A Model of the Formation of a Porous Fibrous Cake

by

Edward McRae Williams

Thesis submitted to the Faculty of the

Virginia Polytechnic Institute and State University

in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

in

Mechanical Engineering

APPROVED:

Dr. Douglas J. Nelson, Chairman

Dr. Clint L. Dancey

Dr. Charles F. Reinholtz

November 18, 1994
Blacksburg, Virginia

A Model of the Formation of a Porous Fibrous Cake

by
Edward McRae Williams
Dr. Douglas J. Nelson, Chairman
Mechanical Engineering

(ABSTRACT)

A continuous physical cake made up of porous fibrous media can be formed by using air to draw the fibers to a moving screen. A numerical model of the formation of this cake has been formulated and solved. The numerical model is based on solving Darcy's law, the Bernoulli equation, and two-material related experimental correlations at discrete points along the screen. A permeability measurement test apparatus was designed and built, and experiments were run to determine the experimental relations for two different materials. A computer code was then written to solve the system of equations at each point on the screen and give a density distribution of the resulting cake. Tests were then run to see the effects of various density anomalies in the material at different points along the screen.

The results of the experiments show that the first material was more permeable and more compressible than the second material. This lead to distinct differences in the cake that the two formed in the numerical model. The first material formed a fairly constant density cake that was not greatly affected by the density anomalies. The second material had a large variation in density across the final cake height and was affected more by the different density anomalies.

ACKNOWLEDGMENTS

Foremost, I would like to thank my advisor, Dr. Douglas J. Nelson, for entrusting me with this project and giving me insight and direction when it was needed.

To the members of my graduate committee, Dr. C. F. Reinholtz and C. L. Dancey, thank you for the advice during the course of my research.

I would also like to acknowledge Eric Johnstone, Brian Nutter, Kevin Riutort, and Shannon Stewart for their help in the lab and during project meetings.

I would like to thank Jean Reid for her support in my decision to pursue my Master's Degree.

To my grandmother, thank you for the moral and monetary support.

Lastly, merci to Nathalie Benier for love and support.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

NOMENCLATURE

a_m	-	interpolation constant for density relation (kg/m^3)
A_c	-	cross-sectional area of device (m^2)
b_m	-	interpolation constant for density relation (m/Pa)
c_m	-	interpolation constant for permeability relation
d_m	-	interpolation constant for permeability relation
h	-	height of cake (m)
K	-	hydraulic conductivity ($m^3 \cdot s/kg$)
k	-	permeability of cake (m^2)
l	-	characteristic length (m)
m	-	mass of material used in test apparatus (kg)
P_{atm}	-	atmospheric pressure (Pa)
Pb	-	pressure below cake (Pa)
Pi	-	intermediate pressure (Pa)
P_p	-	plenum pressure (Pa)
P_{ref}	-	pressure inside test apparatus (Pa)
Pt	-	pressure above screen (Pa)
$\vec{q}$	-	specific flux vector (m/s)
Q	-	flow rate (m^3/s)
Re_k	-	Reynolds number based on permeability
V	-	velocity of air (m/s^2)
W	-	width of sidewalls (m)

GREEK SYMBOLS

υ	-	kinematic viscosity of air (m^2/s)
φ	-	pieziometric head (m)
μ	-	viscosity of air ($N \cdot s/m^2$)
ρ	-	density of cake (kg/m^3)
ρ_{air}	-	density of air (kg/m^3)

SUBSCRIPTS

1	-	properties at the first discrete step down the screen
2	-	properties at the second discrete step down the screen
i	-	properties at the ith discrete step down the screen

I. INTRODUCTION

Note: Since the material discussed in this thesis is of a proprietory nature, care has been taken to word things as generally as possible.

General Background

A continuous cake of non-uniform porous fibers can be formed by packing the fibers onto a moving screen conveyor with suction from above the screen. Figure 1.1 shows a diagram of how this process works. As the screen conveyor moves by, the suction above the screen draws air carrying the individual fibers up to the screen and packs them into a cake that builds up along the length of the screen. The fibers are fed up to the conveyor at a set rate over a specified feed zone. The cake is held in place in the z-direction between two walls. At the end of this formation area, a cutter trims the cake to a uniform height, so a continuous length of formed cake with constant rectangular cross-section is produced. The density distribution through this cake in the y direction after it is cut can have important consequences on further manufacturing processes. This density distribution is affected by several operating parameters as well as material bulk properties. Large variances in the physical properties of individual fibers can produce dense spots or voids, which can have adverse effects on the density distribution as well.

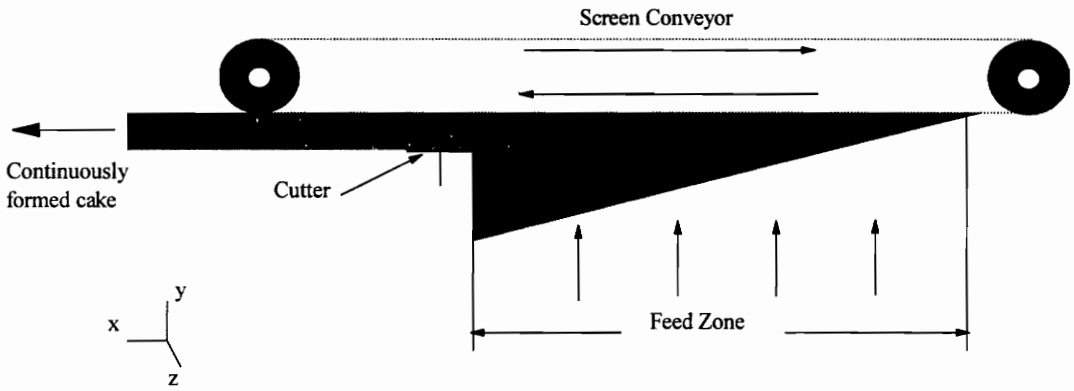

Figure 1.1 Screen Conveyor for Forming Fibrous Cake

Purpose

The purpose of this research is to model the formation of a cake of fibrous porous material including its density distribution. A numerical model of this situation has been developed. Also of interest is a comparison of the cake formed by two different materials, A and B. Seven test cases of each material were run to see the effects of various density anomalies on the final formed cake. In order to solve this model, some experimental material-related equations are needed. A permeability measurement device was built and experiments were run in order to determine these relations for the two materials.

Literature Survey

The main areas covered by this survey are 1) methods of making actual permeability measurements, 2) Darcy's Law for flow through porous media, and 3) the flow regime for which Darcy's Law is valid.

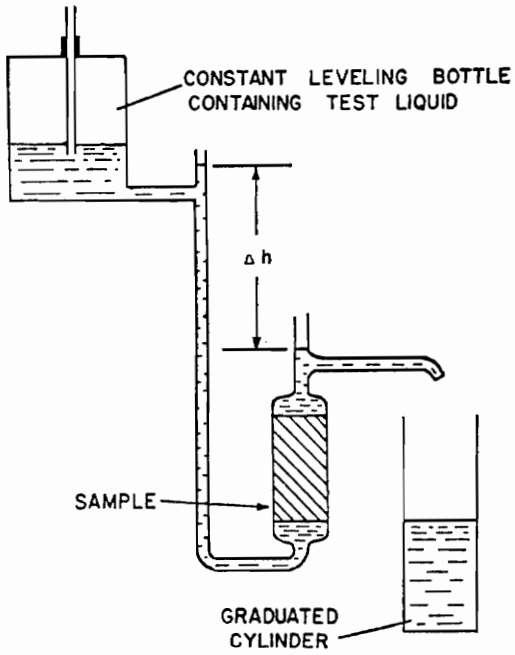

Figure 1.2 Suggested Permeability Measurement Apparatus (Scheidegger)

Permeability Measurement Device

A permeability measurement apparatus as suggested by Scheidegger (1957) is shown in Fig. 1.2. This device is based on a non-compressible medium with liquid as a working fluid. The porous medium of constant height, h, and cross sectional area, A, is exposed to a constant pressure, P. The flow rate, Q, is measured by timing the rate that the graduated cylinder fills. Using Darcy's law, the permeability, k, can then be calculated:

$$k = \frac{Q}{A} \cdot \mu \cdot \frac{h}{P}$$

where μ is the viscosity of the working fluid.

Darcy's Law

Darcy's law is a widely used equation for describing flow through porous medium. It is a reduced form of the equations of fluid motion that predicts a linear relation between the fluid velocity and the pressure gradient. In its most general form, Darcy's law as stated by Bear (1974) is:

$$\vec{q} = -K \cdot grad(\varphi)$$

where $\vec{q}$ is the specific flux vector with components in all three dimensions, K is the hydraulic conductivity, φ is the pieziometric head and $-grad(\varphi)$ is the defined as the hydraulic gradient. The hydraulic gradient is the sum of pressure and potential energies of the fluid per unit weight. For an isotropic medium with flow in only one dimension and neglecting gravity effects, Darcy's law reduces to:

$$V = -\frac{k}{\mu} \cdot \frac{dP}{dx}$$

where V is the velocity of the fluid through the porous medium, k is the permeability of the medium, μ is the viscosity of the fluid, and dP/dx is the pressure gradient.

Darcy's law is valid only for flows with relatively low fluid speeds where the viscous forces due to the resistance to fluid flow by the medium outweigh the inertial forces of the fluid. Hassanizadah and Gray (1987) define a Reynolds number for porous flow to be:

$$\mathrm{Re} = \frac{\rho \cdot V \cdot l}{\mu}$$

where l represents a characteristic length of the porous medium. The critical range of this Reynolds number varies anywhere from 5 to about 13 depending on which reference is consulted. What value to use for l is also the subject of some debate. Bear suggests using the mean grain diameter or some other measure of the average diameter that the fluid flows through as it goes through the medium. Ward (1964) uses $l = k^{0.5}$ for his characteristic length.

II. EXPERIMENTAL PROCEDURE

In order to solve the numerical model described in the next section, two equations relating the density of the material, ρ, the permeability of the material, k, and the pressure drop across a given height of material are needed. To get these relations a permeability and density measurement device was designed and built. Experiments were performed on two different materials, A and B, and regression curves were found from the data.

Test Apparatus

A device to measure the permeability and density of the material was constructed based on the design suggested by Scheidegger. The device used for the experiments discussed in this thesis has a few differences. First, in order to get conditions similar to those in the actual machine, the working fluid used is air. Also the cross-section of the device is rectangular, with the distance between the sidewalls being the same as in the actual machine's feed zone. A flow meter is used to measure the air flow rate and a water manometer is used to measure the pressure drop across the porous material. Since a relation giving the density to which the material compresses for a given pressure gradient is also required, the device was designed so it would be convenient to measure the height to which the material compresses.

A diagram of the experimental apparatus is shown in Fig. 2.1. The device consists of a Plexiglas box that is enclosed on the top and sides but open at the bottom. Grooves are cut into the sidewalls at the bottom which allow a screen be inserted across the bottom. The screen used is a piece of the actual screen conveyor from the cake formation machine. Holes are drilled and tapped into the top and into one side of the device. The supply air goes through the flow meter and into a diffuser in the top of the device. The hole in the back side of the device is connected to the manometer which measures the pressure drop between the inside of the device (above the screen and material) and

atmospheric pressure. The top of the device is removable to allow for adding or removing the fibrous material for each test.

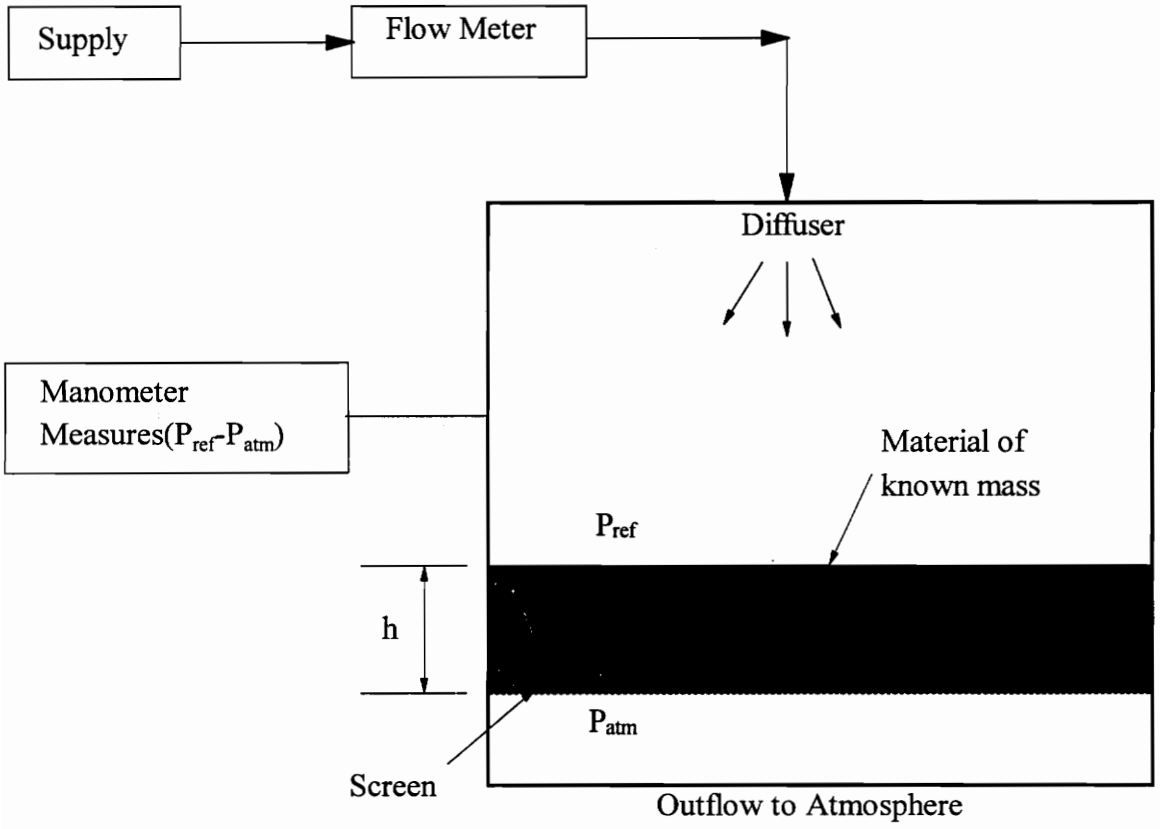

Figure 2.1 Test Apparatus for Measuring Permeability

Test Procedure

In order to make the required permeability measurements and get usable relations, an experimental test procedure was developed. This procedure consists of starting with a known mass of material which is put into the device and leveled across the screen (but not compressed). The supply air is then turned on to a specified initial flow rate. The height to which the air compresses the material is noted, as well as the pressure drop

across this height. This is repeated at one or two higher flow rates for the same sample. Then the material is removed and discarded, and another sample can be tested. The actual data from this testing is included in Appendix A. For both materials, some additional data points were taken where the material was compressed in the device by hand before readings were taken. The reasons for this will be explained in the next section.

Analysis of Experimental Data

It is necessary to perform some manipulations on the data collected in order to get the relations needed for the numerical model. First, the density of the material at each point is calculated from the known mass, m, the measured height, h, the known cross-sectional area of the device, A_c, and a conversion factor to get to standard SI units:

$$\rho = \frac{m}{A_c \cdot h}$$

This is the density of the material plus the air which occupies the spaces between the individual fibers. The velocity through the material at each data point is also needed. It is found with the measured flow rate, Q, the known cross-sectional area of the device, A_c, and another SI conversion factor:

$$V = \frac{Q}{A_c}$$

To find the permeability, it is necessary to calculate the pressure gradient across the material. This is found by dividing the pressure drop across the material by its height:

$$\frac{dP}{dh} = \frac{P_{ref} - P_{atm}}{h}$$

The next required manipulation is to calculate the permeability at each data point. Darcy's law is used to find the permeability, k, based on the velocity through the material, V, the viscosity of air, μ, the pressure gradient, dP/dh, and another SI conversion factor:

$$k = V \cdot \mu \cdot \frac{1}{\frac{dP}{dh}}$$

The last required data manipulation is necessary in order to normalize the permeability with respect to velocity. Noting that permeability has units of [L^2] a Reynolds number for porous flow can be calculated based on permeability:

$$\mathrm{Re}_k = \frac{V \cdot \sqrt{k}}{\upsilon}$$

All of these calculations for each data point are included with the collected data in Appendix A.

Once the data is collected, plots of certain parameters are made in order get regression equations. Figure 2.2 is a plot of the density versus Re_k for the data collected on materials A and B. The pre-compressed material data points were included in this data set because they help define the permeability of material that is near its maximum possible density. A power regression has been found for the data points for each material. This regression results in the following equation relating the density to Re_k:

$$\mathrm{Re}_k = c_m \cdot \rho^{d_m}$$

where c_m and d_m are constants determined by the material. This power form was chosen because it fit the collected data well, giving R^2 values of 0.95 for material A and 0.90 for material B. Table 2.1 gives the values of these constants for the two materials. The permeability can be solved for from this equation:

$$k = \left[\frac{c_m \ \upsilon}{V} \cdot \rho^{d_m} \right]^2$$

Figure 2.3 shows the pressure gradient versus density for the two data sets, not including the data taken from pre-compressed material. The pre-compressed data was left out because this relation shows the density to which the material is compressed for a given pressure gradient. When the material is already compressed to a given density, the pressure gradient has no additional effect, unless it is driven above the point where it would naturally cause the pre-compressed density. To avoid skewing this data, these data points were neglected. A logarithmic regression was used on this data, which yields the following relation:

$$\rho = a_m \cdot \ln\left(b_m \cdot \frac{dP}{dh}\right)$$

where a_m and b_m are the regression constants determined by the material. The logarithmic regression was used even though the power form gave a slightly better curve fit. This was done because in solving the model, a Newton-Raphson iterative solver is used, and it is necessary to solve this equation for h and take a derivative. This is much simpler to do with the logarithmic equation. The values for the constants are also given in Table 2.1.

When these experiments were performed, it was noticed that there was a maximum density to which the material could be compressed whereas the experimental relation has no such limit. A test was performed where the material was compressed in a graduated cylinder and the maximum density was found. The maximum density was found to be approximately 250 kg/m^3 for both materials. Therefore, in the computer code the density relation is clipped for each material at its maximum density. Note that since the permeability relation is density dependent, the permeability will also be clipped when the density is clipped.

Table 2.1 Regression Constants for the Two Materials

	a_m	b_m	c_m	d_m
Material A	32.4006	16.5888	6081.19	-1.4725
Material B	38.2165	10.75	3956.61	-1.4809

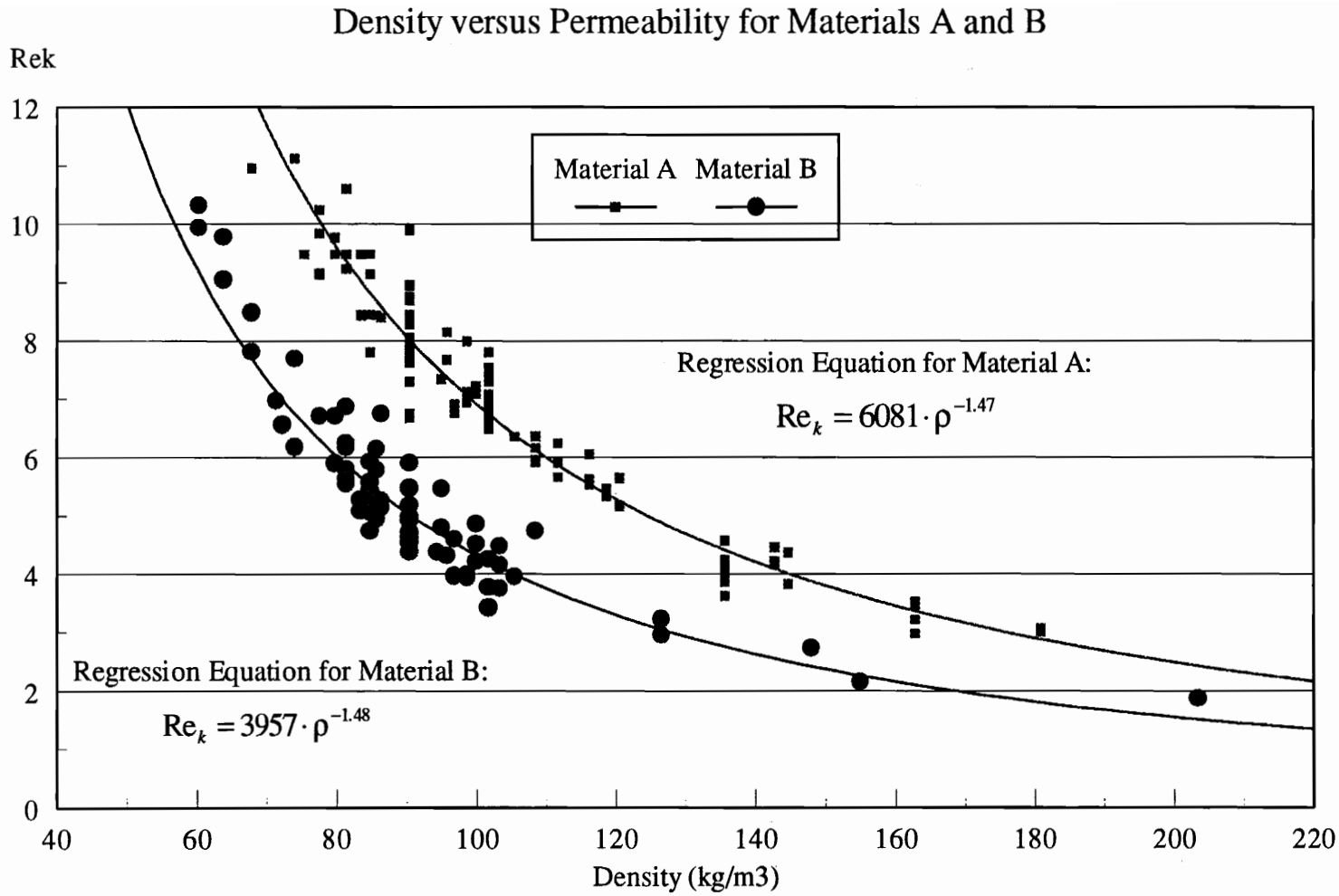

Figure 2.2 Density Versus Permeability for the Two Tested Materials

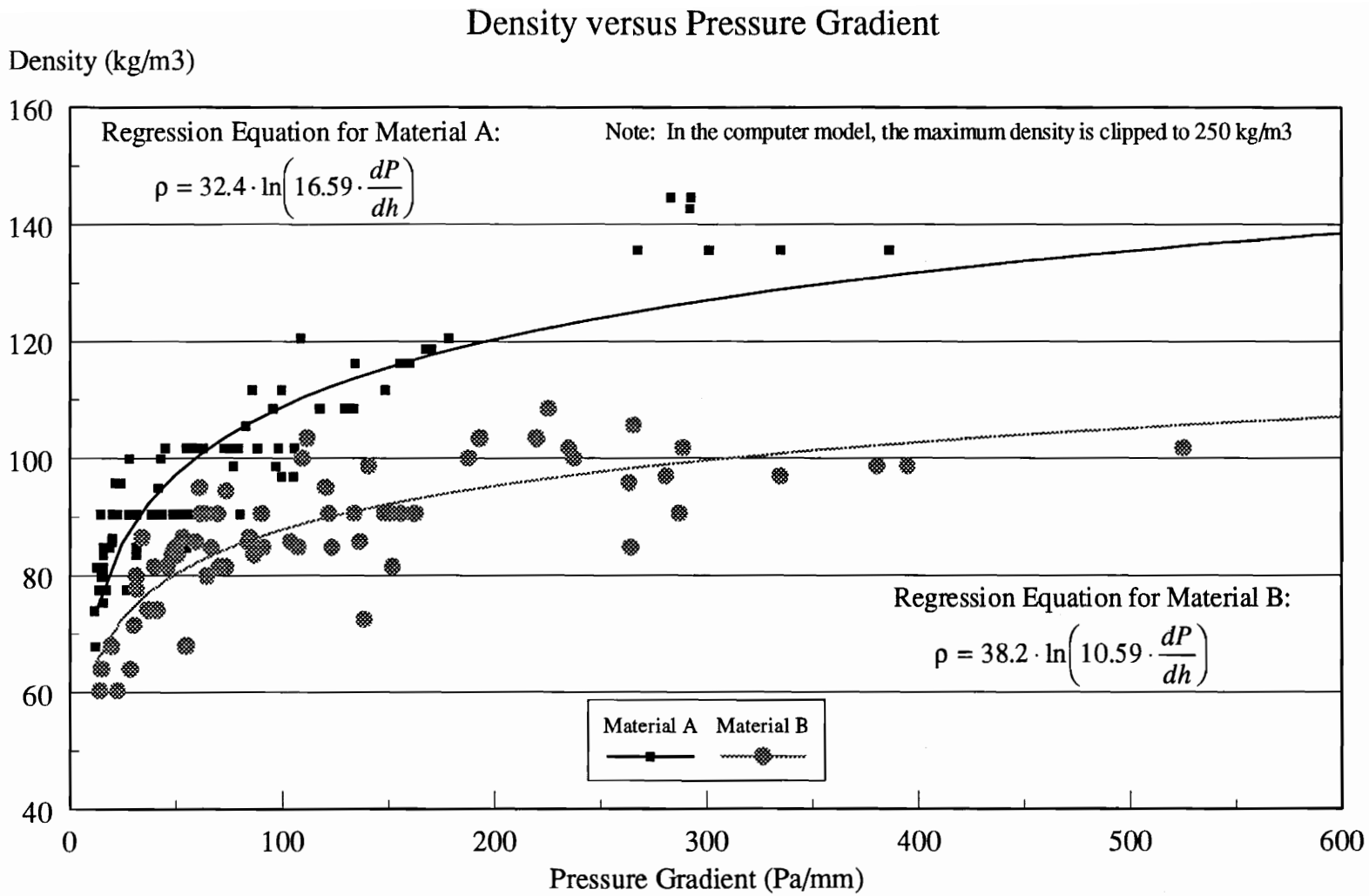

Figure 2.3 Presure Gradient Versus Density for the Two Tested Materials

III. NUMERICAL ANALYSIS

In order to get the density distribution of the cake after it passes the cutter, a numerical model was developed that breaks the cake into discrete sections in the x-direction over the entire feed zone. This model makes use of the two relations developed from the experimental work described above. Seven test cases were run for each material in order simulate anomalies that might occur in the fibers as they feed onto the cake.

Cake Formation Model

Assumptions

The numerical model to describe the cake formation is based on a few assumptions that simplify the problem to the point that it can be solved. The first main assumption was to neglect the effects of friction between the fibrous material and the sidewalls. As the cake is formed in the real machine, this could have a large effect on the cake formation as the screen conveyor can be moving extremely fast. The fourth test case tries to address this problem to some extent.

The next main assumption involves the way the cake is discretized. The model assumes that once a discrete mass of material is added to the cake at a given step, it develops certain properties at that step, such as ρ, k, and h, which are determined by the conditions the mass is subjected to when it is added. At all following steps down the screen, these properties are assumed to remain the same. For example, at the initial step some material is added at a given ρ, k, and h. At the final step, this material, which is at the top of the cake against the screen, will still have these same properties.

Another necessary assumption has to do with the use of the Bernoulli equation. First, the air is assumed to be incompressible because at the pressure differences used in this model, the density of the air does not change significantly. Also, in order to utilize the Bernoulli equation, it is assumed that there is some point below the screen where the flow rate is very small due to a much larger cross-sectional area. The pressure of the air

at this point is the plenum pressure, P_p. This pressure will be used along with the velocity at each discrete step, V, to calculate the bottom pressure, Pb, that each discrete column of cake feels, using the Bernoulli equation:

$$Pb = P_p - \rho_{air} \cdot \frac{V^2}{2}$$

Figure 3.1 shows the pressures acting on a discrete column of the cake. Pt is the low pressure that draws the material up to the screen. In the model, Pt is taken to be zero, while the bottom pressure, Pb, represent the pressure drop across the cake.

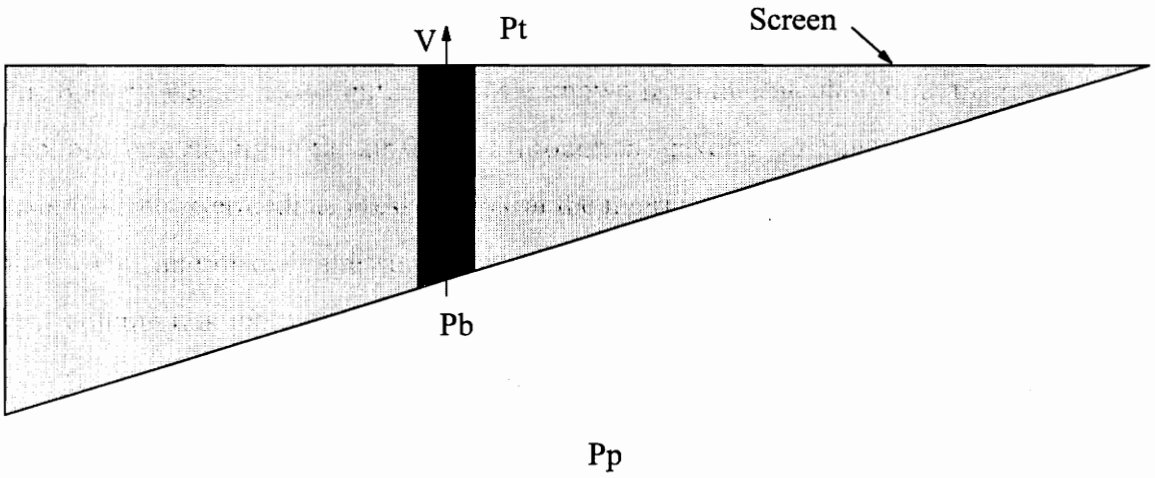

Figure 3.1 Pressures Acting on Cake

The last major assumption has to do with the way the material is added to the cake. In the actual machine, the fibers are physically thrown on to the screen as well as being drawn up by the lower pressure above the screen. For this model, the effect of the inertia carried by the fibers is neglected. In the model the material is added evenly across the length of the feed zone, with only the pressure difference above and below the screen affecting the formation of the cake. It is also assumed that there is a uniform density distribution in the z-direction.

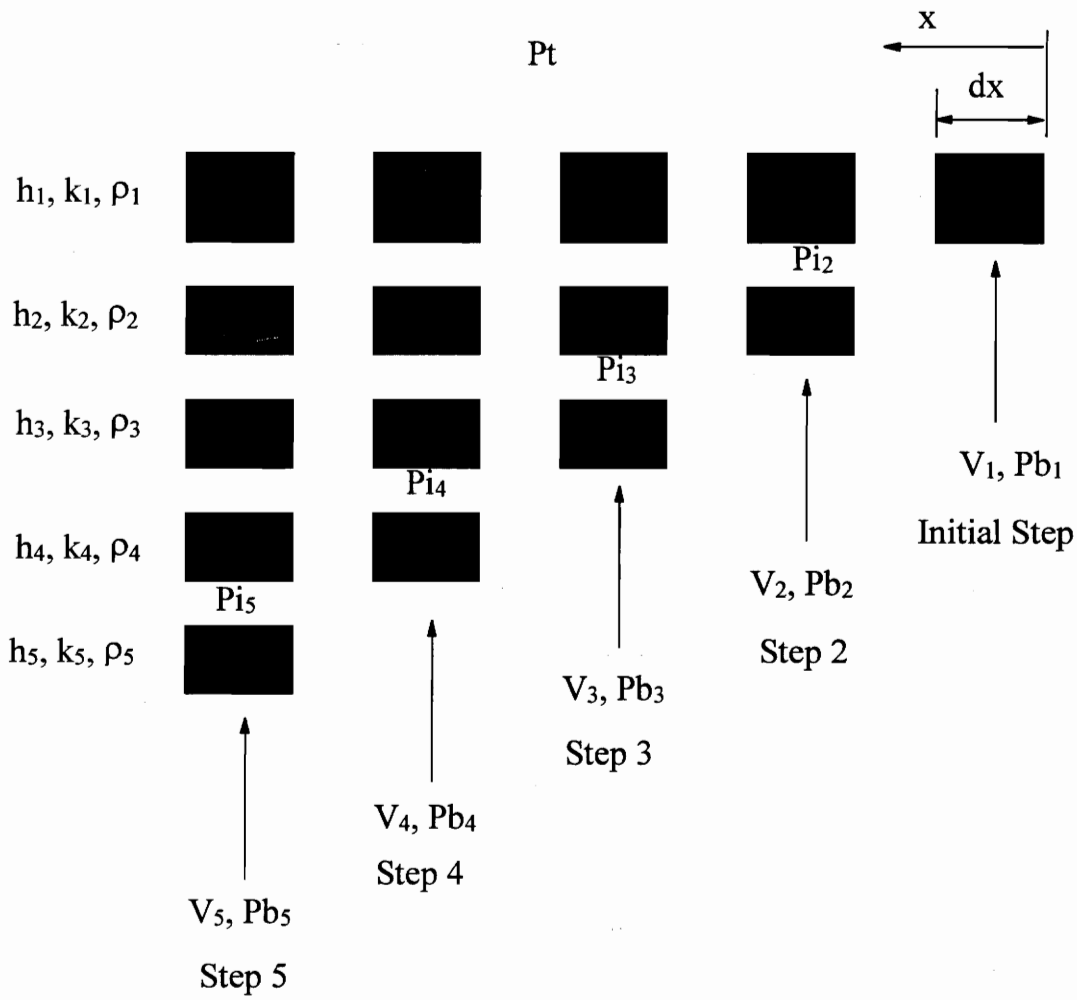

Figure 3.2 First Five Steps of Cake Formation

Description of Model

Figure 3.2 shows the first five steps in the x-direction of the discretized model. At the initial step in the x-direction, an initial height of material is assumed to already be on the screen. In order to determine the properties of this initial height, the two experimental correlations are needed, along with the Bernoulli equation and Darcy's law:

$$V_1 = \frac{k_1}{\mu} \cdot \frac{Pb_1 - Pt}{h_1} \qquad \text{Darcy's Law}$$

$$k_1 = \left[\frac{c_m \ \upsilon}{V_1} \cdot \rho_1{}^{d_m} \right]^2$$ Permeability Relation

$$\rho_1 = a_m \cdot \ln\left(b_m \cdot \frac{Pb_1 \quad Pt}{h_1} \right)$$ Density Relation

$$Pb_1 = P_p - \rho_{air} \cdot \frac{V_1^2}{2}$$ Bernoulli Equation

Simultaneously solving these four non-linear equations iteratively with the computer program yields the velocity, permeability, density and bottom pressure felt by the initial height of cake at the first discrete step.

At the second step, a new mass of material is added on top of the initial mass. The bulk properties of the initial mass are known from the calculations at the previous step, but the velocity of the air flowing through the cake at this point is different. Also, there is some intermediate pressure, Pi_2, at the interface the new mass and the initial mass. This intermediate pressure, along with the velocity of the air through the discrete cake column link the two masses. In order to find the bulk properties of the new piece, the two experimental relations, an equation relating the density to the height of the new piece, the Bernoulli equation and Darcy's law for each of the masses of material have to be solved:

$$V_2 = \frac{k_1}{\mu} \cdot \frac{Pi_2 - Pt}{h_1}$$ Darcy's Law for the initial mass

$$V_2 = \frac{k_2}{\mu} \cdot \frac{Pb_2 - Pi_2}{h_2}$$ Darcy's Law for the new mass

$$k_2 = \left[\frac{c_m \ \upsilon}{V_2} \cdot \rho_2{}^{d_m} \right]^2$$ Permeability Relation

$$\rho_2 = a_m \cdot \ln\left(b_m \cdot \frac{Pb_2 \quad Pi_2}{h_2} \right)$$ Density Relation

$$Pb_2 = P_p - \rho_{air} \cdot \frac{V_2^2}{2}$$ Bernoulli Equation at step two

$$\rho_2 = \frac{dm}{dx} \cdot \frac{1}{W \cdot h_2}$$ Definition of density

where W is the width of the sidewalls, and dm/dx is the mass of material that is added to the cake per discrete step in the x-direction. By solving these six equations, the bulk properties of the added mass can be found.

At the third step, this same set of equations has to be solved, with the addition of another Darcy's law equation and another intermediate pressure variable, because there are now three masses of material that are linked with two interfaces. However, since the bulk properties of the initial mass and the mass added at step two are known from the previous calculation, they can be lumped into one mass that has a varying permeability. Since Darcy's law can be thought of as a resistance to flow, different masses of permeable material can be summed as if they were resistors. Therefore Darcy's law for the two linked masses can be written:

$$V_3 = \frac{Pi_3 \quad Pt}{\mu} \cdot \frac{1}{\left(\frac{h_1}{k_1} + \frac{h_2}{k_2}\right)}$$ Darcy's Law for first two masses at step 3

Now the six equations can be solved for the remaining steps in the discretized model with each new step relying on information calculated at the previous step. In the general form these equations at the ith discrete step down the cake can be written:

[EQN 3.1] $$V_i = \frac{Pi_i \quad Pt}{\left(\frac{h_1}{k_1} + \frac{h_2}{k_2} + \ldots + \frac{h_{i-1}}{k_{i-1}}\right) \cdot \mu}$$ Darcy's Law for the previous masses

[EQN 3.2] $$V_i = \frac{k_i}{\mu} \cdot \frac{Pb_i \quad Pi_i}{h_i}$$ Darcy's Law for the new mass

[EQN 3.3] $$k_i = \left[\frac{c_m \quad \upsilon}{V_i} \cdot \rho_i^{d_m}\right]^2$$ Permeability Relation

[EQN 3.4] $$\rho_i = a_m \cdot \ln\left(b_m \cdot \frac{Pb_i \quad Pi_i}{h_i}\right)$$ Density Relation

[EQN 3.5] $$Pb_i = P_p - \rho_{air} \cdot \frac{V_i^2}{2}$$ Bernoulli Equation at step i

[EQN 3.6] $$\rho_i = \frac{dm}{dx} \cdot \frac{1}{W \cdot h_i}$$ Definition of density

Once these equations are solved for each step down the screen, the density along with the height of each added mass give the density distribution in the formed cake. This is demonstrated in the four test cases.

Computer Model

In order to solve the non-linear sets of equations described above a computer code was written. This code is included as Appendix B. Figure 3.3 is a flow chart describing the main iteration loop of the program. First an initial guess is made for the velocity. Then Eqn. 3.1 is solved for the intermediate pressure based on the guessed velocity and Eqn. 3.5 is solved to find the pressure beneath the cake. At this point an Newton-Raphson iterative solver is used to solve equations 3.4 and 3.6 for the height and density of the most recently added mass. Now Eqn. 3.3 can be solved for the permeability of this new piece. With all of the properties of the new piece now known, Eqn. 3.2 can be solved for the air velocity through the whole cake at the current step. This calculated velocity is compared to the initial guessed velocity, and if they are not within some prescribed tolerance, then a new guess is made based on these guessed and calculated velocities. If the two are close enough, all of the variables are saved for that step, and the program goes on to the next discrete step. This continues until the entire length of screen is solved.

A grid refinement analysis was performed and is included in Appendix C. From this analysis, a grid consisting of 170 points is used which produces a numerical error of less then 0.2%. This grid divides the feed zone into 0.5 cm segments.

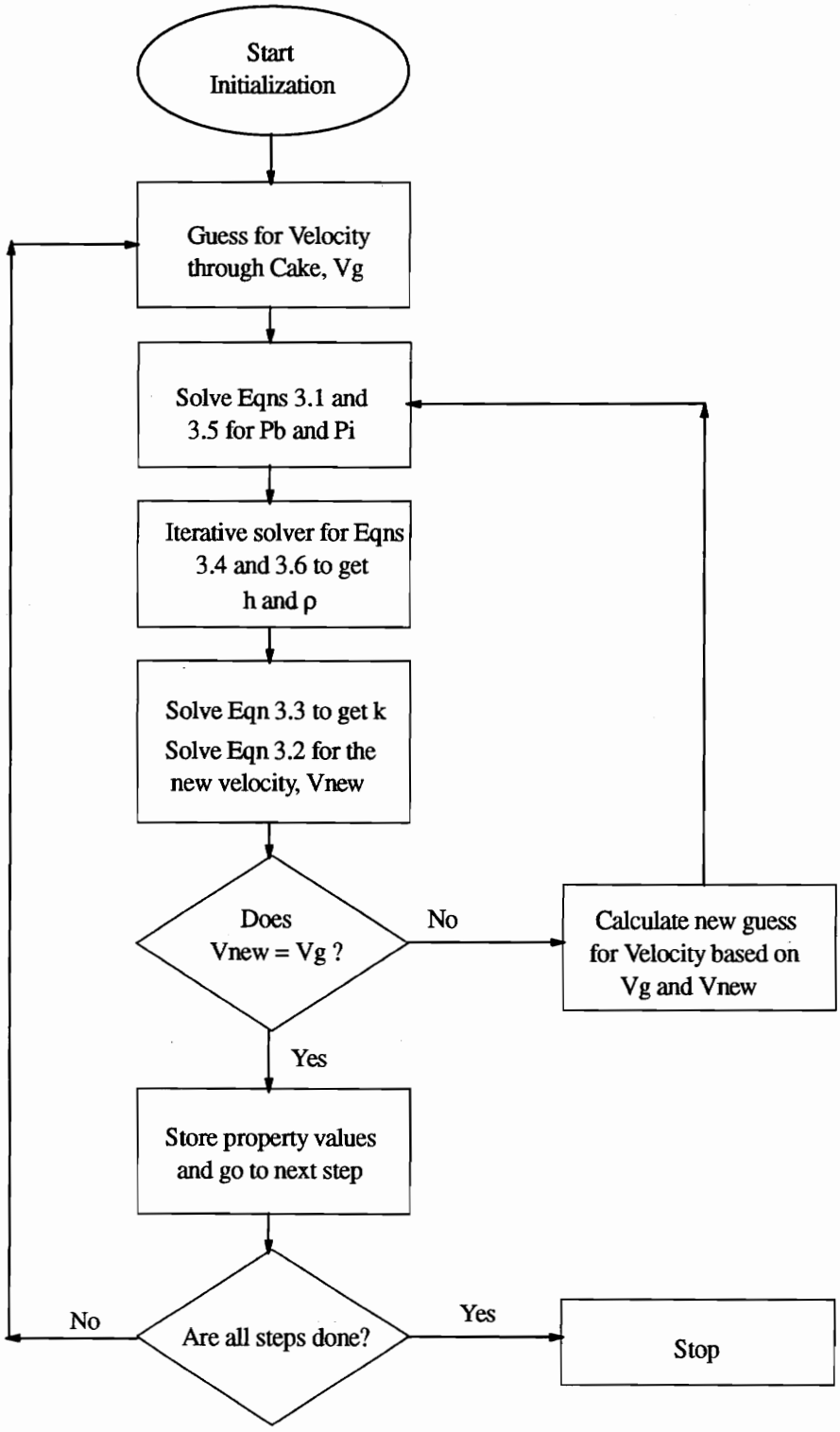

Figure 3.3 Flow Chart of Program

Test Cases

Four test cases of the computer model were run in order to see the effect on the density distributions for different scenarios. Both materials were run to determine how large a part the material properties play in the final cake density distributions.

Cases Run

The first case run was based on normal cake formation with nothing unusual happening. This case is the baseline for comparing the two different materials, and also for noting how large the effects of the density anomalies are. The plenum pressure used is 8000 Pa as measured from the actual machine, and an initial height of 0.01 mm is considered to be on the screen before the regular feed starts. An initial height is necessary to avoid a singularity in solving the set of equations in the program, and can be thought of as modeling the flow resistance of the screen. The initial height is so small relative to the subsequent added masses that it has a negligible effect on the final density distribution.

Case two models a dense mass being added to the cake at some point along the screen. This could be solid chunk of material or a group of fibers that are stuck together. Case three is the opposite effect. It models a low density section added to the cake at the same position. This might happen if a loose group of fibers is added to the cake, or if the friction with the sidewalls restricts the ability of the material to pack as tightly on to the cake as it otherwise would. The fourth case models both effects. There is first a section where denser material is added which is then immediately followed by a region of lower density. This models either the effect of a dense mass blocking the flow of material for a short time, or the effect of friction with the sidewalls holding some of the material as the screen goes forward, thereby causing a low density region in front of a high density region.

For each of these three cases with anomalies, the density difference starts at 10 cm down the 85 cm feed zone length. The anomalies are each 3.0 cm long, so for case four, there is 3.0 cm of dense region and 3.0 cm of loose region. Three additional tests were run in which the low density spot was moved around on the screen to see what effect this had on the final density distribution. In cases five, six, and seven, the aberration starts at 1.0, 30.0 and 50.0 cm, respectively, along the screen.

For all cases, the total mass added over the feed zone length is the same for each material. Since the cutter is set at a constant height of 8.0 mm to produce a cake of constant cross-sectional area, it trims off material at this height for each of the different cases. This means that in the cases with density anomalies, there will be a different mass flux passing above the cutter. For material A, which produces a denser cake per unit length then material B, the mass added over the feed zone is set so that the cake has a mass flux of 27.7 gm/m going to the cutter at the end of the feed zone. For material B the mass flux is set to 20.0 gm/m. This flux is controlled in the program by setting the dm/dx used in Eqn. 3.6 accordingly.

Analysis of Case Runs

The output for the test case runs is included in Appendix D. Figures 3.4 - 3.17 are plots of the density distribution for each of the test cases. Each test case is parameterized by two variables. First the total cake height that each case builds gives a way of comparing the different cases. A more valuable parameter is the total mass flux that passes the cutter as the continuous cake. Both of these values are given in table 3.1 for material A, and in table 3.2 for material B. A major concern in the formation of the cake is that spots of low cake density along with large variations in the density distribution can cause problems in later manufacturing processes. A low mass flux would indicate a low density region in the formed cake.

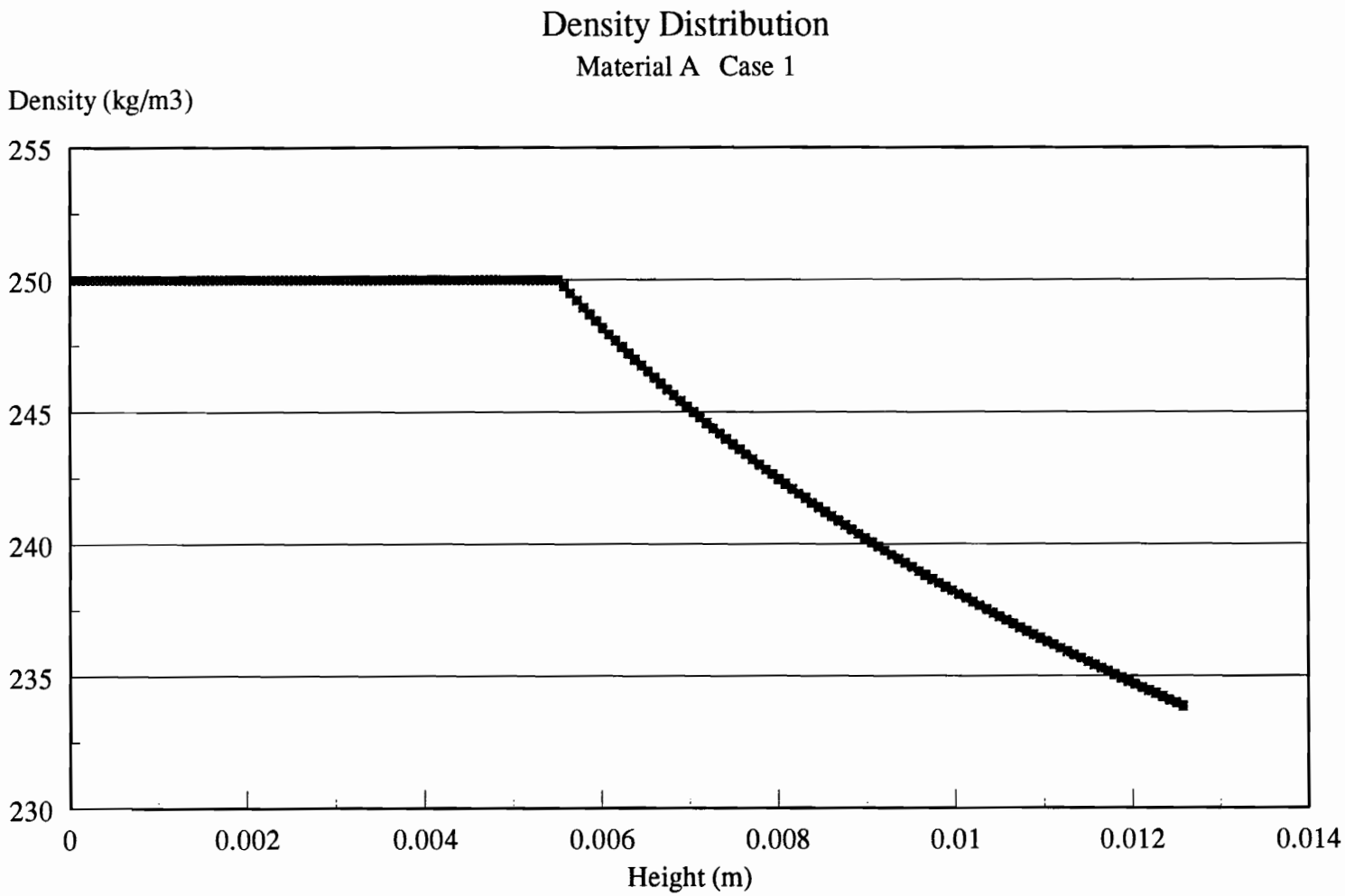

Figure 3.4 Density Distribution for Material A Case 1

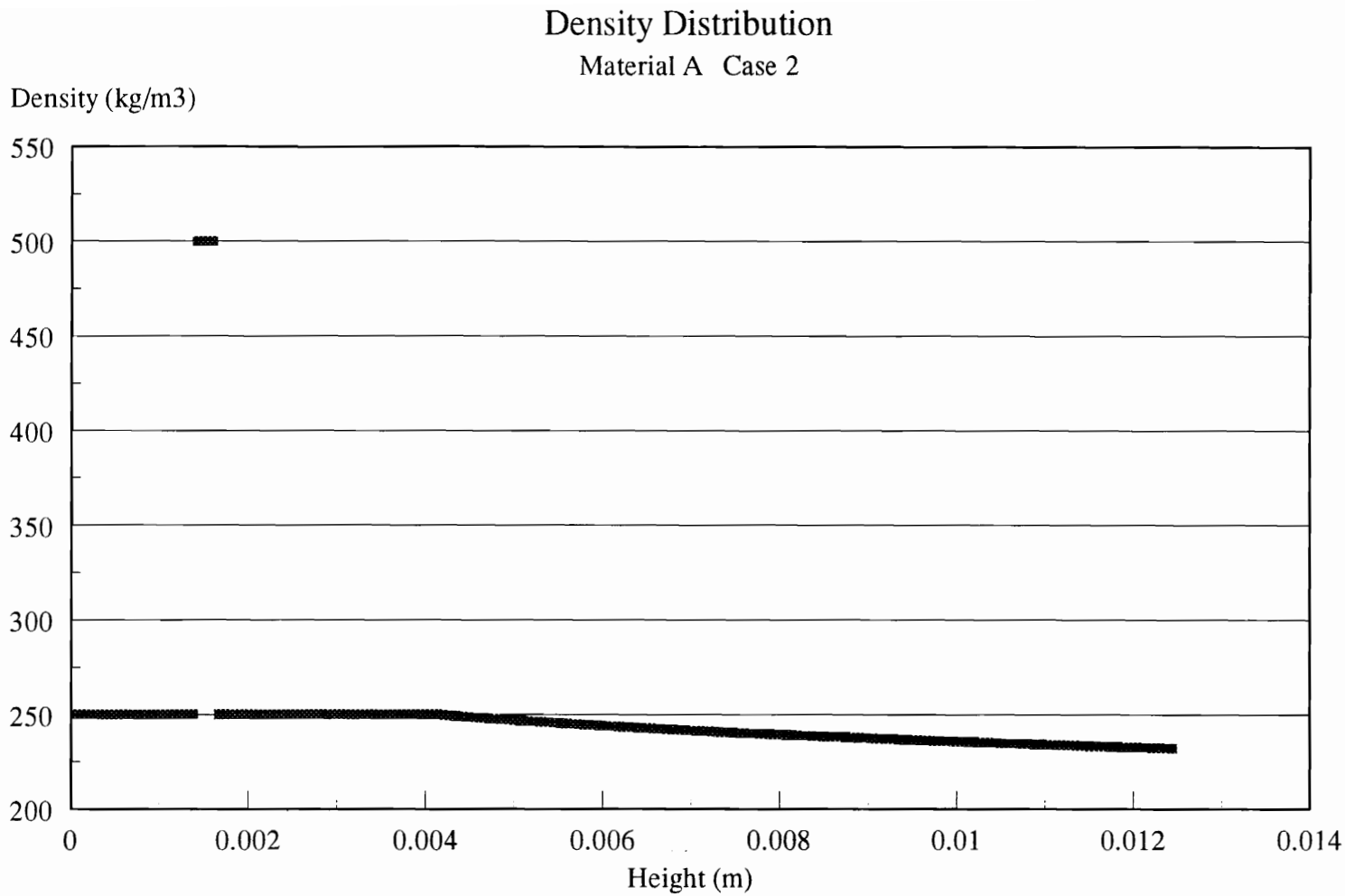

Figure 3.5 Density Distribution for Material A Case 2

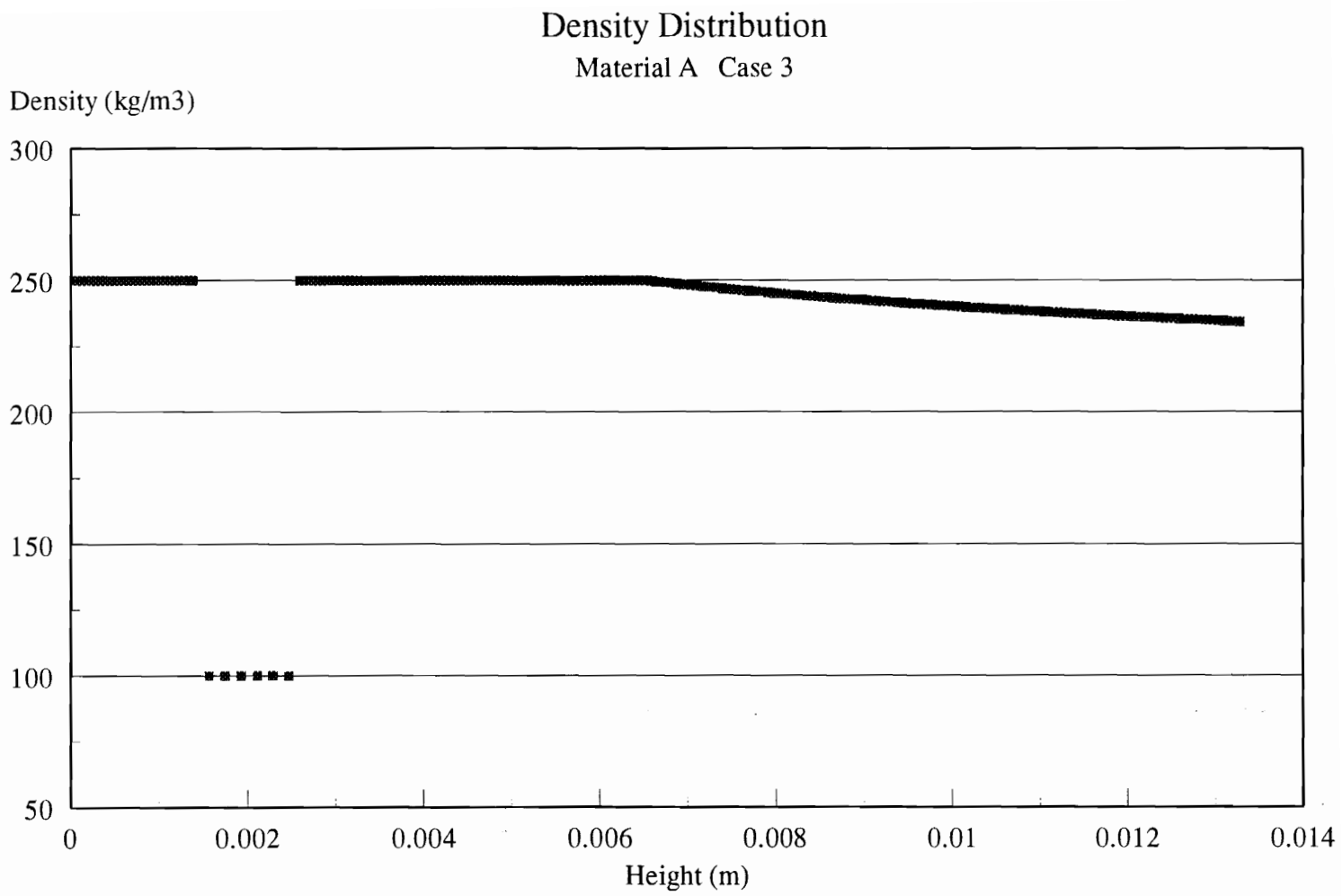

Figure 3.6 Density Distribution for Material A Case 3

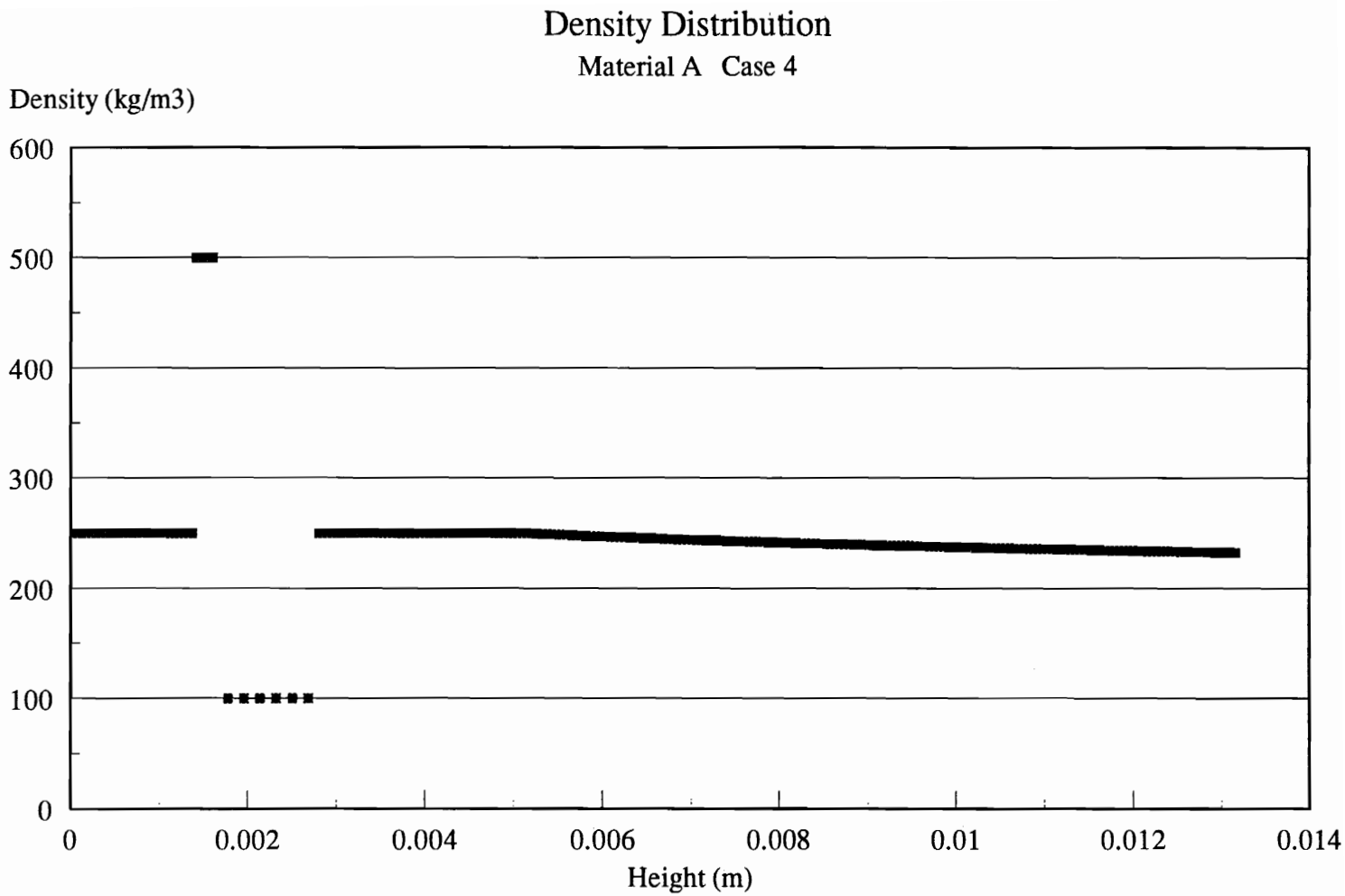

Figure 3.7 Density Distribution for Material A Case 4

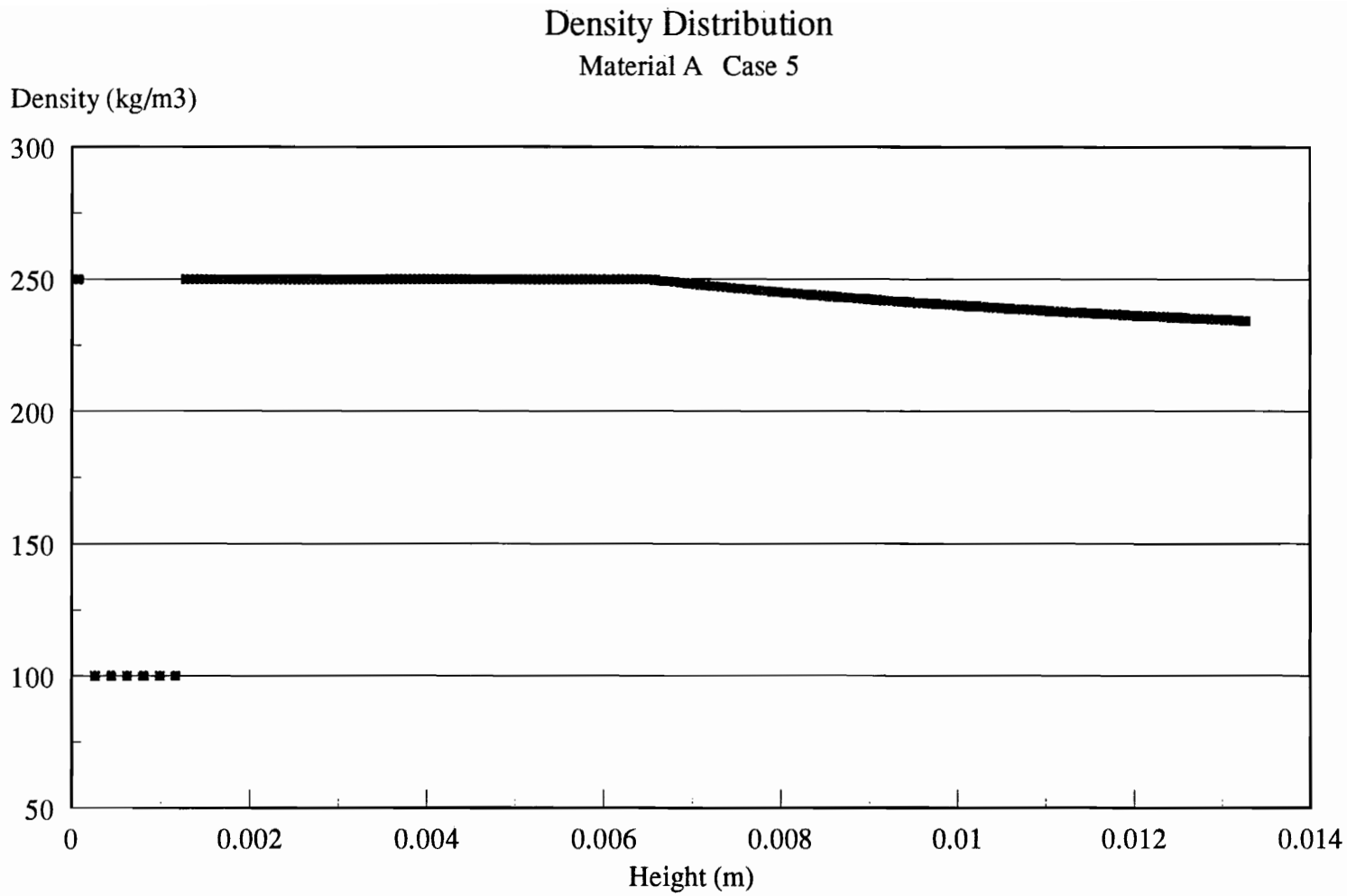

Figure 3.8 Density Distribution for Material A Case 5

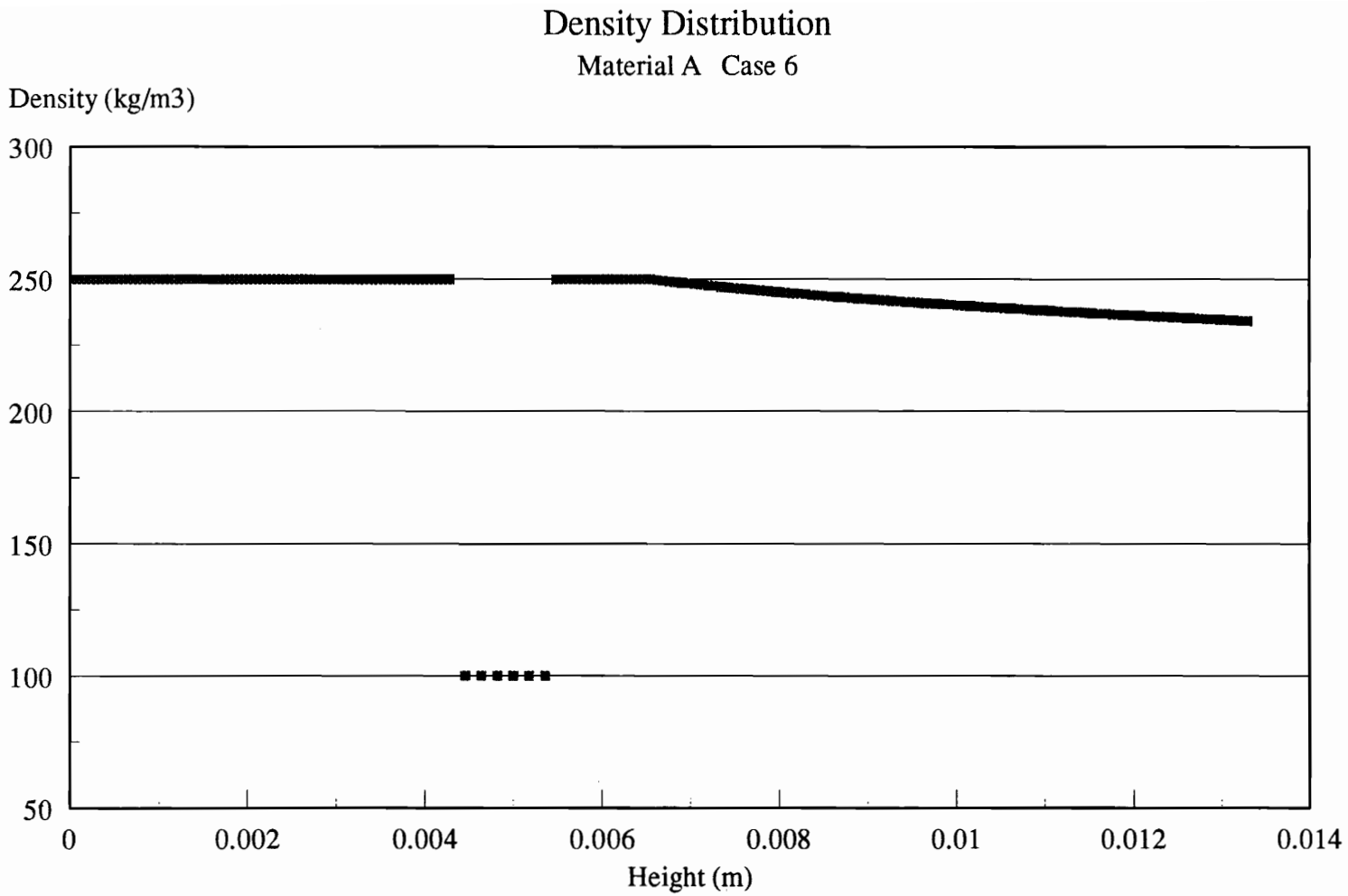

Figure 3.9 Density Distribution for Material A Case 6

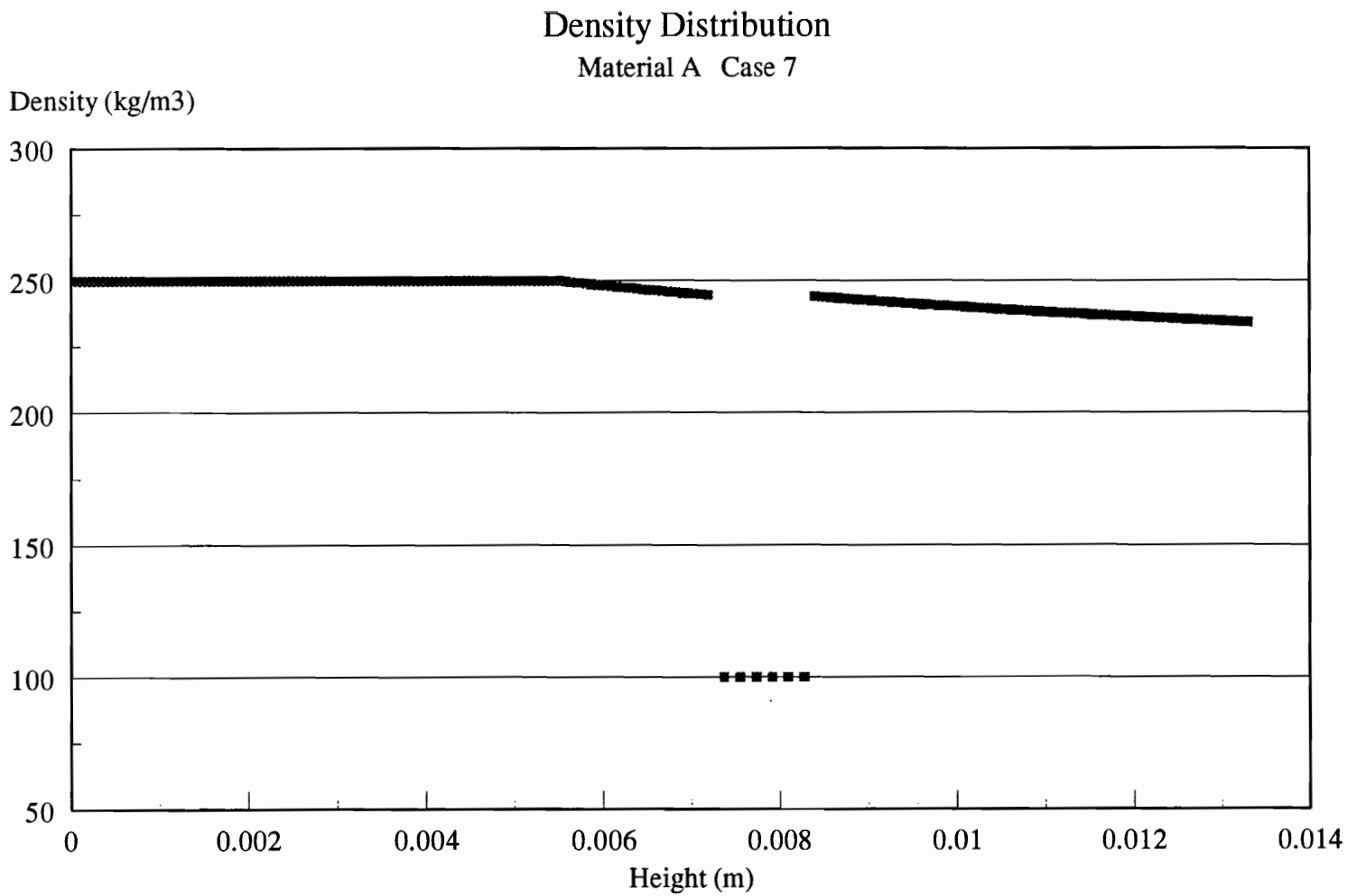

Figure 3.10 Density Distribution for Material A Case 7

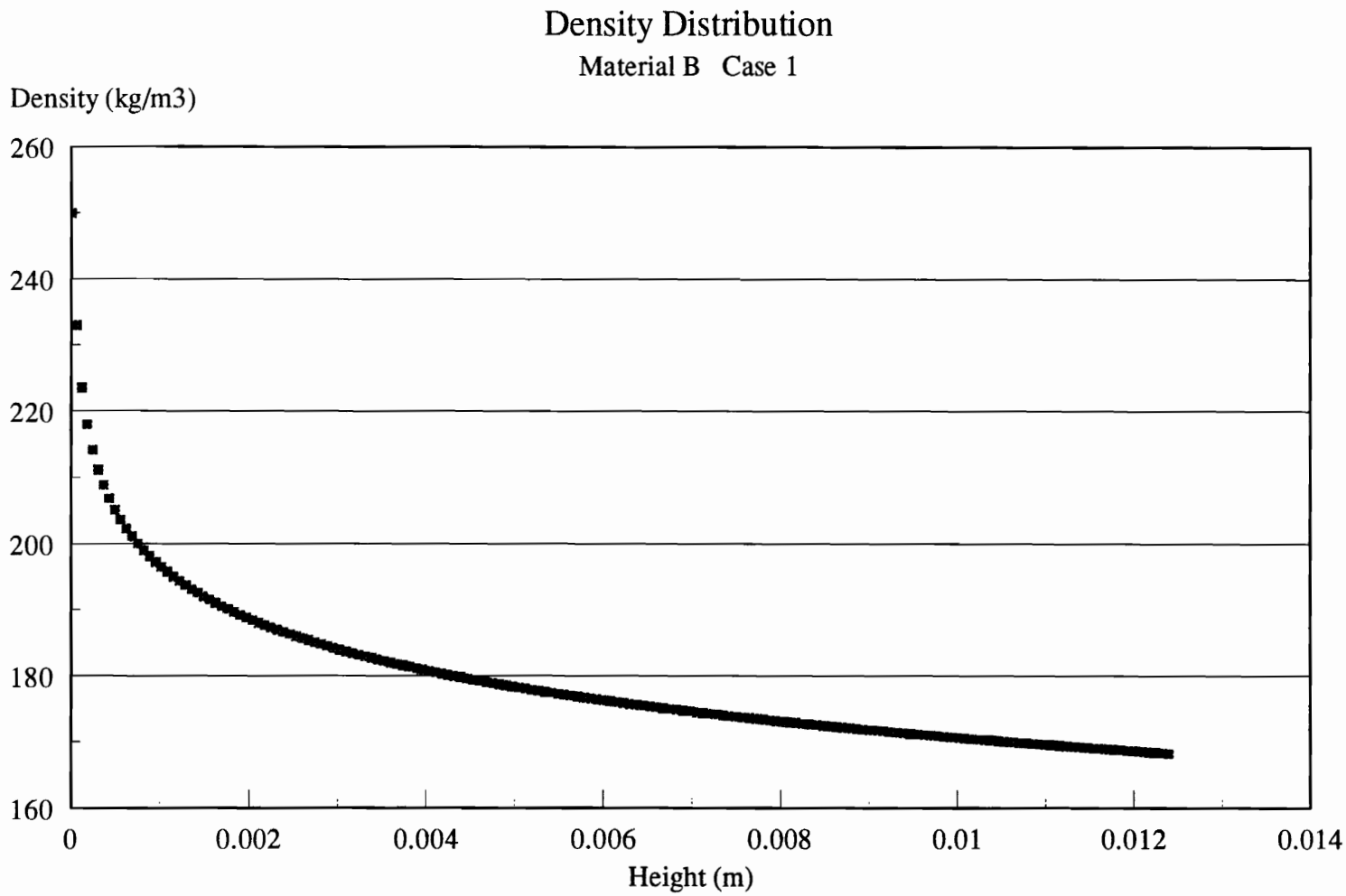

Figure 3.11 Density Distribution for Material B Case 1

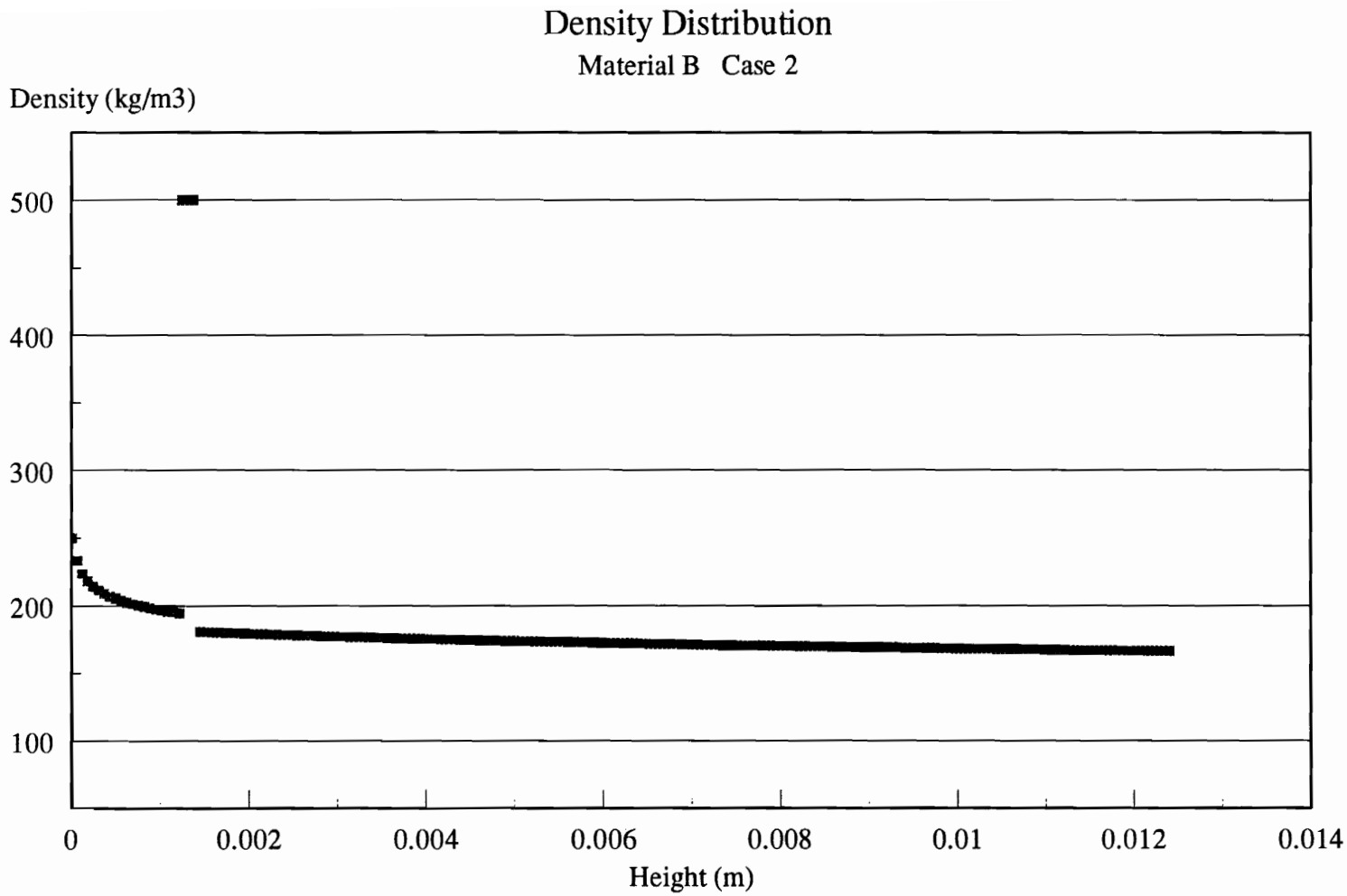

Figure 3.12 Density Distribution for Material B Case 2

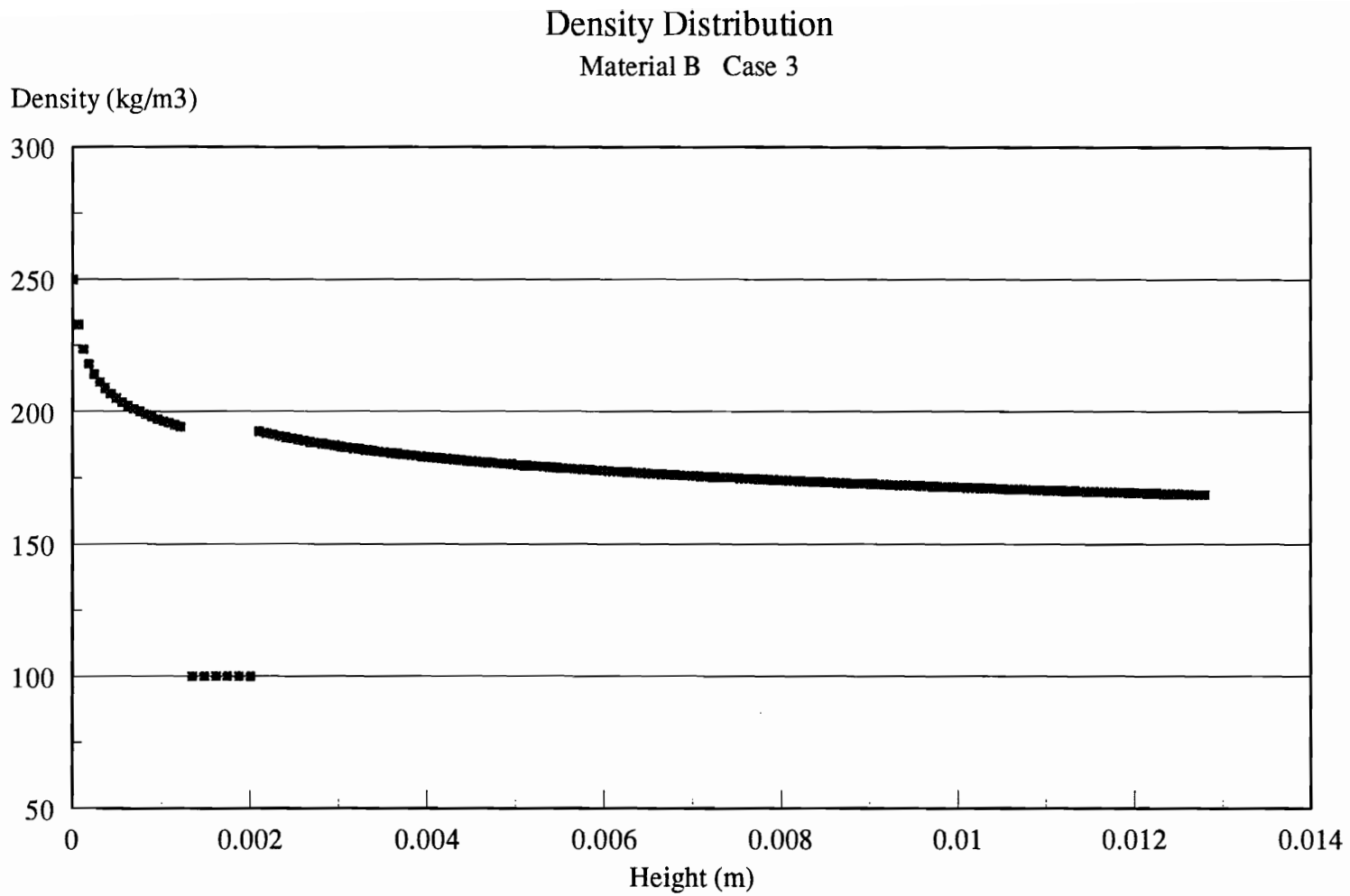

Figure 3.13 Density Distribution for Material B Case 3

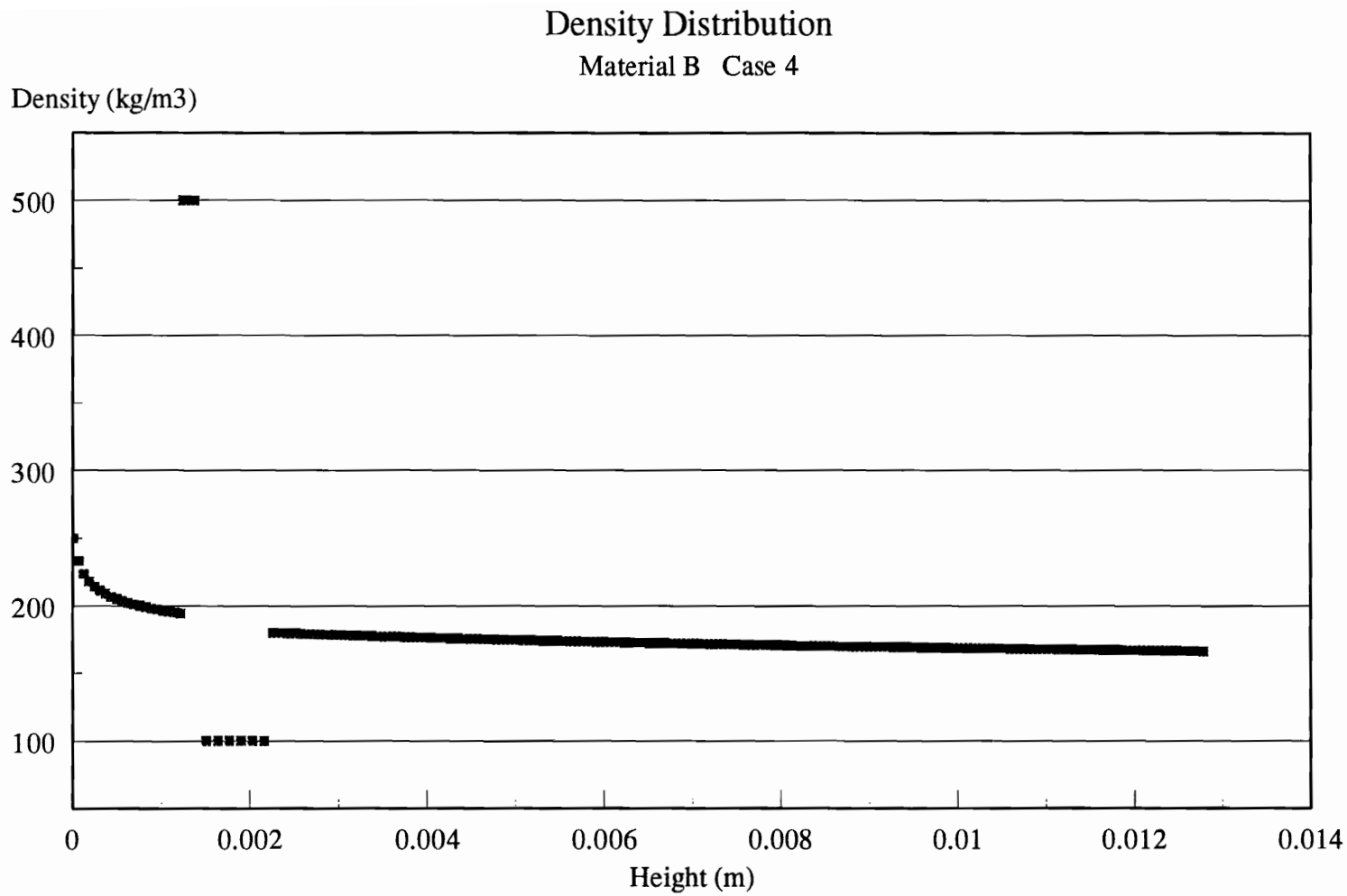

Figure 3.14 Density Distribution for Material B Case 4

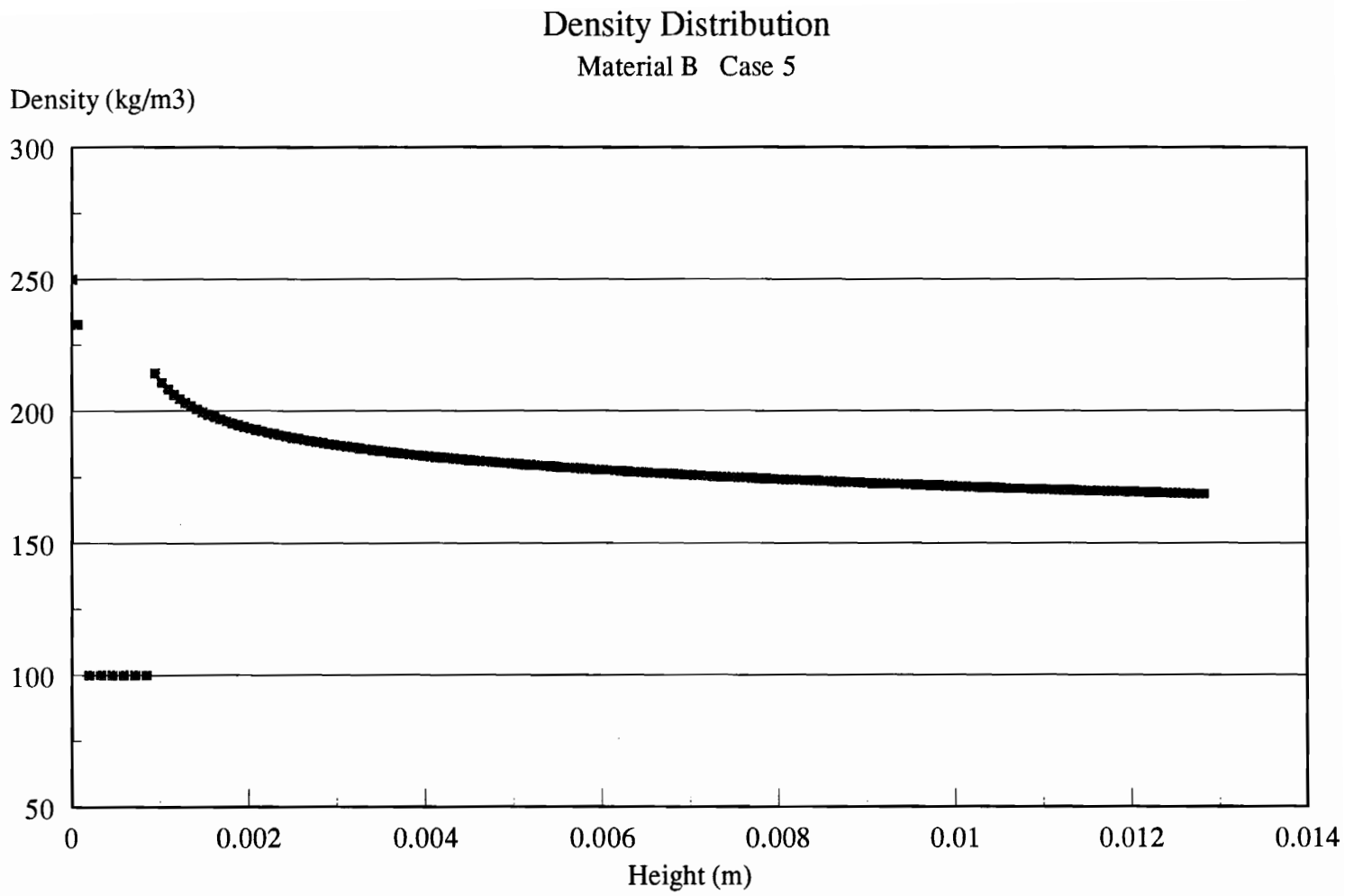

Figure 3.15 Density Distribution for Material B Case 5

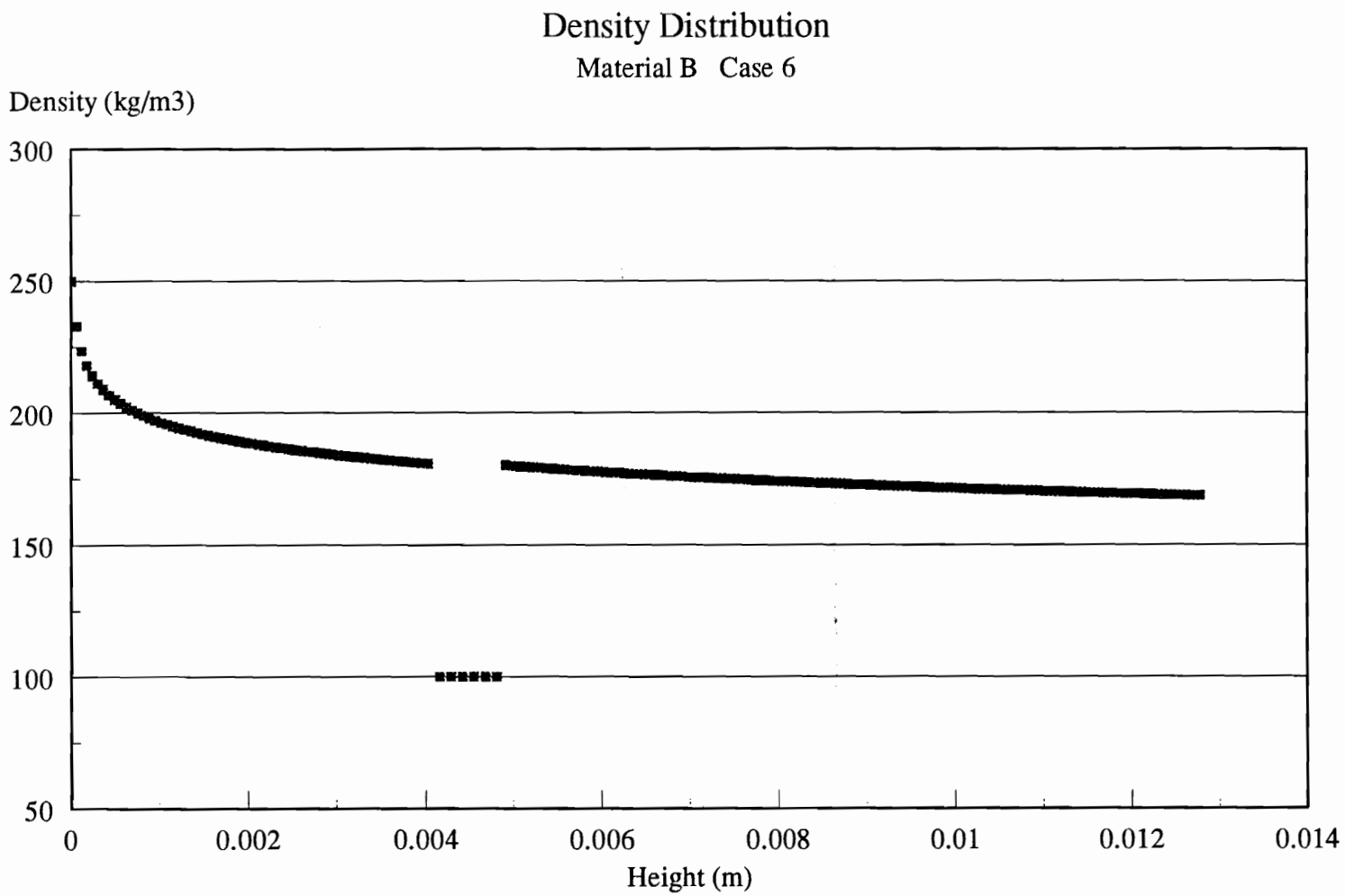

Figure 3.16 Density Distribution for Material B Case 6

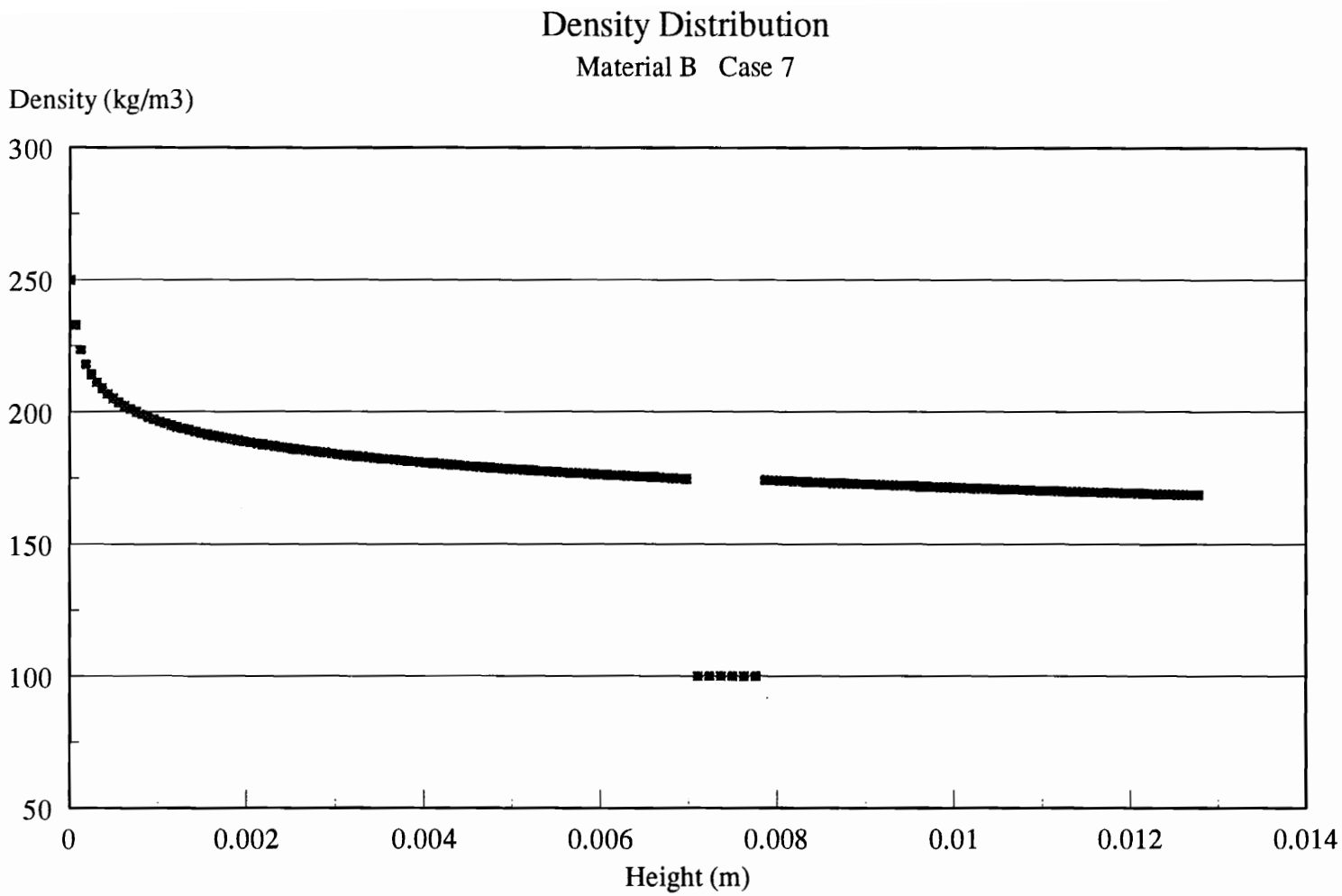

Figure 3.17 Density Distribution for Material B Case 7

Table 3.1 Total Cake Height and Mass Flux Values for Material A

Test Case	*Anomaly Position*	*Cake Height (mm)*	*% Height Difference*	*Mass Flux (gm/m)*	*% Flux Difference*
1	none	12.58	(ref.)	17.91	(ref.)
2(High)	10 mm	12.45	-1.0	18.28	2.1
3 (Low)	10 mm	13.29	5.6	16.50	-7.9
4 (Both)	10 mm	13.16	4.7	16.90	-5.6
5 (Low)	1 mm	13.27	5.5	16.50	-7.9
6 (Low)	30 mm	13.30	5.8	16.50	-7.9
7 (Low)	50 mm	13.30	5.8	16.87	-5.8

Table 3.2 Total Cake Height and Mass Flux Values for Material B

Test Case	*Anomaly Position*	*Cake Height (mm)*	*% Height Difference*	*Mass Flux (gm/m)*	*% Flux Difference*
1	none	12.40	(ref.)	13.26	(ref.)
2(High)	10 mm	12.40	0.0	13.36	0.7
3 (Low)	10 mm	12.80	3.2	12.72	-4.0
4 (Both)	10 mm	12.78	3.1	12.85	-3.1
5 (Low)	1 mm	12.82	3.4	12.71	-4.2
6 (Low)	30 mm	12.78	3.1	12.73	-4.0
7 (Low)	50 mm	12.78	3.0	12.74	-3.9

Figures 3.4 - 3.10 are plots of the output for the seven test cases of material A. Note that due to the large variations in the anomaly density, the scales differ for the different plots. The first plot, Fig. 3.4, for the normal case shows that over the 8.0 mm

cutter height, the density variation is not large. For the first 5.5 mm, it is constant at the cut-off density of 250 kg/m^3 and only drops to 245 kg/m^3 by the time it gets to 8.0 mm. This holds true for all of the cases of material A. For the most part, the density anomalies do not have a large effect on the building of the cake except right in the region where they are located.

Figures 3.11 - 3.17 are the plots for material B. From Fig. 3.10, which is the normal case, it is obvious that there is a significant change in the density across the cake height. Discounting the density at the initial point because the initial height is so small, the density varies from about 232 kg/m^3 at the screen to 173 kg/m^3 at the cutter height. The density varies more in material B than in material A because A is more compressible than B. This is offset somewhat by the fact that material A has a greater permeability and therefore lets air pass with less resistance than material B, resulting in a lower pressure drop over the same height of material. Figure 3.18 shows a plot of the density distributions for both cases across the cutter height. Note that material B has a lower average density distribution because it has a lower overall total mass added over the feed zone. What is important to notice is that where material A has a fairly constant distribution, material B has a large variation across the cake height. The remaining plots, Fig. 3.11 - 3.17 show the density variations for the remaining test cases for material B.

From these plots and data in Table 3.1, it is obvious that the anomalies have a larger effect on the way the cake builds for material B than for material A. This is evident first in case two for both materials. Table 3.1 shows that for material A, the high density anomaly in case two causes the cake to be shorter than in the normal case, and a greater mass flux to pass above the cutter. This is to be expected, since the total mass is the same for the two cases, and the dense spot simply concentrates some of this mass. This shows that the anomaly has no significant secondary effects on the way the cake builds. This is not true for material B. Table 3.2 shows that for material B, the high density anomaly causes no change in the total cake height and a slight increase in the total mass flux. This means that when the dense spot was added to the cake, it initially caused

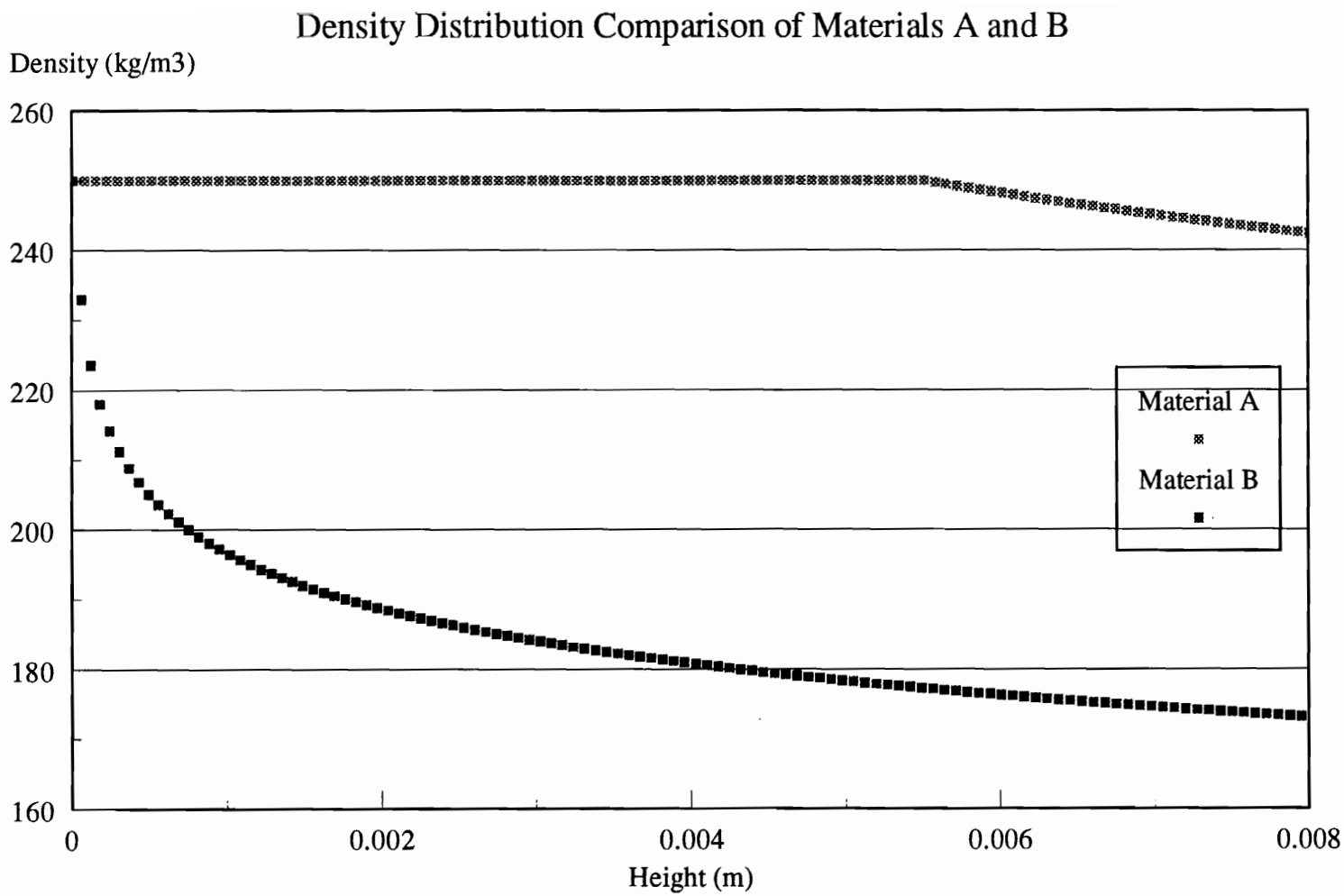

Figure 3.18 Density Distribution Comparison of Materials A and B Case 1

the cake to be shorter. As material was subsequently added on top of the anomaly, it acted as a spot of greater flow resistance and caused the cake built over top of it to build looser. The result is cake of the same height as in the case with no anomaly. The problem with this is that the lower part of the cake is less dense than normal, and this lower density can cause problems in later production.

The low density anomalies produced similar effects. For material A, Figs. 3.6, 3.8, 3.9, and 3.10 show the effects of moving the low density anomaly to different regions of the feed zone. From Table 3.1, it is shown that this anomaly produces a significant increase in the overall cake height (~ 5.5%). It also shows that as the low density spot moves from the beginning of the feed zone towards the cutter, the cake height gets only slightly larger (~0.3%). The mass flux passing above the cutter also is significantly different from the normal case (7.9%), but does not change at all as the anomaly is moved around the feed zone. Note that for case seven, Fig. 3.10, the low density spot ends up overlapping the cutter at 8.0 mm, so the mass flux number given should not compare with the other low density cases. As in the high density anomaly case, this shows that the anomalies do not have any large secondary effects on the way the cake forms after the low density spot occurs. The overall cake height is larger, but only due to the added thickness of the anomalies. The cake formed beneath the spots is basically the same as in the normal case. For material B, the effects of the anomalies is greater. Figures 3.13 and 3.15-3.17, show the effects of moving the low density anomaly around for material B. Table 3.2 shows that low density spot causes the cake to build to a greater height than the normal case (~3.0%), and for a slightly lower mass flux to pass above the cutter (~ 4.0%). This is not very different from what would be expected, except that as the anomaly is moved towards the cutter, the mass flux passing above the cutter gets closer to the normal case. This means that there are some secondary effects to the cake building on top of the anomaly, and these effects are reduced as the low density spot is moved closer to the cutter. This is because the anomalies closer to the cutter have less cake built up on top of them. Also, it is interesting to note that for material A, the

overall cake height increases as the anomaly moves closer to the cutter, but for material B, the cake height decreases. This also shows that where material A does not have any secondary effects from the anomalies, material B does.

The effects of the two anomalies together are less interesting. For material A, the cake has a greater height and a lower mass flux passing above the cutter. The same is true for material B.

Improving the Performance of Material B

A couple of methods for attempting to improve the formation performance of material B became evident as this research progressed. The objective was to form a cake of material B with a more uniform density distribution by altering machine related parameters. Another case was run through the computer model where the plenum pressure was doubled from 8000 Pa to 16000 Pa and the width of the rails was increased from 9.0 mm to 9.5 mm. In order to achieve the same mass flux of continuous cake, it was necessary to lower the cutter from 8.0 mm to 7.6 mm and adjust the total mass added over the feed zone accordingly. This set-up would produce a continuous cake of the same cross-sectional area as the normal set-up, but with a more oblique shape, (7.6 mm x 9.5 mm) as opposed to (8 mm x 9 mm).

This case was run and the resulting density distribution is shown in Fig. 3.18 compared to the normal set-up. This shows that the machine changes resulted in a small improvement inoi the cake formed by material B. The density change is not as great out to the cutter height. This benefit would have to be weighed against the difficulty in modifying the cake formation machine, and any problems that might occur with the change in cross-section.

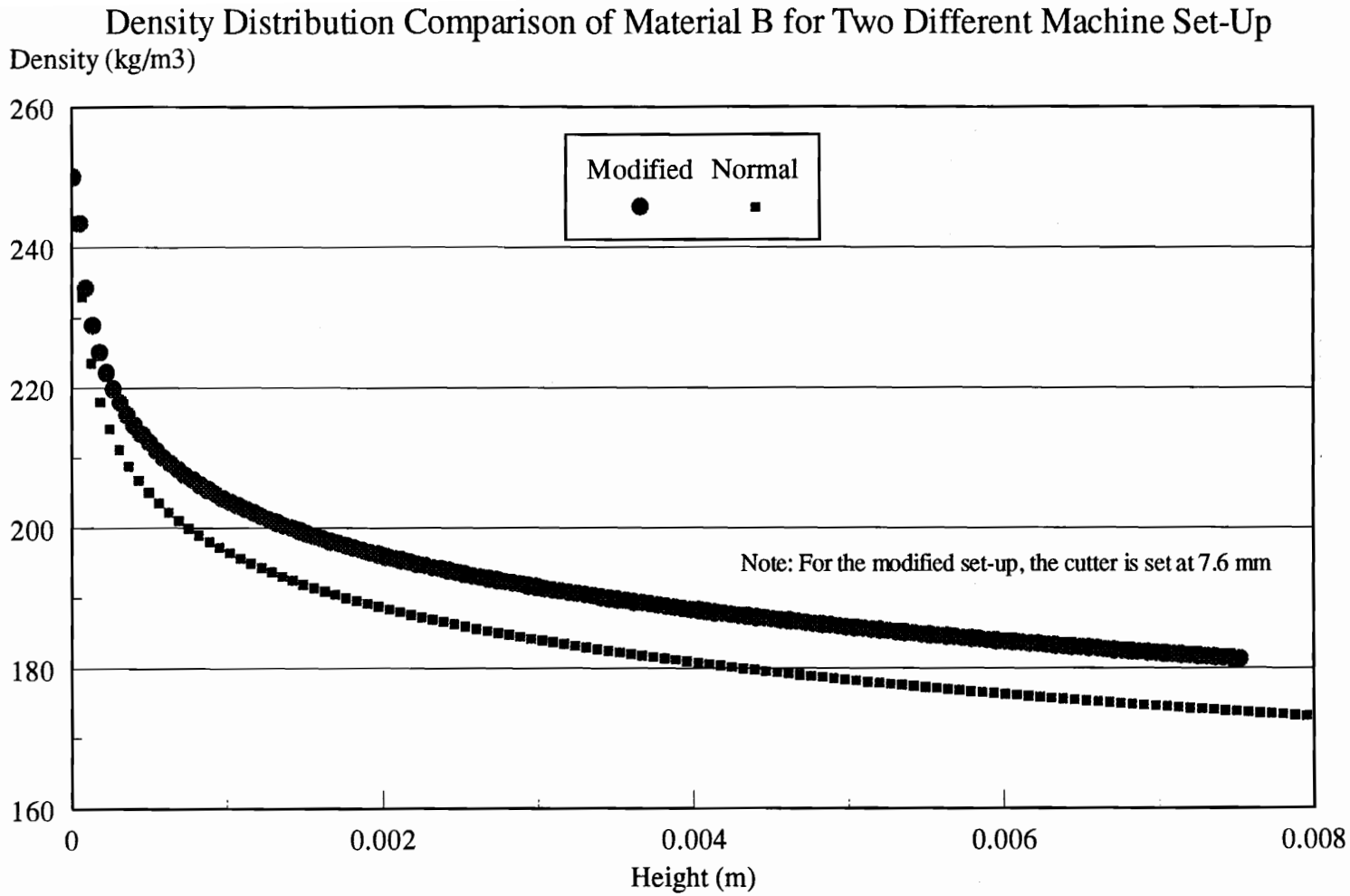

Figure 3.19 Density Distribution Comparison of Material B for Two Different Machine Set-Ups

IV. CONCLUSIONS AND RECOMMENDATIONS

A numerical model of the formation of a cake of fibrous porous material has been developed and a computer code written to solve this model. The model gives the density distribution of the formed cake for a variety of input parameters involving the material and cake formation process. Also, equations relating the density, permeability and pressure gradient for two different materials were found by building a permeability device and performing experiments on these materials. Seven different test cases were run on each of these materials in order to see their effects on the formed cake and verify that the numerical model produced reasonable results.

It has been determined that materials A and B have different properties that could lead to different characteristics in cake that they produce. From the experimental data, material A is more permeable and more compressible than material B. The numerical model shows that these differences lead to distinct density distributions. Material A has a flat, almost constant final density distribution, while B has a large variation in the density across the final cake height. Also, material B is affected more by density anomalies in the feed material.

From this analysis, there are some methods of changing the cake formation machines operating parameters to make material B have a more constant density profile. First, the plenum pressure could be increased in order to put more pressure on the cake to compress it to a greater and more uniform density. Also, the sidewalls could be moved farther apart, and the total mass over the feed zone could be increased. This would give more surface area for the same pressure, and the added mass would help to maintain the required mass flux for the formed cake. The model shows that this gives some improvement to the formed cake, but the biggest factor is the properties of the material. If they could be changed by mixing them with another material, or somehow altering the size and/or shape of the fibers, then this material could be formed into better cake.

REFERENCES

Bear, J., 1974, Dynamics of Fluids in Porous Media, American Elsevier Publishing Company, pp. 119-129, 176-180.

Churchill, Chao and Ozoe, (1981), "Extrapolation of Finite-Difference Calculations of Laminar Natural Convection in Enclosures to Zero Grid Size", Numerical Heat Transfer, Vol. 4, pp. 39-51.

Hassanizadeh, S.M., and Gray, W.G., 1987, "High Velocity Flow in porous Media," Transport in Porous Media, Vol. 2, pp. 522-523.

Scheidegger, A.E., 1957, The Physics of Flow Through Porous Media, 3rd ed., University of Toronto Press, pp. 73-75.

Ward, J.C., 1964, "Turbulent Flow in Porous Media", Proc. Amer. Soc. Civil., No. HY5, pp. 1-12.

APPENDIX A - Data Collected in Experiments

Material A

Mass (gms)	Flow Rate (SCFM)	Pressure Drop (in H_20)	Height (in)	Velocity (m/s)	Density (kg/m^3)	Permeability (e^{-10})	Rek	Pressure Gradient (Pa/mm)
0.75	3.00	1.0	0.63	2.438	81.365	26.746	9.48	15.68
0.75	4.00	2.8	0.56	3.251	90.405	11.463	8.28	48.78
0.75	4.55	5.4	0.50	3.698	101.706	6.010	6.82	105.83
1.00	3.00	1.3	0.88	2.438	77.490	28.804	9.84	14.56
1.00	4.00	3.9	0.81	3.251	83.451	11.887	8.43	47.04
1.00	4.55	6.8	0.69	3.698	98.624	6.562	7.12	96.92
1.25	3.00	1.6	1.00	2.438	84.755	26.746	9.48	15.68
1.25	4.00	5.2	0.94	3.251	90.405	10.287	7.84	54.35
1.25	4.55	9.4	0.88	3.698	96.863	6.042	6.83	105.27
1.50	3.00	2.3	1.13	2.438	90.405	20.932	8.39	20.03
1.50	4.00	7.4	1.00	3.251	101.706	7.711	6.79	72.51
1.50	4.55	12.4	0.94	3.698	108.486	4.907	6.16	129.61
0.75	3.00	0.9	0.75	2.438	67.804	35.662	10.95	11.76
0.75	4.00	2.5	0.56	3.251	90.405	12.838	8.76	43.55
0.75	4.55	4.5	0.50	3.698	101.706	7.212	7.47	88.19
1.00	3.00	1.1	0.75	2.438	90.405	29.178	9.90	14.37
1.00	4.00	3.2	0.75	3.251	90.405	13.373	8.94	41.81
1.00	4.55	5.4	0.69	3.698	98.624	8.263	7.99	76.97
1.25	3.00	1.7	1.06	2.438	79.769	26.746	9.48	15.68
1.50	3.00	2.3	1.06	2.438	95.723	19.769	8.15	21.21
1.50	4.00	6.4	1.00	3.251	101.706	8.915	7.30	62.71
1.50	4.55	12.0	0.88	3.698	116.235	4.733	6.05	134.39
0.75	3.00	0.8	0.69	2.438	73.968	36.776	11.12	11.40
0.75	4.00	2.5	0.63	3.251	81.365	14.265	9.23	39.20
0.75	4.55	4.6	0.56	3.698	90.405	7.937	7.83	80.14
1.00	3.00	1.3	0.81	2.438	83.451	26.746	9.48	15.68
1.00	4.00	4.4	0.75	3.251	90.405	9.726	7.62	57.49
1.00	4.50	7.5	0.63	3.658	108.486	5.349	6.36	117.59
1.25	3.10	1.9	1.00	2.520	84.755	23.274	9.14	18.62
1.25	4.00	5.0	0.94	3.251	90.405	10.698	8.00	52.26
1.25	4.50	8.9	0.88	3.658	96.863	6.311	6.91	99.67
1.50	3.00	2.5	1.13	2.438	90.405	19.257	8.05	21.78
1.50	4.00	8.1	1.00	3.251	101.706	7.044	6.49	79.37
1.50	4.50	13.9	0.88	3.658	116.235	4.041	5.53	155.67
1.75	3.00	3.4	1.19	2.438	99.922	14.946	7.09	28.06
1.75	4.05	10.8	1.06	3.292	111.677	5.684	5.90	99.61

1.75	4.50	17.1	1.00	3.658	118.657	3.754	5.33	167.57
0.75	3.00	1.0	0.63	2.438	81.365	26.746	9.48	15.68
0.75	3.50	1.6	0.56	2.845	90.405	17.552	8.96	27.87
0.75	4.00	3.0	0.50	3.251	101.706	9.510	7.54	58.80
0.75	4.50	5.0	0.50	3.658	101.706	6.419	6.97	97.99
1.00	3.00	1.5	0.88	2.438	77.490	24.963	9.16	16.80
1.00	3.50	2.6	0.81	2.845	83.451	15.602	8.45	31.36
1.00	4.00	4.8	0.75	3.251	90.405	8.915	7.30	62.71
1.00	4.50	8.0	0.75	3.658	90.405	6.018	6.75	104.52
1.25	3.00	1.6	1.06	2.438	79.769	28.418	9.77	14.76
1.25	3.50	3.0	0.94	2.845	90.405	15.602	8.45	31.36
1.25	4.00	5.3	0.94	3.251	90.405	10.093	7.77	55.40
1.25	4.50	9.3	0.88	3.658	96.863	6.039	6.76	104.15
1.50	3.00	2.6	1.06	2.438	95.723	17.488	7.67	23.98
1.50	3.50	4.6	1.00	2.845	101.706	10.854	7.05	45.08
1.50	4.00	7.8	1.00	3.251	101.706	7.315	6.61	76.43
1.50	4.60	14.3	0.88	3.739	116.235	4.015	5.63	160.15
1.75	3.00	2.8	1.38	2.438	86.296	21.015	8.40	19.95
1.75	3.50	5.2	1.19	2.845	99.922	11.401	7.22	42.91
1.75	4.00	9.3	1.06	3.251	111.677	6.519	6.24	85.77
1.75	4.60	17.4	1.00	3.739	118.657	3.771	5.46	170.51
0.75	3.00	0.8	0.63	2.438	81.365	33.433	10.60	12.54
0.75	3.50	1.7	0.56	2.845	90.405	16.520	8.69	29.62
0.75	4.00	2.8	0.50	3.251	101.706	10.189	7.80	54.88
0.75	4.55	5.0	0.50	3.698	101.706	6.490	7.08	97.99
1.00	3.00	1.2	0.88	2.438	77.490	31.204	10.24	13.44
1.00	3.50	2.4	0.88	2.845	77.490	18.202	9.13	26.88
1.00	4.00	4.2	0.75	3.251	90.405	10.189	7.80	54.88
1.00	4.60	7.4	0.69	3.739	98.624	6.096	6.94	105.48
1.25	3.00	1.8	1.13	2.438	75.338	26.746	9.48	15.68
1.25	3.50	3.2	1.00	2.845	84.755	15.602	8.45	31.36
1.25	4.00	5.6	1.00	3.251	84.755	10.189	7.80	54.88
1.25	4.60	10.9	0.94	3.739	90.405	5.644	6.68	113.93
1.50	3.00	2.4	1.19	2.438	85.647	21.174	8.44	19.80
1.50	3.50	4.4	1.13	2.845	90.405	12.765	7.64	38.33
1.50	4.00	8.0	1.00	3.251	101.706	7.132	6.53	78.39
1.50	4.50	12.8	0.94	3.658	108.486	4.701	5.96	133.79
1.75	3.00	3	1.31	2.438	90.405	18.722	7.93	22.40
1.75	3.50	5.3	1.25	2.845	94.926	11.775	7.34	41.55
1.75	4.00	9.5	1.13	3.251	105.473	6.757	6.35	82.75
1.75	4.50	16.1	1.06	3.658	111.677	4.236	5.66	148.49
0.75	3.00	3.6	0.31	2.438	162.730	3.715	3.53	112.89
0.75	3.50	6	0.31	2.845	162.730	2.600	3.45	188.14

0.75	4.00	10.3	0.31	3.251	162.730	1.731	3.22	322.98
0.75	4.60	18.3	0.31	3.739	162.730	1.121	2.98	573.84
1.00	3.00	4	0.50	2.438	135.608	5.349	4.24	78.39
1.00	3.50	6.4	0.50	2.845	135.608	3.900	4.22	125.43
1.00	4.00	11.4	0.50	3.251	135.608	2.503	3.87	223.42
1.00	4.60	19.7	0.50	3.739	135.608	1.665	3.63	386.09
1.25	3.00	4.3	0.59	2.438	142.745	5.909	4.46	70.97
1.25	3.50	7.6	0.59	2.845	142.745	3.900	4.22	125.43
1.25	4.00	11.6	0.59	3.251	142.745	2.921	4.18	191.45
1.25	4.60	17.7	0.59	3.739	142.745	2.201	4.17	292.12
2.00	4.05	21.7	1.00	3.292	135.608	2.662	4.04	212.64
2.00	4.30	27.1	0.94	3.495	144.649	2.122	3.83	283.26
2.00	4.05	12.5	1.13	3.292	120.540	5.199	5.64	108.88
2.00	4.75	28	0.94	3.861	144.649	2.269	4.37	292.67
2.00	4.00	12.2	1.25	3.251	108.486	5.846	5.91	95.64
2.00	4.50	20.5	1.13	3.658	120.540	3.523	5.16	178.56
2.00	4.75	27.3	1.00	3.861	135.608	2.482	4.57	267.52
1.50	4.00	20.4	0.56	3.251	180.811	1.573	3.07	355.38
1.50	4.35	27.3	0.56	3.536	180.811	1.279	3.01	475.59
1.75	4.00	17.2	0.88	3.251	135.608	2.903	4.16	192.62
1.75	4.50	26.9	0.88	3.658	135.608	2.088	3.97	301.26
1.75	4.60	29.9	0.88	3.739	135.608	1.920	3.90	334.85

Material B

Mass (gms)	Flow Rate (SCFM)	Pressure Drop (in H_20)	Height (in)	Velocity (m/s)	Density (kg/m^3)	Permeability (e^{-10}) (m^2)	Re_k	Pressure Gradient (Pa/mm)
0.50	3.05	0.8	0.56	2.479	60.270	30.591	10.31	13.94
0.50	3.50	1.3	0.5625	2.845	60.270	21.603	9.94	22.65
0.75	3.00	1.5	0.75	2.438	67.804	21.397	8.48	19.60
0.75	3.60	2.9	0.6875	2.926	73.968	12.174	7.68	41.33
0.75	4.05	4.7	0.625	3.292	81.365	7.682	6.86	73.69
0.75	4.80	9.7	0.625	3.901	81.365	4.412	6.16	152.08
1.00	3.00	1.6	1.0625	2.438	63.816	28.418	9.77	14.76
1.00	3.55	3.1	1.0625	2.885	63.816	17.356	9.04	28.59
1.00	4.00	5.6	1	3.251	67.804	10.189	7.80	54.88
1.00	4.85	13.3	0.9375	3.942	72.324	4.877	6.55	139.02
1.25	3.05	3.7	1.1875	2.479	71.373	13.963	6.97	30.53
1.25	3.50	7	1.0625	2.845	79.769	7.578	5.89	64.56
1.25	4.05	12.6	1	3.292	84.755	4.585	5.30	123.47
1.25	4.85	27	1	3.942	84.755	2.562	4.74	264.58
1.50	3.10	5.9	1.25	2.520	81.365	9.369	5.80	46.25
1.50	3.50	10.2	1.1875	2.845	85.647	5.812	5.16	84.17
1.50	4.00	17.3	1.125	3.251	90.405	3.710	4.71	150.69
1.50	4.55	28.6	1.0625	3.698	95.723	2.411	4.32	263.77
1.75	3.10	4.8	1.375	2.520	86.296	12.667	6.74	34.21
1.75	3.50	8.6	1.3125	2.845	90.405	7.620	5.90	64.21
1.75	4.10	15.4	1.25	3.332	94.926	4.747	5.46	120.73
1.75	4.75	28.8	1.1875	3.861	99.922	2.794	4.85	237.66
2.00	3.05	9.4	1.5	2.479	90.405	6.943	4.91	61.41
2.00	3.50	15	1.3125	2.845	103.320	4.369	4.47	111.99
2.00	4.00	25.9	1.3125	3.251	103.320	2.891	4.16	193.37
2.00	4.60	28.8	1.25	3.739	108.486	2.848	4.74	225.77
0.75	3.00	2.6	0.6875	2.438	73.968	11.316	6.17	37.06
0.75	3.50	4.5	0.625	2.845	81.365	6.934	5.63	70.55
0.75	4.10	7.7	0.5625	3.332	90.405	4.272	5.18	134.14
0.75	4.85	16.5	0.5625	3.942	90.405	2.359	4.55	287.44
1.00	3.00	4.2	0.8125	2.438	83.451	8.279	5.28	50.65
1.00	3.50	7.2	0.8125	2.845	83.451	5.634	5.08	86.84
1.00	4.00	12.4	0.75	3.251	90.405	3.451	4.54	162.01
1.00	4.85	26.7	0.6875	3.942	98.624	1.781	3.96	380.57
1.25	3.00	3.4	1.0625	2.438	79.769	13.373	6.70	31.36
1.25	3.55	6.8	1	2.885	84.755	7.447	5.92	66.63
1.25	4.00	11	1	3.251	84.755	5.187	5.57	107.79

1.25	4.85	25.1	0.875	3.942	96.863	2.412	4.60	281.10
1.50	3.00	4.2	1.3125	2.438	77.490	13.373	6.70	31.36
1.50	3.50	7.2	1.1875	2.845	85.647	8.234	6.14	59.41
1.50	4.05	12.6	1.1875	3.292	85.647	5.445	5.78	103.97
1.50	3.10	22.8	0.5	2.520	203.412	0.970	1.87	446.84
1.75	3.00	7.8	1.25	2.438	94.926	6.858	4.80	61.15
1.75	3.50	13.3	1.1875	2.845	99.922	4.458	4.52	109.75
1.75	4.00	22.8	1.1875	3.251	99.922	2.972	4.21	188.14
1.75	4.30	30.5	1.125	3.495	105.473	2.262	3.95	265.67
1.75	4.00	30.9	0.9375	3.251	126.567	1.731	3.22	322.98
2.00	3.00	10.8	1.4375	2.438	94.336	5.696	4.38	73.62
2.00	3.50	19.8	1.375	2.845	98.624	3.467	3.98	141.11
2.00	3.90	29.5	1.3125	3.170	103.320	2.475	3.75	220.25
1.00	3.90	29.9	0.4375	3.170	154.981	0.814	2.15	669.71
0.75	3.05	4	0.5625	2.479	90.405	6.118	4.61	69.68
0.75	3.55	7	0.5625	2.885	90.405	4.069	4.38	121.95
0.75	4.00	12	0.5	3.251	101.706	2.377	3.77	235.18
0.75	4.90	26.8	0.5	3.983	101.706	1.304	3.42	525.24
1.00	2.95	4	0.8125	2.398	83.451	8.548	5.27	48.24
1.00	3.50	6.9	0.75	2.845	90.405	5.427	4.98	90.15
1.00	4.00	11.9	0.75	3.251	90.405	3.596	4.64	155.48
1.00	4.90	27.7	0.6875	3.983	98.624	1.735	3.94	394.82
1.25	3.05	5.1	1	2.479	84.755	8.531	5.44	49.98
1.25	3.55	9.3	1	2.885	84.755	5.445	5.06	91.13
1.25	4.00	15.6	0.9375	3.251	90.405	3.429	4.53	163.06
1.25	4.65	29.9	0.875	3.780	96.863	1.941	3.96	334.85
1.50	3.10	5.1	1.25	2.520	81.365	10.838	6.24	39.98
1.50	3.50	9.3	1.25	2.845	81.365	6.711	5.54	72.91
1.50	4.00	16.6	1.1875	3.251	85.647	4.082	4.94	136.98
1.50	4.65	29.5	1	3.780	101.706	2.248	4.26	289.08
1.50	3.95	30.3	0.6875	3.211	147.936	1.278	2.73	431.88
1.75	3.05	7.5	1.375	2.479	86.296	7.976	5.26	53.45
1.75	3.50	11.9	1.375	2.845	86.296	5.769	5.14	84.81
1.75	4.00	20.9	1.3125	3.251	90.405	3.583	4.63	156.04
1.75	4.40	19.9	1.3125	3.576	90.405	4.140	5.47	148.57
1.75	3.75	30.3	0.9375	3.048	126.567	1.655	2.95	316.71

APPENDIX B - Listing of Computer Code

```
C234567890
C MODEL OF CAKE FORMATION ON SUCTION ROD CONVEYOR
C VARIABLES
C  V(X)=VELOCITY AT XTH POSITION ALONG CONVEYOR
C  H(Y)=CAKE HEIGHT OF YTH MASS
C  P(Y)=INTERMEDIATE PRESSURE AT THE BOTTOM OF YTH MASS
C  RHO(Y)=DENSITY OF CAKE AT YTH MASS
C  PERM(Y)=PERMEABILITY OF CAKE AT YTH MASS
      IMPLICIT DOUBLE PRECISION (A-H,O-Z,L)
      COMMON/CONST/ A,B,C,D,CNU,DMDX,N,W,RHOC,HV,PV,C1,CRHO
     1,TOL,PP,CMU,DUD,PT,F,FF
      DIMENSION V(321),H(321),RHO(321),PERM(321),PINT(321),
     1X(321),PB(321),HTT(321),FLX(321)

C**  A AND B ARE THE REGRESSION COEFFICIENTS FOR THE DENSITY PRESSURE GRADIENT RELATION
C**  C AND D ARE THE REGRESSION COEFFICIENTS FOR THE DENSITY PERMEABILITY RELATION

      MAT=1

      IF (MAT.EQ.1) THEN
      A=32.4006D0
      B=16.58880
      C=6081.19D0
      D=-1.4725D0
      FLUX=0.0277D0
      ELSE
      A=38.2165D0
      B=10.750D0
      C=3956.61D0
      D=-1.4809D0
      FLUX=0.02001D0
      ENDIF

C**  OTHER CONSTANTS: CMU, CNU, & CRHO ARE AIR PROPERTIES
C**  PP AND PT ARE THE PLENUM AND ABOVE SCREEN PRESSURES
C**  L IS THE LENGTH AND W IS THE WIDTH OF THE SCREEN
C**  TOL IS THE CONVERGENCE TOLERANCE AND F AND FF ARE RELAXATION FACTORS
C**  H(1) IS THE INITAL HEIGHT, RHOC IS THE CLIPPING DENSITY
C**  NMAX IS THE # O'GRIDPOINTS, CUT IS CUTTER HEIGHT
C**  PN IS A MARKER VARABLE, AND C1 IS THE MULTIPLIER RELATING THE GUESSED
C**  VELOCITY TO THE TRUE VELOCITY AT THE PREVIOUS STEP

      CMU=17.2E-6
      CNU=1.33E-5
      CRHO=1.278D0
      PP=8000.0D0
      PT=0.0D0
      L=0.850D0
      W=0.009D0
      TOL=0.0000001D0
      F=0.003D0
      FF=0.0009D0
      FFF=0.001D0
      H(1)=0.00001D0
      RHOC=250.0D0
      NMAX=171
      PN=0.0D0
      EPS=TOL
      C1=0.8D0
      CUT=0.008D0

C**  THESE CONSTANTS ARE RELATED TO THE SPECIAL CASES OF ABNORMAL DENSITY VARIATIONS
C**  RHOV AND RHOF ARE THE DENSITY ANOMALIES AT THE FIRST AND SECOND REGIONS
C**  LV AND FV ARE THE LENGTHS OF THESE ANOMALIES, XV IS THEIR STARTING POINT
```

```
C** HV AND KV ARE HEIGHT AND PERMEABILITY ANOMALIES (OPTIONAL)

      MCASE=1
      OPEN(UNIT=7,FILE='OUTA1.TXT')
      RHOV=500.0D0
      RHOF=100.0D0
      LV=0.03D0
      FV=0.00D0
      XV=1.1D0
      HV=1.0D0
      KV=1.0D0

C** PROPERTIES OF INITIAL MASS OF TOBACCO

      X(1)=0.0D0
      V1=10.0D0
      IC=0
   10 PB1=PP-CRHO*0.5D0*V1*V1
      CALL DENSE(PT,PB1,H(1),RHO1)
      CALL PERME(RHO1,V1,PERM1)
      VNEW=PERM1*PB1/(H(1)*CMU)
      IF ((ABS(VNEW-V1)/VNEW).GT.TOL) THEN
      V1=0.8*V1+0.2*VNEW
      IC=IC+1
      IF (IC.GT.1000) THEN
      WRITE(*,*)' Initial velocity not converging!!'
      STOP
      ENDIF
      GOTO 10
      ENDIF
      V(1)=V1
      RHO(1)=RHO1
      PB(1)=PB1
      PERM(1)=PERM1
      DUD=H(1)/PERM(1)
      HTOT=H(1)
      HTT(1)=HTOT
      FLX(1)=H(1)*RHO(1)*W*1000.0D0
      PINT(1)=PT

C** INFO ABOUT DISCRETIZATION

      DELX=L/(NMAX-1)
      CMASS=H(1)*DELX*W*RHO(1)
      DELM=(FLUX*DELX-CMASS)/(NMAX-1)
      DMDX=DELM/DELX

      IF (MAT.EQ.1) THEN
      WRITE(7,12)'MATERIAL A    CASE',MCASE
      ELSE
      WRITE(7,12)'MATERIAL B    CASE',MCASE
      ENDIF
      WRITE(7,*)'INITIAL PARAMETERS AND CONSTANTS'
      WRITE(7,*)' STEPS IN AXIAL DIRECTION',NMAX-1
      WRITE(7,11)' DELX                ',DELX
      WRITE(7,11)' INITIAL HEIGHT      ',H(1)
      WRITE(7,11)' MAXIMUM DENSITY OF CAKE ',RHOC
      WRITE(7,11)' PLENUM PRESSURE     ',PP

   11 FORMAT(A25,F12.5)
   12 FORMAT(A19,I2)

C** THIS SECTION DOES THE MAIN ITERATION SOLVING FOR THE VELOCITIES
C** AND CAKE THICKNESSES ALONG THE CONVEYOR.  ALL VARIABLE WITH G
C** ARE GUESSED VARIABLES

      DO 500 N=2,NMAX
```

```
      X(N)=(N-1)*DELX

C** SECTION TO MODEL ABNORMAL PIECE OF TOBACCO, OR
C** SOME OTHER NON-NORMAL DENSITY

      IF ((X(N).GE.XV).AND.(X(N).LT.(XV+LV-EPS))) THEN
      CALL ABN(RHO,RHOV,H,PERM,V,PB,PINT,PN)
      ELSEIF ((X(N).GT.(XV+LV-EPS)).AND.(X(N).LE.(XV+LV+
     1FV-EPS))) THEN
      CALL ABN(RHO,RHOF,H,PERM,V,PB,PINT,PN)
      ELSE

      VG=C1*V(N-1)
      ICOUNT=1

C** START ITERATION LOOP HERE AFTER INITIAL GUESS

   50 IF (ICOUNT.GT.5000) THEN
      WRITE(*,*)'NOT CONVERGING AT N ='
      WRITE(*,60)N
   60 FORMAT(5X,I3)
      STOP
      ENDIF
      PBG=PP-CRHO*0.5D0*VG*VG
      PINTG=PT+VG*CMU*DUD

C** CHECK TO MAKE SURE THE GUESSED INTERMEDIATE
C** PRESSURE IS LESS THEN THE DRIVING PRESSURE

      IF (PINTG.GE.PBG) THEN
      VG = 0.9999D0*VG
      ICOUNT=ICOUNT
      GOTO 50
      ENDIF

C** CHECK TO MAKE SURE THE GUESSED PRESSURE IS GREATER
C** THAN THE PREVIOUS ITERATION'S INTERMEDIATE PRESSURE

      IF ((PINTG.LE.PINT(N-1)).AND.(PN.NE.N-1)) THEN
      VG = 1.0001D0*VG
      ICOUNT=ICOUNT
      GOTO 50
      ENDIF

C** CALL SUBROUTINES TO CALCULATE h, k AND DENSITY

      CALL HEIGHT(H(N-1),PINTG,PBG,RHO(N-1),HG)
      CALL DENSE(PINTG,PBG,HG,RHOG)
      CALL PERME(RHOG,VG,PERMG)

      VNEW=PERMG*(PBG-PINTG)/(CMU*HG)
      IF ((ABS(VNEW-VG)/VNEW).GT.(TOL)) THEN
C     WRITE(*,105)ICOUNT,N,VNEW-VG
  105 FORMAT('ICOUNT = ',I5,'   N =',I5,'   DIFF =',F15.7)

      IF (N.LT.100) THEN
      VG=F*VNEW+(1-F)*VG
      ELSE
      VG=FFF*VNEW+(1-FFF)*VG
      ENDIF

  110 ICOUNT=ICOUNT+1
      GOTO 50
      ENDIF
      V(N)=VG
      H(N)=HG
      PERM(N)=PERMG
```

```
      RHO(N)=RHOG
      PINT(N)=PINTG
      PB(N)=PBG
      ENDIF
      HTOT=HTOT+H(N)
      HTT(N)=HTOT
      FLX(N)=FLX(N-1)+RHO(N)*H(N)*W*1000.0D0
      DUD=H(1)/PERM(1)
      DO 200 I=2,N
      DUD=DUD+H(I)/PERM(I)
  200 CONTINUE
  500 CONTINUE


C** POSTPROCESSING CALCULATION TO FIND MASS FLUX

      FLUM=0.0D0
      DO 540 N=1,NMAX
      IF (HTT(N).LE.CUT) THEN
      FLUM=FLUM+RHO(N)*H(N)*W*1000
      ENDIF
  540 CONTINUE

C** OUTPUT HERE

      WRITE(7,545)'THE TOTAL CAKE HEIGHT (MM) IS ',HTOT*1000.0D0
      WRITE(7,545)'MASS FLUX PAST CUTTER (GM/M)  ',FLUM
      WRITE(7,*)' '
      WRITE(7,*)' '
      WRITE(7,*)'   X       V      PERM       RHO        H
     1 HTOT      PINT     PB      FLUX'
      HTOT=0.0D0
      DO 600 N=1,NMAX
      HTOT=HTOT+H(N)
      WRITE(7,550)X(N),V(N),PERM(N),RHO(N),H(N),HTOT,
     1PINT(N),PB(N),FLX(N)
  545 FORMAT(A30,F14.9)
  550 FORMAT(1X,F7.3,F8.3,1PE13.4,0P,F10.3,2E13.5,2F10.2,F12.4)
  600 CONTINUE
      STOP
      END

C** SUBROUTINE DEFINING DENSITY
      SUBROUTINE DENSE(P,PB,H,RHON)
      IMPLICIT DOUBLE PRECISION (A-H,O-Z)
      COMMON/CONST/ A,B,C,D,CNU,DMDX,N,W,RHOC,HV,PV,C1,CRHO
     1,TOL,PP,CMU,DUD,PT,F,FF
      RHON=A+B*LOG((PB-P)/H)
      IF (RHON.GE.RHOC) THEN
      RHON=RHOC
      ENDIF
      RETURN
      END

C** SUBROUTINE DEFINING PERMEABILITY
      SUBROUTINE PERME(RHO,V,PERMN)
      IMPLICIT DOUBLE PRECISION (A-H,O-Z)
      COMMON/CONST/ A,B,C,D,CNU,DMDX,N,W,RHOC,HV,PV,C1,CRHO
     1,TOL,PP,CMU,DUD,PT,F,FF
      PERMN=(CNU*C*(RHO**D)/V)**2
      RETURN
      END

C** SUBROUTINE FOR NEWTON-RAPHSON ITERATION TO SOLVE FOR H
      SUBROUTINE HEIGHT(HPR,PINT,PB,RHOI,HG)
      IMPLICIT DOUBLE PRECISION (A-H,O-Z)
      COMMON/CONST/ A,B,C,D,CNU,DMDX,N,W,RHOC,HV,PV,C1,CRHO
```

```
     1,TOL,PP,CMU,DUD,PT,F,FF
      HOG=1.00*HPR
      IF (N.EQ.2) THEN
      HOG=DMDX/(W*RHOI)
      ENDIF
      IC=1
   70 IF (IC.GT.5000) THEN
      WRITE(*,*) 'H NOT CONVERGING AT N = ',N
      STOP
      ENDIF
      FH=(DMDX/W)-A*HOG-B*HOG*LOG(PB-PINT)+B*HOG*LOG(HOG)
      DFDH=B*(1-LOG(PB-PINT))-A+B*LOG(HOG)
      HNG=HOG-0.5*FH/DFDH
      IF (HNG.LE.0) THEN
      HOG=1.0001*HOG
      IC=IC+1
      GOTO 70
      ENDIF
      TEST=(DMDX/W)-A*HNG-B*HNG*LOG((PB-PINT)/HNG)
      HOG=HNG
      IF (TEST.GE.TOL) THEN
      IC=IC+1
      GOTO 70
      ENDIF
      HG=HNG
      TEST=DMDX/(W*HG)
      IF (TEST.GE.RHOC) THEN
      HG=DMDX/(W*RHOC)
      ENDIF
   80 RETURN
      END

C** SUBROUTINE FOR CALCULATING ABNORMAL DENSITIES
      SUBROUTINE ABN(RHO,RHOV,H,PERM,V,PB,PINT,PN)
      IMPLICIT DOUBLE PRECISION (A-H,O-Z)
      COMMON/CONST/ A,B,C,D,CNU,DMDX,N,W,RHOC,HV,PV,C1,CRHO
     1,TOL,PP,CMU,DUD,PT,F,FF
      DIMENSION V(301),H(301),RHO(301),PERM(301),PINT(301),
     1X(301),PB(301)
      RHO(N)=RHOV
      H(N)=DMDX/(W*RHO(N))
      V1=C1*V(N-1)
      IC=0
   20 PB1=PP-CRHO*0.5D0*V1*V1
      CALL PERME(RHO(N),V1,PERM1)
      P1=PT+V1*CMU*DUD
      IF (P1.GT.PB1) THEN
      V1=V1*0.9995D0
      GOTO 20
      ENDIF
      VNEW=PERM1*(PB1-P1)/(H(N)*CMU)
      IF ((ABS(VNEW-V1)/VNEW).GT.TOL) THEN
      V1=FF*VNEW+(1-FF)*V1
      IC=IC+1
      IF (IC.GT.3000) THEN
      WRITE(*,*)' Anomaly velocity not converging!'
      STOP
      ENDIF
      GOTO 20
      ENDIF
      V(N)=V1
      PB(N)=PB1
      PERM(N)=PERM1
      PINT(N)=P1
      PN=N
      RETURN
      END
```

APPENDIX C - Grid Refinement Analysis

In order to determine the proper number of discrete steps that should be used for the test cases, an analysis of the effects of grid size was performed. This analysis was done using the regression equations for material B because this material gives more variation than material A. The variable analyzed was the total cake height at the end of the feed zone. Figure C.1 shows the effect of the grid size on the final cake height. The value of the cake height at an infinite number of grid points was found using the Richardson extrapolation method as in Churchill et al. (1981), and the relative errors of each of the different grid sizes were found.

First, the order of the method was found by solving the following equation for n:

$$n = \frac{\log\left[1 - \left(\frac{x_1 - x_2}{x_1 - x_3}\right) \cdot \left(1 - \left[\frac{h_3}{h_1}\right]^n\right)\right]}{\log\left(\frac{h_2}{h_1}\right)}$$

where x_1 is the cake height at a 320 point grid size, x_2 is the height at a 160 point grid size, x_3 is the height at an 80 point grid size, and h_i is the grid spacing at which x_i was obtained. These values are given in table C.1. Solving this equation yields an order of about 0.7. The value for the cake height at a zero grid size can extrapolated using n in the following equation:

$$x_0 = \frac{\left(\frac{h_2}{h_1}\right)^n \cdot x_1 - x_2}{\left(\frac{h_2}{h_1}\right)^n - 1}$$

Solving this equation yields a zero grid size of 15.7418mm. This value can be used to calculate the relative errors of the different grid sizes. These relative errors are given in Table C.1.

Table C.1 Relative Errors for Different Grid Sizes

Number of Grid Points	Cake Height (mm)	% Error from Zero Grid Value
20	15.625	0.781
40	15.667	0.515
80	15.697	0.324
160	15.716	0.201
320	15.729	0.124
∞	15.748	

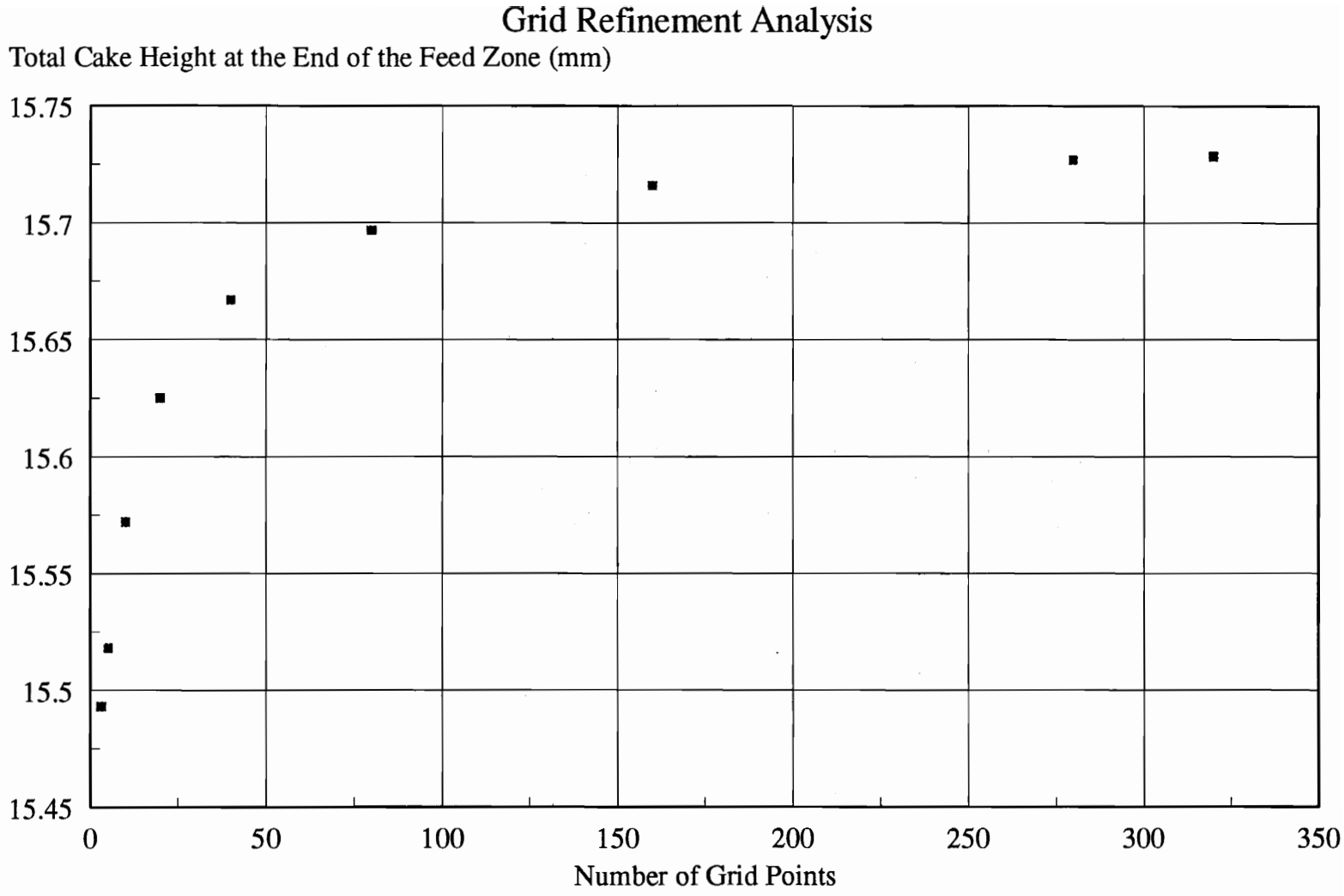

Figure C.1 Cake Height versus Grid Size

APPENDIX D - Output from Test Cases

MATERIAL A CASE 1
INITIAL PARAMETERS AND CONSTANTS
STEPS IN AXIAL DIRECTION 170
DELX 0.00500
INITIAL HEIGHT 0.00001
MAXIMUM DENSITY OF CAKE 250.00000
PLENUM PRESSURE 8000.00000
THE TOTAL CAKE HEIGHT (MM) IS 12.577055610
MASS FLUX PAST CUTTER (GM/M) 17.768643934

X	V	PERM	RHO	H	HTOT	PINT	PB	FLUX
0.000	29.083	6.7060E-13	250.000	0.10000E-04	0.10000E-04	0.00	7459.51	0.0225
0.005	12.808	3.4577E-12	250.000	0.72359E-04	0.82359E-04	3285.08	7895.18	0.1853
0.010	9.666	6.0706E-12	250.000	0.72359E-04	0.15472E-03	5958.55	7940.29	0.3481
0.015	8.209	8.4174E-12	250.000	0.72359E-04	0.22708E-03	6743.18	7956.94	0.5109
0.020	7.327	1.0565E-11	250.000	0.72359E-04	0.29944E-03	7102.47	7965.69	0.6737
0.025	6.720	1.2561E-11	250.000	0.72359E-04	0.37180E-03	7305.31	7971.14	0.8365
0.030	6.268	1.4439E-11	250.000	0.72359E-04	0.44416E-03	7434.66	7974.90	0.9994
0.035	5.913	1.6222E-11	250.000	0.72359E-04	0.51652E-03	7523.97	7977.66	1.1622
0.040	5.625	1.7925E-11	250.000	0.72359E-04	0.58888E-03	7589.19	7979.78	1.3250
0.045	5.385	1.9561E-11	250.000	0.72359E-04	0.66124E-03	7638.84	7981.47	1.4878
0.050	5.180	2.1138E-11	250.000	0.72359E-04	0.73359E-03	7677.86	7982.85	1.6506
0.055	5.003	2.2665E-11	250.000	0.72359E-04	0.80595E-03	7709.30	7984.01	1.8134
0.060	4.847	2.4147E-11	250.000	0.72359E-04	0.87831E-03	7735.18	7984.99	1.9762
0.065	4.708	2.5588E-11	250.000	0.72359E-04	0.95067E-03	7756.83	7985.84	2.1390
0.070	4.584	2.6993E-11	250.000	0.72359E-04	0.10230E-02	7775.21	7986.57	2.3018
0.075	4.472	2.8365E-11	250.000	0.72359E-04	0.10954E-02	7791.01	7987.22	2.4646
0.080	4.370	2.9707E-11	250.000	0.72359E-04	0.11678E-02	7804.73	7987.80	2.6274
0.085	4.276	3.1021E-11	250.000	0.72359E-04	0.12401E-02	7816.76	7988.32	2.7903
0.090	4.190	3.2310E-11	250.000	0.72359E-04	0.13125E-02	7827.39	7988.78	2.9531
0.095	4.110	3.3575E-11	250.000	0.72359E-04	0.13848E-02	7836.84	7989.20	3.1159
0.100	4.036	3.4818E-11	250.000	0.72359E-04	0.14572E-02	7845.31	7989.59	3.2787
0.105	3.967	3.6040E-11	250.000	0.72359E-04	0.15295E-02	7852.94	7989.94	3.4415
0.110	3.903	3.7243E-11	250.000	0.72359E-04	0.16019E-02	7859.85	7990.27	3.6043
0.115	3.842	3.8428E-11	250.000	0.72359E-04	0.16743E-02	7866.14	7990.57	3.7671
0.120	3.785	3.9595E-11	250.000	0.72359E-04	0.17466E-02	7871.88	7990.85	3.9299
0.125	3.731	4.0747E-11	250.000	0.72359E-04	0.18190E-02	7877.14	7991.10	4.0927
0.130	3.680	4.1883E-11	250.000	0.72359E-04	0.18913E-02	7881.99	7991.35	4.2555
0.135	3.632	4.3004E-11	250.000	0.72359E-04	0.19637E-02	7886.46	7991.57	4.4183
0.140	3.586	4.4112E-11	250.000	0.72359E-04	0.20361E-02	7890.61	7991.78	4.5811
0.145	3.542	4.5206E-11	250.000	0.72359E-04	0.21084E-02	7894.46	7991.98	4.7440
0.150	3.501	4.6288E-11	250.000	0.72359E-04	0.21808E-02	7898.05	7992.17	4.9068
0.155	3.461	4.7357E-11	250.000	0.72359E-04	0.22531E-02	7901.39	7992.35	5.0696
0.160	3.423	4.8415E-11	250.000	0.72359E-04	0.23255E-02	7904.53	7992.51	5.2324
0.165	3.386	4.9462E-11	250.000	0.72359E-04	0.23979E-02	7907.46	7992.67	5.3952
0.170	3.351	5.0499E-11	250.000	0.72359E-04	0.24702E-02	7910.22	7992.82	5.5580
0.175	3.318	5.1525E-11	250.000	0.72359E-04	0.25426E-02	7912.82	7992.97	5.7208
0.180	3.286	5.2542E-11	250.000	0.72359E-04	0.26149E-02	7915.27	7993.10	5.8836
0.185	3.255	5.3549E-11	250.000	0.72359E-04	0.26873E-02	7917.59	7993.23	6.0464
0.190	3.225	5.4547E-11	250.000	0.72359E-04	0.27597E-02	7919.78	7993.36	6.2092
0.195	3.196	5.5536E-11	250.000	0.72359E-04	0.28320E-02	7921.85	7993.47	6.3720
0.200	3.168	5.6516E-11	250.000	0.72359E-04	0.29044E-02	7923.82	7993.59	6.5349
0.205	3.141	5.7489E-11	250.000	0.72359E-04	0.29767E-02	7925.69	7993.70	6.6977
0.210	3.115	5.8453E-11	250.000	0.72359E-04	0.30491E-02	7927.47	7993.80	6.8605
0.215	3.090	5.9410E-11	250.000	0.72359E-04	0.31215E-02	7929.17	7993.90	7.0233
0.220	3.065	6.0359E-11	250.000	0.72359E-04	0.31938E-02	7930.79	7994.00	7.1861
0.225	3.042	6.1301E-11	250.000	0.72359E-04	0.32662E-02	7932.33	7994.09	7.3489
0.230	3.019	6.2237E-11	250.000	0.72359E-04	0.33385E-02	7933.81	7994.18	7.5117
0.235	2.997	6.3165E-11	250.000	0.72359E-04	0.34109E-02	7935.22	7994.26	7.6745
0.240	2.975	6.4087E-11	250.000	0.72359E-04	0.34833E-02	7936.57	7994.34	7.8373
0.245	2.954	6.5002E-11	250.000	0.72359E-04	0.35556E-02	7937.86	7994.42	8.0001

0.250	2.934	6.5911E-11	250.000	0.72359E-04	0.36280E-02	7939.11	7994.50	8.1629
0.255	2.914	6.6814E-11	250.000	0.72359E-04	0.37003E-02	7940.30	7994.58	8.3258
0.260	2.894	6.7711E-11	250.000	0.72359E-04	0.37727E-02	7941.45	7994.65	8.4886
0.265	2.875	6.8602E-11	250.000	0.72359E-04	0.38451E-02	7942.55	7994.72	8.6514
0.270	2.857	6.9487E-11	250.000	0.72359E-04	0.39174E-02	7943.61	7994.78	8.8142
0.275	2.839	7.0367E-11	250.000	0.72359E-04	0.39898E-02	7944.63	7994.85	8.9770
0.280	2.822	7.1242E-11	250.000	0.72359E-04	0.40621E-02	7945.62	7994.91	9.1398
0.285	2.805	7.2111E-11	250.000	0.72359E-04	0.41345E-02	7946.57	7994.97	9.3026
0.290	2.788	7.2976E-11	250.000	0.72359E-04	0.42068E-02	7947.49	7995.03	9.4654
0.295	2.772	7.3835E-11	250.000	0.72359E-04	0.42792E-02	7948.37	7995.09	9.6282
0.300	2.756	7.4690E-11	250.000	0.72359E-04	0.43516E-02	7949.23	7995.15	9.7910
0.305	2.740	7.5539E-11	250.000	0.72359E-04	0.44239E-02	7950.05	7995.20	9.9538
0.310	2.725	7.6384E-11	250.000	0.72359E-04	0.44963E-02	7950.85	7995.25	10.1166
0.315	2.710	7.7225E-11	250.000	0.72359E-04	0.45686E-02	7951.63	7995.31	10.2795
0.320	2.696	7.8061E-11	250.000	0.72359E-04	0.46410E-02	7952.38	7995.36	10.4423
0.325	2.681	7.8892E-11	250.000	0.72359E-04	0.47134E-02	7953.11	7995.41	10.6051
0.330	2.667	7.9720E-11	250.000	0.72359E-04	0.47857E-02	7953.81	7995.45	10.7679
0.335	2.654	8.0543E-11	250.000	0.72359E-04	0.48581E-02	7954.49	7995.50	10.9307
0.340	2.640	8.1362E-11	250.000	0.72359E-04	0.49304E-02	7955.16	7995.55	11.0935
0.345	2.627	8.2177E-11	250.000	0.72359E-04	0.50028E-02	7955.80	7995.59	11.2563
0.350	2.614	8.2988E-11	250.000	0.72359E-04	0.50752E-02	7956.42	7995.63	11.4191
0.355	2.602	8.3795E-11	250.000	0.72359E-04	0.51475E-02	7957.03	7995.67	11.5819
0.360	2.589	8.4598E-11	250.000	0.72359E-04	0.52199E-02	7957.62	7995.72	11.7447
0.365	2.577	8.5398E-11	250.000	0.72359E-04	0.52922E-02	7958.20	7995.76	11.9075
0.370	2.565	8.6194E-11	250.000	0.72359E-04	0.53646E-02	7958.75	7995.79	12.0704
0.375	2.554	8.6986E-11	250.000	0.72359E-04	0.54370E-02	7959.30	7995.83	12.2332
0.380	2.542	8.7775E-11	250.000	0.72359E-04	0.55093E-02	7959.83	7995.87	12.3960
0.385	2.531	8.8816E-11	249.753	0.72431E-04	0.55818E-02	7960.41	7995.91	12.5588
0.390	2.520	8.9884E-11	249.483	0.72509E-04	0.56543E-02	7960.98	7995.94	12.7216
0.395	2.509	9.0949E-11	249.216	0.72587E-04	0.57268E-02	7961.54	7995.98	12.8844
0.400	2.498	9.2011E-11	248.953	0.72664E-04	0.57995E-02	7962.08	7996.01	13.0472
0.405	2.488	9.3070E-11	248.693	0.72739E-04	0.58723E-02	7962.60	7996.05	13.2100
0.410	2.478	9.4126E-11	248.438	0.72814E-04	0.59451E-02	7963.11	7996.08	13.3728
0.415	2.468	9.5179E-11	248.186	0.72888E-04	0.60180E-02	7963.61	7996.11	13.5356
0.420	2.458	9.6230E-11	247.937	0.72961E-04	0.60909E-02	7964.09	7996.14	13.6984
0.425	2.448	9.7277E-11	247.692	0.73034E-04	0.61639E-02	7964.56	7996.17	13.8612
0.430	2.438	9.8323E-11	247.450	0.73105E-04	0.62371E-02	7965.02	7996.20	14.0241
0.435	2.429	9.9365E-11	247.211	0.73176E-04	0.63102E-02	7965.46	7996.23	14.1869
0.440	2.420	1.0040E-10	246.975	0.73245E-04	0.63835E-02	7965.90	7996.26	14.3497
0.445	2.411	1.0144E-10	246.742	0.73315E-04	0.64568E-02	7966.32	7996.29	14.5125
0.450	2.402	1.0248E-10	246.512	0.73383E-04	0.65302E-02	7966.73	7996.31	14.6753
0.455	2.393	1.0351E-10	246.286	0.73451E-04	0.66036E-02	7967.13	7996.34	14.8381
0.460	2.384	1.0454E-10	246.061	0.73517E-04	0.66771E-02	7967.52	7996.37	15.0009
0.465	2.376	1.0557E-10	245.840	0.73584E-04	0.67507E-02	7967.91	7996.39	15.1637
0.470	2.368	1.0659E-10	245.621	0.73649E-04	0.68244E-02	7968.28	7996.42	15.3265
0.475	2.359	1.0762E-10	245.405	0.73714E-04	0.68981E-02	7968.65	7996.44	15.4893
0.480	2.351	1.0864E-10	245.191	0.73778E-04	0.69719E-02	7969.00	7996.47	15.6521
0.485	2.343	1.0965E-10	244.980	0.73842E-04	0.70457E-02	7969.35	7996.49	15.8149
0.490	2.335	1.1067E-10	244.772	0.73905E-04	0.71196E-02	7969.69	7996.51	15.9778
0.495	2.328	1.1168E-10	244.565	0.73967E-04	0.71936E-02	7970.02	7996.54	16.1406
0.500	2.320	1.1270E-10	244.361	0.74029E-04	0.72676E-02	7970.35	7996.56	16.3034
0.505	2.313	1.1371E-10	244.159	0.74090E-04	0.73417E-02	7970.66	7996.58	16.4662
0.510	2.305	1.1471E-10	243.960	0.74151E-04	0.74158E-02	7970.98	7996.60	16.6290
0.515	2.298	1.1572E-10	243.762	0.74211E-04	0.74901E-02	7971.28	7996.63	16.7918
0.520	2.291	1.1672E-10	243.567	0.74270E-04	0.75643E-02	7971.58	7996.65	16.9546
0.525	2.284	1.1772E-10	243.374	0.74329E-04	0.76387E-02	7971.87	7996.67	17.1174
0.530	2.277	1.1872E-10	243.183	0.74388E-04	0.77130E-02	7972.15	7996.69	17.2802
0.535	2.270	1.1972E-10	242.994	0.74446E-04	0.77875E-02	7972.43	7996.71	17.4430
0.540	2.263	1.2072E-10	242.806	0.74503E-04	0.78620E-02	7972.71	7996.73	17.6058
0.545	2.256	1.2171E-10	242.621	0.74560E-04	0.79366E-02	7972.98	7996.75	17.7686
0.550	2.250	1.2270E-10	242.437	0.74616E-04	0.80112E-02	7973.24	7996.77	17.9315
0.555	2.243	1.2369E-10	242.256	0.74672E-04	0.80858E-02	7973.50	7996.79	18.0943
0.560	2.237	1.2468E-10	242.076	0.74728E-04	0.81606E-02	7973.75	7996.80	18.2571
0.565	2.230	1.2567E-10	241.898	0.74783E-04	0.82354E-02	7974.00	7996.82	18.4199
0.570	2.224	1.2665E-10	241.721	0.74837E-04	0.83102E-02	7974.24	7996.84	18.5827
0.575	2.218	1.2764E-10	241.547	0.74891E-04	0.83851E-02	7974.48	7996.86	18.7455
0.580	2.211	1.2862E-10	241.374	0.74945E-04	0.84600E-02	7974.71	7996.87	18.9083

0.585	2.205	1.2960E-10	241.202	0.74998E-04	0.85350E-02	7974.94	7996.89	19.0711
0.590	2.199	1.3057E-10	241.033	0.75051E-04	0.86101E-02	7975.16	7996.91	19.2339
0.595	2.193	1.3155E-10	240.864	0.75104E-04	0.86852E-02	7975.39	7996.93	19.3967
0.600	2.188	1.3252E-10	240.698	0.75156E-04	0.87603E-02	7975.60	7996.94	19.5595
0.605	2.182	1.3350E-10	240.532	0.75207E-04	0.88355E-02	7975.82	7996.96	19.7223
0.610	2.176	1.3447E-10	240.369	0.75258E-04	0.89108E-02	7976.03	7996.97	19.8851
0.615	2.171	1.3544E-10	240.206	0.75309E-04	0.89861E-02	7976.23	7996.99	20.0480
0.620	2.165	1.3640E-10	240.046	0.75360E-04	0.90615E-02	7976.43	7997.01	20.2108
0.625	2.159	1.3737E-10	239.886	0.75410E-04	0.91369E-02	7976.63	7997.02	20.3736
0.630	2.154	1.3833E-10	239.728	0.75460E-04	0.92123E-02	7976.83	7997.04	20.5364
0.635	2.149	1.3930E-10	239.572	0.75509E-04	0.92878E-02	7977.02	7997.05	20.6992
0.640	2.143	1.4026E-10	239.416	0.75558E-04	0.93634E-02	7977.21	7997.06	20.8620
0.645	2.138	1.4122E-10	239.262	0.75607E-04	0.94390E-02	7977.39	7997.08	21.0248
0.650	2.133	1.4218E-10	239.110	0.75655E-04	0.95147E-02	7977.57	7997.09	21.1876
0.655	2.128	1.4314E-10	238.958	0.75703E-04	0.95904E-02	7977.75	7997.11	21.3504
0.660	2.122	1.4409E-10	238.808	0.75750E-04	0.96661E-02	7977.93	7997.12	21.5132
0.665	2.117	1.4504E-10	238.659	0.75798E-04	0.97419E-02	7978.10	7997.14	21.6760
0.670	2.112	1.4600E-10	238.511	0.75845E-04	0.98178E-02	7978.27	7997.15	21.8388
0.675	2.108	1.4695E-10	238.365	0.75891E-04	0.98937E-02	7978.44	7997.16	22.0017
0.680	2.103	1.4790E-10	238.219	0.75938E-04	0.99696E-02	7978.61	7997.17	22.1645
0.685	2.098	1.4885E-10	238.075	0.75984E-04	0.10046E-01	7978.77	7997.19	22.3273
0.690	2.093	1.4979E-10	237.932	0.76029E-04	0.10122E-01	7978.93	7997.20	22.4901
0.695	2.088	1.5074E-10	237.790	0.76075E-04	0.10198E-01	7979.09	7997.21	22.6529
0.700	2.084	1.5168E-10	237.649	0.76120E-04	0.10274E-01	7979.24	7997.23	22.8157
0.705	2.079	1.5263E-10	237.509	0.76165E-04	0.10350E-01	7979.39	7997.24	22.9785
0.710	2.074	1.5357E-10	237.370	0.76209E-04	0.10426E-01	7979.55	7997.25	23.1413
0.715	2.070	1.5451E-10	237.232	0.76253E-04	0.10502E-01	7979.69	7997.26	23.3041
0.720	2.065	1.5545E-10	237.096	0.76297E-04	0.10579E-01	7979.84	7997.27	23.4669
0.725	2.061	1.5639E-10	236.960	0.76341E-04	0.10655E-01	7979.98	7997.29	23.6297
0.730	2.056	1.5732E-10	236.825	0.76385E-04	0.10731E-01	7980.13	7997.30	23.7925
0.735	2.052	1.5826E-10	236.692	0.76428E-04	0.10808E-01	7980.26	7997.31	23.9553
0.740	2.048	1.5919E-10	236.559	0.76471E-04	0.10884E-01	7980.40	7997.32	24.1182
0.745	2.043	1.6012E-10	236.427	0.76513E-04	0.10961E-01	7980.54	7997.33	24.2810
0.750	2.039	1.6106E-10	236.296	0.76556E-04	0.11037E-01	7980.67	7997.34	24.4438
0.755	2.035	1.6199E-10	236.166	0.76598E-04	0.11114E-01	7980.80	7997.35	24.6066
0.760	2.031	1.6292E-10	236.037	0.76640E-04	0.11191E-01	7980.93	7997.36	24.7694
0.765	2.027	1.6384E-10	235.909	0.76681E-04	0.11267E-01	7981.06	7997.38	24.9322
0.770	2.022	1.6477E-10	235.782	0.76722E-04	0.11344E-01	7981.19	7997.39	25.0950
0.775	2.018	1.6570E-10	235.656	0.76764E-04	0.11421E-01	7981.31	7997.40	25.2578
0.780	2.014	1.6662E-10	235.530	0.76804E-04	0.11498E-01	7981.44	7997.41	25.4206
0.785	2.010	1.6754E-10	235.406	0.76845E-04	0.11574E-01	7981.56	7997.42	25.5834
0.790	2.006	1.6847E-10	235.282	0.76886E-04	0.11651E-01	7981.68	7997.43	25.7462
0.795	2.002	1.6939E-10	235.159	0.76926E-04	0.11728E-01	7981.80	7997.44	25.9090
0.800	1.999	1.7031E-10	235.037	0.76966E-04	0.11805E-01	7981.91	7997.45	26.0719
0.805	1.995	1.7123E-10	234.916	0.77005E-04	0.11882E-01	7982.03	7997.46	26.2347
0.810	1.991	1.7214E-10	234.796	0.77045E-04	0.11959E-01	7982.14	7997.47	26.3975
0.815	1.987	1.7306E-10	234.676	0.77084E-04	0.12036E-01	7982.25	7997.48	26.5603
0.820	1.983	1.7397E-10	234.557	0.77123E-04	0.12114E-01	7982.36	7997.49	26.7231
0.825	1.980	1.7489E-10	234.439	0.77162E-04	0.12191E-01	7982.47	7997.50	26.8859
0.830	1.976	1.7580E-10	234.321	0.77201E-04	0.12268E-01	7982.58	7997.51	27.0487
0.835	1.972	1.7671E-10	234.205	0.77239E-04	0.12345E-01	7982.69	7997.51	27.2115
0.840	1.969	1.7763E-10	234.089	0.77277E-04	0.12422E-01	7982.79	7997.52	27.3743
0.845	1.965	1.7854E-10	233.974	0.77316E-04	0.12500E-01	7982.90	7997.53	27.5371
0.850	1.962	1.7944E-10	233.859	0.77353E-04	0.12577E-01	7983.00	7997.54	27.6999

MATERIAL A CASE 2
INITIAL PARAMETERS AND CONSTANTS
STEPS IN AXIAL DIRECTION 170
DELX 0.00500
INITIAL HEIGHT 0.00001
MAXIMUM DENSITY OF CAKE 250.00000
PLENUM PRESSURE 8000.00000
THE TOTAL CAKE HEIGHT (MM) IS 12.446911904
MASS FLUX PAST CUTTER (GM/M) 18.257053907

X	V	PERM	RHO	H	HTOT	PINT	PB	FLUX
0.000	29.083	6.7060E-13	250.000	0.10000E-04	0.10000E-04	0.00	7459.51	0.0225
0.005	12.808	3.4577E-12	250.000	0.72359E-04	0.82359E-04	3285.08	7895.18	0.1853
0.010	9.666	6.0706E-12	250.000	0.72359E-04	0.15472E-03	5958.55	7940.29	0.3481
0.015	8.209	8.4174E-12	250.000	0.72359E-04	0.22708E-03	6743.18	7956.94	0.5109
0.020	7.327	1.0565E-11	250.000	0.72359E-04	0.29944E-03	7102.47	7965.69	0.6737
0.025	6.720	1.2561E-11	250.000	0.72359E-04	0.37180E-03	7305.31	7971.14	0.8365
0.030	6.268	1.4439E-11	250.000	0.72359E-04	0.44416E-03	7434.66	7974.90	0.9994
0.035	5.913	1.6222E-11	250.000	0.72359E-04	0.51652E-03	7523.97	7977.66	1.1622
0.040	5.625	1.7925E-11	250.000	0.72359E-04	0.58888E-03	7589.19	7979.78	1.3250
0.045	5.385	1.9561E-11	250.000	0.72359E-04	0.66124E-03	7638.84	7981.47	1.4878
0.050	5.180	2.1138E-11	250.000	0.72359E-04	0.73359E-03	7677.86	7982.85	1.6506
0.055	5.003	2.2665E-11	250.000	0.72359E-04	0.80595E-03	7709.30	7984.01	1.8134
0.060	4.847	2.4147E-11	250.000	0.72359E-04	0.87831E-03	7735.18	7984.99	1.9762
0.065	4.708	2.5588E-11	250.000	0.72359E-04	0.95067E-03	7756.83	7985.84	2.1390
0.070	4.584	2.6993E-11	250.000	0.72359E-04	0.10230E-02	7775.21	7986.57	2.3018
0.075	4.472	2.8365E-11	250.000	0.72359E-04	0.10954E-02	7791.01	7987.22	2.4646
0.080	4.370	2.9707E-11	250.000	0.72359E-04	0.11678E-02	7804.73	7987.80	2.6274
0.085	4.276	3.1021E-11	250.000	0.72359E-04	0.12401E-02	7816.76	7988.32	2.7903
0.090	4.190	3.2310E-11	250.000	0.72359E-04	0.13125E-02	7827.39	7988.78	2.9531
0.095	4.110	3.3575E-11	250.000	0.72359E-04	0.13848E-02	7836.84	7989.20	3.1159
0.100	3.861	4.9416E-12	500.000	0.36180E-04	0.14210E-02	7504.30	7990.48	3.2787
0.105	3.661	5.4958E-12	500.000	0.36180E-04	0.14572E-02	7576.91	7991.44	3.4415
0.110	3.496	6.0269E-12	500.000	0.36180E-04	0.14934E-02	7631.23	7992.19	3.6043
0.115	3.356	6.5381E-12	500.000	0.36180E-04	0.15295E-02	7673.34	7992.80	3.7671
0.120	3.236	7.0322E-12	500.000	0.36180E-04	0.15657E-02	7706.91	7993.31	3.9299
0.125	3.132	7.5111E-12	500.000	0.36180E-04	0.16019E-02	7734.29	7993.73	4.0927
0.130	3.106	5.8803E-11	250.000	0.72359E-04	0.16743E-02	7928.10	7993.84	4.2555
0.135	3.081	5.9757E-11	250.000	0.72359E-04	0.17466E-02	7929.77	7993.93	4.4183
0.140	3.057	6.0704E-11	250.000	0.72359E-04	0.18190E-02	7931.36	7994.03	4.5811
0.145	3.033	6.1643E-11	250.000	0.72359E-04	0.18913E-02	7932.88	7994.12	4.7440
0.150	3.011	6.2576E-11	250.000	0.72359E-04	0.19637E-02	7934.33	7994.21	4.9068
0.155	2.989	6.3502E-11	250.000	0.72359E-04	0.20361E-02	7935.72	7994.29	5.0696
0.160	2.967	6.4421E-11	250.000	0.72359E-04	0.21084E-02	7937.05	7994.37	5.2324
0.165	2.946	6.5334E-11	250.000	0.72359E-04	0.21808E-02	7938.32	7994.45	5.3952
0.170	2.926	6.6241E-11	250.000	0.72359E-04	0.22531E-02	7939.55	7994.53	5.5580
0.175	2.907	6.7141E-11	250.000	0.72359E-04	0.23255E-02	7940.72	7994.60	5.7208
0.180	2.887	6.8036E-11	250.000	0.72359E-04	0.23979E-02	7941.85	7994.67	5.8836
0.185	2.869	6.8925E-11	250.000	0.72359E-04	0.24702E-02	7942.94	7994.74	6.0464
0.190	2.850	6.9809E-11	250.000	0.72359E-04	0.25426E-02	7943.99	7994.81	6.2092
0.195	2.833	7.0687E-11	250.000	0.72359E-04	0.26149E-02	7945.00	7994.87	6.3720
0.200	2.815	7.1560E-11	250.000	0.72359E-04	0.26873E-02	7945.97	7994.93	6.5349
0.205	2.798	7.2427E-11	250.000	0.72359E-04	0.27597E-02	7946.91	7995.00	6.6977
0.210	2.782	7.3290E-11	250.000	0.72359E-04	0.28320E-02	7947.81	7995.05	6.8605
0.215	2.766	7.4147E-11	250.000	0.72359E-04	0.29044E-02	7948.69	7995.11	7.0233
0.220	2.750	7.5000E-11	250.000	0.72359E-04	0.29767E-02	7949.53	7995.17	7.1861
0.225	2.735	7.5848E-11	250.000	0.72359E-04	0.30491E-02	7950.35	7995.22	7.3489
0.230	2.720	7.6691E-11	250.000	0.72359E-04	0.31215E-02	7951.14	7995.27	7.5117
0.235	2.705	7.7530E-11	250.000	0.72359E-04	0.31938E-02	7951.90	7995.33	7.6745
0.240	2.690	7.8364E-11	250.000	0.72359E-04	0.32662E-02	7952.65	7995.37	7.8373
0.245	2.676	7.9194E-11	250.000	0.72359E-04	0.33385E-02	7953.36	7995.42	8.0001
0.250	2.662	8.0020E-11	250.000	0.72359E-04	0.34109E-02	7954.06	7995.47	8.1629
0.255	2.649	8.0842E-11	250.000	0.72359E-04	0.34833E-02	7954.74	7995.52	8.3258
0.260	2.636	8.1659E-11	250.000	0.72359E-04	0.35556E-02	7955.39	7995.56	8.4886
0.265	2.623	8.2473E-11	250.000	0.72359E-04	0.36280E-02	7956.03	7995.61	8.6514
0.270	2.610	8.3282E-11	250.000	0.72359E-04	0.37003E-02	7956.65	7995.65	8.8142

0.275	2.597	8.4088E-11	250.000	0.72359E-04	0.37727E-02	7957.25	7995.69	8.9770
0.280	2.585	8.4890E-11	250.000	0.72359E-04	0.38451E-02	7957.83	7995.73	9.1398
0.285	2.573	8.5688E-11	250.000	0.72359E-04	0.39174E-02	7958.40	7995.77	9.3026
0.290	2.561	8.6483E-11	250.000	0.72359E-04	0.39898E-02	7958.95	7995.81	9.4654
0.295	2.549	8.7274E-11	250.000	0.72359E-04	0.40621E-02	7959.49	7995.85	9.6282
0.300	2.538	8.8136E-11	249.928	0.72380E-04	0.41345E-02	7960.04	7995.88	9.7910
0.305	2.527	8.9206E-11	249.654	0.72459E-04	0.42070E-02	7960.62	7995.92	9.9538
0.310	2.516	9.0272E-11	249.385	0.72538E-04	0.42795E-02	7961.19	7995.96	10.1166
0.315	2.505	9.1336E-11	249.119	0.72615E-04	0.43521E-02	7961.74	7995.99	10.2795
0.320	2.494	9.2397E-11	248.858	0.72691E-04	0.44248E-02	7962.27	7996.02	10.4423
0.325	2.484	9.3455E-11	248.600	0.72767E-04	0.44976E-02	7962.79	7996.06	10.6051
0.330	2.474	9.4510E-11	248.345	0.72841E-04	0.45704E-02	7963.29	7996.09	10.7679
0.335	2.464	9.5562E-11	248.095	0.72915E-04	0.46433E-02	7963.79	7996.12	10.9307
0.340	2.454	9.6612E-11	247.847	0.72988E-04	0.47163E-02	7964.26	7996.15	11.0935
0.345	2.444	9.7659E-11	247.603	0.73060E-04	0.47894E-02	7964.73	7996.18	11.2563
0.350	2.435	9.8703E-11	247.362	0.73131E-04	0.48625E-02	7965.18	7996.21	11.4191
0.355	2.426	9.9744E-11	247.125	0.73201E-04	0.49357E-02	7965.62	7996.24	11.5819
0.360	2.416	1.0078E-10	246.890	0.73271E-04	0.50090E-02	7966.05	7996.27	11.7447
0.365	2.407	1.0182E-10	246.658	0.73340E-04	0.50823E-02	7966.47	7996.30	11.9075
0.370	2.399	1.0285E-10	246.429	0.73408E-04	0.51557E-02	7966.88	7996.32	12.0703
0.375	2.390	1.0389E-10	246.204	0.73475E-04	0.52292E-02	7967.28	7996.35	12.2332
0.380	2.381	1.0491E-10	245.980	0.73542E-04	0.53028E-02	7967.67	7996.38	12.3960
0.385	2.373	1.0594E-10	245.760	0.73608E-04	0.53764E-02	7968.04	7996.40	12.5588
0.390	2.365	1.0697E-10	245.542	0.73673E-04	0.54500E-02	7968.41	7996.43	12.7216
0.395	2.356	1.0799E-10	245.327	0.73738E-04	0.55238E-02	7968.78	7996.45	12.8844
0.400	2.348	1.0901E-10	245.114	0.73802E-04	0.55976E-02	7969.13	7996.48	13.0472
0.405	2.340	1.1003E-10	244.904	0.73865E-04	0.56714E-02	7969.47	7996.50	13.2100
0.410	2.333	1.1104E-10	244.696	0.73928E-04	0.57454E-02	7969.81	7996.52	13.3728
0.415	2.325	1.1205E-10	244.491	0.73990E-04	0.58194E-02	7970.14	7996.55	13.5356
0.420	2.317	1.1307E-10	244.287	0.74051E-04	0.58934E-02	7970.46	7996.57	13.6984
0.425	2.310	1.1407E-10	244.086	0.74112E-04	0.59675E-02	7970.78	7996.59	13.8612
0.430	2.303	1.1508E-10	243.888	0.74173E-04	0.60417E-02	7971.09	7996.61	14.0240
0.435	2.295	1.1609E-10	243.691	0.74233E-04	0.61159E-02	7971.39	7996.63	14.1869
0.440	2.288	1.1709E-10	243.496	0.74292E-04	0.61902E-02	7971.68	7996.65	14.3497
0.445	2.281	1.1809E-10	243.304	0.74351E-04	0.62646E-02	7971.97	7996.68	14.5125
0.450	2.274	1.1909E-10	243.114	0.74409E-04	0.63390E-02	7972.26	7996.70	14.6753
0.455	2.267	1.2009E-10	242.925	0.74467E-04	0.64134E-02	7972.53	7996.72	14.8381
0.460	2.260	1.2108E-10	242.739	0.74524E-04	0.64880E-02	7972.81	7996.74	15.0009
0.465	2.254	1.2207E-10	242.554	0.74581E-04	0.65625E-02	7973.07	7996.75	15.1637
0.470	2.247	1.2306E-10	242.371	0.74637E-04	0.66372E-02	7973.33	7996.77	15.3265
0.475	2.241	1.2405E-10	242.190	0.74692E-04	0.67119E-02	7973.59	7996.79	15.4893
0.480	2.234	1.2504E-10	242.011	0.74748E-04	0.67866E-02	7973.84	7996.81	15.6521
0.485	2.228	1.2603E-10	241.833	0.74803E-04	0.68614E-02	7974.08	7996.83	15.8149
0.490	2.222	1.2701E-10	241.658	0.74857E-04	0.69363E-02	7974.33	7996.85	15.9777
0.495	2.215	1.2799E-10	241.484	0.74911E-04	0.70112E-02	7974.56	7996.86	16.1405
0.500	2.209	1.2897E-10	241.311	0.74965E-04	0.70862E-02	7974.79	7996.88	16.3034
0.505	2.203	1.2995E-10	241.140	0.75018E-04	0.71612E-02	7975.02	7996.90	16.4662
0.510	2.197	1.3093E-10	240.971	0.75070E-04	0.72362E-02	7975.25	7996.91	16.6290
0.515	2.191	1.3190E-10	240.803	0.75123E-04	0.73114E-02	7975.47	7996.93	16.7918
0.520	2.186	1.3288E-10	240.637	0.75174E-04	0.73865E-02	7975.68	7996.95	16.9546
0.525	2.180	1.3385E-10	240.473	0.75226E-04	0.74618E-02	7975.89	7996.96	17.1174
0.530	2.174	1.3482E-10	240.309	0.75277E-04	0.75370E-02	7976.10	7996.98	17.2802
0.535	2.168	1.3579E-10	240.148	0.75328E-04	0.76124E-02	7976.30	7997.00	17.4430
0.540	2.163	1.3676E-10	239.987	0.75378E-04	0.76878E-02	7976.51	7997.01	17.6058
0.545	2.157	1.3772E-10	239.829	0.75428E-04	0.77632E-02	7976.70	7997.03	17.7686
0.550	2.152	1.3869E-10	239.671	0.75478E-04	0.78387E-02	7976.90	7997.04	17.9314
0.555	2.147	1.3965E-10	239.515	0.75527E-04	0.79142E-02	7977.09	7997.06	18.0942
0.560	2.141	1.4061E-10	239.360	0.75576E-04	0.79898E-02	7977.27	7997.07	18.2571
0.565	2.136	1.4157E-10	239.206	0.75624E-04	0.80654E-02	7977.46	7997.08	18.4199
0.570	2.131	1.4253E-10	239.054	0.75672E-04	0.81411E-02	7977.64	7997.10	18.5827
0.575	2.126	1.4348E-10	238.903	0.75720E-04	0.82168E-02	7977.82	7997.11	18.7455
0.580	2.121	1.4444E-10	238.753	0.75768E-04	0.82925E-02	7977.99	7997.13	18.9083
0.585	2.116	1.4539E-10	238.605	0.75815E-04	0.83684E-02	7978.17	7997.14	19.0711
0.590	2.111	1.4634E-10	238.458	0.75862E-04	0.84442E-02	7978.33	7997.15	19.2339
0.595	2.106	1.4730E-10	238.311	0.75908E-04	0.85201E-02	7978.50	7997.17	19.3967
0.600	2.101	1.4824E-10	238.166	0.75954E-04	0.85961E-02	7978.67	7997.18	19.5595
0.605	2.096	1.4919E-10	238.023	0.76000E-04	0.86721E-02	7978.83	7997.19	19.7223

0.610	2.091	1.5014E-10	237.880	0.76046E-04	0.87481E-02	7978.99	7997.21	19.8851
0.615	2.087	1.5108E-10	237.738	0.76091E-04	0.88242E-02	7979.14	7997.22	20.0479
0.620	2.082	1.5203E-10	237.598	0.76136E-04	0.89004E-02	7979.30	7997.23	20.2108
0.625	2.077	1.5297E-10	237.458	0.76181E-04	0.89765E-02	7979.45	7997.24	20.3736
0.630	2.073	1.5391E-10	237.320	0.76225E-04	0.90528E-02	7979.60	7997.25	20.5364
0.635	2.068	1.5485E-10	237.182	0.76270E-04	0.91290E-02	7979.75	7997.27	20.6992
0.640	2.064	1.5579E-10	237.046	0.76313E-04	0.92053E-02	7979.89	7997.28	20.8620
0.645	2.059	1.5673E-10	236.911	0.76357E-04	0.92817E-02	7980.04	7997.29	21.0248
0.650	2.055	1.5766E-10	236.776	0.76400E-04	0.93581E-02	7980.18	7997.30	21.1876
0.655	2.050	1.5860E-10	236.643	0.76443E-04	0.94345E-02	7980.32	7997.31	21.3504
0.660	2.046	1.5953E-10	236.511	0.76486E-04	0.95110E-02	7980.45	7997.32	21.5132
0.665	2.042	1.6046E-10	236.379	0.76529E-04	0.95876E-02	7980.59	7997.34	21.6760
0.670	2.038	1.6140E-10	236.249	0.76571E-04	0.96641E-02	7980.72	7997.35	21.8388
0.675	2.033	1.6233E-10	236.119	0.76613E-04	0.97407E-02	7980.85	7997.36	22.0016
0.680	2.029	1.6325E-10	235.991	0.76655E-04	0.98174E-02	7980.98	7997.37	22.1644
0.685	2.025	1.6418E-10	235.863	0.76696E-04	0.98941E-02	7981.11	7997.38	22.3273
0.690	2.021	1.6511E-10	235.736	0.76738E-04	0.99708E-02	7981.23	7997.39	22.4901
0.695	2.017	1.6603E-10	235.610	0.76779E-04	0.10048E-01	7981.36	7997.40	22.6529
0.700	2.013	1.6696E-10	235.485	0.76819E-04	0.10124E-01	7981.48	7997.41	22.8157
0.705	2.009	1.6788E-10	235.361	0.76860E-04	0.10201E-01	7981.60	7997.42	22.9785
0.710	2.005	1.6880E-10	235.237	0.76900E-04	0.10278E-01	7981.72	7997.43	23.1413
0.715	2.001	1.6972E-10	235.115	0.76940E-04	0.10355E-01	7981.84	7997.44	23.3041
0.720	1.997	1.7064E-10	234.993	0.76980E-04	0.10432E-01	7981.95	7997.45	23.4669
0.725	1.993	1.7156E-10	234.872	0.77020E-04	0.10509E-01	7982.07	7997.46	23.6297
0.730	1.990	1.7248E-10	234.752	0.77059E-04	0.10586E-01	7982.18	7997.47	23.7925
0.735	1.986	1.7339E-10	234.632	0.77098E-04	0.10663E-01	7982.29	7997.48	23.9553
0.740	1.982	1.7431E-10	234.514	0.77137E-04	0.10740E-01	7982.40	7997.49	24.1181
0.745	1.978	1.7522E-10	234.396	0.77176E-04	0.10818E-01	7982.51	7997.50	24.2810
0.750	1.975	1.7613E-10	234.279	0.77215E-04	0.10895E-01	7982.62	7997.51	24.4438
0.755	1.971	1.7705E-10	234.163	0.77253E-04	0.10972E-01	7982.73	7997.52	24.6066
0.760	1.967	1.7796E-10	234.047	0.77291E-04	0.11049E-01	7982.83	7997.53	24.7694
0.765	1.964	1.7887E-10	233.932	0.77329E-04	0.11127E-01	7982.93	7997.54	24.9322
0.770	1.960	1.7978E-10	233.818	0.77367E-04	0.11204E-01	7983.04	7997.54	25.0950
0.775	1.957	1.8068E-10	233.704	0.77405E-04	0.11281E-01	7983.14	7997.55	25.2578
0.780	1.953	1.8159E-10	233.592	0.77442E-04	0.11359E-01	7983.24	7997.56	25.4206
0.785	1.950	1.8250E-10	233.480	0.77479E-04	0.11436E-01	7983.33	7997.57	25.5834
0.790	1.946	1.8340E-10	233.368	0.77516E-04	0.11514E-01	7983.43	7997.58	25.7462
0.795	1.943	1.8430E-10	233.258	0.77553E-04	0.11591E-01	7983.53	7997.59	25.9090
0.800	1.939	1.8521E-10	233.147	0.77590E-04	0.11669E-01	7983.62	7997.60	26.0718
0.805	1.936	1.8611E-10	233.038	0.77626E-04	0.11747E-01	7983.72	7997.60	26.2347
0.810	1.933	1.8701E-10	232.929	0.77662E-04	0.11824E-01	7983.81	7997.61	26.3975
0.815	1.929	1.8791E-10	232.821	0.77698E-04	0.11902E-01	7983.90	7997.62	26.5603
0.820	1.926	1.8881E-10	232.714	0.77734E-04	0.11980E-01	7983.99	7997.63	26.7231
0.825	1.923	1.8970E-10	232.607	0.77770E-04	0.12058E-01	7984.08	7997.64	26.8859
0.830	1.920	1.9060E-10	232.501	0.77805E-04	0.12135E-01	7984.17	7997.65	27.0487
0.835	1.916	1.9150E-10	232.395	0.77841E-04	0.12213E-01	7984.25	7997.65	27.2115
0.840	1.913	1.9239E-10	232.290	0.77876E-04	0.12291E-01	7984.34	7997.66	27.3743
0.845	1.910	1.9329E-10	232.186	0.77911E-04	0.12369E-01	7984.43	7997.67	27.5371
0.850	1.907	1.9418E-10	232.082	0.77946E-04	0.12447E-01	7984.51	7997.68	27.6999

MATERIAL A CASE 3
INITIAL PARAMETERS AND CONSTANTS
STEPS IN AXIAL DIRECTION 170
DELX 0.00500
INITIAL HEIGHT 0.00001
MAXIMUM DENSITY OF CAKE 250.00000
PLENUM PRESSURE 8000.00000
THE TOTAL CAKE HEIGHT (MM) IS 13.285247385
MASS FLUX PAST CUTTER (GM/M) 16.475347218

X	V	PERM	RHO	H	HTOT	PINT	PB	FLUX
0.000	29.083	6.7060E-13	250.000	0.10000E-04	0.10000E-04	0.00	7459.51	0.0225
0.005	12.808	3.4577E-12	250.000	0.72359E-04	0.82359E-04	3285.08	7895.18	0.1853
0.010	9.666	6.0706E-12	250.000	0.72359E-04	0.15472E-03	5958.55	7940.29	0.3481
0.015	8.209	8.4174E-12	250.000	0.72359E-04	0.22708E-03	6743.18	7956.94	0.5109
0.020	7.327	1.0565E-11	250.000	0.72359E-04	0.29944E-03	7102.47	7965.69	0.6737
0.025	6.720	1.2561E-11	250.000	0.72359E-04	0.37180E-03	7305.31	7971.14	0.8365
0.030	6.268	1.4439E-11	250.000	0.72359E-04	0.44416E-03	7434.66	7974.90	0.9994
0.035	5.913	1.6222E-11	250.000	0.72359E-04	0.51652E-03	7523.97	7977.66	1.1622
0.040	5.625	1.7925E-11	250.000	0.72359E-04	0.58888E-03	7589.19	7979.78	1.3250
0.045	5.385	1.9561E-11	250.000	0.72359E-04	0.66124E-03	7638.84	7981.47	1.4878
0.050	5.180	2.1138E-11	250.000	0.72359E-04	0.73359E-03	7677.86	7982.85	1.6506
0.055	5.003	2.2665E-11	250.000	0.72359E-04	0.80595E-03	7709.30	7984.01	1.8134
0.060	4.847	2.4147E-11	250.000	0.72359E-04	0.87831E-03	7735.18	7984.99	1.9762
0.065	4.708	2.5588E-11	250.000	0.72359E-04	0.95067E-03	7756.83	7985.84	2.1390
0.070	4.584	2.6993E-11	250.000	0.72359E-04	0.10230E-02	7775.21	7986.57	2.3018
0.075	4.472	2.8365E-11	250.000	0.72359E-04	0.10954E-02	7791.01	7987.22	2.4646
0.080	4.370	2.9707E-11	250.000	0.72359E-04	0.11678E-02	7804.73	7987.80	2.6274
0.085	4.276	3.1021E-11	250.000	0.72359E-04	0.12401E-02	7816.76	7988.32	2.7903
0.090	4.190	3.2310E-11	250.000	0.72359E-04	0.13125E-02	7827.39	7988.78	2.9531
0.095	4.110	3.3575E-11	250.000	0.72359E-04	0.13848E-02	7836.84	7989.20	3.1159
0.100	4.097	5.0200E-10	100.000	0.18090E-03	0.15657E-02	7963.88	7989.27	3.2787
0.105	4.084	5.0517E-10	100.000	0.18090E-03	0.17466E-02	7964.18	7989.34	3.4415
0.110	4.072	5.0833E-10	100.000	0.18090E-03	0.19275E-02	7964.48	7989.41	3.6043
0.115	4.059	5.1148E-10	100.000	0.18090E-03	0.21084E-02	7964.78	7989.47	3.7671
0.120	4.047	5.1462E-10	100.000	0.18090E-03	0.22893E-02	7965.07	7989.54	3.9299
0.125	4.034	5.1775E-10	100.000	0.18090E-03	0.24702E-02	7965.35	7989.60	4.0927
0.130	3.923	3.6856E-11	250.000	0.12083E-03	0.25911E-02	7768.95	7990.17	4.3646
0.135	3.845	3.8371E-11	250.000	0.92635E-04	0.26837E-02	7830.90	7990.55	4.5730
0.140	3.782	3.9649E-11	250.000	0.79340E-04	0.27630E-02	7860.68	7990.86	4.7515
0.145	3.728	4.0811E-11	250.000	0.73067E-04	0.28361E-02	7876.31	7991.12	4.9159
0.150	3.677	4.1946E-11	250.000	0.72359E-04	0.29085E-02	7882.25	7991.36	5.0787
0.155	3.629	4.3066E-11	250.000	0.72359E-04	0.29808E-02	7886.70	7991.58	5.2415
0.160	3.583	4.4173E-11	250.000	0.72359E-04	0.30532E-02	7890.83	7991.79	5.4044
0.165	3.540	4.5267E-11	250.000	0.72359E-04	0.31255E-02	7894.67	7991.99	5.5672
0.170	3.498	4.6348E-11	250.000	0.72359E-04	0.31979E-02	7898.24	7992.18	5.7300
0.175	3.459	4.7417E-11	250.000	0.72359E-04	0.32703E-02	7901.57	7992.36	5.8928
0.180	3.421	4.8474E-11	250.000	0.72359E-04	0.33426E-02	7904.70	7992.52	6.0556
0.185	3.384	4.9521E-11	250.000	0.72359E-04	0.34150E-02	7907.62	7992.68	6.2184
0.190	3.350	5.0557E-11	250.000	0.72359E-04	0.34873E-02	7910.37	7992.83	6.3812
0.195	3.316	5.1582E-11	250.000	0.72359E-04	0.35597E-02	7912.96	7992.97	6.5440
0.200	3.284	5.2598E-11	250.000	0.72359E-04	0.36320E-02	7915.41	7993.11	6.7068
0.205	3.253	5.3605E-11	250.000	0.72359E-04	0.37044E-02	7917.71	7993.24	6.8696
0.210	3.223	5.4602E-11	250.000	0.72359E-04	0.37768E-02	7919.90	7993.36	7.0324
0.215	3.194	5.5591E-11	250.000	0.72359E-04	0.38491E-02	7921.97	7993.48	7.1953
0.220	3.166	5.6571E-11	250.000	0.72359E-04	0.39215E-02	7923.93	7993.59	7.3581
0.225	3.140	5.7543E-11	250.000	0.72359E-04	0.39938E-02	7925.79	7993.70	7.5209
0.230	3.114	5.8507E-11	250.000	0.72359E-04	0.40662E-02	7927.57	7993.81	7.6837
0.235	3.089	5.9463E-11	250.000	0.72359E-04	0.41386E-02	7929.26	7993.90	7.8465
0.240	3.064	6.0412E-11	250.000	0.72359E-04	0.42109E-02	7930.87	7994.00	8.0093
0.245	3.041	6.1354E-11	250.000	0.72359E-04	0.42833E-02	7932.41	7994.09	8.1721
0.250	3.018	6.2289E-11	250.000	0.72359E-04	0.43556E-02	7933.89	7994.18	8.3349
0.255	2.995	6.3217E-11	250.000	0.72359E-04	0.44280E-02	7935.29	7994.27	8.4977
0.260	2.974	6.4138E-11	250.000	0.72359E-04	0.45004E-02	7936.64	7994.35	8.6605
0.265	2.953	6.5053E-11	250.000	0.72359E-04	0.45727E-02	7937.93	7994.43	8.8233
0.270	2.932	6.5961E-11	250.000	0.72359E-04	0.46451E-02	7939.17	7994.51	8.9862

0.275	2.913	6.6864E-11	250.000	0.72359E-04	0.47174E-02	7940.37	7994.58	9.1490
0.280	2.893	6.7761E-11	250.000	0.72359E-04	0.47898E-02	7941.51	7994.65	9.3118
0.285	2.874	6.8651E-11	250.000	0.72359E-04	0.48622E-02	7942.61	7994.72	9.4746
0.290	2.856	6.9537E-11	250.000	0.72359E-04	0.49345E-02	7943.67	7994.79	9.6374
0.295	2.838	7.0416E-11	250.000	0.72359E-04	0.50069E-02	7944.69	7994.85	9.8002
0.300	2.821	7.1291E-11	250.000	0.72359E-04	0.50792E-02	7945.67	7994.92	9.9630
0.305	2.804	7.2160E-11	250.000	0.72359E-04	0.51516E-02	7946.62	7994.98	10.1258
0.310	2.787	7.3024E-11	250.000	0.72359E-04	0.52240E-02	7947.54	7995.04	10.2886
0.315	2.771	7.3883E-11	250.000	0.72359E-04	0.52963E-02	7948.42	7995.09	10.4514
0.320	2.755	7.4737E-11	250.000	0.72359E-04	0.53687E-02	7949.27	7995.15	10.6142
0.325	2.739	7.5587E-11	250.000	0.72359E-04	0.54410E-02	7950.10	7995.20	10.7770
0.330	2.724	7.6431E-11	250.000	0.72359E-04	0.55134E-02	7950.90	7995.26	10.9399
0.335	2.709	7.7272E-11	250.000	0.72359E-04	0.55858E-02	7951.67	7995.31	11.1027
0.340	2.695	7.8107E-11	250.000	0.72359E-04	0.56581E-02	7952.42	7995.36	11.2655
0.345	2.681	7.8939E-11	250.000	0.72359E-04	0.57305E-02	7953.15	7995.41	11.4283
0.350	2.667	7.9766E-11	250.000	0.72359E-04	0.58028E-02	7953.85	7995.46	11.5911
0.355	2.653	8.0589E-11	250.000	0.72359E-04	0.58752E-02	7954.53	7995.50	11.7539
0.360	2.640	8.1408E-11	250.000	0.72359E-04	0.59476E-02	7955.19	7995.55	11.9167
0.365	2.627	8.2222E-11	250.000	0.72359E-04	0.60199E-02	7955.83	7995.59	12.0795
0.370	2.614	8.3033E-11	250.000	0.72359E-04	0.60923E-02	7956.46	7995.63	12.2423
0.375	2.601	8.3840E-11	250.000	0.72359E-04	0.61646E-02	7957.07	7995.68	12.4051
0.380	2.589	8.4643E-11	250.000	0.72359E-04	0.62370E-02	7957.65	7995.72	12.5679
0.385	2.577	8.5442E-11	250.000	0.72359E-04	0.63093E-02	7958.23	7995.76	12.7308
0.390	2.565	8.6238E-11	250.000	0.72359E-04	0.63817E-02	7958.78	7995.80	12.8936
0.395	2.553	8.7030E-11	250.000	0.72359E-04	0.64541E-02	7959.33	7995.84	13.0564
0.400	2.541	8.7819E-11	250.000	0.72359E-04	0.65264E-02	7959.86	7995.87	13.2192
0.405	2.530	8.8876E-11	249.738	0.72435E-04	0.65989E-02	7960.44	7995.91	13.3820
0.410	2.519	8.9944E-11	249.468	0.72514E-04	0.66714E-02	7961.01	7995.94	13.5448
0.415	2.508	9.1008E-11	249.201	0.72591E-04	0.67440E-02	7961.57	7995.98	13.7076
0.420	2.498	9.2070E-11	248.938	0.72668E-04	0.68166E-02	7962.11	7996.01	13.8704
0.425	2.487	9.3129E-11	248.679	0.72744E-04	0.68894E-02	7962.63	7996.05	14.0332
0.430	2.477	9.4185E-11	248.424	0.72818E-04	0.69622E-02	7963.14	7996.08	14.1960
0.435	2.467	9.5238E-11	248.172	0.72892E-04	0.70351E-02	7963.64	7996.11	14.3588
0.440	2.457	9.6288E-11	247.923	0.72965E-04	0.71081E-02	7964.12	7996.14	14.5216
0.445	2.447	9.7336E-11	247.678	0.73038E-04	0.71811E-02	7964.59	7996.17	14.6845
0.450	2.438	9.8381E-11	247.436	0.73109E-04	0.72542E-02	7965.04	7996.20	14.8473
0.455	2.429	9.9423E-11	247.198	0.73180E-04	0.73274E-02	7965.49	7996.23	15.0101
0.460	2.419	1.0046E-10	246.962	0.73249E-04	0.74006E-02	7965.92	7996.26	15.1729
0.465	2.410	1.0150E-10	246.729	0.73318E-04	0.74739E-02	7966.34	7996.29	15.3357
0.470	2.401	1.0254E-10	246.500	0.73387E-04	0.75473E-02	7966.75	7996.32	15.4985
0.475	2.393	1.0357E-10	246.273	0.73454E-04	0.76208E-02	7967.15	7996.34	15.6613
0.480	2.384	1.0460E-10	246.049	0.73521E-04	0.76943E-02	7967.55	7996.37	15.8241
0.485	2.375	1.0562E-10	245.828	0.73587E-04	0.77679E-02	7967.93	7996.39	15.9869
0.490	2.367	1.0665E-10	245.609	0.73653E-04	0.78416E-02	7968.30	7996.42	16.1497
0.495	2.359	1.0767E-10	245.393	0.73718E-04	0.79153E-02	7968.67	7996.44	16.3125
0.500	2.351	1.0869E-10	245.180	0.73782E-04	0.79891E-02	7969.02	7996.47	16.4753
0.505	2.343	1.0971E-10	244.969	0.73845E-04	0.80629E-02	7969.37	7996.49	16.6382
0.510	2.335	1.1073E-10	244.760	0.73908E-04	0.81368E-02	7969.71	7996.52	16.8010
0.515	2.327	1.1174E-10	244.554	0.73971E-04	0.82108E-02	7970.04	7996.54	16.9638
0.520	2.320	1.1275E-10	244.350	0.74032E-04	0.82848E-02	7970.36	7996.56	17.1266
0.525	2.312	1.1376E-10	244.148	0.74094E-04	0.83589E-02	7970.68	7996.58	17.2894
0.530	2.305	1.1477E-10	243.949	0.74154E-04	0.84331E-02	7970.99	7996.61	17.4522
0.535	2.297	1.1578E-10	243.751	0.74214E-04	0.85073E-02	7971.30	7996.63	17.6150
0.540	2.290	1.1678E-10	243.556	0.74274E-04	0.85815E-02	7971.59	7996.65	17.7778
0.545	2.283	1.1778E-10	243.363	0.74333E-04	0.86559E-02	7971.88	7996.67	17.9406
0.550	2.276	1.1878E-10	243.172	0.74391E-04	0.87303E-02	7972.17	7996.69	18.1034
0.555	2.269	1.1978E-10	242.983	0.74449E-04	0.88047E-02	7972.45	7996.71	18.2662
0.560	2.262	1.2077E-10	242.796	0.74506E-04	0.88792E-02	7972.72	7996.73	18.4290
0.565	2.256	1.2177E-10	242.611	0.74563E-04	0.89538E-02	7972.99	7996.75	18.5919
0.570	2.249	1.2276E-10	242.427	0.74619E-04	0.90284E-02	7973.25	7996.77	18.7547
0.575	2.243	1.2375E-10	242.246	0.74675E-04	0.91031E-02	7973.51	7996.79	18.9175
0.580	2.236	1.2474E-10	242.066	0.74731E-04	0.91778E-02	7973.76	7996.80	19.0803
0.585	2.230	1.2572E-10	241.888	0.74786E-04	0.92526E-02	7974.01	7996.82	19.2431
0.590	2.223	1.2671E-10	241.712	0.74840E-04	0.93274E-02	7974.25	7996.84	19.4059
0.595	2.217	1.2769E-10	241.537	0.74894E-04	0.94023E-02	7974.49	7996.86	19.5687
0.600	2.211	1.2867E-10	241.364	0.74948E-04	0.94773E-02	7974.72	7996.88	19.7315
0.605	2.205	1.2965E-10	241.193	0.75001E-04	0.95523E-02	7974.95	7996.89	19.8943

0.610	2.199	1.3063E-10	241.023	0.75054E-04	0.96273E-02	7975.18	7996.91	20.0571
0.615	2.193	1.3160E-10	240.855	0.75107E-04	0.97024E-02	7975.40	7996.93	20.2199
0.620	2.187	1.3258E-10	240.688	0.75159E-04	0.97776E-02	7975.61	7996.94	20.3827
0.625	2.182	1.3355E-10	240.523	0.75210E-04	0.98528E-02	7975.83	7996.96	20.5456
0.630	2.176	1.3452E-10	240.360	0.75261E-04	0.99281E-02	7976.04	7996.97	20.7084
0.635	2.170	1.3549E-10	240.197	0.75312E-04	0.10003E-01	7976.24	7996.99	20.8712
0.640	2.165	1.3646E-10	240.037	0.75363E-04	0.10079E-01	7976.44	7997.01	21.0340
0.645	2.159	1.3742E-10	239.877	0.75413E-04	0.10154E-01	7976.64	7997.02	21.1968
0.650	2.154	1.3839E-10	239.719	0.75462E-04	0.10230E-01	7976.84	7997.04	21.3596
0.655	2.148	1.3935E-10	239.563	0.75512E-04	0.10305E-01	7977.03	7997.05	21.5224
0.660	2.143	1.4031E-10	239.408	0.75561E-04	0.10381E-01	7977.22	7997.07	21.6852
0.665	2.138	1.4127E-10	239.254	0.75609E-04	0.10456E-01	7977.40	7997.08	21.8480
0.670	2.132	1.4223E-10	239.101	0.75657E-04	0.10532E-01	7977.58	7997.09	22.0108
0.675	2.127	1.4319E-10	238.950	0.75705E-04	0.10608E-01	7977.76	7997.11	22.1736
0.680	2.122	1.4414E-10	238.799	0.75753E-04	0.10683E-01	7977.94	7997.12	22.3364
0.685	2.117	1.4510E-10	238.651	0.75800E-04	0.10759E-01	7978.11	7997.14	22.4992
0.690	2.112	1.4605E-10	238.503	0.75847E-04	0.10835E-01	7978.28	7997.15	22.6621
0.695	2.107	1.4700E-10	238.356	0.75894E-04	0.10911E-01	7978.45	7997.16	22.8249
0.700	2.102	1.4795E-10	238.211	0.75940E-04	0.10987E-01	7978.62	7997.18	22.9877
0.705	2.098	1.4890E-10	238.067	0.75986E-04	0.11063E-01	7978.78	7997.19	23.1505
0.710	2.093	1.4985E-10	237.924	0.76032E-04	0.11139E-01	7978.94	7997.20	23.3133
0.715	2.088	1.5079E-10	237.782	0.76077E-04	0.11215E-01	7979.10	7997.21	23.4761
0.720	2.083	1.5174E-10	237.641	0.76122E-04	0.11291E-01	7979.25	7997.23	23.6389
0.725	2.079	1.5268E-10	237.501	0.76167E-04	0.11367E-01	7979.40	7997.24	23.8017
0.730	2.074	1.5362E-10	237.362	0.76212E-04	0.11443E-01	7979.55	7997.25	23.9645
0.735	2.070	1.5456E-10	237.225	0.76256E-04	0.11520E-01	7979.70	7997.26	24.1273
0.740	2.065	1.5550E-10	237.088	0.76300E-04	0.11596E-01	7979.85	7997.28	24.2901
0.745	2.061	1.5644E-10	236.952	0.76344E-04	0.11672E-01	7979.99	7997.29	24.4529
0.750	2.056	1.5738E-10	236.818	0.76387E-04	0.11749E-01	7980.13	7997.30	24.6158
0.755	2.052	1.5831E-10	236.684	0.76430E-04	0.11825E-01	7980.27	7997.31	24.7786
0.760	2.047	1.5924E-10	236.551	0.76473E-04	0.11902E-01	7980.41	7997.32	24.9414
0.765	2.043	1.6018E-10	236.420	0.76516E-04	0.11978E-01	7980.55	7997.33	25.1042
0.770	2.039	1.6111E-10	236.289	0.76558E-04	0.12055E-01	7980.68	7997.34	25.2670
0.775	2.035	1.6204E-10	236.159	0.76600E-04	0.12131E-01	7980.81	7997.35	25.4298
0.780	2.030	1.6297E-10	236.030	0.76642E-04	0.12208E-01	7980.94	7997.37	25.5926
0.785	2.026	1.6390E-10	235.902	0.76683E-04	0.12285E-01	7981.07	7997.38	25.7554
0.790	2.022	1.6482E-10	235.775	0.76725E-04	0.12361E-01	7981.20	7997.39	25.9182
0.795	2.018	1.6575E-10	235.649	0.76766E-04	0.12438E-01	7981.32	7997.40	26.0810
0.800	2.014	1.6667E-10	235.523	0.76807E-04	0.12515E-01	7981.44	7997.41	26.2438
0.805	2.010	1.6760E-10	235.399	0.76847E-04	0.12592E-01	7981.56	7997.42	26.4066
0.810	2.006	1.6852E-10	235.275	0.76888E-04	0.12669E-01	7981.68	7997.43	26.5695
0.815	2.002	1.6944E-10	235.152	0.76928E-04	0.12746E-01	7981.80	7997.44	26.7323
0.820	1.998	1.7036E-10	235.030	0.76968E-04	0.12823E-01	7981.92	7997.45	26.8951
0.825	1.995	1.7128E-10	234.909	0.77008E-04	0.12900E-01	7982.03	7997.46	27.0579
0.830	1.991	1.7219E-10	234.789	0.77047E-04	0.12977E-01	7982.15	7997.47	27.2207
0.835	1.987	1.7311E-10	234.669	0.77086E-04	0.13054E-01	7982.26	7997.48	27.3835
0.840	1.983	1.7403E-10	234.550	0.77125E-04	0.13131E-01	7982.37	7997.49	27.5463
0.845	1.979	1.7494E-10	234.432	0.77164E-04	0.13208E-01	7982.48	7997.50	27.7091
0.850	1.976	1.7585E-10	234.315	0.77203E-04	0.13285E-01	7982.59	7997.51	27.8719

MATERIAL A CASE 4
INITIAL PARAMETERS AND CONSTANTS
STEPS IN AXIAL DIRECTION 170
DELX 0.00500
INITIAL HEIGHT 0.00001
MAXIMUM DENSITY OF CAKE 250.00000
PLENUM PRESSURE 8000.00000
THE TOTAL CAKE HEIGHT (MM) IS 13.163286159
MASS FLUX PAST CUTTER (GM/M) 16.822950907

X	V	PERM	RHO	H	HTOT	PINT	PB	FLUX
0.000	29.083	6.7060E-13	250.000	0.10000E-04	0.10000E-04	0.00	7459.51	0.0225
0.005	12.808	3.4577E-12	250.000	0.72359E-04	0.82359E-04	3285.08	7895.18	0.1853
0.010	9.666	6.0706E-12	250.000	0.72359E-04	0.15472E-03	5958.55	7940.29	0.3481
0.015	8.209	8.4174E-12	250.000	0.72359E-04	0.22708E-03	6743.18	7956.94	0.5109
0.020	7.327	1.0565E-11	250.000	0.72359E-04	0.29944E-03	7102.47	7965.69	0.6737
0.025	6.720	1.2561E-11	250.000	0.72359E-04	0.37180E-03	7305.31	7971.14	0.8365
0.030	6.268	1.4439E-11	250.000	0.72359E-04	0.44416E-03	7434.66	7974.90	0.9994
0.035	5.913	1.6222E-11	250.000	0.72359E-04	0.51652E-03	7523.97	7977.66	1.1622
0.040	5.625	1.7925E-11	250.000	0.72359E-04	0.58888E-03	7589.19	7979.78	1.3250
0.045	5.385	1.9561E-11	250.000	0.72359E-04	0.66124E-03	7638.84	7981.47	1.4878
0.050	5.180	2.1138E-11	250.000	0.72359E-04	0.73359E-03	7677.86	7982.85	1.6506
0.055	5.003	2.2665E-11	250.000	0.72359E-04	0.80595E-03	7709.30	7984.01	1.8134
0.060	4.847	2.4147E-11	250.000	0.72359E-04	0.87831E-03	7735.18	7984.99	1.9762
0.065	4.708	2.5588E-11	250.000	0.72359E-04	0.95067E-03	7756.83	7985.84	2.1390
0.070	4.584	2.6993E-11	250.000	0.72359E-04	0.10230E-02	7775.21	7986.57	2.3018
0.075	4.472	2.8365E-11	250.000	0.72359E-04	0.10954E-02	7791.01	7987.22	2.4646
0.080	4.370	2.9707E-11	250.000	0.72359E-04	0.11678E-02	7804.73	7987.80	2.6274
0.085	4.276	3.1021E-11	250.000	0.72359E-04	0.12401E-02	7816.76	7988.32	2.7903
0.090	4.190	3.2310E-11	250.000	0.72359E-04	0.13125E-02	7827.39	7988.78	2.9531
0.095	4.110	3.3575E-11	250.000	0.72359E-04	0.13848E-02	7836.84	7989.20	3.1159
0.100	3.861	4.9416E-12	500.000	0.36180E-04	0.14210E-02	7504.30	7990.48	3.2787
0.105	3.661	5.4958E-12	500.000	0.36180E-04	0.14572E-02	7576.91	7991.44	3.4415
0.110	3.496	6.0269E-12	500.000	0.36180E-04	0.14934E-02	7631.23	7992.19	3.6043
0.115	3.356	6.5381E-12	500.000	0.36180E-04	0.15295E-02	7673.34	7992.80	3.7671
0.120	3.236	7.0322E-12	500.000	0.36180E-04	0.15657E-02	7706.91	7993.31	3.9299
0.125	3.132	7.5111E-12	500.000	0.36180E-04	0.16019E-02	7734.29	7993.73	4.0927
0.130	3.127	8.6178E-10	100.000	0.18090E-03	0.17828E-02	7982.46	7993.75	4.2555
0.135	3.123	8.6421E-10	100.000	0.18090E-03	0.19637E-02	7982.53	7993.77	4.4183
0.140	3.118	8.6663E-10	100.000	0.18090E-03	0.21446E-02	7982.59	7993.79	4.5811
0.145	3.114	8.6905E-10	100.000	0.18090E-03	0.23255E-02	7982.65	7993.80	4.7440
0.150	3.110	8.7146E-10	100.000	0.18090E-03	0.25064E-02	7982.72	7993.82	4.9068
0.155	3.105	8.7387E-10	100.000	0.18090E-03	0.26873E-02	7982.78	7993.84	5.0696
0.160	3.064	6.0419E-11	250.000	0.12238E-03	0.28097E-02	7887.25	7994.00	5.3449
0.165	3.033	6.1650E-11	250.000	0.94929E-04	0.29046E-02	7913.79	7994.12	5.5585
0.170	3.008	6.2705E-11	250.000	0.81962E-04	0.29866E-02	7926.60	7994.22	5.7429
0.175	2.985	6.3674E-11	250.000	0.75817E-04	0.30624E-02	7933.18	7994.31	5.9135
0.180	2.963	6.4599E-11	250.000	0.72915E-04	0.31353E-02	7936.86	7994.39	6.0776
0.185	2.943	6.5510E-11	250.000	0.72359E-04	0.32077E-02	7938.56	7994.47	6.2404
0.190	2.922	6.6416E-11	250.000	0.72359E-04	0.32800E-02	7939.78	7994.54	6.4032
0.195	2.903	6.7315E-11	250.000	0.72359E-04	0.33524E-02	7940.95	7994.62	6.5660
0.200	2.884	6.8209E-11	250.000	0.72359E-04	0.34247E-02	7942.07	7994.69	6.7288
0.205	2.865	6.9097E-11	250.000	0.72359E-04	0.34971E-02	7943.15	7994.75	6.8916
0.210	2.847	6.9980E-11	250.000	0.72359E-04	0.35695E-02	7944.19	7994.82	7.0544
0.215	2.829	7.0857E-11	250.000	0.72359E-04	0.36418E-02	7945.19	7994.88	7.2173
0.220	2.812	7.1728E-11	250.000	0.72359E-04	0.37142E-02	7946.15	7994.95	7.3801
0.225	2.795	7.2595E-11	250.000	0.72359E-04	0.37865E-02	7947.08	7995.01	7.5429
0.230	2.779	7.3457E-11	250.000	0.72359E-04	0.38589E-02	7947.98	7995.07	7.7057
0.235	2.763	7.4313E-11	250.000	0.72359E-04	0.39313E-02	7948.85	7995.12	7.8685
0.240	2.747	7.5165E-11	250.000	0.72359E-04	0.40036E-02	7949.69	7995.18	8.0313
0.245	2.732	7.6012E-11	250.000	0.72359E-04	0.40760E-02	7950.50	7995.23	8.1941
0.250	2.717	7.6854E-11	250.000	0.72359E-04	0.41483E-02	7951.29	7995.28	8.3569
0.255	2.702	7.7692E-11	250.000	0.72359E-04	0.42207E-02	7952.05	7995.33	8.5197
0.260	2.688	7.8526E-11	250.000	0.72359E-04	0.42931E-02	7952.79	7995.38	8.6825
0.265	2.674	7.9355E-11	250.000	0.72359E-04	0.43654E-02	7953.50	7995.43	8.8453
0.270	2.660	8.0180E-11	250.000	0.72359E-04	0.44378E-02	7954.19	7995.48	9.0082
0.275	2.646	8.1001E-11	250.000	0.72359E-04	0.45101E-02	7954.87	7995.53	9.1710

0.280	2.633	8.1818E-11	250.000	0.72359E-04	0.45825E-02	7955.52	7995.57	9.3338
0.285	2.620	8.2630E-11	250.000	0.72359E-04	0.46549E-02	7956.15	7995.61	9.4966
0.290	2.607	8.3439E-11	250.000	0.72359E-04	0.47272E-02	7956.77	7995.66	9.6594
0.295	2.595	8.4244E-11	250.000	0.72359E-04	0.47996E-02	7957.36	7995.70	9.8222
0.300	2.583	8.5045E-11	250.000	0.72359E-04	0.48719E-02	7957.94	7995.74	9.9850
0.305	2.571	8.5843E-11	250.000	0.72359E-04	0.49443E-02	7958.51	7995.78	10.1478
0.310	2.559	8.6637E-11	250.000	0.72359E-04	0.50167E-02	7959.06	7995.82	10.3106
0.315	2.547	8.7427E-11	250.000	0.72359E-04	0.50890E-02	7959.59	7995.85	10.4734
0.320	2.536	8.8344E-11	249.874	0.72396E-04	0.51614E-02	7960.15	7995.89	10.6362
0.325	2.525	8.9413E-11	249.602	0.72475E-04	0.52339E-02	7960.73	7995.93	10.7990
0.330	2.514	9.0479E-11	249.333	0.72553E-04	0.53064E-02	7961.29	7995.96	10.9619
0.335	2.503	9.1542E-11	249.068	0.72630E-04	0.53791E-02	7961.84	7996.00	11.1247
0.340	2.492	9.2603E-11	248.807	0.72706E-04	0.54518E-02	7962.37	7996.03	11.2875
0.345	2.482	9.3660E-11	248.550	0.72781E-04	0.55246E-02	7962.89	7996.06	11.4503
0.350	2.472	9.4714E-11	248.296	0.72856E-04	0.55974E-02	7963.39	7996.10	11.6131
0.355	2.462	9.5766E-11	248.046	0.72929E-04	0.56703E-02	7963.88	7996.13	11.7759
0.360	2.452	9.6815E-11	247.800	0.73002E-04	0.57433E-02	7964.35	7996.16	11.9387
0.365	2.443	9.7861E-11	247.556	0.73074E-04	0.58164E-02	7964.82	7996.19	12.1015
0.370	2.433	9.8905E-11	247.316	0.73145E-04	0.58896E-02	7965.27	7996.22	12.2643
0.375	2.424	9.9946E-11	247.079	0.73215E-04	0.59628E-02	7965.71	7996.25	12.4271
0.380	2.415	1.0098E-10	246.845	0.73284E-04	0.60361E-02	7966.13	7996.27	12.5899
0.385	2.406	1.0202E-10	246.614	0.73353E-04	0.61094E-02	7966.55	7996.30	12.7527
0.390	2.397	1.0305E-10	246.385	0.73421E-04	0.61828E-02	7966.96	7996.33	12.9156
0.395	2.388	1.0409E-10	246.160	0.73488E-04	0.62563E-02	7967.35	7996.36	13.0784
0.400	2.380	1.0511E-10	245.937	0.73555E-04	0.63299E-02	7967.74	7996.38	13.2412
0.405	2.371	1.0614E-10	245.717	0.73620E-04	0.64035E-02	7968.12	7996.41	13.4040
0.410	2.363	1.0716E-10	245.500	0.73686E-04	0.64772E-02	7968.49	7996.43	13.5668
0.415	2.355	1.0819E-10	245.285	0.73750E-04	0.65509E-02	7968.85	7996.46	13.7296
0.420	2.347	1.0921E-10	245.073	0.73814E-04	0.66247E-02	7969.20	7996.48	13.8924
0.425	2.339	1.1022E-10	244.863	0.73877E-04	0.66986E-02	7969.54	7996.50	14.0552
0.430	2.331	1.1124E-10	244.656	0.73940E-04	0.67726E-02	7969.88	7996.53	14.2180
0.435	2.323	1.1225E-10	244.451	0.74002E-04	0.68466E-02	7970.20	7996.55	14.3808
0.440	2.316	1.1326E-10	244.248	0.74063E-04	0.69206E-02	7970.53	7996.57	14.5436
0.445	2.308	1.1427E-10	244.048	0.74124E-04	0.69948E-02	7970.84	7996.59	14.7064
0.450	2.301	1.1528E-10	243.849	0.74184E-04	0.70689E-02	7971.15	7996.62	14.8693
0.455	2.294	1.1628E-10	243.653	0.74244E-04	0.71432E-02	7971.45	7996.64	15.0321
0.460	2.287	1.1728E-10	243.459	0.74303E-04	0.72175E-02	7971.74	7996.66	15.1949
0.465	2.280	1.1828E-10	243.267	0.74362E-04	0.72918E-02	7972.03	7996.68	15.3577
0.470	2.273	1.1928E-10	243.077	0.74420E-04	0.73663E-02	7972.31	7996.70	15.5205
0.475	2.266	1.2028E-10	242.889	0.74478E-04	0.74407E-02	7972.59	7996.72	15.6833
0.480	2.259	1.2127E-10	242.703	0.74535E-04	0.75153E-02	7972.86	7996.74	15.8461
0.485	2.252	1.2227E-10	242.518	0.74592E-04	0.75899E-02	7973.12	7996.76	16.0089
0.490	2.246	1.2326E-10	242.336	0.74648E-04	0.76645E-02	7973.38	7996.78	16.1717
0.495	2.239	1.2425E-10	242.155	0.74703E-04	0.77392E-02	7973.64	7996.80	16.3345
0.500	2.233	1.2523E-10	241.976	0.74758E-04	0.78140E-02	7973.89	7996.81	16.4973
0.505	2.227	1.2622E-10	241.799	0.74813E-04	0.78888E-02	7974.13	7996.83	16.6601
0.510	2.220	1.2720E-10	241.624	0.74868E-04	0.79637E-02	7974.37	7996.85	16.8230
0.515	2.214	1.2818E-10	241.450	0.74921E-04	0.80386E-02	7974.61	7996.87	16.9858
0.520	2.208	1.2916E-10	241.278	0.74975E-04	0.81136E-02	7974.84	7996.88	17.1486
0.525	2.202	1.3014E-10	241.107	0.75028E-04	0.81886E-02	7975.07	7996.90	17.3114
0.530	2.196	1.3112E-10	240.938	0.75081E-04	0.82637E-02	7975.29	7996.92	17.4742
0.535	2.190	1.3209E-10	240.771	0.75133E-04	0.83388E-02	7975.51	7996.93	17.6370
0.540	2.184	1.3307E-10	240.605	0.75184E-04	0.84140E-02	7975.72	7996.95	17.7998
0.545	2.179	1.3404E-10	240.441	0.75236E-04	0.84892E-02	7975.93	7996.97	17.9626
0.550	2.173	1.3501E-10	240.278	0.75287E-04	0.85645E-02	7976.14	7996.98	18.1254
0.555	2.167	1.3598E-10	240.116	0.75338E-04	0.86398E-02	7976.34	7997.00	18.2882
0.560	2.162	1.3694E-10	239.956	0.75388E-04	0.87152E-02	7976.54	7997.01	18.4510
0.565	2.156	1.3791E-10	239.798	0.75438E-04	0.87907E-02	7976.74	7997.03	18.6138
0.570	2.151	1.3887E-10	239.641	0.75487E-04	0.88662E-02	7976.93	7997.04	18.7766
0.575	2.146	1.3984E-10	239.485	0.75536E-04	0.89417E-02	7977.12	7997.06	18.9395
0.580	2.140	1.4080E-10	239.330	0.75585E-04	0.90173E-02	7977.31	7997.07	19.1023
0.585	2.135	1.4176E-10	239.177	0.75634E-04	0.90929E-02	7977.49	7997.09	19.2651
0.590	2.130	1.4271E-10	239.025	0.75682E-04	0.91686E-02	7977.67	7997.10	19.4279
0.595	2.125	1.4367E-10	238.874	0.75729E-04	0.92443E-02	7977.85	7997.12	19.5907
0.600	2.120	1.4462E-10	238.724	0.75777E-04	0.93201E-02	7978.03	7997.13	19.7535
0.605	2.115	1.4558E-10	238.576	0.75824E-04	0.93959E-02	7978.20	7997.14	19.9163
0.610	2.110	1.4653E-10	238.429	0.75871E-04	0.94718E-02	7978.37	7997.16	20.0791

0.615	2.105	1.4748E-10	238.283	0.75917E-04	0.95477E-02	7978.53	7997.17	20.2419
0.620	2.100	1.4843E-10	238.138	0.75963E-04	0.96237E-02	7978.70	7997.18	20.4047
0.625	2.095	1.4938E-10	237.995	0.76009E-04	0.96997E-02	7978.86	7997.20	20.5675
0.630	2.090	1.5032E-10	237.852	0.76055E-04	0.97757E-02	7979.02	7997.21	20.7303
0.635	2.086	1.5127E-10	237.711	0.76100E-04	0.98518E-02	7979.17	7997.22	20.8932
0.640	2.081	1.5221E-10	237.570	0.76145E-04	0.99280E-02	7979.33	7997.23	21.0560
0.645	2.076	1.5315E-10	237.431	0.76190E-04	0.10004E-01	7979.48	7997.25	21.2188
0.650	2.072	1.5409E-10	237.293	0.76234E-04	0.10080E-01	7979.63	7997.26	21.3816
0.655	2.067	1.5503E-10	237.156	0.76278E-04	0.10157E-01	7979.78	7997.27	21.5444
0.660	2.063	1.5597E-10	237.020	0.76322E-04	0.10233E-01	7979.92	7997.28	21.7072
0.665	2.058	1.5691E-10	236.885	0.76365E-04	0.10309E-01	7980.06	7997.29	21.8700
0.670	2.054	1.5785E-10	236.751	0.76409E-04	0.10386E-01	7980.20	7997.30	22.0328
0.675	2.050	1.5878E-10	236.617	0.76452E-04	0.10462E-01	7980.34	7997.32	22.1956
0.680	2.045	1.5971E-10	236.485	0.76494E-04	0.10539E-01	7980.48	7997.33	22.3584
0.685	2.041	1.6065E-10	236.354	0.76537E-04	0.10615E-01	7980.61	7997.34	22.5212
0.690	2.037	1.6158E-10	236.224	0.76579E-04	0.10692E-01	7980.75	7997.35	22.6840
0.695	2.033	1.6251E-10	236.094	0.76621E-04	0.10768E-01	7980.88	7997.36	22.8468
0.700	2.028	1.6343E-10	235.966	0.76663E-04	0.10845E-01	7981.01	7997.37	23.0097
0.705	2.024	1.6436E-10	235.838	0.76704E-04	0.10922E-01	7981.13	7997.38	23.1725
0.710	2.020	1.6529E-10	235.712	0.76745E-04	0.10999E-01	7981.26	7997.39	23.3353
0.715	2.016	1.6621E-10	235.586	0.76786E-04	0.11075E-01	7981.38	7997.40	23.4981
0.720	2.012	1.6714E-10	235.461	0.76827E-04	0.11152E-01	7981.50	7997.41	23.6609
0.725	2.008	1.6806E-10	235.337	0.76868E-04	0.11229E-01	7981.62	7997.42	23.8237
0.730	2.004	1.6898E-10	235.213	0.76908E-04	0.11306E-01	7981.74	7997.43	23.9865
0.735	2.000	1.6990E-10	235.091	0.76948E-04	0.11383E-01	7981.86	7997.44	24.1493
0.740	1.996	1.7082E-10	234.969	0.76988E-04	0.11460E-01	7981.98	7997.45	24.3121
0.745	1.993	1.7174E-10	234.849	0.77028E-04	0.11537E-01	7982.09	7997.46	24.4749
0.750	1.989	1.7265E-10	234.729	0.77067E-04	0.11614E-01	7982.20	7997.47	24.6377
0.755	1.985	1.7357E-10	234.609	0.77106E-04	0.11691E-01	7982.31	7997.48	24.8005
0.760	1.981	1.7449E-10	234.491	0.77145E-04	0.11768E-01	7982.42	7997.49	24.9634
0.765	1.978	1.7540E-10	234.373	0.77184E-04	0.11845E-01	7982.53	7997.50	25.1262
0.770	1.974	1.7631E-10	234.256	0.77222E-04	0.11923E-01	7982.64	7997.51	25.2890
0.775	1.970	1.7722E-10	234.140	0.77261E-04	0.12000E-01	7982.75	7997.52	25.4518
0.780	1.967	1.7813E-10	234.025	0.77299E-04	0.12077E-01	7982.85	7997.53	25.6146
0.785	1.963	1.7904E-10	233.910	0.77337E-04	0.12155E-01	7982.95	7997.54	25.7774
0.790	1.960	1.7995E-10	233.796	0.77374E-04	0.12232E-01	7983.05	7997.55	25.9402
0.795	1.956	1.8086E-10	233.682	0.77412E-04	0.12309E-01	7983.16	7997.56	26.1030
0.800	1.952	1.8177E-10	233.570	0.77449E-04	0.12387E-01	7983.25	7997.56	26.2658
0.805	1.949	1.8267E-10	233.458	0.77486E-04	0.12464E-01	7983.35	7997.57	26.4286
0.810	1.946	1.8358E-10	233.347	0.77523E-04	0.12542E-01	7983.45	7997.58	26.5914
0.815	1.942	1.8448E-10	233.236	0.77560E-04	0.12619E-01	7983.55	7997.59	26.7542
0.820	1.939	1.8538E-10	233.126	0.77597E-04	0.12697E-01	7983.64	7997.60	26.9171
0.825	1.935	1.8628E-10	233.017	0.77633E-04	0.12775E-01	7983.73	7997.61	27.0799
0.830	1.932	1.8718E-10	232.908	0.77669E-04	0.12852E-01	7983.83	7997.61	27.2427
0.835	1.929	1.8808E-10	232.800	0.77705E-04	0.12930E-01	7983.92	7997.62	27.4055
0.840	1.925	1.8898E-10	232.693	0.77741E-04	0.13008E-01	7984.01	7997.63	27.5683
0.845	1.922	1.8988E-10	232.586	0.77777E-04	0.13085E-01	7984.10	7997.64	27.7311
0.850	1.919	1.9078E-10	232.480	0.77812E-04	0.13163E-01	7984.18	7997.65	27.8939

MATERIAL A CASE 5
INITIAL PARAMETERS AND CONSTANTS
STEPS IN AXIAL DIRECTION 170
DELX 0.00500
INITIAL HEIGHT 0.00001
MAXIMUM DENSITY OF CAKE 250.00000
PLENUM PRESSURE 8000.00000
THE TOTAL CAKE HEIGHT (MM) IS 13.270496359
MASS FLUX PAST CUTTER (GM/M) 16.443229243

X	V	PERM	RHO	H	HTOT	PINT	PB	FLUX
0.000	29.083	6.7060E-13	250.000	0.10000E-04	0.10000E-04	0.00	7459.51	0.0225
0.005	12.808	3.4577E-12	250.000	0.72359E-04	0.82359E-04	3285.08	7895.18	0.1853
0.010	11.839	6.0126E-11	100.000	0.18090E-03	0.26326E-03	7297.80	7910.44	0.3481
0.015	11.099	6.8404E-11	100.000	0.18090E-03	0.44416E-03	7416.40	7921.28	0.5109
0.020	10.510	7.6289E-11	100.000	0.18090E-03	0.62506E-03	7500.75	7929.41	0.6737
0.025	10.025	8.3844E-11	100.000	0.18090E-03	0.80595E-03	7563.73	7935.77	0.8365
0.030	9.617	9.1116E-11	100.000	0.18090E-03	0.98685E-03	7612.49	7940.90	0.9994
0.035	9.266	9.8143E-11	100.000	0.18090E-03	0.11678E-02	7651.36	7945.13	1.1622
0.040	7.522	1.0026E-11	250.000	0.11737E-03	0.12851E-02	6449.25	7963.85	1.4262
0.045	6.754	1.2435E-11	250.000	0.87798E-04	0.13729E-02	7150.69	7970.85	1.6238
0.050	6.285	1.4361E-11	250.000	0.74069E-04	0.14470E-02	7417.24	7974.76	1.7904
0.055	5.927	1.6147E-11	250.000	0.72359E-04	0.15193E-02	7520.73	7977.55	1.9533
0.060	5.637	1.7854E-11	250.000	0.72359E-04	0.15917E-02	7586.77	7979.70	2.1161
0.065	5.394	1.9492E-11	250.000	0.72359E-04	0.16641E-02	7636.97	7981.41	2.2789
0.070	5.188	2.1072E-11	250.000	0.72359E-04	0.17364E-02	7676.36	7982.80	2.4417
0.075	5.010	2.2601E-11	250.000	0.72359E-04	0.18088E-02	7708.09	7983.96	2.6045
0.080	4.853	2.4084E-11	250.000	0.72359E-04	0.18811E-02	7734.17	7984.95	2.7673
0.085	4.714	2.5527E-11	250.000	0.72359E-04	0.19535E-02	7755.98	7985.80	2.9301
0.090	4.589	2.6934E-11	250.000	0.72359E-04	0.20259E-02	7774.49	7986.54	3.0929
0.095	4.476	2.8307E-11	250.000	0.72359E-04	0.20982E-02	7790.38	7987.20	3.2557
0.100	4.374	2.9650E-11	250.000	0.72359E-04	0.21706E-02	7804.18	7987.78	3.4185
0.105	4.280	3.0966E-11	250.000	0.72359E-04	0.22429E-02	7816.28	7988.30	3.5813
0.110	4.193	3.2256E-11	250.000	0.72359E-04	0.23153E-02	7826.96	7988.76	3.7442
0.115	4.114	3.3521E-11	250.000	0.72359E-04	0.23877E-02	7836.46	7989.19	3.9070
0.120	4.039	3.4765E-11	250.000	0.72359E-04	0.24600E-02	7844.97	7989.57	4.0698
0.125	3.970	3.5988E-11	250.000	0.72359E-04	0.25324E-02	7852.63	7989.93	4.2326
0.130	3.905	3.7192E-11	250.000	0.72359E-04	0.26047E-02	7859.57	7990.25	4.3954
0.135	3.844	3.8378E-11	250.000	0.72359E-04	0.26771E-02	7865.88	7990.56	4.5582
0.140	3.787	3.9546E-11	250.000	0.72359E-04	0.27495E-02	7871.64	7990.83	4.7210
0.145	3.733	4.0698E-11	250.000	0.72359E-04	0.28218E-02	7876.93	7991.09	4.8838
0.150	3.682	4.1834E-11	250.000	0.72359E-04	0.28942E-02	7881.79	7991.34	5.0466
0.155	3.634	4.2956E-11	250.000	0.72359E-04	0.29665E-02	7886.28	7991.56	5.2094
0.160	3.588	4.4065E-11	250.000	0.72359E-04	0.30389E-02	7890.44	7991.77	5.3722
0.165	3.544	4.5159E-11	250.000	0.72359E-04	0.31113E-02	7894.30	7991.97	5.5350
0.170	3.502	4.6242E-11	250.000	0.72359E-04	0.31836E-02	7897.90	7992.16	5.6979
0.175	3.462	4.7312E-11	250.000	0.72359E-04	0.32560E-02	7901.25	7992.34	5.8607
0.180	3.424	4.8370E-11	250.000	0.72359E-04	0.33283E-02	7904.40	7992.51	6.0235
0.185	3.388	4.9418E-11	250.000	0.72359E-04	0.34007E-02	7907.34	7992.67	6.1863
0.190	3.353	5.0455E-11	250.000	0.72359E-04	0.34731E-02	7910.11	7992.82	6.3491
0.195	3.319	5.1482E-11	250.000	0.72359E-04	0.35454E-02	7912.71	7992.96	6.5119
0.200	3.287	5.2498E-11	250.000	0.72359E-04	0.36178E-02	7915.17	7993.10	6.6747
0.205	3.256	5.3506E-11	250.000	0.72359E-04	0.36901E-02	7917.49	7993.23	6.8375
0.210	3.226	5.4504E-11	250.000	0.72359E-04	0.37625E-02	7919.69	7993.35	7.0003
0.215	3.197	5.5494E-11	250.000	0.72359E-04	0.38349E-02	7921.77	7993.47	7.1631
0.220	3.169	5.6475E-11	250.000	0.72359E-04	0.39072E-02	7923.74	7993.58	7.3259
0.225	3.142	5.7447E-11	250.000	0.72359E-04	0.39796E-02	7925.62	7993.69	7.4888
0.230	3.116	5.8412E-11	250.000	0.72359E-04	0.40519E-02	7927.40	7993.79	7.6516
0.235	3.091	5.9369E-11	250.000	0.72359E-04	0.41243E-02	7929.10	7993.89	7.8144
0.240	3.067	6.0319E-11	250.000	0.72359E-04	0.41966E-02	7930.72	7993.99	7.9772
0.245	3.043	6.1261E-11	250.000	0.72359E-04	0.42690E-02	7932.27	7994.08	8.1400
0.250	3.020	6.2197E-11	250.000	0.72359E-04	0.43414E-02	7933.74	7994.17	8.3028
0.255	2.998	6.3125E-11	250.000	0.72359E-04	0.44137E-02	7935.16	7994.26	8.4656
0.260	2.976	6.4047E-11	250.000	0.72359E-04	0.44861E-02	7936.51	7994.34	8.6284
0.265	2.955	6.4963E-11	250.000	0.72359E-04	0.45584E-02	7937.81	7994.42	8.7912
0.270	2.934	6.5872E-11	250.000	0.72359E-04	0.46308E-02	7939.05	7994.50	8.9540
0.275	2.915	6.6775E-11	250.000	0.72359E-04	0.47032E-02	7940.25	7994.57	9.1168

0.280	2.895	6.7672E-11	250.000	0.72359E-04	0.47755E-02	7941.40	7994.64	9.2797
0.285	2.876	6.8564E-11	250.000	0.72359E-04	0.48479E-02	7942.50	7994.71	9.4425
0.290	2.858	6.9450E-11	250.000	0.72359E-04	0.49202E-02	7943.57	7994.78	9.6053
0.295	2.840	7.0330E-11	250.000	0.72359E-04	0.49926E-02	7944.59	7994.85	9.7681
0.300	2.822	7.1205E-11	250.000	0.72359E-04	0.50650E-02	7945.58	7994.91	9.9309
0.305	2.805	7.2074E-11	250.000	0.72359E-04	0.51373E-02	7946.53	7994.97	10.0937
0.310	2.789	7.2939E-11	250.000	0.72359E-04	0.52097E-02	7947.45	7995.03	10.2565
0.315	2.772	7.3799E-11	250.000	0.72359E-04	0.52820E-02	7948.33	7995.09	10.4193
0.320	2.756	7.4653E-11	250.000	0.72359E-04	0.53544E-02	7949.19	7995.14	10.5821
0.325	2.741	7.5503E-11	250.000	0.72359E-04	0.54268E-02	7950.02	7995.20	10.7449
0.330	2.726	7.6348E-11	250.000	0.72359E-04	0.54991E-02	7950.82	7995.25	10.9077
0.335	2.711	7.7189E-11	250.000	0.72359E-04	0.55715E-02	7951.60	7995.30	11.0705
0.340	2.696	7.8025E-11	250.000	0.72359E-04	0.56438E-02	7952.35	7995.35	11.2334
0.345	2.682	7.8857E-11	250.000	0.72359E-04	0.57162E-02	7953.07	7995.40	11.3962
0.350	2.668	7.9684E-11	250.000	0.72359E-04	0.57886E-02	7953.78	7995.45	11.5590
0.355	2.654	8.0508E-11	250.000	0.72359E-04	0.58609E-02	7954.46	7995.50	11.7218
0.360	2.641	8.1327E-11	250.000	0.72359E-04	0.59333E-02	7955.13	7995.54	11.8846
0.365	2.628	8.2142E-11	250.000	0.72359E-04	0.60056E-02	7955.77	7995.59	12.0474
0.370	2.615	8.2953E-11	250.000	0.72359E-04	0.60780E-02	7956.40	7995.63	12.2102
0.375	2.602	8.3761E-11	250.000	0.72359E-04	0.61504E-02	7957.01	7995.67	12.3730
0.380	2.590	8.4564E-11	250.000	0.72359E-04	0.62227E-02	7957.60	7995.71	12.5358
0.385	2.578	8.5364E-11	250.000	0.72359E-04	0.62951E-02	7958.17	7995.75	12.6986
0.390	2.566	8.6160E-11	250.000	0.72359E-04	0.63674E-02	7958.73	7995.79	12.8614
0.395	2.554	8.6952E-11	250.000	0.72359E-04	0.64398E-02	7959.27	7995.83	13.0243
0.400	2.543	8.7741E-11	250.000	0.72359E-04	0.65122E-02	7959.80	7995.87	13.1871
0.405	2.531	8.8771E-11	249.765	0.72427E-04	0.65846E-02	7960.38	7995.91	13.3499
0.410	2.520	8.9839E-11	249.494	0.72506E-04	0.66571E-02	7960.96	7995.94	13.5127
0.415	2.509	9.0904E-11	249.227	0.72584E-04	0.67297E-02	7961.51	7995.98	13.6755
0.420	2.499	9.1965E-11	248.964	0.72660E-04	0.68023E-02	7962.05	7996.01	13.8383
0.425	2.488	9.3025E-11	248.704	0.72736E-04	0.68751E-02	7962.58	7996.04	14.0011
0.430	2.478	9.4081E-11	248.449	0.72811E-04	0.69479E-02	7963.09	7996.08	14.1639
0.435	2.468	9.5134E-11	248.196	0.72885E-04	0.70208E-02	7963.59	7996.11	14.3267
0.440	2.458	9.6185E-11	247.948	0.72958E-04	0.70937E-02	7964.07	7996.14	14.4895
0.445	2.448	9.7233E-11	247.702	0.73030E-04	0.71668E-02	7964.54	7996.17	14.6523
0.450	2.439	9.8278E-11	247.460	0.73102E-04	0.72399E-02	7965.00	7996.20	14.8151
0.455	2.429	9.9321E-11	247.221	0.73173E-04	0.73130E-02	7965.44	7996.23	14.9780
0.460	2.420	1.0036E-10	246.985	0.73243E-04	0.73863E-02	7965.88	7996.26	15.1408
0.465	2.411	1.0140E-10	246.752	0.73312E-04	0.74596E-02	7966.30	7996.29	15.3036
0.470	2.402	1.0243E-10	246.522	0.73380E-04	0.75330E-02	7966.71	7996.31	15.4664
0.475	2.393	1.0347E-10	246.295	0.73448E-04	0.76064E-02	7967.12	7996.34	15.6292
0.480	2.385	1.0450E-10	246.071	0.73515E-04	0.76799E-02	7967.51	7996.37	15.7920
0.485	2.376	1.0552E-10	245.849	0.73581E-04	0.77535E-02	7967.89	7996.39	15.9548
0.490	2.368	1.0655E-10	245.631	0.73646E-04	0.78271E-02	7968.27	7996.42	16.1176
0.495	2.360	1.0757E-10	245.414	0.73711E-04	0.79009E-02	7968.63	7996.44	16.2804
0.500	2.352	1.0859E-10	245.201	0.73776E-04	0.79746E-02	7968.99	7996.47	16.4432
0.505	2.344	1.0961E-10	244.989	0.73839E-04	0.80485E-02	7969.33	7996.49	16.6060
0.510	2.336	1.1063E-10	244.780	0.73902E-04	0.81224E-02	7969.68	7996.51	16.7688
0.515	2.328	1.1164E-10	244.574	0.73965E-04	0.81963E-02	7970.01	7996.54	16.9317
0.520	2.320	1.1265E-10	244.370	0.74026E-04	0.82704E-02	7970.33	7996.56	17.0945
0.525	2.313	1.1366E-10	244.168	0.74088E-04	0.83445E-02	7970.65	7996.58	17.2573
0.530	2.305	1.1467E-10	243.968	0.74148E-04	0.84186E-02	7970.96	7996.60	17.4201
0.535	2.298	1.1568E-10	243.771	0.74208E-04	0.84928E-02	7971.27	7996.63	17.5829
0.540	2.291	1.1668E-10	243.575	0.74268E-04	0.85671E-02	7971.56	7996.65	17.7457
0.545	2.284	1.1768E-10	243.382	0.74327E-04	0.86414E-02	7971.86	7996.67	17.9085
0.550	2.277	1.1868E-10	243.191	0.74385E-04	0.87158E-02	7972.14	7996.69	18.0713
0.555	2.270	1.1968E-10	243.002	0.74443E-04	0.87902E-02	7972.42	7996.71	18.2341
0.560	2.263	1.2068E-10	242.814	0.74501E-04	0.88647E-02	7972.70	7996.73	18.3969
0.565	2.256	1.2167E-10	242.629	0.74558E-04	0.89393E-02	7972.96	7996.75	18.5597
0.570	2.250	1.2266E-10	242.445	0.74614E-04	0.90139E-02	7973.23	7996.77	18.7225
0.575	2.243	1.2365E-10	242.264	0.74670E-04	0.90886E-02	7973.48	7996.78	18.8854
0.580	2.237	1.2464E-10	242.084	0.74725E-04	0.91633E-02	7973.74	7996.80	19.0482
0.585	2.230	1.2563E-10	241.905	0.74780E-04	0.92381E-02	7973.99	7996.82	19.2110
0.590	2.224	1.2661E-10	241.729	0.74835E-04	0.93129E-02	7974.23	7996.84	19.3738
0.595	2.218	1.2759E-10	241.554	0.74889E-04	0.93878E-02	7974.47	7996.86	19.5366
0.600	2.212	1.2857E-10	241.381	0.74943E-04	0.94628E-02	7974.70	7996.87	19.6994
0.605	2.206	1.2955E-10	241.210	0.74996E-04	0.95377E-02	7974.93	7996.89	19.8622
0.610	2.200	1.3053E-10	241.040	0.75049E-04	0.96128E-02	7975.16	7996.91	20.0250

0.615	2.194	1.3151E-10	240.871	0.75101E-04	0.96879E-02	7975.38	7996.92	20.1878
0.620	2.188	1.3248E-10	240.705	0.75153E-04	0.97631E-02	7975.59	7996.94	20.3506
0.625	2.182	1.3345E-10	240.539	0.75205E-04	0.98383E-02	7975.81	7996.96	20.5134
0.630	2.176	1.3443E-10	240.376	0.75256E-04	0.99135E-02	7976.02	7996.97	20.6762
0.635	2.171	1.3540E-10	240.213	0.75307E-04	0.99888E-02	7976.22	7996.99	20.8390
0.640	2.165	1.3636E-10	240.053	0.75358E-04	0.10064E-01	7976.42	7997.00	21.0019
0.645	2.160	1.3733E-10	239.893	0.75408E-04	0.10140E-01	7976.62	7997.02	21.1647
0.650	2.154	1.3829E-10	239.735	0.75457E-04	0.10215E-01	7976.82	7997.03	21.3275
0.655	2.149	1.3926E-10	239.578	0.75507E-04	0.10291E-01	7977.01	7997.05	21.4903
0.660	2.143	1.4022E-10	239.423	0.75556E-04	0.10366E-01	7977.20	7997.06	21.6531
0.665	2.138	1.4118E-10	239.269	0.75604E-04	0.10442E-01	7977.38	7997.08	21.8159
0.670	2.133	1.4214E-10	239.116	0.75653E-04	0.10517E-01	7977.57	7997.09	21.9787
0.675	2.128	1.4309E-10	238.965	0.75701E-04	0.10593E-01	7977.75	7997.11	22.1415
0.680	2.123	1.4405E-10	238.814	0.75748E-04	0.10669E-01	7977.92	7997.12	22.3043
0.685	2.118	1.4500E-10	238.665	0.75796E-04	0.10745E-01	7978.10	7997.13	22.4671
0.690	2.113	1.4596E-10	238.517	0.75843E-04	0.10820E-01	7978.27	7997.15	22.6299
0.695	2.108	1.4691E-10	238.371	0.75889E-04	0.10896E-01	7978.43	7997.16	22.7927
0.700	2.103	1.4786E-10	238.225	0.75936E-04	0.10972E-01	7978.60	7997.17	22.9556
0.705	2.098	1.4881E-10	238.081	0.75982E-04	0.11048E-01	7978.76	7997.19	23.1184
0.710	2.093	1.4975E-10	237.938	0.76027E-04	0.11124E-01	7978.92	7997.20	23.2812
0.715	2.088	1.5070E-10	237.796	0.76073E-04	0.11200E-01	7979.08	7997.21	23.4440
0.720	2.084	1.5164E-10	237.655	0.76118E-04	0.11276E-01	7979.24	7997.23	23.6068
0.725	2.079	1.5259E-10	237.515	0.76163E-04	0.11353E-01	7979.39	7997.24	23.7696
0.730	2.075	1.5353E-10	237.376	0.76207E-04	0.11429E-01	7979.54	7997.25	23.9324
0.735	2.070	1.5447E-10	237.238	0.76252E-04	0.11505E-01	7979.69	7997.26	24.0952
0.740	2.065	1.5541E-10	237.101	0.76296E-04	0.11581E-01	7979.83	7997.27	24.2580
0.745	2.061	1.5635E-10	236.966	0.76339E-04	0.11658E-01	7979.98	7997.29	24.4208
0.750	2.057	1.5728E-10	236.831	0.76383E-04	0.11734E-01	7980.12	7997.30	24.5836
0.755	2.052	1.5822E-10	236.697	0.76426E-04	0.11811E-01	7980.26	7997.31	24.7464
0.760	2.048	1.5915E-10	236.565	0.76469E-04	0.11887E-01	7980.40	7997.32	24.9093
0.765	2.044	1.6009E-10	236.433	0.76511E-04	0.11964E-01	7980.53	7997.33	25.0721
0.770	2.039	1.6102E-10	236.302	0.76554E-04	0.12040E-01	7980.67	7997.34	25.2349
0.775	2.035	1.6195E-10	236.172	0.76596E-04	0.12117E-01	7980.80	7997.35	25.3977
0.780	2.031	1.6288E-10	236.043	0.76638E-04	0.12193E-01	7980.93	7997.36	25.5605
0.785	2.027	1.6380E-10	235.915	0.76679E-04	0.12270E-01	7981.06	7997.38	25.7233
0.790	2.023	1.6473E-10	235.788	0.76721E-04	0.12347E-01	7981.18	7997.39	25.8861
0.795	2.019	1.6566E-10	235.661	0.76762E-04	0.12423E-01	7981.31	7997.40	26.0489
0.800	2.015	1.6658E-10	235.536	0.76803E-04	0.12500E-01	7981.43	7997.41	26.2117
0.805	2.011	1.6750E-10	235.411	0.76843E-04	0.12577E-01	7981.55	7997.42	26.3745
0.810	2.007	1.6843E-10	235.287	0.76884E-04	0.12654E-01	7981.67	7997.43	26.5373
0.815	2.003	1.6935E-10	235.165	0.76924E-04	0.12731E-01	7981.79	7997.44	26.7001
0.820	1.999	1.7027E-10	235.042	0.76964E-04	0.12808E-01	7981.91	7997.45	26.8630
0.825	1.995	1.7119E-10	234.921	0.77004E-04	0.12885E-01	7982.02	7997.46	27.0258
0.830	1.991	1.7210E-10	234.801	0.77043E-04	0.12962E-01	7982.14	7997.47	27.1886
0.835	1.987	1.7302E-10	234.681	0.77083E-04	0.13039E-01	7982.25	7997.48	27.3514
0.840	1.984	1.7394E-10	234.562	0.77122E-04	0.13116E-01	7982.36	7997.49	27.5142
0.845	1.980	1.7485E-10	234.444	0.77160E-04	0.13193E-01	7982.47	7997.50	27.6770
0.850	1.976	1.7576E-10	234.326	0.77199E-04	0.13270E-01	7982.58	7997.50	27.8398

MATERIAL A CASE 6
INITIAL PARAMETERS AND CONSTANTS
STEPS IN AXIAL DIRECTION 170
DELX 0.00500
INITIAL HEIGHT 0.00001
MAXIMUM DENSITY OF CAKE 250.00000
PLENUM PRESSURE 8000.00000
THE TOTAL CAKE HEIGHT (MM) IS 13.303020156
MASS FLUX PAST CUTTER (GM/M) 16.349954221

X	V	PERM	RHO	H	HTOT	PINT	PB	FLUX
0.000	29.083	6.7060E-13	250.000	0.10000E-04	0.10000E-04	0.00	7459.51	0.0225
0.005	12.808	3.4577E-12	250.000	0.72359E-04	0.82359E-04	3285.08	7895.18	0.1853
0.010	9.666	6.0706E-12	250.000	0.72359E-04	0.15472E-03	5958.55	7940.29	0.3481
0.015	8.209	8.4174E-12	250.000	0.72359E-04	0.22708E-03	6743.18	7956.94	0.5109
0.020	7.327	1.0565E-11	250.000	0.72359E-04	0.29944E-03	7102.47	7965.69	0.6737
0.025	6.720	1.2561E-11	250.000	0.72359E-04	0.37180E-03	7305.31	7971.14	0.8365
0.030	6.268	1.4439E-11	250.000	0.72359E-04	0.44416E-03	7434.66	7974.90	0.9994
0.035	5.913	1.6222E-11	250.000	0.72359E-04	0.51652E-03	7523.97	7977.66	1.1622
0.040	5.625	1.7925E-11	250.000	0.72359E-04	0.58888E-03	7589.19	7979.78	1.3250
0.045	5.385	1.9561E-11	250.000	0.72359E-04	0.66124E-03	7638.84	7981.47	1.4878
0.050	5.180	2.1138E-11	250.000	0.72359E-04	0.73359E-03	7677.86	7982.85	1.6506
0.055	5.003	2.2665E-11	250.000	0.72359E-04	0.80595E-03	7709.30	7984.01	1.8134
0.060	4.847	2.4147E-11	250.000	0.72359E-04	0.87831E-03	7735.18	7984.99	1.9762
0.065	4.708	2.5588E-11	250.000	0.72359E-04	0.95067E-03	7756.83	7985.84	2.1390
0.070	4.584	2.6993E-11	250.000	0.72359E-04	0.10230E-02	7775.21	7986.57	2.3018
0.075	4.472	2.8365E-11	250.000	0.72359E-04	0.10954E-02	7791.01	7987.22	2.4646
0.080	4.370	2.9707E-11	250.000	0.72359E-04	0.11678E-02	7804.73	7987.80	2.6274
0.085	4.276	3.1021E-11	250.000	0.72359E-04	0.12401E-02	7816.76	7988.32	2.7903
0.090	4.190	3.2310E-11	250.000	0.72359E-04	0.13125E-02	7827.39	7988.78	2.9531
0.095	4.110	3.3575E-11	250.000	0.72359E-04	0.13848E-02	7836.84	7989.20	3.1159
0.100	4.036	3.4818E-11	250.000	0.72359E-04	0.14572E-02	7845.31	7989.59	3.2787
0.105	3.967	3.6040E-11	250.000	0.72359E-04	0.15295E-02	7852.94	7989.94	3.4415
0.110	3.903	3.7243E-11	250.000	0.72359E-04	0.16019E-02	7859.85	7990.27	3.6043
0.115	3.842	3.8428E-11	250.000	0.72359E-04	0.16743E-02	7866.14	7990.57	3.7671
0.120	3.785	3.9595E-11	250.000	0.72359E-04	0.17466E-02	7871.88	7990.85	3.9299
0.125	3.731	4.0747E-11	250.000	0.72359E-04	0.18190E-02	7877.14	7991.10	4.0927
0.130	3.680	4.1883E-11	250.000	0.72359E-04	0.18913E-02	7881.99	7991.35	4.2555
0.135	3.632	4.3004E-11	250.000	0.72359E-04	0.19637E-02	7886.46	7991.57	4.4183
0.140	3.586	4.4112E-11	250.000	0.72359E-04	0.20361E-02	7890.61	7991.78	4.5811
0.145	3.542	4.5206E-11	250.000	0.72359E-04	0.21084E-02	7894.46	7991.98	4.7440
0.150	3.501	4.6288E-11	250.000	0.72359E-04	0.21808E-02	7898.05	7992.17	4.9068
0.155	3.461	4.7357E-11	250.000	0.72359E-04	0.22531E-02	7901.39	7992.35	5.0696
0.160	3.423	4.8415E-11	250.000	0.72359E-04	0.23255E-02	7904.53	7992.51	5.2324
0.165	3.386	4.9462E-11	250.000	0.72359E-04	0.23979E-02	7907.46	7992.67	5.3952
0.170	3.351	5.0499E-11	250.000	0.72359E-04	0.24702E-02	7910.22	7992.82	5.5580
0.175	3.318	5.1525E-11	250.000	0.72359E-04	0.25426E-02	7912.82	7992.97	5.7208
0.180	3.286	5.2542E-11	250.000	0.72359E-04	0.26149E-02	7915.27	7993.10	5.8836
0.185	3.255	5.3549E-11	250.000	0.72359E-04	0.26873E-02	7917.59	7993.23	6.0464
0.190	3.225	5.4547E-11	250.000	0.72359E-04	0.27597E-02	7919.78	7993.36	6.2092
0.195	3.196	5.5536E-11	250.000	0.72359E-04	0.28320E-02	7921.85	7993.47	6.3720
0.200	3.168	5.6516E-11	250.000	0.72359E-04	0.29044E-02	7923.82	7993.59	6.5349
0.205	3.141	5.7489E-11	250.000	0.72359E-04	0.29767E-02	7925.69	7993.70	6.6977
0.210	3.115	5.8453E-11	250.000	0.72359E-04	0.30491E-02	7927.47	7993.80	6.8605
0.215	3.090	5.9410E-11	250.000	0.72359E-04	0.31215E-02	7929.17	7993.90	7.0233
0.220	3.065	6.0359E-11	250.000	0.72359E-04	0.31938E-02	7930.79	7994.00	7.1861
0.225	3.042	6.1301E-11	250.000	0.72359E-04	0.32662E-02	7932.33	7994.09	7.3489
0.230	3.019	6.2237E-11	250.000	0.72359E-04	0.33385E-02	7933.81	7994.18	7.5117
0.235	2.997	6.3165E-11	250.000	0.72359E-04	0.34109E-02	7935.22	7994.26	7.6745
0.240	2.975	6.4087E-11	250.000	0.72359E-04	0.34833E-02	7936.57	7994.34	7.8373
0.245	2.954	6.5002E-11	250.000	0.72359E-04	0.35556E-02	7937.86	7994.42	8.0001
0.250	2.934	6.5911E-11	250.000	0.72359E-04	0.36280E-02	7939.11	7994.50	8.1629
0.255	2.914	6.6814E-11	250.000	0.72359E-04	0.37003E-02	7940.30	7994.58	8.3258
0.260	2.894	6.7711E-11	250.000	0.72359E-04	0.37727E-02	7941.45	7994.65	8.4886
0.265	2.875	6.8602E-11	250.000	0.72359E-04	0.38451E-02	7942.55	7994.72	8.6514
0.270	2.857	6.9487E-11	250.000	0.72359E-04	0.39174E-02	7943.61	7994.78	8.8142
0.275	2.839	7.0367E-11	250.000	0.72359E-04	0.39898E-02	7944.63	7994.85	8.9770

0.280	2.822	7.1242E-11	250.000	0.72359E-04	0.40621E-02	7945.62	7994.91	9.1398
0.285	2.805	7.2111E-11	250.000	0.72359E-04	0.41345E-02	7946.57	7994.97	9.3026
0.290	2.788	7.2976E-11	250.000	0.72359E-04	0.42068E-02	7947.49	7995.03	9.4654
0.295	2.772	7.3835E-11	250.000	0.72359E-04	0.42792E-02	7948.37	7995.09	9.6282
0.300	2.769	1.0991E-09	100.000	0.18090E-03	0.44601E-02	7987.26	7995.10	9.7910
0.305	2.766	1.1013E-09	100.000	0.18090E-03	0.46410E-02	7987.29	7995.11	9.9538
0.310	2.764	1.1034E-09	100.000	0.18090E-03	0.48219E-02	7987.33	7995.12	10.1166
0.315	2.761	1.1056E-09	100.000	0.18090E-03	0.50028E-02	7987.36	7995.13	10.2795
0.320	2.758	1.1077E-09	100.000	0.18090E-03	0.51837E-02	7987.39	7995.14	10.4423
0.325	2.756	1.1099E-09	100.000	0.18090E-03	0.53646E-02	7987.42	7995.15	10.6051
0.330	2.729	7.6140E-11	250.000	0.12317E-03	0.54878E-02	7919.30	7995.24	10.8822
0.335	2.710	7.7255E-11	250.000	0.96093E-04	0.55839E-02	7937.34	7995.31	11.0984
0.340	2.693	7.8216E-11	250.000	0.83304E-04	0.56672E-02	7946.03	7995.37	11.2858
0.345	2.678	7.9102E-11	250.000	0.77236E-04	0.57444E-02	7950.45	7995.42	11.4596
0.350	2.664	7.9951E-11	250.000	0.74362E-04	0.58188E-02	7952.86	7995.47	11.6269
0.355	2.650	8.0780E-11	250.000	0.73015E-04	0.58918E-02	7954.32	7995.51	11.7912
0.360	2.637	8.1599E-11	250.000	0.72403E-04	0.59642E-02	7955.32	7995.56	11.9541
0.365	2.623	8.2413E-11	250.000	0.72359E-04	0.60365E-02	7955.98	7995.60	12.1169
0.370	2.611	8.3222E-11	250.000	0.72359E-04	0.61089E-02	7956.60	7995.64	12.2797
0.375	2.598	8.4028E-11	250.000	0.72359E-04	0.61813E-02	7957.20	7995.69	12.4426
0.380	2.586	8.4831E-11	250.000	0.72359E-04	0.62536E-02	7957.79	7995.73	12.6054
0.385	2.574	8.5629E-11	250.000	0.72359E-04	0.63260E-02	7958.36	7995.77	12.7682
0.390	2.562	8.6424E-11	250.000	0.72359E-04	0.63983E-02	7958.91	7995.81	12.9310
0.395	2.550	8.7215E-11	250.000	0.72359E-04	0.64707E-02	7959.45	7995.84	13.0938
0.400	2.539	8.8056E-11	249.948	0.72374E-04	0.65431E-02	7959.99	7995.88	13.2566
0.405	2.528	8.9126E-11	249.674	0.72454E-04	0.66155E-02	7960.58	7995.92	13.4194
0.410	2.517	9.0193E-11	249.405	0.72532E-04	0.66881E-02	7961.14	7995.95	13.5822
0.415	2.506	9.1257E-11	249.139	0.72609E-04	0.67607E-02	7961.70	7995.99	13.7450
0.420	2.495	9.2318E-11	248.877	0.72686E-04	0.68334E-02	7962.23	7996.02	13.9078
0.425	2.485	9.3376E-11	248.619	0.72761E-04	0.69061E-02	7962.75	7996.05	14.0706
0.430	2.475	9.4432E-11	248.364	0.72836E-04	0.69789E-02	7963.26	7996.09	14.2334
0.435	2.465	9.5484E-11	248.113	0.72909E-04	0.70519E-02	7963.75	7996.12	14.3963
0.440	2.455	9.6534E-11	247.865	0.72982E-04	0.71248E-02	7964.23	7996.15	14.5591
0.445	2.445	9.7581E-11	247.621	0.73054E-04	0.71979E-02	7964.69	7996.18	14.7219
0.450	2.436	9.8625E-11	247.380	0.73126E-04	0.72710E-02	7965.15	7996.21	14.8847
0.455	2.426	9.9667E-11	247.142	0.73196E-04	0.73442E-02	7965.59	7996.24	15.0475
0.460	2.417	1.0071E-10	246.907	0.73266E-04	0.74175E-02	7966.02	7996.27	15.2103
0.465	2.408	1.0174E-10	246.675	0.73334E-04	0.74908E-02	7966.44	7996.29	15.3731
0.470	2.399	1.0278E-10	246.446	0.73403E-04	0.75642E-02	7966.85	7996.32	15.5359
0.475	2.391	1.0381E-10	246.220	0.73470E-04	0.76377E-02	7967.25	7996.35	15.6987
0.480	2.382	1.0484E-10	245.997	0.73537E-04	0.77112E-02	7967.64	7996.37	15.8615
0.485	2.374	1.0586E-10	245.776	0.73603E-04	0.77848E-02	7968.02	7996.40	16.0243
0.490	2.365	1.0689E-10	245.558	0.73668E-04	0.78585E-02	7968.39	7996.43	16.1871
0.495	2.357	1.0791E-10	245.343	0.73733E-04	0.79322E-02	7968.75	7996.45	16.3500
0.500	2.349	1.0893E-10	245.130	0.73797E-04	0.80060E-02	7969.10	7996.47	16.5128
0.505	2.341	1.0995E-10	244.920	0.73860E-04	0.80799E-02	7969.45	7996.50	16.6756
0.510	2.333	1.1097E-10	244.711	0.73923E-04	0.81538E-02	7969.79	7996.52	16.8384
0.515	2.326	1.1198E-10	244.506	0.73985E-04	0.82278E-02	7970.12	7996.54	17.0012
0.520	2.318	1.1299E-10	244.302	0.74047E-04	0.83018E-02	7970.44	7996.57	17.1640
0.525	2.310	1.1400E-10	244.101	0.74108E-04	0.83759E-02	7970.76	7996.59	17.3268
0.530	2.303	1.1501E-10	243.902	0.74168E-04	0.84501E-02	7971.06	7996.61	17.4896
0.535	2.296	1.1601E-10	243.706	0.74228E-04	0.85243E-02	7971.37	7996.63	17.6524
0.540	2.289	1.1701E-10	243.511	0.74288E-04	0.85986E-02	7971.66	7996.65	17.8152
0.545	2.282	1.1802E-10	243.318	0.74346E-04	0.86730E-02	7971.95	7996.67	17.9780
0.550	2.275	1.1901E-10	243.128	0.74405E-04	0.87474E-02	7972.24	7996.69	18.1408
0.555	2.268	1.2001E-10	242.939	0.74462E-04	0.88218E-02	7972.51	7996.71	18.3037
0.560	2.261	1.2101E-10	242.752	0.74520E-04	0.88964E-02	7972.79	7996.73	18.4665
0.565	2.254	1.2200E-10	242.568	0.74576E-04	0.89709E-02	7973.05	7996.75	18.6293
0.570	2.248	1.2299E-10	242.385	0.74633E-04	0.90456E-02	7973.31	7996.77	18.7921
0.575	2.241	1.2398E-10	242.203	0.74688E-04	0.91203E-02	7973.57	7996.79	18.9549
0.580	2.235	1.2497E-10	242.024	0.74744E-04	0.91950E-02	7973.82	7996.81	19.1177
0.585	2.228	1.2595E-10	241.846	0.74799E-04	0.92698E-02	7974.07	7996.83	19.2805
0.590	2.222	1.2694E-10	241.671	0.74853E-04	0.93447E-02	7974.31	7996.85	19.4433
0.595	2.216	1.2792E-10	241.496	0.74907E-04	0.94196E-02	7974.55	7996.86	19.6061
0.600	2.210	1.2890E-10	241.324	0.74961E-04	0.94945E-02	7974.78	7996.88	19.7689
0.605	2.204	1.2988E-10	241.153	0.75014E-04	0.95695E-02	7975.01	7996.90	19.9317
0.610	2.198	1.3086E-10	240.984	0.75066E-04	0.96446E-02	7975.23	7996.91	20.0945

0.615	2.192	1.3183E-10	240.816	0.75119E-04	0.97197E-02	7975.45	7996.93	20.2574
0.620	2.186	1.3281E-10	240.650	0.75171E-04	0.97949E-02	7975.67	7996.95	20.4202
0.625	2.180	1.3378E-10	240.485	0.75222E-04	0.98701E-02	7975.88	7996.96	20.5830
0.630	2.175	1.3475E-10	240.322	0.75273E-04	0.99454E-02	7976.09	7996.98	20.7458
0.635	2.169	1.3572E-10	240.160	0.75324E-04	0.10021E-01	7976.29	7996.99	20.9086
0.640	2.163	1.3668E-10	239.999	0.75374E-04	0.10096E-01	7976.49	7997.01	21.0714
0.645	2.158	1.3765E-10	239.840	0.75424E-04	0.10172E-01	7976.69	7997.02	21.2342
0.650	2.152	1.3861E-10	239.683	0.75474E-04	0.10247E-01	7976.88	7997.04	21.3970
0.655	2.147	1.3958E-10	239.526	0.75523E-04	0.10323E-01	7977.07	7997.05	21.5598
0.660	2.142	1.4054E-10	239.371	0.75572E-04	0.10398E-01	7977.26	7997.07	21.7226
0.665	2.136	1.4150E-10	239.218	0.75621E-04	0.10474E-01	7977.44	7997.08	21.8854
0.670	2.131	1.4246E-10	239.065	0.75669E-04	0.10549E-01	7977.63	7997.10	22.0482
0.675	2.126	1.4341E-10	238.914	0.75717E-04	0.10625E-01	7977.80	7997.11	22.2110
0.680	2.121	1.4437E-10	238.765	0.75764E-04	0.10701E-01	7977.98	7997.13	22.3739
0.685	2.116	1.4532E-10	238.616	0.75811E-04	0.10777E-01	7978.15	7997.14	22.5367
0.690	2.111	1.4627E-10	238.468	0.75858E-04	0.10853E-01	7978.32	7997.15	22.6995
0.695	2.106	1.4722E-10	238.322	0.75905E-04	0.10928E-01	7978.49	7997.17	22.8623
0.700	2.101	1.4817E-10	238.177	0.75951E-04	0.11004E-01	7978.65	7997.18	23.0251
0.705	2.096	1.4912E-10	238.033	0.75997E-04	0.11080E-01	7978.82	7997.19	23.1879
0.710	2.092	1.5007E-10	237.890	0.76043E-04	0.11156E-01	7978.97	7997.20	23.3507
0.715	2.087	1.5101E-10	237.749	0.76088E-04	0.11233E-01	7979.13	7997.22	23.5135
0.720	2.082	1.5196E-10	237.608	0.76133E-04	0.11309E-01	7979.29	7997.23	23.6763
0.725	2.078	1.5290E-10	237.469	0.76178E-04	0.11385E-01	7979.44	7997.24	23.8391
0.730	2.073	1.5384E-10	237.330	0.76222E-04	0.11461E-01	7979.59	7997.25	24.0019
0.735	2.068	1.5478E-10	237.193	0.76266E-04	0.11537E-01	7979.74	7997.27	24.1647
0.740	2.064	1.5572E-10	237.056	0.76310E-04	0.11614E-01	7979.88	7997.28	24.3276
0.745	2.059	1.5666E-10	236.921	0.76354E-04	0.11690E-01	7980.02	7997.29	24.4904
0.750	2.055	1.5759E-10	236.786	0.76397E-04	0.11766E-01	7980.17	7997.30	24.6532
0.755	2.051	1.5853E-10	236.653	0.76440E-04	0.11843E-01	7980.31	7997.31	24.8160
0.760	2.046	1.5946E-10	236.521	0.76483E-04	0.11919E-01	7980.44	7997.32	24.9788
0.765	2.042	1.6040E-10	236.389	0.76526E-04	0.11996E-01	7980.58	7997.34	25.1416
0.770	2.038	1.6133E-10	236.259	0.76568E-04	0.12072E-01	7980.71	7997.35	25.3044
0.775	2.034	1.6226E-10	236.129	0.76610E-04	0.12149E-01	7980.84	7997.36	25.4672
0.780	2.029	1.6319E-10	236.000	0.76652E-04	0.12226E-01	7980.97	7997.37	25.6300
0.785	2.025	1.6411E-10	235.872	0.76693E-04	0.12302E-01	7981.10	7997.38	25.7928
0.790	2.021	1.6504E-10	235.745	0.76734E-04	0.12379E-01	7981.23	7997.39	25.9556
0.795	2.017	1.6596E-10	235.619	0.76775E-04	0.12456E-01	7981.35	7997.40	26.1184
0.800	2.013	1.6689E-10	235.494	0.76816E-04	0.12533E-01	7981.47	7997.41	26.2813
0.805	2.009	1.6781E-10	235.370	0.76857E-04	0.12610E-01	7981.59	7997.42	26.4441
0.810	2.005	1.6873E-10	235.246	0.76897E-04	0.12686E-01	7981.71	7997.43	26.6069
0.815	2.001	1.6965E-10	235.124	0.76937E-04	0.12763E-01	7981.83	7997.44	26.7697
0.820	1.997	1.7057E-10	235.002	0.76977E-04	0.12840E-01	7981.95	7997.45	26.9325
0.825	1.994	1.7149E-10	234.881	0.77017E-04	0.12917E-01	7982.06	7997.46	27.0953
0.830	1.990	1.7241E-10	234.761	0.77056E-04	0.12994E-01	7982.17	7997.47	27.2581
0.835	1.986	1.7332E-10	234.641	0.77096E-04	0.13072E-01	7982.29	7997.48	27.4209
0.840	1.982	1.7424E-10	234.523	0.77135E-04	0.13149E-01	7982.40	7997.49	27.5837
0.845	1.979	1.7515E-10	234.405	0.77173E-04	0.13226E-01	7982.50	7997.50	27.7465
0.850	1.975	1.7607E-10	234.288	0.77212E-04	0.13303E-01	7982.61	7997.51	27.9093

MATERIAL A CASE 7
INITIAL PARAMETERS AND CONSTANTS
STEPS IN AXIAL DIRECTION 170
DELX 0.00500
INITIAL HEIGHT 0.00001
MAXIMUM DENSITY OF CAKE 250.00000
PLENUM PRESSURE 8000.00000
THE TOTAL CAKE HEIGHT (MM) IS 13.302149019
MASS FLUX PAST CUTTER (GM/M) 16.791795740

X	V	PERM	RHO	H	HTOT	PINT	PB	FLUX
0.000	29.083	6.7060E-13	250.000	0.10000E-04	0.10000E-04	0.00	7459.51	0.0225
0.005	12.808	3.4577E-12	250.000	0.72359E-04	0.82359E-04	3285.08	7895.18	0.1853
0.010	9.666	6.0706E-12	250.000	0.72359E-04	0.15472E-03	5958.55	7940.29	0.3481
0.015	8.209	8.4174E-12	250.000	0.72359E-04	0.22708E-03	6743.18	7956.94	0.5109
0.020	7.327	1.0565E-11	250.000	0.72359E-04	0.29944E-03	7102.47	7965.69	0.6737
0.025	6.720	1.2561E-11	250.000	0.72359E-04	0.37180E-03	7305.31	7971.14	0.8365
0.030	6.268	1.4439E-11	250.000	0.72359E-04	0.44416E-03	7434.66	7974.90	0.9994
0.035	5.913	1.6222E-11	250.000	0.72359E-04	0.51652E-03	7523.97	7977.66	1.1622
0.040	5.625	1.7925E-11	250.000	0.72359E-04	0.58888E-03	7589.19	7979.78	1.3250
0.045	5.385	1.9561E-11	250.000	0.72359E-04	0.66124E-03	7638.84	7981.47	1.4878
0.050	5.180	2.1138E-11	250.000	0.72359E-04	0.73359E-03	7677.86	7982.85	1.6506
0.055	5.003	2.2665E-11	250.000	0.72359E-04	0.80595E-03	7709.30	7984.01	1.8134
0.060	4.847	2.4147E-11	250.000	0.72359E-04	0.87831E-03	7735.18	7984.99	1.9762
0.065	4.708	2.5588E-11	250.000	0.72359E-04	0.95067E-03	7756.83	7985.84	2.1390
0.070	4.584	2.6993E-11	250.000	0.72359E-04	0.10230E-02	7775.21	7986.57	2.3018
0.075	4.472	2.8365E-11	250.000	0.72359E-04	0.10954E-02	7791.01	7987.22	2.4646
0.080	4.370	2.9707E-11	250.000	0.72359E-04	0.11678E-02	7804.73	7987.80	2.6274
0.085	4.276	3.1021E-11	250.000	0.72359E-04	0.12401E-02	7816.76	7988.32	2.7903
0.090	4.190	3.2310E-11	250.000	0.72359E-04	0.13125E-02	7827.39	7988.78	2.9531
0.095	4.110	3.3575E-11	250.000	0.72359E-04	0.13848E-02	7836.84	7989.20	3.1159
0.100	4.036	3.4818E-11	250.000	0.72359E-04	0.14572E-02	7845.31	7989.59	3.2787
0.105	3.967	3.6040E-11	250.000	0.72359E-04	0.15295E-02	7852.94	7989.94	3.4415
0.110	3.903	3.7243E-11	250.000	0.72359E-04	0.16019E-02	7859.85	7990.27	3.6043
0.115	3.842	3.8428E-11	250.000	0.72359E-04	0.16743E-02	7866.14	7990.57	3.7671
0.120	3.785	3.9595E-11	250.000	0.72359E-04	0.17466E-02	7871.88	7990.85	3.9299
0.125	3.731	4.0747E-11	250.000	0.72359E-04	0.18190E-02	7877.14	7991.10	4.0927
0.130	3.680	4.1883E-11	250.000	0.72359E-04	0.18913E-02	7881.99	7991.35	4.2555
0.135	3.632	4.3004E-11	250.000	0.72359E-04	0.19637E-02	7886.46	7991.57	4.4183
0.140	3.586	4.4112E-11	250.000	0.72359E-04	0.20361E-02	7890.61	7991.78	4.5811
0.145	3.542	4.5206E-11	250.000	0.72359E-04	0.21084E-02	7894.46	7991.98	4.7440
0.150	3.501	4.6288E-11	250.000	0.72359E-04	0.21808E-02	7898.05	7992.17	4.9068
0.155	3.461	4.7357E-11	250.000	0.72359E-04	0.22531E-02	7901.39	7992.35	5.0696
0.160	3.423	4.8415E-11	250.000	0.72359E-04	0.23255E-02	7904.53	7992.51	5.2324
0.165	3.386	4.9462E-11	250.000	0.72359E-04	0.23979E-02	7907.46	7992.67	5.3952
0.170	3.351	5.0499E-11	250.000	0.72359E-04	0.24702E-02	7910.22	7992.82	5.5580
0.175	3.318	5.1525E-11	250.000	0.72359E-04	0.25426E-02	7912.82	7992.97	5.7208
0.180	3.286	5.2542E-11	250.000	0.72359E-04	0.26149E-02	7915.27	7993.10	5.8836
0.185	3.255	5.3549E-11	250.000	0.72359E-04	0.26873E-02	7917.59	7993.23	6.0464
0.190	3.225	5.4547E-11	250.000	0.72359E-04	0.27597E-02	7919.78	7993.36	6.2092
0.195	3.196	5.5536E-11	250.000	0.72359E-04	0.28320E-02	7921.85	7993.47	6.3720
0.200	3.168	5.6516E-11	250.000	0.72359E-04	0.29044E-02	7923.82	7993.59	6.5349
0.205	3.141	5.7489E-11	250.000	0.72359E-04	0.29767E-02	7925.69	7993.70	6.6977
0.210	3.115	5.8453E-11	250.000	0.72359E-04	0.30491E-02	7927.47	7993.80	6.8605
0.215	3.090	5.9410E-11	250.000	0.72359E-04	0.31215E-02	7929.17	7993.90	7.0233
0.220	3.065	6.0359E-11	250.000	0.72359E-04	0.31938E-02	7930.79	7994.00	7.1861
0.225	3.042	6.1301E-11	250.000	0.72359E-04	0.32662E-02	7932.33	7994.09	7.3489
0.230	3.019	6.2237E-11	250.000	0.72359E-04	0.33385E-02	7933.81	7994.18	7.5117
0.235	2.997	6.3165E-11	250.000	0.72359E-04	0.34109E-02	7935.22	7994.26	7.6745
0.240	2.975	6.4087E-11	250.000	0.72359E-04	0.34833E-02	7936.57	7994.34	7.8373
0.245	2.954	6.5002E-11	250.000	0.72359E-04	0.35556E-02	7937.86	7994.42	8.0001
0.250	2.934	6.5911E-11	250.000	0.72359E-04	0.36280E-02	7939.11	7994.50	8.1629
0.255	2.914	6.6814E-11	250.000	0.72359E-04	0.37003E-02	7940.30	7994.58	8.3258
0.260	2.894	6.7711E-11	250.000	0.72359E-04	0.37727E-02	7941.45	7994.65	8.4886
0.265	2.875	6.8602E-11	250.000	0.72359E-04	0.38451E-02	7942.55	7994.72	8.6514
0.270	2.857	6.9487E-11	250.000	0.72359E-04	0.39174E-02	7943.61	7994.78	8.8142

0.275	2.839	7.0367E-11	250.000	0.72359E-04	0.39898E-02	7944.63	7994.85	8.9770
0.280	2.822	7.1242E-11	250.000	0.72359E-04	0.40621E-02	7945.62	7994.91	9.1398
0.285	2.805	7.2111E-11	250.000	0.72359E-04	0.41345E-02	7946.57	7994.97	9.3026
0.290	2.788	7.2976E-11	250.000	0.72359E-04	0.42068E-02	7947.49	7995.03	9.4654
0.295	2.772	7.3835E-11	250.000	0.72359E-04	0.42792E-02	7948.37	7995.09	9.6282
0.300	2.756	7.4690E-11	250.000	0.72359E-04	0.43516E-02	7949.23	7995.15	9.7910
0.305	2.740	7.5539E-11	250.000	0.72359E-04	0.44239E-02	7950.05	7995.20	9.9538
0.310	2.725	7.6384E-11	250.000	0.72359E-04	0.44963E-02	7950.85	7995.25	10.1166
0.315	2.710	7.7225E-11	250.000	0.72359E-04	0.45686E-02	7951.63	7995.31	10.2795
0.320	2.696	7.8061E-11	250.000	0.72359E-04	0.46410E-02	7952.38	7995.36	10.4423
0.325	2.681	7.8892E-11	250.000	0.72359E-04	0.47134E-02	7953.11	7995.41	10.6051
0.330	2.667	7.9720E-11	250.000	0.72359E-04	0.47857E-02	7953.81	7995.45	10.7679
0.335	2.654	8.0543E-11	250.000	0.72359E-04	0.48581E-02	7954.49	7995.50	10.9307
0.340	2.640	8.1362E-11	250.000	0.72359E-04	0.49304E-02	7955.16	7995.55	11.0935
0.345	2.627	8.2177E-11	250.000	0.72359E-04	0.50028E-02	7955.80	7995.59	11.2563
0.350	2.614	8.2988E-11	250.000	0.72359E-04	0.50752E-02	7956.42	7995.63	11.4191
0.355	2.602	8.3795E-11	250.000	0.72359E-04	0.51475E-02	7957.03	7995.67	11.5819
0.360	2.589	8.4598E-11	250.000	0.72359E-04	0.52199E-02	7957.62	7995.72	11.7447
0.365	2.577	8.5398E-11	250.000	0.72359E-04	0.52922E-02	7958.20	7995.76	11.9075
0.370	2.565	8.6194E-11	250.000	0.72359E-04	0.53646E-02	7958.75	7995.79	12.0704
0.375	2.554	8.6986E-11	250.000	0.72359E-04	0.54370E-02	7959.30	7995.83	12.2332
0.380	2.542	8.7775E-11	250.000	0.72359E-04	0.55093E-02	7959.83	7995.87	12.3960
0.385	2.531	8.8816E-11	249.753	0.72431E-04	0.55818E-02	7960.41	7995.91	12.5588
0.390	2.520	8.9884E-11	249.483	0.72509E-04	0.56543E-02	7960.98	7995.94	12.7216
0.395	2.509	9.0949E-11	249.216	0.72587E-04	0.57268E-02	7961.54	7995.98	12.8844
0.400	2.498	9.2011E-11	248.953	0.72664E-04	0.57995E-02	7962.08	7996.01	13.0472
0.405	2.488	9.3070E-11	248.693	0.72739E-04	0.58723E-02	7962.60	7996.05	13.2100
0.410	2.478	9.4126E-11	248.438	0.72814E-04	0.59451E-02	7963.11	7996.08	13.3728
0.415	2.468	9.5179E-11	248.186	0.72888E-04	0.60180E-02	7963.61	7996.11	13.5356
0.420	2.458	9.6230E-11	247.937	0.72961E-04	0.60909E-02	7964.09	7996.14	13.6984
0.425	2.448	9.7277E-11	247.692	0.73034E-04	0.61639E-02	7964.56	7996.17	13.8612
0.430	2.438	9.8323E-11	247.450	0.73105E-04	0.62371E-02	7965.02	7996.20	14.0241
0.435	2.429	9.9365E-11	247.211	0.73176E-04	0.63102E-02	7965.46	7996.23	14.1869
0.440	2.420	1.0040E-10	246.975	0.73245E-04	0.63835E-02	7965.90	7996.26	14.3497
0.445	2.411	1.0144E-10	246.742	0.73315E-04	0.64568E-02	7966.32	7996.29	14.5125
0.450	2.402	1.0248E-10	246.512	0.73383E-04	0.65302E-02	7966.73	7996.31	14.6753
0.455	2.393	1.0351E-10	246.286	0.73451E-04	0.66036E-02	7967.13	7996.34	14.8381
0.460	2.384	1.0454E-10	246.061	0.73517E-04	0.66771E-02	7967.52	7996.37	15.0009
0.465	2.376	1.0557E-10	245.840	0.73584E-04	0.67507E-02	7967.91	7996.39	15.1637
0.470	2.368	1.0659E-10	245.621	0.73649E-04	0.68244E-02	7968.28	7996.42	15.3265
0.475	2.359	1.0762E-10	245.405	0.73714E-04	0.68981E-02	7968.65	7996.44	15.4893
0.480	2.351	1.0864E-10	245.191	0.73778E-04	0.69719E-02	7969.00	7996.47	15.6521
0.485	2.343	1.0965E-10	244.980	0.73842E-04	0.70457E-02	7969.35	7996.49	15.8149
0.490	2.335	1.1067E-10	244.772	0.73905E-04	0.71196E-02	7969.69	7996.51	15.9778
0.495	2.328	1.1168E-10	244.565	0.73967E-04	0.71936E-02	7970.02	7996.54	16.1406
0.500	2.326	1.5571E-09	100.000	0.18090E-03	0.73745E-02	7991.89	7996.54	16.3034
0.505	2.325	1.5589E-09	100.000	0.18090E-03	0.75554E-02	7991.91	7996.55	16.4662
0.510	2.324	1.5607E-09	100.000	0.18090E-03	0.77363E-02	7991.92	7996.55	16.6290
0.515	2.322	1.5625E-09	100.000	0.18090E-03	0.79172E-02	7991.93	7996.55	16.7918
0.520	2.321	1.5643E-09	100.000	0.18090E-03	0.80981E-02	7991.94	7996.56	16.9546
0.525	2.320	1.5661E-09	100.000	0.18090E-03	0.82790E-02	7991.95	7996.56	17.1174
0.530	2.307	1.1445E-10	244.013	0.12455E-03	0.84035E-02	7953.41	7996.60	17.3909
0.535	2.297	1.1578E-10	243.752	0.98169E-04	0.85017E-02	7963.12	7996.63	17.6063
0.540	2.289	1.1693E-10	243.527	0.85716E-04	0.85874E-02	7967.79	7996.65	17.7942
0.545	2.282	1.1801E-10	243.320	0.79808E-04	0.86672E-02	7970.13	7996.67	17.9689
0.550	2.274	1.1904E-10	243.123	0.77007E-04	0.87442E-02	7971.39	7996.69	18.1374
0.555	2.267	1.2005E-10	242.931	0.75690E-04	0.88199E-02	7972.13	7996.71	18.3029
0.560	2.261	1.2106E-10	242.743	0.75085E-04	0.88950E-02	7972.62	7996.73	18.4670
0.565	2.254	1.2205E-10	242.558	0.74823E-04	0.89698E-02	7972.99	7996.75	18.6303
0.570	2.247	1.2304E-10	242.375	0.74726E-04	0.90445E-02	7973.30	7996.77	18.7933
0.575	2.241	1.2403E-10	242.194	0.74708E-04	0.91193E-02	7973.58	7996.79	18.9562
0.580	2.234	1.2502E-10	242.014	0.74747E-04	0.91940E-02	7973.83	7996.81	19.1190
0.585	2.228	1.2601E-10	241.837	0.74802E-04	0.92688E-02	7974.08	7996.83	19.2818
0.590	2.222	1.2699E-10	241.661	0.74856E-04	0.93437E-02	7974.32	7996.85	19.4446
0.595	2.215	1.2797E-10	241.487	0.74910E-04	0.94186E-02	7974.56	7996.86	19.6074
0.600	2.209	1.2895E-10	241.314	0.74963E-04	0.94935E-02	7974.79	7996.88	19.7702
0.605	2.203	1.2993E-10	241.144	0.75017E-04	0.95685E-02	7975.02	7996.90	19.9330

0.610	2.197	1.3091E-10	240.974	0.75069E-04	0.96436E-02	7975.24	7996.91	20.0958
0.615	2.191	1.3189E-10	240.807	0.75122E-04	0.97187E-02	7975.46	7996.93	20.2586
0.620	2.186	1.3286E-10	240.640	0.75173E-04	0.97939E-02	7975.68	7996.95	20.4214
0.625	2.180	1.3383E-10	240.476	0.75225E-04	0.98691E-02	7975.89	7996.96	20.5842
0.630	2.174	1.3480E-10	240.313	0.75276E-04	0.99444E-02	7976.10	7996.98	20.7470
0.635	2.169	1.3577E-10	240.151	0.75327E-04	0.10020E-01	7976.30	7996.99	20.9099
0.640	2.163	1.3674E-10	239.991	0.75377E-04	0.10095E-01	7976.50	7997.01	21.0727
0.645	2.158	1.3770E-10	239.832	0.75427E-04	0.10171E-01	7976.70	7997.03	21.2355
0.650	2.152	1.3867E-10	239.674	0.75477E-04	0.10246E-01	7976.89	7997.04	21.3983
0.655	2.147	1.3963E-10	239.518	0.75526E-04	0.10322E-01	7977.08	7997.06	21.5611
0.660	2.141	1.4059E-10	239.363	0.75575E-04	0.10397E-01	7977.27	7997.07	21.7239
0.665	2.136	1.4155E-10	239.209	0.75623E-04	0.10473E-01	7977.45	7997.08	21.8867
0.670	2.131	1.4251E-10	239.057	0.75671E-04	0.10548E-01	7977.64	7997.10	22.0495
0.675	2.126	1.4346E-10	238.906	0.75719E-04	0.10624E-01	7977.81	7997.11	22.2123
0.680	2.121	1.4442E-10	238.756	0.75767E-04	0.10700E-01	7977.99	7997.13	22.3751
0.685	2.116	1.4537E-10	238.608	0.75814E-04	0.10776E-01	7978.16	7997.14	22.5379
0.690	2.111	1.4633E-10	238.460	0.75861E-04	0.10852E-01	7978.33	7997.15	22.7007
0.695	2.106	1.4728E-10	238.314	0.75907E-04	0.10927E-01	7978.50	7997.17	22.8635
0.700	2.101	1.4823E-10	238.169	0.75954E-04	0.11003E-01	7978.66	7997.18	23.0264
0.705	2.096	1.4917E-10	238.025	0.75999E-04	0.11079E-01	7978.82	7997.19	23.1892
0.710	2.091	1.5012E-10	237.883	0.76045E-04	0.11155E-01	7978.98	7997.21	23.3520
0.715	2.087	1.5107E-10	237.741	0.76090E-04	0.11232E-01	7979.14	7997.22	23.5148
0.720	2.082	1.5201E-10	237.600	0.76135E-04	0.11308E-01	7979.29	7997.23	23.6776
0.725	2.077	1.5295E-10	237.461	0.76180E-04	0.11384E-01	7979.45	7997.24	23.8404
0.730	2.073	1.5389E-10	237.323	0.76225E-04	0.11460E-01	7979.60	7997.25	24.0032
0.735	2.068	1.5483E-10	237.185	0.76269E-04	0.11536E-01	7979.74	7997.27	24.1660
0.740	2.064	1.5577E-10	237.049	0.76313E-04	0.11613E-01	7979.89	7997.28	24.3288
0.745	2.059	1.5671E-10	236.913	0.76356E-04	0.11689E-01	7980.03	7997.29	24.4916
0.750	2.055	1.5765E-10	236.779	0.76399E-04	0.11765E-01	7980.17	7997.30	24.6544
0.755	2.050	1.5858E-10	236.646	0.76443E-04	0.11842E-01	7980.31	7997.31	24.8172
0.760	2.046	1.5951E-10	236.513	0.76485E-04	0.11918E-01	7980.45	7997.32	24.9801
0.765	2.042	1.6045E-10	236.382	0.76528E-04	0.11995E-01	7980.58	7997.34	25.1429
0.770	2.038	1.6138E-10	236.251	0.76570E-04	0.12071E-01	7980.72	7997.35	25.3057
0.775	2.033	1.6231E-10	236.122	0.76612E-04	0.12148E-01	7980.85	7997.36	25.4685
0.780	2.029	1.6324E-10	235.993	0.76654E-04	0.12225E-01	7980.98	7997.37	25.6313
0.785	2.025	1.6416E-10	235.865	0.76695E-04	0.12301E-01	7981.11	7997.38	25.7941
0.790	2.021	1.6509E-10	235.739	0.76737E-04	0.12378E-01	7981.23	7997.39	25.9569
0.795	2.017	1.6601E-10	235.613	0.76778E-04	0.12455E-01	7981.36	7997.40	26.1197
0.800	2.013	1.6694E-10	235.487	0.76819E-04	0.12532E-01	7981.48	7997.41	26.2825
0.805	2.009	1.6786E-10	235.363	0.76859E-04	0.12609E-01	7981.60	7997.42	26.4453
0.810	2.005	1.6878E-10	235.240	0.76899E-04	0.12686E-01	7981.72	7997.43	26.6081
0.815	2.001	1.6970E-10	235.117	0.76940E-04	0.12762E-01	7981.84	7997.44	26.7709
0.820	1.997	1.7062E-10	234.995	0.76979E-04	0.12839E-01	7981.95	7997.45	26.9338
0.825	1.993	1.7154E-10	234.874	0.77019E-04	0.12916E-01	7982.07	7997.46	27.0966
0.830	1.990	1.7246E-10	234.754	0.77058E-04	0.12994E-01	7982.18	7997.47	27.2594
0.835	1.986	1.7337E-10	234.635	0.77098E-04	0.13071E-01	7982.29	7997.48	27.4222
0.840	1.982	1.7429E-10	234.516	0.77137E-04	0.13148E-01	7982.40	7997.49	27.5850
0.845	1.978	1.7520E-10	234.398	0.77175E-04	0.13225E-01	7982.51	7997.50	27.7478
0.850	1.975	1.7612E-10	234.281	0.77214E-04	0.13302E-01	7982.62	7997.51	27.9106

MATERIAL B CASE 1
INITIAL PARAMETERS AND CONSTANTS
STEPS IN AXIAL DIRECTION 170
DELX 0.00500
INITIAL HEIGHT 0.00001
MAXIMUM DENSITY OF CAKE 250.00000
PLENUM PRESSURE 8000.00000
THE TOTAL CAKE HEIGHT (MM) IS 12.399434899
MASS FLUX PAST CUTTER (GM/M) 13.190663276

X	V	PERM	RHO	H	HTOT	PINT	PB	FLUX
0.000	21.404	4.7767E-13	250.000	0.10000E-04	0.10000E-04	0.00	7707.25	0.0225
0.005	10.505	2.4431E-12	232.996	0.56068E-04	0.66068E-04	3782.68	7929.48	0.1401
0.010	8.164	4.5723E-12	223.548	0.58438E-04	0.12451E-03	6162.63	7957.41	0.2576
0.015	7.048	6.6093E-12	218.007	0.59923E-04	0.18443E-03	6869.19	7968.26	0.3752
0.020	6.363	8.5516E-12	214.137	0.61006E-04	0.24544E-03	7193.43	7974.13	0.4928
0.025	5.886	1.0413E-11	211.183	0.61859E-04	0.30729E-03	7376.49	7977.86	0.6104
0.030	5.528	1.2207E-11	208.800	0.62565E-04	0.36986E-03	7493.15	7980.47	0.7279
0.035	5.246	1.3945E-11	206.807	0.63168E-04	0.43303E-03	7573.65	7982.41	0.8455
0.040	5.016	1.5633E-11	205.096	0.63695E-04	0.49672E-03	7632.38	7983.92	0.9631
0.045	4.823	1.7279E-11	203.599	0.64163E-04	0.56089E-03	7677.05	7985.13	1.0807
0.050	4.659	1.8887E-11	202.269	0.64586E-04	0.62547E-03	7712.13	7986.13	1.1982
0.055	4.515	2.0462E-11	201.072	0.64970E-04	0.69044E-03	7740.38	7986.97	1.3158
0.060	4.389	2.2007E-11	199.984	0.65323E-04	0.75577E-03	7763.61	7987.69	1.4334
0.065	4.276	2.3524E-11	198.988	0.65650E-04	0.82142E-03	7783.04	7988.31	1.5509
0.070	4.175	2.5017E-11	198.070	0.65955E-04	0.88737E-03	7799.53	7988.86	1.6685
0.075	4.084	2.6488E-11	197.217	0.66240E-04	0.95361E-03	7813.69	7989.34	1.7861
0.080	4.000	2.7938E-11	196.422	0.66508E-04	0.10201E-02	7825.98	7989.77	1.9037
0.085	3.924	2.9368E-11	195.678	0.66761E-04	0.10869E-02	7836.74	7990.16	2.0212
0.090	3.853	3.0780E-11	194.977	0.67001E-04	0.11539E-02	7846.26	7990.51	2.1388
0.095	3.788	3.2176E-11	194.317	0.67229E-04	0.12211E-02	7854.72	7990.83	2.2564
0.100	3.727	3.3555E-11	193.691	0.67446E-04	0.12886E-02	7862.29	7991.13	2.3740
0.105	3.670	3.4920E-11	193.097	0.67653E-04	0.13562E-02	7869.11	7991.39	2.4915
0.110	3.616	3.6271E-11	192.531	0.67852E-04	0.14241E-02	7875.28	7991.64	2.6091
0.115	3.566	3.7609E-11	191.992	0.68043E-04	0.14921E-02	7880.90	7991.87	2.7267
0.120	3.519	3.8934E-11	191.476	0.68226E-04	0.15603E-02	7886.02	7992.09	2.8442
0.125	3.474	4.0248E-11	190.983	0.68402E-04	0.16287E-02	7890.72	7992.29	2.9618
0.130	3.432	4.1550E-11	190.509	0.68573E-04	0.16973E-02	7895.05	7992.47	3.0794
0.135	3.392	4.2841E-11	190.053	0.68737E-04	0.17660E-02	7899.04	7992.65	3.1970
0.140	3.354	4.4122E-11	189.615	0.68896E-04	0.18349E-02	7902.74	7992.81	3.3145
0.145	3.318	4.5393E-11	189.192	0.69050E-04	0.19040E-02	7906.17	7992.97	3.4321
0.150	3.283	4.6655E-11	188.785	0.69199E-04	0.19732E-02	7909.37	7993.11	3.5497
0.155	3.250	4.7908E-11	188.391	0.69344E-04	0.20425E-02	7912.35	7993.25	3.6673
0.160	3.218	4.9152E-11	188.009	0.69484E-04	0.21120E-02	7915.14	7993.38	3.7848
0.165	3.187	5.0388E-11	187.640	0.69621E-04	0.21816E-02	7917.76	7993.51	3.9024
0.170	3.158	5.1616E-11	187.282	0.69754E-04	0.22514E-02	7920.22	7993.63	4.0200
0.175	3.130	5.2836E-11	186.935	0.69883E-04	0.23213E-02	7922.53	7993.74	4.1376
0.180	3.103	5.4049E-11	186.598	0.70010E-04	0.23913E-02	7924.71	7993.85	4.2551
0.185	3.077	5.5254E-11	186.270	0.70133E-04	0.24614E-02	7926.77	7993.95	4.3727
0.190	3.052	5.6453E-11	185.952	0.70253E-04	0.25317E-02	7928.72	7994.05	4.4903
0.195	3.028	5.7645E-11	185.641	0.70370E-04	0.26020E-02	7930.57	7994.14	4.6078
0.200	3.004	5.8830E-11	185.339	0.70485E-04	0.26725E-02	7932.32	7994.23	4.7254
0.205	2.982	6.0009E-11	185.044	0.70597E-04	0.27431E-02	7933.99	7994.32	4.8430
0.210	2.960	6.1182E-11	184.757	0.70707E-04	0.28138E-02	7935.57	7994.40	4.9606
0.215	2.939	6.2349E-11	184.477	0.70815E-04	0.28846E-02	7937.08	7994.48	5.0781
0.220	2.918	6.3510E-11	184.203	0.70920E-04	0.29556E-02	7938.51	7994.56	5.1957
0.225	2.898	6.4665E-11	183.935	0.71023E-04	0.30266E-02	7939.89	7994.63	5.3133
0.230	2.879	6.5815E-11	183.673	0.71124E-04	0.30977E-02	7941.20	7994.70	5.4309
0.235	2.860	6.6960E-11	183.418	0.71224E-04	0.31689E-02	7942.45	7994.77	5.5484
0.240	2.842	6.8099E-11	183.167	0.71321E-04	0.32403E-02	7943.65	7994.84	5.6660
0.245	2.824	6.9234E-11	182.922	0.71416E-04	0.33117E-02	7944.81	7994.90	5.7836
0.250	2.806	7.0364E-11	182.682	0.71510E-04	0.33832E-02	7945.91	7994.97	5.9011
0.255	2.790	7.1488E-11	182.447	0.71603E-04	0.34548E-02	7946.97	7995.03	6.0187
0.260	2.773	7.2608E-11	182.216	0.71693E-04	0.35265E-02	7947.99	7995.09	6.1363
0.265	2.757	7.3724E-11	181.990	0.71782E-04	0.35983E-02	7948.97	7995.14	6.2539
0.270	2.742	7.4835E-11	181.768	0.71870E-04	0.36701E-02	7949.91	7995.20	6.3714
0.275	2.726	7.5942E-11	181.551	0.71956E-04	0.37421E-02	7950.82	7995.25	6.4890

0.280	2.712	7.7044E-11	181.337	0.72041E-04	0.38141E-02	7951.69	7995.30	6.6066
0.285	2.697	7.8143E-11	181.127	0.72124E-04	0.38862E-02	7952.54	7995.35	6.7242
0.290	2.683	7.9237E-11	180.921	0.72206E-04	0.39585E-02	7953.35	7995.40	6.8417
0.295	2.669	8.0327E-11	180.719	0.72287E-04	0.40307E-02	7954.14	7995.45	6.9593
0.300	2.655	8.1414E-11	180.520	0.72367E-04	0.41031E-02	7954.90	7995.49	7.0769
0.305	2.642	8.2496E-11	180.324	0.72446E-04	0.41756E-02	7955.63	7995.54	7.1944
0.310	2.629	8.3575E-11	180.131	0.72523E-04	0.42481E-02	7956.34	7995.58	7.3120
0.315	2.617	8.4650E-11	179.942	0.72599E-04	0.43207E-02	7957.03	7995.63	7.4296
0.320	2.604	8.5722E-11	179.756	0.72674E-04	0.43934E-02	7957.69	7995.67	7.5472
0.325	2.592	8.6790E-11	179.572	0.72749E-04	0.44661E-02	7958.34	7995.71	7.6647
0.330	2.580	8.7855E-11	179.392	0.72822E-04	0.45389E-02	7958.96	7995.75	7.7823
0.335	2.568	8.8916E-11	179.214	0.72894E-04	0.46118E-02	7959.57	7995.78	7.8999
0.340	2.557	8.9974E-11	179.039	0.72965E-04	0.46848E-02	7960.16	7995.82	8.0175
0.345	2.546	9.1029E-11	178.866	0.73036E-04	0.47578E-02	7960.73	7995.86	8.1350
0.350	2.535	9.2080E-11	178.696	0.73105E-04	0.48309E-02	7961.28	7995.89	8.2526
0.355	2.524	9.3129E-11	178.528	0.73174E-04	0.49041E-02	7961.82	7995.93	8.3702
0.360	2.513	9.4174E-11	178.363	0.73242E-04	0.49773E-02	7962.34	7995.96	8.4877
0.365	2.503	9.5216E-11	178.200	0.73309E-04	0.50506E-02	7962.85	7996.00	8.6053
0.370	2.493	9.6255E-11	178.039	0.73375E-04	0.51240E-02	7963.35	7996.03	8.7229
0.375	2.483	9.7291E-11	177.881	0.73440E-04	0.51975E-02	7963.83	7996.06	8.8405
0.380	2.473	9.8325E-11	177.725	0.73505E-04	0.52710E-02	7964.30	7996.09	8.9580
0.385	2.463	9.9355E-11	177.570	0.73569E-04	0.53445E-02	7964.75	7996.12	9.0756
0.390	2.454	1.0038E-10	177.418	0.73632E-04	0.54182E-02	7965.20	7996.15	9.1932
0.395	2.444	1.0141E-10	177.268	0.73694E-04	0.54919E-02	7965.63	7996.18	9.3108
0.400	2.435	1.0243E-10	177.119	0.73756E-04	0.55656E-02	7966.05	7996.21	9.4283
0.405	2.426	1.0345E-10	176.973	0.73817E-04	0.56394E-02	7966.47	7996.24	9.5459
0.410	2.417	1.0447E-10	176.828	0.73878E-04	0.57133E-02	7966.87	7996.27	9.6635
0.415	2.408	1.0548E-10	176.685	0.73937E-04	0.57873E-02	7967.26	7996.29	9.7810
0.420	2.400	1.0649E-10	176.544	0.73997E-04	0.58612E-02	7967.64	7996.32	9.8986
0.425	2.391	1.0750E-10	176.404	0.74055E-04	0.59353E-02	7968.01	7996.35	10.0162
0.430	2.383	1.0851E-10	176.266	0.74113E-04	0.60094E-02	7968.38	7996.37	10.1338
0.435	2.375	1.0951E-10	176.130	0.74170E-04	0.60836E-02	7968.74	7996.40	10.2513
0.440	2.366	1.1052E-10	175.995	0.74227E-04	0.61578E-02	7969.08	7996.42	10.3689
0.445	2.358	1.1152E-10	175.862	0.74283E-04	0.62321E-02	7969.42	7996.45	10.4865
0.450	2.351	1.1251E-10	175.731	0.74339E-04	0.63064E-02	7969.76	7996.47	10.6041
0.455	2.343	1.1351E-10	175.600	0.74394E-04	0.63808E-02	7970.08	7996.49	10.7216
0.460	2.335	1.1450E-10	175.472	0.74449E-04	0.64553E-02	7970.40	7996.52	10.8392
0.465	2.328	1.1549E-10	175.344	0.74503E-04	0.65298E-02	7970.71	7996.54	10.9568
0.470	2.320	1.1648E-10	175.218	0.74556E-04	0.66043E-02	7971.02	7996.56	11.0744
0.475	2.313	1.1747E-10	175.094	0.74610E-04	0.66789E-02	7971.31	7996.58	11.1919
0.480	2.306	1.1845E-10	174.970	0.74662E-04	0.67536E-02	7971.61	7996.60	11.3095
0.485	2.299	1.1943E-10	174.848	0.74714E-04	0.68283E-02	7971.89	7996.62	11.4271
0.490	2.292	1.2041E-10	174.728	0.74766E-04	0.69031E-02	7972.17	7996.64	11.5446
0.495	2.285	1.2139E-10	174.608	0.74817E-04	0.69779E-02	7972.45	7996.66	11.6622
0.500	2.278	1.2237E-10	174.490	0.74868E-04	0.70528E-02	7972.72	7996.68	11.7798
0.505	2.271	1.2334E-10	174.373	0.74918E-04	0.71277E-02	7972.98	7996.70	11.8974
0.510	2.264	1.2431E-10	174.257	0.74968E-04	0.72027E-02	7973.24	7996.72	12.0149
0.515	2.258	1.2528E-10	174.142	0.75017E-04	0.72777E-02	7973.49	7996.74	12.1325
0.520	2.251	1.2625E-10	174.028	0.75066E-04	0.73527E-02	7973.74	7996.76	12.2501
0.525	2.245	1.2722E-10	173.916	0.75115E-04	0.74279E-02	7973.98	7996.78	12.3677
0.530	2.239	1.2818E-10	173.804	0.75163E-04	0.75030E-02	7974.22	7996.80	12.4852
0.535	2.232	1.2914E-10	173.694	0.75211E-04	0.75782E-02	7974.46	7996.82	12.6028
0.540	2.226	1.3010E-10	173.584	0.75258E-04	0.76535E-02	7974.69	7996.83	12.7204
0.545	2.220	1.3106E-10	173.476	0.75305E-04	0.77288E-02	7974.91	7996.85	12.8379
0.550	2.214	1.3202E-10	173.368	0.75352E-04	0.78042E-02	7975.13	7996.87	12.9555
0.555	2.208	1.3297E-10	173.262	0.75398E-04	0.78796E-02	7975.35	7996.88	13.0731
0.560	2.202	1.3393E-10	173.156	0.75444E-04	0.79550E-02	7975.56	7996.90	13.1907
0.565	2.196	1.3488E-10	173.052	0.75490E-04	0.80305E-02	7975.77	7996.92	13.3082
0.570	2.191	1.3583E-10	172.948	0.75535E-04	0.81060E-02	7975.98	7996.93	13.4258
0.575	2.185	1.3678E-10	172.845	0.75580E-04	0.81816E-02	7976.18	7996.95	13.5434
0.580	2.179	1.3772E-10	172.744	0.75625E-04	0.82572E-02	7976.38	7996.97	13.6610
0.585	2.174	1.3867E-10	172.643	0.75669E-04	0.83329E-02	7976.58	7996.98	13.7785
0.590	2.168	1.3961E-10	172.543	0.75713E-04	0.84086E-02	7976.77	7997.00	13.8961
0.595	2.163	1.4055E-10	172.443	0.75756E-04	0.84844E-02	7976.96	7997.01	14.0137
0.600	2.157	1.4149E-10	172.345	0.75800E-04	0.85602E-02	7977.15	7997.03	14.1312
0.605	2.152	1.4243E-10	172.247	0.75842E-04	0.86360E-02	7977.33	7997.04	14.2488
0.610	2.147	1.4337E-10	172.151	0.75885E-04	0.87119E-02	7977.51	7997.05	14.3664

0.615	2.142	1.4430E-10	172.055	0.75927E-04	0.87878E-02	7977.69	7997.07	14.4840
0.620	2.136	1.4523E-10	171.960	0.75969E-04	0.88638E-02	7977.86	7997.08	14.6015
0.625	2.131	1.4617E-10	171.865	0.76011E-04	0.89398E-02	7978.03	7997.10	14.7191
0.630	2.126	1.4710E-10	171.772	0.76053E-04	0.90158E-02	7978.20	7997.11	14.8367
0.635	2.121	1.4803E-10	171.679	0.76094E-04	0.90919E-02	7978.37	7997.12	14.9543
0.640	2.116	1.4895E-10	171.587	0.76135E-04	0.91681E-02	7978.53	7997.14	15.0718
0.645	2.112	1.4988E-10	171.495	0.76175E-04	0.92443E-02	7978.69	7997.15	15.1894
0.650	2.107	1.5080E-10	171.404	0.76216E-04	0.93205E-02	7978.85	7997.16	15.3070
0.655	2.102	1.5173E-10	171.314	0.76256E-04	0.93967E-02	7979.01	7997.18	15.4246
0.660	2.097	1.5265E-10	171.225	0.76295E-04	0.94730E-02	7979.16	7997.19	15.5421
0.665	2.093	1.5357E-10	171.136	0.76335E-04	0.95494E-02	7979.31	7997.20	15.6597
0.670	2.088	1.5449E-10	171.048	0.76374E-04	0.96257E-02	7979.46	7997.21	15.7773
0.675	2.083	1.5541E-10	170.961	0.76413E-04	0.97021E-02	7979.61	7997.23	15.8948
0.680	2.079	1.5632E-10	170.874	0.76452E-04	0.97786E-02	7979.75	7997.24	16.0124
0.685	2.074	1.5724E-10	170.788	0.76490E-04	0.98551E-02	7979.90	7997.25	16.1300
0.690	2.070	1.5815E-10	170.703	0.76528E-04	0.99316E-02	7980.04	7997.26	16.2476
0.695	2.065	1.5906E-10	170.618	0.76567E-04	0.10008E-01	7980.17	7997.27	16.3651
0.700	2.061	1.5997E-10	170.534	0.76604E-04	0.10085E-01	7980.31	7997.29	16.4827
0.705	2.057	1.6088E-10	170.450	0.76642E-04	0.10161E-01	7980.45	7997.30	16.6003
0.710	2.052	1.6179E-10	170.367	0.76679E-04	0.10238E-01	7980.58	7997.31	16.7179
0.715	2.048	1.6270E-10	170.285	0.76716E-04	0.10315E-01	7980.71	7997.32	16.8354
0.720	2.044	1.6360E-10	170.203	0.76753E-04	0.10392E-01	7980.84	7997.33	16.9530
0.725	2.040	1.6451E-10	170.122	0.76790E-04	0.10468E-01	7980.97	7997.34	17.0706
0.730	2.035	1.6541E-10	170.041	0.76826E-04	0.10545E-01	7981.09	7997.35	17.1881
0.735	2.031	1.6631E-10	169.961	0.76863E-04	0.10622E-01	7981.22	7997.36	17.3057
0.740	2.027	1.6721E-10	169.881	0.76899E-04	0.10699E-01	7981.34	7997.37	17.4233
0.745	2.023	1.6811E-10	169.802	0.76934E-04	0.10776E-01	7981.46	7997.38	17.5409
0.750	2.019	1.6901E-10	169.724	0.76970E-04	0.10853E-01	7981.58	7997.39	17.6584
0.755	2.015	1.6990E-10	169.646	0.77005E-04	0.10930E-01	7981.69	7997.40	17.7760
0.760	2.011	1.7080E-10	169.568	0.77041E-04	0.11007E-01	7981.81	7997.41	17.8936
0.765	2.007	1.7169E-10	169.491	0.77076E-04	0.11084E-01	7981.92	7997.42	18.0112
0.770	2.004	1.7259E-10	169.415	0.77110E-04	0.11161E-01	7982.04	7997.43	18.1287
0.775	2.000	1.7348E-10	169.339	0.77145E-04	0.11238E-01	7982.15	7997.44	18.2463
0.780	1.996	1.7437E-10	169.263	0.77179E-04	0.11315E-01	7982.26	7997.45	18.3639
0.785	1.992	1.7526E-10	169.188	0.77214E-04	0.11393E-01	7982.37	7997.46	18.4814
0.790	1.989	1.7615E-10	169.114	0.77248E-04	0.11470E-01	7982.47	7997.47	18.5990
0.795	1.985	1.7704E-10	169.040	0.77282E-04	0.11547E-01	7982.58	7997.48	18.7166
0.800	1.981	1.7792E-10	168.966	0.77315E-04	0.11624E-01	7982.68	7997.49	18.8342
0.805	1.977	1.7881E-10	168.893	0.77349E-04	0.11702E-01	7982.79	7997.50	18.9517
0.810	1.974	1.7969E-10	168.820	0.77382E-04	0.11779E-01	7982.89	7997.51	19.0693
0.815	1.970	1.8057E-10	168.748	0.77415E-04	0.11857E-01	7982.99	7997.52	19.1869
0.820	1.967	1.8146E-10	168.676	0.77448E-04	0.11934E-01	7983.09	7997.53	19.3045
0.825	1.963	1.8234E-10	168.605	0.77481E-04	0.12012E-01	7983.19	7997.54	19.4220
0.830	1.960	1.8322E-10	168.534	0.77513E-04	0.12089E-01	7983.29	7997.55	19.5396
0.835	1.956	1.8410E-10	168.463	0.77546E-04	0.12167E-01	7983.38	7997.55	19.6572
0.840	1.953	1.8497E-10	168.393	0.77578E-04	0.12244E-01	7983.48	7997.56	19.7747
0.845	1.949	1.8585E-10	168.324	0.77610E-04	0.12322E-01	7983.57	7997.57	19.8923
0.850	1.946	1.8672E-10	168.254	0.77642E-04	0.12399E-01	7983.66	7997.58	20.0099

MATERIAL B CASE 2
INITIAL PARAMETERS AND CONSTANTS
STEPS IN AXIAL DIRECTION 170
DELX 0.00500
INITIAL HEIGHT 0.00001
MAXIMUM DENSITY OF CAKE 250.00000
PLENUM PRESSURE 8000.00000
THE TOTAL CAKE HEIGHT (MM) IS 12.402716040
MASS FLUX PAST CUTTER (GM/M) 13.308239551

X	V	PERM	RHO	H	HTOT	PINT	PB	FLUX
0.000	21.404	4.7767E-13	250.000	0.10000E-04	0.10000E-04	0.00	7707.25	0.0225
0.005	10.505	2.4431E-12	232.996	0.56068E-04	0.66068E-04	3782.68	7929.48	0.1401
0.010	8.164	4.5723E-12	223.548	0.58438E-04	0.12451E-03	6162.63	7957.41	0.2576
0.015	7.048	6.6093E-12	218.007	0.59923E-04	0.18443E-03	6869.19	7968.26	0.3752
0.020	6.363	8.5516E-12	214.137	0.61006E-04	0.24544E-03	7193.43	7974.13	0.4928
0.025	5.886	1.0413E-11	211.183	0.61859E-04	0.30729E-03	7376.49	7977.86	0.6104
0.030	5.528	1.2207E-11	208.800	0.62565E-04	0.36986E-03	7493.15	7980.47	0.7279
0.035	5.246	1.3945E-11	206.807	0.63168E-04	0.43303E-03	7573.65	7982.41	0.8455
0.040	5.016	1.5633E-11	205.096	0.63695E-04	0.49672E-03	7632.38	7983.92	0.9631
0.045	4.823	1.7279E-11	203.599	0.64163E-04	0.56089E-03	7677.05	7985.13	1.0807
0.050	4.659	1.8887E-11	202.269	0.64586E-04	0.62547E-03	7712.13	7986.13	1.1982
0.055	4.515	2.0462E-11	201.072	0.64970E-04	0.69044E-03	7740.38	7986.97	1.3158
0.060	4.389	2.2007E-11	199.984	0.65323E-04	0.75577E-03	7763.61	7987.69	1.4334
0.065	4.276	2.3524E-11	198.988	0.65650E-04	0.82142E-03	7783.04	7988.31	1.5509
0.070	4.175	2.5017E-11	198.070	0.65955E-04	0.88737E-03	7799.53	7988.86	1.6685
0.075	4.084	2.6488E-11	197.217	0.66240E-04	0.95361E-03	7813.69	7989.34	1.7861
0.080	4.000	2.7938E-11	196.422	0.66508E-04	0.10201E-02	7825.98	7989.77	1.9037
0.085	3.924	2.9368E-11	195.678	0.66761E-04	0.10869E-02	7836.74	7990.16	2.0212
0.090	3.853	3.0780E-11	194.977	0.67001E-04	0.11539E-02	7846.26	7990.51	2.1388
0.095	3.788	3.2176E-11	194.317	0.67229E-04	0.12211E-02	7854.72	7990.83	2.2564
0.100	3.471	2.3313E-12	500.000	0.26127E-04	0.12472E-02	7323.21	7992.30	2.3740
0.105	3.236	2.6823E-12	500.000	0.26127E-04	0.12734E-02	7451.13	7993.31	2.4915
0.110	3.052	3.0152E-12	500.000	0.26127E-04	0.12995E-02	7539.14	7994.05	2.6091
0.115	2.903	3.3331E-12	500.000	0.26127E-04	0.13256E-02	7603.22	7994.61	2.7267
0.120	2.779	3.6384E-12	500.000	0.26127E-04	0.13517E-02	7651.88	7995.07	2.8443
0.125	2.673	3.9328E-12	500.000	0.26127E-04	0.13779E-02	7690.05	7995.44	2.9618
0.130	2.659	8.1135E-11	180.570	0.72347E-04	0.14502E-02	7954.70	7995.48	3.0794
0.135	2.646	8.2218E-11	180.374	0.72426E-04	0.15226E-02	7955.44	7995.53	3.1970
0.140	2.633	8.3298E-11	180.180	0.72503E-04	0.15952E-02	7956.16	7995.57	3.3145
0.145	2.620	8.4374E-11	179.990	0.72580E-04	0.16677E-02	7956.85	7995.61	3.4321
0.150	2.607	8.5447E-11	179.803	0.72655E-04	0.17404E-02	7957.52	7995.66	3.5497
0.155	2.595	8.6516E-11	179.619	0.72730E-04	0.18131E-02	7958.17	7995.70	3.6673
0.160	2.583	8.7581E-11	179.438	0.72803E-04	0.18859E-02	7958.80	7995.74	3.7848
0.165	2.571	8.8644E-11	179.259	0.72876E-04	0.19588E-02	7959.41	7995.77	3.9024
0.170	2.560	8.9702E-11	179.083	0.72947E-04	0.20317E-02	7960.01	7995.81	4.0200
0.175	2.549	9.0758E-11	178.910	0.73018E-04	0.21048E-02	7960.58	7995.85	4.1376
0.180	2.538	9.1810E-11	178.739	0.73088E-04	0.21778E-02	7961.14	7995.89	4.2551
0.185	2.527	9.2859E-11	178.571	0.73156E-04	0.22510E-02	7961.68	7995.92	4.3727
0.190	2.516	9.3905E-11	178.405	0.73224E-04	0.23242E-02	7962.21	7995.95	4.4903
0.195	2.506	9.4948E-11	178.242	0.73292E-04	0.23975E-02	7962.72	7995.99	4.6078
0.200	2.495	9.5988E-11	178.081	0.73358E-04	0.24709E-02	7963.22	7996.02	4.7254
0.205	2.485	9.7025E-11	177.922	0.73424E-04	0.25443E-02	7963.71	7996.05	4.8430
0.210	2.475	9.8059E-11	177.765	0.73488E-04	0.26178E-02	7964.18	7996.08	4.9606
0.215	2.466	9.9091E-11	177.610	0.73552E-04	0.26913E-02	7964.64	7996.12	5.0781
0.220	2.456	1.0012E-10	177.457	0.73616E-04	0.27650E-02	7965.08	7996.15	5.1957
0.225	2.447	1.0115E-10	177.306	0.73678E-04	0.28386E-02	7965.52	7996.17	5.3133
0.230	2.437	1.0217E-10	177.157	0.73740E-04	0.29124E-02	7965.95	7996.20	5.4309
0.235	2.428	1.0319E-10	177.010	0.73802E-04	0.29862E-02	7966.36	7996.23	5.5484
0.240	2.419	1.0421E-10	176.865	0.73862E-04	0.30600E-02	7966.76	7996.26	5.6660
0.245	2.411	1.0522E-10	176.722	0.73922E-04	0.31340E-02	7967.16	7996.29	5.7836
0.250	2.402	1.0623E-10	176.580	0.73981E-04	0.32079E-02	7967.54	7996.31	5.9011
0.255	2.393	1.0724E-10	176.440	0.74040E-04	0.32820E-02	7967.92	7996.34	6.0187
0.260	2.385	1.0825E-10	176.302	0.74098E-04	0.33561E-02	7968.29	7996.37	6.1363
0.265	2.377	1.0926E-10	176.165	0.74156E-04	0.34302E-02	7968.64	7996.39	6.2539
0.270	2.369	1.1026E-10	176.030	0.74213E-04	0.35045E-02	7969.00	7996.42	6.3714
0.275	2.361	1.1126E-10	175.896	0.74269E-04	0.35787E-02	7969.34	7996.44	6.4890

0.280	2.353	1.1226E-10	175.764	0.74325E-04	0.36530E-02	7969.67	7996.46	6.6066
0.285	2.345	1.1325E-10	175.634	0.74380E-04	0.37274E-02	7970.00	7996.49	6.7242
0.290	2.337	1.1425E-10	175.505	0.74435E-04	0.38019E-02	7970.32	7996.51	6.8417
0.295	2.330	1.1524E-10	175.377	0.74489E-04	0.38763E-02	7970.63	7996.53	6.9593
0.300	2.322	1.1623E-10	175.251	0.74543E-04	0.39509E-02	7970.94	7996.55	7.0769
0.305	2.315	1.1721E-10	175.126	0.74596E-04	0.40255E-02	7971.24	7996.58	7.1944
0.310	2.308	1.1820E-10	175.002	0.74649E-04	0.41001E-02	7971.53	7996.60	7.3120
0.315	2.300	1.1918E-10	174.880	0.74701E-04	0.41748E-02	7971.82	7996.62	7.4296
0.320	2.293	1.2016E-10	174.759	0.74753E-04	0.42496E-02	7972.10	7996.64	7.5472
0.325	2.286	1.2114E-10	174.639	0.74804E-04	0.43244E-02	7972.38	7996.66	7.6647
0.330	2.279	1.2212E-10	174.520	0.74855E-04	0.43992E-02	7972.65	7996.68	7.7823
0.335	2.273	1.2309E-10	174.403	0.74905E-04	0.44742E-02	7972.91	7996.70	7.8999
0.340	2.266	1.2406E-10	174.286	0.74955E-04	0.45491E-02	7973.17	7996.72	8.0175
0.345	2.259	1.2503E-10	174.171	0.75005E-04	0.46241E-02	7973.43	7996.74	8.1350
0.350	2.253	1.2600E-10	174.057	0.75054E-04	0.46992E-02	7973.67	7996.76	8.2526
0.355	2.246	1.2697E-10	173.944	0.75103E-04	0.47743E-02	7973.92	7996.78	8.3702
0.360	2.240	1.2793E-10	173.833	0.75151E-04	0.48494E-02	7974.16	7996.79	8.4878
0.365	2.234	1.2890E-10	173.722	0.75199E-04	0.49246E-02	7974.40	7996.81	8.6053
0.370	2.228	1.2986E-10	173.612	0.75246E-04	0.49999E-02	7974.63	7996.83	8.7229
0.375	2.222	1.3082E-10	173.503	0.75293E-04	0.50752E-02	7974.85	7996.85	8.8405
0.380	2.215	1.3177E-10	173.396	0.75340E-04	0.51505E-02	7975.08	7996.86	8.9580
0.385	2.210	1.3273E-10	173.289	0.75387E-04	0.52259E-02	7975.30	7996.88	9.0756
0.390	2.204	1.3368E-10	173.183	0.75433E-04	0.53013E-02	7975.51	7996.90	9.1932
0.395	2.198	1.3463E-10	173.079	0.75478E-04	0.53768E-02	7975.72	7996.91	9.3108
0.400	2.192	1.3558E-10	172.975	0.75524E-04	0.54523E-02	7975.93	7996.93	9.4283
0.405	2.186	1.3653E-10	172.872	0.75569E-04	0.55279E-02	7976.13	7996.95	9.5459
0.410	2.181	1.3748E-10	172.770	0.75613E-04	0.56035E-02	7976.33	7996.96	9.6635
0.415	2.175	1.3842E-10	172.669	0.75657E-04	0.56792E-02	7976.53	7996.98	9.7811
0.420	2.170	1.3937E-10	172.568	0.75701E-04	0.57549E-02	7976.72	7996.99	9.8986
0.425	2.164	1.4031E-10	172.469	0.75745E-04	0.58306E-02	7976.91	7997.01	10.0162
0.430	2.159	1.4125E-10	172.370	0.75788E-04	0.59064E-02	7977.10	7997.02	10.1338
0.435	2.153	1.4219E-10	172.272	0.75831E-04	0.59822E-02	7977.28	7997.04	10.2513
0.440	2.148	1.4313E-10	172.176	0.75874E-04	0.60581E-02	7977.46	7997.05	10.3689
0.445	2.143	1.4406E-10	172.079	0.75917E-04	0.61340E-02	7977.64	7997.07	10.4865
0.450	2.138	1.4500E-10	171.984	0.75959E-04	0.62100E-02	7977.82	7997.08	10.6041
0.455	2.133	1.4593E-10	171.889	0.76000E-04	0.62860E-02	7977.99	7997.09	10.7216
0.460	2.128	1.4686E-10	171.796	0.76042E-04	0.63620E-02	7978.16	7997.11	10.8392
0.465	2.123	1.4779E-10	171.703	0.76083E-04	0.64381E-02	7978.33	7997.12	10.9568
0.470	2.118	1.4872E-10	171.610	0.76124E-04	0.65142E-02	7978.49	7997.13	11.0744
0.475	2.113	1.4964E-10	171.519	0.76165E-04	0.65904E-02	7978.65	7997.15	11.1919
0.480	2.108	1.5057E-10	171.428	0.76205E-04	0.66666E-02	7978.81	7997.16	11.3095
0.485	2.103	1.5149E-10	171.337	0.76245E-04	0.67428E-02	7978.97	7997.17	11.4271
0.490	2.098	1.5241E-10	171.248	0.76285E-04	0.68191E-02	7979.12	7997.19	11.5446
0.495	2.094	1.5333E-10	171.159	0.76325E-04	0.68954E-02	7979.27	7997.20	11.6622
0.500	2.089	1.5425E-10	171.071	0.76364E-04	0.69718E-02	7979.42	7997.21	11.7798
0.505	2.084	1.5517E-10	170.983	0.76403E-04	0.70482E-02	7979.57	7997.22	11.8974
0.510	2.080	1.5609E-10	170.896	0.76442E-04	0.71247E-02	7979.72	7997.24	12.0149
0.515	2.075	1.5700E-10	170.810	0.76480E-04	0.72011E-02	7979.86	7997.25	12.1325
0.520	2.071	1.5791E-10	170.725	0.76519E-04	0.72777E-02	7980.00	7997.26	12.2501
0.525	2.066	1.5883E-10	170.640	0.76557E-04	0.73542E-02	7980.14	7997.27	12.3677
0.530	2.062	1.5974E-10	170.555	0.76595E-04	0.74308E-02	7980.28	7997.28	12.4852
0.535	2.058	1.6065E-10	170.472	0.76632E-04	0.75074E-02	7980.41	7997.29	12.6028
0.540	2.053	1.6156E-10	170.388	0.76670E-04	0.75841E-02	7980.54	7997.31	12.7204
0.545	2.049	1.6246E-10	170.306	0.76707E-04	0.76608E-02	7980.68	7997.32	12.8379
0.550	2.045	1.6337E-10	170.224	0.76744E-04	0.77376E-02	7980.81	7997.33	12.9555
0.555	2.041	1.6427E-10	170.143	0.76781E-04	0.78143E-02	7980.93	7997.34	13.0731
0.560	2.037	1.6518E-10	170.062	0.76817E-04	0.78912E-02	7981.06	7997.35	13.1907
0.565	2.032	1.6608E-10	169.981	0.76853E-04	0.79680E-02	7981.18	7997.36	13.3082
0.570	2.028	1.6698E-10	169.902	0.76889E-04	0.80449E-02	7981.31	7997.37	13.4258
0.575	2.024	1.6788E-10	169.822	0.76925E-04	0.81218E-02	7981.43	7997.38	13.5434
0.580	2.020	1.6878E-10	169.744	0.76961E-04	0.81988E-02	7981.55	7997.39	13.6610
0.585	2.016	1.6967E-10	169.666	0.76996E-04	0.82758E-02	7981.66	7997.40	13.7785
0.590	2.012	1.7057E-10	169.588	0.77032E-04	0.83528E-02	7981.78	7997.41	13.8961
0.595	2.008	1.7146E-10	169.511	0.77067E-04	0.84299E-02	7981.90	7997.42	14.0137
0.600	2.005	1.7236E-10	169.434	0.77102E-04	0.85070E-02	7982.01	7997.43	14.1312
0.605	2.001	1.7325E-10	169.358	0.77136E-04	0.85841E-02	7982.12	7997.44	14.2488
0.610	1.997	1.7414E-10	169.283	0.77171E-04	0.86613E-02	7982.23	7997.45	14.3664

0.615	1.993	1.7503E-10	169.207	0.77205E-04	0.87385E-02	7982.34	7997.46	14.4840
0.620	1.989	1.7592E-10	169.133	0.77239E-04	0.88157E-02	7982.45	7997.47	14.6015
0.625	1.986	1.7681E-10	169.059	0.77273E-04	0.88930E-02	7982.55	7997.48	14.7191
0.630	1.982	1.7769E-10	168.985	0.77307E-04	0.89703E-02	7982.66	7997.49	14.8367
0.635	1.978	1.7858E-10	168.912	0.77340E-04	0.90477E-02	7982.76	7997.50	14.9543
0.640	1.975	1.7946E-10	168.839	0.77373E-04	0.91250E-02	7982.86	7997.51	15.0718
0.645	1.971	1.8035E-10	168.766	0.77407E-04	0.92024E-02	7982.96	7997.52	15.1894
0.650	1.968	1.8123E-10	168.695	0.77440E-04	0.92799E-02	7983.06	7997.53	15.3070
0.655	1.964	1.8211E-10	168.623	0.77472E-04	0.93573E-02	7983.16	7997.53	15.4245
0.660	1.961	1.8299E-10	168.552	0.77505E-04	0.94349E-02	7983.26	7997.54	15.5421
0.665	1.957	1.8387E-10	168.481	0.77538E-04	0.95124E-02	7983.36	7997.55	15.6597
0.670	1.954	1.8475E-10	168.411	0.77570E-04	0.95900E-02	7983.45	7997.56	15.7773
0.675	1.950	1.8562E-10	168.342	0.77602E-04	0.96676E-02	7983.55	7997.57	15.8948
0.680	1.947	1.8650E-10	168.272	0.77634E-04	0.97452E-02	7983.64	7997.58	16.0124
0.685	1.943	1.8737E-10	168.203	0.77666E-04	0.98229E-02	7983.73	7997.59	16.1300
0.690	1.940	1.8825E-10	168.135	0.77697E-04	0.99006E-02	7983.82	7997.59	16.2476
0.695	1.937	1.8912E-10	168.067	0.77729E-04	0.99783E-02	7983.91	7997.60	16.3651
0.700	1.934	1.8999E-10	167.999	0.77760E-04	0.10056E-01	7984.00	7997.61	16.4827
0.705	1.930	1.9086E-10	167.932	0.77792E-04	0.10134E-01	7984.09	7997.62	16.6003
0.710	1.927	1.9173E-10	167.865	0.77823E-04	0.10212E-01	7984.17	7997.63	16.7179
0.715	1.924	1.9260E-10	167.798	0.77853E-04	0.10290E-01	7984.26	7997.64	16.8354
0.720	1.921	1.9347E-10	167.732	0.77884E-04	0.10367E-01	7984.34	7997.64	16.9530
0.725	1.917	1.9434E-10	167.666	0.77915E-04	0.10445E-01	7984.43	7997.65	17.0706
0.730	1.914	1.9520E-10	167.600	0.77945E-04	0.10523E-01	7984.51	7997.66	17.1881
0.735	1.911	1.9607E-10	167.535	0.77975E-04	0.10601E-01	7984.59	7997.67	17.3057
0.740	1.908	1.9693E-10	167.471	0.78006E-04	0.10679E-01	7984.67	7997.67	17.4233
0.745	1.905	1.9779E-10	167.406	0.78036E-04	0.10757E-01	7984.75	7997.68	17.5409
0.750	1.902	1.9866E-10	167.342	0.78065E-04	0.10835E-01	7984.83	7997.69	17.6584
0.755	1.899	1.9952E-10	167.279	0.78095E-04	0.10913E-01	7984.91	7997.70	17.7760
0.760	1.896	2.0038E-10	167.215	0.78125E-04	0.10992E-01	7984.99	7997.70	17.8936
0.765	1.893	2.0124E-10	167.152	0.78154E-04	0.11070E-01	7985.07	7997.71	18.0112
0.770	1.890	2.0209E-10	167.090	0.78184E-04	0.11148E-01	7985.14	7997.72	18.1287
0.775	1.887	2.0295E-10	167.027	0.78213E-04	0.11226E-01	7985.22	7997.72	18.2463
0.780	1.884	2.0381E-10	166.965	0.78242E-04	0.11304E-01	7985.29	7997.73	18.3639
0.785	1.881	2.0466E-10	166.904	0.78271E-04	0.11383E-01	7985.37	7997.74	18.4814
0.790	1.878	2.0552E-10	166.842	0.78299E-04	0.11461E-01	7985.44	7997.75	18.5990
0.795	1.875	2.0637E-10	166.781	0.78328E-04	0.11539E-01	7985.51	7997.75	18.7166
0.800	1.872	2.0722E-10	166.721	0.78357E-04	0.11618E-01	7985.58	7997.76	18.8342
0.805	1.870	2.0808E-10	166.660	0.78385E-04	0.11696E-01	7985.65	7997.77	18.9517
0.810	1.867	2.0893E-10	166.600	0.78413E-04	0.11774E-01	7985.72	7997.77	19.0693
0.815	1.864	2.0978E-10	166.540	0.78441E-04	0.11853E-01	7985.79	7997.78	19.1869
0.820	1.861	2.1063E-10	166.481	0.78469E-04	0.11931E-01	7985.86	7997.79	19.3045
0.825	1.858	2.1148E-10	166.422	0.78497E-04	0.12010E-01	7985.93	7997.79	19.4220
0.830	1.856	2.1232E-10	166.363	0.78525E-04	0.12088E-01	7985.99	7997.80	19.5396
0.835	1.853	2.1317E-10	166.304	0.78553E-04	0.12167E-01	7986.06	7997.81	19.6572
0.840	1.850	2.1402E-10	166.246	0.78580E-04	0.12245E-01	7986.13	7997.81	19.7747
0.845	1.848	2.1486E-10	166.188	0.78608E-04	0.12324E-01	7986.19	7997.82	19.8923
0.850	1.845	2.1571E-10	166.130	0.78635E-04	0.12403E-01	7986.26	7997.82	20.0099

MATERIAL B CASE 3
INITIAL PARAMETERS AND CONSTANTS
STEPS IN AXIAL DIRECTION 170
DELX 0.00500
INITIAL HEIGHT 0.00001
MAXIMUM DENSITY OF CAKE 250.00000
PLENUM PRESSURE 8000.00000
THE TOTAL CAKE HEIGHT (MM) IS 12.799304703
MASS FLUX PAST CUTTER (GM/M) 12.701219428

X	V	PERM	RHO	H	HTOT	PINT	PB	FLUX
0.000	21.404	4.7767E-13	250.000	0.10000E-04	0.10000E-04	0.00	7707.25	0.0225
0.005	10.505	2.4431E-12	232.996	0.56068E-04	0.66068E-04	3782.68	7929.48	0.1401
0.010	8.164	4.5723E-12	223.548	0.58438E-04	0.12451E-03	6162.63	7957.41	0.2576
0.015	7.048	6.6093E-12	218.007	0.59923E-04	0.18443E-03	6869.19	7968.26	0.3752
0.020	6.363	8.5516E-12	214.137	0.61006E-04	0.24544E-03	7193.43	7974.13	0.4928
0.025	5.886	1.0413E-11	211.183	0.61859E-04	0.30729E-03	7376.49	7977.86	0.6104
0.030	5.528	1.2207E-11	208.800	0.62565E-04	0.36986E-03	7493.15	7980.47	0.7279
0.035	5.246	1.3945E-11	206.807	0.63168E-04	0.43303E-03	7573.65	7982.41	0.8455
0.040	5.016	1.5633E-11	205.096	0.63695E-04	0.49672E-03	7632.38	7983.92	0.9631
0.045	4.823	1.7279E-11	203.599	0.64163E-04	0.56089E-03	7677.05	7985.13	1.0807
0.050	4.659	1.8887E-11	202.269	0.64586E-04	0.62547E-03	7712.13	7986.13	1.1982
0.055	4.515	2.0462E-11	201.072	0.64970E-04	0.69044E-03	7740.38	7986.97	1.3158
0.060	4.389	2.2007E-11	199.984	0.65323E-04	0.75577E-03	7763.61	7987.69	1.4334
0.065	4.276	2.3524E-11	198.988	0.65650E-04	0.82142E-03	7783.04	7988.31	1.5509
0.070	4.175	2.5017E-11	198.070	0.65955E-04	0.88737E-03	7799.53	7988.86	1.6685
0.075	4.084	2.6488E-11	197.217	0.66240E-04	0.95361E-03	7813.69	7989.34	1.7861
0.080	4.000	2.7938E-11	196.422	0.66508E-04	0.10201E-02	7825.98	7989.77	1.9037
0.085	3.924	2.9368E-11	195.678	0.66761E-04	0.10869E-02	7836.74	7990.16	2.0212
0.090	3.853	3.0780E-11	194.977	0.67001E-04	0.11539E-02	7846.26	7990.51	2.1388
0.095	3.788	3.2176E-11	194.317	0.67229E-04	0.12211E-02	7854.72	7990.83	2.2564
0.100	3.770	2.3227E-10	100.000	0.13064E-03	0.13517E-02	7954.44	7990.92	2.3740
0.105	3.753	2.3437E-10	100.000	0.13064E-03	0.14824E-02	7955.01	7991.00	2.4915
0.110	3.737	2.3647E-10	100.000	0.13064E-03	0.16130E-02	7955.57	7991.08	2.6091
0.115	3.720	2.3855E-10	100.000	0.13064E-03	0.17437E-02	7956.11	7991.16	2.7267
0.120	3.704	2.4062E-10	100.000	0.13064E-03	0.18743E-02	7956.64	7991.23	2.8443
0.125	3.689	2.4269E-10	100.000	0.13064E-03	0.20049E-02	7957.16	7991.31	2.9618
0.130	3.612	3.6399E-11	192.479	0.97953E-04	0.21029E-02	7824.50	7991.67	3.1315
0.135	3.552	3.8010E-11	191.834	0.82482E-04	0.21854E-02	7859.37	7991.94	3.2739
0.140	3.501	3.9462E-11	191.276	0.75155E-04	0.22605E-02	7877.49	7992.17	3.4033
0.145	3.455	4.0831E-11	190.768	0.71714E-04	0.23322E-02	7887.99	7992.37	3.5264
0.150	3.413	4.2156E-11	190.293	0.70136E-04	0.24024E-02	7894.89	7992.56	3.6465
0.155	3.374	4.3454E-11	189.842	0.69455E-04	0.24718E-02	7899.98	7992.73	3.7652
0.160	3.336	4.4735E-11	189.410	0.69206E-04	0.25410E-02	7904.12	7992.89	3.8832
0.165	3.301	4.6002E-11	188.994	0.69163E-04	0.26102E-02	7907.69	7993.04	4.0008
0.170	3.267	4.7260E-11	188.593	0.69269E-04	0.26795E-02	7910.83	7993.18	4.1184
0.175	3.234	4.8509E-11	188.205	0.69412E-04	0.27489E-02	7913.72	7993.32	4.2360
0.180	3.203	4.9749E-11	187.830	0.69550E-04	0.28184E-02	7916.42	7993.44	4.3535
0.185	3.173	5.0981E-11	187.466	0.69685E-04	0.28881E-02	7918.96	7993.57	4.4711
0.190	3.145	5.2205E-11	187.114	0.69817E-04	0.29579E-02	7921.35	7993.68	4.5887
0.195	3.117	5.3421E-11	186.772	0.69944E-04	0.30279E-02	7923.60	7993.79	4.7063
0.200	3.090	5.4631E-11	186.439	0.70069E-04	0.30979E-02	7925.72	7993.90	4.8238
0.205	3.065	5.5833E-11	186.116	0.70191E-04	0.31681E-02	7927.73	7994.00	4.9414
0.210	3.040	5.7028E-11	185.801	0.70310E-04	0.32384E-02	7929.62	7994.09	5.0590
0.215	3.016	5.8216E-11	185.495	0.70426E-04	0.33089E-02	7931.42	7994.19	5.1766
0.220	2.993	5.9399E-11	185.196	0.70540E-04	0.33794E-02	7933.13	7994.27	5.2941
0.225	2.971	6.0575E-11	184.905	0.70651E-04	0.34501E-02	7934.76	7994.36	5.4117
0.230	2.949	6.1745E-11	184.621	0.70759E-04	0.35208E-02	7936.30	7994.44	5.5293
0.235	2.929	6.2909E-11	184.344	0.70866E-04	0.35917E-02	7937.78	7994.52	5.6468
0.240	2.908	6.4067E-11	184.073	0.70970E-04	0.36627E-02	7939.18	7994.60	5.7644
0.245	2.889	6.5220E-11	183.808	0.71072E-04	0.37337E-02	7940.53	7994.67	5.8820
0.250	2.869	6.6367E-11	183.550	0.71172E-04	0.38049E-02	7941.81	7994.74	5.9996
0.255	2.851	6.7509E-11	183.296	0.71271E-04	0.38762E-02	7943.04	7994.81	6.1171
0.260	2.833	6.8647E-11	183.049	0.71367E-04	0.39475E-02	7944.21	7994.87	6.2347
0.265	2.815	6.9779E-11	182.806	0.71462E-04	0.40190E-02	7945.34	7994.94	6.3523
0.270	2.798	7.0906E-11	182.568	0.71555E-04	0.40906E-02	7946.43	7995.00	6.4699
0.275	2.782	7.2028E-11	182.335	0.71646E-04	0.41622E-02	7947.47	7995.06	6.5874

0.280	2.765	7.3146E-11	182.107	0.71736E-04	0.42339E-02	7948.46	7995.11	6.7050
0.285	2.750	7.4260E-11	181.883	0.71825E-04	0.43058E-02	7949.43	7995.17	6.8226
0.290	2.734	7.5369E-11	181.663	0.71912E-04	0.43777E-02	7950.35	7995.22	6.9401
0.295	2.719	7.6473E-11	181.447	0.71997E-04	0.44497E-02	7951.24	7995.28	7.0577
0.300	2.704	7.7574E-11	181.236	0.72081E-04	0.45218E-02	7952.10	7995.33	7.1753
0.305	2.690	7.8670E-11	181.028	0.72164E-04	0.45939E-02	7952.93	7995.38	7.2929
0.310	2.676	7.9763E-11	180.823	0.72246E-04	0.46662E-02	7953.73	7995.42	7.4104
0.315	2.662	8.0851E-11	180.622	0.72326E-04	0.47385E-02	7954.51	7995.47	7.5280
0.320	2.649	8.1936E-11	180.425	0.72405E-04	0.48109E-02	7955.25	7995.52	7.6456
0.325	2.636	8.3017E-11	180.231	0.72483E-04	0.48834E-02	7955.97	7995.56	7.7632
0.330	2.623	8.4094E-11	180.040	0.72560E-04	0.49559E-02	7956.67	7995.60	7.8807
0.335	2.611	8.5167E-11	179.852	0.72636E-04	0.50286E-02	7957.35	7995.65	7.9983
0.340	2.598	8.6237E-11	179.667	0.72710E-04	0.51013E-02	7958.01	7995.69	8.1159
0.345	2.586	8.7303E-11	179.485	0.72784E-04	0.51741E-02	7958.64	7995.73	8.2335
0.350	2.574	8.8366E-11	179.306	0.72857E-04	0.52469E-02	7959.26	7995.76	8.3510
0.355	2.563	8.9426E-11	179.129	0.72929E-04	0.53199E-02	7959.85	7995.80	8.4686
0.360	2.552	9.0482E-11	178.955	0.72999E-04	0.53929E-02	7960.43	7995.84	8.5862
0.365	2.540	9.1536E-11	178.784	0.73069E-04	0.54659E-02	7961.00	7995.88	8.7037
0.370	2.530	9.2586E-11	178.615	0.73139E-04	0.55391E-02	7961.54	7995.91	8.8213
0.375	2.519	9.3632E-11	178.448	0.73207E-04	0.56123E-02	7962.07	7995.95	8.9389
0.380	2.508	9.4676E-11	178.284	0.73274E-04	0.56855E-02	7962.59	7995.98	9.0565
0.385	2.498	9.5717E-11	178.123	0.73341E-04	0.57589E-02	7963.09	7996.01	9.1740
0.390	2.488	9.6755E-11	177.963	0.73407E-04	0.58323E-02	7963.58	7996.04	9.2916
0.395	2.478	9.7790E-11	177.805	0.73472E-04	0.59058E-02	7964.06	7996.08	9.4092
0.400	2.468	9.8822E-11	177.650	0.73536E-04	0.59793E-02	7964.52	7996.11	9.5268
0.405	2.459	9.9851E-11	177.497	0.73599E-04	0.60529E-02	7964.97	7996.14	9.6443
0.410	2.449	1.0088E-10	177.345	0.73662E-04	0.61266E-02	7965.41	7996.17	9.7619
0.415	2.440	1.0190E-10	177.196	0.73724E-04	0.62003E-02	7965.84	7996.20	9.8795
0.420	2.431	1.0292E-10	177.048	0.73786E-04	0.62741E-02	7966.25	7996.22	9.9970
0.425	2.422	1.0394E-10	176.903	0.73846E-04	0.63479E-02	7966.66	7996.25	10.1146
0.430	2.413	1.0496E-10	176.759	0.73907E-04	0.64218E-02	7967.06	7996.28	10.2322
0.435	2.404	1.0597E-10	176.617	0.73966E-04	0.64958E-02	7967.44	7996.31	10.3498
0.440	2.396	1.0698E-10	176.476	0.74025E-04	0.65698E-02	7967.82	7996.33	10.4673
0.445	2.387	1.0799E-10	176.338	0.74083E-04	0.66439E-02	7968.19	7996.36	10.5849
0.450	2.379	1.0899E-10	176.201	0.74141E-04	0.67180E-02	7968.55	7996.38	10.7025
0.455	2.371	1.1000E-10	176.065	0.74198E-04	0.67922E-02	7968.90	7996.41	10.8201
0.460	2.363	1.1100E-10	175.931	0.74254E-04	0.68665E-02	7969.25	7996.43	10.9376
0.465	2.355	1.1200E-10	175.799	0.74310E-04	0.69408E-02	7969.59	7996.46	11.0552
0.470	2.347	1.1299E-10	175.668	0.74366E-04	0.70152E-02	7969.91	7996.48	11.1728
0.475	2.339	1.1399E-10	175.538	0.74421E-04	0.70896E-02	7970.24	7996.50	11.2903
0.480	2.332	1.1498E-10	175.410	0.74475E-04	0.71641E-02	7970.55	7996.53	11.4079
0.485	2.324	1.1597E-10	175.283	0.74529E-04	0.72386E-02	7970.86	7996.55	11.5255
0.490	2.317	1.1696E-10	175.158	0.74582E-04	0.73132E-02	7971.16	7996.57	11.6431
0.495	2.309	1.1794E-10	175.034	0.74635E-04	0.73878E-02	7971.46	7996.59	11.7606
0.500	2.302	1.1892E-10	174.911	0.74687E-04	0.74625E-02	7971.74	7996.61	11.8782
0.505	2.295	1.1991E-10	174.790	0.74739E-04	0.75372E-02	7972.03	7996.63	11.9958
0.510	2.288	1.2088E-10	174.670	0.74791E-04	0.76120E-02	7972.30	7996.65	12.1134
0.515	2.281	1.2186E-10	174.551	0.74842E-04	0.76869E-02	7972.58	7996.67	12.2309
0.520	2.274	1.2284E-10	174.433	0.74892E-04	0.77618E-02	7972.84	7996.69	12.3485
0.525	2.268	1.2381E-10	174.317	0.74942E-04	0.78367E-02	7973.10	7996.71	12.4661
0.530	2.261	1.2478E-10	174.201	0.74992E-04	0.79117E-02	7973.36	7996.73	12.5836
0.535	2.255	1.2575E-10	174.087	0.75041E-04	0.79867E-02	7973.61	7996.75	12.7012
0.540	2.248	1.2672E-10	173.974	0.75090E-04	0.80618E-02	7973.86	7996.77	12.8188
0.545	2.242	1.2768E-10	173.862	0.75138E-04	0.81370E-02	7974.10	7996.79	12.9364
0.550	2.235	1.2864E-10	173.751	0.75186E-04	0.82121E-02	7974.33	7996.81	13.0539
0.555	2.229	1.2961E-10	173.641	0.75234E-04	0.82874E-02	7974.57	7996.82	13.1715
0.560	2.223	1.3057E-10	173.532	0.75281E-04	0.83627E-02	7974.79	7996.84	13.2891
0.565	2.217	1.3152E-10	173.424	0.75328E-04	0.84380E-02	7975.02	7996.86	13.4067
0.570	2.211	1.3248E-10	173.317	0.75374E-04	0.85134E-02	7975.24	7996.88	13.5242
0.575	2.205	1.3343E-10	173.211	0.75421E-04	0.85888E-02	7975.45	7996.89	13.6418
0.580	2.199	1.3439E-10	173.106	0.75466E-04	0.86642E-02	7975.67	7996.91	13.7594
0.585	2.194	1.3534E-10	173.002	0.75512E-04	0.87398E-02	7975.87	7996.93	13.8769
0.590	2.188	1.3629E-10	172.899	0.75557E-04	0.88153E-02	7976.08	7996.94	13.9945
0.595	2.182	1.3723E-10	172.796	0.75602E-04	0.88909E-02	7976.28	7996.96	14.1121
0.600	2.177	1.3818E-10	172.695	0.75646E-04	0.89666E-02	7976.48	7996.97	14.2297
0.605	2.171	1.3912E-10	172.594	0.75690E-04	0.90423E-02	7976.67	7996.99	14.3472
0.610	2.166	1.4006E-10	172.495	0.75734E-04	0.91180E-02	7976.86	7997.00	14.4648

0.615	2.160	1.4100E-10	172.396	0.75777E-04	0.91938E-02	7977.05	7997.02	14.5824
0.620	2.155	1.4194E-10	172.298	0.75820E-04	0.92696E-02	7977.24	7997.03	14.7000
0.625	2.150	1.4288E-10	172.201	0.75863E-04	0.93454E-02	7977.42	7997.05	14.8175
0.630	2.144	1.4382E-10	172.104	0.75905E-04	0.94214E-02	7977.60	7997.06	14.9351
0.635	2.139	1.4475E-10	172.009	0.75948E-04	0.94973E-02	7977.77	7997.08	15.0527
0.640	2.134	1.4568E-10	171.914	0.75990E-04	0.95733E-02	7977.94	7997.09	15.1703
0.645	2.129	1.4662E-10	171.820	0.76031E-04	0.96493E-02	7978.11	7997.10	15.2878
0.650	2.124	1.4754E-10	171.727	0.76072E-04	0.97254E-02	7978.28	7997.12	15.4054
0.655	2.119	1.4847E-10	171.634	0.76113E-04	0.98015E-02	7978.45	7997.13	15.5230
0.660	2.114	1.4940E-10	171.542	0.76154E-04	0.98777E-02	7978.61	7997.14	15.6405
0.665	2.109	1.5033E-10	171.451	0.76195E-04	0.99539E-02	7978.77	7997.16	15.7581
0.670	2.104	1.5125E-10	171.361	0.76235E-04	0.10030E-01	7978.93	7997.17	15.8757
0.675	2.100	1.5217E-10	171.271	0.76275E-04	0.10106E-01	7979.08	7997.18	15.9933
0.680	2.095	1.5309E-10	171.182	0.76314E-04	0.10183E-01	7979.23	7997.20	16.1108
0.685	2.090	1.5401E-10	171.094	0.76354E-04	0.10259E-01	7979.38	7997.21	16.2284
0.690	2.086	1.5493E-10	171.006	0.76393E-04	0.10335E-01	7979.53	7997.22	16.3460
0.695	2.081	1.5585E-10	170.919	0.76432E-04	0.10412E-01	7979.68	7997.23	16.4636
0.700	2.077	1.5676E-10	170.833	0.76470E-04	0.10488E-01	7979.82	7997.24	16.5811
0.705	2.072	1.5768E-10	170.747	0.76509E-04	0.10565E-01	7979.96	7997.26	16.6987
0.710	2.068	1.5859E-10	170.662	0.76547E-04	0.10641E-01	7980.10	7997.27	16.8163
0.715	2.063	1.5950E-10	170.577	0.76585E-04	0.10718E-01	7980.24	7997.28	16.9338
0.720	2.059	1.6041E-10	170.493	0.76622E-04	0.10795E-01	7980.38	7997.29	17.0514
0.725	2.055	1.6132E-10	170.410	0.76660E-04	0.10871E-01	7980.51	7997.30	17.1690
0.730	2.050	1.6223E-10	170.327	0.76697E-04	0.10948E-01	7980.64	7997.31	17.2866
0.735	2.046	1.6313E-10	170.245	0.76734E-04	0.11025E-01	7980.77	7997.33	17.4041
0.740	2.042	1.6404E-10	170.164	0.76771E-04	0.11101E-01	7980.90	7997.34	17.5217
0.745	2.038	1.6494E-10	170.083	0.76808E-04	0.11178E-01	7981.03	7997.35	17.6393
0.750	2.034	1.6584E-10	170.002	0.76844E-04	0.11255E-01	7981.15	7997.36	17.7569
0.755	2.029	1.6674E-10	169.922	0.76880E-04	0.11332E-01	7981.27	7997.37	17.8744
0.760	2.025	1.6764E-10	169.843	0.76916E-04	0.11409E-01	7981.40	7997.38	17.9920
0.765	2.021	1.6854E-10	169.764	0.76952E-04	0.11486E-01	7981.52	7997.39	18.1096
0.770	2.017	1.6944E-10	169.686	0.76987E-04	0.11563E-01	7981.63	7997.40	18.2271
0.775	2.013	1.7034E-10	169.608	0.77022E-04	0.11640E-01	7981.75	7997.41	18.3447
0.780	2.010	1.7123E-10	169.531	0.77058E-04	0.11717E-01	7981.87	7997.42	18.4623
0.785	2.006	1.7212E-10	169.454	0.77092E-04	0.11794E-01	7981.98	7997.43	18.5799
0.790	2.002	1.7302E-10	169.378	0.77127E-04	0.11871E-01	7982.09	7997.44	18.6974
0.795	1.998	1.7391E-10	169.302	0.77162E-04	0.11948E-01	7982.20	7997.45	18.8150
0.800	1.994	1.7480E-10	169.227	0.77196E-04	0.12025E-01	7982.31	7997.46	18.9326
0.805	1.990	1.7569E-10	169.152	0.77230E-04	0.12103E-01	7982.42	7997.47	19.0502
0.810	1.987	1.7658E-10	169.078	0.77264E-04	0.12180E-01	7982.53	7997.48	19.1677
0.815	1.983	1.7746E-10	169.004	0.77298E-04	0.12257E-01	7982.63	7997.49	19.2853
0.820	1.979	1.7835E-10	168.931	0.77331E-04	0.12335E-01	7982.73	7997.50	19.4029
0.825	1.976	1.7923E-10	168.858	0.77365E-04	0.12412E-01	7982.84	7997.51	19.5204
0.830	1.972	1.8012E-10	168.785	0.77398E-04	0.12489E-01	7982.94	7997.51	19.6380
0.835	1.969	1.8100E-10	168.713	0.77431E-04	0.12567E-01	7983.04	7997.52	19.7556
0.840	1.965	1.8188E-10	168.642	0.77464E-04	0.12644E-01	7983.14	7997.53	19.8732
0.845	1.962	1.8276E-10	168.571	0.77497E-04	0.12722E-01	7983.24	7997.54	19.9907
0.850	1.958	1.8364E-10	168.500	0.77529E-04	0.12799E-01	7983.33	7997.55	20.1083

MATERIAL B CASE 4
INITIAL PARAMETERS AND CONSTANTS
STEPS IN AXIAL DIRECTION 170
DELX 0.00500
INITIAL HEIGHT 0.00001
MAXIMUM DENSITY OF CAKE 250.00000
PLENUM PRESSURE 8000.00000
THE TOTAL CAKE HEIGHT (MM) IS 12.784166198
MASS FLUX PAST CUTTER (GM/M) 12.806356398

X	V	PERM	RHO	H	HTOT	PINT	PB	FLUX
0.000	21.404	4.7767E-13	250.000	0.10000E-04	0.10000E-04	0.00	7707.25	0.0225
0.005	10.505	2.4431E-12	232.996	0.56068E-04	0.66068E-04	3782.68	7929.48	0.1401
0.010	8.164	4.5723E-12	223.548	0.58438E-04	0.12451E-03	6162.63	7957.41	0.2576
0.015	7.048	6.6093E-12	218.007	0.59923E-04	0.18443E-03	6869.19	7968.26	0.3752
0.020	6.363	8.5516E-12	214.137	0.61006E-04	0.24544E-03	7193.43	7974.13	0.4928
0.025	5.886	1.0413E-11	211.183	0.61859E-04	0.30729E-03	7376.49	7977.86	0.6104
0.030	5.528	1.2207E-11	208.800	0.62565E-04	0.36986E-03	7493.15	7980.47	0.7279
0.035	5.246	1.3945E-11	206.807	0.63168E-04	0.43303E-03	7573.65	7982.41	0.8455
0.040	5.016	1.5633E-11	205.096	0.63695E-04	0.49672E-03	7632.38	7983.92	0.9631
0.045	4.823	1.7279E-11	203.599	0.64163E-04	0.56089E-03	7677.05	7985.13	1.0807
0.050	4.659	1.8887E-11	202.269	0.64586E-04	0.62547E-03	7712.13	7986.13	1.1982
0.055	4.515	2.0462E-11	201.072	0.64970E-04	0.69044E-03	7740.38	7986.97	1.3158
0.060	4.389	2.2007E-11	199.984	0.65323E-04	0.75577E-03	7763.61	7987.69	1.4334
0.065	4.276	2.3524E-11	198.988	0.65650E-04	0.82142E-03	7783.04	7988.31	1.5509
0.070	4.175	2.5017E-11	198.070	0.65955E-04	0.88737E-03	7799.53	7988.86	1.6685
0.075	4.084	2.6488E-11	197.217	0.66240E-04	0.95361E-03	7813.69	7989.34	1.7861
0.080	4.000	2.7938E-11	196.422	0.66508E-04	0.10201E-02	7825.98	7989.77	1.9037
0.085	3.924	2.9368E-11	195.678	0.66761E-04	0.10869E-02	7836.74	7990.16	2.0212
0.090	3.853	3.0780E-11	194.977	0.67001E-04	0.11539E-02	7846.26	7990.51	2.1388
0.095	3.788	3.2176E-11	194.317	0.67229E-04	0.12211E-02	7854.72	7990.83	2.2564
0.100	3.471	2.3313E-12	500.000	0.26127E-04	0.12472E-02	7323.21	7992.30	2.3740
0.105	3.236	2.6823E-12	500.000	0.26127E-04	0.12734E-02	7451.13	7993.31	2.4915
0.110	3.052	3.0152E-12	500.000	0.26127E-04	0.12995E-02	7539.14	7994.05	2.6091
0.115	2.903	3.3331E-12	500.000	0.26127E-04	0.13256E-02	7603.22	7994.61	2.7267
0.120	2.779	3.6384E-12	500.000	0.26127E-04	0.13517E-02	7651.88	7995.07	2.8443
0.125	2.673	3.9328E-12	500.000	0.26127E-04	0.13779E-02	7690.05	7995.44	2.9618
0.130	2.668	4.6378E-10	100.000	0.13064E-03	0.15085E-02	7982.52	7995.45	3.0794
0.135	2.664	4.6527E-10	100.000	0.13064E-03	0.16391E-02	7982.60	7995.47	3.1970
0.140	2.660	4.6676E-10	100.000	0.13064E-03	0.17698E-02	7982.68	7995.48	3.3145
0.145	2.655	4.6825E-10	100.000	0.13064E-03	0.19004E-02	7982.75	7995.49	3.4321
0.150	2.651	4.6974E-10	100.000	0.13064E-03	0.20311E-02	7982.83	7995.51	3.5497
0.155	2.647	4.7123E-10	100.000	0.13064E-03	0.21617E-02	7982.90	7995.52	3.6673
0.160	2.629	8.3590E-11	180.129	0.10032E-03	0.22620E-02	7941.31	7995.58	3.8299
0.165	2.614	8.4861E-11	179.905	0.85940E-04	0.23480E-02	7950.10	7995.63	3.9691
0.170	2.601	8.6025E-11	179.703	0.79088E-04	0.24270E-02	7954.55	7995.68	4.0970
0.175	2.588	8.7137E-11	179.513	0.75827E-04	0.25029E-02	7956.98	7995.72	4.2195
0.180	2.576	8.8221E-11	179.330	0.74290E-04	0.25772E-02	7958.45	7995.76	4.3394
0.185	2.564	8.9291E-11	179.151	0.73583E-04	0.26507E-02	7959.45	7995.80	4.4580
0.190	2.553	9.0352E-11	178.977	0.73278E-04	0.27240E-02	7960.22	7995.84	4.5761
0.195	2.542	9.1407E-11	178.805	0.73166E-04	0.27972E-02	7960.88	7995.87	4.6938
0.200	2.531	9.2457E-11	178.635	0.73148E-04	0.28703E-02	7961.47	7995.91	4.8114
0.205	2.520	9.3504E-11	178.469	0.73199E-04	0.29435E-02	7962.01	7995.94	4.9290
0.210	2.510	9.4549E-11	178.304	0.73266E-04	0.30168E-02	7962.53	7995.98	5.0465
0.215	2.499	9.5590E-11	178.142	0.73333E-04	0.30901E-02	7963.03	7996.01	5.1641
0.220	2.489	9.6628E-11	177.982	0.73399E-04	0.31635E-02	7963.52	7996.04	5.2817
0.225	2.479	9.7663E-11	177.825	0.73464E-04	0.32370E-02	7964.00	7996.07	5.3993
0.230	2.469	9.8696E-11	177.669	0.73528E-04	0.33105E-02	7964.46	7996.10	5.5168
0.235	2.460	9.9725E-11	177.515	0.73592E-04	0.33841E-02	7964.91	7996.13	5.6344
0.240	2.450	1.0075E-10	177.364	0.73655E-04	0.34578E-02	7965.35	7996.16	5.7520
0.245	2.441	1.0178E-10	177.214	0.73717E-04	0.35315E-02	7965.78	7996.19	5.8696
0.250	2.432	1.0280E-10	177.066	0.73778E-04	0.36053E-02	7966.20	7996.22	5.9871
0.255	2.423	1.0382E-10	176.921	0.73839E-04	0.36791E-02	7966.61	7996.25	6.1047
0.260	2.414	1.0483E-10	176.776	0.73899E-04	0.37530E-02	7967.01	7996.28	6.2223
0.265	2.405	1.0585E-10	176.634	0.73959E-04	0.38270E-02	7967.40	7996.30	6.3398
0.270	2.397	1.0686E-10	176.494	0.74018E-04	0.39010E-02	7967.78	7996.33	6.4574
0.275	2.388	1.0787E-10	176.355	0.74076E-04	0.39751E-02	7968.15	7996.36	6.5750

0.280	2.380	1.0887E-10	176.217	0.74134E-04	0.40492E-02	7968.51	7996.38	6.6926
0.285	2.372	1.0988E-10	176.082	0.74191E-04	0.41234E-02	7968.86	7996.41	6.8101
0.290	2.364	1.1088E-10	175.947	0.74247E-04	0.41976E-02	7969.21	7996.43	6.9277
0.295	2.356	1.1188E-10	175.815	0.74303E-04	0.42719E-02	7969.54	7996.45	7.0453
0.300	2.348	1.1287E-10	175.684	0.74359E-04	0.43463E-02	7969.87	7996.48	7.1629
0.305	2.340	1.1387E-10	175.554	0.74414E-04	0.44207E-02	7970.20	7996.50	7.2804
0.310	2.332	1.1486E-10	175.426	0.74468E-04	0.44952E-02	7970.51	7996.52	7.3980
0.315	2.325	1.1585E-10	175.299	0.74522E-04	0.45697E-02	7970.82	7996.55	7.5156
0.320	2.318	1.1684E-10	175.173	0.74576E-04	0.46443E-02	7971.12	7996.57	7.6331
0.325	2.310	1.1782E-10	175.049	0.74628E-04	0.47189E-02	7971.42	7996.59	7.7507
0.330	2.303	1.1880E-10	174.926	0.74681E-04	0.47936E-02	7971.71	7996.61	7.8683
0.335	2.296	1.1979E-10	174.805	0.74733E-04	0.48683E-02	7971.99	7996.63	7.9859
0.340	2.289	1.2077E-10	174.684	0.74784E-04	0.49431E-02	7972.27	7996.65	8.1034
0.345	2.282	1.2174E-10	174.565	0.74835E-04	0.50179E-02	7972.54	7996.67	8.2210
0.350	2.275	1.2272E-10	174.448	0.74886E-04	0.50928E-02	7972.81	7996.69	8.3386
0.355	2.269	1.2369E-10	174.331	0.74936E-04	0.51678E-02	7973.07	7996.71	8.4562
0.360	2.262	1.2466E-10	174.215	0.74986E-04	0.52427E-02	7973.33	7996.73	8.5737
0.365	2.255	1.2563E-10	174.101	0.75035E-04	0.53178E-02	7973.58	7996.75	8.6913
0.370	2.249	1.2660E-10	173.988	0.75084E-04	0.53929E-02	7973.83	7996.77	8.8089
0.375	2.243	1.2756E-10	173.875	0.75132E-04	0.54680E-02	7974.07	7996.79	8.9264
0.380	2.236	1.2853E-10	173.764	0.75180E-04	0.55432E-02	7974.31	7996.80	9.0440
0.385	2.230	1.2949E-10	173.654	0.75228E-04	0.56184E-02	7974.54	7996.82	9.1616
0.390	2.224	1.3045E-10	173.545	0.75275E-04	0.56937E-02	7974.77	7996.84	9.2792
0.395	2.218	1.3141E-10	173.437	0.75322E-04	0.57690E-02	7974.99	7996.86	9.3967
0.400	2.212	1.3236E-10	173.330	0.75369E-04	0.58444E-02	7975.21	7996.87	9.5143
0.405	2.206	1.3332E-10	173.224	0.75415E-04	0.59198E-02	7975.43	7996.89	9.6319
0.410	2.200	1.3427E-10	173.119	0.75461E-04	0.59952E-02	7975.64	7996.91	9.7495
0.415	2.194	1.3522E-10	173.014	0.75506E-04	0.60708E-02	7975.85	7996.92	9.8670
0.420	2.188	1.3617E-10	172.911	0.75551E-04	0.61463E-02	7976.05	7996.94	9.9846
0.425	2.183	1.3712E-10	172.809	0.75596E-04	0.62219E-02	7976.26	7996.96	10.1022
0.430	2.177	1.3806E-10	172.707	0.75641E-04	0.62975E-02	7976.45	7996.97	10.2198
0.435	2.172	1.3901E-10	172.607	0.75685E-04	0.63732E-02	7976.65	7996.99	10.3373
0.440	2.166	1.3995E-10	172.507	0.75728E-04	0.64490E-02	7976.84	7997.00	10.4549
0.445	2.161	1.4089E-10	172.408	0.75772E-04	0.65247E-02	7977.03	7997.02	10.5725
0.450	2.155	1.4183E-10	172.310	0.75815E-04	0.66005E-02	7977.21	7997.03	10.6900
0.455	2.150	1.4277E-10	172.213	0.75858E-04	0.66764E-02	7977.40	7997.05	10.8076
0.460	2.145	1.4370E-10	172.116	0.75900E-04	0.67523E-02	7977.57	7997.06	10.9252
0.465	2.140	1.4464E-10	172.021	0.75943E-04	0.68282E-02	7977.75	7997.07	11.0428
0.470	2.135	1.4557E-10	171.926	0.75984E-04	0.69042E-02	7977.92	7997.09	11.1603
0.475	2.130	1.4650E-10	171.831	0.76026E-04	0.69803E-02	7978.09	7997.10	11.2779
0.480	2.125	1.4743E-10	171.738	0.76067E-04	0.70563E-02	7978.26	7997.12	11.3955
0.485	2.120	1.4836E-10	171.645	0.76108E-04	0.71324E-02	7978.43	7997.13	11.5131
0.490	2.115	1.4929E-10	171.554	0.76149E-04	0.72086E-02	7978.59	7997.14	11.6306
0.495	2.110	1.5021E-10	171.462	0.76190E-04	0.72848E-02	7978.75	7997.16	11.7482
0.500	2.105	1.5114E-10	171.372	0.76230E-04	0.73610E-02	7978.91	7997.17	11.8658
0.505	2.100	1.5206E-10	171.282	0.76270E-04	0.74373E-02	7979.06	7997.18	11.9833
0.510	2.096	1.5298E-10	171.193	0.76310E-04	0.75136E-02	7979.22	7997.19	12.1009
0.515	2.091	1.5390E-10	171.105	0.76349E-04	0.75899E-02	7979.37	7997.21	12.2185
0.520	2.086	1.5482E-10	171.017	0.76388E-04	0.76663E-02	7979.51	7997.22	12.3361
0.525	2.082	1.5573E-10	170.930	0.76427E-04	0.77427E-02	7979.66	7997.23	12.4536
0.530	2.077	1.5665E-10	170.843	0.76466E-04	0.78192E-02	7979.80	7997.24	12.5712
0.535	2.073	1.5756E-10	170.757	0.76504E-04	0.78957E-02	7979.95	7997.26	12.6888
0.540	2.068	1.5848E-10	170.672	0.76542E-04	0.79723E-02	7980.09	7997.27	12.8064
0.545	2.064	1.5939E-10	170.588	0.76580E-04	0.80488E-02	7980.22	7997.28	12.9239
0.550	2.059	1.6030E-10	170.504	0.76618E-04	0.81255E-02	7980.36	7997.29	13.0415
0.555	2.055	1.6121E-10	170.420	0.76655E-04	0.82021E-02	7980.49	7997.30	13.1591
0.560	2.051	1.6211E-10	170.338	0.76693E-04	0.82788E-02	7980.63	7997.31	13.2766
0.565	2.047	1.6302E-10	170.255	0.76730E-04	0.83555E-02	7980.76	7997.32	13.3942
0.570	2.042	1.6393E-10	170.174	0.76766E-04	0.84323E-02	7980.88	7997.33	13.5118
0.575	2.038	1.6483E-10	170.093	0.76803E-04	0.85091E-02	7981.01	7997.35	13.6294
0.580	2.034	1.6573E-10	170.012	0.76839E-04	0.85859E-02	7981.14	7997.36	13.7469
0.585	2.030	1.6663E-10	169.932	0.76876E-04	0.86628E-02	7981.26	7997.37	13.8645
0.590	2.026	1.6753E-10	169.853	0.76912E-04	0.87397E-02	7981.38	7997.38	13.9821
0.595	2.022	1.6843E-10	169.774	0.76947E-04	0.88167E-02	7981.50	7997.39	14.0997
0.600	2.018	1.6933E-10	169.696	0.76983E-04	0.88937E-02	7981.62	7997.40	14.2172
0.605	2.014	1.7023E-10	169.618	0.77018E-04	0.89707E-02	7981.74	7997.41	14.3348
0.610	2.010	1.7112E-10	169.540	0.77053E-04	0.90477E-02	7981.85	7997.42	14.4524

0.615	2.006	1.7201E-10	169.464	0.77088E-04	0.91248E-02	7981.97	7997.43	14.5699
0.620	2.002	1.7291E-10	169.387	0.77123E-04	0.92019E-02	7982.08	7997.44	14.6875
0.625	1.998	1.7380E-10	169.311	0.77157E-04	0.92791E-02	7982.19	7997.45	14.8051
0.630	1.995	1.7469E-10	169.236	0.77192E-04	0.93563E-02	7982.30	7997.46	14.9227
0.635	1.991	1.7558E-10	169.161	0.77226E-04	0.94335E-02	7982.41	7997.47	15.0402
0.640	1.987	1.7647E-10	169.087	0.77260E-04	0.95108E-02	7982.51	7997.48	15.1578
0.645	1.983	1.7735E-10	169.013	0.77294E-04	0.95881E-02	7982.62	7997.49	15.2754
0.650	1.980	1.7824E-10	168.940	0.77327E-04	0.96654E-02	7982.72	7997.50	15.3930
0.655	1.976	1.7912E-10	168.867	0.77361E-04	0.97428E-02	7982.82	7997.50	15.5105
0.660	1.973	1.8001E-10	168.794	0.77394E-04	0.98201E-02	7982.93	7997.51	15.6281
0.665	1.969	1.8089E-10	168.722	0.77427E-04	0.98976E-02	7983.03	7997.52	15.7457
0.670	1.965	1.8177E-10	168.650	0.77460E-04	0.99750E-02	7983.13	7997.53	15.8632
0.675	1.962	1.8265E-10	168.579	0.77493E-04	0.10053E-01	7983.22	7997.54	15.9808
0.680	1.958	1.8353E-10	168.508	0.77525E-04	0.10130E-01	7983.32	7997.55	16.0984
0.685	1.955	1.8441E-10	168.438	0.77558E-04	0.10208E-01	7983.42	7997.56	16.2160
0.690	1.952	1.8529E-10	168.368	0.77590E-04	0.10285E-01	7983.51	7997.57	16.3335
0.695	1.948	1.8616E-10	168.299	0.77622E-04	0.10363E-01	7983.60	7997.57	16.4511
0.700	1.945	1.8704E-10	168.230	0.77654E-04	0.10440E-01	7983.70	7997.58	16.5687
0.705	1.941	1.8791E-10	168.161	0.77685E-04	0.10518E-01	7983.79	7997.59	16.6863
0.710	1.938	1.8879E-10	168.093	0.77717E-04	0.10596E-01	7983.88	7997.60	16.8038
0.715	1.935	1.8966E-10	168.025	0.77748E-04	0.10674E-01	7983.97	7997.61	16.9214
0.720	1.932	1.9053E-10	167.957	0.77780E-04	0.10751E-01	7984.05	7997.62	17.0390
0.725	1.928	1.9140E-10	167.890	0.77811E-04	0.10829E-01	7984.14	7997.62	17.1565
0.730	1.925	1.9227E-10	167.823	0.77842E-04	0.10907E-01	7984.23	7997.63	17.2741
0.735	1.922	1.9314E-10	167.757	0.77872E-04	0.10985E-01	7984.31	7997.64	17.3917
0.740	1.919	1.9400E-10	167.691	0.77903E-04	0.11063E-01	7984.40	7997.65	17.5093
0.745	1.915	1.9487E-10	167.626	0.77934E-04	0.11141E-01	7984.48	7997.66	17.6268
0.750	1.912	1.9574E-10	167.560	0.77964E-04	0.11219E-01	7984.56	7997.66	17.7444
0.755	1.909	1.9660E-10	167.495	0.77994E-04	0.11297E-01	7984.64	7997.67	17.8620
0.760	1.906	1.9746E-10	167.431	0.78024E-04	0.11375E-01	7984.72	7997.68	17.9796
0.765	1.903	1.9833E-10	167.367	0.78054E-04	0.11453E-01	7984.80	7997.69	18.0971
0.770	1.900	1.9919E-10	167.303	0.78084E-04	0.11531E-01	7984.88	7997.69	18.2147
0.775	1.897	2.0005E-10	167.239	0.78113E-04	0.11609E-01	7984.96	7997.70	18.3323
0.780	1.894	2.0091E-10	167.176	0.78143E-04	0.11687E-01	7985.04	7997.71	18.4498
0.785	1.891	2.0177E-10	167.114	0.78172E-04	0.11765E-01	7985.11	7997.71	18.5674
0.790	1.888	2.0262E-10	167.051	0.78202E-04	0.11844E-01	7985.19	7997.72	18.6850
0.795	1.885	2.0348E-10	166.989	0.78231E-04	0.11922E-01	7985.26	7997.73	18.8026
0.800	1.882	2.0434E-10	166.927	0.78260E-04	0.12000E-01	7985.34	7997.74	18.9201
0.805	1.879	2.0519E-10	166.866	0.78288E-04	0.12078E-01	7985.41	7997.74	19.0377
0.810	1.876	2.0604E-10	166.805	0.78317E-04	0.12157E-01	7985.48	7997.75	19.1553
0.815	1.874	2.0690E-10	166.744	0.78346E-04	0.12235E-01	7985.55	7997.76	19.2729
0.820	1.871	2.0775E-10	166.683	0.78374E-04	0.12313E-01	7985.63	7997.76	19.3904
0.825	1.868	2.0860E-10	166.623	0.78402E-04	0.12392E-01	7985.70	7997.77	19.5080
0.830	1.865	2.0945E-10	166.563	0.78431E-04	0.12470E-01	7985.76	7997.78	19.6256
0.835	1.862	2.1030E-10	166.504	0.78459E-04	0.12549E-01	7985.83	7997.78	19.7432
0.840	1.860	2.1115E-10	166.444	0.78487E-04	0.12627E-01	7985.90	7997.79	19.8607
0.845	1.857	2.1200E-10	166.385	0.78514E-04	0.12706E-01	7985.97	7997.80	19.9783
0.850	1.854	2.1285E-10	166.327	0.78542E-04	0.12784E-01	7986.04	7997.80	20.0959

MATERIAL B CASE 5
INITIAL PARAMETERS AND CONSTANTS
STEPS IN AXIAL DIRECTION 170
DELX 0.00500
INITIAL HEIGHT 0.00001
MAXIMUM DENSITY OF CAKE 250.00000
PLENUM PRESSURE 8000.00000
THE TOTAL CAKE HEIGHT (MM) IS 12.820994895
MASS FLUX PAST CUTTER (GM/M) 12.602357440

X	V	PERM	RHO	H	HTOT	PINT	PB	FLUX
0.000	21.404	4.7767E-13	250.000	0.10000E-04	0.10000E-04	0.00	7707.25	0.0225
0.005	10.505	2.4431E-12	232.996	0.56068E-04	0.66068E-04	3782.68	7929.48	0.1401
0.010	9.697	3.5114E-11	100.000	0.13064E-03	0.19671E-03	7319.41	7939.91	0.2576
0.015	9.083	4.0021E-11	100.000	0.13064E-03	0.32734E-03	7437.31	7947.28	0.3752
0.020	8.595	4.4690E-11	100.000	0.13064E-03	0.45798E-03	7520.62	7952.79	0.4928
0.025	8.195	4.9162E-11	100.000	0.13064E-03	0.58862E-03	7582.51	7957.08	0.6104
0.030	7.859	5.3463E-11	100.000	0.13064E-03	0.71925E-03	7630.25	7960.54	0.7279
0.035	7.570	5.7618E-11	100.000	0.13064E-03	0.84989E-03	7668.17	7963.38	0.8455
0.040	6.404	8.4118E-12	214.385	0.94446E-04	0.94434E-03	6737.02	7973.79	1.0277
0.045	5.824	1.0696E-11	210.781	0.77659E-04	0.10220E-02	7251.05	7978.33	1.1751
0.050	5.448	1.2669E-11	208.244	0.69967E-04	0.10920E-02	7463.52	7981.03	1.3062
0.055	5.170	1.4474E-11	206.250	0.66558E-04	0.11585E-02	7573.99	7982.92	1.4297
0.060	4.949	1.6181E-11	204.581	0.65169E-04	0.12237E-02	7641.51	7984.35	1.5497
0.065	4.765	1.7823E-11	203.135	0.64728E-04	0.12884E-02	7687.84	7985.49	1.6681
0.070	4.608	1.9420E-11	201.852	0.64724E-04	0.13531E-02	7722.27	7986.43	1.7857
0.075	4.471	2.0984E-11	200.695	0.65092E-04	0.14182E-02	7748.69	7987.23	1.9032
0.080	4.350	2.2520E-11	199.640	0.65436E-04	0.14837E-02	7770.52	7987.91	2.0208
0.085	4.241	2.4029E-11	198.671	0.65755E-04	0.15494E-02	7788.88	7988.51	2.1384
0.090	4.144	2.5515E-11	197.776	0.66053E-04	0.16155E-02	7804.52	7989.03	2.2559
0.095	4.055	2.6978E-11	196.944	0.66332E-04	0.16818E-02	7818.01	7989.49	2.3735
0.100	3.974	2.8421E-11	196.167	0.66595E-04	0.17484E-02	7829.75	7989.91	2.4911
0.105	3.899	2.9845E-11	195.437	0.66843E-04	0.18152E-02	7840.07	7990.28	2.6087
0.110	3.830	3.1251E-11	194.751	0.67079E-04	0.18823E-02	7849.21	7990.62	2.7262
0.115	3.767	3.2641E-11	194.102	0.67303E-04	0.19496E-02	7857.35	7990.93	2.8438
0.120	3.707	3.4016E-11	193.488	0.67517E-04	0.20171E-02	7864.66	7991.22	2.9614
0.125	3.651	3.5376E-11	192.904	0.67721E-04	0.20849E-02	7871.25	7991.48	3.0790
0.130	3.599	3.6723E-11	192.347	0.67917E-04	0.21528E-02	7877.23	7991.72	3.1965
0.135	3.550	3.8056E-11	191.816	0.68105E-04	0.22209E-02	7882.67	7991.95	3.3141
0.140	3.504	3.9377E-11	191.308	0.68286E-04	0.22892E-02	7887.65	7992.16	3.4317
0.145	3.460	4.0687E-11	190.821	0.68460E-04	0.23576E-02	7892.22	7992.35	3.5492
0.150	3.418	4.1985E-11	190.353	0.68628E-04	0.24263E-02	7896.42	7992.53	3.6668
0.155	3.379	4.3273E-11	189.904	0.68791E-04	0.24951E-02	7900.31	7992.70	3.7844
0.160	3.341	4.4551E-11	189.471	0.68948E-04	0.25640E-02	7903.92	7992.87	3.9020
0.165	3.306	4.5819E-11	189.054	0.69100E-04	0.26331E-02	7907.27	7993.02	4.0195
0.170	3.271	4.7078E-11	188.651	0.69248E-04	0.27024E-02	7910.39	7993.16	4.1371
0.175	3.239	4.8328E-11	188.261	0.69391E-04	0.27717E-02	7913.31	7993.30	4.2547
0.180	3.207	4.9569E-11	187.884	0.69530E-04	0.28413E-02	7916.04	7993.43	4.3723
0.185	3.177	5.0802E-11	187.519	0.69666E-04	0.29109E-02	7918.60	7993.55	4.4898
0.190	3.149	5.2027E-11	187.164	0.69798E-04	0.29807E-02	7921.01	7993.66	4.6074
0.195	3.121	5.3245E-11	186.821	0.69926E-04	0.30507E-02	7923.28	7993.78	4.7250
0.200	3.094	5.4455E-11	186.487	0.70051E-04	0.31207E-02	7925.42	7993.88	4.8425
0.205	3.069	5.5658E-11	186.162	0.70173E-04	0.31909E-02	7927.44	7993.98	4.9601
0.210	3.044	5.6855E-11	185.846	0.70293E-04	0.32612E-02	7929.35	7994.08	5.0777
0.215	3.020	5.8044E-11	185.539	0.70409E-04	0.33316E-02	7931.17	7994.17	5.1953
0.220	2.997	5.9227E-11	185.239	0.70523E-04	0.34021E-02	7932.89	7994.26	5.3128
0.225	2.974	6.0404E-11	184.947	0.70635E-04	0.34727E-02	7934.53	7994.35	5.4304
0.230	2.953	6.1575E-11	184.662	0.70744E-04	0.35435E-02	7936.08	7994.43	5.5480
0.235	2.932	6.2740E-11	184.384	0.70850E-04	0.36143E-02	7937.57	7994.51	5.6656
0.240	2.911	6.3899E-11	184.112	0.70955E-04	0.36853E-02	7938.98	7994.58	5.7831
0.245	2.891	6.5053E-11	183.846	0.71057E-04	0.37564E-02	7940.33	7994.66	5.9007
0.250	2.872	6.6201E-11	183.587	0.71158E-04	0.38275E-02	7941.63	7994.73	6.0183
0.255	2.854	6.7344E-11	183.333	0.71257E-04	0.38988E-02	7942.86	7994.80	6.1358
0.260	2.835	6.8482E-11	183.084	0.71353E-04	0.39701E-02	7944.05	7994.86	6.2534
0.265	2.818	6.9614E-11	182.841	0.71448E-04	0.40416E-02	7945.18	7994.93	6.3710
0.270	2.801	7.0742E-11	182.602	0.71542E-04	0.41131E-02	7946.27	7994.99	6.4886
0.275	2.784	7.1866E-11	182.369	0.71633E-04	0.41847E-02	7947.32	7995.05	6.6061

0.280	2.768	7.2984E-11	182.140	0.71723E-04	0.42565E-02	7948.32	7995.10	6.7237
0.285	2.752	7.4098E-11	181.915	0.71812E-04	0.43283E-02	7949.29	7995.16	6.8413
0.290	2.736	7.5208E-11	181.695	0.71899E-04	0.44002E-02	7950.22	7995.22	6.9589
0.295	2.721	7.6313E-11	181.478	0.71985E-04	0.44722E-02	7951.12	7995.27	7.0764
0.300	2.707	7.7414E-11	181.266	0.72069E-04	0.45442E-02	7951.98	7995.32	7.1940
0.305	2.692	7.8511E-11	181.058	0.72152E-04	0.46164E-02	7952.81	7995.37	7.3116
0.310	2.678	7.9604E-11	180.853	0.72234E-04	0.46886E-02	7953.62	7995.42	7.4292
0.315	2.664	8.0693E-11	180.651	0.72314E-04	0.47609E-02	7954.39	7995.46	7.5467
0.320	2.651	8.1778E-11	180.453	0.72394E-04	0.48333E-02	7955.15	7995.51	7.6643
0.325	2.638	8.2860E-11	180.259	0.72472E-04	0.49058E-02	7955.87	7995.55	7.7819
0.330	2.625	8.3937E-11	180.067	0.72549E-04	0.49783E-02	7956.57	7995.60	7.8994
0.335	2.612	8.5011E-11	179.879	0.72625E-04	0.50510E-02	7957.25	7995.64	8.0170
0.340	2.600	8.6082E-11	179.694	0.72699E-04	0.51237E-02	7957.91	7995.68	8.1346
0.345	2.588	8.7149E-11	179.511	0.72773E-04	0.51964E-02	7958.55	7995.72	8.2522
0.350	2.576	8.8212E-11	179.331	0.72846E-04	0.52693E-02	7959.17	7995.76	8.3697
0.355	2.565	8.9272E-11	179.155	0.72918E-04	0.53422E-02	7959.77	7995.80	8.4873
0.360	2.553	9.0329E-11	178.980	0.72989E-04	0.54152E-02	7960.35	7995.83	8.6049
0.365	2.542	9.1383E-11	178.809	0.73059E-04	0.54883E-02	7960.91	7995.87	8.7225
0.370	2.531	9.2433E-11	178.639	0.73129E-04	0.55614E-02	7961.46	7995.91	8.8400
0.375	2.520	9.3480E-11	178.472	0.73197E-04	0.56346E-02	7962.00	7995.94	8.9576
0.380	2.510	9.4525E-11	178.308	0.73264E-04	0.57078E-02	7962.52	7995.97	9.0752
0.385	2.499	9.5566E-11	178.146	0.73331E-04	0.57812E-02	7963.02	7996.01	9.1927
0.390	2.489	9.6604E-11	177.986	0.73397E-04	0.58546E-02	7963.51	7996.04	9.3103
0.395	2.479	9.7639E-11	177.828	0.73462E-04	0.59280E-02	7963.99	7996.07	9.4279
0.400	2.470	9.8672E-11	177.672	0.73527E-04	0.60016E-02	7964.45	7996.10	9.5455
0.405	2.460	9.9702E-11	177.519	0.73590E-04	0.60752E-02	7964.90	7996.13	9.6630
0.410	2.450	1.0073E-10	177.367	0.73653E-04	0.61488E-02	7965.34	7996.16	9.7806
0.415	2.441	1.0175E-10	177.218	0.73715E-04	0.62225E-02	7965.77	7996.19	9.8982
0.420	2.432	1.0277E-10	177.070	0.73777E-04	0.62963E-02	7966.19	7996.22	10.0158
0.425	2.423	1.0379E-10	176.924	0.73838E-04	0.63701E-02	7966.60	7996.25	10.1333
0.430	2.414	1.0481E-10	176.780	0.73898E-04	0.64440E-02	7967.00	7996.28	10.2509
0.435	2.405	1.0582E-10	176.637	0.73957E-04	0.65180E-02	7967.39	7996.30	10.3685
0.440	2.397	1.0683E-10	176.497	0.74016E-04	0.65920E-02	7967.77	7996.33	10.4860
0.445	2.388	1.0784E-10	176.358	0.74075E-04	0.66661E-02	7968.14	7996.36	10.6036
0.450	2.380	1.0885E-10	176.220	0.74132E-04	0.67402E-02	7968.50	7996.38	10.7212
0.455	2.372	1.0985E-10	176.085	0.74190E-04	0.68144E-02	7968.85	7996.41	10.8388
0.460	2.364	1.1085E-10	175.950	0.74246E-04	0.68887E-02	7969.20	7996.43	10.9563
0.465	2.356	1.1185E-10	175.818	0.74302E-04	0.69630E-02	7969.54	7996.45	11.0739
0.470	2.348	1.1285E-10	175.687	0.74358E-04	0.70373E-02	7969.87	7996.48	11.1915
0.475	2.340	1.1384E-10	175.557	0.74413E-04	0.71117E-02	7970.19	7996.50	11.3091
0.480	2.333	1.1484E-10	175.429	0.74467E-04	0.71862E-02	7970.51	7996.52	11.4266
0.485	2.325	1.1583E-10	175.302	0.74521E-04	0.72607E-02	7970.81	7996.55	11.5442
0.490	2.318	1.1681E-10	175.176	0.74574E-04	0.73353E-02	7971.12	7996.57	11.6618
0.495	2.310	1.1780E-10	175.052	0.74627E-04	0.74099E-02	7971.41	7996.59	11.7793
0.500	2.303	1.1878E-10	174.929	0.74680E-04	0.74846E-02	7971.70	7996.61	11.8969
0.505	2.296	1.1976E-10	174.808	0.74732E-04	0.75593E-02	7971.99	7996.63	12.0145
0.510	2.289	1.2074E-10	174.687	0.74783E-04	0.76341E-02	7972.26	7996.65	12.1321
0.515	2.282	1.2172E-10	174.568	0.74834E-04	0.77089E-02	7972.54	7996.67	12.2496
0.520	2.275	1.2269E-10	174.450	0.74885E-04	0.77838E-02	7972.80	7996.69	12.3672
0.525	2.269	1.2367E-10	174.333	0.74935E-04	0.78588E-02	7973.07	7996.71	12.4848
0.530	2.262	1.2464E-10	174.218	0.74985E-04	0.79337E-02	7973.32	7996.73	12.6024
0.535	2.256	1.2561E-10	174.103	0.75034E-04	0.80088E-02	7973.57	7996.75	12.7199
0.540	2.249	1.2658E-10	173.990	0.75083E-04	0.80839E-02	7973.82	7996.77	12.8375
0.545	2.243	1.2754E-10	173.878	0.75131E-04	0.81590E-02	7974.06	7996.79	12.9551
0.550	2.236	1.2850E-10	173.767	0.75179E-04	0.82342E-02	7974.30	7996.80	13.0726
0.555	2.230	1.2947E-10	173.657	0.75227E-04	0.83094E-02	7974.53	7996.82	13.1902
0.560	2.224	1.3043E-10	173.547	0.75274E-04	0.83847E-02	7974.76	7996.84	13.3078
0.565	2.218	1.3138E-10	173.439	0.75321E-04	0.84600E-02	7974.99	7996.86	13.4254
0.570	2.212	1.3234E-10	173.332	0.75368E-04	0.85354E-02	7975.21	7996.87	13.5429
0.575	2.206	1.3329E-10	173.226	0.75414E-04	0.86108E-02	7975.42	7996.89	13.6605
0.580	2.200	1.3425E-10	173.121	0.75460E-04	0.86862E-02	7975.64	7996.91	13.7781
0.585	2.194	1.3520E-10	173.017	0.75505E-04	0.87617E-02	7975.84	7996.92	13.8957
0.590	2.189	1.3615E-10	172.913	0.75550E-04	0.88373E-02	7976.05	7996.94	14.0132
0.595	2.183	1.3709E-10	172.811	0.75595E-04	0.89129E-02	7976.25	7996.95	14.1308
0.600	2.177	1.3804E-10	172.710	0.75640E-04	0.89885E-02	7976.45	7996.97	14.2484
0.605	2.172	1.3898E-10	172.609	0.75684E-04	0.90642E-02	7976.64	7996.99	14.3660
0.610	2.166	1.3993E-10	172.509	0.75727E-04	0.91399E-02	7976.84	7997.00	14.4835

0.615	2.161	1.4087E-10	172.410	0.75771E-04	0.92157E-02	7977.02	7997.02	14.6011
0.620	2.156	1.4181E-10	172.312	0.75814E-04	0.92915E-02	7977.21	7997.03	14.7187
0.625	2.150	1.4274E-10	172.215	0.75857E-04	0.93674E-02	7977.39	7997.05	14.8362
0.630	2.145	1.4368E-10	172.118	0.75899E-04	0.94433E-02	7977.57	7997.06	14.9538
0.635	2.140	1.4462E-10	172.023	0.75942E-04	0.95192E-02	7977.75	7997.07	15.0714
0.640	2.135	1.4555E-10	171.928	0.75983E-04	0.95952E-02	7977.92	7997.09	15.1890
0.645	2.130	1.4648E-10	171.834	0.76025E-04	0.96712E-02	7978.09	7997.10	15.3065
0.650	2.125	1.4741E-10	171.740	0.76066E-04	0.97473E-02	7978.26	7997.12	15.4241
0.655	2.120	1.4834E-10	171.648	0.76108E-04	0.98234E-02	7978.42	7997.13	15.5417
0.660	2.115	1.4927E-10	171.556	0.76148E-04	0.98996E-02	7978.59	7997.14	15.6593
0.665	2.110	1.5019E-10	171.464	0.76189E-04	0.99757E-02	7978.75	7997.16	15.7768
0.670	2.105	1.5111E-10	171.374	0.76229E-04	0.10052E-01	7978.90	7997.17	15.8944
0.675	2.100	1.5204E-10	171.284	0.76269E-04	0.10128E-01	7979.06	7997.18	16.0120
0.680	2.096	1.5296E-10	171.195	0.76309E-04	0.10205E-01	7979.21	7997.19	16.1295
0.685	2.091	1.5388E-10	171.107	0.76348E-04	0.10281E-01	7979.36	7997.21	16.2471
0.690	2.086	1.5480E-10	171.019	0.76387E-04	0.10357E-01	7979.51	7997.22	16.3647
0.695	2.082	1.5571E-10	170.932	0.76426E-04	0.10434E-01	7979.66	7997.23	16.4823
0.700	2.077	1.5663E-10	170.845	0.76465E-04	0.10510E-01	7979.80	7997.24	16.5998
0.705	2.073	1.5754E-10	170.759	0.76503E-04	0.10587E-01	7979.94	7997.25	16.7174
0.710	2.068	1.5846E-10	170.674	0.76541E-04	0.10663E-01	7980.08	7997.27	16.8350
0.715	2.064	1.5937E-10	170.590	0.76579E-04	0.10740E-01	7980.22	7997.28	16.9526
0.720	2.059	1.6028E-10	170.506	0.76617E-04	0.10816E-01	7980.36	7997.29	17.0701
0.725	2.055	1.6119E-10	170.422	0.76655E-04	0.10893E-01	7980.49	7997.30	17.1877
0.730	2.051	1.6209E-10	170.339	0.76692E-04	0.10970E-01	7980.62	7997.31	17.3053
0.735	2.047	1.6300E-10	170.257	0.76729E-04	0.11046E-01	7980.75	7997.32	17.4228
0.740	2.042	1.6391E-10	170.176	0.76766E-04	0.11123E-01	7980.88	7997.33	17.5404
0.745	2.038	1.6481E-10	170.094	0.76802E-04	0.11200E-01	7981.01	7997.35	17.6580
0.750	2.034	1.6571E-10	170.014	0.76839E-04	0.11277E-01	7981.13	7997.36	17.7756
0.755	2.030	1.6661E-10	169.934	0.76875E-04	0.11354E-01	7981.26	7997.37	17.8931
0.760	2.026	1.6751E-10	169.855	0.76911E-04	0.11431E-01	7981.38	7997.38	18.0107
0.765	2.022	1.6841E-10	169.776	0.76946E-04	0.11508E-01	7981.50	7997.39	18.1283
0.770	2.018	1.6931E-10	169.697	0.76982E-04	0.11585E-01	7981.62	7997.40	18.2459
0.775	2.014	1.7021E-10	169.619	0.77017E-04	0.11662E-01	7981.73	7997.41	18.3634
0.780	2.010	1.7110E-10	169.542	0.77052E-04	0.11739E-01	7981.85	7997.42	18.4810
0.785	2.006	1.7199E-10	169.465	0.77087E-04	0.11816E-01	7981.96	7997.43	18.5986
0.790	2.002	1.7289E-10	169.389	0.77122E-04	0.11893E-01	7982.07	7997.44	18.7161
0.795	1.999	1.7378E-10	169.313	0.77157E-04	0.11970E-01	7982.19	7997.45	18.8337
0.800	1.995	1.7467E-10	169.238	0.77191E-04	0.12047E-01	7982.30	7997.46	18.9513
0.805	1.991	1.7556E-10	169.163	0.77225E-04	0.12124E-01	7982.40	7997.47	19.0689
0.810	1.987	1.7645E-10	169.089	0.77259E-04	0.12202E-01	7982.51	7997.48	19.1864
0.815	1.984	1.7733E-10	169.015	0.77293E-04	0.12279E-01	7982.62	7997.49	19.3040
0.820	1.980	1.7822E-10	168.941	0.77327E-04	0.12356E-01	7982.72	7997.50	19.4216
0.825	1.976	1.7910E-10	168.868	0.77360E-04	0.12434E-01	7982.82	7997.50	19.5392
0.830	1.973	1.7999E-10	168.796	0.77393E-04	0.12511E-01	7982.92	7997.51	19.6567
0.835	1.969	1.8087E-10	168.724	0.77426E-04	0.12589E-01	7983.02	7997.52	19.7743
0.840	1.966	1.8175E-10	168.652	0.77459E-04	0.12666E-01	7983.12	7997.53	19.8919
0.845	1.962	1.8263E-10	168.581	0.77492E-04	0.12743E-01	7983.22	7997.54	20.0094
0.850	1.959	1.8351E-10	168.510	0.77524E-04	0.12821E-01	7983.32	7997.55	20.1270

MATERIAL B CASE 6
INITIAL PARAMETERS AND CONSTANTS
STEPS IN AXIAL DIRECTION 170
DELX 0.00500
INITIAL HEIGHT 0.00001
MAXIMUM DENSITY OF CAKE 250.00000
PLENUM PRESSURE 8000.00000
THE TOTAL CAKE HEIGHT (MM) IS 12.784197012
MASS FLUX PAST CUTTER (GM/M) 12.688727033

X	V	PERM	RHO	H	HTOT	PINT	PB	FLUX
0.000	21.404	4.7767E-13	250.000	0.10000E-04	0.10000E-04	0.00	7707.25	0.0225
0.005	10.505	2.4431E-12	232.996	0.56068E-04	0.66068E-04	3782.68	7929.48	0.1401
0.010	8.164	4.5723E-12	223.548	0.58438E-04	0.12451E-03	6162.63	7957.41	0.2576
0.015	7.048	6.6093E-12	218.007	0.59923E-04	0.18443E-03	6869.19	7968.26	0.3752
0.020	6.363	8.5516E-12	214.137	0.61006E-04	0.24544E-03	7193.43	7974.13	0.4928
0.025	5.886	1.0413E-11	211.183	0.61859E-04	0.30729E-03	7376.49	7977.86	0.6104
0.030	5.528	1.2207E-11	208.800	0.62565E-04	0.36986E-03	7493.15	7980.47	0.7279
0.035	5.246	1.3945E-11	206.807	0.63168E-04	0.43303E-03	7573.65	7982.41	0.8455
0.040	5.016	1.5633E-11	205.096	0.63695E-04	0.49672E-03	7632.38	7983.92	0.9631
0.045	4.823	1.7279E-11	203.599	0.64163E-04	0.56089E-03	7677.05	7985.13	1.0807
0.050	4.659	1.8887E-11	202.269	0.64586E-04	0.62547E-03	7712.13	7986.13	1.1982
0.055	4.515	2.0462E-11	201.072	0.64970E-04	0.69044E-03	7740.38	7986.97	1.3158
0.060	4.389	2.2007E-11	199.984	0.65323E-04	0.75577E-03	7763.61	7987.69	1.4334
0.065	4.276	2.3524E-11	198.988	0.65650E-04	0.82142E-03	7783.04	7988.31	1.5509
0.070	4.175	2.5017E-11	198.070	0.65955E-04	0.88737E-03	7799.53	7988.86	1.6685
0.075	4.084	2.6488E-11	197.217	0.66240E-04	0.95361E-03	7813.69	7989.34	1.7861
0.080	4.000	2.7938E-11	196.422	0.66508E-04	0.10201E-02	7825.98	7989.77	1.9037
0.085	3.924	2.9368E-11	195.678	0.66761E-04	0.10869E-02	7836.74	7990.16	2.0212
0.090	3.853	3.0780E-11	194.977	0.67001E-04	0.11539E-02	7846.26	7990.51	2.1388
0.095	3.788	3.2176E-11	194.317	0.67229E-04	0.12211E-02	7854.72	7990.83	2.2564
0.100	3.727	3.3555E-11	193.691	0.67446E-04	0.12886E-02	7862.29	7991.13	2.3740
0.105	3.670	3.4920E-11	193.097	0.67653E-04	0.13562E-02	7869.11	7991.39	2.4915
0.110	3.616	3.6271E-11	192.531	0.67852E-04	0.14241E-02	7875.28	7991.64	2.6091
0.115	3.566	3.7609E-11	191.992	0.68043E-04	0.14921E-02	7880.90	7991.87	2.7267
0.120	3.519	3.8934E-11	191.476	0.68226E-04	0.15603E-02	7886.02	7992.09	2.8442
0.125	3.474	4.0248E-11	190.983	0.68402E-04	0.16287E-02	7890.72	7992.29	2.9618
0.130	3.432	4.1550E-11	190.509	0.68573E-04	0.16973E-02	7895.05	7992.47	3.0794
0.135	3.392	4.2841E-11	190.053	0.68737E-04	0.17660E-02	7899.04	7992.65	3.1970
0.140	3.354	4.4122E-11	189.615	0.68896E-04	0.18349E-02	7902.74	7992.81	3.3145
0.145	3.318	4.5393E-11	189.192	0.69050E-04	0.19040E-02	7906.17	7992.97	3.4321
0.150	3.283	4.6655E-11	188.785	0.69199E-04	0.19732E-02	7909.37	7993.11	3.5497
0.155	3.250	4.7908E-11	188.391	0.69344E-04	0.20425E-02	7912.35	7993.25	3.6673
0.160	3.218	4.9152E-11	188.009	0.69484E-04	0.21120E-02	7915.14	7993.38	3.7848
0.165	3.187	5.0388E-11	187.640	0.69621E-04	0.21816E-02	7917.76	7993.51	3.9024
0.170	3.158	5.1616E-11	187.282	0.69754E-04	0.22514E-02	7920.22	7993.63	4.0200
0.175	3.130	5.2836E-11	186.935	0.69883E-04	0.23213E-02	7922.53	7993.74	4.1376
0.180	3.103	5.4049E-11	186.598	0.70010E-04	0.23913E-02	7924.71	7993.85	4.2551
0.185	3.077	5.5254E-11	186.270	0.70133E-04	0.24614E-02	7926.77	7993.95	4.3727
0.190	3.052	5.6453E-11	185.952	0.70253E-04	0.25317E-02	7928.72	7994.05	4.4903
0.195	3.028	5.7645E-11	185.641	0.70370E-04	0.26020E-02	7930.57	7994.14	4.6078
0.200	3.004	5.8830E-11	185.339	0.70485E-04	0.26725E-02	7932.32	7994.23	4.7254
0.205	2.982	6.0009E-11	185.044	0.70597E-04	0.27431E-02	7933.99	7994.32	4.8430
0.210	2.960	6.1182E-11	184.757	0.70707E-04	0.28138E-02	7935.57	7994.40	4.9606
0.215	2.939	6.2349E-11	184.477	0.70815E-04	0.28846E-02	7937.08	7994.48	5.0781
0.220	2.918	6.3510E-11	184.203	0.70920E-04	0.29556E-02	7938.51	7994.56	5.1957
0.225	2.898	6.4665E-11	183.935	0.71023E-04	0.30266E-02	7939.89	7994.63	5.3133
0.230	2.879	6.5815E-11	183.673	0.71124E-04	0.30977E-02	7941.20	7994.70	5.4309
0.235	2.860	6.6960E-11	183.418	0.71224E-04	0.31689E-02	7942.45	7994.77	5.5484
0.240	2.842	6.8099E-11	183.167	0.71321E-04	0.32403E-02	7943.65	7994.84	5.6660
0.245	2.824	6.9234E-11	182.922	0.71416E-04	0.33117E-02	7944.81	7994.90	5.7836
0.250	2.806	7.0364E-11	182.682	0.71510E-04	0.33832E-02	7945.91	7994.97	5.9011
0.255	2.790	7.1488E-11	182.447	0.71603E-04	0.34548E-02	7946.97	7995.03	6.0187
0.260	2.773	7.2608E-11	182.216	0.71693E-04	0.35265E-02	7947.99	7995.09	6.1363
0.265	2.757	7.3724E-11	181.990	0.71782E-04	0.35983E-02	7948.97	7995.14	6.2539
0.270	2.742	7.4835E-11	181.768	0.71870E-04	0.36701E-02	7949.91	7995.20	6.3714
0.275	2.726	7.5942E-11	181.551	0.71956E-04	0.37421E-02	7950.82	7995.25	6.4890

0.280	2.712	7.7044E-11	181.337	0.72041E-04	0.38141E-02	7951.69	7995.30	6.6066
0.285	2.697	7.8143E-11	181.127	0.72124E-04	0.38862E-02	7952.54	7995.35	6.7242
0.290	2.683	7.9237E-11	180.921	0.72206E-04	0.39585E-02	7953.35	7995.40	6.8417
0.295	2.669	8.0327E-11	180.719	0.72287E-04	0.40307E-02	7954.14	7995.45	6.9593
0.300	2.665	4.6500E-10	100.000	0.13064E-03	0.41614E-02	7982.59	7995.46	7.0769
0.305	2.660	4.6649E-10	100.000	0.13064E-03	0.42920E-02	7982.66	7995.48	7.1944
0.310	2.656	4.6798E-10	100.000	0.13064E-03	0.44227E-02	7982.74	7995.49	7.3120
0.315	2.652	4.6947E-10	100.000	0.13064E-03	0.45533E-02	7982.81	7995.51	7.4296
0.320	2.648	4.7096E-10	100.000	0.13064E-03	0.46839E-02	7982.89	7995.52	7.5472
0.325	2.644	4.7244E-10	100.000	0.13064E-03	0.48146E-02	7982.96	7995.53	7.6647
0.330	2.626	8.3868E-11	180.080	0.10033E-03	0.49149E-02	7941.56	7995.59	7.8274
0.335	2.611	8.5137E-11	179.857	0.85955E-04	0.50009E-02	7950.30	7995.64	7.9665
0.340	2.598	8.6300E-11	179.656	0.79105E-04	0.50800E-02	7954.74	7995.69	8.0944
0.345	2.585	8.7411E-11	179.467	0.75845E-04	0.51558E-02	7957.15	7995.73	8.2169
0.350	2.573	8.8494E-11	179.284	0.74308E-04	0.52301E-02	7958.61	7995.77	8.3368
0.355	2.561	8.9563E-11	179.106	0.73602E-04	0.53037E-02	7959.60	7995.81	8.4554
0.360	2.550	9.0623E-11	178.932	0.73296E-04	0.53770E-02	7960.37	7995.84	8.5735
0.365	2.539	9.1678E-11	178.761	0.73184E-04	0.54502E-02	7961.02	7995.88	8.6912
0.370	2.528	9.2727E-11	178.592	0.73166E-04	0.55234E-02	7961.61	7995.92	8.8088
0.375	2.517	9.3774E-11	178.426	0.73216E-04	0.55966E-02	7962.14	7995.95	8.9264
0.380	2.507	9.4817E-11	178.262	0.73283E-04	0.56699E-02	7962.66	7995.98	9.0440
0.385	2.497	9.5858E-11	178.101	0.73350E-04	0.57432E-02	7963.16	7996.02	9.1615
0.390	2.487	9.6895E-11	177.941	0.73415E-04	0.58166E-02	7963.64	7996.05	9.2791
0.395	2.477	9.7929E-11	177.784	0.73480E-04	0.58901E-02	7964.12	7996.08	9.3967
0.400	2.467	9.8961E-11	177.629	0.73544E-04	0.59636E-02	7964.58	7996.11	9.5143
0.405	2.457	9.9990E-11	177.476	0.73608E-04	0.60373E-02	7965.03	7996.14	9.6318
0.410	2.448	1.0102E-10	177.325	0.73671E-04	0.61109E-02	7965.47	7996.17	9.7494
0.415	2.439	1.0204E-10	177.176	0.73733E-04	0.61847E-02	7965.89	7996.20	9.8670
0.420	2.429	1.0306E-10	177.029	0.73794E-04	0.62585E-02	7966.31	7996.23	9.9846
0.425	2.420	1.0408E-10	176.883	0.73855E-04	0.63323E-02	7966.71	7996.26	10.1021
0.430	2.412	1.0509E-10	176.740	0.73915E-04	0.64062E-02	7967.11	7996.28	10.2197
0.435	2.403	1.0611E-10	176.598	0.73974E-04	0.64802E-02	7967.50	7996.31	10.3373
0.440	2.394	1.0712E-10	176.458	0.74033E-04	0.65542E-02	7967.87	7996.34	10.4548
0.445	2.386	1.0812E-10	176.319	0.74091E-04	0.66283E-02	7968.24	7996.36	10.5724
0.450	2.378	1.0913E-10	176.182	0.74149E-04	0.67025E-02	7968.60	7996.39	10.6900
0.455	2.370	1.1013E-10	176.047	0.74206E-04	0.67767E-02	7968.95	7996.41	10.8076
0.460	2.362	1.1113E-10	175.913	0.74262E-04	0.68509E-02	7969.29	7996.44	10.9251
0.465	2.354	1.1213E-10	175.781	0.74318E-04	0.69253E-02	7969.63	7996.46	11.0427
0.470	2.346	1.1313E-10	175.650	0.74373E-04	0.69996E-02	7969.96	7996.48	11.1603
0.475	2.338	1.1412E-10	175.521	0.74428E-04	0.70741E-02	7970.28	7996.51	11.2779
0.480	2.331	1.1511E-10	175.393	0.74482E-04	0.71485E-02	7970.59	7996.53	11.3954
0.485	2.323	1.1610E-10	175.266	0.74536E-04	0.72231E-02	7970.90	7996.55	11.5130
0.490	2.316	1.1709E-10	175.141	0.74589E-04	0.72977E-02	7971.20	7996.57	11.6306
0.495	2.308	1.1807E-10	175.017	0.74642E-04	0.73723E-02	7971.50	7996.59	11.7481
0.500	2.301	1.1906E-10	174.895	0.74694E-04	0.74470E-02	7971.78	7996.62	11.8657
0.505	2.294	1.2004E-10	174.774	0.74746E-04	0.75217E-02	7972.07	7996.64	11.9833
0.510	2.287	1.2102E-10	174.654	0.74798E-04	0.75965E-02	7972.34	7996.66	12.1009
0.515	2.280	1.2199E-10	174.535	0.74848E-04	0.76714E-02	7972.61	7996.68	12.2184
0.520	2.274	1.2297E-10	174.417	0.74899E-04	0.77463E-02	7972.88	7996.70	12.3360
0.525	2.267	1.2394E-10	174.301	0.74949E-04	0.78212E-02	7973.14	7996.72	12.4536
0.530	2.260	1.2491E-10	174.186	0.74998E-04	0.78962E-02	7973.39	7996.74	12.5712
0.535	2.254	1.2588E-10	174.072	0.75048E-04	0.79713E-02	7973.64	7996.75	12.6887
0.540	2.247	1.2685E-10	173.959	0.75096E-04	0.80464E-02	7973.89	7996.77	12.8063
0.545	2.241	1.2781E-10	173.847	0.75145E-04	0.81215E-02	7974.13	7996.79	12.9239
0.550	2.235	1.2877E-10	173.736	0.75193E-04	0.81967E-02	7974.37	7996.81	13.0414
0.555	2.228	1.2974E-10	173.626	0.75240E-04	0.82720E-02	7974.60	7996.83	13.1590
0.560	2.222	1.3070E-10	173.517	0.75288E-04	0.83472E-02	7974.83	7996.84	13.2766
0.565	2.216	1.3165E-10	173.409	0.75334E-04	0.84226E-02	7975.05	7996.86	13.3942
0.570	2.210	1.3261E-10	173.302	0.75381E-04	0.84980E-02	7975.27	7996.88	13.5117
0.575	2.204	1.3356E-10	173.197	0.75427E-04	0.85734E-02	7975.48	7996.89	13.6293
0.580	2.199	1.3451E-10	173.092	0.75473E-04	0.86489E-02	7975.69	7996.91	13.7469
0.585	2.193	1.3546E-10	172.988	0.75518E-04	0.87244E-02	7975.90	7996.93	13.8645
0.590	2.187	1.3641E-10	172.885	0.75563E-04	0.87999E-02	7976.11	7996.94	13.9820
0.595	2.181	1.3736E-10	172.783	0.75608E-04	0.88756E-02	7976.31	7996.96	14.0996
0.600	2.176	1.3831E-10	172.681	0.75652E-04	0.89512E-02	7976.50	7996.97	14.2172
0.605	2.170	1.3925E-10	172.581	0.75696E-04	0.90269E-02	7976.70	7996.99	14.3347
0.610	2.165	1.4019E-10	172.481	0.75740E-04	0.91026E-02	7976.89	7997.01	14.4523

0.615	2.159	1.4113E-10	172.383	0.75783E-04	0.91784E-02	7977.08	7997.02	14.5699
0.620	2.154	1.4207E-10	172.285	0.75826E-04	0.92542E-02	7977.26	7997.03	14.6875
0.625	2.149	1.4301E-10	172.188	0.75869E-04	0.93301E-02	7977.44	7997.05	14.8050
0.630	2.144	1.4394E-10	172.091	0.75911E-04	0.94060E-02	7977.62	7997.06	14.9226
0.635	2.138	1.4488E-10	171.996	0.75953E-04	0.94820E-02	7977.80	7997.08	15.0402
0.640	2.133	1.4581E-10	171.901	0.75995E-04	0.95580E-02	7977.97	7997.09	15.1578
0.645	2.128	1.4674E-10	171.807	0.76037E-04	0.96340E-02	7978.14	7997.11	15.2753
0.650	2.123	1.4767E-10	171.714	0.76078E-04	0.97101E-02	7978.30	7997.12	15.3929
0.655	2.118	1.4860E-10	171.622	0.76119E-04	0.97862E-02	7978.47	7997.13	15.5105
0.660	2.113	1.4953E-10	171.530	0.76160E-04	0.98624E-02	7978.63	7997.15	15.6281
0.665	2.109	1.5045E-10	171.439	0.76200E-04	0.99386E-02	7978.79	7997.16	15.7456
0.670	2.104	1.5137E-10	171.349	0.76240E-04	0.10015E-01	7978.95	7997.17	15.8632
0.675	2.099	1.5230E-10	171.259	0.76280E-04	0.10091E-01	7979.10	7997.18	15.9808
0.680	2.094	1.5322E-10	171.170	0.76320E-04	0.10167E-01	7979.25	7997.20	16.0983
0.685	2.090	1.5414E-10	171.082	0.76359E-04	0.10244E-01	7979.40	7997.21	16.2159
0.690	2.085	1.5505E-10	170.994	0.76398E-04	0.10320E-01	7979.55	7997.22	16.3335
0.695	2.080	1.5597E-10	170.907	0.76437E-04	0.10397E-01	7979.70	7997.23	16.4511
0.700	2.076	1.5689E-10	170.821	0.76475E-04	0.10473E-01	7979.84	7997.25	16.5686
0.705	2.071	1.5780E-10	170.735	0.76514E-04	0.10550E-01	7979.98	7997.26	16.6862
0.710	2.067	1.5871E-10	170.650	0.76552E-04	0.10626E-01	7980.12	7997.27	16.8038
0.715	2.063	1.5962E-10	170.566	0.76590E-04	0.10703E-01	7980.26	7997.28	16.9214
0.720	2.058	1.6053E-10	170.482	0.76628E-04	0.10779E-01	7980.39	7997.29	17.0389
0.725	2.054	1.6144E-10	170.399	0.76665E-04	0.10856E-01	7980.53	7997.30	17.1565
0.730	2.050	1.6235E-10	170.316	0.76702E-04	0.10933E-01	7980.66	7997.32	17.2741
0.735	2.045	1.6325E-10	170.234	0.76739E-04	0.11009E-01	7980.79	7997.33	17.3916
0.740	2.041	1.6416E-10	170.153	0.76776E-04	0.11086E-01	7980.92	7997.34	17.5092
0.745	2.037	1.6506E-10	170.072	0.76812E-04	0.11163E-01	7981.04	7997.35	17.6268
0.750	2.033	1.6596E-10	169.991	0.76849E-04	0.11240E-01	7981.17	7997.36	17.7444
0.755	2.029	1.6687E-10	169.912	0.76885E-04	0.11317E-01	7981.29	7997.37	17.8619
0.760	2.025	1.6777E-10	169.832	0.76921E-04	0.11394E-01	7981.41	7997.38	17.9795
0.765	2.021	1.6866E-10	169.754	0.76956E-04	0.11471E-01	7981.53	7997.39	18.0971
0.770	2.017	1.6956E-10	169.675	0.76992E-04	0.11548E-01	7981.65	7997.40	18.2147
0.775	2.013	1.7046E-10	169.598	0.77027E-04	0.11625E-01	7981.77	7997.41	18.3322
0.780	2.009	1.7135E-10	169.521	0.77062E-04	0.11702E-01	7981.88	7997.42	18.4498
0.785	2.005	1.7225E-10	169.444	0.77097E-04	0.11779E-01	7981.99	7997.43	18.5674
0.790	2.001	1.7314E-10	169.368	0.77132E-04	0.11856E-01	7982.11	7997.44	18.6849
0.795	1.997	1.7403E-10	169.292	0.77166E-04	0.11933E-01	7982.22	7997.45	18.8025
0.800	1.994	1.7492E-10	169.217	0.77201E-04	0.12010E-01	7982.33	7997.46	18.9201
0.805	1.990	1.7581E-10	169.142	0.77235E-04	0.12088E-01	7982.43	7997.47	19.0377
0.810	1.986	1.7670E-10	169.068	0.77269E-04	0.12165E-01	7982.54	7997.48	19.1552
0.815	1.983	1.7758E-10	168.994	0.77302E-04	0.12242E-01	7982.64	7997.49	19.2728
0.820	1.979	1.7847E-10	168.921	0.77336E-04	0.12319E-01	7982.75	7997.50	19.3904
0.825	1.975	1.7935E-10	168.848	0.77369E-04	0.12397E-01	7982.85	7997.51	19.5080
0.830	1.972	1.8024E-10	168.776	0.77402E-04	0.12474E-01	7982.95	7997.52	19.6255
0.835	1.968	1.8112E-10	168.704	0.77435E-04	0.12552E-01	7983.05	7997.52	19.7431
0.840	1.965	1.8200E-10	168.632	0.77468E-04	0.12629E-01	7983.15	7997.53	19.8607
0.845	1.961	1.8288E-10	168.561	0.77501E-04	0.12707E-01	7983.25	7997.54	19.9782
0.850	1.958	1.8376E-10	168.490	0.77533E-04	0.12784E-01	7983.34	7997.55	20.0958

MATERIAL B CASE 7
INITIAL PARAMETERS AND CONSTANTS
STEPS IN AXIAL DIRECTION 170
DELX 0.00500
INITIAL HEIGHT 0.00001
MAXIMUM DENSITY OF CAKE 250.00000
PLENUM PRESSURE 8000.00000
THE TOTAL CAKE HEIGHT (MM) IS 12.775754232
MASS FLUX PAST CUTTER (GM/M) 12.664479245

X	V	PERM	RHO	H	HTOT	PINT	PB	FLUX
0.000	21.404	4.7767E-13	250.000	0.10000E-04	0.10000E-04	0.00	7707.25	0.0225
0.005	10.505	2.4431E-12	232.996	0.56068E-04	0.66068E-04	3782.68	7929.48	0.1401
0.010	8.164	4.5723E-12	223.548	0.58438E-04	0.12451E-03	6162.63	7957.41	0.2576
0.015	7.048	6.6093E-12	218.007	0.59923E-04	0.18443E-03	6869.19	7968.26	0.3752
0.020	6.363	8.5516E-12	214.137	0.61006E-04	0.24544E-03	7193.43	7974.13	0.4928
0.025	5.886	1.0413E-11	211.183	0.61859E-04	0.30729E-03	7376.49	7977.86	0.6104
0.030	5.528	1.2207E-11	208.800	0.62565E-04	0.36986E-03	7493.15	7980.47	0.7279
0.035	5.246	1.3945E-11	206.807	0.63168E-04	0.43303E-03	7573.65	7982.41	0.8455
0.040	5.016	1.5633E-11	205.096	0.63695E-04	0.49672E-03	7632.38	7983.92	0.9631
0.045	4.823	1.7279E-11	203.599	0.64163E-04	0.56089E-03	7677.05	7985.13	1.0807
0.050	4.659	1.8887E-11	202.269	0.64586E-04	0.62547E-03	7712.13	7986.13	1.1982
0.055	4.515	2.0462E-11	201.072	0.64970E-04	0.69044E-03	7740.38	7986.97	1.3158
0.060	4.389	2.2007E-11	199.984	0.65323E-04	0.75577E-03	7763.61	7987.69	1.4334
0.065	4.276	2.3524E-11	198.988	0.65650E-04	0.82142E-03	7783.04	7988.31	1.5509
0.070	4.175	2.5017E-11	198.070	0.65955E-04	0.88737E-03	7799.53	7988.86	1.6685
0.075	4.084	2.6488E-11	197.217	0.66240E-04	0.95361E-03	7813.69	7989.34	1.7861
0.080	4.000	2.7938E-11	196.422	0.66508E-04	0.10201E-02	7825.98	7989.77	1.9037
0.085	3.924	2.9368E-11	195.678	0.66761E-04	0.10869E-02	7836.74	7990.16	2.0212
0.090	3.853	3.0780E-11	194.977	0.67001E-04	0.11539E-02	7846.26	7990.51	2.1388
0.095	3.788	3.2176E-11	194.317	0.67229E-04	0.12211E-02	7854.72	7990.83	2.2564
0.100	3.727	3.3555E-11	193.691	0.67446E-04	0.12886E-02	7862.29	7991.13	2.3740
0.105	3.670	3.4920E-11	193.097	0.67653E-04	0.13562E-02	7869.11	7991.39	2.4915
0.110	3.616	3.6271E-11	192.531	0.67852E-04	0.14241E-02	7875.28	7991.64	2.6091
0.115	3.566	3.7609E-11	191.992	0.68043E-04	0.14921E-02	7880.90	7991.87	2.7267
0.120	3.519	3.8934E-11	191.476	0.68226E-04	0.15603E-02	7886.02	7992.09	2.8442
0.125	3.474	4.0248E-11	190.983	0.68402E-04	0.16287E-02	7890.72	7992.29	2.9618
0.130	3.432	4.1550E-11	190.509	0.68573E-04	0.16973E-02	7895.05	7992.47	3.0794
0.135	3.392	4.2841E-11	190.053	0.68737E-04	0.17660E-02	7899.04	7992.65	3.1970
0.140	3.354	4.4122E-11	189.615	0.68896E-04	0.18349E-02	7902.74	7992.81	3.3145
0.145	3.318	4.5393E-11	189.192	0.69050E-04	0.19040E-02	7906.17	7992.97	3.4321
0.150	3.283	4.6655E-11	188.785	0.69199E-04	0.19732E-02	7909.37	7993.11	3.5497
0.155	3.250	4.7908E-11	188.391	0.69344E-04	0.20425E-02	7912.35	7993.25	3.6673
0.160	3.218	4.9152E-11	188.009	0.69484E-04	0.21120E-02	7915.14	7993.38	3.7848
0.165	3.187	5.0388E-11	187.640	0.69621E-04	0.21816E-02	7917.76	7993.51	3.9024
0.170	3.158	5.1616E-11	187.282	0.69754E-04	0.22514E-02	7920.22	7993.63	4.0200
0.175	3.130	5.2836E-11	186.935	0.69883E-04	0.23213E-02	7922.53	7993.74	4.1376
0.180	3.103	5.4049E-11	186.598	0.70010E-04	0.23913E-02	7924.71	7993.85	4.2551
0.185	3.077	5.5254E-11	186.270	0.70133E-04	0.24614E-02	7926.77	7993.95	4.3727
0.190	3.052	5.6453E-11	185.952	0.70253E-04	0.25317E-02	7928.72	7994.05	4.4903
0.195	3.028	5.7645E-11	185.641	0.70370E-04	0.26020E-02	7930.57	7994.14	4.6078
0.200	3.004	5.8830E-11	185.339	0.70485E-04	0.26725E-02	7932.32	7994.23	4.7254
0.205	2.982	6.0009E-11	185.044	0.70597E-04	0.27431E-02	7933.99	7994.32	4.8430
0.210	2.960	6.1182E-11	184.757	0.70707E-04	0.28138E-02	7935.57	7994.40	4.9606
0.215	2.939	6.2349E-11	184.477	0.70815E-04	0.28846E-02	7937.08	7994.48	5.0781
0.220	2.918	6.3510E-11	184.203	0.70920E-04	0.29556E-02	7938.51	7994.56	5.1957
0.225	2.898	6.4665E-11	183.935	0.71023E-04	0.30266E-02	7939.89	7994.63	5.3133
0.230	2.879	6.5815E-11	183.673	0.71124E-04	0.30977E-02	7941.20	7994.70	5.4309
0.235	2.860	6.6960E-11	183.418	0.71224E-04	0.31689E-02	7942.45	7994.77	5.5484
0.240	2.842	6.8099E-11	183.167	0.71321E-04	0.32403E-02	7943.65	7994.84	5.6660
0.245	2.824	6.9234E-11	182.922	0.71416E-04	0.33117E-02	7944.81	7994.90	5.7836
0.250	2.806	7.0364E-11	182.682	0.71510E-04	0.33832E-02	7945.91	7994.97	5.9011
0.255	2.790	7.1488E-11	182.447	0.71603E-04	0.34548E-02	7946.97	7995.03	6.0187
0.260	2.773	7.2608E-11	182.216	0.71693E-04	0.35265E-02	7947.99	7995.09	6.1363
0.265	2.757	7.3724E-11	181.990	0.71782E-04	0.35983E-02	7948.97	7995.14	6.2539
0.270	2.742	7.4835E-11	181.768	0.71870E-04	0.36701E-02	7949.91	7995.20	6.3714
0.275	2.726	7.5942E-11	181.551	0.71956E-04	0.37421E-02	7950.82	7995.25	6.4890

0.280	2.712	7.7044E-11	181.337	0.72041E-04	0.38141E-02	7951.69	7995.30	6.6066
0.285	2.697	7.8143E-11	181.127	0.72124E-04	0.38862E-02	7952.54	7995.35	6.7242
0.290	2.683	7.9237E-11	180.921	0.72206E-04	0.39585E-02	7953.35	7995.40	6.8417
0.295	2.669	8.0327E-11	180.719	0.72287E-04	0.40307E-02	7954.14	7995.45	6.9593
0.300	2.655	8.1414E-11	180.520	0.72367E-04	0.41031E-02	7954.90	7995.49	7.0769
0.305	2.642	8.2496E-11	180.324	0.72446E-04	0.41756E-02	7955.63	7995.54	7.1944
0.310	2.629	8.3575E-11	180.131	0.72523E-04	0.42481E-02	7956.34	7995.58	7.3120
0.315	2.617	8.4650E-11	179.942	0.72599E-04	0.43207E-02	7957.03	7995.63	7.4296
0.320	2.604	8.5722E-11	179.756	0.72674E-04	0.43934E-02	7957.69	7995.67	7.5472
0.325	2.592	8.6790E-11	179.572	0.72749E-04	0.44661E-02	7958.34	7995.71	7.6647
0.330	2.580	8.7855E-11	179.392	0.72822E-04	0.45389E-02	7958.96	7995.75	7.7823
0.335	2.568	8.8916E-11	179.214	0.72894E-04	0.46118E-02	7959.57	7995.78	7.8999
0.340	2.557	8.9974E-11	179.039	0.72965E-04	0.46848E-02	7960.16	7995.82	8.0175
0.345	2.546	9.1029E-11	178.866	0.73036E-04	0.47578E-02	7960.73	7995.86	8.1350
0.350	2.535	9.2080E-11	178.696	0.73105E-04	0.48309E-02	7961.28	7995.89	8.2526
0.355	2.524	9.3129E-11	178.528	0.73174E-04	0.49041E-02	7961.82	7995.93	8.3702
0.360	2.513	9.4174E-11	178.363	0.73242E-04	0.49773E-02	7962.34	7995.96	8.4877
0.365	2.503	9.5216E-11	178.200	0.73309E-04	0.50506E-02	7962.85	7996.00	8.6053
0.370	2.493	9.6255E-11	178.039	0.73375E-04	0.51240E-02	7963.35	7996.03	8.7229
0.375	2.483	9.7291E-11	177.881	0.73440E-04	0.51975E-02	7963.83	7996.06	8.8405
0.380	2.473	9.8325E-11	177.725	0.73505E-04	0.52710E-02	7964.30	7996.09	8.9580
0.385	2.463	9.9355E-11	177.570	0.73569E-04	0.53445E-02	7964.75	7996.12	9.0756
0.390	2.454	1.0038E-10	177.418	0.73632E-04	0.54182E-02	7965.20	7996.15	9.1932
0.395	2.444	1.0141E-10	177.268	0.73694E-04	0.54919E-02	7965.63	7996.18	9.3108
0.400	2.435	1.0243E-10	177.119	0.73756E-04	0.55656E-02	7966.05	7996.21	9.4283
0.405	2.426	1.0345E-10	176.973	0.73817E-04	0.56394E-02	7966.47	7996.24	9.5459
0.410	2.417	1.0447E-10	176.828	0.73878E-04	0.57133E-02	7966.87	7996.27	9.6635
0.415	2.408	1.0548E-10	176.685	0.73937E-04	0.57873E-02	7967.26	7996.29	9.7810
0.420	2.400	1.0649E-10	176.544	0.73997E-04	0.58612E-02	7967.64	7996.32	9.8986
0.425	2.391	1.0750E-10	176.404	0.74055E-04	0.59353E-02	7968.01	7996.35	10.0162
0.430	2.383	1.0851E-10	176.266	0.74113E-04	0.60094E-02	7968.38	7996.37	10.1338
0.435	2.375	1.0951E-10	176.130	0.74170E-04	0.60836E-02	7968.74	7996.40	10.2513
0.440	2.366	1.1052E-10	175.995	0.74227E-04	0.61578E-02	7969.08	7996.42	10.3689
0.445	2.358	1.1152E-10	175.862	0.74283E-04	0.62321E-02	7969.42	7996.45	10.4865
0.450	2.351	1.1251E-10	175.731	0.74339E-04	0.63064E-02	7969.76	7996.47	10.6041
0.455	2.343	1.1351E-10	175.600	0.74394E-04	0.63808E-02	7970.08	7996.49	10.7216
0.460	2.335	1.1450E-10	175.472	0.74449E-04	0.64553E-02	7970.40	7996.52	10.8392
0.465	2.328	1.1549E-10	175.344	0.74503E-04	0.65298E-02	7970.71	7996.54	10.9568
0.470	2.320	1.1648E-10	175.218	0.74556E-04	0.66043E-02	7971.02	7996.56	11.0744
0.475	2.313	1.1747E-10	175.094	0.74610E-04	0.66789E-02	7971.31	7996.58	11.1919
0.480	2.306	1.1845E-10	174.970	0.74662E-04	0.67536E-02	7971.61	7996.60	11.3095
0.485	2.299	1.1943E-10	174.848	0.74714E-04	0.68283E-02	7971.89	7996.62	11.4271
0.490	2.292	1.2041E-10	174.728	0.74766E-04	0.69031E-02	7972.17	7996.64	11.5446
0.495	2.285	1.2139E-10	174.608	0.74817E-04	0.69779E-02	7972.45	7996.66	11.6622
0.500	2.282	6.3389E-10	100.000	0.13064E-03	0.71085E-02	7988.58	7996.67	11.7798
0.505	2.280	6.3517E-10	100.000	0.13064E-03	0.72392E-02	7988.61	7996.68	11.8974
0.510	2.278	6.3645E-10	100.000	0.13064E-03	0.73698E-02	7988.64	7996.68	12.0149
0.515	2.275	6.3772E-10	100.000	0.13064E-03	0.75005E-02	7988.67	7996.69	12.1325
0.520	2.273	6.3900E-10	100.000	0.13064E-03	0.76311E-02	7988.70	7996.70	12.2501
0.525	2.271	6.4027E-10	100.000	0.13064E-03	0.77617E-02	7988.74	7996.70	12.3677
0.530	2.262	1.2467E-10	174.214	0.10158E-03	0.78633E-02	7965.03	7996.73	12.5269
0.535	2.254	1.2581E-10	174.080	0.87795E-04	0.79511E-02	7969.69	7996.75	12.6645
0.540	2.247	1.2685E-10	173.958	0.81219E-04	0.80323E-02	7972.02	7996.77	12.7916
0.545	2.241	1.2785E-10	173.842	0.78080E-04	0.81104E-02	7973.26	7996.79	12.9138
0.550	2.234	1.2883E-10	173.729	0.76591E-04	0.81870E-02	7973.96	7996.81	13.0336
0.555	2.228	1.2980E-10	173.618	0.75896E-04	0.82629E-02	7974.42	7996.83	13.1521
0.560	2.222	1.3077E-10	173.509	0.75584E-04	0.83385E-02	7974.76	7996.85	13.2702
0.565	2.216	1.3173E-10	173.401	0.75457E-04	0.84139E-02	7975.03	7996.86	13.3879
0.570	2.210	1.3268E-10	173.294	0.75420E-04	0.84894E-02	7975.27	7996.88	13.5056
0.575	2.204	1.3364E-10	173.188	0.75430E-04	0.85648E-02	7975.50	7996.90	13.6231
0.580	2.198	1.3459E-10	173.084	0.75476E-04	0.86403E-02	7975.71	7996.91	13.7407
0.585	2.192	1.3554E-10	172.980	0.75521E-04	0.87158E-02	7975.92	7996.93	13.8583
0.590	2.187	1.3649E-10	172.877	0.75566E-04	0.87914E-02	7976.12	7996.94	13.9759
0.595	2.181	1.3743E-10	172.775	0.75611E-04	0.88670E-02	7976.32	7996.96	14.0934
0.600	2.175	1.3838E-10	172.674	0.75655E-04	0.89426E-02	7976.52	7996.98	14.2110
0.605	2.170	1.3932E-10	172.573	0.75699E-04	0.90183E-02	7976.71	7996.99	14.3286
0.610	2.164	1.4026E-10	172.474	0.75743E-04	0.90941E-02	7976.90	7997.01	14.4461

0.615	2.159	1.4120E-10	172.375	0.75786E-04	0.91698E-02	7977.09	7997.02	14.5637
0.620	2.154	1.4214E-10	172.277	0.75829E-04	0.92457E-02	7977.27	7997.04	14.6813
0.625	2.148	1.4308E-10	172.180	0.75872E-04	0.93215E-02	7977.46	7997.05	14.7989
0.630	2.143	1.4402E-10	172.084	0.75914E-04	0.93975E-02	7977.63	7997.06	14.9164
0.635	2.138	1.4495E-10	171.989	0.75957E-04	0.94734E-02	7977.81	7997.08	15.0340
0.640	2.133	1.4588E-10	171.894	0.75998E-04	0.95494E-02	7977.98	7997.09	15.1516
0.645	2.128	1.4681E-10	171.800	0.76040E-04	0.96255E-02	7978.15	7997.11	15.2692
0.650	2.123	1.4774E-10	171.707	0.76081E-04	0.97015E-02	7978.32	7997.12	15.3867
0.655	2.118	1.4867E-10	171.615	0.76122E-04	0.97777E-02	7978.48	7997.13	15.5043
0.660	2.113	1.4960E-10	171.523	0.76163E-04	0.98538E-02	7978.64	7997.15	15.6219
0.665	2.108	1.5052E-10	171.432	0.76203E-04	0.99300E-02	7978.80	7997.16	15.7395
0.670	2.103	1.5144E-10	171.342	0.76243E-04	0.10006E-01	7978.96	7997.17	15.8570
0.675	2.099	1.5237E-10	171.252	0.76283E-04	0.10083E-01	7979.11	7997.19	15.9746
0.680	2.094	1.5329E-10	171.163	0.76323E-04	0.10159E-01	7979.27	7997.20	16.0922
0.685	2.089	1.5421E-10	171.075	0.76362E-04	0.10235E-01	7979.42	7997.21	16.2097
0.690	2.085	1.5512E-10	170.988	0.76401E-04	0.10312E-01	7979.56	7997.22	16.3273
0.695	2.080	1.5604E-10	170.901	0.76440E-04	0.10388E-01	7979.71	7997.24	16.4449
0.700	2.076	1.5696E-10	170.815	0.76478E-04	0.10465E-01	7979.85	7997.25	16.5625
0.705	2.071	1.5787E-10	170.729	0.76517E-04	0.10541E-01	7979.99	7997.26	16.6800
0.710	2.067	1.5878E-10	170.644	0.76555E-04	0.10618E-01	7980.13	7997.27	16.7976
0.715	2.062	1.5969E-10	170.560	0.76593E-04	0.10694E-01	7980.27	7997.28	16.9152
0.720	2.058	1.6060E-10	170.476	0.76630E-04	0.10771E-01	7980.40	7997.29	17.0328
0.725	2.054	1.6151E-10	170.393	0.76668E-04	0.10848E-01	7980.54	7997.31	17.1503
0.730	2.049	1.6242E-10	170.310	0.76705E-04	0.10924E-01	7980.67	7997.32	17.2679
0.735	2.045	1.6332E-10	170.228	0.76742E-04	0.11001E-01	7980.80	7997.33	17.3855
0.740	2.041	1.6423E-10	170.147	0.76779E-04	0.11078E-01	7980.93	7997.34	17.5030
0.745	2.037	1.6513E-10	170.066	0.76815E-04	0.11155E-01	7981.05	7997.35	17.6206
0.750	2.033	1.6603E-10	169.985	0.76852E-04	0.11231E-01	7981.18	7997.36	17.7382
0.755	2.029	1.6693E-10	169.906	0.76888E-04	0.11308E-01	7981.30	7997.37	17.8558
0.760	2.025	1.6783E-10	169.826	0.76924E-04	0.11385E-01	7981.42	7997.38	17.9733
0.765	2.021	1.6873E-10	169.748	0.76959E-04	0.11462E-01	7981.54	7997.39	18.0909
0.770	2.017	1.6963E-10	169.669	0.76995E-04	0.11539E-01	7981.66	7997.40	18.2085
0.775	2.013	1.7053E-10	169.592	0.77030E-04	0.11616E-01	7981.77	7997.41	18.3261
0.780	2.009	1.7142E-10	169.515	0.77065E-04	0.11693E-01	7981.89	7997.42	18.4436
0.785	2.005	1.7231E-10	169.438	0.77100E-04	0.11770E-01	7982.00	7997.43	18.5612
0.790	2.001	1.7321E-10	169.362	0.77134E-04	0.11848E-01	7982.11	7997.44	18.6788
0.795	1.997	1.7410E-10	169.286	0.77169E-04	0.11925E-01	7982.23	7997.45	18.7963
0.800	1.993	1.7499E-10	169.211	0.77203E-04	0.12002E-01	7982.33	7997.46	18.9139
0.805	1.990	1.7588E-10	169.136	0.77237E-04	0.12079E-01	7982.44	7997.47	19.0315
0.810	1.986	1.7676E-10	169.062	0.77271E-04	0.12156E-01	7982.55	7997.48	19.1491
0.815	1.982	1.7765E-10	168.988	0.77305E-04	0.12234E-01	7982.65	7997.49	19.2666
0.820	1.979	1.7854E-10	168.915	0.77338E-04	0.12311E-01	7982.76	7997.50	19.3842
0.825	1.975	1.7942E-10	168.842	0.77372E-04	0.12388E-01	7982.86	7997.51	19.5018
0.830	1.971	1.8030E-10	168.770	0.77405E-04	0.12466E-01	7982.96	7997.52	19.6194
0.835	1.968	1.8119E-10	168.698	0.77438E-04	0.12543E-01	7983.06	7997.53	19.7369
0.840	1.964	1.8207E-10	168.627	0.77471E-04	0.12621E-01	7983.16	7997.53	19.8545
0.845	1.961	1.8295E-10	168.556	0.77503E-04	0.12698E-01	7983.26	7997.54	19.9721
0.850	1.957	1.8383E-10	168.485	0.77536E-04	0.12776E-01	7983.35	7997.55	20.0896

MATERIAL B MODIFIED MACHINE SET-UP CUTTER AT 7.6 MM
INITIAL PARAMETERS AND CONSTANTS
STEPS IN AXIAL DIRECTION 170
DELX 0.00500
INITIAL HEIGHT 0.00001
MAXIMUM DENSITY OF CAKE 250.00000
PLENUM PRESSURE 16000.00000
THE TOTAL CAKE HEIGHT (MM) IS 8.846023614
MASS FLUX PAST CUTTER (GM/M) 13.847052000

X	V	PERM	RHO	H	HTOT	PINT	PB	FLUX
0.000	27.037	2.9938E-13	250.000	0.10000E-04	0.10000E-04	0.00	15532.91	0.0238
0.005	13.884	1.2293E-12	243.377	0.40672E-04	0.50672E-04	7976.31	15876.83	0.1178
0.010	10.859	2.2509E-12	234.233	0.42259E-04	0.92931E-04	12418.00	15924.65	0.2118
0.015	9.394	3.2239E-12	228.812	0.43261E-04	0.13619E-03	13775.59	15943.62	0.3059
0.020	8.488	4.1497E-12	225.009	0.43992E-04	0.18018E-03	14406.30	15953.96	0.3999
0.025	7.855	5.0357E-12	222.096	0.44569E-04	0.22475E-03	14764.79	15960.57	0.4939
0.030	7.380	5.8886E-12	219.742	0.45046E-04	0.26980E-03	14994.24	15965.20	0.5880
0.035	7.004	6.7135E-12	217.772	0.45454E-04	0.31525E-03	15153.01	15968.65	0.6820
0.040	6.697	7.5145E-12	216.078	0.45810E-04	0.36106E-03	15269.10	15971.34	0.7760
0.045	6.440	8.2947E-12	214.595	0.46127E-04	0.40719E-03	15357.53	15973.50	0.8701
0.050	6.220	9.0566E-12	213.276	0.46412E-04	0.45360E-03	15427.06	15975.28	0.9641
0.055	6.028	9.8022E-12	212.089	0.46672E-04	0.50027E-03	15483.12	15976.78	1.0581
0.060	5.859	1.0533E-11	211.011	0.46910E-04	0.54718E-03	15529.25	15978.06	1.1522
0.065	5.709	1.1251E-11	210.023	0.47131E-04	0.59431E-03	15567.85	15979.18	1.2462
0.070	5.573	1.1957E-11	209.111	0.47336E-04	0.64165E-03	15600.63	15980.15	1.3403
0.075	5.451	1.2651E-11	208.265	0.47529E-04	0.68918E-03	15628.79	15981.01	1.4343
0.080	5.339	1.3336E-11	207.476	0.47709E-04	0.73689E-03	15653.25	15981.78	1.5283
0.085	5.237	1.4011E-11	206.736	0.47880E-04	0.78477E-03	15674.68	15982.48	1.6224
0.090	5.142	1.4677E-11	206.041	0.48042E-04	0.83281E-03	15693.62	15983.11	1.7164
0.095	5.054	1.5335E-11	205.384	0.48195E-04	0.88100E-03	15710.47	15983.68	1.8104
0.100	4.973	1.5986E-11	204.763	0.48342E-04	0.92935E-03	15725.56	15984.20	1.9045
0.105	4.896	1.6629E-11	204.173	0.48481E-04	0.97783E-03	15739.15	15984.68	1.9985
0.110	4.825	1.7265E-11	203.611	0.48615E-04	0.10264E-02	15751.45	15985.12	2.0925
0.115	4.758	1.7895E-11	203.075	0.48743E-04	0.10752E-02	15762.64	15985.54	2.1866
0.120	4.694	1.8519E-11	202.562	0.48866E-04	0.11241E-02	15772.86	15985.92	2.2806
0.125	4.635	1.9137E-11	202.072	0.48985E-04	0.11730E-02	15782.23	15986.27	2.3747
0.130	4.578	1.9750E-11	201.601	0.49100E-04	0.12221E-02	15790.85	15986.61	2.4687
0.135	4.524	2.0357E-11	201.148	0.49210E-04	0.12713E-02	15798.81	15986.92	2.5627
0.140	4.473	2.0960E-11	200.712	0.49317E-04	0.13207E-02	15806.19	15987.21	2.6568
0.145	4.424	2.1557E-11	200.292	0.49420E-04	0.13701E-02	15813.04	15987.49	2.7508
0.150	4.378	2.2150E-11	199.887	0.49521E-04	0.14196E-02	15819.41	15987.75	2.8448
0.155	4.333	2.2739E-11	199.495	0.49618E-04	0.14692E-02	15825.36	15988.00	2.9389
0.160	4.291	2.3323E-11	199.116	0.49712E-04	0.15189E-02	15830.93	15988.24	3.0329
0.165	4.250	2.3904E-11	198.749	0.49804E-04	0.15687E-02	15836.15	15988.46	3.1269
0.170	4.211	2.4480E-11	198.394	0.49893E-04	0.16186E-02	15841.06	15988.67	3.2210
0.175	4.173	2.5053E-11	198.049	0.49980E-04	0.16686E-02	15845.68	15988.87	3.3150
0.180	4.137	2.5622E-11	197.713	0.50065E-04	0.17187E-02	15850.03	15989.06	3.4090
0.185	4.102	2.6187E-11	197.387	0.50148E-04	0.17688E-02	15854.14	15989.25	3.5031
0.190	4.068	2.6750E-11	197.071	0.50228E-04	0.18191E-02	15858.03	15989.42	3.5971
0.195	4.036	2.7308E-11	196.762	0.50307E-04	0.18694E-02	15861.72	15989.59	3.6912
0.200	4.004	2.7864E-11	196.462	0.50384E-04	0.19197E-02	15865.21	15989.75	3.7852
0.205	3.974	2.8417E-11	196.169	0.50459E-04	0.19702E-02	15868.53	15989.91	3.8792
0.210	3.945	2.8966E-11	195.883	0.50533E-04	0.20207E-02	15871.69	15990.06	3.9733
0.215	3.916	2.9513E-11	195.604	0.50605E-04	0.20713E-02	15874.70	15990.20	4.0673
0.220	3.889	3.0057E-11	195.332	0.50676E-04	0.21220E-02	15877.57	15990.34	4.1613
0.225	3.862	3.0598E-11	195.066	0.50744E-04	0.21728E-02	15880.31	15990.47	4.2554
0.230	3.836	3.1137E-11	194.806	0.50812E-04	0.22236E-02	15882.93	15990.60	4.3494
0.235	3.811	3.1673E-11	194.551	0.50879E-04	0.22745E-02	15885.43	15990.72	4.4434
0.240	3.786	3.2206E-11	194.302	0.50944E-04	0.23254E-02	15887.83	15990.84	4.5375
0.245	3.762	3.2737E-11	194.059	0.51008E-04	0.23764E-02	15890.13	15990.96	4.6315
0.250	3.739	3.3266E-11	193.820	0.51071E-04	0.24275E-02	15892.33	15991.07	4.7256
0.255	3.717	3.3792E-11	193.586	0.51132E-04	0.24786E-02	15894.45	15991.17	4.8196
0.260	3.694	3.4316E-11	193.357	0.51193E-04	0.25298E-02	15896.48	15991.28	4.9136
0.265	3.673	3.4838E-11	193.132	0.51253E-04	0.25811E-02	15898.44	15991.38	5.0077
0.270	3.652	3.5358E-11	192.911	0.51311E-04	0.26324E-02	15900.32	15991.48	5.1017

0.275	3.632	3.5875E-11	192.695	0.51369E-04	0.26837E-02	15902.13	15991.57	5.1957
0.280	3.612	3.6391E-11	192.482	0.51426E-04	0.27352E-02	15903.87	15991.66	5.2898
0.285	3.592	3.6904E-11	192.274	0.51481E-04	0.27866E-02	15905.56	15991.75	5.3838
0.290	3.573	3.7416E-11	192.069	0.51536E-04	0.28382E-02	15907.18	15991.84	5.4778
0.295	3.555	3.7925E-11	191.867	0.51590E-04	0.28898E-02	15908.75	15991.93	5.5719
0.300	3.537	3.8433E-11	191.669	0.51644E-04	0.29414E-02	15910.27	15992.01	5.6659
0.305	3.519	3.8939E-11	191.475	0.51696E-04	0.29931E-02	15911.73	15992.09	5.7599
0.310	3.502	3.9443E-11	191.283	0.51748E-04	0.30449E-02	15913.15	15992.17	5.8540
0.315	3.485	3.9945E-11	191.095	0.51799E-04	0.30967E-02	15914.52	15992.24	5.9480
0.320	3.468	4.0445E-11	190.910	0.51849E-04	0.31485E-02	15915.85	15992.32	6.0421
0.325	3.452	4.0944E-11	190.727	0.51899E-04	0.32004E-02	15917.14	15992.39	6.1361
0.330	3.436	4.1441E-11	190.548	0.51948E-04	0.32524E-02	15918.38	15992.46	6.2301
0.335	3.420	4.1936E-11	190.371	0.51996E-04	0.33043E-02	15919.59	15992.53	6.3242
0.340	3.405	4.2430E-11	190.197	0.52044E-04	0.33564E-02	15920.77	15992.59	6.4182
0.345	3.390	4.2922E-11	190.025	0.52091E-04	0.34085E-02	15921.90	15992.66	6.5122
0.350	3.375	4.3413E-11	189.856	0.52137E-04	0.34606E-02	15923.01	15992.72	6.6063
0.355	3.360	4.3902E-11	189.689	0.52183E-04	0.35128E-02	15924.09	15992.78	6.7003
0.360	3.346	4.4390E-11	189.525	0.52228E-04	0.35650E-02	15925.13	15992.85	6.7943
0.365	3.332	4.4876E-11	189.363	0.52273E-04	0.36173E-02	15926.14	15992.91	6.8884
0.370	3.318	4.5360E-11	189.203	0.52317E-04	0.36696E-02	15927.13	15992.96	6.9824
0.375	3.305	4.5844E-11	189.046	0.52361E-04	0.37220E-02	15928.09	15993.02	7.0765
0.380	3.292	4.6325E-11	188.890	0.52404E-04	0.37744E-02	15929.03	15993.08	7.1705
0.385	3.279	4.6806E-11	188.737	0.52446E-04	0.38268E-02	15929.94	15993.13	7.2645
0.390	3.266	4.7285E-11	188.585	0.52488E-04	0.38793E-02	15930.83	15993.18	7.3586
0.395	3.253	4.7763E-11	188.436	0.52530E-04	0.39318E-02	15931.69	15993.24	7.4526
0.400	3.241	4.8239E-11	188.288	0.52571E-04	0.39844E-02	15932.53	15993.29	7.5466
0.405	3.229	4.8714E-11	188.142	0.52612E-04	0.40370E-02	15933.36	15993.34	7.6407
0.410	3.217	4.9188E-11	187.999	0.52652E-04	0.40897E-02	15934.16	15993.39	7.7347
0.415	3.205	4.9661E-11	187.856	0.52692E-04	0.41424E-02	15934.94	15993.44	7.8287
0.420	3.194	5.0132E-11	187.716	0.52732E-04	0.41951E-02	15935.70	15993.48	7.9228
0.425	3.182	5.0602E-11	187.577	0.52771E-04	0.42479E-02	15936.45	15993.53	8.0168
0.430	3.171	5.1071E-11	187.440	0.52809E-04	0.43007E-02	15937.18	15993.57	8.1109
0.435	3.160	5.1539E-11	187.305	0.52847E-04	0.43535E-02	15937.89	15993.62	8.2049
0.440	3.149	5.2006E-11	187.171	0.52885E-04	0.44064E-02	15938.58	15993.66	8.2989
0.445	3.138	5.2471E-11	187.038	0.52923E-04	0.44593E-02	15939.26	15993.71	8.3930
0.450	3.128	5.2936E-11	186.907	0.52960E-04	0.45123E-02	15939.92	15993.75	8.4870
0.455	3.117	5.3399E-11	186.778	0.52996E-04	0.45653E-02	15940.57	15993.79	8.5810
0.460	3.107	5.3861E-11	186.650	0.53033E-04	0.46183E-02	15941.21	15993.83	8.6751
0.465	3.097	5.4322E-11	186.523	0.53069E-04	0.46714E-02	15941.83	15993.87	8.7691
0.470	3.087	5.4782E-11	186.398	0.53104E-04	0.47245E-02	15942.44	15993.91	8.8631
0.475	3.077	5.5241E-11	186.274	0.53140E-04	0.47776E-02	15943.03	15993.95	8.9572
0.480	3.068	5.5699E-11	186.151	0.53175E-04	0.48308E-02	15943.61	15993.99	9.0512
0.485	3.058	5.6156E-11	186.030	0.53209E-04	0.48840E-02	15944.18	15994.02	9.1453
0.490	3.049	5.6611E-11	185.910	0.53244E-04	0.49373E-02	15944.74	15994.06	9.2393
0.495	3.039	5.7066E-11	185.791	0.53278E-04	0.49906E-02	15945.29	15994.10	9.3333
0.500	3.030	5.7520E-11	185.673	0.53311E-04	0.50439E-02	15945.83	15994.13	9.4274
0.505	3.021	5.7973E-11	185.557	0.53345E-04	0.50972E-02	15946.35	15994.17	9.5214
0.510	3.012	5.8425E-11	185.442	0.53378E-04	0.51506E-02	15946.87	15994.20	9.6154
0.515	3.003	5.8876E-11	185.327	0.53411E-04	0.52040E-02	15947.37	15994.24	9.7095
0.520	2.995	5.9326E-11	185.214	0.53444E-04	0.52574E-02	15947.87	15994.27	9.8035
0.525	2.986	5.9775E-11	185.102	0.53476E-04	0.53109E-02	15948.35	15994.30	9.8975
0.530	2.978	6.0223E-11	184.992	0.53508E-04	0.53644E-02	15948.83	15994.33	9.9916
0.535	2.969	6.0670E-11	184.882	0.53540E-04	0.54180E-02	15949.30	15994.37	10.0856
0.540	2.961	6.1117E-11	184.773	0.53571E-04	0.54715E-02	15949.76	15994.40	10.1796
0.545	2.953	6.1562E-11	184.665	0.53603E-04	0.55251E-02	15950.21	15994.43	10.2737
0.550	2.945	6.2007E-11	184.558	0.53634E-04	0.55788E-02	15950.65	15994.46	10.3677
0.555	2.937	6.2450E-11	184.452	0.53664E-04	0.56324E-02	15951.08	15994.49	10.4618
0.560	2.929	6.2893E-11	184.347	0.53695E-04	0.56861E-02	15951.51	15994.52	10.5558
0.565	2.921	6.3335E-11	184.244	0.53725E-04	0.57399E-02	15951.93	15994.55	10.6498
0.570	2.913	6.3776E-11	184.141	0.53755E-04	0.57936E-02	15952.34	15994.58	10.7439
0.575	2.906	6.4217E-11	184.038	0.53785E-04	0.58474E-02	15952.75	15994.60	10.8379
0.580	2.898	6.4656E-11	183.937	0.53815E-04	0.59012E-02	15953.14	15994.63	10.9319
0.585	2.891	6.5095E-11	183.837	0.53844E-04	0.59551E-02	15953.53	15994.66	11.0260
0.590	2.883	6.5533E-11	183.737	0.53873E-04	0.60089E-02	15953.92	15994.69	11.1200
0.595	2.876	6.5970E-11	183.639	0.53902E-04	0.60628E-02	15954.30	15994.71	11.2140
0.600	2.869	6.6406E-11	183.541	0.53931E-04	0.61168E-02	15954.67	15994.74	11.3081
0.605	2.862	6.6842E-11	183.444	0.53959E-04	0.61707E-02	15955.03	15994.77	11.4021

0.610	2.855	6.7276E-11	183.348	0.53988E-04	0.62247E-02	15955.39	15994.79	11.4961
0.615	2.848	6.7710E-11	183.252	0.54016E-04	0.62787E-02	15955.74	15994.82	11.5902
0.620	2.841	6.8144E-11	183.158	0.54044E-04	0.63328E-02	15956.09	15994.84	11.6842
0.625	2.834	6.8576E-11	183.064	0.54071E-04	0.63868E-02	15956.43	15994.87	11.7783
0.630	2.827	6.9008E-11	182.971	0.54099E-04	0.64409E-02	15956.77	15994.89	11.8723
0.635	2.821	6.9439E-11	182.878	0.54126E-04	0.64951E-02	15957.10	15994.92	11.9663
0.640	2.814	6.9869E-11	182.787	0.54153E-04	0.65492E-02	15957.43	15994.94	12.0604
0.645	2.807	7.0299E-11	182.696	0.54180E-04	0.66034E-02	15957.75	15994.96	12.1544
0.650	2.801	7.0728E-11	182.606	0.54207E-04	0.66576E-02	15958.06	15994.99	12.2484
0.655	2.795	7.1156E-11	182.516	0.54234E-04	0.67118E-02	15958.37	15995.01	12.3425
0.660	2.788	7.1583E-11	182.427	0.54260E-04	0.67661E-02	15958.68	15995.03	12.4365
0.665	2.782	7.2010E-11	182.339	0.54286E-04	0.68204E-02	15958.98	15995.05	12.5305
0.670	2.776	7.2436E-11	182.252	0.54312E-04	0.68747E-02	15959.28	15995.08	12.6246
0.675	2.770	7.2861E-11	182.165	0.54338E-04	0.69290E-02	15959.57	15995.10	12.7186
0.680	2.763	7.3286E-11	182.079	0.54364E-04	0.69834E-02	15959.86	15995.12	12.8127
0.685	2.757	7.3710E-11	181.993	0.54390E-04	0.70378E-02	15960.15	15995.14	12.9067
0.690	2.751	7.4134E-11	181.908	0.54415E-04	0.70922E-02	15960.43	15995.16	13.0007
0.695	2.745	7.4556E-11	181.824	0.54440E-04	0.71466E-02	15960.70	15995.18	13.0948
0.700	2.740	7.4979E-11	181.740	0.54465E-04	0.72011E-02	15960.97	15995.20	13.1888
0.705	2.734	7.5400E-11	181.657	0.54490E-04	0.72556E-02	15961.24	15995.22	13.2828
0.710	2.728	7.5821E-11	181.574	0.54515E-04	0.73101E-02	15961.51	15995.24	13.3769
0.715	2.722	7.6241E-11	181.492	0.54540E-04	0.73647E-02	15961.77	15995.26	13.4709
0.720	2.717	7.6661E-11	181.411	0.54564E-04	0.74192E-02	15962.03	15995.28	13.5649
0.725	2.711	7.7080E-11	181.330	0.54588E-04	0.74738E-02	15962.28	15995.30	13.6590
0.730	2.705	7.7498E-11	181.250	0.54613E-04	0.75284E-02	15962.53	15995.32	13.7530
0.735	2.700	7.7916E-11	181.170	0.54637E-04	0.75831E-02	15962.78	15995.34	13.8471
0.740	2.695	7.8333E-11	181.091	0.54661E-04	0.76377E-02	15963.02	15995.36	13.9411
0.745	2.689	7.8750E-11	181.013	0.54684E-04	0.76924E-02	15963.26	15995.38	14.0351
0.750	2.684	7.9165E-11	180.935	0.54708E-04	0.77471E-02	15963.50	15995.40	14.1292
0.755	2.678	7.9581E-11	180.857	0.54731E-04	0.78018E-02	15963.73	15995.42	14.2232
0.760	2.673	7.9996E-11	180.780	0.54755E-04	0.78566E-02	15963.96	15995.43	14.3172
0.765	2.668	8.0410E-11	180.703	0.54778E-04	0.79114E-02	15964.19	15995.45	14.4113
0.770	2.663	8.0823E-11	180.627	0.54801E-04	0.79662E-02	15964.42	15995.47	14.5053
0.775	2.658	8.1237E-11	180.552	0.54824E-04	0.80210E-02	15964.64	15995.49	14.5993
0.780	2.653	8.1649E-11	180.477	0.54847E-04	0.80758E-02	15964.86	15995.50	14.6934
0.785	2.648	8.2061E-11	180.402	0.54869E-04	0.81307E-02	15965.07	15995.52	14.7874
0.790	2.643	8.2472E-11	180.328	0.54892E-04	0.81856E-02	15965.29	15995.54	14.8814
0.795	2.638	8.2883E-11	180.254	0.54914E-04	0.82405E-02	15965.50	15995.55	14.9755
0.800	2.633	8.3294E-11	180.181	0.54937E-04	0.82955E-02	15965.71	15995.57	15.0695
0.805	2.628	8.3703E-11	180.109	0.54959E-04	0.83504E-02	15965.91	15995.59	15.1636
0.810	2.623	8.4112E-11	180.036	0.54981E-04	0.84054E-02	15966.11	15995.60	15.2576
0.815	2.618	8.4521E-11	179.965	0.55003E-04	0.84604E-02	15966.32	15995.62	15.3516
0.820	2.613	8.4929E-11	179.893	0.55025E-04	0.85154E-02	15966.51	15995.64	15.4457
0.825	2.609	8.5337E-11	179.822	0.55046E-04	0.85705E-02	15966.71	15995.65	15.5397
0.830	2.604	8.5744E-11	179.752	0.55068E-04	0.86255E-02	15966.90	15995.67	15.6337
0.835	2.599	8.6151E-11	179.682	0.55089E-04	0.86806E-02	15967.09	15995.68	15.7278
0.840	2.595	8.6557E-11	179.612	0.55111E-04	0.87357E-02	15967.28	15995.70	15.8218
0.845	2.590	8.6962E-11	179.543	0.55132E-04	0.87909E-02	15967.47	15995.71	15.9158
0.850	2.586	8.7367E-11	179.474	0.55153E-04	0.88460E-02	15967.65	15995.73	16.0099

VITA

The author, Edward McRae Williams, was born in Richmond, Virginia, on November 19, 1968. He lived there until 1987 when he began the first of many extended visits to Blacksburg, Virginia, where he received his B.S. degree in Mechanical Engineering from Virginia Tech in 1992. In the immediate future he plans to move to Washington, D.C. to work for Teledyne Brown.