847	2171050.	35.398	6.532	13.942	5.913	24.570	72.59 C
2696.	2.048	1.012	0.02289	1741411.	28.519	0.125	25.784	0.712	26.384	72.59 C
5018.	0.633	0.987	0.02289	1739618.	26.821	0.738	25.286	1.325	26.005	72.59 C
6182.	0.819	0.970	0.02289	1738714.	26.799	1.352	24.724	1.634	25.672	72.59 C
7327.	1.037	0.949	0.02289	1737576.	26.770	1.964	24.090	1.939	25.869	72.59 C
9614.	1.601	0.896	0.02289	1735246.	26.710	2.577	23.186	2.550	24.433	72.59 C
11834.	2.314	0.831	0.02289	1732971.	26.650	3.174	21.999	3.148	25.054	72.59 C
13254.	2.679	0.783	0.02289	1723514.	26.434	3.504	20.944	3.530	24.148	72.59 C
15273.	3.575	0.704	0.02289	1721714.	26.382	4.103	19.440	4.078	23.304	72.59 C
17503.	4.730	0.605	0.02289	1719714.	26.322	4.714	17.512	4.688	21.930	72.59 C
18628.	5.379	0.549	0.02289	1718700.	26.292	5.325	15.166	4.997	20.269	72.59 C
19732.	6.069	0.492	0.02289	1718093.	26.270	5.938	12.611	5.301	20.226	72.59 C
21945.	7.584	0.366	0.02289	1716935.	26.226	6.532	10.104	5.913	18.434	72.59 C
1304.	7.601	1.056	0.01002	1817819.	36.380	0.125	28.248	0.712	28.493	72.59 C
2470.	3.860	1.028	0.01002	1817611.	32.391	0.738	27.846	1.325	28.271	72.59 C
3072.	1.181	1.008	0.01002	1817506.	29.530	1.352	27.497	1.634	28.038	72.59 C
3674.	0.361	0.983	0.01002	1817282.	28.495	1.964	27.074	1.939	28.121	72.59 C
4910.	0.886	0.921	0.01002	1816811.	28.474	2.577	26.434	2.550	27.254	72.59 C
6152.	1.540	0.843	0.01002	1816352.	28.452	3.174	25.529	3.148	27.499	72.59 C
6967.	2.011	0.784	0.01002	1815083.	28.415	3.504	24.675	3.530	26.837	72.59 C
8158.	2.817	0.688	0.01002	1814755.	28.393	4.103	23.446	4.078	26.225	72.59 C
9515.	3.851	0.563	0.01002	1814389.	28.366	4.714	21.765	4.688	24.917	72.59 C
10217.	4.431	0.493	0.01002	1814204.	28.352	5.325	19.751	4.997	23.619	72.59 C
10917.	5.040	0.419	0.01002	1814096.	28.338	5.938	17.640	5.301	23.284	72.59 C
12352.	6.375	0.257	0.01002	1813891.	28.311	6.532	15.748	5.913	21.385	72.59 C
1152.	9.119	1.079	0.01014	2202960.	45.525	0.125	35.862	0.712	36.236	72.59 C
2198.	6.084	1.053	0.01014	2202775.	42.256	0.738	35.299	1.325	35.928	72.59 C
2742.	3.899	1.033	0.01014	2202682.	39.900	1.352	34.976	1.634	35.708	72.59 C
3290.	1.362	1.009	0.01014	2202491.	37.159	1.964	34.573	1.939	35.744	72.59 C
4425.	0.787	0.950	0.01014	2202090.	36.070	2.577	33.964	2.550	34.965	72.59 C
5577.	1.405	0.875	0.01014	2201699.	36.051	3.174	33.168	3.148	35.148	72.59 C
6339.	1.857	0.818	0.01014	2200781.	36.024	3.504	32.544	3.530	34.526	72.59 C
7461.	2.619	0.724	0.01014	2200558.	36.005	4.103	31.369	4.078	33.991	72.59 C
8750.	3.596	0.602	0.01014	2200310.	35.981	4.714	29.862	4.688	32.748	72.59 C
9421.	4.143	0.533	0.01014	2200184.	35.968	5.325	27.937	4.997	31.576	72.59 C
10092.	4.717	0.461	0.01014	2200091.	35.955	5.938	25.961	5.301	31.261	72.59 C
11478.	5.975	0.301	0.01014	2199907.	35.928	6.532	24.162	5.913	29.429	72.59 C
2696.	7.737	1.066	0.02120	2299161.	45.318	0.125	36.955	0.712	37.685	72.59 C
4971.	4.595	1.037	0.02120	2298158.	41.872	0.738	36.259	1.325	37.084	72.59 C
6097.	2.415	1.015	0.02120	2297652.	39.470	1.352	35.683	1.634	36.709	72.59 C
7192.	1.000	0.990	0.02120	2296963.	37.791	1.964	35.025	1.939	36.840	72.59 C
9349.	1.630	0.928	0.02120	2295546.	37.756	2.577	34.123	2.550	35.471	72.59 C
11401.	2.419	0.853	0.02120	2294161.	37.718	3.174	33.011	3.148	35.993	72.59 C
12693.	2.935	0.796	0.02120	2288837.	37.614	3.504	32.142	3.530	34.969	72.59 C
14498.	3.915	0.706	0.02120	2287825.	37.582	4.103	30.638	4.078	34.095	72.59 C
16450.	5.174	0.593	0.02120	2286700.	37.544	4.714	28.797	4.688	32.715	72.59 C
17418.	5.880	0.531	0.02120	2286130.	37.524	5.325	26.558	4.997	31.072	72.59 C
18357.	6.623	0.466	0.02120	2285783.	37.508	5.938	24.136	5.301	30.965	72.59 C
20204.	8.256	0.327	0.02120	2285118.	37.475	6.532	21.874	5.913	28.992	72.59 C
3696.	13.183	1.095	0.02402	1937727.	43.852	0.125	30.052	0.712	30.786	72.59 C
6757.	8.852	1.061	0.02402	1936215.	39.148	0.738	29.137	1.325	30.071	72.59 C
8252.	5.841	1.037	0.02402	1935453.	35.863	1.352	28.365	1.634	29.590	72.59 C
9693.	2.429	1.009	0.02402	1934405.	32.125	1.964	27.533	1.939	29.767	72.59 C
12491.	1.995	0.941	0.02402	1932249.	30.870	2.577	26.387	2.550	27.964	72.59 C
15103.	2.957	0.858	0.02402	1930141.	30.813	3.174	24.901	3.148	28.724	72.59 C
16717.	3.531	0.797	0.02402	1921249.	30.623	3.504	23.610	3.530	27.536	72.59 C
18937.	4.732	0.700	0.02402	1919670.	30.575	4.103	21.718	4.078	26.386	72.59 C
21284.	6.276	0.579	0.02402	1917915.	30.520	4.714	19.309	4.688	24.741	72.59 C
22425.	7.144	0.513	0.02402	1917026.	30.492	5.325	16.437	4.997	22.596	72.59 C
23517.	8.061	0.445	0.02402	1916556.	30.472	5.938	13.398	5.301	22.477	72.59 C
25623.	10.075	0.299	0.02402	1915674.	30.433	6.532	10.600	5.913	20.072	72.59 C
3521.	11.526	1.089	0.02447	2106292.	45.474	0.125	33.301	0.712	34.062	72.59 C
6458.	7.681	1.057	0.02447	2104870.	41.264	0.738	32.396	1.325	33.355	72.59 C
7898.	5.012	1.034	0.02447	2104153.	38.326	1.352	31.660	1.634	32.887	72.59 C
9292.	1.991	1.006	0.02447	2103162.	34.987	1.964	30.851	1.939	33.054	72.59 C
12013.	1.990	0.940	0.02447	2101121.	34.182	2.577	29.734	2.550	31.340	72.59 C
14571.	2.936	0.859	0.02447	2099128.	34.131	3.174	28.318	3.148	32.051	72.59 C
16164.	3.518	0.799	0.02447	2090905.	33.964	3.504	27.142	3.530	30.858	72.59 C
18367.	4.697	0.704	0.02447	2089445.	33.921	4.103	25.292	4.078	29.726	72.59 C
20718.	6.213	0.585	0.02447	2087822.	33.871	4.714	22.955	4.688	28.159	72.59 C
21870.	7.063	0.519	0.02447	2087000.	33.846	5.325	20.127	4.997	26.076	72.59 C
22978.	7.962	0.452	0.02447	2086552.	33.827	5.938	17.138	5.301	25.943	72.59 C
25132.	9.934	0.307	0.02447	2085708.	33.789	6.532	14.444	5.913	23.548	72.59 C
3315.	9.016	1.075	0.02488	2266968.	45.951	0.125	36.228	0.712	37.068	72.59 C
6111.	5.684	1.044	0.02488	2265587.	42.260	0.738	35.393	1.325	36.323	72.59 C
7494.	3.373	1.022	0.02488	2264890.	39.686	1.352	34.696	1.634	35.872	72.59 C
8839.	1.202	0.996	0.02488	2263960.	37.202	1.964	33.914	1.939	36.045	72.59 C
11490.	1.945	0.932	0.02488	2262050.	37.157	2.577	32.832	2.550	34.403	72.59 C
14013.	2.877	0.853	0.02488	2260183.	37.110	3.174	31.481	3.148	35.086	72.59 C
15600.	3.465	0.794	0.02488	2252609.	36.964	3.504	30.377	3.530	33.884	72.59 C
17820.	4.625	0.701	0.02488	2251273.	36.925	4.103	28.572	4.078	32.804	72.59 C
20221.	6.115	0.583	0.02488	2249789.	36.879	4.714	26.286	4.688	31.266	72.59 C
21413.	6.952	0.518	0.02488	2249036.	36.856	5.325	23.523	4.997	29.234	72.59 C
22568.	7.834	0.451	0.02488	2248604.	36.838	5.938	20.581	5.301	29.087	72.59 C
24841.	9.769	0.306	0.02488	2247784.	36.801	6.532	17.896	5.913	26.699	72.59 C
24755.	6.539	0.756	0.01557	1772932.	27.509	0.125	10.654	0.712	21.073	72.59 P
19732.	5.629	0.554	0.01557	1772240.	27.462	0.738	14.202	1.325	21.513	72.59 P
17429.	5.223	0.470	0.01557	1771891.	27.442	1.352	16.782	1.634	22.013	72.59 P
15309.	4.860	0.398	0.01557	1771621.	27.426	1.964	18.901	1.939	23.417	72.59 P
11497.	4.234	0.279	0.01557	1771090.	27.397	2.577	20.557	2.550	22.604	72.59 P
8350.	3.755	0.194	0.01557	1770571.	27.374	3.174	21.531	3.148	23.676	72.59 P
6641.	3.518	0.152	0.01557	1770296.	27.362	3.504	22.169	3.530	23.661	72.59 P
4587.	3.274	0.108	0.01557	1770099.	27.352	4.103	22.845	4.078	24.484	72.59 P
2868.	3.131	0.076	0.01557	1769880.	27.343	4.714	23.312	4.688	24.126	72.59 P
2222.	3.109	0.065	0.01557	1769769.	27.339	5.325	23.611	4.997	24.211	72.59 P
1735.	3.122	0.056	0.01557	1769703.	27.336	5.938	23.762	5.301	24.162	72.59 P
1203.	3.248	0.043	0.01557	1769578.	27.332	6.532	23.823	5.913	24.092	72.59 P
27262.	6.800	0.775	0.01946	1862214.	29.405	0.125	11.056	0.712	22.681	72.59 P
21830.	5.833	0.594	0.01946	1861131.	29.354	0.738	14.950	1.325	23.220	72.59 P
19350.	5.388	0.518	0.01946	1860585.	29.331	1.352	17.834	1.634	23.735	72.59 P
17077.	4.980	0.452	0.01946	1860171.	29.312	1.964	20.184	1.939	25.260	72.59 P
13018.	4.246	0.343	0.01946	1859363.	29.279	2.577	22.013	2.550	24.396	72.59 P
9707.	3.634	0.263	0.01946	1858573.	29.251	3.174	23.151	3.148	25.678	72.59 P
7934.	3.282	0.223	0.01946	1857274.	29.218	3.504	23.937	3.530	25.761	72.59 P
5843.	2.883	0.179	0.01946	1856980.	29.206	4.103	24.719	4.078	26.701	72.59 P

4159.	2.541	0.144	0.01946	1856654.	29.194	4.714	25.374	4.688	26.590	72.59	P
3562.	2.409	0.130	0.01946	1856489.	29.189	5.325	25.820	4.997	26.731	72.59	P
3143.	2.307	0.118	0.01946	1856356.	29.184	5.938	26.167	5.301	26.881	72.59	P
2807.	2.180	0.098	0.01946	1856093.	29.176	6.532	26.422	5.913	26.982	72.59	P
30791.	7.536	0.770	0.02279	1995640.	32.110	0.125	11.583	0.712	24.555	72.59	P
24651.	6.444	0.591	0.02279	1994244.	32.054	0.738	15.968	1.325	25.341	72.59	P
21850.	5.941	0.516	0.02279	1993540.	32.028	1.352	19.249	1.634	25.919	72.59	P
19281.	5.480	0.450	0.02279	1993030.	32.008	1.964	21.928	1.939	27.619	72.59	P
14700.	4.646	0.343	0.02279	1992039.	31.973	2.577	23.979	2.550	26.624	72.59	P
10965.	3.948	0.264	0.02279	1991071.	31.942	3.174	25.272	3.148	27.988	72.59	P
8967.	3.540	0.225	0.02279	1989310.	31.901	3.504	26.153	3.530	28.160	72.59	P
6615.	3.078	0.181	0.02279	1988916.	31.887	4.103	27.036	4.078	29.191	72.59	P
4727.	2.677	0.146	0.02279	1988478.	31.874	4.714	27.788	4.688	29.142	72.59	P
4062.	2.519	0.133	0.02279	1988256.	31.867	5.325	28.308	4.997	29.280	72.59	P
3598.	2.394	0.121	0.02279	1988100.	31.862	5.938	28.701	5.301	29.473	72.59	P
3241.	2.232	0.100	0.02279	1987796.	31.853	6.532	28.995	5.913	29.633	72.59	P

APPENDIX C4

Convective condensation of R134a within a micro-fin tube

(file: taraw.tbl)

q" (W/m²)	ΔT_s (K)	x_q	m_r (kg/s)	P_r (Pa)	T_r (°C)	z_i (m)	T_i (°C)	z_o (m)	T_o (°C)	M (g/mole)	flow
373.	1.250	1.014	0.01685	1038738.	42.769	0.125	40.352	0.712	40.776	102.03	C
1176.	0.544	1.007	0.01685	1037505.	41.709	0.738	39.969	1.325	40.482	102.03	C
1749.	-0.162	1.000	0.01685	1036883.	40.744	1.352	39.603	1.634	40.315	102.03	C
2426.	0.121	0.990	0.01685	1036183.	40.719	1.964	39.072	1.939	40.323	102.03	C
4115.	0.848	0.959	0.01685	1034763.	40.667	2.577	38.181	2.550	39.845	102.03	C
6194.	1.763	0.911	0.01685	1033374.	40.617	3.174	37.134	3.148	39.734	102.03	C
7747.	2.196	0.870	0.01685	1025371.	40.326	3.504	36.101	3.530	39.054	102.03	C
10278.	3.322	0.792	0.01685	1023824.	40.270	4.103	33.912	4.078	38.186	102.03	C
13508.	4.774	0.679	0.01685	1022106.	40.207	4.714	30.665	4.688	36.482	102.03	C
15314.	5.591	0.609	0.01685	1021235.	40.175	5.325	26.047	4.997	34.299	102.03	C
17202.	6.461	0.532	0.01685	1020770.	40.158	5.938	20.532	5.301	33.532	102.03	C
21335.	8.375	0.347	0.01685	1019895.	40.126	6.532	15.082	5.913	30.376	102.03	C
632.	2.157	1.022	0.01887	1221001.	49.934	0.125	46.003	0.712	46.932	102.03	C
1657.	1.234	1.012	0.01887	1219748.	48.582	0.738	45.370	1.325	46.546	102.03	C
2342.	0.342	1.003	0.01887	1219116.	47.375	1.352	44.833	1.634	46.304	102.03	C
3127.	0.254	0.991	0.01887	1218369.	46.912	1.964	44.092	1.939	46.337	102.03	C
5035.	1.151	0.955	0.01887	1216847.	46.863	2.577	42.821	2.550	45.681	102.03	C
7326.	2.275	0.901	0.01887	1215361.	46.815	3.174	41.451	3.148	45.585	102.03	C
9014.	2.890	0.856	0.01887	1207126.	46.551	3.504	41.013	3.530	44.855	102.03	C
11736.	4.278	0.773	0.01887	1205612.	46.502	4.103	38.323	4.078	43.644	102.03	C
15179.	6.064	0.654	0.01887	1203930.	46.447	4.714	34.682	4.688	41.534	102.03	C
17092.	7.067	0.581	0.01887	1203078.	46.420	5.325	29.280	4.997	39.071	102.03	C
19085.	8.133	0.501	0.01887	1202692.	46.407	5.938	23.189	5.301	38.121	102.03	C
23429.	10.473	0.311	0.01887	1201986.	46.385	6.532	17.648	5.913	34.264	102.03	C
789.	2.135	1.023	0.01918	1219517.	50.049	0.125	46.226	0.712	46.835	102.03	C
2005.	1.022	1.011	0.01918	1218218.	48.423	0.738	45.640	1.325	46.455	102.03	C
2806.	-0.028	1.001	0.01918	1217563.	46.996	1.352	45.117	1.634	46.206	102.03	C
3719.	0.284	0.987	0.01918	1216772.	46.861	1.964	44.369	1.939	46.228	102.03	C
5922.	1.361	0.945	0.01918	1215158.	46.809	2.577	43.107	2.550	45.153	102.03	C
8551.	2.711	0.883	0.01918	1213580.	46.758	3.174	41.644	3.148	45.466	102.03	C
10481.	3.488	0.831	0.01918	1205067.	46.484	3.504	40.313	3.530	44.452	102.03	C
13586.	5.156	0.736	0.01918	1203541.	46.435	4.103	37.200	4.078	43.007	102.03	C
17503.	7.299	0.601	0.01918	1201845.	46.380	4.714	32.801	4.688	40.496	102.03	C
19677.	8.503	0.518	0.01918	1200986.	46.352	5.325	26.564	4.997	37.573	102.03	C
21939.	9.781	0.427	0.01918	1200674.	46.342	5.938	19.440	5.301	36.373	102.03	C
26863.	12.587	0.213	0.01918	1200130.	46.325	6.532	13.349	5.913	31.672	102.03	C
415.	2.639	1.027	0.02366	1318917.	53.490	0.125	49.343	0.712	50.006	102.03	C
1448.	2.249	1.021	0.02366	1317181.	52.632	0.738	48.678	1.325	49.584	102.03	C
2207.	1.721	1.014	0.02366	1316306.	51.762	1.352	48.144	1.634	49.322	102.03	C
3109.	0.889	1.005	0.02366	1315229.	50.522	1.964	47.404	1.939	49.333	102.03	C
5387.	1.253	0.974	0.02366	1313028.	49.859	2.577	46.147	2.550	48.206	102.03	C
8214.	2.463	0.926	0.02366	1310878.	49.794	3.174	44.723	3.148	48.551	102.03	C
10336.	3.062	0.885	0.02366	1299158.	49.437	3.504	43.758	3.530	47.589	102.03	C
13803.	4.559	0.806	0.02366	1296982.	49.371	4.103	40.837	4.078	46.393	102.03	C
18245.	6.485	0.690	0.02366	1294565.	49.297	4.714	36.559	4.688	44.135	102.03	C
20733.	7.568	0.619	0.02366	1293339.	49.259	5.325	30.310	4.997	41.349	102.03	C
23336.	8.722	0.539	0.02366	1292746.	49.241	5.938	22.789	5.301	40.368	102.03	C
29045.	11.258	0.348	0.02366	1291649.	49.207	6.532	15.364	5.913	36.166	102.03	C
519.	2.937	1.030	0.02381	1282874.	52.796	0.125	48.321	0.712	48.902	102.03	C
1670.	2.428	1.023	0.02381	1281061.	51.781	0.738	47.645	1.325	48.476	102.03	C
2497.	1.804	1.015	0.02381	1280146.	50.786	1.352	47.096	1.634	48.210	102.03	C
3474.	0.851	1.004	0.02381	1279022.	49.391	1.964	46.321	1.939	48.212	102.03	C
5919.	1.322	0.971	0.02381	1276723.	48.748	2.577	45.025	2.550	47.012	102.03	C
8934.	2.634	0.919	0.02381	1274478.	48.679	3.174	43.530	3.148	47.408	102.03	C
11188.	3.284	0.875	0.02381	1262047.	48.292	3.504	42.180	3.530	46.326	102.03	C
14863.	4.908	0.792	0.02381	1259791.	48.222	4.103	38.982	4.078	45.025	102.03	C
19559.	6.998	0.669	0.02381	1257284.	48.143	4.714	34.280	4.688	42.577	102.03	C
22186.	8.173	0.594	0.02381	1256013.	48.104	5.325	27.427	4.997	39.570	102.03	C
24932.	9.425	0.510	0.02381	1255423.	48.085	5.938	19.278	5.301	38.494	102.03	C
30947.	12.177	0.310	0.02381	1254340.	48.051	6.532	11.599	5.913	33.925	102.03	C
2776.	3.977	1.023	0.02135	990435.	42.386	0.125	37.554	0.712	38.440	102.03	C
5089.	0.865	0.993	0.02135	988158.	38.951	0.738	36.834	1.325	37.852	102.03	C
6224.	1.058	0.972	0.02135	987010.	38.908	1.352	36.198	1.634	37.473	102.03	C
7323.	1.289	0.946	0.02135	985684.	38.858	1.964	35.425	1.939	37.657	102.03	C
9466.	1.897	0.884	0.02135	982985.	38.757	2.577	34.343	2.550	36.127	102.03	C
11482.	2.678	0.807	0.02135	980348.	38.658	3.174	33.212	3.148	36.680	102.03	C
12726.	2.850	0.752	0.02135	967480.	38.170	3.504	32.525	3.530	35.732	102.03	C
14462.	3.846	0.661	0.02135	965315.	38.088	4.103	30.850	4.078	34.748	102.03	C
16313.	5.135	0.546	0.02135	962909.	37.996	4.714	28.941	4.688	33.312	102.03	C
17220.	5.861	0.483	0.02135	961689.	37.949	5.325	26.566	4.997	31.541	102.03	C
18092.	6.650	0.418	0.02135	961152.	37.929	5.938	24.003	5.301	31.358	102.03	C
19787.	8.386	0.276	0.02135	960176.	37.891	6.532	21.741	5.913	29.130	102.03	C
2911.	3.575	1.019	0.02122	945809.	40.287	0.125	35.968	0.712	36.739	102.03	C
5324.	0.858	0.989	0.02122	943420.	37.246	0.738	35.299	1.325	36.160	102.03	C
6503.	1.050	0.966	0.02122	942215.	37.199	1.352	34.672	1.634	35.772	102.03	C
7640.	1.279	0.940	0.02122	940820.	37.145	1.964	33.924	1.939	35.963	102.03	C
9851.	1.883	0.875	0.02122	937983.	37.034	2.577	32.879	2.550	34.451	102.03	C
11916.	2.662	0.796	0.02122	935210.	36.926	3.174	31.761	3.148	34.998	102.03	C
13184.	2.799	0.739	0.02122	921750.	36.398	3.504	30.837	3.530	33.956	102.03	C
14942.	3.796	0.645	0.02122	919486.	36.308	4.103	29.179	4.078	33.000	102.03	C
16803.	5.088	0.528	0.02122	916971.	36.209	4.714	27.242	4.688	31.539	102.03	C
17710.	5.817	0.464	0.02122	915696.	36.158	5.325	24.915	4.997	29.785	102.03	C
18577.	6.610	0.397	0.02122	915136.	36.136	5.938	22.362	5.301	29.596	102.03	C
20249.	8.358	0.252	0.02122	914116.	36.095	6.532	20.105	5.913	27.407	102.03	C
2913.	6.692	1.047	0.02856	1290112.	55.245	0.125	47.832	0.712	48.611	102.03	C
5493.	3.708	1.022	0.02856	1287336.	51.884	0.738	47.011	1.325	47.890	102.03	C
6817.	1.550	1.003	0.02856	1285938.	49.450	1.352	46.312	1.634	47.464	102.03	C
8136.	1.403	0.981	0.02856	1284098.	48.976	1.964	45.469	1.939	47.611	102.03	C
10829.	2.114	0.924	0.02856	1280321.	48.859	2.577	44.285	2.550	45.955	102.03	C
13518.	3.026	0.853	0.02856	1276631.	48.745	3.174	43.017	3.148	46.567	102.03	C
15268.	3.298	0.800	0.02856	1260599.	48.247	3.504	42.019	3.530	45.371	102.03	C
17820.	4.467	0.712	0.02856	1257739.	48.158	4.103	39.983	4.078	44.287	102.03	C
20712.	5.978	0.597	0.02856	1254561.	48.058	4.714	37.567	4.688	42.547	102.03	C
22201.	6.830	0.533	0.02856	1252950.	48.008	5.325	34.523	4.997	40.590	102.03	C
23681.	7.747	0.465	0.02856	1252113.	47.982	5.938	31.086	5.301	40.386	102.03	C
26704.	9.767	0.314	0.02856	1250546.	47.932	6.532	27.917	5.913	37.685	102.03	C
2516.	1.956	1.009	0.01642	991594.	40.443	0.125	37.903	0.712	38.531	102.03	C
4535.	0.803	0.975	0.01642	990157.	39.026	0.738	37.367	1.325	38.089	102.03	C
5497.	0.970	0.950	0.01642	989432.	38.999	1.352	36.879	1.634	37.773	102.03	C
6409.	1.166	0.921	0.01642	988516.	38.965	1.964	36.288	1.939	37.931	102.03	C
8131.	1.676	0.850	0.01642	986641.	38.894	2.577	35.472	2.550	36.686	102.03	C
9674.	2.328	0.765	0.01642	984809.	38.826	3.174	34.610	3.148	36.978	102.03	C
10586.	2.611	0.704	0.01642	977987.	38.569	3.504	33.900	3.530	36.224	102.03	C
11798.	3.445	0.606	0.01642	976676.	38.519	4.103	32.650	4.078	35.352	102.03	C
13008.	4.521	0.486	0.01642	975221.	38.464	4.714	31.209	4.688	34.215	102.03	C
13566.	5.126	0.420	0.01642	974482.	38.436	5.325	29.528	4.997	32.838	102.03	C
14079.	5.776	0.354	0.01642	974147.	38.423	5.938	27.713	5.301	32.684	102.03	C
15002.	7.205	0.212	0.01642	973532.	38.400	6.532	26.202	5.913	31.079	102.03	C
2407.	1.306	1.006	0.01765	1374852.	52.422	0.125	50.433	0.712	51.161	102.03	C
4345.	0.819	0.972	0.01765	1373735.	51.666	0.738	49.804	1.325	50.720	102.03	C
5271.	1.000	0.948	0.01765	1373172.	51.649	1.352	49.324	1.634	50.398	102.03	C
6150.	1.213	0.920	0.01765	1372440.	51.628	1.964	48.688	1.939	50.544	102.03	C
7815.	1.761	0.850	0.01765	1370937.	51.584	2.577	47.850	2.550	49.331	102.03	C
9314.	2.452	0.767	0.01765	1369470.	51.541	3.174	47.035	3.148	49.445	102.03	C
10205.	2.851	0.706	0.01765	1364336.	51.390	3.504	46.522	3.530	48.764	102.03	C
11393.	3.723	0.610	0.01765	1363385.	51.362	4.103	45.192	4.078	47.988	102.03	C
12588.	4.844	0.491	0.01765	1362330.	51.331	4.714	43.786	4.688	46.791	102.03	C
13143.	5.473	0.427	0.01765	1361795.	51.315	5.325	41.962	4.997	45.435	102.03	C
13656.	6.140	0.361	0.01765	1361523.	51.307	5.938	40.125	5.301	45.227	102.03	C
14589.	7.605	0.220	0.01765	1361016.	51.292	6.532	38.760	5.913	43.494	102.03	C
3246.	1.276	1.004	0.01414	999938.	40.002	0.125	38.095	0.712	38.777	102.03	C
5642.	0.926	0.953	0.01414	998923.	39.353	0.738	37.521	1.325	38.318	102.03	C
6703.	1.126	0.918	0.01414	998411.	39.334	1.352	36.994	1.634	37.970	102.03	C
7653.	1.361	0.877	0.01414	997729.	39.309	1.964	36.341	1.939	38.141	102.03	C
9274.	1.966	0.781	0.01414	996326.	39.256	2.577	35.455	2.550	36.758	102.03	C
10488.	2.730	0.671	0.01414	994955.	39.205	3.174	34.419	3.148	36.793	102.03	C
11078.	3.180	0.593	0.01414	990618.	39.043	3.504	33.691	3.530	36.040	102.03	C
11654.	4.152	0.477	0.01414	989901.	39.016	4.103	32.390	4.078	35.241	102.03	C
11932.	5.402	0.344	0.01414	989104.	38.987	4.714	30.923	4.688	33.888	102.03	C
11927.	6.103	0.275	0.01414	988700.	38.972	5.325	29.311	4.997	32.441	102.03	C
11827.	6.848	0.208	0.01414	988549.	38.966	5.938	27.818	5.301	32.147	102.03	C
11338.	8.481	0.076	0.01414	988284.	38.956	6.532	27.246	5.913	30.335	102.03	C
1464.	-0.486	0.990	0.00825	1131611.	44.056	0.125	43.343	0.712	43.914	102.03	C
2619.	-0.162	0.948	0.00825	1131345.	44.047	0.738	42.924	1.325	43.637	102.03	C
3164.	0.077	0.919	0.00825	1131210.	44.043	1.352	42.596	1.634	43.454	102.03	C
3676.	0.360	0.885	0.00825	1130992.	44.035	1.964	42.131	1.939	43.535	102.03	C
4631.	1.077	0.801	0.00825	1130539.	44.020	2.577	41.358	2.550	42.663	102.03	C
5468.	1.970	0.702	0.00825	1130096.	44.005	3.174	40.368	3.148	42.752	102.03	C
5956.	2.625	0.629	0.00825	1129339.	43.979	3.504	39.677	3.530	42.109	102.03	C
6586.	3.731	0.516	0.00825	1129115.	43.972	4.103	38.032	4.078	41.387	102.03	C
7193.	5.147	0.378	0.00825	1128868.	43.963	4.714	36.081	4.688	39.669	102.03	C
7464.	5.941	0.304	0.00825	1128742.	43.959	5.325	33.619	4.997	38.006	102.03	C
7705.	6.774	0.228	0.00825	1128672.	43.957	5.938	31.847	5.301	37.556	102.03	C
8117.	8.599	0.068	0.00825	1128541.	43.952	6.532	31.610	5.913	33.652	102.03	C

113.	4.950	1.036	0.00734	1027047.	45.698	0.125	40.152	0.712	40.402	102.03	C
433.	4.277	1.031	0.00734	1026800.	44.855	0.738	39.844	1.325	40.233	102.03	C
673.	3.497	1.024	0.00734	1026675.	43.949	1.352	39.714	1.634	40.166	102.03	C
960.	2.330	1.016	0.00734	1026511.	42.634	1.964	39.522	1.939	40.157	102.03	C
1690.	0.426	0.987	0.00734	1026172.	40.356	2.577	39.183	2.550	39.809	102.03	C
2600.	0.878	0.941	0.00734	1025841.	40.343	3.174	38.680	3.148	39.905	102.03	C
3286.	1.199	0.900	0.00734	1025108.	40.317	3.504	38.248	3.530	39.628	102.03	C
4409.	1.758	0.824	0.00734	1024811.	40.306	4.103	37.235	4.078	39.201	102.03	C
5849.	2.474	0.712	0.00734	1024481.	40.294	4.714	35.820	4.688	38.330	102.03	C
6657.	2.876	0.642	0.00734	1024313.	40.288	5.325	33.713	4.997	37.370	102.03	C
7503.	3.299	0.564	0.00734	1024186.	40.283	5.938	31.230	5.301	36.970	102.03	C
9360.	4.226	0.379	0.00734	1023937.	40.274	6.532	28.621	5.913	35.233	102.03	C
140.	5.092	1.037	0.00689	1015681.	45.425	0.125	39.749	0.712	39.995	102.03	C
471.	4.247	1.030	0.00689	1015506.	44.410	0.738	39.448	1.325	39.829	102.03	C
712.	3.339	1.023	0.00689	1015419.	43.376	1.352	39.313	1.634	39.753	102.03	C
997.	2.020	1.013	0.00689	1015282.	41.909	1.964	39.116	1.939	39.739	102.03	C
1714.	0.433	0.982	0.00689	1015000.	39.947	2.577	38.771	2.550	39.396	102.03	C
2602.	0.888	0.933	0.00689	1014724.	39.937	3.174	38.257	3.148	39.483	102.03	C
3267.	1.220	0.890	0.00689	1014248.	39.919	3.504	37.815	3.530	39.191	102.03	C
4351.	1.781	0.810	0.00689	1014009.	39.910	4.103	36.807	4.078	38.776	102.03	C
5739.	2.502	0.693	0.00689	1013742.	39.901	4.714	35.398	4.688	37.901	102.03	C
6516.	2.906	0.620	0.00689	1013607.	39.896	5.325	33.328	4.997	36.971	102.03	C
7328.	3.330	0.539	0.00689	1013520.	39.893	5.938	30.891	5.301	36.541	102.03	C
9108.	4.262	0.347	0.00689	1013350.	39.886	6.532	28.369	5.913	34.815	102.03	C
4132.	5.375	1.031	0.02666	1042554.	45.414	0.125	39.248	0.712	40.111	102.03	C
7477.	1.202	0.995	0.02666	1039257.	40.830	0.738	38.431	1.325	39.401	102.03	C
9081.	1.443	0.970	0.02666	1037595.	40.770	1.352	37.660	1.634	38.892	102.03	C
10610.	1.726	0.940	0.02666	1035530.	40.695	1.964	36.740	1.939	39.142	102.03	C
13520.	2.477	0.867	0.02666	1031310.	40.542	2.577	35.452	2.550	37.258	102.03	C
16159.	3.449	0.780	0.02666	1027185.	40.392	3.174	33.841	3.148	37.667	102.03	C
17747.	3.650	0.717	0.02666	1009719.	39.753	3.504	32.597	3.530	36.457	102.03	C
19872.	4.918	0.616	0.02666	1006810.	39.645	4.103	30.529	4.078	35.262	102.03	C
22032.	6.558	0.490	0.02666	1003578.	39.526	4.714	28.129	4.688	33.413	102.03	C
23047.	7.483	0.422	0.02666	1001940.	39.465	5.325	25.217	4.997	31.396	102.03	C
23992.	8.487	0.351	0.02666	1001205.	39.438	5.938	22.168	5.301	31.083	102.03	C
25736.	10.697	0.201	0.02666	999865.	39.388	6.532	19.533	5.913	28.313	102.03	C
4015.	4.608	1.025	0.02791	991962.	42.758	0.125	37.362	0.712	38.259	102.03	C
7297.	1.198	0.992	0.02791	988179.	38.952	0.738	36.548	1.325	37.569	102.03	C
8884.	1.417	0.969	0.02791	986271.	38.880	1.352	35.778	1.634	37.056	102.03	C
10404.	1.674	0.942	0.02791	983895.	38.791	1.964	34.863	1.939	37.323	102.03	C
13324.	2.364	0.874	0.02791	979035.	38.608	2.577	33.588	2.550	35.421	102.03	C
16007.	3.266	0.792	0.02791	974287.	38.429	3.174	31.986	3.148	35.884	102.03	C
17641.	3.296	0.735	0.02791	953783.	37.646	3.504	30.758	3.530	34.619	102.03	C
19857.	4.489	0.639	0.02791	950308.	37.512	4.103	28.728	4.078	33.517	102.03	C
22152.	6.038	0.521	0.02791	946448.	37.363	4.714	26.332	4.688	31.710	102.03	C
23249.	6.914	0.456	0.02791	944490.	37.287	5.325	23.441	4.997	29.708	102.03	C
24284.	7.874	0.389	0.02791	943582.	37.252	5.938	20.319	5.301	29.535	102.03	C
26235.	9.991	0.245	0.02791	941914.	37.187	6.532	17.536	5.913	26.938	102.03	C
4322.	5.046	1.031	0.02797	1208013.	50.780	0.125	44.807	0.712	45.733	102.03	C
7819.	1.191	0.995	0.02797	1204966.	46.481	0.738	43.923	1.325	45.021	102.03	C
9497.	1.466	0.968	0.02797	1203430.	46.431	1.352	43.133	1.634	44.493	102.03	C
11094.	1.791	0.938	0.02797	1201525.	46.370	1.964	42.167	1.939	44.757	102.03	C
14136.	2.641	0.862	0.02797	1197632.	46.244	2.577	40.822	2.550	42.788	102.03	C
16894.	3.728	0.771	0.02797	1193828.	46.120	3.174	39.169	3.148	43.147	102.03	C
18553.	4.125	0.706	0.02797	1178191.	45.609	3.504	37.932	3.530	41.908	102.03	C
20772.	5.527	0.600	0.02797	1175714.	45.528	4.103	35.751	4.078	40.564	102.03	C
23029.	7.336	0.470	0.02797	1172962.	45.437	4.714	33.206	4.688	38.749	102.03	C
24089.	8.354	0.399	0.02797	1171567.	45.391	5.325	30.135	4.997	36.412	102.03	C
25076.	9.448	0.325	0.02797	1171010.	45.373	5.938	26.958	5.301	36.054	102.03	C
26896.	11.855	0.170	0.02797	1170015.	45.340	6.532	24.321	5.913	32.969	102.03	C
3487.	4.279	1.028	0.02829	1313358.	53.427	0.125	48.409	0.712	49.179	102.03	C
6421.	1.020	0.998	0.02829	1310553.	49.784	0.738	47.633	1.325	48.526	102.03	C
7871.	1.259	0.976	0.02829	1309140.	49.741	1.352	46.954	1.634	48.067	102.03	C
9280.	1.540	0.950	0.02829	1307383.	49.688	1.964	46.121	1.939	48.269	102.03	C
12051.	2.276	0.885	0.02829	1303790.	49.578	2.577	44.957	2.550	46.625	102.03	C
14684.	3.217	0.805	0.02829	1300280.	49.471	3.174	43.532	3.148	46.915	102.03	C
16336.	3.543	0.747	0.02829	1285270.	49.012	3.504	42.467	3.530	45.831	102.03	C
18644.	4.750	0.652	0.02829	1282756.	48.934	4.103	40.510	4.078	44.682	102.03	C
21136.	6.309	0.532	0.02829	1279964.	48.848	4.714	38.249	4.688	43.008	102.03	C
22370.	7.186	0.466	0.02829	1278548.	48.804	5.325	35.401	4.997	41.106	102.03	C
23565.	8.129	0.396	0.02829	1277868.	48.783	5.938	32.340	5.301	40.795	102.03	C
25913.	10.203	0.246	0.02829	1276610.	48.744	6.532	29.594	5.913	38.102	102.03	C
2999.	7.067	1.051	0.02389	1304709.	56.088	0.125	48.279	0.712	49.102	102.03	C
5511.	3.373	1.020	0.02389	1302751.	52.052	0.738	47.512	1.325	48.465	102.03	C
6747.	1.087	0.997	0.02389	1301764.	49.517	1.352	46.900	1.634	48.049	102.03	C
7946.	1.345	0.971	0.02389	1300436.	49.476	1.964	46.163	1.939	48.199	102.03	C
10293.	2.014	0.905	0.02389	1297706.	49.393	2.577	45.146	2.550	46.767	102.03	C
12511.	2.865	0.825	0.02389	1295038.	49.311	3.174	43.921	3.148	47.032	102.03	C
13897.	3.233	0.766	0.02389	1284218.	48.979	3.504	43.074	3.530	46.100	102.03	C
15823.	4.318	0.670	0.02389	1282296.	48.920	4.103	41.355	4.078	45.027	102.03	C
17888.	5.716	0.549	0.02389	1280160.	48.854	4.714	39.403	4.688	43.601	102.03	C
18906.	6.503	0.483	0.02389	1279078.	48.821	5.325	36.934	4.997	41.806	102.03	C
19887.	7.344	0.413	0.02389	1278544.	48.804	5.938	34.316	5.301	41.552	102.03	C
21804.	9.195	0.263	0.02389	1277552.	48.774	6.532	31.953	5.913	39.230	102.03	C
3261.	6.740	1.044	0.02347	1139352.	50.415	0.125	43.037	0.712	43.751	102.03	C
5952.	2.470	1.011	0.02347	1137089.	45.794	0.738	42.319	1.325	43.113	102.03	C
7263.	1.137	0.988	0.02347	1135949.	44.203	1.352	41.682	1.634	42.685	102.03	C
8524.	1.393	0.960	0.02347	1134476.	44.153	1.964	40.932	1.939	42.856	102.03	C
10965.	2.064	0.891	0.02347	1131457.	44.051	2.577	39.885	2.550	41.333	102.03	C
13233.	2.923	0.808	0.02347	1128507.	43.951	3.174	38.576	3.148	41.646	102.03	C
14629.	3.222	0.747	0.02347	1116187.	43.531	3.504	37.564	3.530	40.651	102.03	C
16541.	4.321	0.649	0.02347	1113969.	43.456	4.103	35.824	4.078	39.575	102.03	C
18550.	5.741	0.526	0.02347	1111504.	43.371	4.714	33.794	4.688	38.084	102.03	C
19523.	6.541	0.459	0.02347	1110255.	43.328	5.325	31.345	4.997	36.237	102.03	C
20450.	7.402	0.389	0.02347	1109661.	43.308	5.938	28.700	5.301	35.998	102.03	C
22225.	9.296	0.239	0.02347	1108565.	43.270	6.532	26.315	5.913	33.650	102.03	C
3097.	4.602	1.027	0.02218	1042914.	44.932	0.125	39.671	0.712	40.387	102.03	C
5645.	0.877	0.995	0.02218	1040631.	40.879	0.738	39.015	1.325	39.817	102.03	C
6881.	1.075	0.972	0.02218	1039480.	40.838	1.352	38.413	1.634	39.415	102.03	C
8069.	1.308	0.945	0.02218	1038015.	40.785	1.964	37.700	1.939	39.589	102.03	C
10361.	1.919	0.878	0.02218	1035014.	40.676	2.577	36.702	2.550	38.127	102.03	C
12480.	2.706	0.797	0.02218	1032083.	40.570	3.174	35.464	3.148	38.471	102.03	C
13778.	2.931	0.738	0.02218	1019893.	40.126	3.504	34.510	3.530	37.508	102.03	C
15549.	3.944	0.642	0.02218	1017657.	40.044	4.103	32.882	4.078	36.509	102.03	C
17400.	5.254	0.523	0.02218	1015172.	39.953	4.714	30.995	4.688	35.087	102.03	C
18291.	5.993	0.457	0.02218	1013912.	39.907	5.325	28.699	4.997	33.375	102.03	C
19136.	6.792	0.390	0.02218	1013309.	39.885	5.938	26.240	5.301	33.166	102.03	C
20745.	8.551	0.245	0.02218	1012195.	39.844	6.532	24.003	5.913	31.037	102.03	C
2144.	1.199	1.005	0.01543	1065609.	42.532	0.125	40.853	0.712	41.357	102.03	C
3893.	0.632	0.973	0.01543	1064469.	41.731	0.738	40.385	1.325	40.965	102.03	C
4736.	0.782	0.950	0.01543	1063894.	41.711	1.352	39.976	1.634	40.694	102.03	C
5540.	0.960	0.923	0.01543	1063149.	41.684	1.964	39.476	1.939	40.822	102.03	C
7079.	1.419	0.856	0.01543	1061623.	41.630	2.577	38.769	2.550	39.804	102.03	C
8482.	2.003	0.776	0.01543	1060131.	41.577	3.174	37.915	3.148	40.036	102.03	C
9334.	2.286	0.717	0.01543	1054651.	41.382	3.504	37.306	3.530	39.300	102.03	C
10477.	3.029	0.623	0.01543	1053570.	41.344	4.103	36.171	4.078	38.553	102.03	C
11651.	3.986	0.507	0.01543	1052369.	41.301	4.714	34.879	4.688	37.547	102.03	C
12207.	4.524	0.443	0.01543	1051759.	41.279	5.325	33.321	4.997	36.351	102.03	C
12728.	5.099	0.378	0.01543	1051444.	41.268	5.938	31.646	5.301	36.210	102.03	C
13699.	6.362	0.238	0.01543	1050854.	41.246	6.532	30.213	5.913	34.767	102.03	C
426.	0.584	1.006	0.00994	1090640.	43.554	0.125	42.137	0.712	42.628	102.03	C
1010.	-0.127	0.995	0.00994	1090226.	42.636	0.738	41.829	1.325	42.418	102.03	C
1380.	0.017	0.985	0.00994	1090017.	42.629	1.352	41.622	1.634	42.294	102.03	C
1795.	0.188	0.972	0.00994	1089727.	42.618	1.964	41.343	1.939	42.316	102.03	C
2775.	0.622	0.934	0.00994	1089128.	42.598	2.577	40.852	2.550	41.813	102.03	C
3925.	1.166	0.881	0.00994	1088543.	42.577	3.174	40.174	3.148	41.949	102.03	C
4761.	1.525	0.836	0.00994	1086681.	42.512	3.504	39.688	3.530	41.529	102.03	C
6094.	2.200	0.755	0.00994	1086174.	42.495	4.103	38.453	4.078	40.919	102.03	C
7763.	3.067	0.641	0.00994	1085611.	42.475	4.714	36.897	4.688	39.891	102.03	C
8685.	3.553	0.573	0.00994	1085326.	42.465	5.325	34.609	4.997	38.739	102.03	C
9641.	4.067	0.498	0.00994	1085158.	42.459	5.938	32.036	5.301	38.394	102.03	C
11714.	5.194	0.321	0.00994	1084839.	42.448	6.532	29.592	5.913	36.518	102.03	C
1128.	-0.061	1.000	0.00912	1266153.	48.452	0.125	47.715	0.712	48.259	102.03	C
2103.	0.136	0.970	0.00912	1265854.	48.411	0.738	47.310	1.325	47.985	102.03	C
2595.	0.305	0.948	0.00912	1265704.	48.406	1.352	47.048	1.634	47.815	102.03	C
3079.	0.505	0.921	0.00912	1265469.	48.399	1.964	46.674	1.939	47.884	102.03	C
4051.	1.013	0.854	0.00912	1264983.	48.384	2.577	46.085	2.550	47.127	102.03	C
5000.	1.646	0.771	0.00912	1264507.	48.369	3.174	45.375	3.148	47.219	102.03	C
5609.	2.103	0.708	0.00912	1263554.	48.339	3.504	44.888	3.530	46.625	102.03	C
6480.	2.890	0.606	0.00912	1263298.	48.331	4.103	43.701	4.078	46.074	102.03	C
7448.	3.899	0.476	0.00912	1263012.	48.322	4.714	42.295	4.688	44.823	102.03	C
7938.	4.464	0.403	0.00912	1262868.	48.318	5.325	40.539	4.997	43.582	102.03	C
8421.	5.058	0.326	0.00912	1262787.	48.315	5.938	38.697	5.301	43.207	102.03	C
9392.	6.361	0.159	0.00912	1262635.	48.311	6.532	37.761	5.913	41.439	102.03	C
34034.	8.189	0.760	0.02482	1073678.	42.057	0.125	17.475	0.712	33.927	102.03	P
26428.	6.953	0.562	0.02482	1071102.	41.966	0.738	23.484	1.325	34.620	102.03	P
22997.	6.379	0.480	0.02482	1069804.	41.920	1.352	27.780	1.634	35.353	102.03	P
19879.	5.861	0.409	0.02482	1069027.	41.893	1.964	31.063	1.939	37.194	102.03	P
14409.	4.920	0.297	0.02482	1067556.	41.841	2.577	33.457	2.550	36.241	102.03	P
10083.	4.121	0.219	0.02482	1066118.	41.790	3.174	34.923	3.148	37.499	102.03	P
7848.	3.600	0.183	0.02482	1063136.	41.684	3.504	35.919	3.530	37.980	102.03	P
5357.	3.071	0.145	0.02482	1062598.	41.665	4.103	36.816	4.078	39.013	102.03	P
3584.	2.602	0.116	0.02482	1061999.	41.644	4.714	37.607	4.688	39.021	102.03	P
3086.	2.412	0.105	0.02482	1061696.	41.633	5.325	38.101	4.997	39.179	102.03	P
2859.	2.259	0.095	0.02482	1061479.	41.625	5.938	38.490	5.301	39.332	102.03	P
3192.	2.047	0.076	0.02482	1061056.	41.610	6.532	38.811	5.913	39.554	102.03	P
34745.	8.338	0.762	0.02507	1079976.	42.278	0.125	17.134	0.712	34.029	102.03	P
27003.	7.087	0.560	0.02507	1077345.	42.185	0.738	23.248	1.325	34.692	102.03	P
23507.	6.505	0.477	0.02507	1076019.	42.139	1.352	27.648	1.634	35.408	102.03	P
20329.	5.982	0.406	0.02507	1075239.	42.111	1.964	30.985	1.939	37.308	102.03	P
14748.	5.031	0.292	0.02507	1073765.	42.060	2.577	33.432	2.550	36.334	102.03	P
10327.	4.226	0.213	0.02507	1072324.	42.009	3.174	34.936	3.148	37.620	102.03	P
8036.	3.703	0.176	0.02507	1069367.	41.904	3.504	35.970	3.530	38.091	102.03	P
5474.	3.172	0.137	0.02507	1068849.	41.886	4.103	36.872	4.078	39.148	102.03	P
3634.	2.704	0.108	0.02507	1068274.	41.866	4.714	37.684	4.688	39.144	102.03	P
3107.	2.515	0.097	0.02507	1067982.	41.856	5.325	38.166	4.997	39.311	102.03	P
2854.	2.363	0.088	0.02507	1067767.	41.848	5.938	38.553	5.301	39.466	102.03	P
3145.	2.155	0.069	0.02507	1067343.	41.833	6.532	38.871	5.913	39.643	102.03	P
16808.	4.909	0.760	0.01338	1204892.	46.479	0.125	33.503	0.712	41.717	102.03	P
13144.	4.159	0.571	0.01338	1204233.	46.457	0.738	36.535	1.325	42.031	102.03	P
11487.	3.813	0.493	0.01338	1203901.	46.447	1.352	38.725	1.634	42.423	102.03	P
9979.	3.497	0.426	0.01338	1203667.	46.439	1.964	40.314	1.939	43.503	102.03	P
7324.	2.926	0.317	0.01338	1203214.	46.424	2.577	41.575	2.550	43.198	102.03	P
5212.	2.451	0.240	0.01338	1202772.	46.410	3.174	42.363	3.148	43.938	102.03	P
4114.	2.194	0.203	0.01338	1202613.	46.405	3.504	42.938	3.530	44.089	102.03	P
2875.	1.887	0.164	0.01338	1202503.	46.401	4.103	43.353	4.078	44.774	102.03	P

1968.	1.626	0.134	0.01338	1202380.	46.397	4.714	43.848	4.688	44.793	102.03 P
1698.	1.527	0.122	0.01338	1202318.	46.395	5.325	44.042	4.997	44.879	102.03 P
1556.	1.450	0.112	0.01338	1202246.	46.393	5.938	44.260	5.301	44.913	102.03 P
1646.	1.358	0.092	0.01338	1202098.	46.388	6.532	44.476	5.913	44.982	102.03 P
13531.	4.140	0.766	0.00993	1191943.	46.059	0.125	34.534	0.712	42.171	102.03 P
10534.	3.478	0.562	0.00993	1191639.	46.049	0.738	37.268	1.325	42.259	102.03 P
9173.	3.182	0.478	0.00993	1191486.	46.044	1.352	39.257	1.634	42.630	102.03 P
7929.	2.915	0.406	0.00993	1191359.	46.040	1.964	40.659	1.939	43.526	102.03 P
5723.	2.453	0.291	0.00993	1191111.	46.032	2.577	41.753	2.550	43.263	102.03 P
3944.	2.095	0.211	0.00993	1190868.	46.024	3.174	42.437	3.148	43.975	102.03 P
3004.	1.932	0.174	0.00993	1191254.	46.036	3.504	42.967	3.530	44.076	102.03 P
1919.	1.746	0.137	0.00993	1191225.	46.035	4.103	43.284	4.078	44.609	102.03 P
1082.	1.632	0.112	0.00993	1191192.	46.034	4.714	43.663	4.688	44.395	102.03 P
805.	1.610	0.104	0.00993	1191176.	46.034	5.325	43.685	4.997	44.379	102.03 P
631.	1.612	0.098	0.00993	1191098.	46.031	5.938	43.764	5.301	44.383	102.03 P
572.	1.688	0.088	0.00993	1190933.	46.026	6.532	43.877	5.913	44.293	102.03 P
11786.	3.475	0.751	0.00971	1142013.	44.407	0.125	34.490	0.712	41.111	102.03 P
9185.	2.950	0.572	0.00971	1141638.	44.394	0.738	36.854	1.325	41.180	102.03 P
8012.	2.706	0.497	0.00971	1141449.	44.388	1.352	38.577	1.634	41.517	102.03 P
6947.	2.480	0.434	0.00971	1141310.	44.383	1.964	39.812	1.939	42.285	102.03 P
5079.	2.065	0.331	0.00971	1141040.	44.374	2.577	40.778	2.550	42.062	102.03 P
3605.	1.711	0.259	0.00971	1140775.	44.366	3.174	41.382	3.148	42.664	102.03 P
2846.	1.525	0.224	0.00971	1141018.	44.374	3.504	41.847	3.530	42.800	102.03 P
2002.	1.278	0.187	0.00971	1140941.	44.371	4.103	42.152	4.078	43.314	102.03 P
1405.	1.055	0.158	0.00971	1140855.	44.368	4.714	42.554	4.688	43.313	102.03 P
1241.	0.961	0.147	0.00971	1140811.	44.367	5.325	42.704	4.997	43.404	102.03 P
1169.	0.881	0.137	0.00971	1140739.	44.364	5.938	42.888	5.301	43.471	102.03 P
1297.	0.760	0.116	0.00971	1140588.	44.359	6.532	43.097	5.913	43.547	102.03 P
22997.	6.428	0.768	0.01605	1041801.	40.921	0.125	23.410	0.712	34.655	102.03 P
18023.	5.427	0.561	0.01605	1040656.	40.880	0.738	27.493	1.325	35.176	102.03 P
15758.	4.975	0.474	0.01605	1040078.	40.859	1.352	30.402	1.634	35.631	102.03 P
13685.	4.572	0.400	0.01605	1039740.	40.847	1.964	32.527	1.939	37.001	102.03 P
10000.	3.870	0.281	0.01605	1039101.	40.824	2.577	34.195	2.550	36.480	102.03 P
7015.	3.317	0.198	0.01605	1038476.	40.802	3.174	35.235	3.148	37.392	102.03 P
5427.	3.027	0.158	0.01605	1037921.	40.782	3.504	36.007	3.530	37.612	102.03 P
3580.	2.727	0.118	0.01605	1037698.	40.773	4.103	36.553	4.078	38.488	102.03 P
2128.	2.524	0.089	0.01605	1037451.	40.765	4.714	37.136	4.688	38.288	102.03 P
1633.	2.474	0.080	0.01605	1037326.	40.760	5.325	37.262	4.997	38.268	102.03 P
1305.	2.462	0.073	0.01605	1037267.	40.758	5.938	37.406	5.301	38.249	102.03 P
1122.	2.542	0.061	0.01605	1037159.	40.754	6.532	37.532	5.913	38.141	102.03 P
17557.	4.768	0.765	0.01418	1101401.	43.023	0.125	31.006	0.712	38.380	102.03 P
13840.	4.092	0.582	0.01418	1100530.	42.993	0.738	33.689	1.325	38.683	102.03 P
12158.	3.777	0.506	0.01418	1100090.	42.978	1.352	35.611	1.634	38.989	102.03 P
10628.	3.488	0.440	0.01418	1099774.	42.967	1.964	37.041	1.939	39.989	102.03 P
7933.	2.958	0.333	0.01418	1099159.	42.946	2.577	38.189	2.550	39.687	102.03 P
5789.	2.506	0.256	0.01418	1098559.	42.925	3.174	38.932	3.148	40.456	102.03 P
4676.	2.242	0.217	0.01418	1097932.	42.903	3.504	39.469	3.530	40.577	102.03 P
3417.	1.935	0.175	0.01418	1097728.	42.896	4.103	39.883	4.078	41.166	102.03 P
2494.	1.656	0.141	0.01418	1097500.	42.888	4.714	40.344	4.688	41.209	102.03 P
2219.	1.541	0.128	0.01418	1097385.	42.884	5.325	40.598	4.997	41.347	102.03 P
2073.	1.445	0.115	0.01418	1097300.	42.881	5.938	40.853	5.301	41.426	102.03 P
2160.	1.304	0.091	0.01418	1097134.	42.876	6.532	41.086	5.913	41.540	102.03 P
34831.	7.978	0.790	0.02502	1089600.	42.614	0.125	20.060	0.712	34.759	102.03 P
27243.	6.858	0.586	0.02502	1086928.	42.521	0.738	25.334	1.325	35.258	102.03 P
23814.	6.334	0.502	0.02502	1085580.	42.474	1.352	29.130	1.634	35.904	102.03 P
20694.	5.862	0.429	0.02502	1084763.	42.445	1.964	32.030	1.939	37.676	102.03 P
15206.	4.998	0.312	0.02502	1083211.	42.391	2.577	34.191	2.550	36.730	102.03 P
10848.	4.256	0.230	0.02502	1081694.	42.338	3.174	35.551	3.148	37.943	102.03 P
8584.	3.753	0.190	0.02502	1078399.	42.222	3.504	36.466	3.530	38.361	102.03 P
6038.	3.250	0.148	0.02502	1077800.	42.201	4.103	37.317	4.078	39.386	102.03 P
4187.	2.792	0.115	0.02502	1077135.	42.178	4.714	38.083	4.688	39.375	102.03 P
3643.	2.600	0.103	0.02502	1076797.	42.166	5.325	38.578	4.997	39.550	102.03 P
3366.	2.440	0.091	0.02502	1076547.	42.157	5.938	38.961	5.301	39.694	102.03 P
3587.	2.200	0.069	0.02502	1076054.	42.140	6.532	39.281	5.913	39.890	102.03 P
31135.	7.550	0.778	0.02452	1213463.	46.755	0.125	25.982	0.712	39.287	102.03 P
24416.	6.447	0.586	0.02452	1211207.	46.682	0.738	30.754	1.325	39.893	102.03 P
21379.	5.933	0.507	0.02452	1210070.	46.645	1.352	34.234	1.634	40.496	102.03 P
18615.	5.467	0.438	0.02452	1209344.	46.622	1.964	36.813	1.939	42.127	102.03 P
13751.	4.616	0.328	0.02452	1207956.	46.577	2.577	38.791	2.550	41.418	102.03 P
9883.	3.891	0.249	0.02452	1206599.	46.534	3.174	40.066	3.148	42.568	102.03 P
7873.	3.413	0.211	0.02452	1203614.	46.437	3.504	40.980	3.530	42.891	102.03 P
5608.	2.925	0.170	0.02452	1203058.	46.419	4.103	41.705	4.078	43.833	102.03 P
3955.	2.486	0.138	0.02452	1202441.	46.399	4.714	42.490	4.688	43.896	102.03 P
3465.	2.306	0.125	0.02452	1202127.	46.389	5.325	42.864	4.997	44.058	102.03 P
3211.	2.158	0.113	0.02452	1201886.	46.381	5.938	43.259	5.301	44.200	102.03 P
3387.	1.943	0.091	0.02452	1201409.	46.366	6.532	43.623	5.913	44.407	102.03 P
33558.	7.910	0.761	0.02802	1278386.	48.799	0.125	26.710	0.712	40.929	102.03 P
26194.	6.701	0.578	0.02802	1275706.	48.717	0.738	31.943	1.325	41.635	102.03 P
22872.	6.138	0.502	0.02802	1274355.	48.675	1.352	35.720	1.634	42.360	102.03 P
19856.	5.627	0.437	0.02802	1273477.	48.648	1.964	38.574	1.939	44.095	102.03 P
14565.	4.693	0.333	0.02802	1271793.	48.595	2.577	40.718	2.550	43.343	102.03 P
10386.	3.896	0.259	0.02802	1270148.	48.544	3.174	42.088	3.148	44.577	102.03 P
8231.	3.346	0.224	0.02802	1265864.	48.411	3.504	43.018	3.530	44.933	102.03 P
5831.	2.805	0.186	0.02802	1265071.	48.386	4.103	43.809	4.078	45.852	102.03 P
4131.	2.318	0.156	0.02802	1264189.	48.359	4.714	44.610	4.688	45.992	102.03 P
3658.	2.117	0.144	0.02802	1263742.	48.345	5.325	45.074	4.997	46.215	102.03 P
3448.	1.951	0.134	0.02802	1263391.	48.334	5.938	45.507	5.301	46.370	102.03 P
3793.	1.708	0.112	0.02802	1262700.	48.313	6.532	45.910	5.913	46.614	102.03 P
37990.	8.435	0.779	0.02841	1152326.	44.753	0.125	20.305	0.712	36.412	102.03 P
29669.	7.224	0.580	0.02841	1149232.	44.649	0.738	26.069	1.325	37.010	102.03 P
25912.	6.657	0.498	0.02841	1147672.	44.597	1.352	30.247	1.634	37.694	102.03 P
22495.	6.147	0.428	0.02841	1146720.	44.565	1.964	33.414	1.939	39.619	102.03 P
16493.	5.209	0.315	0.02841	1144911.	44.504	2.577	35.774	2.550	38.612	102.03 P
11734.	4.403	0.235	0.02841	1143143.	44.445	3.174	37.271	3.148	39.881	102.03 P
9268.	3.835	0.197	0.02841	1138798.	44.299	3.504	38.271	3.530	40.355	102.03 P
6506.	3.284	0.156	0.02841	1138071.	44.274	4.103	39.166	4.078	41.381	102.03 P
4516.	2.778	0.125	0.02841	1137263.	44.247	4.714	40.010	4.688	41.457	102.03 P
3942.	2.565	0.112	0.02841	1136854.	44.233	5.325	40.541	4.997	41.673	102.03 P
3663.	2.387	0.101	0.02841	1136536.	44.223	5.938	40.969	5.301	41.817	102.03 P
3959.	2.112	0.080	0.02841	1135910.	44.202	6.532	41.338	5.913	42.043	102.03 P
38870.	8.344	0.768	0.02809	1006642.	39.639	0.125	14.857	0.712	31.349	102.03 P
30403.	7.185	0.570	0.02809	1003120.	39.509	0.738	20.631	1.325	31.955	102.03 P
26576.	6.640	0.488	0.02809	1001345.	39.443	1.352	24.841	1.634	32.576	102.03 P
23095.	6.153	0.417	0.02809	1000276.	39.403	1.964	28.082	1.939	34.498	102.03 P
16971.	5.258	0.304	0.02809	998250.	39.328	2.577	30.473	2.550	33.305	102.03 P
12105.	4.483	0.223	0.02809	996270.	39.254	3.174	31.974	3.148	34.613	102.03 P
9578.	3.908	0.186	0.02809	991513.	39.077	3.504	32.950	3.530	35.025	102.03 P
6733.	3.380	0.144	0.02809	990756.	39.048	4.103	33.901	4.078	36.093	102.03 P
4664.	2.890	0.113	0.02809	989914.	39.017	4.714	34.722	4.688	36.131	102.03 P
4054.	2.681	0.100	0.02809	989487.	39.001	5.325	35.312	4.997	36.329	102.03 P
3743.	2.505	0.089	0.02809	989178.	38.989	5.938	35.728	5.301	36.461	102.03 P
3983.	2.228	0.068	0.02809	988573.	38.967	6.532	36.064	5.913	36.686	102.03 P
25929.	6.284	0.769	0.01959	1035781.	40.704	0.125	23.490	0.712	34.579	102.03 P
20416.	5.433	0.578	0.01959	1034025.	40.641	0.738	27.364	1.325	34.891	102.03 P
17921.	5.033	0.498	0.01959	1033141.	40.609	1.352	30.185	1.634	35.305	102.03 P
15647.	4.669	0.429	0.01959	1032561.	40.588	1.964	32.275	1.939	36.696	102.03 P
11637.	4.000	0.316	0.01959	1031449.	40.547	2.577	33.904	2.550	36.066	102.03 P
8437.	3.420	0.236	0.01959	1030362.	40.508	3.174	34.960	3.148	37.061	102.03 P
6768.	3.045	0.196	0.01959	1028468.	40.439	3.504	35.725	3.530	37.321	102.03 P
4871.	2.644	0.154	0.01959	1028066.	40.424	4.103	36.342	4.078	38.132	102.03 P
3465.	2.273	0.120	0.01959	1027620.	40.408	4.714	36.975	4.688	38.104	102.03 P
3033.	2.114	0.106	0.01959	1027394.	40.400	5.325	37.314	4.997	38.243	102.03 P
2794.	1.980	0.095	0.01959	1027241.	40.394	5.938	37.652	5.301	38.401	102.03 P
2870.	1.768	0.072	0.01959	1026946.	40.384	6.532	37.933	5.913	38.584	102.03 P
27802.	6.617	0.772	0.01976	938041.	37.037	0.125	18.901	0.712	30.567	102.03 P
21862.	5.732	0.573	0.01976	936046.	36.959	0.738	23.030	1.325	30.920	102.03 P
19172.	5.317	0.490	0.01976	935040.	36.920	1.352	25.978	1.634	31.352	102.03 P
16720.	4.943	0.418	0.01976	934411.	36.895	1.964	28.254	1.939	32.796	102.03 P
12392.	4.256	0.303	0.01976	933211.	36.848	2.577	29.968	2.550	32.033	102.03 P
8932.	3.665	0.220	0.01976	932038.	36.802	3.174	31.055	3.148	33.043	102.03 P
7123.	3.280	0.179	0.01976	930060.	36.725	3.504	31.798	3.530	33.363	102.03 P
5063.	2.879	0.136	0.01976	929651.	36.709	4.103	32.496	4.078	34.207	102.03 P
3525.	2.512	0.102	0.01976	929195.	36.691	4.714	33.100	4.688	34.157	102.03 P
3048.	2.357	0.089	0.01976	928964.	36.682	5.325	33.523	4.997	34.345	102.03 P
2776.	2.229	0.078	0.01976	928833.	36.676	5.938	33.823	5.301	34.471	102.03 P
2826.	2.034	0.056	0.01976	928584.	36.667	6.532	34.046	5.913	34.534	102.03 P
22647.	5.908	0.768	0.01974	1216992.	46.868	0.125	31.436	0.712	41.065	102.03 P
17839.	5.041	0.595	0.01974	1215461.	46.819	0.738	34.894	1.325	41.523	102.03 P
15666.	4.637	0.522	0.01974	1214689.	46.794	1.352	37.430	1.634	41.936	102.03 P
13687.	4.266	0.460	0.01974	1214150.	46.777	1.964	39.280	1.939	43.181	102.03 P
10205.	3.587	0.358	0.01974	1213105.	46.743	2.577	40.751	2.550	42.767	102.03 P
7436.	3.006	0.285	0.01974	1212084.	46.710	3.174	41.720	3.148	43.715	102.03 P
5997.	2.631	0.249	0.01974	1210035.	46.644	3.504	42.424	3.530	43.915	102.03 P
4373.	2.232	0.209	0.01974	1209574.	46.629	4.103	42.955	4.078	44.669	102.03 P
3186.	1.868	0.178	0.01974	1209061.	46.613	4.714	43.581	4.688	44.706	102.03 P
2833.	1.716	0.165	0.01974	1208801.	46.605	5.325	43.857	4.997	44.865	102.03 P
2649.	1.589	0.153	0.01974	1208594.	46.598	5.938	44.186	5.301	44.977	102.03 P
2769.	1.398	0.130	0.01974	1208185.	46.585	6.532	44.520	5.913	45.185	102.03 P
23440.	6.331	0.778	0.02032	1372091.	51.617	0.125	35.451	0.712	45.357	102.03 P
18367.	5.361	0.597	0.02032	1370668.	51.576	0.738	39.201	1.325	45.969	102.03 P
16078.	4.911	0.522	0.02032	1369950.	51.555	1.352	41.902	1.634	46.437	102.03 P
13999.	4.498	0.458	0.02032	1369435.	51.540	1.964	43.907	1.939	47.746	102.03 P
10349.	3.746	0.353	0.02032	1368434.	51.510	2.577	45.474	2.550	47.397	102.03 P
7463.	3.108	0.279	0.02032	1367455.	51.481	3.174	46.482	3.148	48.359	102.03 P
5973.	2.713	0.242	0.02032	1365551.	51.426	3.504	47.187	3.530	48.615	102.03 P
4309.	2.284	0.203	0.02032	1365139.	51.413	4.103	47.763	4.078	49.379	102.03 P
3125.	1.903	0.172	0.02032	1364682.	51.400	4.714	48.383	4.688	49.450	102.03 P
2791.	1.748	0.159	0.02032	1364450.	51.393	5.325	48.712	4.997	49.610	102.03 P
2638.	1.621	0.147	0.02032	1364240.	51.387	5.938	49.046	5.301	49.734	102.03 P
2856.	1.442	0.124	0.02032	1363822.	51.375	6.532	49.389	5.913	49.953	102.03 P
28540.	6.887	0.787	0.02109	1083268.	42.393	0.125	23.792	0.712	35.666	102.03 P
22380.	5.934	0.590	0.02109	1081287.	42.324	0.738	28.098	1.325	36.047	102.03 P
19596.	5.488	0.507	0.02109	1080289.	42.289	1.352	31.167	1.634	36.541	102.03 P
17063.	5.082	0.437	0.02109	1079647.	42.266	1.964	33.519	1.939	38.026	102.03 P
12607.	4.336	0.322	0.02109	1078418.	42.223	2.577	35.294	2.550	37.371	102.03 P
9067.	3.694	0.241	0.02109	1077218.	42.181	3.174	36.428	3.148	38.396	102.03 P
7229.	3.269	0.201	0.02109	1074781.	42.095	3.504	37.204	3.530	38.763	102.03 P
5160.	2.827	0.158	0.02109	1074322.	42.079	4.103	37.910	4.078	39.643	102.03 P
3655.	2.420	0.125	0.02109	1073812.	42.061	4.714	38.551	4.688	39.614	102.03 P
3211.	2.248	0.112	0.02109	1073554.	42.052	5.325	38.976	4.997	39.777	102.03 P
2985.	2.102	0.100	0.02109	1073355.	42.045	5.938	39.314	5.301	39.925	102.03 P
3160.	1.877	0.076	0.02109	1072963.	42.031	6.532	39.615	5.913	40.109	102.03 P
13851.	3.932	0.768	0.00985	934773.	36.909	0.125	26.093	0.712	33.191	102.03 P
10876.	3.322	0.569	0.00985	934350.	36.893	0.738	28.657	1.325	33.286	102.03 P
9525.	3.045	0.486	0.00985	934137.	36.884	1.352	30.459	1.634	33.656	102.03 P
8290.	2.793	0.415	0.00985	933977.	36.878	1.964	31.810	1.939	34.509	102.03 P

6102.	2.345	0.300	0.00985	933666.	36.866	2.577	32.857	2.550	34.159	102.03	P
4341.	1.984	0.219	0.00985	933361.	36.854	3.174	33.492	3.148	34.916	102.03	P
3412.	1.806	0.179	0.00985	933536.	36.861	3.504	33.973	3.530	34.959	102.03	P
2340.	1.593	0.138	0.00985	933497.	36.859	4.103	34.361	4.078	35.599	102.03	P
1516.	1.430	0.107	0.00985	933454.	36.857	4.714	34.746	4.688	35.470	102.03	P
1246.	1.377	0.096	0.00985	933432.	36.857	5.325	34.906	4.997	35.460	102.03	P
1078.	1.342	0.087	0.00985	933345.	36.853	5.938	35.036	5.301	35.460	102.03	P
1030.	1.329	0.070	0.00985	933159.	36.846	6.532	35.133	5.913	35.457	102.03	P
12593.	3.555	0.759	0.00976	1030591.	40.516	0.125	30.715	0.712	37.163	102.03	P
9852.	3.025	0.573	0.00976	1030204.	40.502	0.738	33.054	1.325	37.198	102.03	P
8615.	2.779	0.496	0.00976	1030009.	40.495	1.352	34.715	1.634	37.540	102.03	P
7489.	2.550	0.429	0.00976	1029842.	40.489	1.964	35.959	1.939	38.337	102.03	P
5513.	2.133	0.322	0.00976	1029511.	40.477	2.577	36.920	2.550	38.061	102.03	P
3947.	1.777	0.246	0.00976	1029188.	40.465	3.174	37.515	3.148	38.708	102.03	P
3138.	1.591	0.208	0.00976	1029381.	40.472	3.504	37.949	3.530	38.797	102.03	P
2231.	1.349	0.168	0.00976	1029300.	40.469	4.103	38.299	4.078	39.376	102.03	P
1580.	1.131	0.137	0.00976	1029211.	40.466	4.714	38.675	4.688	39.323	102.03	P
1393.	1.041	0.125	0.00976	1029166.	40.464	5.325	38.878	4.997	39.510	102.03	P
1303.	0.965	0.114	0.00976	1029095.	40.462	5.938	39.057	5.301	39.448	102.03	P
1407.	0.852	0.092	0.00976	1028950.	40.457	6.532	39.231	5.913	39.526	102.03	P
12474.	3.730	0.792	0.01002	1321063.	50.101	0.125	39.878	0.712	46.576	102.03	P
9728.	3.175	0.600	0.01002	1320770.	50.093	0.738	42.255	1.325	46.634	102.03	P
8489.	2.918	0.520	0.01002	1320623.	50.088	1.352	44.012	1.634	46.981	102.03	P
7362.	2.680	0.452	0.01002	1320479.	50.084	1.964	45.247	1.939	47.774	102.03	P
5385.	2.248	0.342	0.01002	1320190.	50.075	2.577	46.222	2.550	47.593	102.03	P
3820.	1.886	0.265	0.01002	1319908.	50.067	3.174	46.848	3.148	48.238	102.03	P
3012.	1.696	0.227	0.01002	1320124.	50.073	3.504	47.320	3.530	48.285	102.03	P
2108.	1.454	0.187	0.01002	1320060.	50.071	4.103	47.618	4.078	48.850	102.03	P
1461.	1.244	0.157	0.01002	1319989.	50.069	4.714	48.041	4.688	48.837	102.03	P
1278.	1.160	0.145	0.01002	1319953.	50.068	5.325	48.153	4.997	48.902	102.03	P
1192.	1.093	0.135	0.01002	1319895.	50.066	5.938	48.336	5.301	48.953	102.03	P
1304.	1.002	0.114	0.01002	1319775.	50.063	6.532	48.554	5.913	49.008	102.03	P
21402.	6.076	0.782	0.01633	1235476.	47.457	0.125	30.855	0.712	41.454	102.03	P
16601.	5.087	0.584	0.01633	1234481.	47.425	0.738	34.941	1.325	42.059	102.03	P
14438.	4.633	0.502	0.01633	1233979.	47.409	1.352	37.825	1.634	42.586	102.03	P
12475.	4.218	0.432	0.01633	1233628.	47.398	1.964	39.934	1.939	43.898	102.03	P
9038.	3.473	0.321	0.01633	1232949.	47.377	2.577	41.563	2.550	43.528	102.03	P
6331.	2.855	0.244	0.01633	1232286.	47.356	3.174	42.573	3.148	44.563	102.03	P
4940.	2.509	0.207	0.01633	1231604.	47.334	3.504	43.287	3.530	44.688	102.03	P
3401.	2.116	0.168	0.01633	1231379.	47.327	4.103	43.833	4.078	45.432	102.03	P
2327.	1.787	0.139	0.01633	1231129.	47.319	4.714	44.416	4.688	45.454	102.03	P
2038.	1.664	0.128	0.01633	1231003.	47.315	5.325	44.709	4.997	45.627	102.03	P
1922.	1.572	0.118	0.01633	1230918.	47.312	5.938	45.000	5.301	45.728	102.03	P
2194.	1.475	0.097	0.01633	1230754.	47.307	6.532	45.281	5.913	45.854	102.03	P
21433.	6.081	0.781	0.01632	1233976.	47.409	0.125	30.800	0.712	41.408	102.03	P
16624.	5.095	0.583	0.01632	1232982.	47.378	0.738	34.889	1.325	41.999	102.03	P
14458.	4.641	0.502	0.01632	1232480.	47.362	1.352	37.775	1.634	42.536	102.03	P
12492.	4.227	0.432	0.01632	1232134.	47.351	1.964	39.889	1.939	43.831	102.03	P
9050.	3.482	0.320	0.01632	1231464.	47.330	2.577	41.520	2.550	43.472	102.03	P
6339.	2.864	0.243	0.01632	1230809.	47.309	3.174	42.532	3.148	44.506	102.03	P
4946.	2.515	0.206	0.01632	1230059.	47.285	3.504	43.242	3.530	44.633	102.03	P
3404.	2.120	0.167	0.01632	1229829.	47.278	4.103	43.792	4.078	45.369	102.03	P
2329.	1.788	0.138	0.01632	1229574.	47.270	4.714	44.370	4.688	45.403	102.03	P
2040.	1.663	0.127	0.01632	1229444.	47.265	5.325	44.669	4.997	45.592	102.03	P
1924.	1.568	0.116	0.01632	1229330.	47.262	5.938	44.960	5.301	45.700	102.03	P
2197.	1.464	0.096	0.01632	1229101.	47.255	6.532	45.239	5.913	45.793	102.03	P