STP-PT-071

# STRESS INTENSITY FACTOR SOLUTIONS FOR INTERNAL CRACKS IN THICK-WALLED CYLINDER VESSELS



ASME STANDARDS TECHNOLOGY, LLC

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# STRESS INTENSITY FACTOR SOLUTIONS FOR INTERNAL CRACKS IN THICK-WALLED CYLINDER VESSELS



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## FOREWORD

Stress intensity K factors were computed for internal cracks in thick-walled cylinders. The 744 cases include a range of geometry ratios and crack size ratios for internal axial and internal circumferential surface cracks, axial internal full-width partial depth axial cracks, and circumferential internal 360º partial depth cracks. These K solutions extend the K factor solutions available in the API 579-1/ASME FFS-1 Annex C tables.

The 3D crack meshes were created using the FEACrack software, and the analyses were run using the Abaqus FEA software. A mesh convergence study examined a variety of mesh settings to confirm that adequate mesh refinement was used to compute the stress intensity values. The post processing included automatic and manual quality checks to confirm the results.

The results are reported as non-dimensional geometry factors that are tabulated in the appendices along with plots of all the result cases. The new solutions can be added to the API 579-1/ASME FFS-1 Annex C tables.

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## EXECUTIVE SUMMARY

This report describes the analysis methods and results for internal surface crack stress intensity K solutions in thick-walled cylinders. The 744 cases include a range of geometry ratios and crack size ratios for internal axial and internal circumferential surface cracks, axial full-width cracks, and 360º circumferential cracks. These K solutions extend the K factor solutions available in the 2007 API 579-1/ASME FFS-1 Annex C tables. The results are reported as non-dimensional geometry factors that are tabulated in the appendices along with plots of all the result cases.

# 1 INTRODUCTION

This report computes the stress intensity K factors for internal surface cracks in thick-walled cylinder vessels. The 744 crack analysis cases for this project extend the K factor solutions available in the API 579-1/ASME FFS-1 Annex C tables [1].

The analysis method uses the FEACrack™ [2] software to generate the three-dimensional (3D) crack meshes, described below. The FEACrack software, a commercial product for 3D crack mesh generation and analysis, was originally released in 1998, and was used to create most of the K solutions in Annex C of API 579 [1][4][5]. FEACrack creates complete and ready-to-run Abaqus™ [6] input files, including the syntax to define the J-integral calculation, to allow efficient analysis of many crack cases.

The finite element analysis (FEA) cases are run for each crack mesh using the Abaqus solver. Abaqus also provides the crack front J-integral calculation at the crack front nodes. FEACrack provides automated post processing to help inspect the mesh and crack front J-integral results and tabulate the stress intensity solution factors. FEACrack automatically computes the stress intensity K factor from the J-integral using the elastic material properties, and examines the J-integral path dependence to indicate any issues with a result.

The stress intensity results are reported as non-dimensional geometry G factor values, described in Section 1.2. The result values are tabulated in the appendices. Plots of the results for all the cases examined and for result trends are also shown in the appendices. Each appendix begins with a description of the values or plots within the particular appendix.



## 1.1 Analysis Cases

The crack analysis cases use the geometry ratio Y = OD/ID and the a/l crack aspect ratio, where OD is the cylinder outside diameter, ID is the cylinder inside diameter, a is the crack depth, and l is the total semi-elliptical crack length. The crack depth ratio a/t describes the crack depths examined, where t is the cylinder wall thickness.

The Y and a/l ratios are related to the t/Ri and a/c ratios used in the API 579 Annex C tables, where Ri is the cylinder inside radius and c is the half semi-elliptical surface crack length: t/Ri = Y-1, a/l = (a/c)/2, 2c = l. The same a/l and a/t ratio values as the Annex C solutions were used so that the new stress intensity solutions can be easily added to the existing solution tables. Both sets of ratios are given in Figure 1-1 through Figure 1-3 below. The Y = 2 ratio (t/Ri = 1) overlaps the current solutions so that the new results can be compared to show continuity of values. The new solutions extend the Y ratio to 4 (t/Ri = 3) for the thickest cylinder case examined.

Generic values for geometry and loads are used to create the crack meshes, since the final results are given as the non-dimensional geometry G factors.

**Figure 1-1: Y and t/Ri Ratios to Set the Cylinder Thickness, t**

| case | Y=OD/ID | t/Ri |
|---|---|---|
| 1 | 2 | 1 |
| 2 | 2.5 | 1.5 |
| 3 | 3 | 2 |
| 4 | 3.5 | 2.5 |
| 5 | 4 | 3 |

**Figure 1-2: a/l and a/c Ratios to Set the Crack Length, l=2c**

| case | a/l=a/2c | a/c |
|---|---|---|
| 1 | 0.015625 | 0.03125 |
| 2 | 0.03125 | 0.0625 |
| 3 | 0.0625 | 0.125 |
| 4 | 0.125 | 0.25 |
| 5 | 0.25 | 0.5 |
| 6 | 0.5 | 1 |
| 7 | 1 | 2 |
| 8 | 360-deg or full width | |

**Figure 1-3: a/t Ratios to Set the Crack Depth, a**

| case | a/t |
|---|---|
| 1 | 0.2 |
| 2 | 0.4 |
| 3 | 0.6 |
| 4 | 0.8 |

Some of the a/l crack length ratios give circumferential crack lengths that are longer than the thick-walled cylinder inside circumference, so those cases are omitted. Figure 1-4 summarizes the valid circumferential surface crack cases, including the 360-degree crack cases that provide a bounding case for the circumferential crack solutions.

**Figure 1-4: Internal Circumferential Crack Valid Cases**

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Y=OD/ID = | 2 | | | | | | | |
| | a/l=a/2c | | | | | | | |
| a/t | 360-deg | 0.015625 | 0.03125 | 0.0625 | 0.125 | 0.25 | 0.5 | 1 |
| 0.2 | ok | too long | too long | ok | ok | ok | ok | ok |
| 0.4 | ok | too long | too long | too long | ok | ok | ok | ok |
| 0.6 | ok | too long | too long | too long | ok | ok | ok | ok |
| 0.8 | ok | too long | too long | too long | too long | ok | ok | ok |
| Y=OD/ID = | 2.5 | | | | | | | |
| | a/l=a/2c | | | | | | | |
| a/t | 360-deg | 0.015625 | 0.03125 | 0.0625 | 0.125 | 0.25 | 0.5 | 1 |
| 0.2 | ok | too long | too long | ok | ok | ok | ok | ok |
| 0.4 | ok | too long | too long | too long | ok | ok | ok | ok |
| 0.6 | ok | too long | too long | too long | too long | ok | ok | ok |
| 0.8 | ok | too long | too long | too long | too long | ok | ok | ok |
| Y=OD/ID = | 3 | | | | | | | |
| | a/l=a/2c | | | | | | | |
| a/t | 360-deg | 0.015625 | 0.03125 | 0.0625 | 0.125 | 0.25 | 0.5 | 1 |
| 0.2 | ok | too long | too long | too long | ok | ok | ok | ok |
| 0.4 | ok | too long | too long | too long | too long | ok | ok | ok |
| 0.6 | ok | too long | too long | too long | too long | ok | ok | ok |
| 0.8 | ok | too long | too long | too long | too long | too long | ok | ok |
| Y=OD/ID = | 3.5 | | | | | | | |
| | a/l=a/2c | | | | | | | |
| a/t | 360-deg | 0.015625 | 0.03125 | 0.0625 | 0.125 | 0.25 | 0.5 | 1 |
| 0.2 | ok | too long | too long | too long | ok | ok | ok | ok |
| 0.4 | ok | too long | too long | too long | too long | ok | ok | ok |
| 0.6 | ok | too long | too long | too long | too long | ok | ok | ok |
| 0.8 | ok | too long | too long | too long | too long | too long | ok | ok |
| Y=OD/ID = | 4 | | | | | | | |
| | a/l=a/2c | | | | | | | |
| a/t | 360-deg | 0.015625 | 0.03125 | 0.0625 | 0.125 | 0.25 | 0.5 | 1 |
| 0.2 | ok | too long | too long | too long | ok | ok | ok | ok |
| 0.4 | ok | too long | too long | too long | too long | ok | ok | ok |
| 0.6 | ok | too long | too long | too long | too long | too long | ok | ok |
| 0.8 | ok | too long | too long | too long | too long | too long | ok | ok |

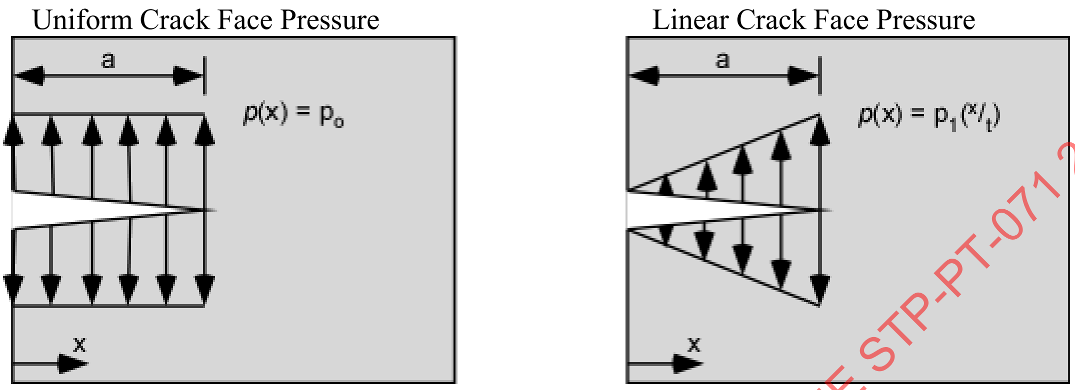


## 1.2 Geometry Factors

The stress intensity K factors are given in the API 579 Annex C tables as non-dimensional geometry factors: $G_0$ and $G_1$ for the surface cracks, where $G_0$ is the uniform crack face pressure solution and $G_1$ is the linear crack face pressure solution. Geometry factors $G_0$ through $G_4$ are given for the axial full-width and circumferential 360° partial-depth cracks. Uniform and linear crack face pressure distributions are applied to the surface crack meshes to obtain the geometry factors for these two load cases. The full-width and 360° cracks have uniform, linear, quadratic, cubic and quartic (fourth order) crack face pressure distributions applied to obtain their geometry factor solutions.

Diagrams of the uniform and linear crack face pressure distributions are shown in Figure 1-5, and the general form of the stress intensity K equations with the geometry factor G are shown below each diagram. The linear crack face pressure is zero at the free surface and increases toward the crack depth. Likewise the quadratic, cubic and quartic crack face pressures increase from zero at the free surface to maximum at the crack depth.

**Figure 1-5: Crack Face Pressure Distributions**




$$K_I = p_o G_o \sqrt{\frac{\pi a}{Q}} \quad (1)$$

$$K_I = p_1 G_1 \sqrt{\frac{\pi a}{Q}} \quad (2)$$

The circumferential surface cracks also have two global bending K solutions in API 579 Table C.14 that provide the $G_5$ (in-plane bending) and $G_6$ (out-of-plane bending) geometry factor solutions. Since the bending load cases can put part of the surface crack into compression and would cause crack face closure, superposition is used to apply a combined bending plus axial load, so that the entire crack front is in tension for the FEA solution. Then subtracting the axial load solution from the combined load solution obtains the bending only solution for each case, which may be negative due to compressive stress.

For example, the entire crack front is put into tension by applying a combined axial force and bending moment, which gives the total crack front stress intensity $K_{total}$. The axial force is applied by itself in another model to get the crack front stress intensity $K_{axial}$. The principle of superposition allows combining load cases in linear elastic analysis such that: $K_{total} = K_{bending} + K_{axial}$. The bending only stress intensity is obtained by subtracting the axial load case from the combined load case: $K_{bending} = K_{total} - K_{axial}$. The bending only K solutions can be negative so that when combined with other load cases in a crack assessment the correct sum of the K solutions from each loading component is obtained. In a crack assessment, a total negative K value after combining all loads indicates crack closure and K is set to zero.

The FEACrack post processor uses the crack front stress intensity K values from the Abaqus results file and the applied loading to compute the non-dimensional geometry G factors. A sixth order polynomial is used to curve-fit the G solution along the crack front. The seven polynomial coefficients are tabulated for each crack case to give the same result format as in the API 579 Annex C tables. The geometry factor polynomial, G, is given by the equations below [API 579 eq. C.91 and C.96].

$$G = A_0 + A_1\beta + A_2\beta^2 + A_3\beta^3 + A_4\beta^4 + A_5\beta^5 + A_6\beta^6 \quad (3)$$

$$\beta = \frac{2\varphi}{\pi} \quad (4)$$

where the crack front position angle, $\varphi$, varies from 0 at the crack tip (at the free surface) to $\pi/2$ at the deepest point of the surface crack. Likewise, the non-dimensional crack front position, $\beta$ varies from 0 at the crack tip to 1 at the crack depth. The polynomial curve fit coefficient values are given by the $A_0$ through $A_6$ values. The geometry factor and stress intensity solutions at the crack tip location are obtained by setting $\beta = 0$, which gives just the $A_0$ coefficient. The geometry factor and stress intensity solutions at the crack depth location are given by setting $\beta = 1$, which is the sum of the $A_i$ coefficient values: $G(\beta=1) = \Sigma Ai$, $i=0,6$. By reporting the polynomial coefficients, $A_0$ through $A_6$, the stress intensity solution is available along the entire crack front in addition to the crack tip and crack depth locations.

The axial full-width and circumferential 360$^o$ partial-depth cracks have a constant stress intensity value along the crack front, so only the $A_0$ coefficient is reported for the geometry factors for each crack face pressure load case.

The non-dimensional geometry factor solutions obtained for the uniform and linear surface crack face pressure load cases can be used to infer the solutions for other loading distributions by using the weight function method as described in the API 579 Section C.14 [3]. The weight function method uses equations and weighting factors to combine the $G_0$ and $G_1$ solutions to obtain other load case solutions. For example, the non-uniform stress distribution due to internal pressure in a thick-walled cylinder could be obtained using the weight function method.

## 2 AXIAL INTERNAL SURFACE CRACKS

The combination of geometry ratios and two load cases gives 280 axial internal surface crack meshes. The model "Run ID" numbers are used to uniquely identify each case, and are from 1 through 280. The non-dimensional G polynomial coefficient results are listed in Table 1 in Appendix A.

The axial internal surface crack meshes are quarter symmetric models; the constraints and dimensions are shown in Figure 2-1. The left end of the cylinder is the cross-section symmetry plane and has an X-constraint. The top and bottom mesh surfaces are on the axial symmetry plane and have a Z-constraint outside the crack. The right end of the cylinder is unconstrained. A single node at the top of the cylinder has a Y-constraint. The green mesh zone is used to improve the mesh refinement near the crack plane, and has the same elastic material properties as the red mesh zone in the cylinder model. The crack face pressure loading is applied to the crack face elements in the light blue mesh region.

For the shallower crack depths, more elements are added through the thickness in the ligament outside the crack as shown in Figure 2-2. An example of the thickest cylinder, Y = 4 (t/Ri = 3) is shown in Figure 2-3.

**Figure 2-1: Quarter Symmetric Crack Mesh, Case 149, t/Ri=2, a/c=0.5, a/t=0.6**

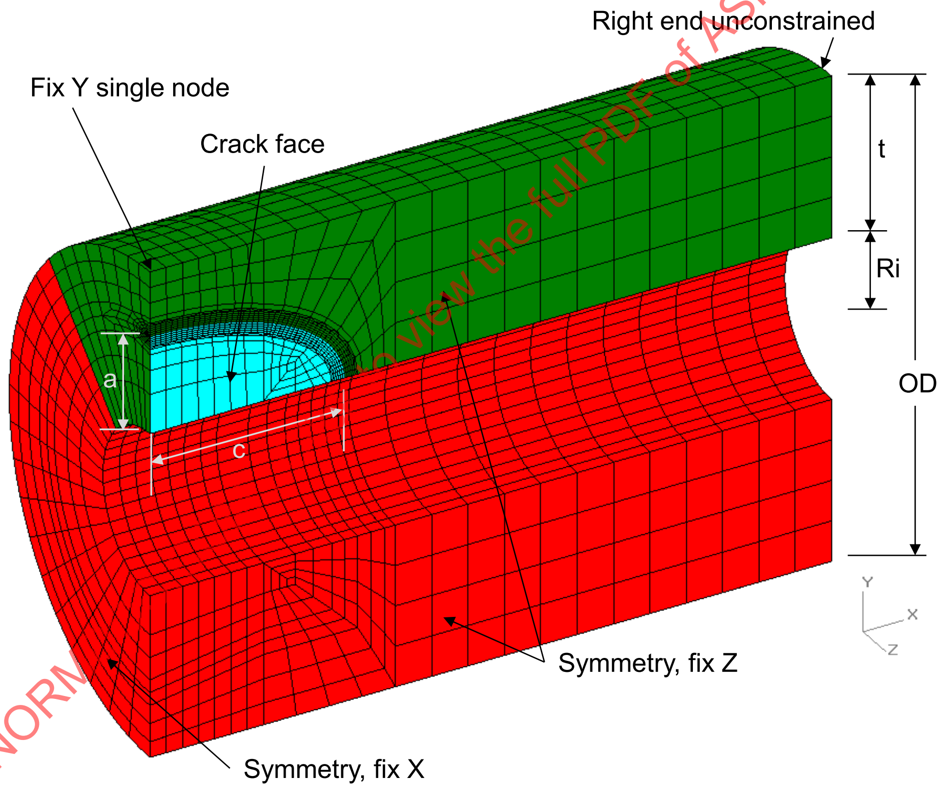


**Figure 2-2: Shallow Crack Mesh Example, Case 17, t/Ri=1, a/c=0.125, a/t=0.2**

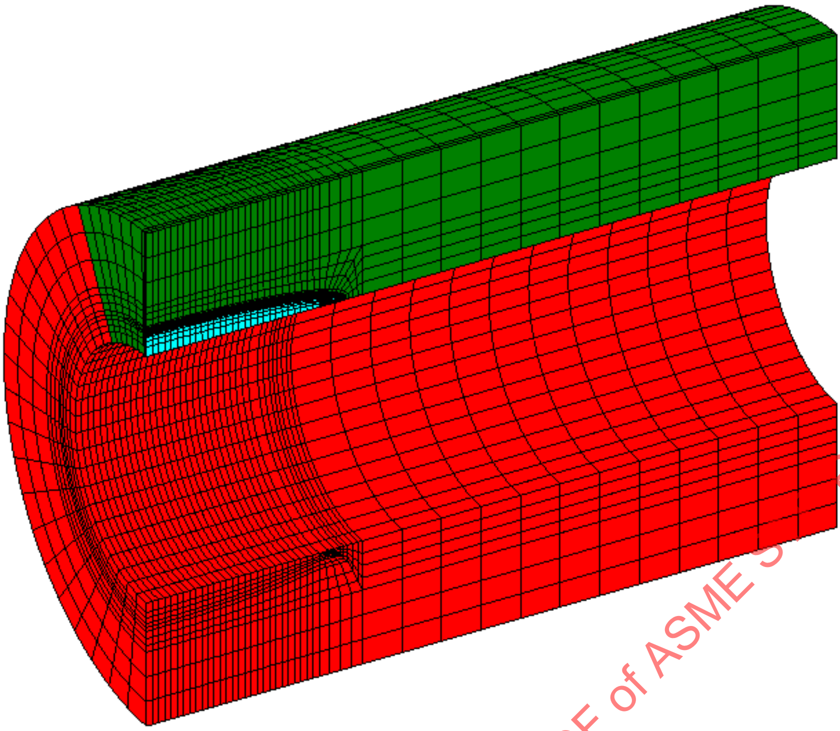
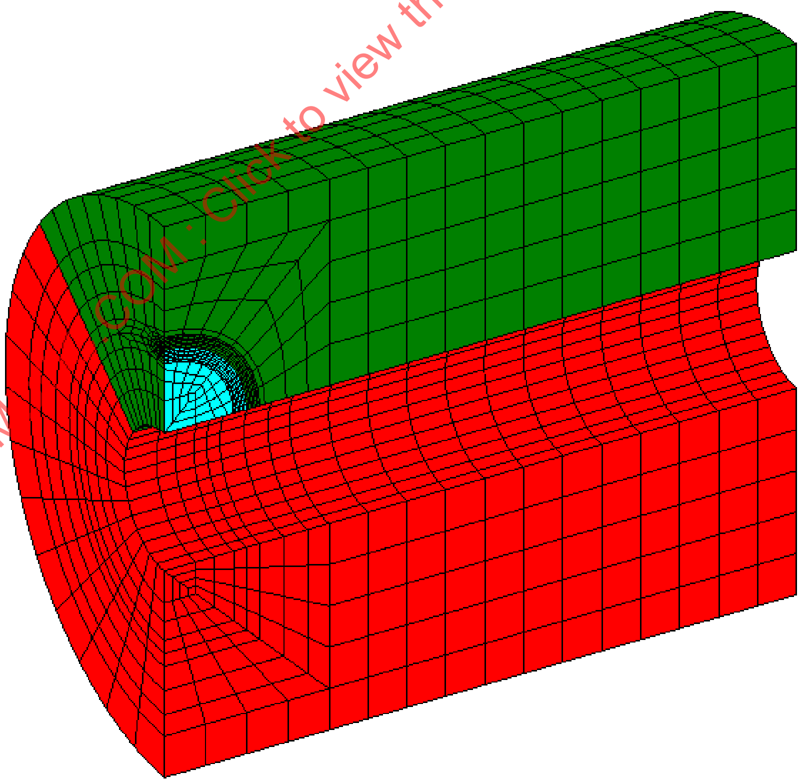


**Figure 2-3: Thickest Cylinder Example, Case 267, t/Ri=3, a/c=1.0, a/t=0.4**

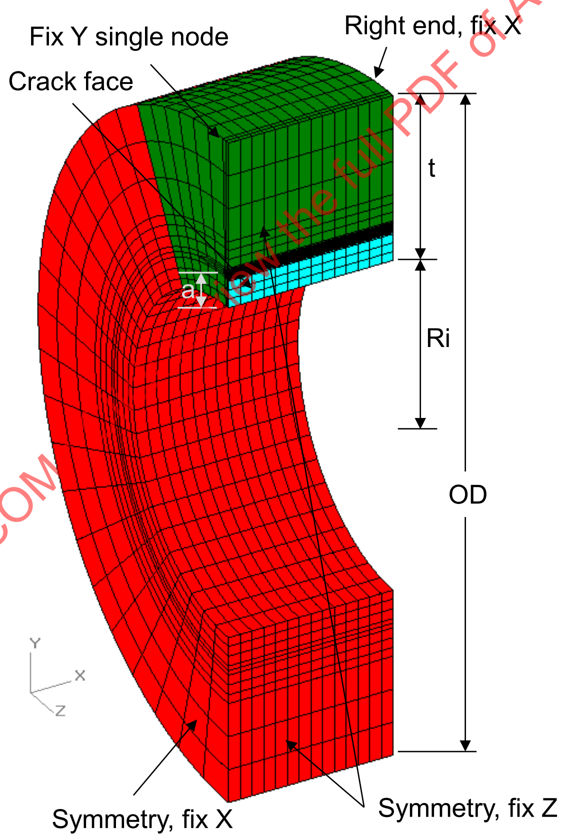


# 3 AXIAL INTERNAL FULL-WIDTH CRACKS

The combination of geometry ratios and five load cases gives 100 axial internal full-width crack meshes. The full-width crack meshes are intended to model an infinitely long, partial-depth crack as a bounding solution for long axial surface cracks. The model "Run ID" numbers are used to uniquely identify each case, and are from 301 through 400. The non-dimensional G polynomial coefficient results are listed in Table 2 in Appendix B.

The axial full-width crack meshes are quarter symmetric models; the constraints and dimensions are shown in Figure 3-1. The left end of the cylinder is the cross-section symmetry plane and has an X-constraint. The top and bottom mesh surfaces are on the axial symmetry plane and have a Z-constraint outside the crack. The right end of the cylinder is constrained in the X-direction to model the infinitely long partial-depth crack. A single node at the top of the cylinder has a Y-constraint. The green mesh zone is used to improve the mesh refinement near the crack plane, and has the same elastic material properties as the red mesh zone in the cylinder model. The crack face pressure loading is applied to the crack face elements in the light blue mesh region. The full-width crack mesh does not need to be very long, since the geometry factor is constant along the crack front for the infinitely long crack being modeled.

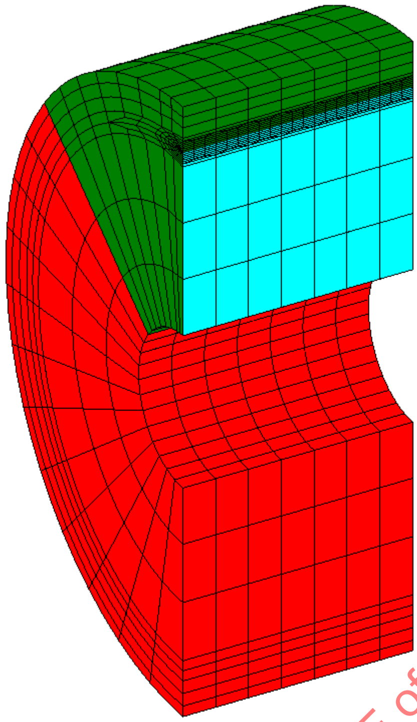
**Figure 3-1: Internal Full-Width Crack, Case 301, t/Ri=1, a/t=0.2**






An example of the deepest full-width crack in the thickest cylinder is shown in Figure 3-2.

**Figure 3-2: Thickest Cylinder, Full-Width Crack, Case 396, t/Ri=3, a/t=0.8**

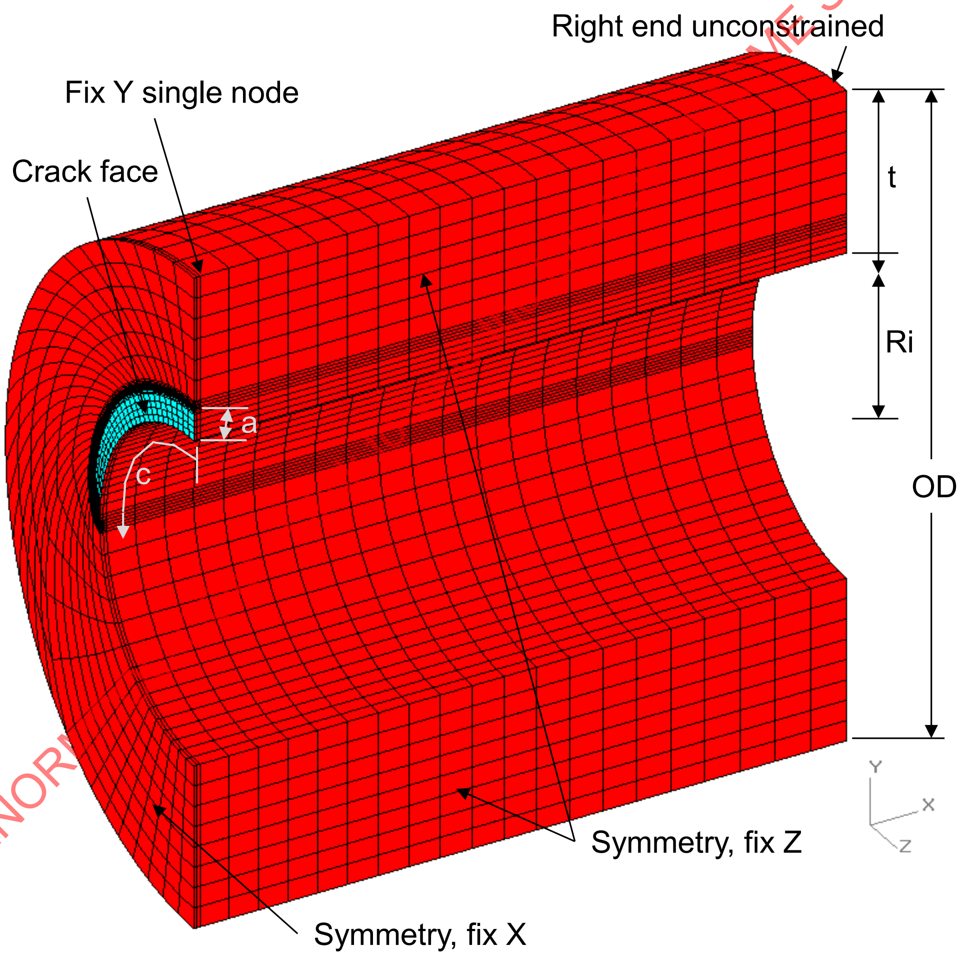


# 4 CIRCUMFERENTIAL INTERNAL SURFACE CRACKS

The combination of geometry ratios and four load cases gives 264 internal circumferential surface crack meshes. The model "Run ID" numbers are used to uniquely identify each case and are from 501 through 1060, with gaps for cases where the crack length is too long for the inside cylinder circumference (see Figure 1-4). The non-dimensional G polynomial coefficient results are listed in Table 3 in Appendix C.

The circumferential surface crack meshes are quarter symmetric models for the crack face pressure and in-plane bending load cases. Half symmetric models are needed for the out-of-plane bending load case. The quarter symmetric model constraints and dimensions are shown in Figure 4-1. The left end of the cylinder is the cross-section symmetry plane and has an X-constraint on the nodes outside the crack. The top and bottom mesh surfaces are on the axial symmetry plane and have a Z-constraint. The right end of the cylinder is unconstrained for the crack face pressure load cases. The bending load cases are shown below. A single node at the top of the cylinder has a Y-constraint. The crack face pressure loading is applied to the crack face elements in the light blue mesh region.

**Figure 4-1: Internal Circumferential Surface Crack, Case 533, t/Ri=1, a/c=0.125, a/t=0.2**






A deeper and longer circumferential crack is shown in Figure 4-2. A circumferential crack in the thickest cylinder is shown in Figure 4-3, and the same size cylinder and same size crack for the half-symmetric mesh for the out-of-plane bending load case is shown in Figure 4-4.

The combined loading for the in-plane bending about the z-axis plus the axial load in the x-direction is shown in Figure 4-5. The combined loading for the out-of-plane bending about the y-axis plus the axial load in the x-direction is shown in Figure 4-6 for the half symmetric mesh.

**Figure 4-2: Circumferential Surface Crack Case 797, t/Ri=2, a/c=0.5, a/t=0.6**

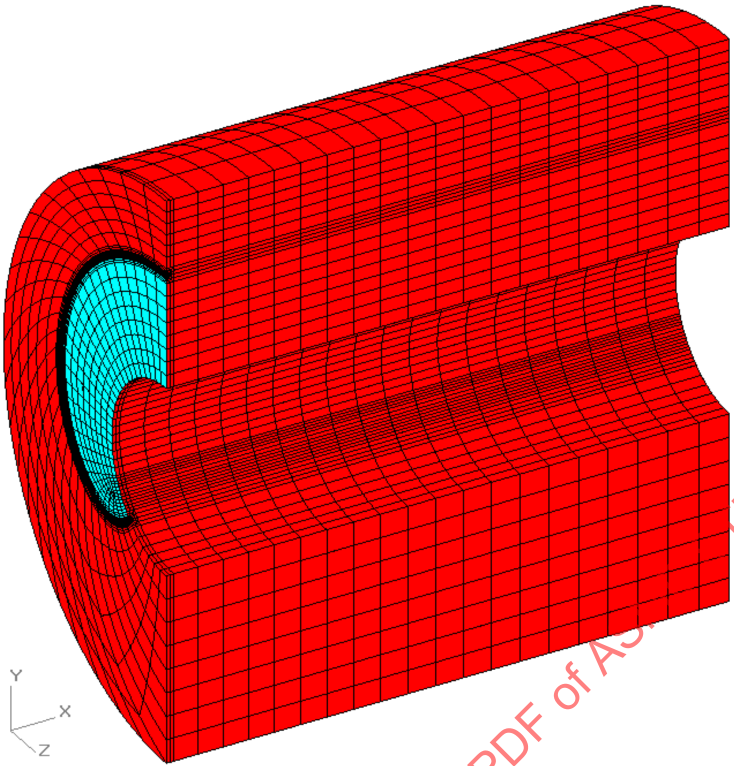



**Figure 4-3: Circumferential Surface Crack Case 1033, t/Ri=3, a/c=1.0, a/t=0.4, Thickest Cylinder**

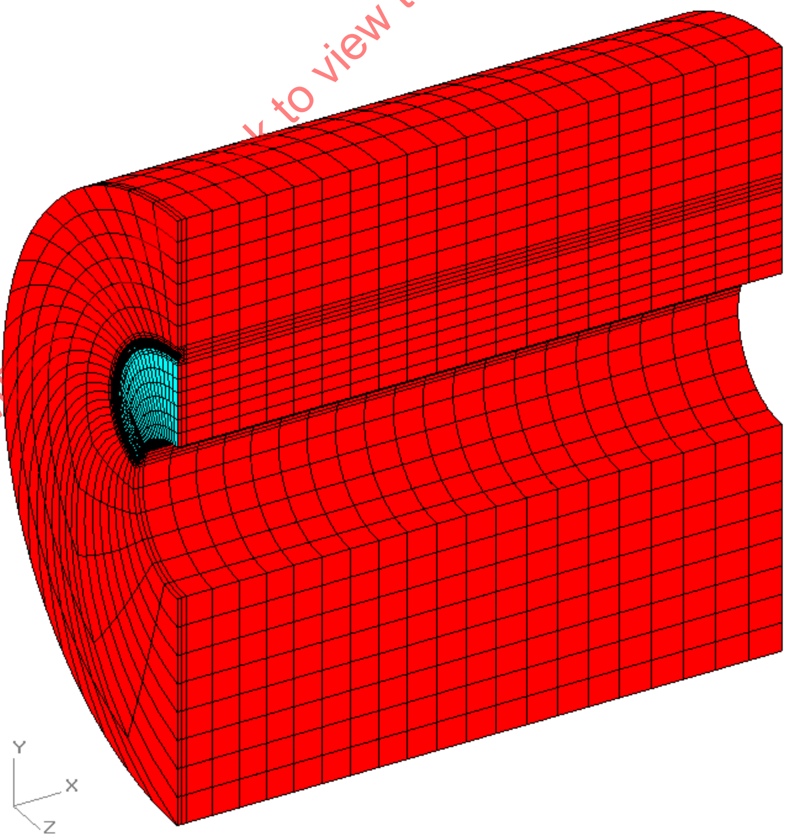


**Figure 4-4: Case 1036, t/Ri=3, a/c=1.0, a/t=0.4, Half Symmetric Mesh to Apply the Out-of-Plane Bending Load about the Y-Axis**

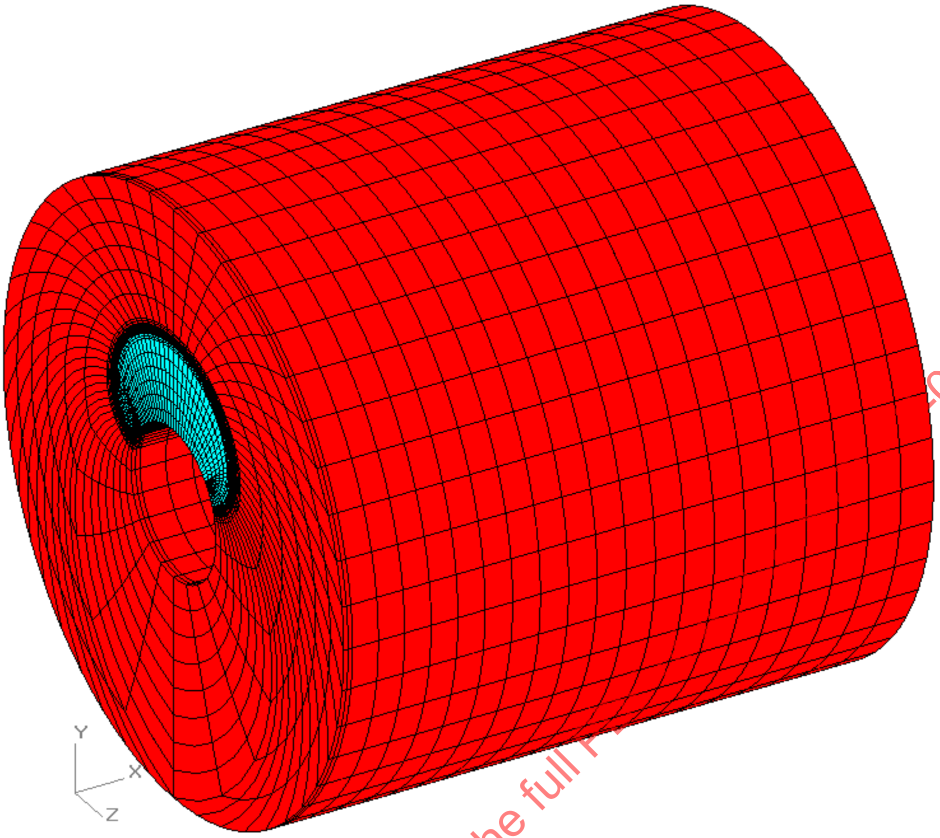



**Figure 4-5: Combined In-Plane Bending Plus Axial Load, Case 559, t/Ri=1, a/c=0.25, a/t=0.6**

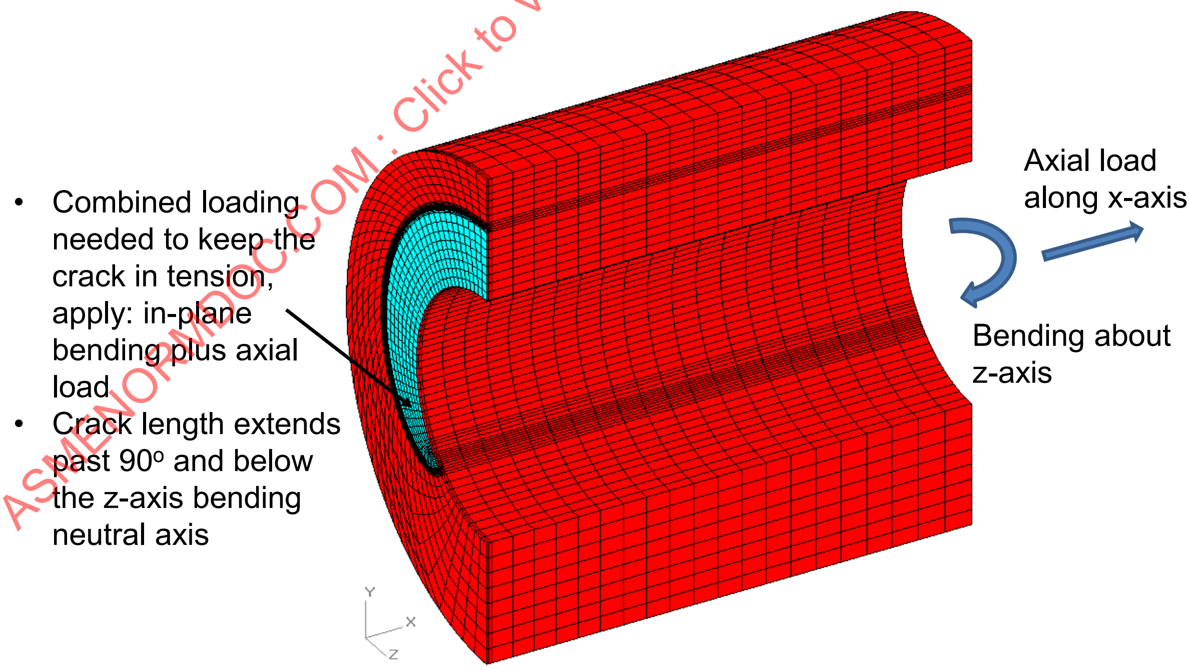
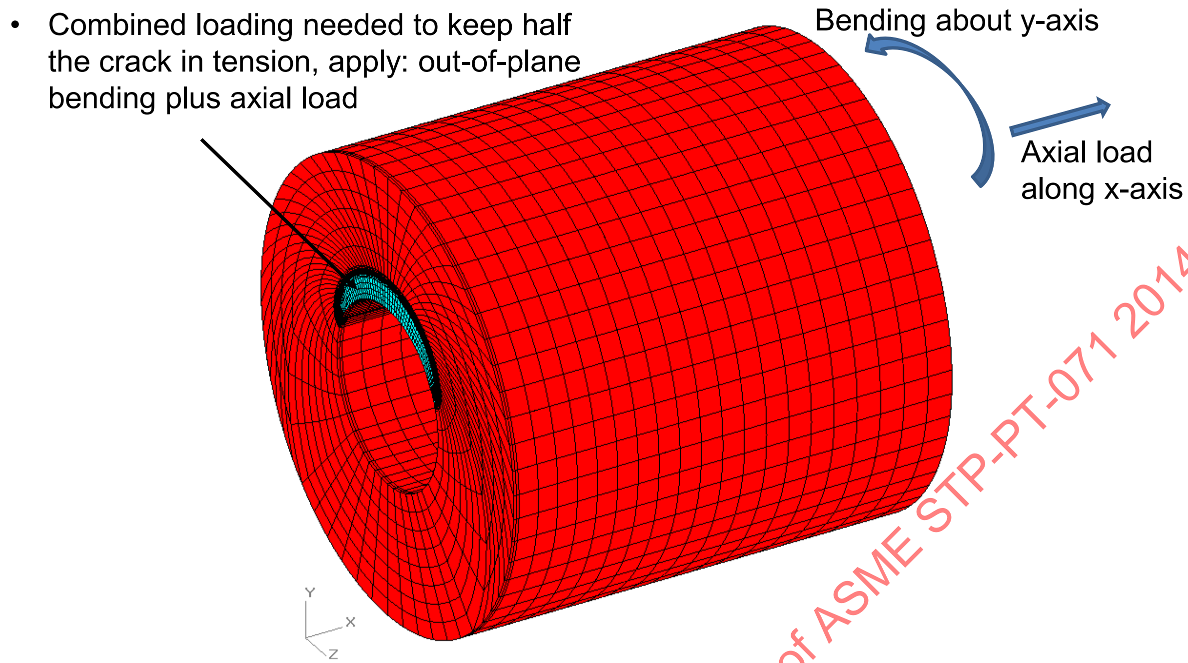


**Figure 4-6: Combined Out-of-Plane Bending Plus Axial Load, Case 664, t/Ri=1.5, a/c=0.25, a/t=0.2**

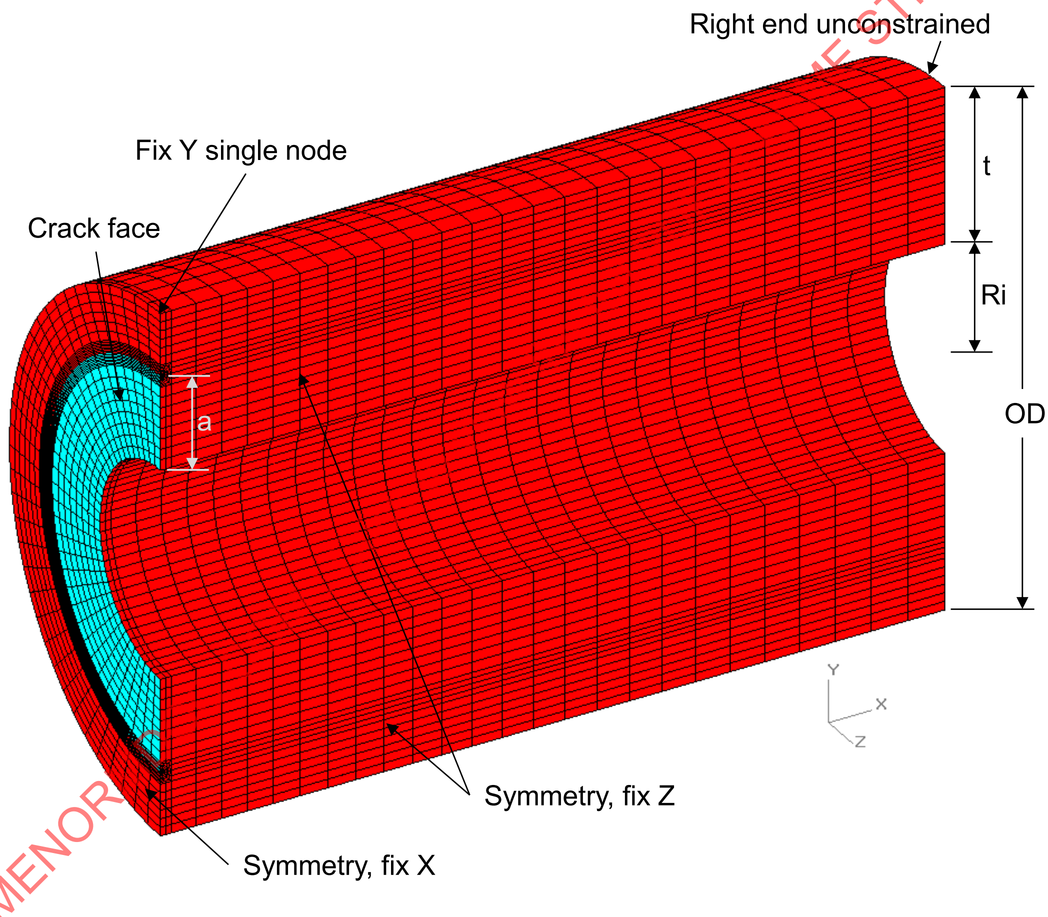


# 5 CIRCUMFERENTIAL INTERNAL 360$^{O}$ CRACKS

The combination of geometry ratios and five load cases gives 100 circumferential internal 360° crack meshes. The 360° crack meshes are intended to provide a bounding solution for the crack lengths that are longer than the internal cylinder circumference. The model “Run ID” numbers are used to uniquely identify each case, and are from 1101 through 1200. The non-dimensional G polynomial coefficient results are listed in Table 4 in Appendix D.

The circumferential internal 360° crack meshes are quarter symmetric models; the constraints and dimensions are shown in Figure 5-1. The left end of the cylinder is the cross-section symmetry plane and has an X-constraint on the nodes in the ligament region outside the crack. The top and bottom mesh surfaces are on the axial symmetry plane and have a Z-constraint. The right end of the cylinder is unconstrained. A single node at the top of the cylinder has a Y-constraint. The crack face pressure loading is applied to the crack face elements in the light blue mesh region on the left end of the cylinder.

**Figure 5-1: Internal Circumferential 360° Crack, Case 1131, t/Ri=1.5, a/t=0.6**




An example of the shallow crack mesh is shown in Figure 5-2. An example of the thickest cylinder with a deep 360° crack is shown in Figure 5-3.

**Figure 5-2: 360° Crack, Case 1101, t/Ri=1, a/t=0.2, Shallow Crack Example**

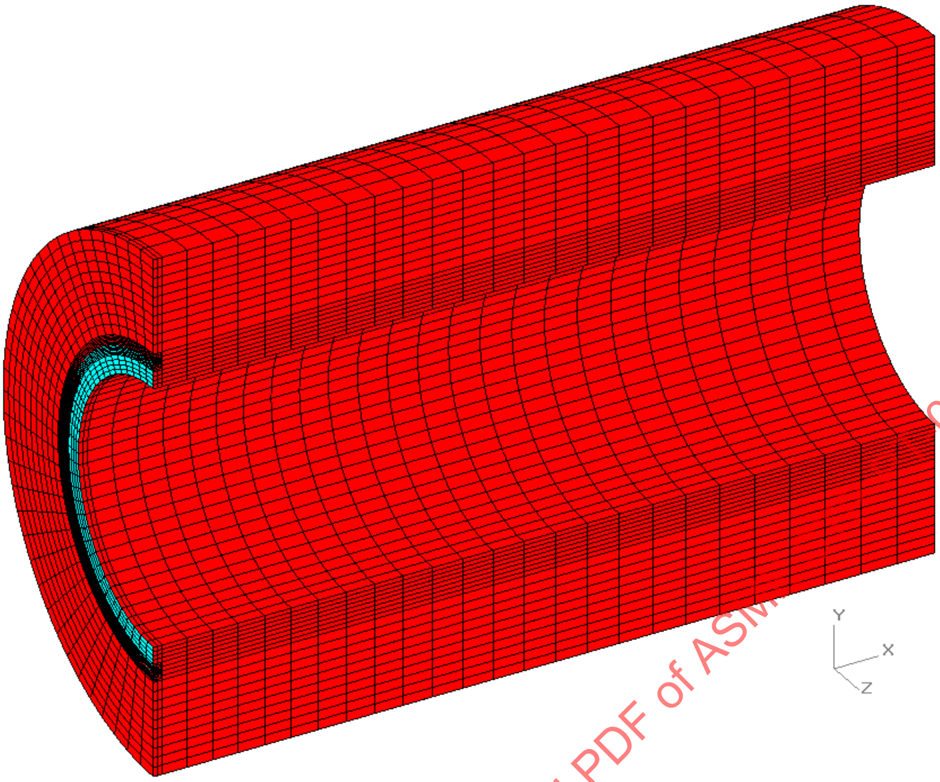
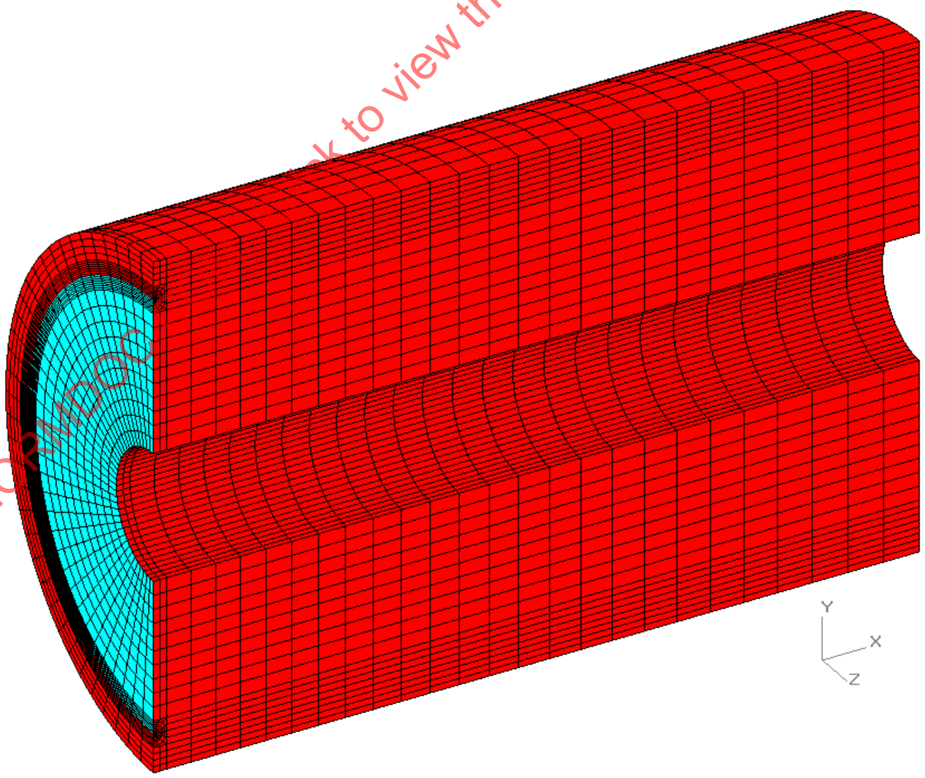


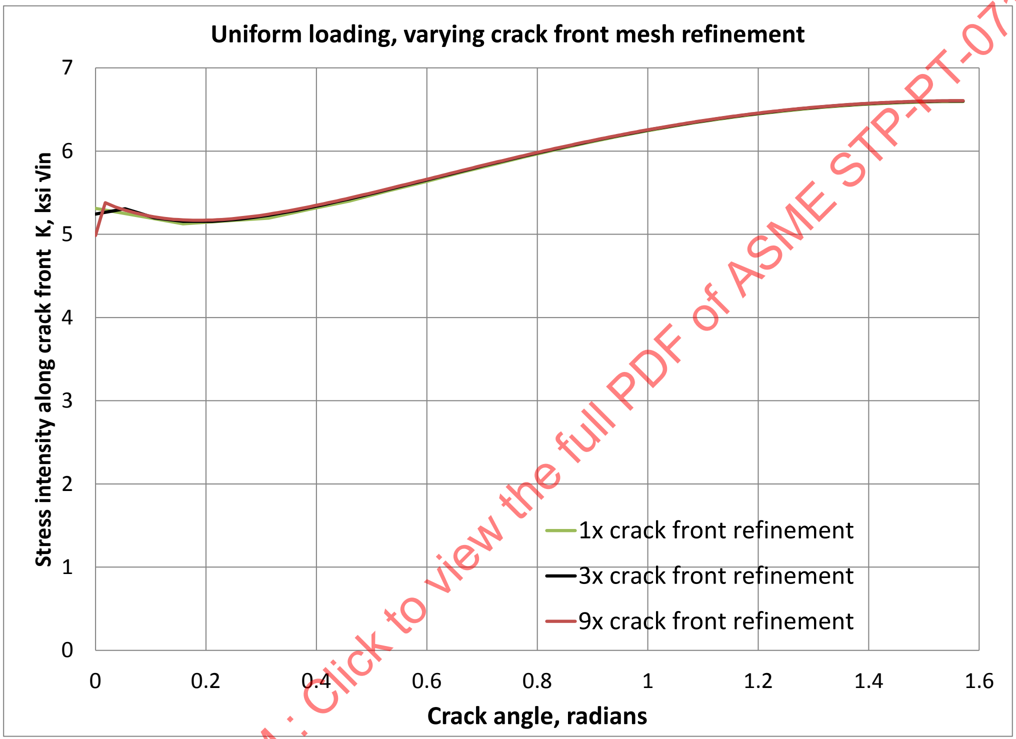

**Figure 5-3: 360° Crack, Case 1196, t/Ri=3, a/t=0.8, Thickest Cylinder**



## 6 MESH REFINEMENT STUDY

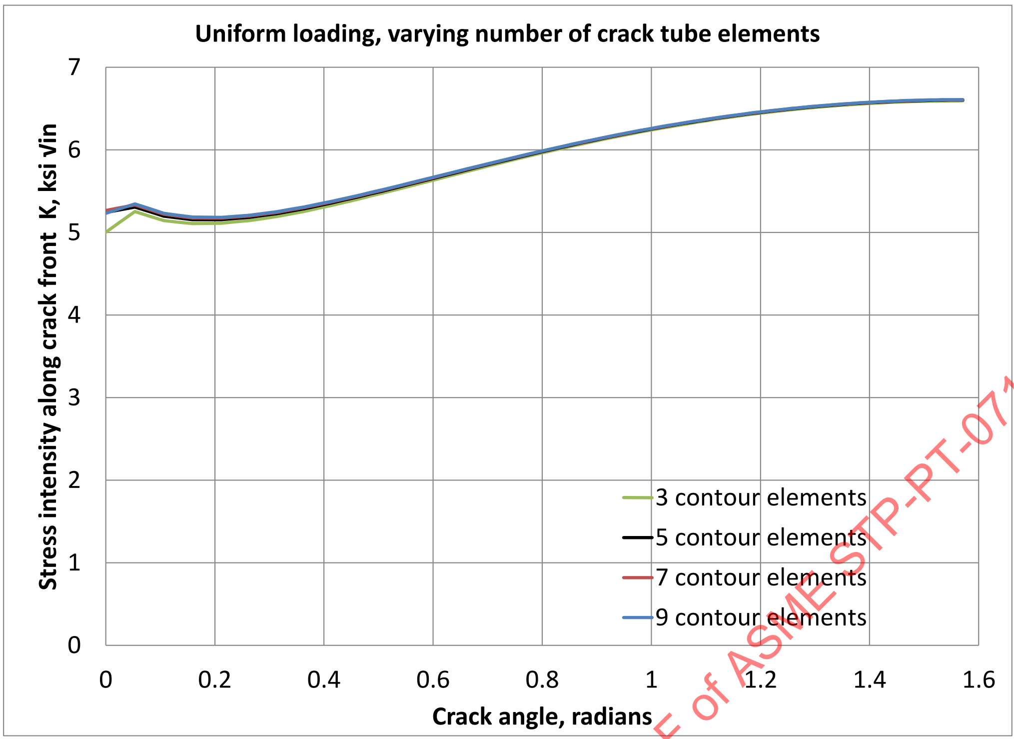
Several aspects of the crack mesh refinement were examined to confirm that sufficient mesh refinement was used for the crack models in this analysis. The number of elements along the crack front was varied from the default 1x crack front refinement to 3x refinement (three times as many crack front elements) and to 9x refinement (nine times as many crack front elements). The plot in Figure 6-1 shows that there is good agreement along most of the crack front, with some difference at the crack tip node. Free surface effects are expected at the crack tip node, so the observed difference in the K results in this comparison is expected. Omitting the crack tip node from the non-dimensional geometry factor results curve-fit is discussed in the Results section below. The 3x crack front refinement level was used for this analysis.

**Figure 6-1: Compare Crack Front Mesh Refinement**




The number of elements in the contours around the crack front was varied from three to nine. The number of mesh contours sets the number of J-integral contours used to compute J and subsequently K along the crack front. The plot in Figure 6-2 shows overall good agreement, except near the crack tip for the lower refinement with three contours. Five element contours were used in this analysis.

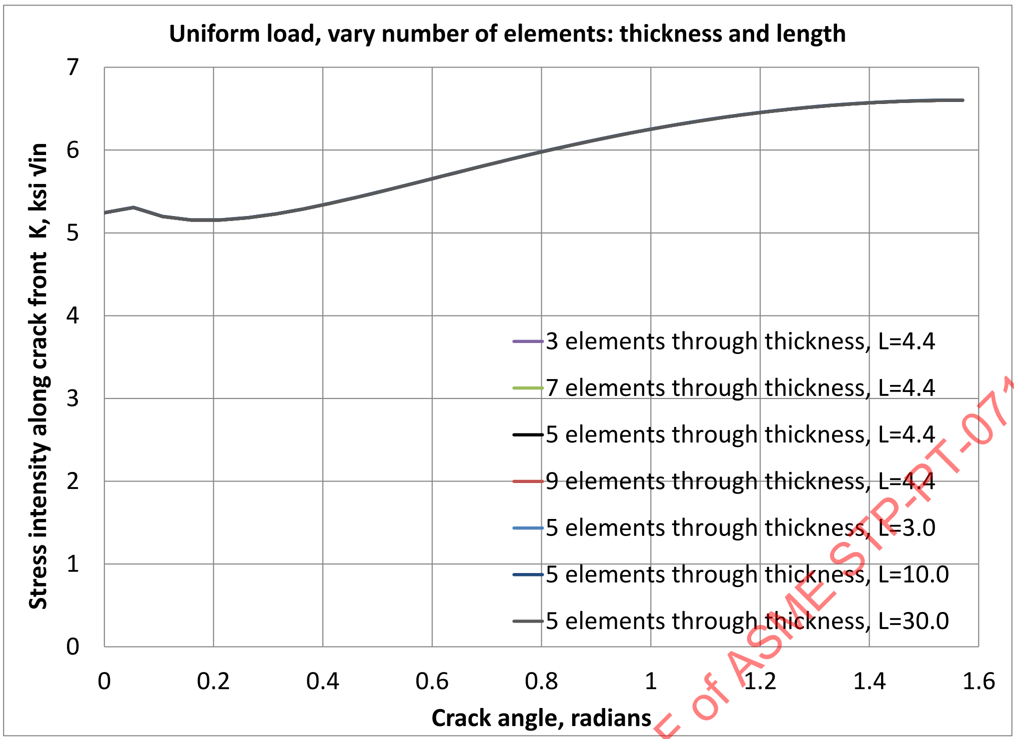
**Figure 6-2: Compare the Number of Contours around the Crack Front**




The number of elements through the remaining ligament in the thickness past the crack depth was varied from three to eight elements. The plot in Figure 6-3 shows no difference in the K results. The number of elements in the ligament for each analysis varies depending on the crack depth.

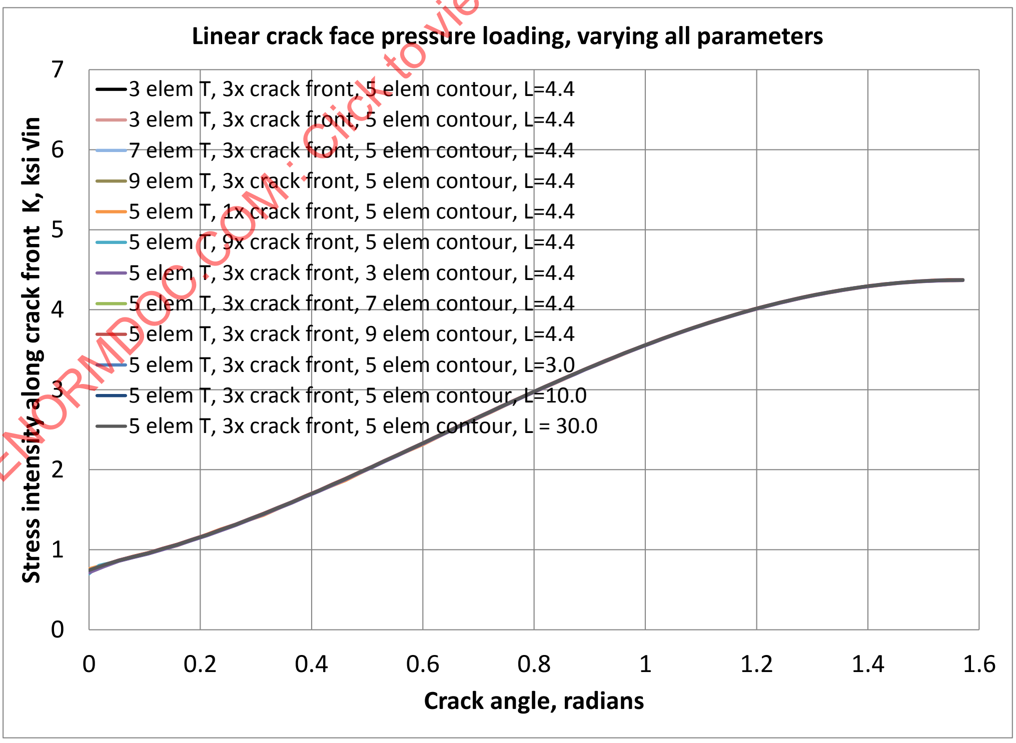
The additional length of the cylinder past the end of the crack tip was varied from three to 30 inches as a multiple of the cylinder OD, and again no difference in the K results was observed. The additional cylinder length past the axial crack length used for this analysis was 2*OD.

**Figure 6-3: Compare the Number of Elements through the Thickness and the Cylinder Length**




A combination of mesh refinement settings were used to compare the K results for the linear crack face pressure load case. No difference in the K results was observed from the plot in Figure 6-4, indicating that sufficient mesh refinement is available to compute accurate crack front J values.

**Figure 6-4: Compare Mesh Refinement for the Linear Crack Face Pressure Load Case**




The longest axial crack length was also used to compare the crack front refinement for case 175, t/Ri=2.5, a/c=0.03125, a/t=0.8. The analysis mesh has 285,865 nodes with 1,099 crack front nodes. The coarser comparison mesh has 135,146 nodes with 201 crack front nodes, and does not include the

3-to-1 crack front mesh transition option. The plot in Figure 6-5 shows good agreement in the K results along the crack front, indicating that the more refined crack mesh is sufficient for the analysis. Figure 6-6 shows the coarser comparison axial crack mesh picture.

**Figure 6-5: Longest Axial Crack Mesh Comparison**

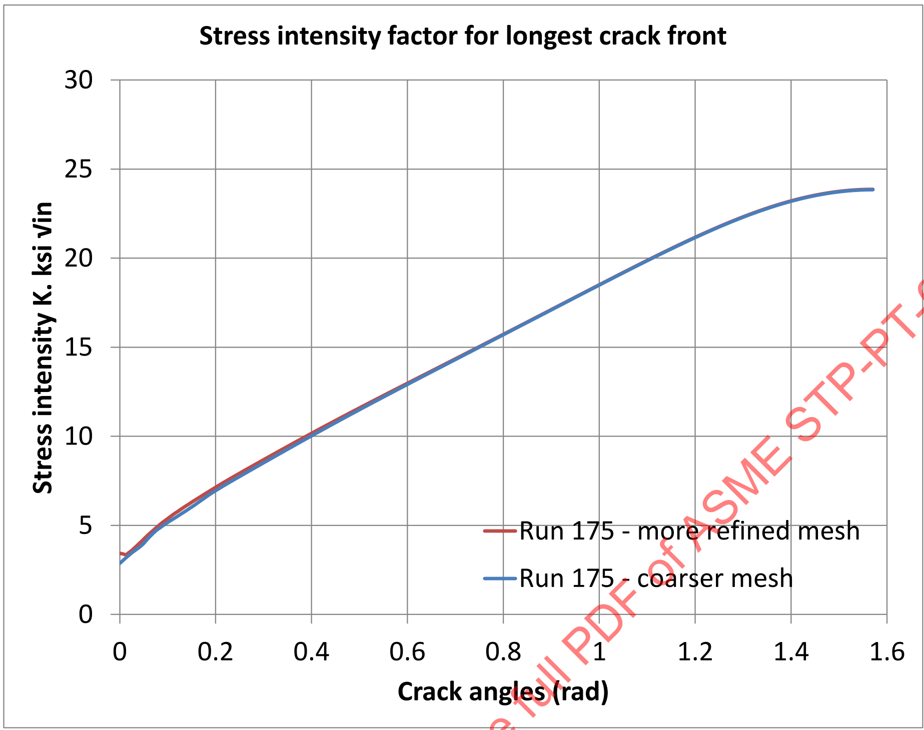
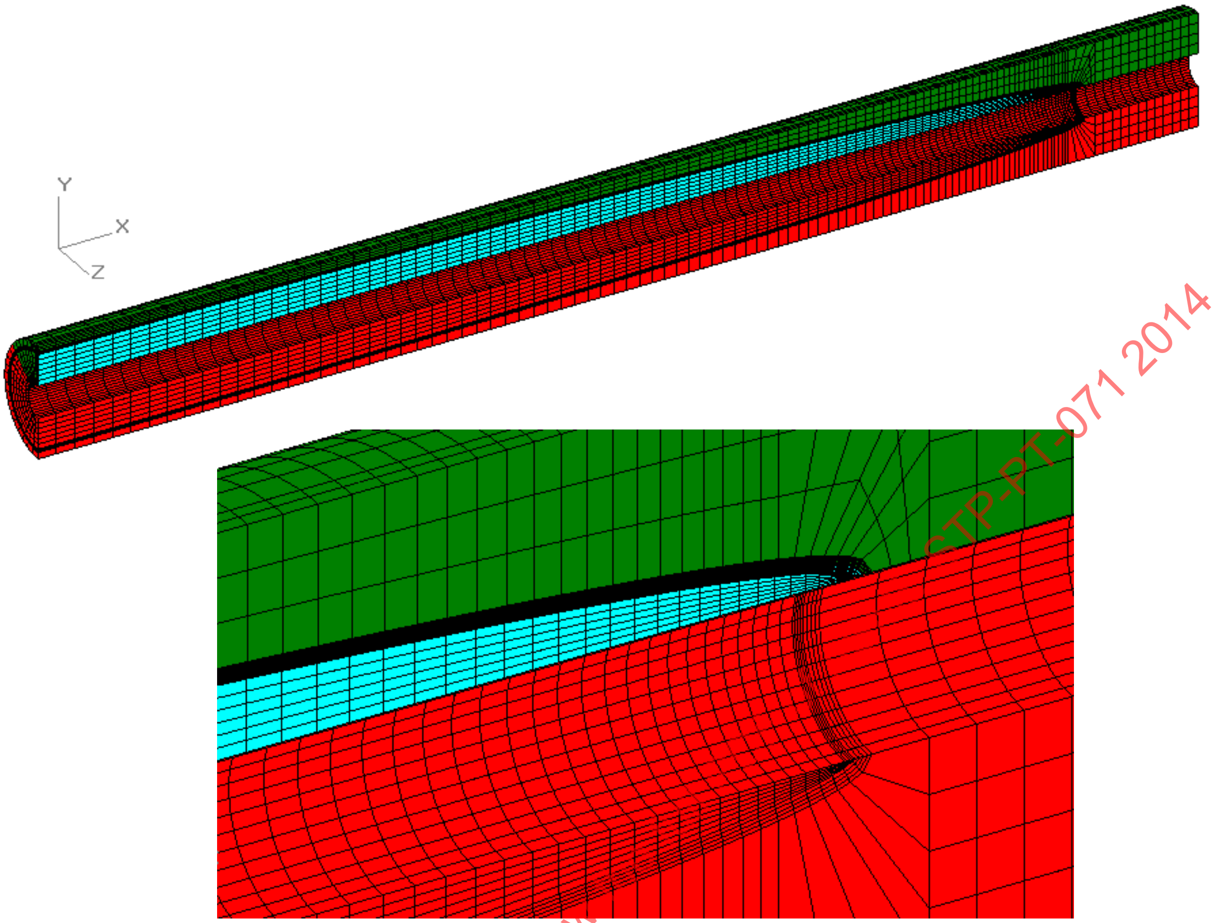


**Figure 6-6:  Comparison Coarser Mesh for the Longest Axial Internal Crack, Case 175**




The mesh refinement results indicate that sufficient crack and cylinder mesh refinement was used in this analysis to obtain accurate crack front J-integral and stress intensity K results.

# 7 RESULTS AND DISCUSSION

The crack front stress intensity results are reported as a sixth order polynomial curve-fit to the non-dimensional G trend along the crack front for the internal surface cracks. The axial full-width and circumferential 360° cracks have a constant G value along the crack front, so a single value is reported. The results values are tabulated in appendices A through D.

Since the crack tip node (at ϕ=0) J-integral value can be inconsistent due to stress triaxiality at the free surface as compared to the overall crack front trend, the crack tip node is omitted from the polynomial curve-fit. This allows the overall curve-fit along the crack front of the non-dimensional geometry factor to extrapolate the solution to the crack tip location.

An example of the internal axial surface crack results plot of the non-dimensional G value versus the normalized crack front angle is shown in Figure 7-1; results from axial surface crack cases 1 to 8 are shown. The plot x-axis uses the normalized crack front angle $2\phi/\pi$ along the crack front from 0 at the crack tip to 1 at the crack depth location. The solid curves are for the uniform crack face pressure $G_0$ load cases, and the dashed curves are for the linear crack face pressure $G_1$ load cases.

Examples of the internal circumferential surface crack results plots are shown in Figure 7-2 (crack face pressure loads) and Figure 7-3 (bending loads) for cases 565 to 580.

Results plots for all the analysis cases are shown in the appendices.

**Figure 7-1: Results Plot Example of the Non-Dimensional G Results versus the Normalized Crack Front Angle for the Internal Axial Surface Crack**

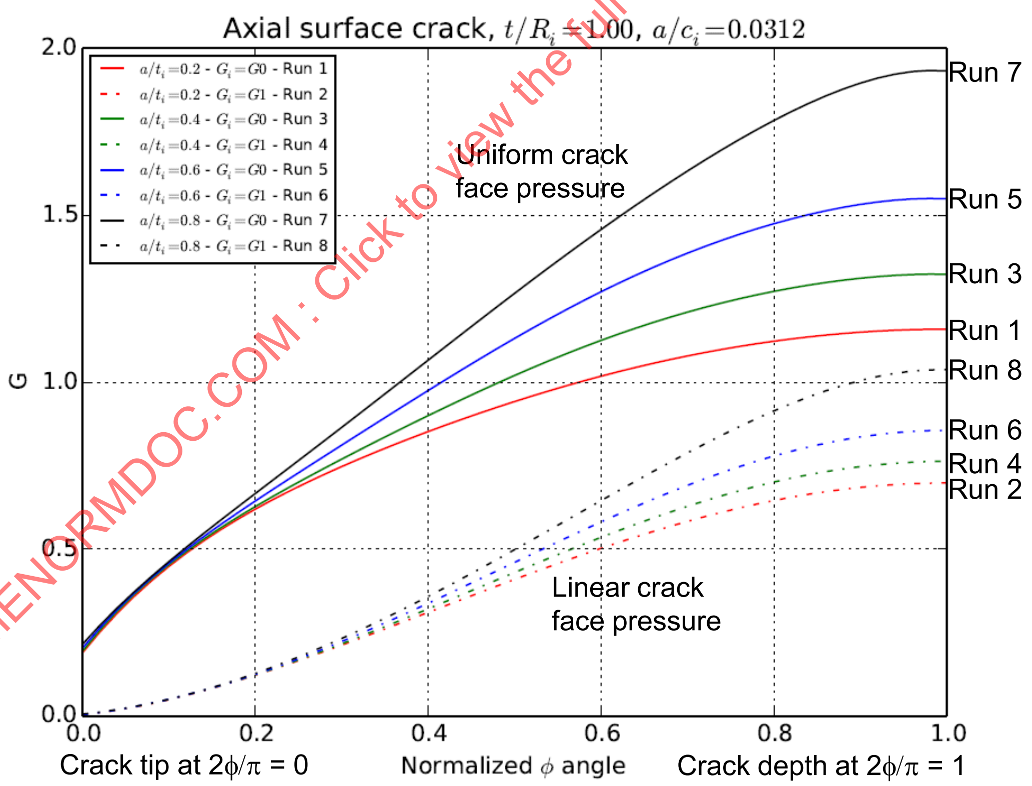


**Figure 7-2: Results Plot Example for the Internal Circumferential Surface Crack, Uniform and Linear Crack Face Pressure Load Cases**

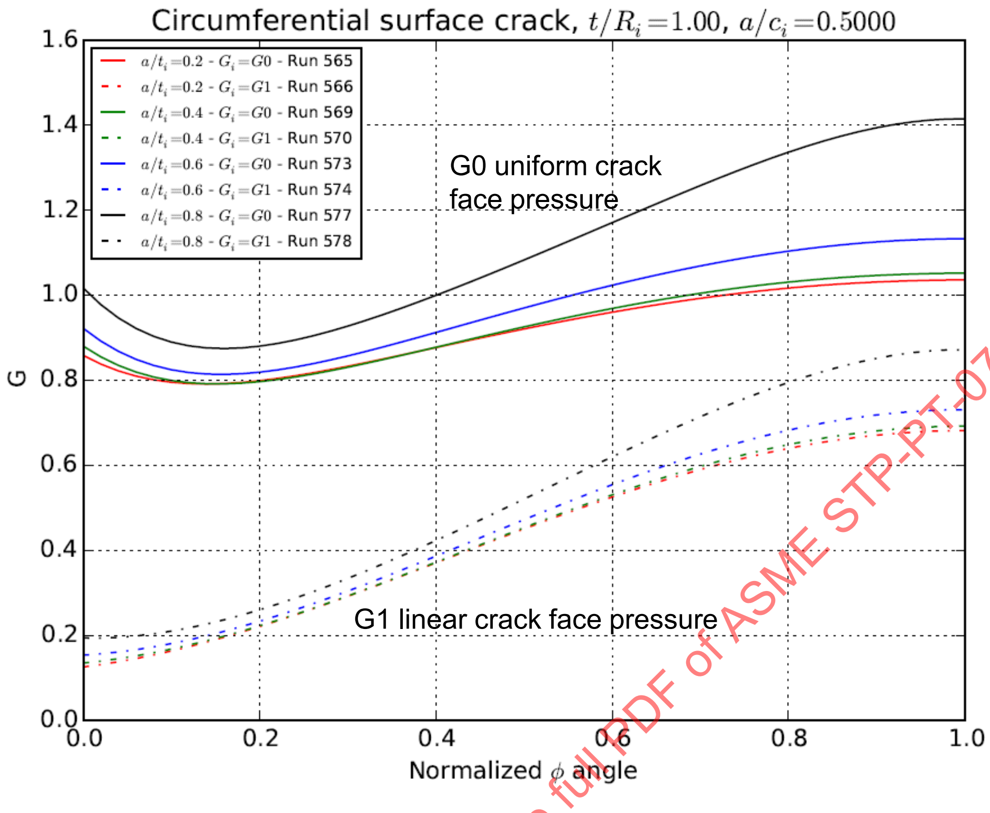
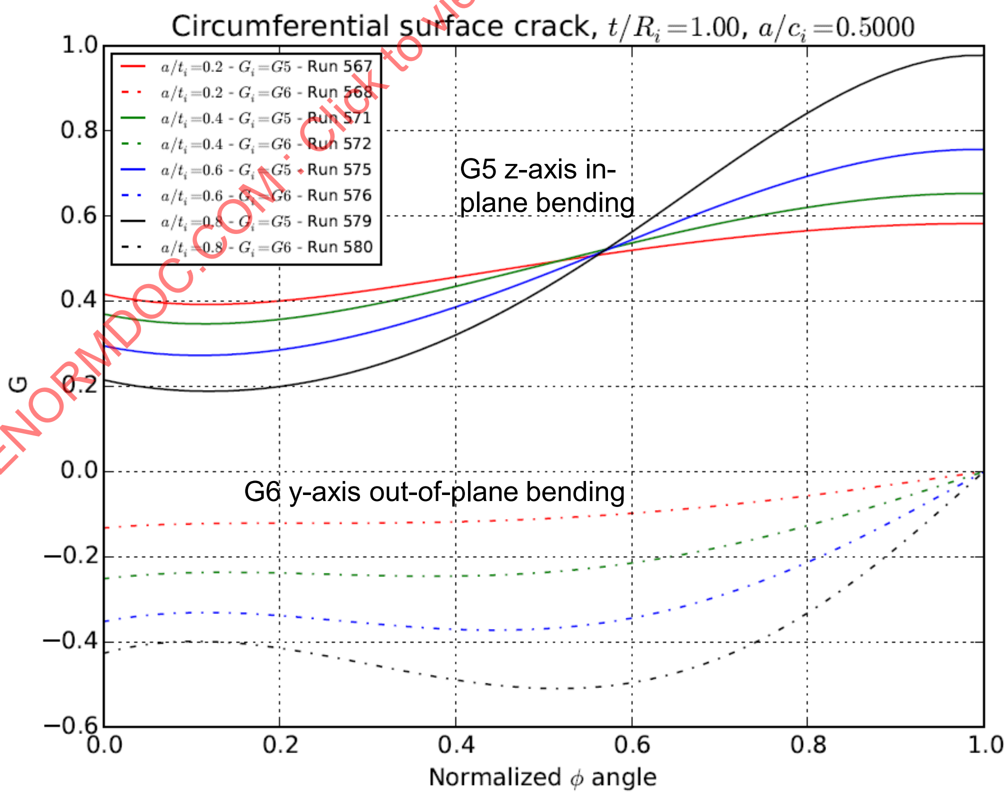



**Figure 7-3: Results Plot Example for the Internal Circumferential Surface Crack, In-Plane and Out-of-Plane Bending Load Cases**



## 7.1 Combined Load Post Processing

The non-dimensional geometry G factor solutions for the bending load cases were obtained by subtracting the uniform load results from the combined bending plus axial load results. Subtracting the uniform load result curve from the combined result curve is done by subtracting a set of points along each curve at the same crack front angle locations. Then a new polynomial curve is fit to the bending only result curve to report the bending only $G_5$ and $G_6$ coefficient values.

Figure 7-4 shows an example for the in-plane bending $G_5$ result. The combined loading is the higher $G_{total}$ values in the plot, and when the uniform $G_0$ result curve is subtracted, the bending only $G_5$ result curve is the lower value along the bottom of the plot.

Figure 7-5 shows an example for the out-of-plane bending $G_6$ result. Just half of the crack front is used in the range from $2\phi/\pi=0$ (left crack tip) to $2\phi/\pi=1$ (crack depth) even though the half symmetric model crack front extends to $2\phi/\pi=2$ at the right side crack tip so that the same sixth order polynomial can be used to report the crack front results. The combined loading G results are the higher values, and when the uniform $G_0$ results are subtracted the out-of-plane bending $G_6$ results are negative along the first half of the crack front (crack closure on half of the crack) going to zero at the crack depth location, which is on the bending neutral axis for the out-of-plane bending load case. The other half of the crack front trend in the $2\phi/\pi=1$ to $2\phi/\pi=2$ range is anti-symmetric for the out-of-plane bending load case and can be obtained by changing the sign of the G results.

**Figure 7-4: Subtract G Result Curves to get In-Plane Bending only Result: G5 = Gtotal – G0**

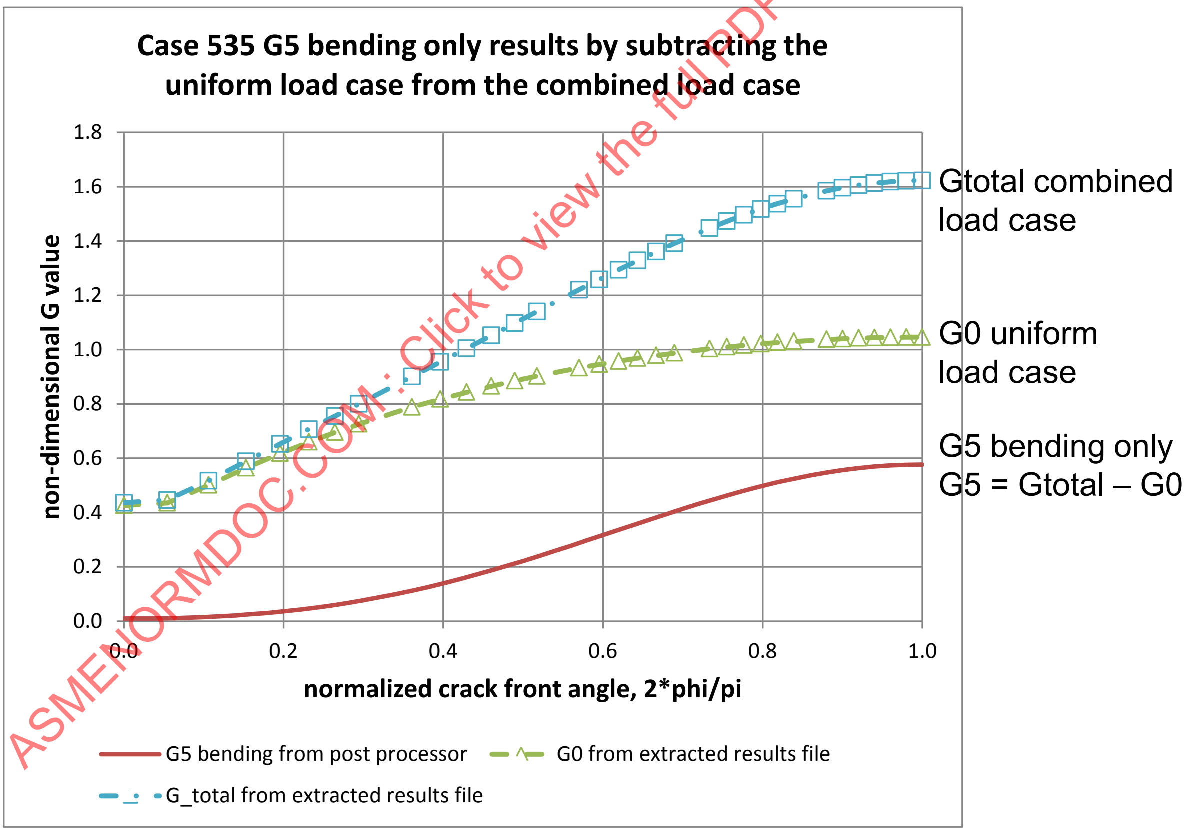
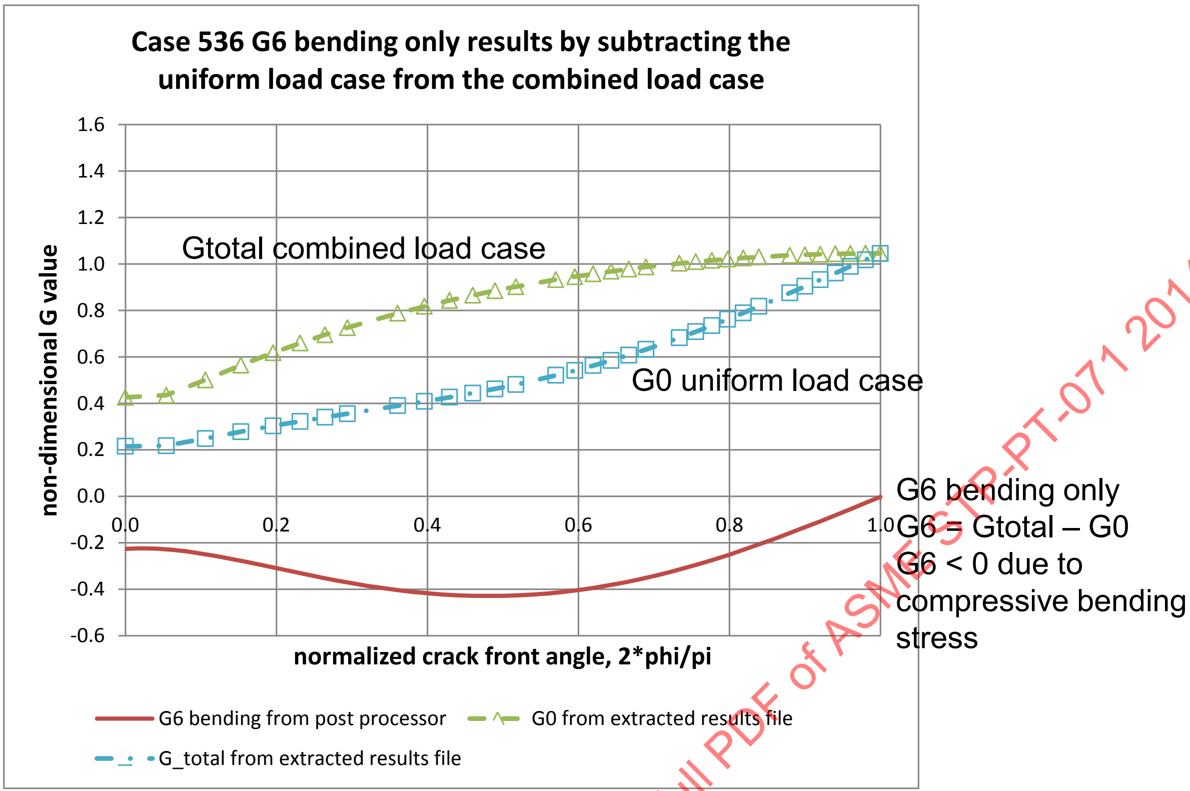


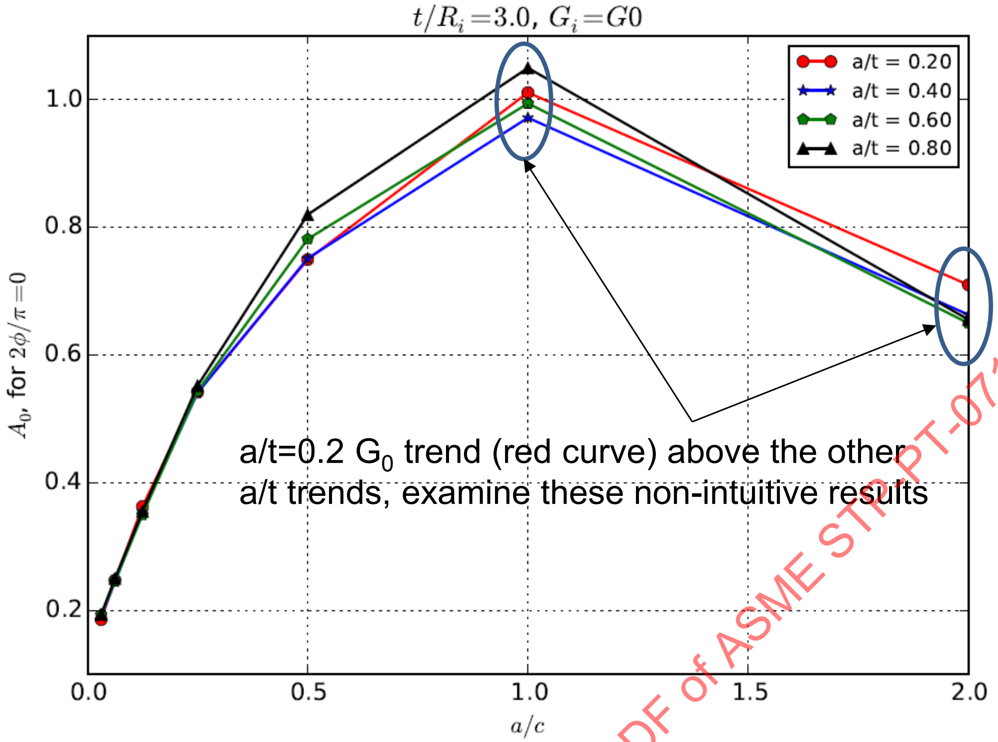
**Figure 7-5: Subtract G Result Curves to get Out-of-Plane Bending only Result: G6 = Gtotal – G0**




## 7.2 Examination of Non-Intuitive Result Trends

The trend plots for the non-dimensional G results were created to check that the computed results followed expected trends as the cylinder and crack dimensions changed. For the thicker cylinder cases some result trends were non-intuitive, such as the internal axial surface cracks for t/Ri = 3, a/c = 1 and 2 (shorter cracks), uniform crack face pressure $G_0$ load case. In Figure 7-6 the a/t = 0.2 shallow crack $G_0$ trend (red curve) is above the other a/t trends for the shorter a/c ratios. Further examination of the G and K results explains this non-intuitive result trend.

**Figure 7-6: Examine the a/t = 0.2 G0 Non-Intuitive Result Trend**



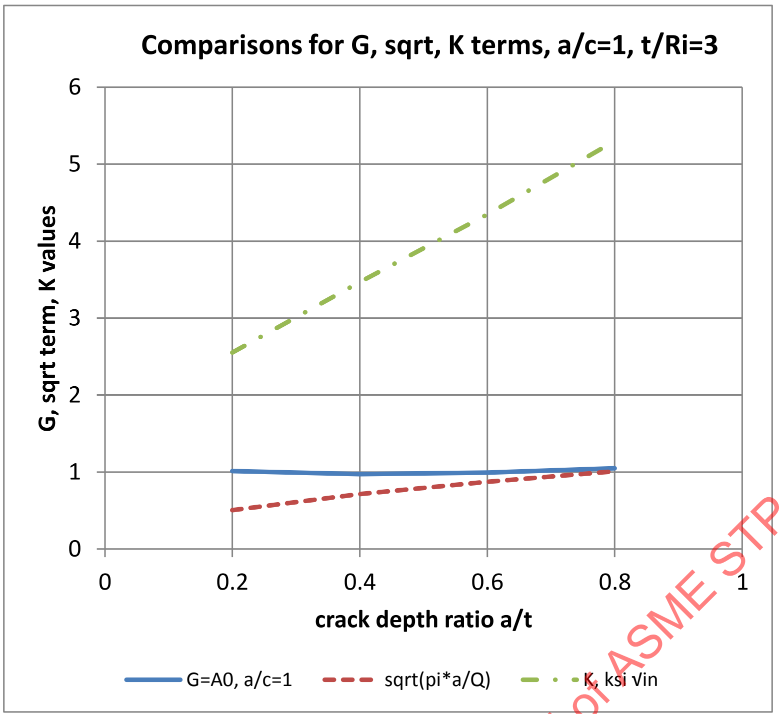

The non-dimensional geometry value, G, is computed using the stress intensity K values from the FEA results, the given crack size, and characteristic loading using the general K equation:

$$K = G\sigma\sqrt{\pi a/Q} \tag{5}$$

where K is the stress intensity computed by FEA, σ is the applied characteristic loading (for example, a crack face pressure distribution or bending stress), a is the crack depth, and Q is the shape factor, which is also a function of the crack depth and the crack length. Notice that in the K equation the square root term also varies with the crack size, which can affect the trend of the G values.

The plot in Figure 7-7 compares the non-dimensional G and square root terms for the four a/t ratios and the a/c = 1 crack length ratio. Notice that for this set of models the G value is nearly constant (solid blue curve), and the square root term varies more noticeably with the a/t ratio (dashed red curve). Using the G results, the stress intensity K is computed and shows the expected increase in K as the crack depth increases (dot-dash green curve). The stress value σ = 5 ksi was used to compute the K trend (any load value could be used).

**Figure 7-7: Compare the Terms in the K Equation for a/c = 1**




The a/c = 2 (shortest crack) G trend is shown in Figure 7-8, and again the square root term varies more than the G term. The K value computed from the G results shows the expected increase in K as the crack depth increases.

For further comparison, the $G_0$ result trends shown in Figure 7-9 for t/Ri = 1 give the more commonly expected ordering of the a/t result curves that G increases as the crack depth increases. Figure 7-10 shows that the G and square root term values vary in a similar manner as the crack depth gets deeper, and again the K value increases as expected as the crack depth increases.

If the square root term in the K equation varies more than the G value, then the non-dimensional G results can give a non-intuitive trend. If the G and square root terms in the K equation vary in a similar magnitude, then the G results give the expected increasing trends. The G result trends should be considered as part of the total stress intensity K solution using the K equation with the other terms to compute K for a given crack size.

**Figure 7-8: Compare the Terms in the K Equation for a/c = 2**

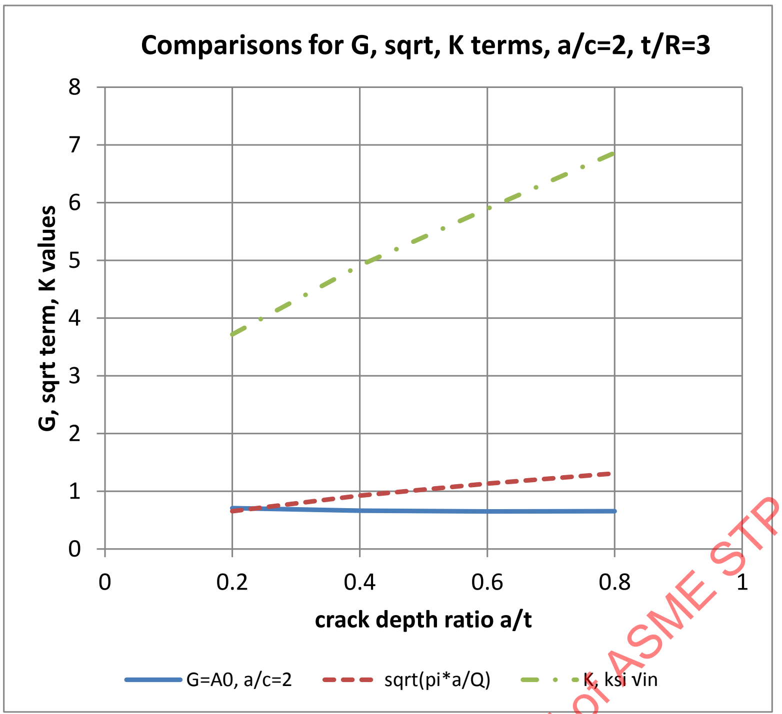



**Figure 7-9: A More Typical G0 Result Trend**

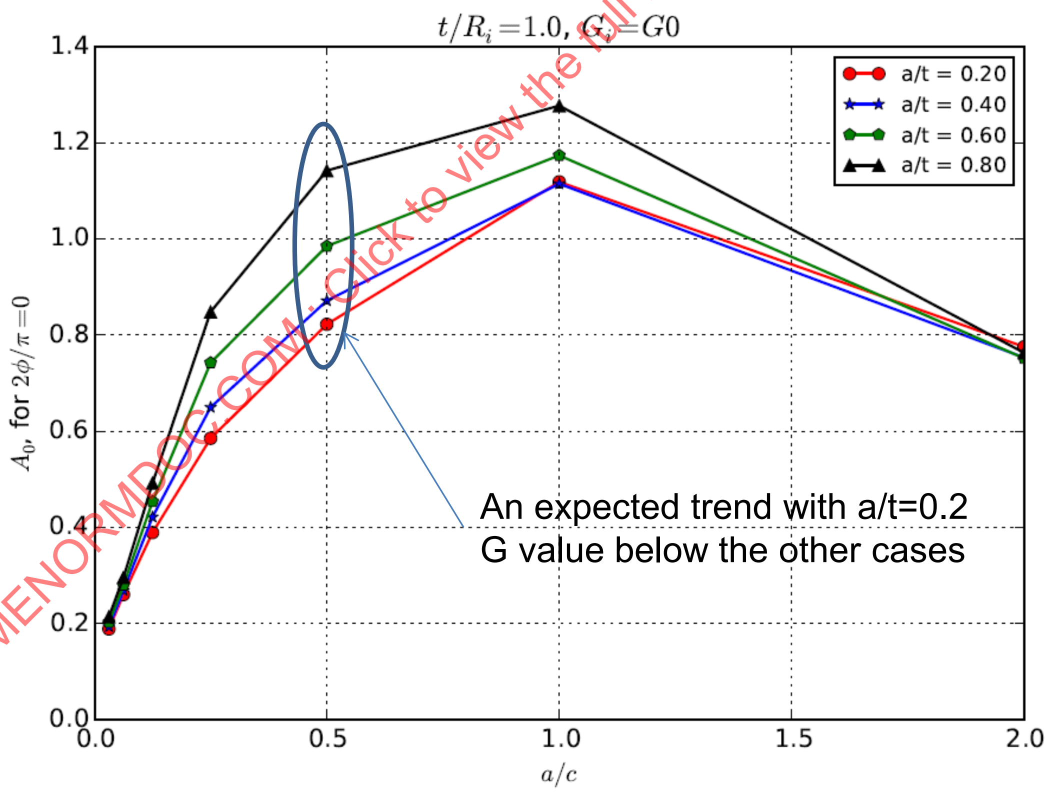
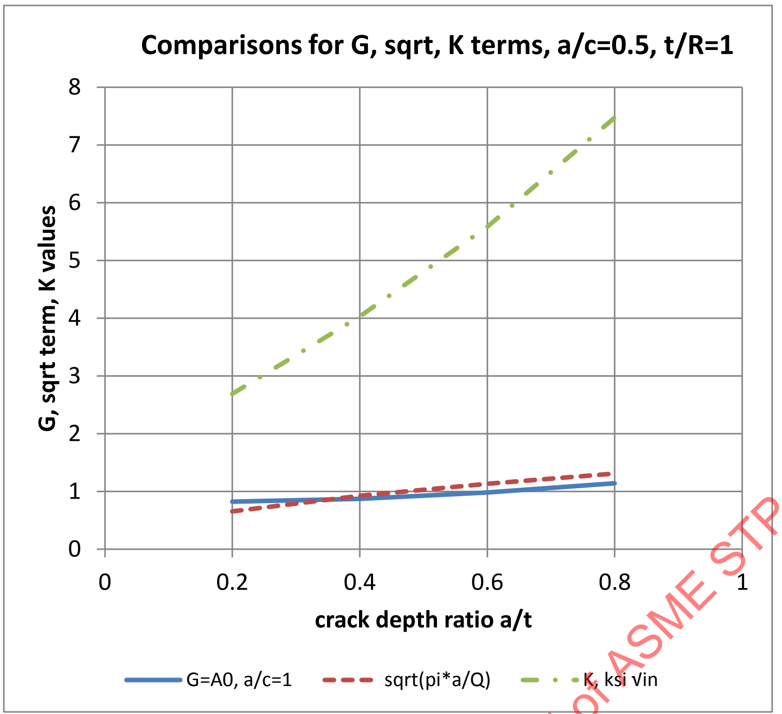
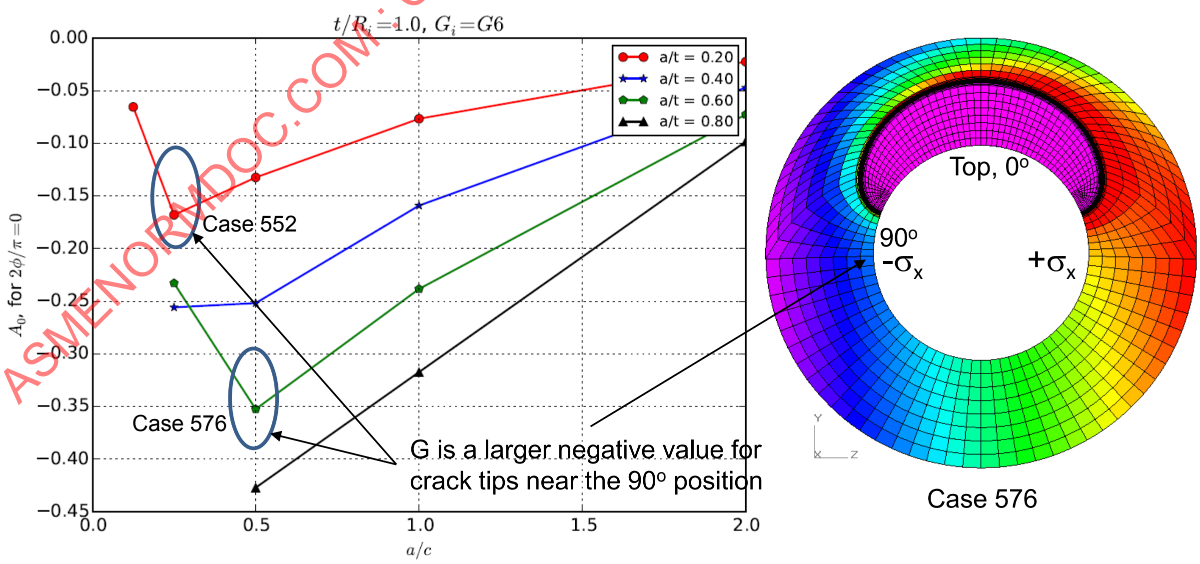


**Figure 7-10: Terms in the K Equation for t/Ri = 1**




Another non-intuitive result is found in the out-of-plane bending $G_6$ results where the G value at the crack tip drops (is more negative) and then rises again as the a/c ratio increases along the plot x-axis. Figure 7-11 shows the G result trend for case 552 and case 576. The G value decreases when the crack length puts the crack tip near the 90° position around the side of cylinder circumference from the top of the cylinder. At the 90° location the axial stress due to the out-of-plane bending has the largest magnitude, so the negative magnitude of the G result is larger (more negative) at the crack tip and causes the drop in the G result trend versus the a/c ratio. The other a/c ratios give a shorter or longer crack length with the crack tip farther away from the 90° location on the side of the cylinder.

**Figure 7-11: Crack Tip $G_6$ Result Trends for the Out-of-Plane Bending Load Case**



## 7.3 K From Displacement

The crack front stress intensity K is computed from the J-integral ("K from J") for all the cases in this report. Another check on the results and post processing is to use the independent calculation of K from the crack face opening displacement ("K from displacement"). The mode 1 crack opening K from displacement is computed using the equation:

$$K_I = 0.25E\,\frac{U_{\text{total}}}{2}\left(\frac{2\pi}{R}\right)^2 \qquad (6)$$

where $K_I$ is the mode 1 crack opening stress intensity due to the $U_{total}$ crack face opening displacement between the crack faces at radial distance R from the crack front. Crack opening displacement equations are available for mode II and mode III, but are not needed, since the results are for mode I crack opening. Since the crack front node is at distance R = 0, it would cause a division by zero and cannot be used directly. Instead, crack face nodes away from the crack front along a radial mesh line are used to obtain a trend of stress intensity versus distance that is extrapolated back to the crack front.

As an example, Figure 7-12 and Figure 7-13 show plots comparing K from the crack opening displacement to K from the J-integral for eight axial internal surface crack cases. The data points show the K from J values, and the solid curves show the K from displacement values. The close agreement in K values provides another indication that the crack mesh refinement is adequate to compute accurate K results. In Figure 7-13 there is a small difference in the K values at the crack tip, which often occurs in the K from J value at the crack tip node and is not unexpected.

**Figure 7-12: K from Displacement Comparison to K from J for Axial Internal Surface Crack Cases 1, 3, 5, 7, Uniform Crack Face Pressure G0 Load Case**

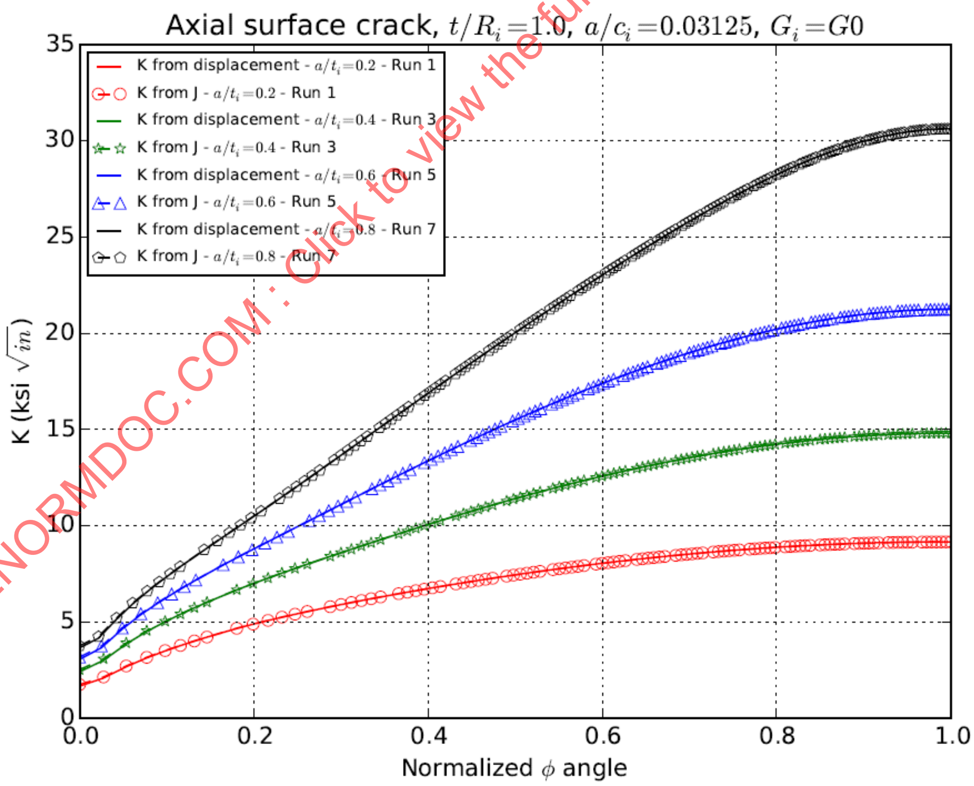
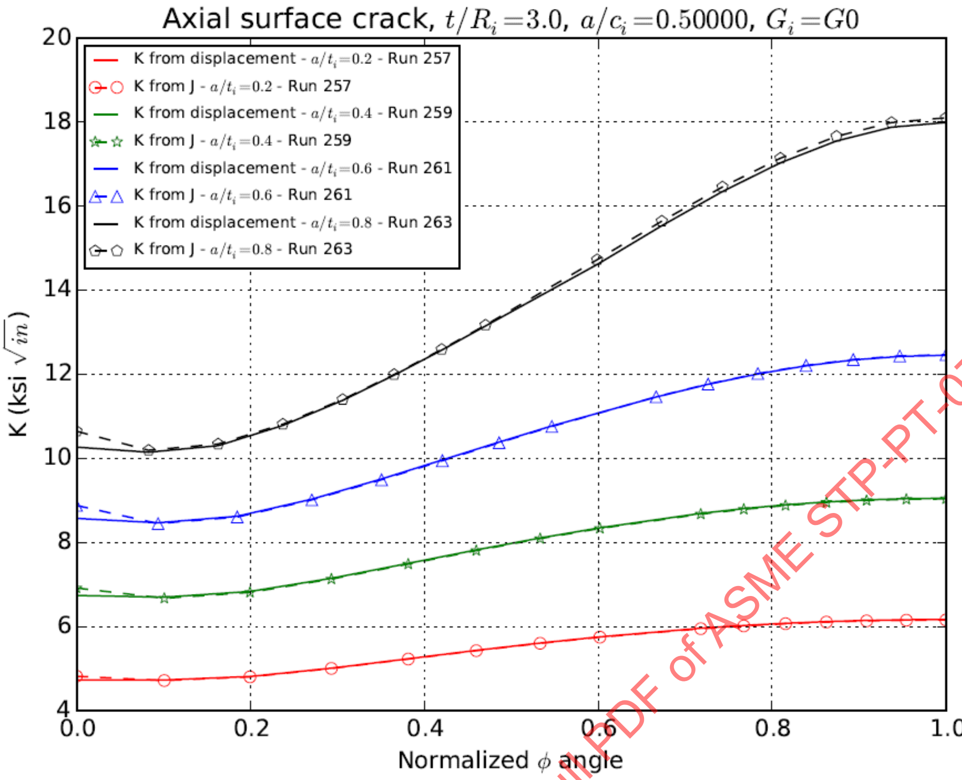


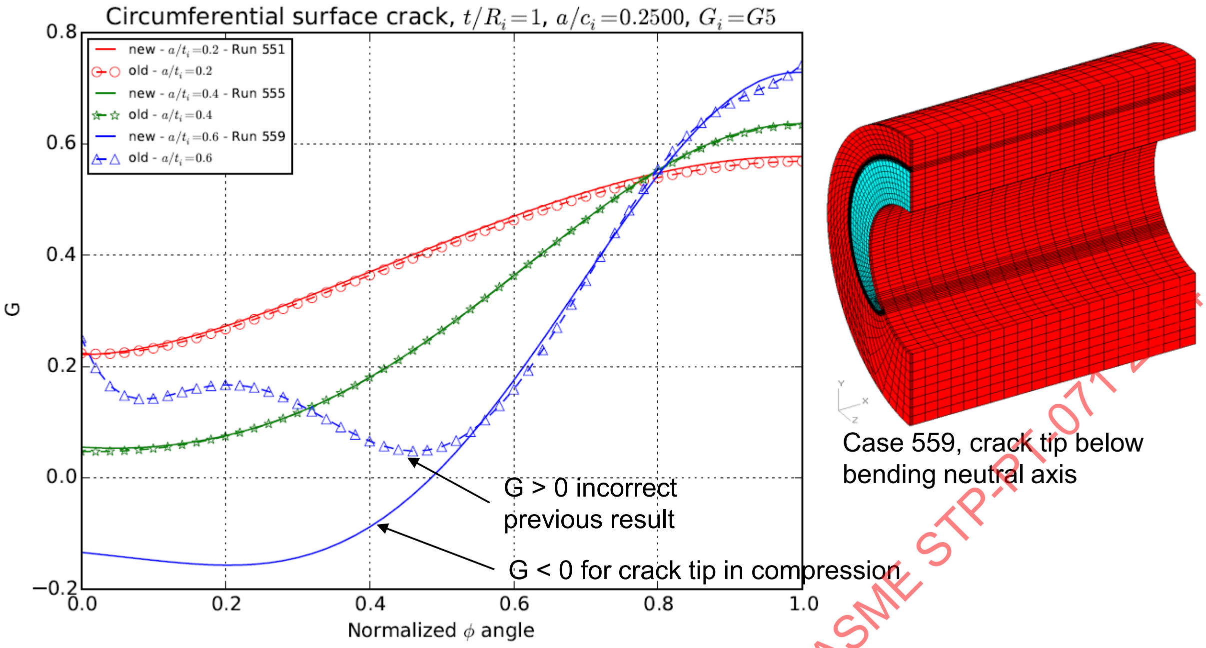
**Figure 7-13: K from Displacement Comparison to K from J for Axial Internal Surface Crack Cases 257, 259, 261, 263, Uniform Crack Face Pressure G0 Load Case**




## 7.4 Incorrect Previous Results

The comparison of the results for the t/Ri = 1 cases to the previous results generally agree well (see appendices G, I, L and N), except for case 559: t/Ri = 1, a/c = 0.25, a/t = 0.6, in-plane bending G5, where the result trend was very different for part of the crack front. In Figure 7-14 the solid blue curve shows the new result along the crack front angle, and the previous results are shown by the blue dashed curve with the triangle data points. The new G5 result is negative for part of the crack front near the crack tip. The crack length is long enough that the crack tip is below the bending neutral axis for the in-plane bending load case, which puts the crack tip into compression. By using the combined bending plus axial load and then subtracting the uniform load case results, the correct negative G5 results are obtained for this case. It is likely that the previous results did not account for the crack tip compression, which gave a positive G result near the crack tip.

**Figure 7-14: Results for Case 559 Show a Previous Result Error**



# 8 SUMMARY

Stress intensity K factors were computed for internal cracks in thick-walled cylinders. The 744 cases include a range of geometry ratios and crack size ratios for internal axial and internal circumferential surface cracks, axial internal full-width partial depth axial cracks, and circumferential internal 360º partial depth cracks. These K solutions extend the K factor solutions available in the API 579-1/ASME FFS-1 Annex C tables.

The 3D crack meshes were created using the FEACrack software, and the analyses were run using the Abaqus FEA software. A mesh convergence study examined a variety of mesh settings to confirm that adequate mesh refinement was used to compute the stress intensity values. The post processing included automatic and manual quality checks to confirm the results.

The results are reported as non-dimensional geometry factors that are tabulated in the appendices along with plots of all the result cases. The new solutions can be added to the API 579-1/ASME FFS-1 Annex C tables.

## REFERENCES


*[1]* API 579-1/ASME FFS-1, Annex C Table C.10 through Table C.14, June 5, 2007, American Petroleum Institute and The American Society of Mechanical Engineers, API Publishing Services, 1220 L Street, N.W., Washington, D.C. 20005.

*[2]* FEACrack software, version 3.2, Quest Integrity Group, http://www.questintegrity.com/products/feacrack-3D-crack-mesh-software

*[3]* API 579, Section C.14, "The weight function method for surface cracks".

*[4]* Anderson, T.L., et. al, Development of Stress Intensity Factor Solutions for Surface and Embedded Cracks in API 579, WRC Bulletin 471, Welding Research Council, Inc. New York, NY, May 2002.

*[5]* Anderson, T.L., Stress Intensity and Crack Growth Opening Area Solutions for Through-Wall Cracks in Cylinders and Spheres, WRC Bulletin 478, Welding Research Council, Inc. New York, NY, Jan 2003.

*[6]* Abaqus, version 6.13, Dassault Systemes Simulia Corp., Rising Sun Mills, 166 Valley Street, Providence, RI 02909-2499, USA

*[7]* Anderson, T. L., Fracture Mechanics, Fundamentals and Applications, 3rd ed., 2005, CRC Press, Taylor & Francis Group, p. 44-45.

# APPENDIX A - AXIAL INTERNAL SURFACE CRACK RESULTS

The results table columns include ratios to describe each case and the polynomial coefficient values A0 through A6 for the non-dimensional geometry factor G. The "Run ID" case number uniquely identifies each model. The Y or t/Ri ratio describes the cylinder thickness ratio; the higher ratio values are the thicker cylinder models. The a/l or a/c ratio describes the crack length; the smaller ratios are the longer crack lengths. The a/t ratio describes the crack depth; the larger ratios are the deeper cracks. The Gi column indicates the load for each case: G0 is the uniform crack face pressure and G1 is the linear crack face pressure.

**Table 1. Non-Dimensional Geometry Polynomial Coefficient Values for Axial Internal Surface Cracks**

| Run ID | Y=O D/ID | a/l=a/2c | t/Ri | a/c | a/t | Gi | A0 | A1 | A2 | A3 | A4 | A5 | A6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2.0 | 0.01563 | 1.0 | 0.03125 | 0.2 | G0 | 0.18877705 | 3.24601261 | -7.96571189 | 15.80393118 | -18.60110823 | 11.25741445 | -2.77088858 |
| 2 | 2.0 | 0.01563 | 1.0 | 0.03125 | 0.2 | G1 | 0.00353150 | 0.25578270 | 2.24886029 | -3.41822578 | 3.37293372 | -2.60952867 | 0.84487291 |
| 3 | 2.0 | 0.01563 | 1.0 | 0.03125 | 0.4 | G0 | 0.19360576 | 3.32561028 | -9.32850476 | 23.26970364 | -32.01584092 | 21.74781962 | -5.86925401 |
| 4 | 2.0 | 0.01563 | 1.0 | 0.03125 | 0.4 | G1 | 0.00319127 | 0.29493099 | 1.84846308 | -1.88124442 | 1.50936466 | -1.69863976 | 0.68686504 |
| 5 | 2.0 | 0.01563 | 1.0 | 0.03125 | 0.6 | G0 | 0.20275928 | 3.19723165 | -8.55287018 | 24.16364445 | -35.83441962 | 25.59624401 | -7.22306657 |
| 6 | 2.0 | 0.01563 | 1.0 | 0.03125 | 0.6 | G1 | 0.00359242 | 0.30181494 | 1.68680411 | -0.82097424 | 0.11471210 | -0.91344193 | 0.48316625 |
| 7 | 2.0 | 0.01563 | 1.0 | 0.03125 | 0.8 | G0 | 0.21444151 | 2.93323859 | -6.24024485 | 19.70777544 | -31.40509498 | 24.50620566 | -7.78389921 |
| 8 | 2.0 | 0.01563 | 1.0 | 0.03125 | 0.8 | G1 | 0.00541267 | 0.25771050 | 1.96232858 | -1.05646222 | 0.18321760 | -0.08230479 | -0.23256239 |
| 9 | 2.0 | 0.03125 | 1.0 | 0.0625 | 0.2 | G0 | 0.26027143 | 2.50723699 | -4.01963396 | 4.86049618 | -3.16144113 | 0.52627351 | 0.16263936 |
| 10 | 2.0 | 0.03125 | 1.0 | 0.0625 | 0.2 | G1 | 0.01406790 | 0.26180081 | 2.20801810 | -3.34915659 | 3.04773577 | -2.15774665 | 0.66225623 |
| 11 | 2.0 | 0.03125 | 1.0 | 0.0625 | 0.4 | G0 | 0.26880224 | 2.67345368 | -5.64469561 | 11.35403327 | -12.53333237 | 6.47766814 | -1.28172705 |
| 12 | 2.0 | 0.03125 | 1.0 | 0.0625 | 0.4 | G1 | 0.01592632 | 0.29064464 | 2.01419638 | -2.86165492 | 3.24826665 | -2.98806684 | 1.03759464 |
| 13 | 2.0 | 0.03125 | 1.0 | 0.0625 | 0.6 | G0 | 0.27982513 | 2.71738746 | -6.51961455 | 17.30162975 | -23.16751064 | 14.54847265 | -3.61241827 |
| 14 | 2.0 | 0.03125 | 1.0 | 0.0625 | 0.6 | G1 | 0.01670898 | 0.30990564 | 1.78740359 | -1.89523443 | 2.51468205 | -3.03411965 | 1.15417937 |
| 15 | 2.0 | 0.03125 | 1.0 | 0.0625 | 0.8 | G0 | 0.29583910 | 2.57093236 | -5.80643027 | 18.88026486 | -28.54665227 | 20.78975184 | -6.24932848 |
| 16 | 2.0 | 0.03125 | 1.0 | 0.0625 | 0.8 | G1 | 0.01841342 | 0.28787362 | 1.85593151 | -1.59051535 | 2.10141803 | -2.13646006 | 0.50092281 |
| 17 | 2.0 | 0.0625 | 1.0 | 0.125 | 0.2 | G0 | 0.38920221 | 1.30312413 | 1.24262113 | -7.64301332 | 12.60140425 | -9.59198843 | 2.78825889 |
| 18 | 2.0 | 0.0625 | 1.0 | 0.125 | 0.2 | G1 | 0.03572147 | 0.24814587 | 2.08264421 | -2.94328117 | 2.22131150 | -1.38651037 | 0.41119592 |
| 19 | 2.0 | 0.0625 | 1.0 | 0.125 | 0.4 | G0 | 0.42156754 | 1.38236968 | 0.78624669 | -6.27682654 | 12.08843403 | -10.40897681 | 3.26834156 |

| Run ID | Y=O D/ID | a/l=a/2c | t/Ri | a/c | a/t | Gi | A0 | A1 | A2 | A3 | A4 | A5 | A6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | 2.0 | 0.0625 | 1.0 | 0.125 | 0.4 | G1 | 0.04697090 | 0.26007488 | 2.12112272 | -3.27935771 | 3.44977589 | -2.73245745 | 0.86737898 |
| 21 | 2.0 | 0.0625 | 1.0 | 0.125 | 0.6 | G0 | 0.45374469 | 1.34784303 | 0.73803852 | -4.85901447 | 11.11185412 | -11.05856793 | 3.77684723 |
| 22 | 2.0 | 0.0625 | 1.0 | 0.125 | 0.6 | G1 | 0.05461140 | 0.23887474 | 2.27996675 | -3.85461143 | 5.41422818 | -4.90491954 | 1.60688572 |
| 23 | 2.0 | 0.0625 | 1.0 | 0.125 | 0.8 | G0 | 0.49200038 | 1.12555047 | 1.66093291 | -5.03258220 | 11.02798398 | -10.71768034 | 3.35783495 |
| 24 | 2.0 | 0.0625 | 1.0 | 0.125 | 0.8 | G1 | 0.06141133 | 0.16642121 | 2.76125336 | -5.28233654 | 8.46842183 | -7.15847500 | 2.00838342 |
| 25 | 2.0 | 0.125 | 1.0 | 0.25 | 0.2 | G0 | 0.58525652 | -0.10000313 | 5.38617298 | -14.48172056 | 18.70592607 | -12.30900735 | 3.25345816 |
| 26 | 2.0 | 0.125 | 1.0 | 0.25 | 0.2 | G1 | 0.07245400 | 0.20565627 | 1.89194823 | -2.32294123 | 1.26481851 | -0.65024834 | 0.19547726 |
| 27 | 2.0 | 0.125 | 1.0 | 0.25 | 0.4 | G0 | 0.64969157 | -0.18785194 | 5.84133906 | -15.67286103 | 20.88136986 | -14.20898369 | 3.84550899 |
| 28 | 2.0 | 0.125 | 1.0 | 0.25 | 0.4 | G1 | 0.09732754 | 0.16686056 | 2.11521406 | -2.95922768 | 2.35046534 | -1.52989790 | 0.45507532 |
| 29 | 2.0 | 0.125 | 1.0 | 0.25 | 0.6 | G0 | 0.74235185 | -0.49786034 | 7.42252907 | -19.52484644 | 27.42257816 | -19.75695902 | 5.56042922 |
| 30 | 2.0 | 0.125 | 1.0 | 0.25 | 0.6 | G1 | 0.12658284 | 0.07208596 | 2.64948813 | -4.45082349 | 5.09665908 | -3.86373971 | 1.15262098 |
| 31 | 2.0 | 0.125 | 1.0 | 0.25 | 0.8 | G0 | 0.84823214 | -1.03014321 | 10.27345371 | -26.71532844 | 39.52192086 | -29.40393600 | 8.26607667 |
| 32 | 2.0 | 0.125 | 1.0 | 0.25 | 0.8 | G1 | 0.15665648 | -0.10057273 | 3.72058015 | -7.63688015 | 10.81463330 | -8.23531994 | 2.24477178 |
| 33 | 2.0 | 0.25 | 1.0 | 0.5 | 0.2 | G0 | 0.82237764 | -0.69268152 | 4.17493124 | -7.93886159 | 8.14378838 | -4.59362986 | 1.09292185 |
| 34 | 2.0 | 0.25 | 1.0 | 0.5 | 0.2 | G1 | 0.11878883 | 0.32915006 | 1.06843027 | -0.64754330 | -0.52476034 | 0.36630726 | -0.04253290 |
| 35 | 2.0 | 0.25 | 1.0 | 0.5 | 0.4 | G0 | 0.87146131 | -0.79857968 | 4.44560799 | -8.31114453 | 8.48373443 | -4.78181094 | 1.13663697 |
| 36 | 2.0 | 0.25 | 1.0 | 0.5 | 0.4 | G1 | 0.14000514 | 0.27626198 | 1.20506110 | -0.85463433 | -0.32380023 | 0.25547274 | -0.01733869 |
| 37 | 2.0 | 0.25 | 1.0 | 0.5 | 0.6 | G0 | 0.98493138 | -1.12124911 | 5.61929254 | -10.55105544 | 11.33691086 | -6.78246084 | 1.68439488 |
| 38 | 2.0 | 0.25 | 1.0 | 0.5 | 0.6 | G1 | 0.17998550 | 0.15995023 | 1.63907136 | -1.71288895 | 0.82726905 | -0.56463775 | 0.20241375 |
| 39 | 2.0 | 0.25 | 1.0 | 0.5 | 0.8 | G0 | 1.14200488 | -1.65971653 | 7.90078468 | -15.43972630 | 18.28701883 | -11.72804591 | 2.94306808 |
| 40 | 2.0 | 0.25 | 1.0 | 0.5 | 0.8 | G1 | 0.23280068 | -0.04672961 | 2.66115391 | -4.23250461 | 4.66108983 | -3.24143607 | 0.82820643 |
| 41 | 2.0 | 0.5 | 1.0 | 1 | 0.2 | G0 | 1.11854021 | -0.74661164 | 2.25699655 | -4.29236585 | 4.97324629 | -3.14993354 | 0.82913700 |
| 42 | 2.0 | 0.5 | 1.0 | 1 | 0.2 | G1 | 0.16791434 | 0.55763207 | 1.07885854 | -2.13611768 | 1.80245286 | -1.03154235 | 0.27399933 |
| 43 | 2.0 | 0.5 | 1.0 | 1 | 0.4 | G0 | 1.11451900 | -0.75429912 | 2.40596443 | -4.70328880 | 5.53276057 | -3.53809119 | 0.93677714 |
| 44 | 2.0 | 0.5 | 1.0 | 1 | 0.4 | G1 | 0.17288505 | 0.51610164 | 1.25965101 | -2.54418070 | 2.32165346 | -1.37902768 | 0.36819189 |
| 45 | 2.0 | 0.5 | 1.0 | 1 | 0.6 | G0 | 1.17355270 | -0.91077179 | 3.00095221 | -5.85218459 | 6.80374236 | -4.29749676 | 1.12458586 |
| 46 | 2.0 | 0.5 | 1.0 | 1 | 0.6 | G1 | 0.19624697 | 0.44243716 | 1.53879494 | -3.06791947 | 2.90346713 | -1.73257655 | 0.45601380 |
| 47 | 2.0 | 0.5 | 1.0 | 1 | 0.8 | G0 | 1.27696615 | -1.15931681 | 4.13564963 | -8.23430236 | 9.82439383 | -6.29876683 | 1.63189198 |

| Run ID | Y=O D/ID | a/l=a/2c | t/Ri | a/c | a/t | Gi | A0 | A1 | A2 | A3 | A4 | A5 | A6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 48 | 2.0 | 0.5 | 1.0 | 1 | 0.8 | G1 | 0.23163367 | 0.35961119 | 1.96240932 | -3.93422158 | 4.04856964 | -2.46988489 | 0.61137748 |
| 49 | 2.0 | 1 | 1.0 | 2 | 0.2 | G0 | 0.77554178 | -0.46216998 | 0.92896725 | -1.91376971 | 1.75673954 | -0.96298213 | 0.35928442 |
| 50 | 2.0 | 1 | 1.0 | 2 | 0.2 | G1 | 0.09738392 | 0.52648571 | 0.55991515 | -1.02300569 | -0.43892440 | 0.82673236 | -0.15596843 |
| 51 | 2.0 | 1 | 1.0 | 2 | 0.4 | G0 | 0.75313334 | -0.38897875 | 0.88897431 | -2.08260345 | 2.12412287 | -1.26858744 | 0.45480859 |
| 52 | 2.0 | 1 | 1.0 | 2 | 0.4 | G1 | 0.09450969 | 0.51890942 | 0.65650062 | -1.30446378 | -0.04035567 | 0.53691111 | -0.07018306 |
| 53 | 2.0 | 1 | 1.0 | 2 | 0.6 | G0 | 0.75173765 | -0.36330010 | 0.94721673 | -2.34803300 | 2.47636422 | -1.47438544 | 0.50057059 |
| 54 | 2.0 | 1 | 1.0 | 2 | 0.6 | G1 | 0.09708005 | 0.50609381 | 0.75153449 | -1.52275735 | 0.19970618 | 0.41135427 | -0.04598244 |
| 55 | 2.0 | 1 | 1.0 | 2 | 0.8 | G0 | 0.76311423 | -0.32820138 | 0.95972777 | -2.37935468 | 2.42721524 | -1.39758430 | 0.47505888 |
| 56 | 2.0 | 1 | 1.0 | 2 | 0.8 | G1 | 0.10183627 | 0.51405449 | 0.78335525 | -1.54681939 | 0.18629603 | 0.43672464 | -0.05822519 |
| 57 | 2.5 | 0.01563 | 1.5 | 0.03125 | 0.2 | G0 | 0.18714817 | 3.21932332 | -8.35474523 | 17.17530552 | -20.94269416 | 13.16803918 | -3.35482152 |
| 58 | 2.5 | 0.01563 | 1.5 | 0.03125 | 0.2 | G1 | 0.00300566 | 0.25540015 | 2.17447033 | -3.27426463 | 3.12193758 | -2.37573021 | 0.77028556 |
| 59 | 2.5 | 0.01563 | 1.5 | 0.03125 | 0.4 | G0 | 0.19249652 | 3.16028722 | -8.95520619 | 22.10756468 | -30.88292517 | 21.55858023 | -5.98533093 |
| 60 | 2.5 | 0.01563 | 1.5 | 0.03125 | 0.4 | G1 | 0.00262303 | 0.28279215 | 1.80225011 | -1.80107384 | 1.06005207 | -1.07431392 | 0.44267235 |
| 61 | 2.5 | 0.01563 | 1.5 | 0.03125 | 0.6 | G0 | 0.20079859 | 2.91473577 | -7.28252155 | 18.92637619 | -27.28494733 | 19.42251461 | -5.53442191 |
| 62 | 2.5 | 0.01563 | 1.5 | 0.03125 | 0.6 | G1 | 0.00341475 | 0.26333687 | 1.85892066 | -1.66245598 | 1.11428967 | -1.28542200 | 0.49556470 |
| 63 | 2.5 | 0.01563 | 1.5 | 0.03125 | 0.8 | G0 | 0.20891525 | 2.62419304 | -4.73368750 | 12.14424271 | -17.29485294 | 13.15012575 | -4.38953440 |
| 64 | 2.5 | 0.01563 | 1.5 | 0.03125 | 0.8 | G1 | 0.00545197 | 0.19745454 | 2.36051792 | -3.03866481 | 3.34978356 | -2.22951166 | 0.31391148 |
| 65 | 2.5 | 0.03125 | 1.5 | 0.0625 | 0.2 | G0 | 0.25590746 | 2.47698433 | -4.35043343 | 5.89193699 | -4.60705013 | 1.52281690 | -0.10473721 |
| 66 | 2.5 | 0.03125 | 1.5 | 0.0625 | 0.2 | G1 | 0.01300064 | 0.25430859 | 2.17123031 | -3.34669877 | 3.11209132 | -2.21504369 | 0.67944777 |
| 67 | 2.5 | 0.03125 | 1.5 | 0.0625 | 0.4 | G0 | 0.25866133 | 2.56145820 | -5.90141752 | 12.72182781 | -15.47020840 | 9.19262335 | -2.16788988 |
| 68 | 2.5 | 0.03125 | 1.5 | 0.0625 | 0.4 | G1 | 0.01314043 | 0.27629968 | 1.90580717 | -2.55492426 | 2.63252555 | -2.41338227 | 0.85430809 |
| 69 | 2.5 | 0.03125 | 1.5 | 0.0625 | 0.6 | G0 | 0.26567242 | 2.47340864 | -5.98958215 | 16.08408488 | -22.64594006 | 15.27260664 | -4.09488907 |
| 70 | 2.5 | 0.03125 | 1.5 | 0.0625 | 0.6 | G1 | 0.01316329 | 0.28152129 | 1.72867366 | -1.71498233 | 1.82044573 | -2.17229108 | 0.83215150 |
| 71 | 2.5 | 0.03125 | 1.5 | 0.0625 | 0.8 | G0 | 0.27758860 | 2.19336325 | -4.17582088 | 13.09689456 | -20.08626719 | 15.38513635 | -4.97789805 |
| 72 | 2.5 | 0.03125 | 1.5 | 0.0625 | 0.8 | G1 | 0.01465808 | 0.23498151 | 1.99729582 | -2.21581431 | 2.66152788 | -2.11071082 | 0.37887092 |
| 73 | 2.5 | 0.0625 | 1.5 | 0.125 | 0.2 | G0 | 0.38187537 | 1.28359347 | 0.99801803 | -7.00462296 | 11.89543928 | -9.20621292 | 2.70296719 |
| 74 | 2.5 | 0.0625 | 1.5 | 0.125 | 0.2 | G1 | 0.03435858 | 0.24180354 | 2.05019799 | -2.93865188 | 2.29147647 | -1.45654608 | 0.43235029 |
| 75 | 2.5 | 0.0625 | 1.5 | 0.125 | 0.4 | G0 | 0.39612141 | 1.30717290 | 0.43683667 | -4.88890285 | 9.92772201 | -8.84381916 | 2.83926831 |

| Run ID | Y=O D/ID | a/l=a/2c | t/Ri | a/c | a/t | Gi | A0 | A1 | A2 | A3 | A4 | A5 | A6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76 | 2.5 | 0.0625 | 1.5 | 0.125 | 0.4 | G1 | 0.03996303 | 0.23684144 | 2.06413686 | -3.14632462 | 3.31917495 | -2.66365006 | 0.85349179 |
| 77 | 2.5 | 0.0625 | 1.5 | 0.125 | 0.6 | G0 | 0.40892230 | 1.23354812 | 0.36368211 | -2.97365975 | 7.41022452 | -7.86369928 | 2.78186329 |
| 78 | 2.5 | 0.0625 | 1.5 | 0.125 | 0.6 | G1 | 0.04212630 | 0.21014093 | 2.18007448 | -3.53506733 | 4.86020234 | -4.43758685 | 1.46505736 |
| 79 | 2.5 | 0.0625 | 1.5 | 0.125 | 0.8 | G0 | 0.42933797 | 0.98188968 | 1.48659176 | -3.80639255 | 7.83896742 | -7.38712228 | 2.17300821 |
| 80 | 2.5 | 0.0625 | 1.5 | 0.125 | 0.8 | G1 | 0.04480419 | 0.14019084 | 2.63572541 | -4.90681557 | 7.70015611 | -6.39882072 | 1.74529066 |
| 81 | 2.5 | 0.125 | 1.5 | 0.25 | 0.2 | G0 | 0.57312593 | -0.10268091 | 5.23487180 | -14.16692620 | 18.42038649 | -12.18078902 | 3.23042994 |
| 82 | 2.5 | 0.125 | 1.5 | 0.25 | 0.2 | G1 | 0.07029886 | 0.20070677 | 1.86929514 | -2.30965987 | 1.28453234 | -0.67058944 | 0.20101357 |
| 83 | 2.5 | 0.125 | 1.5 | 0.25 | 0.4 | G0 | 0.61436525 | -0.19256028 | 5.55955449 | -14.83773586 | 19.88991016 | -13.65196121 | 3.71926383 |
| 84 | 2.5 | 0.125 | 1.5 | 0.25 | 0.4 | G1 | 0.08836934 | 0.15737568 | 2.06644860 | -2.83876601 | 2.26111535 | -1.51130301 | 0.45669947 |
| 85 | 2.5 | 0.125 | 1.5 | 0.25 | 0.6 | G0 | 0.66542756 | -0.46033154 | 6.89765249 | -17.92659270 | 25.34470398 | -18.47556217 | 5.24708105 |
| 86 | 2.5 | 0.125 | 1.5 | 0.25 | 0.6 | G1 | 0.10465693 | 0.07129199 | 2.54904197 | -4.19330528 | 4.87553227 | -3.79494737 | 1.14743879 |
| 87 | 2.5 | 0.125 | 1.5 | 0.25 | 0.8 | G0 | 0.71875796 | -0.86845537 | 9.23646887 | -23.83474577 | 35.66160255 | -26.82722941 | 7.56953275 |
| 88 | 2.5 | 0.125 | 1.5 | 0.25 | 0.8 | G1 | 0.11882864 | -0.06791292 | 3.49585650 | -7.13847079 | 10.35717743 | -8.02700426 | 2.19596880 |
| 89 | 2.5 | 0.25 | 1.5 | 0.5 | 0.2 | G0 | 0.79999341 | -0.67020822 | 4.07079825 | -7.74238698 | 7.92675651 | -4.45694420 | 1.05636626 |
| 90 | 2.5 | 0.25 | 1.5 | 0.5 | 0.2 | G1 | 0.11369425 | 0.32751435 | 1.05610509 | -0.62228699 | -0.55861503 | 0.39468862 | -0.05188629 |
| 91 | 2.5 | 0.25 | 1.5 | 0.5 | 0.4 | G0 | 0.83405837 | -0.76793192 | 4.37489574 | -8.19956763 | 8.41489024 | -4.78098603 | 1.14451936 |
| 92 | 2.5 | 0.25 | 1.5 | 0.5 | 0.4 | G1 | 0.13167273 | 0.26852254 | 1.23199740 | -0.91433958 | -0.23718722 | 0.19074030 | 0.00103691 |
| 93 | 2.5 | 0.25 | 1.5 | 0.5 | 0.6 | G0 | 0.91908387 | -1.05561276 | 5.59218396 | -10.64765768 | 11.70354444 | -7.17836456 | 1.81634924 |
| 94 | 2.5 | 0.25 | 1.5 | 0.5 | 0.6 | G1 | 0.16392756 | 0.15412483 | 1.71792813 | -1.92786803 | 1.18142016 | -0.84985255 | 0.28619794 |
| 95 | 2.5 | 0.25 | 1.5 | 0.5 | 0.8 | G0 | 1.03003947 | -1.49498842 | 7.81051456 | -15.76003267 | 19.46449771 | -12.94090151 | 3.33175046 |
| 96 | 2.5 | 0.25 | 1.5 | 0.5 | 0.8 | G1 | 0.20370479 | -0.03262156 | 2.77284630 | -4.66254764 | 5.50195103 | -3.95488100 | 1.03763301 |
| 97 | 2.5 | 0.5 | 1.5 | 1 | 0.2 | G0 | 1.08527150 | -0.69576608 | 2.21729465 | -4.30202610 | 5.01002174 | -3.17316096 | 0.83351801 |
| 98 | 2.5 | 0.5 | 1.5 | 1 | 0.2 | G1 | 0.16003173 | 0.55598628 | 1.11979553 | -2.23728489 | 1.92094775 | -1.10187853 | 0.29081254 |
| 99 | 2.5 | 0.5 | 1.5 | 1 | 0.4 | G0 | 1.06776949 | -0.67007720 | 2.36074131 | -4.79414585 | 5.71010947 | -3.66161734 | 0.96794165 |
| 100 | 2.5 | 0.5 | 1.5 | 1 | 0.4 | G1 | 0.16286386 | 0.51146726 | 1.34356619 | -2.75490928 | 2.57501251 | -1.53316838 | 0.40591908 |
| 101 | 2.5 | 0.5 | 1.5 | 1 | 0.6 | G0 | 1.11578454 | -0.78769937 | 2.96789724 | -6.10666616 | 7.28283817 | -4.66170397 | 1.22652655 |
| 102 | 2.5 | 0.5 | 1.5 | 1 | 0.6 | G1 | 0.18486461 | 0.43758439 | 1.67513598 | -3.43510366 | 3.38298512 | -2.04949959 | 0.53947179 |
| 103 | 2.5 | 0.5 | 1.5 | 1 | 0.8 | G0 | 1.20688966 | -0.98261357 | 4.15851409 | -8.91871624 | 11.17664562 | -7.40498727 | 1.95770216 |

| Run ID | Y=O D/ID | a/l=a/2c | t/Ri | a/c | a/t | Gi | A0 | A1 | A2 | A3 | A4 | A5 | A6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 104 | 2.5 | 0.5 | 1.5 | 1 | 0.8 | G1 | 0.21931761 | 0.35451785 | 2.19200736 | -4.62164228 | 5.06323519 | -3.20807364 | 0.81834918 |
| 105 | 2.5 | 1 | 1.5 | 2 | 0.2 | G0 | 0.75615664 | -0.41133334 | 0.89227378 | -1.97737447 | 1.91107028 | -1.08921570 | 0.39721314 |
| 106 | 2.5 | 1 | 1.5 | 2 | 0.2 | G1 | 0.09336331 | 0.52722310 | 0.59965878 | -1.14372960 | -0.27250707 | 0.70953409 | -0.12219865 |
| 107 | 2.5 | 1 | 1.5 | 2 | 0.4 | G0 | 0.72418609 | -0.29551405 | 0.77402685 | -2.07604265 | 2.25761768 | -1.40808502 | 0.50160691 |
| 108 | 2.5 | 1 | 1.5 | 2 | 0.4 | G1 | 0.08898216 | 0.52195757 | 0.71109389 | -1.48303819 | 0.21330853 | 0.35495002 | -0.01698731 |
| 109 | 2.5 | 1 | 1.5 | 2 | 0.6 | G0 | 0.71762836 | -0.23202652 | 0.74551327 | -2.23140682 | 2.53304941 | -1.59104434 | 0.54716494 |
| 110 | 2.5 | 1 | 1.5 | 2 | 0.6 | G1 | 0.09117126 | 0.51234380 | 0.81227978 | -1.73861270 | 0.51682240 | 0.17962389 | 0.02247882 |
| 111 | 2.5 | 1 | 1.5 | 2 | 0.8 | G0 | 0.72696543 | -0.16543494 | 0.70813601 | -2.26295090 | 2.59017889 | -1.64148173 | 0.56848675 |
| 112 | 2.5 | 1 | 1.5 | 2 | 0.8 | G1 | 0.09671534 | 0.52073480 | 0.86940518 | -1.85984670 | 0.66639548 | 0.07455000 | 0.05047334 |
| 113 | 3.0 | 0.01563 | 2.0 | 0.03125 | 0.2 | G0 | 0.18624312 | 3.18718621 | -8.61635344 | 18.18866470 | -22.75344397 | 14.69690998 | -3.83723625 |
| 114 | 3.0 | 0.01563 | 2.0 | 0.03125 | 0.2 | G1 | 0.00267769 | 0.25625219 | 2.10519023 | -3.12020558 | 2.85437295 | -2.13213659 | 0.69151166 |
| 115 | 3.0 | 0.01563 | 2.0 | 0.03125 | 0.4 | G0 | 0.19209903 | 3.01770629 | -8.48844920 | 20.53607952 | -28.58379035 | 20.06180136 | -5.61740197 |
| 116 | 3.0 | 0.01563 | 2.0 | 0.03125 | 0.4 | G1 | 0.00246162 | 0.27006961 | 1.81319832 | -1.92846417 | 1.12564649 | -0.97437591 | 0.37734655 |
| 117 | 3.0 | 0.01563 | 2.0 | 0.03125 | 0.6 | G0 | 0.19839928 | 2.74093407 | -6.57461069 | 15.93599378 | -22.02583006 | 15.29701971 | -4.31158211 |
| 118 | 3.0 | 0.01563 | 2.0 | 0.03125 | 0.6 | G1 | 0.00333893 | 0.23948432 | 1.97248294 | -2.27279437 | 2.03910081 | -1.86176641 | 0.63052752 |
| 119 | 3.0 | 0.01563 | 2.0 | 0.03125 | 0.8 | G0 | 0.20311282 | 2.48223554 | -4.32029136 | 9.58838452 | -12.00203917 | 8.55995198 | -2.92418559 |
| 120 | 3.0 | 0.01563 | 2.0 | 0.03125 | 0.8 | G1 | 0.00518072 | 0.17304784 | 2.49595606 | -3.88583823 | 4.83181257 | -3.33533951 | 0.63054628 |
| 121 | 3.0 | 0.03125 | 2.0 | 0.0625 | 0.2 | G0 | 0.25241415 | 2.44889603 | -4.62427366 | 6.85536542 | -6.08310420 | 2.60442944 | -0.40817331 |
| 122 | 3.0 | 0.03125 | 2.0 | 0.0625 | 0.2 | G1 | 0.01218569 | 0.25002202 | 2.12546611 | -3.28294849 | 3.06332928 | -2.18814526 | 0.67369530 |
| 123 | 3.0 | 0.03125 | 2.0 | 0.0625 | 0.4 | G0 | 0.25239748 | 2.45670680 | -5.86960135 | 13.09378750 | -16.72282945 | 10.57743485 | -2.66778727 |
| 124 | 3.0 | 0.03125 | 2.0 | 0.0625 | 0.4 | G1 | 0.01158521 | 0.26713051 | 1.83219884 | -2.32462940 | 2.14807518 | -1.94894991 | 0.70095381 |
| 125 | 3.0 | 0.03125 | 2.0 | 0.0625 | 0.6 | G0 | 0.25740055 | 2.27972147 | -5.26235811 | 13.91612704 | -19.87874259 | 13.75303877 | -3.80121606 |
| 126 | 3.0 | 0.03125 | 2.0 | 0.0625 | 0.6 | G1 | 0.01145982 | 0.25991065 | 1.74158276 | -1.77381339 | 1.67460678 | -1.85243265 | 0.69090689 |
| 127 | 3.0 | 0.03125 | 2.0 | 0.0625 | 0.8 | G0 | 0.26629148 | 1.95486935 | -2.95649114 | 8.56940916 | -12.79518810 | 10.02727446 | -3.47538140 |
| 128 | 3.0 | 0.03125 | 2.0 | 0.0625 | 0.8 | G1 | 0.01291212 | 0.20131688 | 2.13000250 | -2.78662577 | 3.39512775 | -2.47484931 | 0.43958741 |
| 129 | 3.0 | 0.0625 | 2.0 | 0.125 | 0.2 | G0 | 0.37487347 | 1.26397115 | 0.79048902 | -6.37142739 | 11.08917087 | -8.70557915 | 2.57902443 |
| 130 | 3.0 | 0.0625 | 2.0 | 0.125 | 0.2 | G1 | 0.03297416 | 0.23608867 | 2.01801371 | -2.90298069 | 2.30128358 | -1.48446675 | 0.44293694 |
| 131 | 3.0 | 0.0625 | 2.0 | 0.125 | 0.4 | G0 | 0.37814859 | 1.24931762 | 0.24474994 | -3.94387979 | 8.24013074 | -7.50126646 | 2.44629104 |

| Run ID | Y=O D/ID | a/l=a/2c | t/Ri | a/c | a/t | Gi | A0 | A1 | A2 | A3 | A4 | A5 | A6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 132 | 3.0 | 0.0625 | 2.0 | 0.125 | 0.4 | G1 | 0.03533717 | 0.22245895 | 2.01690617 | -3.00469672 | 3.11041685 | -2.50897061 | 0.81111678 |
| 133 | 3.0 | 0.0625 | 2.0 | 0.125 | 0.6 | G0 | 0.38216189 | 1.15265793 | 0.29529170 | -2.24301113 | 5.53823744 | -6.01934269 | 2.16250656 |
| 134 | 3.0 | 0.0625 | 2.0 | 0.125 | 0.6 | G1 | 0.03542630 | 0.19563745 | 2.11528984 | -3.29928134 | 4.37900217 | -3.99927947 | 1.32664115 |
| 135 | 3.0 | 0.0625 | 2.0 | 0.125 | 0.8 | G0 | 0.39493745 | 0.88710001 | 1.64863942 | -4.02455553 | 7.30839815 | -6.32743434 | 1.71201951 |
| 136 | 3.0 | 0.0625 | 2.0 | 0.125 | 0.8 | G1 | 0.03678471 | 0.12831527 | 2.56846945 | -4.68060946 | 7.14432220 | -5.82586458 | 1.54929755 |
| 137 | 3.0 | 0.125 | 2.0 | 0.25 | 0.2 | G0 | 0.56180287 | -0.10353819 | 5.09889215 | -13.83480421 | 18.06248610 | -11.98912659 | 3.18868105 |
| 138 | 3.0 | 0.125 | 2.0 | 0.25 | 0.2 | G1 | 0.06822362 | 0.19651662 | 1.84843951 | -2.28159570 | 1.27680496 | -0.67459995 | 0.20311916 |
| 139 | 3.0 | 0.125 | 2.0 | 0.25 | 0.4 | G0 | 0.58495278 | -0.19117947 | 5.36126810 | -14.20310133 | 19.04580534 | -13.11677475 | 3.58438585 |
| 140 | 3.0 | 0.125 | 2.0 | 0.25 | 0.4 | G1 | 0.08093941 | 0.15072333 | 2.03429376 | -2.74474258 | 2.16655222 | -1.46821350 | 0.44861005 |
| 141 | 3.0 | 0.125 | 2.0 | 0.25 | 0.6 | G0 | 0.61181609 | -0.41815168 | 6.55056838 | -16.90535161 | 23.89443037 | -17.47841739 | 4.98078404 |
| 142 | 3.0 | 0.125 | 2.0 | 0.25 | 0.6 | G1 | 0.08979902 | 0.07426074 | 2.48300328 | -4.02774184 | 4.69506141 | -3.69827748 | 1.12587411 |
| 143 | 3.0 | 0.125 | 2.0 | 0.25 | 0.8 | G0 | 0.64078467 | -0.73940848 | 8.55211220 | -22.04828632 | 33.08206859 | -24.94176512 | 7.03061212 |
| 144 | 3.0 | 0.125 | 2.0 | 0.25 | 0.8 | G1 | 0.09690156 | -0.04140983 | 3.34115391 | -6.80144599 | 9.95802170 | -7.76630025 | 2.12326297 |
| 145 | 3.0 | 0.25 | 2.0 | 0.5 | 0.2 | G0 | 0.78082131 | -0.64814664 | 3.98205659 | -7.57179065 | 7.73841287 | -4.34248118 | 1.02711096 |
| 146 | 3.0 | 0.25 | 2.0 | 0.5 | 0.2 | G1 | 0.10950888 | 0.32589833 | 1.04959137 | -0.60786498 | -0.57771380 | 0.41026580 | -0.05691503 |
| 147 | 3.0 | 0.25 | 2.0 | 0.5 | 0.4 | G0 | 0.80227055 | -0.73209944 | 4.31037456 | -8.11307777 | 8.36541796 | -4.78269891 | 1.15122407 |
| 148 | 3.0 | 0.25 | 2.0 | 0.5 | 0.4 | G1 | 0.12462774 | 0.26354555 | 1.25995145 | -0.98012874 | -0.14612109 | 0.12520899 | 0.01935526 |
| 149 | 3.0 | 0.25 | 2.0 | 0.5 | 0.6 | G0 | 0.86425911 | -0.97184160 | 5.49129466 | -10.61866537 | 11.86987237 | -7.39683733 | 1.89273997 |
| 150 | 3.0 | 0.25 | 2.0 | 0.5 | 0.6 | G1 | 0.15028472 | 0.15725437 | 1.76548451 | -2.08354784 | 1.43967519 | -1.05368838 | 0.34538588 |
| 151 | 3.0 | 0.25 | 2.0 | 0.5 | 0.8 | G0 | 0.94182791 | -1.30725335 | 7.49650607 | -15.53197403 | 19.71263138 | -13.37782410 | 3.48985165 |
| 152 | 3.0 | 0.25 | 2.0 | 0.5 | 0.8 | G1 | 0.18009292 | -0.00425009 | 2.79213916 | -4.86126761 | 5.94651416 | -4.34176318 | 1.15187011 |
| 153 | 3.0 | 0.5 | 2.0 | 1 | 0.2 | G0 | 1.05692331 | -0.64763028 | 2.18075084 | -4.33113276 | 5.09102241 | -3.23620945 | 0.85075945 |
| 154 | 3.0 | 0.5 | 2.0 | 1 | 0.2 | G1 | 0.15361073 | 0.55381873 | 1.16360051 | -2.35340495 | 2.06845223 | -1.19651003 | 0.31515981 |
| 155 | 3.0 | 0.5 | 2.0 | 1 | 0.4 | G0 | 1.03000587 | -0.58583793 | 2.27735252 | -4.80603608 | 5.81499462 | -3.75339511 | 0.99421666 |
| 156 | 3.0 | 0.5 | 2.0 | 1 | 0.4 | G1 | 0.15512631 | 0.50947299 | 1.41137325 | -2.94000755 | 2.81104512 | -1.68384765 | 0.44444245 |
| 157 | 3.0 | 0.5 | 2.0 | 1 | 0.6 | G0 | 1.06831028 | -0.65421942 | 2.80042630 | -6.03981238 | 7.36977462 | -4.77734799 | 1.26513920 |
| 158 | 3.0 | 0.5 | 2.0 | 1 | 0.6 | G1 | 0.17538019 | 0.44264465 | 1.75042993 | -3.66684871 | 3.69817778 | -2.26158490 | 0.59608354 |
| 159 | 3.0 | 0.5 | 2.0 | 1 | 0.8 | G0 | 1.14623619 | -0.77990898 | 3.89030488 | -8.85440938 | 11.51727521 | -7.81682335 | 2.09760531 |

| Run ID | Y=O D/ID | a/l=a/2c | t/Ri | a/c | a/t | Gi | A0 | A1 | A2 | A3 | A4 | A5 | A6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 160 | 3.0 | 0.5 | 2.0 | 1 | 0.8 | G1 | 0.20741204 | 0.36876211 | 2.29819951 | -5.01318629 | 5.68059612 | -3.67239417 | 0.95199350 |
| 161 | 3.0 | 1 | 2.0 | 2 | 0.2 | G0 | 0.73893985 | -0.36153751 | 0.84374928 | -2.01107827 | 2.03381256 | -1.19937661 | 0.43197870 |
| 162 | 3.0 | 1 | 2.0 | 2 | 0.2 | G1 | 0.08990900 | 0.52830445 | 0.63469969 | -1.25577130 | -0.11270281 | 0.59435632 | -0.08853163 |
| 163 | 3.0 | 1 | 2.0 | 2 | 0.4 | G0 | 0.70027323 | -0.20594310 | 0.62519669 | -1.96685694 | 2.26172959 | -1.46756787 | 0.52860203 |
| 164 | 3.0 | 1 | 2.0 | 2 | 0.4 | G1 | 0.08460278 | 0.52636093 | 0.74863614 | -1.62117104 | 0.42088639 | 0.19999855 | 0.02966032 |
| 165 | 3.0 | 1 | 2.0 | 2 | 0.6 | G0 | 0.69041806 | -0.10824948 | 0.48541548 | -1.91714966 | 2.31523124 | -1.52158256 | 0.54349382 |
| 166 | 3.0 | 1 | 2.0 | 2 | 0.6 | G1 | 0.08654387 | 0.52170286 | 0.83728449 | -1.85831576 | 0.70586965 | 0.03526035 | 0.06679794 |
| 167 | 3.0 | 1 | 2.0 | 2 | 0.8 | G0 | 0.69812817 | -0.01156125 | 0.35425731 | -1.78032092 | 2.19948689 | -1.47903281 | 0.54465936 |
| 168 | 3.0 | 1 | 2.0 | 2 | 0.8 | G1 | 0.09241702 | 0.53373315 | 0.89007193 | -1.98095282 | 0.86258506 | -0.07587698 | 0.09665495 |
| 169 | 3.5 | 0.01563 | 2.5 | 0.03125 | 0.2 | G0 | 0.18574437 | 3.15018097 | -8.77186978 | 18.87605353 | -24.03777697 | 15.81304660 | -4.19810759 |
| 170 | 3.5 | 0.01563 | 2.5 | 0.03125 | 0.2 | G1 | 0.00246222 | 0.25671508 | 2.04825804 | -2.98959326 | 2.63045189 | -1.92848464 | 0.62454836 |
| 171 | 3.5 | 0.01563 | 2.5 | 0.03125 | 0.4 | G0 | 0.19163207 | 2.90066181 | -8.06888584 | 19.14358407 | -26.41514142 | 18.50073242 | -5.18597690 |
| 172 | 3.5 | 0.01563 | 2.5 | 0.03125 | 0.4 | G1 | 0.00240500 | 0.25913335 | 1.83515217 | -2.08379209 | 1.31968633 | -1.04394416 | 0.37790836 |
| 173 | 3.5 | 0.01563 | 2.5 | 0.03125 | 0.6 | G0 | 0.19580008 | 2.62387752 | -6.15230951 | 14.20486686 | -18.92999634 | 12.80637848 | -3.55332267 |
| 174 | 3.5 | 0.01563 | 2.5 | 0.03125 | 0.6 | G1 | 0.00322398 | 0.22493999 | 2.03235305 | -2.63525607 | 2.62605878 | -2.25815357 | 0.73338106 |
| 175 | 3.5 | 0.01563 | 2.5 | 0.03125 | 0.8 | G0 | 0.19799772 | 2.39687687 | -4.17962527 | 8.56875947 | -9.76721531 | 6.54509199 | -2.25493436 |
| 176 | 3.5 | 0.01563 | 2.5 | 0.03125 | 0.8 | G1 | 0.00486200 | 0.16150479 | 2.53734108 | -4.25414280 | 5.49408017 | -3.83899371 | 0.78153446 |
| 177 | 3.5 | 0.03125 | 2.5 | 0.0625 | 0.2 | G0 | 0.24957626 | 2.42041145 | -4.83089293 | 7.67167671 | -7.41605945 | 3.62192557 | -0.70244678 |
| 178 | 3.5 | 0.03125 | 2.5 | 0.0625 | 0.2 | G1 | 0.01155410 | 0.24736827 | 2.07884817 | -3.19027576 | 2.95380944 | -2.11332537 | 0.65404091 |
| 179 | 3.5 | 0.03125 | 2.5 | 0.0625 | 0.4 | G0 | 0.24795200 | 2.35843482 | -5.67065073 | 12.82985522 | -16.82068293 | 10.99245591 | -2.86769459 |
| 180 | 3.5 | 0.03125 | 2.5 | 0.0625 | 0.4 | G1 | 0.01060189 | 0.25884087 | 1.79288570 | -2.19272275 | 1.84143951 | -1.63656480 | 0.59334939 |
| 181 | 3.5 | 0.03125 | 2.5 | 0.0625 | 0.6 | G0 | 0.25127897 | 2.13047149 | -4.58219435 | 11.75290621 | -16.75612745 | 11.67112357 | -3.26843022 |
| 182 | 3.5 | 0.03125 | 2.5 | 0.0625 | 0.6 | G1 | 0.01044835 | 0.24258284 | 1.77928014 | -1.91723703 | 1.75598056 | -1.78238043 | 0.63994521 |
| 183 | 3.5 | 0.03125 | 2.5 | 0.0625 | 0.8 | G0 | 0.25751239 | 1.80322321 | -2.12792938 | 5.39158330 | -7.48719778 | 5.94495750 | -2.27171937 |
| 184 | 3.5 | 0.03125 | 2.5 | 0.0625 | 0.8 | G1 | 0.01184103 | 0.17867940 | 2.23289114 | -3.22923329 | 4.01126222 | -2.84635811 | 0.52918861 |
| 185 | 3.5 | 0.0625 | 2.5 | 0.125 | 0.2 | G0 | 0.36850510 | 1.24468028 | 0.62343185 | -5.79431829 | 10.28233088 | -8.16589424 | 2.43737037 |
| 186 | 3.5 | 0.0625 | 2.5 | 0.125 | 0.2 | G1 | 0.03170473 | 0.23113084 | 1.98803714 | -2.85073900 | 2.27017044 | -1.47964141 | 0.44436523 |
| 187 | 3.5 | 0.0625 | 2.5 | 0.125 | 0.4 | G0 | 0.36471963 | 1.20080397 | 0.17182282 | -3.39553644 | 7.10548285 | -6.52240913 | 2.14481486 |

| Run ID | Y=O D/ID | a/l=a/2c | t/Ri | a/c | a/t | Gi | A0 | A1 | A2 | A3 | A4 | A5 | A6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 188 | 3.5 | 0.0625 | 2.5 | 0.125 | 0.4 | G1 | 0.03212645 | 0.21243396 | 1.98332298 | -2.88671170 | 2.90723016 | -2.34425234 | 0.76318928 |
| 189 | 3.5 | 0.0625 | 2.5 | 0.125 | 0.6 | G0 | 0.36368808 | 1.09021179 | 0.37816623 | -2.17286856 | 4.85534048 | -5.13722524 | 1.82934234 |
| 190 | 3.5 | 0.0625 | 2.5 | 0.125 | 0.6 | G1 | 0.03124096 | 0.18615290 | 2.08011344 | -3.15356639 | 4.03433577 | -3.66241545 | 1.21604490 |
| 191 | 3.5 | 0.0625 | 2.5 | 0.125 | 0.8 | G0 | 0.37209592 | 0.82235246 | 1.89783501 | -4.76988810 | 7.95250703 | -6.38000486 | 1.62544169 |
| 192 | 3.5 | 0.0625 | 2.5 | 0.125 | 0.8 | G1 | 0.03202932 | 0.12059015 | 2.54052042 | -4.58050823 | 6.81441423 | -5.45236105 | 1.41828086 |
| 193 | 3.5 | 0.125 | 2.5 | 0.25 | 0.2 | G0 | 0.55136419 | -0.10319566 | 4.98078754 | -13.51439198 | 17.68100914 | -11.76584487 | 3.13598383 |
| 194 | 3.5 | 0.125 | 2.5 | 0.25 | 0.2 | G1 | 0.06628731 | 0.19288357 | 1.83044025 | -2.24770286 | 1.25307506 | -0.66712360 | 0.20236123 |
| 195 | 3.5 | 0.125 | 2.5 | 0.25 | 0.4 | G0 | 0.56083624 | -0.18553289 | 5.22311577 | -13.74819413 | 18.39464975 | -12.67265242 | 3.46589373 |
| 196 | 3.5 | 0.125 | 2.5 | 0.25 | 0.4 | G1 | 0.07496549 | 0.14607311 | 2.01439463 | -2.67941880 | 2.08841478 | -1.42314207 | 0.43786161 |
| 197 | 3.5 | 0.125 | 2.5 | 0.25 | 0.6 | G0 | 0.57302228 | -0.37492848 | 6.30086242 | -16.22624878 | 22.88473758 | -16.73762958 | 4.77289000 |
| 198 | 3.5 | 0.125 | 2.5 | 0.25 | 0.6 | G1 | 0.07944522 | 0.07874044 | 2.43616744 | -3.91527170 | 4.54887122 | -3.59875326 | 1.09899657 |
| 199 | 3.5 | 0.125 | 2.5 | 0.25 | 0.8 | G0 | 0.58905382 | -0.63207467 | 8.05174868 | -20.83655551 | 31.28514971 | -23.57153648 | 6.62919724 |
| 200 | 3.5 | 0.125 | 2.5 | 0.25 | 0.8 | G1 | 0.08305159 | -0.02040335 | 3.22972660 | -6.56261294 | 9.63005374 | -7.52036084 | 2.05107441 |
| 201 | 3.5 | 0.25 | 2.5 | 0.5 | 0.2 | G0 | 0.76413490 | -0.62638371 | 3.90471122 | -7.42263263 | 7.57389779 | -4.24480553 | 1.00294576 |
| 202 | 3.5 | 0.25 | 2.5 | 0.5 | 0.2 | G1 | 0.10599876 | 0.32438116 | 1.04717801 | -0.60165246 | -0.58601599 | 0.41707791 | -0.05910793 |
| 203 | 3.5 | 0.25 | 2.5 | 0.5 | 0.4 | G0 | 0.77501391 | -0.69207773 | 4.24002750 | -8.02495755 | 8.30890774 | -4.77282371 | 1.15339069 |
| 204 | 3.5 | 0.25 | 2.5 | 0.5 | 0.4 | G1 | 0.11861659 | 0.26105633 | 1.28420830 | -1.04146465 | -0.06283609 | 0.06702646 | 0.03532797 |
| 205 | 3.5 | 0.25 | 2.5 | 0.5 | 0.6 | G0 | 0.81911305 | -0.88058008 | 5.33616545 | -10.48202814 | 11.87628181 | -7.48349079 | 1.92886692 |
| 206 | 3.5 | 0.25 | 2.5 | 0.5 | 0.6 | G1 | 0.13898290 | 0.16538022 | 1.78953265 | -2.19103036 | 1.62300534 | -1.19565079 | 0.38585345 |
| 207 | 3.5 | 0.25 | 2.5 | 0.5 | 0.8 | G0 | 0.87349879 | -1.12628558 | 7.10291512 | -15.08176877 | 19.56348895 | -13.47380618 | 3.54519177 |
| 208 | 3.5 | 0.25 | 2.5 | 0.5 | 0.8 | G1 | 0.16166149 | 0.02638655 | 2.77512921 | -4.96597026 | 6.22145516 | -4.58353312 | 1.22295643 |
| 209 | 3.5 | 0.5 | 2.5 | 1 | 0.2 | G0 | 1.03245179 | -0.60118276 | 2.14099832 | -4.35827983 | 5.18175394 | -3.31272923 | 0.87313377 |
| 210 | 3.5 | 0.5 | 2.5 | 1 | 0.2 | G1 | 0.14829719 | 0.55167870 | 1.20653427 | -2.47245833 | 2.22621473 | -1.30140078 | 0.34298383 |
| 211 | 3.5 | 0.5 | 2.5 | 1 | 0.4 | G0 | 0.99853323 | -0.50094591 | 2.15284674 | -4.71431172 | 5.79555246 | -3.76915568 | 1.00181116 |
| 212 | 3.5 | 0.5 | 2.5 | 1 | 0.4 | G1 | 0.14885244 | 0.51061910 | 1.45839974 | -3.07910253 | 2.99340840 | -1.80194055 | 0.47499106 |
| 213 | 3.5 | 0.5 | 2.5 | 1 | 0.6 | G0 | 1.02832218 | -0.51691773 | 2.53831838 | -5.71942167 | 7.11970498 | -4.66409988 | 1.24173415 |
| 214 | 3.5 | 0.5 | 2.5 | 1 | 0.6 | G1 | 0.16720062 | 0.45482140 | 1.77692457 | -3.77924542 | 3.85449228 | -2.36366589 | 0.62230465 |
| 215 | 3.5 | 0.5 | 2.5 | 1 | 0.8 | G0 | 1.09423194 | -0.57340456 | 3.46274005 | -8.32679351 | 11.18178178 | -7.73282663 | 2.09566418 |

| Run ID | Y=O D/ID | a/l=a/2c | t/Ri | a/c | a/t | Gi | A0 | A1 | A2 | A3 | A4 | A5 | A6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 216 | 3.5 | 0.5 | 2.5 | 1 | 0.8 | G1 | 0.19647730 | 0.39309654 | 2.32621015 | -5.20120940 | 6.00264354 | -3.91584551 | 1.02095906 |
| 217 | 3.5 | 1 | 2.5 | 2 | 0.2 | G0 | 0.72356831 | -0.31279124 | 0.78402573 | -2.01354416 | 2.11966870 | -1.28812570 | 0.46177962 |
| 218 | 3.5 | 1 | 2.5 | 2 | 0.2 | G1 | 0.08691723 | 0.52977602 | 0.66465242 | -1.35662946 | 0.03553615 | 0.48529053 | -0.05620886 |
| 219 | 3.5 | 1 | 2.5 | 2 | 0.4 | G0 | 0.68018042 | -0.12059639 | 0.45125390 | -1.76982253 | 2.14344494 | -1.44446533 | 0.53349821 |
| 220 | 3.5 | 1 | 2.5 | 2 | 0.4 | G1 | 0.08102843 | 0.53204886 | 0.77001975 | -1.71577639 | 0.57095731 | 0.08388834 | 0.06567224 |
| 221 | 3.5 | 1 | 2.5 | 2 | 0.6 | G0 | 0.66823104 | 0.00541220 | 0.20332740 | -1.49797073 | 1.93400254 | -1.33197326 | 0.50513280 |
| 222 | 3.5 | 1 | 2.5 | 2 | 0.6 | G1 | 0.08280423 | 0.53229936 | 0.84091586 | -1.91529799 | 0.80389909 | -0.04153128 | 0.09100255 |
| 223 | 3.5 | 1 | 2.5 | 2 | 0.8 | G0 | 0.67469278 | 0.12662386 | -0.01978738 | -1.16520013 | 1.57296687 | -1.12285340 | 0.45951356 |
| 224 | 3.5 | 1 | 2.5 | 2 | 0.8 | G1 | 0.08879538 | 0.54806291 | 0.88314632 | -2.01340814 | 0.91441189 | -0.10690075 | 0.10409507 |
| 225 | 4.0 | 0.01563 | 3.0 | 0.03125 | 0.2 | G0 | 0.18547202 | 3.11057541 | -8.84961869 | 19.31092175 | -24.89865950 | 16.58472942 | -4.45324306 |
| 226 | 4.0 | 0.01563 | 3.0 | 0.03125 | 0.2 | G1 | 0.00231744 | 0.25653048 | 2.00358637 | -2.88820186 | 2.46035681 | -1.77348613 | 0.57287067 |
| 227 | 4.0 | 0.01563 | 3.0 | 0.03125 | 0.4 | G0 | 0.19098864 | 2.80414478 | -7.70771254 | 17.97998444 | -24.57862285 | 17.13602104 | -4.79485400 |
| 228 | 4.0 | 0.01563 | 3.0 | 0.03125 | 0.4 | G1 | 0.00237141 | 0.25019218 | 1.85558092 | -2.21842890 | 1.51508682 | -1.14974563 | 0.39772519 |
| 229 | 4.0 | 0.01563 | 3.0 | 0.03125 | 0.6 | G0 | 0.19320826 | 2.53833454 | -5.86362852 | 13.08755545 | -16.95876972 | 11.21944971 | -3.06664555 |
| 230 | 4.0 | 0.01563 | 3.0 | 0.03125 | 0.6 | G1 | 0.00308904 | 0.21549052 | 2.06283601 | -2.84701700 | 2.97321865 | -2.49361910 | 0.79560766 |
| 231 | 4.0 | 0.01563 | 3.0 | 0.03125 | 0.8 | G0 | 0.19358480 | 2.33602802 | -4.09371829 | 7.98916585 | -8.52968371 | 5.43576127 | -1.88240519 |
| 232 | 4.0 | 0.01563 | 3.0 | 0.03125 | 0.8 | G1 | 0.00459469 | 0.15420646 | 2.55444240 | -4.45520056 | 5.84258612 | -4.09496366 | 0.85887401 |
| 233 | 4.0 | 0.03125 | 3.0 | 0.0625 | 0.2 | G0 | 0.24720794 | 2.39058440 | -4.97206063 | 8.31310721 | -8.52684236 | 4.50028898 | -0.96307349 |
| 234 | 4.0 | 0.03125 | 3.0 | 0.0625 | 0.2 | G1 | 0.01104962 | 0.24536366 | 2.03607144 | -3.09059867 | 2.82096333 | -2.01790069 | 0.62785216 |
| 235 | 4.0 | 0.03125 | 3.0 | 0.0625 | 0.4 | G0 | 0.24443276 | 2.26923955 | -5.39462809 | 12.22900154 | -16.25933478 | 10.82282588 | -2.87807936 |
| 236 | 4.0 | 0.03125 | 3.0 | 0.0625 | 0.4 | G1 | 0.00992293 | 0.25094987 | 1.77654207 | -2.13144122 | 1.66610430 | -1.43974126 | 0.52213597 |
| 237 | 4.0 | 0.03125 | 3.0 | 0.0625 | 0.6 | G0 | 0.24612768 | 2.01718660 | -4.01109936 | 9.87294678 | -13.91438147 | 9.66184472 | -2.71950656 |
| 238 | 4.0 | 0.03125 | 3.0 | 0.0625 | 0.6 | G1 | 0.00975417 | 0.22872222 | 1.82170098 | -2.07507417 | 1.90570402 | -1.80482311 | 0.62571451 |
| 239 | 4.0 | 0.03125 | 3.0 | 0.0625 | 0.8 | G0 | 0.25009298 | 1.70482168 | -1.56416146 | 3.14154727 | -3.63764476 | 2.91321826 | -1.35578968 |
| 240 | 4.0 | 0.03125 | 3.0 | 0.0625 | 0.8 | G1 | 0.01108954 | 0.16234404 | 2.31556719 | -3.58600383 | 4.52402492 | -3.17716468 | 0.61669406 |
| 241 | 4.0 | 0.0625 | 3.0 | 0.125 | 0.2 | G0 | 0.36277550 | 1.22559920 | 0.49574269 | -5.29794905 | 9.53588326 | -7.63948990 | 2.29370419 |
| 242 | 4.0 | 0.0625 | 3.0 | 0.125 | 0.2 | G1 | 0.03057249 | 0.22676585 | 1.96147612 | -2.79216221 | 2.21510359 | -1.45307882 | 0.43923895 |
| 243 | 4.0 | 0.0625 | 3.0 | 0.125 | 0.4 | G0 | 0.35409348 | 1.15893828 | 0.17753672 | -3.14384392 | 6.43352428 | -5.87781836 | 1.93448104 |

| Run ID | Y=O D/ID | a/l=a/2c | t/Ri | a/c | a/t | Gi | A0 | A1 | A2 | A3 | A4 | A5 | A6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 244 | 4.0 | 0.0625 | 3.0 | 0.125 | 0.4 | G1 | 0.02976098 | 0.20471449 | 1.96188699 | -2.79881845 | 2.73607704 | -2.19598497 | 0.71821198 |
| 245 | 4.0 | 0.0625 | 3.0 | 0.125 | 0.6 | G0 | 0.34968652 | 1.04221725 | 0.52051592 | -2.43679216 | 4.84955123 | -4.84279262 | 1.67959935 |
| 246 | 4.0 | 0.0625 | 3.0 | 0.125 | 0.6 | G1 | 0.02834809 | 0.17896644 | 2.06512803 | -3.07741810 | 3.80744553 | -3.41855825 | 1.13209867 |
| 247 | 4.0 | 0.0625 | 3.0 | 0.125 | 0.8 | G0 | 0.35519756 | 0.77962283 | 2.14120992 | -5.65851479 | 9.07486815 | -6.95956287 | 1.72981997 |
| 248 | 4.0 | 0.0625 | 3.0 | 0.125 | 0.8 | G1 | 0.02886281 | 0.11429980 | 2.53929746 | -4.57907674 | 6.67500551 | -5.24728190 | 1.34088624 |
| 249 | 4.0 | 0.125 | 3.0 | 0.25 | 0.2 | G0 | 0.54177352 | -0.10213025 | 4.88072715 | -13.22156312 | 17.30795923 | -11.53480075 | 3.07884946 |
| 250 | 4.0 | 0.125 | 3.0 | 0.25 | 0.2 | G1 | 0.06449996 | 0.18964689 | 1.81571695 | -2.21364041 | 1.22204752 | -0.65309245 | 0.19976385 |
| 251 | 4.0 | 0.125 | 3.0 | 0.25 | 0.4 | G0 | 0.54079908 | -0.17648901 | 5.12303564 | -13.42469163 | 17.90672733 | -12.32102130 | 3.36812430 |
| 252 | 4.0 | 0.125 | 3.0 | 0.25 | 0.4 | G1 | 0.07011886 | 0.14295812 | 2.00196106 | -2.63475432 | 2.02565597 | -1.38022522 | 0.42624880 |
| 253 | 4.0 | 0.125 | 3.0 | 0.25 | 0.6 | G0 | 0.54350469 | -0.33168719 | 6.10462593 | -15.75053349 | 22.17055390 | -16.19231802 | 4.61479065 |
| 254 | 4.0 | 0.125 | 3.0 | 0.25 | 0.6 | G1 | 0.07187740 | 0.08373172 | 2.40136126 | -3.83780770 | 4.43337335 | -3.50723337 | 1.07174197 |
| 255 | 4.0 | 0.125 | 3.0 | 0.25 | 0.8 | G0 | 0.55181384 | -0.53934014 | 7.65816605 | -19.97235724 | 30.02708130 | -22.60088590 | 6.34229245 |
| 256 | 4.0 | 0.125 | 3.0 | 0.25 | 0.8 | G1 | 0.07358329 | -0.00384598 | 3.15059266 | -6.40817384 | 9.40246086 | -7.33480615 | 1.99450260 |
| 257 | 4.0 | 0.25 | 3.0 | 0.5 | 0.2 | G0 | 0.74939836 | -0.60493298 | 3.83632618 | -7.29251246 | 7.43134603 | -4.16173940 | 0.98290771 |
| 258 | 4.0 | 0.25 | 3.0 | 0.5 | 0.2 | G1 | 0.10299474 | 0.32298465 | 1.04781609 | -0.60217424 | -0.58556896 | 0.41723555 | -0.05925322 |
| 259 | 4.0 | 0.25 | 3.0 | 0.5 | 0.4 | G0 | 0.75131941 | -0.64891230 | 4.15899329 | -7.92026252 | 8.22771948 | -4.74071412 | 1.14821736 |
| 260 | 4.0 | 0.25 | 3.0 | 0.5 | 0.4 | G1 | 0.11340225 | 0.26070481 | 1.30269802 | -1.09216526 | 0.00416316 | 0.02244605 | 0.04706407 |
| 261 | 4.0 | 0.25 | 3.0 | 0.5 | 0.6 | G0 | 0.78160765 | -0.78837376 | 5.15041476 | -10.28125229 | 11.79003016 | -7.49468625 | 1.94183216 |
| 262 | 4.0 | 0.25 | 3.0 | 0.5 | 0.6 | G1 | 0.12959521 | 0.17580348 | 1.79987403 | -2.27156029 | 1.76480768 | -1.30228818 | 0.41526211 |
| 263 | 4.0 | 0.25 | 3.0 | 0.5 | 0.8 | G0 | 0.81980253 | -0.96194683 | 6.70481863 | -14.60343245 | 19.34211000 | -13.49674860 | 3.57803899 |
| 264 | 4.0 | 0.25 | 3.0 | 0.5 | 0.8 | G1 | 0.14721391 | 0.05441856 | 2.75321870 | -5.06351305 | 6.47533879 | -4.80121150 | 1.28650018 |
| 265 | 4.0 | 0.5 | 3.0 | 1 | 0.2 | G0 | 1.01106016 | -0.55582600 | 2.09455307 | -4.37033540 | 5.25959527 | -3.38477541 | 0.89525243 |
| 266 | 4.0 | 0.5 | 3.0 | 1 | 0.2 | G1 | 0.14382446 | 0.54992803 | 1.24611689 | -2.58598364 | 2.38048395 | -1.40598248 | 0.37117542 |
| 267 | 4.0 | 0.5 | 3.0 | 1 | 0.4 | G0 | 0.97163756 | -0.41615792 | 1.99461271 | -4.52898819 | 5.65381846 | -3.70434247 | 0.98822656 |
| 268 | 4.0 | 0.5 | 3.0 | 1 | 0.4 | G1 | 0.14356014 | 0.51453846 | 1.48618203 | -3.17152295 | 3.11566908 | -1.88007622 | 0.49491435 |
| 269 | 4.0 | 0.5 | 3.0 | 1 | 0.6 | G0 | 0.99407486 | -0.38242238 | 2.22939681 | -5.26288565 | 6.68473543 | -4.42281004 | 1.18281181 |
| 270 | 4.0 | 0.5 | 3.0 | 1 | 0.6 | G1 | 0.16004858 | 0.47045164 | 1.77601739 | -3.82553545 | 3.92263884 | -2.40303694 | 0.63049783 |
| 271 | 4.0 | 0.5 | 3.0 | 1 | 0.8 | G0 | 1.04965946 | -0.37649930 | 2.97623553 | -7.60406922 | 10.55614860 | -7.43201387 | 2.02991545 |

| Run ID | Y=O D/ID | a/l=a/2c | t/Ri | a/c | a/t | Gi | A0 | A1 | A2 | A3 | A4 | A5 | A6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 272 | 4.0 | 0.5 | 3.0 | 1 | 0.8 | G1 | 0.18671177 | 0.42032128 | 2.32014466 | -5.30583087 | 6.20806863 | -4.06964728 | 1.06198086 |
| 273 | 4.0 | 1 | 3.0 | 2 | 0.2 | G0 | 0.70976587 | -0.26512065 | 0.71415616 | -1.98525344 | 2.16630063 | -1.35230980 | 0.48543784 |
| 274 | 4.0 | 1 | 3.0 | 2 | 0.2 | G1 | 0.08430153 | 0.53166680 | 0.68935487 | -1.44463617 | 0.16849387 | 0.38559211 | -0.02625232 |
| 275 | 4.0 | 1 | 3.0 | 2 | 0.4 | G0 | 0.66306661 | -0.04024268 | 0.26403041 | -1.51418583 | 1.93652847 | -1.35805934 | 0.52066198 |
| 276 | 4.0 | 1 | 3.0 | 2 | 0.4 | G1 | 0.07805148 | 0.53845109 | 0.77972475 | -1.77666632 | 0.67350468 | 0.00184712 | 0.09187597 |
| 277 | 4.0 | 1 | 3.0 | 2 | 0.6 | G0 | 0.64984582 | 0.10724535 | -0.07173200 | -1.06005634 | 1.50987787 | -1.10498075 | 0.45443914 |
| 278 | 4.0 | 1 | 3.0 | 2 | 0.6 | G1 | 0.07975309 | 0.54215598 | 0.83883493 | -1.95400134 | 0.87344176 | -0.09403284 | 0.10681434 |
| 279 | 4.0 | 1 | 3.0 | 2 | 0.8 | G0 | 0.65538852 | 0.24627846 | -0.36277048 | -0.58966363 | 0.98319725 | -0.78189929 | 0.37501580 |
| 280 | 4.0 | 1 | 3.0 | 2 | 0.8 | G1 | 0.08582457 | 0.55957513 | 0.88219374 | -2.06452611 | 0.99344416 | -0.15157658 | 0.11252735 |

## APPENDIX B - AXIAL INTERNAL FULL-WIDTH CRACK RESULTS

The internal axial full-width crack has a constant G value along the crack front to model an infinitely long partial-depth crack, so only the A0 polynomial coefficient value is reported for the non-dimensional geometry factor G results. There are 5 load cases for the full-width crack: G0 is the uniform crack face pressure, G1 is the linear crack face pressure, G2 is the quadratic crack face pressure, G3 is the cubic crack face pressure, and G4 is the quartic ($4^{th}$ order) crack face pressure.

**Table 2. Non-dimensional Geometry Polynomial Coefficient Values for Axial Internal Full-Width Cracks**

| Run ID | Y=OD/ID | t/Ri | a/t | Gi | A0 |
|---|---|---|---|---|---|
| 301 | 2 | 1 | 0.2 | G0 | 1.15882634 |
| 302 | 2 | 1 | 0.2 | G1 | 0.69868014 |
| 303 | 2 | 1 | 0.2 | G2 | 0.53489320 |
| 304 | 2 | 1 | 0.2 | G3 | 0.44740833 |
| 305 | 2 | 1 | 0.2 | G4 | 0.39156371 |
| 306 | 2 | 1 | 0.4 | G0 | 1.32423266 |
| 307 | 2 | 1 | 0.4 | G1 | 0.76305588 |
| 308 | 2 | 1 | 0.4 | G2 | 0.57118634 |
| 309 | 2 | 1 | 0.4 | G3 | 0.47143448 |
| 310 | 2 | 1 | 0.4 | G4 | 0.40897512 |
| 311 | 2 | 1 | 0.6 | G0 | 1.55252331 |
| 312 | 2 | 1 | 0.6 | G1 | 0.85639239 |
| 313 | 2 | 1 | 0.6 | G2 | 0.62541133 |
| 314 | 2 | 1 | 0.6 | G3 | 0.50804517 |
| 315 | 2 | 1 | 0.6 | G4 | 0.43587232 |
| 316 | 2 | 1 | 0.8 | G0 | 1.93730719 |
| 317 | 2 | 1 | 0.8 | G1 | 1.03909236 |
| 318 | 2 | 1 | 0.8 | G2 | 0.74025823 |
| 319 | 2 | 1 | 0.8 | G3 | 0.58944872 |
| 320 | 2 | 1 | 0.8 | G4 | 0.49768814 |
| 321 | 2.5 | 1.5 | 0.2 | G0 | 1.09593519 |
| 322 | 2.5 | 1.5 | 0.2 | G1 | 0.67419243 |
| 323 | 2.5 | 1.5 | 0.2 | G2 | 0.52113179 |
| 324 | 2.5 | 1.5 | 0.2 | G3 | 0.43834312 |
| 325 | 2.5 | 1.5 | 0.2 | G4 | 0.38503308 |
| 326 | 2.5 | 1.5 | 0.4 | G0 | 1.19544059 |
| 327 | 2.5 | 1.5 | 0.4 | G1 | 0.71429548 |
| 328 | 2.5 | 1.5 | 0.4 | G2 | 0.54424695 |
| 329 | 2.5 | 1.5 | 0.4 | G3 | 0.45388079 |
| 330 | 2.5 | 1.5 | 0.4 | G4 | 0.39641962 |
| 331 | 2.5 | 1.5 | 0.6 | G0 | 1.36393029 |
| 332 | 2.5 | 1.5 | 0.6 | G1 | 0.78760630 |
| 333 | 2.5 | 1.5 | 0.6 | G2 | 0.58828799 |
| 334 | 2.5 | 1.5 | 0.6 | G3 | 0.48424064 |
| 335 | 2.5 | 1.5 | 0.6 | G4 | 0.41904421 |

| Run ID | Y=OD/ID | t/Ri | a/t | Gi | A0 |
|---|---|---|---|---|---|
| 336 | 2.5 | 1.5 | 0.8 | G0 | 1.71240592 |
| 337 | 2.5 | 1.5 | 0.8 | G1 | 0.96005231 |
| 338 | 2.5 | 1.5 | 0.8 | G2 | 0.69871611 |
| 339 | 2.5 | 1.5 | 0.8 | G3 | 0.56334099 |
| 340 | 2.5 | 1.5 | 0.8 | G4 | 0.47952416 |
| 341 | 3 | 2 | 0.2 | G0 | 1.05018068 |
| 342 | 3 | 2 | 0.2 | G1 | 0.65645208 |
| 343 | 3 | 2 | 0.2 | G2 | 0.51118837 |
| 344 | 3 | 2 | 0.2 | G3 | 0.43180494 |
| 345 | 3 | 2 | 0.2 | G4 | 0.38032975 |
| 346 | 3 | 2 | 0.4 | G0 | 1.11779278 |
| 347 | 3 | 2 | 0.4 | G1 | 0.68499905 |
| 348 | 3 | 2 | 0.4 | G2 | 0.52808078 |
| 349 | 3 | 2 | 0.4 | G3 | 0.44334898 |
| 350 | 3 | 2 | 0.4 | G4 | 0.38888522 |
| 351 | 3 | 2 | 0.6 | G0 | 1.26093582 |
| 352 | 3 | 2 | 0.6 | G1 | 0.75002553 |
| 353 | 3 | 2 | 0.6 | G2 | 0.56795810 |
| 354 | 3 | 2 | 0.6 | G3 | 0.47116591 |
| 355 | 3 | 2 | 0.6 | G4 | 0.40977426 |
| 356 | 3 | 2 | 0.8 | G0 | 1.58927277 |
| 357 | 3 | 2 | 0.8 | G1 | 0.91617522 |
| 358 | 3 | 2 | 0.8 | G2 | 0.67535141 |
| 359 | 3 | 2 | 0.8 | G3 | 0.54848142 |
| 360 | 3 | 2 | 0.8 | G4 | 0.46907504 |
| 361 | 3.5 | 2.5 | 0.2 | G0 | 1.01577656 |
| 362 | 3.5 | 2.5 | 0.2 | G1 | 0.64317328 |
| 363 | 3.5 | 2.5 | 0.2 | G2 | 0.50376596 |
| 364 | 3.5 | 2.5 | 0.2 | G3 | 0.42693326 |
| 365 | 3.5 | 2.5 | 0.2 | G4 | 0.37683003 |
| 366 | 3.5 | 2.5 | 0.4 | G0 | 1.06625956 |
| 367 | 3.5 | 2.5 | 0.4 | G1 | 0.66561388 |
| 368 | 3.5 | 2.5 | 0.4 | G2 | 0.51739048 |
| 369 | 3.5 | 2.5 | 0.4 | G3 | 0.43638145 |
| 370 | 3.5 | 2.5 | 0.4 | G4 | 0.38389647 |
| 371 | 3.5 | 2.5 | 0.6 | G0 | 1.19549755 |
| 372 | 3.5 | 2.5 | 0.6 | G1 | 0.72606187 |
| 373 | 3.5 | 2.5 | 0.6 | G2 | 0.55492386 |
| 374 | 3.5 | 2.5 | 0.6 | G3 | 0.46273275 |
| 375 | 3.5 | 2.5 | 0.6 | G4 | 0.40375957 |
| 376 | 3.5 | 2.5 | 0.8 | G0 | 1.50884203 |
| 377 | 3.5 | 2.5 | 0.8 | G1 | 0.88698032 |
| 378 | 3.5 | 2.5 | 0.8 | G2 | 0.65954197 |
| 379 | 3.5 | 2.5 | 0.8 | G3 | 0.53827347 |

| Run ID | Y=OD/ID | t/Ri | a/t | Gi | A0 |
|---|---|---|---|---|---|
| 380 | 3.5 | 2.5 | 0.8 | G4 | 0.46179802 |
| 381 | 4 | 3 | 0.2 | G0 | 0.98909403 |
| 382 | 4 | 3 | 0.2 | G1 | 0.63292257 |
| 383 | 4 | 3 | 0.2 | G2 | 0.49805153 |
| 384 | 4 | 3 | 0.2 | G3 | 0.42318881 |
| 385 | 4 | 3 | 0.2 | G4 | 0.37414319 |
| 386 | 4 | 3 | 0.4 | G0 | 1.02953006 |
| 387 | 4 | 3 | 0.4 | G1 | 0.65182489 |
| 388 | 4 | 3 | 0.4 | G2 | 0.50978292 |
| 389 | 4 | 3 | 0.4 | G3 | 0.43141548 |
| 390 | 4 | 3 | 0.4 | G4 | 0.38033383 |
| 391 | 4 | 3 | 0.6 | G0 | 1.14957244 |
| 392 | 4 | 3 | 0.6 | G1 | 0.70911352 |
| 393 | 4 | 3 | 0.6 | G2 | 0.54562022 |
| 394 | 4 | 3 | 0.6 | G3 | 0.45665577 |
| 395 | 4 | 3 | 0.6 | G4 | 0.39938500 |
| 396 | 4 | 3 | 0.8 | G0 | 1.45083851 |
| 397 | 4 | 3 | 0.8 | G1 | 0.86553019 |
| 398 | 4 | 3 | 0.8 | G2 | 0.64773533 |
| 399 | 4 | 3 | 0.8 | G3 | 0.53053936 |
| 400 | 4 | 3 | 0.8 | G4 | 0.45621310 |

## APPENDIX C - CIRCUMFERENTIAL INTERNAL SURFACE CRACK RESULTS

Some of the circumferential surface crack cases have an a/c ratio that gives a crack length that is longer than the inside cylinder circumference and are indicated by the "too long" label in the A0 column. There are 4 load cases for the circumferential internal surface cracks: G0 is the uniform crack face pressure, G1 is the linear crack face pressure, G5 is the in-plane bending about the z-axis, and G6 is the out-of-plane bending about the y-axis.

**Table 3. Non-Dimensional Geometry Polynomial Coefficient Values for Circumferential Internal Surface Cracks**

| Run ID | Y = OD/ID | a/l = a/(2*c) | t/Ri | a/c | a/t | Gi | A0 | A1 | A2 | A3 | A4 | A5 | A6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 501 | 2 | 0.015625 | 1 | 0.03125 | 0.2 | G0 | too long | | | | | | |
| 502 | 2 | 0.015625 | 1 | 0.03125 | 0.2 | G1 | too long | | | | | | |
| 503 | 2 | 0.015625 | 1 | 0.03125 | 0.2 | G5 | too long | | | | | | |
| 504 | 2 | 0.015625 | 1 | 0.03125 | 0.2 | G6 | too long | | | | | | |
| 505 | 2 | 0.015625 | 1 | 0.03125 | 0.4 | G0 | too long | | | | | | |
| 506 | 2 | 0.015625 | 1 | 0.03125 | 0.4 | G1 | too long | | | | | | |
| 507 | 2 | 0.015625 | 1 | 0.03125 | 0.4 | G5 | too long | | | | | | |
| 508 | 2 | 0.015625 | 1 | 0.03125 | 0.4 | G6 | too long | | | | | | |
| 509 | 2 | 0.015625 | 1 | 0.03125 | 0.6 | G0 | too long | | | | | | |
| 510 | 2 | 0.015625 | 1 | 0.03125 | 0.6 | G1 | too long | | | | | | |
| 511 | 2 | 0.015625 | 1 | 0.03125 | 0.6 | G5 | too long | | | | | | |
| 512 | 2 | 0.015625 | 1 | 0.03125 | 0.6 | G6 | too long | | | | | | |
| 513 | 2 | 0.015625 | 1 | 0.03125 | 0.8 | G0 | too long | | | | | | |
| 514 | 2 | 0.015625 | 1 | 0.03125 | 0.8 | G1 | too long | | | | | | |
| 515 | 2 | 0.015625 | 1 | 0.03125 | 0.8 | G5 | too long | | | | | | |
| 516 | 2 | 0.015625 | 1 | 0.03125 | 0.8 | G6 | too long | | | | | | |
| 517 | 2 | 0.03125 | 1 | 0.0625 | 0.2 | G0 | too long | | | | | | |
| 518 | 2 | 0.03125 | 1 | 0.0625 | 0.2 | G1 | too long | | | | | | |
| 519 | 2 | 0.03125 | 1 | 0.0625 | 0.2 | G5 | too long | | | | | | |
| 520 | 2 | 0.03125 | 1 | 0.0625 | 0.2 | G6 | too long | | | | | | |
| 521 | 2 | 0.03125 | 1 | 0.0625 | 0.4 | G0 | too long | | | | | | |

| Run ID | Y = OD/ID | a/l = a/(2*c) | t/Ri | a/c | a/t | Gi | A0 | A1 | A2 | A3 | A4 | A5 | A6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 522 | 2 | 0.03125 | 1 | 0.0625 | 0.4 | G1 | too long | | | | | | |
| 523 | 2 | 0.03125 | 1 | 0.0625 | 0.4 | G5 | too long | | | | | | |
| 524 | 2 | 0.03125 | 1 | 0.0625 | 0.4 | G6 | too long | | | | | | |
| 525 | 2 | 0.03125 | 1 | 0.0625 | 0.6 | G0 | too long | | | | | | |
| 526 | 2 | 0.03125 | 1 | 0.0625 | 0.6 | G1 | too long | | | | | | |
| 527 | 2 | 0.03125 | 1 | 0.0625 | 0.6 | G5 | too long | | | | | | |
| 528 | 2 | 0.03125 | 1 | 0.0625 | 0.6 | G6 | too long | | | | | | |
| 529 | 2 | 0.03125 | 1 | 0.0625 | 0.8 | G0 | too long | | | | | | |
| 530 | 2 | 0.03125 | 1 | 0.0625 | 0.8 | G1 | too long | | | | | | |
| 531 | 2 | 0.03125 | 1 | 0.0625 | 0.8 | G5 | too long | | | | | | |
| 532 | 2 | 0.03125 | 1 | 0.0625 | 0.8 | G6 | too long | | | | | | |
| 533 | 2 | 0.0625 | 1 | 0.125 | 0.2 | G0 | 0.19649274 | 3.37733430 | -9.04160150 | 17.69306300 | -20.69529400 | 12.69972600 | -3.18510930 |
| 534 | 2 | 0.0625 | 1 | 0.125 | 0.2 | G1 | -0.00074471 | 0.49819628 | 0.98011019 | -0.50201097 | -0.65581682 | 0.34714344 | -0.01059897 |
| 535 | 2 | 0.0625 | 1 | 0.125 | 0.2 | G5 | 0.05076255 | -0.41471368 | 2.18877769 | -2.80158448 | 5.16759968 | -5.45534182 | 1.83888936 |
| 536 | 2 | 0.0625 | 1 | 0.125 | 0.2 | G6 | -0.06548428 | -1.99423277 | 5.26439524 | -9.59685135 | 10.54757500 | -4.29201365 | 0.13440895 |
| 537 | 2 | 0.0625 | 1 | 0.125 | 0.4 | G0 | too long | | | | | | |
| 538 | 2 | 0.0625 | 1 | 0.125 | 0.4 | G1 | too long | | | | | | |
| 539 | 2 | 0.0625 | 1 | 0.125 | 0.4 | G5 | too long | | | | | | |
| 540 | 2 | 0.0625 | 1 | 0.125 | 0.4 | G6 | too long | | | | | | |
| 541 | 2 | 0.0625 | 1 | 0.125 | 0.6 | G0 | too long | | | | | | |
| 542 | 2 | 0.0625 | 1 | 0.125 | 0.6 | G1 | too long | | | | | | |
| 543 | 2 | 0.0625 | 1 | 0.125 | 0.6 | G5 | too long | | | | | | |
| 544 | 2 | 0.0625 | 1 | 0.125 | 0.6 | G6 | too long | | | | | | |
| 545 | 2 | 0.0625 | 1 | 0.125 | 0.8 | G0 | too long | | | | | | |
| 546 | 2 | 0.0625 | 1 | 0.125 | 0.8 | G1 | too long | | | | | | |
| 547 | 2 | 0.0625 | 1 | 0.125 | 0.8 | G5 | too long | | | | | | |
| 548 | 2 | 0.0625 | 1 | 0.125 | 0.8 | G6 | too long | | | | | | |
| 549 | 2 | 0.125 | 1 | 0.25 | 0.2 | G0 | 0.55321667 | 0.00499976 | 5.04611220 | -13.89330800 | 18.38340300 | -12.42087500 | 3.36444610 |

| Run ID | Y = OD/ID | a/l = a/(2*c) | t/Ri | a/c | a/t | Gi | A0 | A1 | A2 | A3 | A4 | A5 | A6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 550 | 2 | 0.125 | 1 | 0.25 | 0.2 | G1 | 0.06601916 | 0.14320361 | 2.27338590 | -3.37082090 | 2.88318110 | -1.90879140 | 0.57335766 |
| 551 | 2 | 0.125 | 1 | 0.25 | 0.2 | G5 | 0.22125046 | 0.01275979 | 1.70743024 | -2.97587609 | 3.08260393 | -1.98212373 | 0.51110494 |
| 552 | 2 | 0.125 | 1 | 0.25 | 0.2 | G6 | -0.16802326 | -0.20809902 | -0.39143783 | 1.22647643 | 0.06445879 | -0.85528576 | 0.33176917 |
| 553 | 2 | 0.125 | 1 | 0.25 | 0.4 | G0 | 0.55428525 | -0.03257189 | 5.19051830 | -14.13169900 | 18.82193900 | -12.85158100 | 3.50854280 |
| 554 | 2 | 0.125 | 1 | 0.25 | 0.4 | G1 | 0.06993267 | 0.11431817 | 2.39582300 | -3.64446480 | 3.33784250 | -2.29695680 | 0.69476067 |
| 555 | 2 | 0.125 | 1 | 0.25 | 0.4 | G5 | 0.05541613 | -0.08763640 | 0.98594451 | -0.74947619 | 3.77270913 | -5.32121086 | 1.98037887 |
| 556 | 2 | 0.125 | 1 | 0.25 | 0.4 | G6 | -0.25582391 | -0.24717997 | -1.16426694 | 1.62267137 | 1.07896447 | -1.03807724 | 0.00359404 |
| 557 | 2 | 0.125 | 1 | 0.25 | 0.6 | G0 | 0.61588512 | -0.70013620 | 8.82797100 | -23.71499500 | 32.86583100 | -23.05300900 | 6.34053650 |
| 558 | 2 | 0.125 | 1 | 0.25 | 0.6 | G1 | 0.08274508 | 0.05150389 | 2.70040460 | -4.43783820 | 4.80338330 | -3.48679590 | 1.01390600 |
| 559 | 2 | 0.125 | 1 | 0.25 | 0.6 | G5 | -0.13358672 | -0.14164990 | 0.03646374 | -1.60219097 | 13.34926320 | -16.08569530 | 5.30606604 |
| 560 | 2 | 0.125 | 1 | 0.25 | 0.6 | G6 | -0.23288402 | 0.04200742 | -2.42181110 | 2.44174027 | -3.16710281 | 7.50414705 | -4.16763163 |
| 561 | 2 | 0.125 | 1 | 0.25 | 0.8 | G0 | too long | | | | | | |
| 562 | 2 | 0.125 | 1 | 0.25 | 0.8 | G1 | too long | | | | | | |
| 563 | 2 | 0.125 | 1 | 0.25 | 0.8 | G5 | too long | | | | | | |
| 564 | 2 | 0.125 | 1 | 0.25 | 0.8 | G6 | too long | | | | | | |
| 565 | 2 | 0.25 | 1 | 0.5 | 0.2 | G0 | 0.85881481 | -1.15056840 | 6.29662000 | -12.68848900 | 14.14480000 | -8.61031830 | 2.18547720 |
| 566 | 2 | 0.25 | 1 | 0.5 | 0.2 | G1 | 0.12563289 | 0.25876498 | 1.26694950 | -0.86615338 | -0.30934566 | 0.19078773 | 0.01502248 |
| 567 | 2 | 0.25 | 1 | 0.5 | 0.2 | G5 | 0.41677868 | -0.46341327 | 2.63733959 | -4.31297112 | 3.75420403 | -1.79655230 | 0.34687549 |
| 568 | 2 | 0.25 | 1 | 0.5 | 0.2 | G6 | -0.13245851 | 0.17288898 | -0.97940302 | 2.47610712 | -2.87156105 | 1.87285531 | -0.53847873 |
| 569 | 2 | 0.25 | 1 | 0.5 | 0.4 | G0 | 0.88051950 | -1.40166200 | 7.16675310 | -13.92566700 | 15.01166100 | -8.89328100 | 2.21395210 |
| 570 | 2 | 0.25 | 1 | 0.5 | 0.4 | G1 | 0.13480417 | 0.20574039 | 1.30394130 | -0.58617056 | -0.86440987 | 0.58551975 | -0.08730737 |
| 571 | 2 | 0.25 | 1 | 0.5 | 0.4 | G5 | 0.37010863 | -0.44175080 | 2.35250902 | -2.55272770 | 1.20839095 | -0.23571736 | -0.04787424 |
| 572 | 2 | 0.25 | 1 | 0.5 | 0.4 | G6 | -0.25180075 | 0.25236878 | -1.27133942 | 1.71472728 | 0.41308653 | -1.30927885 | 0.45207837 |
| 573 | 2 | 0.25 | 1 | 0.5 | 0.6 | G0 | 0.92243052 | -1.66348930 | 8.29401380 | -15.79819800 | 16.79460400 | -9.80128910 | 2.38512600 |
| 574 | 2 | 0.25 | 1 | 0.5 | 0.6 | G1 | 0.15343450 | 0.12752278 | 1.53103740 | -0.73722549 | -0.85833197 | 0.63322401 | -0.11881369 |
| 575 | 2 | 0.25 | 1 | 0.5 | 0.6 | G5 | 0.29522789 | -0.43427217 | 2.32641625 | -2.44894719 | 2.88631439 | -2.77088642 | 0.90281934 |
| 576 | 2 | 0.25 | 1 | 0.5 | 0.6 | G6 | -0.35251528 | 0.40962321 | -2.26963449 | 2.84874582 | 0.52551568 | -1.59893095 | 0.43711805 |
| 577 | 2 | 0.25 | 1 | 0.5 | 0.8 | G0 | 1.01731240 | -2.16607470 | 10.86521700 | -21.77887500 | 25.30667400 | -15.49565900 | 3.66635520 |

| Run ID | Y = OD/ID | a/l = a/(2*c) | t/Ri | a/c | a/t | Gi | A0 | A1 | A2 | A3 | A4 | A5 | A6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 578 | 2 | 0.25 | 1 | 0.5 | 0.8 | G1 | 0.19397957 | -0.05496712 | 2.39876610 | -2.71204760 | 2.01307120 | -1.11127120 | 0.14427680 |
| 579 | 2 | 0.25 | 1 | 0.5 | 0.8 | G5 | 0.21550036 | -0.47345656 | 2.34733653 | -2.97424316 | 6.63729382 | -6.72655821 | 1.95150518 |
| 580 | 2 | 0.25 | 1 | 0.5 | 0.8 | G6 | -0.42708507 | 0.58638257 | -3.47327685 | 4.55162239 | -1.63083088 | 1.27090025 | -0.87773633 |
| 581 | 2 | 0.5 | 1 | 1 | 0.2 | G0 | 1.18516770 | -1.09929630 | 3.18058390 | -5.67853190 | 6.80507320 | -4.64985730 | 1.30315780 |
| 582 | 2 | 0.5 | 1 | 1 | 0.2 | G1 | 0.18548478 | 0.54220433 | 0.85646416 | -1.55484840 | 1.55525160 | -1.23029830 | 0.39031056 |
| 583 | 2 | 0.5 | 1 | 1 | 0.2 | G5 | 0.60149241 | -0.44069922 | 1.24031258 | -1.38515496 | 0.73684633 | -0.09635632 | -0.06107924 |
| 584 | 2 | 0.5 | 1 | 1 | 0.2 | G6 | -0.07669394 | 0.07709739 | -0.25231397 | 0.58493042 | -0.58525288 | 0.39052314 | -0.13793841 |
| 585 | 2 | 0.5 | 1 | 1 | 0.4 | G0 | 1.21641530 | -1.40283950 | 4.12793150 | -7.27444410 | 8.99830410 | -6.51551690 | 1.93076470 |
| 586 | 2 | 0.5 | 1 | 1 | 0.4 | G1 | 0.19981964 | 0.45843849 | 1.04207670 | -2.04946030 | 2.85122360 | -2.62584890 | 0.89004787 |
| 587 | 2 | 0.5 | 1 | 1 | 0.4 | G5 | 0.61719823 | -0.53129077 | 1.74985409 | -2.20923209 | 2.08585715 | -1.44844139 | 0.42557576 |
| 588 | 2 | 0.5 | 1 | 1 | 0.4 | G6 | -0.15915775 | 0.15577149 | -0.73802626 | 2.29646277 | -3.39995623 | 2.73681259 | -0.89152199 |
| 589 | 2 | 0.5 | 1 | 1 | 0.6 | G0 | 1.26592160 | -1.66174680 | 4.69281960 | -7.27967080 | 8.25366830 | -5.92317000 | 1.79208590 |
| 590 | 2 | 0.5 | 1 | 1 | 0.6 | G1 | 0.22172688 | 0.38638722 | 1.06139540 | -1.74190170 | 2.61421380 | -2.73543880 | 0.99215332 |
| 591 | 2 | 0.5 | 1 | 1 | 0.6 | G5 | 0.63152319 | -0.61328870 | 2.07570505 | -2.23096228 | 2.17216492 | -1.87390351 | 0.63966829 |
| 592 | 2 | 0.5 | 1 | 1 | 0.6 | G6 | -0.23835558 | 0.19012679 | -0.71080625 | 0.84017789 | 0.81346309 | -1.40442944 | 0.51039743 |
| 593 | 2 | 0.5 | 1 | 1 | 0.8 | G0 | 1.35634050 | -1.98396540 | 5.56454560 | -7.61133130 | 7.60329000 | -4.98711580 | 1.37135860 |
| 594 | 2 | 0.5 | 1 | 1 | 0.8 | G1 | 0.26132523 | 0.28076494 | 1.24597870 | -1.60941020 | 2.36474720 | -2.48488640 | 0.83742341 |
| 595 | 2 | 0.5 | 1 | 1 | 0.8 | G5 | 0.65977752 | -0.74442267 | 2.55064344 | -2.35186934 | 2.43933678 | -2.27869701 | 0.72055477 |
| 596 | 2 | 0.5 | 1 | 1 | 0.8 | G6 | -0.31731346 | 0.17899653 | -0.73247898 | 0.85855752 | 0.22045177 | 0.07285667 | -0.28134304 |
| 597 | 2 | 1 | 1 | 2 | 0.2 | G0 | 0.81915040 | -0.59310586 | 1.09038750 | -1.83535670 | 1.27315870 | -0.14389109 | -0.07501270 |
| 598 | 2 | 1 | 1 | 2 | 0.2 | G1 | 0.10968072 | 0.54623183 | 0.30486184 | -0.28256785 | -1.66949530 | 2.15351230 | -0.73308185 |
| 599 | 2 | 1 | 1 | 2 | 0.2 | G5 | 0.41764531 | -0.21887805 | 0.38630128 | -0.25046086 | -0.75132233 | 1.16886055 | -0.44143927 |
| 600 | 2 | 1 | 1 | 2 | 0.2 | G6 | -0.02251883 | 0.02624558 | -0.12124907 | 0.39920595 | -0.56780356 | 0.42017520 | -0.13190424 |
| 601 | 2 | 1 | 1 | 2 | 0.4 | G0 | 0.83949460 | -0.72978530 | 1.70202020 | -3.55557680 | 4.14237130 | -2.36067920 | 0.53882358 |
| 602 | 2 | 1 | 1 | 2 | 0.4 | G1 | 0.11907706 | 0.51324353 | 0.46429587 | -0.98788437 | -0.22999952 | 1.03551600 | -0.45693894 |
| 603 | 2 | 1 | 1 | 2 | 0.4 | G5 | 0.43741685 | -0.22982952 | 0.67602104 | -0.97041631 | 0.26317269 | 0.49755415 | -0.29393828 |
| 604 | 2 | 1 | 1 | 2 | 0.4 | G6 | -0.04719056 | 0.03762180 | -0.19999835 | 0.63549972 | -0.80068481 | 0.52885646 | -0.15264195 |
| 605 | 2 | 1 | 1 | 2 | 0.6 | G0 | 0.86471586 | -0.85887187 | 2.24853930 | -5.24316230 | 7.35775120 | -5.20566090 | 1.45150700 |

| Run ID | Y = OD/ID | a/l = a/(2*c) | t/Ri | a/c | a/t | Gi | A0 | A1 | A2 | A3 | A4 | A5 | A6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 606 | 2 | 1 | 1 | 2 | 0.6 | G1 | 0.13068870 | 0.47217210 | 0.68537243 | -2.00091070 | 1.96072590 | -0.91294547 | 0.14656567 |
| 607 | 2 | 1 | 1 | 2 | 0.6 | G5 | 0.45951390 | -0.24277386 | 0.94987589 | -1.78823149 | 1.80029333 | -0.85936081 | 0.13243902 |
| 608 | 2 | 1 | 1 | 2 | 0.6 | G6 | -0.07267569 | 0.04314246 | -0.36132285 | 1.35313988 | -2.05338669 | 1.58623886 | -0.49394289 |
| 609 | 2 | 1 | 1 | 2 | 0.8 | G0 | 0.89870316 | -0.97364907 | 2.66944620 | -6.09382470 | 8.74622800 | -6.34588290 | 1.77908220 |
| 610 | 2 | 1 | 1 | 2 | 0.8 | G1 | 0.14527745 | 0.44413317 | 0.81731916 | -2.51776720 | 3.15492960 | -1.96597090 | 0.44589195 |
| 611 | 2 | 1 | 1 | 2 | 0.8 | G5 | 0.48706251 | -0.26633135 | 1.28075337 | -2.57808161 | 3.14412737 | -1.96139956 | 0.44227570 |
| 612 | 2 | 1 | 1 | 2 | 0.8 | G6 | -0.09846215 | 0.04187309 | -0.56564039 | 2.13592911 | -3.16677308 | 2.34448934 | -0.68988210 |
| 613 | 2.5 | 0.015625 | 1.5 | 0.03125 | 0.2 | G0 | too long | | | | | | |
| 614 | 2.5 | 0.015625 | 1.5 | 0.03125 | 0.2 | G1 | too long | | | | | | |
| 615 | 2.5 | 0.015625 | 1.5 | 0.03125 | 0.2 | G5 | too long | | | | | | |
| 616 | 2.5 | 0.015625 | 1.5 | 0.03125 | 0.2 | G6 | too long | | | | | | |
| 617 | 2.5 | 0.015625 | 1.5 | 0.03125 | 0.4 | G0 | too long | | | | | | |
| 618 | 2.5 | 0.015625 | 1.5 | 0.03125 | 0.4 | G1 | too long | | | | | | |
| 619 | 2.5 | 0.015625 | 1.5 | 0.03125 | 0.4 | G5 | too long | | | | | | |
| 620 | 2.5 | 0.015625 | 1.5 | 0.03125 | 0.4 | G6 | too long | | | | | | |
| 621 | 2.5 | 0.015625 | 1.5 | 0.03125 | 0.6 | G0 | too long | | | | | | |
| 622 | 2.5 | 0.015625 | 1.5 | 0.03125 | 0.6 | G1 | too long | | | | | | |
| 623 | 2.5 | 0.015625 | 1.5 | 0.03125 | 0.6 | G5 | too long | | | | | | |
| 624 | 2.5 | 0.015625 | 1.5 | 0.03125 | 0.6 | G6 | too long | | | | | | |
| 625 | 2.5 | 0.015625 | 1.5 | 0.03125 | 0.8 | G0 | too long | | | | | | |
| 626 | 2.5 | 0.015625 | 1.5 | 0.03125 | 0.8 | G1 | too long | | | | | | |
| 627 | 2.5 | 0.015625 | 1.5 | 0.03125 | 0.8 | G5 | too long | | | | | | |
| 628 | 2.5 | 0.015625 | 1.5 | 0.03125 | 0.8 | G6 | too long | | | | | | |
| 629 | 2.5 | 0.03125 | 1.5 | 0.0625 | 0.2 | G0 | too long | | | | | | |
| 630 | 2.5 | 0.03125 | 1.5 | 0.0625 | 0.2 | G1 | too long | | | | | | |
| 631 | 2.5 | 0.03125 | 1.5 | 0.0625 | 0.2 | G5 | too long | | | | | | |
| 632 | 2.5 | 0.03125 | 1.5 | 0.0625 | 0.2 | G6 | too long | | | | | | |
| 633 | 2.5 | 0.03125 | 1.5 | 0.0625 | 0.4 | G0 | too long | | | | | | |

| Run ID | Y = OD/ID | a/l = a/(2*c) | t/Ri | a/c | a/t | Gi | A0 | A1 | A2 | A3 | A4 | A5 | A6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 634 | 2.5 | 0.03125 | 1.5 | 0.0625 | 0.4 | G1 | too long | | | | | | |
| 635 | 2.5 | 0.03125 | 1.5 | 0.0625 | 0.4 | G5 | too long | | | | | | |
| 636 | 2.5 | 0.03125 | 1.5 | 0.0625 | 0.4 | G6 | too long | | | | | | |
| 637 | 2.5 | 0.03125 | 1.5 | 0.0625 | 0.6 | G0 | too long | | | | | | |
| 638 | 2.5 | 0.03125 | 1.5 | 0.0625 | 0.6 | G1 | too long | | | | | | |
| 639 | 2.5 | 0.03125 | 1.5 | 0.0625 | 0.6 | G5 | too long | | | | | | |
| 640 | 2.5 | 0.03125 | 1.5 | 0.0625 | 0.6 | G6 | too long | | | | | | |
| 641 | 2.5 | 0.03125 | 1.5 | 0.0625 | 0.8 | G0 | too long | | | | | | |
| 642 | 2.5 | 0.03125 | 1.5 | 0.0625 | 0.8 | G1 | too long | | | | | | |
| 643 | 2.5 | 0.03125 | 1.5 | 0.0625 | 0.8 | G5 | too long | | | | | | |
| 644 | 2.5 | 0.03125 | 1.5 | 0.0625 | 0.8 | G6 | too long | | | | | | |
| 645 | 2.5 | 0.0625 | 1.5 | 0.125 | 0.2 | G0 | 0.18774621 | 3.36661390 | -9.17856760 | 17.90060600 | -20.87349600 | 12.81374200 | -3.21761250 |
| 646 | 2.5 | 0.0625 | 1.5 | 0.125 | 0.2 | G1 | -0.00177250 | 0.48884315 | 0.98141629 | -0.56663947 | -0.56909283 | 0.31730001 | -0.01010059 |
| 647 | 2.5 | 0.0625 | 1.5 | 0.125 | 0.2 | G5 | -0.00046244 | -1.46455455 | 5.20950079 | -10.57657810 | 18.10288430 | -15.15783600 | 4.34301901 |
| 648 | 2.5 | 0.0625 | 1.5 | 0.125 | 0.2 | G6 | -0.00392442 | -1.52984464 | 4.47631550 | -10.66211990 | 11.01471900 | -1.82530320 | -1.47247553 |
| 649 | 2.5 | 0.0625 | 1.5 | 0.125 | 0.4 | G0 | too long | | | | | | |
| 650 | 2.5 | 0.0625 | 1.5 | 0.125 | 0.4 | G1 | too long | | | | | | |
| 651 | 2.5 | 0.0625 | 1.5 | 0.125 | 0.4 | G5 | too long | | | | | | |
| 652 | 2.5 | 0.0625 | 1.5 | 0.125 | 0.4 | G6 | too long | | | | | | |
| 653 | 2.5 | 0.0625 | 1.5 | 0.125 | 0.6 | G0 | too long | | | | | | |
| 654 | 2.5 | 0.0625 | 1.5 | 0.125 | 0.6 | G1 | too long | | | | | | |
| 655 | 2.5 | 0.0625 | 1.5 | 0.125 | 0.6 | G5 | too long | | | | | | |
| 656 | 2.5 | 0.0625 | 1.5 | 0.125 | 0.6 | G6 | too long | | | | | | |
| 657 | 2.5 | 0.0625 | 1.5 | 0.125 | 0.8 | G0 | too long | | | | | | |
| 658 | 2.5 | 0.0625 | 1.5 | 0.125 | 0.8 | G1 | too long | | | | | | |
| 659 | 2.5 | 0.0625 | 1.5 | 0.125 | 0.8 | G5 | too long | | | | | | |
| 660 | 2.5 | 0.0625 | 1.5 | 0.125 | 0.8 | G6 | too long | | | | | | |
| 661 | 2.5 | 0.125 | 1.5 | 0.25 | 0.2 | G0 | 0.53725990 | -0.00953219 | 4.98940410 | -13.79002000 | 18.28857100 | -12.36156100 | 3.34792630 |

| Run ID | Y = OD/ID | a/l = a/(2*c) | t/Ri | a/c | a/t | Gi | A0 | A1 | A2 | A3 | A4 | A5 | A6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 662 | 2.5 | 0.125 | 1.5 | 0.25 | 0.2 | G1 | 0.06228560 | 0.13551549 | 2.25323240 | -3.32146210 | 2.81907070 | -1.86011960 | 0.55885482 |
| 663 | 2.5 | 0.125 | 1.5 | 0.25 | 0.2 | G5 | 0.11214997 | -0.02551663 | 1.06219792 | -1.26913059 | 1.96823907 | -2.12050009 | 0.73902094 |
| 664 | 2.5 | 0.125 | 1.5 | 0.25 | 0.2 | G6 | -0.17763962 | -0.19045973 | -0.68984467 | 1.58166003 | -0.06302226 | -0.65573961 | 0.19501855 |
| 665 | 2.5 | 0.125 | 1.5 | 0.25 | 0.4 | G0 | 0.53351433 | -0.13574455 | 5.68861460 | -15.84655100 | 21.56682100 | -14.87986200 | 4.07827860 |
| 666 | 2.5 | 0.125 | 1.5 | 0.25 | 0.4 | G1 | 0.06589056 | 0.07850637 | 2.52063940 | -4.05949540 | 3.99749590 | -2.77419610 | 0.82467923 |
| 667 | 2.5 | 0.125 | 1.5 | 0.25 | 0.4 | G5 | -0.09609125 | -0.26808685 | 0.59711313 | -2.31416273 | 11.21741100 | -12.80532260 | 4.18690157 |
| 668 | 2.5 | 0.125 | 1.5 | 0.25 | 0.4 | G6 | -0.15326022 | -0.19383532 | -0.76894224 | -0.72907066 | 1.09147525 | 3.20764351 | -2.45511961 |
| 669 | 2.5 | 0.125 | 1.5 | 0.25 | 0.6 | G0 | too long | | | | | | |
| 670 | 2.5 | 0.125 | 1.5 | 0.25 | 0.6 | G1 | too long | | | | | | |
| 671 | 2.5 | 0.125 | 1.5 | 0.25 | 0.6 | G5 | too long | | | | | | |
| 672 | 2.5 | 0.125 | 1.5 | 0.25 | 0.6 | G6 | too long | | | | | | |
| 673 | 2.5 | 0.125 | 1.5 | 0.25 | 0.8 | G0 | too long | | | | | | |
| 674 | 2.5 | 0.125 | 1.5 | 0.25 | 0.8 | G1 | too long | | | | | | |
| 675 | 2.5 | 0.125 | 1.5 | 0.25 | 0.8 | G5 | too long | | | | | | |
| 676 | 2.5 | 0.125 | 1.5 | 0.25 | 0.8 | G6 | too long | | | | | | |
| 677 | 2.5 | 0.25 | 1.5 | 0.5 | 0.2 | G0 | 0.84361568 | -1.21867180 | 6.47493220 | -12.77243700 | 13.92032700 | -8.30750330 | 2.07650060 |
| 678 | 2.5 | 0.25 | 1.5 | 0.5 | 0.2 | G1 | 0.12162194 | 0.24869525 | 1.20728880 | -0.56920620 | -0.77822464 | 0.51976044 | -0.07350034 |
| 679 | 2.5 | 0.25 | 1.5 | 0.5 | 0.2 | G5 | 0.30777779 | -0.34701511 | 1.95274186 | -2.68839002 | 1.86615193 | -0.68546367 | 0.07556582 |
| 680 | 2.5 | 0.25 | 1.5 | 0.5 | 0.2 | G6 | -0.15405028 | 0.21293604 | -1.12971926 | 1.95219326 | -0.57356334 | -0.73727322 | 0.42987692 |
| 681 | 2.5 | 0.25 | 1.5 | 0.5 | 0.4 | G0 | 0.84746040 | -1.50397000 | 7.58804270 | -14.53309400 | 15.31691200 | -8.83452030 | 2.14118250 |
| 682 | 2.5 | 0.25 | 1.5 | 0.5 | 0.4 | G1 | 0.12595639 | 0.18975397 | 1.23767010 | -0.16540008 | -1.59212570 | 1.13197620 | -0.24346957 |
| 683 | 2.5 | 0.25 | 1.5 | 0.5 | 0.4 | G5 | 0.20486668 | -0.28251952 | 1.59643698 | -1.60430396 | 2.04592085 | -2.14378953 | 0.73802465 |
| 684 | 2.5 | 0.25 | 1.5 | 0.5 | 0.4 | G6 | -0.27243036 | 0.30789793 | -1.75319588 | 2.22510290 | 0.36087656 | -1.17788196 | 0.30949572 |
| 685 | 2.5 | 0.25 | 1.5 | 0.5 | 0.6 | G0 | 0.87922837 | -1.85594590 | 9.39470260 | -18.55239200 | 20.55481700 | -12.35889400 | 3.05183180 |
| 686 | 2.5 | 0.25 | 1.5 | 0.5 | 0.6 | G1 | 0.14243915 | 0.08262551 | 1.62546500 | -0.76876212 | -0.84684983 | 0.61428756 | -0.11932603 |
| 687 | 2.5 | 0.25 | 1.5 | 0.5 | 0.6 | G5 | 0.06435868 | -0.19544724 | 1.03749871 | -1.69483304 | 6.86317444 | -8.22262287 | 2.80726099 |
| 688 | 2.5 | 0.25 | 1.5 | 0.5 | 0.6 | G6 | -0.32937259 | 0.45423812 | -2.63216710 | 2.18869305 | 1.48308313 | -0.86729991 | -0.29734308 |
| 689 | 2.5 | 0.25 | 1.5 | 0.5 | 0.8 | G0 | 0.96912906 | -2.52904450 | 13.10681300 | -28.69528600 | 36.30705400 | -23.38937600 | 5.67862190 |

| Run ID | Y = OD/ID | a/l = a/(2*c) | t/Ri | a/c | a/t | Gi | A0 | A1 | A2 | A3 | A4 | A5 | A6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 690 | 2.5 | 0.25 | 1.5 | 0.5 | 0.8 | G1 | 0.18161513 | -0.16621665 | 2.88163310 | -4.16527970 | 4.55552420 | -2.95583910 | 0.56801657 |
| 691 | 2.5 | 0.25 | 1.5 | 0.5 | 0.8 | G5 | -0.06931113 | -0.18537630 | 0.82250035 | -4.96696138 | 18.15073200 | -17.92926600 | 5.05257797 |
| 692 | 2.5 | 0.25 | 1.5 | 0.5 | 0.8 | G6 | -0.31219241 | 0.56357229 | -3.57192612 | 4.60710382 | -7.80544138 | 12.44617940 | -5.92781258 |
| 693 | 2.5 | 0.5 | 1.5 | 1 | 0.2 | G0 | 1.17677920 | -1.17929860 | 3.38624030 | -6.03012980 | 7.68418750 | -5.71644980 | 1.72951980 |
| 694 | 2.5 | 0.5 | 1.5 | 1 | 0.2 | G1 | 0.18501752 | 0.51642840 | 0.92509988 | -1.91961450 | 2.62445090 | -2.39270580 | 0.81184730 |
| 695 | 2.5 | 0.5 | 1.5 | 1 | 0.2 | G5 | 0.47719061 | -0.35497195 | 1.06299806 | -1.17842841 | 0.88260925 | -0.52314055 | 0.14063437 |
| 696 | 2.5 | 0.5 | 1.5 | 1 | 0.2 | G6 | -0.09347811 | 0.08592588 | -0.32293838 | 1.03664601 | -1.70330453 | 1.57560635 | -0.57866705 |
| 697 | 2.5 | 0.5 | 1.5 | 1 | 0.4 | G0 | 1.19466860 | -1.50815640 | 4.20745520 | -6.30323540 | 6.95405300 | -4.97251940 | 1.51343590 |
| 698 | 2.5 | 0.5 | 1.5 | 1 | 0.4 | G1 | 0.19671192 | 0.43612210 | 0.89947740 | -1.43452620 | 2.21129960 | -2.44565410 | 0.91112676 |
| 699 | 2.5 | 0.5 | 1.5 | 1 | 0.4 | G5 | 0.47147620 | -0.42652062 | 1.50146580 | -1.59222198 | 1.59820926 | -1.44610322 | 0.50685233 |
| 700 | 2.5 | 0.5 | 1.5 | 1 | 0.4 | G6 | -0.18821560 | 0.15177707 | -0.58453751 | 0.70426452 | 0.64889395 | -1.16349757 | 0.43178517 |
| 701 | 2.5 | 0.5 | 1.5 | 1 | 0.6 | G0 | 1.23420040 | -1.79243690 | 4.85039980 | -5.93563920 | 5.11904510 | -3.35834820 | 1.04122690 |
| 702 | 2.5 | 0.5 | 1.5 | 1 | 0.6 | G1 | 0.21815877 | 0.35588956 | 0.84329829 | -0.61892699 | 1.06002330 | -1.85897380 | 0.81490247 |
| 703 | 2.5 | 0.5 | 1.5 | 1 | 0.6 | G5 | 0.45345756 | -0.51050967 | 1.95138848 | -2.22503948 | 3.37519145 | -3.62899947 | 1.32539022 |
| 704 | 2.5 | 0.5 | 1.5 | 1 | 0.6 | G6 | -0.27888751 | 0.19419462 | -1.08591950 | 1.99827409 | -1.51623893 | 1.30962765 | -0.62120831 |
| 705 | 2.5 | 0.5 | 1.5 | 1 | 0.8 | G0 | 1.33568760 | -2.23831640 | 6.19174340 | -6.74290970 | 4.50202220 | -1.98038830 | 0.32779888 |
| 706 | 2.5 | 0.5 | 1.5 | 1 | 0.8 | G1 | 0.26759258 | 0.19344782 | 1.12892810 | -0.28916696 | 0.18530310 | -0.92997055 | 0.38680086 |
| 707 | 2.5 | 0.5 | 1.5 | 1 | 0.8 | G5 | 0.44671473 | -0.66049057 | 2.28013849 | -1.84060371 | 3.42279601 | -3.97891355 | 1.30041695 |
| 708 | 2.5 | 0.5 | 1.5 | 1 | 0.8 | G6 | -0.36094892 | 0.17584641 | -0.94390053 | 0.13547128 | 1.97124314 | -0.58385783 | -0.39426357 |
| 709 | 2.5 | 1 | 1.5 | 2 | 0.2 | G0 | 0.82060851 | -0.62609736 | 1.21717410 | -2.14946380 | 1.81040540 | -0.52031648 | 0.00035669 |
| 710 | 2.5 | 1 | 1.5 | 2 | 0.2 | G1 | 0.11174871 | 0.53887177 | 0.33736972 | -0.48043962 | -1.24014070 | 1.86105380 | -0.68690628 |
| 711 | 2.5 | 1 | 1.5 | 2 | 0.2 | G5 | 0.33763194 | -0.17031381 | 0.41946834 | -0.54702246 | -0.03443527 | 0.50303352 | -0.23459953 |
| 712 | 2.5 | 1 | 1.5 | 2 | 0.2 | G6 | -0.02755898 | 0.02655404 | -0.13439566 | 0.44467759 | -0.61952704 | 0.45435602 | -0.14238560 |
| 713 | 2.5 | 1 | 1.5 | 2 | 0.4 | G0 | 0.84159689 | -0.80297612 | 2.06440610 | -4.76109110 | 6.58115470 | -4.56734090 | 1.24761560 |
| 714 | 2.5 | 1 | 1.5 | 2 | 0.4 | G1 | 0.12325645 | 0.48685499 | 0.63036056 | -1.85572290 | 1.71838490 | -0.70690303 | 0.07957894 |
| 715 | 2.5 | 1 | 1.5 | 2 | 0.4 | G5 | 0.35625681 | -0.17290640 | 0.71555662 | -1.36384618 | 1.35792446 | -0.62331969 | 0.08532079 |
| 716 | 2.5 | 1 | 1.5 | 2 | 0.4 | G6 | -0.05788959 | 0.03537443 | -0.30057275 | 1.14771938 | -1.80093336 | 1.43363929 | -0.45626363 |
| 717 | 2.5 | 1 | 1.5 | 2 | 0.6 | G0 | 0.86751968 | -0.93897585 | 2.46703010 | -5.59421300 | 8.21016040 | -6.12900670 | 1.76827610 |

| Run ID | Y = OD/ID | a/l = a/(2*c) | t/Ri | a/c | a/t | Gi | A0 | A1 | A2 | A3 | A4 | A5 | A6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 718 | 2.5 | 1 | 1.5 | 2 | 0.6 | G1 | 0.13700908 | 0.44637736 | 0.73162281 | -2.38873770 | 3.19847360 | -2.17359890 | 0.55425060 |
| 719 | 2.5 | 1 | 1.5 | 2 | 0.6 | G5 | 0.37549600 | -0.16332278 | 0.75053322 | -1.13411462 | 1.04303885 | -0.45642600 | 0.02521256 |
| 720 | 2.5 | 1 | 1.5 | 2 | 0.6 | G6 | -0.08866137 | 0.03134145 | -0.52183628 | 1.87341845 | -2.55950499 | 1.73492360 | -0.46810448 |
| 721 | 2.5 | 1 | 1.5 | 2 | 0.8 | G0 | 0.90929627 | -1.09197210 | 3.05009420 | -6.85205310 | 10.49534400 | -8.21087050 | 2.44127580 |
| 722 | 2.5 | 1 | 1.5 | 2 | 0.8 | G1 | 0.15779737 | 0.39687258 | 0.92377728 | -3.11677120 | 4.99886410 | -3.90826330 | 1.10835490 |
| 723 | 2.5 | 1 | 1.5 | 2 | 0.8 | G5 | 0.40270487 | -0.19432773 | 1.06024325 | -1.83396482 | 2.59010911 | -1.97603440 | 0.51214755 |
| 724 | 2.5 | 1 | 1.5 | 2 | 0.8 | G6 | -0.11934244 | -0.02338026 | -0.34172607 | 0.96085942 | -0.47017461 | -0.12743814 | 0.12262033 |
| 725 | 3 | 0.015625 | 2 | 0.03125 | 0.2 | G0 | too long | | | | | | |
| 726 | 3 | 0.015625 | 2 | 0.03125 | 0.2 | G1 | too long | | | | | | |
| 727 | 3 | 0.015625 | 2 | 0.03125 | 0.2 | G5 | too long | | | | | | |
| 728 | 3 | 0.015625 | 2 | 0.03125 | 0.2 | G6 | too long | | | | | | |
| 729 | 3 | 0.015625 | 2 | 0.03125 | 0.4 | G0 | too long | | | | | | |
| 730 | 3 | 0.015625 | 2 | 0.03125 | 0.4 | G1 | too long | | | | | | |
| 731 | 3 | 0.015625 | 2 | 0.03125 | 0.4 | G5 | too long | | | | | | |
| 732 | 3 | 0.015625 | 2 | 0.03125 | 0.4 | G6 | too long | | | | | | |
| 733 | 3 | 0.015625 | 2 | 0.03125 | 0.6 | G0 | too long | | | | | | |
| 734 | 3 | 0.015625 | 2 | 0.03125 | 0.6 | G1 | too long | | | | | | |
| 735 | 3 | 0.015625 | 2 | 0.03125 | 0.6 | G5 | too long | | | | | | |
| 736 | 3 | 0.015625 | 2 | 0.03125 | 0.6 | G6 | too long | | | | | | |
| 737 | 3 | 0.015625 | 2 | 0.03125 | 0.8 | G0 | too long | | | | | | |
| 738 | 3 | 0.015625 | 2 | 0.03125 | 0.8 | G1 | too long | | | | | | |
| 739 | 3 | 0.015625 | 2 | 0.03125 | 0.8 | G5 | too long | | | | | | |
| 740 | 3 | 0.015625 | 2 | 0.03125 | 0.8 | G6 | too long | | | | | | |
| 741 | 3 | 0.03125 | 2 | 0.0625 | 0.2 | G0 | too long | | | | | | |
| 742 | 3 | 0.03125 | 2 | 0.0625 | 0.2 | G1 | too long | | | | | | |
| 743 | 3 | 0.03125 | 2 | 0.0625 | 0.2 | G5 | too long | | | | | | |
| 744 | 3 | 0.03125 | 2 | 0.0625 | 0.2 | G6 | too long | | | | | | |
| 745 | 3 | 0.03125 | 2 | 0.0625 | 0.4 | G0 | too long | | | | | | |

| Run ID | Y = OD/ID | a/l = a/(2*c) | t/Ri | a/c | a/t | Gi | A0 | A1 | A2 | A3 | A4 | A5 | A6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 746 | 3 | 0.03125 | 2 | 0.0625 | 0.4 | G1 | too long | | | | | | |
| 747 | 3 | 0.03125 | 2 | 0.0625 | 0.4 | G5 | too long | | | | | | |
| 748 | 3 | 0.03125 | 2 | 0.0625 | 0.4 | G6 | too long | | | | | | |
| 749 | 3 | 0.03125 | 2 | 0.0625 | 0.6 | G0 | too long | | | | | | |
| 750 | 3 | 0.03125 | 2 | 0.0625 | 0.6 | G1 | too long | | | | | | |
| 751 | 3 | 0.03125 | 2 | 0.0625 | 0.6 | G5 | too long | | | | | | |
| 752 | 3 | 0.03125 | 2 | 0.0625 | 0.6 | G6 | too long | | | | | | |
| 753 | 3 | 0.03125 | 2 | 0.0625 | 0.8 | G0 | too long | | | | | | |
| 754 | 3 | 0.03125 | 2 | 0.0625 | 0.8 | G1 | too long | | | | | | |
| 755 | 3 | 0.03125 | 2 | 0.0625 | 0.8 | G5 | too long | | | | | | |
| 756 | 3 | 0.03125 | 2 | 0.0625 | 0.8 | G6 | too long | | | | | | |
| 757 | 3 | 0.0625 | 2 | 0.125 | 0.2 | G0 | too long | | | | | | |
| 758 | 3 | 0.0625 | 2 | 0.125 | 0.2 | G1 | too long | | | | | | |
| 759 | 3 | 0.0625 | 2 | 0.125 | 0.2 | G5 | too long | | | | | | |
| 760 | 3 | 0.0625 | 2 | 0.125 | 0.2 | G6 | too long | | | | | | |
| 761 | 3 | 0.0625 | 2 | 0.125 | 0.4 | G0 | too long | | | | | | |
| 762 | 3 | 0.0625 | 2 | 0.125 | 0.4 | G1 | too long | | | | | | |
| 763 | 3 | 0.0625 | 2 | 0.125 | 0.4 | G5 | too long | | | | | | |
| 764 | 3 | 0.0625 | 2 | 0.125 | 0.4 | G6 | too long | | | | | | |
| 765 | 3 | 0.0625 | 2 | 0.125 | 0.6 | G0 | too long | | | | | | |
| 766 | 3 | 0.0625 | 2 | 0.125 | 0.6 | G1 | too long | | | | | | |
| 767 | 3 | 0.0625 | 2 | 0.125 | 0.6 | G5 | too long | | | | | | |
| 768 | 3 | 0.0625 | 2 | 0.125 | 0.6 | G6 | too long | | | | | | |
| 769 | 3 | 0.0625 | 2 | 0.125 | 0.8 | G0 | too long | | | | | | |
| 770 | 3 | 0.0625 | 2 | 0.125 | 0.8 | G1 | too long | | | | | | |
| 771 | 3 | 0.0625 | 2 | 0.125 | 0.8 | G5 | too long | | | | | | |
| 772 | 3 | 0.0625 | 2 | 0.125 | 0.8 | G6 | too long | | | | | | |
| 773 | 3 | 0.125 | 2 | 0.25 | 0.2 | G0 | 0.52303107 | -0.00343024 | 4.87819010 | -13.58102100 | 18.06545000 | -12.21787800 | 3.30842450 |

| Run ID | Y = OD/ID | a/l = a/(2*c) | t/Ri | a/c | a/t | Gi | A0 | A1 | A2 | A3 | A4 | A5 | A6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 774 | 3 | 0.125 | 2 | 0.25 | 0.2 | G1 | 0.05940204 | 0.12975568 | 2.23892030 | -3.29216440 | 2.77994850 | -1.82619600 | 0.54773651 |
| 775 | 3 | 0.125 | 2 | 0.25 | 0.2 | G5 | 0.03169308 | -0.04903194 | 0.45566663 | 0.20296109 | 1.16078401 | -2.32888055 | 0.92025989 |
| 776 | 3 | 0.125 | 2 | 0.25 | 0.2 | G6 | -0.15882015 | -0.20781618 | -0.60546643 | 0.92767274 | 0.56886739 | -0.42032099 | -0.10436173 |
| 777 | 3 | 0.125 | 2 | 0.25 | 0.4 | G0 | too long | | | | | | |
| 778 | 3 | 0.125 | 2 | 0.25 | 0.4 | G1 | too long | | | | | | |
| 779 | 3 | 0.125 | 2 | 0.25 | 0.4 | G5 | too long | | | | | | |
| 780 | 3 | 0.125 | 2 | 0.25 | 0.4 | G6 | too long | | | | | | |
| 781 | 3 | 0.125 | 2 | 0.25 | 0.6 | G0 | too long | | | | | | |
| 782 | 3 | 0.125 | 2 | 0.25 | 0.6 | G1 | too long | | | | | | |
| 783 | 3 | 0.125 | 2 | 0.25 | 0.6 | G5 | too long | | | | | | |
| 784 | 3 | 0.125 | 2 | 0.25 | 0.6 | G6 | too long | | | | | | |
| 785 | 3 | 0.125 | 2 | 0.25 | 0.8 | G0 | too long | | | | | | |
| 786 | 3 | 0.125 | 2 | 0.25 | 0.8 | G1 | too long | | | | | | |
| 787 | 3 | 0.125 | 2 | 0.25 | 0.8 | G5 | too long | | | | | | |
| 788 | 3 | 0.125 | 2 | 0.25 | 0.8 | G6 | too long | | | | | | |
| 789 | 3 | 0.25 | 2 | 0.5 | 0.2 | G0 | 0.82996596 | -1.28526820 | 6.70219040 | -13.03829100 | 13.94719500 | -8.15751590 | 2.00149380 |
| 790 | 3 | 0.25 | 2 | 0.5 | 0.2 | G1 | 0.11808639 | 0.23784717 | 1.16745150 | -0.32566665 | -1.19596960 | 0.83279041 | -0.16270838 |
| 791 | 3 | 0.25 | 2 | 0.5 | 0.2 | G5 | 0.22848250 | -0.26221597 | 1.46359301 | -1.60139465 | 0.78236222 | -0.17446783 | -0.02262583 |
| 792 | 3 | 0.25 | 2 | 0.5 | 0.2 | G6 | -0.16182914 | 0.13820688 | -0.69444019 | 0.77105540 | 0.71330833 | -1.11902058 | 0.35247490 |
| 793 | 3 | 0.25 | 2 | 0.5 | 0.4 | G0 | 0.82456077 | -1.62712250 | 8.25163250 | -16.04966800 | 17.10200200 | -9.89510970 | 2.39256390 |
| 794 | 3 | 0.25 | 2 | 0.5 | 0.4 | G1 | 0.12024632 | 0.16396541 | 1.26414060 | -0.04407931 | -1.88882500 | 1.38423580 | -0.32128386 |
| 795 | 3 | 0.25 | 2 | 0.5 | 0.4 | G5 | 0.08132229 | -0.15026158 | 0.84751791 | -0.83660579 | 3.31717038 | -4.31093645 | 1.54053211 |
| 796 | 3 | 0.25 | 2 | 0.5 | 0.4 | G6 | -0.25731441 | 0.30456251 | -1.83058548 | 1.69076896 | 1.17957139 | -1.16013265 | 0.07297307 |
| 797 | 3 | 0.25 | 2 | 0.5 | 0.6 | G0 | 0.86096135 | -2.10231250 | 10.88624700 | -22.70784500 | 26.42522800 | -16.35601500 | 4.09060040 |
| 798 | 3 | 0.25 | 2 | 0.5 | 0.6 | G1 | 0.13907774 | 0.01473397 | 1.88833390 | -1.37325210 | -0.01332183 | 0.06565121 | 0.00751361 |
| 799 | 3 | 0.25 | 2 | 0.5 | 0.6 | G5 | -0.08225277 | -0.06752549 | 0.35834885 | -3.73531008 | 15.14156720 | -16.06050110 | 5.03608131 |
| 800 | 3 | 0.25 | 2 | 0.5 | 0.6 | G6 | -0.23510140 | 0.36045462 | -2.19789910 | 1.28375483 | -1.51760626 | 5.67287636 | -3.36742640 |
| 801 | 3 | 0.25 | 2 | 0.5 | 0.8 | G0 | too long | | | | | | |

| Run ID | Y = OD/ID | a/l = a/(2*c) | t/Ri | a/c | a/t | Gi | A0 | A1 | A2 | A3 | A4 | A5 | A6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 802 | 3 | 0.25 | 2 | 0.5 | 0.8 | G1 | too long | | | | | | |
| 803 | 3 | 0.25 | 2 | 0.5 | 0.8 | G5 | too long | | | | | | |
| 804 | 3 | 0.25 | 2 | 0.5 | 0.8 | G6 | too long | | | | | | |
| 805 | 3 | 0.5 | 2 | 1 | 0.2 | G0 | 1.16845310 | -1.25850720 | 3.52794260 | -5.72810680 | 6.76225720 | -4.86811620 | 1.45006080 |
| 806 | 3 | 0.5 | 2 | 1 | 0.2 | G1 | 0.18427408 | 0.49714981 | 0.88636134 | -1.67582460 | 2.33264770 | -2.25113830 | 0.78184213 |
| 807 | 3 | 0.5 | 2 | 1 | 0.2 | G5 | 0.39209375 | -0.30821952 | 1.01440203 | -1.16445732 | 1.01833653 | -0.72522515 | 0.22034070 |
| 808 | 3 | 0.5 | 2 | 1 | 0.2 | G6 | -0.10450943 | 0.10349040 | -0.53794920 | 1.84293628 | -3.00233197 | 2.54539728 | -0.84680688 |
| 809 | 3 | 0.5 | 2 | 1 | 0.4 | G0 | 1.17563740 | -1.60911760 | 4.33125450 | -5.44291990 | 4.85490220 | -3.21059190 | 0.98944531 |
| 810 | 3 | 0.5 | 2 | 1 | 0.4 | G1 | 0.19392965 | 0.41487997 | 0.75065569 | -0.69642868 | 1.19231750 | -1.86930630 | 0.79468419 |
| 811 | 3 | 0.5 | 2 | 1 | 0.4 | G5 | 0.36557415 | -0.34659374 | 1.20606565 | -0.74257988 | 0.63551372 | -0.96449184 | 0.40721846 |
| 812 | 3 | 0.5 | 2 | 1 | 0.4 | G6 | -0.20440835 | 0.09074152 | -0.32116273 | 0.08293387 | 0.90987295 | -0.54106426 | -0.01716332 |
| 813 | 3 | 0.5 | 2 | 1 | 0.6 | G0 | 1.21152680 | -1.95315200 | 5.20401100 | -5.05746560 | 2.23456380 | -0.59848966 | 0.13128570 |
| 814 | 3 | 0.5 | 2 | 1 | 0.6 | G1 | 0.21609208 | 0.31530286 | 0.67160037 | 0.54336836 | -0.89810235 | -0.45055306 | 0.42898526 |
| 815 | 3 | 0.5 | 2 | 1 | 0.6 | G5 | 0.31824330 | -0.44693521 | 1.67781377 | -1.65436220 | 3.50364161 | -4.25789070 | 1.55677474 |
| 816 | 3 | 0.5 | 2 | 1 | 0.6 | G6 | -0.29384607 | 0.12656048 | -0.64830411 | -0.35781986 | 2.56845045 | -1.34782028 | -0.04765812 |
| 817 | 3 | 0.5 | 2 | 1 | 0.8 | G0 | 1.32368420 | -2.57246770 | 7.42962080 | -8.10884280 | 4.87370780 | -1.40655800 | -0.07703320 |
| 818 | 3 | 0.5 | 2 | 1 | 0.8 | G1 | 0.27284634 | 0.07675564 | 1.24313310 | 0.32894653 | -1.10722100 | 0.14309946 | 0.02460122 |
| 819 | 3 | 0.5 | 2 | 1 | 0.8 | G5 | 0.27788791 | -0.68061101 | 2.44394088 | -3.63147831 | 8.82765388 | -9.08603382 | 2.79292440 |
| 820 | 3 | 0.5 | 2 | 1 | 0.8 | G6 | -0.36477563 | 0.19052516 | -1.16348803 | -0.52890110 | 2.65945315 | 0.40730241 | -1.20076156 |
| 821 | 3 | 1 | 2 | 2 | 0.2 | G0 | 0.82200894 | -0.65730546 | 1.32116430 | -2.38351980 | 2.24761220 | -0.86541941 | 0.08372799 |
| 822 | 3 | 1 | 2 | 2 | 0.2 | G1 | 0.11380396 | 0.53131199 | 0.36355429 | -0.66605912 | -0.78275223 | 1.49255120 | -0.59982831 |
| 823 | 3 | 1 | 2 | 2 | 0.2 | G5 | 0.28390253 | -0.13213556 | 0.37559778 | -0.49170521 | 0.00579923 | 0.41592839 | -0.20843308 |
| 824 | 3 | 1 | 2 | 2 | 0.2 | G6 | -0.03111196 | 0.02498739 | -0.12983467 | 0.41402084 | -0.54629731 | 0.39755568 | -0.12802979 |
| 825 | 3 | 1 | 2 | 2 | 0.4 | G0 | 0.84317279 | -0.86683038 | 2.27546650 | -5.19594150 | 7.41234300 | -5.32324900 | 1.48021570 |
| 826 | 3 | 1 | 2 | 2 | 0.4 | G1 | 0.12697159 | 0.46659497 | 0.68446833 | -2.18360810 | 2.61444400 | -1.55812920 | 0.34007843 |
| 827 | 3 | 1 | 2 | 2 | 0.4 | G5 | 0.30085221 | -0.13583645 | 0.68535912 | -1.33326244 | 1.52567840 | -0.88211632 | 0.17717969 |
| 828 | 3 | 1 | 2 | 2 | 0.4 | G6 | -0.06501139 | 0.03054744 | -0.41086477 | 1.58551204 | -2.43660307 | 1.85220623 | -0.55450070 |
| 829 | 3 | 1 | 2 | 2 | 0.6 | G0 | 0.87049779 | -1.03594710 | 2.80004950 | -6.30812130 | 9.69171600 | -7.65471660 | 2.31612590 |

| Run ID | Y = OD/ID | a/l = a/(2*c) | t/Ri | a/c | a/t | Gi | A0 | A1 | A2 | A3 | A4 | A5 | A6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 830 | 3 | 1 | 2 | 2 | 0.6 | G1 | 0.14302528 | 0.41016519 | 0.82387099 | -2.87396950 | 4.61880490 | -3.67732790 | 1.07964180 |
| 831 | 3 | 1 | 2 | 2 | 0.6 | G5 | 0.31712103 | -0.14073974 | 0.78385514 | -1.34100664 | 1.90595794 | -1.51288402 | 0.42035779 |
| 832 | 3 | 1 | 2 | 2 | 0.6 | G6 | -0.09889083 | -0.01777500 | -0.28957745 | 0.79612792 | -0.34321445 | -0.17501880 | 0.12962598 |
| 833 | 3 | 1 | 2 | 2 | 0.8 | G0 | 0.92070223 | -1.21870890 | 3.32665650 | -6.92003820 | 10.75202500 | -8.76129230 | 2.69349820 |
| 834 | 3 | 1 | 2 | 2 | 0.8 | G1 | 0.16985281 | 0.34469395 | 0.95084995 | -3.18527660 | 5.74287830 | -4.93421540 | 1.50264720 |
| 835 | 3 | 1 | 2 | 2 | 0.8 | G5 | 0.34328100 | -0.21026152 | 1.17661238 | -2.18685031 | 3.93676782 | -3.59423661 | 1.10571456 |
| 836 | 3 | 1 | 2 | 2 | 0.8 | G6 | -0.13382736 | -0.09338440 | -0.32492173 | 1.45207667 | -2.17085004 | 2.07004952 | -0.79822153 |
| 837 | 3.5 | 0.015625 | 2.5 | 0.03125 | 0.2 | G0 | too long | | | | | | |
| 838 | 3.5 | 0.015625 | 2.5 | 0.03125 | 0.2 | G1 | too long | | | | | | |
| 839 | 3.5 | 0.015625 | 2.5 | 0.03125 | 0.2 | G5 | too long | | | | | | |
| 840 | 3.5 | 0.015625 | 2.5 | 0.03125 | 0.2 | G6 | too long | | | | | | |
| 841 | 3.5 | 0.015625 | 2.5 | 0.03125 | 0.4 | G0 | too long | | | | | | |
| 842 | 3.5 | 0.015625 | 2.5 | 0.03125 | 0.4 | G1 | too long | | | | | | |
| 843 | 3.5 | 0.015625 | 2.5 | 0.03125 | 0.4 | G5 | too long | | | | | | |
| 844 | 3.5 | 0.015625 | 2.5 | 0.03125 | 0.4 | G6 | too long | | | | | | |
| 845 | 3.5 | 0.015625 | 2.5 | 0.03125 | 0.6 | G0 | too long | | | | | | |
| 846 | 3.5 | 0.015625 | 2.5 | 0.03125 | 0.6 | G1 | too long | | | | | | |
| 847 | 3.5 | 0.015625 | 2.5 | 0.03125 | 0.6 | G5 | too long | | | | | | |
| 848 | 3.5 | 0.015625 | 2.5 | 0.03125 | 0.6 | G6 | too long | | | | | | |
| 849 | 3.5 | 0.015625 | 2.5 | 0.03125 | 0.8 | G0 | too long | | | | | | |
| 850 | 3.5 | 0.015625 | 2.5 | 0.03125 | 0.8 | G1 | too long | | | | | | |
| 851 | 3.5 | 0.015625 | 2.5 | 0.03125 | 0.8 | G5 | too long | | | | | | |
| 852 | 3.5 | 0.015625 | 2.5 | 0.03125 | 0.8 | G6 | too long | | | | | | |
| 853 | 3.5 | 0.03125 | 2.5 | 0.0625 | 0.2 | G0 | too long | | | | | | |
| 854 | 3.5 | 0.03125 | 2.5 | 0.0625 | 0.2 | G1 | too long | | | | | | |
| 855 | 3.5 | 0.03125 | 2.5 | 0.0625 | 0.2 | G5 | too long | | | | | | |
| 856 | 3.5 | 0.03125 | 2.5 | 0.0625 | 0.2 | G6 | too long | | | | | | |
| 857 | 3.5 | 0.03125 | 2.5 | 0.0625 | 0.4 | G0 | too long | | | | | | |

| Run ID | Y = OD/ID | a/l = a/(2*c) | t/Ri | a/c | a/t | Gi | A0 | A1 | A2 | A3 | A4 | A5 | A6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 858 | 3.5 | 0.03125 | 2.5 | 0.0625 | 0.4 | G1 | too long | | | | | | |
| 859 | 3.5 | 0.03125 | 2.5 | 0.0625 | 0.4 | G5 | too long | | | | | | |
| 860 | 3.5 | 0.03125 | 2.5 | 0.0625 | 0.4 | G6 | too long | | | | | | |
| 861 | 3.5 | 0.03125 | 2.5 | 0.0625 | 0.6 | G0 | too long | | | | | | |
| 862 | 3.5 | 0.03125 | 2.5 | 0.0625 | 0.6 | G1 | too long | | | | | | |
| 863 | 3.5 | 0.03125 | 2.5 | 0.0625 | 0.6 | G5 | too long | | | | | | |
| 864 | 3.5 | 0.03125 | 2.5 | 0.0625 | 0.6 | G6 | too long | | | | | | |
| 865 | 3.5 | 0.03125 | 2.5 | 0.0625 | 0.8 | G0 | too long | | | | | | |
| 866 | 3.5 | 0.03125 | 2.5 | 0.0625 | 0.8 | G1 | too long | | | | | | |
| 867 | 3.5 | 0.03125 | 2.5 | 0.0625 | 0.8 | G5 | too long | | | | | | |
| 868 | 3.5 | 0.03125 | 2.5 | 0.0625 | 0.8 | G6 | too long | | | | | | |
| 869 | 3.5 | 0.0625 | 2.5 | 0.125 | 0.2 | G0 | too long | | | | | | |
| 870 | 3.5 | 0.0625 | 2.5 | 0.125 | 0.2 | G1 | too long | | | | | | |
| 871 | 3.5 | 0.0625 | 2.5 | 0.125 | 0.2 | G5 | too long | | | | | | |
| 872 | 3.5 | 0.0625 | 2.5 | 0.125 | 0.2 | G6 | too long | | | | | | |
| 873 | 3.5 | 0.0625 | 2.5 | 0.125 | 0.4 | G0 | too long | | | | | | |
| 874 | 3.5 | 0.0625 | 2.5 | 0.125 | 0.4 | G1 | too long | | | | | | |
| 875 | 3.5 | 0.0625 | 2.5 | 0.125 | 0.4 | G5 | too long | | | | | | |
| 876 | 3.5 | 0.0625 | 2.5 | 0.125 | 0.4 | G6 | too long | | | | | | |
| 877 | 3.5 | 0.0625 | 2.5 | 0.125 | 0.6 | G0 | too long | | | | | | |
| 878 | 3.5 | 0.0625 | 2.5 | 0.125 | 0.6 | G1 | too long | | | | | | |
| 879 | 3.5 | 0.0625 | 2.5 | 0.125 | 0.6 | G5 | too long | | | | | | |
| 880 | 3.5 | 0.0625 | 2.5 | 0.125 | 0.6 | G6 | too long | | | | | | |
| 881 | 3.5 | 0.0625 | 2.5 | 0.125 | 0.8 | G0 | too long | | | | | | |
| 882 | 3.5 | 0.0625 | 2.5 | 0.125 | 0.8 | G1 | too long | | | | | | |
| 883 | 3.5 | 0.0625 | 2.5 | 0.125 | 0.8 | G5 | too long | | | | | | |
| 884 | 3.5 | 0.0625 | 2.5 | 0.125 | 0.8 | G6 | too long | | | | | | |
| 885 | 3.5 | 0.125 | 2.5 | 0.25 | 0.2 | G0 | 0.51574819 | -0.06856692 | 5.22044060 | -14.60285800 | 19.53607200 | -13.23843500 | 3.58663210 |

| Run ID | Y = OD/ID | a/l = a/(2*c) | t/Ri | a/c | a/t | Gi | A0 | A1 | A2 | A3 | A4 | A5 | A6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 886 | 3.5 | 0.125 | 2.5 | 0.25 | 0.2 | G1 | 0.05821087 | 0.11092907 | 2.30478610 | -3.45645650 | 2.97692650 | -1.93806240 | 0.57299139 |
| 887 | 3.5 | 0.125 | 2.5 | 0.25 | 0.2 | G5 | -0.02485150 | -0.10796206 | 0.30537283 | -0.17046428 | 3.47000694 | -4.89211178 | 1.76367903 |
| 888 | 3.5 | 0.125 | 2.5 | 0.25 | 0.2 | G6 | -0.12875526 | -0.17171887 | -0.58813572 | 0.29366112 | 0.91326642 | 0.27808052 | -0.59678149 |
| 889 | 3.5 | 0.125 | 2.5 | 0.25 | 0.4 | G0 | too long | | | | | | |
| 890 | 3.5 | 0.125 | 2.5 | 0.25 | 0.4 | G1 | too long | | | | | | |
| 891 | 3.5 | 0.125 | 2.5 | 0.25 | 0.4 | G5 | too long | | | | | | |
| 892 | 3.5 | 0.125 | 2.5 | 0.25 | 0.4 | G6 | too long | | | | | | |
| 893 | 3.5 | 0.125 | 2.5 | 0.25 | 0.6 | G0 | too long | | | | | | |
| 894 | 3.5 | 0.125 | 2.5 | 0.25 | 0.6 | G1 | too long | | | | | | |
| 895 | 3.5 | 0.125 | 2.5 | 0.25 | 0.6 | G5 | too long | | | | | | |
| 896 | 3.5 | 0.125 | 2.5 | 0.25 | 0.6 | G6 | too long | | | | | | |
| 897 | 3.5 | 0.125 | 2.5 | 0.25 | 0.8 | G0 | too long | | | | | | |
| 898 | 3.5 | 0.125 | 2.5 | 0.25 | 0.8 | G1 | too long | | | | | | |
| 899 | 3.5 | 0.125 | 2.5 | 0.25 | 0.8 | G5 | too long | | | | | | |
| 900 | 3.5 | 0.125 | 2.5 | 0.25 | 0.8 | G6 | too long | | | | | | |
| 901 | 3.5 | 0.25 | 2.5 | 0.5 | 0.2 | G0 | 0.81724453 | -1.34811820 | 6.95720950 | -13.44890500 | 14.22762100 | -8.20452130 | 1.98422030 |
| 902 | 3.5 | 0.25 | 2.5 | 0.5 | 0.2 | G1 | 0.11486239 | 0.22677246 | 1.14385100 | -0.13924274 | -1.53235190 | 1.09134820 | -0.23755555 |
| 903 | 3.5 | 0.25 | 2.5 | 0.5 | 0.2 | G5 | 0.16764449 | -0.21342011 | 1.26084948 | -1.56085420 | 1.57543802 | -1.25491738 | 0.39062804 |
| 904 | 3.5 | 0.25 | 2.5 | 0.5 | 0.2 | G6 | -0.16938029 | 0.26088351 | -1.52277994 | 2.76464748 | -1.64853859 | 0.30208486 | 0.01319033 |
| 905 | 3.5 | 0.25 | 2.5 | 0.5 | 0.4 | G0 | 0.81136422 | -1.78627840 | 9.19745370 | -18.48218200 | 20.26693800 | -11.94531900 | 2.91900710 |
| 906 | 3.5 | 0.25 | 2.5 | 0.5 | 0.4 | G1 | 0.11754042 | 0.12610191 | 1.38318700 | -0.19730629 | -1.81386390 | 1.39722880 | -0.33904500 |
| 907 | 3.5 | 0.25 | 2.5 | 0.5 | 0.4 | G5 | -0.00917128 | -0.06179952 | 0.33064944 | -1.06869340 | 6.24876833 | -7.57720852 | 2.57975149 |
| 908 | 3.5 | 0.25 | 2.5 | 0.5 | 0.4 | G6 | -0.22057031 | 0.30087799 | -1.87474895 | 1.50507021 | 0.38050109 | 0.81728989 | -0.90884858 |
| 909 | 3.5 | 0.25 | 2.5 | 0.5 | 0.6 | G0 | 0.94553588 | -2.75549550 | 13.36192300 | -28.31216500 | 33.36841600 | -20.64540200 | 5.12128300 |
| 910 | 3.5 | 0.25 | 2.5 | 0.5 | 0.6 | G1 | 0.16551690 | -0.16384153 | 2.45517480 | -2.52974640 | 1.32396900 | -0.67236946 | 0.14912046 |
| 911 | 3.5 | 0.25 | 2.5 | 0.5 | 0.6 | G5 | -0.16082405 | -0.02482829 | 0.64654970 | -9.20237637 | 26.96508220 | -24.36499600 | 6.68082142 |
| 912 | 3.5 | 0.25 | 2.5 | 0.5 | 0.6 | G6 | -0.09325241 | 0.10017152 | -0.90548515 | 0.43583679 | -8.78297901 | 17.69764900 | -8.45331097 |
| 913 | 3.5 | 0.25 | 2.5 | 0.5 | 0.8 | G0 | too long | | | | | | |

| Run ID | Y = OD/ID | a/l = a/(2*c) | t/Ri | a/c | a/t | Gi | A0 | A1 | A2 | A3 | A4 | A5 | A6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 914 | 3.5 | 0.25 | 2.5 | 0.5 | 0.8 | G1 | too long | | | | | | |
| 915 | 3.5 | 0.25 | 2.5 | 0.5 | 0.8 | G5 | too long | | | | | | |
| 916 | 3.5 | 0.25 | 2.5 | 0.5 | 0.8 | G6 | too long | | | | | | |
| 917 | 3.5 | 0.5 | 2.5 | 1 | 0.2 | G0 | 1.15909000 | -1.29575560 | 3.43737560 | -4.91453030 | 5.37803620 | -3.92559950 | 1.21786540 |
| 918 | 3.5 | 0.5 | 2.5 | 1 | 0.2 | G1 | 0.18303758 | 0.49208424 | 0.77140408 | -1.27617870 | 1.93878970 | -2.14919820 | 0.79952105 |
| 919 | 3.5 | 0.5 | 2.5 | 1 | 0.2 | G5 | 0.32899809 | -0.26923266 | 0.97621739 | -1.28871691 | 1.56683505 | -1.38491452 | 0.47500643 |
| 920 | 3.5 | 0.5 | 2.5 | 1 | 0.2 | G6 | -0.11086557 | 0.11510433 | -0.63329071 | 1.75134420 | -2.13657665 | 1.39005756 | -0.37518948 |
| 921 | 3.5 | 0.5 | 2.5 | 1 | 0.4 | G0 | 1.15940140 | -1.71093460 | 4.52286700 | -4.81330830 | 2.98785660 | -1.50988050 | 0.45419161 |
| 922 | 3.5 | 0.5 | 2.5 | 1 | 0.4 | G1 | 0.19160694 | 0.39269158 | 0.61586774 | 0.06166423 | 0.00794522 | -1.08291140 | 0.59862641 |
| 923 | 3.5 | 0.5 | 2.5 | 1 | 0.4 | G5 | 0.28371030 | -0.31410402 | 1.18642497 | -0.97545278 | 1.65092230 | -2.13053036 | 0.82115150 |
| 924 | 3.5 | 0.5 | 2.5 | 1 | 0.4 | G6 | -0.21568959 | 0.15278655 | -0.79281622 | 0.85569370 | 0.47441500 | -0.47015744 | -0.00417076 |
| 925 | 3.5 | 0.5 | 2.5 | 1 | 0.6 | G0 | 1.19663460 | -2.15730610 | 5.97113870 | -5.71011810 | 1.80209530 | 0.34273193 | -0.26203294 |
| 926 | 3.5 | 0.5 | 2.5 | 1 | 0.6 | G1 | 0.21554150 | 0.25824743 | 0.64726442 | 1.25012390 | -2.25611530 | 0.59409875 | 0.12749264 |
| 927 | 3.5 | 0.5 | 2.5 | 1 | 0.6 | G5 | 0.21008495 | -0.41819474 | 1.49704075 | -1.74025786 | 5.00325394 | -5.95378780 | 2.06497431 |
| 928 | 3.5 | 0.5 | 2.5 | 1 | 0.6 | G6 | -0.29312331 | 0.13208666 | -0.68920654 | -1.23375940 | 4.08191252 | -1.84423542 | -0.15431595 |
| 929 | 3.5 | 0.5 | 2.5 | 1 | 0.8 | G0 | 1.32158590 | -2.97404950 | 9.20845590 | -11.54655600 | 8.52355650 | -3.14676480 | 0.12758691 |
| 930 | 3.5 | 0.5 | 2.5 | 1 | 0.8 | G1 | 0.27863564 | -0.06450045 | 1.57881160 | 0.15695712 | -1.25356790 | 0.48752515 | -0.16973371 |
| 931 | 3.5 | 0.5 | 2.5 | 1 | 0.8 | G5 | 0.14170979 | -0.70375907 | 2.52541590 | -5.99050808 | 15.43965630 | -14.72728250 | 4.23100805 |
| 932 | 3.5 | 0.5 | 2.5 | 1 | 0.8 | G6 | -0.33914617 | 0.25968698 | -1.55122733 | -0.24915361 | 0.35982657 | 4.76004601 | -3.24095774 |
| 933 | 3.5 | 1 | 2.5 | 2 | 0.2 | G0 | 0.82331405 | -0.68963354 | 1.46392090 | -2.87088620 | 3.29482750 | -1.83671270 | 0.39749125 |
| 934 | 3.5 | 1 | 2.5 | 2 | 0.2 | G1 | 0.11586610 | 0.52073445 | 0.42736837 | -1.04307430 | 0.10007298 | 0.70039401 | -0.35891844 |
| 935 | 3.5 | 1 | 2.5 | 2 | 0.2 | G5 | 0.24527609 | -0.10954817 | 0.39153555 | -0.66851091 | 0.48209029 | -0.06192571 | -0.04790647 |
| 936 | 3.5 | 1 | 2.5 | 2 | 0.2 | G6 | -0.03358381 | 0.02065913 | -0.13428721 | 0.51631922 | -0.83973932 | 0.72398388 | -0.25236937 |
| 937 | 3.5 | 1 | 2.5 | 2 | 0.4 | G0 | 0.84409362 | -0.91908731 | 2.41853620 | -5.51679880 | 8.27988210 | -6.31265510 | 1.84953810 |
| 938 | 3.5 | 1 | 2.5 | 2 | 0.4 | G1 | 0.13028823 | 0.44895972 | 0.71790545 | -2.48187620 | 3.58208950 | -2.59416910 | 0.70016983 |
| 939 | 3.5 | 1 | 2.5 | 2 | 0.4 | G5 | 0.26010200 | -0.11233010 | 0.67155290 | -1.41496527 | 2.00586414 | -1.49764097 | 0.41272646 |
| 940 | 3.5 | 1 | 2.5 | 2 | 0.4 | G6 | -0.06980798 | 0.01723279 | -0.39807683 | 1.34233141 | -1.62160301 | 0.94251341 | -0.21116844 |
| 941 | 3.5 | 1 | 2.5 | 2 | 0.6 | G0 | 0.87319857 | -1.12660490 | 3.03827160 | -6.57267290 | 10.28497000 | -8.43454060 | 2.64062240 |

| Run ID | Y = OD/ID | a/l = a/(2*c) | t/Ri | a/c | a/t | Gi | A0 | A1 | A2 | A3 | A4 | A5 | A6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 942 | 3.5 | 1 | 2.5 | 2 | 0.6 | G1 | 0.14847408 | 0.37649452 | 0.85147392 | -3.01993760 | 5.37318960 | -4.63985380 | 1.44970080 |
| 943 | 3.5 | 1 | 2.5 | 2 | 0.6 | G5 | 0.27333835 | -0.15249778 | 0.94212729 | -1.97082710 | 3.52027273 | -3.21688843 | 1.03155541 |
| 944 | 3.5 | 1 | 2.5 | 2 | 0.6 | G6 | -0.10629123 | -0.07790466 | -0.12032030 | 0.58223355 | -0.61494941 | 0.63036138 | -0.29229564 |
| 945 | 3.5 | 1 | 2.5 | 2 | 0.8 | G0 | 0.93295220 | -1.36099260 | 3.59415410 | -6.65764680 | 10.08179000 | -8.37450160 | 2.62205140 |
| 946 | 3.5 | 1 | 2.5 | 2 | 0.8 | G1 | 0.18144524 | 0.28510332 | 0.94976639 | -2.92499540 | 5.68390090 | -5.21065420 | 1.65344010 |
| 947 | 3.5 | 1 | 2.5 | 2 | 0.8 | G5 | 0.29656106 | -0.23684809 | 1.04509151 | -1.38929999 | 3.01786256 | -3.15451193 | 0.99956942 |
| 948 | 3.5 | 1 | 2.5 | 2 | 0.8 | G6 | -0.14509910 | -0.11930071 | -0.40394473 | 1.42039430 | -1.90763092 | 1.99071348 | -0.83411539 |
| 949 | 4 | 0.015625 | 3 | 0.03125 | 0.2 | G0 | too long | | | | | | |
| 950 | 4 | 0.015625 | 3 | 0.03125 | 0.2 | G1 | too long | | | | | | |
| 951 | 4 | 0.015625 | 3 | 0.03125 | 0.2 | G5 | too long | | | | | | |
| 952 | 4 | 0.015625 | 3 | 0.03125 | 0.2 | G6 | too long | | | | | | |
| 953 | 4 | 0.015625 | 3 | 0.03125 | 0.4 | G0 | too long | | | | | | |
| 954 | 4 | 0.015625 | 3 | 0.03125 | 0.4 | G1 | too long | | | | | | |
| 955 | 4 | 0.015625 | 3 | 0.03125 | 0.4 | G5 | too long | | | | | | |
| 956 | 4 | 0.015625 | 3 | 0.03125 | 0.4 | G6 | too long | | | | | | |
| 957 | 4 | 0.015625 | 3 | 0.03125 | 0.6 | G0 | too long | | | | | | |
| 958 | 4 | 0.015625 | 3 | 0.03125 | 0.6 | G1 | too long | | | | | | |
| 959 | 4 | 0.015625 | 3 | 0.03125 | 0.6 | G5 | too long | | | | | | |
| 960 | 4 | 0.015625 | 3 | 0.03125 | 0.6 | G6 | too long | | | | | | |
| 961 | 4 | 0.015625 | 3 | 0.03125 | 0.8 | G0 | too long | | | | | | |
| 962 | 4 | 0.015625 | 3 | 0.03125 | 0.8 | G1 | too long | | | | | | |
| 963 | 4 | 0.015625 | 3 | 0.03125 | 0.8 | G5 | too long | | | | | | |
| 964 | 4 | 0.015625 | 3 | 0.03125 | 0.8 | G6 | too long | | | | | | |
| 965 | 4 | 0.03125 | 3 | 0.0625 | 0.2 | G0 | too long | | | | | | |
| 966 | 4 | 0.03125 | 3 | 0.0625 | 0.2 | G1 | too long | | | | | | |
| 967 | 4 | 0.03125 | 3 | 0.0625 | 0.2 | G5 | too long | | | | | | |
| 968 | 4 | 0.03125 | 3 | 0.0625 | 0.2 | G6 | too long | | | | | | |
| 969 | 4 | 0.03125 | 3 | 0.0625 | 0.4 | G0 | too long | | | | | | |

| Run ID | Y = OD/ID | a/l = a/(2*c) | t/Ri | a/c | a/t | Gi | A0 | A1 | A2 | A3 | A4 | A5 | A6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 970 | 4 | 0.03125 | 3 | 0.0625 | 0.4 | G1 | too long | | | | | | |
| 971 | 4 | 0.03125 | 3 | 0.0625 | 0.4 | G5 | too long | | | | | | |
| 972 | 4 | 0.03125 | 3 | 0.0625 | 0.4 | G6 | too long | | | | | | |
| 973 | 4 | 0.03125 | 3 | 0.0625 | 0.6 | G0 | too long | | | | | | |
| 974 | 4 | 0.03125 | 3 | 0.0625 | 0.6 | G1 | too long | | | | | | |
| 975 | 4 | 0.03125 | 3 | 0.0625 | 0.6 | G5 | too long | | | | | | |
| 976 | 4 | 0.03125 | 3 | 0.0625 | 0.6 | G6 | too long | | | | | | |
| 977 | 4 | 0.03125 | 3 | 0.0625 | 0.8 | G0 | too long | | | | | | |
| 978 | 4 | 0.03125 | 3 | 0.0625 | 0.8 | G1 | too long | | | | | | |
| 979 | 4 | 0.03125 | 3 | 0.0625 | 0.8 | G5 | too long | | | | | | |
| 980 | 4 | 0.03125 | 3 | 0.0625 | 0.8 | G6 | too long | | | | | | |
| 981 | 4 | 0.0625 | 3 | 0.125 | 0.2 | G0 | too long | | | | | | |
| 982 | 4 | 0.0625 | 3 | 0.125 | 0.2 | G1 | too long | | | | | | |
| 983 | 4 | 0.0625 | 3 | 0.125 | 0.2 | G5 | too long | | | | | | |
| 984 | 4 | 0.0625 | 3 | 0.125 | 0.2 | G6 | too long | | | | | | |
| 985 | 4 | 0.0625 | 3 | 0.125 | 0.4 | G0 | too long | | | | | | |
| 986 | 4 | 0.0625 | 3 | 0.125 | 0.4 | G1 | too long | | | | | | |
| 987 | 4 | 0.0625 | 3 | 0.125 | 0.4 | G5 | too long | | | | | | |
| 988 | 4 | 0.0625 | 3 | 0.125 | 0.4 | G6 | too long | | | | | | |
| 989 | 4 | 0.0625 | 3 | 0.125 | 0.6 | G0 | too long | | | | | | |
| 990 | 4 | 0.0625 | 3 | 0.125 | 0.6 | G1 | too long | | | | | | |
| 991 | 4 | 0.0625 | 3 | 0.125 | 0.6 | G5 | too long | | | | | | |
| 992 | 4 | 0.0625 | 3 | 0.125 | 0.6 | G6 | too long | | | | | | |
| 993 | 4 | 0.0625 | 3 | 0.125 | 0.8 | G0 | too long | | | | | | |
| 994 | 4 | 0.0625 | 3 | 0.125 | 0.8 | G1 | too long | | | | | | |
| 995 | 4 | 0.0625 | 3 | 0.125 | 0.8 | G5 | too long | | | | | | |
| 996 | 4 | 0.0625 | 3 | 0.125 | 0.8 | G6 | too long | | | | | | |
| 997 | 4 | 0.125 | 3 | 0.25 | 0.2 | G0 | 0.50926326 | -0.11165756 | 5.43866200 | -15.26322200 | 20.47737500 | -13.87847400 | 3.75732440 |

| Run ID | Y = OD/ID | a/l = a/(2*c) | t/Ri | a/c | a/t | Gi | A0 | A1 | A2 | A3 | A4 | A5 | A6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 998 | 4 | 0.125 | 3 | 0.25 | 0.2 | G1 | 0.05744857 | 0.09615872 | 2.35327250 | -3.57563600 | 3.11327280 | -2.00943090 | 0.58747057 |
| 999 | 4 | 0.125 | 3 | 0.25 | 0.2 | G5 | -0.05984806 | -0.17225832 | 0.33579886 | -1.29690552 | 6.68870544 | -7.74394703 | 2.55494642 |
| 1000 | 4 | 0.125 | 3 | 0.25 | 0.2 | G6 | -0.08951440 | -0.13550094 | -0.43829215 | -0.44993949 | 0.66969204 | 1.91387975 | -1.47092223 |
| 1001 | 4 | 0.125 | 3 | 0.25 | 0.4 | G0 | too long | | | | | | |
| 1002 | 4 | 0.125 | 3 | 0.25 | 0.4 | G1 | too long | | | | | | |
| 1003 | 4 | 0.125 | 3 | 0.25 | 0.4 | G5 | too long | | | | | | |
| 1004 | 4 | 0.125 | 3 | 0.25 | 0.4 | G6 | too long | | | | | | |
| 1005 | 4 | 0.125 | 3 | 0.25 | 0.6 | G0 | too long | | | | | | |
| 1006 | 4 | 0.125 | 3 | 0.25 | 0.6 | G1 | too long | | | | | | |
| 1007 | 4 | 0.125 | 3 | 0.25 | 0.6 | G5 | too long | | | | | | |
| 1008 | 4 | 0.125 | 3 | 0.25 | 0.6 | G6 | too long | | | | | | |
| 1009 | 4 | 0.125 | 3 | 0.25 | 0.8 | G0 | too long | | | | | | |
| 1010 | 4 | 0.125 | 3 | 0.25 | 0.8 | G1 | too long | | | | | | |
| 1011 | 4 | 0.125 | 3 | 0.25 | 0.8 | G5 | too long | | | | | | |
| 1012 | 4 | 0.125 | 3 | 0.25 | 0.8 | G6 | too long | | | | | | |
| 1013 | 4 | 0.25 | 3 | 0.5 | 0.2 | G0 | 0.80800041 | -1.41737550 | 7.27760290 | -14.06916800 | 14.80265400 | -8.44795710 | 2.01838010 |
| 1014 | 4 | 0.25 | 3 | 0.5 | 0.2 | G1 | 0.11261324 | 0.21345660 | 1.14066850 | -0.00195621 | -1.82095390 | 1.33020140 | -0.30971287 |
| 1015 | 4 | 0.25 | 3 | 0.5 | 0.2 | G5 | 0.11867335 | -0.15871628 | 0.92996365 | -0.92793816 | 1.20872140 | -1.28297734 | 0.44277337 |
| 1016 | 4 | 0.25 | 3 | 0.5 | 0.2 | G6 | -0.16380714 | 0.15930067 | -0.91799682 | 0.91955888 | 0.88207865 | -1.20933938 | 0.33009258 |
| 1017 | 4 | 0.25 | 3 | 0.5 | 0.4 | G0 | 0.80503833 | -1.94022740 | 10.12494000 | -20.90489400 | 23.41531700 | -13.96010200 | 3.42706960 |
| 1018 | 4 | 0.25 | 3 | 0.5 | 0.4 | G1 | 0.11723505 | 0.08587962 | 1.52489940 | -0.42090982 | -1.65954190 | 1.37654690 | -0.35371648 |
| 1019 | 4 | 0.25 | 3 | 0.5 | 0.4 | G5 | -0.07122735 | -0.01946168 | 0.15292144 | -2.64731598 | 11.19489570 | -12.04485510 | 3.84290838 |
| 1020 | 4 | 0.25 | 3 | 0.5 | 0.4 | G6 | -0.16885521 | 0.26857621 | -1.67117333 | 1.14098334 | -1.31717968 | 4.20240831 | -2.45546198 |
| 1021 | 4 | 0.25 | 3 | 0.5 | 0.6 | G0 | too long | | | | | | |
| 1022 | 4 | 0.25 | 3 | 0.5 | 0.6 | G1 | too long | | | | | | |
| 1023 | 4 | 0.25 | 3 | 0.5 | 0.6 | G5 | too long | | | | | | |
| 1024 | 4 | 0.25 | 3 | 0.5 | 0.6 | G6 | too long | | | | | | |
| 1025 | 4 | 0.25 | 3 | 0.5 | 0.8 | G0 | too long | | | | | | |

| Run ID | Y = OD/ID | a/l = a/(2*c) | t/Ri | a/c | a/t | Gi | A0 | A1 | A2 | A3 | A4 | A5 | A6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1026 | 4 | 0.25 | 3 | 0.5 | 0.8 | G1 | too long | | | | | | |
| 1027 | 4 | 0.25 | 3 | 0.5 | 0.8 | G5 | too long | | | | | | |
| 1028 | 4 | 0.25 | 3 | 0.5 | 0.8 | G6 | too long | | | | | | |
| 1029 | 4 | 0.5 | 3 | 1 | 0.2 | G0 | 1.15094820 | -1.37481200 | 3.65158410 | -4.91277500 | 4.96310230 | -3.50173050 | 1.08163990 |
| 1030 | 4 | 0.5 | 3 | 1 | 0.2 | G1 | 0.18213511 | 0.47196689 | 0.75435080 | -1.09848510 | 1.74753200 | -2.10613310 | 0.81144703 |
| 1031 | 4 | 0.5 | 3 | 1 | 0.2 | G5 | 0.27994177 | -0.22209615 | 0.72016501 | -0.38883206 | 0.04473536 | -0.14299381 | 0.07997916 |
| 1032 | 4 | 0.5 | 3 | 1 | 0.2 | G6 | -0.11437794 | 0.09054801 | -0.32698941 | 0.19774807 | 0.99904370 | -1.34313166 | 0.49754149 |
| 1033 | 4 | 0.5 | 3 | 1 | 0.4 | G0 | 1.14558630 | -1.81691670 | 4.79629150 | -4.47614940 | 1.50239850 | -0.01946310 | -0.04080768 |
| 1034 | 4 | 0.5 | 3 | 1 | 0.4 | G1 | 0.18976541 | 0.36789907 | 0.50970493 | 0.76785712 | -1.19120570 | -0.22037880 | 0.36559251 |
| 1035 | 4 | 0.5 | 3 | 1 | 0.4 | G5 | 0.21711433 | -0.28082842 | 1.01550424 | -0.63546574 | 1.61123776 | -2.32745123 | 0.89157373 |
| 1036 | 4 | 0.5 | 3 | 1 | 0.4 | G6 | -0.21532670 | 0.07931064 | -0.41218978 | -0.42039287 | 2.07977486 | -1.09329104 | -0.01822513 |
| 1037 | 4 | 0.5 | 3 | 1 | 0.6 | G0 | 1.18778770 | -2.36089150 | 6.78103640 | -6.63602630 | 1.79469880 | 1.03334410 | -0.60807392 |
| 1038 | 4 | 0.5 | 3 | 1 | 0.6 | G1 | 0.21634059 | 0.19815773 | 0.66441677 | 1.82664900 | -3.49828600 | 1.63064660 | -0.19303305 |
| 1039 | 4 | 0.5 | 3 | 1 | 0.6 | G5 | 0.12209099 | -0.41989148 | 1.51303279 | -2.94031906 | 8.65663052 | -9.32989407 | 3.03367352 |
| 1040 | 4 | 0.5 | 3 | 1 | 0.6 | G6 | -0.27870131 | 0.15970843 | -0.82369810 | -1.63359904 | 4.27087021 | -0.93586236 | -0.75941324 |
| 1041 | 4 | 0.5 | 3 | 1 | 0.8 | G0 | 1.33849310 | -3.43041320 | 11.32206300 | -16.27761400 | 14.12957700 | -6.17057570 | 0.64146062 |
| 1042 | 4 | 0.5 | 3 | 1 | 0.8 | G1 | 0.28982263 | -0.22957484 | 2.09203560 | -0.66789430 | -0.46304631 | 0.25770711 | -0.23937613 |
| 1043 | 4 | 0.5 | 3 | 1 | 0.8 | G5 | 0.03698258 | -0.73419744 | 2.84765816 | -10.05532930 | 24.81736950 | -21.87211610 | 5.84726238 |
| 1044 | 4 | 0.5 | 3 | 1 | 0.8 | G6 | -0.28724262 | 0.34502798 | -1.93709004 | 1.04145241 | -5.63869381 | 13.22116570 | -6.74557781 |
| 1045 | 4 | 1 | 3 | 2 | 0.2 | G0 | 0.82464143 | -0.73150114 | 1.68883610 | -3.62219300 | 4.73675210 | -3.09316740 | 0.79152424 |
| 1046 | 4 | 1 | 3 | 2 | 0.2 | G1 | 0.11796054 | 0.50477575 | 0.52918143 | -1.52994440 | 1.14093640 | -0.20850053 | -0.08317403 |
| 1047 | 4 | 1 | 3 | 2 | 0.2 | G5 | 0.21588273 | -0.08459159 | 0.31495845 | -0.44311357 | 0.17181550 | 0.16398946 | -0.12170297 |
| 1048 | 4 | 1 | 3 | 2 | 0.2 | G6 | -0.03567111 | 0.02347752 | -0.20662497 | 0.84098983 | -1.44993973 | 1.24724722 | -0.41857624 |
| 1049 | 4 | 1 | 3 | 2 | 0.4 | G0 | 0.84540291 | -0.98486630 | 2.61727270 | -5.84588610 | 8.91661410 | -6.98456130 | 2.09493930 |
| 1050 | 4 | 1 | 3 | 2 | 0.4 | G1 | 0.13356932 | 0.42569080 | 0.75991509 | -2.70281970 | 4.30554160 | -3.38976100 | 0.98176151 |
| 1051 | 4 | 1 | 3 | 2 | 0.4 | G5 | 0.22847483 | -0.09075126 | 0.54265785 | -0.91804600 | 1.28648555 | -1.00393462 | 0.27043551 |
| 1052 | 4 | 1 | 3 | 2 | 0.4 | G6 | -0.07339308 | -0.01286347 | -0.20819917 | 0.50970012 | -0.02312365 | -0.38229832 | 0.19133486 |
| 1053 | 4 | 1 | 3 | 2 | 0.6 | G0 | 0.87585846 | -1.20984400 | 3.16452160 | -6.28852290 | 9.73865390 | -8.18729290 | 2.62963470 |

| Run ID | Y = OD/ID | a/l = a/(2*c) | t/Ri | a/c | a/t | Gi | A0 | A1 | A2 | A3 | A4 | A5 | A6 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1054 | 4 | 1 | 3 | 2 | 0.6 | G1 | 0.15349099 | 0.34535108 | 0.81844869 | -2.82912930 | 5.41873680 | -4.97540230 | 1.62081330 |
| 1055 | 4 | 1 | 3 | 2 | 0.6 | G5 | 0.23768526 | -0.15012734 | 0.79681885 | -1.32593989 | 2.71409297 | -2.78160810 | 0.93088043 |
| 1056 | 4 | 1 | 3 | 2 | 0.6 | G6 | -0.11278015 | -0.07114110 | -0.45902938 | 1.79955506 | -2.72095156 | 2.47439885 | -0.90905106 |
| 1057 | 4 | 1 | 3 | 2 | 0.8 | G0 | 0.94610155 | -1.52322710 | 3.92992110 | -6.41218860 | 9.12624580 | -7.57161060 | 2.38230340 |
| 1058 | 4 | 1 | 3 | 2 | 0.8 | G1 | 0.19261391 | 0.21632094 | 0.96615361 | -2.55110920 | 5.21591810 | -5.04777370 | 1.64929530 |
| 1059 | 4 | 1 | 3 | 2 | 0.8 | G5 | 0.25821620 | -0.31445757 | 1.20667291 | -1.66613626 | 3.95598555 | -4.19583607 | 1.33950818 |
| 1060 | 4 | 1 | 3 | 2 | 0.8 | G6 | -0.15098801 | -0.19299153 | -0.15229219 | 0.72981042 | -1.48542988 | 2.48404646 | -1.23150122 |

## APPENDIX D - CIRCUMFERENTIAL INTERNAL 360$^{O}$ CRACK RESULTS

The circumferential internal 360° partial-depth crack has a constant G value along the crack front around the cylinder circumference, so only the A0 polynomial coefficient value is reported for the non-dimensional geometry factor G results. There are 5 load cases for the 360° crack: G0 is the uniform crack face pressure, G1 is the linear crack face pressure, G2 is the quadratic crack face pressure, G3 is the cubic crack face pressure, and G4 is the quartic (4$^{th}$ order) crack face pressure.

**Table 4. Non-dimensional Geometry Polynomial Coefficient Values for Circumferential Internal 360° Cracks**

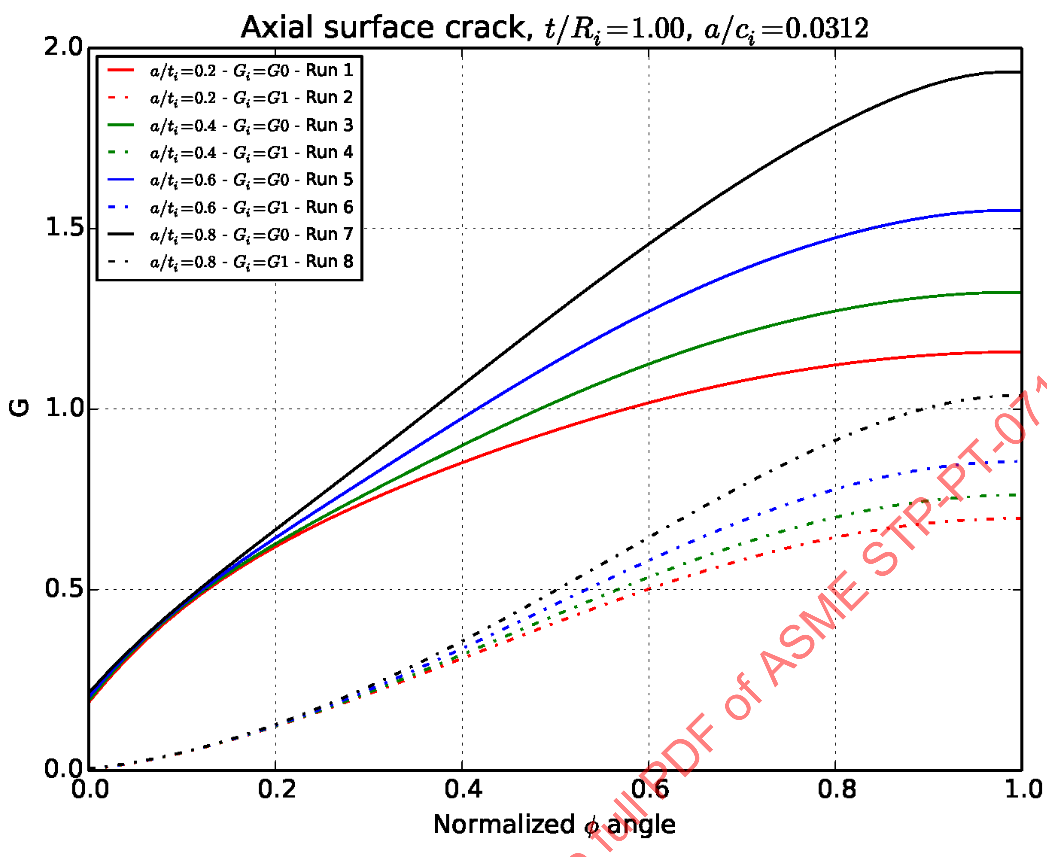
| Run ID | Y=OD/ID | t/Ri | a/t | Gi | A0 |
|---|---|---|---|---|---|
| 1101 | 2 | 1 | 0.2 | G0 | 1.05316946 |
| 1102 | 2 | 1 | 0.2 | G1 | 0.65865379 |
| 1103 | 2 | 1 | 0.2 | G2 | 0.51266931 |
| 1104 | 2 | 1 | 0.2 | G3 | 0.43289635 |
| 1105 | 2 | 1 | 0.2 | G4 | 0.38121608 |
| 1106 | 2 | 1 | 0.4 | G0 | 1.08081383 |
| 1107 | 2 | 1 | 0.4 | G1 | 0.67366536 |
| 1108 | 2 | 1 | 0.4 | G2 | 0.52249923 |
| 1109 | 2 | 1 | 0.4 | G3 | 0.43996501 |
| 1110 | 2 | 1 | 0.4 | G4 | 0.38660224 |
| 1111 | 2 | 1 | 0.6 | G0 | 1.20159533 |
| 1112 | 2 | 1 | 0.6 | G1 | 0.73135023 |
| 1113 | 2 | 1 | 0.6 | G2 | 0.55862113 |
| 1114 | 2 | 1 | 0.6 | G3 | 0.46543565 |
| 1115 | 2 | 1 | 0.6 | G4 | 0.40584128 |
| 1116 | 2 | 1 | 0.8 | G0 | 1.55042444 |
| 1117 | 2 | 1 | 0.8 | G1 | 0.90589355 |
| 1118 | 2 | 1 | 0.8 | G2 | 0.67100324 |
| 1119 | 2 | 1 | 0.8 | G3 | 0.54621451 |
| 1120 | 2 | 1 | 0.8 | G4 | 0.46773345 |
| 1121 | 2.5 | 1.5 | 0.2 | G0 | 0.99992796 |
| 1122 | 2.5 | 1.5 | 0.2 | G1 | 0.63833200 |
| 1123 | 2.5 | 1.5 | 0.2 | G2 | 0.50132125 |
| 1124 | 2.5 | 1.5 | 0.2 | G3 | 0.42540785 |
| 1125 | 2.5 | 1.5 | 0.2 | G4 | 0.37577938 |
| 1126 | 2.5 | 1.5 | 0.4 | G0 | 0.99673749 |
| 1127 | 2.5 | 1.5 | 0.4 | G1 | 0.64185819 |
| 1128 | 2.5 | 1.5 | 0.4 | G2 | 0.50488185 |
| 1129 | 2.5 | 1.5 | 0.4 | G3 | 0.42844045 |
| 1130 | 2.5 | 1.5 | 0.4 | G4 | 0.37831805 |
| 1131 | 2.5 | 1.5 | 0.6 | G0 | 1.09264577 |
| 1132 | 2.5 | 1.5 | 0.6 | G1 | 0.69108515 |
| 1133 | 2.5 | 1.5 | 0.6 | G2 | 0.53667945 |
| 1134 | 2.5 | 1.5 | 0.6 | G3 | 0.45125860 |
| 1135 | 2.5 | 1.5 | 0.6 | G4 | 0.39575213 |

| Run ID | Y=OD/ID | t/Ri | a/t | Gi | A0 |
|---|---|---|---|---|---|
| 1136 | 2.5 | 1.5 | 0.8 | G0 | 1.41221858 |
| 1137 | 2.5 | 1.5 | 0.8 | G1 | 0.85680073 |
| 1138 | 2.5 | 1.5 | 0.8 | G2 | 0.64504053 |
| 1139 | 2.5 | 1.5 | 0.8 | G3 | 0.52983435 |
| 1140 | 2.5 | 1.5 | 0.8 | G4 | 0.45630272 |
| 1141 | 3 | 2 | 0.2 | G0 | 0.96030349 |
| 1142 | 3 | 2 | 0.2 | G1 | 0.62323508 |
| 1143 | 3 | 2 | 0.2 | G2 | 0.49291409 |
| 1144 | 3 | 2 | 0.2 | G3 | 0.41988257 |
| 1145 | 3 | 2 | 0.2 | G4 | 0.37179030 |
| 1146 | 3 | 2 | 0.4 | G0 | 0.94215135 |
| 1147 | 3 | 2 | 0.4 | G1 | 0.62114484 |
| 1148 | 3 | 2 | 0.4 | G2 | 0.49339510 |
| 1149 | 3 | 2 | 0.4 | G3 | 0.42092469 |
| 1150 | 3 | 2 | 0.4 | G4 | 0.37291850 |
| 1151 | 3 | 2 | 0.6 | G0 | 1.02580757 |
| 1152 | 3 | 2 | 0.6 | G1 | 0.66624804 |
| 1153 | 3 | 2 | 0.6 | G2 | 0.52310457 |
| 1154 | 3 | 2 | 0.6 | G3 | 0.44247272 |
| 1155 | 3 | 2 | 0.6 | G4 | 0.38949429 |
| 1156 | 3 | 2 | 0.8 | G0 | 1.32737142 |
| 1157 | 3 | 2 | 0.8 | G1 | 0.82651408 |
| 1158 | 3 | 2 | 0.8 | G2 | 0.62897730 |
| 1159 | 3 | 2 | 0.8 | G3 | 0.51968160 |
| 1160 | 3 | 2 | 0.8 | G4 | 0.44920993 |
| 1161 | 3.5 | 2.5 | 0.2 | G0 | 0.92916558 |
| 1162 | 3.5 | 2.5 | 0.2 | G1 | 0.61137646 |
| 1163 | 3.5 | 2.5 | 0.2 | G2 | 0.48631623 |
| 1164 | 3.5 | 2.5 | 0.2 | G3 | 0.41555239 |
| 1165 | 3.5 | 2.5 | 0.2 | G4 | 0.36867005 |
| 1166 | 3.5 | 2.5 | 0.4 | G0 | 0.90337333 |
| 1167 | 3.5 | 2.5 | 0.4 | G1 | 0.60639294 |
| 1168 | 3.5 | 2.5 | 0.4 | G2 | 0.48520507 |
| 1169 | 3.5 | 2.5 | 0.4 | G3 | 0.41556344 |
| 1170 | 3.5 | 2.5 | 0.4 | G4 | 0.36906662 |
| 1171 | 3.5 | 2.5 | 0.6 | G0 | 0.98016940 |
| 1172 | 3.5 | 2.5 | 0.6 | G1 | 0.64922203 |
| 1173 | 3.5 | 2.5 | 0.6 | G2 | 0.51377935 |
| 1174 | 3.5 | 2.5 | 0.6 | G3 | 0.43642982 |
| 1175 | 3.5 | 2.5 | 0.6 | G4 | 0.38518705 |
| 1176 | 3.5 | 2.5 | 0.8 | G0 | 1.26947796 |
| 1177 | 3.5 | 2.5 | 0.8 | G1 | 0.80578141 |
| 1178 | 3.5 | 2.5 | 0.8 | G2 | 0.61796081 |
| 1179 | 3.5 | 2.5 | 0.8 | G3 | 0.51271043 |

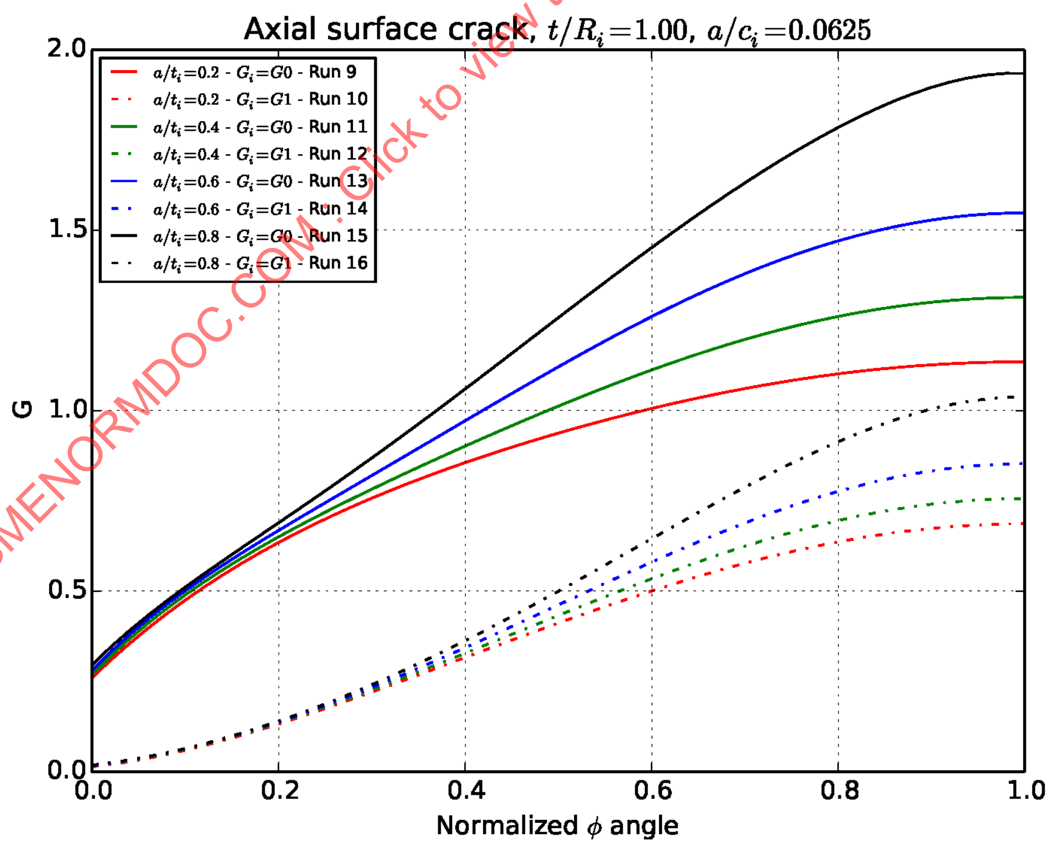
| Run ID | Y=OD/ID | t/Ri | a/t | Gi | A0 |
|---|---|---|---|---|---|
| 1180 | 3.5 | 2.5 | 0.8 | G4 | 0.44433609 |
| 1181 | 4 | 3 | 0.2 | G0 | 0.90386077 |
| 1182 | 4 | 3 | 0.2 | G1 | 0.60173851 |
| 1183 | 4 | 3 | 0.2 | G2 | 0.48095567 |
| 1184 | 4 | 3 | 0.2 | G3 | 0.41203638 |
| 1185 | 4 | 3 | 0.2 | G4 | 0.36613870 |
| 1186 | 4 | 3 | 0.4 | G0 | 0.87424105 |
| 1187 | 4 | 3 | 0.4 | G1 | 0.59528857 |
| 1188 | 4 | 3 | 0.4 | G2 | 0.47903464 |
| 1189 | 4 | 3 | 0.4 | G3 | 0.41152256 |
| 1190 | 4 | 3 | 0.4 | G4 | 0.36616299 |
| 1191 | 4 | 3 | 0.6 | G0 | 0.94689026 |
| 1192 | 4 | 3 | 0.6 | G1 | 0.63677115 |
| 1193 | 4 | 3 | 0.6 | G2 | 0.50694975 |
| 1194 | 4 | 3 | 0.6 | G3 | 0.43200024 |
| 1195 | 4 | 3 | 0.6 | G4 | 0.38202806 |
| 1196 | 4 | 3 | 0.8 | G0 | 1.22731682 |
| 1197 | 4 | 3 | 0.8 | G1 | 0.79064860 |
| 1198 | 4 | 3 | 0.8 | G2 | 0.60990980 |
| 1199 | 4 | 3 | 0.8 | G3 | 0.50761178 |
| 1200 | 4 | 3 | 0.8 | G4 | 0.44076955 |

## APPENDIX E - AXIAL INTERNAL SURFACE CRACK G RESULT PLOTS

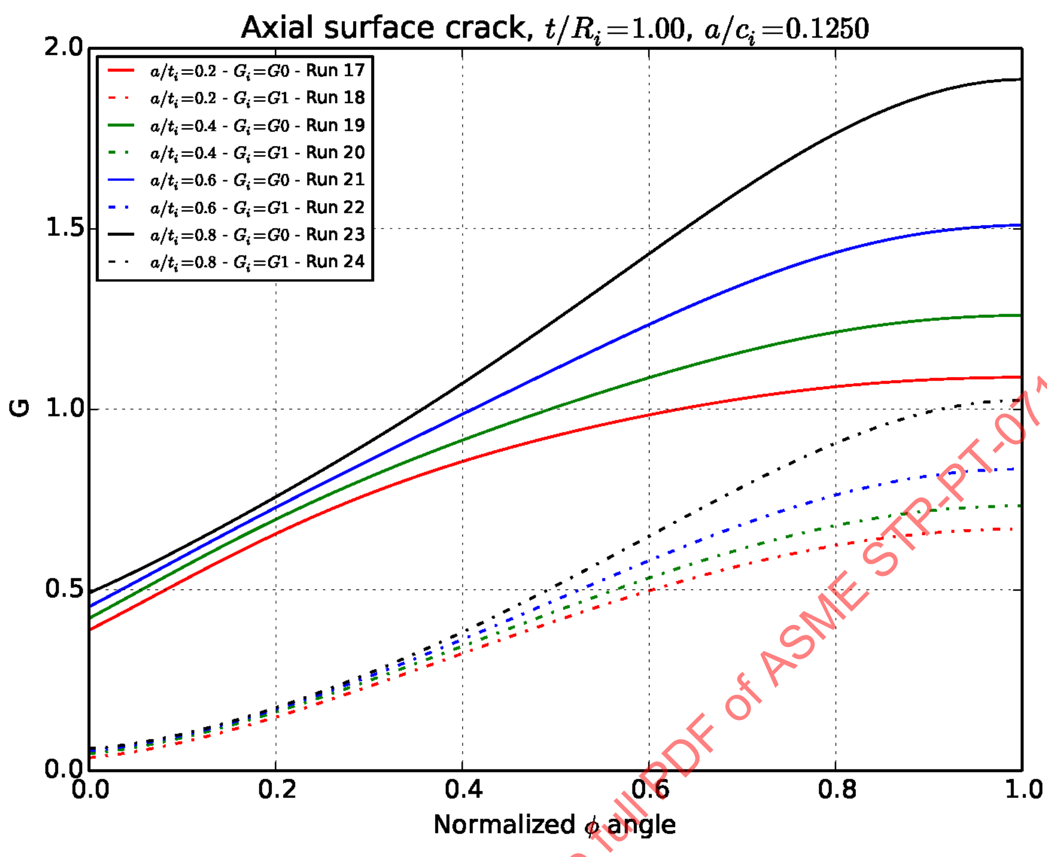
Plots of all the axial internal surface crack cases, G versus the normalized crack front angle position $2\phi/\pi$. Eight curves per plot to show the uniform $G_0$ and linear $G_1$ load cases for the four a/t ratios. Each page contains the plot for a particular t/Ri and a/c ratio. 35 plots total.

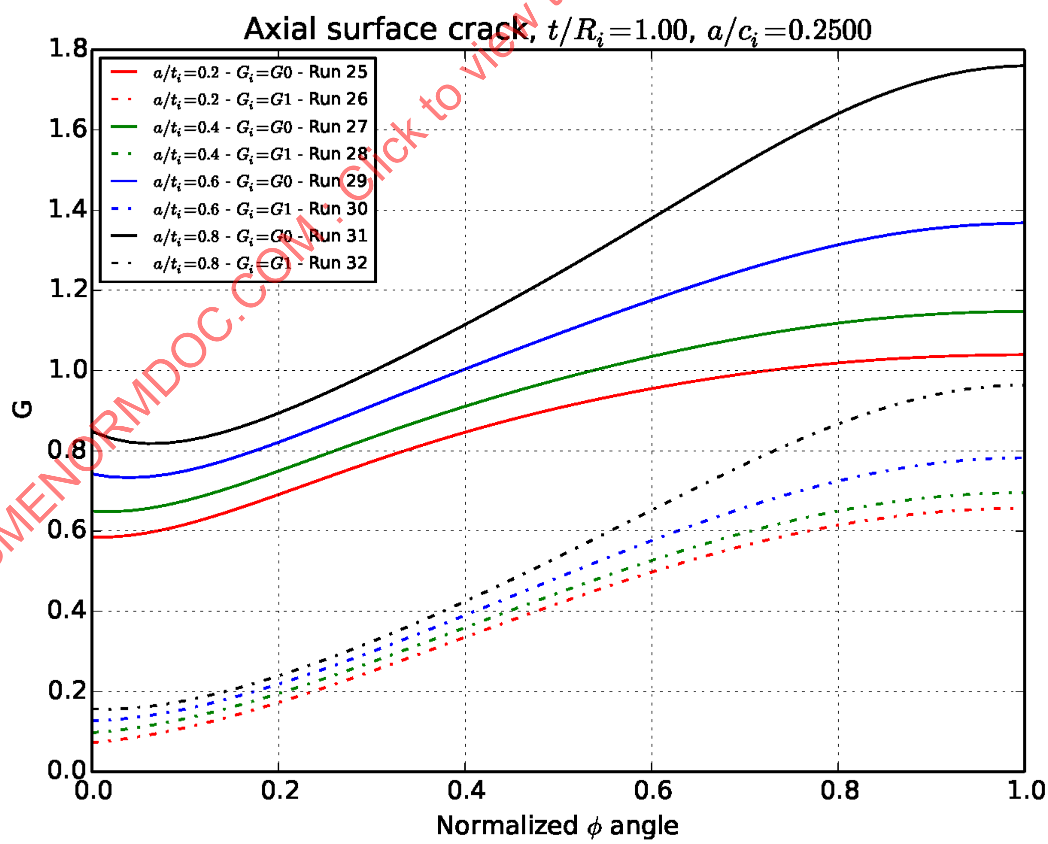


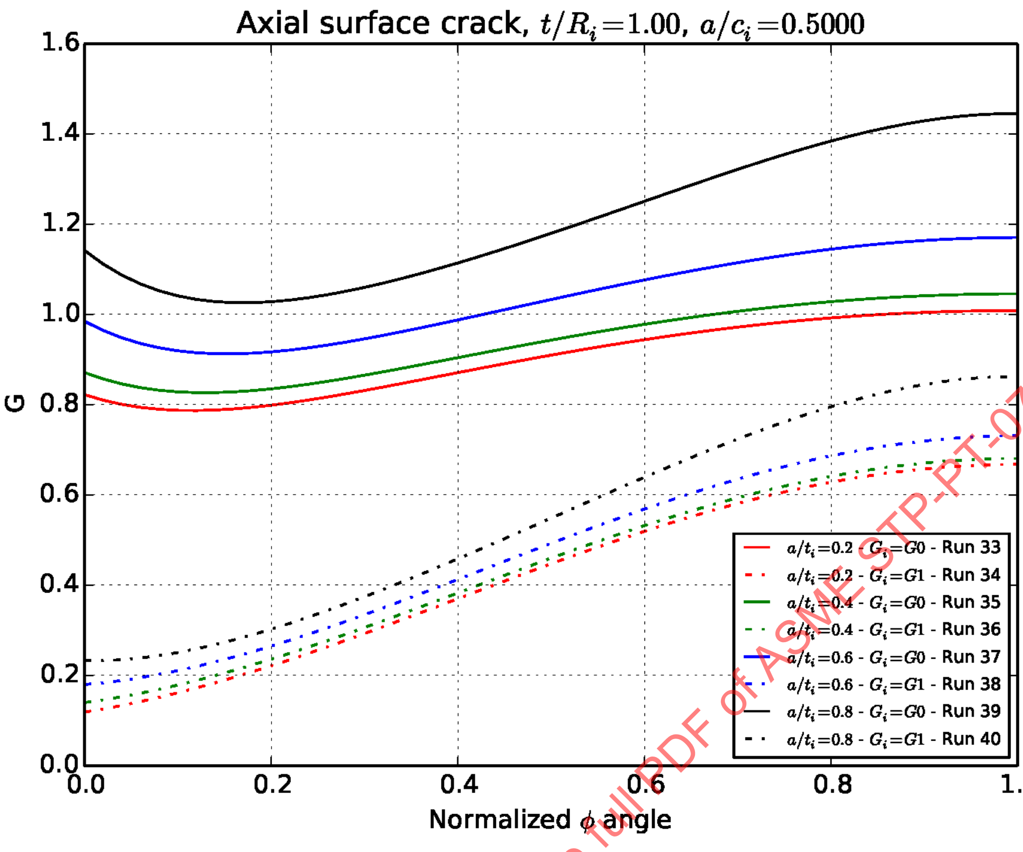
Axial surface crack, $t/R_i=1.00$, $a/c_i=0.0312$
$a/t_i=0.2$ - $G_i=G0$ - Run 1
$a/t_i=0.2$ - $G_i=G1$ - Run 2
$a/t_i=0.4$ - $G_i=G0$ - Run 3
$a/t_i=0.4$ - $G_i=G1$ - Run 4
$a/t_i=0.6$ - $G_i=G0$ - Run 5
$a/t_i=0.6$ - $G_i=G1$ - Run 6
$a/t_i=0.8$ - $G_i=G0$ - Run 7
$a/t_i=0.8$ - $G_i=G1$ - Run 8
G
0.0
0.5
1.0
1.5
2.0
0.0
0.2
0.4
0.6
0.8
1.0
Normalized $\phi$ angle

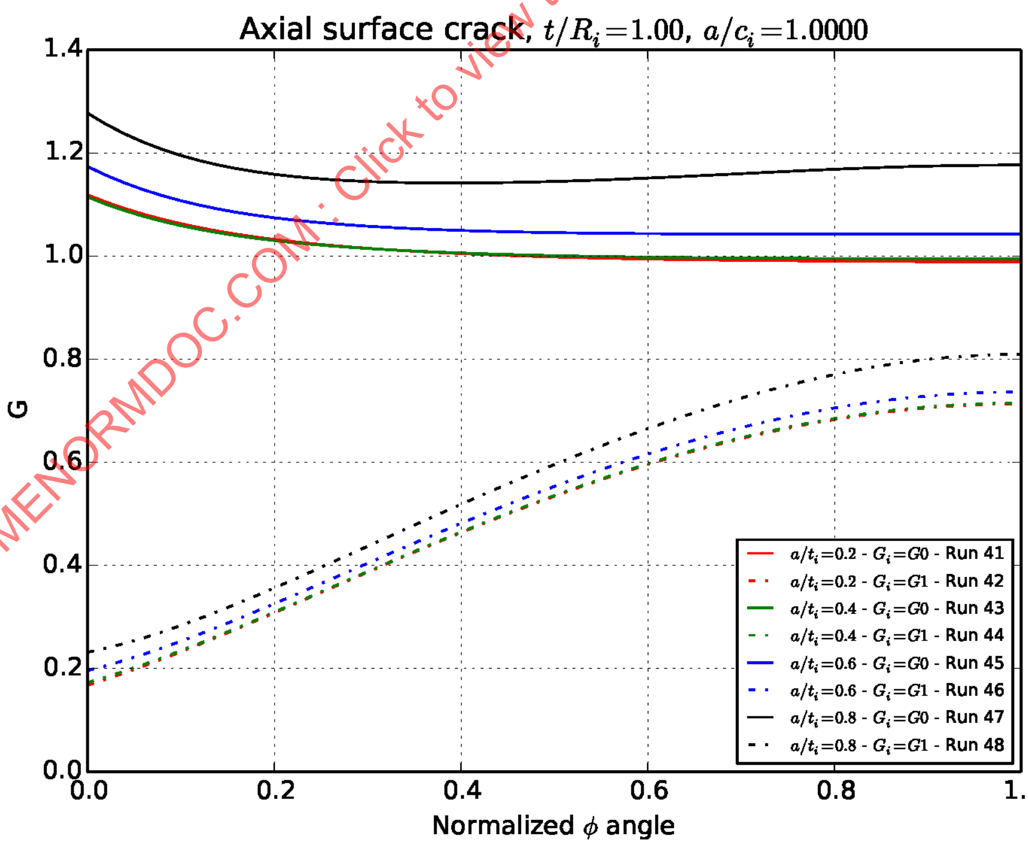



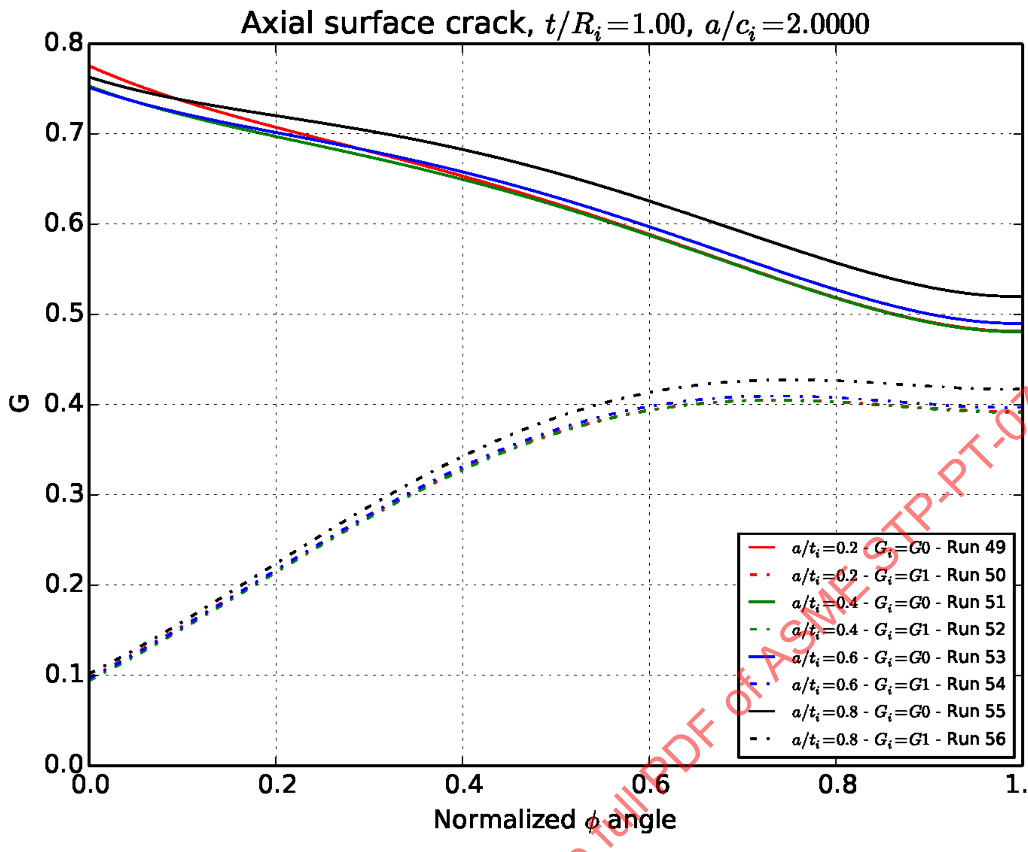
Axial surface crack, $t/R_i=1.00$, $a/c_i=0.0625$
$a/t_i=0.2$ - $G_i=G0$ - Run 9
$a/t_i=0.2$ - $G_i=G1$ - Run 10
$a/t_i=0.4$ - $G_i=G0$ - Run 11
$a/t_i=0.4$ - $G_i=G1$ - Run 12
$a/t_i=0.6$ - $G_i=G0$ - Run 13
$a/t_i=0.6$ - $G_i=G1$ - Run 14
$a/t_i=0.8$ - $G_i=G0$ - Run 15
$a/t_i=0.8$ - $G_i=G1$ - Run 16
G
0.0
0.5
1.0
1.5
2.0
0.0
0.2
0.4
0.6
0.8
1.0
Normalized $\phi$ angle

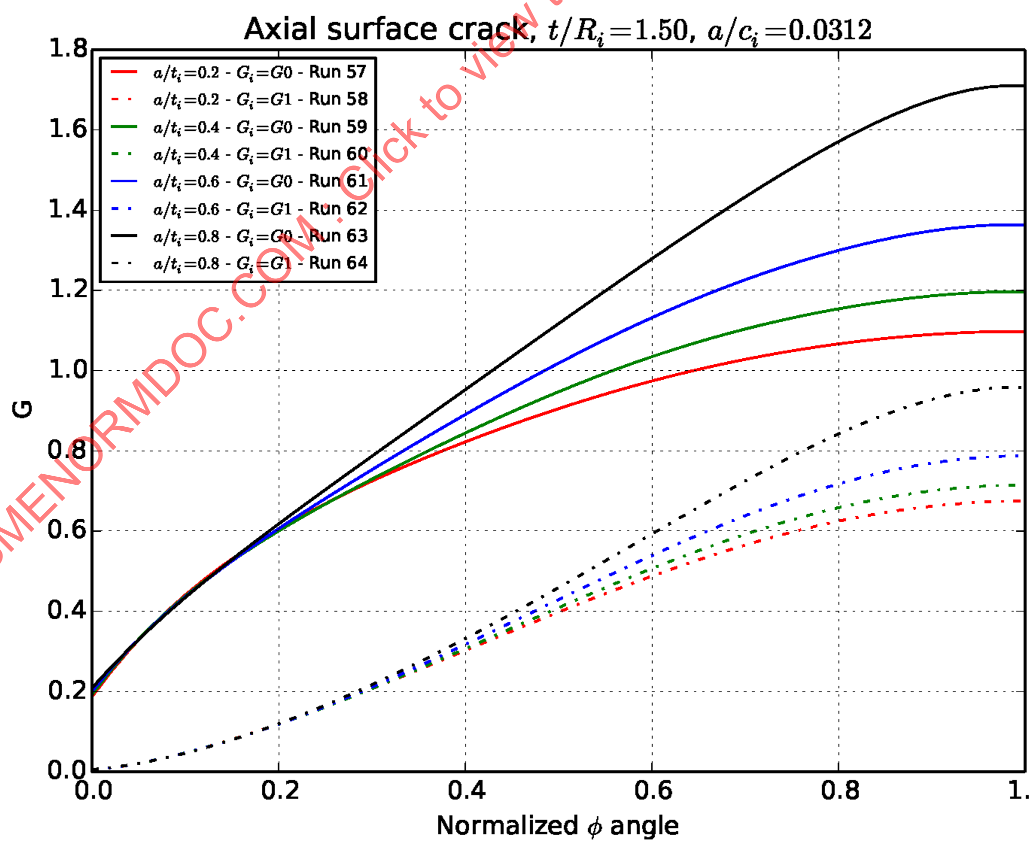

Axial surface crack, $t/R_i=1.00$, $a/c_i=0.1250$
$a/t_i=0.2$ - $G_i=G0$ - Run 17
$a/t_i=0.2$ - $G_i=G1$ - Run 18
$a/t_i=0.4$ - $G_i=G0$ - Run 19
$a/t_i=0.4$ - $G_i=G1$ - Run 20
$a/t_i=0.6$ - $G_i=G0$ - Run 21
$a/t_i=0.6$ - $G_i=G1$ - Run 22
$a/t_i=0.8$ - $G_i=G0$ - Run 23
$a/t_i=0.8$ - $G_i=G1$ - Run 24
G
Normalized $\phi$ angle
0.0
0.5
1.0
1.5
2.0
0.2
0.4
0.6
0.8

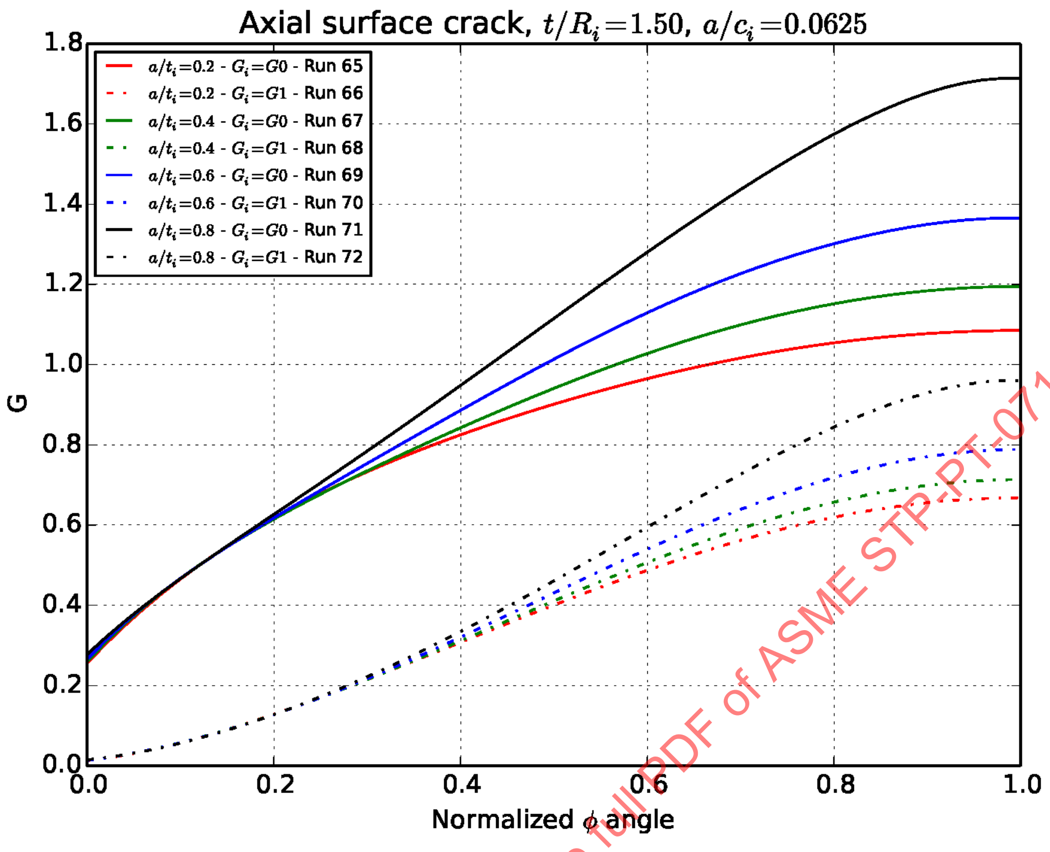

Axial surface crack, $t/R_i=1.00$, $a/c_i=0.2500$
$a/t_i=0.2$ - $G_i=G0$ - Run 25
$a/t_i=0.2$ - $G_i=G1$ - Run 26
$a/t_i=0.4$ - $G_i=G0$ - Run 27
$a/t_i=0.4$ - $G_i=G1$ - Run 28
$a/t_i=0.6$ - $G_i=G0$ - Run 29
$a/t_i=0.6$ - $G_i=G1$ - Run 30
$a/t_i=0.8$ - $G_i=G0$ - Run 31
$a/t_i=0.8$ - $G_i=G1$ - Run 32
G
Normalized $\phi$ angle
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8

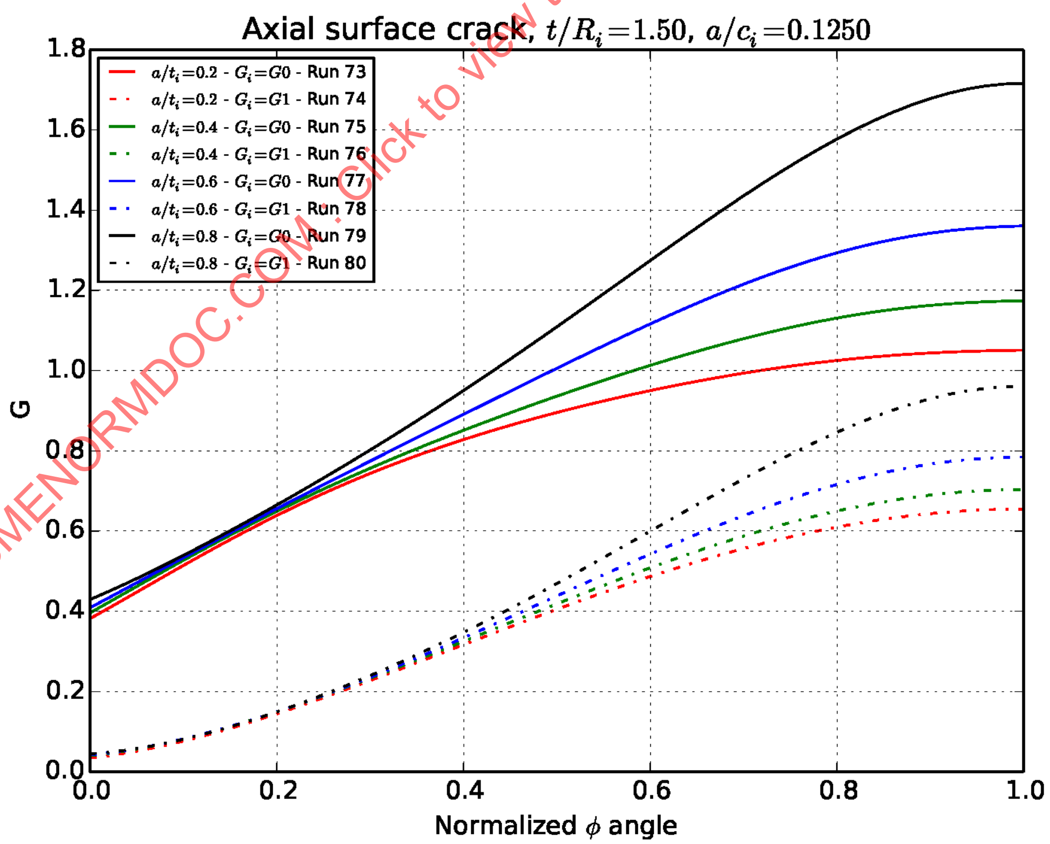

Axial surface crack, $t/R_i=1.00$, $a/c_i=0.5000$
G
Normalized $\phi$ angle
$a/t_i=0.2$ - $G_i=G0$ - Run 33
$a/t_i=0.2$ - $G_i=G1$ - Run 34
$a/t_i=0.4$ - $G_i=G0$ - Run 35
$a/t_i=0.4$ - $G_i=G1$ - Run 36
$a/t_i=0.6$ - $G_i=G0$ - Run 37
$a/t_i=0.6$ - $G_i=G1$ - Run 38
$a/t_i=0.8$ - $G_i=G0$ - Run 39
$a/t_i=0.8$ - $G_i=G1$ - Run 40

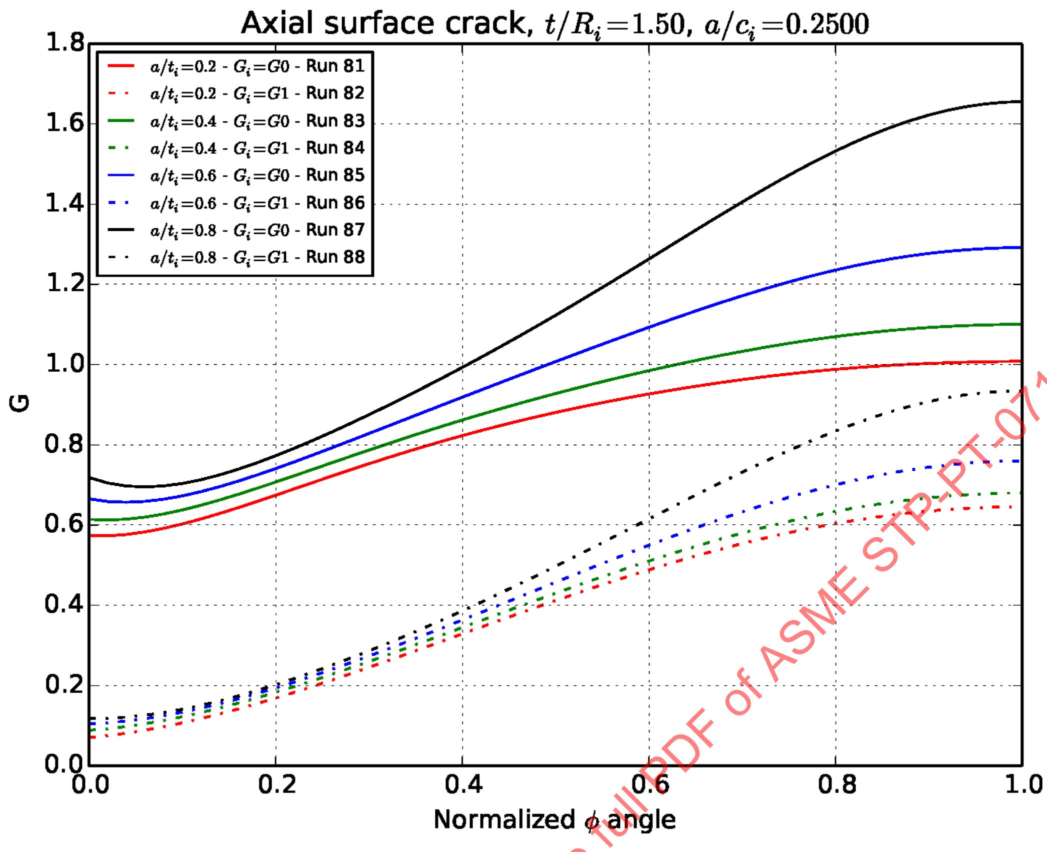

Axial surface crack, $t/R_i=1.00$, $a/c_i=1.0000$
G
Normalized $\phi$ angle
$a/t_i=0.2$ - $G_i=G0$ - Run 41
$a/t_i=0.2$ - $G_i=G1$ - Run 42
$a/t_i=0.4$ - $G_i=G0$ - Run 43
$a/t_i=0.4$ - $G_i=G1$ - Run 44
$a/t_i=0.6$ - $G_i=G0$ - Run 45
$a/t_i=0.6$ - $G_i=G1$ - Run 46
$a/t_i=0.8$ - $G_i=G0$ - Run 47
$a/t_i=0.8$ - $G_i=G1$ - Run 48

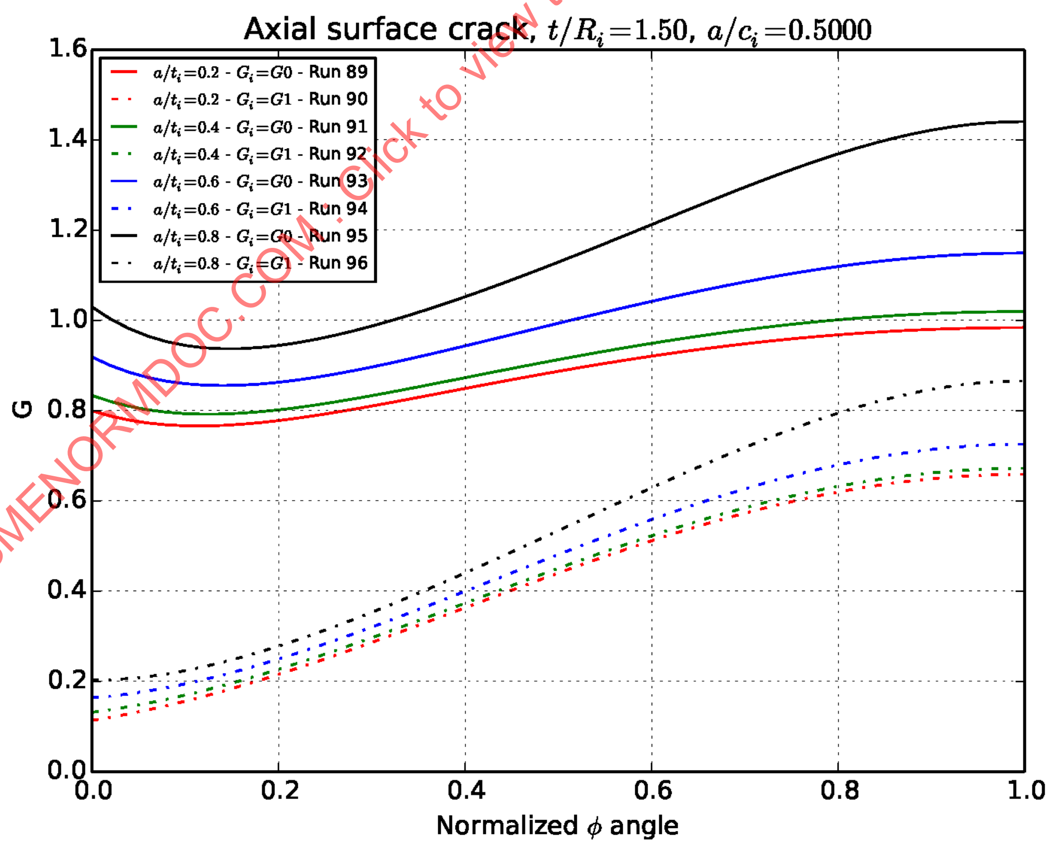

Axial surface crack, $t/R_i=1.00$, $a/c_i=2.0000$
G
Normalized $\phi$ angle
$a/t_i=0.2$ - $G_i=G0$ - Run 49
$a/t_i=0.2$ - $G_i=G1$ - Run 50
$a/t_i=0.4$ - $G_i=G0$ - Run 51
$a/t_i=0.4$ - $G_i=G1$ - Run 52
$a/t_i=0.6$ - $G_i=G0$ - Run 53
$a/t_i=0.6$ - $G_i=G1$ - Run 54
$a/t_i=0.8$ - $G_i=G0$ - Run 55
$a/t_i=0.8$ - $G_i=G1$ - Run 56

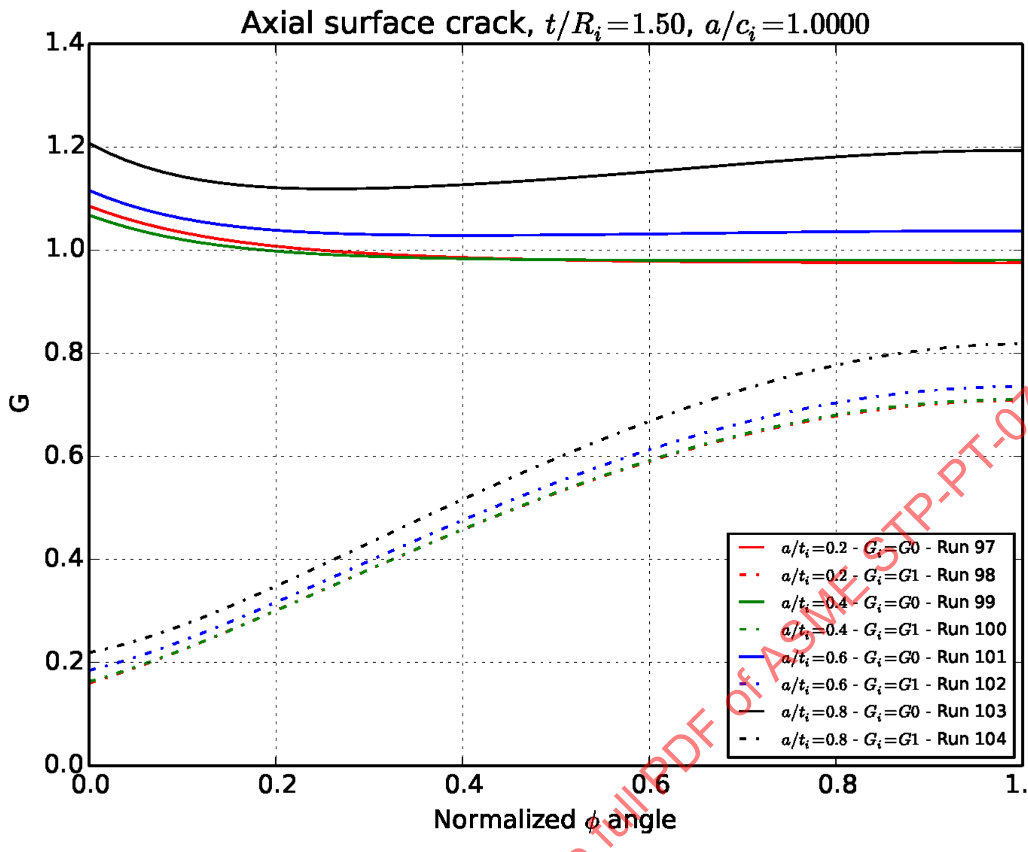

Axial surface crack, $t/R_i=1.50$, $a/c_i=0.0312$
G
Normalized $\phi$ angle
$a/t_i=0.2$ - $G_i=G0$ - Run 57
$a/t_i=0.2$ - $G_i=G1$ - Run 58
$a/t_i=0.4$ - $G_i=G0$ - Run 59
$a/t_i=0.4$ - $G_i=G1$ - Run 60
$a/t_i=0.6$ - $G_i=G0$ - Run 61
$a/t_i=0.6$ - $G_i=G1$ - Run 62
$a/t_i=0.8$ - $G_i=G0$ - Run 63
$a/t_i=0.8$ - $G_i=G1$ - Run 64

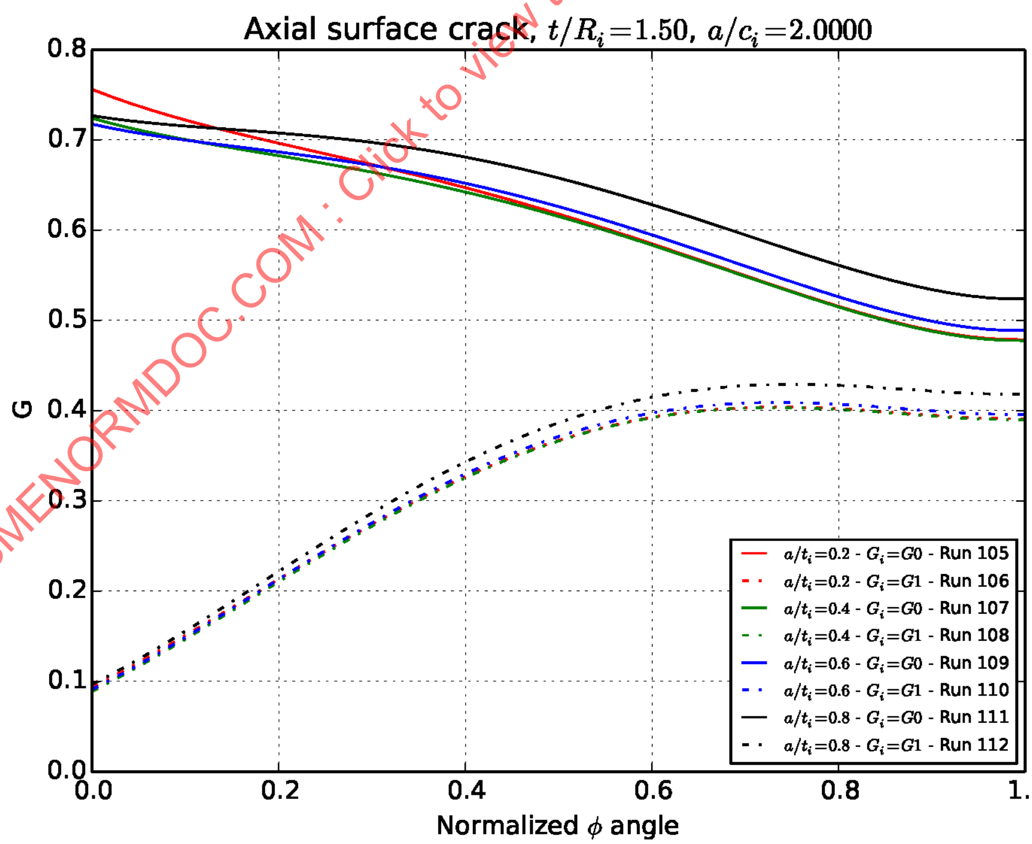

Axial surface crack, $t/R_i = 1.50$, $a/c_i = 0.0625$
$a/t_i$=0.2 - $G_i$=G0 - Run 65
$a/t_i$=0.2 - $G_i$=G1 - Run 66
$a/t_i$=0.4 - $G_i$=G0 - Run 67
$a/t_i$=0.4 - $G_i$=G1 - Run 68
$a/t_i$=0.6 - $G_i$=G0 - Run 69
$a/t_i$=0.6 - $G_i$=G1 - Run 70
$a/t_i$=0.8 - $G_i$=G0 - Run 71
$a/t_i$=0.8 - $G_i$=G1 - Run 72
G
Normalized $\phi$ angle
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8

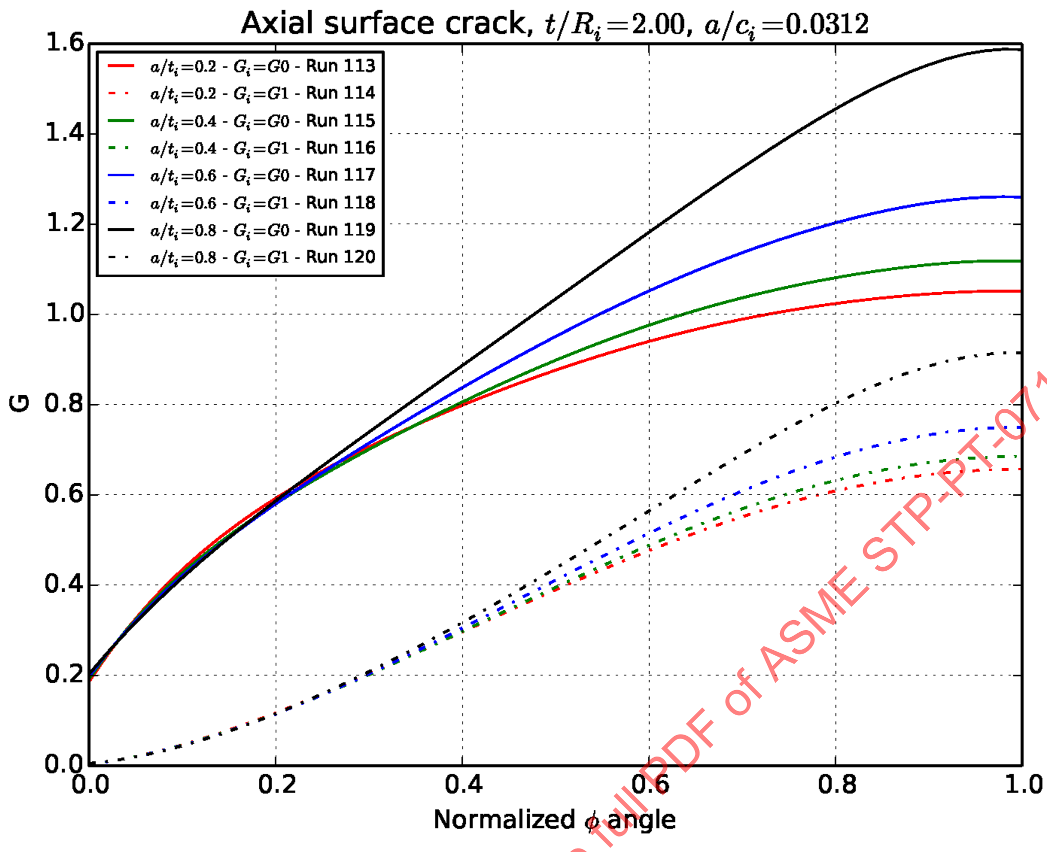

Axial surface crack, $t/R_i = 1.50$, $a/c_i = 0.1250$
$a/t_i$=0.2 - $G_i$=G0 - Run 73
$a/t_i$=0.2 - $G_i$=G1 - Run 74
$a/t_i$=0.4 - $G_i$=G0 - Run 75
$a/t_i$=0.4 - $G_i$=G1 - Run 76
$a/t_i$=0.6 - $G_i$=G0 - Run 77
$a/t_i$=0.6 - $G_i$=G1 - Run 78
$a/t_i$=0.8 - $G_i$=G0 - Run 79
$a/t_i$=0.8 - $G_i$=G1 - Run 80
G
Normalized $\phi$ angle
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
1.8

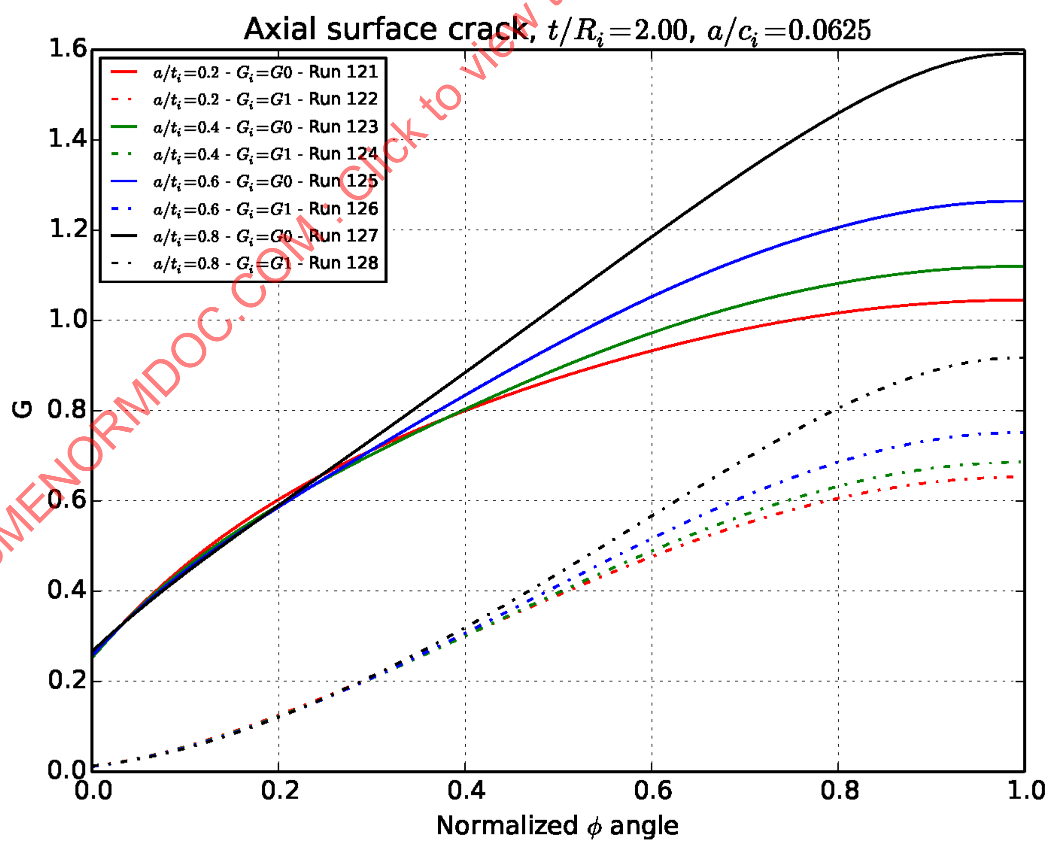

Axial surface crack, $t/R_i = 1.50$, $a/c_i = 0.2500$
$a/t_i = 0.2$ - $G_i = G0$ - Run 81
$a/t_i = 0.2$ - $G_i = G1$ - Run 82
$a/t_i = 0.4$ - $G_i = G0$ - Run 83
$a/t_i = 0.4$ - $G_i = G1$ - Run 84
$a/t_i = 0.6$ - $G_i = G0$ - Run 85
$a/t_i = 0.6$ - $G_i = G1$ - Run 86
$a/t_i = 0.8$ - $G_i = G0$ - Run 87
$a/t_i = 0.8$ - $G_i = G1$ - Run 88
G
Normalized $\phi$ angle

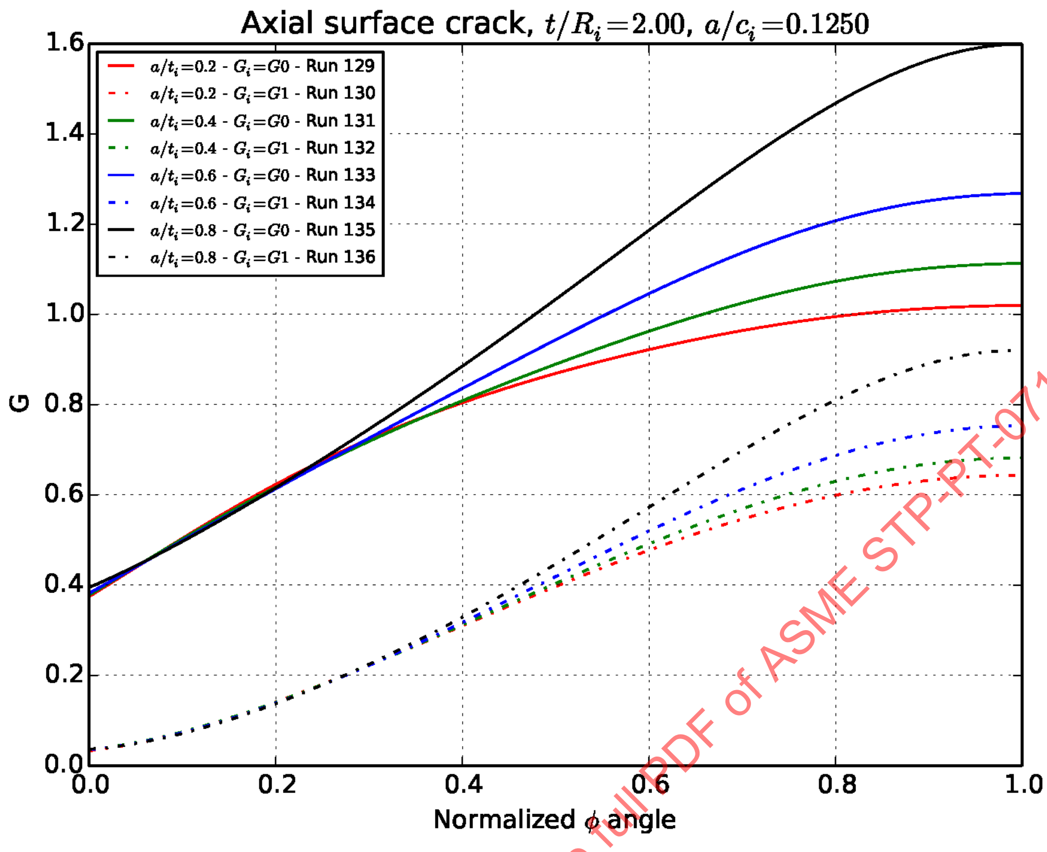

Axial surface crack, $t/R_i = 1.50$, $a/c_i = 0.5000$
$a/t_i = 0.2$ - $G_i = G0$ - Run 89
$a/t_i = 0.2$ - $G_i = G1$ - Run 90
$a/t_i = 0.4$ - $G_i = G0$ - Run 91
$a/t_i = 0.4$ - $G_i = G1$ - Run 92
$a/t_i = 0.6$ - $G_i = G0$ - Run 93
$a/t_i = 0.6$ - $G_i = G1$ - Run 94
$a/t_i = 0.8$ - $G_i = G0$ - Run 95
$a/t_i = 0.8$ - $G_i = G1$ - Run 96
G
Normalized $\phi$ angle

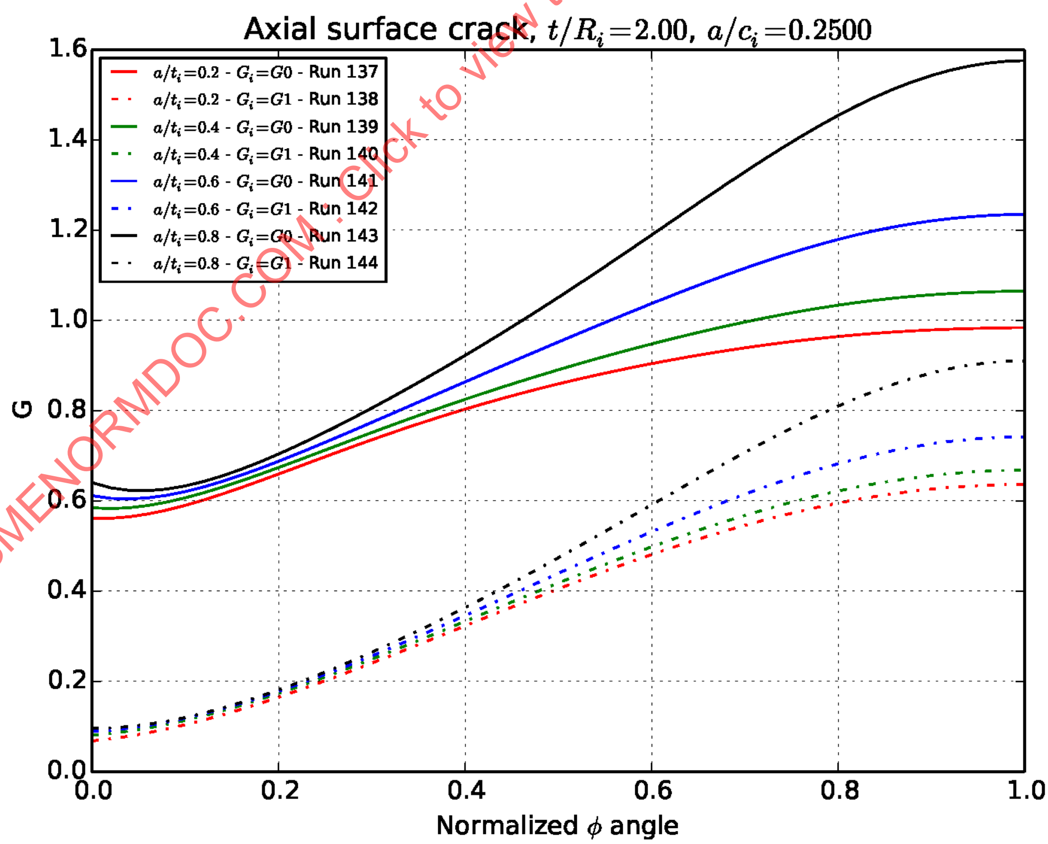

Axial surface crack, $t/R_i = 1.50$, $a/c_i = 1.0000$
G
Normalized $\phi$ angle
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
$a/t_i = 0.2$ - $G_i = G0$ - Run 97
$a/t_i = 0.2$ - $G_i = G1$ - Run 98
$a/t_i = 0.4$ - $G_i = G0$ - Run 99
$a/t_i = 0.4$ - $G_i = G1$ - Run 100
$a/t_i = 0.6$ - $G_i = G0$ - Run 101
$a/t_i = 0.6$ - $G_i = G1$ - Run 102
$a/t_i = 0.8$ - $G_i = G0$ - Run 103
$a/t_i = 0.8$ - $G_i = G1$ - Run 104

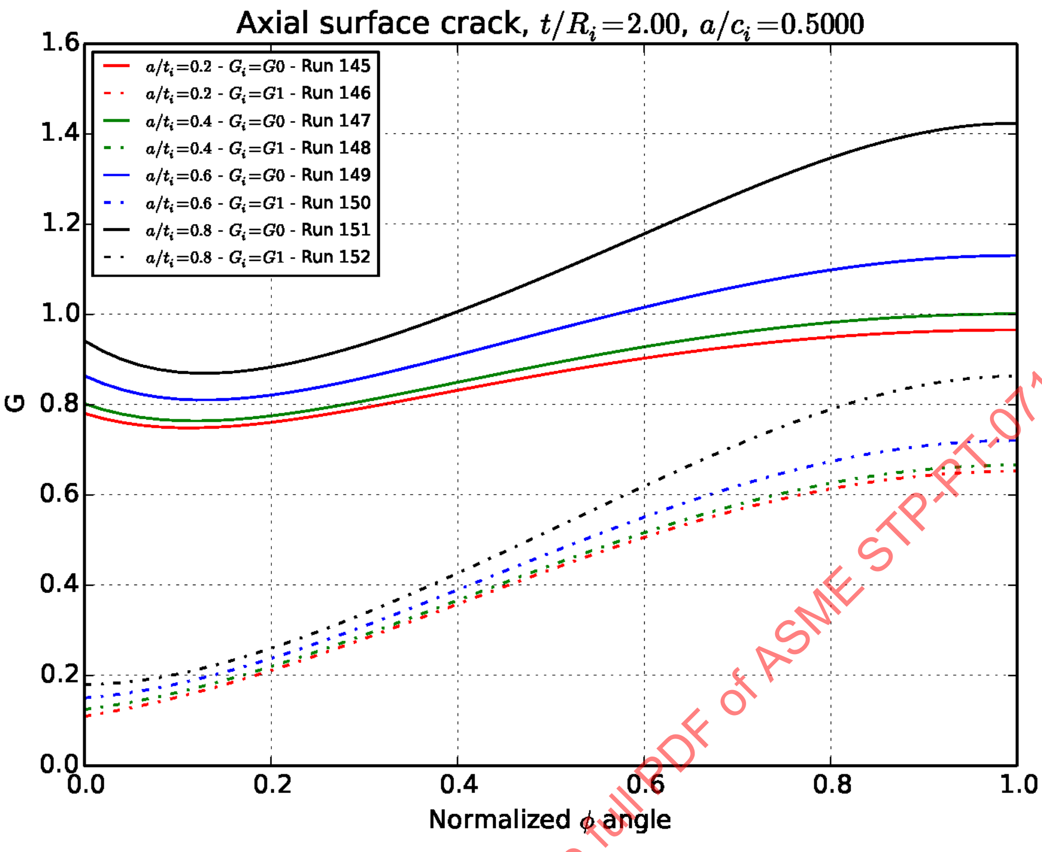

Axial surface crack, $t/R_i = 1.50$, $a/c_i = 2.0000$
G
Normalized $\phi$ angle
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
1.0
$a/t_i = 0.2$ - $G_i = G0$ - Run 105
$a/t_i = 0.2$ - $G_i = G1$ - Run 106
$a/t_i = 0.4$ - $G_i = G0$ - Run 107
$a/t_i = 0.4$ - $G_i = G1$ - Run 108
$a/t_i = 0.6$ - $G_i = G0$ - Run 109
$a/t_i = 0.6$ - $G_i = G1$ - Run 110
$a/t_i = 0.8$ - $G_i = G0$ - Run 111
$a/t_i = 0.8$ - $G_i = G1$ - Run 112

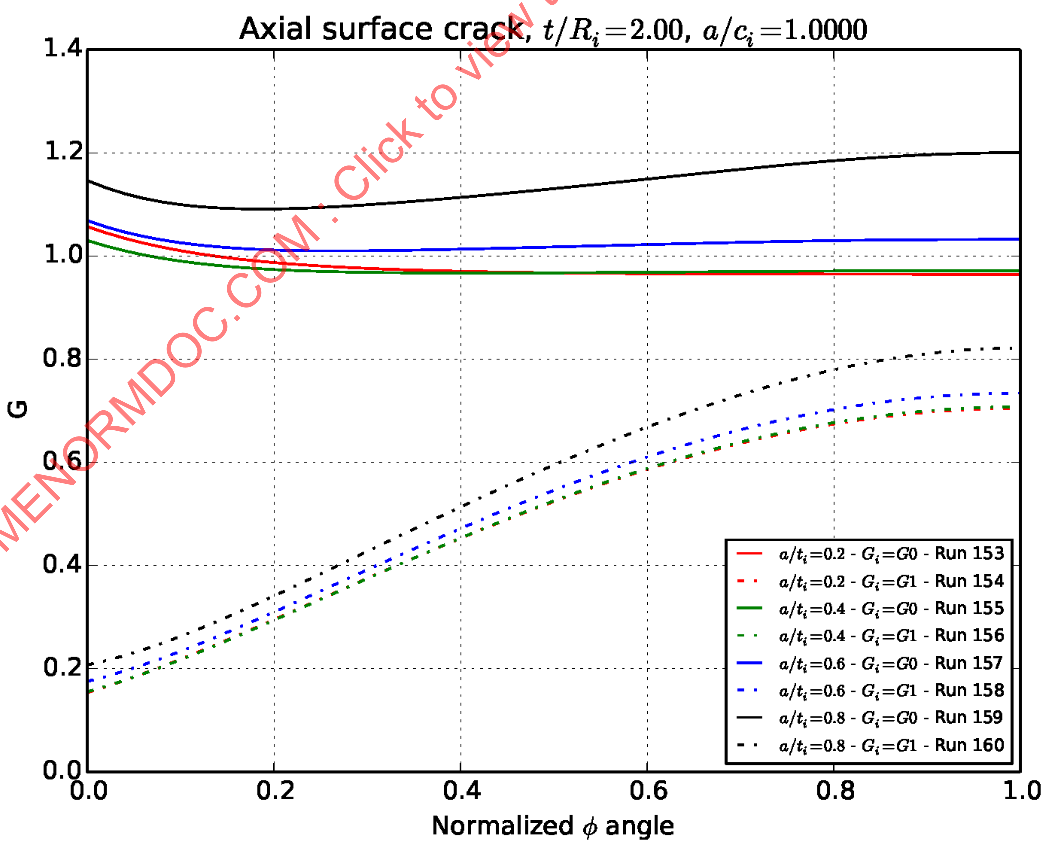

Axial surface crack, $t/R_i = 2.00$, $a/c_i = 0.0312$
$a/t_i = 0.2$ - $G_i = G0$ - Run 113
$a/t_i = 0.2$ - $G_i = G1$ - Run 114
$a/t_i = 0.4$ - $G_i = G0$ - Run 115
$a/t_i = 0.4$ - $G_i = G1$ - Run 116
$a/t_i = 0.6$ - $G_i = G0$ - Run 117
$a/t_i = 0.6$ - $G_i = G1$ - Run 118
$a/t_i = 0.8$ - $G_i = G0$ - Run 119
$a/t_i = 0.8$ - $G_i = G1$ - Run 120
G
Normalized $\phi$ angle

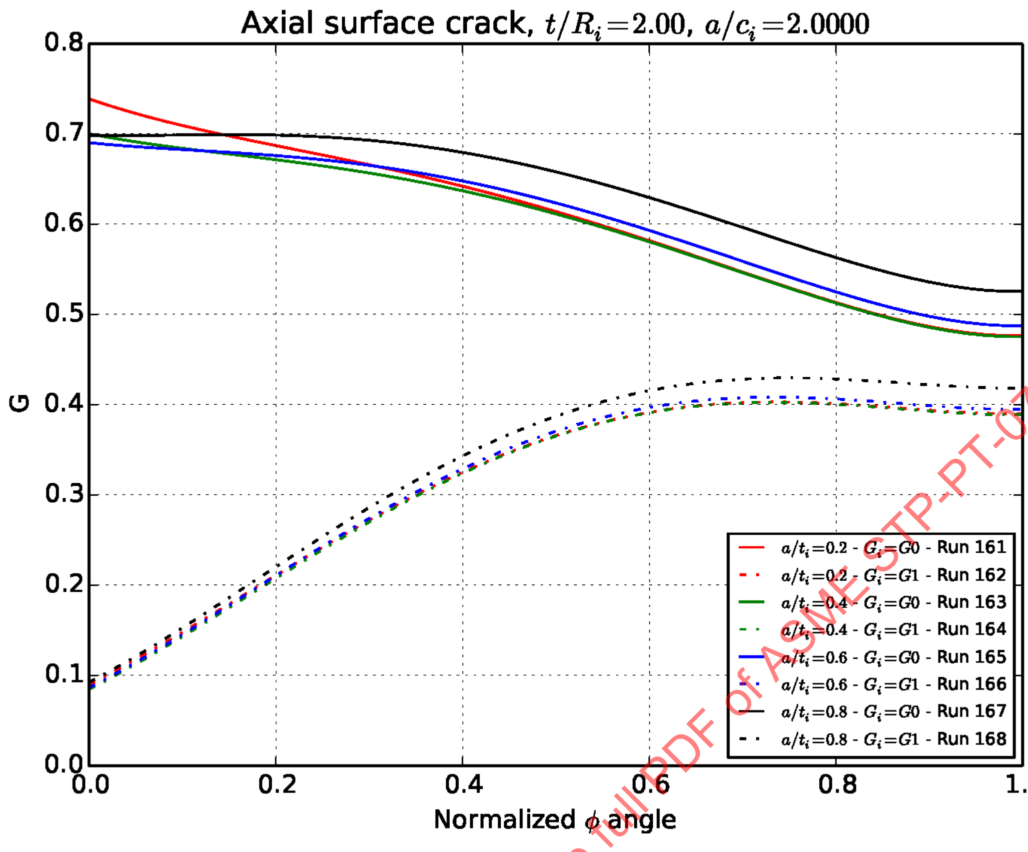

Axial surface crack, $t/R_i = 2.00$, $a/c_i = 0.0625$
$a/t_i = 0.2$ - $G_i = G0$ - Run 121
$a/t_i = 0.2$ - $G_i = G1$ - Run 122
$a/t_i = 0.4$ - $G_i = G0$ - Run 123
$a/t_i = 0.4$ - $G_i = G1$ - Run 124
$a/t_i = 0.6$ - $G_i = G0$ - Run 125
$a/t_i = 0.6$ - $G_i = G1$ - Run 126
$a/t_i = 0.8$ - $G_i = G0$ - Run 127
$a/t_i = 0.8$ - $G_i = G1$ - Run 128
G
Normalized $\phi$ angle

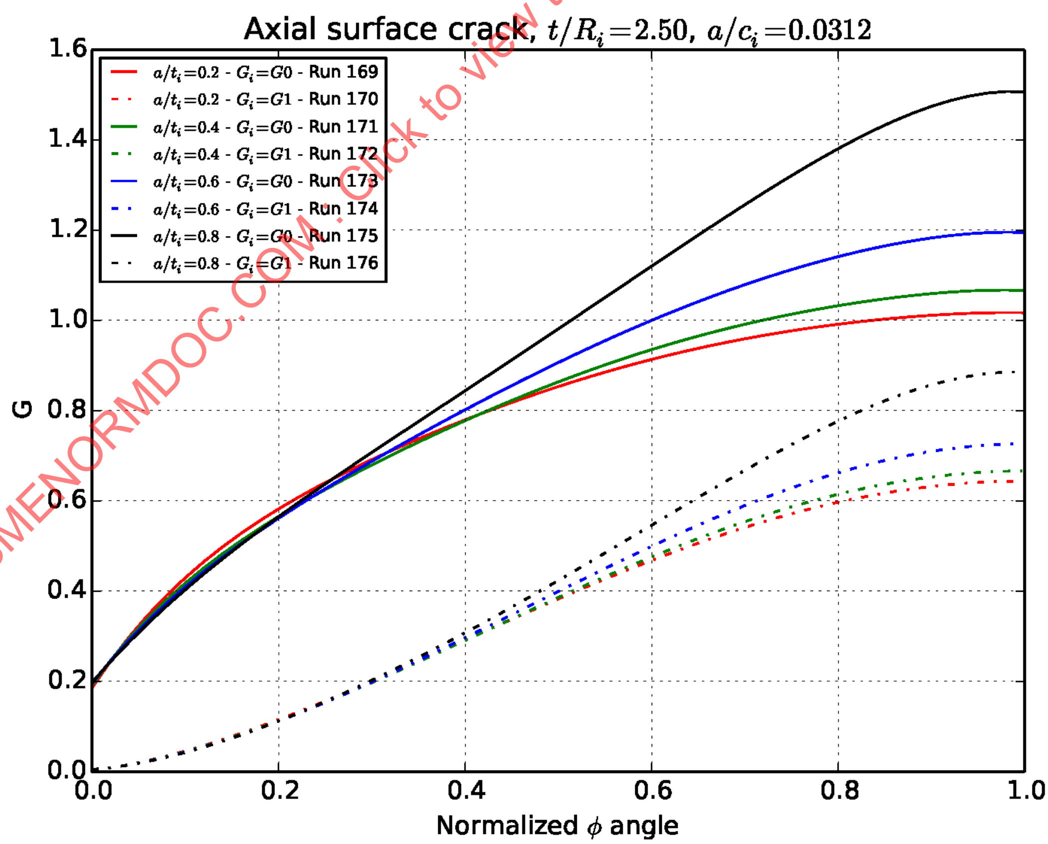

Axial surface crack, $t/R_i=2.00$, $a/c_i=0.1250$
$a/t_i=0.2$ - $G_i=G0$ - Run 129
$a/t_i=0.2$ - $G_i=G1$ - Run 130
$a/t_i=0.4$ - $G_i=G0$ - Run 131
$a/t_i=0.4$ - $G_i=G1$ - Run 132
$a/t_i=0.6$ - $G_i=G0$ - Run 133
$a/t_i=0.6$ - $G_i=G1$ - Run 134
$a/t_i=0.8$ - $G_i=G0$ - Run 135
$a/t_i=0.8$ - $G_i=G1$ - Run 136
G
Normalized $\phi$ angle

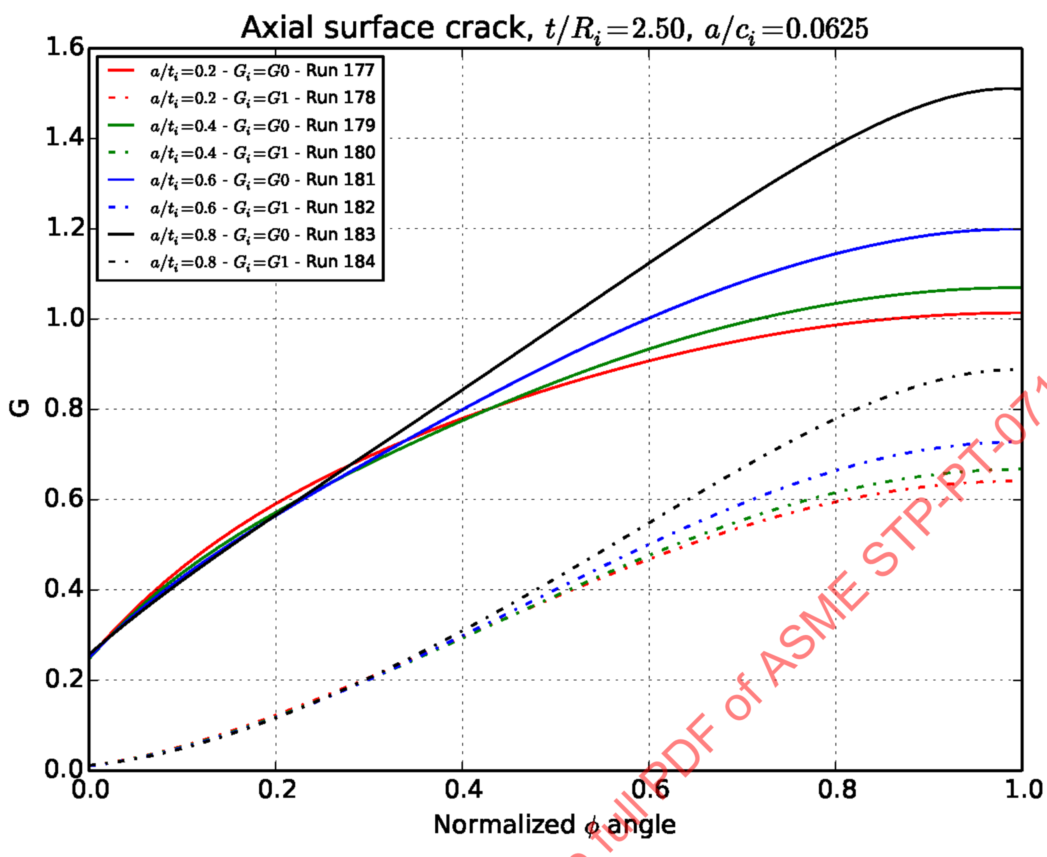

Axial surface crack, $t/R_i=2.00$, $a/c_i=0.2500$
$a/t_i=0.2$ - $G_i=G0$ - Run 137
$a/t_i=0.2$ - $G_i=G1$ - Run 138
$a/t_i=0.4$ - $G_i=G0$ - Run 139
$a/t_i=0.4$ - $G_i=G1$ - Run 140
$a/t_i=0.6$ - $G_i=G0$ - Run 141
$a/t_i=0.6$ - $G_i=G1$ - Run 142
$a/t_i=0.8$ - $G_i=G0$ - Run 143
$a/t_i=0.8$ - $G_i=G1$ - Run 144
G
Normalized $\phi$ angle

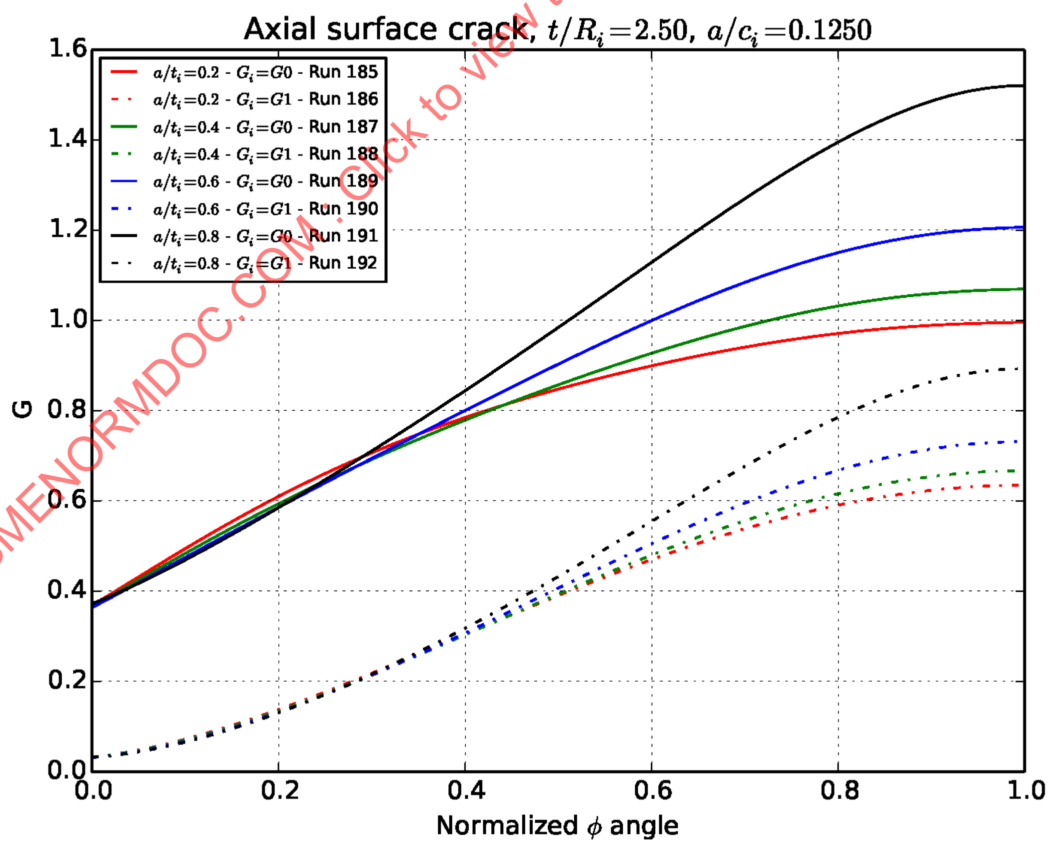

Axial surface crack, $t/R_i = 2.00$, $a/c_i = 0.5000$
$a/t_i = 0.2$ - $G_i = G0$ - Run 145
$a/t_i = 0.2$ - $G_i = G1$ - Run 146
$a/t_i = 0.4$ - $G_i = G0$ - Run 147
$a/t_i = 0.4$ - $G_i = G1$ - Run 148
$a/t_i = 0.6$ - $G_i = G0$ - Run 149
$a/t_i = 0.6$ - $G_i = G1$ - Run 150
$a/t_i = 0.8$ - $G_i = G0$ - Run 151
$a/t_i = 0.8$ - $G_i = G1$ - Run 152
G
Normalized $\phi$ angle

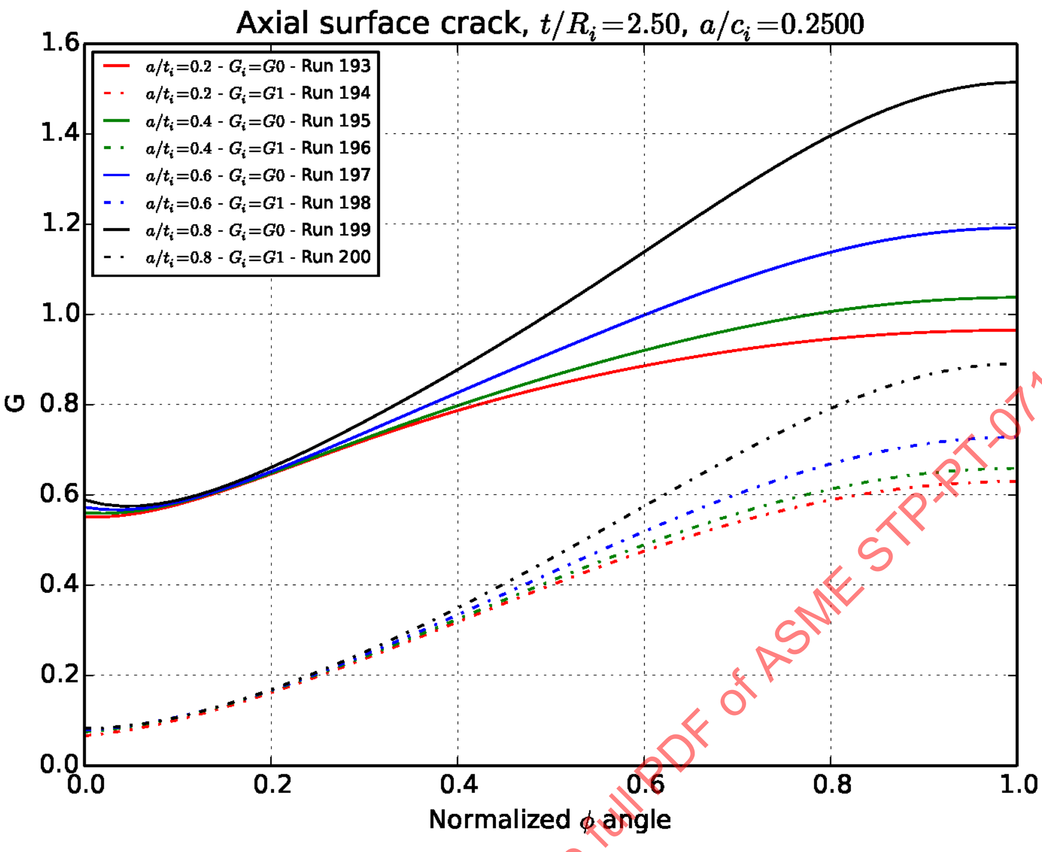

Axial surface crack, $t/R_i = 2.00$, $a/c_i = 1.0000$
$a/t_i = 0.2$ - $G_i = G0$ - Run 153
$a/t_i = 0.2$ - $G_i = G1$ - Run 154
$a/t_i = 0.4$ - $G_i = G0$ - Run 155
$a/t_i = 0.4$ - $G_i = G1$ - Run 156
$a/t_i = 0.6$ - $G_i = G0$ - Run 157
$a/t_i = 0.6$ - $G_i = G1$ - Run 158
$a/t_i = 0.8$ - $G_i = G0$ - Run 159
$a/t_i = 0.8$ - $G_i = G1$ - Run 160
G
Normalized $\phi$ angle

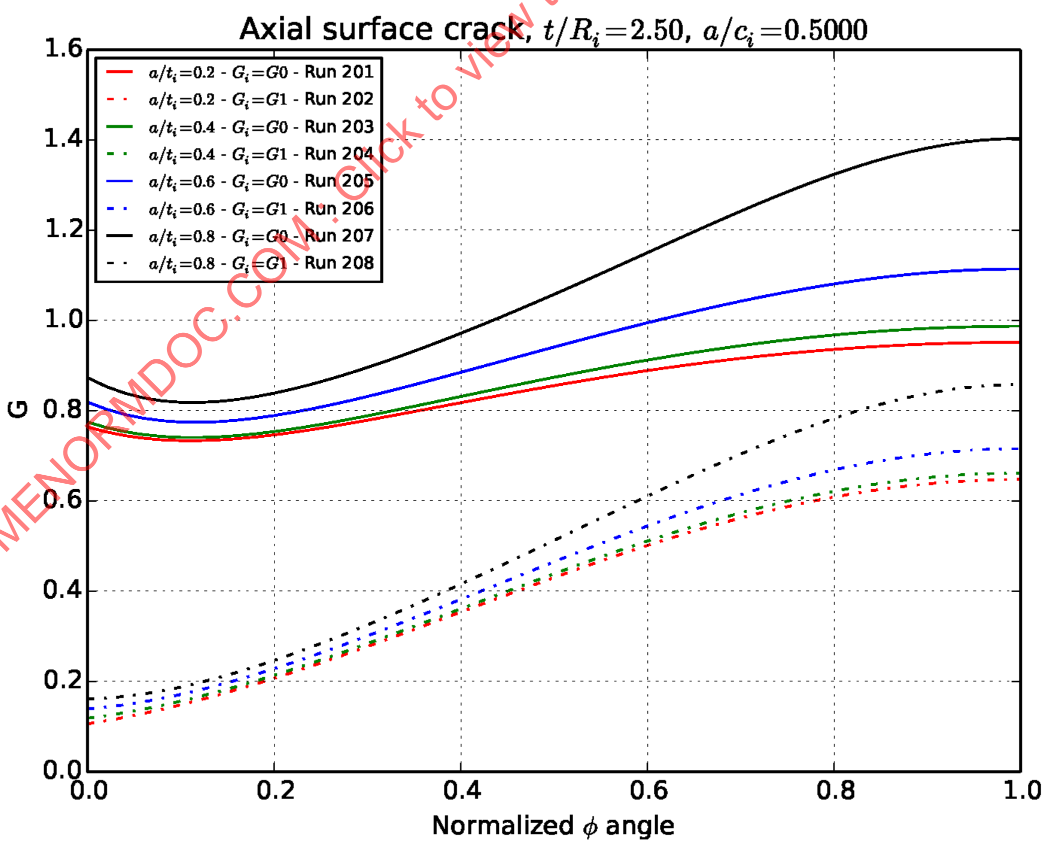

Axial surface crack, $t/R_i=2.00$, $a/c_i=2.0000$
G
Normalized $\phi$ angle
$a/t_i=0.2$ - $G_i=G0$ - Run 161
$a/t_i=0.2$ - $G_i=G1$ - Run 162
$a/t_i=0.4$ - $G_i=G0$ - Run 163
$a/t_i=0.4$ - $G_i=G1$ - Run 164
$a/t_i=0.6$ - $G_i=G0$ - Run 165
$a/t_i=0.6$ - $G_i=G1$ - Run 166
$a/t_i=0.8$ - $G_i=G0$ - Run 167
$a/t_i=0.8$ - $G_i=G1$ - Run 168

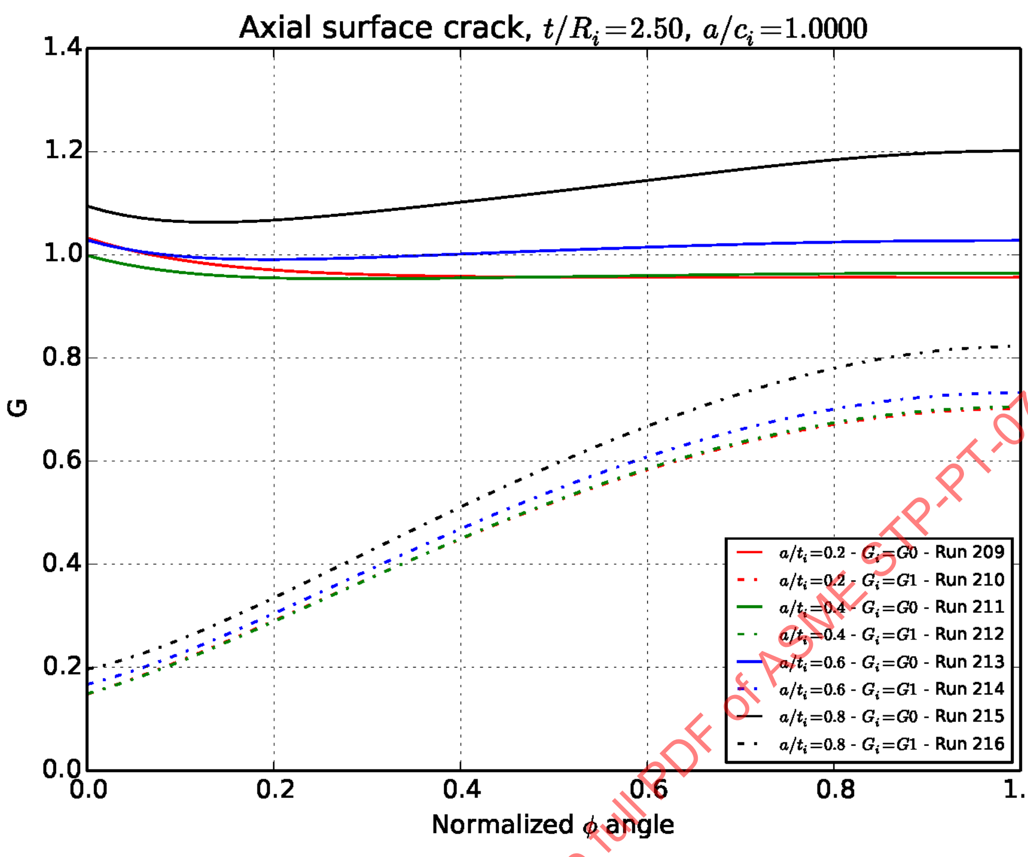

Axial surface crack, $t/R_i=2.50$, $a/c_i=0.0312$
G
Normalized $\phi$ angle
$a/t_i=0.2$ - $G_i=G0$ - Run 169
$a/t_i=0.2$ - $G_i=G1$ - Run 170
$a/t_i=0.4$ - $G_i=G0$ - Run 171
$a/t_i=0.4$ - $G_i=G1$ - Run 172
$a/t_i=0.6$ - $G_i=G0$ - Run 173
$a/t_i=0.6$ - $G_i=G1$ - Run 174
$a/t_i=0.8$ - $G_i=G0$ - Run 175
$a/t_i=0.8$ - $G_i=G1$ - Run 176

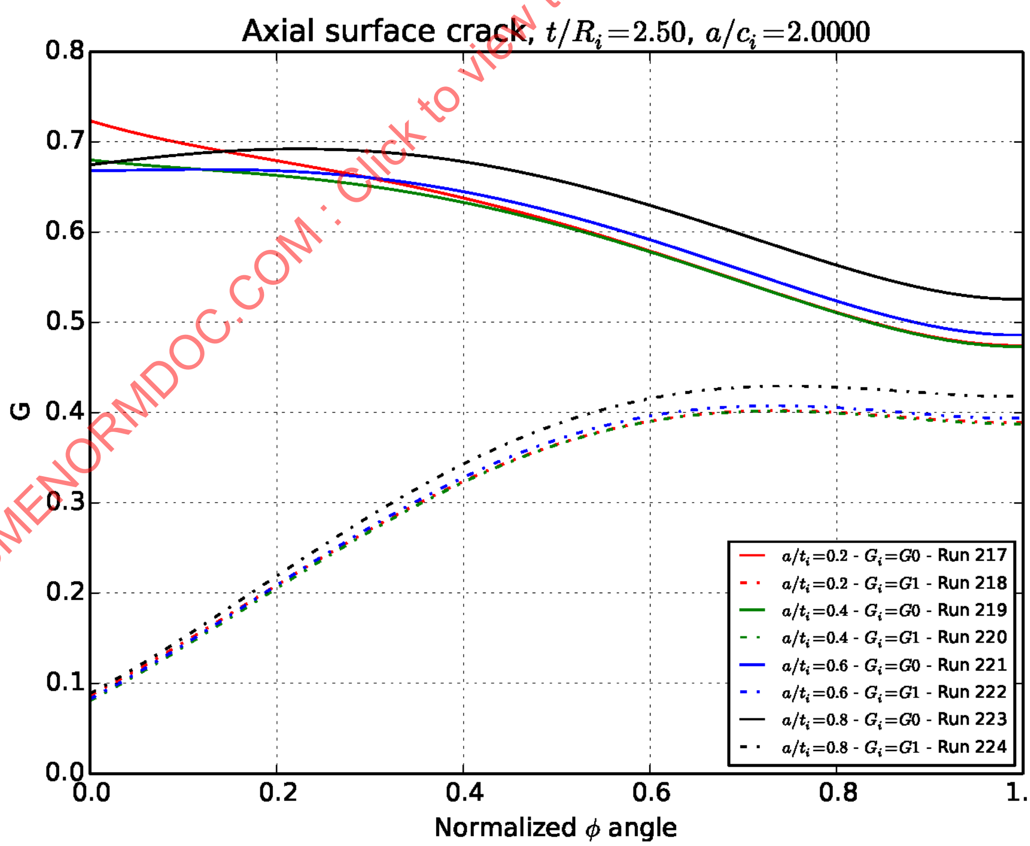

Axial surface crack, $t/R_i = 2.50$, $a/c_i = 0.0625$
$a/t_i = 0.2$ - $G_i = G0$ - Run 177
$a/t_i = 0.2$ - $G_i = G1$ - Run 178
$a/t_i = 0.4$ - $G_i = G0$ - Run 179
$a/t_i = 0.4$ - $G_i = G1$ - Run 180
$a/t_i = 0.6$ - $G_i = G0$ - Run 181
$a/t_i = 0.6$ - $G_i = G1$ - Run 182
$a/t_i = 0.8$ - $G_i = G0$ - Run 183
$a/t_i = 0.8$ - $G_i = G1$ - Run 184
G
Normalized $\phi$ angle

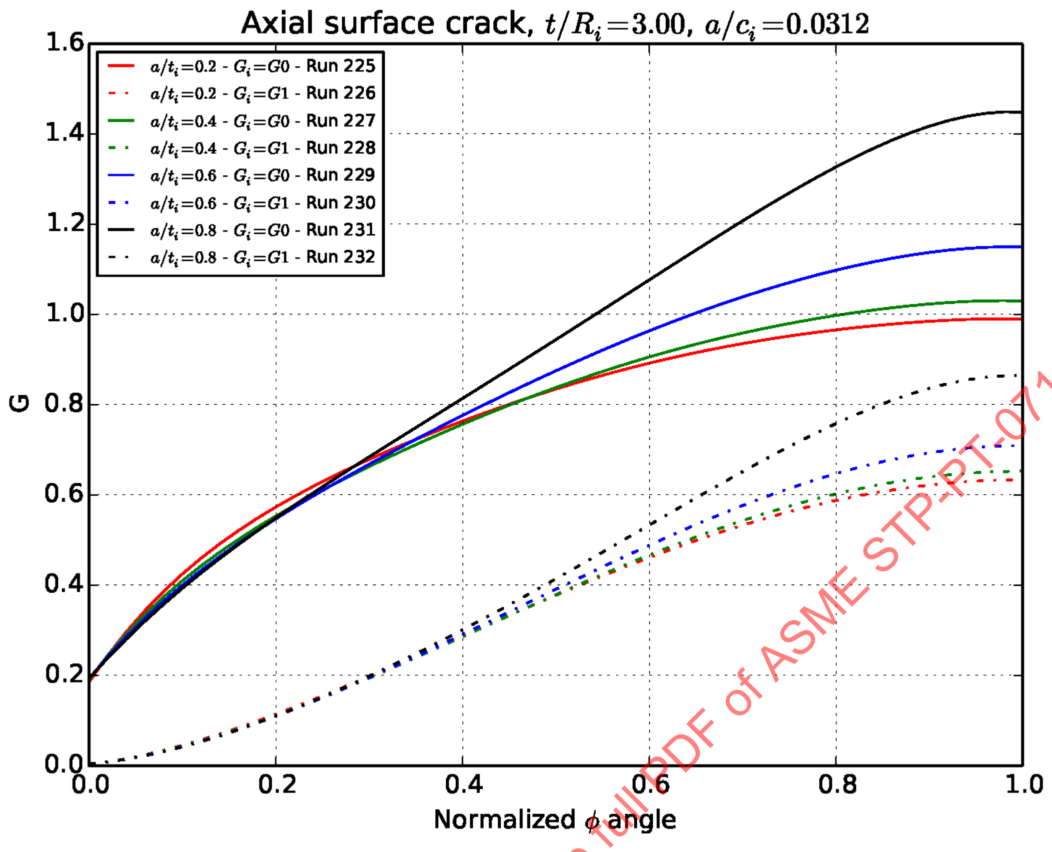

Axial surface crack, $t/R_i = 2.50$, $a/c_i = 0.1250$
$a/t_i = 0.2$ - $G_i = G0$ - Run 185
$a/t_i = 0.2$ - $G_i = G1$ - Run 186
$a/t_i = 0.4$ - $G_i = G0$ - Run 187
$a/t_i = 0.4$ - $G_i = G1$ - Run 188
$a/t_i = 0.6$ - $G_i = G0$ - Run 189
$a/t_i = 0.6$ - $G_i = G1$ - Run 190
$a/t_i = 0.8$ - $G_i = G0$ - Run 191
$a/t_i = 0.8$ - $G_i = G1$ - Run 192
G
Normalized $\phi$ angle

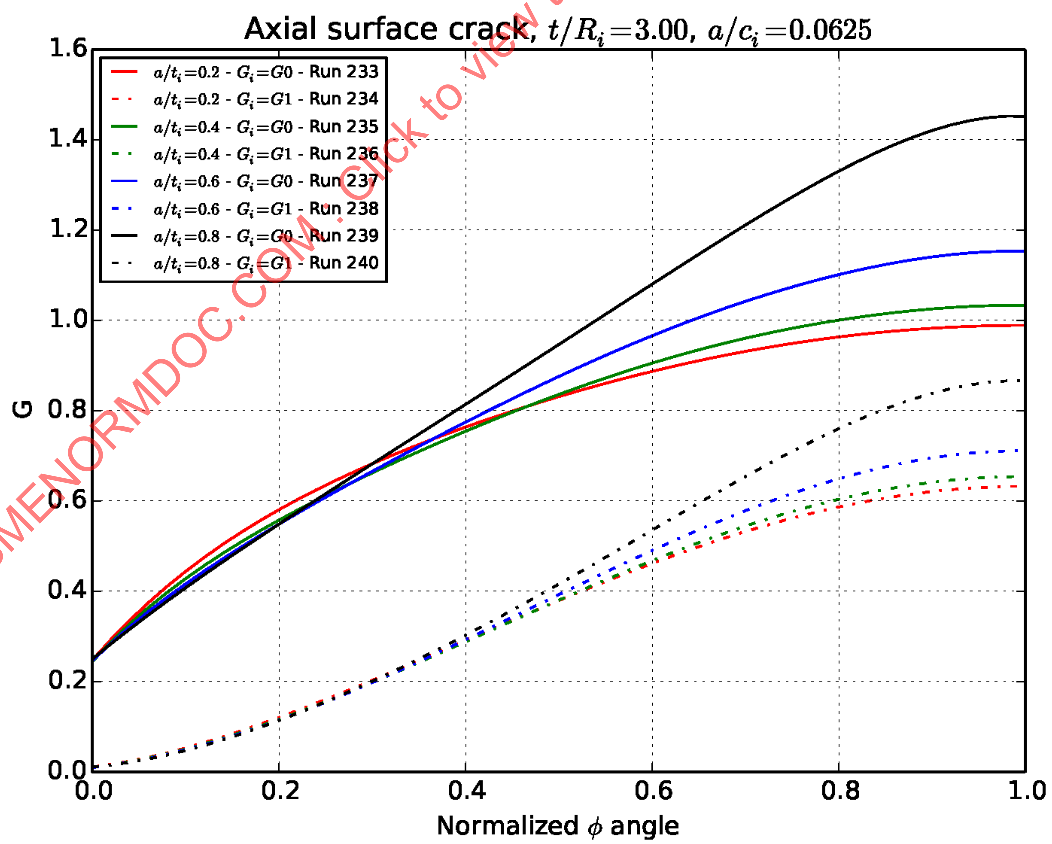

Axial surface crack, $t/R_i=2.50$, $a/c_i=0.2500$
$a/t_i=0.2$ - $G_i=G0$ - Run 193
$a/t_i=0.2$ - $G_i=G1$ - Run 194
$a/t_i=0.4$ - $G_i=G0$ - Run 195
$a/t_i=0.4$ - $G_i=G1$ - Run 196
$a/t_i=0.6$ - $G_i=G0$ - Run 197
$a/t_i=0.6$ - $G_i=G1$ - Run 198
$a/t_i=0.8$ - $G_i=G0$ - Run 199
$a/t_i=0.8$ - $G_i=G1$ - Run 200
G
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0
Normalized $\phi$ angle

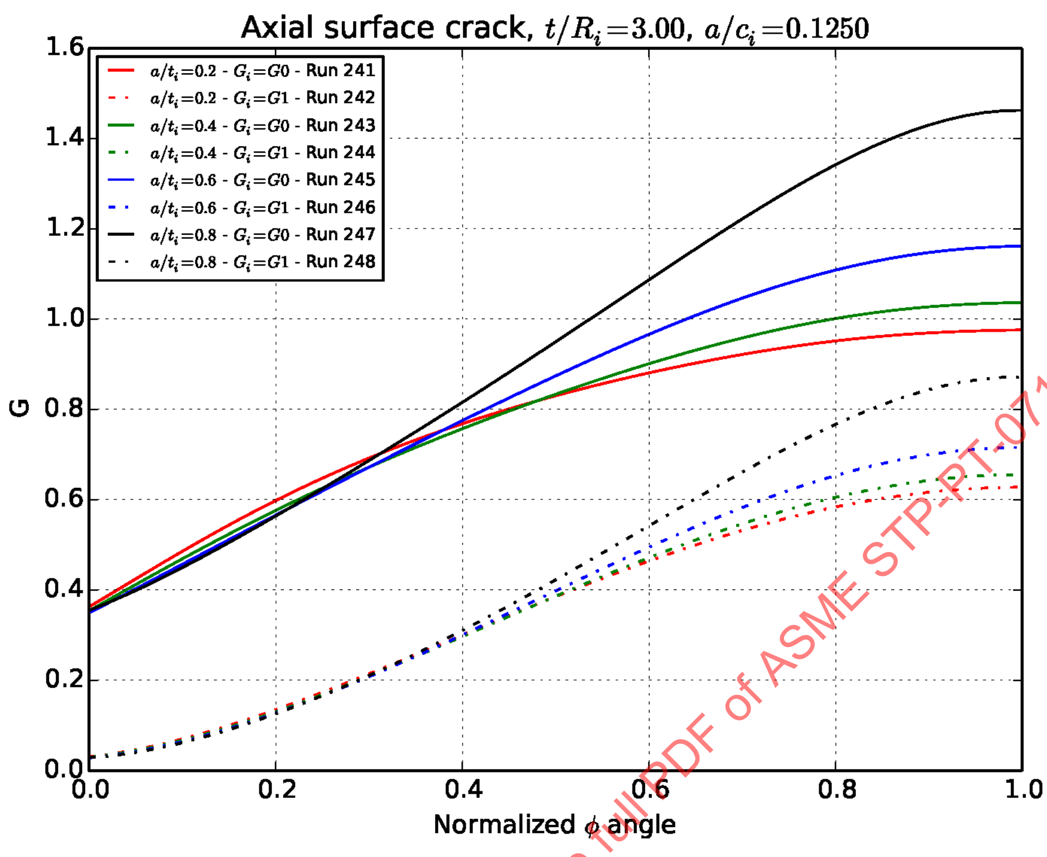

Axial surface crack, $t/R_i=2.50$, $a/c_i=0.5000$
$a/t_i=0.2$ - $G_i=G0$ - Run 201
$a/t_i=0.2$ - $G_i=G1$ - Run 202
$a/t_i=0.4$ - $G_i=G0$ - Run 203
$a/t_i=0.4$ - $G_i=G1$ - Run 204
$a/t_i=0.6$ - $G_i=G0$ - Run 205
$a/t_i=0.6$ - $G_i=G1$ - Run 206
$a/t_i=0.8$ - $G_i=G0$ - Run 207
$a/t_i=0.8$ - $G_i=G1$ - Run 208
G
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0
Normalized $\phi$ angle

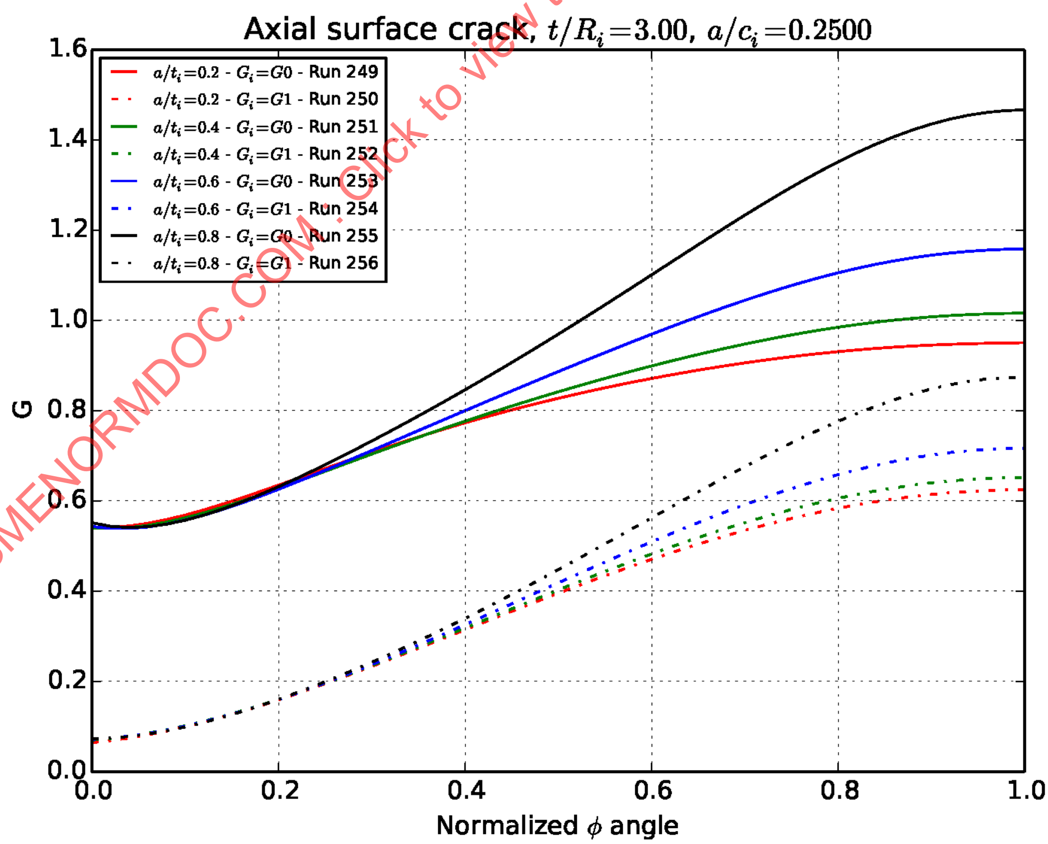

Axial surface crack, $t/R_i = 2.50$, $a/c_i = 1.0000$
G
Normalized $\phi$ angle
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0
$a/t_i = 0.2$ - $G_i = G0$ - Run 209
$a/t_i = 0.2$ - $G_i = G1$ - Run 210
$a/t_i = 0.4$ - $G_i = G0$ - Run 211
$a/t_i = 0.4$ - $G_i = G1$ - Run 212
$a/t_i = 0.6$ - $G_i = G0$ - Run 213
$a/t_i = 0.6$ - $G_i = G1$ - Run 214
$a/t_i = 0.8$ - $G_i = G0$ - Run 215
$a/t_i = 0.8$ - $G_i = G1$ - Run 216

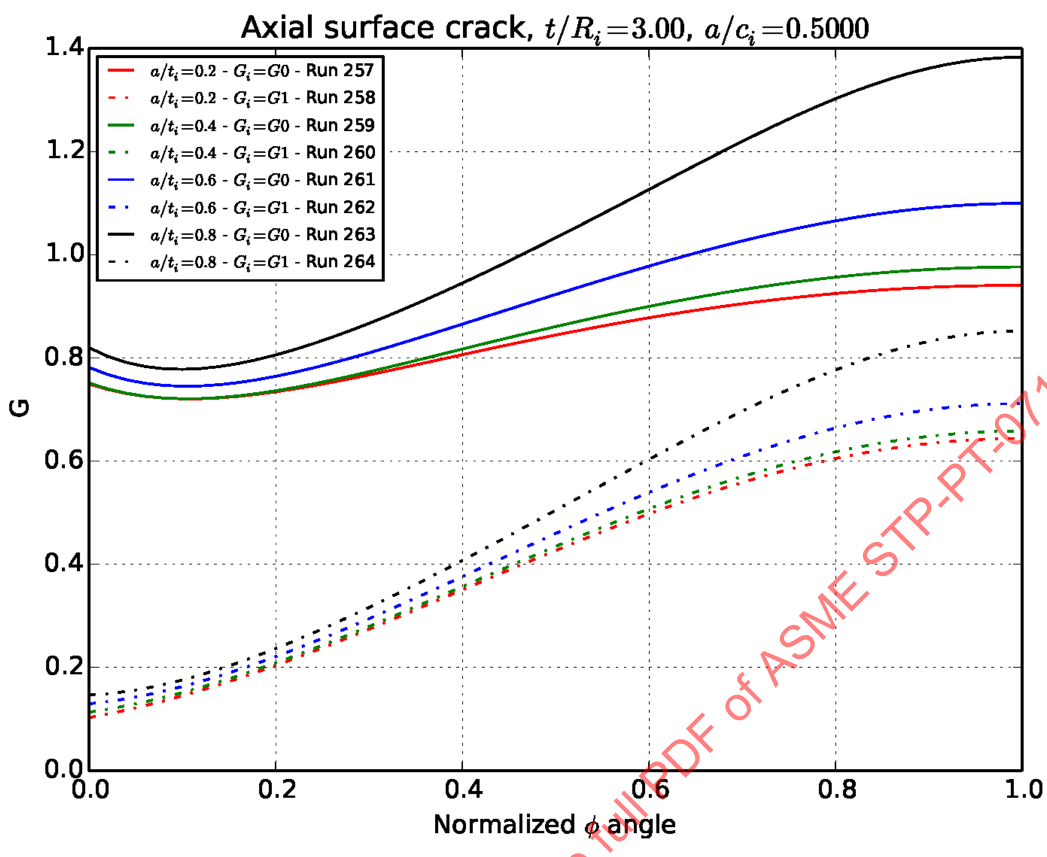

Axial surface crack, $t/R_i = 2.50$, $a/c_i = 2.0000$
G
Normalized $\phi$ angle
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.0
0.2
0.4
0.6
0.8
1.0
$a/t_i = 0.2$ - $G_i = G0$ - Run 217
$a/t_i = 0.2$ - $G_i = G1$ - Run 218
$a/t_i = 0.4$ - $G_i = G0$ - Run 219
$a/t_i = 0.4$ - $G_i = G1$ - Run 220
$a/t_i = 0.6$ - $G_i = G0$ - Run 221
$a/t_i = 0.6$ - $G_i = G1$ - Run 222
$a/t_i = 0.8$ - $G_i = G0$ - Run 223
$a/t_i = 0.8$ - $G_i = G1$ - Run 224

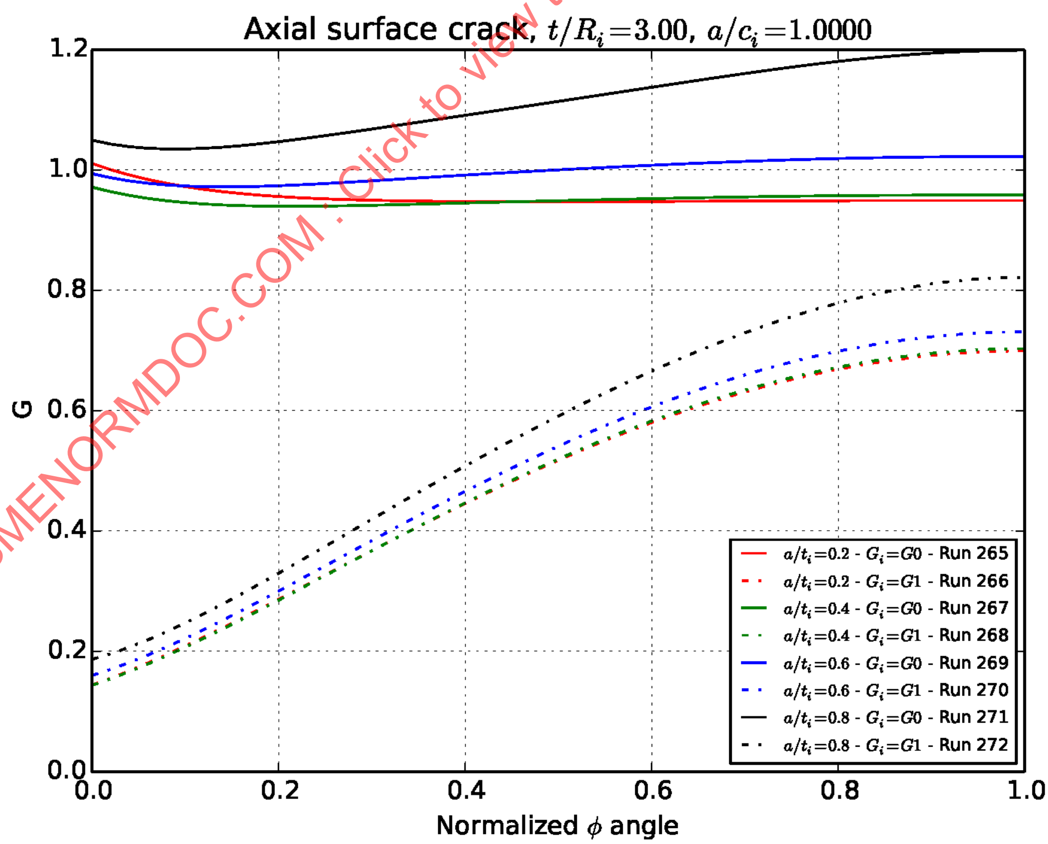

Axial surface crack, $t/R_i = 3.00$, $a/c_i = 0.0312$
$a/t_i$=0.2 - $G_i$=$G0$ - Run 225
$a/t_i$=0.2 - $G_i$=$G1$ - Run 226
$a/t_i$=0.4 - $G_i$=$G0$ - Run 227
$a/t_i$=0.4 - $G_i$=$G1$ - Run 228
$a/t_i$=0.6 - $G_i$=$G0$ - Run 229
$a/t_i$=0.6 - $G_i$=$G1$ - Run 230
$a/t_i$=0.8 - $G_i$=$G0$ - Run 231
$a/t_i$=0.8 - $G_i$=$G1$ - Run 232
G
Normalized $\phi$ angle

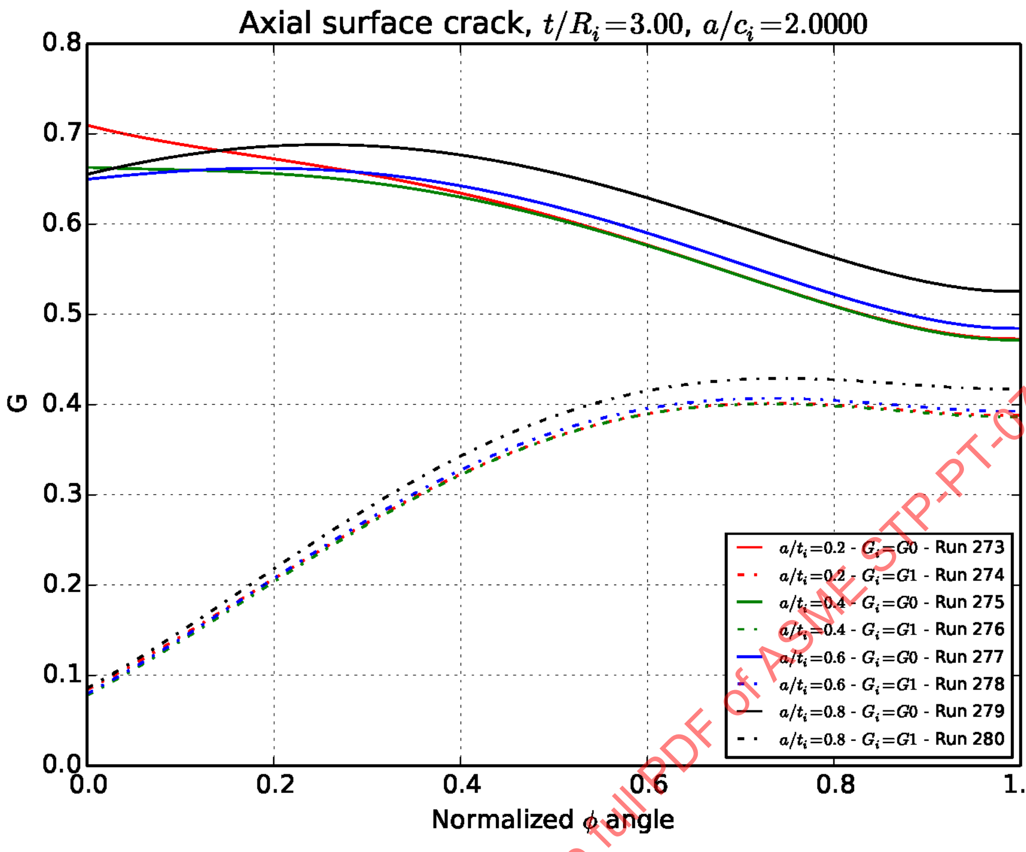

Axial surface crack, $t/R_i = 3.00$, $a/c_i = 0.0625$
$a/t_i$=0.2 - $G_i$=$G0$ - Run 233
$a/t_i$=0.2 - $G_i$=$G1$ - Run 234
$a/t_i$=0.4 - $G_i$=$G0$ - Run 235
$a/t_i$=0.4 - $G_i$=$G1$ - Run 236
$a/t_i$=0.6 - $G_i$=$G0$ - Run 237
$a/t_i$=0.6 - $G_i$=$G1$ - Run 238
$a/t_i$=0.8 - $G_i$=$G0$ - Run 239
$a/t_i$=0.8 - $G_i$=$G1$ - Run 240
G
Normalized $\phi$ angle


Axial surface crack, $t/R_i = 3.00$, $a/c_i = 0.1250$
$a/t_i = 0.2$ - $G_i = G0$ - Run 241
$a/t_i = 0.2$ - $G_i = G1$ - Run 242
$a/t_i = 0.4$ - $G_i = G0$ - Run 243
$a/t_i = 0.4$ - $G_i = G1$ - Run 244
$a/t_i = 0.6$ - $G_i = G0$ - Run 245
$a/t_i = 0.6$ - $G_i = G1$ - Run 246
$a/t_i = 0.8$ - $G_i = G0$ - Run 247
$a/t_i = 0.8$ - $G_i = G1$ - Run 248
G
Normalized $\phi$ angle


Axial surface crack, $t/R_i = 3.00$, $a/c_i = 0.2500$
$a/t_i = 0.2$ - $G_i = G0$ - Run 249
$a/t_i = 0.2$ - $G_i = G1$ - Run 250
$a/t_i = 0.4$ - $G_i = G0$ - Run 251
$a/t_i = 0.4$ - $G_i = G1$ - Run 252
$a/t_i = 0.6$ - $G_i = G0$ - Run 253
$a/t_i = 0.6$ - $G_i = G1$ - Run 254
$a/t_i = 0.8$ - $G_i = G0$ - Run 255
$a/t_i = 0.8$ - $G_i = G1$ - Run 256
G
Normalized $\phi$ angle

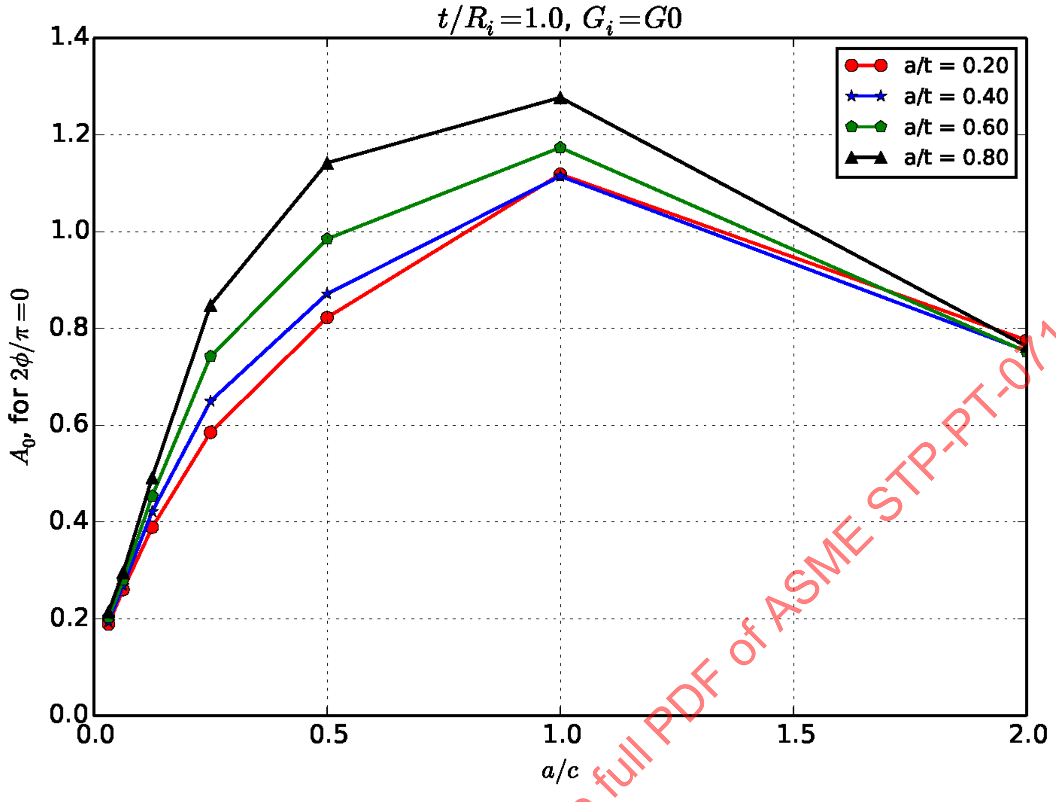

Axial surface crack, $t/R_i = 3.00$, $a/c_i = 0.5000$
$a/t_i = 0.2$ - $G_i = G0$ - Run 257
$a/t_i = 0.2$ - $G_i = G1$ - Run 258
$a/t_i = 0.4$ - $G_i = G0$ - Run 259
$a/t_i = 0.4$ - $G_i = G1$ - Run 260
$a/t_i = 0.6$ - $G_i = G0$ - Run 261
$a/t_i = 0.6$ - $G_i = G1$ - Run 262
$a/t_i = 0.8$ - $G_i = G0$ - Run 263
$a/t_i = 0.8$ - $G_i = G1$ - Run 264
G
Normalized $\phi$ angle

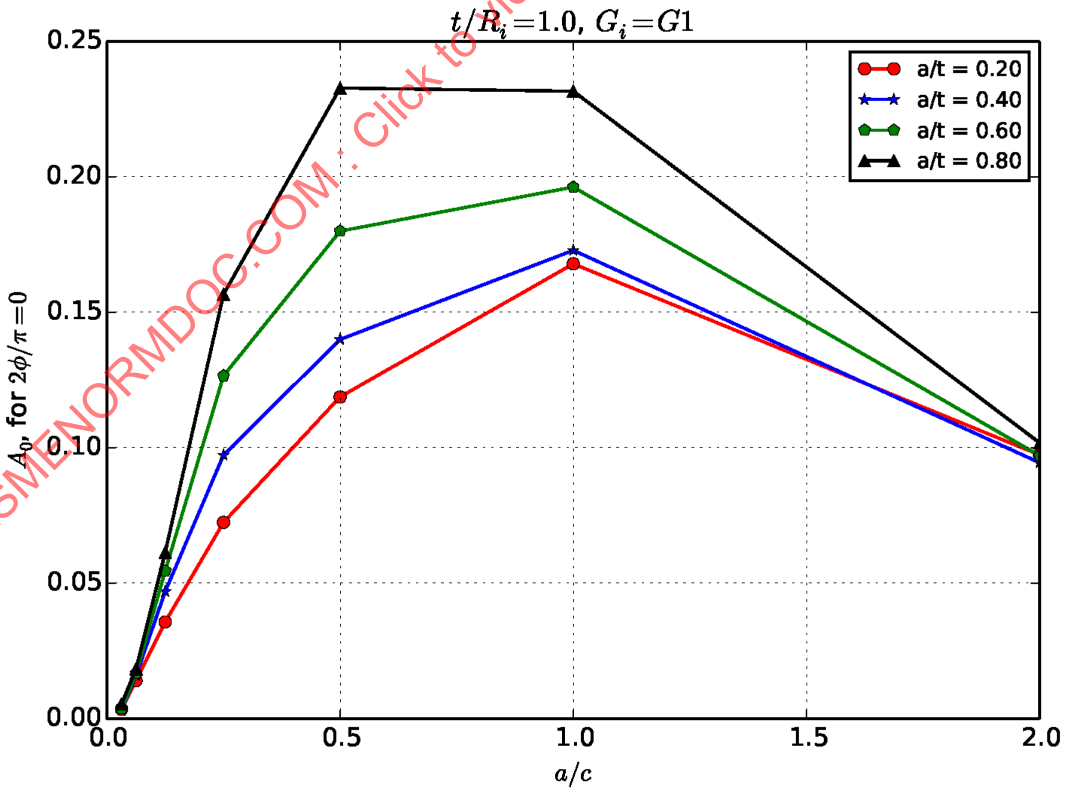

Axial surface crack, $t/R_i = 3.00$, $a/c_i = 1.0000$
$a/t_i = 0.2$ - $G_i = G0$ - Run 265
$a/t_i = 0.2$ - $G_i = G1$ - Run 266
$a/t_i = 0.4$ - $G_i = G0$ - Run 267
$a/t_i = 0.4$ - $G_i = G1$ - Run 268
$a/t_i = 0.6$ - $G_i = G0$ - Run 269
$a/t_i = 0.6$ - $G_i = G1$ - Run 270
$a/t_i = 0.8$ - $G_i = G0$ - Run 271
$a/t_i = 0.8$ - $G_i = G1$ - Run 272
G
Normalized $\phi$ angle

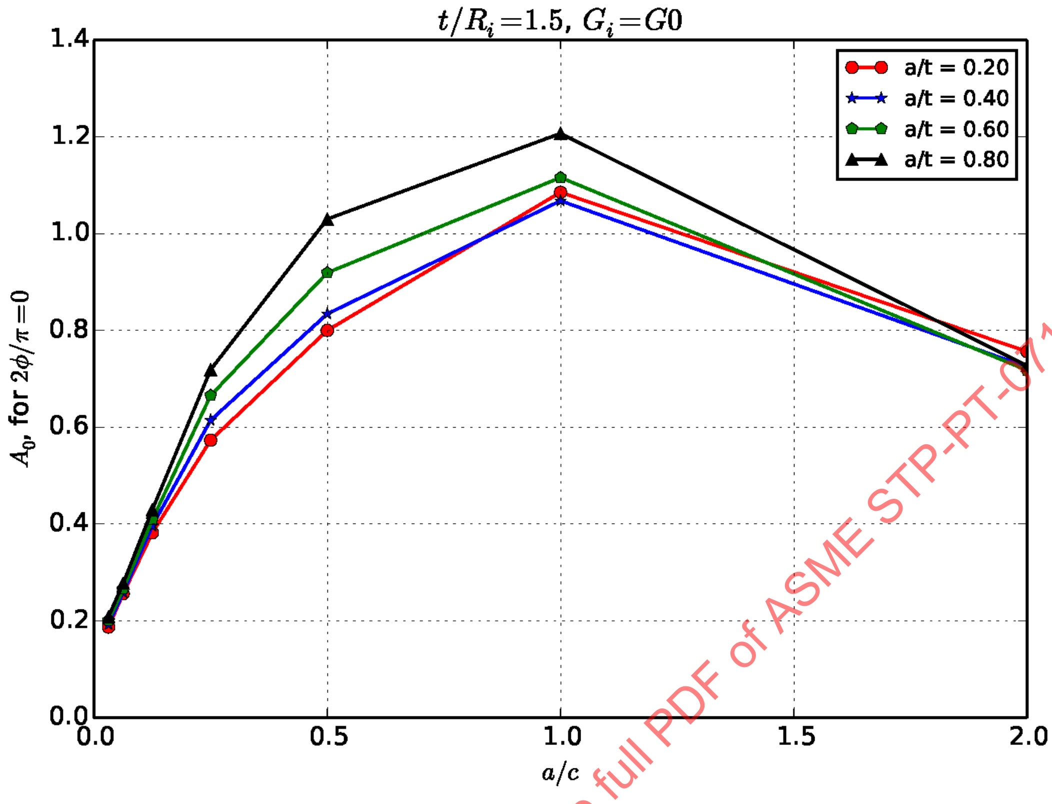

Axial surface crack, $t/R_i = 3.00$, $a/c_i = 2.0000$
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
G
0.0
0.2
0.4
0.6
0.8
1.0
Normalized $\phi$ angle
$a/t_i = 0.2$ - $G_i = G0$ - Run 273
$a/t_i = 0.2$ - $G_i = G1$ - Run 274
$a/t_i = 0.4$ - $G_i = G0$ - Run 275
$a/t_i = 0.4$ - $G_i = G1$ - Run 276
$a/t_i = 0.6$ - $G_i = G0$ - Run 277
$a/t_i = 0.6$ - $G_i = G1$ - Run 278
$a/t_i = 0.8$ - $G_i = G0$ - Run 279
$a/t_i = 0.8$ - $G_i = G1$ - Run 280

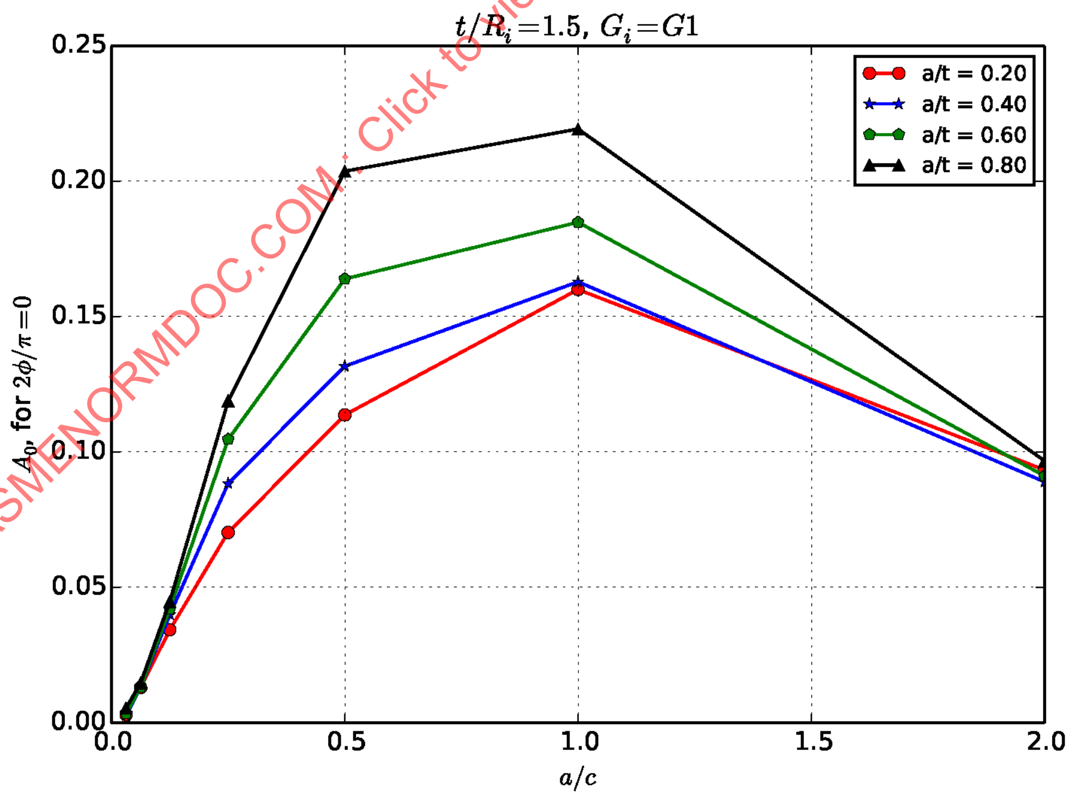
## APPENDIX F - AXIAL INTERNAL SURFACE CRACK TREND PLOTS

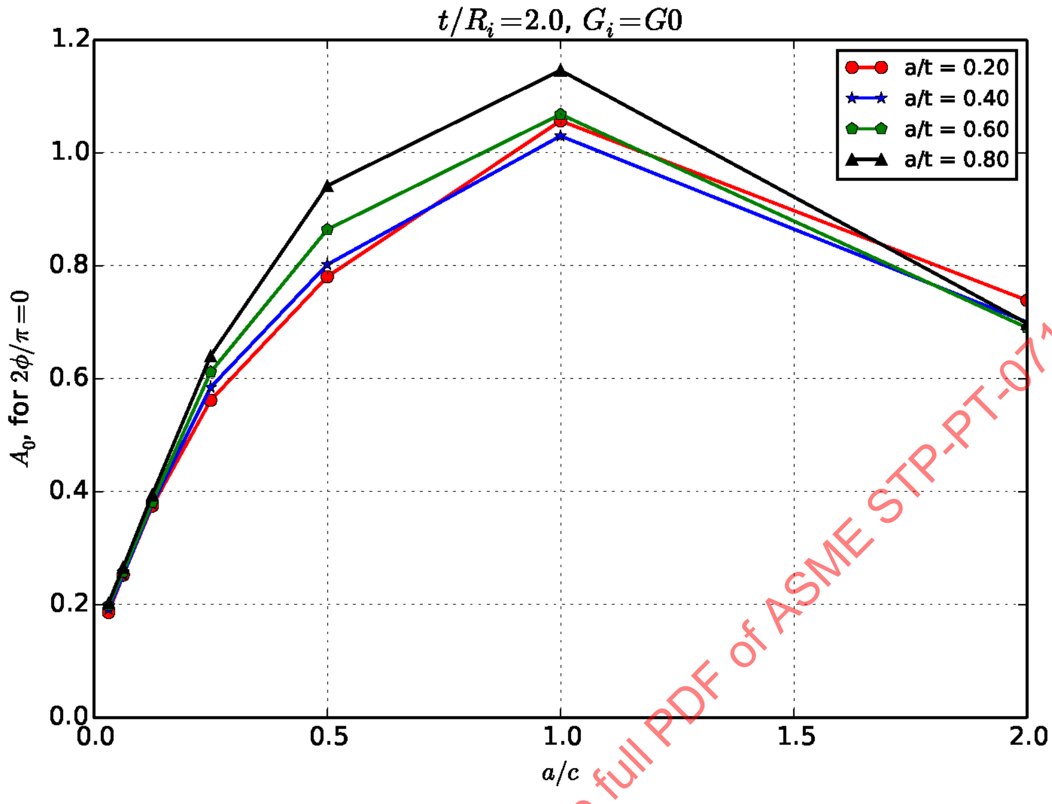
Plots to compare G result trends at the crack tip (at $2\phi/\pi = 0$) and at the crack depth (at $2\phi/\pi = 1$) for the axial internal surface cracks. Four curves per plot for each a/t ratio; 20 plots total. At the crack tip, plot the $G = A_0$ curve-fit coefficient versus the a/c ratio; see the first 10 plots. At the crack depth, plot the sum of the curve-fit coefficient values: $G = \Sigma A_i$; see the last 10 plots.

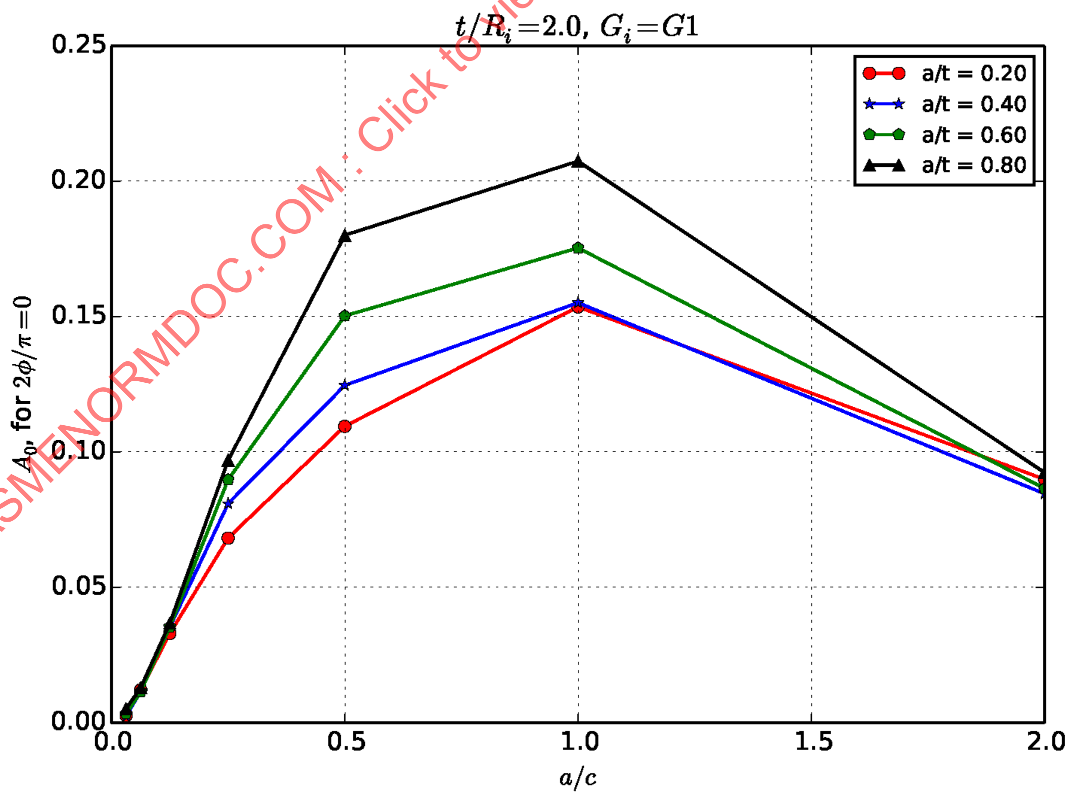

$t/R_i = 1.0,\ G_i = G0$
a/t = 0.20
a/t = 0.40
a/t = 0.60
a/t = 0.80
$A_0$, for $2\phi/\pi = 0$
$a/c$
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
0.5
1.5
2.0

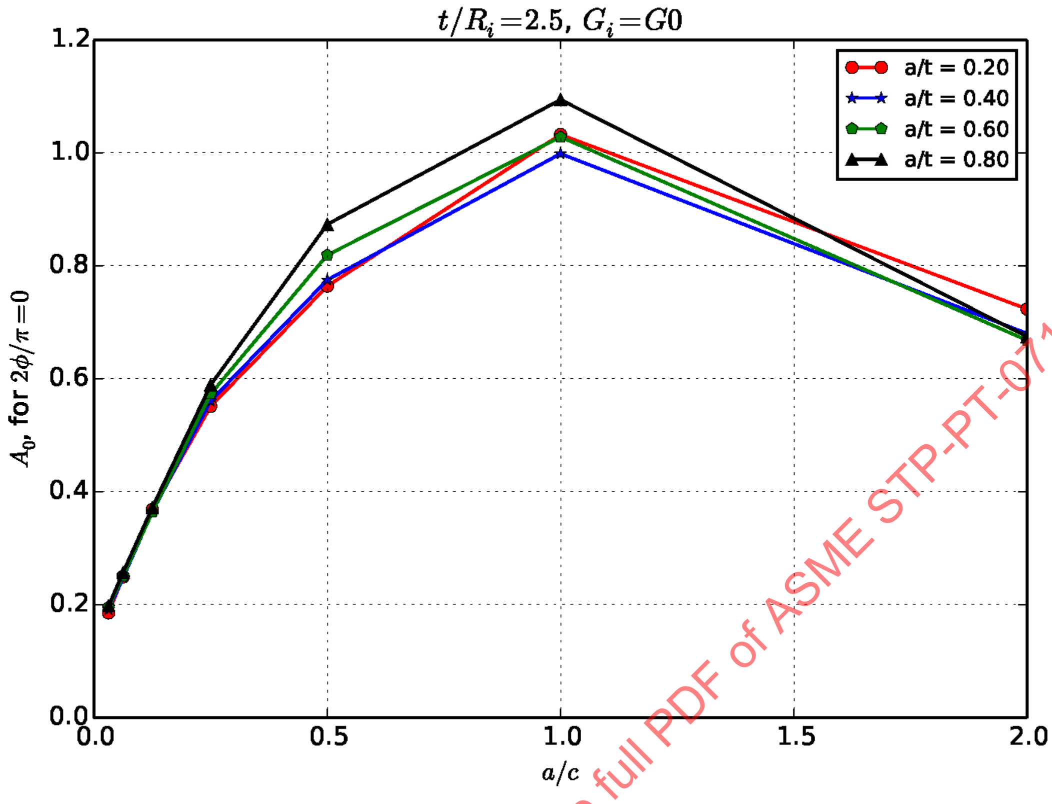

$t/R_i = 1.0,\ G_i = G1$
a/t = 0.20
a/t = 0.40
a/t = 0.60
a/t = 0.80
$A_0$, for $2\phi/\pi = 0$
$a/c$
0.00
0.05
0.10
0.15
0.20
0.25
0.0
0.5
1.0
1.5
2.0

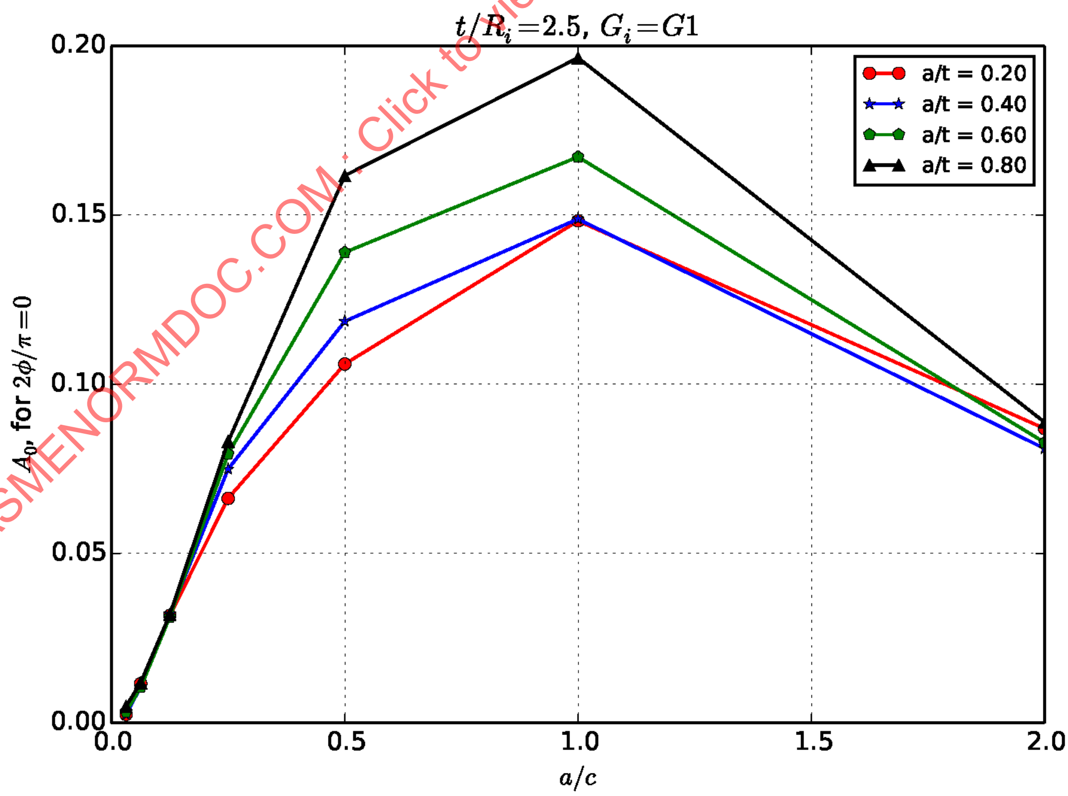

$t/R_i = 1.5,\ G_i = G0$
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.5
1.0
1.5
2.0
$a/c$
$A_0$, for $2\phi/\pi = 0$
a/t = 0.20
a/t = 0.40
a/t = 0.60
a/t = 0.80

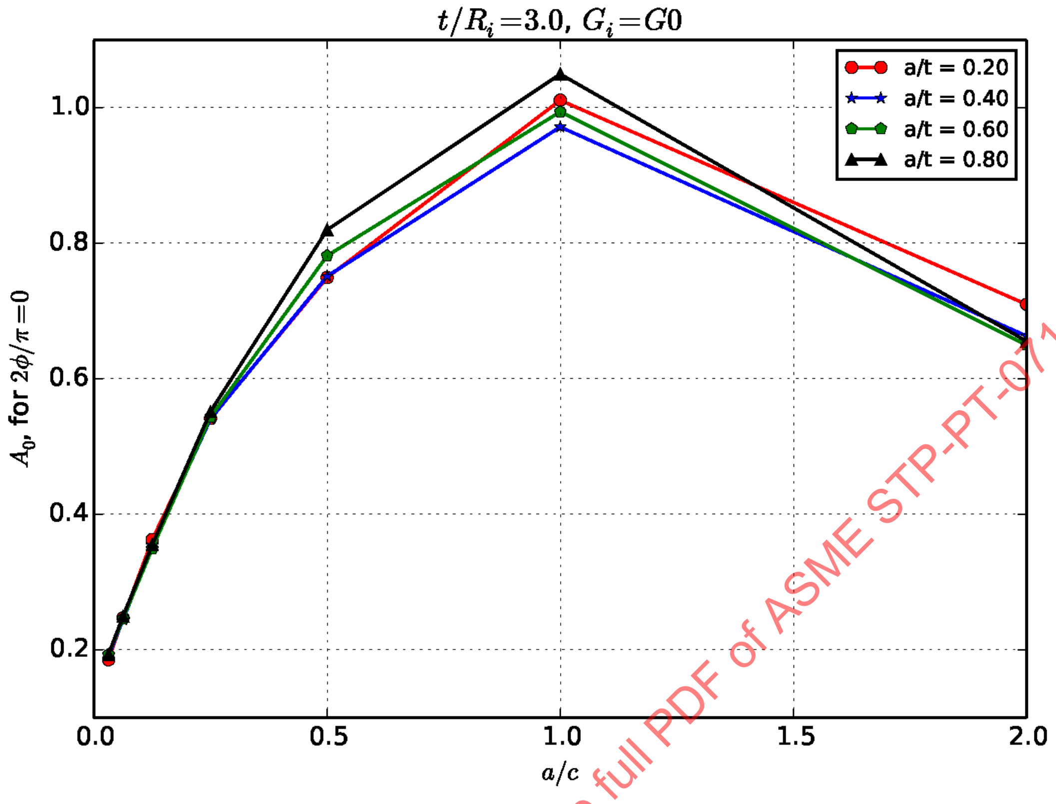

$t/R_i = 1.5,\ G_i = G1$
0.25
0.20
0.15
0.10
0.05
0.00
0.0
0.5
1.0
1.5
2.0
$a/c$
$A_0$, for $2\phi/\pi = 0$
a/t = 0.20
a/t = 0.40
a/t = 0.60
a/t = 0.80

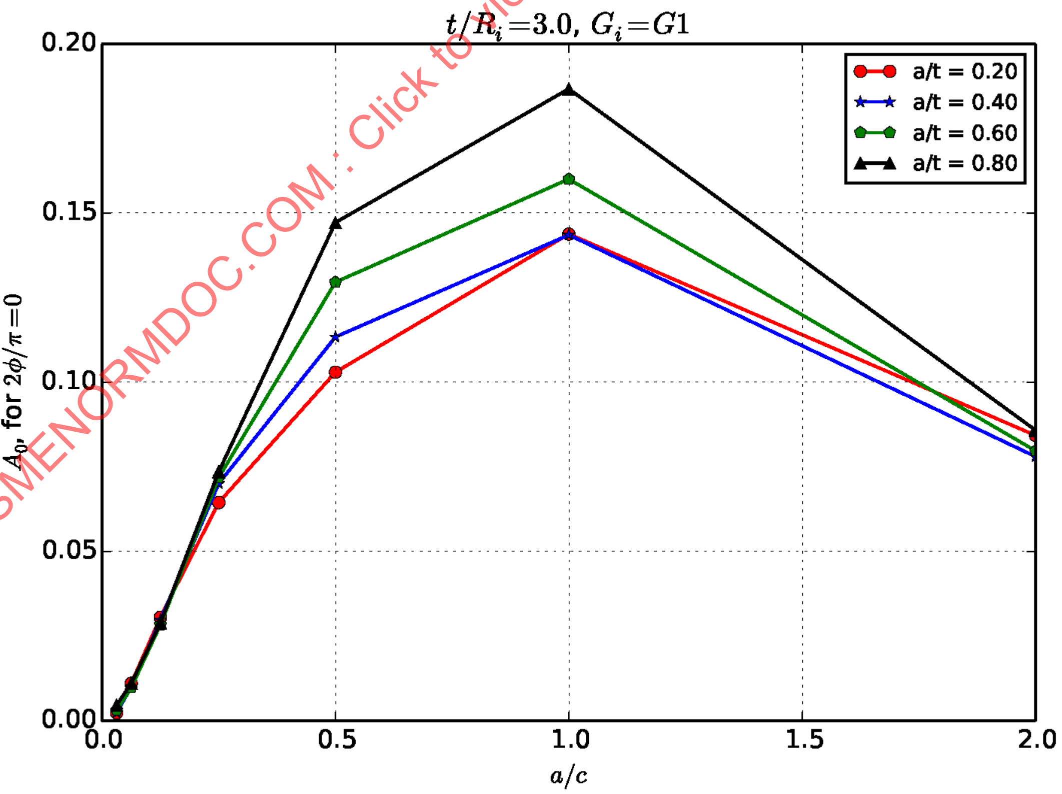

$t/R_i = 2.0,\ G_i = G0$
a/t = 0.20
a/t = 0.40
a/t = 0.60
a/t = 0.80
$A_0$, for $2\phi/\pi = 0$
$a/c$
0.0
0.2
0.4
0.6
0.8
1.0
1.2
0.5
1.5
2.0

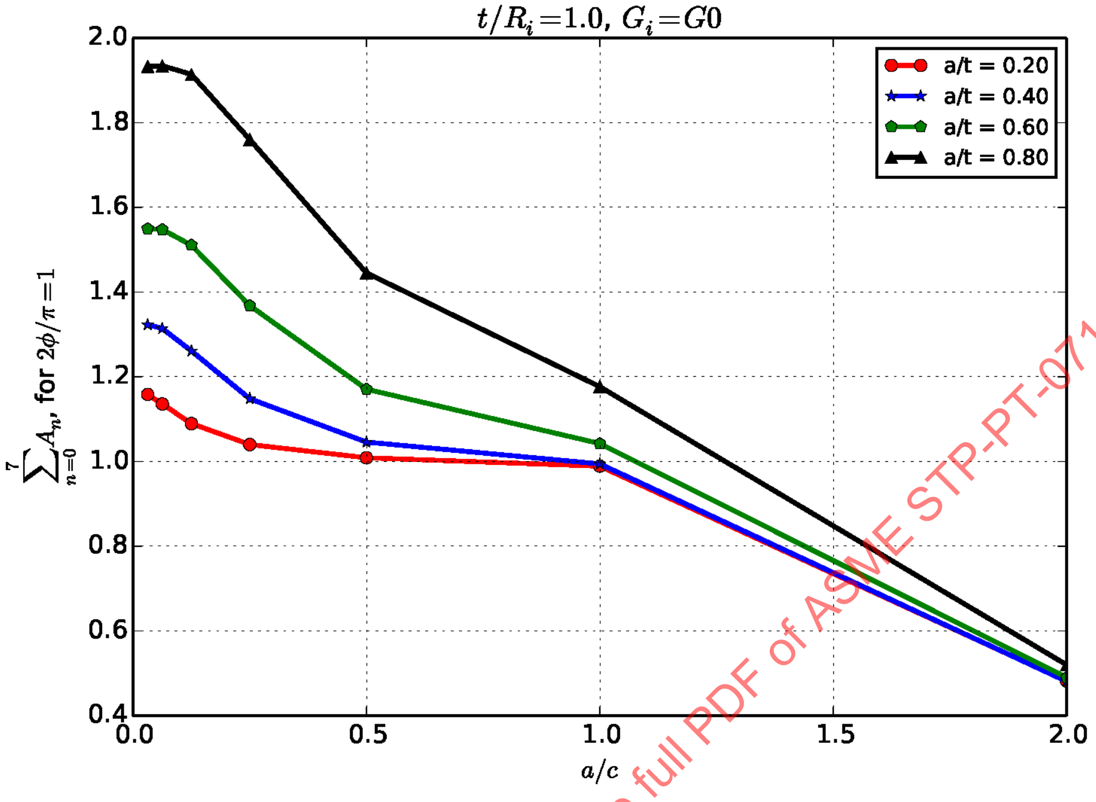

$t/R_i = 2.0,\ G_i = G1$
a/t = 0.20
a/t = 0.40
a/t = 0.60
a/t = 0.80
$A_0$, for $2\phi/\pi = 0$
$a/c$
0.00
0.05
0.10
0.15
0.20
0.25
0.0
0.5
1.0
1.5
2.0

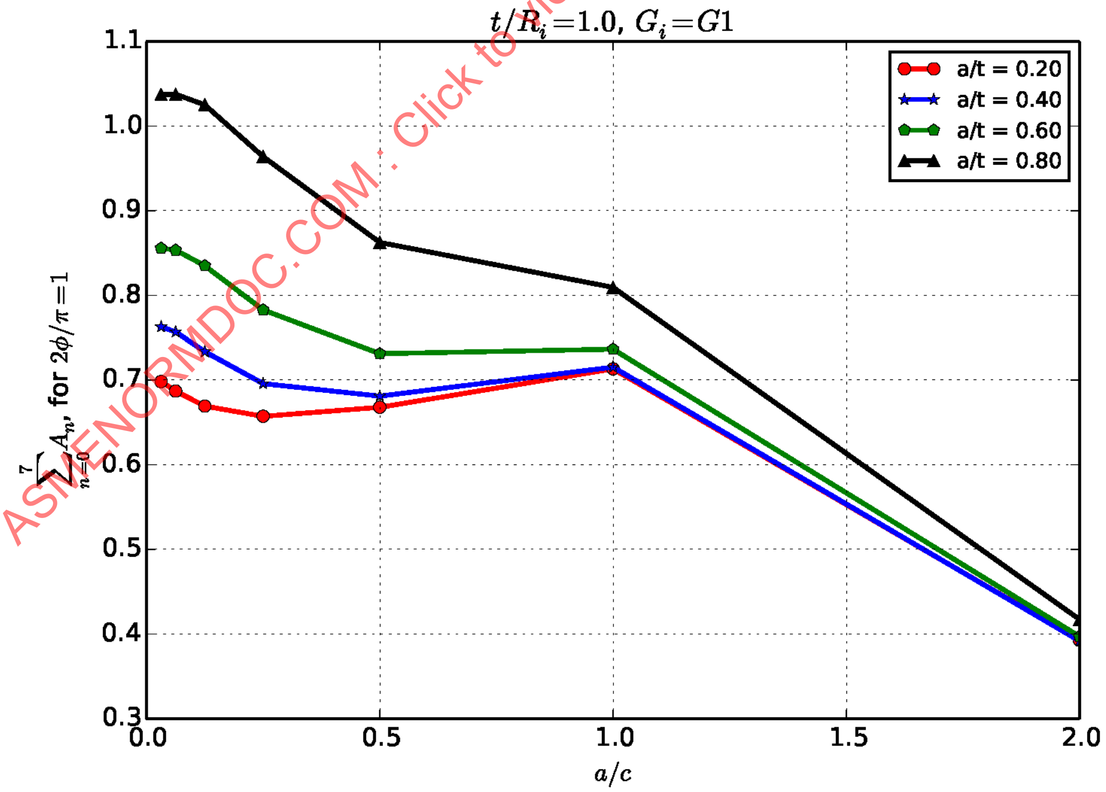

$t/R_i = 2.5,\ G_i = G0$
a/t = 0.20
a/t = 0.40
a/t = 0.60
a/t = 0.80
$A_0$, for $2\phi/\pi = 0$
$a/c$
0.0
0.2
0.4
0.6
0.8
1.0
1.2
0.0
0.5
1.0
1.5
2.0

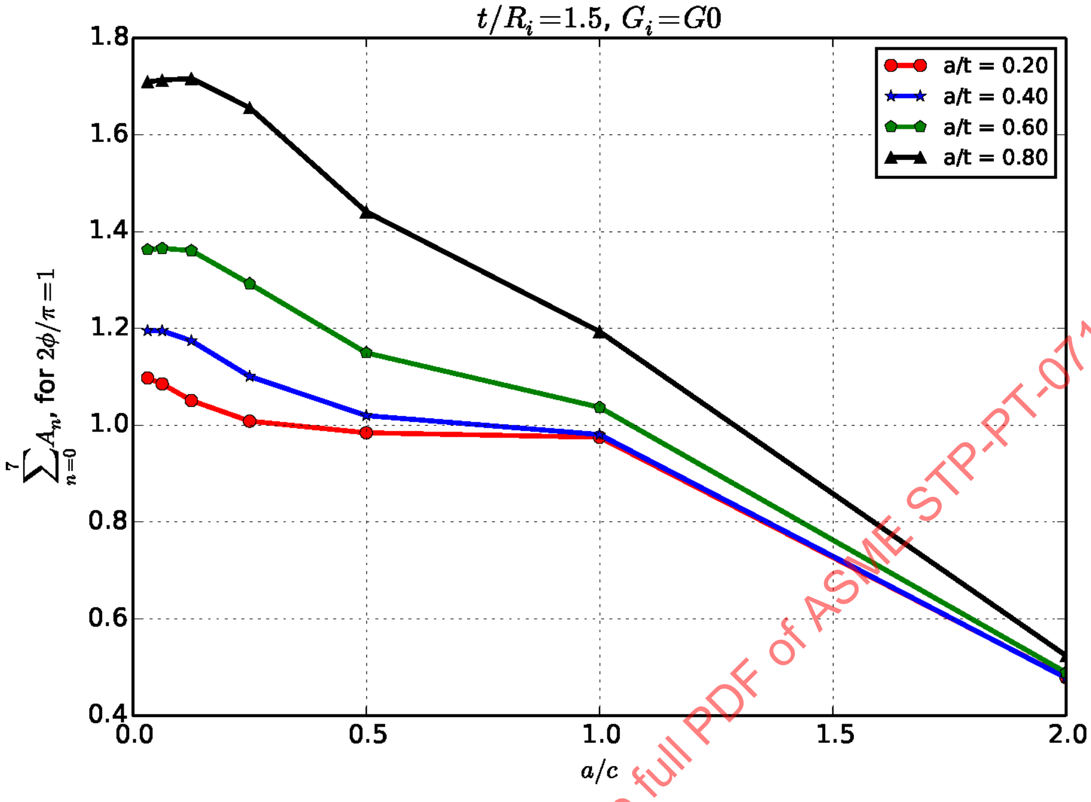

$t/R_i = 2.5,\ G_i = G1$
a/t = 0.20
a/t = 0.40
a/t = 0.60
a/t = 0.80
$A_0$, for $2\phi/\pi = 0$
$a/c$
0.00
0.05
0.10
0.15
0.20
0.0
0.5
1.0
1.5
2.0

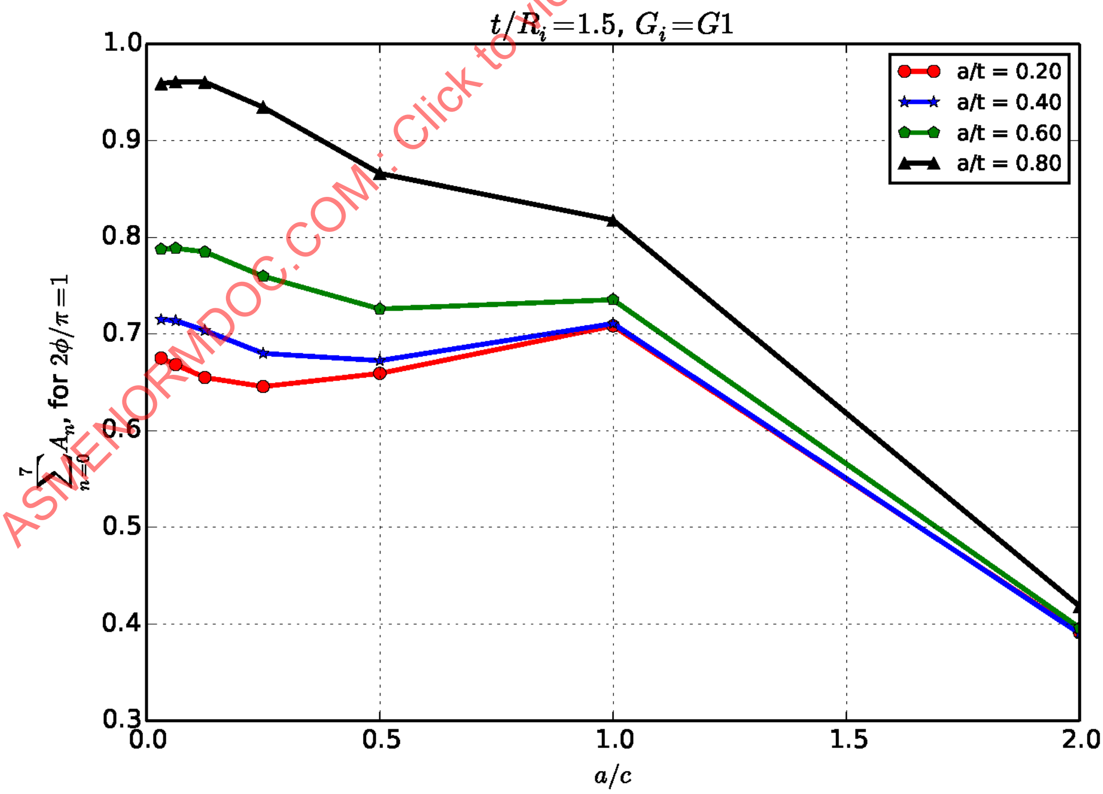

$t/R_i = 3.0,\ G_i = G0$
a/t = 0.20
a/t = 0.40
a/t = 0.60
a/t = 0.80
$A_0$, for $2\phi/\pi = 0$
$a/c$
0.2
0.4
0.6
0.8
1.0
0.0
0.5
1.0
1.5
2.0

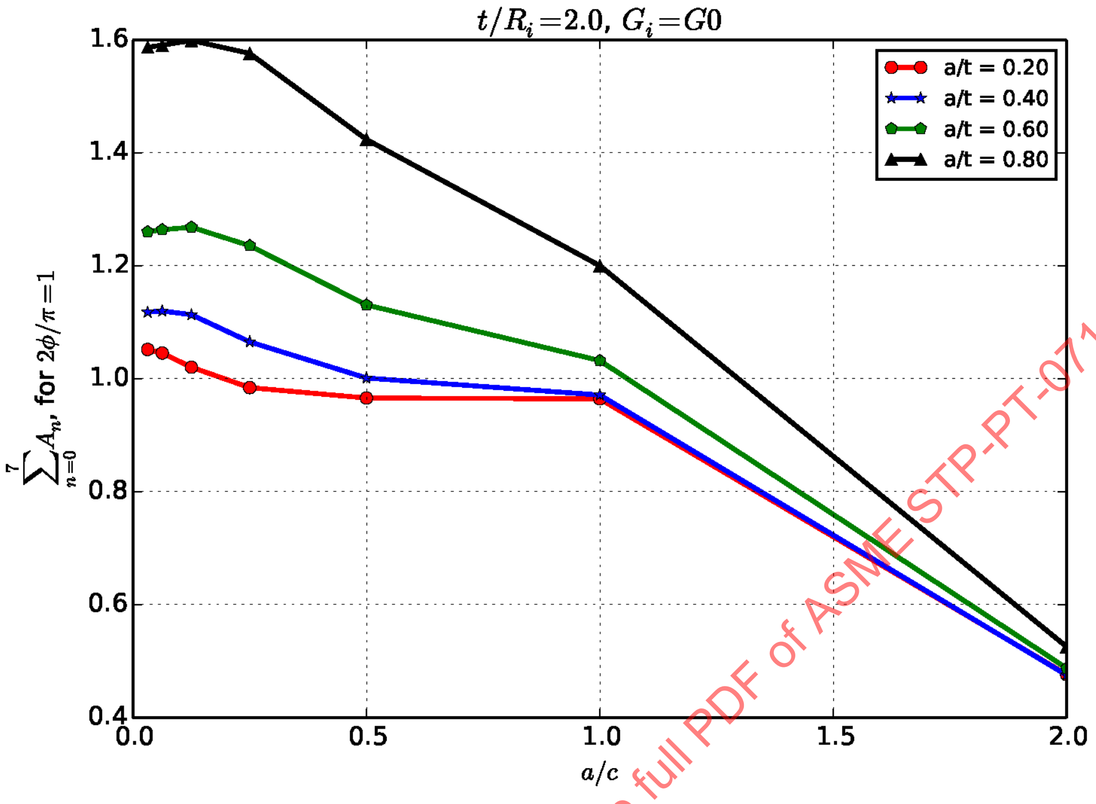

$t/R_i = 3.0,\ G_i = G1$
a/t = 0.20
a/t = 0.40
a/t = 0.60
a/t = 0.80
$A_0$, for $2\phi/\pi = 0$
$a/c$
0.00
0.05
0.10
0.15
0.20
0.0
0.5
1.0
1.5
2.0

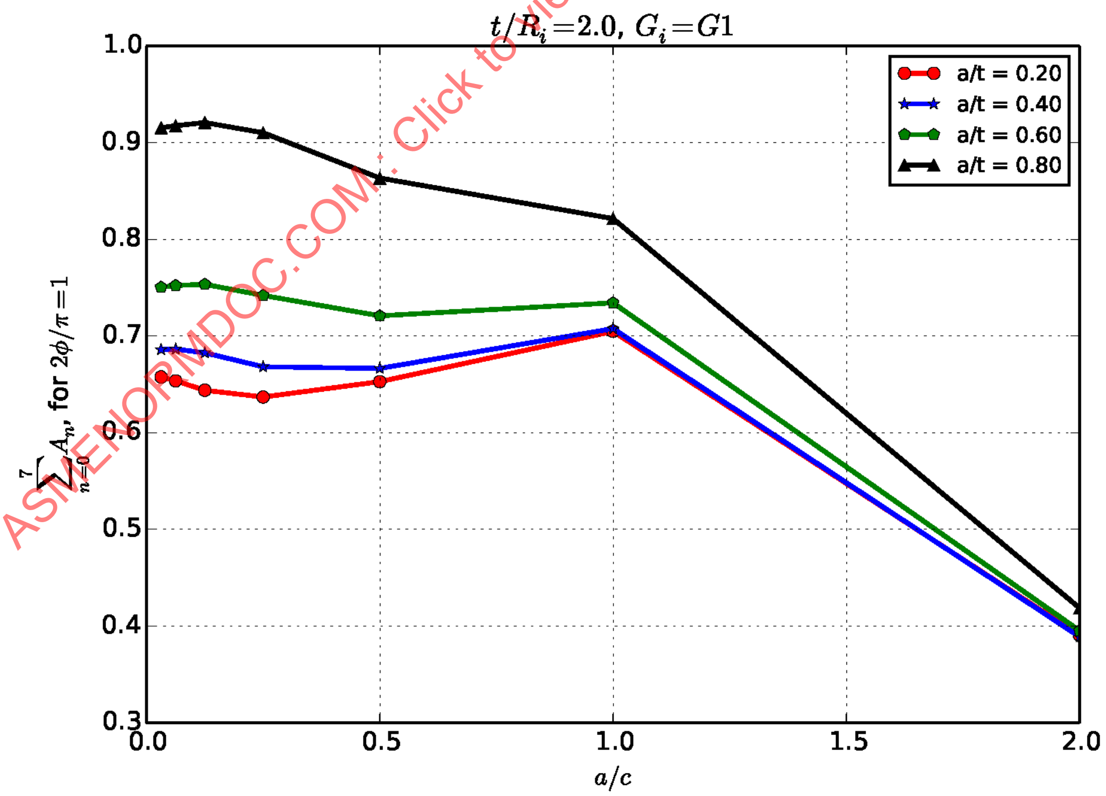

$t/R_i = 1.0$, $G_i = G0$
a/t = 0.20
a/t = 0.40
a/t = 0.60
a/t = 0.80
$\sum_{n=0}^{7} A_n$, for $2\phi/\pi = 1$
$a/c$
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.0
0.5
1.0
1.5
2.0

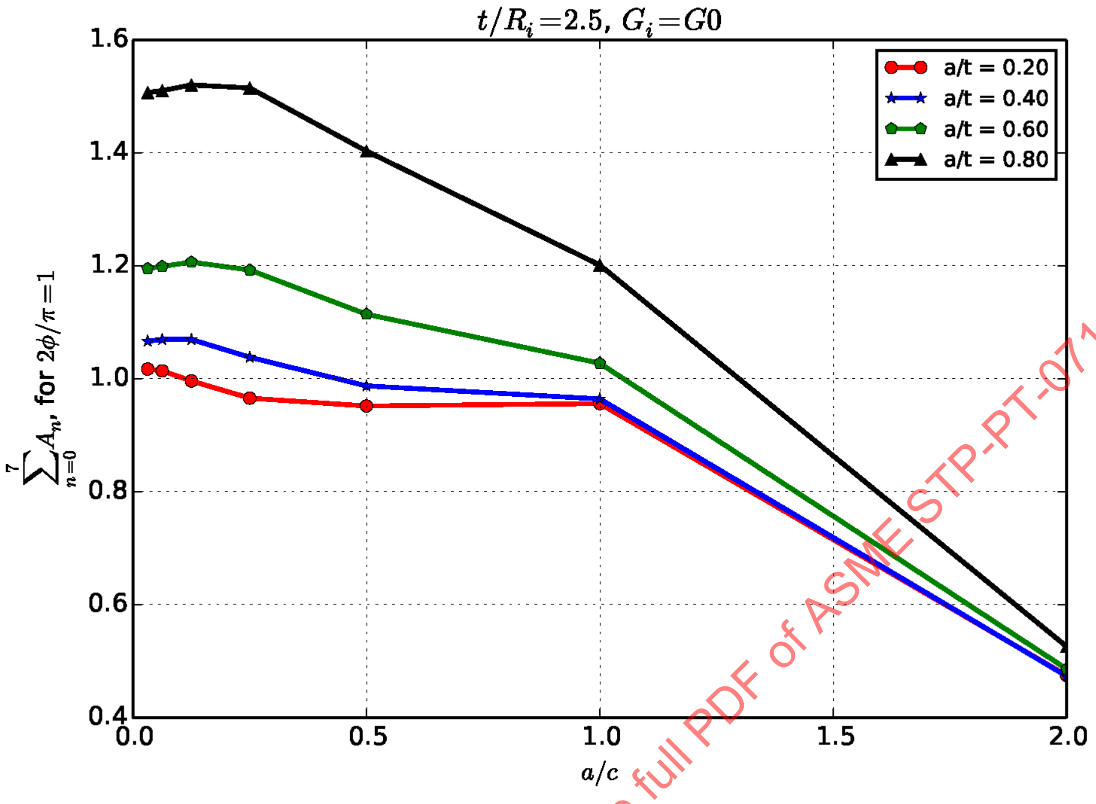

$t/R_i = 1.0$, $G_i = G1$
a/t = 0.20
a/t = 0.40
a/t = 0.60
a/t = 0.80
$\sum_{n=0}^{7} A_n$, for $2\phi/\pi = 1$
$a/c$
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.0
0.5
1.0
1.5
2.0

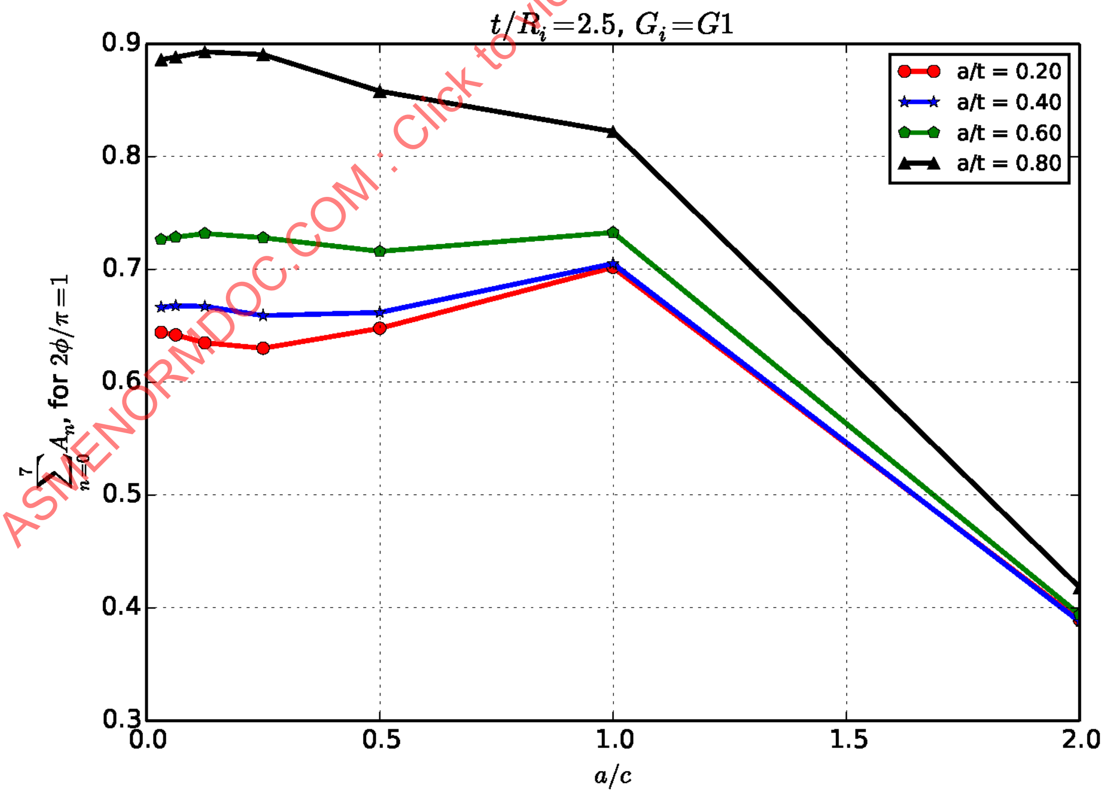

$t/R_i = 1.5,\ G_i = G0$
a/t = 0.20
a/t = 0.40
a/t = 0.60
a/t = 0.80
$\sum_{n=0}^{7} A_n$, for $2\phi/\pi = 1$
$a/c$
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.0
0.5
1.0
1.5
2.0

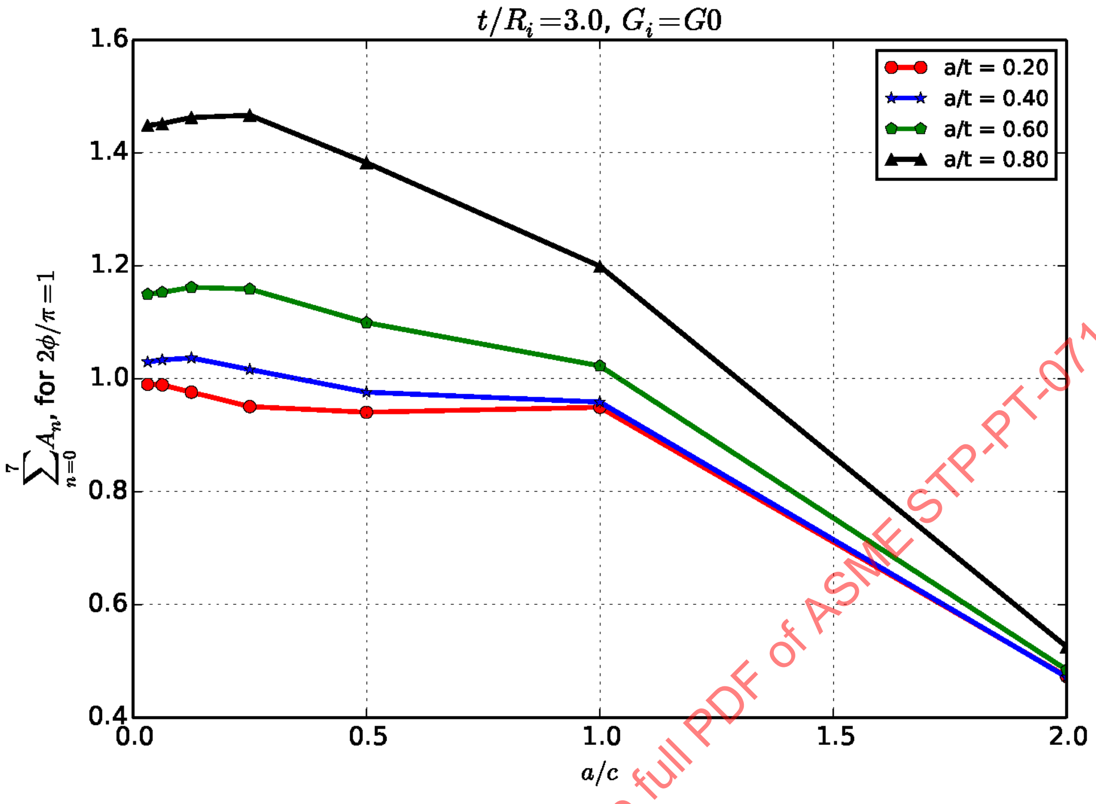

$t/R_i = 1.5,\ G_i = G1$
a/t = 0.20
a/t = 0.40
a/t = 0.60
a/t = 0.80
$\sum_{n=0}^{7} A_n$, for $2\phi/\pi = 1$
$a/c$
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.0
0.5
1.0
1.5
2.0

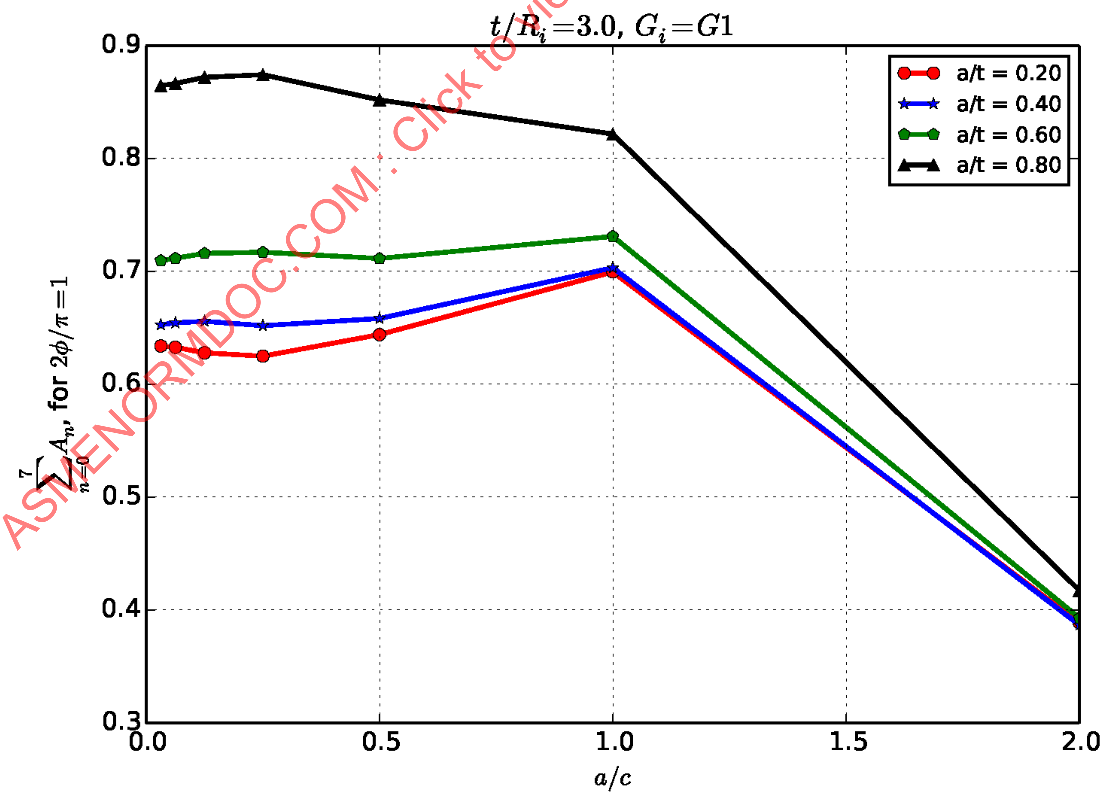

$t/R_i = 2.0,\ G_i = G0$
a/t = 0.20
a/t = 0.40
a/t = 0.60
a/t = 0.80
$\sum_{n=0}^{7} A_n$, for $2\phi/\pi = 1$
$a/c$
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.0
0.5
1.0
1.5
2.0


$t/R_i = 2.0,\ G_i = G1$
a/t = 0.20
a/t = 0.40
a/t = 0.60
a/t = 0.80
$\sum_{n=0}^{7} A_n$, for $2\phi/\pi = 1$
$a/c$
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.0
0.5
1.0
1.5
2.0


$t/R_i = 2.5,\ G_i = G0$
a/t = 0.20
a/t = 0.40
a/t = 0.60
a/t = 0.80
$\sum_{n=0}^{7} A_n$, for $2\phi/\pi = 1$
$a/c$
0.0
0.5
1.0
1.5
2.0
0.4
0.6
0.8
1.0
1.2
1.4
1.6

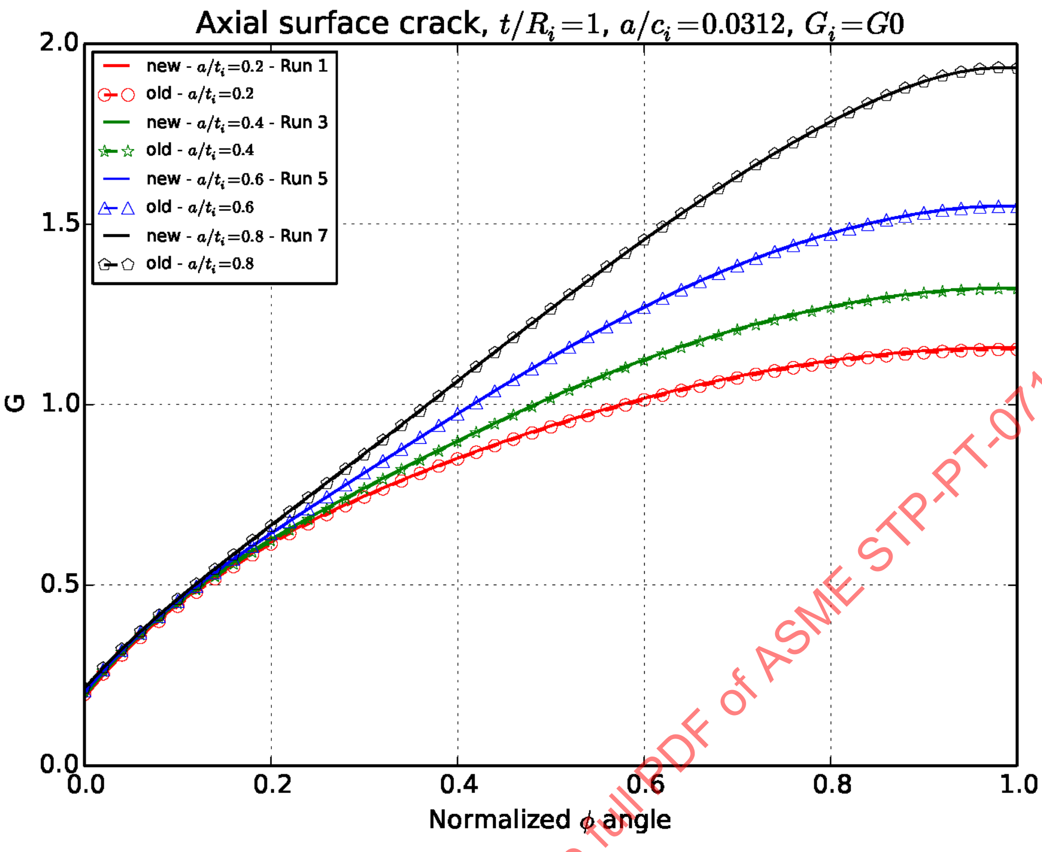

$t/R_i = 2.5,\ G_i = G1$
a/t = 0.20
a/t = 0.40
a/t = 0.60
a/t = 0.80
$\sum_{n=0}^{7} A_n$, for $2\phi/\pi = 1$
$a/c$
0.0
0.5
1.0
1.5
2.0
0.3
0.4
0.5
0.6
0.7
0.8
0.9


$t/R_i = 3.0,\ G_i = G0$
a/t = 0.20
a/t = 0.40
a/t = 0.60
a/t = 0.80
$\sum_{n=0}^{7} A_n$, for $2\phi/\pi = 1$
$a/c$
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.0
0.5
1.0
1.5
2.0

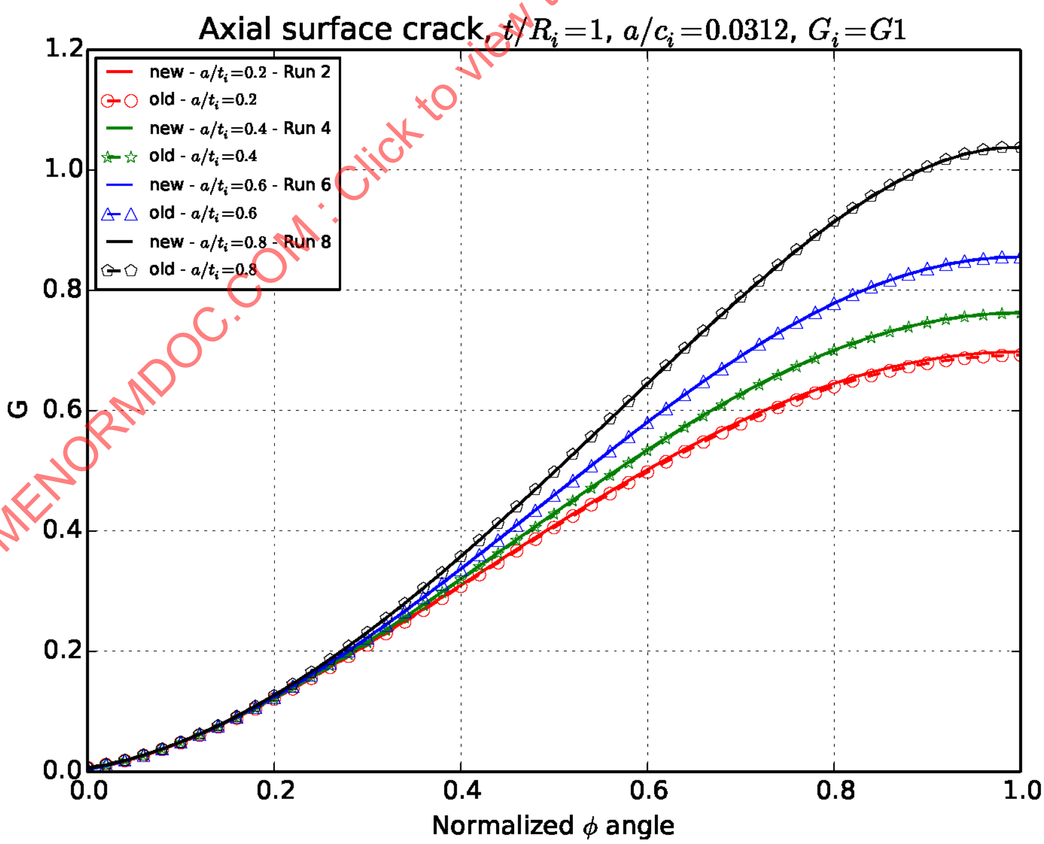

$t/R_i = 3.0,\ G_i = G1$
a/t = 0.20
a/t = 0.40
a/t = 0.60
a/t = 0.80
$\sum_{n=0}^{7} A_n$, for $2\phi/\pi = 1$
$a/c$
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.0
0.5
1.0
1.5
2.0

# APPENDIX G - AXIAL INTERNAL SURFACE CRACK COMPARISON TO PREVIOUS RESULTS

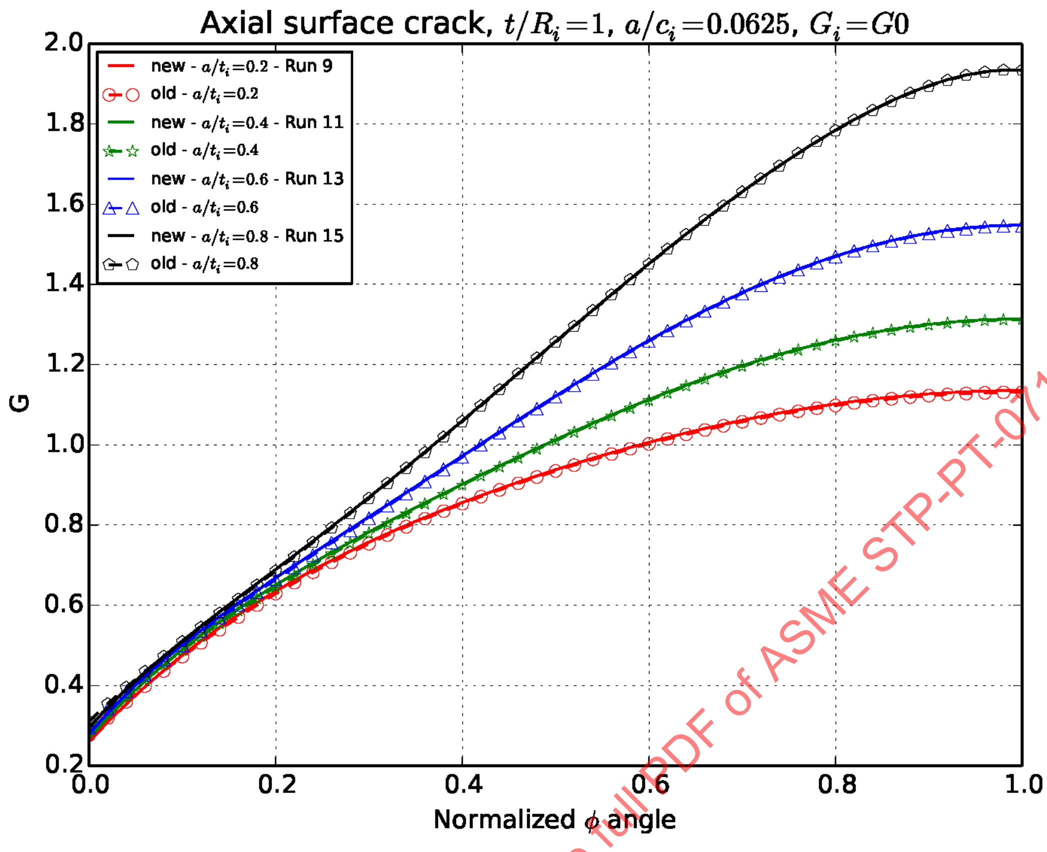
Plots to compare G results for the t/Ri=1 ratio from the previous results to the new results for the axial internal surface cracks. The previous results were obtained from API 579, Annex C, Table C.12 [1]. Plot curves with data points and dashed lines show the previous results, and plot curves with solid lines show the new results; 14 plots total. Generally good agreement, except for the a/c=1, 2 cases (semi-circular and shorter crack); the new results are an improvement with more mesh refinement.

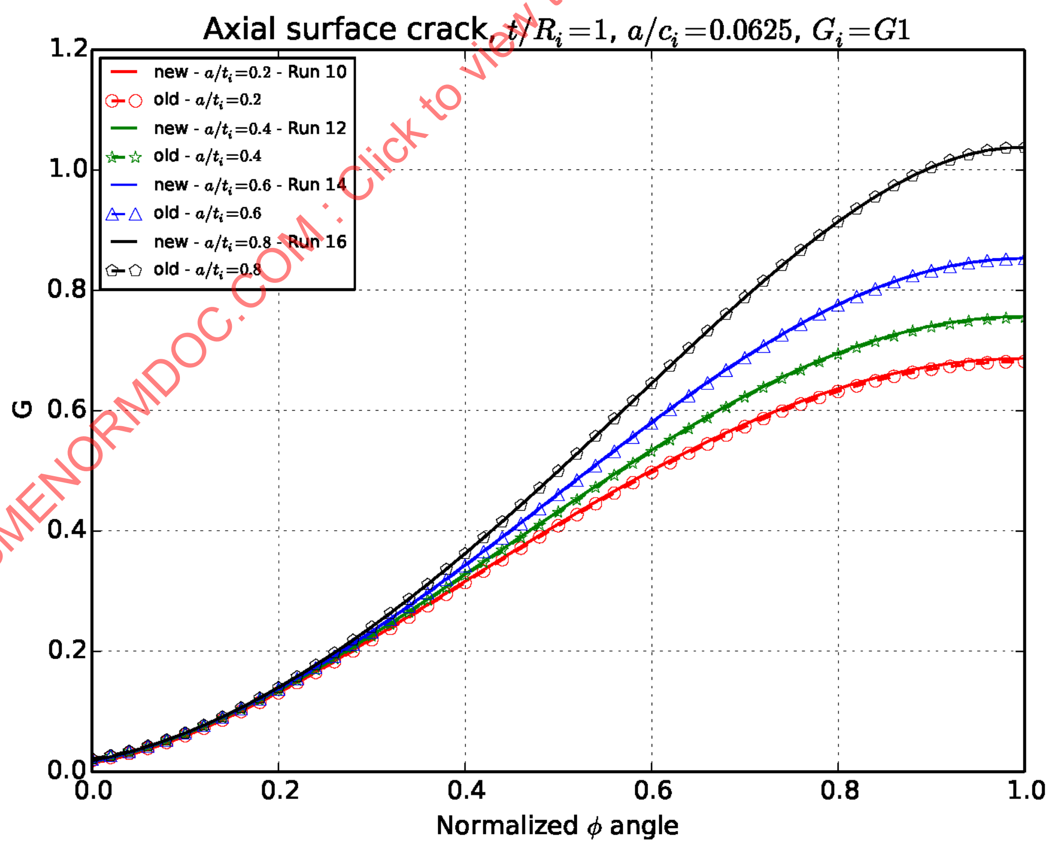


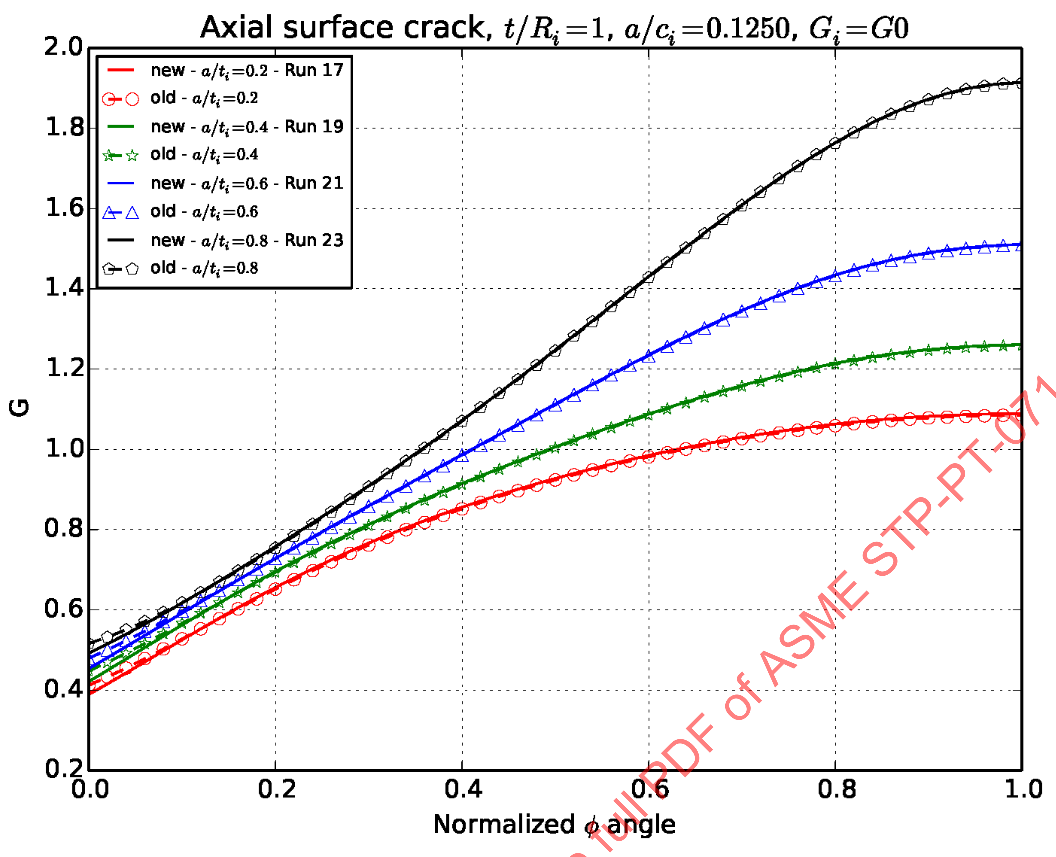
Axial surface crack, $t/R_i=1$, $a/c_i=0.0312$, $G_i=G0$
new - $a/t_i=0.2$ - Run 1
old - $a/t_i=0.2$
new - $a/t_i=0.4$ - Run 3
old - $a/t_i=0.4$
new - $a/t_i=0.6$ - Run 5
old - $a/t_i=0.6$
new - $a/t_i=0.8$ - Run 7
old - $a/t_i=0.8$
G
Normalized $\phi$ angle

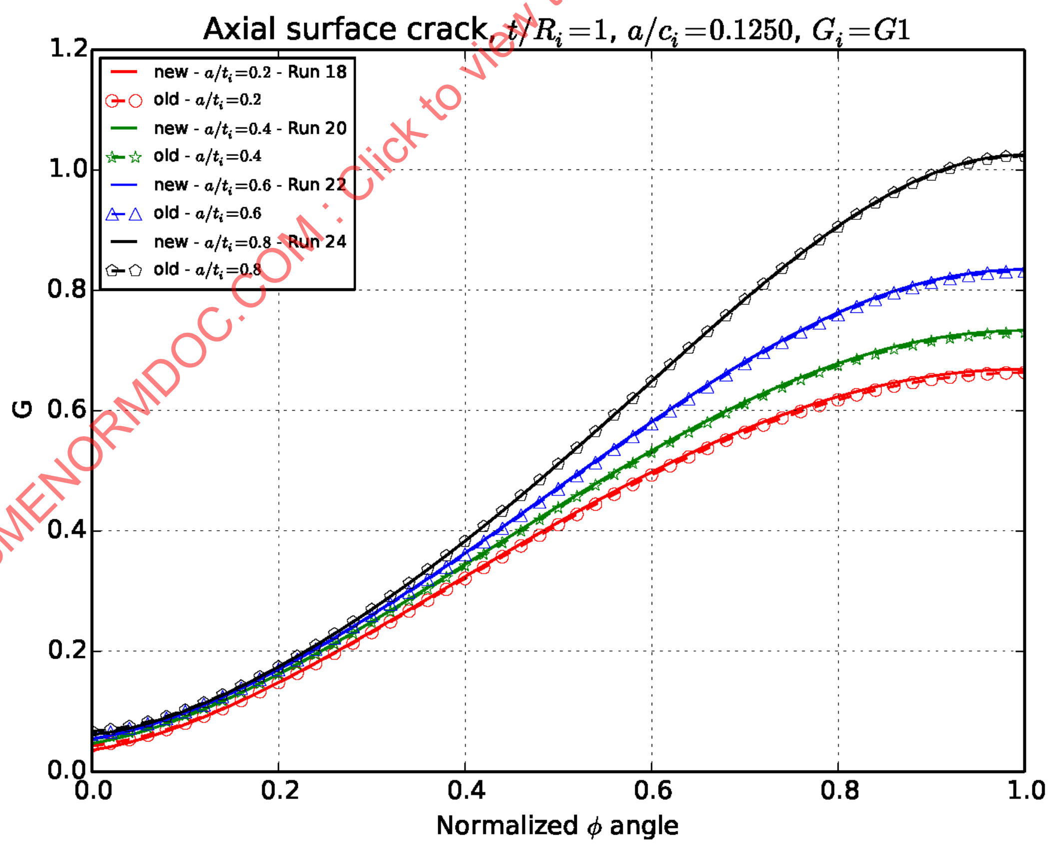



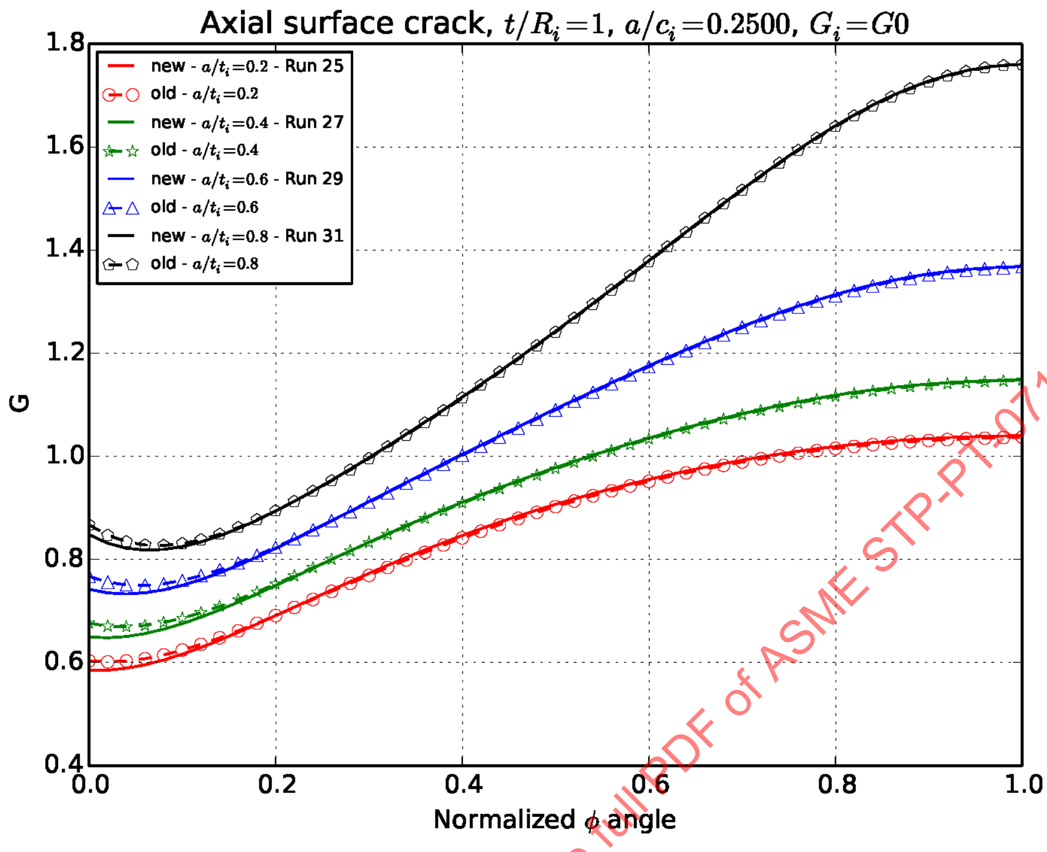
Axial surface crack, $t/R_i=1$, $a/c_i=0.0312$, $G_i=G1$
new - $a/t_i=0.2$ - Run 2
old - $a/t_i=0.2$
new - $a/t_i=0.4$ - Run 4
old - $a/t_i=0.4$
new - $a/t_i=0.6$ - Run 6
old - $a/t_i=0.6$
new - $a/t_i=0.8$ - Run 8
old - $a/t_i=0.8$
G
Normalized $\phi$ angle

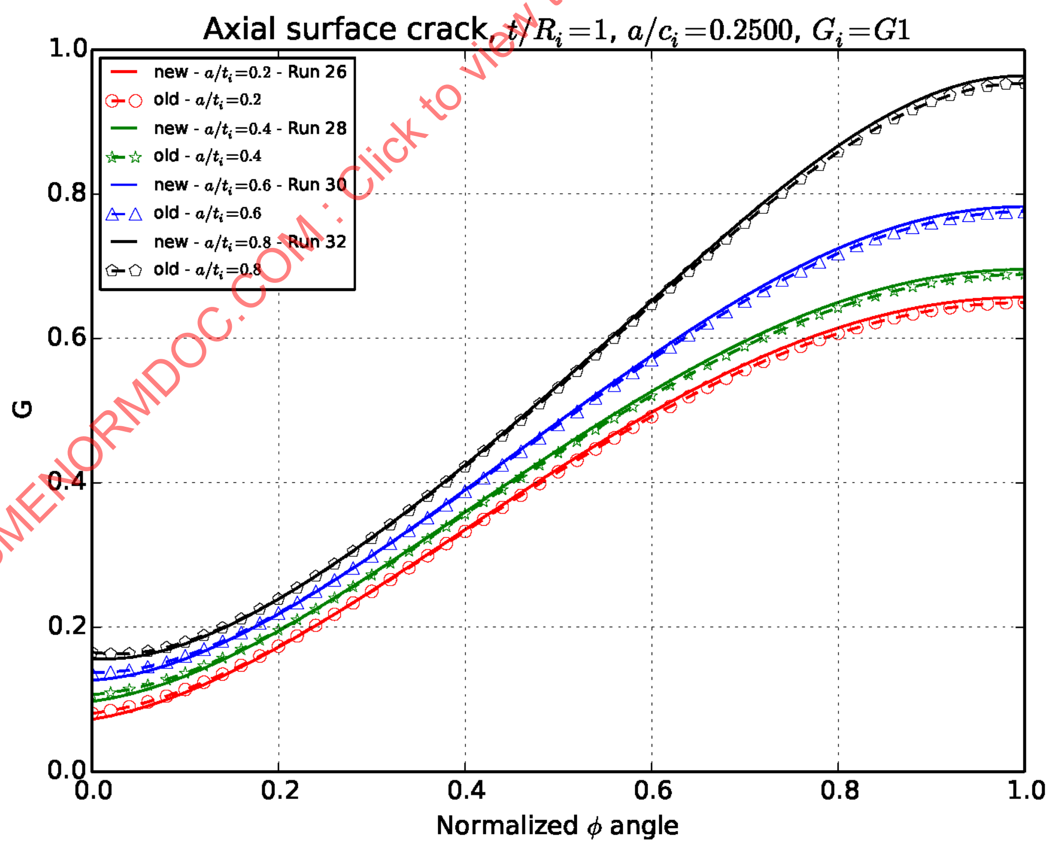

Axial surface crack, $t/R_i = 1$, $a/c_i = 0.0625$, $G_i = G0$
new - $a/t_i$=0.2 - Run 9
old - $a/t_i$=0.2
new - $a/t_i$=0.4 - Run 11
old - $a/t_i$=0.4
new - $a/t_i$=0.6 - Run 13
old - $a/t_i$=0.6
new - $a/t_i$=0.8 - Run 15
old - $a/t_i$=0.8
G
Normalized $\phi$ angle

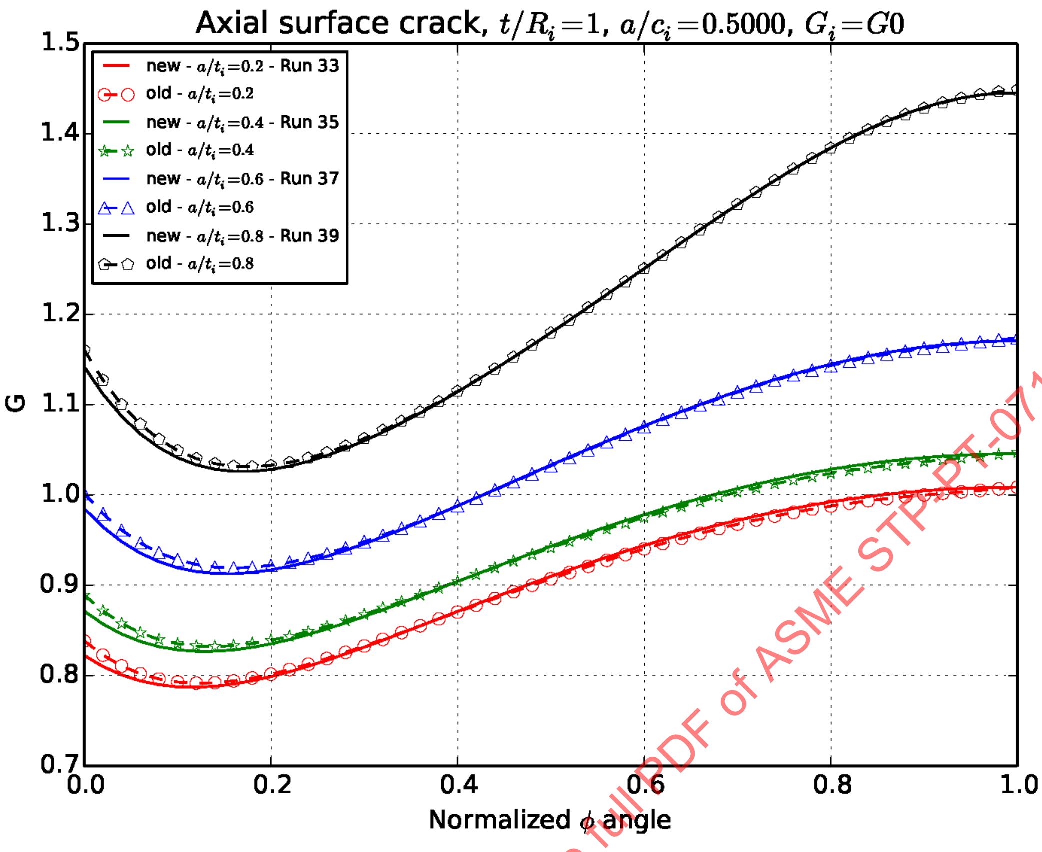

Axial surface crack, $t/R_i = 1$, $a/c_i = 0.0625$, $G_i = G1$
new - $a/t_i$=0.2 - Run 10
old - $a/t_i$=0.2
new - $a/t_i$=0.4 - Run 12
old - $a/t_i$=0.4
new - $a/t_i$=0.6 - Run 14
old - $a/t_i$=0.6
new - $a/t_i$=0.8 - Run 16
old - $a/t_i$=0.8
G
Normalized $\phi$ angle

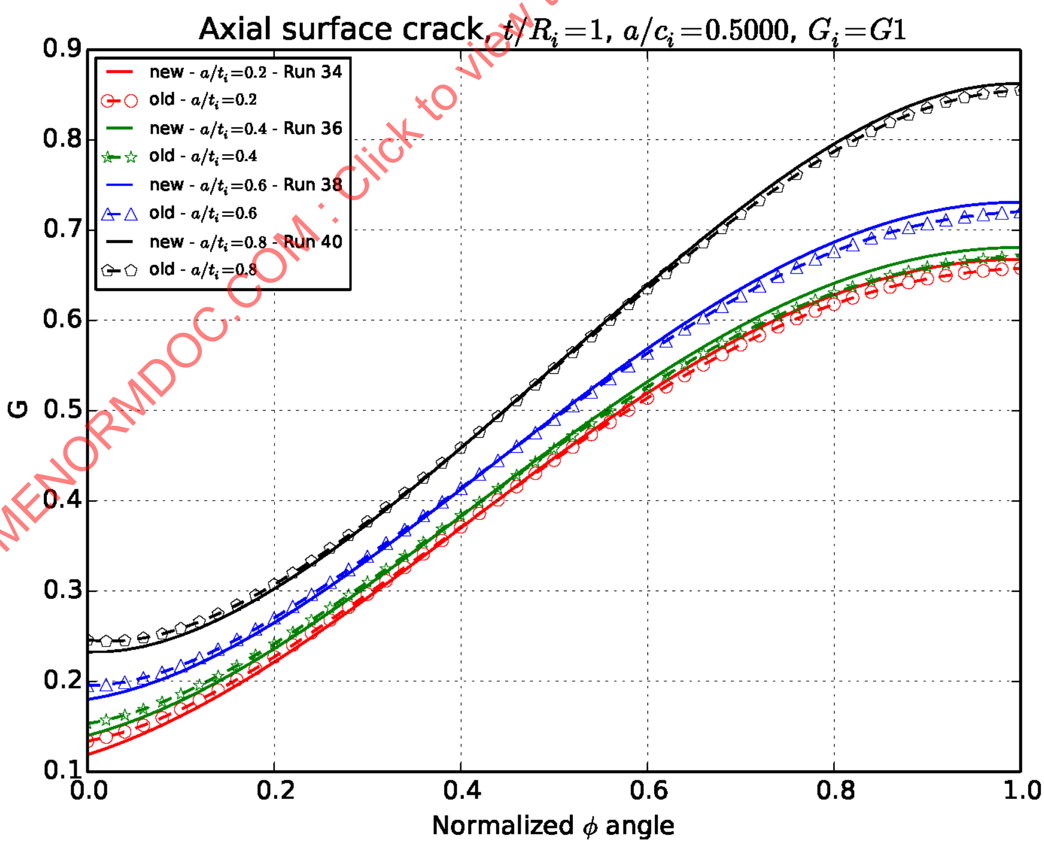

Axial surface crack, $t/R_i = 1$, $a/c_i = 0.1250$, $G_i = G0$
new - $a/t_i$=0.2 - Run 17
old - $a/t_i$=0.2
new - $a/t_i$=0.4 - Run 19
old - $a/t_i$=0.4
new - $a/t_i$=0.6 - Run 21
old - $a/t_i$=0.6
new - $a/t_i$=0.8 - Run 23
old - $a/t_i$=0.8
G
Normalized $\phi$ angle

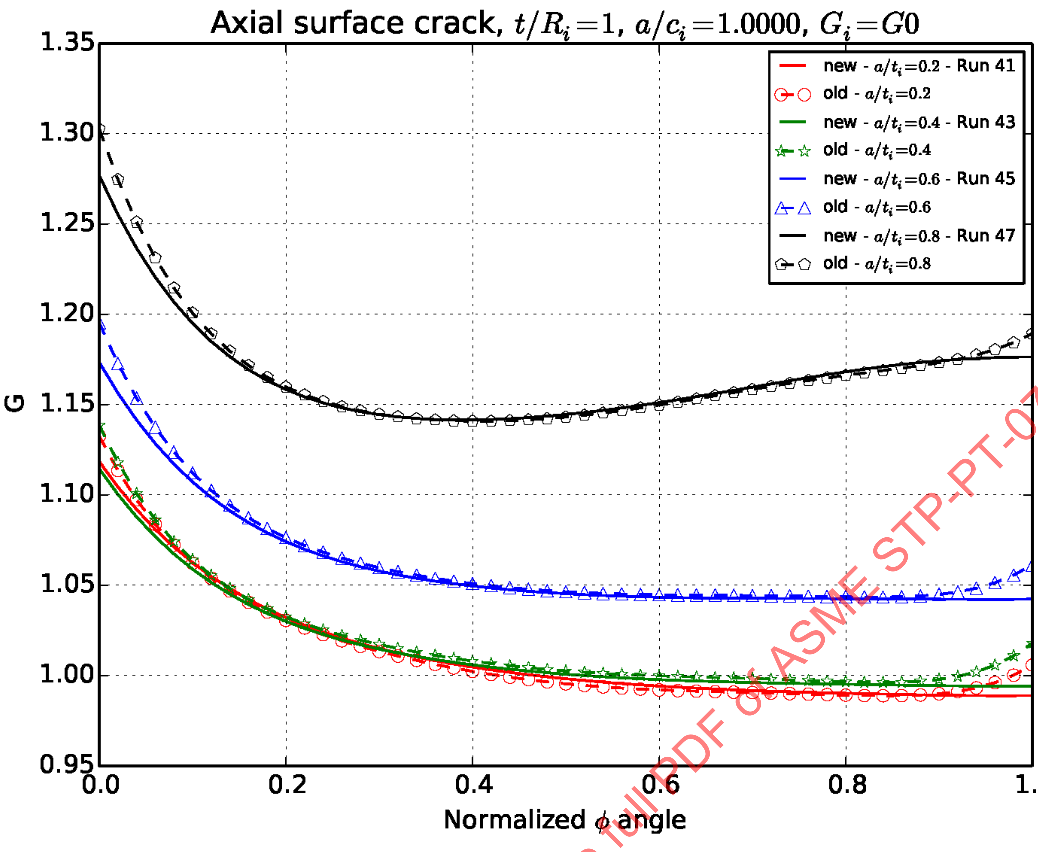

Axial surface crack, $t/R_i = 1$, $a/c_i = 0.1250$, $G_i = G1$
new - $a/t_i$=0.2 - Run 18
old - $a/t_i$=0.2
new - $a/t_i$=0.4 - Run 20
old - $a/t_i$=0.4
new - $a/t_i$=0.6 - Run 22
old - $a/t_i$=0.6
new - $a/t_i$=0.8 - Run 24
old - $a/t_i$=0.8
G
Normalized $\phi$ angle

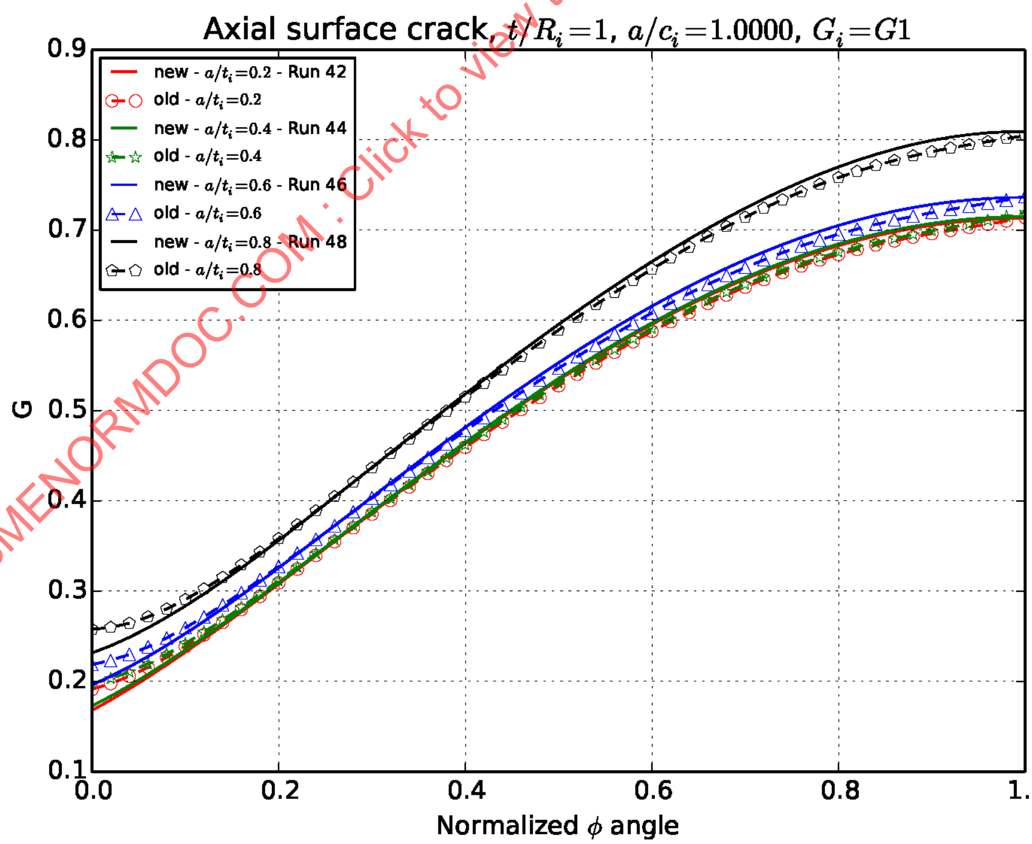

Axial surface crack, $t/R_i=1$, $a/c_i=0.2500$, $G_i=G0$
new - $a/t_i$=0.2 - Run 25
old - $a/t_i$=0.2
new - $a/t_i$=0.4 - Run 27
old - $a/t_i$=0.4
new - $a/t_i$=0.6 - Run 29
old - $a/t_i$=0.6
new - $a/t_i$=0.8 - Run 31
old - $a/t_i$=0.8
G
Normalized $\phi$ angle

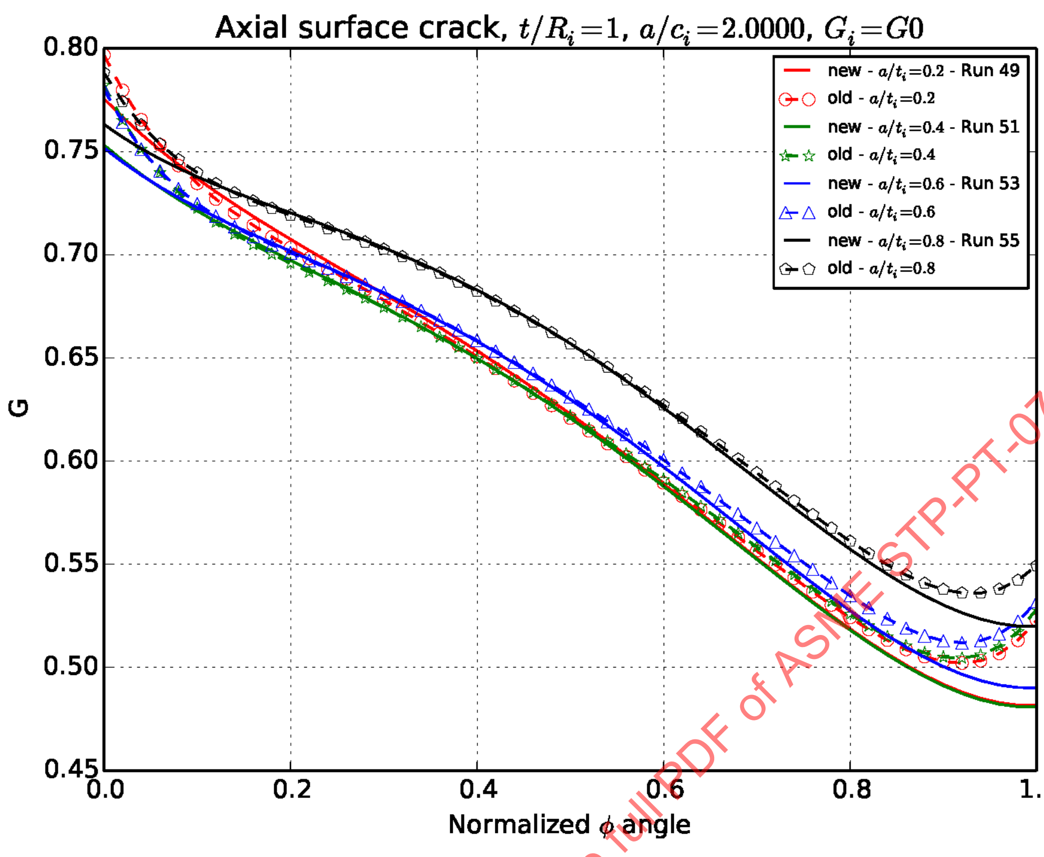

Axial surface crack, $t/R_i=1$, $a/c_i=0.2500$, $G_i=G1$
new - $a/t_i$=0.2 - Run 26
old - $a/t_i$=0.2
new - $a/t_i$=0.4 - Run 28
old - $a/t_i$=0.4
new - $a/t_i$=0.6 - Run 30
old - $a/t_i$=0.6
new - $a/t_i$=0.8 - Run 32
old - $a/t_i$=0.8
G
Normalized $\phi$ angle

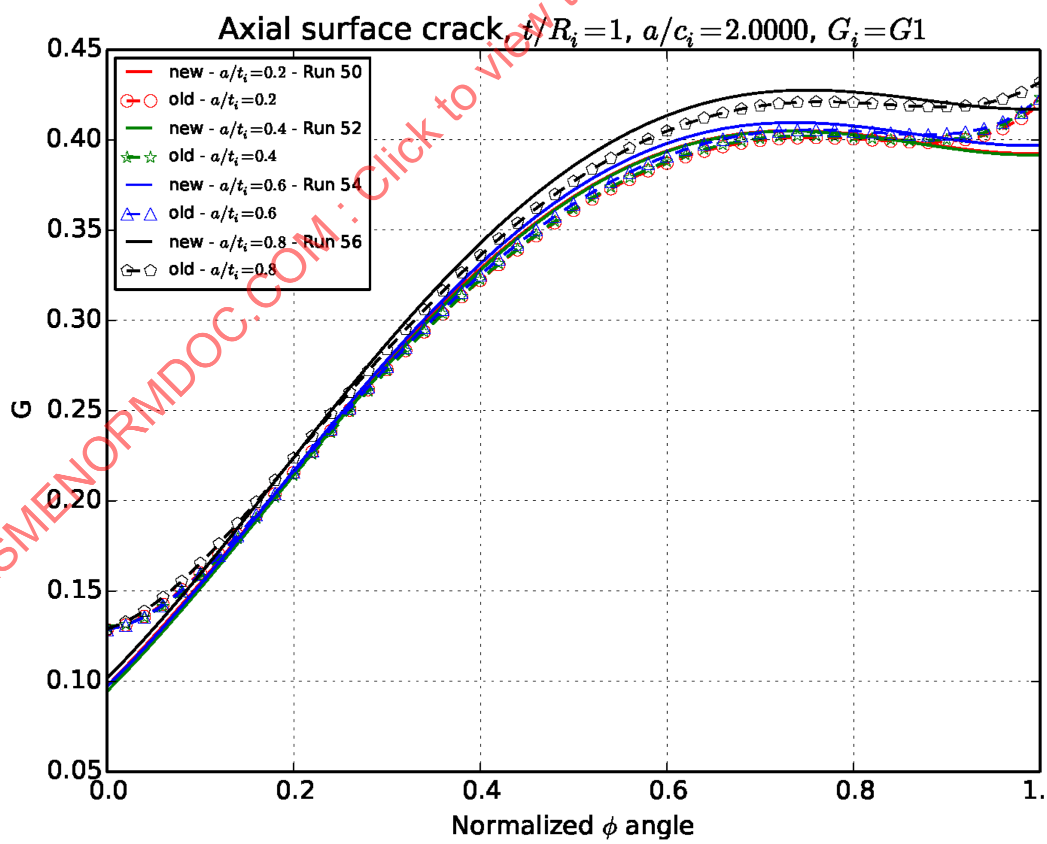

Axial surface crack, $t/R_i=1$, $a/c_i=0.5000$, $G_i=G0$
new - $a/t_i$=0.2 - Run 33
old - $a/t_i$=0.2
new - $a/t_i$=0.4 - Run 35
old - $a/t_i$=0.4
new - $a/t_i$=0.6 - Run 37
old - $a/t_i$=0.6
new - $a/t_i$=0.8 - Run 39
old - $a/t_i$=0.8
G
Normalized $\phi$ angle
0.0
0.2
0.4
0.6
0.8
1.0
0.7
0.8
0.9
1.0
1.1
1.2
1.3
1.4
1.5


Axial surface crack, $t/R_i=1$, $a/c_i=0.5000$, $G_i=G1$
new - $a/t_i$=0.2 - Run 34
old - $a/t_i$=0.2
new - $a/t_i$=0.4 - Run 36
old - $a/t_i$=0.4
new - $a/t_i$=0.6 - Run 38
old - $a/t_i$=0.6
new - $a/t_i$=0.8 - Run 40
old - $a/t_i$=0.8
G
Normalized $\phi$ angle
0.0
0.2
0.4
0.6
0.8
1.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9


Axial surface crack, $t/R_i=1$, $a/c_i=1.0000$, $G_i=G0$
new - $a/t_i=0.2$ - Run 41
old - $a/t_i=0.2$
new - $a/t_i=0.4$ - Run 43
old - $a/t_i=0.4$
new - $a/t_i=0.6$ - Run 45
old - $a/t_i=0.6$
new - $a/t_i=0.8$ - Run 47
old - $a/t_i=0.8$
G
Normalized $\phi$ angle

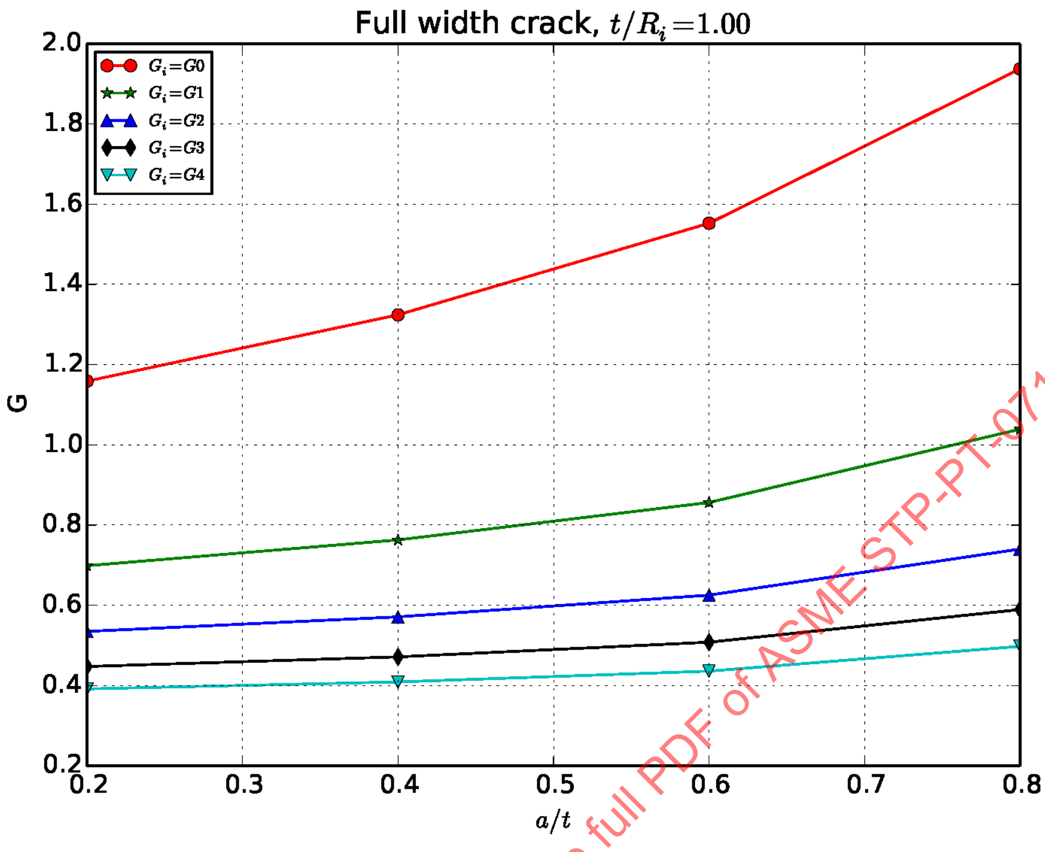

Axial surface crack, $t/R_i=1$, $a/c_i=1.0000$, $G_i=G1$
new - $a/t_i=0.2$ - Run 42
old - $a/t_i=0.2$
new - $a/t_i=0.4$ - Run 44
old - $a/t_i=0.4$
new - $a/t_i=0.6$ - Run 46
old - $a/t_i=0.6$
new - $a/t_i=0.8$ - Run 48
old - $a/t_i=0.8$
G
Normalized $\phi$ angle

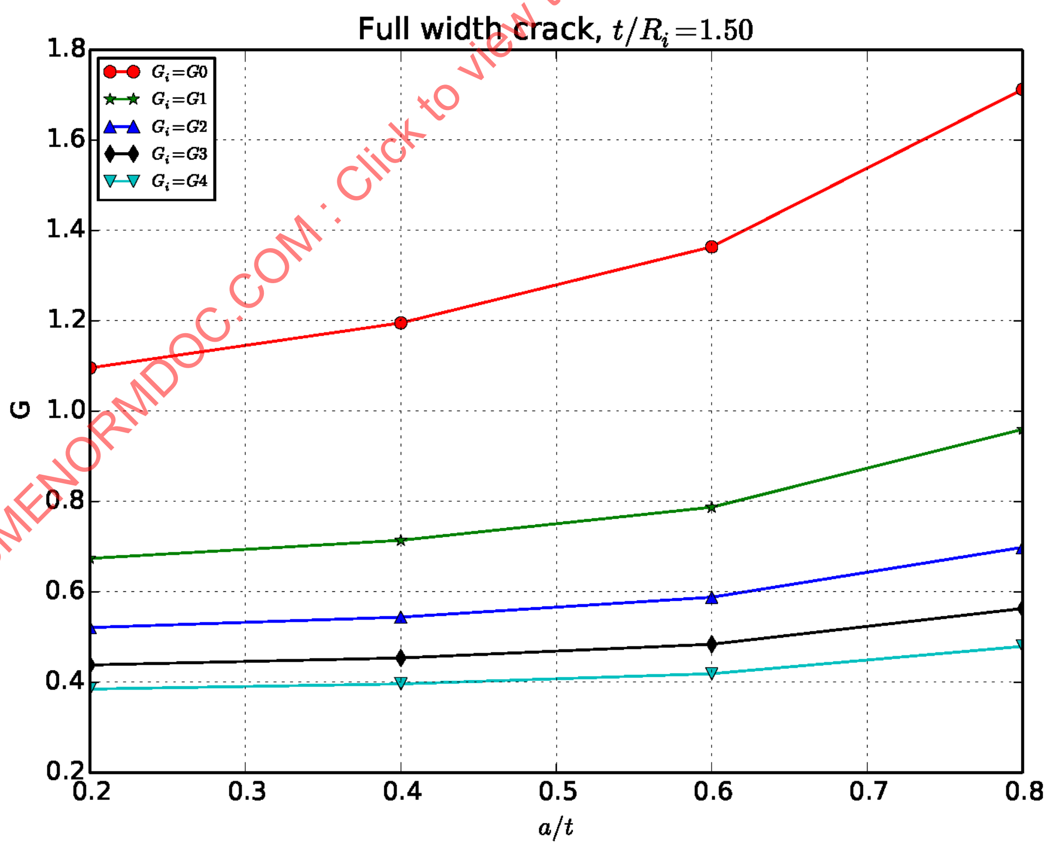

Axial surface crack, $t/R_i=1$, $a/c_i=2.0000$, $G_i=G0$
new - $a/t_i=0.2$ - Run 49
old - $a/t_i=0.2$
new - $a/t_i=0.4$ - Run 51
old - $a/t_i=0.4$
new - $a/t_i=0.6$ - Run 53
old - $a/t_i=0.6$
new - $a/t_i=0.8$ - Run 55
old - $a/t_i=0.8$
G
Normalized $\phi$ angle

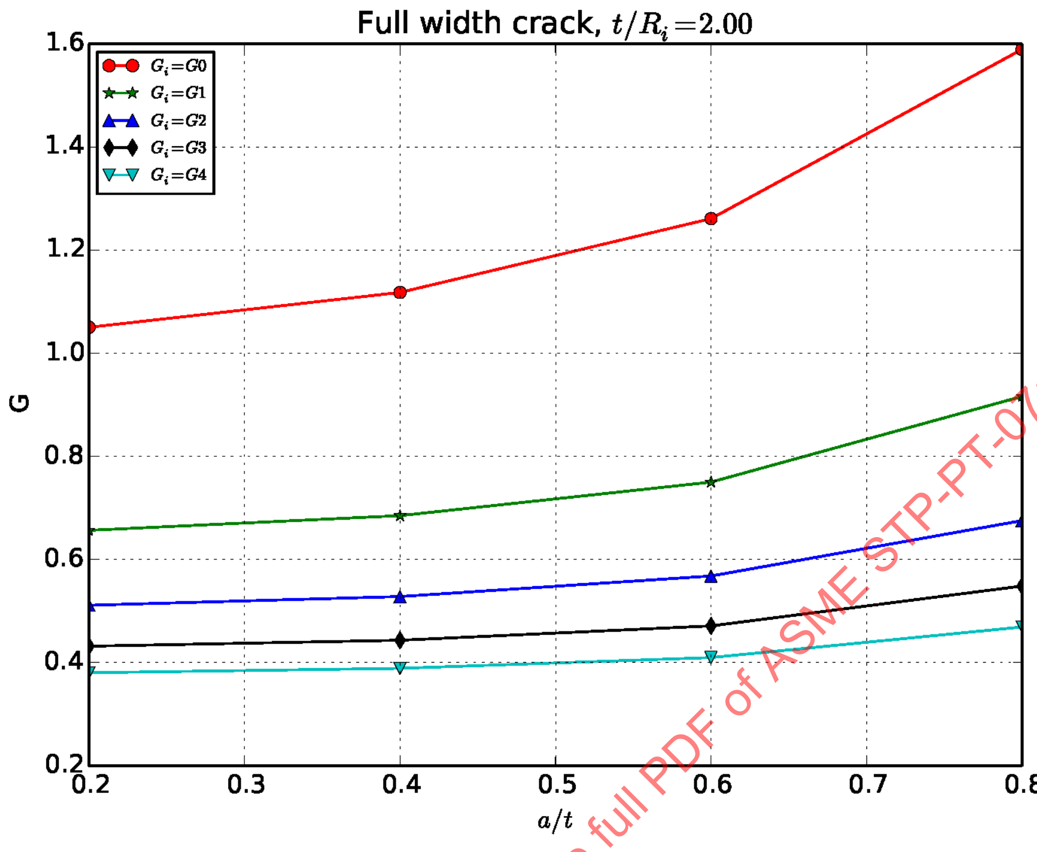

Axial surface crack, $t/R_i=1$, $a/c_i=2.0000$, $G_i=G1$
new - $a/t_i=0.2$ - Run 50
old - $a/t_i=0.2$
new - $a/t_i=0.4$ - Run 52
old - $a/t_i=0.4$
new - $a/t_i=0.6$ - Run 54
old - $a/t_i=0.6$
new - $a/t_i=0.8$ - Run 56
old - $a/t_i=0.8$
G
Normalized $\phi$ angle

## APPENDIX H - AXIAL INTERNAL FULL-WIDTH CRACK G RESULT PLOTS

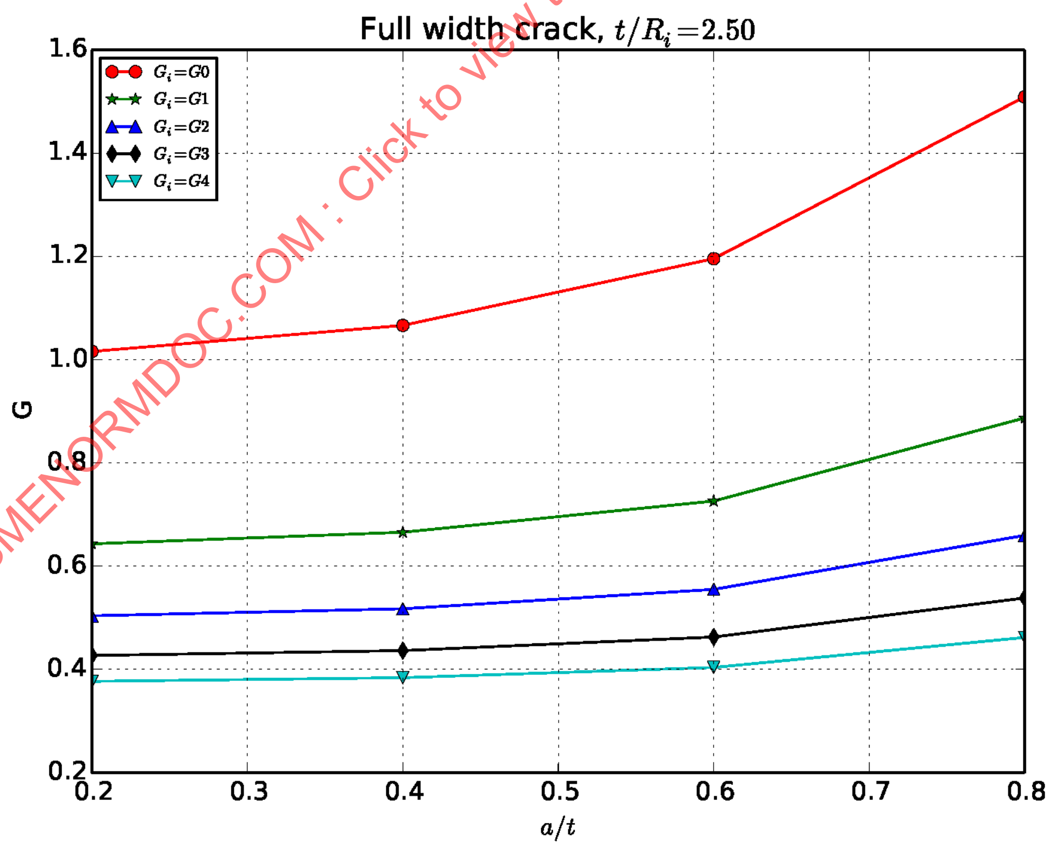
Plots shown for all the axial internal full-width partial-depth crack cases; plot G versus the a/t ratio. G is constant along the full-width crack front, so just one G value per crack model. A curve for each of the five load cases: G0 to G4 for uniform, linear, quadratic, cubic, and quartic crack face pressure distributions. Five plots total for each t/Ri ratio.


Full width crack, $t/R_i = 1.00$
G
$a/t$
$G_i = G0$
$G_i = G1$
$G_i = G2$
$G_i = G3$
$G_i = G4$
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.2
0.3
0.4
0.5
0.6
0.7
0.8

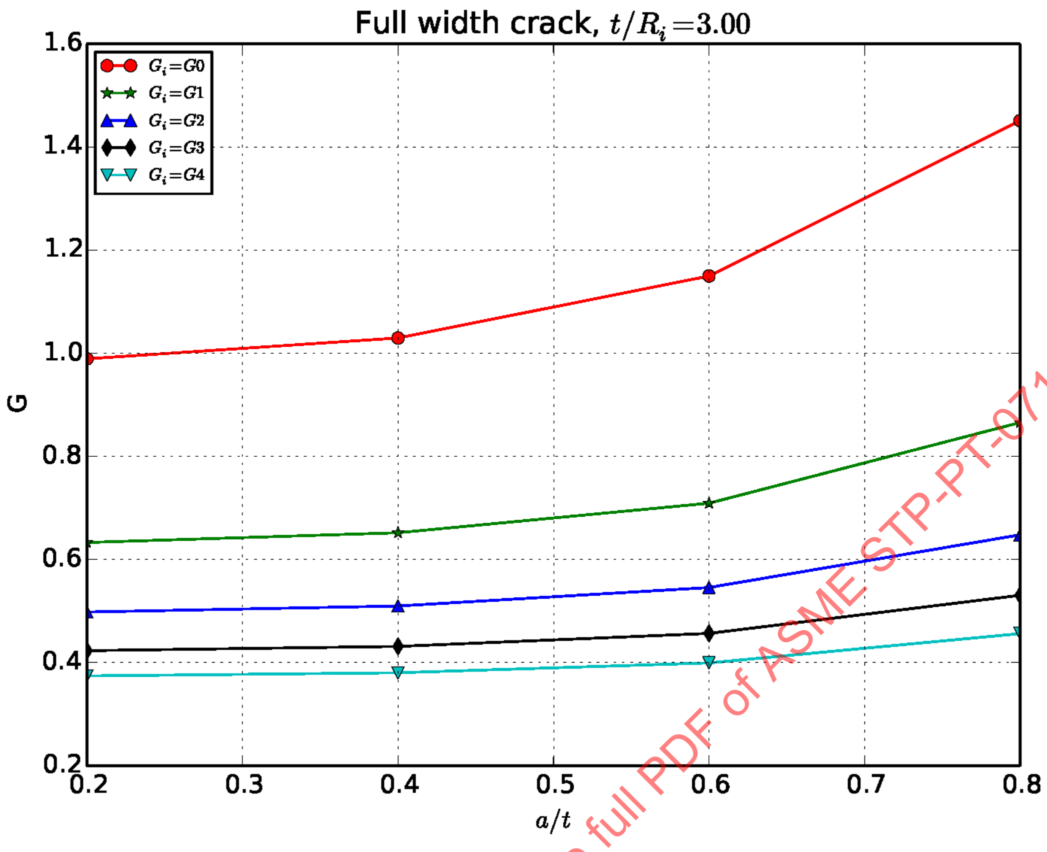

Full width crack, $t/R_i = 1.50$
G
$a/t$
$G_i = G0$
$G_i = G1$
$G_i = G2$
$G_i = G3$
$G_i = G4$
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.2
0.3
0.4
0.5
0.6
0.7
0.8



Full width crack, $t/R_i = 2.00$
$G_i = G0$
$G_i = G1$
$G_i = G2$
$G_i = G3$
$G_i = G4$
G
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.2
0.3
0.4
0.5
0.6
0.7
0.8
$a/t$

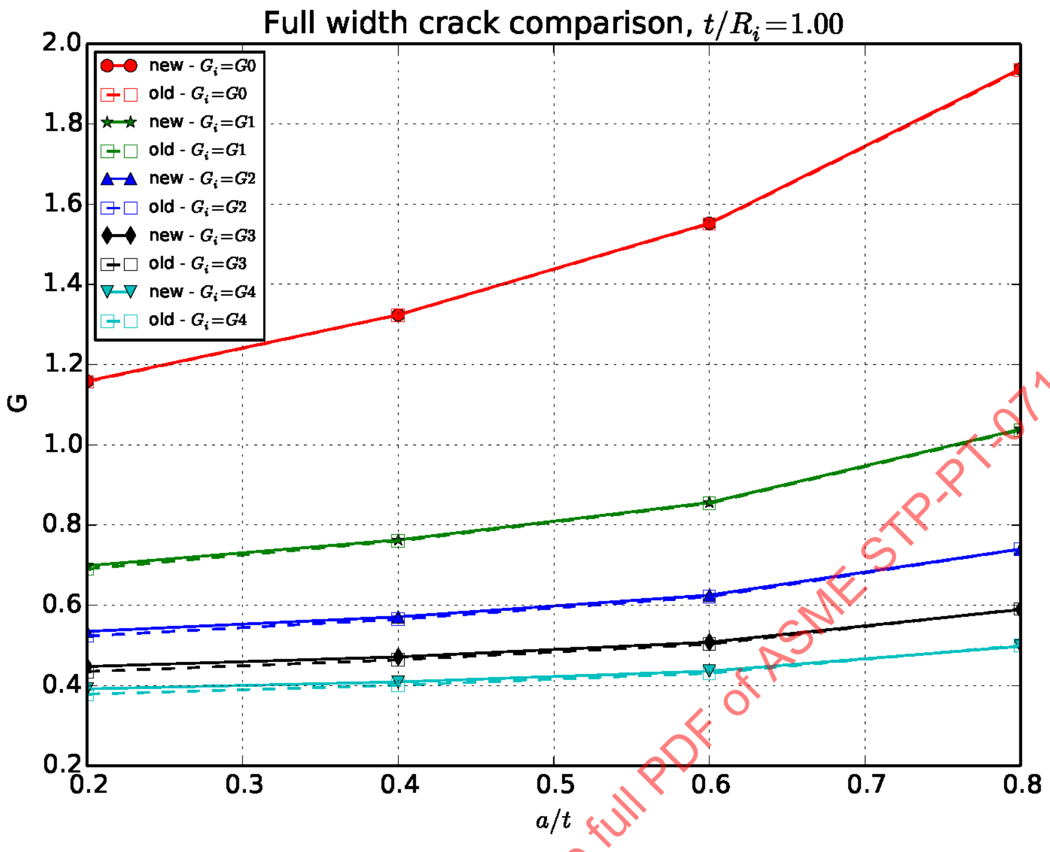



Full width crack, $t/R_i = 2.50$
$G_i = G0$
$G_i = G1$
$G_i = G2$
$G_i = G3$
$G_i = G4$
G
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.2
0.3
0.4
0.5
0.6
0.7
0.8
$a/t$


Full width crack, $t/R_i = 3.00$
$G_i = G0$
$G_i = G1$
$G_i = G2$
$G_i = G3$
$G_i = G4$
G
$a/t$
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.2
0.3
0.4
0.5
0.6
0.7
0.8

# APPENDIX I - AXIAL INTERNAL FULL-WIDTH CRACK COMPARISON TO PREVIOUS RESULTS

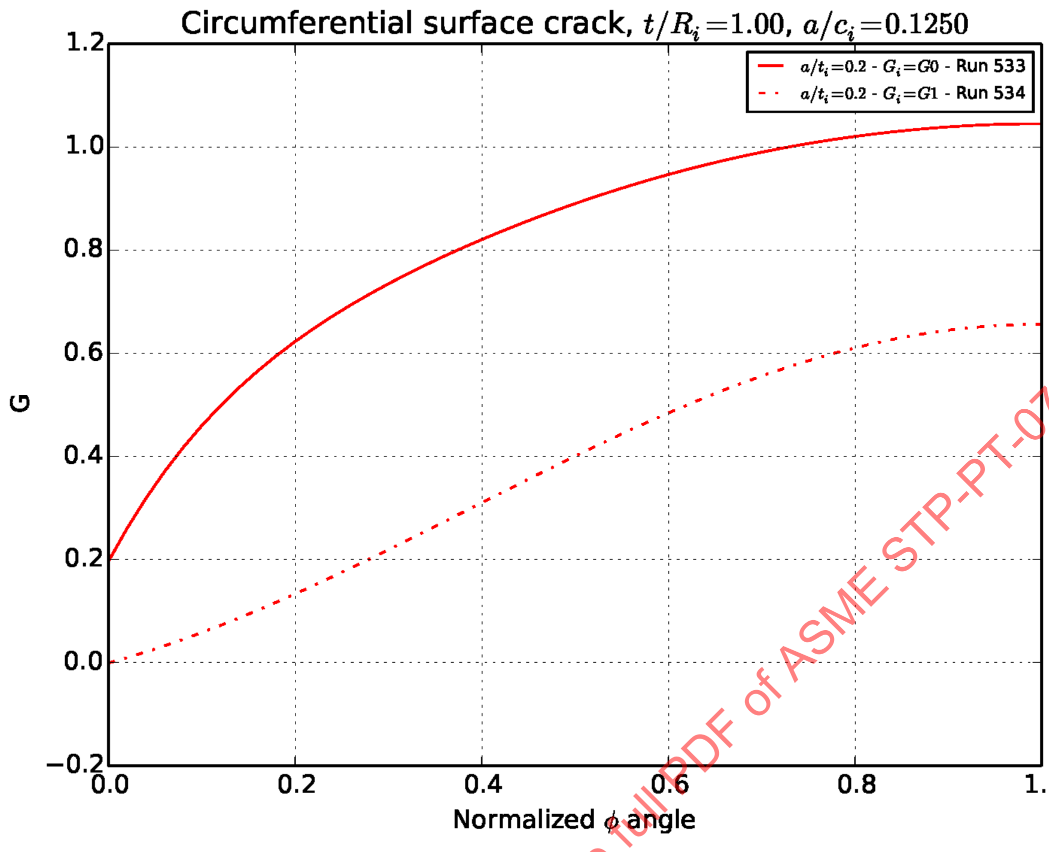
Plots to compare axial full-width crack G results for the t/Ri=1 ratio from the previous results to the new results. Plot G versus the a/t ratio for the five load cases; one plot. Close agreement between previous and new results. The previous results were obtained from API 579, Annex C, Table C.10 [1].



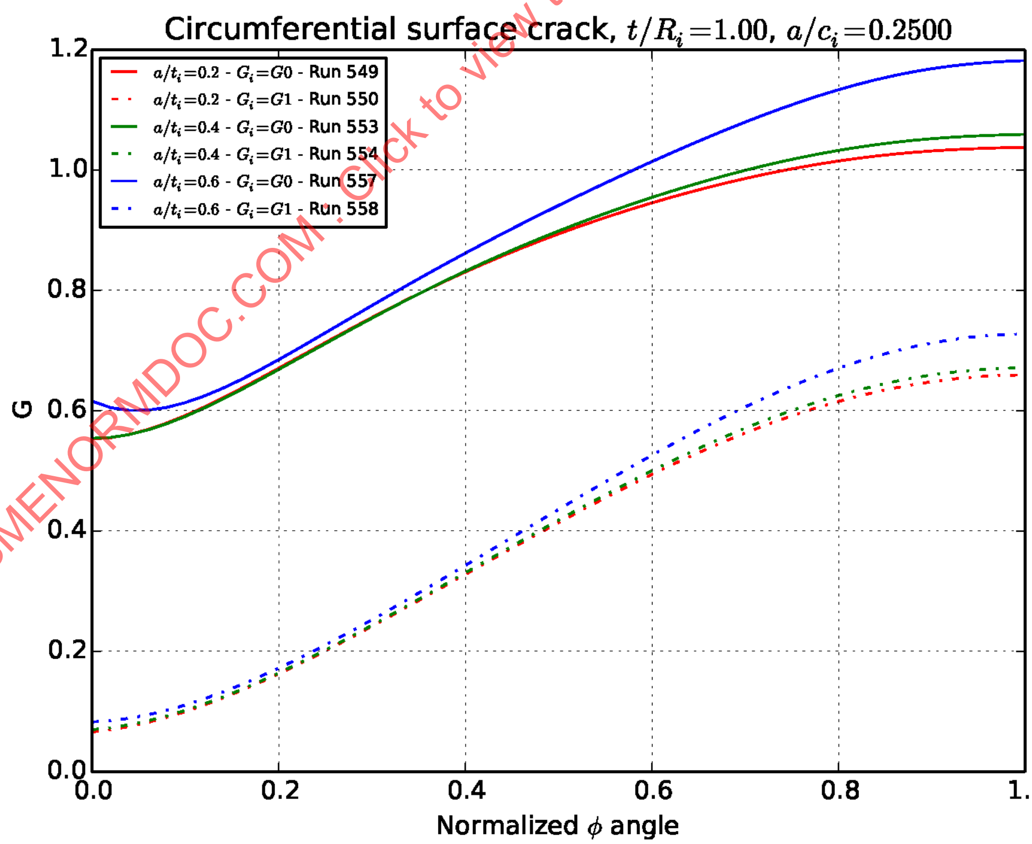
Full width crack comparison, $t/R_i = 1.00$
new - $G_i = G0$
old - $G_i = G0$
new - $G_i = G1$
old - $G_i = G1$
new - $G_i = G2$
old - $G_i = G2$
new - $G_i = G3$
old - $G_i = G3$
new - $G_i = G4$
old - $G_i = G4$
G
$a/t$
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.2
0.3
0.4
0.5
0.6
0.7
0.8

# APPENDIX J - CIRCUMFERENTIAL INTERNAL SURFACE CRACK G RESULT PLOTS

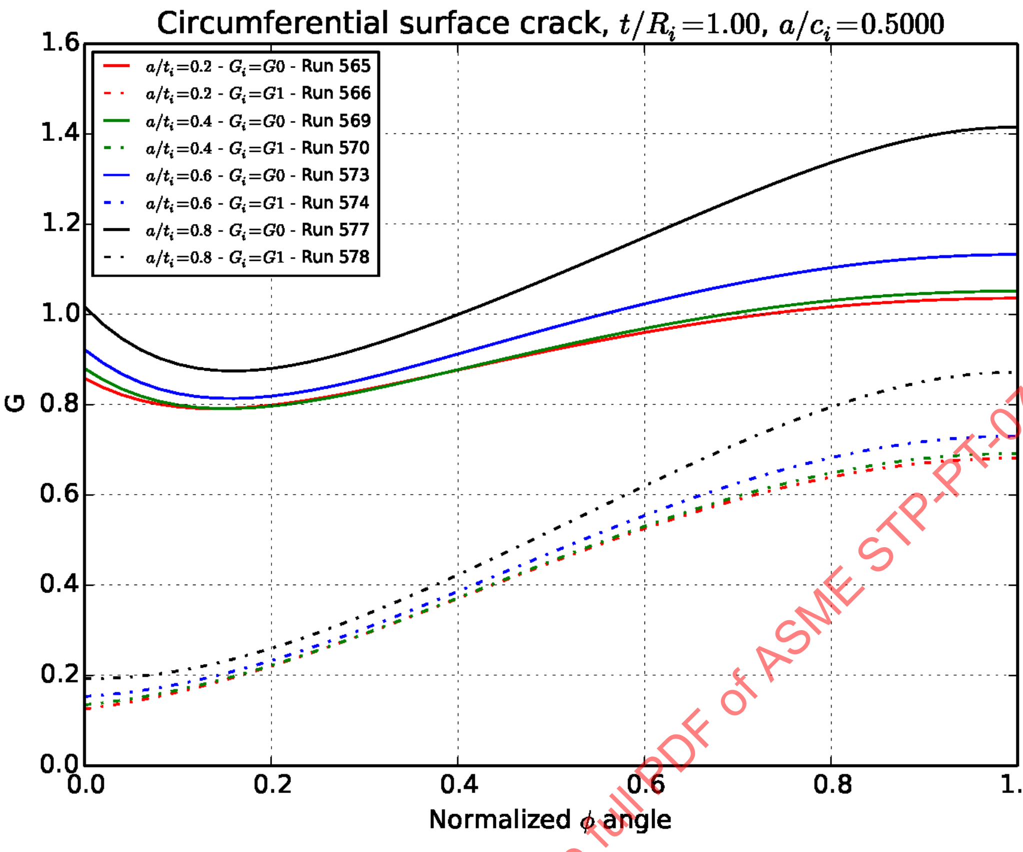
Plots shown for all the circumferential surface crack cases; plot G versus the normalized crack front angle position $2\phi/\pi$. Up to eight curves per plot to show the uniform $G_0$, linear $G_1$, in-plane bending $G_5$, and out-of-plane bending $G_6$ load cases for the four a/t ratios; 44 plots total. Each page contains the plots for a particular t/Ri and a/c ratio. The $G_0$ and $G_1$ results are in the first 22 plots, and the $G_5$ and $G_6$ results are in the last 22 plots.



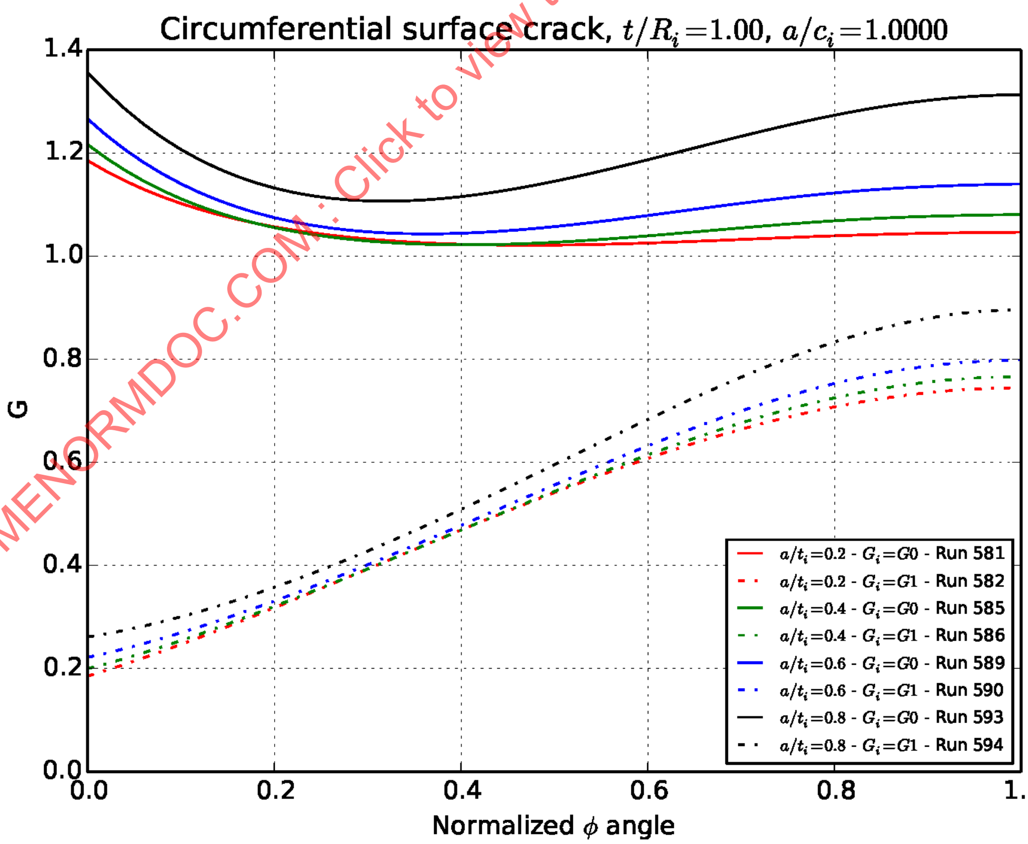
Circumferential surface crack, $t/R_i=1.00$, $a/c_i=0.1250$
$a/t_i=0.2$ - $G_i=G0$ - Run 533
$a/t_i=0.2$ - $G_i=G1$ - Run 534
G
1.2
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
0.0
0.2
0.4
0.6
0.8
1.0
Normalized $\phi$ angle

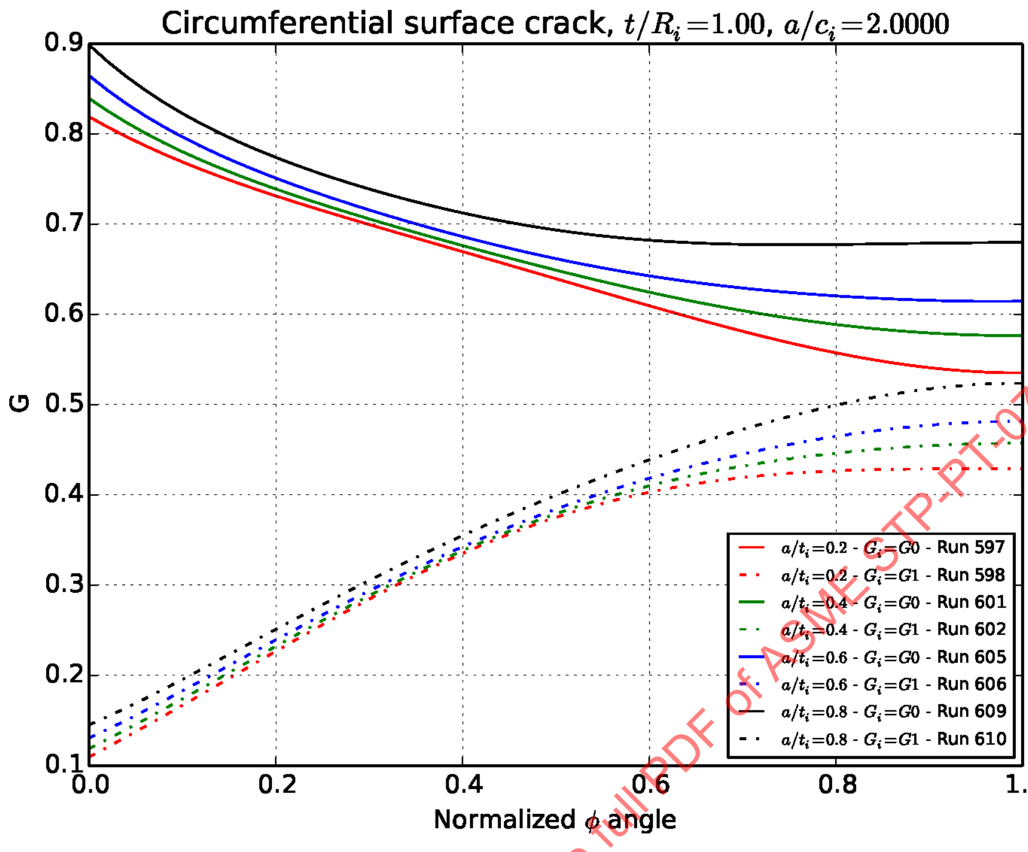
Circumferential surface crack, $t/R_i=1.00$, $a/c_i=0.2500$
$a/t_i=0.2$ - $G_i=G0$ - Run 549
$a/t_i=0.2$ - $G_i=G1$ - Run 550
$a/t_i=0.4$ - $G_i=G0$ - Run 553
$a/t_i=0.4$ - $G_i=G1$ - Run 554
$a/t_i=0.6$ - $G_i=G0$ - Run 557
$a/t_i=0.6$ - $G_i=G1$ - Run 558
G
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0
Normalized $\phi$ angle

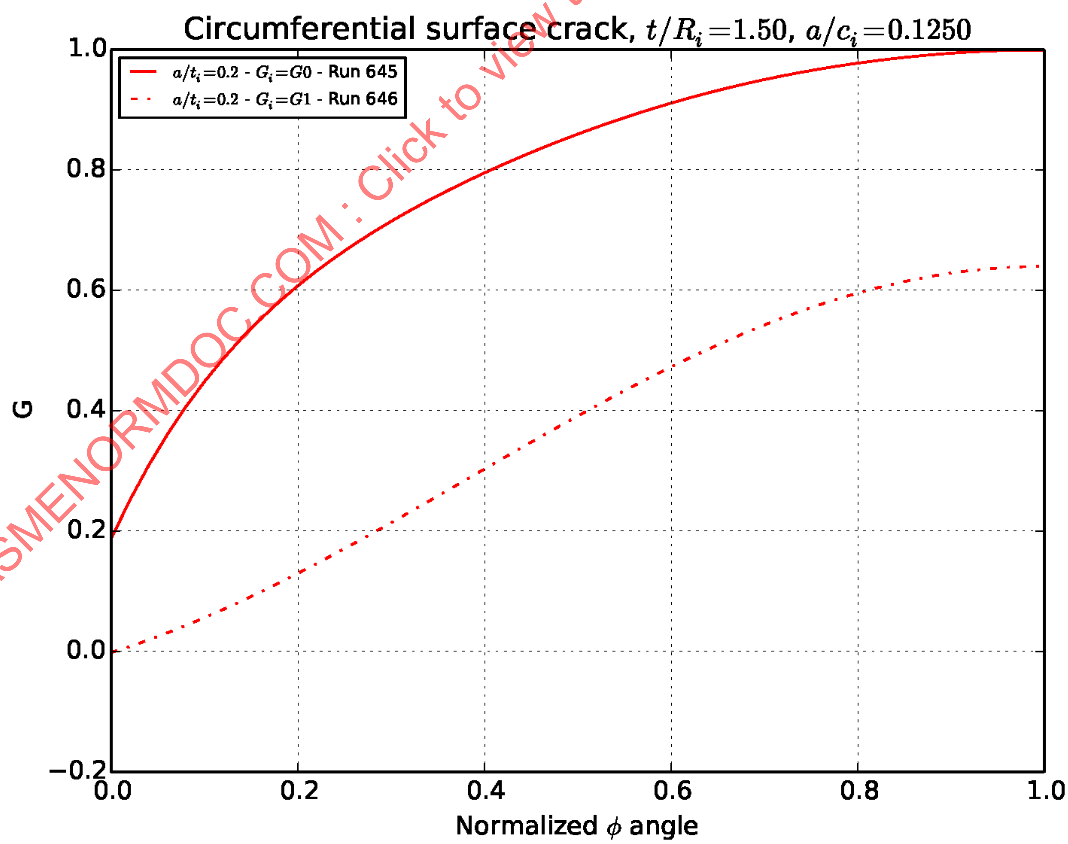


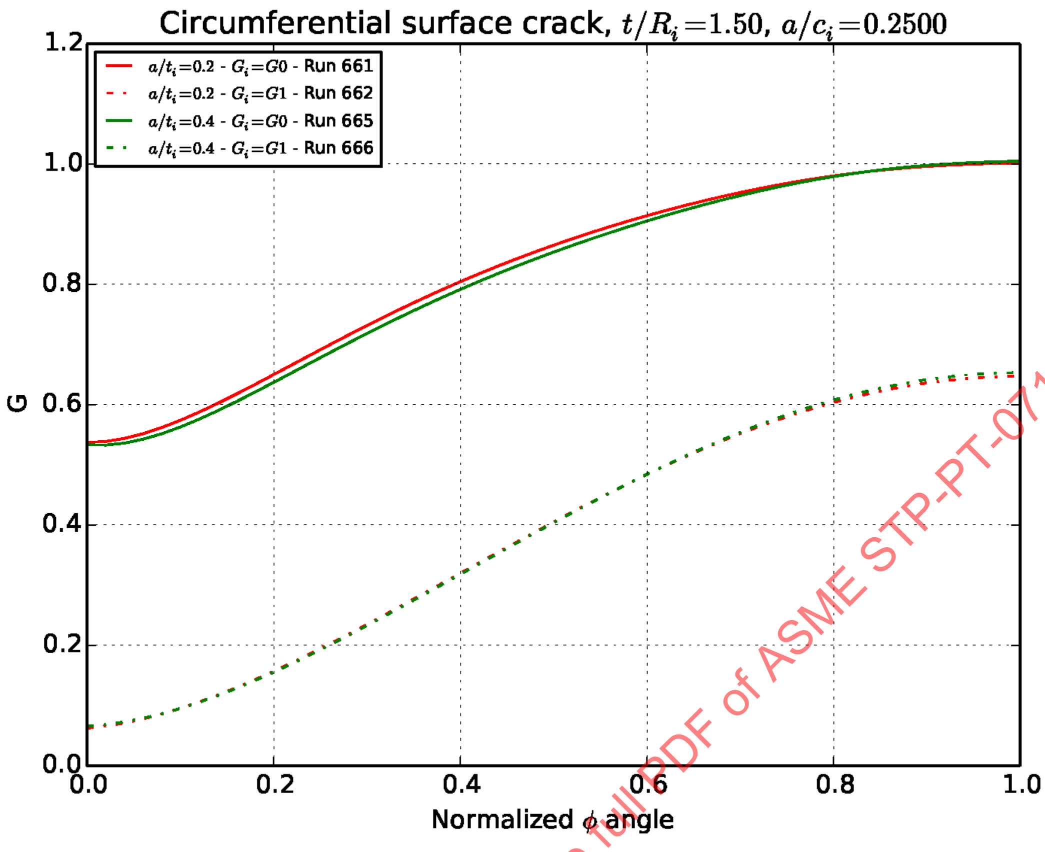
Circumferential surface crack, $t/R_i = 1.00$, $a/c_i = 0.5000$
$a/t_i$=0.2 - $G_i$=$G0$ - Run 565
$a/t_i$=0.2 - $G_i$=$G1$ - Run 566
$a/t_i$=0.4 - $G_i$=$G0$ - Run 569
$a/t_i$=0.4 - $G_i$=$G1$ - Run 570
$a/t_i$=0.6 - $G_i$=$G0$ - Run 573
$a/t_i$=0.6 - $G_i$=$G1$ - Run 574
$a/t_i$=0.8 - $G_i$=$G0$ - Run 577
$a/t_i$=0.8 - $G_i$=$G1$ - Run 578
G
Normalized $\phi$ angle

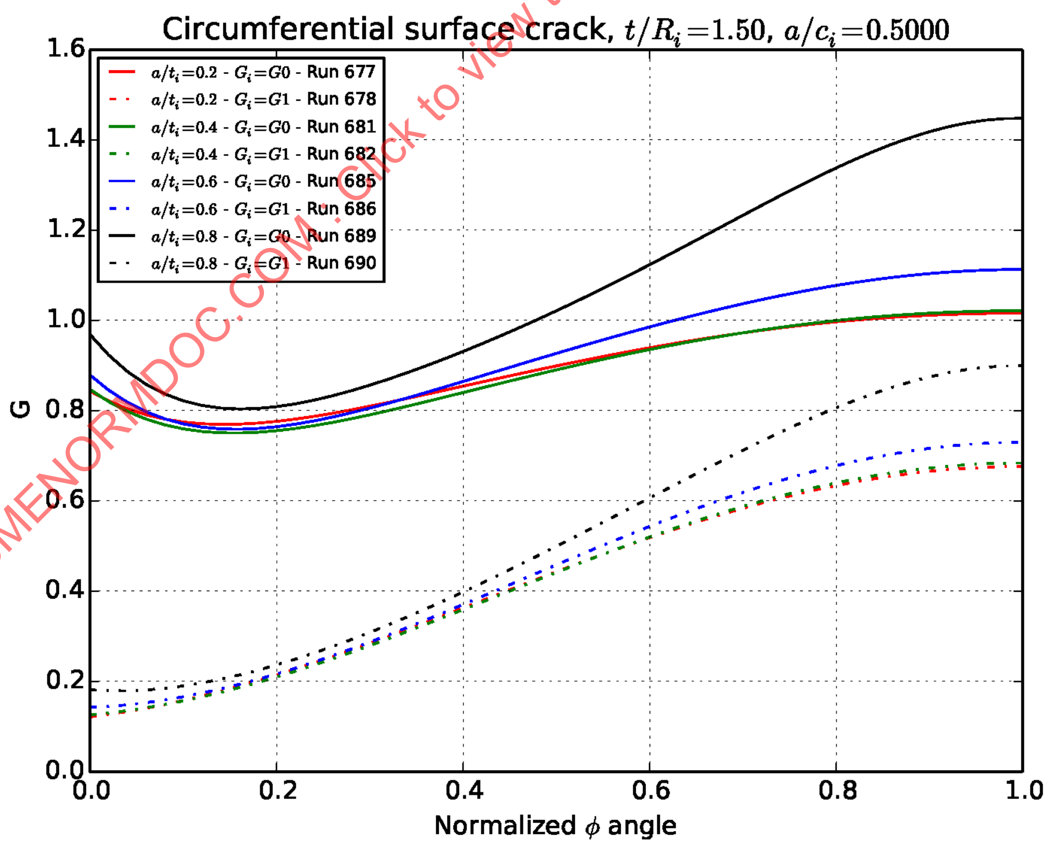



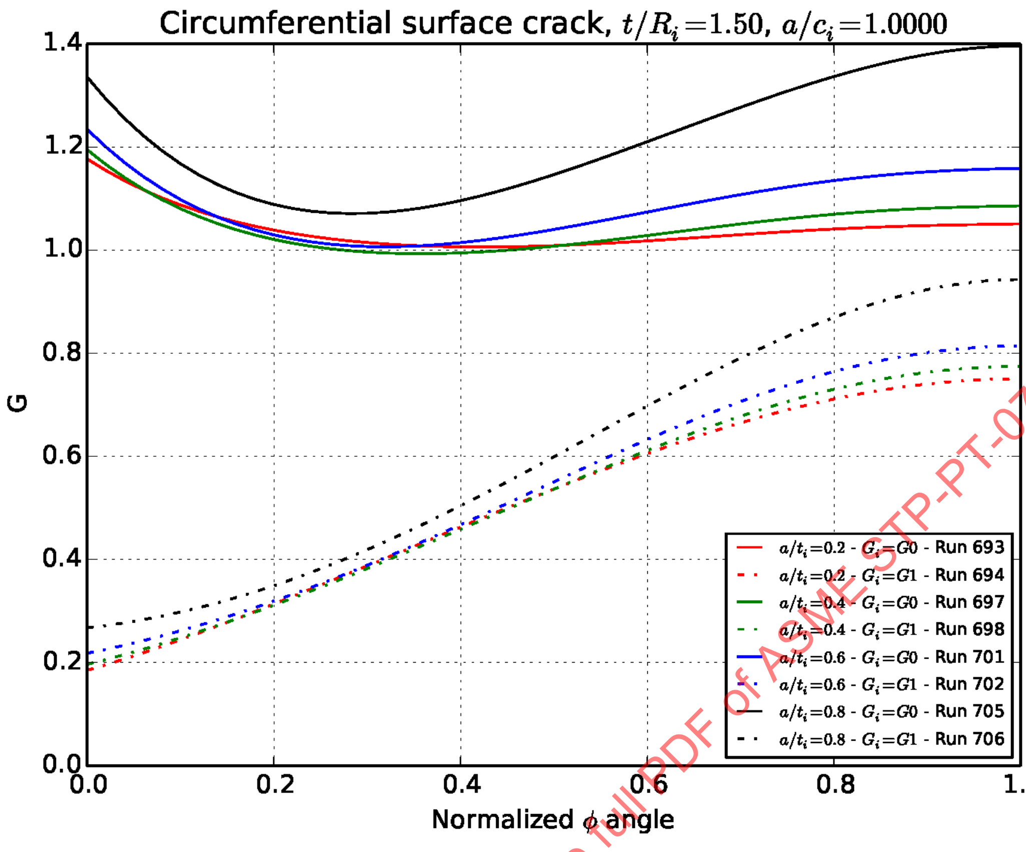
Circumferential surface crack, $t/R_i = 1.00$, $a/c_i = 1.0000$
$a/t_i$=0.2 - $G_i$=$G0$ - Run 581
$a/t_i$=0.2 - $G_i$=$G1$ - Run 582
$a/t_i$=0.4 - $G_i$=$G0$ - Run 585
$a/t_i$=0.4 - $G_i$=$G1$ - Run 586
$a/t_i$=0.6 - $G_i$=$G0$ - Run 589
$a/t_i$=0.6 - $G_i$=$G1$ - Run 590
$a/t_i$=0.8 - $G_i$=$G0$ - Run 593
$a/t_i$=0.8 - $G_i$=$G1$ - Run 594
G
Normalized $\phi$ angle

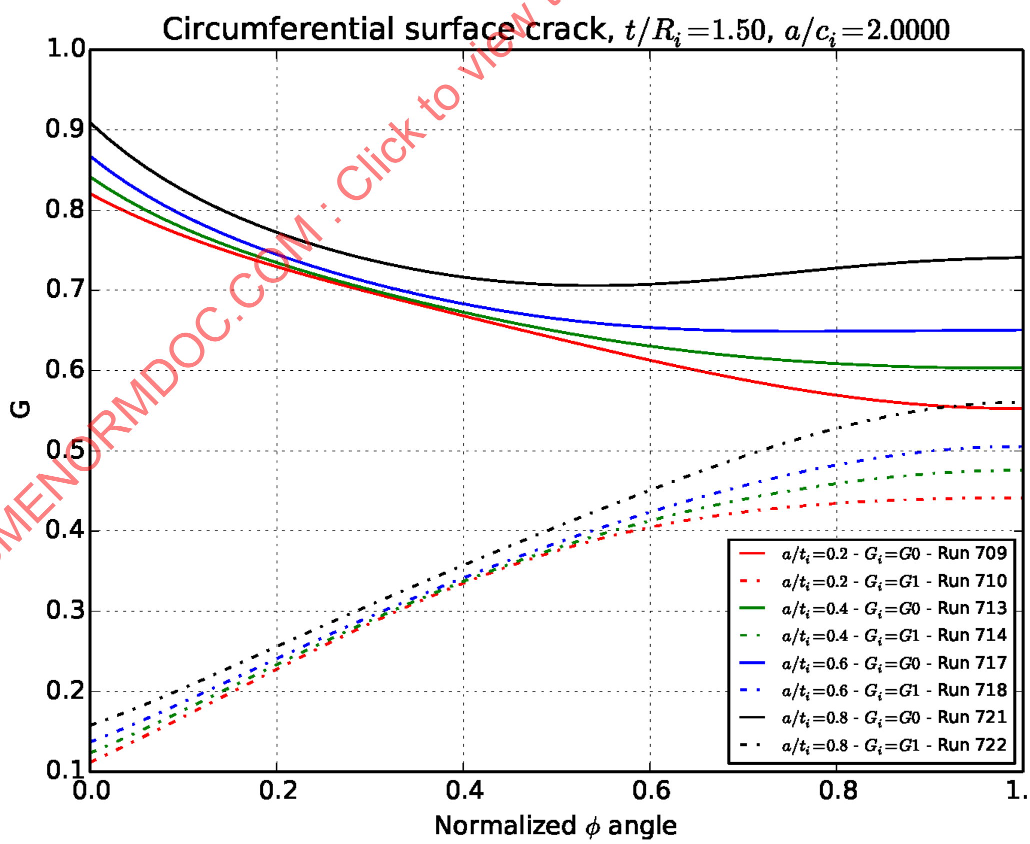

Circumferential surface crack, $t/R_i = 1.00$, $a/c_i = 2.0000$
G
Normalized $\phi$ angle
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
0.0
0.2
0.4
0.6
0.8
1.0
$a/t_i = 0.2$ - $G_i = G0$ - Run 597
$a/t_i = 0.2$ - $G_i = G1$ - Run 598
$a/t_i = 0.4$ - $G_i = G0$ - Run 601
$a/t_i = 0.4$ - $G_i = G1$ - Run 602
$a/t_i = 0.6$ - $G_i = G0$ - Run 605
$a/t_i = 0.6$ - $G_i = G1$ - Run 606
$a/t_i = 0.8$ - $G_i = G0$ - Run 609
$a/t_i = 0.8$ - $G_i = G1$ - Run 610

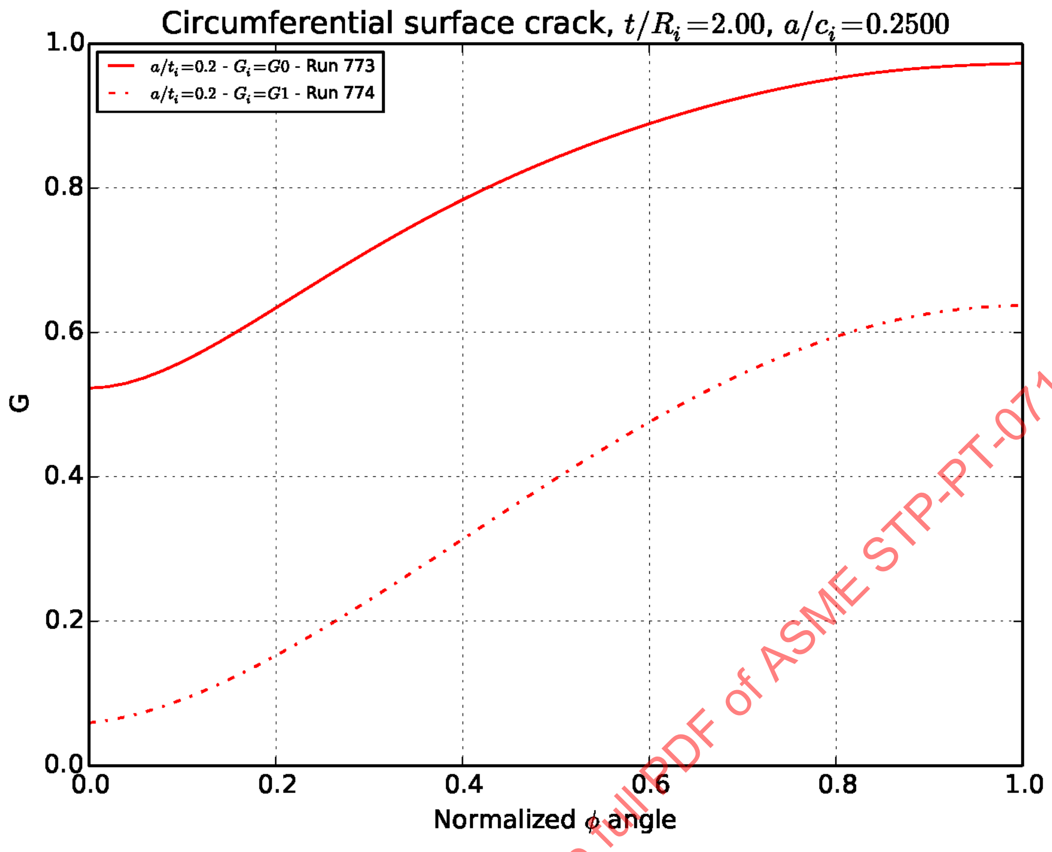

Circumferential surface crack, $t/R_i = 1.50$, $a/c_i = 0.1250$
G
Normalized $\phi$ angle
−0.2
0.0
0.2
0.4
0.6
0.8
1.0
0.0
0.2
0.4
0.6
0.8
1.0
$a/t_i = 0.2$ - $G_i = G0$ - Run 645
$a/t_i = 0.2$ - $G_i = G1$ - Run 646

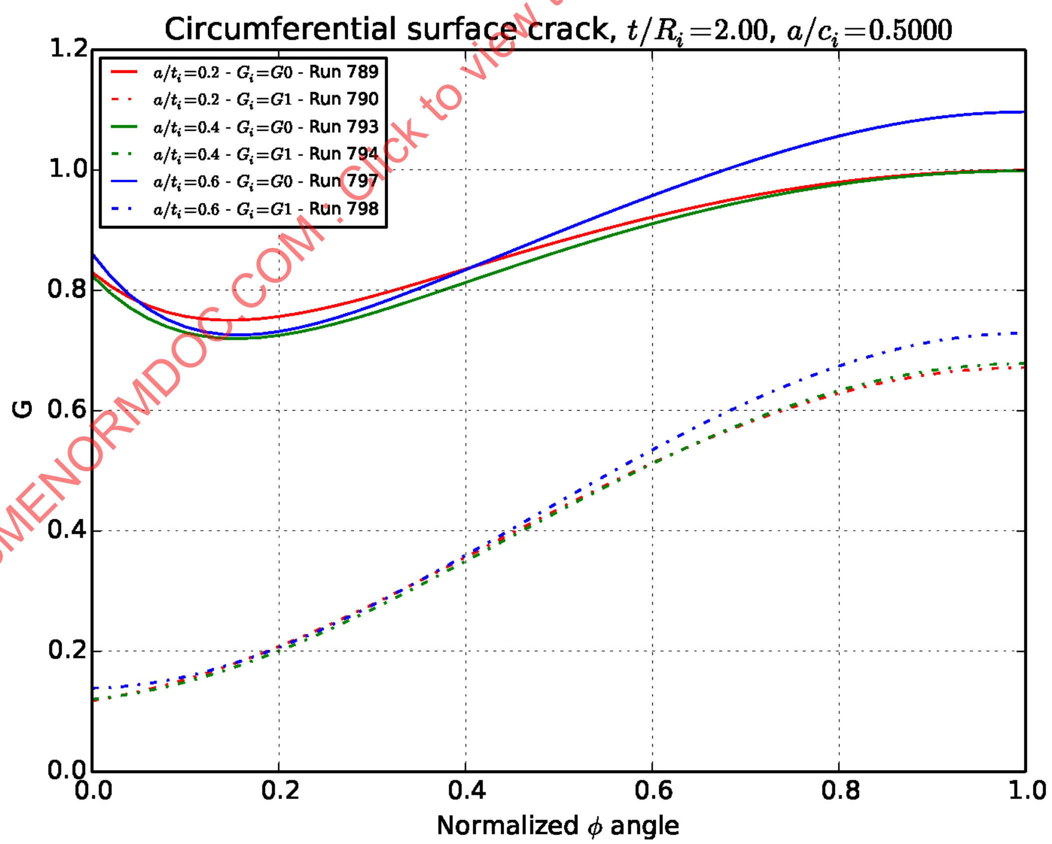

Circumferential surface crack, $t/R_i = 1.50$, $a/c_i = 0.2500$
$a/t_i = 0.2$ - $G_i = G0$ - Run 661
$a/t_i = 0.2$ - $G_i = G1$ - Run 662
$a/t_i = 0.4$ - $G_i = G0$ - Run 665
$a/t_i = 0.4$ - $G_i = G1$ - Run 666
G
Normalized $\phi$ angle

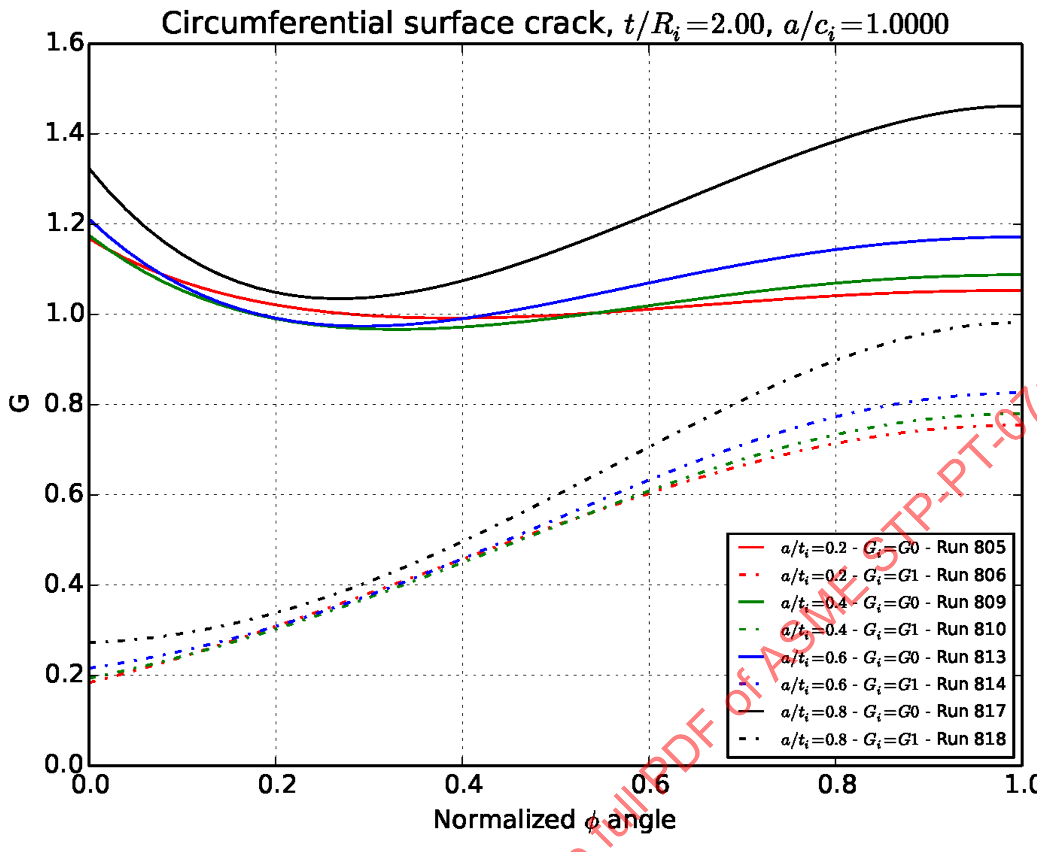

Circumferential surface crack, $t/R_i = 1.50$, $a/c_i = 0.5000$
$a/t_i = 0.2$ - $G_i = G0$ - Run 677
$a/t_i = 0.2$ - $G_i = G1$ - Run 678
$a/t_i = 0.4$ - $G_i = G0$ - Run 681
$a/t_i = 0.4$ - $G_i = G1$ - Run 682
$a/t_i = 0.6$ - $G_i = G0$ - Run 685
$a/t_i = 0.6$ - $G_i = G1$ - Run 686
$a/t_i = 0.8$ - $G_i = G0$ - Run 689
$a/t_i = 0.8$ - $G_i = G1$ - Run 690
G
Normalized $\phi$ angle


Circumferential surface crack, $t/R_i = 1.50$, $a/c_i = 1.0000$
G
Normalized $\phi$ angle
$a/t_i$=0.2 - $G_i$=$G0$ - Run 693
$a/t_i$=0.2 - $G_i$=$G1$ - Run 694
$a/t_i$=0.4 - $G_i$=$G0$ - Run 697
$a/t_i$=0.4 - $G_i$=$G1$ - Run 698
$a/t_i$=0.6 - $G_i$=$G0$ - Run 701
$a/t_i$=0.6 - $G_i$=$G1$ - Run 702
$a/t_i$=0.8 - $G_i$=$G0$ - Run 705
$a/t_i$=0.8 - $G_i$=$G1$ - Run 706

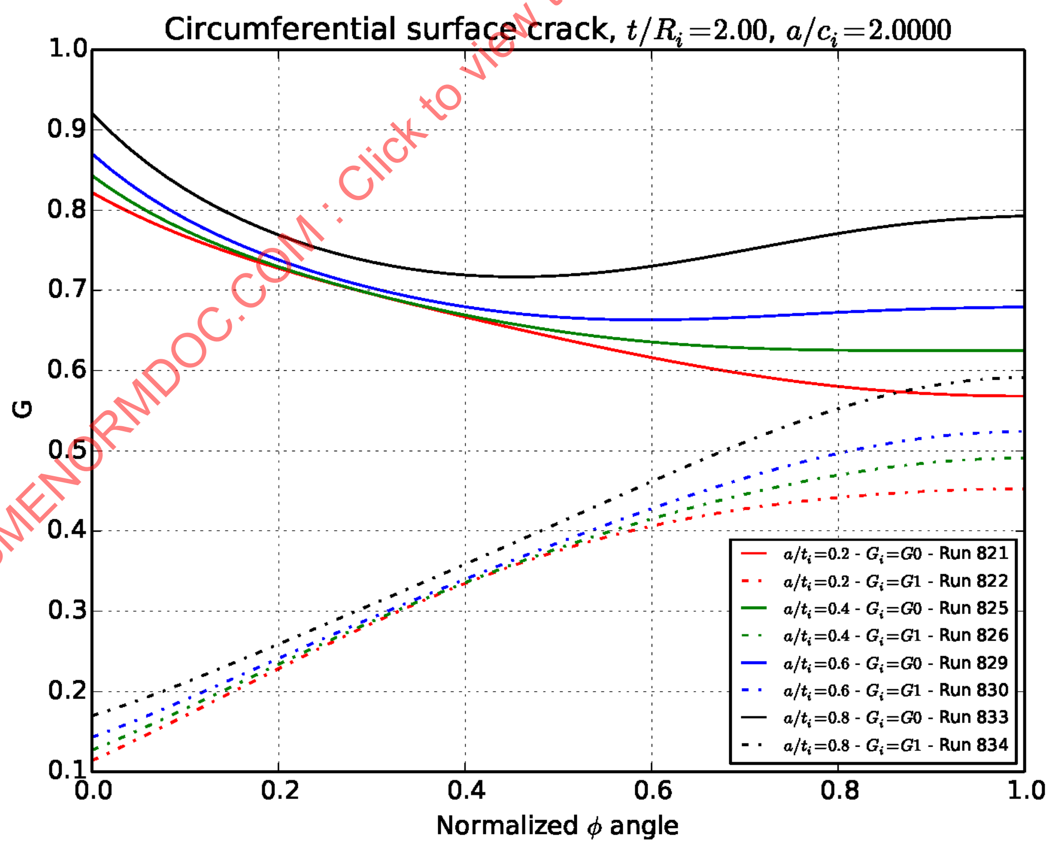

Circumferential surface crack, $t/R_i = 1.50$, $a/c_i = 2.0000$
G
Normalized $\phi$ angle
$a/t_i$=0.2 - $G_i$=$G0$ - Run 709
$a/t_i$=0.2 - $G_i$=$G1$ - Run 710
$a/t_i$=0.4 - $G_i$=$G0$ - Run 713
$a/t_i$=0.4 - $G_i$=$G1$ - Run 714
$a/t_i$=0.6 - $G_i$=$G0$ - Run 717
$a/t_i$=0.6 - $G_i$=$G1$ - Run 718
$a/t_i$=0.8 - $G_i$=$G0$ - Run 721
$a/t_i$=0.8 - $G_i$=$G1$ - Run 722


Circumferential surface crack, $t/R_i = 2.00$, $a/c_i = 0.2500$
$a/t_i = 0.2$ - $G_i = G0$ - Run 773
$a/t_i = 0.2$ - $G_i = G1$ - Run 774
G
Normalized $\phi$ angle
0.0
0.2
0.4
0.6
0.8
1.0

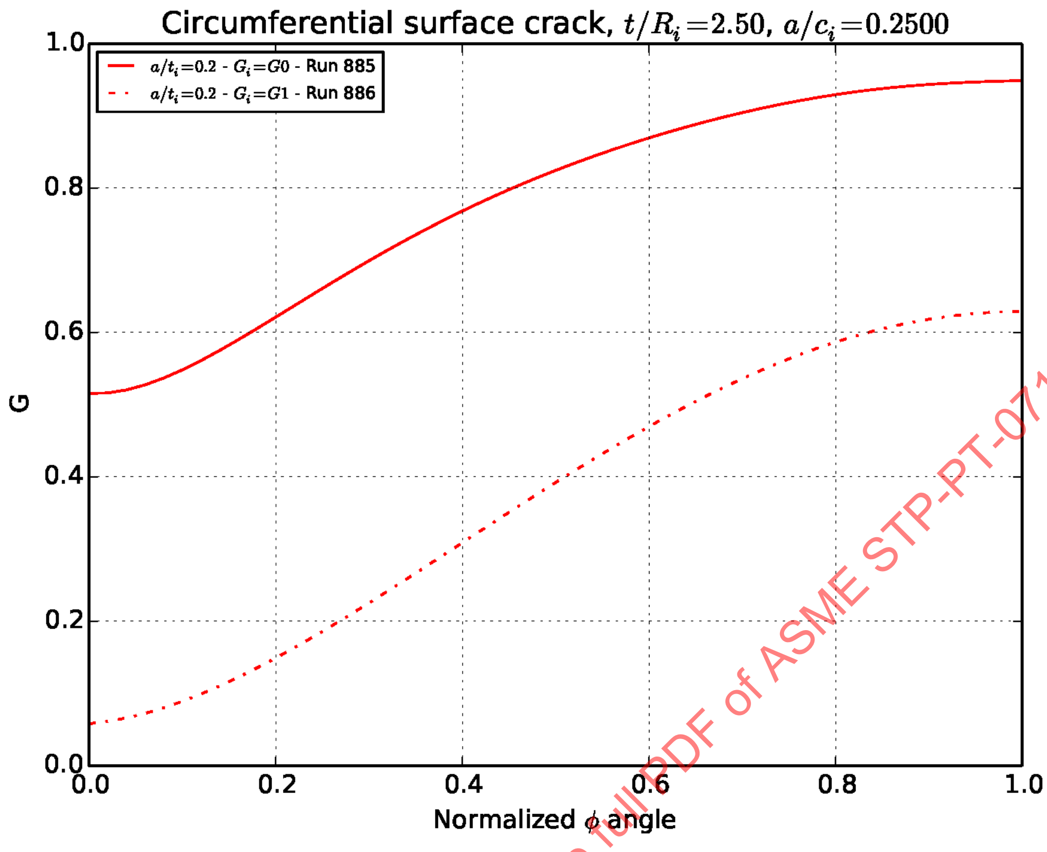

Circumferential surface crack, $t/R_i = 2.00$, $a/c_i = 0.5000$
$a/t_i = 0.2$ - $G_i = G0$ - Run 789
$a/t_i = 0.2$ - $G_i = G1$ - Run 790
$a/t_i = 0.4$ - $G_i = G0$ - Run 793
$a/t_i = 0.4$ - $G_i = G1$ - Run 794
$a/t_i = 0.6$ - $G_i = G0$ - Run 797
$a/t_i = 0.6$ - $G_i = G1$ - Run 798
G
Normalized $\phi$ angle
0.0
0.2
0.4
0.6
0.8
1.0
1.2

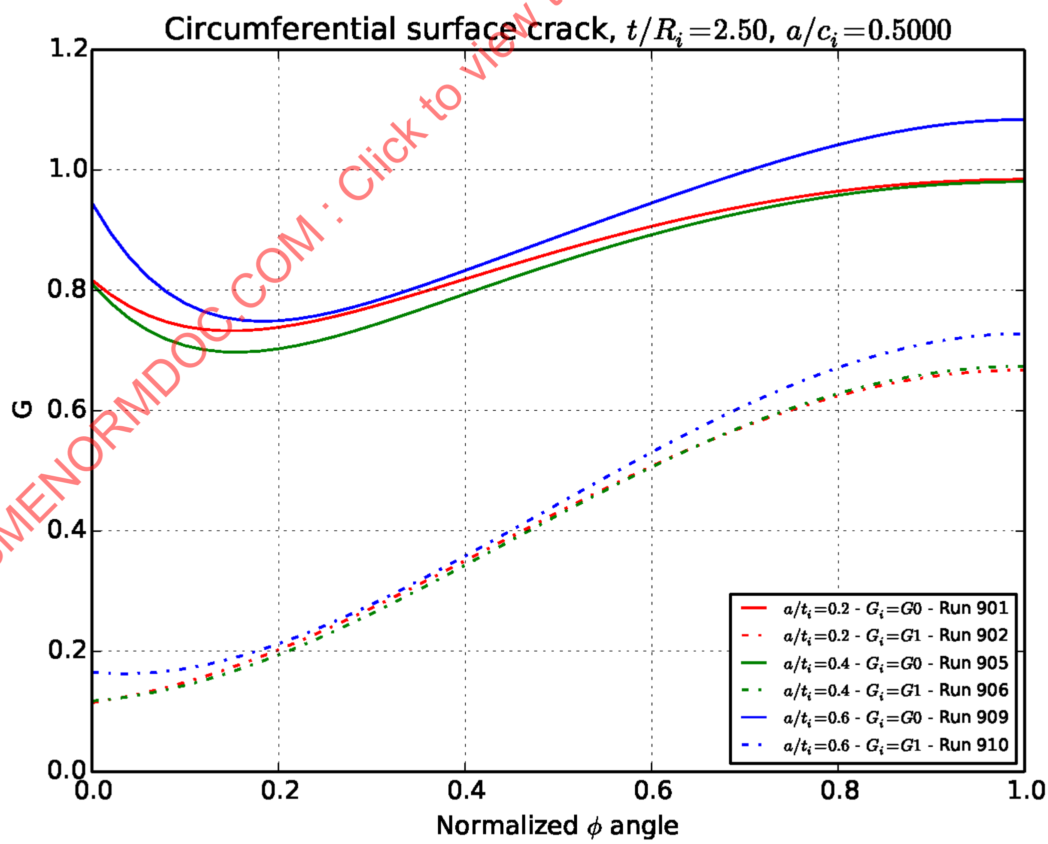


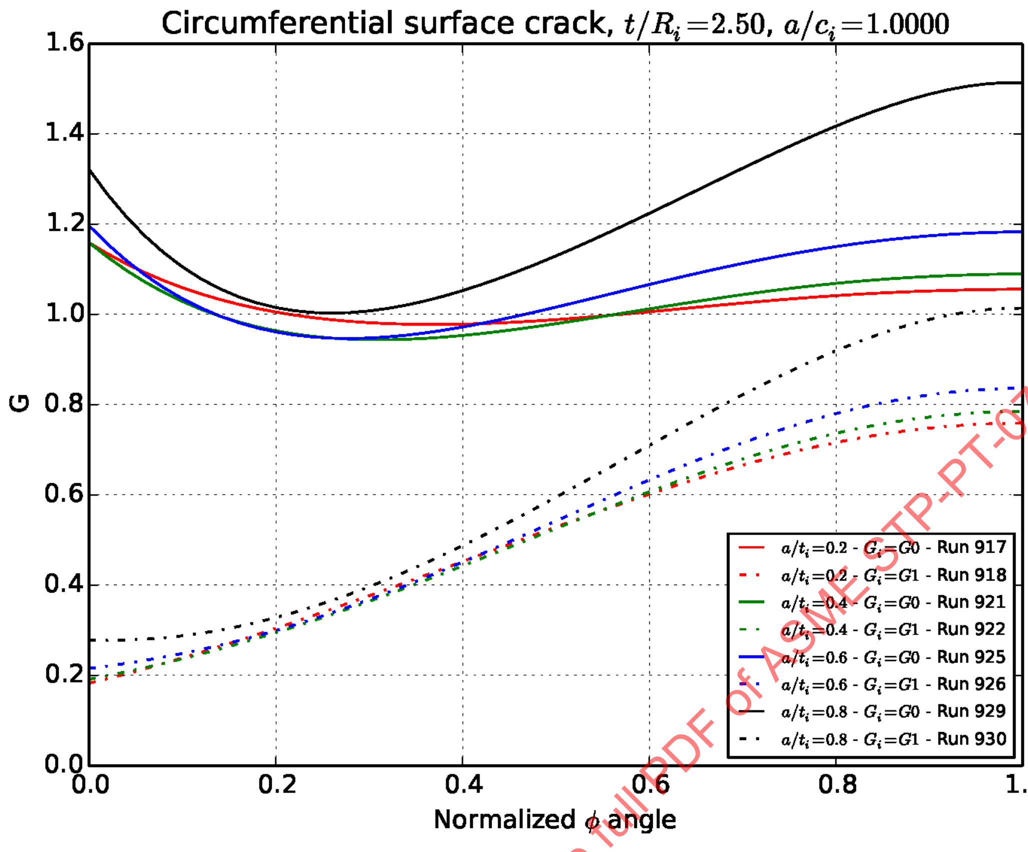
Circumferential surface crack, $t/R_i = 2.00$, $a/c_i = 1.0000$
G
Normalized $\phi$ angle
$a/t_i$=0.2 - $G_i$=G0 - Run 805
$a/t_i$=0.2 - $G_i$=G1 - Run 806
$a/t_i$=0.4 - $G_i$=G0 - Run 809
$a/t_i$=0.4 - $G_i$=G1 - Run 810
$a/t_i$=0.6 - $G_i$=G0 - Run 813
$a/t_i$=0.6 - $G_i$=G1 - Run 814
$a/t_i$=0.8 - $G_i$=G0 - Run 817
$a/t_i$=0.8 - $G_i$=G1 - Run 818

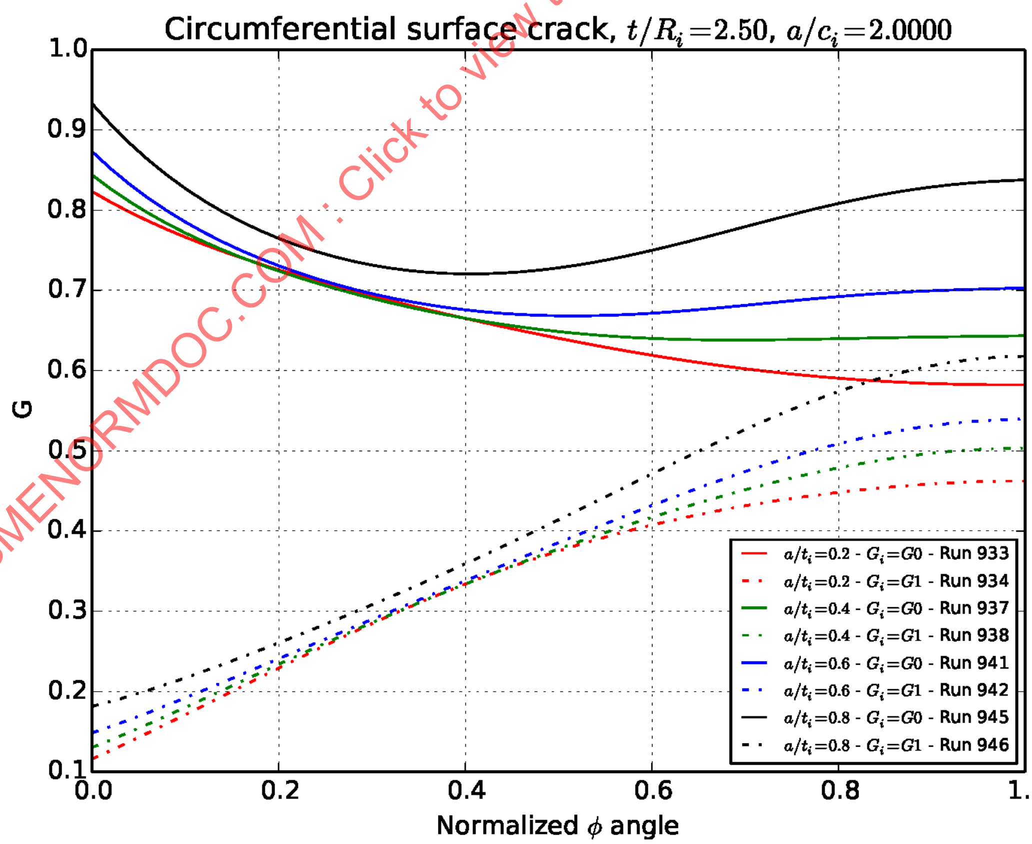



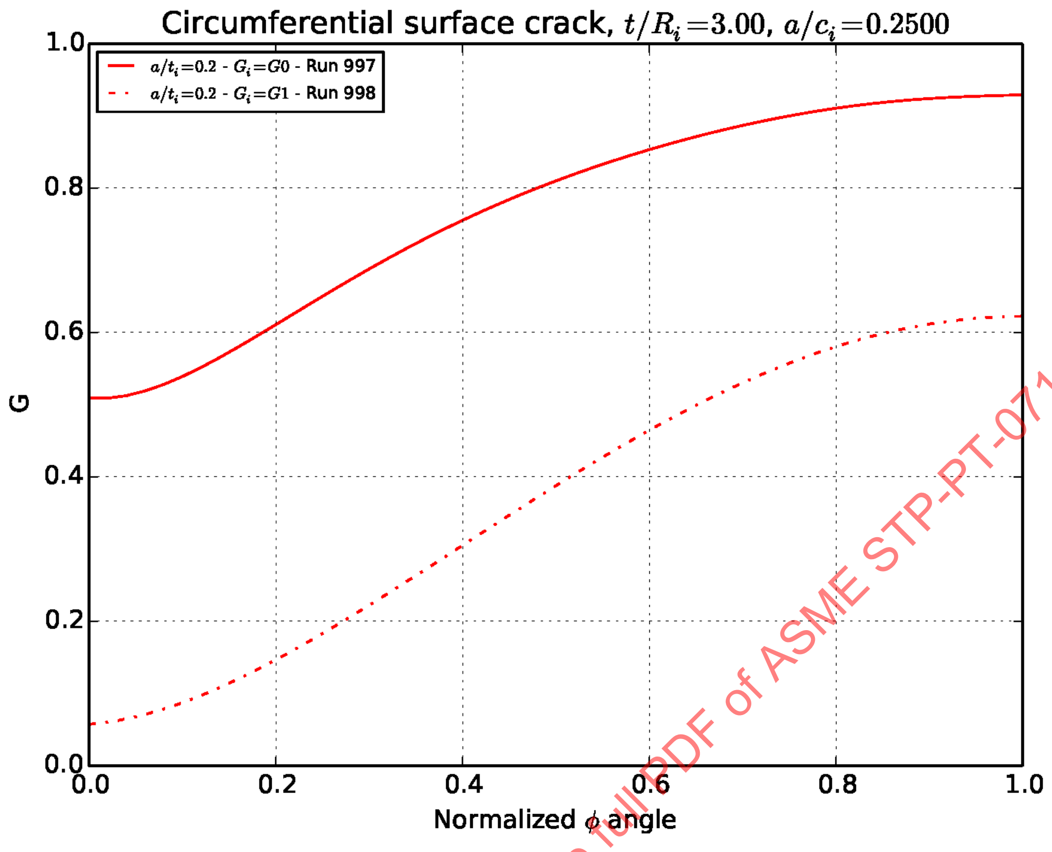
Circumferential surface crack, $t/R_i = 2.00$, $a/c_i = 2.0000$
G
Normalized $\phi$ angle
$a/t_i$=0.2 - $G_i$=G0 - Run 821
$a/t_i$=0.2 - $G_i$=G1 - Run 822
$a/t_i$=0.4 - $G_i$=G0 - Run 825
$a/t_i$=0.4 - $G_i$=G1 - Run 826
$a/t_i$=0.6 - $G_i$=G0 - Run 829
$a/t_i$=0.6 - $G_i$=G1 - Run 830
$a/t_i$=0.8 - $G_i$=G0 - Run 833
$a/t_i$=0.8 - $G_i$=G1 - Run 834


Circumferential surface crack, $t/R_i = 2.50$, $a/c_i = 0.2500$
$a/t_i = 0.2$ - $G_i = G0$ - Run 885
$a/t_i = 0.2$ - $G_i = G1$ - Run 886
G
Normalized $\phi$ angle
0.0
0.2
0.4
0.6
0.8
1.0

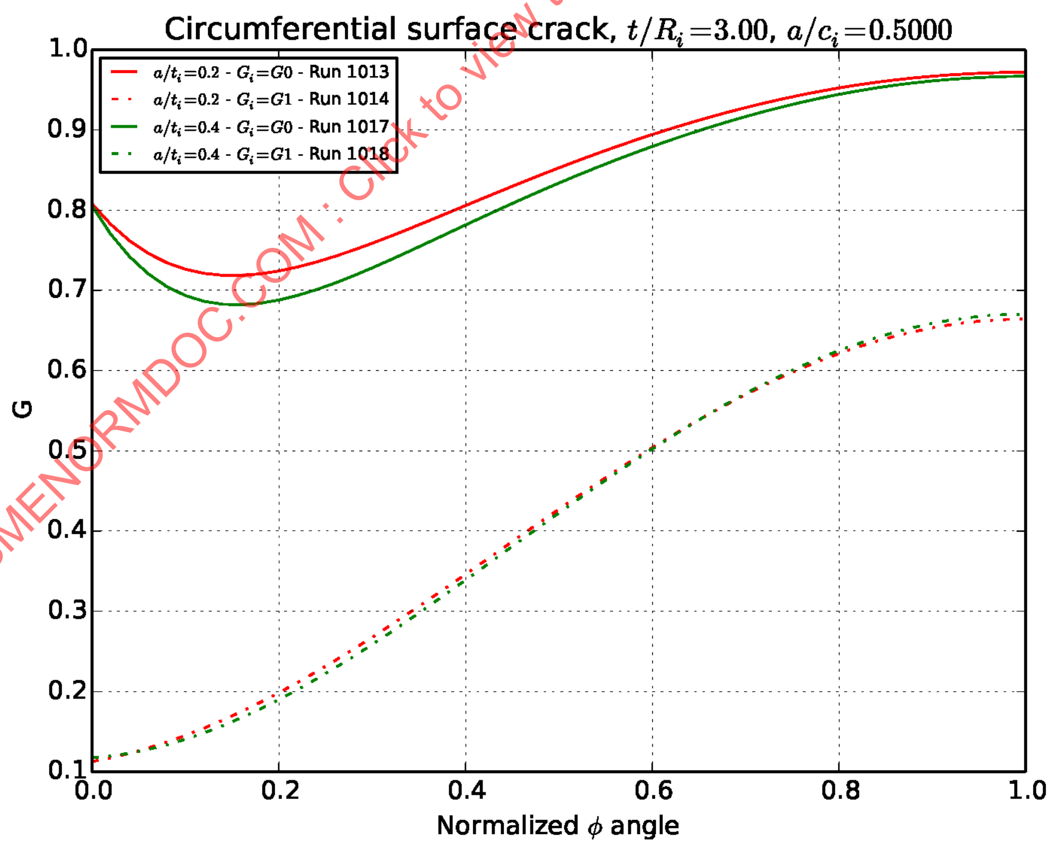

Circumferential surface crack, $t/R_i = 2.50$, $a/c_i = 0.5000$
$a/t_i = 0.2$ - $G_i = G0$ - Run 901
$a/t_i = 0.2$ - $G_i = G1$ - Run 902
$a/t_i = 0.4$ - $G_i = G0$ - Run 905
$a/t_i = 0.4$ - $G_i = G1$ - Run 906
$a/t_i = 0.6$ - $G_i = G0$ - Run 909
$a/t_i = 0.6$ - $G_i = G1$ - Run 910
G
Normalized $\phi$ angle
0.0
0.2
0.4
0.6
0.8
1.0
1.2


Circumferential surface crack, $t/R_i = 2.50$, $a/c_i = 1.0000$
G
Normalized $\phi$ angle
$a/t_i = 0.2$ - $G_i = G0$ - Run 917
$a/t_i = 0.2$ - $G_i = G1$ - Run 918
$a/t_i = 0.4$ - $G_i = G0$ - Run 921
$a/t_i = 0.4$ - $G_i = G1$ - Run 922
$a/t_i = 0.6$ - $G_i = G0$ - Run 925
$a/t_i = 0.6$ - $G_i = G1$ - Run 926
$a/t_i = 0.8$ - $G_i = G0$ - Run 929
$a/t_i = 0.8$ - $G_i = G1$ - Run 930

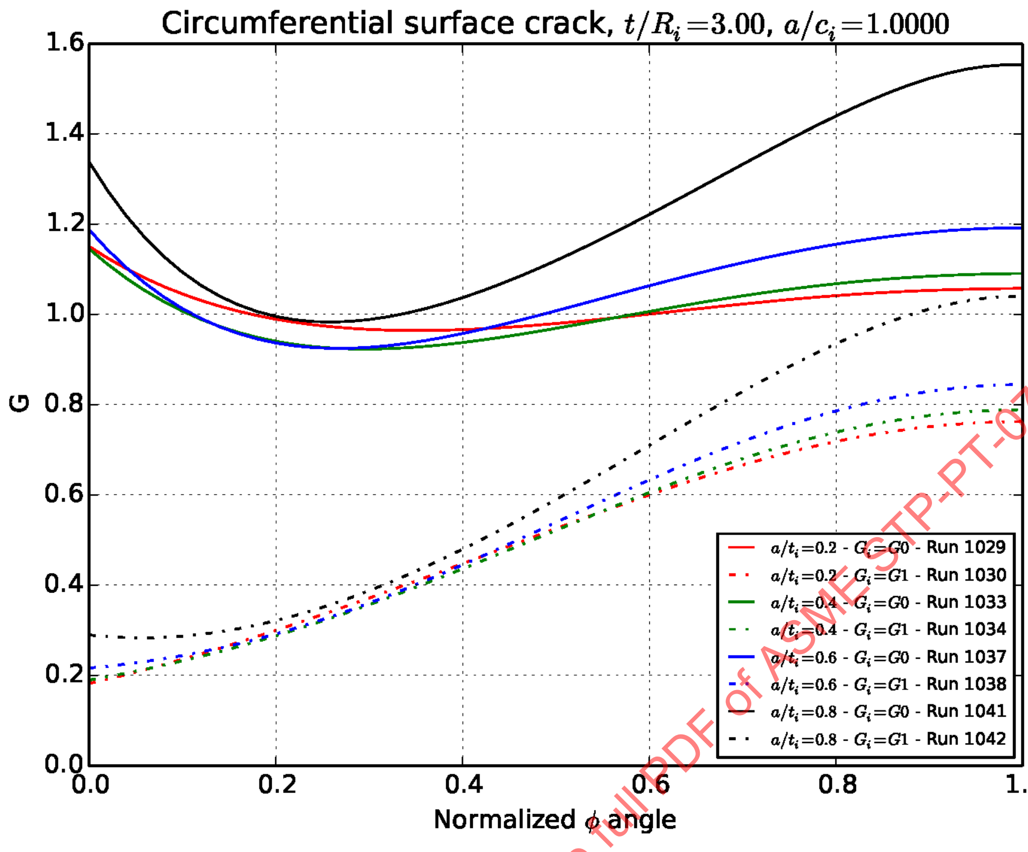

Circumferential surface crack, $t/R_i = 2.50$, $a/c_i = 2.0000$
G
Normalized $\phi$ angle
$a/t_i = 0.2$ - $G_i = G0$ - Run 933
$a/t_i = 0.2$ - $G_i = G1$ - Run 934
$a/t_i = 0.4$ - $G_i = G0$ - Run 937
$a/t_i = 0.4$ - $G_i = G1$ - Run 938
$a/t_i = 0.6$ - $G_i = G0$ - Run 941
$a/t_i = 0.6$ - $G_i = G1$ - Run 942
$a/t_i = 0.8$ - $G_i = G0$ - Run 945
$a/t_i = 0.8$ - $G_i = G1$ - Run 946

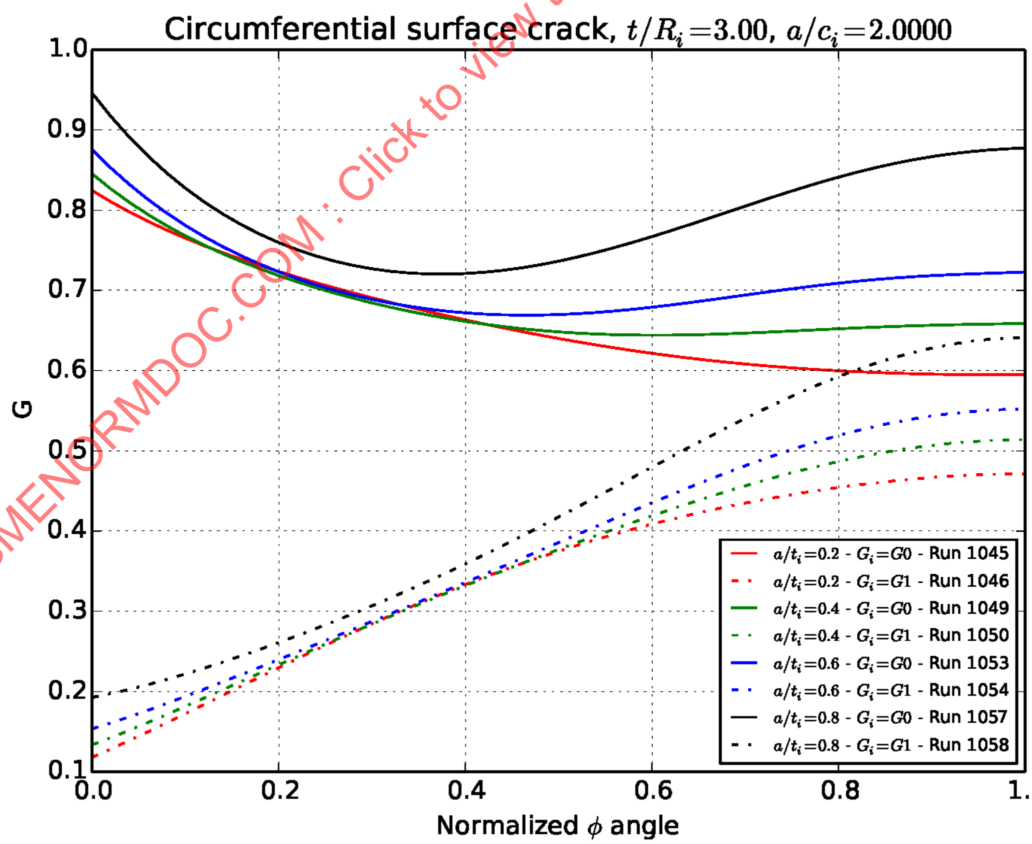


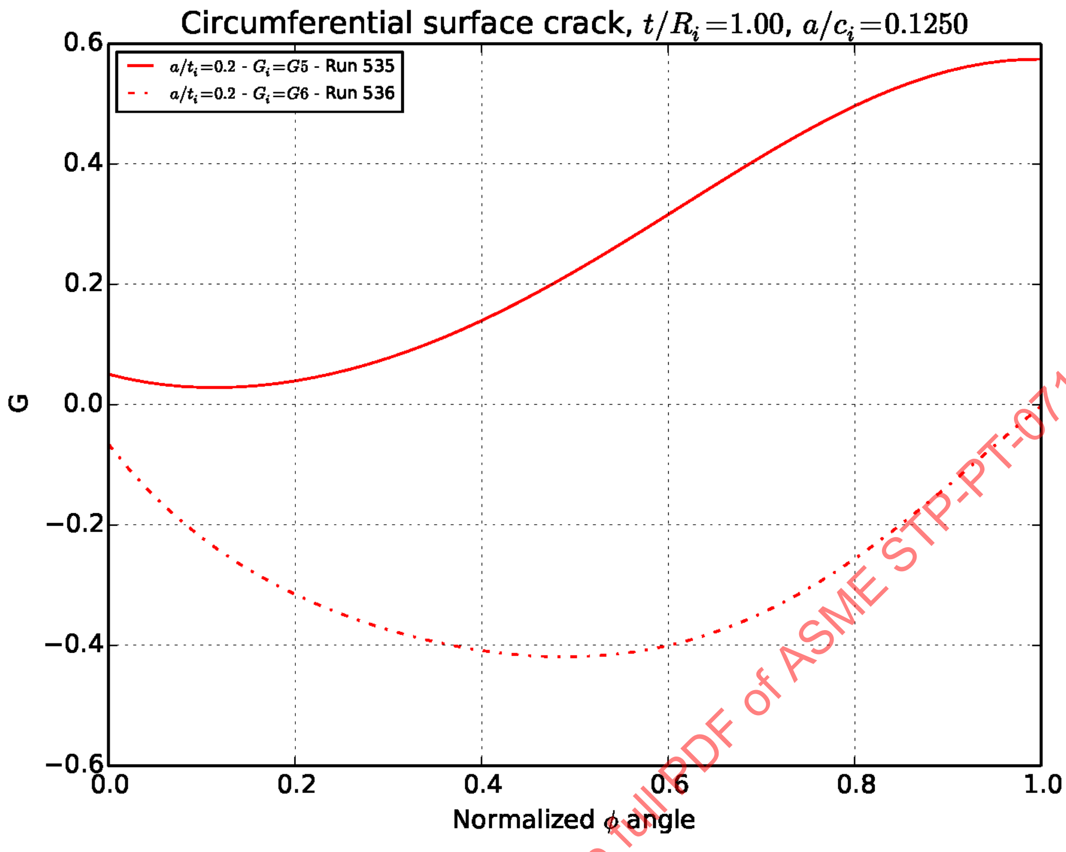
Circumferential surface crack, $t/R_i = 3.00$, $a/c_i = 0.2500$
$a/t_i = 0.2$ - $G_i = G0$ - Run 997
$a/t_i = 0.2$ - $G_i = G1$ - Run 998
G
Normalized $\phi$ angle

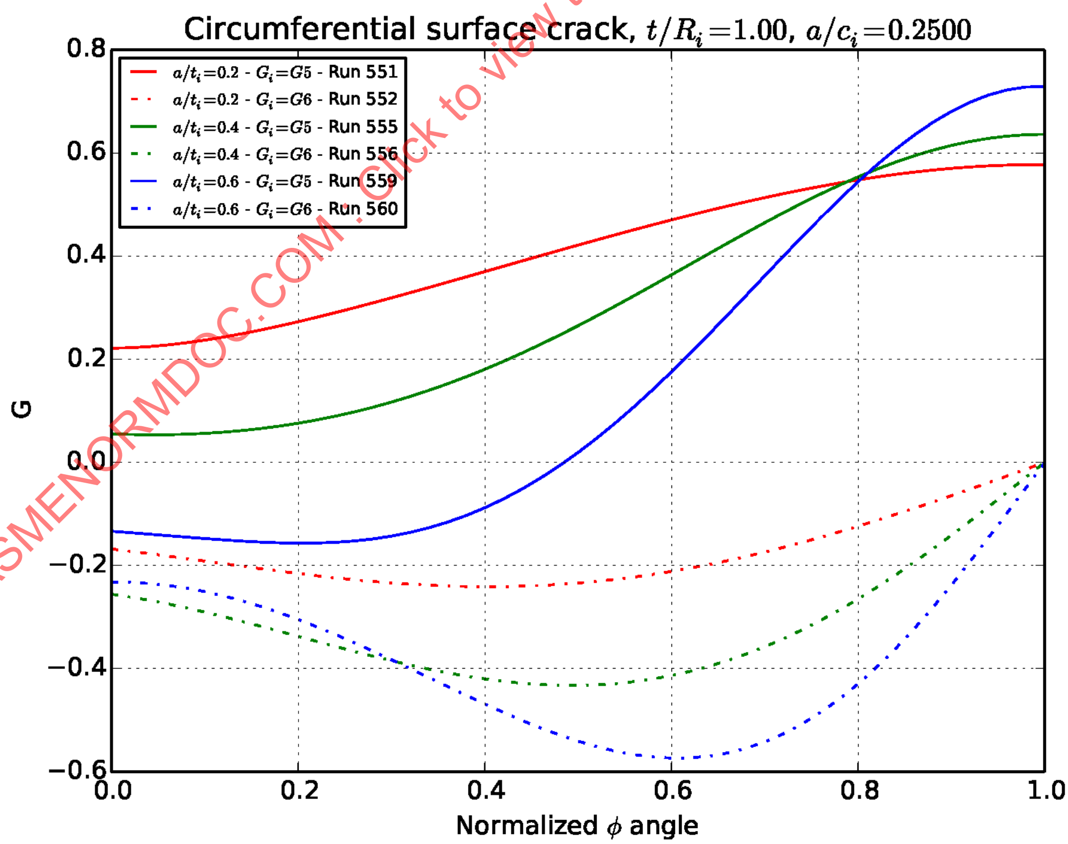



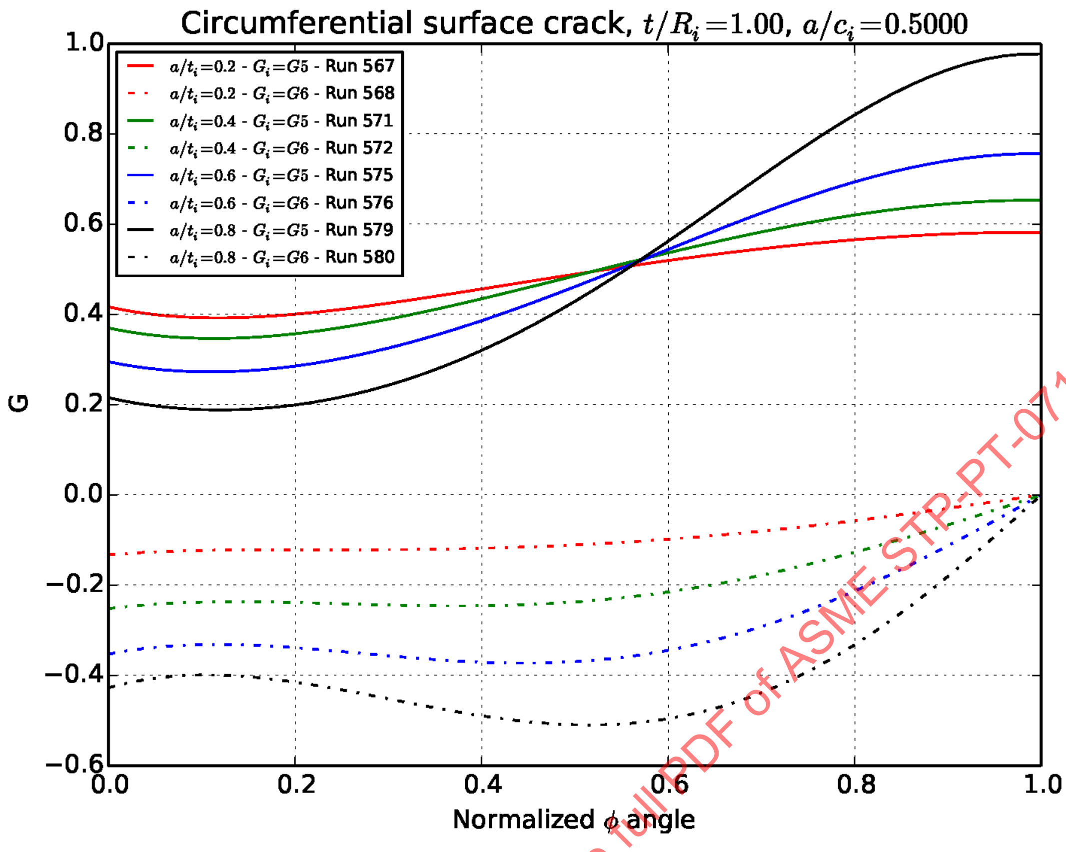
Circumferential surface crack, $t/R_i = 3.00$, $a/c_i = 0.5000$
$a/t_i = 0.2$ - $G_i = G0$ - Run 1013
$a/t_i = 0.2$ - $G_i = G1$ - Run 1014
$a/t_i = 0.4$ - $G_i = G0$ - Run 1017
$a/t_i = 0.4$ - $G_i = G1$ - Run 1018
G
Normalized $\phi$ angle

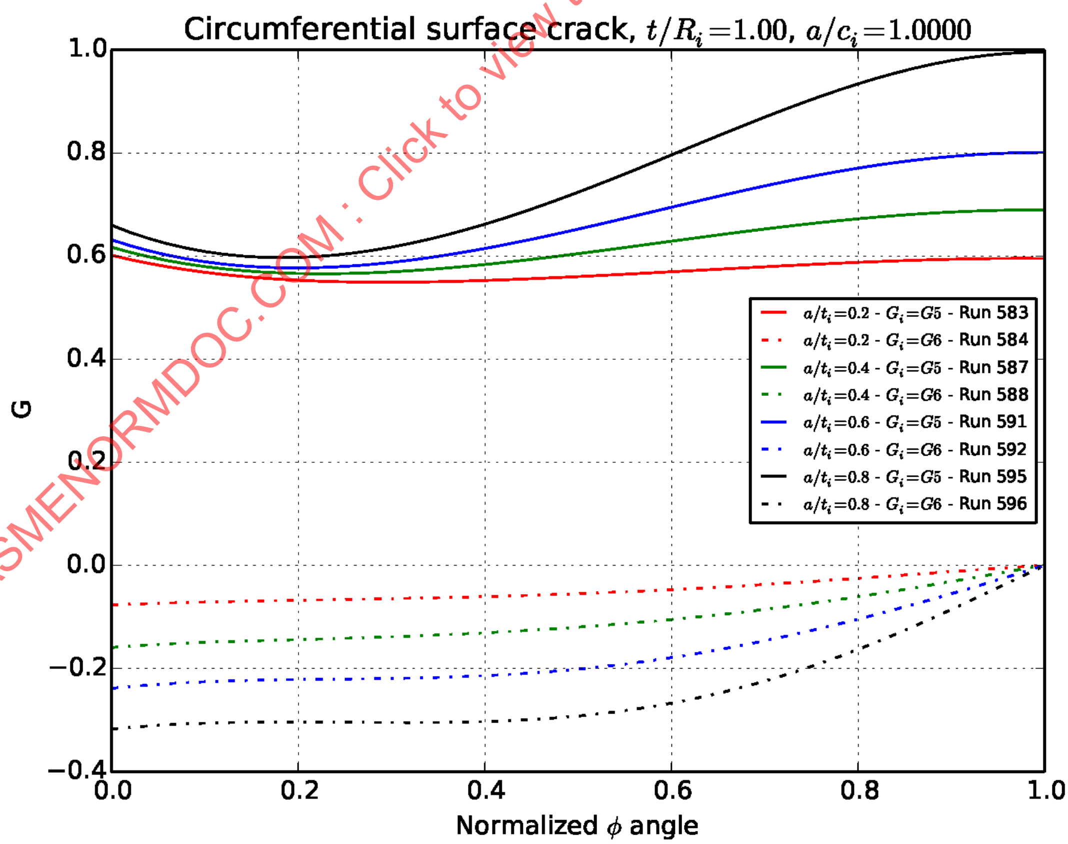

Circumferential surface crack, $t/R_i = 3.00$, $a/c_i = 1.0000$
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
G
0.0
0.2
0.4
0.6
0.8
1.0
Normalized $\phi$ angle
$a/t_i = 0.2$ - $G_i = G0$ - Run 1029
$a/t_i = 0.2$ - $G_i = G1$ - Run 1030
$a/t_i = 0.4$ - $G_i = G0$ - Run 1033
$a/t_i = 0.4$ - $G_i = G1$ - Run 1034
$a/t_i = 0.6$ - $G_i = G0$ - Run 1037
$a/t_i = 0.6$ - $G_i = G1$ - Run 1038
$a/t_i = 0.8$ - $G_i = G0$ - Run 1041
$a/t_i = 0.8$ - $G_i = G1$ - Run 1042

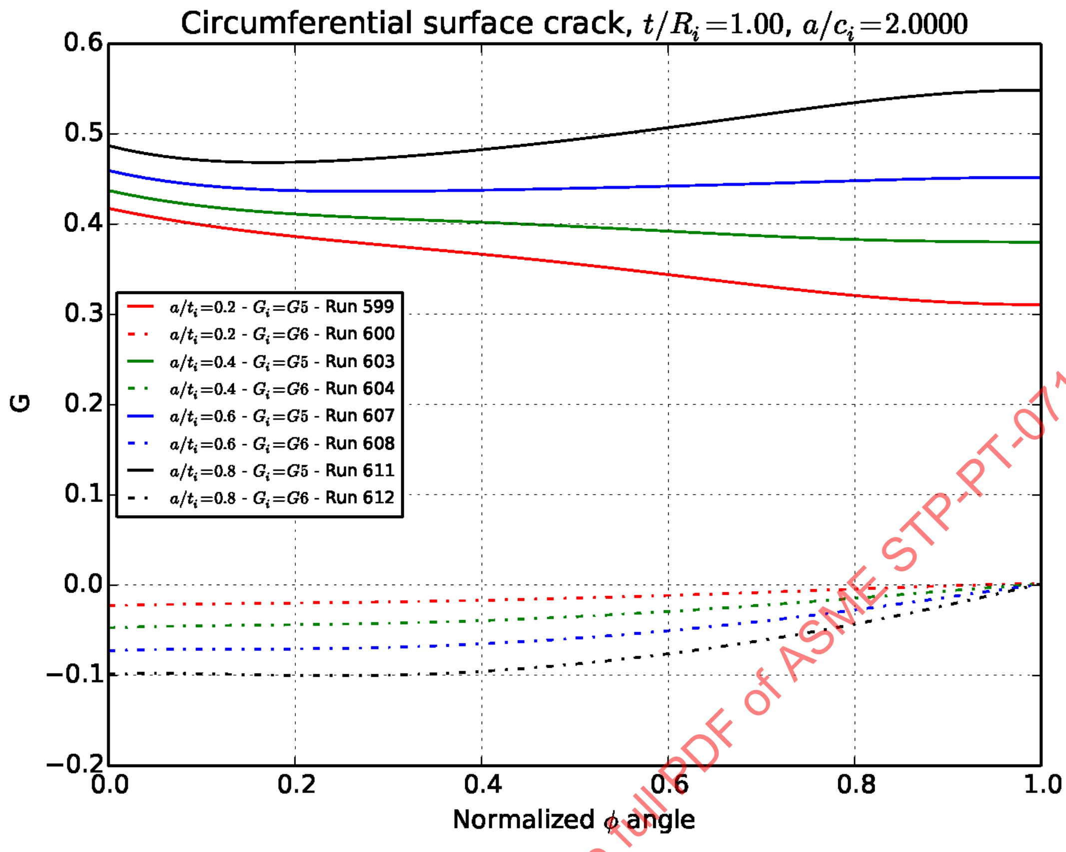

Circumferential surface crack, $t/R_i = 3.00$, $a/c_i = 2.0000$
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
G
0.0
0.2
0.4
0.6
0.8
1.0
Normalized $\phi$ angle
$a/t_i = 0.2$ - $G_i = G0$ - Run 1045
$a/t_i = 0.2$ - $G_i = G1$ - Run 1046
$a/t_i = 0.4$ - $G_i = G0$ - Run 1049
$a/t_i = 0.4$ - $G_i = G1$ - Run 1050
$a/t_i = 0.6$ - $G_i = G0$ - Run 1053
$a/t_i = 0.6$ - $G_i = G1$ - Run 1054
$a/t_i = 0.8$ - $G_i = G0$ - Run 1057
$a/t_i = 0.8$ - $G_i = G1$ - Run 1058

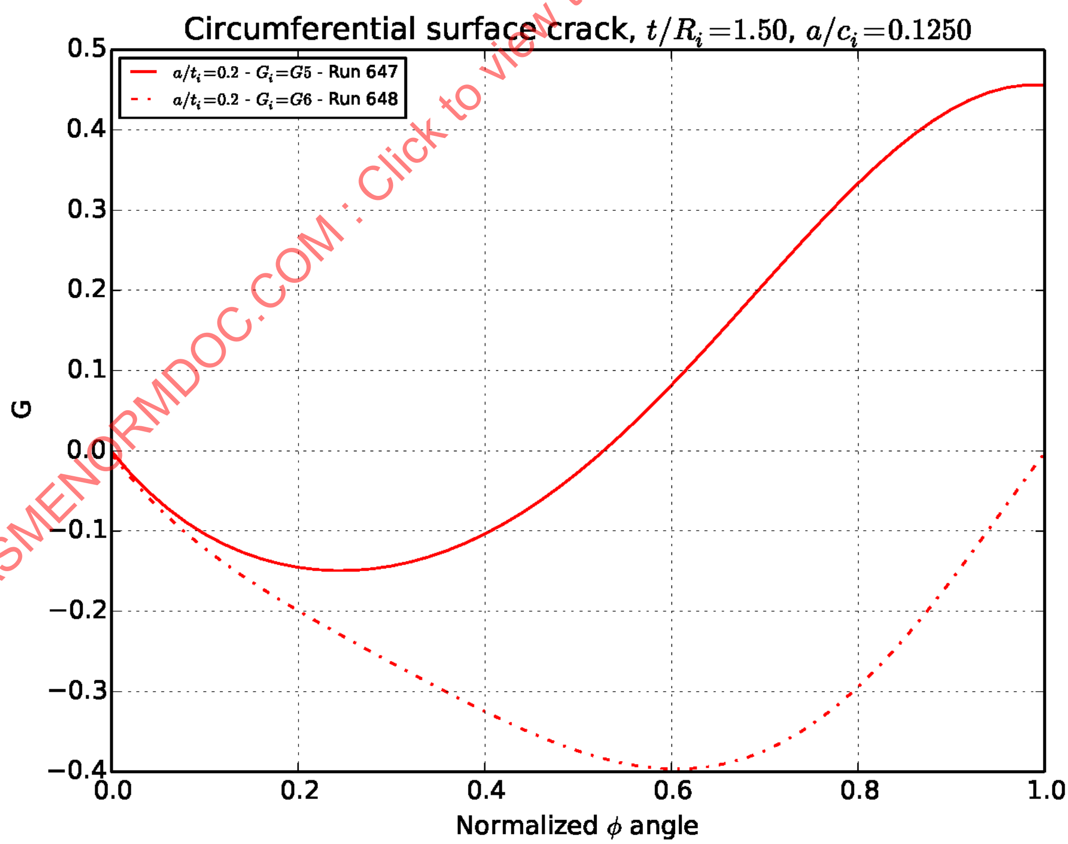

Circumferential surface crack, $t/R_i = 1.00$, $a/c_i = 0.1250$
$a/t_i$=0.2 - $G_i$=$G5$ - Run 535
$a/t_i$=0.2 - $G_i$=$G6$ - Run 536
G
Normalized $\phi$ angle
0.6
0.4
0.2
0.0
−0.2
−0.4
−0.6
0.0
0.2
0.4
0.6
0.8
1.0

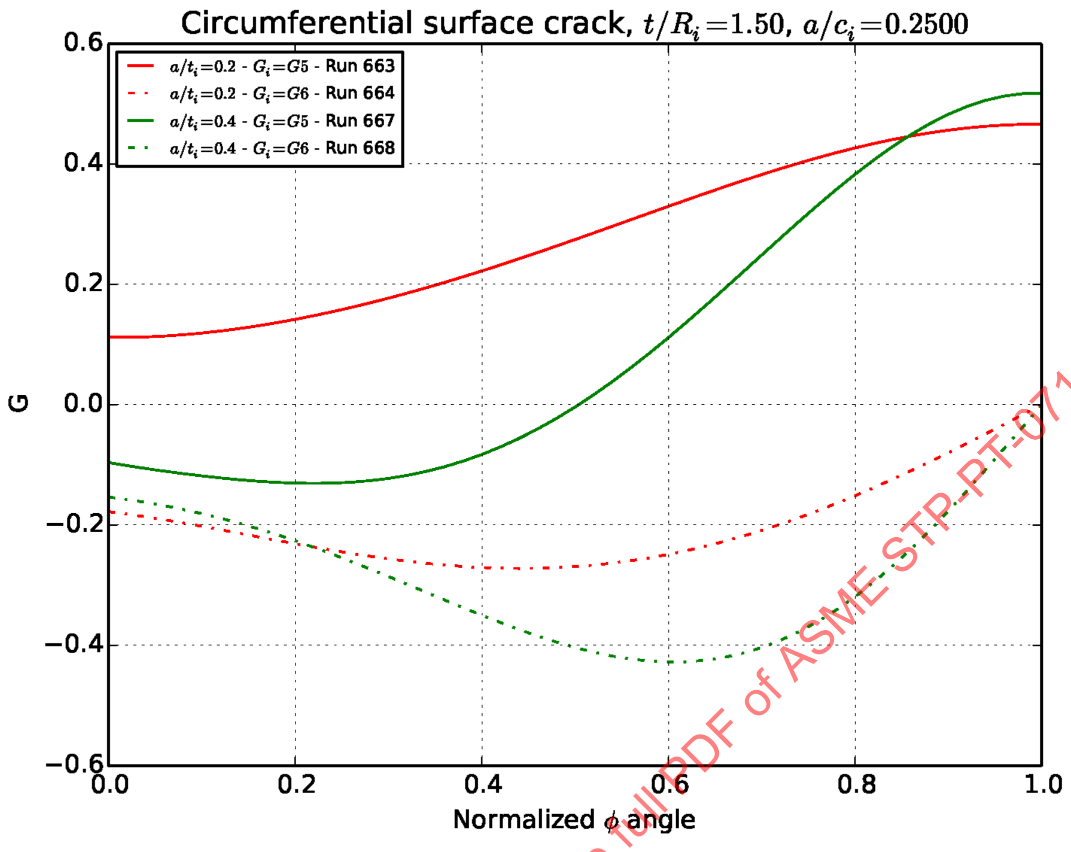

Circumferential surface crack, $t/R_i = 1.00$, $a/c_i = 0.2500$
$a/t_i$=0.2 - $G_i$=$G5$ - Run 551
$a/t_i$=0.2 - $G_i$=$G6$ - Run 552
$a/t_i$=0.4 - $G_i$=$G5$ - Run 555
$a/t_i$=0.4 - $G_i$=$G6$ - Run 556
$a/t_i$=0.6 - $G_i$=$G5$ - Run 559
$a/t_i$=0.6 - $G_i$=$G6$ - Run 560
G
Normalized $\phi$ angle
0.8
0.6
0.4
0.2
0.0
−0.2
−0.4
−0.6
0.0
0.2
0.4
0.6
0.8
1.0

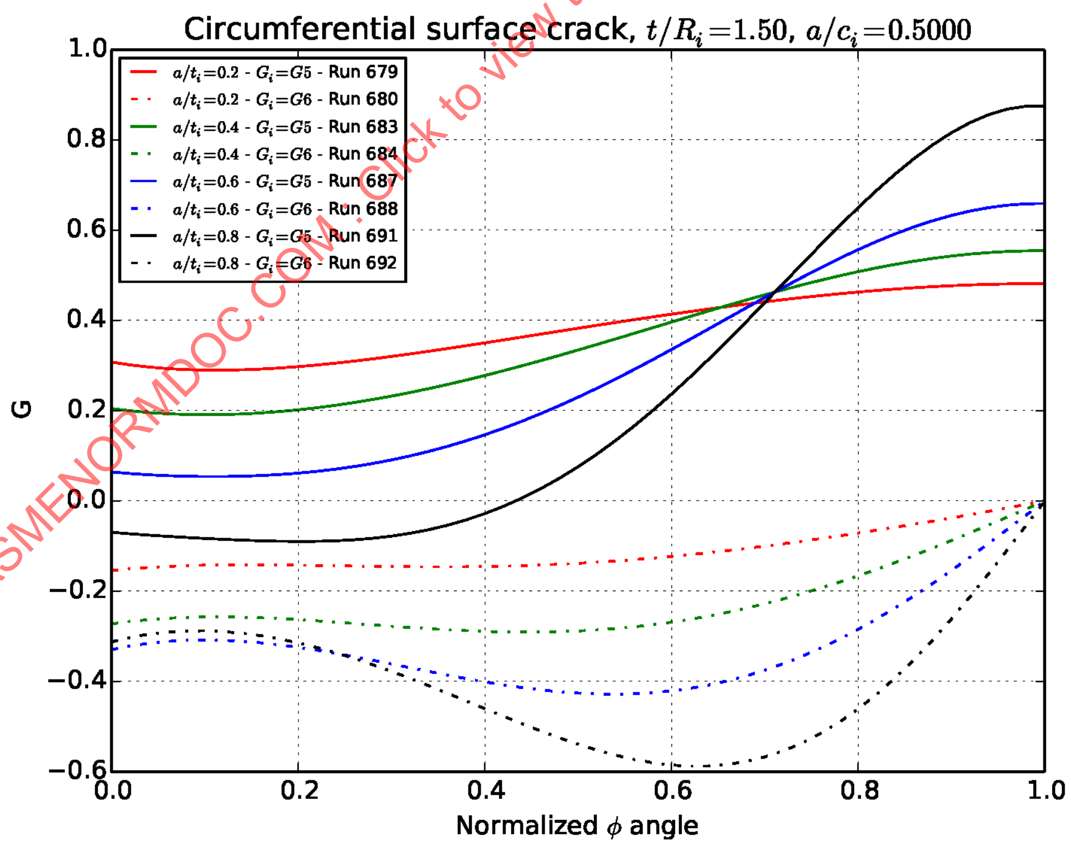

Circumferential surface crack, $t/R_i=1.00$, $a/c_i=0.5000$
$a/t_i=0.2$ - $G_i=G5$ - Run 567
$a/t_i=0.2$ - $G_i=G6$ - Run 568
$a/t_i=0.4$ - $G_i=G5$ - Run 571
$a/t_i=0.4$ - $G_i=G6$ - Run 572
$a/t_i=0.6$ - $G_i=G5$ - Run 575
$a/t_i=0.6$ - $G_i=G6$ - Run 576
$a/t_i=0.8$ - $G_i=G5$ - Run 579
$a/t_i=0.8$ - $G_i=G6$ - Run 580
G
Normalized $\phi$ angle

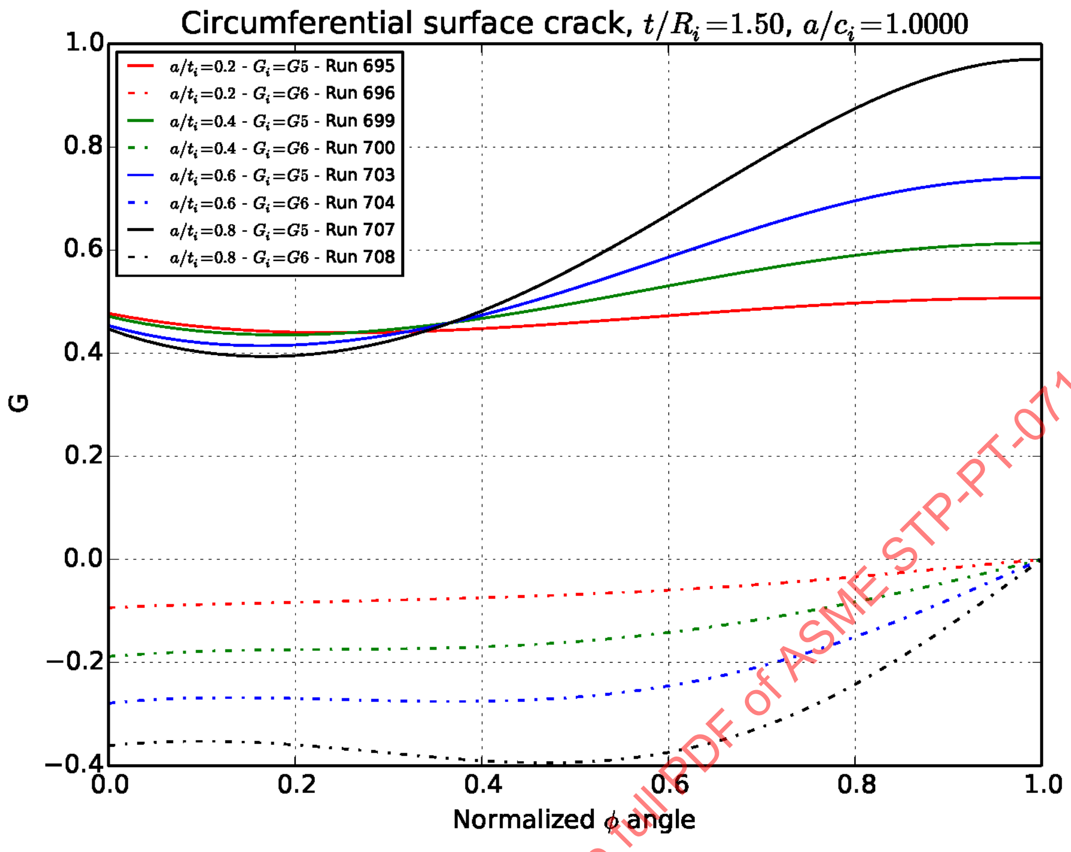

Circumferential surface crack, $t/R_i=1.00$, $a/c_i=1.0000$
$a/t_i=0.2$ - $G_i=G5$ - Run 583
$a/t_i=0.2$ - $G_i=G6$ - Run 584
$a/t_i=0.4$ - $G_i=G5$ - Run 587
$a/t_i=0.4$ - $G_i=G6$ - Run 588
$a/t_i=0.6$ - $G_i=G5$ - Run 591
$a/t_i=0.6$ - $G_i=G6$ - Run 592
$a/t_i=0.8$ - $G_i=G5$ - Run 595
$a/t_i=0.8$ - $G_i=G6$ - Run 596
G
Normalized $\phi$ angle

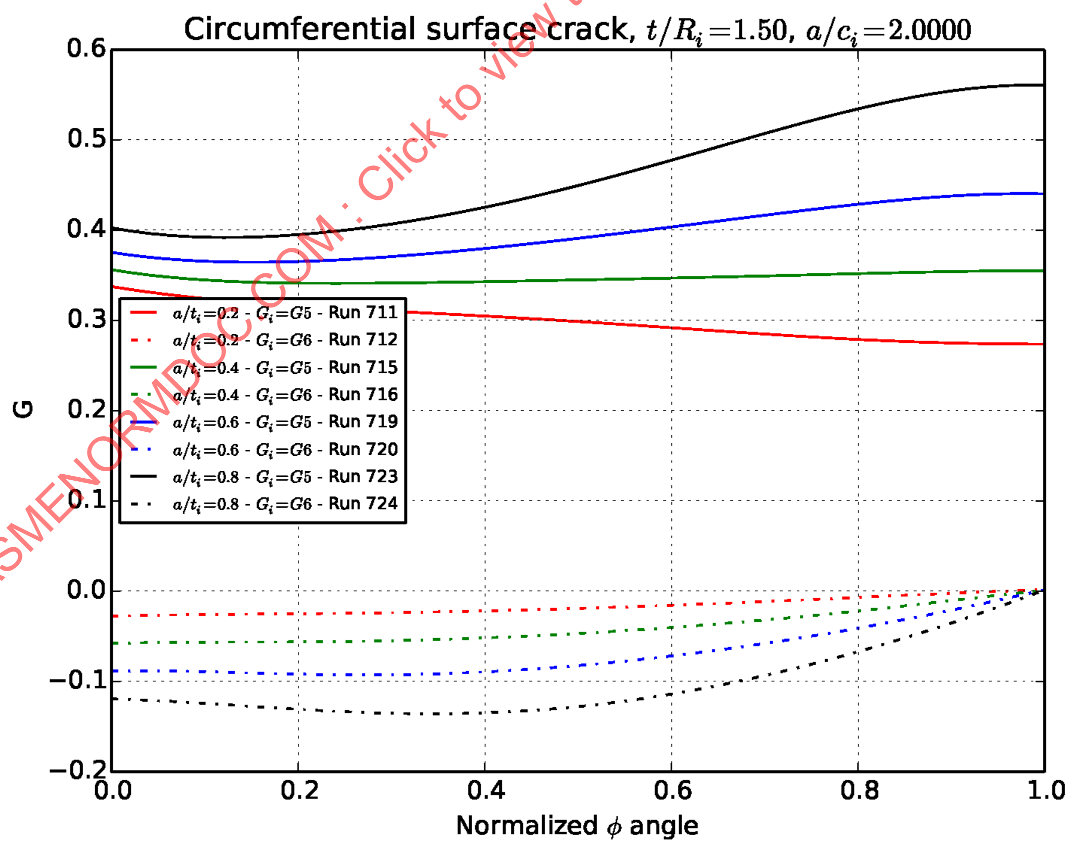

Circumferential surface crack, $t/R_i = 1.00$, $a/c_i = 2.0000$
G
Normalized $\phi$ angle
$a/t_i = 0.2$ - $G_i = G5$ - Run 599
$a/t_i = 0.2$ - $G_i = G6$ - Run 600
$a/t_i = 0.4$ - $G_i = G5$ - Run 603
$a/t_i = 0.4$ - $G_i = G6$ - Run 604
$a/t_i = 0.6$ - $G_i = G5$ - Run 607
$a/t_i = 0.6$ - $G_i = G6$ - Run 608
$a/t_i = 0.8$ - $G_i = G5$ - Run 611
$a/t_i = 0.8$ - $G_i = G6$ - Run 612

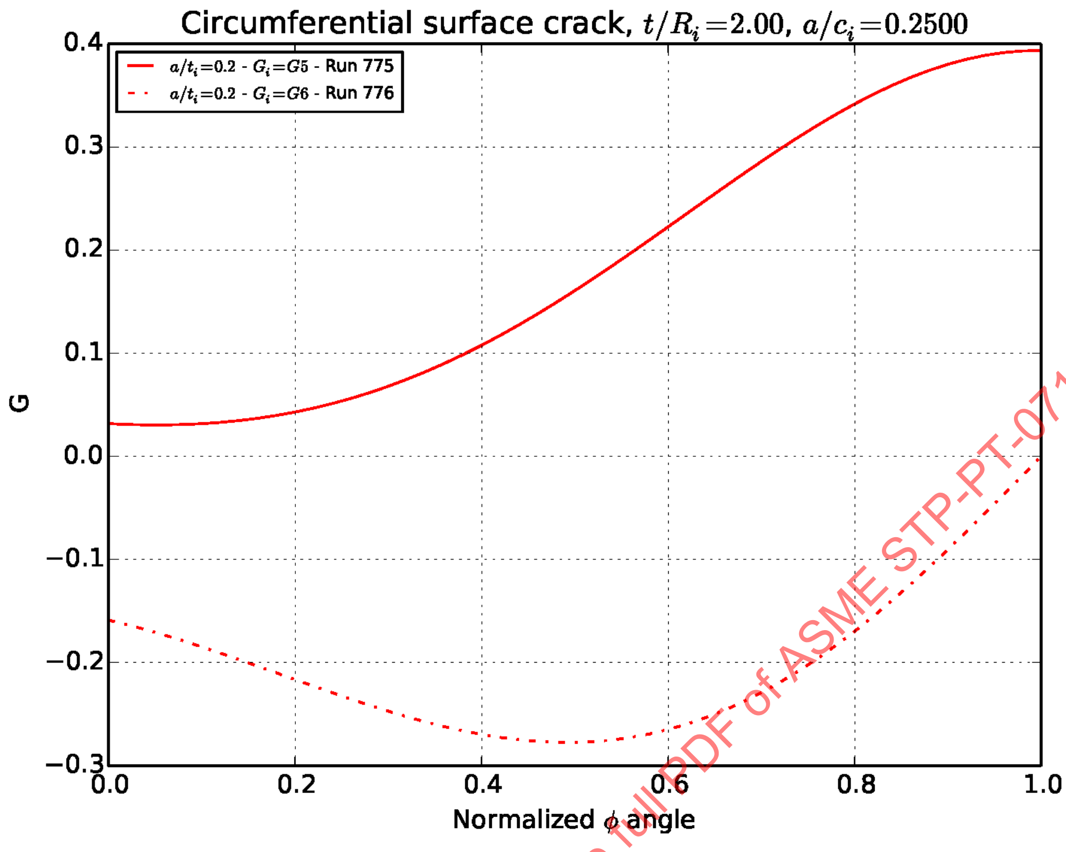

Circumferential surface crack, $t/R_i = 1.50$, $a/c_i = 0.1250$
G
Normalized $\phi$ angle
$a/t_i = 0.2$ - $G_i = G5$ - Run 647
$a/t_i = 0.2$ - $G_i = G6$ - Run 648

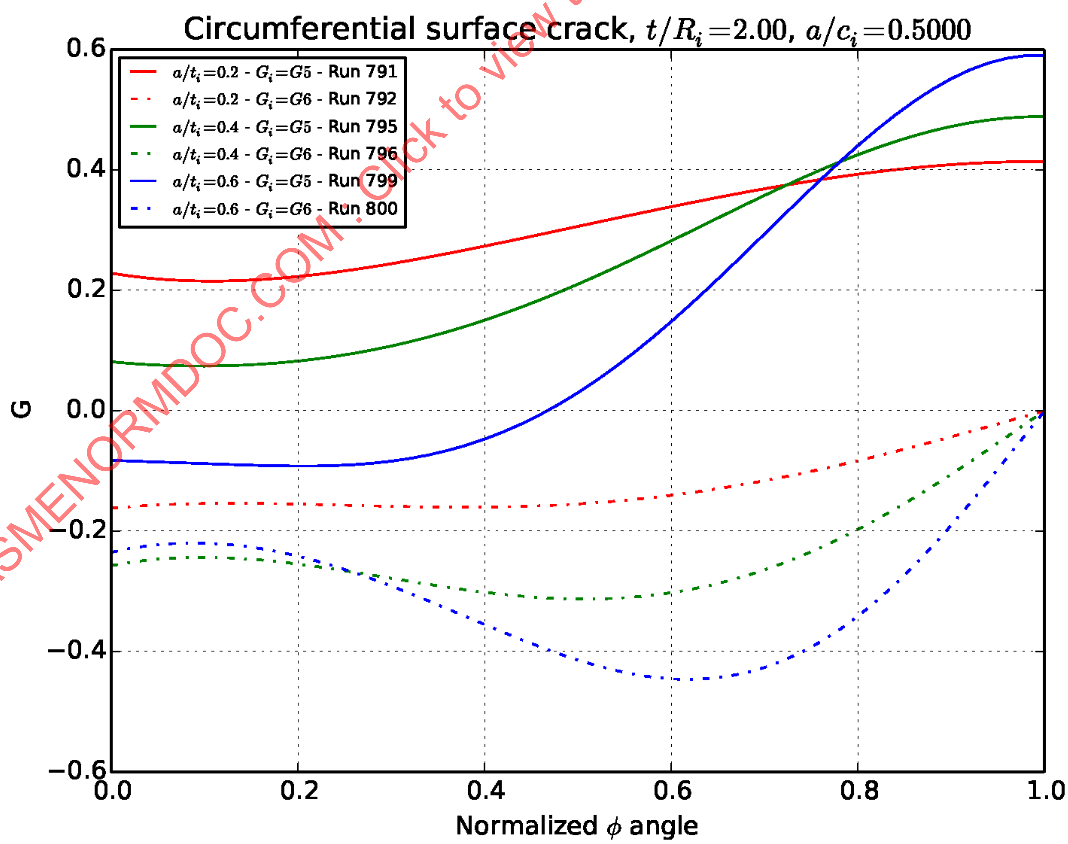

Circumferential surface crack, $t/R_i = 1.50$, $a/c_i = 0.2500$
$a/t_i = 0.2$ - $G_i = G5$ - Run 663
$a/t_i = 0.2$ - $G_i = G6$ - Run 664
$a/t_i = 0.4$ - $G_i = G5$ - Run 667
$a/t_i = 0.4$ - $G_i = G6$ - Run 668
G
Normalized $\phi$ angle

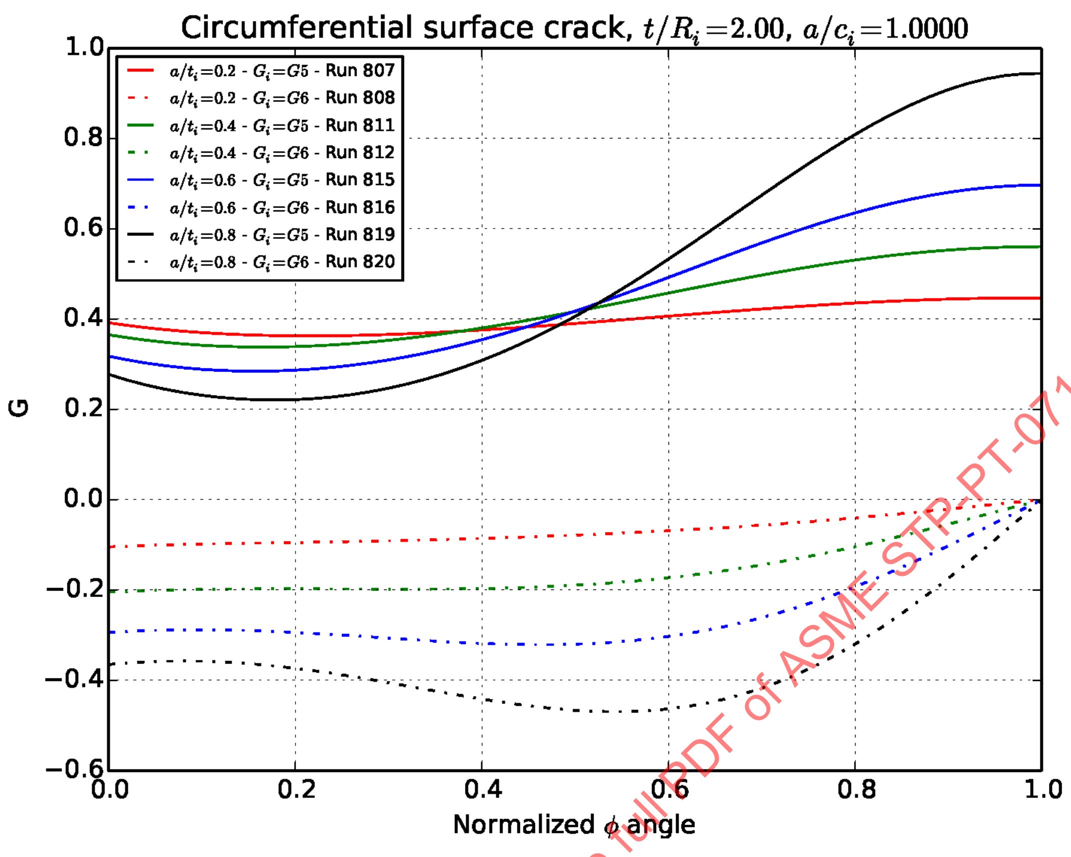

Circumferential surface crack, $t/R_i = 1.50$, $a/c_i = 0.5000$
$a/t_i = 0.2$ - $G_i = G5$ - Run 679
$a/t_i = 0.2$ - $G_i = G6$ - Run 680
$a/t_i = 0.4$ - $G_i = G5$ - Run 683
$a/t_i = 0.4$ - $G_i = G6$ - Run 684
$a/t_i = 0.6$ - $G_i = G5$ - Run 687
$a/t_i = 0.6$ - $G_i = G6$ - Run 688
$a/t_i = 0.8$ - $G_i = G5$ - Run 691
$a/t_i = 0.8$ - $G_i = G6$ - Run 692
G
Normalized $\phi$ angle

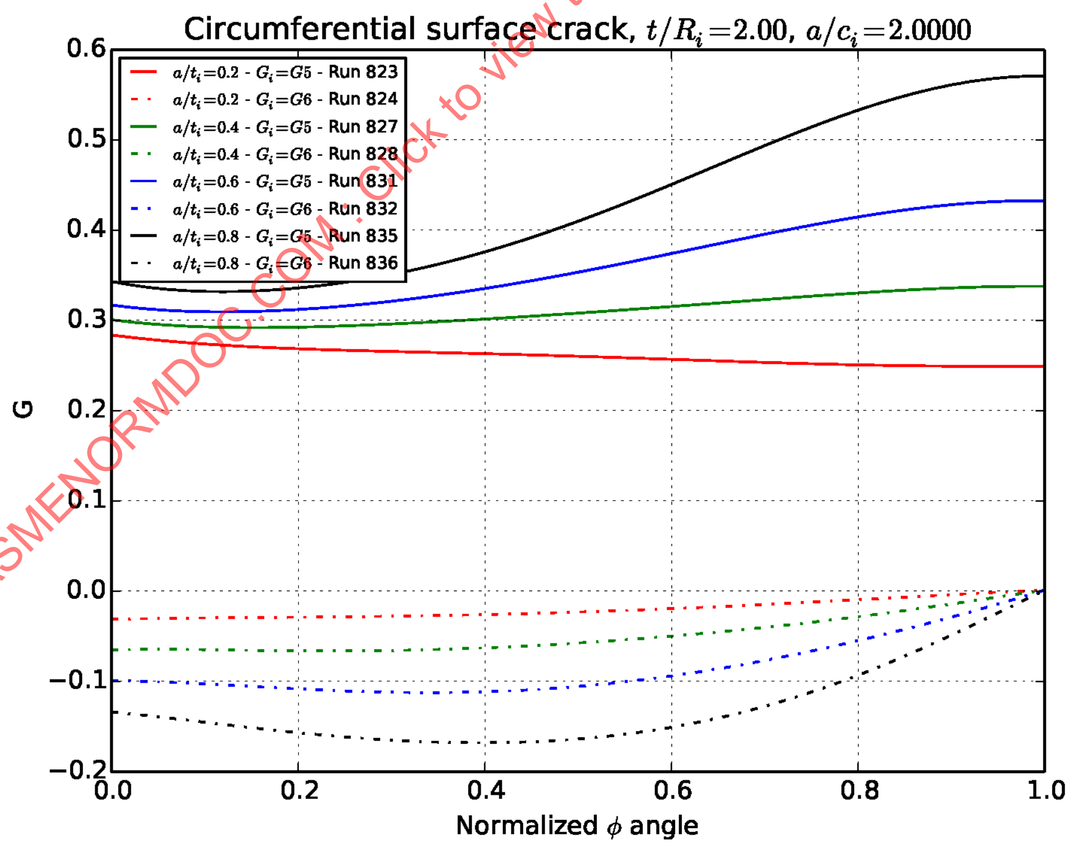

Circumferential surface crack, $t/R_i = 1.50$, $a/c_i = 1.0000$
$a/t_i = 0.2$ - $G_i = G5$ - Run 695
$a/t_i = 0.2$ - $G_i = G6$ - Run 696
$a/t_i = 0.4$ - $G_i = G5$ - Run 699
$a/t_i = 0.4$ - $G_i = G6$ - Run 700
$a/t_i = 0.6$ - $G_i = G5$ - Run 703
$a/t_i = 0.6$ - $G_i = G6$ - Run 704
$a/t_i = 0.8$ - $G_i = G5$ - Run 707
$a/t_i = 0.8$ - $G_i = G6$ - Run 708
G
Normalized $\phi$ angle

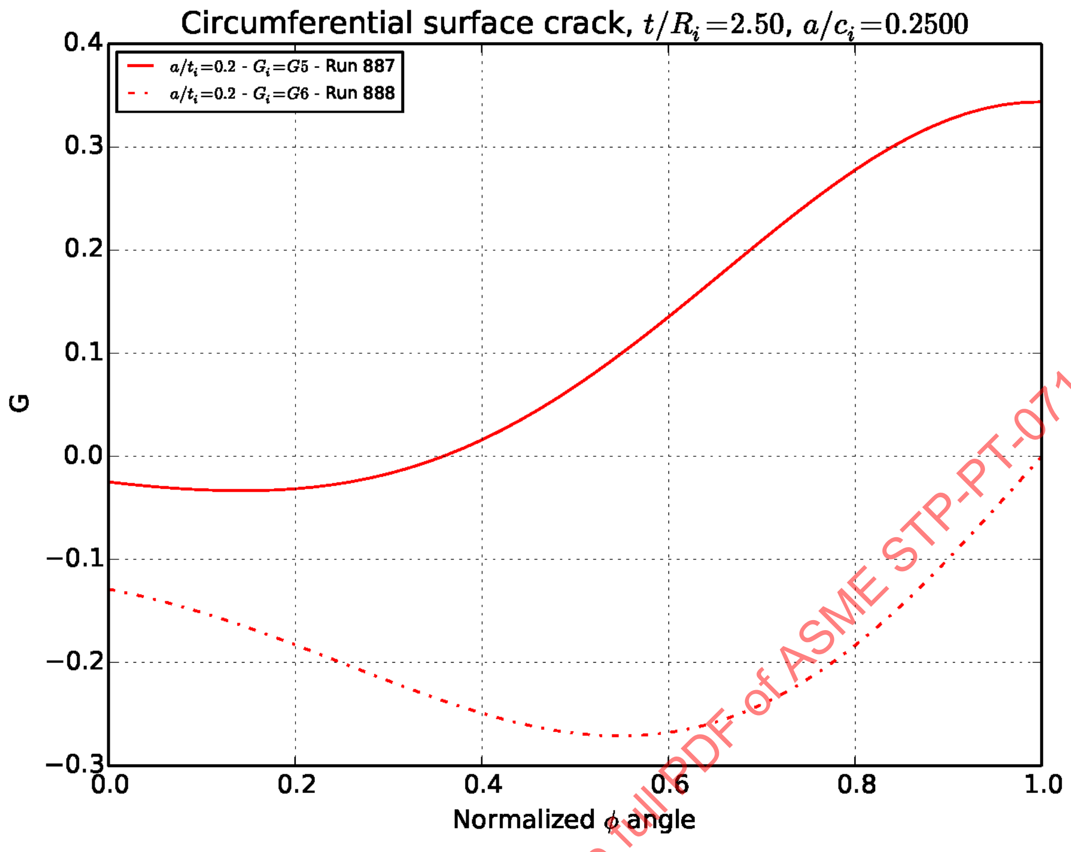

Circumferential surface crack, $t/R_i = 1.50$, $a/c_i = 2.0000$
$a/t_i = 0.2$ - $G_i = G5$ - Run 711
$a/t_i = 0.2$ - $G_i = G6$ - Run 712
$a/t_i = 0.4$ - $G_i = G5$ - Run 715
$a/t_i = 0.4$ - $G_i = G6$ - Run 716
$a/t_i = 0.6$ - $G_i = G5$ - Run 719
$a/t_i = 0.6$ - $G_i = G6$ - Run 720
$a/t_i = 0.8$ - $G_i = G5$ - Run 723
$a/t_i = 0.8$ - $G_i = G6$ - Run 724
G
Normalized $\phi$ angle

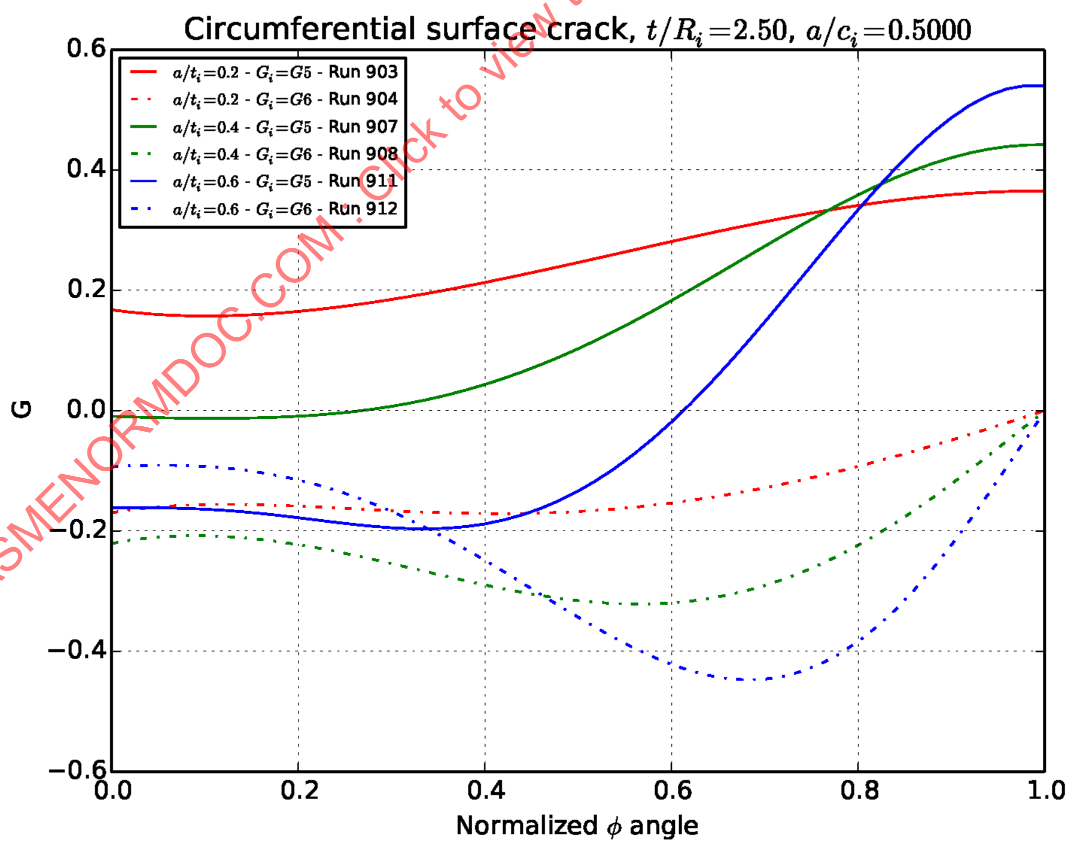

Circumferential surface crack, $t/R_i = 2.00$, $a/c_i = 0.2500$
$a/t_i$=0.2 - $G_i$=$G5$ - Run 775
$a/t_i$=0.2 - $G_i$=$G6$ - Run 776
G
Normalized $\phi$ angle

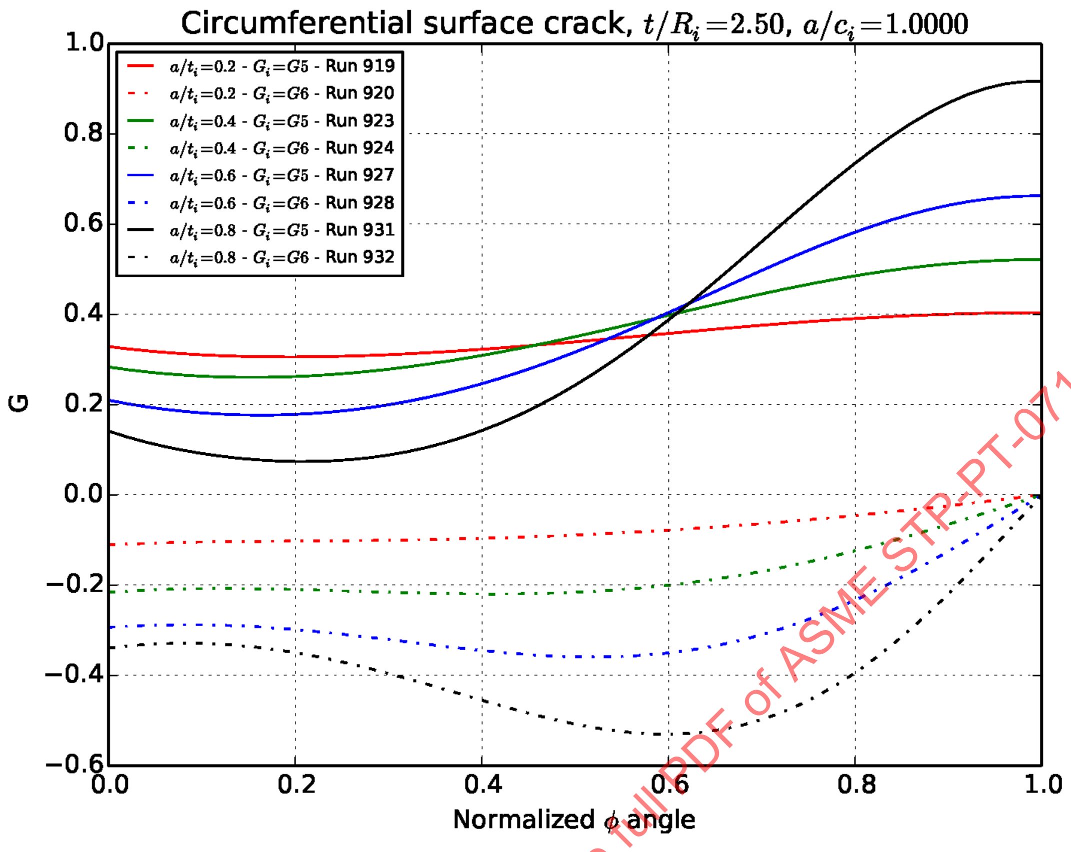

Circumferential surface crack, $t/R_i = 2.00$, $a/c_i = 0.5000$
$a/t_i$=0.2 - $G_i$=$G5$ - Run 791
$a/t_i$=0.2 - $G_i$=$G6$ - Run 792
$a/t_i$=0.4 - $G_i$=$G5$ - Run 795
$a/t_i$=0.4 - $G_i$=$G6$ - Run 796
$a/t_i$=0.6 - $G_i$=$G5$ - Run 799
$a/t_i$=0.6 - $G_i$=$G6$ - Run 800
G
Normalized $\phi$ angle

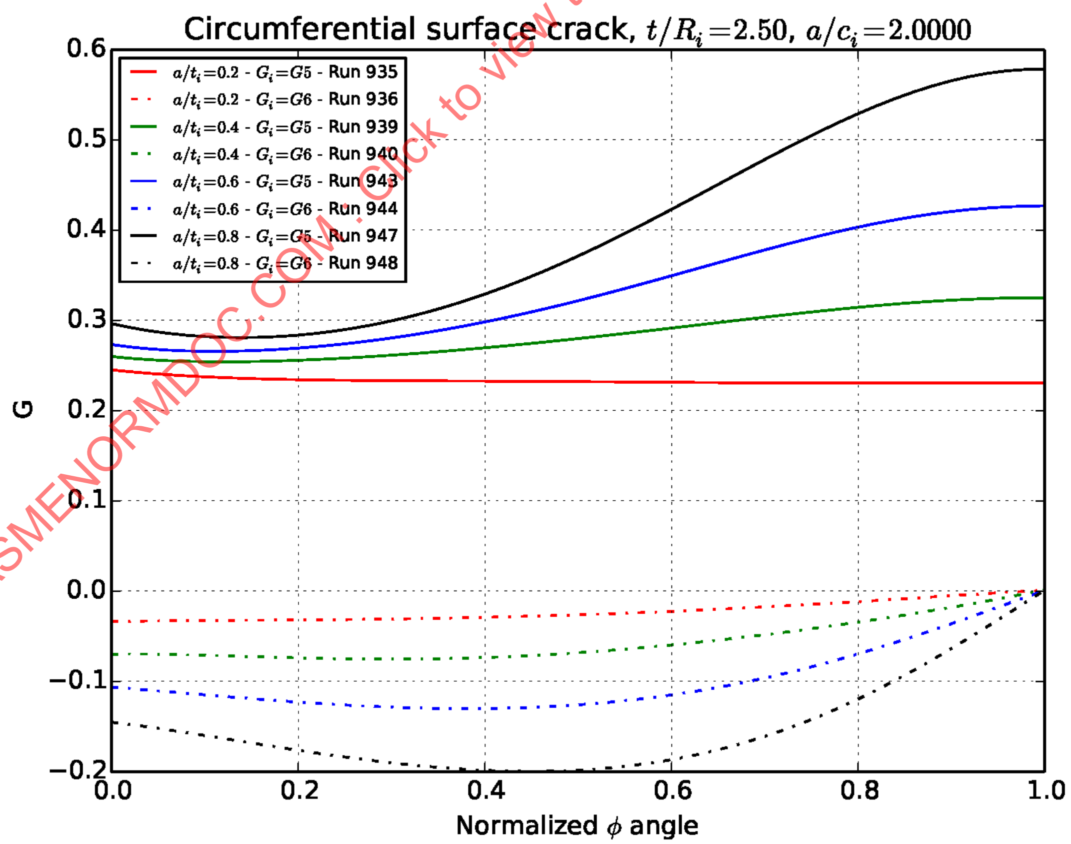

Circumferential surface crack, $t/R_i = 2.00$, $a/c_i = 1.0000$
$a/t_i$=0.2 - $G_i$=$G5$ - Run 807
$a/t_i$=0.2 - $G_i$=$G6$ - Run 808
$a/t_i$=0.4 - $G_i$=$G5$ - Run 811
$a/t_i$=0.4 - $G_i$=$G6$ - Run 812
$a/t_i$=0.6 - $G_i$=$G5$ - Run 815
$a/t_i$=0.6 - $G_i$=$G6$ - Run 816
$a/t_i$=0.8 - $G_i$=$G5$ - Run 819
$a/t_i$=0.8 - $G_i$=$G6$ - Run 820
G
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
−0.4
−0.6
0.0
0.2
0.4
0.6
0.8
1.0
Normalized $\phi$ angle

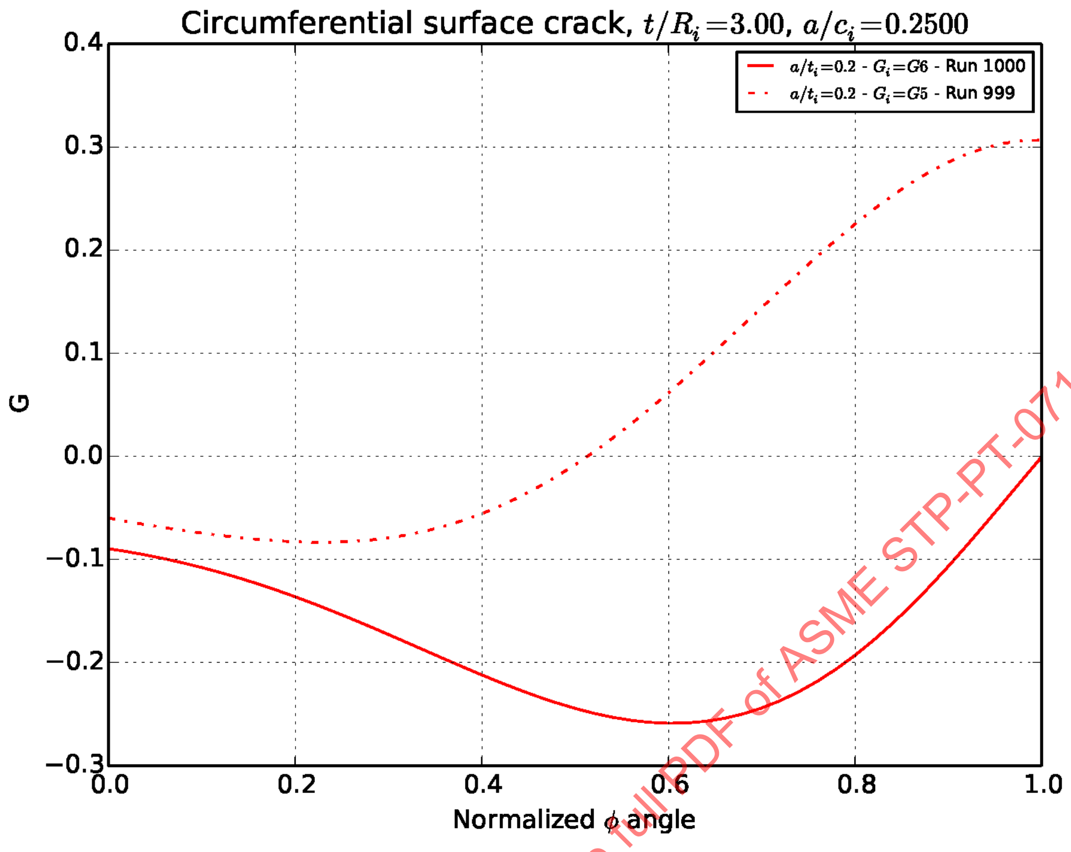

Circumferential surface crack, $t/R_i = 2.00$, $a/c_i = 2.0000$
$a/t_i$=0.2 - $G_i$=$G5$ - Run 823
$a/t_i$=0.2 - $G_i$=$G6$ - Run 824
$a/t_i$=0.4 - $G_i$=$G5$ - Run 827
$a/t_i$=0.4 - $G_i$=$G6$ - Run 828
$a/t_i$=0.6 - $G_i$=$G5$ - Run 831
$a/t_i$=0.6 - $G_i$=$G6$ - Run 832
$a/t_i$=0.8 - $G_i$=$G5$ - Run 835
$a/t_i$=0.8 - $G_i$=$G6$ - Run 836
G
0.6
0.5
0.4
0.3
0.2
0.1
0.0
−0.1
−0.2
0.0
0.2
0.4
0.6
0.8
1.0
Normalized $\phi$ angle

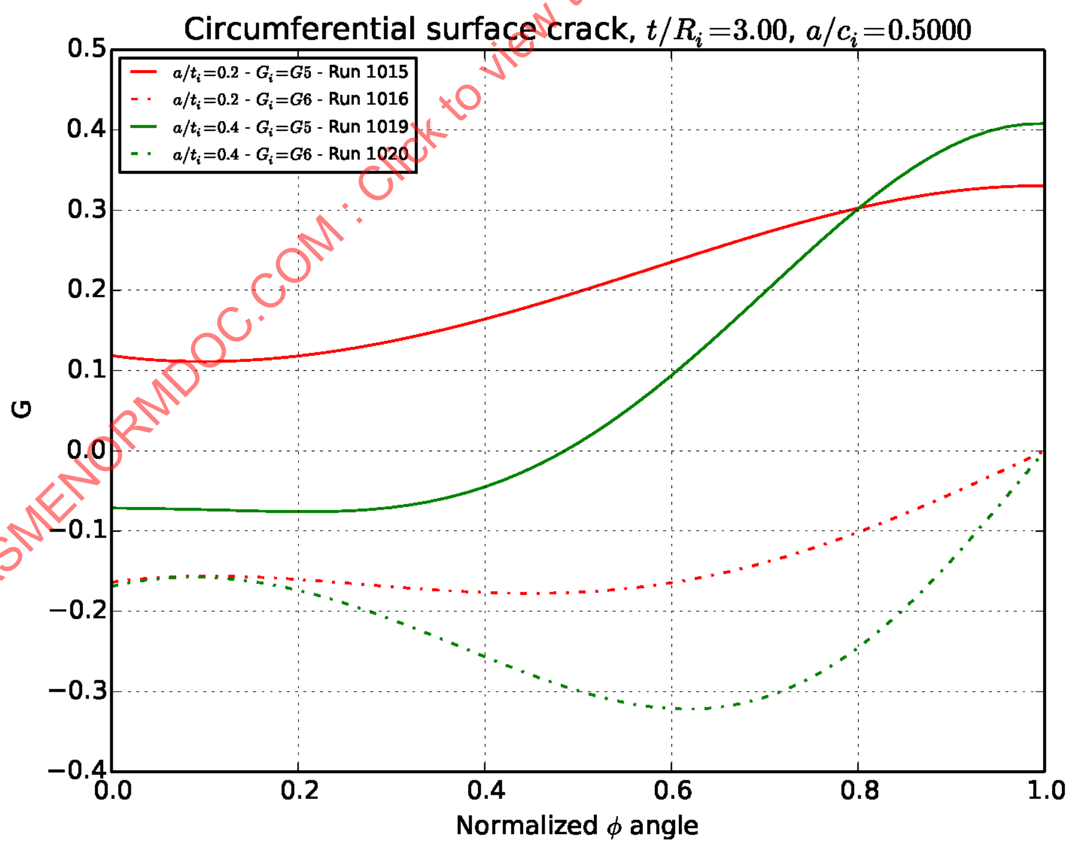

Circumferential surface crack, $t/R_i = 2.50$, $a/c_i = 0.2500$
$a/t_i = 0.2$ - $G_i = G5$ - Run 887
$a/t_i = 0.2$ - $G_i = G6$ - Run 888
G
Normalized $\phi$ angle
0.4
0.3
0.2
0.1
0.0
−0.1
−0.2
−0.3
0.0
0.2
0.4
0.6
0.8
1.0

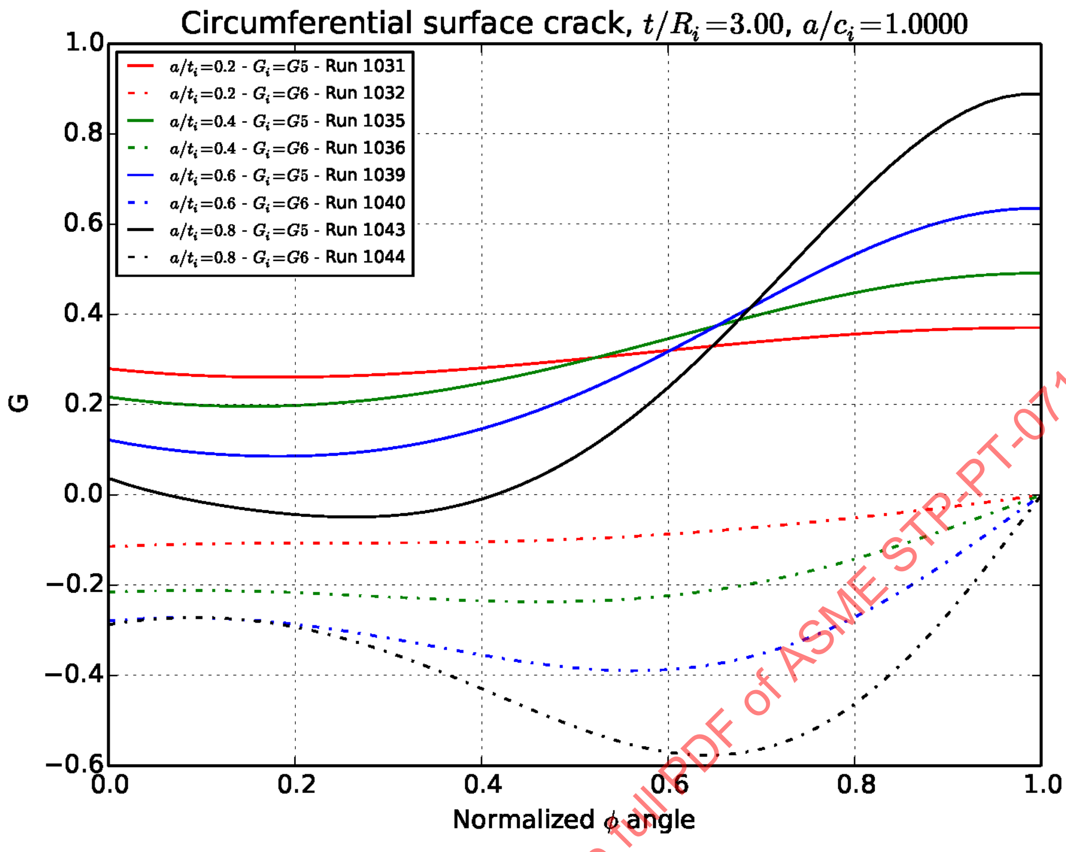

Circumferential surface crack, $t/R_i = 2.50$, $a/c_i = 0.5000$
$a/t_i = 0.2$ - $G_i = G5$ - Run 903
$a/t_i = 0.2$ - $G_i = G6$ - Run 904
$a/t_i = 0.4$ - $G_i = G5$ - Run 907
$a/t_i = 0.4$ - $G_i = G6$ - Run 908
$a/t_i = 0.6$ - $G_i = G5$ - Run 911
$a/t_i = 0.6$ - $G_i = G6$ - Run 912
G
Normalized $\phi$ angle
0.6
0.4
0.2
0.0
−0.2
−0.4
−0.6
0.0
0.2
0.4
0.6
0.8
1.0

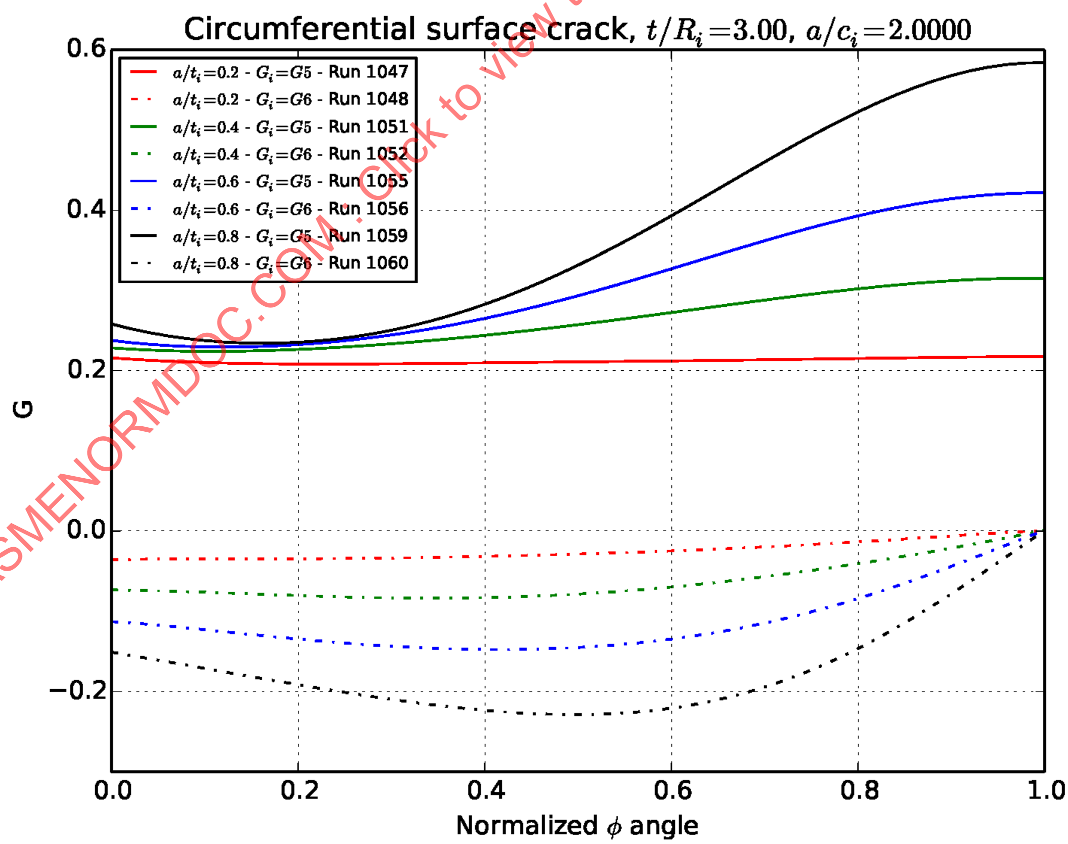

Circumferential surface crack, $t/R_i = 2.50$, $a/c_i = 1.0000$
$a/t_i$=0.2 - $G_i$=$G5$ - Run 919
$a/t_i$=0.2 - $G_i$=$G6$ - Run 920
$a/t_i$=0.4 - $G_i$=$G5$ - Run 923
$a/t_i$=0.4 - $G_i$=$G6$ - Run 924
$a/t_i$=0.6 - $G_i$=$G5$ - Run 927
$a/t_i$=0.6 - $G_i$=$G6$ - Run 928
$a/t_i$=0.8 - $G_i$=$G5$ - Run 931
$a/t_i$=0.8 - $G_i$=$G6$ - Run 932
G
Normalized $\phi$ angle


Circumferential surface crack, $t/R_i = 2.50$, $a/c_i = 2.0000$
$a/t_i$=0.2 - $G_i$=$G5$ - Run 935
$a/t_i$=0.2 - $G_i$=$G6$ - Run 936
$a/t_i$=0.4 - $G_i$=$G5$ - Run 939
$a/t_i$=0.4 - $G_i$=$G6$ - Run 940
$a/t_i$=0.6 - $G_i$=$G5$ - Run 943
$a/t_i$=0.6 - $G_i$=$G6$ - Run 944
$a/t_i$=0.8 - $G_i$=$G5$ - Run 947
$a/t_i$=0.8 - $G_i$=$G6$ - Run 948
G
Normalized $\phi$ angle


Circumferential surface crack, $t/R_i = 3.00$, $a/c_i = 0.2500$
$a/t_i = 0.2$ - $G_i = G6$ - Run 1000
$a/t_i = 0.2$ - $G_i = G5$ - Run 999
G
Normalized $\phi$ angle
0.4
0.3
0.2
0.1
0.0
−0.1
−0.2
−0.3
0.0
0.2
0.4
0.6
0.8
1.0


Circumferential surface crack, $t/R_i = 3.00$, $a/c_i = 0.5000$
$a/t_i = 0.2$ - $G_i = G5$ - Run 1015
$a/t_i = 0.2$ - $G_i = G6$ - Run 1016
$a/t_i = 0.4$ - $G_i = G5$ - Run 1019
$a/t_i = 0.4$ - $G_i = G6$ - Run 1020
G
Normalized $\phi$ angle
0.5
0.4
0.3
0.2
0.1
0.0
−0.1
−0.2
−0.3
−0.4
0.0
0.2
0.4
0.6
0.8
1.0


Circumferential surface crack, $t/R_i=3.00$, $a/c_i=1.0000$
$a/t_i=0.2$ - $G_i=G5$ - Run 1031
$a/t_i=0.2$ - $G_i=G6$ - Run 1032
$a/t_i=0.4$ - $G_i=G5$ - Run 1035
$a/t_i=0.4$ - $G_i=G6$ - Run 1036
$a/t_i=0.6$ - $G_i=G5$ - Run 1039
$a/t_i=0.6$ - $G_i=G6$ - Run 1040
$a/t_i=0.8$ - $G_i=G5$ - Run 1043
$a/t_i=0.8$ - $G_i=G6$ - Run 1044
G
Normalized $\phi$ angle


Circumferential surface crack, $t/R_i=3.00$, $a/c_i=2.0000$
$a/t_i=0.2$ - $G_i=G5$ - Run 1047
$a/t_i=0.2$ - $G_i=G6$ - Run 1048
$a/t_i=0.4$ - $G_i=G5$ - Run 1051
$a/t_i=0.4$ - $G_i=G6$ - Run 1052
$a/t_i=0.6$ - $G_i=G5$ - Run 1055
$a/t_i=0.6$ - $G_i=G6$ - Run 1056
$a/t_i=0.8$ - $G_i=G5$ - Run 1059
$a/t_i=0.8$ - $G_i=G6$ - Run 1060
G
Normalized $\phi$ angle