REVIEW OF DIFFUSION IN

POLYMER PENETRANT SYSTEMS

Review of Diffusion in Polymer Penetrant Systems

by

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Contents

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I. Introduction

Diffusion in polymers is concerned with the process by which matter is transported from one position in a portion of polymer to another position. The subject of diffusion is of interest because polymers are quite often used in contact with gases, liquids or solids that can penetrate it. Resistance to permeation is an important factor in the selection of polymeric materials for use in many applications. In some cases advantage has been taken of the permeation properties of polymer membranes to separate penetrant mixtures that would be otherwise difficult to separate.

Diffusion in polymers is not only important because of the practical uses of polymeric barriers, but it is an active field of research because the nature of penetrant movement in a polymeric solid can yield information about the polymer configuration. In this respect a diffusion-sorption experiment may yield information related to the configuration and flexibility of the molecular chain and the morphology of the polymer. A particular goal of research in this area is to establish models, mechanisms and laws relating solubility-permeability and diffusivity in polymer-diluent systems with the characteristics and molecular properties of the components.

The subject of diffusion behavior is very closely related to solution (solubility) and permeation (permability). Solubility is determined when a state of equilibrium exists between molecules inside and outside the polymer. Until equilibrium is reached the polymer will continue to take up or give off foreign molecules by the process of diffusion. The permeation process is concerned with the transport of molecules in a polymeric membrane that separates two reservoirs containing molecules at different concentrations or pressures. Permeation is usually considered to consist of three distinct processes. A molecule first dissolves at the membrane face, it then diffuses to the other face at a lower concentration where it evaporates or is extracted. Permeation is more complex than diffusion since it involves a solution as well as an evaporation step. However, permeation is experimentally much less difficult to study than diffusion and much effort has been expended in determining permeabilities. A permeability coefficient is not as fundamental a quantity as a diffusion coefficient because of the more complex nature of the permeability process.

This review is concerned with diffusion in solid polymers and plastics in particular. Reference will sometimes be made to work that has been done on elastomers. Since solubility and permeability are intimately associated with diffusion a number of references have been made to work done in these areas.

This review is primarily concerned with transport of relatively low-molecular weight gases, vapors and liquids ("penetrants") in polymer solids with the restriction that the concentration of the sorbed species is small relative to the amount of polymer solid present. The appendix contains tabulated diffusion data extracted from the literature. No attempt has been made to correlate the data other than what has been done by the original investigator, since in most cases experimental systems have not been sufficiently well defined to justify correlation. No claim is made that diffusivity data contained in the appendix is comprehensive since data from several industrial laboratories were not available to the reviewer.

II. Fundamentals

A. Definitions and General Equations

1. The Diffusion Coefficient

The transport of penetrant through a polymer normally occurs by an activated diffusion process. As a physical process diffusion closely resembles heat conduction. In both cases the driving force for transport of matter or heat is the absence of equilibrium caused by a concentration or temperature gradient coupled with a tendency to eliminate these differences by molecular motion. The descriptive mathematics of diffusion are largely based on the mathematical theory of heat conduction and can be found in several monographs on the subject(1-5). It is useful to review some of the mathematical results since they may help to understand the experimental methods for measuring rates of diffusion as well as the application of experimental data.

Diffusion in an isotropic substance is based on the assumption that the rate of transfer or flux, J, of matter by diffusion through a unit area of a substance is proportional to the concentration gradient normal to the unit area. Fick (6) employed the analogy between heat transfer by conduction as formulated by Fourier (7) and mass transfer by diffusion to state what is known as Fick's first law of diffusion:

$$J = - D\ (\partial c/\partial x) \qquad \text{(II-1)}$$

where J is the flux equal to the rate of flow per unit area of the diffusing substance, x is the space coordinate perpendicular to the reference unit area, c is concentration of the diffusing species, and D is the diffusion coefficient which is independent of concentration and has units of area per unit time.

Equation (II-1) indicates that the steadystate rate of flow through a normal unit area is in a direction opposite to the concentration gradient but proportional to the absolute value of that gradient. If diffusion is considered in the x direction only as dx approaches zero, the rate of concentration increase with time is given by Fick's second law of diffusion.

$$\frac{\partial c}{\partial t} = D \frac{\partial^2 c}{\partial x^2} \qquad \text{(II-2)}$$

or for 3 dimensions

$$\frac{\partial c}{\partial t} = D \left(\frac{\partial^2 c}{\partial x^2} + \frac{\partial^2 c}{\partial y^2} + \frac{\partial^2 c}{\partial z^2}\right) \qquad \text{(II-3)}$$

Fick's second law of diffusion describes the concentration of diffusing molecules as a function of position and time when D is independent of concentration, position, and time. Concentration independence of D can be expected when the concentration is relatively low as in the case of the diffusion of permanent gases in polymers at atmospheric pressure. The solution of equation (II-3) is dependent on the sample geometry and the initial and boundary conditions for the particular situation under consideration. Solutions for many situations can be found in several texts (1-4). Usually the solution is either a series of error functions, or a trigonometric series, or a series of Bessel functions.

In many cases the diffusion coefficient may not be constant but a function of position, concentration, and time. The diffusion of organic liquids and vapors in polymers which swell during sorption may be characterized by a variable diffusion coefficient.

Equation (II-1), Fick's first law, remains the same for position or concentration dependent diffusion, but equation (II-3), the second law, takes the following form when D is a function of position and concentration.

$$\frac{\partial c}{\partial t} = \frac{\partial}{\partial x}\left(D\frac{\partial c}{\partial x}\right) + \frac{\partial}{\partial y}\left(D\frac{\partial c}{\partial y}\right) + \frac{\partial}{\partial z}\left(D\frac{\partial c}{\partial z}\right) \qquad \text{(II-4)}$$

The mathematical and experimental methods of handling concentration-dependent diffusion present considerable difficulties. If D does not depend explicitly on position then equation (II-2) can be transformed to

$$\frac{\partial c}{\partial t} = D(c)\frac{\partial^2 c}{\partial x^2} + \left(\frac{\partial D(c)}{\partial c}\right)\left(\frac{\partial c}{\partial x}\right)^2 \qquad \text{(II-5)}$$

A simple experimental method of removing the difficulty imposed by a concentration dependent diffusivity is to reduce the vapor pressure of the penetrant so much that diffusivity is not concentration dependent. The problem of a concentration dependent diffusivity has been approached experimentally by employing methods which closely follow those used for constant diffusivity, when it is assumed that D depends on concentration in a simple way, such as:

$$D = D_o\ (1 + \alpha c) \qquad \text{(II-6)}$$

$$D = D_o\ \exp\ (\alpha c) \qquad \text{(II-7)}$$

$$D = D_o\ (1 + \alpha c + \beta c^2 + \gamma c^3 + \ldots) \qquad \text{(II-8)}$$

Several workers (2,8-11) have developed the mathematical methods for concentration dependent diffusion coefficients and methods for their experimental determination. One method of treating concentration dependent diffusion coefficients is to limit experiments to small concentration intervals so that the change of diffusivity with concentration is small when compared to the absolute magnitude of the diffusivity. Then the value of $\frac{\partial D(c)}{\partial c}$ in equation (II-5) is small and a mean or integral value of D can be determined for the concentration interval. The value of the mean or integral diffusion coefficient $\bar{D}$ over the concentration range c_1 to c_2 is defined as

$$\bar{D} = \frac{\int_{c_2}^{c_1} D(c)\,dc}{c_1 - c_2} \qquad \text{(II-9)}$$

when $\bar{D}$ is measured over several ranges of concentration the concentration dependence of D(c) can be estimated.

One method which has been used with some success to establish whether a diffusion coefficient is concentration dependent or not is the determination of absorption and desorption-time curves. If the absorption and desorption of a penetrant is plotted versus the square root of time the curves will coincide for a constant diffusion coefficient but will differ for a concentration dependent one. In many cases (10) the shape of the desorption-time curve is affected more strongly by a concentration dependent diffusivity than the absorption curve. Crank and Park (9,12) have shown that the concentration dependence of the diffusion coefficient can be determined from the absorption-time curve.

Crank and Henry (10) have suggested a method of obtaining a better approximation to $\bar{D}$ than either D_{abs} or D_{des} the mean absorption and desorption diffusion coefficients as follows:

$$\bar{D}_{av} = \frac{1}{2} \; (\bar{D}_{abs} + \bar{D}_{des}) \qquad \text{(II-10)}$$

If better accuracy is desired and if D(c) is exponentially or linearly dependent on C, the correction curves developed by Crank (2) for $\bar{D}_{av}$ may be used. Although equation (II-10) may lead to large errors when D is strongly concentration dependent, it has been applied to the diffusion of solvents (13,14) and water in plastics (15). One must be careful when deriving diffusion coefficients from absorption time curves if time-dependent relaxation processes caused by polymer swelling by penetrant are present. Diffusion coefficients determined in this situation would be concentration dependent and time dependent. Time effects are particularly prevalent for diffusion in polymers below the glass transition temperature (16-19). To date practical solutions have not been developed for time dependent diffusion problems.

Fick's second law applies strictly only to those diffusion cases in which the partial specific volumes of the components are independent of pressure and composition. These conditions are satisfied by a incompressible two component mixture in which there are no volume changes on mixing. An example of such a system is a mixture in which one of the components is sufficiently dilute.

2. The Solubility Coefficient S

In the strictest sense, solubility falls outside the scope of the subject of diffusion, however, it is desirable to give some attention to the solubility of gases and vapors in polymers. This is necessary because the rate of permeation and diffusion depends on the concentration of diffusing molecules in the polymer.

The equilibrium concentration C_x of a penetrant in a polymer is related to the partial pressure of the ambient gas, P_x, by Henry's law:

$$C_x = S(P)\ P_x \tag{II-11}$$

in which the solubility coefficient S(P) may be a function of P or C and is usually expressed as cm^3 gas (STP), dissolved per cm^3 of material at a pressure of one atmosphere (20). Henry's law is a special case of the Nernst distribution law and should describe the solubility situation reasonably well except when easily condensable vapors are encountered especially at high vapor pressures.

A number of methods have been used to measure the solubility of gases and vapors in polymers. One method determines the quantity of gas or vapor sorbed by weighing or by measuring a change in gas volume (21-24), while another method relies on the measurement of the diffusion coefficient D and the permeation coefficient P and the use of equation (II-12)

$$S = P/D \tag{II-12}$$

Of the two methods of finding the solubility the method based on the determination of D sometimes gives higher values for easily condensable vapors (25,26).

The solubility of gases in polymers increases with the boiling point of the gas (21,22,27,28,29). The easier a gas can be condensed, the higher the solubility (30). A similar solubility relationship holds for gases in organic liquids (31). The degree of solubility of a gas in a polymer depends to a large degree on their compatibility or the specific interaction between the gas and polymer molecule. Polar gases tend to be more soluable in polar polymers than in nonpolar polymers.

The temperature dependence of the solubility coefficient is best described by the well-known Arrhenius-type relationship:

$$S = S_o \exp(-\Delta H_s/RT) \qquad \text{(II-13)}$$

where S_o is a constant and ΔH_s is the apparent heat of solution which is the sum of the heat of condensation and the heat of mixing. For permanent gases such as H_2, O_2, He, N_2, etc at room temperature, the heat of condensation is small and the heat of solution is mainly determined by the heat of mixing. The more readily condensable gases such as SO_2, NH_3, and heavier hydrocarbons have heats of solution determined mainly by the heat of condensation.

3. The Permeation Coefficient P

The permeation or transport of matter through a homogeneous membrane is usually considered to occur by solution of gas at the surface, migration by diffusion through the membrane to the other surface, and evaporation from the other surface into the gas phase.

If we consider a membrane of thickness l' with partial pressure p_1 and p_2 in the gas phase and equilibrium concentration c_1 and c_2 of penetrant at the membrane surface, and if Henry's law is obeyed, then at steady state the flux J can be written as:

$$J = D(c_1 - c_2)/l' \qquad \text{(II-14)}$$

which is a form of Fick's first law. With the restrictions noted above this relation can be expressed as

$$J = DS\ (p_1 - p_2)/l' \qquad \text{(II-15)}$$

or as

$$P = DS = \frac{Jl'}{(p_1 - p_2)} \qquad \text{(II-16)}$$

where the product DS is defined as the permeability P.

The permeability constant may be calculated as (32),

$$P = (\Delta Q/\Delta t)(p_1 - p_2)\, l'/A \qquad \text{(II-17)}$$

where A is the effective membrane area, l' is the average membrane thickness and ΔQ is the quantity of gas at STP permeated in the time interval Δt at steady state. In general either S or D or both may vary with position, concentration, or time so that the permeability P will also be concentration, position or time dependent. Thus

$$J = \bar{D}\,\bar{S}\,(p_1 - p_2)/l' \qquad \text{(II-18)}$$

or

$$\bar{P} = \bar{D}\,\bar{S} \qquad \text{(II-19)}$$

Equations (II-16) and (II-19) show that two factors govern permeability, ie, diffusion and solubility. These two factors may cause large differences in the permeability of various gases. Gases with large diameter molecules diffuse more slowly while gases with high boiling points have higher solubilities. A certain permeability may be a combination of high diffusivity with low solubility, as with hydrogen, or low diffusivity with high solubility, as with methane.

The temperature dependence of the permeability of gases in polymers can be expressed as:

$$P = P_o \exp(-\Delta H_P/RT) \qquad \text{(II-20)}$$

where P_o is a constant and ΔH_P is an activation energy for permeation. The activation energy for permeation ΔH_P has little meaning in itself since it is the summation of the energy of activation for diffusion ΔH_D and the heat of solution ΔH_S.

B. Diffusion Coefficients for Binary Mixtures

At this point it is worthwhile to define clearly the various diffusion coefficients which have been used to describe diffusion in a binary mixture. When two components (1 and 2) interdiffuse the total flow through a fixed reference plane may be due to the pure diffusion fluxes of 1 and 2 plus a concurrent mass flow of the components. The interdiffusion coefficient for such a system may be dependent on the experimental method, the boundary conditions, temperature and composition ranges, and other experimental variables. Even under exactly similar experimental conditions, the diffusion coefficient for one system may have a different meaning than another system because dependence of the thermodynamic behavior upon temperature and composition of the different systems may lead to different effects on the diffusion process.

In order to interpret measured diffusion rates, one must carefully define the reference plane in terms of the concentration and space coordinate units appropriate to the given experimental situation. Hartly and Crank (11,2) and Darken (33) have characterized a binary mixture by five diffusion coefficients each defined with respect to a different coordinate system. Several authors (34-38) have discussed the physical significance of the coefficients measured under different conditions. The interested reader is referred to these references for a complete discussion of the significance of each coefficient.

C. Mechanisms of Diffusion

The precise details of molecular motions which occur during diffusion are not known. However, it is generally accepted that differences between the diffusion behavior of crystalline solid, amorphous solids and liquids are ones of degree rather than kind. Thus the application of the fundamental diffusion equations and the generalized models are not restricted by the order or physical state of the medium.

Solution and permeation in amorphous solids has been shown (20,29,39) to be quite similar to the corresponding processes in low molecular weight liquids. Aitken and Barrer (40) have shown that the relationship between the standard entropies and enthalpies of solution of gases in elastomers is linear as is commonly observed for the solution of gases in liquids. In crystalline materials bulk diffusion is believed to take place by a defect mechanism or by phase change (1,3,41).

III. Experimental Methods

There are in general three basic experimental method for determining diffusion coefficients in polymers. One method involves measuring the solubility and permeability of a system. The second method involves measuring the rate of sorption and desorption of penetrant in a solid polymer. The third method, sometimes called the "time lag" method involves determining the time required to reach steadystate permeation after penetrant first enters a membrane.

The rate of sorption or desorption method for determining diffusion coefficients is experimentally simple. The change in weight of a sample in a vapor atmosphere is followed as a function of time at constant temperature and pressure. If one takes a sample of thickness l' and measures the cumulative masses sorbed or desorbed, M_t, as a function of time until there is no sensible weight change over a long time interval, ie until M_∞ is reached, then a plot of relative weight gain or loss M_t/M_∞ , vs either $t^{1/2}/l'$ or t/l'^2 can be made and the value of the diffusion coefficient determined.

When M_t/M_∞ is 1/2 than t/l'^2 can be determined approximately (2) to be,

$$(t/l'^2)_{\frac{1}{2}} = -(1/\pi^2 D)\ \ln\ [(\pi^2/16) - (1/9)(\pi^2/16)^9] \qquad \text{(III-1)}$$

thus $\bar{D}$ is

$$\bar{D} = 0.049/(t/l'^2)_{\frac{1}{2}} \qquad \text{(III-2)}$$

If (M_t/M_∞) is greater than 0.4 then the solution of the diffusion equation for sorption into a plane sheet is

$$\ln\ (1 - M_t/M_\infty) = \ln\ (K/\pi^2) - D\ \pi^2\ t/l'^2 \qquad \text{(III-3)}$$

In many cases the initial stage of sorption or desorption agrees with Boltzmann's solution for diffusion in a semi-infinite medium and a plot of M_t/M_∞ versus $t^{1/2}/l'$ is initially linear. For this situation the diffusion equation reduces to

$$M_t/M_\infty = (4/\pi^{1/2})\ (D\ t/l'^2)^{1/2} \qquad \text{(III-4)}$$

from which $\bar{D}$ can be determined.

The "time lag" type of experiment is also a dynamic experiment. When a penetrant diffuses through a membrane there is a period of unsteady state flow or a "time lag" until steadystate flow is established. If the total quantity of penetrant diffusing through the membrane is plotted versus time, an extrapolation of the steadystate portion of the curve to the time axis will yield the time lag, τ. The time lag is then the time from the start of the experiment to the intercept on the time axis of the extrapolation of the steadystate portion of the curve.

The time lag can be related to the diffusion coefficient, D, through appropriate solutions of the diffusion equation (39,42). The method has the advantage that both the diffusion coefficient and the permeation coefficient may be determined from a single experiment and thus the solubility, S, can be calculated from the quotient P/D.

The experimental method usually begins with a penetrant free membrane. The upstream side of the apparatus is then flooded with penetrant at constant composition, pressure and temperature while the down stream side is maintained at essentially zero concentration. Thus, the time lag is related to the diffusion coefficient as,

$$\tau = l'^2/6D \qquad \text{(III-5)}$$

Expressions have been developed (43,44) which permit the calculation of D from time lag data for systems in which D may be dependent upon time, concentration or spatial coordinates. If the functional dependence D(c) on C is not known, the integral diffusion coefficient, $\bar{D}$, can be estimated from time lag data. Pollak and Frisch (44) have shown that the following inequality holds, with some minor restrictions, for a large class of functional dependencies of D(c) on C.

$$1/6 \leq \frac{\tau \bar{D}}{l'^2} \leq 1/2 \qquad \text{(III-6)}$$

IV. Concentration, Pressure and Temperature Dependence

Permanent gases interact very little with polymers and hence the polymer solid structure does not undergo rearrangment to any degree. Thus for permanent gases, the permeability, solubility and diffusivity are independent of pressure at a given temperature (21,27,39,45,46).

The sorption and desorption of condensable vapors are often dependent upon the concentration of the penetrant. Penetrants which are good solvents tend to swell and plasticize the polymer. This in tern leads to increased mobilities for polymer segments and penetrants. In the presence of a good diffusing solvent, the polymer morphology may be altered because of stress relaxation and orientation and thus the permeation, sorption and diffusion behavior strongly altered. The characteristic features of several concentration dependent diffusion coefficient systems have been discussed by several authors (2,10,47,48). Many concentration dependent systems behave like "Fickian" systems in contrast to "non-Fickian" or "anomalous" behavior for systems in which sorption-desorption processes or diffusion are dependent on variables other than concentration.

The concentration dependence of diffusion for any given polymer-penetrant system is primarily dependent on the temperature and molecular size and solvent power of the penetrant. Large increases in the magnitude of the diffusion coefficent have been observed when penetrant concentration is increased for some systems. Fujita and co-workers (49) have observed large increases for the diffusion of n-alkyl acetates in poly methylacrylate while Kokes and Long (50) have noted that the diffusion coefficient for benzene in polyvinylacetate increased 900-fold with concentration as the weight concentration changed from zero to 10%. There have been a number of studies of concentration dependent diffusion in rubber-penetrant systems (21,27,28,39,40). There have also been several studies of the diffusion of water vapor into polymers. The diffusion coefficient for water vapor in polymethylacrylate is larger than that for n-alkyl acetates, perhaps due to its smaller molecular size, but the coefficient is independent of concentration (49).

It has also been found that the diffusion of water vapor in polytheylene (51) and in cellulose acetate, polyvinylacetate, and some nylons (52) is concentration independent. When water is a nonsolvent for a polymer the quantity sorbed is small and swelling is negligible. However, when the polymer is soluable in water such as poly vinyl alcohol, cellophane, nylon 6, etc; diffusion is dependent upon concentration (51).

Boyer (53) has shown that the most effective plasticizers for polymers are those with the highest mobility within the polymer and those with the greatest polymer-penetrant interaction. The effectiveness of the plasticization of a polymer by a penetrant depends on factors such as the magnitude and nature of interaction between polymer and penetrant, the inherent flexability of the polymer chains the size and shape of the penetrant, polymer morphology and temperature. Because the interaction of these factors is quite complex, it is difficult to predict concentration dependence except in very general terms.

The effect of temperature upon concentration dependence is also quite complex. In a study of the diffusion of c_4 and c_5 paraffins in rubber, Aitken and Barrer (40) concluded that the mobility of the polymer chains had increased so much at higher temperatures that increases in vapor concentration no longer caused corresponding increases in plasticization of the polymer. However, at lower temperatures the chain mobility is much less and the plasticizing effect of penetrant molecules is much greater. For polystyrene, Park (54) found that the plasticizing effect of the penetrant increased with temperature, in contrast to the study on rubber. This effect has been attributed to the very small increase in chain mobility brought about by small temperature increases below the glass transition temperature. The increase in the plasticizing ability of penetrants with increasing temperature is a dominant factor affecting polymer chain mobility and diffusion rate.

The magnitude of molecular mobility is not only dependent upon the size and shape of the diffusing molecule but also by concentration-sensitive factors such as the local segmental mobility of polymer chains and the nature and magnitude of nearest neighbor interactions between the components of the mixture. The position, manner and strength by which a sorbed molecule is held within a polymer solid, is an important factor governing molecular mobility. If penetrant molecules are held by sites of varying energies, the driving force for diffusion will contain energy terms which depend on concentration as well as the number and distribution of sites within the polymer. When sorption or desorption takes place with sorbed concentration changing with time or with varying external concentration, the relative number of polymer-polymer, penetrant-penetrant and polymer-penetrant contacts at any position in the medium may vary greatly with a resultant change in the dominant mode of sorption and a change in the diffusion rate. The magnitude and nature of the interaction forces between nearest neighbors may cause a penetrant molecule to remain at a site or within a volume element for longer periods of time then the average time required for a diffusion step. Such localized penetrant molecules are essentially immobilized and contribute little to the overall flux of material through the polymer.

Theoretical developments have been presented (55,56) to allow for varying degree of binding to sites depending on their energies. Fujita (57) has developed the case for transport through a solid where adsorption is governed by a Langmiur-type isotherm. The mathematics of diffusion with concurrent immobilization of some of the penetrant closely follows mathematical treatments for simultaneous diffusion and chemical reaction. Crank (2,53) has discussed the mathematics of simultaneous diffusion and chemical reaction.

Over a small range of temperatures Arrhenius type relations represent the temperature dependence of the diffusion, permeation and solubility coefficients.

$$D = D_o \exp (- \Delta H_D/RT) \qquad \text{(IV-1)}$$

$$P = P_o \exp (- \Delta H_P/RT) \qquad \text{(II-20)}$$

$$S = S_o \exp (- \Delta H_S/RT) \qquad \text{(II-13)}$$

From the definition that P = DS, it follows that

$$P_o = D_o S_o \qquad \text{(IV-2)}$$

and

$$\Delta H_P = \Delta H_D + \Delta H_S \qquad \text{(IV-3)}$$

The diffusion process in an amorphous plastic can be thought of as the movement of penetrant molecules through tangled polymer molecules and holes. Above the polymer glass transition temperature, holes constantly disappear and reform because of random thermal fluctuations. Diffusion thus takes place by the movement of a penetrant from one hole to another under the influence of a concentration gradient due to cooperative action of surrounding molecules. Often the hole is not the size of the penetrant and several jumps must take place in the same direction before the penetrant can move a distance equal to its length. A hole need not be formed for diffusion, since theoretically a penetrant molecule and some of the surrounding polymer segments may share some common volume before and after diffusion jumps. In order for this to occur, a number of van der Waals type polymer-polymer or penetrant-polymer contacts must be broken to rearrange the local structure and allow passage of the diffusing molecule. The amount of energy required to rearrange the local structure increases as the hole size increases and according to Boltzmann's law, the concentration of holes should decrease exponentially with increasing hole size.

Relative motion between polymer segments also occurs during viscous flow and there is a great similarity between the form of temperature dependence equations for diffusion and the corresponding equations for viscous flow. The exact nature of molecular and segmental motions for the two processes are different and the analogy between the two processes is only qualitative. In viscous flow polymer molecules are displaced requiring coordination of segmental motions, while when small molecules diffuse in a polymer matrix only relatively uncoordinated motion of small polymer segments are involved. Correlations between D and η should be closer for large size penetrants or for low penetrant concentrants where the segmental motions of the two processes are similar.

The temperature dependence of viscosity also can be represented by an Arrhenius type equation. Several workers (49,59,61) have found that the activation energy for viscous flow is nearly the same as the activation energy for self diffusion in polymers.

The activation energy for diffusion E_D has been associated with the energy required for hole formation against the cohesive energy density of the polymer in addition to the energy required to force the penetrant through the polymer sturucture. Diffusion in polymeric materials usually involves activation energies of the order of 40 to 50 Kcal/mole.

Several theories to account for the temperature dependence of diffusion have been developed. The "activated zone theory" of diffusion developed by Barrer (1,39,62,63) assumes that the activation energy is shared with the chain segments involved in the diffusion step as well as with the diffusing molecules. The "transition state" theory developed by Eyring (64,65) also leads to an expression for the diffusion coefficient.

Over wider ranges of temperature the temperature dependence of the diffusion coefficient deviates from the Arrhenius type relationship (27,66). Both the "transition-state" theory and the "activation-zone" theory predict that a plot of ln. D versus 1/T will be nonlinear over a wide temperature interval since the activation energy E_D is temperature dependent.

V. The Nature of the Penetrant and Polymer

The diffusion coefficient D is usually independent of concentration at low concentrations for most gases since at normal pressures only small amounts of the gases are taken up by the polymer. However, with easily-condensable vapors the concentration in the polymer may reach such a level that the diffusion coefficient becomes concentration dependent.

Diffusion coefficients vary with the molecular weight or size of the penetrant molecule. As the molecular weight or the volume or shape of the penetrant decrease the diffusion coefficient generally increases (40,50,60,67,68). For the diffusion of liquid penetrants in polyvinylacetate, Zhurkov (71) found a linear relationship between ln D and molar volume. For the case of diffusion through open pores the rate of diffusion has been found to be proportional to the molecular weight (61). Others (72,73) have suggested a simple proportionality between ln D and molecular weight or between ln D and the logarithm of the molecular weight (60,74). Since data on the effective diameters of molecules during diffusion are not accurate, a precise relationship between molecular dimensions and diffusivity has not been developed.

Barrier and co-workers (29,40) and Prager and Blyholder (70,75) have studied the diffusion of various hydrocarbons in natural rubber and polyisobutylene. They concluded that for the homologous series of n paraffins above n-C_4H_{10} the rate of diffusion changes little when the carbon chain length of the penetrant molecule is increased. Diffusion of these penetrants is believed to occur preferentially along the direction of greatest length of the molecule, which tends to penetrate the rubber with the penetrant oriented as a needle. Chain hydrocarbons are thought to diffuse by first penetrating with one segment into a hole when one of sufficient size is formed, followed by more segments when the hole has been sufficiently enlarged by thermal fluctuations.

Cyclization and branching of the penetrant causes a decrease in the diffusion coefficient. This may be explained by the larger cross-sectional area of cyclic and branched hydrocarbons. However, double bonds make the dimensions of the penetrant molecules more favorable for diffusion and an olefin such as ethylene diffuses more rapidly than ethane. With larger molecules double bonds tend to increase internal mobility.

Vasenim (76-78) has made a study of the effect of carbon chain length, branching, and double bonds on the rate of diffusion of organic compounds in rubber. He assumed that in each elementary diffusion step the molecule moves through a distance equal to the diameter of a CH_2 group and predicted that the diffusion coefficient is inversely proportional to the number of atom groups and proportional to the cross-sectional area of the diffusing molecule to a power greater than one. The diffusion of a series of alcohols in polyvinylacetate follow the behavior predicted by Vasenin, however, further refinements are necessary to account for the leveling-off of the diffusion coefficient of the higher normal paraffins in rubber.

Evidence has recently been presented for the presence of a microporous structure in certain amorphous polymers near or below their glass temperature and in semicrystalline polymers above the glass transition temperature (79). In semicrystalline polymers Matsuoka (79) has suggested that microvoids are the result of the local volume decrease accompanying the secondary crystallization of the intervening amorphous phase between discrete spherulitic fibrils which were formed during the rapid initial stages of crystallization. The distribution of void size and shape in dependent on the manner of apherulite growth, and may range from very small voids of the order of unit-cell dimensions to voids of much greater size with nonrandom configurations.

A similar mechanism may explain the development of microporosity in glassy amorphous polymers such as polyvinylacetate (80) and atactic polystyrene (81). When the temperature is lowered below the glass transition temperature, the volume occupied by a polymer becomes increasingly greater than the equilibrium volume of the equivalent liquid, and since segmental mobility is low, the volume difference must cause the formation of different density regions on the microscale. Less densely packed regions correspond to voids within a surrounding densely packed matrix. The effect of a microporous structure on the solubility and permeability of a polymer depends upon the nature of the penetrant within the void and the continuity of the path afforded by the distribution of voids. It is convenient to distinguish between two kinds of microporosity: cracks, pores, or other flows in gross polymer structure and voids which are distributed more or less randomly.

The presence of small cracks, channels or interconnected micropores in the polymer structure permits penetrant convection to occur as well as activated diffusion. The simultaneous convection and diffusion of penetrant has been observed (80,81,83,84) and mathematically treated by Frisch (82). When a homogeneous distribution of noninterconnected microvoids are present in the polymer structure and in the absence of penetrant clustering, the overall rate of transport should increase somewhat due to the smaller structural packing density. One would also expect that the probability that a penetrant molecule can make a successful diffusion step to be increased because of the presence of voids.

The activated diffusion process is a very specific one, dependent on the solubility and mobility of the penetrant in the solid. Capillary flow, on the other hand, does not show pronounced differences for different gases unless the gas has dimensions comparable to that of the capillary. The activated diffusion process is characterized by a large positive temperature dependence, while the temperature dependence for capillary flow is due mainly to changes in gas viscosity and is small and negative.

The degree of crystallinity of a polymer can have a profound influence upon its permeation properties. At temperatures well below the melting point, crystalline regions of a polymer are generally not accessible to penetrants (85-88). In semicrystalline polymers such as polyethylene, sorption isotherms for a vapor or gas based on the entire polymer being accessible for penetrant differ for different density samples (85,86) and thus the effective composition must be computed on the basis of the accessible amorphous content. For low concentrations and in the absence of a significant amount of swelling or strong specific interaction, semicrystalline polymers have been treated as if they were a two-phase mixture of liquid-like amorphous material and impenetrable crystallites.

The permeation rate in several amorphous polymers below or not far above the glass transition temperature is markedly dependent on the molecular orientation of polymer chains and their direction relative to the direction of permeation (11,17,89-91). The rate of permeation perpendicular to the orientation axis is greater than the rate in a randomly oriented polymer, which is greater than the rate parallel to the orientation axis. These effects may be due to reduced capacity for an oriented sample to swell in the direction of orientation. Brandt (92) has shown that the direction and magnitude of changes in permeation of several gases due to stretching of polymers having high initial degrees of crystallinity, such as nylon, polyethylene and polypropylene, depends on the temperature and penetrant used. He suggested that the primary factor affecting the magnitude and temperature dependence of diffusion was the change in void content, since changes in crystallinity on elongation were negligible.

VI. Non-Fickian Behavior

Below their glass transition temperature polymers with long relaxation times often exhibit "non-Fickian" diffusion behavior, especially with penetrants that cause extensive swelling. "Non-Fickian" behavior cannot be adequately described by any generalized form of Fick's law with constant boundary conditions and with the diffusion coefficient dependent only on concentration (89). "Non-Fickian" behavior has been attributed to the diffusion coefficient being a function not only of concentration but time and spatial coordinates, or the boundary conditions time dependent or due to the simultaneous diffusion and convection of more than one concurrent activated diffusion mechanism.

In many polymers "non-Fickain" behavior is considered to be the consequence of the finite rates at which changes in polymer structure occur in response to stresses imposed upon the medium before and during the sorption process (93).

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Appendix A

Abstracted Data for Specific Polymers

DIFFUSION DATA OF VARIOUS PENETRANTS THROUGH GIVEN MEDIA

DIFFUSION THROUGH VINYLIDENE CHLORIDE-ACRYLONITRILE

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
48001	7	5	3.20 E-10	298		40	20200	3
48001	7	5	3.20 E-10	298		60	20200	3
48001	7	5	1.60 E-9	313		40	20200	3

DIFFUSION THROUGH LEXAN

I.D	POL	PEN	DIF COEFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
63006	10	11	5.30 E-9	273			6000	
63006	10	11	1.50 E-8	298				
63006	10	11	3.30 E-8	323				
63006	10	11	6.40 E-8	348				
63006	10	11	1.20 E-7	373				
63006	10	11	2.10 E-7	398				
63006	10	11	3.30 E-7	423				
63006	10	11	5.30 E-7	448				
63006	10	14	3.00 E-7	273			5000	
63006	10	14	6.40 E-7	298				
63006	10	14	1.10 E-6	323				
63006	10	13	6.70 E-9	273			7700	
63006	10	13	2.10 E-[illegible]	[illegible]				
63006	10	13	5.40 E-8	323				
63006	10	13	1.30 E-7	348			9000	
63006	10	13	2.40 E-7	373				
63006	10	21	2.00 E-7	398				
63006	10	16	1.20 E-9	273			9000	
63006	10	16	4.80 E-9	298				
63006	10	16	1.50 E-8	323				
63006	10	16	4.70 E-8	348				
63006	10	16	1.00 E-7	373				
63006	10	17	2.50 E-8	448			2000	
63006	10	17	1.00 E-13	298				

DIFFUSION THROUGH EPOXY RESIN

I.D	POL	PEN	DIF COEFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
63003	16	19	8.96 E-7	328				
63003	16	19	5.52 E-7	320				
63003	16	19	4.22 E-7	313				
63003	16	19	3.34 E-7	306				
63003	16	19	2.35 E-7	299				
63003	16	14	7.16 E-7	328				
63003	16	14	5.97 E-7	320				
63003	16	14	[illegible]	[illegible]				
63003	16	14	3.32 E-7	306				
63003	16	14	2.11 E-7	298				
63003	16	20	3.49 E-6	328				
63003	16	20	3.41 E-6	320				
63003	16	20	2.47 E-6	313				
63003	16	20	1.84 E-6	306				
63003	16	20	1.56 E-6	298				
63003	16	21	.96 E-7	323				
63003	11	14	2.60 E-7	292				
63003	11	14	3.43 E-7	293				
63003	11	14	3.57 E-7	298				
63003	11	14	4.67 E-7	303				
63003	11	14	5.62 E-7	308				
63003	11	14	7.01 E-7	[illegible]				
63003	11	18	3.05 E-7	293				
63003	11	18	3.70 E-7	298				
63003	11	18	4.53 E-7	303				
63003	11	18	5.72 E-7	308				

DIFFUSION THROUGH BUTADIENE STYRENE

I.D	POL	PEN	DIF COEFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
39001	18	21	2.37 E-7	293		0.93	8900	4
39001	18	21	5.06 E-7	308		0.93	8900	4
39001	18	21	9.50 E-7	323		0.93	8900	4
39001	18	21	1.53 E-6	347		0.93	8900	4
39001	18	11	3.80 E-7	293		1.84	9000	4
39001	18	11	6.80 E-7	303		1.84	9000	4
39001	18	11	1.11 E-6	314		1.84	9000	4
39001	18	11	1.75 E-6	324		1.84	9000	4
39001	18	11	3.04 E-6	338		1.84	9000	4

DIFFUSION THROUGH GUTTA PERCHA

I.D	POL	PEN	DIF COEFF	T(KEL)	DENSITY	D(SUB O)	E	STATE
47002	19	14	3.50 E-6	290				4
47002	19	14	4.20 E-6	294				4
47002	19	14	5.00 E-6	298				4
47002	19	14	6.20 E-6	303				4
47002	19	14	7.60 E-6	308				4
47002	19	14	9.20 E-6	312				4
47002	19	14	1.15 E-5	316				4
47002	19	14	2.10 E-5	323				4
47002	19	14	2.60 E-5	328				4
47002	19	14	3.10 E-5	333				4
47002	19	14	3.40 E-5	338				4
47002	19	14	4.00 E-5	343				4
47002	19	16	3.10 E-7	290				4
47002	19	16	4.10 E-7	294				4
47002	19	16	4.70 E-7	298				4
47002	19	16	6.60 E-7	303				4
47002	19	16	8.20 E-7	308				4
47002	19	16	1.10 E-6	312				4
47002	19	16	1.70 E-6	316				4
47002	19	16	4.10 E-6	323				4
47002	19	16	4.90 E-6	328				4
47002	19	16	5.70 E-6	333				4
47002	19	16	6.50 E-6	338				4
47002	19	16	7.80 E-6	343				4
47002	19	21	3.20 E-7	290				4
47002	19	21	4.10 E-7	294				4
47002	19	21	5.00 E-7	298				4
47002	19	21	6.60 E-7	303				
47002	19	21	8.70 E-7	308				4
47002	19	21	1.20 E-6	312				4
47002	19	21	1.80 E-6	316				4
47002	19	21	4.20 E-6	323				4
47002	19	21	5.00 E-6	328				4
47002	19	21	5.70 E-6	333				4
47002	[illegible]	[illegible]	[illegible].00 [illegible]	[illegible]				
47002	19	21	7.80 E-6	343				4
47002	19	13	4.40 E-7	290				4
47002	19	13	5.70 E-7	294				4
47002	19	13	7.00 E-7	298				4
47002	19	13	8.90 E-7	303				4
47002	19	13	1.20 E-6	[illegible]0				
47002	19	13	1.60 E-6	312				4
47002	19	13	2.30 E-6	316				4
47002	19	13	5.30 E-6	323				4
47002	19	13	6.50 E-6	328				4
47002	19	13	7.50 E-6	333				4
47002	19	13	8.30 E-6	338				
47002	[illegible]	[illegible]	[illegible]	[illegible]				

DIFFUSION THROUGH TEFLON [illegible]

I.D	POL	PEN	DIF COEFF	T(KEL)	DENS+TY	D(SUB 0)	E	STATE
63002	21	24	3.50 E-9	266		.16	9500	
63002	21	16	1.20 E-7	290		.25	8400	
63002	21	23	1.50 E-8	290		.21	9600	
63002	21	17	9.70 E-9	351		1.72 E1	14600	

DIFFUSION THROUGH COPOLYMER OF TEFLON 89 AND 52

I.D	POL	PEN	DIF COEFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
63002	107	16	8.00 E-7	350		7.65	11000	
63002	107	17	2.00 E-8	364		6.83 E1	15800	
63002	107	23	9.00 E-8	350		3.50	12000	

DIFFUSION THROUGH TEFLON 89

I.D	POL	PEN	DIF COEFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
63002	106	23	5.00 E-9	312		.46	11400	

DIFFUSION THROUGH BUTADIENF-METHYLMETHACRYLATF

I.D	POL	PEN	DIF COEF	T(KEL)	DENS+TY	C(SUB 0)	E	STATE
39001	23	11	3.40 E-7	293		15.10	10300	4
39001	23	11	6.20 E-7	304		15.10	10300	4
39001	23	11	1.12 E-6	312		15.10	10300	4
39001	23	11	1.86 E-6	325		15.10	10300	4
39001	23	11	3.09 E-6	335		15.10	10300	4
39001	23	21	4.10 E-7	313		38.0	11500	4
39001	23	21	9.20 E-7	328		38.0	11500	4
39001	23	21	1.60 E-6	339		38.0	11500	4
39001	23	21	2.90 E-6	351		38.0	11500	4

DIFFUSION THROUGH POLYPROPYLENE

I.D	POL	PEN	DIF COEFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
64001	20	33	.27 E-8	287			19800	
64001	20	33	.04 [illegible]	[illegible]				
64001	20	33	4.30 E-8	313				
66001	20	21	2.04 E-5	461				
66001	20	16	3.37 E-5	461				
66001	20	72	7.30 E-5	461				
66001	20	11	5.18 E-5	461				
66001	[illegible]	[illegible]	[illegible]	[illegible]				
66001	20	21	3.51 E-5	461				
66001	20	16	4.25 E-5	461				
66001	20	93	4.02 E-5	461				
66001	20	11	7.40 E-5	461				
66001	20	10	1.05 E-4	461				

DIFFUSION THROUGH NEOPRENE

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
39001	26	21	1.90 E-7	300		79.0	11900	4
39001	26	21	3.40 E-7	308		79.0	11900	4
39001	26	21	5.50 E-7	317		79.0	11900	4
39001	26	21	9.60 E-7	327		79.0	11900	4
39001	26	21	1.80 E-6	338		79.0	11900	4
39001	26	21	4.50 E-6	358		79.0	11900	4
39001	26	11	3.30 E-7	309		54.6	11700	4
39001	26	11	7.80 E-7	326		54.6	11700	4
39001	26	11	1.45 E-6	335		54.6	11700	4
39001	26	11	2.53 E-6	347		54.6	11700	4
39001	26	11	4.84 E-6	359		54.6	11700	4
39001	26	14	3.70 E-7	273		9.0	9250	4
39001	26	14	1.03 E-6	290		9.0	9250	4
39001	26	14	1.80 E-6	300		9.0	9250	4
39001	26	14	2.97 E-6	309		9.0	9250	4
39001	26	14	4.81 E-6	320		9.0	9250	4
58001	26	74	.33 E-7	313			12700	
58001	26	74	.78 E-7	323			12700	
58001	26	74	1.10 E-7	333			12700	
58001	26	74	1.88 E-7	343			12700	

DIFFUSION THROUGH POLYVINYLCHLORIDE

I.D	POL	PEN	DIF COFF	T(KEL)	DENS+TY	D(SUB 0)	E	STATE
58003	28	27	1.15 E-8	323			26.0	
58003	28	26	6.50 E-9	304		4.0 E-9	9.0	
58003	28	26	7.00 E-9	304			11.0	
58003	28	26	8.90 E-9	304			15.0	
58003	28	26	1.10 E-8	304			19.0	
58003	28	26	1.15 E-8	304			21.0	
58003	28	26	1.20 E-8	304			22.0	
58003	28	26	7.80 E-9	308		5.6 E-9	7.0	
58003	28	26	8.90 E-9	308			9.0	
58003	28	26	9.90 E-9	308			11.0	
58003	28	26	1.23 E-8	308			15.0	
58003	28	26	1.34 E-8	308			17.0	
58003	28	26	1.44 E-8	308			19.0	
58003	28	26	9.70 E-9	313		7.20 E-9	6.0	
58003	28	26	1.09 E-8	313			8.0	
58003	28	26	1.22 E-8	313			10.0	
58003	28	26	1.29 E-8	313			12.0	
58003	28	26	1.44 E-8	313			14.0	
58003	28	26	1.64 E-8	313			16.0	
58003	28	26	1.14 E-8	318		8.70 E-9	5.0	
58003	28	26	1.31 E-8	318			7.0	
58003	28	26	1.46 E-8	318			9.0	
58003	28	26	1.63 E-8	318			[illegible].0	
58003	28	26	1.86 E-8	318			13.0	
58003	28	26	2.02 E-8	318			15.0	
58003	28	26	1.42 E-8	323		1.18 E-8	4.0	
58003	28	26	1.51 E-8	323			5.0	
58003	28	26	1.66 E-8	323			6.0	
58003	28	26	1.81 E-8	323			8.0	
58003	28	26	1.88 E-8	323			10.0	
58003	28	26	2.28 E-8	323			12.0	
58003	28	26	1.74 E-8	328		1.39 E-8	4.0	
58003	28	26	1.83 E-8	328			5.0	
58003	28	26	2.09 E-8	328			7.0	
58003	28	26	2.23 E-8	328			8.0	
58003	28	26	2.55 E-8	328			10.0	
58003	28	26	2.86 E-8	328			11.0	
58003	28	26	2.18 E-8	333		1.97 E-8	3.0	
58003	28	26	2.36 E-8	333			4.0	
58003	28	26	2.49 E-8	333			5.0	
58003	28	26	2.64 E-8	333			7.0	
58003	28	26	2.76 E-8	333			8.0	
58003	28	26	2.98 E-8	333			9.0	
58003	28	26	3.19 E-8	343		2.91 E-8	2.0	
58003	28	26	3.53 E-8	343			3.0	
58003	28	26	3.79 E-8	343			4.0	
58003	28	26	4.08 E-8	343			5.0	
58003	28	26	4.15 E-8	343			6.0	
58003	28	26	4.42 E-8	343			7.0	
58003	28	29	.97 E-9	304		.77 E-9	4.5	

58003	28	29	1.20 E-9	304		6.8
58003	28	29	1.42 E-9	304		8.5
58003	28	29	1.60 E-9	304		10.5
58003	28	29	1.79 E-9	304		12.5
58003	28	29	2.03 E-9	308	.82 E-9	14.5
58003	28	29	1.20 E-9	308		4.0
58003	28	29	1.42 E-9	308		6.0
58003	28	29	1.72 E-9	308		8.0
58003	28	29	2.08 E-9	308		10.0
58003	28	29	2.61 E-9	308		12.0
58003	28	29	3.00 E-9	308		14.0
58003	28	29	1.46 E-9	313	1.02 E-9	2.0
58003	28	29	1.78 E-9	313		4.0
58003	28	29	2.12 E-9	313		6.0
58003	28	29	2.42 E-9	313		8.0
58003	28	29	2.95 E-9	313		10.0
58003	28	29	4.17 E-9	313		12.0
58003	28	29	2.11 E-9	318	1.66 E-9	2.5
58003	28	29	2.24 E-9	318		[illegible]
58003	28	29	3.11 E-9	318		7.5
58003	28	29	4.00 E-9	318		9.5
58003	28	29	4.40 E-9	318		10.5
58003	28	29	2.70 E-9	323	2.09 E-9	2.0
58003	28	29	2.80 E-9	323		3.0
58003	28	29	3.60 E-9	323		5.0
58003	28	29	3.80 E-9	323		6.0
58003	28	29	4.60 E-9	323		8.0
58003	28	29	5.40 E-9	323		9.0
58003	28	29	3.50 E-9	328	2.81 E-9	2.0
58003	28	29	3.80 E-9	328		3.0
58003	28	29	4.30 E-9	328		4.0
58003	28	29	5.00 E-9	328		6.0
58003	28	29	5.90 E-9	328		7.0
58003	28	29	6.70 E-9	328		8.0
58003	28	29	4.50 E-9	333	3.60 E-9	1.0
58003	28	29	4.80 E-9	333		2.0
58003	28	29	5.30 E-9	333		3.0
58003	28	29	6.40 E-9	333		5.0
58003	28	29	6.80 E-9	333		6.0
58003	28	29	7.30 E-9	333		7.0
58003	28	29	7.50 E-9	343	4.70 E-9	1.0
58003	28	29	7.80 E-9	343		1.5
58003	28	29	8.40 E-9	343		2.0
58003	28	29	9.30 E-9	343		3.0
58003	28	29	9.40 E-9	343		4.0
58003	28	29	9.90 E-9	343		5.0
58003	28	27	4.70 E-9	308	2.90 E-9	20.0
58003	28	27	4.90 E-9	308		24.0
58003	28	27	5.10 E-9	308		32.0
58003	28	27	5.20 E-9	308		36.0
58003	28	27	4.90 E-9	313	4.20 E-9	12.0
58003	28	27	5.40 E-9	313		16.0
58003	28	27	6.30 E-9	313		24.0
58003	28	27	6.70 E-9	313		28.0

58003	28	27	7.20 E-9	313		36.0
58003	28	27	5.70 E-9	318	4.60 E-9	10.0
58003	28	27	6.50 E-9	318		14.0
58003	28	27	6.90 E-9	318		18.0
58003	28	27	8.00 E-9	318		26.0
58003	28	27	8.70 E-9	318		30.0
58003	28	27	9.20 E-9	318		32.0
58003	28	27	7.00 E-9	323	5.80 E-9	8.0
58003	28	27	7.60 E-9	323		11.0
58003	28	27	9.00 E-9	323		17.0
58003	28	27	9.90 E-9	323		20.0
58003	28	27	1.18 E-8	323		28.0
58003	28	27	8.40 E-9	328	6.8 E-9	7.0
58003	28	27	9.20 E-9	328		10.0
58003	28	27	1.00 E-8	328		13.0
58003	28	27	1.17 E-8	328		19.0
58003	28	27	1.31 E-8	328		22.0
58003	28	27	1.38 E-8	328		24.0
58003	28	27	1.05 E-8	333	9.40 E-9	5.0
58003	28	27	1.10 E-8	333		7.0
58003	28	27	1.21 E-8	333		11.0
58003	28	27	1.33 E-8	333		15.0
58003	28	27	1.53 E-8	333		19.0
58003	28	27	1.60 E-8	333		20.0
58003	28	27	1.32 E-8	338	1.12 E-8	4.0
58003	28	27	1.35 E-8	338		6.0
58003	28	27	1.48 E-8	338		10.0
58003	28	27	1.57 E-8	338		12.0
58003	28	27	1.80 E-8	338		16.0
58003	28	27	1.88 E-8	338		18.0
58003	28	27	1.61 E-8	343	1.48 E-8	4.0
58003	28	27	1.72 E-8	343		6.0
58003	28	27	1.79 E-8	343		8.0
58003	28	27	1.99 E-8	343		12.0
58003	28	27	2.02 E-8	343		14.0
58003	28	27	2.16 E-8	343		16.0
58003	28	27	1.95 E-8	348	1.81 E-8	3.0
58003	28	27	2.08 E-8	348		5.0
58003	28	27	2.20 E-8	348		7.0
58003	28	27	2.26 E-8	348		9.0
58003	28	27	2.49 E-8	348		11.0
58003	28	27	2.65 E-8	348		13.0
58003	28	30	1.82 E-9	308	1.25 E-9	11.0
58003	28	30	2.08 E-9	308		15.0
58003	28	30	2.40 E-9	308		19.0
58003	28	30	2.70 E-9	308		23.0
58003	28	30	3.10 E-9	308		27.0
58003	28	30	4.10 E-9	308		35.0
58003	28	30	2.30 E-9	313	1.57 E-9	9.0
58003	28	30	2.70 E-9	313		13.0
58003	28	30	3.20 E-9	313		17.0
58003	28	30	3.70 E-9	313		21.0
58003	28	30	4.40 E-9	313		25.0
58003	28	30	5.10 E-9	313		29.0

58003	28	30	3.00 E-9	323	2.27 E-9	6.0
58003	28	30	3.50 E-9	323		9.0
58003	28	30	4.00 E-9	323		12.0
58003	28	30	4.60 E-9	323		15.0
58003	28	30	5.40 E-9	323		18.0
58003	28	30	6.20 E-9	323		21.0
58003	28	30	4.40 E-9	333	3.50 E-9	4.0
58003	28	30	5.20 E-9	333		7.0
58003	28	30	6.10 E-9	333		10.0
58003	28	30	1.72 E-8	333		13.0
58003	28	30	6.50 E-9	343	5.60 E-9	3.0
58003	28	30	7.10 E-9	343		5.0
58003	28	30	7.90 E-9	343		7.0
58003	28	30	8.70 E-9	343		9.0
58003	28	30	9.60 E-9	343		11.0
58003	28	30	1.03 E-8	343		12.5
58003	28	30	8.10 E-9	348	7.00 E-9	2.5
58003	28	30	8.80 E-9	348		4.0
58003	28	30	9.60 E-9	348		5.5
58003	28	30	1.05 E-8	348		9.0
58003	28	30	1.14 E-8	348		10.0
58003	28	30	1.25 E-8	348		11.0
58003	28	30	3.30 E-9	323	2.17 E-9	3.0
58003	28	30	3.80 E-9	323		4.0
58003	28	30	4.40 E-9	323		5.0
58003	28	30	5.00 E-9	323		6.0
58003	28	30	6.70 E-9	323		8.0
58003	28	30	8.80 E-9	323		10.0
58003	28	30	1.16 E-8	323		12.0
58003	28	30	5.50 E-9	338	3.23 E-9	3.0
58003	28	30	6.60 E-9	338		4.0
58003	28	30	8.00 E-9	338		5.0
58003	28	30	9.50 E-9	338		6.0
58003	28	30	1.36 E-8	338		8.0
58003	28	30	6.50 E-9	348	4.70 E-9	2.0
58003	28	30	7.60 E-9	348		3.0
58003	28	30	8.90 E-9	348		4.0
58003	28	30	1.05 E-8	348		5.0
58003	28	30	6.50 E-9	353	5.56 E-9	1.0
58003	28	30	7.50 E-9	353		2.0
58003	28	30	8.70 E-9	353		3.0
58003	28	30	1.01 E-8	353		4.0
58003	28	30	1.18 E-8	353		5.0

DIFFUSION THROUGH BUTYL RUBBER

I.D	POL	PEN	DIF COEFF	T(KEL)	DENS+TY	D(SUB 0)	E	STATE	
58001	33	74	2.85 E-7	323					1.51
58001	33	74	2.86 E-7	323					2.39
58001	33	74	2.93 E-7	323					4.29
58001	33	73	1.02 E-7	313			6800		
58001	33	73	1.40 E-7	323			6800		
58001	33	73	1.94 E-7	333			6800		
58001	33	75	1.41 E-7	313			8400		
58001	33	75	1.98 E-7	323			8400		
58001	33	75	3.16 E-7	333			8400		
61004	33	10	5.90 E-5	298			5800		
50003	33	14	.41 E-6	273					
50003	33	14	.80 E-6	285			8700		
50003	33	14	1.52 E-6	298			8400		
50003	33	14	2.41 E-6	308			8200		
50003	33	14	4.38 E-6	323			7500		
50003	33	14	8.24 E-6	343			6800		
50003	33	14	1.76 E-5	373					
50003	33	21	.45 E-7	298		3.40 E1			
50003	33	21	.90 E-7	308			12200		
50003	33	21	.22 E-6	323			11400		
50003	33	21	.56 E-6	343			10000		
50003	33	21	1.70 E-6	373					

DIFFUSION THROUGH RUBBER A(.1 MOLE(VINYL GROUP))

I.D	POL	PEN	DIF COEF	T(KEL)	DENS+TY	D(SUB 0)	E	STATE
61005	34	10	216.E-7	298				
61005	34	13	17.3E-7	298				
61005	34	11	13.6E-7	298				
61005	34	16	12.5E-7	298				
61005	34	87	13.5E-7	298				
61005	34	21	11.7E-7	298				
61005	34	12	8.9E-7	298				
61005	34	35	4.0E-7	298				
61005	34	101	5.0E-7					
61005	34	102	3.1E-7	298				
61005	34	22	2.1E-7	298				
61005	34	17	1.15E-7	298				
62001	34	26	5.44 E-6	303		4.90 E-5	4200	5.23 E-6
62001	34	26	6.83 E-6	313				6.51 E-6
62001	34	26	8.49 E-6	323				8.02 E-6
62001	34	26	1.07 E-5	333				9.64 E-6
62001	34	26	1.29 E-5	343				1.19 E-5
62001	34	28	2.83 E-6	303		2.40 E-5	4200	2.49 E-6
62001	34	28	3.53 E-6	313				3.06 E-6
62001	34	28	4.32 E-6	323				3.72 E-6
62001	34	28	5.32 E-6	333				4.43 E-6
62001	34	28	6.40 E-6	343				5.95 E-6
62001	34	29	4.81 E-6	303		1.70 E-5	4000	3.83 E-6
62001	34	29	5.98 E-6	313				4.75 E-6
62001	34	29	7.71 E-6	323				5.78 E-6
62001	34	29	9.40 E-6	333				6.97 E-6
62001	34	29	1.15 E-5	343				8.38 E-6
62001	34	27	4.48 E-6	303		6.40 E-5	4300	4.36 E-6
62001	34	27	5.65 E-6	313				5.58 E-6
62001	34	27	6.92 E-6	323				7.03 E-6
62001	34	27	8.48 E-6	333				8.78 E-6
62001	34	27	1.02 E-5	343				1.09 E-5
20001	34	13	0.95 E-6	290				4
20001	34	56	1.21 E-6	290				4
20001	34	57	0.72 E-6	290				4
20001	34	16	0.85 E-6	290				4
20001	34	14	7.23 E-6	290				4
47001	34	21	1.21 E-6	298	.9	72.9		4
47001	34	21	1.41 E-6	303	.8	73.8		4
47001	34	21	1.75 E-6	308	.1	74.0		4
47001	34	21	1.86 E-6	308	.1	56.1		4
47001	34	21	1.72 E-6	308	37.4	74.9		4
47001	34	21	2.12 E-6	313	1.5	71.5		4
47001	34	21	2.68 E-6	318	.1	75.7		4
47001	34	21	3.02 E-6	323	1.0	72.3		4
47001	34	21	3.06 E-6	323	.1	74.9		4
47001	34	13	1.88 E-6	303	.5	74.8		4
47001	34	13	2.07 E-6	308	4.0	74.9		4
47001	34	13	2.68 E-6	313	4.2	74.2		4
47001	34	13	3.09 E-6	318	.2	74.1		4
47001	34	14	1.23 E-5	303	.1	74.9		4
47001	34	14	1.44 E-5	308	.1	74.6		4
47001	34	14	1.70 E-5	313	.1	76.4		4

47002	34	14	1.05	E-5	298			4
47002	34	14	2.20	E-5	323			4
47002	34	16	1.05	E-6	298			4
47002	34	16	3.20	E-6	323			4
47002	34	21	1.15	E-6	298			4
47002	34	21	3.70	E-6	323			4
47002	34	13	1.75	E-6	298			4
47002	34	13	4.90	E-6	323			4
50003	34	16	1.10	E-6	298	3.7	8900	
50003	34	16	3.50	E-6	323	3.7	8900	
50003	34	64	4.67	E-7	298	4.3	9500	
50003	34	64	1.63	E-6	323	4.3	9500	
50003	34	65	.18	E-6	298			
50003	34	65	.72	E-6	323			
50003	34	13	1.58	E-6	298	1.94	8300	
50003	34	13	4.70	E-6	323	1.94	8300	
50003	34	10	1.00	E-5	273			
50003	34	10	1.50	E-5	285		5100	
50003	34	10	2.16	E-5	298		4700	
50003	34	10	2.77	E-5	308		4400	
50003	34	10	3.80	E-5	323		4000	
50003	34	10	5.34	E-5	343		3300	
50003	34	10	7.21	E-5	373			
50003	34	21	.22	E-6	273			
50003	34	21	.52	E-6	285		10700	
50003	34	21	1.10	E-6	298		9400	
50003	34	21	1.82	E-6	308		8800	
50003	34	21	3.42	E-6	323		7900	
50003	34	21	6.63	E-6	343		6600	
50003	34	21	1.30	E-5	373			
50003	34	14	1.02	E-5	298			
50003	34	14	2.22	E-5	323			
50003	34	14	1.30	E-6	255			
50003	34	14	3.70	E-6	273		7100	
50003	34	14	6.20	E-6	285		6700	
50003	34	14	1.02	E-5	298		6300	
50003	34	14	1.42	E-5	308		6000	
50003	34	14	2.22	E-5	323		5800	
50003	34	14	3.71	E-5	343			
55001	34	26	2.32	E-7	303			
55001	34	26	4.28	E-7	313			
55001	34	26	7.15	E-7	323			4
55001	34	26	1.12	E-7	333			4
55001	34	27	2.28	E-7	303			4
55001	34	27	4.24	E-7	313			4
55001	34	27	6.80	E-7	323			4
55001	34	27	1.00	E-6	333			4
55001	34	29	1.50	E-7	303			4
55001	34	29	2.75	E-7	313			4
55001	34	29	4.65	E-7	323			4
55001	34	29	7.33	E-7	333			4
55001	34	28	.72	E-7	303			4
55001	34	28	1.41	E-7	313			4
55001	34	28	2.55	E-7	323			4
55001	34	28	4.24	E-7	333			4

55001	34	30	.91	E-7	303	4
55001	34	30	2.27	E-7	313	4
55001	34	30	4.40	E-7	323	4
55001	34	30	7.46	E-7	333	4

DIFFUSION THROUGH POLYVINYLALCOHOL

I.D	POL	PEN	DIF COEFF	T(KEL)	DENSITY	D(SUB O)	E	STATE		
57002	35	10	1.41 E-5	313						
57002	35	10	1.00 E-5	303						
57002	35	10	.89 E-5	294						
57002	35	10	7.95 E-6	286						
57002	35	13	1.26 E-7	313						
57002	35	13	.56 E-7	303						
57002	35	13	.33 E-7	294						
57002	35	13	2.08 E-8	286						
57002	35	72	.74 E-8	313						
57002	35	72	2.82 E-9	303						
57002	35	72	1.58 E-9	294						
57002	35	72	7.95 E-10	286						
61004	35	21	4.50 E-8	287				90		
61004	35	16	4.76 E-8	296				94		
65002	35	14	2.06 E-6	TIME LAG METHOD						
65002	35	14	1.93 E-6	STEADY STATE METHOD						
65002	35	14	2.01 E-6	SLOPE OF PLOT METHOD						
67001	35	33	.50 E-10	313	.15 E-10		.06			
67001	35	33	1.20 E-10	313	.30 E-10		.07			
67001	35	33	2.75 E-10	313	.55 E-10		.08			
67001	35	33	5.75 E-10	313	1.00 E-10		.09			
67001	35	38	.10 E-8	313	.05 E-8		.05			
67001	35	38	.30 E-8	313	.06 E-8		.06			
67001	35	38	.75 E-8	313	.10 E-8		.07			
67001	35	38	1.75 E-8	313	.40 E-8		.08			
67001	35	38	3.75 E-8	313	.90 E-8		.09			
67001	35	94	.70 E-8	313	.15 E-8		.04			
67001	35	94	1.80 E-8	313	.45 E-8		.05			
67001	35	94	5.10 E-8	313	1.10 E-8		.06			
48001	35	5	.51 E-10	298		40	14300	3		
48001	35	5	1.25 E-9	298		60	14300	3		
48001	35	5	.12 E-9	309		40	14300	3		
55002	35	5	1.66 E-11	313				4	19	3.3
55002	35	5	1.66 E-10	313				4	35	3.3

DIFFUSION THROUGH CELLULOSE ACETATE

I.D	POL	PEN	DIF COEFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE	
61003	36	38	1.15 E-8	298				.15	
61003	36	38	4.80 E-8	298				.18	
61003	36	38	1.30 E-7	298				.21	
61003	36	38	2.00 E-7	298				.24	
61004	36	16	1.63 E-8	293				0	
61004	36	16	2.40 E-8	293				94	
48001	36	5	3.10 E-9	298		40	12000	3	
48001	36	5	2.90 E-8	298		60	12000	3	
48001	36	5	8.30 E-8	313		40	12000	3	
56002	36	71	.37 E-9	273				4	716
56002	36	71	.74 E-9	298				4	704
56002	36	71	1.00 E-9	303				4	176
56002	36	71	1.40 E-9	303				4	462
56002	36	71	1.60 E-9	303				4	703
56002	36	71	3.00 E-9	318				4	735
56002	36	71	5.05 E-9	333				4	695
56002	36	71	.75 E-9	273				4	711
56002	36	71	2.20 E-9	303				4	68
56002	36	71	2.40 E-9	303				4	151
56002	36	71	2.80 E-9	303				4	355
56002	36	71	3.40 E-9	303				4	728
56002	36	71	7.20 E-9	318				4	742
56002	36	71	1.44 E-8	333				4	728

DIFFUSION THROUGH CELLULOSE ACETATE(37.9(ACETYL))

I.D	POL	PEN	DIF COEFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE	
55002	76	5	.30 E-7	313				4 18	12.4
55002	76	5	.32 E-7	313				4 19	12.4
55002	76	5	.45 E-7	313				4 35	12.4
55002	76	5	.38 E-7	313				4 35	12.4
55002	76	5	.35 E-7	313				4 18	13.8
55002	76	5	.43 E-7	313				4 18	13.8
55002	76	5	.45 E-7	313				4 36	13.8
55002	76	5	.43 E-7	313				4 37	13.8

DIFFUSION THROUGH POLYSTYRENE

I.D	POL	PEN	DIF COEFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
62003	37	12	8.50 E-6	100				
62003	37	12	1.20 E-5	125				
62003	37	12	3.10 E-5	150				
62003	37	12	4.00 E-5	175				
48002	37	21	3.63 E-6	463		270		4
48002	37	21	2.93 E-6	454		280		4
48002	37	21	2.50 E-6	443		280		4
48002	37	21	1.69 E-6	433		282		4
48002	37	21	1.10 E-6	422		110		4
48002	37	21	1.19 E-6	421		200		4
48002	37	21	1.06 E-6	411		272		4
48002	37	21	.52 E-6	393		206		4
48002	37	21	.27 E-6	368		160		4
48002	37	21	.10 E-6	349		205		4
48002	37	21	.04 E-7	293		134		4
48002	37	14	6.68 E-5	464		108		4
48002	37	14	4.50 E-5	450		205		4
48002	37	14	3.15 E-5	430		108		4
48002	37	14	2.41 E-5	422		108		4
48002	37	14	1.66 E-5	407		106		4
48002	37	14	.90 E-5	392		14		4
48002	37	14	.68 E-5	381		95		4
48002	37	14	.96 E-5	368		80		4
48002	37	14	.65 E-5	348		31		4
48002	37	14	.29 E-5	313		62		4
48002	37	14	1.10 E-5	351		88		4
48002	37	14	1.30 E-5	350		94		4
48002	37	14	.59 E-5	343		104		4
48002	37	14	1.20 E-5	358		43		4
48002	37	14	1.10 E-5	357		108		4
48002	37	14	1.35 E-5	354		98		4
48002	37	14	.80 E-5	345		102		4
48002	37	14	.60 E-5	340		96		4
48002	37	14	.35 E-5	307		96		4
48002	37	34	6.44 E-6	483		65		4
48002	37	34	1.47 E-6	435		56		4
48002	37	34	.71 E-6	421		52		4
48002	37	34	.48 E-6	393		54		4
48002	37	34	.42 E-6	391		53		4
48002	37	16	3.90 E-6	459		50		4
48002	37	16	2.45 E-6	450		40		4
48002	37	16	2.11 E-6	438		40		4
49001	37	9	.24 E-11	298		5.0		4
49001	37	9	4.37 E-12	298		7.5		4
49001	37	9	7.97 E-12	298		9.9		4
49001	37	9	1.71 E-11	298		12.9		4
49001	37	9	1.99 E-11	298		13.2		4
49001	37	9	3.26 E-11	298		15.1		4
49001	37	9	8.46 E-11	298		16.3		4
49001	37	9	9.72 E-11	298		16.8		4

50002	37	59	2.60	E-11	298	.0380
50002	37	59	5.10	E-11	298	.0490
50002	37	59	1.13	E-10	298	.0620
50002	37	59	1.93	E-10	298	.0710
50002	37	59	3.38	E-10	298	.0810
50002	37	59	4.46	E-10	298	.0830
50002	37	59	8.25	E-10	298	.0940
50002	37	59	1.75	E-9	298	.1080
50002	37	60	1.33	E-12	298	.083
50002	37	60	3.45	E-12	298	.098
50002	37	60	9.90	E-12	298	.113
50002	37	61	2.06	E-11	288	.030
50002	37	61	3.49	E-11	288	.043
50002	37	61	1.42	E-10	288	.073
50002	37	61	3.94	E-10	288	.090
50002	37	61	7.40	E-10	288	.101
50002	37	61	1.59	E-9	288	.108
50002	37	61	7.31	E-11	298	.042
50002	37	61	1.34	E-10	298	.056
50002	37	61	2.70	E-10	298	.067
50002	37	61	4.70	E-10	298	.076
50002	37	61	1.00	E-9	298	.087
50002	37	61	1.61	E-9	298	.093
50002	37	61	2.73	E-9	298	.102
50002	37	62	8.50	E-12	298	.049
50002	37	62	1.86	E-11	298	.065
50002	37	62	5.03	E-11	298	.083
50002	37	62	5.60	E-11	298	.084
50002	37	62	1.60	E-10	298	.095
50002	37	62	1.91	E-11	308	.053
50002	37	62	3.60	E-11	308	.062
50002	37	62	7.15	E-11	308	.072
50002	37	62	1.86	E-10	308	.083
50002	37	62	4.91	E-10	308	.095
50002	37	43	8.60	E-14	298	.053
50002	37	43	1.79	E-13	298	.071
50002	37	63	0.93	E-10	288	.038
50002	37	63	1.27	E-10	288	.045
50002	37	63	1.74	E-10	288	.051
50002	37	63	2.40	E-10	288	.059
50002	37	63	3.27	E-10	288	.066
50002	37	63	4.51	E-10	288	.073
50002	37	63	6.19	E-10	288	.080
50002	37	63	2.05	E-10	298	.038
50002	37	63	3.00	E-10	298	.045
50002	37	63	4.42	E-10	298	.051
50002	37	63	6.46	E-10	298	.059

50002	37	63	9.63	E-10	298	.066
50002	37	63	1.48	E-9	298	.073
50002	37	63	2.59	E-9	298	.080
50002	37	63	5.68	E-10	308	.038
50002	37	63	8.79	E-10	308	.045
50002	37	63	1.37	E-9	308	.051
50002	37	63	2.21	E-9	308	.059
50002	37	63	3.56	E-9	308	.066
50002	37	63	6.08	E-9	308	.073
50002	37	63	1.23	E-8	308	.080
51001	37	66	9.30	E-12	298	3.7
51001	37	66	1.54	E-11	298	6.3
51001	37	66	2.59	E-11	298	8.5
51001	37	66	5.31	E-11	298	10.1
51001	37	66	9.87	E-11	298	11.3
51001	37	67	4.53	E-12	298	28.0
51001	37	67	1.50	E-11	298	35.2
51001	37	67	3.89	E-11	298	43.6
51001	37	67	6.17	E-11	298	54.7
51001	37	33	8.24	E-13	298	5.0
51001	37	33	1.23	E-12	298	6.5
51001	37	33	1.76	E-12	298	7.9
51001	37	33	3.95	E-12	298	9.1
51001	37	33	7.05	E-12	298	10.8
51001	37	68	1.73	E-12	298	4.5
51001	37	68	2.53	E-12	298	6.0
51001	37	68	4.48	E-12	298	8.0
51001	37	68	7.00	E-12	298	10.0
51001	37	68	1.33	E-11	298	11.1
51001	37	69	1.28	E-12	298	5.0
51001	37	69	2.74	E-12	298	6.0
51001	37	69	6.17	E-12	298	6.8
51001	37	69	1.37	E-11	298	8.5
51001	37	70	3.58	E-12	298	5.0
51001	37	70	1.65	E-11	298	6.2
51001	37	70	2.75	E-11	298	7.1
51001	37	70	7.60	E-11	298	8.4
51001	37	62	2.55	E-12	298	5.0
51001	37	62	2.80	E-12	298	7.0
51001	37	62	7.26	E-12	298	8.6
51001	37	62	1.17	E-11	298	9.4
51001	37	62	1.70	E-11	298	11.0
51001	37	62	2.60	E-11	298	12.0
51001	37	62	4.94	E-11	298	13.5

DIFFUSION THROUGH CELLULOSE

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	E	STATE	
58005	38	58	10.3E-5	303				3	
58005	38	54	2.3E-5	303				3	
58005	38	95	1.06E-5	303				3	
58005	38	36	.47E-5	303				3	
58005	38	005	37.E-5	293				1	
58005	38	005	42.E-5	298				1	
58005	38	005	45.E-5	301				1	
58005	38	005	53.E-5	306.5				1	
58005	38	005	63.E-5	311				1	
58005	38	005	67.E-5	313				1	
58005	38	58	2.5E-5	303				0	
58005	38	54	1.16E-5	303				0	
58005	38	95	.73E-5	303				0	
58005	38	36	.58E-5	303				0	
58005	38	58	2.97E-5	303				1	
58005	38	54	.87E-5	303				1	
58005	38	95	.33E-5	303				1	
58005	38	36	.20E-5	303				1	
58005	38	58	7.37E-5	303				2	
58005	38	54	1.95E-5	303				2	
58005	38	95	.70E-5	303				2	
58005	38	36	.39E-5	303				2	
66002	38	5	3.47 E-10				.03		
66002	38	5	3.24 E-9				.10		
66002	38	5	3.12 E-9				.20		
66002	38	5	2.78 E-9				.32		
56002	38	71	1.60 E-12	318				4	732
56002	38	71	8.60 E-12	323				4	714
56002	38	71	9.50 E-12	328				4	699
56002	38	71	1.34 E-11	333				4	695
64006	47	90	2.16 E-9	363					
64006	47	90	4.60 E-11	323					
64006	47	90	5.70 E-11	323					
64006	47	90	9.40 E-10	298					
64006	47	90	4.20 E-10	294					
64006	47	90		369					
64006	47	90	3.00 E-10	303					
64006	47	91	1.66 E-8	363					
64006	47	91	6.92 E-10	324					
64006	47	91	7.77 E-11	298					
65001	47	92	3.64 E-9	363	.0				
65001	47	92	1.30 E-9	348	.0				
65001	47	92	2.27 E-9	363	.5				
65001	47	92	.60 E-9	348	.5				

DIFFUSION THROUGH POLYVINYLACETATE

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	E	STATE		
55002	41	5	1.27 E-7	313				4	22	26.5
55002	41	5	1.35 E-7	313				4	23	26.5
55002	41	5	1.35 E-7	313				4	29	26.5
55002	41	5	1.27 E-7	313				4	30	26.5
55002	41	5	1.23 E-7	313				4	35	26.5
55002	41	5	1.33 E-7	313				4	36	26.5
55002	41	5	.93 E-7	313				4	44	26.5
55002	41	5	.10 E-6	313				4	45	26.5
55002	41	5	.92 E-7	313				4	46	26.5
55002	41	5	.29 E-7	295				4	16	26.5
55002	41	5	.53 E-7	303				4	14	26.5
55002	41	5	.47 E-7	303				4	23	26.5
55002	41	5	2.25 E-7	324				4	41	26.5
55002	41	5	2.33 E-7	324				4	63	26.5
61004	41	10	1.00 E-4	298			5350			
61004	41	14	2.60 E-5	298			7500			
64005	41	42	1.00 E-9	313			.01			
64005	41	42	9.00 E-8	313			.05			
64005	41	42	8.20 E-7	313			.08			

DIFFUSION THROUGH CELLULOSE NITRATE

I.D	POL	PEN	DIF COEFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
61004	42	16	9.00 E-9	293				0
61004	42	16	5.60 E-9	293				94

DIFFUSION THROUGH CELLULOSE NITRATE(10(N))

I.D	POL	PEN	DIF COEFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE	
55002	77	5	.18 E-7	313				4 19	8.62
55002	77	5	.23 E-7	313				4 19	8.62
55002	77	5	.22 E-7	313				4 36	8.62
55002	77	5	.20 E-7	313				4 36	8.62
55002	77	5	3.84 E-8	313				4 27	19.7
55002	77	5	3.68 E-8	313				4 35	19.7
55002	77	5	3.84 E-8	313				4 45	19.7

DIFFUSION THROUGH NITROCELLULOSE

I.D	POL	PEN	DIF COEFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
61006	108	10		298		6.27 E-5		4.68
61006	108	21	1.93 E-5	298		2.90 E-5		5.21
61006	108	13	1.50 E-4	298		2.16 E-4		4.995
61006	108	11	1.00 E-5	298		1.10 E-5		5.15
61006	108	16	2.36 E-5	298		3.21 E-5		4.56
61006	108	89	1.16 E-6	298		2.63 E-6		4.44
61006	108	86	6.74 E-6	298		1.15 E-5		4.04
61006	108	5		298		3.82 E-5		2.19
61006	108	35	1.73 E-7	298		1.90 E-7		4.92
61006	108	22	.23 E-7	298		.31 E-7		4.57
63004	108	22	.16 E-10	298	1.46		.21 E-10	
63004	108	26	0.0	298	1.46		0.0	
63004	108	35	1.18 E-10	298	1.46		1.30 E-10	
63004	108	16	1.62 E-8	298	1.46		2.21 E-8	
63004	108	89	7.90 E-10	298	1.46		1.80 E-9	
63004	108	86	4.62 E-9	298	1.46		7.86 E-9	
63004	108	5		298	1.46		2.62 E-8	
63004	108	13	1.03 E-7	298	1.46		1.50 E-7	
63004	108	11	6.87 E-9	298	1.46		7.53 E-9	
63004	108	10		298	1.46		4.31 E-7	
63004	108	21	1.29 E-8	298	1.46		1.93 E-8	

DIFFUSION THROUGH NYLON(DRAWN)

I.D	POL	PEN	DIF COEFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE		
48001	43	5	1.2 E-9	298		40	13300	3		
48001	43	5	2.2 E-9	298		60	13300	3		
48001	43	5	3.4 E-9	313		40	13300	3		
55002	43	5	.50 E-8	313				4	19	4.5
55002	43	5	.50 E-8	313				4	36	4.5
55002	43	5	.63 E-8	313				4	19	23.0
55002	43	5	.67 E-8	313				4	36	23.0
56002	43	71	3.00 E-10	303				4		110
56002	43	71	6.00 E-10	303				4		153
56002	43	71	3.90 E-10	303				4		226
56002	43	71	5.40 E-10	303				4		270
56002	43	71	4.50 E-10	303				4		404
56002	43	71	4.90 E-10	303				4		621
56002	43	71	5.00 E-10	303				4		707
56002	43	71	1.60 E-9	318				4		741
56002	43	71	6.00 E-9	333				4		670
56002	43	71	5.30 E-9	333				4		720
56002	43	71	1.50 E-8	348				4		603
56002	43	71	1.70 E-8	348				4		651
56002	43	71	2.00 E-8	353				4		688
59001	43	16	.18 E-9	277			2400			
59001	43	16	.45 E-9	298						

DIFFUSION THROUGH NYLON(UNDRAWN)

I.D	POL	PEN	DIF COEFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
59001	96	16	.18 E-9	277			6700	
59001	96	16	.83 E-9	298				
61004	96	16	1.80 E-7	303				0
64004	96	5	2.20 E-8	298	1	1		
64004	96	5	7.50 E-8	298	2	1		
64004	96	5	3.00 E-8	298	3	1		
64004	96	5	3.00 E-8	298	1	3		
64004	96	5	7.00 E-8	298	2	3		
64004	96	5	4.00 E-8	298	1	5		
64004	96	5	8.00 E-8	298	3	3		
64004	96	5	8.00 E-8	298	2	5		
64004	96	5	3.00 E-7	298	3	5		

DIFFUSION THROUGH POLYAMIDE-NYLON 66

I.D	POL	PEN	DIF COEFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
61002	104	5	2.30 E-10	303				9
61002	104	5	1.20 E-10	298				9
61002	104	5	3.60 E-10	303				20
61002	104	5	2.70 E-10	298				20

DIFFUSION THROUGH MYLAR

I.D	POL	PEN	DIF COEFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE	
56002	45	71	1.30 E-11	273				4	715
56002	45	71	8.10 E-11	303				4	394
56002	45	71	1.01 E-10	303				4	694
56002	45	71	2.84 E-10	318				4	734
56002	45	71	6.15 E-10	333				4	747
62004	45	5	3.99 E-9	298	4.5	1216			
62004	45	5	3.95 E-9	298	6.4	1216			
62004	45	5	3.99 E-9	298	11.8	3274			
62004	45	5	3.95 E-9	298	14.1	1216			
62004	45	5	3.81 E-9	298	18.7	3274			
62004	45	5	3.95 E-9	298	23.0	3274			

DIFFUSION THROUGH ETHYLENE-PROPYLENE COPOLYMER(49-51)

I.D	POL	PEN	DIF COEFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
64001	46	23	1.29 E-7	296				
64001	46	33	6.10 E-8	296				
64001	46	27	5.90 E-8	296				
64001	46	83	4.10 E-8	296				
64001	46	78	2.10 E-8	296				
64001	46	33	2.00 E-8	283			13100	
64001	46	33	6.10 E-8	296				
64001	46	33	1.88 E-7	313				

DIFFUSION THROUGH PROPYLENE-ETHYLENE COPOLYME-(72/28)

I.D	POL	PEN	DIF COEFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
64001	110	33	4.40 E-8	283			10600	
64001	110	33	1.05 E-7	296				
64001	110	33	2.70 E-7	313				

DIFFUSION THROUGH LATEX FILMS

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
56001	48	33	9.00 E-7	298				4 0.2
56001	48	33	2.25 E-6	298				4 0.4
56001	48	33	2.80 E-6	298				4 0.6
56001	48	33	2.90 E-6	298				4 0.7
56001	48	33	2.30 E-6	298				4 0.8
56001	48	33	8.50 E-7	298				4 1.0
58002	48	33	3.00 E-7	298				
61004	48	12	8.80 E-6	298				
61004	48	21	7.60 E-6	293				
61004	48	10	1.12 E-4	298			4300	
61004	48	14	1.00 E-4	293			6000	
62002	48	12	4.36 E-6	323		1.326		3.49 E-6
62002	48	12	4.31 E-6	323		1.336		3.30 E-6
62002	48	12	4.30 E-6	323		1.339		3.83 E-6
62002	48	12	4.30 E-6	323		2.697		4.05 E-6
62002	48	33	5.40 E-6	323		1.515		5.12 E-6
62002	48	33	5.10 E-6	323		1.515		5.14 E-6
62002	48	22	.85 E-6	323		1.021		.83 E-6
64002	48	14	2.88 E-6	333				
64002	48	14	2.28 E-6	323				
64002	48	14	1.78 E-6	313				
64002	48	14	1.48 E-6	303				
64002	48	19	2.76 E-6	333				
64002	48	19	2.08 E-6	323				
64002	48	19	1.66 E-6	313				
64002	48	19	1.20 E-6	303				
65002	48	26	1.84 E-7	298		1.59		
65002	48	26	2.03 E-7	299		1.74		
65002	48	26	2.18 E-7	300		1.91		
65002	48	26	5.04 E-7	314		4.61		

DIFFUSION THROUGH POLYETHYLENE

I.D	POL	PEN	DIF COEFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
48001	49	5	6.8 E-8	298		40	19200	3
48001	49	5	6.8 E-8	298		60	19200	3
48001	49	5	3.0 E-7	313		40	19200	3
58001	49	74	.40 E-7	313			12200	
58001	49	74	.64 E-7	323			12200	
58001	49	74	1.61 E-7	333			12200	
58001	49	74	2.08 E-7	343			12200	
58001	49	74	6.61 E-7	363			12200	
59002	49	5	3.30 E-7	298			4.60 E5	
59002	49	5	2.00 E-7	298			9.90 E5	
59002	49	5		298			1.94 E6	
59002	49	5	1.30 E-7	298			2.99 E6	
59003	49	5	.21 E-8	298			SPRING BALANCE	
59003	49	5	.48 E-8	298			TIME LAG	
59003	49	5	1.44 E-8	298			SPRING BALANCE	
59003	49	5	6.74 E-8	298			SPRING BALANCE	
59003	49	5	3.05 E-7	313			SPRING BALANCE	
59004	49	13	1.30 E-6	298	.859			
59004	49	13	1.00 E-6	298				
60001	49	84	9.30 E-8	303	.919		.115	
60001	49	84	1.07 E-7	303	.919		.218	
60001	49	84	1.26 E-7	303	.919		.300	
60001	49	84	1.35 E-7	303	.919		.368	
60001	49	84	1.00 E-8	273	.919		.335	
60001	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	
60001	49	84	3.06 E-8	273	.919		.905	
60001	49	84	[illegible]	[illegible]	[illegible]		[illegible]	
60001	49	85	1.97 E-9	265	.922		.138	
60001	49	84	4.60 E-9	265	.922		.414	
60001	49	84	[illegible]	[illegible]	[illegible]		[illegible]	
60001	49	84	3.88 E-9	273	.922		.075	
60001	49	84	7.30 E-9	273	.922		.292	
60001	49	84	2.48 E-8	273	.922		.710	
60001	49	84	7.58 E-8	303	.922		.262	
60001	49	33	3.00 E-9	273	.922		.305	
60001	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	
60001	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			
60001	[illegible]	[illegible]	[illegible]	[illegible]				
60001	49	83	7.71 E-8	273	.922		.430	
60001	49	83	1.33 E-7	273	.922		.650	
60001	49	83	2.78 E-9	273	.922		.262	
60001	49	83	6.50 E-9	273	.922		.506	
60001	49	83	1.32 E-8	273	.922		.702	
60001	49	83	2.61 E-8	273	.922		.800	
61004	49	12	.86 E-6	298	.9511			
61004	49	10	9.10 E-5	297	.9170			
61004	49	21	1.20 E-6			4.5 E-6	9000	
61004	49	14	2.40 E-5			4.0 E-2	4300	

61004	49	13	1.70	E-6			2.0		8300	
61004	49	16	1.10	E-6			4.2		9000	
61004	49	13	4.20	E-7	288	.9203				[illegible]
61004	49	21	1.80	E-7	288	.9203				[illegible]
62003	49	21	[illegible]	[illegible]						
62003	49	21	3.00	E-5	150					
62003	49	21	3.50	E-5	175					
62003	49	21	3.95	E-5	200					
62003	49	21	4.10	E-5	225					
62003	[illegible]	[illegible]	[illegible]	[illegible]						
62003	49	12	4.00	E-5	150					
62003	49	12	[illegible]	[illegible]						
62003	49	12	3.50	E-5	200					
62003	49	12	4.10	E-5	225					
58004	49	33	4.90	E-7	298		1.20	E-10	18000	
58004	49	77	4.50	E-7	298		9.00	E-9	16000	
58004	49	78	2.30	E-7	298		1.00	E-10	18000	
58004	49	79	.71	E-7	298		2.00	E-9	23000	
58004	49	80	2.40	E-7	298		1.20	E-10	19000	
58004	49	81	.69	E-7	298		8.00	E-9	19000	
58004	49	82	1.80	E-7	298		1.10	E-10	17000	
58004	49	83	4.40	E-7	298		6.00	E-9	19000	
63001	49	12	.95	E-7	298				11500	IRRADIATED
63001	49	12	1.80	E-7	298				11300	UNIRRADIATED
63001	49	21	.29	E-6	298				9700	UNIRRADIATED
63001	49	21	.19	E-6	298				1[illegible]500	IRRADIATED
63001	49	10	7.70	E-6	298				5600	UNIRRADIATED
63001	49	10	5.40	E-6	298				4700	[illegible]
63001	49	22	.26	E-7	298				15100	UNIRRADIATED
63001	49	22	1.17	E-8	298				15300	IRRADIATED
64002	49	19	5.62	E-6	333					
64002	49	19	3.98	E-6	323					
64002	[illegible]	[illegible]	[illegible]	[illegible]						
64002	49	19	2.20	E-6	303					
64002	49	14	6.30	E-6	333					
64002	49	14	4.79	E-6	323					
64002	49	14	3.30	E-6	313					
64002	49	14	2.64	E-6	303					
64002	49	13	4.54	E-7	298					
66001	49	21	6.04	E-5	461					
66001	49	16	5.69	E-5	461					
66001	49	95	4.10	E-5	461					
66001	[illegible]	[illegible]	[illegible]	[illegible]						
66001	49	10	[illegible]	[illegible]						
67002	49		[illegible]		293	[illegible]	[illegible]	E-8	[illegible]	
67002	49		4.32	E-8	293		[illegible]	E-8	[illegible]	
67002	49		6.14	E-8	293		1.91	E-8	8 .7	
67002	49		[illegible]	[illegible]			[illegible]	[illegible]	[illegible]	
67002	49		8.80	E-8	293		2.52	E-8	[illegible]	
67002	49		8.94	E-8	293		2.62	E-8	3 .9	
67002	49		[illegible]	[illegible]			[illegible]	[illegible]	[illegible]	
67002	49		[illegible]		303		6.54	E-8	[illegible]	
67002	49		1.59	E-7	303		[illegible]	E-8	[illegible]	
67002	49		1.44	E-7	303		[illegible]	E-8	[illegible]	

67002	49		1.39 E-7	[illegible]		4.65 E-8	47.9
67002	49		[illegible]	[illegible]		[illegible]	[illegible]
67002	49		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
67002	49		8.90 E-8	303		0.0	[illegible]
67002	49		0.0	[illegible]		[illegible]	[illegible]
67002	49		2.79 E-7	313		9.97 E-8	18.3
67002	49		2.79 E-7	313		9.9 E-8	29.7
67002	49		2.58 E-7	313		9.20 E-8	47.9
67002	49		[illegible]			[illegible]	[illegible]
[illegible]			[illegible]			[illegible]	
67002	49		1.79 E-7	[illegible]		0.0	[illegible]
67002	49		0.0 E-7	[illegible]		[illegible]	[illegible]
[illegible]			[illegible]			[illegible]	
67002	49		4.09 E-7	323		1.70 E-7	29.7
67002	49		4.32 E-7	323		1.61 E-7	49.9
67002	49		3.94 E-7	323		1.46 E-7	61.2
67002	49		3.43 E-7	323		1.43 E-7	80.9
67002	49		2.96 E-7	323		0.0 E-7	[illegible]
67002	49		0.0	333		3.09 E-7	[illegible]
[illegible]			[illegible]			[illegible]	
[illegible]			[illegible]			[illegible]	
67002	49		6.27 E-7	333		2.64 E-7	49.4
67002	49		5.95 E-7	333		2.67 E-7	80.9
67002	49		5.66 E-7	333		2.8 E-7	61.2
67002	49		[illegible]	[illegible]		[illegible]	[illegible]
67002A	49		0.0	9380	.36		[illegible]
67002A	49		.365	[illegible]	[illegible]	[illegible]	[illegible]
67002A	49		1.18	[illegible]	[illegible]	[illegible]	[illegible]
67002A	49		1.69	11600	11.00	981.	[illegible]
67002A	49		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
67002A	49		7.90	12700	53.60	1090.	[illegible]
67002A	49		77.30			[illegible]	[illegible]
59005	49	27	.12 E-7	[illegible]	[illegible]		
59005	49	27	1.00 E-7	[illegible]	[illegible]		
59005	49	35	.41 E-7	298	.9206		
59005	49	35	2.70 E-7	323	.9206		
59005	49	35	.75 E-8	273	.9103		
59005	49	35	.67 E-7	298	.9103		
59005	49	35	2.80 E-7	323	.9103		
59005	49	35	1.08 E-6	[illegible]	[illegible]		
59005	[illegible]	[illegible]	[illegible]				
59005	49	35	.24 E-7	[illegible]	[illegible]		
59005	[illegible]	[illegible]	[illegible]		[illegible]		
59005	49	12	.86 E-7	298	.9511		
59005	49	35	.04 E-7	[illegible]	.9511		
59005	49	35	.21 E-7	298	.9511		
59005	49	35	1.80 E-7	323	.9511		
59005	49	22	.68 E-8	298	.9511		
59005	49	26	.36 E-8	[illegible]	.9511		

59005	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
59005	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
59005	49	35	.18 E-7	[illegible]	[illegible]
59005	49	35	1.20 E-7	323	[illegible]
59005	49	28	.49 E-8	298	.95[illegible]5
59005	49	28	.54 E-8	[illegible]	[illegible]
59005	49	28	.92 E-8	323	.95[illegible]5
59005	49	27	.33 E-8	298	.95[illegible]5
59005	49	27	.36 E-7	323	.95[illegible]5
59005	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
59005	49	[illegible]	[illegible]	[illegible]	[illegible]
59005	49	35	.56 E-7	[illegible]	[illegible]
59005	49	35	8.00 E-7	[illegible]	[illegible]
59005	49	35	.06 E-7	[illegible]	[illegible]
59005	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
59005	49	35	.45 E-7	[illegible]	[illegible]
59005	49	35	5.00 E-7	323	.9185
59005	49	28	.02 E-7	298	.9185
59005	49	28	.30 E-7	323	.9185

DIFFUSION THROUGH POLYTHENE

I.D	POL	PEN	DIF COEFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
58002	95	33	1.30 E-7	298				

DIFFUSION THROUGH P-76 MOLDED PE GRADE

I.D	POL	PEN	DIF COEFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
59004	98	13	3.00 E-7	298	.922			

DIFFUSION THROUGH ALATHON-34 MOLDED PE GRADE

I.D	POL	PEN	DIF COEFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
59004	99	13	2.50 E-7	298	.931			

DIFFUSION THROUGH SUPER DYCLON(MOLDED) PE GRADE

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
59004	100	13	1.30 E-7	298	.953			
59004	100	13	1.80 E-7	298	.945			

DIFFUSION THROUGH GREX

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
59004	101	13	2.10 E-7	298	.953			
59004	101	13	1.60 E-7	298	.967			
59004	101	13	1.90 E-7	298	.965			
59004	101	13	2.40 E-7	298	.955			
59004	101	13	3.40 E-7	298	.943			
61005	101	10	30.7E-7	298				
61005	101	13	1.7E-7	298				
61005	101	11	1.16E-7	298				
61005	101	16	1.24E-7	298				
61005	101	87	0.96E-7	298				
61005	101	21	0.93E-7	298				
61005	101	35	0.146E-7	298				
61005	101	101	0.247E-7	298				
61005	101	102	0.106E-7	298				
	101	22	0.049E-7	298				
61005	101	17	0.016E-7	298				

DIFFUSION THROUGH ALATHON-14(MOLDED) PE GRADE

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
59004	102	13	5.40 E-7	298	.915			
	102	10	126.E-7	318				
61005	102	13	12.6E-7	318				
61005	102	11	9.7E-7	318				
61005	102	21	8.3E-7	318				
61005	102	87	9.3E-7	318				
61005	102	16	9.8E-7	318				
61005	102	12	6.E-7	318				
	102	101	3.7E-7	318				
61005	102	102	2.2E-7	318				
61005	102	22	1.3E-7	318				
61005	102	17	0.66E-7	318				

61005	102	10	68.F-7	298
61005	102	13	4.60E-7	298
61005	102	11	3.60E-7	298
61005	102	16	3.72F-7	298
61005	102	87	3.32E-7	298
61005	102	21	3.20E-7	298
61005	102	12	1.93E-7	298
	102	35	0.68F-7	
	102	101	1.05E-7	298
61005	102	102	0.58F-7	298
61005	102	22	0.322E-7	298
61005	102	17	0.135E-7	298

DIFFUSION THROUGH ETHYL CELLULOSE

I.D	POL	PEN	DIF COEFF	T(REL)	DENSITY	D(SUB)	E	_.A.F	
57001	51	38	2.25 E-8	333	2.3_ E-8				1._
57001	[illegible]	[illegible]	[illegible]		[illegible]				[illegible]
57001	51	38	2.70 E-8	333	2.84 E-8				2._
57001	51	38	2.95 E-8	333	3.13 E-8				2.5
57001	51	38	3.30 E-8	333	3.5_ E-8				3._
57001	51	38	4.00 E-8	333	4.4_ E-8				3.5
61006	[illegible]	[illegible]					[illegible]		
61006	[illegible]	[illegible]	[illegible]				[illegible]		
61006	51	[illegible]	[illegible]			[illegible]	[illegible]		
61006	51	11	[illegible]			[illegible]	[illegible]	[illegible]	
61006	51	16	6.01 E-4	298		6.21 E-4		5.86_	
61006	51	89	[illegible]	298		[illegible]		[illegible]	
61006	51	86	1.28 E-4	298		1.6 E-4		4.58_	
61006	51	5		298		3.14 E-5		2.26_	
61006	51	35	1.35 E-5	298		2._9 E-5		5._9_	
61006	51	22	2.65 E-6	298		3.2 E-6		5._8_	
61006	51	24	1.10 E-6	298		1.6 E-6		4.51_	
61006	51	[illegible]	[illegible]			[illegible]		[illegible]	
61006	51	83	3.50 E-7	298		1.37 E-6		4.1__	
58006	51	5	6.00 E-7	323	_.7	7._ E-2	75__		
58006	51	5	8.10 E-7	333	1.5				
58006	51	5	5.60 E-7	323	1.9				
58006	51	5	5.30 E-7	323	3._				
58006	51	5	1.64 E-6	353	3._				
58006	51	5	[illegible]	[illegible]	[illegible]				
58006	51	5	[illegible]	[illegible]	[illegible]				
58006	51	5	4.70 E-7	323	4.7				
58006	51	5	1.08 E-6	343	5.5	5._ E-2	1____		
58006	51	5	1.64 E-6	353	5.5				
58006	51	5	[illegible]	[illegible]	[illegible]				
58006	51	5	4.60 E-7	323	6.6				
58006	51	5	9.70 E-7	343	7.1				
58006	51	5	1.36 E-6	353	7.6				
58006	51	5	6.50 E-7	333	7.9				
58006	51	5	4.30 E-7	323	8.8	9._ E-2	8		
58006	51	5	8.90 E-7	343	[illegible]				
58006	51	[illegible]	[illegible]						
58006	51	5	6.00 E-7	333	1_._	2._ E-2	7		
58006	51	5	1.00 E-6	353	1_.2				
58006	51	[illegible]	[illegible]		[illegible]				
58006	51	5	7.6_ E-7	343	1_.8				
58006	51	5	5.10 E-7	333	11.8				
58006	51	5	6.70 E-7	343	12.1				

58006	51	5	8.50	E-7	353	12.1			
58006	51	5	5.90	E-7	343	13.6			
58006	51	5	4.30	E-7	333	14.0			
58006	51	5	7.80	E-7	353	14.1			
58006	51	5	7.40	E-7	353	16.4			
58006	51	5	4.00	E-7	333	16.6			
63004	51	16	5.46	E-7	298	1.10	5.65 E-7		
63004	51	89	5.30	E-8	298	1.10	7.34 E-8		
63004	51	86	1.17	E-7	298	1.10	1.46 E-7		
63004	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
63004	51	35	1.23	E-8	298	1.10	1.90 E-8		
63004	51	22	2.41	E-9	298	1.10	2.93 E-9		
63004	51	83	3.10	E-10	298	1.10	1.25 E-9		
63004	51	26	9.90	E-10	298	1.10	1.46 E-9		
63004	51	27	3.90	E-10	298	1.10	1.38 E-9		
63004	51	10			298	1.10	2.21 E-6		
63004	51	21	2.11	E-7	298	1.10	2.33 E-7		
63004	51	13	6.07	E-7	298	1.10	6.39 E-7		
63004	51	11	3.86	E-7	298	1.10	4.03 E-7		
66003	[illegible]	[illegible]	[illegible]	[illegible]					
66003	[illegible]	[illegible]	[illegible]	[illegible]					
66003	51	5	.95	E-7	298		3		
66003	51	5	.90		298		4		
66003	51	5	.85		298		5		
56002	51	71	6.30	E-9	238			4	117
56002	51	71	1.10	E-8	238			4	625
56002	51	71	6.30	E-9	243			4	56
56002	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]				
56002	51	71	[illegible]	[illegible]					
56002	51	71	6.30	E-9	258			4	53
56002	51	71	1.40	E-8	258			4	125
56002	51	71	2.20	E-8	258			4	654
56002	51	71	2.80	E-8	273			4	126
56002	51	71	3.90	E-8	273			4	704
56002	51	71	5.10	E-8	292			4	113
56002	51	71	[illegible]	[illegible]	[illegible]			4	[illegible]
56002	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]				
56002	51	71	9.80	E-8	303			4	126
56002	51	71	1.10	E-7	303			4	715
56002	51	71	1.60	E-7	318			4	54
56002	51	71	1.70	E-7	318			4	150
56002	51	71	3.20	E-7	333			4	138
56002	51	71	3.34	E-7	333			4	611
56002	51	71	4.20	E-7	333			4	690
56002	51	71	1.10	E-9	[illegible]			4	[illegible]
56002	51	71	1.00	E-9	238			4	51
56002	51	71	1.50	E-9	238			4	101
56002	51	71	1.40	E-9	238			4	106

57001	51	58	.87	E-7	313	.89	E-7				4	1.50
57001	51	58	.92	E-7	313	.95	E-7	.81	E-1	85.00	4	2.00
57001	51	58	.96	E-7	313	.99				78.00	4	2.50
57001	51	58	1.01	E-7	313	1.05				78.00	4	3.00
57001	51	58			313						4	3.50
57001	51	58	1.08	E-7	313	1.13		.03		78.00	4	4.00
57001	51	58	1.08	E-7	313	1.14					4	5.00
57001	51	58	1.0[illegible]	E-[illegible]	[illegible]	[illegible]						[illegible].00
57001	51	58	1.08	E-7	313	1.18					4	7.00
57001	51	58	1.2[illegible]	E-[illegible]		[illegible]						[illegible]
57001	51	58	1.41	E-7	323	1.45	E-7					2.00
57001	51	58	1.50	E-7	323	1.55	E-7					2.50
57001	51	58	1.61	E-7	323	1.67	E-7					3.00
57001	51	58	1.61	E-7	323	1.69	E-7					3.50
57001	51	58	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]					[illegible].00
57001	51	58	1.61	E-7	323	1.71	E-7					5.00
57001	51	58	1.61	E-7	323	1.74	E-7					6.00
57001	51	58	1.61	E-7	323	1.75	E-7					7.00
57001	51	33	.45	E-8	333	.46	E-8	.25	E1	134.00		1.00
57001	51	33	.51	E-8	333	.53	E-8	.15	E1	129.00		1.50
57001	51	33	.58	E-8	333	.61	E-8	.17	E1	129.00		2.00
57001	51	33	.65	E-8	333	.70	E-8	.17	E1	128.00		2.50
57001	51	33	.73	E-8	333	.80	E-8	.22	E1	129.00		3.00
57001	51	33	.88	E-8	333	.99	E-8	.33		116.00		4.00
57001	51	33	1.05	E-8	333	1.21	E-8					5.00
57001	51	33	1.31	E-8	333	1.55	E-8					6.00
57001	51	33	1.76	E-8	333	2.13	E-8					7.00
57001	51	33	.79	E-8	343	.81	E-8					1.00
57001	51	33	.87	E-8	343	.90	E-8					1.50
57001	51	33	.96	E-8	343	1.02	E-8					2.00
57001	[illegible]	[illegible]	[illegible].0[illegible]	[illegible]	[illegible]	[illegible]	[illegible]					[illegible]
57001	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]					[illegible]00
57001	51	33	1.44	E-8	343	1.61	E-8					3.50
57001	51	33	1.24	E-[illegible]	[illegible]	[illegible]	[illegible]					[illegible].00
57001	51	33	1.48	E-8	353	1.54	E-8					1.50
57001	51	33	1.74	E-8	353	1.84	E-8					2.00
57001	51	33	2.03	E-8	353	2.17	E-8					2.50
57001	51	33	2.34	E-8	353	2.55	E-8					3.00
57001	51	38	3.70	E-8	343	3.80	E-8					1.0
57001	51	38	4.10	E-8	343	4.30	E-8					1.5
57001	51	38	4.60	E-8	343	4.80	E-8					2.0
57001	51	38	5.00	E-8	343	5.50	E-8					2.5
57001	51	38	5.40	E-8	343	5.80	E-8					3.0
57001	51	38	6.10	E-8	343	6.70	E-8					4.0
57001	51	38	5.20	E-8	353	5.30	E-8					1.0
57001	51	38	6.10	E-8	353	6.40	E-8					1.5
57001	51	38	7.10	E-8	353	7.50	E-8					2.0
57001	51	[illegible]	[illegible].[illegible]0	[illegible]	[illegible]	[illegible].[illegible]0	[illegible]					[illegible]
57001	51	58	2.18	E-7	333	2.20	E-7					.5

57001	51	58	2.18	E-7	333	2.22	E-7				[illegible]
57001	51	58	2.18	E-7	333	2.24	E-7				2.0
57001	51	58	2.18	E-7	333	2.24	E-7				2.5
57001	51	58	2.18	E-7	333	2.27	E-7				3.0
57001	51	58	2.18	E-7	333	2.29	E-7				3.5
57001	51	58	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]				[illegible]
57001	51	58	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]				
57001	51	58	3.06	E-7	343	3.12	E-7				1.5
57001	51	58	3.06	E-7	343	3.15	E-7				2.0
57001	51	58	3.06	E-7	343	3.15	E-7				2.5
57001	51	58	3.06	E-7	343	3.80	E-7				3.0
57001	51	58	4.40	E-7	353	4.40	E-7				.2
57001	51	58	4.40	E-7	353	4.40	E-7				.5
57001	51	58	4.40	E-7	[illegible]	[illegible]	[illegible]				[illegible]
57001	51	58	4.40	E-7	353	4.50	E-7				2.0
57001	51	33	.12	E-8	313	.12	E-8				1.0
57001	51	33	.14	E-8	313	.14	E-8				[illegible]
57001	51	33	.17	E-8	313	.18	E-8				2.0
57001	51	33	.20	E-8	313	.21	E-8				2.5
57001	51	33	.22	E-8	313	.24	E-8				3.0
57001	51	33	.28	E-8	313	.31	E-8				4.0
57001	51	33	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]				[illegible]
57001	51	33	.39	E-8	313	.46	E-8				6.0
57001	51	33	.45	E-8	313	.55	E-8				7.0
57001	51	33	.51	E-8	313	.63	E-8				8.0
57001	51	33	.20	E-8	323	.21	E-8				1.0
57001	51	33	.25	E-8	323	.26	E-8				1.5
57001	51	33	.30	E-8	323	.32	E-8				2.0
57001	51	33	.35	E-8	323	.36	E-8				2.5
57001	51	33	.41	[illegible]	[illegible]	[illegible]	[illegible]				[illegible]
57001	51	33	.52	E-8	323	.58	E-8				4.0
57001	51	33	.63	E-8	323	.73	E-8				5.0
57001	51	33	.76	E-8	323	.90	E-8				6.0
57001	51	33	.89	E-8	323	1.08	E-8				7.0
57001	51	33	1.04	E-8	323	1.29	E-8				8.0
57001	51	38	.85	E-8	313	.87	E-8	.23	10000		1.0
57001	51	38	.95	E-8	313	.99	E-8	.15	10300		1.5
57001	51	38	1.05	E-8	313	1.10	E-8	.19	10400		2.0
57001	51	38	1.15	E-8	313	1.22	E-8	.25	10500		2.5
57001	51	38	1.25	E-8	313	1.34	E-8	.23	10400		3.0
57001	51	38	1.45	E-8	313	1.60	E-8				4.0
57001	51	38	1.70	E-8	313	1.90	E-8				5.0
57001	51	38	2.05	E-8	313	2.36	E-8				6.0
57001	51	38	1.50	E-8	323	1.53	E-8				1.0
57001	51	38	1.65	E-8	323	1.72	E-8				1.5
57001	51	38	1.80	E-8	323	1.89	E-8				2.0
57001	51	38	1.95	E-8	323	2.07	E-8				2.5
57001	51	38	2.15	E-8	323	2.30	E-8				3.0
57001	51	38	2.60	E-8	323	2.86	E-8				4.0
57001	51	38	3.10	E-8	323	3.40	E-8				5.0
57001	51	38	3.60	E-8	323	4.20	E-8				6.0
56002	51	71	2.70	E-9	238					4	291
56002	51	71	5.20	E-9	238					4	508
56002	51	71	[illegible]	[illegible]	[illegible]						

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DIFFUSION THROUGH SARAN

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUB U)	E	STATE	
56002	52	71	8.00 E-11	303				4	397
56002	52	71	9.60 E-11	303				4	695
56002	52	71	2.90 E-12	318				4	734
56002	52	71	2.40 E-13	333				4	743
56002	52	71	6.00 E-13	348				4	672

DIFFUSION THROUGH POLYISOBUIYLENE

I.D	POL	PEN	DIF COEFF	T(KEL)	DENSITY	D(SUB O)	E	STATE
52001	54	[illegible]				[illegible]		
52001	54	26		308		5.29E-9	16.7	
52001	54	26		[illegible]		[illegible]		
52001	54	29		298		.53F-9		
52001	54	29		308		1.46E-9	17.5	
52001	54	29		314.5		3.75E-9		
52001	54	27		298		1.08E-9		
52001	54	27		308		2.59E-9	16.	
52001	54	[illegible]		[illegible]		[illegible]		
52001	54	30				[illegible]		
52001	54	30		308		1.34E-9	18.1	
52001	54	30		314.5		3.6E-9		
52001	54	28		298		.20E-9		
52001	54	28		308		.60E-9	18.	
52001	54	28		314.5		1.26E-9		
58001	54	73	.46 E-7	373			10200	
58001	54	73	.93 E-7	393			10200	
58001	54	76	.74 E-7	373			7000	
58001	54	76	1.22 E-7	393			7000	
58001	54	75	1.56 E-7	373			10000	
58001	54	75	3.17 E-7	393			10000	
58001	54	74	1.97 E-7	373			9900	
58001	54	74	2.46 E-7	393			9900	
58001	54	74	.15 E-7	333			12000	
58001	54	74	.97 E-7	373			12000	
58001	54	74	1.37 E-7	383			12000	
58001	54	74	2.22 E-7	393			12000	
61004	54	14	1.50 E-5	293				
61004	54	21	.50 E-6	293				
51002	54	30	1.90 E-9	308		106		
51002	54	30	2.90 E-9	308		222		
51002	54	30	3.90 E-9	308		324		
51002	54	30	4.70 E-9	308		333		
51002	54	30	5.10 E-9	308		333		
51002	54	30	7.30 E-9	308		422		
51002	54	30	3.90 E-8	308		666		
51002	54	28	1.10 E-9	308		489		
51002	54	28	1.40 E-9	308		703		
51002	54	28	3.00 E-9	308		1053		
51002	54	28	5.40 E-9	308		1240		
51002	54	27	3.10 E-9	308		32		
51002	54	27	4.40 E-9	308		104		
51002	54	27	8.20 E-9	308		207		
51002	54	27	7.30 E-9	308		212		
51002	54	27	1.81 E-8	308		306		
51002	54	27	3.37 E-8	308		388		
51002	54	22	5.60 E-9	308		496		

51002	54	22	6.40	E-9	308	941
51002	54	22	8.00	E-9	308	1446
51002	54	22	7.40	E-9	308	1452
51002	54	29	1.70	E-9	308	210
51002	54	29	2.20	E-9	308	488
51002	54	29	2.50	E-9	308	712
51002	54	29	2.80	E-9	308	767
51002	54	29	3.60	E-9	308	980
51002	54	29	4.70	E-9	308	1246
51002	54	29	6.40	E-9	308	1460
51002	54	26	4.50	E-9	308	242
51002	54	26	6.80	E-9	308	503
51002	54	26	9.10	E-9	308	662
51002	54	26	1.09	E-8	308	763
51002	54	26	1.86	E-8	308	994
51002	54	26	3.30	E-8	308	1243
51002	54	26	5.68	E-8	308	1448

DIFFUSION THROUGH KERATIN

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB O)	E	STATE
64007	55	54	1.90 E-12		6.3			
64007	55	54	4.30 E-12		8.8			
64007	55	54	5.80 E-12		9.7			
64007	55	54	6.70 E-12		10.3			
64007	55	54	1.19 E-11		11.7			
64007	55	54	4.00 E-11		13.5			
64007	55	54	7.10 E-11		14.4			
64007	55	54	9.30 E-11		15.2			
64007	55	54	9.90 E-11		16.2			
64007	55	54	1.12 E-10		17.9			
6400[illegible]	[illegible]	[illegible]	[illegible].00 [illegible]		[illegible]			
64007	55	54	1.40 E-10		19.7			
45001	55	58	1.70 E-10	298				2
45001	55	54	3.60 E-10	293				2
45001	55	54	7.20 E-10	298				2
45001	55	54	1.16 E-9	303				2
50001	55	53	1.00 E-7	273		15.0		1

DIFFUSION THROUGH POLYVINYLBUTYRAL(UNSTRETCHED)

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE	
59001	57	21	1.85 E-7	277			8600		
59001	57	21	5.60 E-7	298					
61004	57	16	1.81 E-8	288				0	
61004	57	16	6.20 E-8	288				95	
48001	57	5	1.30 E-8	298		40	10900	3	
48001	57	5	1.30 E-8	298		60	10900	3	
48001	57	5	3.00 E-8	313		40	10900	3	
56002	57	71	1.50 E-9	273				4	758
56002	57	71	3.40 E-9	288				4	716
56002	57	71	4.40 E-9	303				4	30
56002	57	71	4.40 E-9	303				4	156
56002	57	71	5.50 E-9	303				4	332
56002	57	71	6.30 E-9	303				[illegible]	[illegible]

DIFFUSION THROUGH POLYVINYL BUTYRAL(STRETCHED)

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
59001	97	21	2.00 E-7	277			9700	
59001	97	21	7.10 E-7	298				

DIFFUSION THROUGH BUTADIENE-ACRYLONITRILE COPOLYME

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB O)	E	STATE
58001	59	74	.50 E-7	333			14000	
58001	59	74	.93 E-7	343			14000	
58001	59	74	1.03 E-7	353			14000	
58001	59	74	4.53 E-7	373			14000	
39001	59	21	0.66 E-7	290		28.1	11500	4
39001	59	21	2.90 E-7	311		28.1	11500	4
39001	59	21	4.40 E-7	322		28.1	11500	4
39001	59	21	8.80 E-7	333		28.1	11500	4
39001	59	21	1.40 E-6	344		28.1	11500	4
39001	59	14	6.10 E-7	273		54.4	8700	4
39001	59	14	1.70 E-6	293		54.4	8700	4
39001	59	14	2.70 E-6	302		54.4	8700	4
39001	59	14	4.60 E-6	315		54.4	8700	4
39001	59	14	6.60 E-6	323		54.4	8700	4

DIFFUSION THROUGH CHLOROPRENE

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
39001	60	14	3.30 E-6	305		39.4	9900	4
39001	60	14	5.60 E-6	314		39.4	9900	4
39001	60	14	9.10 E-6	323		39.4	9900	4
39001	60	14	1.44 E-5	334		39.4	9900	4
39001	60	14	2.10 E-5	343		39.4	9900	4
39001	60	14	2.40 E-5	347		39.4	9900	4

DIFFUSION THROUGH HORN

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	E	STATE	
45001	61	5	7.50 E-8	298				2	3.0 E-2
45001	61	5	9.00 E-8	298					[illegible] E-2
45001	61	58	2.20 E-10	298				2	

DIFFUSION THROUGH RUBBER HYDROCHLORIDE

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	E	STATE	
48001	62	5	1.20 E-9	298		40	17200	3	
48001	62	5	1.10 E-9	298		60	17200	3	
48001	62	5	4.80 E-9	313		40	17200	3	
56002	62	71	1.20 E-10	303				4	325
56002	62	71	1.60 E-10	303				4	587
56002	62	71	2.00 E-10	303				4	745
56002	62	71	[illegible].0[illegible] E-[illegible]	[illegible]					
56002	62	71	3.36 E-9	[illegible]				[illegible]	[illegible]00
56002	62	71	5.60 E-9	333				4	718

DIFFUSION THROUGH POLYISOPRENE

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
50003	63	14	1.00 E-5					
50003	63	21	.94 E-6	298				
50003	63	21	2.50 E-6	298				
58001	63	75	.77 E-7	313				
58001	63	75	1.59 E-7	323				
58001	63	74	1.94 E-7	313			8800	
58001	63	74	3.06 E-7	323			8800	
58001	63	74	4.42 E-7	333			8800	

DIFFUSION THROUGH ISOPRENE-ACRYLONITRILE COPOLYMER

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)		E	STATE
50003	64	14	2.47 E-6	298		.67		1400	
50003	64	14	6.50 E-6	323		.67		1400	
50003	64	21	.45 E-7	298		1.88	F3	14500	
50003	64	21	.30 F-7	323		1.88		14500	
50003	64	13	.92 F-7	298		1.00	F1	12100	
50003	64	13	.45 E-7	323		1.00		12100	
50003	64	16	.31 F-7	298		1.15	F3	14400	
50003	64	16	2.03 F-7	323		1.15		14400	
50003	64	10	8.01 E-6	298		.31	E-1	4900	
50003	64	10	1.51 E-5	323		.31		4900	
50003	64	14	3.55 F-6	298		.41		6900	
50003	64	14	8.74 F-6	323		.41		6900	
50003	64	21	1.23 E-7	298		1.9	F1	11600	
50003	64	21	.56 F-7	323		1.9		11600	
50003	64	13	.24 E-6	298		1.6		9600	
50003	64	13	.83 E-6	323		1.6		9600	
50003	64	16	.91 F-7	298		1.1	F1	12200	
50003	64	16	4.44 F-7	323		1.1		12200	
61004	64	10	8.01 F-5	298					

DIFFUSION THROUGH POLYBUTADIENE

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUP 0)	E	STATE
50003	65	14	9.60 E-6	298		.53 E-1	5100	
50003	65	14	1.80 E-5	323		.53	5100	
50003	65	21	1.10 E-6	298		.22	7200	
50003	65	21	2.90 E-6	323		.22	7200	
50003	65	13	1.50 E-6	298		.15	6800	
50003	65	13	3.70 E-6	323		.15	6800	
50003	65	16	1.05 E-6	298		.24	7300	
50003	65	16	2.80 E-6	323		.24	7300	
58001	65	73	.95 E-7	313			6700	
58001	65	73	1.41 E-7	323			6700	
58001	65	73	1.80 E-7	333			6700	
58001	65	75	2.12 E-7	313				
58001	65	75	2.59 E-7	323				
58001	65	74	2.78 E-7	313			9300	
58001	65	74	3.62 E-7	323			9300	
58001	65	74	6.19 E-7	333			9300	
58001	65	74	9.78 E-7	343			9300	
58001	65	74	1.64 E-6	353			9300	
61004	65	14	9.60 E-5	298				
61004	65	21	1.10 E-5	298				

DIFFUSION THROUGH PERBUNAN 18

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
50003	66	14	6.43 E-6	298		.23	6200	
50003	66	14	1.45 E-5	323		.23	6200	
50003	66	21	.51 E-6	298		.88	8500	
50003	66	21	1.55 E-6	323		.88	8500	
50003	66	13	.79 E-6	298		.69	8100	
50003	66	13	2.30 E-6	323		.69	8100	
50003	66	16	4.25 E-7	298		.40	9200	
50003	66	16	1.42 E-6	323		.40	9200	
50003	66	10	1.55 E-5	298		.19 E-1	4200	
50003	66	10	2.66 E-5	323			4200	
61004	66	14	6.43 E-5	298				
61004	66	21	5.10 E-6	298				
61004	66	10	1.55 E-4	298			4200	

DIFFUSION THROUGH PERBUNAN(GERMAN)

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
50003	67	14	2.53 E-6	285			0	
50003	67	14	4.50 E-6	298			7400	
50003	67	14	6.70 E-6	308			7000	
50003	67	14	1.11 E-5	323			6300	
50003	67	14	1.89 E-5	343			5000	
50003	67	21	1.05 E-7	285				
50003	67	21	.25 E-6	298			11200	
50003	67	21	.46 E-6	308			10600	
50003	67	21	.98 E-6	323			9300	
50003	67	21	2.10 E-6	343				
50003	67	13	.43 E-6	298		2.4	9200	
50003	67	13	1.44 E-6	323		2.4	9200	
50003	67	16	1.19 E-6	298		1.35 E1	10700	
50003	67	16	.77 E-6	323		1.35	10700	
50003	67	10	1.17 E-5	298		.77 E-1	5200	
50003	67	10	2.30 E-5	323		.77	5200	
50003	67	64	7.64 E-8	298		8.2 E1	12300	
50003	67	64	3.83 E-7	323			12300	
50003	[illegible]	[illegible]	[illegible]	[illegible]				
61004	67	21	2.50 E-6	298				
61004	67	14	4.50 E-5	298			6200	

DIFFUSION THROUGH HYCAR OR25

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
50003	68	14	3.65 E-6	298		.52	7000	
50003	68	14	9.60 E-6	323		.52	7000	
50003	68	21	1.52 E-6	298		5.60 E1	11700	
50003	68	21	.70 E-6	323		5.60	11700	
50003	68	21	1.52 E-7	298		5.60 E1	11700	
50003	68	21	.70 E-7	323		5.60	11700	
50003	68	13	.28 E-6	298		9.90	10300	
50003	68	13	1.08 E-6	323		9.90	10300	
50003	68	16	1.07 E-7	298		6.70 E1	12000	
50003	68	16	5.15 E-7	323		6.70	12000	
50003	68	10	1.12 E-5	298		.74 E-1	5200	
50003	68	10	2.21 E-5	323		.74	5200	
61004	68	21	1.52 E-6	298				
61004	68	14	3.85 E-5	298				
61004	68	10	1.12 E-4	298				

DIFFUSION THROUGH HYCAR OR15

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
50003	69	14	6.65 E-7	273				
50003	69	14	1.32 E-6	285			8600	
50003	69	14	2.43 E-6	298			8000	
50003	69	14	3.74 E-6	308			7700	
50003	69	14	6.56 E-6	323			7100	
50003	69	14	1.19 E-5	343			6200	
50003	69	14	2.30 E-5	373				
50003	69	14	.64 E-7	298				
50003	69	14	1.38 E-7	308			13100	
50003	69	14	3.38 E-7	323			10900	
50003	69	14	8.05 E-7	343			9000	
50003	69	14	2.12 E-6	373				
50003	69	10	5.00 E-6	285		.87 E-1		
50003	69	10	7.92 E-6	298			5800	
50003	69	10	1.07 E-5	308			5500	
50003	69	10	1.62 E-5	323			5000	
50003	69	10	2.42 E-5	343				
50003	69	13	1.36 E-7	298		1.36 E1	10900	
50003	69	13	5.65 E-7	323		1.36	10900	
50003	69	16	.38 E-7	298		2.60 E2	13400	
50003	69	16	2.21 E-7	323		2.60	13400	
61004	69	21	.64 E-6	298				
61004	69	10	7.92 E-5	298			5500	
61004	69	14	2.43 E-5	298			7600	

DIFFUSION THROUGH BUTYL RUBBER

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
50003	70	10	3.70 E-6	285		1.05 E-1		
50003	70	10	5.90 E-6	298			6100	
50003	70	10	8.30 E-6	308			5800	
50003	70	10	1.26 E-5	323			5400	
50003	70	10	2.00 E-5	343				
50003	70	13	.81 E-7	298		4.3 E1	11980	
50003	70	13	3.84 E-7	323		4.3	11980	
50003	70	16	5.78 E-8	298		3.6 E1	12000	
50003	70	16	2.76 E-7	323		3.6	12000	
50003	70	64	2.03 E-8	298		5.0 E1	12800	
50003	70	64	1.08 E-7	323		5.0	12800	
50003	70	65	1.04 E-6	323				

DIFFUSION THROUGH POLYMETHYL PENTADIENE

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
50003	71	21	.30 E-6	298		4.2 E1	11100	
50003	71	21	1.28 E-6	323		4.2	11100	
50003	71	13	.55 E-6	298		8.5	9800	
50003	71	13	1.98 E-6	323		8.5	9800	
50003	71	16	1.48 F-6	323				

DIFFUSION THROUGH VULCAPRENE A

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
50003	72	14	2.60 E-6	298		.98	7600	
50003	72	14	7.00 E-6	323		.98	7600	
50003	72	21	1.45 E-7	298		5.5 E1	11700	
50003	72	21	.67 E-6	323		5.5	11700	
50003	72	13	.24 E-6	298		7.5	10200	
50003	72	13	.92 E-6	323		7.5	10200	
50003	72	16	.94 E-7	298		4.2 E1	11800	
50003	72	16	.44 E-6	323		4.2	11800	

DIFFUSION THROUGH METHYL RUBBER

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
50003	73	16	.63 E-7	298		1.60 E2	12800	
50003	73	16	.36 E-6	323		1.60	12800	
50003	73	13	.14 E-6	298		2.0 E1	11100	
50003	73	13	.61 E-6	323		2.0	11100	
50003	73	21	.79 E-7	298		1.05 E2	12400	
50003	73	21	.41 E-6	323		1.05	12400	
50003	73	14	3.90 E-6	298		1.3	7500	
50003	73	14	1.05 E-5	323		1.3	7500	

DIFFUSION THROUGH RUBBER B(1 MOLE(VINYL GROUP))

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
55001	74	29	1.18 E-7	303				4
55001	74	29	2.34 E-7	313				4
55001	74	29	4.09 E-7	323				4
55001	74	29	6.50 E-7	333				4
55001	74	26	2.00 E-7	303				4
55001	74	26	3.71 E-7	313				4
55001	74	26	6.21 E-7	323				4
55001	74	26	9.73 E-7	333				4
55001	74	27	.55 E-7	303				4
55001	74	27	1.17 E-7	313				4
55001	74	27	2.17 E-7	323				4
55001	74	27	3.66 E-7	333				4
55001	74	30	1.16 E-7	303				4
55001	74	30	2.22 E-7	313				4
55001	74	30	3.94 E-7	323				4
55001	74	30	6.63 E-7	333				4
55001	74	27	1.22 E-7	303				4
55001	74	27	2.94 E-7	313				4
55001	74	27	5.52 E-7	323				4
55001	74	27	9.13 E-7	333				4
62001	74	27	4.71 E-6	303		4.30 E-5	3900	4.38 E-6
62001	74	27	5.87 E-6	313				8.58 E-6
62001	74	27	7.14 E-6	323				6.83 E-6
62001	74	27	8.75 E-6	333				8.22 E-6
62001	74	27	1.02 E-5	343				9.98 E-6
62001	74	28	2.78 E-6	303		7.20 E-5	4000	2.62 E-6
62001	74	28	3.50 E-6	313				3.11 E-6
62001	74	30	2.78 E-6	303		7.20 E-5	4000	2.62 E-6
62001	74	30	3.50 E-6	313				3.11 E-6
62001	74	30	4.36 E-6	323				3.77 E-6
62001	74	30	5.50 E-6	333				4.64 E-6
62001	74	30	6.66 E-6	343				5.68 E-6
62001	74	88	6.53 E-6	303		1.31 E-4	3800	5.13 E-6
62001	74	88	8.09 E-6	313				5.89 E-6
62001	74	88	9.42 E-6	323				6.78 E-6
62001	74	88	1.17 E-5	333				8.17 E-6
62001	74	88	1.42 E-5	343				9.68 E-6
62001	74	29	4.32 E-6	303		1.31 E-4	4500	3.77 E-6
62001	74	29	5.57 E-6	313				4.79 E-6
62001	74	29	7.11 E-6	323				6.03 E-6
62001	74	29	8.71 E-6	333				7.44 E-6
62001	74	29	1.05 E-5	343				9.17 E-6

DIFFUSION THROUGH RUBBER C(•1 PER CENT VINYL GROUP ON A MOLAR BASIS)

I•D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	E	STATF
55001	75	29	1•08 E-7	303				4
55001	75	29	2•21 E-7	313				4
55001	75	29	3•99 E-7	323				4
55001	75	29	6•80 E-7	333				4
55001	75	26	1•69 E-7	303				4
55001	75	26	3•23 E-7	313				4
55001	75	26	5•66 E-7	323				4
55001	75	26	9•45 E-7	333				4
55001	75	27	1•38 E-7	303				4
55001	75	27	2•79 E-7	313				4
55001	75	27	4•91 E-7	323				4
55001	75	27	7•76 E-7	333				4
55001	75	28	•54 E-7	303				4
55001	75	28	1•08 E-7	313				4
55001	75	28	2•04 E-7	323				4
55001	75	28	3•72 E-7	333				4
55001	75	30	•87 E-7	303				4
55001	75	30	1•75 E-7	313				4
55001	75	30	3•13 E-7	323				4
55001	75	30	5•29 E-7	333				4
62001	75	26	6•96 E-6	303		8•20 E-5	4300	6•52 E-6
62001	75	26	8•62 E-6	313				7•94 E-6
62001	75	26	1•09 E-5	323				1•02 E-5
62001	75	26	1•32 E-5	333				1•22 E-5
62001	75	26	1•60 E-5	343				1•53 E-5
62001	75	29	5•71 E-6	303		8•90 E-5	4400	5•11 E-6
62001	75	29	7•32 E-6	313				6•45 E-6
62001	75	29	9•15 E-6	323				8•02 E-6
62001	75	29	1•14 E-5	333				9•82 E-6
62001	75	29	1•37 E-5	343				1•20 E-5
62001	75	28	3•66 E-6	303		9•30 E-5	4500	2•79 E-6
62001	75	28	4•74 E-6	313				3•56 E-6
62001	75	28	5•84 E-6	323				4•48 E-6
62001	75	28	7•40 E-6	333				5•58 E-6
62001	75	28	8•76 E-6	343				6•90 E-6
62001	75	27	6•47 E-6	303		1•05 E-4	3700	5•31 E-6
62001	75	27	8•09 E-6	313				6•71 E-6
62001	75	27	9•56 E-6	323				8•34 E-6
62001	75	27	1•14 E-5	333				1•03 E-5
62001	75	27	1•34 E-5	343				1•26 E-5

DIFFUSION THROUGH POLYVINYL TRIFLOUROACETATE

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	E	STATE	
56002	78	71	5.50 E-9	303				4	244
56002	78	71	4.90 E-9	303				4	453
56002	78	71	6.80 E-9	303				4	752
56002	78	71	1.47 E-10	318				4	643
56002	78	71	2.20 E-10	333				4	653
56002	78	71	2.90 E-10	333				4	668

DIFFUSION THROUGH METHOCEL

I.D	POL	PEN	DIF COEFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE	
56003	80	5	.88 E-8	303				4	30

DIFFUSION THROUGH POLYSODIUMACRYLATE

I.D	POL	PEN	DIF COEFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE	
56003	81	5	.50 E-9	303				4	26

DIFFUSION THROUGH POLYACRYLIC ACID

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	E	STATE	
56003	82	5	.32 E-9	303				4	54

DIFFUSION THROUGH METHACRYLATE-ACRYLIC ACID(8/92)

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	E	STATE	
56003	83	5	1.66 E-10	303				4	32

DIFFUSION THROUGH METHACRYLATE-ACRYLIC ACID(60/40)

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	E	STATE	
56003	85	5	.28 E-8	303				4	53

DIFFUSION THROUGH METHYLACRYLATE-SODIUM ACRYLATE(8/92)

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	E	STATE	
56003	79	5	3.24 E-9	303				4	49

DIFFUSION THROUGH METHACRYLATE-SODIUM ACRYLATE(60/40)

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	E	STATE	
56003	84	5	.62 E-8	303				4	53

DIFFUSION THROUGH METHACRYLATE-SODIUM ACRYLATE(89/11)

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	E	STATE	
56003	86	5	1.15 E-8	303				4	56

DIFFUSION THROUGH POLYISOBUTENE

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
57003	87	30	.70 E-9	308				6
57003	87	30	.20 E-8	308				12
57003	87	30	.75 E-8	308				18
57003	87	30	.40 E-8	298				12
57003	87	30	8.00 E-8	298				18

DIFFUSION THROUGH GR-S

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
58001	88	75	.82 E-7	313			8800	
58001	88	75	1.29 E-7	323			8800	
58001	88	74	1.39 E-7	313				
58001	88	74	2.29 E-7	323				
58001	88	74	3.22 E-7	333				

DIFFUSION THROUGH BALATA

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
58001	89	74	.39 E-7	313			16300	
58001	89	74	.86 E-7	323			16300	
58001	89	74	2.05 E-7	333			16300	

DIFFUSION THROUGH HYDROGENATED GR-S

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
58001	90	74	.72 E-7	313			10900	
58001	90	74	1.21 E-7	323			10900	
58001	90	74	2.07 E-7	333			10900	

DIFFUSION THROUGH HYDROGENATED POLYBUTADIENE

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
58001	91	74	.80 E-7	313			10800	
58001	91	74	1.40 E-7	323			10800	
58001	91	74	2.31 E-7	333			10800	

DIFFUSION THROUGH HYDROGENATED POLYISOPRENE

I.D	POL	PEN	DIF COEFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
58001	92	74	1.26 E-7	323				

DIFFUSION THROUGH RAW PALE CREPE RUBBER

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
58001	94	74	1.69 E-7	313		7.19	8700	
58001	94	74	2.85 E-7	323		7.19	8700	
58001	94	74	3.94 E-7	333		7.19	8700	
58001	94	74	6.12 E-7	343		7.19	8700	
58001	94	74	7.00 E-7	353		7.19	8700	
58001	94	74	2.68 E-7	323		2.98	8700	
58001	94	74	1.50 E-7	313		1.38	8000	
58001	94	74	2.28 E-7	323		1.38	8000	
58001	94	74	3.13 E-7	333		1.38	8000	

DIFFUSION THROUGH CROSS LINK PALE CREPE

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
58001	93	74	4.70 E-7	333				.04 E-4
58001	93	74	4.44 E-7	333				.19 E-4
58001	93	74	5.95 E-7	333				1.95 E-4
58001	93	74	2.40 E-7	333				4.19 E-7
58001	93	74	3.70 E-7	333				3.87 E-4
58001	93	74	5.81 E-7	333				2.84 E-4
58001	93	74	6.86 E-7	333				1.06 E-4

DIFFUSION THROUGH VINYL CHLORIDE-VINYL ACETATE(87/13)

I.D	POL	PEN	DIF COEFF	T(KEL)	DENSITY D(SUB 0)	E	STATE
61001	103	14	8.20 E-2	277		6840	566
61001	103	14	2.27 E-1	300		6840	682
61001	103	14	2.94 E-1	306		6840	441
61001	103	14	1.16	339		6840	623
61001	103	14	1.67	354		6840	572
61001	103	14	1.78	364		6840	179
61001	103	10	2.34 E-2	273		7580	498
61001	103	10	5.74 E-2	298		7580	608
61001	103	10	7.06 E-2	306		7580	665
61001	103	10	2.37 E-1	328		7580	504
61001	103	10	3.15 E-1	344		7580	375
61001	103	10	5.16 E-1	364		7580	246
61001	103	15	8.30 E-3	278		10190	451
61001	103	15	2.41 E-2	298		10190	588
61001	103	15	7.28 E-2	304		10190	431
61001	103	15	5.60 E-2	306		10190	275
61001	103	15	8.47 E-2	321		10190	356
61001	103	15	2.22 E-1	336		10190	331
61001	103	15	6.64 E-1	364		10190	275
61001	103	13	1.74 E-4	275		10630	596
61001	103	13	6.12 E-4	284		10630	430
61001	103	13	9.50 E-4	287		10630	434
61001	103	13	1.26 E-3	297		10630	504
61001	103	13	7.55 E-3	327		10630	406
61001	103	13	1.27 E-2	339		10630	305
61001	103	13	1.32 E-2	339		10630	504
61001	103	13	2.92 E-2	361		10630	116
61001	103	86	1.14 E-4	274		10530	125
61001	103	86	7.02 E-4	299		10530	379
61001	103	86	2.65 E-3	324		10530	203
61001	103	86	5.59 E-3	324		10530	506
61001	103	86	7.37 E-3	347		10530	193
61001	103	86	6.78 E-3	347		10530	173
61001	103	87	.25 E-4	283		17050	440
61001	103	87	1.53 E-4	298		17050	332
61001	103	87	1.96 E-4	300		17050	493
61001	103	87	1.74 E-3	324		17050	540
61001	103	87	5.34 E-3	343		17050	408
61001	103	87	1.70 E-2	361		17050	114
61001	103	16	.16 E-4	274		5620	85
61001	103	16	.18 E-4	279		5620	73
61001	103	16	.25 E-4	283		5620	57
61001	103	16	.27 E-4	290		5620	42
61001	103	16	.48 E-4	300		5620	73
61001	103	16	.49 E-4	301		5620	47

61001	103	16	1.12 E-4	306	20560	91
61001	103	16	1.55 E-4	309	20560	70
61001	103	16	3.41 E-4	318	20560	41
61001	103	16	2.97 E-4	321	20560	82
61001	103	16	4.88 E-4	323	20560	76
61001	103	16	8.18 E-4	331	20560	70
61001	103	16	6.31 E-3	364	20560	99

DIFFUSION THROUGH SILICONE RUBBER

I.D	POL	PEN	DIF COEFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
62002	105	22	9.75 E-6	323		2.248		1.00 E-5
62002	105	22	9.91 E-6	323		4.642		1.05 E-5
62002	105	22	9.65 E-6	323		7.049		1.01 E-5

DIFFUSION THROUGH POLYHYDROXYETHER

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUB O)	E	STATE
64001	109	33	.67 E-8	283			15200	
64001	109	33	2.30 E-8	296				
64001	109	33	8.90 E-8	313				
65003	109	16	1.50 E-9	296		1,8		
65003	109	16	3.00 E-9	296		2,8		
65003	109	16	7.50 E-9	296		1,2		
65003	109	13	9.00 E-9	296		1,8		
65003	109	13	1.40 E-8	296		2,8		
65003	109	13	2.20 E-8	296		1,2		

DIFFUSION THROUGH ACRYLAMIDE-METHYLDENE BIS-ACRYLAMIDE

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
60002	112	005	61.0E-5	298				5
60002	112	005	44.6E-5	298				7.5
60002	112	005	30.9E-5	298				10.
60002	112	005	25.2E-5	298				15.
60002	112	005	16.8E-5					20.
60002	112	005	7.1E-5	298				25.
60002	112	005	9.4E-5	298				30.
60002	112	005	4.9E-5	298				35.
60002	112	COL 67 IS WEIGHT PERCENT MONOMER IN THE GEL						

DIFFUSION THROUGH PLIOFILM NO

I.D	POL	PEN	DIF COEFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
62004	113	5	4.12 E-10	298	4.5	175		
62004	113	5	4.10 E-10	298	11.8	1169		
62004	113	5	4.04 E-10	298	14.1	1169		
62004	113	5	4.12 E-10	298	18.7	1169		
62004	113	5	4.12 E-10	298	23.0	1169		

DIFFUSION THROUGH HYDROPOL

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
61005	114	12	5.4E-7	298				
61005	114	35	2.4E-7	298				
61005	114	101	3.1E-7	298				
61005	114	102	2.E-7	298				
61005	114	22	1.2E-7	298				
61005	114	17	0.56E-7	298				
61005	114	10	151.E-7	298				
61005	114	13	12.E-7	298				
61005	114	11	9.6E-7	298				
61005	114	16	9.1E-7	298				
61005	114	87	8.2E-7	298				
61005	114	21	7.4E-7	298				

Appendix B

Abstracted Data for Specific Penetrants

LIST OF DIFFUSING SUBSTANCES THROUGH VARIOUS MEDIA

DIFFUSION OF H2O

I.D	POL	PEN	DIF COEFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE		
58005	38	005	37.E-5	293				1		
58005	38	005	42.E-5	298				1		
58005	38	005	45.E-5	301				1		
58005	38	005	53.E-5	306.5				1		
58005	38	005	63.E-5	311				1		
58005	38	005	67.E-5	313				1		
60002	112	005	61.0E-5	298				5		
60002	112	005	44.6E-5	298				7.5		
60002	112	005	30.9E-5	298				10.		
60002	112	005	25.2E-5	298				15.		
60002	112	005	16.8E-5					20.		
60002	112	005	7.1E-5	298				25.		
60002	112	005	9.4E-5	298				30.		
60002	112	005	4.9E-5	298				35.		
55002	77	5	.23 E-7	313				4	19	8.62
55002	76	5	.30 E-7	313				4	18	12.4
55002	76	5	.32 E-7	313				4	19	12.4
55002	76	5	.45 E-7	313				4	35	12.4
55002	76	5	.38 E-7	313				4	35	12.4
55002	76	5	.35 E-7	313				4	18	13.8
55002	76	5	.43 E-7	313				4	18	13.8
55002	76	5	.45 E-7	313				4	36	13.8
55002	76	5	.43 E-7	313				4	37	13.8
55002	77	5	.18 E-7	313				4	19	8.62
55002	77	5	.22 E-7	313				4	36	8.62
55002	77	5	.20 E-7	313				4	36	8.62
55002	77	5	3.84 E-8	313				4	27	19.7
55002	77	5	3.68 E-8	313				4	35	19.7
55002	77	5	3.84 E-8	313				4	45	19.7
56003	79	5	3.24 E-9	303				4		49
56003	80	5	.88 E-8	303				4		30
56003	81	5	.50 E-9	303				4		26
56003	82	5	.32 E-9	303				4		54
56003	83	5	1.66 E-10	303				4		32
56003	84	5	.62 E-8	303				4		53
61002	104	5	2.30 E-10	303				9		
61002	104	5	1.20 E-10	298				9		
61002	104	5	3.60 E-10	303				20		
61002	104	5	2.70 E-10	298				20		
61006	108	5		298		3.82 E-5		2.19		
63004	108	5		298	1.46		2.62 E-8			

62004	113	5	4.12	E-10	298	4.5		175				
62004	113	5	4.10	E-10	298	11.8		1169				
62004	113	5	4.04	E-10	298	14.1		1169				
62004	113	5	4.12	E-10	298	18.7		1169				
62004	113	5	4.12	E-10	298	23.0		1169				
56003	85	5	.28	E-8	303					4		53
56003	86	5	1.15	E-8	303					4		56
64004	96	5	2.20	E-8	298	1	1					
64004	96	5	7.50	E-8	298	2	1					
64004	96	5	3.00	E-8	298	3	1					
64004	96	5	3.00	E-8	298	1	3					
64004	96	5	7.00	E-8	298	2	3					
64004	96	5	4.00	E-8	298	1	5					
64004	96	5	8.00	E-8	298	3	3					
64004	96	5	8.00	E-8	298	2	5					
64004	96	5	3.00	E-7	298	3	5					
48001	35	5	.51	E-10	298			40	14300	3		
48001	35	5	1.25	E-9	298			60	14300	3		
48001	35	5	.12	E-9	309			40	14300	3		
55002	35	5	1.66	E-11	313					4	19	3.3
55002	35	5	1.66	E-10	313					4	35	3.3
48001	36	5	3.10	E-9	298			40	12000	3		
48001	36	5	2.90	E-8	298			60	12000	3		
48001	36	5	8.30	E-8	313			40	12000	3		
48001	7	5	3.20	E-10	298			40	20200	3		
48001	7	5	3.20	E-10	298			60	20200	3		
48001	7	5	1.60	E-9	313			40	20200	3		
66002	38	5	3.47	E-10					.03			
66002	38	5	3.24	E-9					.10			
66002	38	5	3.12	E-9					.20			
66002	38	5	2.78	E-9					.32			
55002	41	5	1.27	E-7	313					4	22	26.5
55002	41	5	1.35	E-7	313					4	23	26.5
55002	41	5	1.35	E-7	313					4	29	26.5
55002	41	5	1.27	E-7	313					4	30	26.5
55002	41	5	1.23	E-7	313					4	35	26.5
55002	41	5	1.33	E-7	313					4	36	26.5
55002	41	5	.93	E-7	313					4	44	26.5
55002	41	5	.10	E-6	313					4	45	26.5
55002	41	5	.92	E-7	313					4	46	26.5
55002	41	5	.29	E-7	295					4	16	26.5
55002	41	5	.53	E-7	303					4	14	26.5
55002	41	5	.47	E-7	303					4	23	26.5
55002	41	5	2.25	E-7	324					4	41	26.5
55002	41	5	2.33	E-7	324					4	63	26.5
48001	43	5	1.2	E-9	298			40	13300	3		
48001	43	5	2.2	E-9	298			60	13300	3		
48001	43	5	3.4	E-9	313			40	13300	3		
55002	43	5	.50	E-8	313					4	19	4.5
55002	43	5	.50	E-8	313					4	36	4.5
55002	43	5	.63	E-8	313					4	19	23.0
55002	43	5	.67	E-8	313					4	36	23.0
62004	45	5	3.99	E-9	298	4.5		1216				

62004	45	5	3.95 E-9	298	6.4	1216		
62004	45	5	3.99 E-9	298	11.8	3274		
62004	45	5	3.95 E-9	298	14.1	1216		
62004	45	5	3.81 E-9	298	18.7	3274		
62004	45	5	3.95 E-9	298	23.0	3274		
48001	49	5	6.8 E-8	298		40	19200	3
48001	49	5	6.8 E-8	298		60	19200	3
48001	49	5	3.0 E-7	313		40	19200	3
59002	49	5	3.30 E-7	298			4.60 E5	
59002	49	5	2.00 E-7	298			9.90 E5	
59002	49	5		298			1.94 E6	
59002	49	5	1.30 E-7	298			2.99 E6	
59003	49	5	.21 E-8	298			SPRING BALANCE	
59003	49	5	.48 E-8	298			TIME LAG	
59003	49	5	1.44 E-8	298			SPRING BALANCE	
59003	49	5	6.74 E-8	298			SPRING BALANCE	
59003	49	5	3.05 E-7	313			SPRING BALANCE	
61006	51	5		298		3.14 E-5		2.260
58006	51	5	6.00 E-7	323	.7	7.00 E-2	7500	
58006	51	5	8.10 E-7	333	1.5			
58006	51	5	5.60 E-7	323	1.9			
58006	51	5	5.30 E-7	323	3.0			
58006	51	5	1.64 E-6	353	3.0			
58006	51	5	1.17 E-6	343	3.5			
58006	51	5	8.10 E-7	333	4.0			
58006	51	5	4.70 E-7	323	4.7			
58006	51	5	1.08 E-6	343	5.5	5.00 E-2	10000	
58006	51	5	1.64 E-6	353	5.5			
58006	51	5	7.20 E-7	333	6.0			
58006	51	5	4.60 E-7	323	6.6			
58006	51	5	9.70 E-7	343	7.1			
58006	51	5	1.36 E-6	353	7.6			
58006	51	5	6.50 E-7	333	7.9			
58006	51	5	4.30 E-7	323	8.8	9.00 E-2	8000	
58006	51	5	8.90 E-7	343	8.8			
58006	51	5	1.20 E-6	353	8.8			
58006	51	5	6.00 E-7	333	10.0	2.00 E-2	7000	
58006	51	5	1.00 E-6	353	10.2			
58006	51	5	4.10 E-7	323	10.5			
58006	51	5	7.60 E-7	343	10.8			
58006	51	5	5.10 E-7	333	11.8			
58006	51	5	6.70 E-7	343	12.1			
58006	51	5	8.50 E-7	353	12.1			
58006	51	5	5.90 E-7	343	13.6			
58006	51	5	4.30 E-7	333	14.0			
58006	51	5	7.80 E-7	353	14.1			
58006	51	5	7.40 E-7	353	16.4			
58006	51	5	4.00 E-7	333	16.6			
63004	51	5		298	1.10		2.86 E-8	
66003	51	5	1.48 E-7	298			1	
66003	51	5	1.10 E-7	298			2	

66003	51	5	.95 E-7	298		3		
66003	51	5	.90	298		4		
66003	51	5	.85	298		5		
48001	57	5	1.30 E-8	298	40	10900	3	
48001	57	5	1.30 E-8	298	60	10900	3	
48001	57	5	3.00 E-8	313	40	10900	3	
45001	61	5	7.50 E-8	298			2	3.0 E-2
45001	61	5	9.00 E-8	298			2	6.8 E-2
48001	62	5	1.20 E-9	298	40	17200	3	
48001	62	5	1.10 E-9	298	60	17200	3	
48001	62	5	4.80 E-9	313	40	17200	3	

DIFFUSION OF CHLOROFORM

I.D	POL	PEN	DIF COEFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
49001	37	9	.24 E-11	298		5.0		4
49001	37	9	4.37 E-12	298		7.5		4
49001	37	9	7.97 E-12	298		9.9		4
49001	37	9	1.71 E-11	298		12.9		4
49001	37	9	1.99 E-11	298		13.2		4
49001	37	9	3.26 E-11	298		15.1		4
49001	37	9	8.46 E-11	298		16.3		4
49001	37	9	9.72 E-11	298		16.8		4

DIFFUSION OF HELIUM

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
61004	33	10	5.90 E-5	298			5800	
	102	10	126.E-7	318				
61005	102	10	68.E-7	298				
61001	103	10	2.34 E-2	273			7580	498
61001	103	10	5.74 E-2	298			7580	608
61001	103	10	7.06 E-2	306			7580	665
61001	103	10	2.37 E-1	328			7580	504
61001	103	10	3.15 E-1	344			7580	375
61001	103	10	5.16 E-1	364			7580	246
61006	108	10		298		6.27 E-5		4.68
63004	108	10		298	1.46		4.31 E-7	
61005	114	10	151.E-7	298				
61005	101	10	30.7E-7	298				
63004	51	10		[illegible]	[illegible]			
50003	67	10	1.17 E-5	298		.77 E-1	5200	
50003	67	10	2.30 E-5	323		.77	5200	
50003	68	10	1.12 E-5	298		.74 E-1	5200	
50003	68	10	2.21 E-5	323		.74	5200	
61004	68	10	1.12 E-4	298				
50003	69	10	5.00 E-6	285		.87 E-1		
50003	69	10	7.92 E-6	298			5800	
50003	69	10	1.07 E-5	308			5500	
50003	69	10	1.62 E-5	323			5000	
50003	69	10	2.42 E-5	343				
61004	69	10	7.92 E-5	298			5500	
50003	70	10	3.70 E-6	285		1.05 E-1		
50003	70	10	5.90 E-6	298			6100	
50003	70	10	8.30 E-6	308			5800	
50003	70	10	1.26 E-5	323			5400	
50003	70	10	2.00 [illegible]	[illegible]				
50003	64	10	8.01 E-6	298		.31 E-1	4900	
50003	64	10	1.51 E-5	323		.31	4900	
61004	64	10	8.01 E-5	298				
50003	66	10	1.55 E-5	298		.19 E-1	4200	
50003	66	10	2.66 E-5	323			4200	
61004	66	10	1.55 E-4	298			4200	
61004	41	10	1.00 E-4	298			5350	
61004	48	10	1.12 E-4	298			4300	
61004	49	10	9.10 E-5	297	.9170			
63001	49	10	7.70 E-6	298			5600	UNIRRADIATED
63001	49	10	5.40 E-6	298			4700	IRRADIATED
66001	49	10	1.71 E-4	461				
61006	51	10		298		2.43 E-3		6.025

61005	34	10	216.E-7	298	
50003	34	10	1.00 E-5	273	
50003	34	10	1.50 E-5	285	5100
50003	34	10	2.16 E-5	298	4700
50003	34	10	2.77 E-5	308	4400
50003	34	10	3.80 E-5	323	4000
50003	34	10	5.34 E-5	343	3300
50003	34	10	7.21 E-5	373	
57002	35	10	1.41 E-5	313	
57002	35	10	1.00 E-5	303	
57002	35	10	.89 E-5	294	
57002	35	10	7.95 E-6	286	
66001	20	10	1.29 E-4	461	
66001	20	10	1.05 E-4	461	

DIFFUSION OF ARGON

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUB O)	E	STATE
61005	102	11	9.7E-7	318				
61005	102	11	3.60 E-7	298				
61006	108	11	1.00 E-5	298		1.10 E-5		5.15
63004	108	11	6.87 E-9	298	1.46		7.53 E-9	
61005	114	11	9.6E-7	298				
61005	101	11	1.16E-7	298				
63004	51	11	3.86 E-7	298	1.10		4.03 E-7	
66001	49	11	[illegible]	[illegible]				
61006	51	11	4.25 E-4	298		4.43 E-4		5.080
61005	34	11	13.6E-7	298				
63006	10	11	5.30 E-9	273			6000	
63006	10	11	1.50 E-8	298				
63006	10	11	3.30 E-8	323				
63006	10	11	[illegible]	[illegible]				
63006	10	11	1.20 E-7	373				
63006	10	11	2.10 E-7	398				
63006	10	11	3.30 E-7	423				
63006	10	11	5.30 E-7	448				
39001	18	11	3.80 E-7	293		1.84	9000	4
39001	18	11	6.80 E-7	303		1.84	9000	4
39001	18	11	1.11 E-6	314		1.84	9000	4
39001	18	11	1.75 E-6	324		1.84	9000	4
39001	18	11	3.04 E-6	338		1.84	9000	4
66001	20	11	5.18 E-5	461				
66001	20	11	7.40 E-5	461				
39001	23	11	3.40 E-7	293		15.10	10300	4
39001	23	11	6.20 E-7	304		15.10	10300	4
39001	23	11	1.12 E-6	312		15.10	10300	4
39001	23	11	1.86 E-6	325		15.10	10300	4
39001	23	11	3.09 E-6	335		15.10	10300	4
39001	26	11	5.50 E-7	309		54.6	11700	4
39001	26	11	7.80 E-7	326		54.6	11700	4
39001	26	11	1.45 E-6	335		54.6	11700	4
39001	26	11	2.53 E-6	347		54.6	11700	4
39001	26	11	4.84 E-6	359		54.6	11700	4

DIFFUSION OF METHANE

I.D	POL	PEN	DIF COEFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
61005	102	12	6.[illegible]E-7	318				
61005	102	12	1.93E-7	298				
61005	114	12	5.4[illegible]E-7	298				
61004	48	12	8.80 E-6	298				
62002	48	12	4.36 E-6	323		1.326		3.49 E-6
62002	48	12	4.31 E-6	323		1.336		3.30 E-6
62002	48	12	4.30 E-6	323		1.339		3.83 E-6
62002	48	12	4.30 E-6	323		2.697		4.05 E 6
61004	[illegible]	[illegible]	[illegible]	[illegible]	.[illegible]			
62003	49	12	2.80 E-5	125				
62003	49	12	4.00 E-5	150				
62003	49	12	5.20 E-5	175				
62003	49	12	5.30 E-5	200				
62003	49	12	4.10 E-5	225				
63001	49	12	.95 E-7	298			11500	IRRADIATED
63001	49	12	1.80 E-7	298			11300	UNIRRADIATED
59005	49	12	.86 E-7	298	.9511			
61005	34	12	8.9E-7	298				
62003	37	12	8.50 E-6	100				
62003	37	12	1.20 E-5	125				
62003	37	12	5.10 E-5	150				
62003	37	12	4.00 E-5	[illegible]				

DIFFUSION OF OXYGEN

I.D	POL	PEN	DIF COEFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
59004	49	13	1.30 E-6	298	.859			
59004	49	13	1.00 E-6	298				
59004	[illegible]	[illegible]	[illegible].00 [illegible]		[illegible]			
59004	[illegible]	[illegible]	[illegible]0 [illegible]					
59004	100	13	1.50 [illegible]	[illegible]	[illegible]			
59004	100	13	1.60 [illegible]	[illegible]	[illegible]			
59004	101	13	2.10 E-7	298	.953			
59004	101	13	1.60 E-7	298	.967			
59004	101	13	1.90 E-7	298	.965			
59004	101	13	2.40 E-7	298	.955			
59004	101	13	3.40 E-7	298	.943			
59004	102	13	5.40 E-7	298	.915			
61005	102	13	[illegible] E-7	[illegible]				
61005	102	13	4.60 E-7	298				
61001	103	13	1.74 E-4	27			10630	596
61001	103	13	6.12 E-4	2[illegible]4			10630	430
61001	103	13	9.50 E-4	237			10630	434
61001	103	13	1.26 E-3	97			10630	504
61001	103	13	7.55 E-3	327			10630	406
61001	103	13	1.27 E-2	339			10630	305
61001	103	13	1.32 E-2	339			10630	504
61001	103	13	2.92 E-2	361			10630	116
61006	108	13	1.50 E-4	298			2.16 E-4	4.995
63004	108	13	1.03 E-7	298	1.46		1.50 E 7	
65003	109	13	9.00 E-9	296			1.8	
65003	109	13	1.40 E-8	296			2.8	
65003	109	13	2.20 E-8	296			1.2	
61005	114	13	12. E-7	298				
61005	101	13	1.[illegible] E-7	[illegible]				
63004	51	13	6.07 E-7	298	1.10		6.39 E 7	
50003	67	13	.43 E-6	298		2.4	9200	
50003	67	13	1.44 E-6	323		2.4	9200	
50003	68	13	.28 E-6	298		9.90	10300	
50003	68	13	1.08 E-6	323		9.90	10300	
50003	69	13	1.36 E-7	298		1.36 E1	10900	
50003	69	13	5.65 E-7	323		1.36	10900	
50003	70	13	.81 E-7	298		4.3 E1	11980	
50003	70	13	3.84 E-7	323		4.3	11980	
50003	71	13	.55 E-6	298		8.5	9800	
50003	71	13	1.98 E-6	323		8.5	9800	
50003	72	13	.24 E-6	298		7.5	10200	
50003	72	13	.92 E-6	323		7.5	10200	
50003	73	13	.14 E-6	298		2.0 E1	11100	
50003	73	13	.61 E-6	323		2.0	11100	

50003	64	13	.92	E-7	298		7.00	E1	12100	
50003	64	13	.45	E-7	323		7.00		12100	
50003	64	13	.24	E-6	298		2.6		9600	
50003	64	13	.83	E-6	323		2.6		9600	
50003	65	13	1.50	E-6	298		.15		6800	
50003	65	13	3.70	E-6	323		.15		6800	
50003	66	13	.79	E-6	298		.69		6100	
50003	66	13	2.30	E-6	323		.69		6100	
61004	49	13	1.70	E-6			2.0		8300	
61004	49	13	4.20	E-7	288	.9203				0
64003	49	13	4.54	E-7	298					
61006	51	13	6.68	E-4	298			1.00	-4	4.045
61005	34	13	17.3E-7		298					
20001	34	13	0.95	E-6	290					4
47001	34	13	1.88	E-6	303	.5		74.8		4
47001	34	13	2.07	E-6	308	4.0		74.9		4
47001	34	13	2.68	E-6	313	4.2		74.2		4
47001	34	13	3.09	E-6	318	.2		74.1		4
47002	34	13	1.75	E-6	298					4
47002	34	13	4.90	E-6	323					4
50003	34	13	1.58	E-6	298		1.94		8300	
50003	34	13	4.70	E-6	323		1.94		8300	
57002	35	13	1.26	E-7	313					
57002	35	13	.56	E-7	303					
57002	35	13	.33	E-7	294					
57002	35	13	2.08	E-8	286					
63006	10	13	6.70	E-9	273				7700	
63006	10	13	2.10	E-8	298					
63006	10	13	3.40	E-8	323					
63006	10	13	1.30	E-7	348				9000	
63006	10	13	2.40	E-7	373					
47002	19	13	4.40	E-7	290					4
47002	19	13	5.70	E-7	294					4
47002	19	13	7.00	E-7	298					4
47002	19	13	8.90	E-7	303					4
47002	19	13	[illegible]	E-6	[illegible]					[illegible]
47002	19	13	1.60	E-6	312					4
47002	19	13	2.30	E-6	316					4
47002	19	13	5.30	E-6	323					4
47002	19	13	6.50	E-6	328					4
47002	19	13	7.50	E-6	333					4
47002	19	13	8.30	E-6	338					4
47002	19	13	9.30	E-6	343					4

DIFFUSION OF HYDROGEN

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
50003	33	14	.41 E-6	273				
50003	33	14	.80 E-6	285			8700	
50003	33	14	1.52 E-6	298			8400	
50003	33	14	2.41 E-6	308			8200	
50003	33	14	4.38 E-6	323			7500	
50003	33	14	8.24 E-6	343			6800	
50003	[illegible]	14	[illegible]	[illegible]				
61001	103	14	8.20 E-2	277			6840	566
61001	103	14	2.27 E-1	300			6840	682
61001	103	14	2.94 E-1	306			6840	441
61001	103	14	1.16	339			6840	623
61001	103	14	1.67	354			6840	572
61001	103	14	1.78	364			6840	179
[illegible]		[illegible]	[illegible]					
39001	59	14	6.10 E-7	273		54.4	8700	4
39001	59	14	1.70 E-6	293		54.4	8700	4
39001	59	14	2.70 E-6	302		54.4	8700	4
39001	59	14	4.60 E-6	315		54.4	8700	4
39001	59	14	6.60 E-6	323		54.4	8700	4
39001	60	14	3.30 E-6	305		39.4	9900	4
39001	60	14	5.60 E-6	314		39.4	9900	4
39001	60	14	9.10 E-6	323		39.4	9900	4
39001	60	14	1.44 E-5	334		39.4	9900	4
39001	60	14	2.10 E-5	343		39.4	9900	4
39001	60	14	2.40 E-5	347		39.4	9900	4
50003	[illegible]	14	[illegible]	[illegible]		[illegible]		
50003	64	14	2.47 E-6	298		.67	1400	
50003	64	14	6.50 E-6	323		.67	1400	
50003	67	14	2.53 E-6	285			[illegible]	
50003	67	14	4.50 E-6	298			7400	
50003	67	14	6.70 E-6	308			7000	
50003	67	14	1.11 E-5	323			6300	
50003	67	14	1.89 E-5	343			5000	
61004	67	14	4.50 E-5	298			6200	
50003	68	14	3.65 E-6	298		.52	7000	
50003	68	14	9.60 E-6	323		.52	7000	
61004	68	14	3.85 E-5	298				
50003	69	14	6.65 E-7	273				
50003	69	14	1.32 E-6	285			8600	
50003	69	14	2.43 E-6	298			8000	
50003	69	14	3.74 E-6	308			7700	
50003	69	14	6.56 E-6	323			7100	
50003	69	14	1.19 E-5	343			6200	
50003	69	14	2.30 E-5	373				
50003	69	14	[illegible]	[illegible]				
50003	69	14	1.38 E-7	308			13100	
50003	69	14	3.38 E-7	323			10900	
50003	69	14	8.05 E-7	343			9000	
50003	69	14	[illegible]	[illegible]				

61004	69	14	2.43	E-5	298				7600	
50003	72	14	2.60	E-6	298		.98		7600	
50003	72	14	7.00	E-6	323		.98		7600	
50003	73	14	3.90	E-6	298		1.3		7500	
50003	73	14	1.05	E-5	323		1.3		7500	
50003	64	14	3.55	E-6	298		.41		6900	
50003	64	14	8.74	E-6	323		.41		6900	
50003	65	14	9.60	E-6	298		.53	F-1	5100	
50003	65	14	1.80	E-5	323		.53		5100	
61004	[illegible]	14	[illegible]	[illegible]						
50003	66	14	6.43	E-6	298		.23		6200	
50003	66	14	1.45	E-5	323		.23		6200	
61004	66	14	6.43	E-5	298					
61004	41	14	2.60	E-5	298				7500	
61004	48	14	1.00	E-4	293				6000	
64002	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]					
64002	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]					
64002	48	14	[illegible]	[illegible]	[illegible]					
64002	48	14	1.48	E-6	303					
61004	49	14	2.40	E-5			4.0	E-2	4300	
64002	49	14	6.30	E-6	333					
64002	49	14	4.79	E-6	323					
64002	49	14	3.30	E-6	313					
64002	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]					
20001	34	14	7.23	E-6	290					4
47001	34	14	1.23	E-5	303	.1		74.9		4
47001	34	14	1.44	E-5	308	.1		74.6		4
47001	34	14	1.70	E-5	313	.1		76.4		4
47002	34	14	1.05	E-5	298					4
47002	34	14	2.20	E-5	323					4
50003	34	14	1.02	[illegible]	[illegible]					
[illegible]		[illegible]		[illegible]						
50003	34	14	1.30	E-6	255					
50003	34	14	3.70	E-6	273				7100	
50003	34	14	6.20	E-6	285				6700	
50003	34	14	1.02	E-5	298				6300	
50003	34	14	1.42	E-5	308				6000	
50003	34	14	2.22	E-5	323				5800	
50003	34	14	[illegible]	[illegible]	[illegible]					
65002	35	14	2.06	E-6	[illegible]					
65002	35	14	1.93	E-6	STEADY STATE METHOD					
65002	35	14	2.01	E-6	SLOPE OF PLOT METHOD					
48002	37	14	6.68	E-5	464			108		4
48002	37	14	4.50	E-5	450			205		4
48002	37	14	3.15	E-5	430			108		4
48002	37	14	2.41	E-5	422			108		4
48002	37	14	1.66	E-5	407			106		4
[illegible]		[illegible]	[illegible]	[illegible]	[illegible]					
48002	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]					

48002	37	14	.96	E-5	368		80		4
48002	37	14	.65	E-5	348		31		4
48002	37	14	.29	E-5	313		62		4
48002	37	14	1.10	E-5	351				4
48002	37	14	1.30	E-5	350		94		4
48002	37	14	.59	E-5	343		104		4
48002	37	14	1.20	E-5	358		43		4
48002	37	14	1.10	E-5	357		108		4
48002	37	14	1.35	E-5	354		98		4
48002	37	14	.80	E-5	345		102		4
48002	37	14	.60	E-5	340		96		4
48002	37	14	.35	E-5	307		96		4
63006	10	14	3.00	E-7	273			5000	
63006	10	14	6.40	E-7	[illegible]				
63006	10	[illegible]	[illegible]	[illegible]	[illegible]				
63003	11	14	2.60	E-7	292				
63003	11	14	3.45	E-7	295				
63003	11	14	3.57	E-7	298				
63003	11	14	4.67	E-7	303				
63003	11	14	5.62	E-7	308				
63003	11	14	[illegible]	E-7	[illegible]				
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]				
63003	16	14	5.97	E-7	320				
63003	16	14	4.22	E-7	[illegible]				
63003	16	14	3.32	E-7	306				
63003	16	14	2.11	E-7	298				
47002	19	14	3.50	E-6	290				4
47002	19	14	4.20	E-6	294				4
47002	19	14	5.00	E-6	298				4
47002	19	14	6.20	E-6	303				4
47002	19	14	7.60	E-6	308				4
47002	19	14	9.20	E-6	312				4
47002	19	14	1.15	E-5	316				4
47002	19	14	2.10	E-5	323				4
47002	19	14	2.60	E-5	328				4
47002	19	14	3.10	E-5	333				4
47002	19	14	3.40	E-5	338				4
47002	19	14	4.00	E-5	343				4
39001	26	14	3.70	E-7	273	9.0		9250	4
39001	26	14	1.03	E-6	290	9.0		9250	4
39001	26	14	1.80	E-6	300	9.0		9250	4
39001	26	14	2.97	E-6	309	9.0		9250	4
39001	26	14	4.81	E-6	320	9.0		9250	4

DIFFUSION OF NEON

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUP 0)	E	STATE
61001	103	15	8.30 E-3	278			10190	451
61001	103	15	2.41 E-2	298			10190	588
61001	103	15	7.28 E-2	304			10190	431
61001	103	15	5.60 E-2	306			10190	275
61001	103	15	8.47 E-2	321			10190	356
61001	103	15	2.22 E-1	336			10190	331
61001	103	15	6.64 E-1	364			10190	275

DIFFUSION OF CARBON DIOXIDE

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
61005	102	16	[illegible]	[illegible]				
6100[illegible]	10[illegible]	[illegible]	[illegible]	[illegible]				
61001	103	16	.16 E-4	274			5620	85
61001	103	16	.18 E-4	279			5620	73
61001	103	16	.25 E-4	283			5620	57
61001	103	16	.27 E-4	290			5620	42
61001	103	16	.48 E-4	300			5620	73
61001	103	16	.49 E-4	301			5620	47
61001	103	16	1.12 E-4	306			20560	[illegible]
61001	103	16	1.55 E-4	309			20560	70
61001	103	16	3.41 E-4	318			20560	41
61001	103	16	2.97 E-4	321			20560	82
61001	103	16	4.88 E-4	323			20560	76
61001	103	16	8.18 E-4	331			20560	70
61001	103	16	6.31 E-3	364			20560	99
63002	107	16	8.00 E-7	350		7.65	11000	
61006	108	16	2.50 [illegible]	[illegible]		[illegible]	[illegible]	[illegible]
63004	108	16	1.62 E-8	[illegible]	[illegible].46		[illegible]	
65003	109	16	1.50 E-9	296		1.8		
65003	109	16	3.00 E-9	296		2.8		
65003	109	16	7.50 E-9	296		1.2		
61005	114	16	9.1 [illegible]-7	[illegible]				
59001	96	16	.18 E-9	277			6700	
59001	96	16	[illegible]	[illegible]				
61004	96	16	1.80 E-7	303				0
61005	101	16	1.24 -7	298				
63004	51	16	5.46 E-7	298	1.10		5.65 E-7	
61004	57	16	1.81 E-8	288				0
61004	57	16	6.20 E-8	288				95
50003	67	16	1.19 E-6	298		1.35 E1	10700	
50003	67	16	.77 E-6	323		1.35	10700	
50003	68	16	1.07 E-7	298		6.70 E1	12000	
50003	68	16	5.15 E-7	323		6.70	12000	
50003	69	16	.38 E-7	298		2.60 E2	13400	
50003	69	16	2.21 E-7	323		2.60	13400	
50003	70	16	5.78 E-8	298		3.6 E1	12000	
50003	70	16	2.76 E-7	323		3.6	12000	
50003	71	16	1.46 E-6	323				
50003	72	16	.94 E-7	298		4.2 E1	11800	
50003	72	16	.44 E-6	323		4.2	11800	
50003	73	16	.63 E-7	298		1.60 E2	12800	
50003	73	16	.36 E-6	323		1.60	12800	
50003	64	16	.31 E-7	298		1.15 [illegible]	14400	
50003	64	16	2.03 E-7	323		1.15	14400	
50003	64	16	.91 E-7	298		8.1 E1	12200	
50003	64	16	4.44 E-7	323		8.1	12200	
50003	65	16	1.05 E-6	298		.24	7300	

50003	65	16	2.80 E-6	323	.24		7300	
50003	66	16	4.25 E-7	298	2.40		9200	
50003	66	16	1.42 E-6	323	2.40		9200	
61004	42	16	9.00 E-9	293				0
61004	42	16	5.60 E-9	293				94
59001	43	16	.18 E-9	277			2400	
59001	43	16	.45 E-9	298				
61004	49	16	1.10 E-6		4.2		9000	
66001	49	16	[illegible]	[illegible]				
61006	51	16	6.01 E-4	298		6.21 E-4		5.860
[illegible]00		[illegible]	[illegible]					
20001	34	16	0.85 E-6	290				4
47002	34	16	1.05 E-6	298				4
47002	34	16	3.20 E-6	323				4
50003	34	16	1.10 E-6	298	3.7		8900	
50003	34	16	3.50 E-6	323	3.7		8900	
[illegible]			[illegible]					
61004	36	16	1.63 E-8	293				0
61004	36	16	2.40 E-8	293		.		94
48002	37	16	3.90 E-6	459		50		4
48002	37	16	2.45 E-6	450		40		4
48002	37	16	2.11 E-6	438		40		4
63006	10	16	1.20 E-9	273			9000	
63006	10	16	4.80 E-9	298				
63006	10	16	1.50 E-8	323				
63006	10	16	4.70 E-8	348				
63006	10	16	1.00 E-7	373				
47002	19	16	3.10 E-7	290				4
47002	19	16	4.10 E-7	294				4
47002	19	16	4.70 E-7	298				4
47002	19	16	6.60 E-7	303				
47002	19	16	8.20 E-7	308				4
47002	19	16	1.10 E-6	312				4
47002	19	16	1.70 E-6	316				4
47002	19	16	4.10 E-6	323				4
47002	19	16	4.90 E-6	328				4
47002	19	16	5.70 E-6	333				4
47002	19	16	6.50 E-6	338				4
47002	19	16	7.80 E-6	343				4
66001	20	16	3.37 E-5	461				
66001	20	16	[illegible]	[illegible]				
63002	21	16	1.20 E-7	290	.25		8400	

DIFFUSION OF SULFUR HEXAFLORIDE

I.D	POL	PEN	DIF COEFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
61005	102	17	0.66E-7	318				
61005	102	17	0.135E-7	298				
63002	107	17	2.00 E-8	364		6.83 E1	15800	
61005	114	17	0.56E-7	298				
61005	101	17	0.016E-7	298				
61005	34	17	1.15E-7	298				
63006	10	17	2.50 E-8	448			2000	
63006	10	17	1.00 E-13	298				
63002	21	17	9.70 E-9	351		1.72 E1	14600	

DIFFUSION OF TRITIUM

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
63003	11	18	3.05 E-7	293				
63003	11	18	3.70 E-7	298				
63003	11	18	4.53 E-7	303				
63003	11	18	5.72 E-7	308				

DIFFUSION OF DEUTERIUM

I.D	POL	REN	DIF COFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
64002	48	19	[illegible]	[illegible]				
[illegible]			[illegible]					
64002	[illegible]	[illegible]	[illegible]					
64002	48	19	1.20 E-6	303				
64002	[illegible]	[illegible]	[illegible]					
[illegible]			[illegible]					
64002	49	19	2.82 E-6	313				
64002	49	19	2.20 E-6	303				
[illegible]			[illegible]					
63003	16	19	5.52 E-7	320				
63003	16	19	4.22 E-7	313				
63003	16	19	3.34 E-7	306				
[illegible]	[illegible]	[illegible]	[illegible]					

DIFFUSION OF HELIUM-4

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUB O)	E	STATE
63003	16	20	3.49 E-6	328				
63003	16	20	3.41 E-6	320				
63003	16	20	2.47 E-6	313				
63003	16	20	1.84 E-6	306				
63003	16	20	1.56 E-6	298				

DIFFUSION OF NITROGEN

I.D	POL	PEN	DIF COEFF	T(KEL)	DENSITY	D(SUP 0)	E	STATE
50003	33	21	.45 E-7	298		3.40 E1		
50003	33	21	.90 E-7	308			12200	
50003	33	21	.22 E-6	323			11400	
50003	33	21	.56 E-6	343			10000	
50003	33	21	1.70 E-6	373				
61005	102	21	8.3E-7	318				
61005	102	21	3.20E-7	298				
61006	108	21	1.93 E-5	298			2.90 E-5	5.21
63004	108	21	1.29 E-8	298	1.46		1.93 E-8	
61005	114	21	7.4E-7	298				
59001	97	21	2.00 E-7	277			9700	
59001	97	21	7.10 E-7	298				
61005	101	21	0.93E-7	298				
63004	51	21	2.11 E-7	298	1.10		2.33 E-7	
61004	54	21	.50 E-6	293				
59001	57	21	1.85 E-7	277			8600	
59001	57	21	5.60 E-7	298				
39001	59	21	0.66 E-7	290		28.1	11500	4
39001	59	21	2.90 E-7	311		28.1	11500	4
39001	59	21	4.40 E-7	322		28.1	11500	4
39001	59	21	8.80 E-7	333		28.1	11500	4
39001	59	21	1.40 E-6	344		28.1	11500	4
50003	63	21	.94 E-6	298				
50003	63	21	2.50 E-6	298				
50003	64	21	.45 E-7	298		1.88 E3	14500	
50003	67	21	1.05 E-7	285				
50003	67	21	.25 E-6	298			11200	
50003	67	21	.46 E-6	308			10600	
50003	67	21	.98 E-6	323			9300	
50003	67	21	2.10 E-6	343				
61004	67	21	2.50 E-6	298				
50003	68	21	1.52 E-6	298		5.60 E1	11700	
50003	68	21	.70 E-6	323		5.60	11700	
50003	68	21	1.52 E-7	298		5.60 E1	11700	
50003	68	21	.70 E-7	323		5.60	11700	
61004	68	21	1.52 E-6	298				
61004	69	21	.64 E-6	298				
50003	71	21	.30 E-6	298		4.2 E1	11100	
50003	71	21	1.28 E-6	323		4.2	11100	
50003	72	21	1.45 E-7	298		5.5 E1	11700	
50003	72	21	.67 E-6	323		5.5	11700	
50003	73	21	.79 E-7	298		1.05 E2	12400	
50003	73	21	.41 E-6	323		1.05	12400	
50003	64	21	.30 E-7	323		1.88	14500	
50003	64	21	1.23 E-7	298		3.9 E1	11600	
50003	64	21	.56 E-7	323		3.9	11600	
50003	65	21	1.10 E-6	298		.22	7200	
50003	65	21	2.90 E-6	323		.22	7200	

61004	65	21	1.10 E-5	298					
50003	66	21	.51 E-6	298		.88		8500	
50003	66	21	1.55 E-6	323		.88		8500	
61004	66	21	5.10 E-6	298					
61004	48	21	7.60 E-6	293					
61004	49	21	1.20 E-6			4.5 E-6		9000	
61004	49	21	1.80 E-7	288	.9203				0
62003	49	21	2.60 E-5	125					
62003	49	21	3.00 E-5	150					
62003	49	21	3.50 E-5	175					
62003	49	21	3.95 E-5	200					
62003	49	21	4.10 E-5	225					
63001	49	21	.29 E-6	298				9700	UNIRRADIATED
63001	49	21	.19 E-6	298				10500	IRRADIATED
66001	49	21	6.04 E-5	461					
61006	51	21	2.33 E-4	298			2.60 E-4		4.490
61005	34	21	11.7E-7	298					
47001	34	21	1.21 E-6	298	.9		72.9		4
47001	34	21	1.41 E-6	303	.8		73.8		4
47001	34	21	1.75 E-6	308	.1		74.0		4
47001	34	21	1.86 E-6	308	.1		56.1		4
47001	34	21	1.72 E-6	308	37.4		74.9		4
47001	34	21	2.12 E-6	313	1.5		71.5		4
47001	34	21	2.68 E-6	318	.1		75.7		4
47001	34	21	3.02 E-6	323	1.0		72.3		4
47001	34	21	3.06 E-6	323	.1		74.9		4
47002	34	21	1.15 E-6	298					4
47002	34	21	3.70 E-6	323					4
50003	34	21	.22 E-6	273					4
50003	34	21	.52 E-6	285				10700	
50003	34	21	1.10 E-6	298				9400	
50003	34	21	1.82 E-6	308				8800	
50003	34	21	3.42 E-6	323				7900	
50003	34	21	6.63 E-6	343				6600	
50003	34	21	1.30 E-5	373					
61004	35	21	4.50 E-8	287					90
48002	37	21	3.63 E-6	463			270		4
48002	37	21	2.93 E-6	454			280		4
48002	37	21	2.50 E-6	443			280		4
48002	37	21	1.69 E-6	433			282		4
48002	37	21	1.10 E-6	422			110		4
48002	37	21	1.19 E-6	421			200		4
48002	37	21	1.06 E-6	411			272		4
48002	37	21	.52 E-6	393			206		4
48002	37	21	.27 E-6	368			160		4
48002	37	21	.10 E-6	349			205		4
48002	37	21	.04 E-7	293			134		4
63006	10	21	2.00 E-7	398					
63003	16	21	.96 E-7	323					
39001	18	21	2.37 E-7	293		0.93		8900	4
39001	18	21	5.06 E-7	308		0.93		8900	4
39001	18	21	9.50 E-7	323		0.93		8900	4
39001	18	21	1.53 E-6	347		0.93		8900	4
47002	19	21	3.20 E-7	290					4

47002	19	21	4.10	E-7	294			4
47002	19	21	5.00	E-7	298			4
47002	19	21	6.80	E-7	303			4
47002	19	21	8.70	E-7	308			4
47002	19	21	1.20	E-6	312			4
47002	19	21	1.80	E-6	316			4
47002	19	21	4.20	E-6	323			4
47002	19	21	5.00	E-6	328			4
47002	19	21	5.70	E-6	333			4
47002	19	21	7.00	E-6	338			4
47002	19	21	7.80	E-6	343			4
66001	20	21	2.04	E-5	461			
66001	20	21	3.51	E-5	461			
39001	23	21	4.10	E-7	313	38.0	11500	4
39001	23	21	9.20	E-7	328	38.0	11500	4
39001	23	21	1.60	E-6	339	38.0	11500	4
39001	23	21	2.90	E-6	351	38.0	11500	4
39001	26	21	1.90	E-7	300	79.0	11900	4
39001	26	21	3.40	E-7	308	79.0	11900	4
39001	26	21	5.50	E-7	317	79.0	11900	4
39001	26	21	9.60	E-7	327	79.0	11900	4
39001	26	21	1.80	E-6	338	79.0	11900	4
39001	26	21	4.50	E-6	358	79.0	11900	4

DIFFUSION OF PROPANE

I.D	POL	PEN	DIF COEFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
61005	102	22	1.3E-7	318				
61005	102	22	0.322E-7	298				
62002	105	22	9.75 E-6	323		2.248		1.00 E-5
62002	105	22	9.91 E-6	323		4.642		1.05 E-5
62002	105	22	9.65 E-6	323		7.049		1.01 E-5
61006	108	22	.23 E-7	298			.31 E-7	4.57
63004	108	22	.16 E-10	298	1.46		.21 E-10	
61005	114	22	1.2E-7	298				
	101	22	0.049E-7	298				
63004	51	22	2.41 E-9	298	1.10		2.93 E-9	
51002	54	22	5.60 E-9	308		496		
51002	54	22	6.40 E-9	308		941		
51002	54	22	8.00 E-9	308		1446		
51002	54	22	7.40 E-9	308		1452		
62002	48	22	.85 E-6	323		1.021		.83 E-6
63001	49	22	.26 E-7	298			15100	UNIRRADIATED
63001	49	22	1.17 E-8	298			15300	IRRADIATED
59005	49	22	.68 E-8	298	.9511			
61006	51	22	2.65 E-6	298			3.20 E-6	5.080
61005	34	22	2.1E-7	298				

DIFFUSION OF CHLOROMETHANE

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
63002	106	23	5.00 E-9	312		.46	11400	
63002	107	23	9.00 E-8	350		3.50	12000	
64001	46	23	1.29 E-7	296				
63002	21	23	1.50 E-8	290		.21	9600	

DIFFUSION OF FLOUROFORM

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
61006	51	24	1.10 E-6	298		1.60 E-6		4.510
63002	21	24	3.50 E-9	266		.16	9500	

DIFFUSION OF DIOCTYL PTHALATE

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
61006	51	25	4.30 E-7	298		1.52 E-6		4.520

DIFFUSION OF N-BUTANE

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUB O)	F	STATE
63004	103	26	0.0	298	1.46		0.0	
63004	51	26	9.90 E-10	298	1.10		1.46 E-9	
52001	54	26		298		1.17E-9		
52001	54	26		308		3.29E-9	16.7	
52001	54	26		314.5		7.54E-9		
51002	54	26	4.50 E-9	308		242		
51002	54	26	6.80 E-9	308		503		
51002	54	26	9.10 E-9	308		662		
51002	54	26	1.09 E-8	308		762		
51002	54	26	1.86 E-8	308		99[illegible]		
51002	54	26	3.30 E-8	308		1243		
51002	54	26	5.68 E-8	308		1448		
55001	74	26	2.00 E-7	303				4
55001	74	26	3.71 E-7	313				4
55001	74	26	6.21 E-7	323				4
55001	74	26	9.73 E-7	333				4
55001	75	26	1.69 E-7	303				4
55001	75	26	3.23 E-7	313				4
55001	75	26	5.66 E-7	323				4
55001	75	26	9.45 E-7	333				4
62001	75	26	6.96 E-6	303		8.20 E-5	4300	6.52 E-6
62001	75	26	8.62 E-6	313				7.94 E-6
62001	75	26	1.09 E-5	323				1.02 E-5
62001	75	26	1.32 E-5	333				1.22 E-5
62001	75	26	1.60 E-5	343				1.53 E-5
65002	48	26	1.84 E-7	298		1.59		
65002	48	26	2.03 E-7	299		1.74		
65002	48	26	2.18 E-7	300		1.91		
65002	48	26	5.04 E-7	314		4.61		
59005	49	26	.36 E-8	298	.9511			
62001	34	26	5.44 E-6	303		4.90 E-5	4200	5.23 E-6
62001	34	26	6.83 E-6	313				6.51 E-6
62001	34	26	8.49 E-6	323				8.02 E-6
62001	34	26	1.07 E-5	333				9.64 E-6
62001	34	26	1.29 E-5	343				1.19 E-5
55001	34	26	2.32 E-7	303				
55001	34	26	4.28 E-7	313				
55001	34	26	7.15 E-7	323				4
55001	34	26	1.12 E-7	333				4
58003	28	26	6.50 E-9	304		4.0 E-9	9.0	
58003	28	26	7.00 E-9	304			11.0	
58003	28	26	8.90 E-9	304			15.0	
58003	28	26	1.10 E-8	304			19.0	
58003	28	26	1.15 E-8	304			21.0	
58003	28	26	1.20 E-8	304			22.0	
58003	28	26	7.80 E-9	308		5.6 E-9	7.0	

58003	28	26	8.90 E-9	308		9.0
58003	28	26	9.90 E-9	308		11.0
58003	28	26	1.23 E-8	308		15.0
58003	28	26	1.34 E-8	308		17.0
58003	28	26	1.44 E-8	308		19.0
58003	28	26	9.70 E-9	313	7.20 E-9	6.0
58003	28	26	1.09 E-8	313		8.0
58003	28	26	1.22 E-8	313		10.0
58003	28	26	1.29 E-8	313		12.0
58003	28	26	1.44 E-8	313		14.0
58003	28	26	1.64 E-8	313		16.0
58003	28	26	1.14 E-8	318	8.70 E-9	5.0
58003	28	26	1.31 E-8	318		7.0
58003	28	26	1.46 E-8	318		9.0
58003	28	26	1.63 E-8	318		11.0
58003	28	26	1.86 E-8	318		13.0
58003	28	26	2.02 E-8	318		15.0
58003	28	26	1.42 E-8	323	1.18 E-8	4.0
58003	28	26	1.51 E-8	323		5.0
58003	28	26	1.66 E-8	323		6.0
58003	28	26	1.81 E-8	323		8.0
58003	28	26	1.88 E-8	323		10.0
58003	28	26	2.28 E-8	323		12.0
58003	28	26	1.74 E-8	328	1.39 E-8	4.0
58003	28	26	1.83 E-8	328		5.0
58003	28	26	2.09 E-8	328		7.0
58003	28	26	2.23 E-8	328		8.0
58003	28	26	2.55 E-8	328		10.0
58003	28	26	2.86 E-8	328		11.0
58003	28	26	2.18 E-8	333	1.97 E-8	3.0
58003	28	26	2.36 E-8	333		4.0
58003	28	26	2.49 E-8	333		5.0
58003	28	26	2.64 E-8	333		7.0
58003	28	26	2.75 E-8	333		8.0
58003	28	26	2.98 E-8	333		9.0
58003	28	26	3.19 E-8	343	2.91 E-8	2.0
58003	28	26	3.53 E-8	343		3.0
58003	28	26	3.79 E-8	343		4.0
58003	28	26	4.08 E-8	343		5.0
58003	28	26	4.15 E-8	343		6.0
58003	28	26	4.42 E-8	343		7.0

DIFFUSION OF N-PENTANE

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUB O)	E	STATE
63004	51	27	3.90 E-10	298	1.10		1.38 E-9	
52001	54	27		298		1.08E-9		
52001	54	27		308		2.59E-9	16.	
52001	54	27		314.5		6.55E-9		
51002	54	27	3.10 E-9	308		32		
51002	54	27	4.40 E-9	308		104		
51002	54	27	8.20 E-9	308		207		
51002	54	27	7.30 E-9	308		212		
51002	54	27	1.81 E-8	308		306		
51002	54	27	3.37 E-8	308		388		
55001	74	27	.55 E-7	303				4
55001	74	27	1.17 E-7	313				4
55001	74	27	2.17 E-7	323				4
55001	74	27	3.66 E-7	333				4
55001	74	27	1.22 E-7	303				4
55001	74	27	2.94 E-7	313				4
55001	74	27	5.52 E-7	323				4
55001	74	27	9.13 E-7	333				4
62001	74	27	4.71 E-6	303		4.30 E-5	3900	4.38 E-6
62001	74	27	5.87 E-6	313				8.58 E-6
62001	74	27	7.14 E-6	323				6.83 E-6
62001	74	27	8.75 E-6	333				8.22 E-6
62001	74	27	1.02 E-5	343				9.98 E-6
55001	75	27	1.38 E-7	303				4
55001	75	27	2.79 E-7	313				4
55001	75	27	4.91 E-7	323				4
55001	75	27	7.76 E-7	333				4
62001	75	27	6.47 E-6	303		1.05 E-4	3700	5.31 E-6
62001	75	27	8.09 E-6	313				6.71 E-6
62001	75	27	9.56 E-6	323				8.34 E-6
62001	75	27	1.14 E-5	333				1.03 E-5
62001	75	27	1.34 E-5	343				1.26 E-5
64001	46	27	5.90 E-8	296				
59005	49	27	.12 E-7	300	.9185			
59005	49	27	1.00 E-7	323	.9185			
59005	49	27	.33 E-8	298	.9505			
59005	49	27	.36 E-7	323	.9505			
62001	34	27	4.48 E-6	303		6.40 E-5	4300	4.36 E-6
62001	34	27	5.65 E-6	313				5.58 E-6
62001	34	27	6.92 E-6	323				7.03 E-6
62001	34	27	8.48 E-6	333				8.78 E-6
62001	34	27	1.02 E-5	343				1.09 E-5
55001	34	27	2.28 E-7	303				4
55001	34	27	4.24 E-7	313				4
55001	34	27	6.80 E-7	323				4
55001	34	27	1.00 E-6	333				4

58003	28	27	1.15 E-8	323		26.0
58003	28	27	4.70 E-9	308	2.90 E-9	20.0
58003	28	27	4.90 E-9	308		24.0
58003	28	27	5.10 E-9	308		32.0
58003	28	27	5.20 E-9	308		36.0
58003	28	27	4.90 E-9	313	4.20 E-9	12.0
58003	28	27	5.40 E-9	313		16.0
58003	28	27	6.30 E-9	313		24.0
58003	28	27	6.70 E-9	313		28.0
58003	28	27	7.20 E-9	313		36.0
58003	28	27	5.70 E-9	318	4.60 E-9	10.0
58003	28	27	6.50 E-9	318		14.0
58003	28	27	6.90 E-9	318		18.0
58003	28	27	8.00 E-9	318		26.0
58003	28	27	8.70 E-9	318		30.0
58003	28	27	9.20 E-9	318		32.0
58003	28	27	7.00 E-9	323	5.80 E-9	8.0
58003	28	27	7.60 E-9	323		11.0
58003	28	27	9.00 E-9	323		17.0
58003	28	27	9.90 E-9	323		20.0
58003	28	27	1.18 E-8	323		28.0
58003	28	27	8.40 E-9	328	6.8 E-9	7.0
58003	28	27	9.20 E-9	328		10.0
58003	28	27	1.00 E-8	328		13.0
58003	28	27	1.17 E-8	328		19.0
58003	28	27	1.31 E-8	328		22.0
58003	28	27	1.38 E-8	328		24.0
58003	28	27	1.05 E-8	333	9.40 E-9	5.0
58003	28	27	1.10 E-8	333		7.0
58003	28	27	1.21 E-8	333		11.0
58003	28	27	1.33 E-8	333		15.0
58003	28	27	1.53 E-8	333		19.0
58003	28	27	1.60 E-8	333		20.0
58003	28	27	1.32 E-8	338	1.12 E-8	4.0
58003	28	27	1.35 E-8	338		6.0
58003	28	27	1.48 E-8	338		10.0
58003	28	27	1.57 E-8	338		12.0
58003	28	27	1.80 E-8	338		16.0
58003	28	27	1.88 E-8	338		18.0
58003	28	27	1.61 E-8	343	1.48 E-8	4.0
58003	28	27	1.72 E-8	343		6.0
58003	28	27	1.79 E-8	343		8.0
58003	28	27	1.99 E-8	343		12.0
58003	28	27	2.02 E-8	343		14.0
58003	28	27	2.16 E-8	343		16.0
58003	28	27	1.95 E-8	348	1.81 E-8	3.0
58003	28	27	2.08 E-8	348		5.0
58003	28	27	2.20 E-8	348		7.0
58003	28	27	2.26 E-8	348		9.0
58003	28	27	2.49 E-8	348		11.0
58003	28	27	2.65 E-8	348		13.0

DIFFUSION OF NEO-PENTANE

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUB O)	E	STATE
52001	54	28		298		.20E-9		
52001	54	28		308		.60E-9	18.	
52001	54	28		314.5		1.26E-9		
51002	54	28	1.10 E-9	308		489		
51002	54	28	1.40 E-9	308		703		
51002	54	28	3.00 E-9	308		1053		
51002	54	28	5.40 E-9	308		1240		
62001	74	28	2.78 E-6	303		7.20 E-5	4000	2.62 E-6
62001	74	28	3.50 E-6	313				3.11 E-6
55001	75	28	.54 E-7	303				4
55001	75	28	1.08 E-7	313				4
55001	75	28	2.04 E-7	323				4
55001	75	28	3.72 E-7	333				4
62001	75	28	3.66 E-6	303		9.30 E-5	4500	2.79 E-6
62001	75	28	4.74 E-6	313				3.56 E-6
62001	75	28	5.84 E-6	323				4.48 E-6
62001	75	28	7.40 E-6	333				5.58 E-6
62001	75	28	8.76 E-6	343				6.90 E-6
59005	49	28	.49 E-8	298	.9505			
59005	49	28	.34 E-8	308	.9505			
59005	49	28	.92 E-8	323	.9505			
59005	49	28	.02 E-7	298	.9185			
59005	49	28	.30 E-7	323	.9185			
62001	34	28	2.83 E-6	303		2.40 E-5	4200	2.49 E-6
62001	34	28	3.53 E-6	313				3.06 E-6
62001	34	28	4.32 E-6	323				3.72 E-6
62001	34	28	5.32 E-6	333				4.43 E-6
62001	34	28	6.40 E-6	343				5.95 E-6
55001	34	28	.72 E-7	303				4
55001	34	28	1.41 E-7	313				4
55001	34	28	2.55 E-7	323				4
55001	34	28	4.24 E-7	333				4

DIFFUSION OF ISO-BUTANE

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUB 0)	F	STATE
52001	54	29		298		.53E-9		
52001	54	29		308		1.46E-9	17.5	
52001	54	29		314.5		3.75E-9		
51002	54	29	1.70 E-9	308		210		
51002	54	29	2.20 E-9	308		488		
51002	54	29	2.50 E-9	308		712		
51002	54	29	2.80 E-9	308		767		
51002	54	29	3.60 E-9	308		980		
51002	54	29	4.70 E-9	308		1246		
51002	54	29	6.40 E-9	308		1460		
55001	74	29	1.18 E-7	303				4
55001	74	29	2.34 E-7	313				4
55001	74	29	4.09 E-7	323				4
55001	74	29	6.50 E-7	333				4
62001	74	29	4.32 E-6	303		1.31 E-4	4500	3.77 E-6
62001	74	29	5.57 E-6	313				4.79 E-6
62001	74	29	7.11 E-6	323				6.03 E-6
62001	74	29	8.71 E-6	333				7.44 E-6
62001	74	29	1.05 E-5	343				9.17 E-6
55001	75	29	1.08 E-7	303				4
55001	75	29	2.21 E-7	313				4
55001	75	29	3.99 E-7	323				4
55001	75	29	6.80 E-7	333				4
62001	75	29	5.71 E-6	303		8.90 E-5	4400	5.11 E-6
62001	75	29	7.32 E-6	313				6.45 E-6
62001	75	29	9.15 E-6	323				8.02 E-6
62001	75	29	1.14 E-5	333				9.82 E-6
62001	75	29	1.37 E-5	343				1.20 E-5
62001	34	29	4.81 E-6	303		1.70 E-5	4000	3.83 E-6
62001	34	29	5.98 E-6	313				4.75 E-6
62001	34	29	7.71 E-6	323				5.78 E-6
62001	34	29	9.40 E-6	333				6.97 E-6
62001	34	29	1.15 E-5	343				8.38 E-6
55001	34	29	1.50 E-7	303				4
55001	34	29	2.75 E-7	313				4
55001	34	29	4.65 E-7	323				4
55001	34	29	7.33 E-7	333				4
58003	28	29	.97 E-9	304		.77 E-9	4.5	
58003	28	29	1.20 E-9	304			6.8	
58003	28	29	1.42 E-9	304			8.5	

58003	28	29	1.60 E-9	304		10.5
58003	28	29	1.79 E-9	304		12.5
58003	28	29	2.03 E-9	308	.82 E-9	14.5
58003	28	29	1.20 E-9	308		4.0
58003	28	29	1.42 E-9	308		6.0
58003	28	29	1.72 E-9	308		8.0
58003	28	29	2.08 E-9	308		10.0
58003	28	29	2.61 E-9	308		12.0
58003	28	29	3.00 E-9	308		14.0
58003	28	29	1.46 E-9	313	1.02 E-9	2.0
58003	28	29	1.78 E-9	313		4.0
58003	28	29	2.12 E-9	313		6.0
58003	28	29	2.42 E-9	313		8.0
58003	28	29	2.95 E-9	313		10.0
58003	28	29	4.17 E-9	313		12.0
58003	28	29	2.11 E-9	318	1.66 E-9	2.5
58003	28	29	2.24 E-9	318		3.5
58003	28	29	3.11 E-9	318		7.5
58003	28	29	4.00 E-9	318		9.5
58003	28	29	4.40 E-9	318		10.5
58003	28	29	2.70 E-9	323	2.09 E-9	2.0
58003	28	29	2.80 E-9	323		3.0
58003	28	29	3.60 E-9	323		5.0
58003	28	29	3.80 E-9	323		6.0
58003	28	29	4.60 E-9	323		8.0
58003	28	29	5.40 E-9	323		9.0
58003	28	29	3.50 E-9	328	2.81 E-9	2.0
58003	28	29	3.80 E-9	328		3.0
58003	28	29	4.30 E-9	328		4.0
58003	28	29	5.00 E-9	328		6.0
58003	28	29	5.90 E-9	328		7.0
58003	28	29	6.70 E-9	328		8.0
58003	28	29	4.50 E-9	333	3.60 E-9	1.0
58003	28	29	4.80 E-9	333		2.0
58003	28	29	5.30 E-9	333		3.0
58003	28	29	6.40 E-9	333		5.0
58003	28	29	6.80 E-9	333		6.0
58003	28	29	7.30 E-9	333		7.0
58003	28	29	7.50 E-9	343	4.70 E-9	1.0
58003	28	29	7.80 E-9	343		1.5
58003	28	29	8.40 E-9	343		2.0
58003	28	29	9.30 E-9	343		3.0
58003	28	29	9.40 E-9	343		4.0
58003	28	29	9.90 E-9	343		5.0

DIFFUSION OF ISO-PENTANE

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
52001	54	30		298		.47E-9		
52001	54	30		308		1.34E-9	18.1	
52001	54	30		314.5		[illegible].6E-9		
51002	54	30	1.90 E-9	308		106		
51002	54	30	2.90 E-9	308		222		
51002	54	30	3.90 E-9	308		324		
51002	54	30	4.70 E-9	308		333		
51002	54	30	5.10 E-9	308		333		
51002	54	30	7.30 E-9	308		422		
51002	54	30	3.90 E-8	308		666		
55001	74	30	1.16 E-7	303				4
55001	74	30	2.22 E-7	313				4
55001	74	30	3.94 E-7	323				4
55001	74	30	6.63 E-7	333				4
62001	74	30	2.78 E-6	303		7.20 E-5	4000	2.62 E-6
62001	74	30	3.50 E-6	313				3.11 E-6
62001	74	30	4.36 E-6	323				3.77 E-6
62001	74	30	5.30 E-6	333				4.64 E-6
62001	74	30	6.66 E-6	343				5.68 E-6
55001	75	30	.87 E-7	303				4
55001	75	30	1.75 E-7	313				4
55001	75	30	3.13 E-7	323				4
55001	75	30	5.29 E-7	333				4
55001	34	30	.91 E-7	303				4
55001	34	30	2.27 E-7	313				4
55001	34	30	4.40 E-7	323				4
55001	34	30	7.46 E-7	333				4
58003	28	30	1.82 E-9	308		1.25 E-9	11.0	
58003	28	30	2.08 E-9	308			15.0	
58003	28	30	2.40 E-9	308			19.0	
58003	28	30	2.70 E-9	308			23.0	
58003	28	30	3.10 E-9	308			27.0	
58003	28	30	4.10 E-9	308			35.0	
58003	28	30	2.30 E-9	313		1.57 E-9	9.0	
58003	28	30	2.70 E-9	313			13.0	
58003	28	30	3.20 E-9	313			17.0	
58003	28	30	3.70 E-9	313			21.0	
58003	28	30	4.40 E-9	313			25.0	
58003	28	30	5.10 E-9	313			29.0	
58003	28	30	3.00 E-9	323		2.27 E-9	6.0	
58003	28	30	3.50 E-9	323			9.0	
58003	28	30	4.00 E-9	323			12.0	
58003	28	30	4.60 E-9	323			15.0	
58003	28	30	5.40 E-9	323			18.0	

58003	28	30	6.20 E-9	323		21.0	
58003	28	30	4.40 E-9	333	3.50 E-9	4.0	
58003	28	30	5.20 E-9	333		7.0	
58003	28	30	6.10 E-9	333		10.0	
58003	28	30	1.72 E-8	333		13.0	
58003	28	30	6.50 E-9	343	5.60 E-9	3.0	
58003	28	30	7.10 E-9	343		5.0	
58003	28	30	7.90 E-9	343		7.0	
58003	28	30	8.70 E-9	343		9.0	
58003	28	30	9.60 E-9	343		11.0	
58003	28	30	1.03 E-8	343		12.5	
58003	28	30	8.10 E-9	348	7.00 E-9	2.5	
58003	28	30	8.80 E-9	348		4.0	
58003	28	30	9.60 E-9	348		5.5	
58003	28	30	1.05 E-8	348		9.0	
58003	28	30	1.14 E-8	348		10.0	
58003	28	30	1.25 E-8	348		11.0	
58003	28	30	3.30 E-9	323	2.17 E-9	3.0	
58003	28	30	3.80 E-9	323		4.0	
58003	28	30	4.40 E-9	323		5.0	
58003	28	30	5.00 E-9	323		6.0	
58003	28	30	6.70 E-9	323		8.0	
58003	28	30	8.80 E-9	323		10.0	
58003	28	30	1.16 E-8	323		12.0	
58003	28	30	5.50 E-9	338	3.23 E-9	3.0	
58003	28	30	6.60 E-9	338		4.0	
58003	28	30	8.00 E-9	338		5.0	
58003	28	30	9.50 E-9	338		6.0	
58003	28	30	1.36 E-8	338		8.0	
58003	28	30	6.50 E-9	348	4.70 E-9	2.0	
58003	28	30	7.60 E-9	348		3.0	
58003	28	30	8.90 E-9	348		4.0	
58003	28	30	1.05 E-8	348		5.0	
58003	28	30	6.50 E-9	353	5.56 E-9	1.0	
58003	28	30	7.50 E-9	353		2.0	
58003	28	30	8.70 E-9	353		3.0	
58003	28	30	1.01 E-8	353		4.0	
58003	28	30	1.18 E-8	353		5.0	
57003	87	30	.70 E-9	308			6
57003	87	30	.20 E-8	308			12
57003	87	30	.75 E-8	308			18
57003	87	30	.40 E-8	298			12
57003	87	30	8.00 E-8	298			18

DIFFUSION OF BENZENE

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
57001	51	33	.45 E-8	333	.46 E-8	.25 E1	13400	1.00
57001	51	33	.51 E-8	333	.53 E-8	.15 E1	12900	1.50
57001	51	33	.58 E-8	333	.61 E-8	.17 E1	12900	2.00
57001	51	33	.65 E-8	333	.70 E-8	.17 E1	12800	2.50
57001	51	33	.73 E-8	333	.80 E-8	.22 E1	12900	3.00
57001	51	33	.88 E-8	333	.99 E-8	.33	11600	4.00
57001	51	33	1.05 E-8	333	1.21 E-8			5.00
57001	51	33	1.31 E-8	333	1.55 E-8			6.00
57001	51	33	1.76 E-8	333	2.13 E-8			7.00
57001	51	33	.79 E-8	343	.81 E-8			1.00
57001	51	33	.87 E-8	343	.90 E-8			1.50
57001	51	33	.96 E-8	343	1.02 E-8			2.00
57001	51	33	1.06 E-8	343	1.13 E-8			2.50
57001	51	33	1.17 E-8	343	1.28 E-8			3.00
57001	51	33	1.44 E-8	343	1.61 E-8			3.50
57001	51	33	1.24 E-8	353	1.28 E-8			1.00
57001	51	33	1.48 E-8	353	1.54 E-8			1.50
57001	51	33	1.74 E-8	353	1.84 E-8			2.00
57001	51	33	2.03 E-8	353	2.17 E-8			2.50
57001	51	33	2.34 E-8	353	2.55 E-8			3.00
57001	51	33	.12 E-8	313	.12 E-8			1.0
57001	51	33	.14 E-8	313	.14 E-8			1.5
57001	51	33	.17 E-8	313	.18 E-8			2.0
57001	51	33	.20 E-8	313	.21 E-8			2.5
57001	51	33	.22 E-8	313	.24 E-8			3.0
57001	51	33	.28 E-8	313	.31 E-8			4.0
57001	51	33	.34 E-8	313	.39 E-8			5.0
57001	51	33	.39 E-8	313	.46 E-8			6.0
57001	51	33	.45 E-8	313	.55 E-8			7.0
57001	51	33	.51 E-8	313	.63 E-8			8.0
57001	51	33	.20 E-8	323	.21 E-8			1.0
57001	51	33	.25 E-8	323	.26 E-8			1.5
57001	51	33	.30 E-8	323	.32 E-8			2.0
57001	51	33	.35 E-8	323	.38 E-8			2.5
57001	51	33	.41 E-8	323	.45 E-8			3.0
57001	51	33	.52 E-8	323	.58 E-8			4.0
57001	51	33	.63 E-8	323	.73 E-8			5.0
57001	51	33	.76 E-8	323	.90 E-8			6.0
57001	51	33	.89 E-8	323	1.08 E-8			7.0
57001	51	33	1.04 E-8	323	1.29 E-8			8.0
64001	46	33	6.10 E-8	296				
64001	46	33	2.00 E-8	283			13100	
64001	46	33	6.10 E-8	296				
64001	46	33	1.88 E-7	313				

56001	48	33	9.00 E-7	298				4 0.2
56001	48	33	2.25 E-6	298				4 0.4
56001	48	33	2.80 E-6	298				4 0.6
56001	48	33	2.90 E-6	298				4 0.7
56001	48	33	2.30 E-6	298				4 0.8
56001	48	33	8.50 E-7	298				4 1.0
58002	48	33	3.00 E-7	298				
62002	48	33	5.40 E-6	323		1.515		5.12 E-6
62002	48	33	5.10 E-6	323		1.515		5.14 E-6
60001	49	33	3.00 E-9	273	.922		.305	
60001	49	33	5.70 E-9	273	.922		.595	
60001	49	33	1.05 E-8	273	.922		.822	
58004	49	33	4.90 E-7	298		1.20 E-1018000		
67001	35	33	.50 E-10	313	.15 E-10		.06	
67001	35	33	1.20 E-10	313	.30 E-10		.07	
67001	35	33	2.75 E-10	313	.55 E-10		.08	
67001	35	33	5.75 E-10	313	1.00 E-10		.09	
51001	37	33	8.24 E-13	298		5.0		
51001	37	33	1.23 E-12	298		6.5		
51001	37	33	1.76 E-12	298		7.9		
51001	37	33	3.95 E-12	298		9.1		
51001	37	33	7.05 E-12	298		10.8		
64001	20	33	.27 E-8	287			19800	
64001	20	33	.64 E-8	296				
64001	20	33	4.30 E-8	313				
64001	109	33	.67 E-8	283			15200	
64001	109	33	2.30 E-8	296				
64001	109	33	8.90 E-8	313				
64001	110	33	4.40 E-8	283			10600	
64001	110	33	1.05 E-7	296				
64001	110	33	2.70 E-7	313				
58002	95	33	1.30 E-7	298				

DIFFUSION OF ETHYLENE

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
48002	37	34	6.44 E-6	483		65		4
48002	37	34	1.47 E-6	435		56		4
48002	37	34	.71 E-6	421		52		4
48002	37	34	.48 E-6	393		54		4
48002	37	34	.42 E-6	391		53		4

DIFFUSION OF ETHANE

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
63004	51	35	1.23 E-8	298	1.10		1.90 E-8	
59005	49	35	.41 E-7	298	.9206			
59005	49	35	2.70 E-7	323	.9206			
59005	49	35	.75 E-8	273	.9103			
59005	49	35	.67 E-7	298	.9103			
59005	49	35	2.80 E-7	323	.9103			
59005	49	35	1.08 E-8	298	.9637			
59005	49	35	.57 E-7	323	.9637			
59005	49	35	.24 E-7	298	.9508			
59005	49	35	1.50 E-7	323	.9508			
59005	49	35	.04 E-7	268	.9511			
59005	49	35	.21 E-7	298	.9511			
59005	49	35	1.80 E-7	323	.9511			
59005	49	35	.30 E-8	273	.9505			
59005	49	35	.54 E-8	280	.9505			
59005	49	35	.18 E-7	298	.9505			
59005	49	35	1.20 E-7	323	.9505			
59005	49	35	.87 E-8	298	.9639			
59005	49	35	.72 E-7	323	.9639			
59005	49	35	.56 E-7	298	.9182			
59005	49	35	8.00 E-7	323	.9182			
59005	49	35	.06 E-7	273	.9185			
59005	49	35	.13 E-7	381	.9185			
59005	49	35	.45 E-7	298	.9185			
59005	49	35	5.00 E-7	323	.9185			
61006	51	35	1.35 E-5	298		2.09 E-5		5.090
61005	34	35	4.0E-7	298				
	102	35	0.68E-7					
61006	108	35	1.73 E-7	298		1.90 E-7		4.92
63004	108	35	1.18 E-10	298	1.46		1.30 E-10	
61005	114	35	2.4E-7	298				
61005	101	35	0.146E-7	298				

DIFFUSION OF N-BUTANOL

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	[(SUB 0)	E	STATE
58005	38	36	.47E-5	303				3
58005	38	36	.58E-5	303				0
58005	38	36	.20E-5	303				1
58005	38	36	.39E-5	303				2

DIFFUSION OF ACETONE

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE	
57001	51	38	3.70 E-8	343	3.80 E-8				1.0
57001	51	38	4.10 E-8	343	4.30 E-8				1.5
57001	51	38	4.60 E-8	343	4.80 E-8				2.0
57001	51	38	5.00 E-8	343	5.30 E-8				2.5
57001	51	38	5.40 E-8	343	5.80 E-8				3.0
57001	51	38	6.10 E-8	343	6.70 E-8				4.0
57001	51	38	5.20 E-8	353	5.30 E-8				1.0
57001	51	38	6.10 E-8	353	6.40 E-8				1.5
57001	51	38	7.10 E-8	353	7.50 E-8				2.0
57001	51	38	8.20 E-8	353	8.70 E-8				2.5
57001	51	38	.85 E-8	313	.87 E-8	.23	10000		1.0
57001	51	38	.95 E-8	313	.99 E-8	.15	10300		1.5
57001	51	38	1.05 E-8	313	1.10 E-8	.19	10400		2.0
57001	51	38	1.15 E-8	313	1.22 E-8	.25	10500		2.5
57001	51	38	1.25 E-8	313	1.34 E-8	.23	10400		3.0
57001	51	38	1.45 E-8	313	1.60 E-8				4.0
57001	51	38	1.70 E-8	313	1.90 E-8				5.0
57001	51	38	2.05 E-8	313	2.36 E-8				6.0
57001	51	38	1.50 E-8	323	1.53 E-8				1.0
57001	51	38	1.65 E-8	323	1.72 E-8				1.5
57001	51	38	1.80 E-8	323	1.89 E-8				2.0
57001	51	38	1.95 E-8	323	2.07 E-8				2.5
57001	51	38	2.15 E-8	323	2.30 E-8				3.0
57001	51	38	2.60 E-8	323	2.86 E-8				4.0
57001	51	38	3.10 E-8	323	3.40 E-8				5.0
57001	51	38	3.60 E-8	323	4.20 E-8				6.0
57001	51	38	2.25 E-8	333	2.30 E-8				1.0
57001	51	38	2.45 E-8	333	2.55 E-8				1.5
57001	51	38	2.70 E-8	333	2.84 E-8				2.0
57001	51	38	2.95 E-8	333	3.13 E-8				2.5
57001	51	38	3.30 E-8	333	3.50 E-8				3.0
57001	51	38	4.00 E-8	333	4.40 E-8				3.5
67001	35	38	.10 E-8	313	.05 E-8		.05		
67001	35	38	.30 E-8	313	.06 E-8		.06		
67001	35	38	.75 E-8	313	.10 E-8		.07		
67001	35	38	1.75 E-8	313	.40 E-8		.08		
67001	35	38	3.75 E-8	313	.90 E-8		.09		
61003	36	38	1.15 E-8	298				.15	
61003	36	38	4.80 E-8	298				.18	
61003	36	38	1.30 E-7	298				.21	
61003	36	38	2.00 E-7	298				.24	

DIFFUSION OF ALLYL CHLORIDE

I.D	POL PEN	DIF COFF	T(KEL)	DENSITY	D(SUB 0)	F	STATE
64005	41 42	1.00 E-9	313			.01	
64005	41 42	9.00 E-8	313			.05	
64005	41 42	8.20 E-7	313			.08	

DIFFUSION OF CARBON TETRACHLORIDE

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
50002	37	43	8.60 E-14	298		.053		
50002	37	43	1.79 E-13	298		.071		

DIFFUSION OF CHLORINE

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	M(SUB 0)	F	STATE
50001	55	53	1.00 E-7	273		15.0		1

DIFFUSION OF ETHYL ALCOHOL

I.D	POL	PEN	DIF COEFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
64007	55	54	1.90 E-12		6.2			
64007	55	54	4.30 E-12		8.8			
64007	55	54	5.80 E-12		9.7			
64007	55	54	6.70 E-12		10.3			
64007	55	54	1.19 E-11		11.7			
64007	55	54	4.00 E-11		13.5			
64007	55	54	7.10 E-11		14.4			
64007	55	54	9.30 E-11		15.2			
64007	55	54	9.90 E-11		16.2			
64007	55	54	1.12 E-10		17.9			
64007	55	54	5.00 E-13		2.3			
64007	55	54	1.40 E-10		19.7			
45001	55	54	3.60 E-10	293				2
45001	55	54	7.20 E-10	298				2
45001	55	54	1.16 E-9	303				2
58005	38	54	2.3E-5	303				3
58005	38	54	1.16E-5	303				0
58005	38	54	.87E-5	303				1
58005	38	54	1.95E-5	303				2

DIFFUSION OF AIR

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
20001	34	56	1.21 E-6	290				4

DIFFUSION OF DINITROUS OXIDE

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
20001	34	57	0.72 E-6	290				4

DIFFUSION OF METHANOL

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUB O)	E	STATE	
57001	51	58	.87 E-7	313	.89 E-7			4	1.50
57001	51	58	.92 E-7	313	.95 E-7	.81 E-1	8500	4	2.00
57001	51	58	.96 E-7	313	.99		7800	4	2.50
57001	51	58	1.01 E-7	313	1.05		7800	4	3.00
57001	51	58		313				4	3.50
57001	51	58	1.08 E-7	313	1.13	.03	7800	4	4.00
57001	51	58	1.08 E-7	313	1.14			4	5.00
57001	51	58	1.08 E-7	313	1.17			4	6.00
57001	51	58	1.08 E-7	313	1.18			4	7.00
57001	51	58	1.25 E-7	323	1.28 E-7				1.50
57001	51	58	1.41 E-7	323	1.45 E-7				2.00
57001	51	58	1.50 E-7	323	1.55 E-7				2.50
57001	51	58	1.61 E-7	323	1.67 E-7				3.00
57001	51	58	1.61 E-7	323	1.69 E-7				3.50
57001	51	58	1.61 E-7	323	1.69 E-7				4.00
57001	51	58	1.61 E-7	323	1.71 E-7				5.00
57001	51	58	1.61 E-7	323	1.74 E-7				6.00
57001	51	58	1.61 E-7	323	1.75 E-7				7.00
57001	51	58	2.18 E-7	333	2.20 E-7				.5
57001	51	58	2.18 E-7	333	2.22 E-7				1.5
57001	51	58	2.18 E-7	333	2.24 E-7				2.0
57001	51	58	2.18 E-7	333	2.24 E-7				2.5
57001	51	58	2.18 E-7	333	2.27 E-7				3.0
57001	51	58	2.18 E-7	333	2.2[illegible] E-7				3.5
57001	51	58	2.18 E-7	333	2.29 E-7				4.0
57001	51	58	3.06 E-7	343	3.09 E-7				.5
57001	51	58	3.06 E-7	343	3.12 E-7				1.5
57001	51	58	3.06 E-7	343	3.15 E-7				2.0
57001	51	58	3.06 E-7	343	3.15 E-7				2.5
57001	51	58	3.06 E-7	343	3.80 E-7				3.0
57001	51	58	4.40 E-7	353	4.40 E-7				.2
57001	51	58	4.40 E-7	353	4.40 E-7				.5
57001	51	58	4.40 E-7	353	4.50 E-7				1.5
57001	51	58	4.40 E-7	353	4.50 E-7				2.0
45001	61	58	2.20 E-10	298				2	
58005	38	58	10.3E-5	303				3	
58005	38	58	2.5E-5	303				0	
58005	38	58	2.97E-5	303				1	
58005	38	58	7.37E-5	303				2	
45001	55	58	1.70 E-10	298				2	

DIFFUSION OF DIBROMOMETHANE

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
50002	37	59	2.60 E-11	298		.0380		
50002	37	59	5.10 E-11	298		.0490		
50002	37	59	1.13 E-10	298		.0620		
50002	37	59	1.93 E-10	298		.0710		
50002	37	59	3.38 E-10	298		.0810		
50002	37	59	4.46 E-10	298		.0830		
50002	37	59	8.25 E-10	298		.0940		
50002	37	59	1.75 E-9	298		.1080		

DIFFUSION OF TRIBROMOMETHANE

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
50002	37	60	1.33 E-12	298		.083		
50002	37	60	3.45 E-12	298		.098		
50002	37	60	9.90 E-12	298		.113		

DIFFUSION OF IODOMETHANE

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	F	STATE
50002	37	61	2.06 E-11	288		.030		
50002	37	61	3.49 E-11	288		.043		
50002	37	61	1.42 E-10	288		.073		
50002	37	61	3.94 E-10	288		.090		
50002	37	61	7.40 E-10	288		.101		
50002	37	61	1.59 E-9	288		.108		
50002	37	61	7.31 E-11	298		.042		
50002	37	61	1.34 E-10	298		.056		
50002	37	61	2.70 E-10	298		.067		
50002	37	61	4.70 E-10	298		.076		
50002	37	61	1.00 E-9	298		.087		
50002	37	61	1.61 E-9	298		.093		
50002	37	61	2.73 E-9	298		.102		

DIFFUSION OF TRICHLOROMETHANE

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUB 0)	F	STATE
50002	37	62	8.50 E-12	298		.049		
50002	37	62	1.86 E-11	298		.065		
50002	37	62	5.03 E-11	298		.083		
50002	37	62	5.60 E-11	298		.084		
50002	37	62	1.60 E-10	298		.095		
50002	37	62	1.91 E-11	308		.053		
50002	37	62	3.60 E-11	308		.062		
50002	37	62	7.15 E-11	308		.072		
50002	37	62	1.85 E-10	308		.083		
50002	37	62	4.91 E-10	308		.095		
51001	37	62	2.55 E-12	298		5.0		
51001	37	62	2.80 E-12	298		7.0		
51001	37	62	7.26 E-12	298		8.6		
51001	37	62	1.17 E-11	298		9.4		
51001	37	62	1.70 E-11	298		11.0		
51001	37	62	2.60 E-11	298		12.0		
51001	37	62	4.94 E-11	298		13.5		

DIFFUSION OF DICHLOROMETHANE

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUB 0)	F	STATE
50002	37	63	0.93 E-10	288		.038		
50002	37	63	1.27 E-10	288		.045		
50002	37	63	1.74 E-10	288		.051		
50002	37	63	2.40 E-10	288		.059		
50002	37	63	3.27 E-10	288		.066		
50002	37	63	4.51 E-10	288		.073		
50002	37	63	6.19 E-10	288		.080		
50002	37	63	2.05 E-10	298		.038		
50002	37	63	3.00 E-10	298		.045		
50002	37	63	4.42 E-10	298		.051		
50002	37	63	6.46 E-10	298		.059		
50002	37	63	9.63 E-10	298		.066		
50002	37	63	1.48 E-9	298		.073		
50002	37	63	2.59 E-9	298		.080		
50002	37	63	5.68 E-10	308		.038		
50002	37	63	8.79 E-10	308		.045		
50002	37	63	1.37 E-9	308		.051		
50002	37	63	2.21 E-9	308		.059		
50002	37	63	3.56 E-9	308		.066		
50002	37	63	6.08 E-9	308		.073		
50002	37	63	1.23 E-8	308		.080		

DIFFUSION OF ACETYLENE

I.D	POL	PEN	DIF COEFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
50003	67	64	7.64 E-8	298		8.2 E1	12300	
50003	67	64	3.83 E-7	323			12300	
50003	70	64	2.03 E-8	298		5.0 E1	12800	
50003	70	64	1.08 E-7	323		5.0	12800	
50003	34	64	4.67 E-7	298		4.3	9500	
50003	34	64	1.63 E-6	323		4.3	9500	

DIFFUSION OF CYCLOPROPANE

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
50003	67	65	1.41 E-7	323				
50003	70	65	1.04 E-6	323				
50003	34	65	.18 E-6	298				
50003	34	65	.72 E-8	323				

DIFFUSION OF DICHLOROETHANE(CH2CL-CH2CL)

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUB O)	E	STATE
51001	37	66	9.[illegible] E-12	298		[illegible]		
51001	37	66	1.54 E-11	298		6.3		
51001	37	66	[illegible] E-11			[illegible]		
51001	37	66	5.31 E-11	298		10.1		
51001	37	66	[illegible] E-11	298		[illegible]		

DIFFUSION OF DIIODOMETHANE

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
51001	37	67	4.53 E-12	298		28.0		
51001	37	67	[illegible] E-11			[illegible]		
51001	37	67	3.89 E-11	298		45.6		
51001	37	67	6.17 E-11	298		54.7		

DIFFUSION OF DICHLOROETHANE(CH3-CHCL2)

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
51001	37	68	1.73 E-12	298		4.5		
51001	37	68	2.53 E-12	298		6.0		
51001	37	68	4.4[illegible] [illegible]-12	[illegible]		[illegible]		
51001	37	68	7.00 E-12	298		10.0		
51001	37	68	1.33 E-11	298		11.1		

DIFFUSION OF CHLOROBUTANE

I.D	POL	PEN	DIF COEFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
51001	37	69	1.28 E-12	298		5.0		
51001	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]		
51001	37	69	6.17 E-12	298		6.8		
51001	37	69	1.57 E-11	298		6.5		

DIFFUSION OF CHLOROPROPANE

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
51001	37	70	3.58 E-12	298		5.0		
51001	37	70	1.65 E-11	298		6.2		
51001	37	70	2.75 E-11	298		7.1		
51001	37	70	7.60 E-11	298		8.4		

DIFFUSION OF HYDROGEN SULFIDE

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE	
56002	51	71	6.30 E-9	238				4	117
56002	51	71	1.10 E-8	238				4	625
56002	51	71	6.30 E-9	243				4	56
56002	51	71	7.80 E-9	243				4	122
56002	51	71	1.20 E-8	243				4	641
56002	51	71	[illegible]	[illegible]					
56002	[illegible]	[illegible]	[illegible]	[illegible]					
56002	51	71	[illegible]	[illegible]					
56002	[illegible]	[illegible]	[illegible]	[illegible]					
56002	51	71	3.90 E-8	273				4	704
56002	51	71	5.10 E-8	292				4	113
56002	51	71	6.40 E-8	292				4	716
56002	51	71	8.00 E-8	303				4	57
56002	51	71	9.80 E-8	303				4	126
56002	51	71	1.10 E-7	303				4	715
56002	51	71	1.60 E-7	318				4	54
56002	51	71	1.70 E-7	318				4	150
56002	51	71	3.20 E-7	333				4	138
56002	51	71	3.34 E-7	333				4	611
56002	51	71	4.20 E-7	333				4	690
56002	51	71	1.10 E-9	238				4	46
56002	51	71	1.00 E-9	238				4	51
56002	51	71	1.50 E-9	238				4	101
56002	51	71	1.40 E-9	238				4	106
56002	51	71	2.70 E-9	238				4	[illegible]
56002	51	71	5.20 E-9	238				4	508
56002	51	71	7.30 E-9	238				4	717
56002	52	71	[illegible].00 E-11	[illegible]					[illegible]
56002	52	71	9.60 E-11	303				4	695
56002	52	71	2.[illegible]0 E-[illegible]	[illegible]				4	[illegible]
56002	52	71	2.40 E-13	333				4	743
56002	[illegible]	[illegible]	[illegible].00 E-[illegible]	[illegible]					[illegible]
56002	57	71	1.50 E-9	273				4	758
56002	57	71	3.40 E-9	288				4	716
56002	57	71	4.40 E-9	303				4	30
56002	57	71	4.40 E-9	303				4	156
56002	57	71	5.50 E-9	303				4	332
56002	57	71	6.30 E-9	303				4	641
56002	62	71	1.20 E-10	303				4	325
56002	62	71	1.60 E-10	303				4	587
56002	62	71	2.00 E-10	303				4	745
56002	62	71	1.01 E-9	318				4	749
56002	62	71	3.36 E-9	328				4	700
56002	62	71	5.60 E-9	333				4	718
56002	38	71	1.60 E-12	318				4	732
56002	38	71	8.60 E-12	323				4	714
56002	38	71	9.50 E-12	328				4	699
56002	38	71	1.34 E-11	333				[illegible]	[illegible]

56002	43	71	3.00	E-10	303	4	110
56002	43	71	6.00	E-10	303	4	153
56002	43	71	3.90	E-10	303	4	226
56002	43	71	5.40	E-10	303	4	270
56002	43	71	4.50	E-10	303	4	404
56002	43	71	4.90	E-10	303	4	621
56002	43	71	5.00	E-10	303	4	707
56002	43	71	1.60	E-9	318	4	741
56002	43	71	6.00	E-9	333	4	670
56002	43	71	5.30	E-9	333	4	720
56002	43	71	1.50	E-8	348	4	603
56002	43	71	1.70	E-8	348	[illegible]	[illegible]
56002	[illegible]	71	[illegible].00	[illegible]	[illegible]		
56002	45	71	1.50	E-11	275	4	715
56002	45	71	8.10	E-11	303	4	394
56002	45	71	1.01	E-10	303	4	694
56002	45	71	2.84	E-10	318	4	734
56002	45	71	[illegible]	E-10	[illegible]		
56002	[illegible]	71	[illegible]	[illegible]	[illegible]		
56002	36	71	[illegible].74	E-9	290	[illegible]	[illegible]
56002	36	71	1.00	E-9	303	4	176
56002	36	71	1.40	E-9	303	4	462
56002	36	71	1.60	E-9	303	4	703
56002	36	71	3.00	E-9	318	4	735
56002	36	71	5.05	E-9	333	4	695
56002	36	71	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
56002	36	71	2.20	E-9	303	4	68
56002	36	71	2.40	E-9	303	4	151
56002	36	71	2.80	E-9	303	4	355
[illegible]			[illegible]	[illegible]	[illegible]		
56002	36	71	7.20	E-9	318	4	742
56002	36	71	1.44	E-8	333	4	728
56002	78	71	5.50	E-9	303	4	244
56002	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
56002	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
56002	78	71	1.47	E-10	318	4	645
56002	78	71	2.20	E-10	333	[illegible]	[illegible]
56002	[illegible]	[illegible]	[illegible]	E-10	[illegible]		

DIFFUSION OF KRYPTON

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB O)	E	STATE
57002	[illegible]	[illegible]	[illegible]	[illegible]				
57002	35	72	2.82 E-9	303				
57002	35	72	[illegible]	[illegible]				
57002	35	72	[illegible] -10	[illegible]				
66001	20	72	7.30 E-5	461				

DIFFUSION OF OCTADECYL STERATE

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SQR U)	E	STATE
58001	54	73	.46 E-7	373			10200	
58001	54	73	.93 E-7	393			10200	
58001	65	73	.95 E-7	313			6700	
58001	65	73	1.41 E-7	323			6700	
58001	65	73	1.80 E-7	333			6700	
58001	33	73	1.02 E-7	313			6800	
58001	33	73	1.40 E-7	323			6800	
58001	33	73	1.94 E-7	333			6800	

DIFFUSION OF OCTADECANE

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
58001	54	74	1.97 E-7	373			9900	
58001	54	74	2.46 E-7	393			9900	
58001	54	74	.15 E-7	333			12000	
58001	54	74	.97 E-7	373			12000	
58001	54	74	1.37 E-7	383			12000	
58001	54	74	2.22 E-7	393			12000	
58001	59	74	.50 E-7	333			14000	
58001	59	74	.93 E-7	343			14000	
58001	59	74	1.03 E-7	353			14000	
58001	59	74	4.53 E-7	373			14000	
58001	63	74	1.94 E-7	313			8800	
58001	63	74	3.06 E-7	323			8800	
58001	63	74	4.42 E-7	333			8800	
58001	65	74	2.78 E-7	313			9300	
58001	65	74	3.62 E-7	323			9300	
58001	65	74	6.19 E-7	333			9300	
58001	65	74	9.78 E-7	343			9300	
58001	65	74	1.64 E-6	353			9300	
58001	49	74	.40 E-7	313			12200	
58001	49	74	.64 E-7	323			12200	
58001	49	74	1.61 E-7	333			12200	
58001	49	74	2.08 E-7	343			12200	
58001	49	74	6.61 E-7	363			12200	
58001	26	74	.33 E-7	313			12700	
58001	26	74	[illegible]	[illegible]			[illegible]00	
58001	26	74	1.10 E-7	333			12700	
58001	[illegible]	[illegible]	[illegible]				[illegible]00	
58001	[illegible]	[illegible]	[illegible]					
58001	[illegible]	[illegible]	[illegible]					
58001	33	74	2.93 -7	323				4.29
58001	88	74	1.39 -7	313				
58001	88	74	2.29 -7	323				
58001	[illegible]	[illegible]	[illegible]					
58001	89	74	.39 E-7	313			16300	
58001	89	74	.86 E-7	323			16300	
58001	89	74	2.05 E-7	333			16300	
58001	90	74	.72 E-7	313			10900	
58001	90	74	1.21 E-7	323			10900	
58001	90	74	2.07 E-7	333			10900	
58001	91	74	.80 E-7	313			10800	
58001	91	74	1.40 E-7	323			10800	
58001	91	74	2.31 E-7	333			10800	
58001	92	74	1.26 -7	[illegible]				
58001	93	74	4.70 E-7	333				.04 E-4
58001	93	74	4.44 -7	333				.19 -4
58001	93	74	5.95 -7	333				1.95 -4

58001	93	74	2.40 E-7	333			4.19 E-7
58001	93	74	3.70 E-7	333			3.87 E-4
[illegible]	[illegible]	[illegible]	[illegible]				
58001	93	74	6.86 E-7	333			1.06 E-4
58001	94	74	1.69 E-7	313	7.19	8700	
58001	94	74	2.85 E-7	323	7.19	8700	
58001	94	74	3.94 E-7	333	7.19	8700	
58001	94	74	6.12 E-7	343	7.19	8700	
58001	94	74	7.00 E-7	353	7.19	8700	
58001	94	74	2.68 E-7	323	2.98	8700	
58001	94	74	1.50 E-7	313	1.38	8000	
58001	94	74	2.28 E-7	323	1.38	8000	
58001	94	74	3.13 E-7	333	1.38	8000	

DIFFUSION OF OCTADECANOL

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
58001	54	75	1.56 E-7	373			10000	
58001	54	75	3.17 E-7	333			0000	
58001	63	75	[illegible] -7	313				
58001	63	75	1.59 -7	323				
58001	65	75	2.12 -7	313				
58001	65	75	2.59 E-7	323				
58001	33	75	1.41 E-7	313			8400	
58001	33	75	1.98 E-7	323			.400	
58001	33	75	3.16 E-7	333			8400	
58001	88	75	.82 E-7	313			8800	
58001	88	75	1.29 E-7	323			8800	

DIFFUSION OF STERIC ACID

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
58001	54	76	.74 E-7	373			7000	
58001	54	76	1.22 E-7	393			7000	

DIFFUSION OF HEXANE

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
58004	49	77	4.50 E-7	298		9.00 E-9	16000	

DIFFUSION OF CYCLOHEXANE

I.D	POL	PEN	DIF COEFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
64001	46	78	2.10 E-8	296				
58004	49	78	2.30 E-7	298		1.00 E-10	18000	

DIFFUSION OF NEOHEXANE

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUB O)	E	STATE
58004	49	79	.71 E-7	298		2.00 E-9	23000	

DIFFUSION OF 3-METHYL PENTANE

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
58004	49	80	2.40 E-7	298		1.20 E-1	019000	

DIFFUSION OF N-DECANE

I.D	POL PEN		DIF COFF	T(KEL)	DENSITY	D(SUB O)	E	STATE
58004	49	81	.69 E-7	298		8.00 E-9	19000	

DIFFUSION OF N-OCTANE

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
58004	49	82	1.80 E-7	298		1.10 E-10	17000	

DIFFUSION OF N-HEXANE

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
63004	51	83	3.10 E-10	298	1.10		1.25 E-9	
64001	46	83	4.10 E-8	296				
60001	49	83	4.48 E-8	273	.922		[illegible]	
60001	49	83	7.71 E-8	273	.922		.430	
60001	49	83	1.33 E-7	273	.922		.650	
60001	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	
60001	49	83	6.50 E-9	273	.922		.506	
60001	49	83	1.32 E-8	273	.922		.702	
60001	49	83	2.61 E-8	273	.922		.880	
58004	49	83	4.40 E-7	298		6.00 E-9	19000	
61006	51	83	3.50 E-7	298		1.37 E-6		4.100

DIFFUSION OF BROMOMETHANE

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
60001	49	84	[illegible]	[illegible]	[illegible]		[illegible]	
60001	49	84	4.60 E-9	265	.922		.414	
60001	49	84	1.50 E-8	265	.922		[illegible]	
60001	49	84	3.88 E-9	273	.922		[illegible]	
60001	49	84	7.30 E-9	273	.922		.292	
60001	49	84	2.48 E-8	273	.922		.710	
60001	49	84	7.58 E-8	303	.922		.262	
60001	49	84	9.30 E-8	303	.919		.115	
60001	49	84	1.07 E-7	303	.919		.218	
60001	49	84	1.26 E-7	303	.919		.300	
60001	49	84	1.35 E-7	303	.919		.368	
60001	49	84	1.00 E-8	273	.919		.335	
60001	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	
60001	49	84	3.06 E-8	273	.919		.905	

DIFFUSION OF ISOBUTYLENE

I.D	POL PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
60001							

DIFFUSION OF AMMONIA

I.D	POL	PEN	DIF COEFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
63004	51	86	1.17 E-7	298	1.10		1.46 E 7	
61006	51	86	1.28 E-4	298			1.60 E-4	4.580
61001	103	86	1.14 E-4	274			10530	125
61001	103	86	7.02 E-4	299			10530	379
61001	103	86	2.65 E-3	324			10530	203
61001	103	86	5.59 E-3	324			10530	506
61001	103	86	7.37 E-3	347			10530	[illegible]
61001	103	86	6.78 E-3	347			10530	173
61006	108	86	6.74 E-6	298			1.15 E-5	4.04
63004	108	86	4.62 E-9	298	1.46		[illegible]	[illegible]

DIFFUSION OF CARBON MONOXIDE

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
61005	34	87	[illegible]	[illegible]				
61005	102	87	9.3E-7	318				
61005	102	87	[illegible]	[illegible]				
61001	103	87	.25 E-4	283			17050	440
61001	103	87	1.53 E-4	298			17050	332
61001	103	87	1.96 E-4	300			17050	495
61001	103	87	1.74 E-3	324			17050	540
61001	103	87	5.34 E-3	343			17050	408
61001	103	87	1.70 E-2	361			17050	114
61005	114	87	[illegible]	[illegible]				
61001	[illegible]	[illegible]	[illegible]	[illegible]				

DIFFUSION OF [illegible]

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
62001	74	88	6.53 E-6	303		1.31 E-4	3800	5.13 E-6
62001	74	88	8.09 E-6	313				5.89 E-6
62001	74	88	9.42 E-6	323				6.78 E-6
62001	74	88	1.17 E-5	333				8.17 E-6
62001	74	88	1.42 E-5	343				9.68 E-6

DIFFUSION OF SULFUR DIOXIDE

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
63004	51	89	5.30 E-8	298	1.10		7.34 E-8	
61006	51	89	5.83 E-5	298		8.08 E-5		5.655
61006	108	89	1.16 E-6	298		2.63 E-6		4.44
63004	108	89	7.90 E-10	298	1.46		1.80 E-9	

DIFFUSION OF BENZOPURPURINE 4B

I.D	POL PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
64006	47 90	2.16 E-9	363				
64006	47 90	4.60 E-11	323				
64006	47 90	5.70 E-11	323				
64006	47 90	9.40 E-10	298				
64006	47 90	4.20 E-10	294				
64006	47 90		369				
64006	47 90	3.00 E-10	303				

DIFFUSION OF M-BENZOPURPURINE

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB O)	E	STATE
64006	47	91	1.66 E-8	363				
64006	47	91	6.92 E-10	324				
64006	47	91	7.77 E-11	298				

DIFFUSION OF CHLORZOL SKY BLUE FF

I.D	POL	PEN	DIF COEFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
65001	47	92	3.64 E-9	363	.0			
65001	47	92	1.30 E-9	348	.0			
65001	47	92	2.27 E-9	363	.5			
65001	47	92	.60 E-9	348	.5			

DIFFUSION OF DIFLOUROCHLOROMETHANE

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
66001	49	93	4.16 E-5	461				
66001	20	93	4.02 E-5	461				

DIFFUSION OF PROPYLAMINE

I.D	POL	PEN	DIF COEFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
67001	35	94	.70 E-8	313		.15 E-8	.04	
67001	35	94	1.80 E-8	313		.45 E-8	.05	
67001	35	94	5.10 E-8	313		1.10 E-8	.06	

DIFFUSION OF PROPANOL

I.D	POL	PEN	DIF COEFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
58005	38	95	1.06E-5	303				3
58005	38	95	.73E-5	303				0
58005	38	95	.33E-5	303				1
58005	38	95	.70E-5	303				2

DIFFUSION OF C3H4

I.D	POL	PEN	DIF COEF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
	102	101	1.05E-7	298				
61005	114	101	3.1E-7	298				
61005	34	101	5.0E-7					
61005	101	101	0.247E-7	298				
61005	101	102	0.106E-7	298				
	102	101	3.7E-7	318				

DIFFUSION OF C3H6

I.D	POL	PEN	DIF COFF	T(KEL)	DENSITY	D(SUB 0)	E	STATE
61005	102	102	2.2E-7	318				
61005	102	102	0.58E-7	298				
61005	114	102	2.E-7	298				
61005	34	102	3.1E-7	298				

Appendix C

Coding Key for Abstracted Data

COLUMNS 8 THROUGH 12 CORRESPONDS TO CHRONOLOGICAL IDENTIFICATION NUMBER

COLUMNS 16 THROUGH 18 CORRESPONDS TO DIFFUSION MEDIUM (POLYMER)

COLUMNS 20 THROUGH 22 CORRESPONDS TO PENETRANT

COLUMNS 25 THROUGH 32 CORRESPONDS TO DIFFUSION COEFFICIENT (SQ.CM./SEC)

COLUMNS 35 THROUGH 39 CORRESPONDS TO TEMPERATURE (DEGREES KELVIN)

COLUMNS 42 THROUGH 47 CORRESPONDS TO DENSITY (GM./CUBIC CM.)

COLUMNS 50 THROUGH 57 CORRESPONDS TO ARREHENIUS DIF. CONST. (SQ.CM./SEC)

COLUMNS 60 THROUGH 64 CORRESPONDS TO ACTIVATION ENERGY (CAL./MOLE)

COLUMN 67 CORRESPONDS TO STATE, IF NOT SPECIFIED THE STATE IS GASEOUS

STATE 1 - LIQUID (SOLN)

STATE 2 - LIQUID (PURE)

STATE 3 - VAPOR

STATE 4 - GAS

DATA CODE FOR DIFFUSION MEDIUM

1	ACRYLAMIDE POLYMER GEL	DIFFUSION MEDIUM
2	HYDROPHILIC POLYMERS	DIFFUSION MEDIUM
3	POLYELECTROLYTE COMPLEX	DIFFUSION MEDIUM
4	POLYMETHYL ACRYLATE	DIFFUSION MEDIUM
5	EPOXY	DIFFUSION MEDIUM
6	DIBUTYL MALEATE	DIFFUSION MEDIUM
7	VINYLIDENE CHLORIDE-ACRYLONITRILE	DIFFUSION MEDIUM
8	POLYESTER	DIFFUSION MEDIUM
9	URETHANE FOAM	DIFFUSION MEDIUM
10	LEXAN	DIFFUSION MEDIUM
11	ARALDITE	DIFFUSION MEDIUM
12	2-HYDROXYETHYLMETACRYLATE	DIFFUSION MEDIUM
13	GLYCERAL METHACRYLATE	DIFFUSION MEDIUM
14	METHYL POLYAMIDE	DIFFUSION MEDIUM
15	ISOMERIC POLYHYDROXYETHERS	DIFFUSION MEDIUM
16	EPOXY RESIN	DIFFUSION MEDIUM
17	CELLULOSEACETATE BUTYRAL	DIFFUSION MEDIUM
18	BUTADIENE STYRENE	DIFFUSION MEDIUM
19	GUTTA-PERCHA	DIFFUSION MEDIUM
20	POLYPROPYLENE	DIFFUSION MEDIUM
21	TEFLON-52	DIFFUSION MEDIUM
22	POLYFLOURONATED ETHYLENE PROPYLENE	DIFFUSION MEDIUM
23	BUTADIENE-METHYLMETHACRYLATE	DIFFUSION MEDIUM
24	LEXAN(POLYCARBONATE)	DIFFUSION MEDIUM
25	BAKELITE	DIFFUSION MEDIUM
26	NEOPRENE	DIFFUSION MEDIUM
28	POLYVINYLCHLORIDE	DIFFUSION MEDIUM
29	CELLULOSE PROPIONATE	DIFFUSION MEDIUM
27	PHENOLFORMALDEHYDE	DIFFUSION MEDIUM
30	KEROSEAL	DIFFUSION MEDIUM
31	POLYDIMETHYL DIOXANE	DIFFUSION MEDIUM
32	HYDROGEL	DIFFUSION MEDIUM
33	BUTYL RUBBER	DIFFUSION MEDIUM
34	RUBBER A (.1 MOLE (VINYL GROUP)	DIFFUSION MEDIUM
35	POLYVINYLALCOHOL	DIFFUSION MEDIUM
36	CELLULOSE ACETATE	DIFFUSION MEDIUM
37	POLYSTYRENE	DIFFUSION MEDIUM
38	CELLULOSE	DIFFUSION MEDIUM
39	POLYAMIDE	DIFFUSION MEDIUM
40	ETHYLENEVINYLACETATE	DIFFUSION MEDIUM
41	POLYVINYLACETATE	DIFFUSION MEDIUM
42	CELLULOSE NITRATE	DIFFUSION MEDIUM
43	NYLON(DRAWN)	DIFFUSION MEDIUM
44	POLYMETHYLMETHACRYLATE	DIFFUSION MEDIUM
45	MYLAR	DIFFUSION MEDIUM
46	ETHYLENE-PROPYLENE COPOLYMER(49-51)	DIFFUSION MEDIUM
47	CELLULOSE	DIFFUSION MEDIUM
48	LATEX FILMS	DIFFUSION MEDIUM
49	POLYETHYLENE	DIFFUSION MEDIUM
50	VINYL FILM	DIFFUSION MEDIUM
51	ETHYL CELLULOSE	DIFFUSION MEDIUM

52	SARAN	DIFFUSION MEDIUM
53	TRIFLOUROCHLOROETHYLENE	DIFFUSION MEDIUM
54	POLYISOBUTYLENE	DIFFUSION MEDIUM
55	KERATIN	DIFFUSION MEDIUM
56	COTTON	DIFFUSION MEDIUM
57	POLYVINYLBUTYRAL(UNSTRETCHED)	DIFFUSION MEDIUM
58	CELLULOSE ACETATE BUTYRATE	DIFFUSION MEDIUM
59	BUTADIENE-ACRYLONITRILE CO-POLYMER	DIFFUSION MEDIUM
60	CHLOROPRENE	DIFFUSION MEDIUM
61	HORN	DIFFUSION MEDIUM
62	RUBBER HYDROCHLORIDE	DIFFUSION MEDIUM
63	POLYISOPRENE	DIFFUSION MEDIUM
64	ISOPRENE-ACRYLONITRILE COPOLYMER	DIFFUSION MEDIUM
65	POLYBUTADIENE	DIFFUSION MEDIUM
66	PERBUNAN 18	DIFFUSION MEDIUM
67	PERBUNAN (GERMAN)	DIFFUSION MEDIUM
68	HYCAR OR25	DIFFUSION MEDIUM
69	HYCAR OR15	DIFFUSION MEDIUM
70	BUTYL RUBBER	DIFFUSION MEDIUM
71	POLYMETHYL PENTADIENE	DIFFUSION MEDIUM
72	VULCAPRENE A	DIFFUSION MEDIUM
73	METHYL RUBBER	DIFFUSION MEDIUM
74	RUBBER B (1 MOLE (VINYL GROUP)	DIFFUSION MEDIUM
75	RUBBER C (.1 MOLE (VINYL GROUP)	DIFFUSION MEDIUM
76	CELLULOSE ACETATE (37.9(ACETYL)	DIFFUSION MEDIUM
77	CELLULOSE NITRATE (10(N)	DIFFUSION MEDIUM
78	POLYVINYL TRIFLOUROACETATE	DIFFUSION MEDIUM
79	METHYLACRYLATE-SODIUM ACRYLATE (8/92)	DIFFUSION MEDIUM
80	METHOCEL	DIFFUSION MEDIUM
81	POLYSODIUMACRYLATE	DIFFUSION MEDIUM
82	POLYACRYLIC ACID	DIFFUSION MEDIUM
83	METHACRYLATE-ACRYLIC ACID 8/92	DIFFUSION MEDIUM
84	METHACRYLATE-SODIUM ACRYLATE60/40	DIFFUSION MEDIUM
85	METHACRYLATE-ACRYLIC ACID 60/40	DIFFUSION MEDIUM
86	METHACRYLATE-SODIUM ACRYLATE89/11	DIFFUSION MEDIUM
87	POLYISOBUTENE	DIFFUSION MEDIUM
88	GR-S	DIFFUSION MEDIUM
89	BALATA	DIFFUSION MEDIUM
90	HYDROGENATED GR-S	DIFFUSION MEDIUM
91	HYDROGENATED POLYBUTADIENE	DIFFUSION MEDIUM
92	HYDROGENATED POLYISOPRENE	DIFFUSION MEDIUM
93	CROSS LINK PALE CREPE	DIFFUSION MEDIUM
94	RAW PALE CREPE RUBBER	DIFFUSION MEDIUM
95	POLYTHENE	DIFFUSION MEDIUM
96	NYLON(UNDRAWN)	DIFFUSION MEDIUM
97	POLYVINYL BUTYRAL (STRETCHED)	DIFFUSION MEDIUM
98	P-76 MOLDED PE GRADE	DIFFUSION MEDIUM
99	ALATHON-34 MOLDED PE GRADE	DIFFUSION MEDIUM
100	SUPER DYCLON (MOLDED) PE GRADE	DIFFUSION MEDIUM
101	GREX	DIFFUSION MEDIUM
102	ALATHON-14 (MOLDED) PE GRADE	DIFFUSION MEDIUM
103	VINYL CHLORIDE-VINYL ACETATE 87/13	DIFFUSION MEDIUM
104	POLYAMIDE-NYLON 66	DIFFUSION MEDIUM

105	SILICONE RUBBER	DIFFUSION MEDIUM
106	TEFLON 89	DIFFUSION MEDIUM
107	COPOLYMER OF TEFLON 89 AND 52	DIFFUSION MEDIUM
108	NITROCELLULOSE	DIFFUSION MEDIUM
109	POLYHYDROXYETHER	DIFFUSION MEDIUM
110	72(PROPYLENE-28(ETHYLENE COPOLYMER	DIFFUSION MEDIUM
111	31(PROPYLENE-69(ETHYLENE COPOLYMER	DIFFUSION MEDIUM
112	ACRYLAMIDE-METHYLDENE BIS-ACRYLAMIDE	DIFFUSION MEDIUM
113	PLIOFILM NO	DIFFUSION MEDIUM
114	HYDROPOL	DIFFUSION MEDIUM

DATA CODE FOR PENETRANT

1	SUCROSE	SUBSTANCE DIFFUSING
2	UREA	SUBSTANCE DIFFUSING
3	KCL	SUBSTANCE DIFFUSING
4	D20	SUBSTANCE DIFFUSING
5	H20	SUBSTANCE DIFFUSING
6	OXYGEN IN AIR	SUBSTANCE DIFFUSING
7	OXYGEN IN H20	SUBSTANCE DIFFUSING
8	METHYL ACRYLATE	SUBSTANCE DIFFUSING
9	CHLOROFORM	SUBSTANCE DIFFUSING
10	HE	SUBSTANCE DIFFUSING
11	A	SUBSTANCE DIFFUSING
12	METHANE	SUBSTANCE DIFFUSING
13	OXYGEN	SUBSTANCE DIFFUSING
14	HYDROGEN	SUBSTANCE DIFFUSING
15	NEON	SUBSTANCE DIFFUSING
16	CARBON DIOXIDE	SUBSTANCE DIFFUSING
17	SULFUR HEXAFLORIDE	SUBSTANCE DIFFUSING
18	TRITIUM	SUBSTANCE DIFFUSING
19	DEUTERIUM	SUBSTANCE DIFFUSING
20	HE4	SUBSTANCE DIFFUSING
21	NITROGEN	SUBSTANCE DIFFUSING
22	PROPANE	SUBSTANCE DIFFUSING
23	CHLOROMETHANE	SUBSTANCE DIFFUSING
24	FLOUROFORM	SUBSTANCE DIFFUSING
25	DIOCTYL PTHALATE	SUBSTANCE DIFFUSING
26	N-BUTANE	SUBSTANCE DIFFUSING
27	N-PENTANE	SUBSTANCE DIFFUSING
28	NEO-PENTANE	SUBSTANCE DIFFUSING
29	ISO-BUTANE	SUBSTANCE DIFFUSING
30	ISO-PENTANE	SUBSTANCE DIFFUSING
31	1-BENZENEAZO-2-NAPHTHOL	SUBSTANCE DIFFUSING
33	BENZENE	SUBSTANCE DIFFUSING
34	ETHYLENE	SUBSTANCE DIFFUSING
35	ETHANE	SUBSTANCE DIFFUSING
36	N-BUTANOL	SUBSTANCE DIFFUSING
37	ETHYL ETHER	SUBSTANCE DIFFUSING
38	ACETONE	SUBSTANCE DIFFUSING
39	METHYL CHLORIDE	SUBSTANCE DIFFUSING
40	NACL IN WATER	SUBSTANCE DIFFUSING
41	VARIOUS METHYL BR,I,CL	SUBSTANCE DIFFUSING
42	ALLYC CHLORIDE	SUBSTANCE DIFFUSING
43	CARBON TETRACHLORIDE	SUBSTANCE DIFFUSING
44	CHELOHENANE	SUBSTANCE DIFFUSING
45	N-HEXANOL	SUBSTANCE DIFFUSING
46	1,1,2-TRICHLOROETHANE	SUBSTANCE DIFFUSING
47	1,1,2-TRIFLOUROETHANE	SUBSTANCE DIFFUSING
48	DYES	SUBSTANCE DIFFUSING
49	ETHYLENE GLYCOL	SUBSTANCE DIFFUSING
50	XYLENES	SUBSTANCE DIFFUSING
51	NITROGEN DIOXIDE	SUBSTANCE DIFFUSING

52	BINARY MIX	SUBSTANCE DIFFUSING
53	CHLORINE (CL2)	SUBSTANCE DIFFUSING
54	ETHYL ALCOHOL	SUBSTANCE DIFFUSING
55	UREA SOLN	SUBSTANCE DIFFUSING
56	AIR	SUBSTANCE DIFFUSING
57	DINITROUS OXIDE	SUBSTANCE DIFFUSING
58	METHANOL	SUBSTANCE DIFFUSING
59	DIBROMOMETHANE	SUBSTANCE DIFFUSING
60	TRIBROMOMETHANE	SUBSTANCE DIFFUSING
61	IODOMETHANE	SUBSTANCE DIFFUSING
62	TRICHLOROMETHANE	SUBSTANCE DIFFUSING
63	DICHLOROMETHANE	SUBSTANCE DIFFUSING
64	ACETYLENE	SUBSTANCE DIFFUSING
65	CYCLOPROPANE	SUBSTANCE DIFFUSING
66	DICHLOROETHANE(CH2CL-CH2CL)	SUBSTANCE DIFFUSING
67	DIIODOMETHANE	SUBSTANCE DIFFUSING
68	DICHLOROETHANE(CH3-CHCL2)	SUBSTANCE DIFFUSING
69	CHLOROBUTANE	SUBSTANCE DIFFUSING
70	CHLOROPROPANE	SUBSTANCE DIFFUSING
71	HYDROGEN SULFIDE	SUBSTANCE DIFFUSING
72	KRYPTON	SUBSTANCE DIFFUSING
73	OCTADECYL STERATE	SUBSTANCE DIFFUSING
74	OCTADECANE	SUBSTANCE DIFFUSING
75	OCTADECANOL	SUBSTANCE DIFFUSING
76	STERIC ACID	SUBSTANCE DIFFUSING
77	HEXENE	SUBSTANCE DIFFUSING
78	CYCLOHEXANE	SUBSTANCE DIFFUSING
79	NEOHEXANE	SUBSTANCE DIFFUSING
80	3-METHYL PENTANE	SUBSTANCE DIFFUSING
81	N-DECANE	SUBSTANCE DIFFUSING
82	N-OCTANE	SUBSTANCE DIFFUSING
83	N-HEXANE	SUBSTANCE DIFFUSING
84	BROMOMETHANE	SUBSTANCE DIFFUSING
85	ISOBUTYLENE	SUBSTANCE DIFFUSING
86	AMMONIA	SUBSTANCE DIFFUSING
87	CARBON MONOXIDE	SUBSTANCE DIFFUSING
88	NEO-BUTANE	SUBSTANCE DIFFUSING
89	SULFUR DIOXIDE	SUBSTANCE DIFFUSING
90	BENZOPURPURINE 4B	SUBSTANCE DIFFUSING
91	M-BENZOPURPURINE	SUBSTANCE DIFFUSING
92	CHLORZOL SKY BLUE FF	SUBSTANCE DIFFUSING
93	DIFLOUROCHLOROMETHANE	SUBSTANCE DIFFUSING
94	PROPYLAMINE	SUBSTANCE DIFFUSING
95	PROPANOL	SUBSTANCE DIFFUSING
96	ETHYL ACETATE	SUBSTANCE DIFFUSING
97	PROPYL ACETATE	SUBSTANCE DIFFUSING
98	ISOPROPYL ACETATE	SUBSTANCE DIFFUSING
99	BUTYL ACETATE	SUBSTANCE DIFFUSING
100	TRIOCETIN	SUBSTANCE DIFFUSING
101	METHYL ACETYLENE	SUBSTANCE DIFFUSING
102	PROPYLENE	SUBSTANCE DIFFUSING

Appendix D

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