OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT

1. QA: QA

ANALYSIS/MODEL COVER SHEET

Page: 1 of 82

Complete Only Applicable Items

2. ☐ Analysis — Check all that apply

Type of Analysis:
- ☐ Engineering
- ☐ Performance Assessment
- ☐ Scientific

Intended Use of Analysis:
- ☐ Input to Calculation
- ☐ Input to another Analysis or Model
- ☐ Input to Technical Document
- ☐ Input to other Technical Products

Describe use:

3. ☒ Model — Check all that apply

Type of Model:
- ☐ Conceptual Model
- ☐ Abstraction Model
- ☐ Mathematical Model
- ☐ System Model
- ☒ Process Model

Intended Use of Model:
- ☐ Input to Calculation
- ☒ Input to another Model or Analysis
- ☒ Input to Technical Document
- ☒ Input to other Technical Products

Describe use:

Input to Performance Assessment and Waste Package PMR

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Stress Corrosion Cracking of the Drip Shield, the Waste Package Outer Barrier, and the Stainless Steel Structural Material

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OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT
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FIGURES

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ACRONYMS

AMR	Analyses and Models Report
BWR	Boiling Water Reactor
CRWMS	Civilian Radioactive Waste Management System
DCB	Double Cantilever Beam
DS	Drip Shield
EDA	Enhanced Design Alternative
LLNL	Lawrence Livermore National Laboratory
M&O	Management and Operating Contractor
NACE	National Association of Corrosion Engineers
NG-GTAW	Narrow Groove Gas Tungsten Arc Welding
PA	Performance Assessment
PMR	Process Model Report
PWR	Pressurized Water Reactor
QAP	Quality Administrative Procedures
QARD	Quality Assurance Requirements and Description
QP	Quality Procedure
SCC	Stress Corrosion Cracking
SCE	Saturated Calomel Electrode
SECP	Single Edge Cracked Plate
SIA	Structural Integrity Associates
SSRT	Slow Strain Rate Test
TSPA	Total System Performance Assessment
WP	Waste Package
WPD	Waste Package Degradation
YMP	Yucca Mountain Site Characterization Project

1. PURPOSE

One of the potential failure modes of the drip shield (DS), the waste package (WP) outer barrier, and the stainless structural material is the initiation and propagation of stress corrosion cracking (SCC) induced by the WP environment and various types of stresses that can develop in the DSs or the WPs. For the current design of the DS and WP, however, the DS will be excluded from the SCC evaluation because stresses that are relevant to SCC are insignificant in the DS. The major sources of stresses in the DS are loadings due to backfill and earthquakes. These stresses will not induce SCC because the stress caused by backfill is generally compressive stress and the stress caused by earthquakes is temporary in nature. The 316NG stainless steel inner barrier of the WP will also be excluded from the SCC evaluation because the SCC performance assessment will not take credit from the inner barrier. Therefore, the purpose of this document is to provide a detailed description of the process-level models that can be applied to assess the performance of the material (i.e., Alloy 22) used for the WP outer barrier subjected to the effects of SCC. As already mentioned in the development plan for the WP PMR (CRWMS M&O 1999e), this Analyses and Models Report (AMR) is to serve as a feed to the Waste Package Degradation (WPD) Total System Performance Assessment (TSPA) and Process Model Report (PMR).

2. QUALITY ASSURANCE

Quality Assurance (QA) program applies to this AMR. All types of WPs were classified (per QAP-2-3) as Quality Level-1. CRWMS M&O (1999a, p. 7) in Classification of the MGR Uncanistered Spent Nuclear Fuel Disposal Container System is cited as an example of a WP type. The development of this AMR is conducted under activity evaluation 11017040 Long Term Materials Testing and Modeling (CRWMS M&O 1999b), which was prepared per QAP-2-0. The results of that evaluation are such that the activity is subject to the *Quality Assurance Requirements and Description* (QARD) (DOE 2000) requirements.

3. COMPUTER SOFTWARE AND MODEL USAGE

3.1 COMPUTER SOFTWARE

No software or computer codes were used in developing this AMR. Excel bundled with Microsoft Office version 97 was used to generate graphical representation of the tabular data using built in functions.

3.2 MODELS

3.2.1 SCC Threshold Model

The concept of threshold stress intensity factor (K_{ISCC} or K_{th}) has been commonly used to assess the susceptibility of material to SCC. A description of this concept can be found in Jones and Ricker (1987, p. 145-163), and Sprowls (1987, p. 245-282). According to the threshold model, there exists a threshold value (K_{ISCC}) for the stress intensity factor such that no growth occurs in a pre-existing crack having a stress intensity factor less than the threshold value. Pre-existing cracks are usually caused by manufacturing processes (especially welding processes). The adaptation of the threshold model to Alloy 22 (the material to be used for the outer shell of the WP) requires the determination of (1) the threshold stress intensity factor for Alloy 22, which has been experimentally observed by Roy et al. (1998); and (2) the stress intensity factor for the given stress profile and pre-existing crack size in the WP.

3.2.2 SCC Slip Dissolution/Film Rupture Model

The theory of slip dissolution (or film rupture) has been successfully applied to assess the SCC crack propagation for light water reactors at high temperature. The description of the SCC model based on the theory of slip dissolution and film rupture can be found in, for example, Ford and Andresen (1988, pp. 798-800), and Andresen and Ford (1994, pp. 61-70). The adaptation of the slip dissolution model to assess the stress corrosion cracking capability of the WP outer barrier (Alloy 22) requires the determination of two parameters, "A" and "n", in an equation which relates the crack growth rate to the crack tip strain rate. A mathematical formula that relates "A" to "n" for stainless steels is adopted for Alloy 22 to determine "A" from "n". An upper bound value of 0.84 for "n" has been derived from SCC crack growth test results for Alloy 22 at 110°C and K_I = 30 MPa $(m)^{1/2}$ in a concentrated mixed salt environment for 1400 hours (DTN: LL000313105924.136). A lower bound value of 0.75 for "n" has been assumed. The validity of the bounding values for "n" will be verified from data generated during ongoing and planned test activities at LLNL and elsewhere.

4. INPUTS

4.1 PARAMETERS

4.1.1 Material Properties

The material properties are important to determination of the final weld residual stress. The material properties used in this evaluation for Alloy 22 are based on information provided in CRWMS M&O (1999c, Section 5.7, pp. 30-34).

For the thermal analysis, the following material properties are used:

Thermal Conductivity, k
Specific Heat, c
Density, ρ

For the stress analysis, the following material properties are used:

Coefficient of Thermal Expansion, α
Young's Modulus, E
Poisson Ratio, υ
Density, ρ
Yield Strength, Sy

4.1.2 Welding Parameters

In evaluating weld-induced stress, the effect of each weld pass was determined by simulating the heat being deposited by the welding process through an element heat generation (or input) rate that is applied over a prescribed time interval. The net heat input (H_{net} in Joules/in.) can be calculated according to Equation (2.3) of DTN: LL000312705924.132 for given welding parameters including voltage (E), amperage (I), travel velocity of the heat source (v in in./sec.) and heat transfer efficiency (f_1), i.e., $H_{net} = f_1 EI/ v$. The WP lids will be welded with the Narrow Groove Gas Tungsten Arc Welding (NG-GTAW) process utilizing hot wire feed (CRWMS M&O 1998, p. 11). For this type of welding process the amperage, voltage and average travel speed are, respectively, 330-335 A, 12.1-13.0 V and 8.0 in./min. (CRWMS M&O 1998, Table 7-1, p. 12). According to DTN: LL000312705924.132, the heat transfer efficiency for gas tungsten arc welding is 21-48%.

4.1.3 Threshold Stress Intensity Factor K_{ISCC}

Currently, the only existing source related to K_{ISCC} for Alloy 22 is the experimental work performed by Roy et al. (1998) at LLNL. Susceptibility to SCC of Alloy 22 was evaluated by Roy et al. (1998) using wedge-loaded precracked double-cantilever-beam (DCB) specimens in deaerated acidic brine (pH ≈ 2.7) at 90°C. Duplicate samples of each material were loaded at four initial stress-intensity (K_I) values ranging between 20 and 39 ksi $(in)^{1/2}$ (or 22 and 43 MPa $(m)^{1/2}$). The final stress intensity factor for SCC (K_f) was computed from the measured final wedge load and the average crack length. The final stress intensity factor K_f is taken to be the

SCC threshold value K_{ISCC}. In accordance with Table 1 of Roy et al. (1998), the K_f values for the eight Alloy 22 specimens are 27.96, 28.73, 28.78, 29.58, 29.66, 30.94, 31.98, and 32.39 ksi $(in.)^{1/2}$ A normal distribution is assumed to calculate the mean value, $(K_{ISCC})_M$ = 30 ksi $(m)^{1/2}$ or 33 MPa $(m)^{1/2}$, and the standard deviation, $(K_{ISCC})\sigma$ = 1.61 ksi $(in.)^{1/2}$ or 1.77 MPa $(m)^{1/2}$. K_{ISCC} is also assumed to be reasonably bounded by $\pm 4x(K_{ISCC})\sigma$.

4.1.4 Input for Slip Dissolution Model

The A-n relationship (Ford and Andresen 1988, Figure 6), as mentioned below, is an important input for this model:

$$A = 7.8 \times 10^{-3} n^{3.6}$$

where the constant A has the unit of $cm(s)^{n-1}$.

The parameter "n" can be determined from the data for crack growth rate and crack tip strain rate (or applied stress intensity factor in the case of constant load). SCC crack growth test results for Alloy 22 at 110°C and K_I = 30 MPa $(m)^{1/2}$ in a concentrated mixed salt environment for 1400 hours (DTN: LL000313105924.136) indicated an average crack growth rate of about 2.1×10^{-8} mm/s. This input source resulted in a value of 0.84 for the parameter "n" of the slip dissolution model.

4.1.5 Waste Package Design Dimensions

The dimensions for the WP designs evaluated in this AMR are shown in Figure 1 and Figure 2.

4.1.6 Laser Peening Data

Residual stress in WP weld can be mitigated by the laser peening method. Measured data reported in DTN: LL000313305924.138 were used to construct the residual stress profiles in the WP weld after laser peening treatment. DTN: LL000313305924.138's data indicated that laser peening is capable of producing a compressive surface layer of about 60 mils (1.5 mm) with compressive stress in the range of 20 to 60 ksi for a one inch thick Alloy 22 plate.

Residual stress in WP weld can also be mitigated b the induction heat annealing method. Residual stress due to induction heat annealing is not part of input but can be evaluated by the finite element analysis based on the induction heat annealing process to be applied to the WP, i.e., rapid local weld heat up at about 1,000 to 1,200°C for short hold time (about one minute) followed by rapid cool down to < 500°C in about 10 minutes (see Section 6.2.2.4).

4.2 CRITERIA

The following criterion applies to Stress Corrosion Cracking of the Drip Shield, the Waste Package Outer Barrier, and the Stainless Steel Structural Material (CRWMS M&O 1999d).

"The disposal container/WP shall be designed, in conjunction with the Emplacement Drift System and the natural barrier, such that the expected annual dose to the average member of the

critical group shall not exceed 25 mrem total effective dose equivalent at any time during the first 10,000 years after permanent closure, as a result of radioactive materials released from the repository (CRWMS M&O 1999d) (section 1.2.1.3).

4.3 CODES AND STANDARDS

No codes and standards were used to perform the analysis or to develop the model for this AMR.

5. ASSUMPTIONS

The following assumptions were made to develop the models for this AMR:

Assumption 1:

Only the final closure welds of the outer barrier of the WP will be considered for performance assessment. This assumption is based on the following observations:

1) The DS will be excluded from the SCC evaluation because stresses that are relevant to SCC are insignificant in the DS. The major sources of stresses in the DS are loadings due to backfill and earthquakes. These stresses will not induce SCC because the stress caused by backfill is generally compressive stress and the stress caused by earthquakes is temporary in nature.

2) The 316NG stainless steel inner barrier of the WP will also be excluded from the SCC evaluation because the SCC performance assessment will not take credit from the inner barrier.

3) Welds are the most susceptible to SCC because (1) welding procedure can produce very high tensile residual stress in the weld (2) pre-existing flaws due to fabrication and welding have much higher distribution in the weld than in the base metal and (3) metallurgical segregation and brittle non-equilibrium phases, susceptible to SCC, are present due to the rapid heating, melting, freezing and cooling cycle within weldments. All the welds with the exception of the final closure welds will be subjected to heat treatment to relieve the residual stress when the entire WP is heat treated before the loading of spent fuel elements. Since load and thermal stress are very low, without residual tensile stress SCC can not occur in annealed welds.

These assumption(s) have been used in section 6.2.2. This assumption does not have to be verified because it reasonably bounds all other scenarios.

Assumption 2:

It is assumed that embedded flaws will not grow into surface flaws due to lack of cyclic stress, and, thus, only outer surface-breaking flaws are of concern for performance. Since mechanical and thermal stresses are very small, embedded defect growth can only occur by fatigue (cyclic) loading and there are no cyclic stresses. This assumption is applicable in all subsections of section 6.

Assumption 3:

To characterize the uncertainty of the weld residual stress calculated by the finite element analysis, it is assumed that (1) the calculated residual stress is the mean (Sm); and (2) the residual stress has a normal distribution and bounded by ±(three standard deviations) of the mean. This assumption does not have to be verified because the cases that are not captured would not significantly impact the results. For the welds not subjected to any types of stress relief heat treatment (such as the weld in the outer closure lid of the original WP design), the uncertainty range within the two bounding stress at the inside surface of the closure lid is assumed to be ±35% of the yield strength of the material (Mohr 1996, p. 37). For the thinner inner lid of the outer barrier of the improved design, however, the range of variation is assumed to be ±20%. Better control of welding process for thinner welds give less uncertainty in stress. For welds that are subjected to induction heat annealing or laser peening (such as the dual lids of the outer barrier of the improved WP design), the range is assumed to be ±5% of the yield strength. These processes are very well controlled and simpler than welding and therefore lead to less uncertainty. This assumption has been used in section 6.2.2.

It was stated in Section 6.2.2.1 that, although the determination of weld residual stress for the WP welds is a three-dimensional problem, a two-dimensional axisymmetric modeling approach has been used for the finite element analyses of the weld residual stresses. The result of this assumption is that the stress is constant around the circumference. Klepfer (1975, Figure 9-95) indicated that the inside-surface residual stress for a 26 inch austenitic stainless steel pipe shows a sinusoidal distribution around the circumference with a range of about 5 ksi about the mean stress. This variation is assumed to be applicable to the residual stress around the circumference of the WP (see Section 6.2.2.5).

Assumption 4:

The K_{ISCC} value can vary in accordance with different environmental conditions. In the absence of more data needed for the assessment of the variability of K_{ISCC}, the values derived from Roy et al. (1998) under bounding environmental conditions (e.g., pH 2.7 and 90^{o}C brine) for Alloy 22 are conservatively assumed to be applicable to all Yucca Mountain conditions. This assumption has been used in section 6.3.

Assumption 5:

The model quantification processes for the slip dissolution model described in Section 6.4.3 for stainless steels are also conservatively applicable to Alloy 22, because, stainless steels are much more SCC susceptible than Alloy 22 is. Generally, this model applies to alloys that form passive

films. Both alloys, due to their structural similarity (i.e., both have face centered cubic crystal structure, and both give similar type of mechanical response to applied stress. However, due to lack of available data, the model quantification for Alloy 22 has to be developed on the following assumptions:

(1) The relationship between A and n in the equation that relates crack growth rate to crack tip strain rate for stainless steels, with V_t in cm/s and K_I in MPa $(m)^{1/2}$, is also applicable to Alloy 22, i.e.,

$$A = 7.8 \times 10^{-3} n^{3.6}$$

(2) The characterization of the slip dissolution model is that the SCC susceptibility decreases with increased n value. For 304 stainless steel in 288°C water with 0.5 μS cm^{-1} solution conductivity, Ford and Andresen (1988, Figure 7) indicate that n = 0.54 gives a good prediction for observed crack growth rate versus crack tip strain rate. Recent SCC crack growth test results for 22 at 110°C and K_I = 30 MPa $(m)^{1/2}$ in a concentrated mixed salt environment for 1400 hours (DTN: LL000313105924.136) indicates an average crack growth rate about 2.1 x 10^{-8} mm/s and suggested a value of 0.84 for n (Section 6.4.4). For conservative purpose, n = 0.84 will be considered to be the upper bound value for n. Since Alloy 22 is a more SCC resistant material than 304 stainless steel, a lower bound value of 0.75 for n in the case of Alloy 22 has been conservatively assumed.

It has been stated that both Assumptions 5-1 and 5-2 were made because of lack of available data. However, as stated in the text for Assumption 5-2, the assumption of a lower bound 0.75 for n appears to be appropriate based on available data for stainless steel and knowing that Alloy 22 is more SCC resistant that stainless steel.

Assumption 5 has been used in section 6.4. It does not have to be verified because this approach is considered reasonably bounding.

Assumption 6:

A leak can occur if the crack grows through the section thickness providing a potential direct path for water migration from outside to inside of WP. The following assumptions are made to estimate the crack opening:

1. A crack is either circumferential (perpendicular to the radial stress) or radial (perpendicular to the hoop stress) in the outer surface of the closure weld of the WP.

2. According to Section 6.5.1, a circumferential crack is assumed to have a semi-elliptical shape with depth "a" and length "2c." The length of a circumferential crack is determined by an exponential distribution described by Equation 30. The aspect ratio "c/a" for a radial crack is assumed to be "1," i.e., a semi-circular crack (c = a).

3. The crack length "2c" of a circumferential crack remains unchanged but the final length of a through-wall crack is at least twice the wall thickness. Under this assumption, most cracks will grow in both directions of the minor (depth "a") and major (length "2c") axes

and assume the semi-circular shape (i.e., a = c) when they become through-wall cracks. According to fracture mechanics (Ewalds and Wanhill 1984, Section 2.5, p. 43), "a" tends to grow faster than "c" because the stress intensity factor tends to have a maximum value at the end of the minor axis and a minimum value at the end of the major axis. So eventually a semi-elliptical crack will become a semi-circular crack. The crack length "2c" will remain unchanged only for very long cracks with initial crack length greater than twice the wall thickness. For such long cracks, the occurrence rate is usually very low. The length of a semi-circular crack will always be equal to twice the crack depth.

4. The crack opening has an elliptical shape with length "2c" and a crack opening or gap "δ."

Assumption 6 has been used in section 6.5. This represents the most conservative bounding approach and does not have to be verified.

6. ANALYSIS/MODEL

6.1 INTRODUCTION

There are a number of corrosion-related causes for premature fracture of metal structural components under service loading and environment. One of the most common is the SCC. SCC is the initiation and propagation of cracks in structural components due to three factors which must be present simultaneously: metallurgical susceptibility, critical environment, and static tensile stresses.

SCC is of great concern for corrosion-resistant alloys exposed to aggressive aqueous environments (Jones and Ricker 1987, pp. 145-146). Typically, the SCC of an alloy is the result of the presence of a specific chemical species in the environment. Thus, the SCC of copper alloys is virtually always due to the presence of dissolved ammonia, and dissolved chloride ions cause or exacerbate cracking in stainless steels and aluminum alloys. Changes in the environment parameters such as temperature, degree of aeration, and concentration of ionic species will normally influence SCC.

The effects of stress on the propagation of SCC can be characterized by the stress intensity factor, K_I. The definition and calculations of the stress intensity factor are described in Section 6.2.

Two alternative models that deal with SCC can be found in the literature. Because of the critical functions to be performed by the WP. Both models will be used in TSPA. The first model, the Threshold Model, is based on the theory that below a threshold value (K_{ISCC}) for the stress intensity factor, no growth occurs in a pre-existing crack. Pre-existing cracks are usually caused by manufacturing processes (especially welding processes). This model is described in Section 6.3.

The second model, the Slip Dissolution/Film Rupture Model, relates crack initiation from bare metal surface and the subsequent advance to the metal oxidation that occurs when the protective film at the crack tip is ruptured. The Slip Dissolution/Film Rupture SCC model is described in Section 6.4.

Miscellaneous topics related to the application of both threshold model and slip dissolution model as well as the estimate of opening size of a through wall crack are addressed in Section 6.5.

Calculated residual stresses and stress intensity factors for the original and improved WP designs as shown in Figures 1 and 2 are presented in figures in Section 6 and tabulated and graphical forms in Attachment I. Figures identified by DTN: LL000319805924.143 and DTN: LL000319905924.144 in Section 6 and tabulated and graphical presentations of Attachment I (DTN: LL000315905924.139, DTN: LL000316005924.140 and DTN: LL000316105924.141) were developed from supplier's input DTN: LL000316205924.142, a comprehensive data base presenting profiles of mean resdiual stresses and stress intensity factors and their ranges of uncertainty and variability developed from input information described in Section 4 and assumptions described in Section 5.

6.2 STRESS INTENSITY FACTOR

6.2.1 Definition

The stress intensity factor K_I is usually defined as a function of stress (σ) and crack depth size (a):

$$K_I(a, \sigma) = \beta \sigma (\pi a)^{1/2} \quad \text{(Eq. 1)}$$

where,

β is a geometry factor dependent on the size and shape of the crack and the configuration of the structural component

σ is the tensile stress distribution through the wall thickness of the structural component.

Closed-form solutions are possible only in some simple cases of uniform tensile stress and simple geometry. For example, in considering the classical problem of a single edge cracked plate with thickness "h," it has been shown that β can be expressed by the following approximate formula (Ewalds and Wanhill 1984, p. 49):

$$\hat{a} = 1.12 - 0.231\left(\frac{a}{h}\right) + 10.55\left(\frac{a}{h}\right)^2 - 21.72\left(\frac{a}{h}\right)^3 + 30.95\left(\frac{a}{h}\right)^4$$

In most practical cases where stresses are non-uniformly distributed across the thickness, the stress intensity factor has to be calculated by some numerical algorithms, such as the finite element method. Rice (1968, p. 381) has shown that path independent J-Integral taken over an arbitrary contour surrounding the crack tip is proportional to the square of the crack tip stress intensity factor K_I. In accordance with Chan et al. (1970, p. 8), by numerically evaluating the J-Integral for the finite element solution over a path surrounding the crack tip, an estimate of the crack tip stress intensity factor can be obtained.

6.2.2 Calculations of Stress Intensity Factors for WP Closure Welds

Only the final closure welds of the outer barrier of the WP will be considered for performance assessment, based on the following assumptions and observations:

1. The DS will be excluded from the SCC evaluation because stresses that are relevant to SCC are insignificant in the DS. The major sources of stresses in the DS are loadings due to backfill and earthquakes. These stresses will not induce SCC because the stress caused by backfill is generally compressive stress and the stress caused by earthquakes is temporary in nature.

2. The 316NG stainless steel inner barrier of the WP will also be excluded from the SCC evaluation because the SCC performance assessment will not take credit from the inner barrier.

3. Welds are the most susceptible to SCC because (1) welding procedure can produce very high tensile residual stress in the weld (2) pre-existing flaws due to fabrication and welding have much higher distribution in the weld than in the base metal and (3) welding produces segregation and non-equilibrium brittle phases which induce susceptibility to SCC. All the welds with the exception of the final closure welds will be subjected to heat treatment to relieve the residual stress when the entire WP is heat treated before the loading of spent fuel elements.

It is assumed that embedded flaws will not grow due to lack of cyclic stress, and, thus, only outer surface-breaking flaws are of concern for performance.

Weld residual stress is the only type of stress for SCC concern. Other types of stresses are either insignificant (such as stress due to dead weight) or temporary in nature (such as stress caused by earthquakes). Stress and stress intensity factor due to weld residual stresses will be calculated for two different designs of the WP: the original design as shown in Figure 1 and the improved design as shown in Figure 2. For both designs, the outer barrier is made from Alloy 22 and the inner barrier is made from Type 316NG stainless steel. The improved design as shown in Figure 2 has incorporated several design features to minimize the tensile residual stress in the closure welds. The geometrical configuration is the result of a finite element optimum design process to give the most favorable stress distribution in the weld. The dual cover (or lid) concept has been adopted for the outer barrier to prolong the design life. The welds in both covers will be subjected to special stress-relief treatments with the weld in the outer cover treated by induction heat annealing and the inner lid by laser peening as discussed in Section 6.2.2.4.

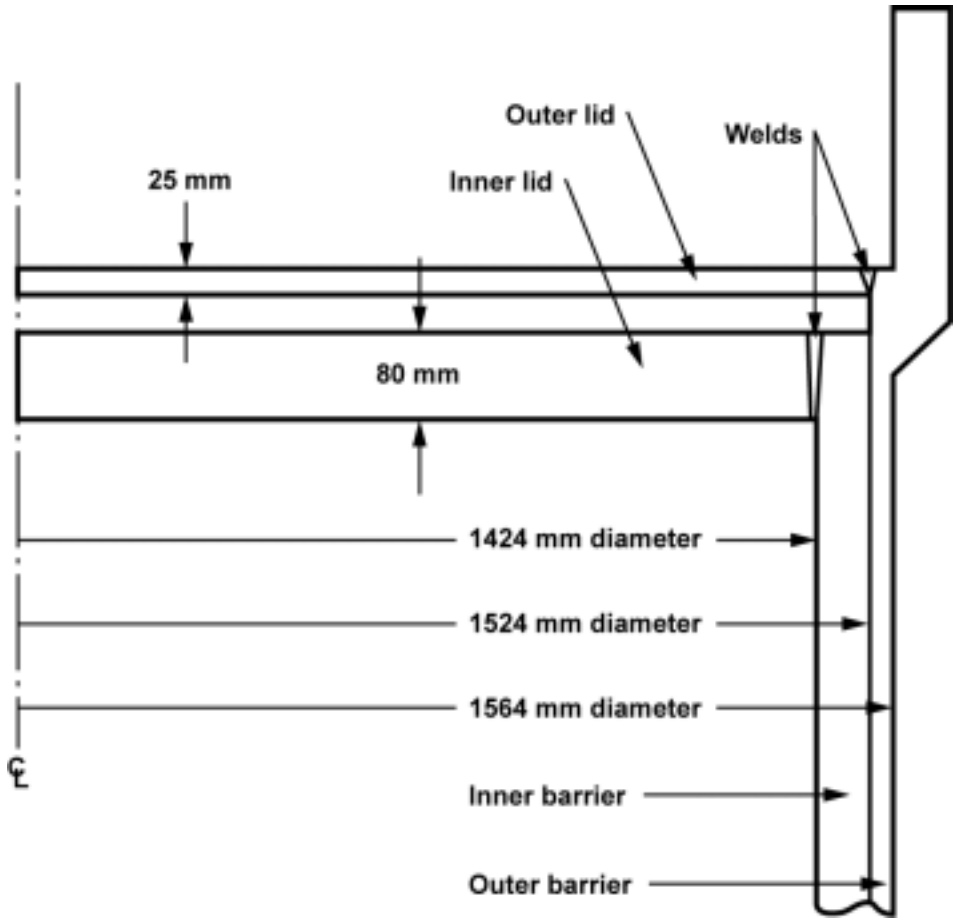


Figure 1. Schematic and Dimensions for the Original WP Design

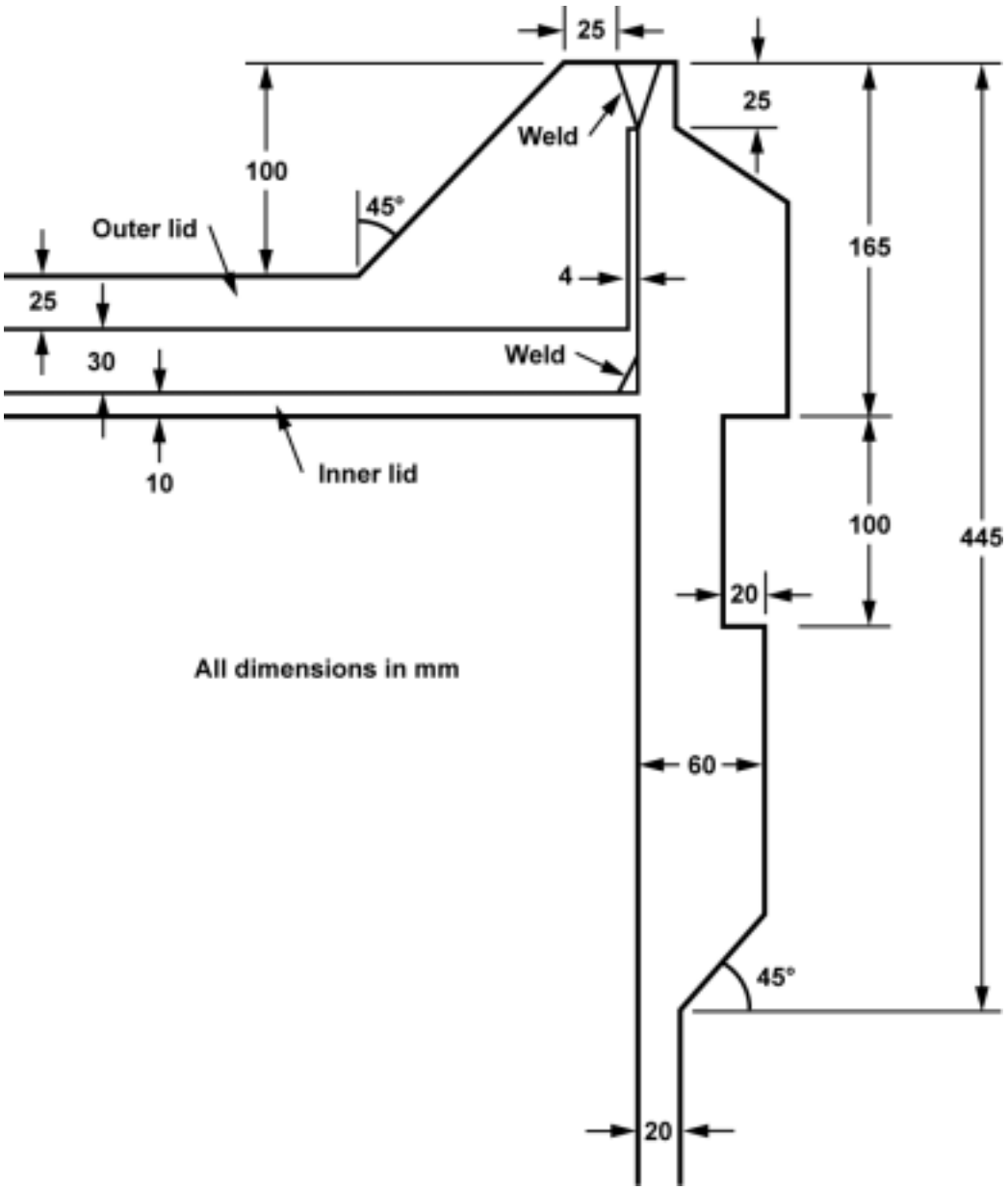


Figure 2. Schematic and Dimensions for the Improved WP Design

6.2.2.1 Stress Analysis

Finite Element Model–Determining the weld residual stress requires a thermal analysis to determine the temperature history caused by the welding process and a subsequent weld residual stress analysis. This problem has been solved using finite element analysis methods. Although the determination of weld residual stress for the WP welds is a three-dimensional problem, it has been found that the use of two-dimensional axisymmetric modeling of the problem provides a reasonable estimate of the behavior. Thus, the WP closure weld models were assumed to be two-dimensionally axisymmetric about the WP axial centerline.

The finite element model for the original design of the WP is shown in Figure 3. The dimensions for this model are shown in Figure 1. The weld geometry and immediate neighboring material are modeled in detail with sufficiently small elements to capture the large thermal and strain gradients associated with the weld pass application. The element sizes become larger with distance from the weld since the field variable gradients are significantly lower.

Figure 3 shows the finite element model with all weld passes deposited and both lids in place. Material making up the individual weld passes is added to the model as each weld pass is simulated. This process continues until all weld beads (or groups of weld beads) are applied.

Material Properties–The material properties are important to determination of the final weld residual stress. As indicated in Section 4.1.1, material properties used in this evaluation for Alloy 22 are based on information provided in CRWMS M&O (1999c, Section 5.7).

For the thermal analysis, the following material properties are used:

Thermal Conductivity, k = 10.1 W/(m K) at 118°F (48°C)
Specific Heat, c = 414 J/(kg K) at 126°F (52°C)
Density, ρ = 8690 kg/m at 24°C (75°F)

For the stress analysis, the following material properties are used:

Coefficient of Thermal Expansion, $\alpha = 12.4 \times 10^{-6}$ m/(m K) at 75°F (24°C)
Young's Modulus, E = 206 GPa at 75°F (24°F)
Poisson Ratio, υ = 0.278
Density, ρ = 8690 kg/m at 24°C (75°C)
Yield Strength, Sy = 372 MPa (54 ksi) at 24°C (75°F)

Material properties at other temperatures are provided in CRWMS M&O (1999c, Section 5.7).

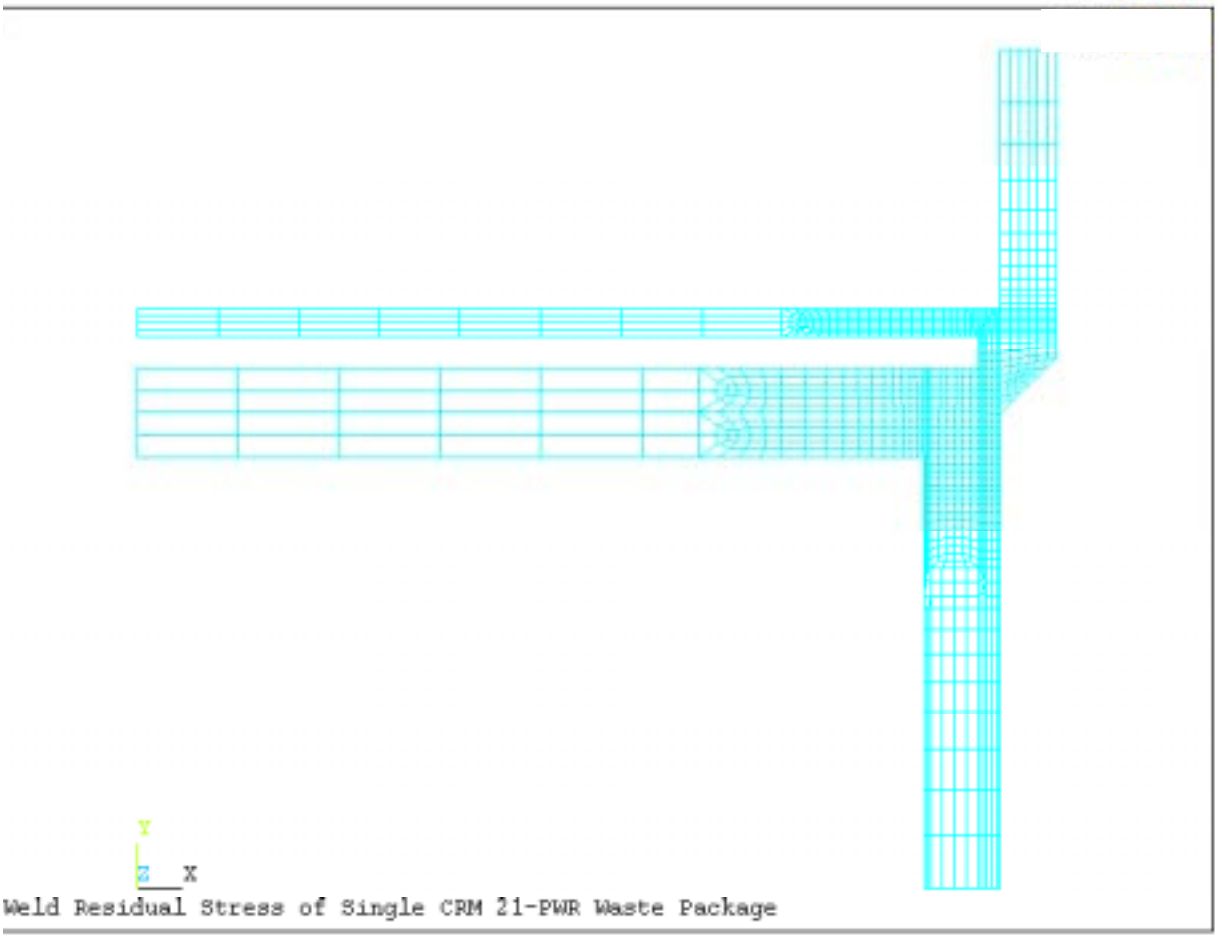


Figure 3. Finite Element Model for Original WP Design

Thermal Analysis–A thermal analysis of the WP closure was performed to simulate the temperature history caused by each weld pass. Each weld pass will result in a different temperature field since as passes are applied, more material is added, residual stress from previous passes are being incorporated, and the relative location of the weld heat input is changing with respect to the lid thickness.

The effect of each weld pass was simulated through heat generated in the finite elements which represent the weld pass and then transferred to the adjoining parts of the WP. The heat generated in the weld pass, represented by the net heat input (H_{net} in joules/in.) of the welding process can be calculated according to Equation (2.3) of DTN: LL000312705924.132, $H_{net} = f_1 EI/v$, for given welding parameters including voltage (E), amperage (I) and travel velocity of the heat source (v in in./sec.) and heat transfer efficiency (f_1). The WP lids will be welded with the NG-GTAW process utilizing hot wire feed (CRWMS M&O 1998, p. 11). For this type of welding process the amperage, voltage and average travel speed are, respectively, 330-335 A, 12.1-13.0 V and 8.0 in./min. (0.133 in./sec.) (CRWMS M&O 1998, Table 7-1, p. 12). The heat transfer efficiency (f_1) for gas tungsten arc welding, according to DTN: LL000312705924.132, is 21-48%. Using the average values for E (12.55 V), I (332.5 A), v (0.133 in./sec.) and f_1 (0.345) and adding 15% to the final result (to represent heat contributed by the filler material), the net heat

input is found to be 12,400 Joules/in. For the closure weld of the outer lid in Figure 5, the total heat input of each complete welding pass is H_{net} L, where L (9.58 m or 377 in.) is the total length of the weld.

For the axisymmetric representation of the three-dimensional problem, it is desired to convert the non-axisymmetric heat input into an equivalent axisymmetric heat input, which would be representative of what a typical point on the circumference of the weld would experience. Since a typical point on the circumference would experience essentially an impulse heat input (i.e., a large amount of heat input over a short amount of time) the heat input is represented by a triangular-shaped pulse over a two-second time interval (ramp up in one second and ramp down in one second) followed by a cooling period. The length of cooling period after the deposit of weld beads is determined by the time required for the weld torch to travel around the circumference of the closure weld.

Weld Residual Stress Analysis–The stress analysis is performed for all individually modeled weld passes. For example, if six weld passes are being modeled, then six thermal stress analyses are performed. The analysis of Weld Pass 1 uses the temperature history for Weld Pass 1 thermal analysis and begins from the stress state caused by the shrink-fit of the two cylinders. The analysis of Weld Pass 2 uses the Weld Pass 2 thermal analysis and uses the residual stress due to Weld Pass 1 as the initial condition. This process continues until all weld passes are analyzed. The final solution (at ambient conditions) is the room temperature weld residual stress.

Results of the weld residual stress analysis are presented at cross-sections 1-4, A-F shown by Figure 4. The results presented in Figures 5 through 10 correspond to the radial, longitudinal, and hoop stress components of the residual stresses for the inner and outer lids at 257°F (125°C).

6.2.2.2 Stress Intensity Factor Calculations

For the WP closure welds, the flaw orientations most likely susceptible to crack propagation are those of a circumferential flaw (parallel to weld) and a radially oriented flaw (perpendicular to weld). Figure 11 shows the flaw orientations with respect to the weld. A radially oriented flaw would be potentially driven by hoop stress. A circumferentially oriented flaw would be driven by radial stress.

A general form of the stress intensity factor can be expressed by Equation 1, i.e.,

$$K_I = \beta \sigma (\pi a)^{1/2}$$

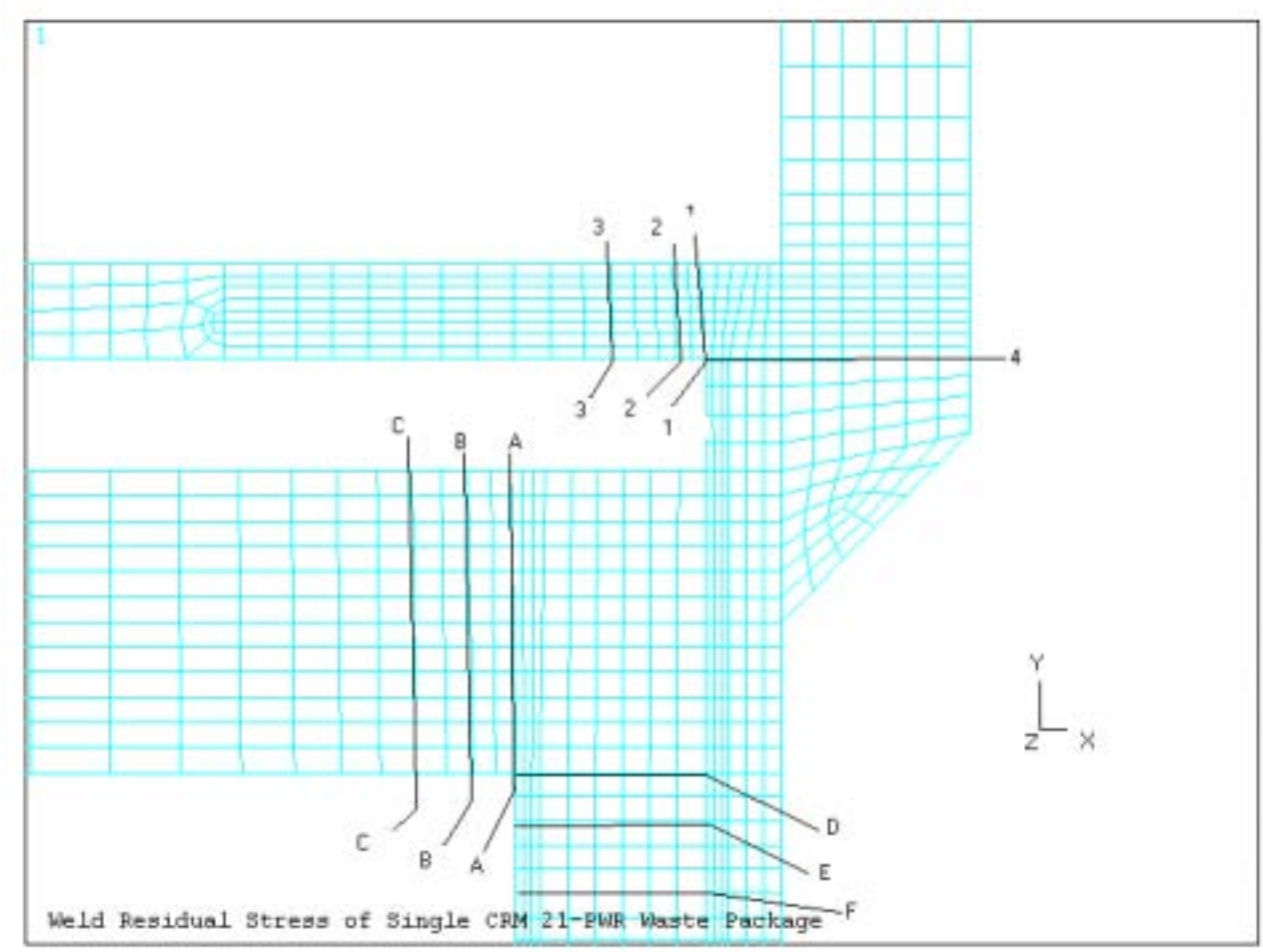
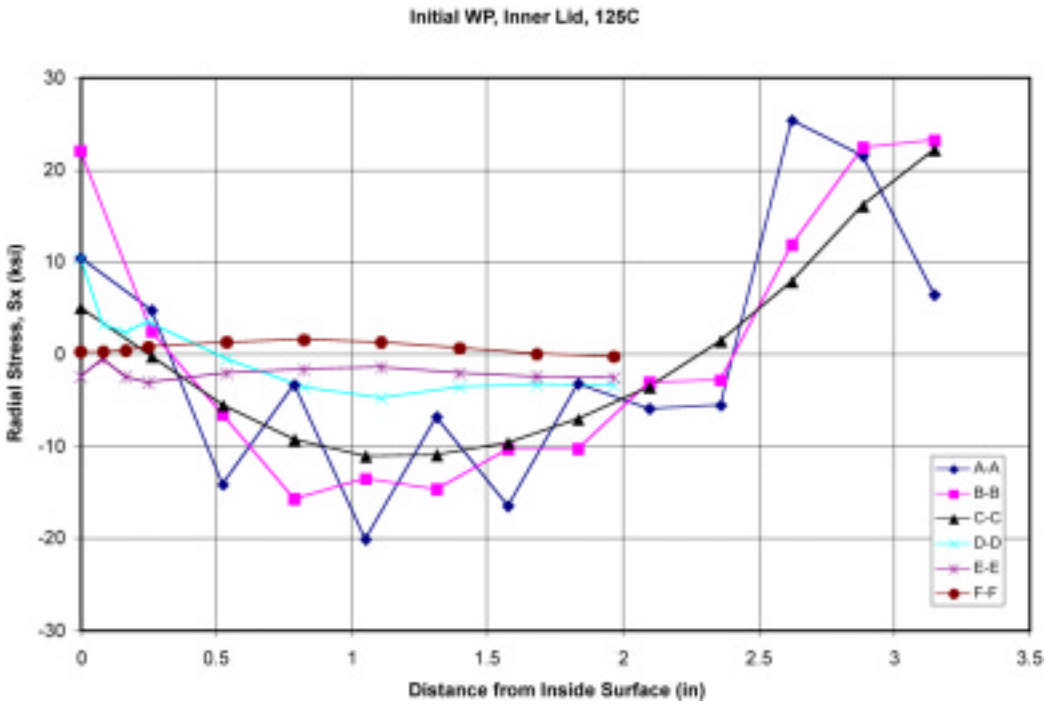


Figure 4. Selected Cross-Sections for Original WP Design

As indicated in Section 6.2.1, β is a geometry factor dependent on the size and shape of the crack and the configuration of the structural component, and σ is the stress distribution through the wall thickness of the structural component. Closed-form solutions of Equation 1 are possible only in some simple cases of uniform tensile stress and simple geometry.

Although finite element program can be used to evaluate the stress intensity factor (see Section 6.2.1), the effort is usually quite time consuming because a series of elaborate finite element analyses must be completed for numerous crack sizes starting from 0 through the thickness of the containment wall.



DTN: LL000319905924.144

Figure 5. Radial Stress, Inner Lid @ 125°C

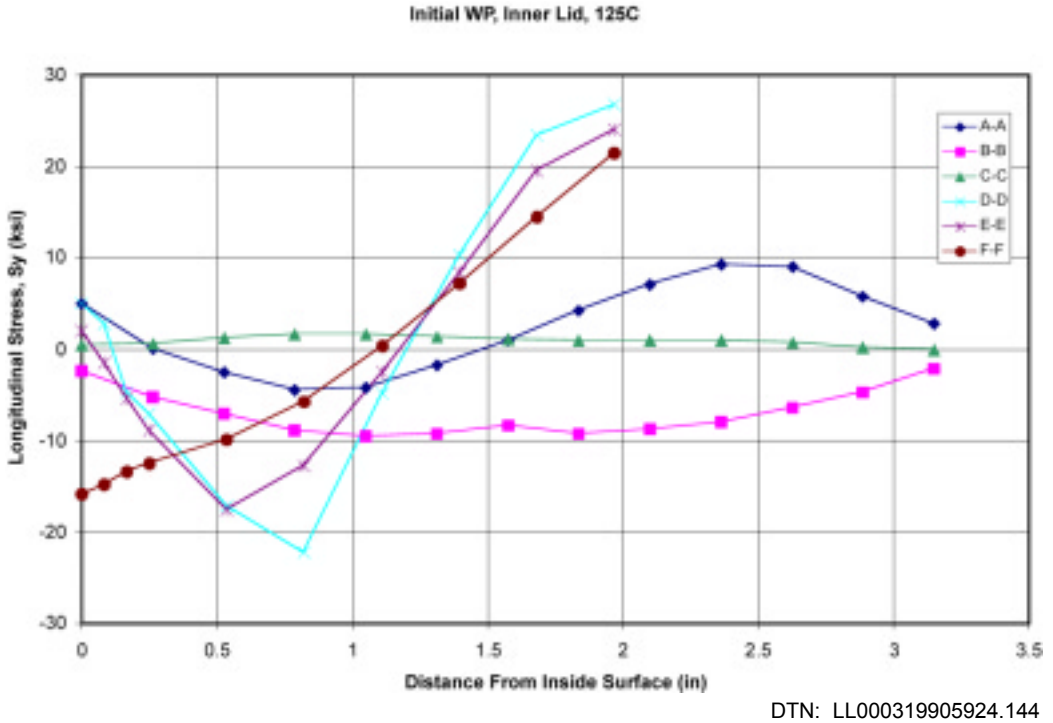


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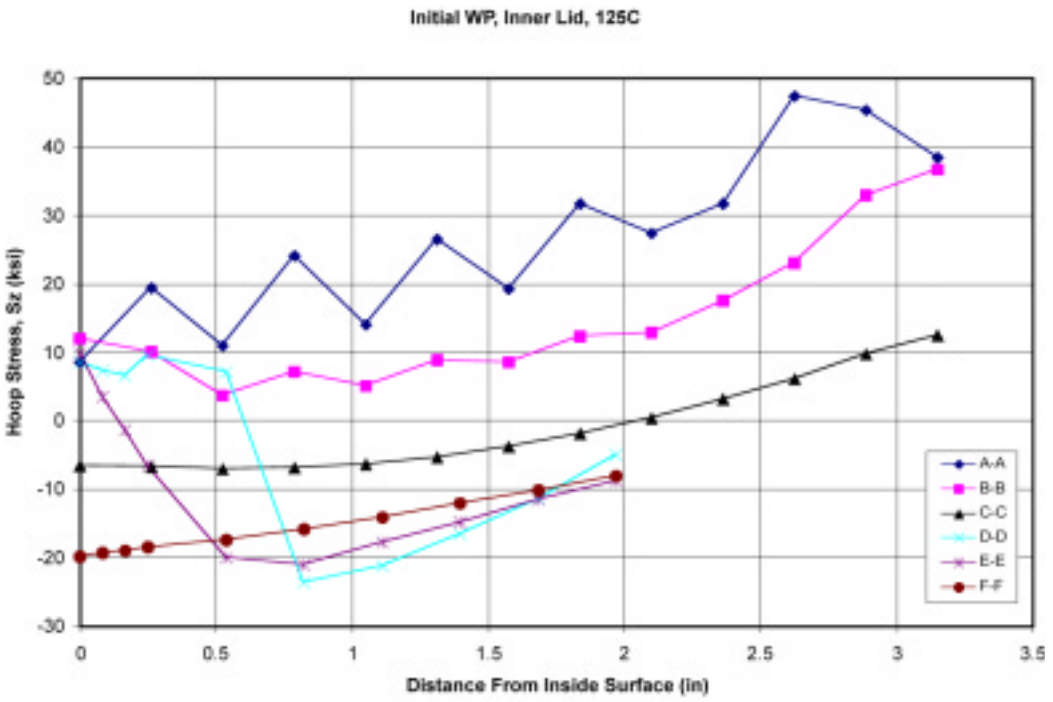
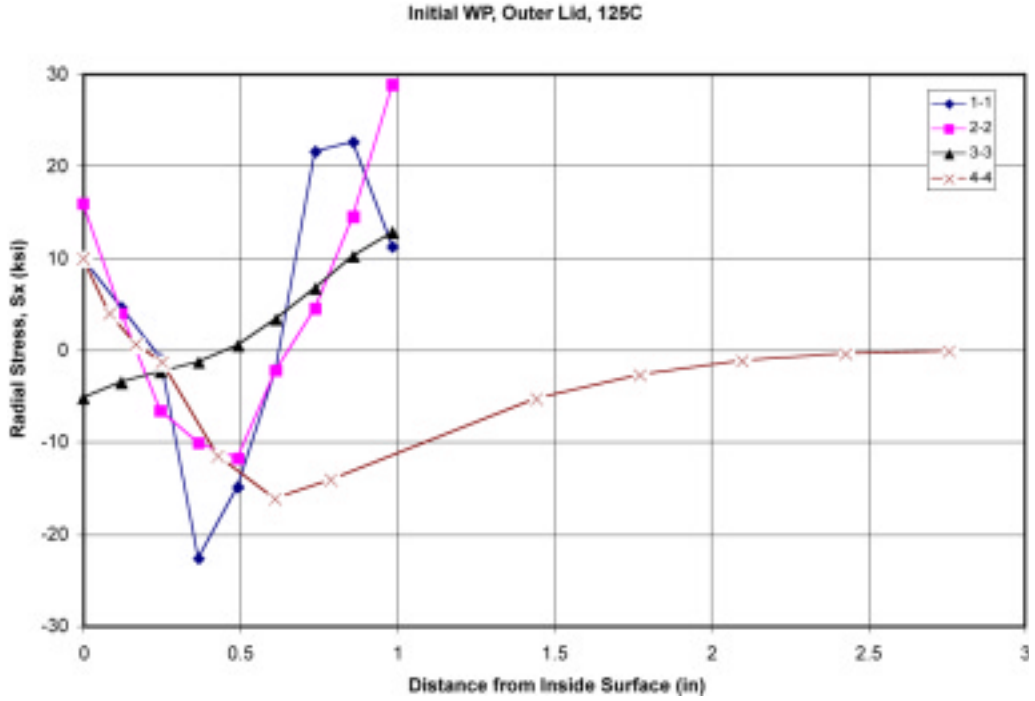
Figure 6. Longitudinal Stress, Inner Lid @ 125°C



DTN: LL000319905924.144

Figure 7. Hoop Stress, Inner Lid @ 125°C



DTN: LL000319905924.144

Figure 8. Radial Stress, Outer Lid @ 125°C

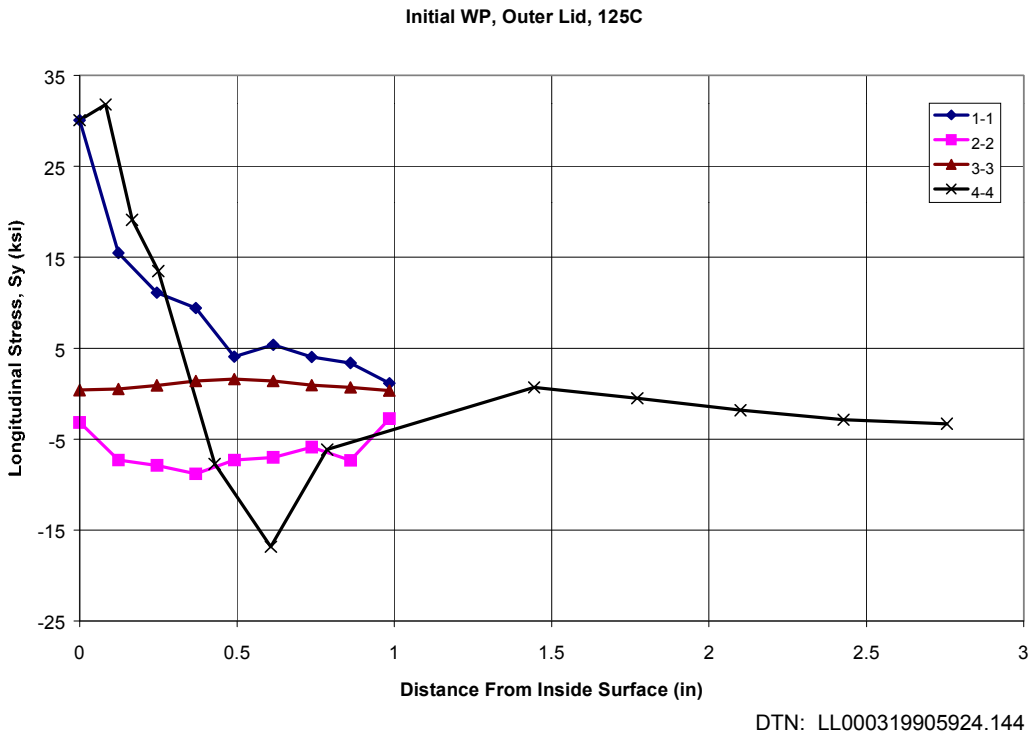


Figure 9. Longitudinal Stress, Outer Lid @ 125°C

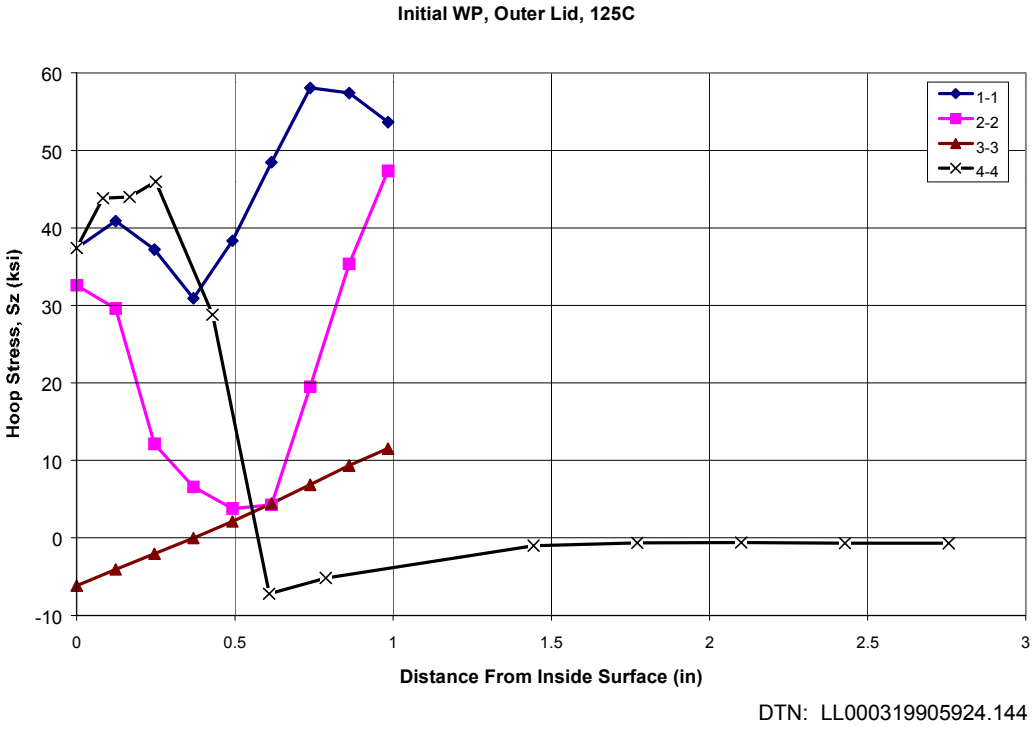


Figure 10. Hoop Stress, Outer Lid @ 125°C

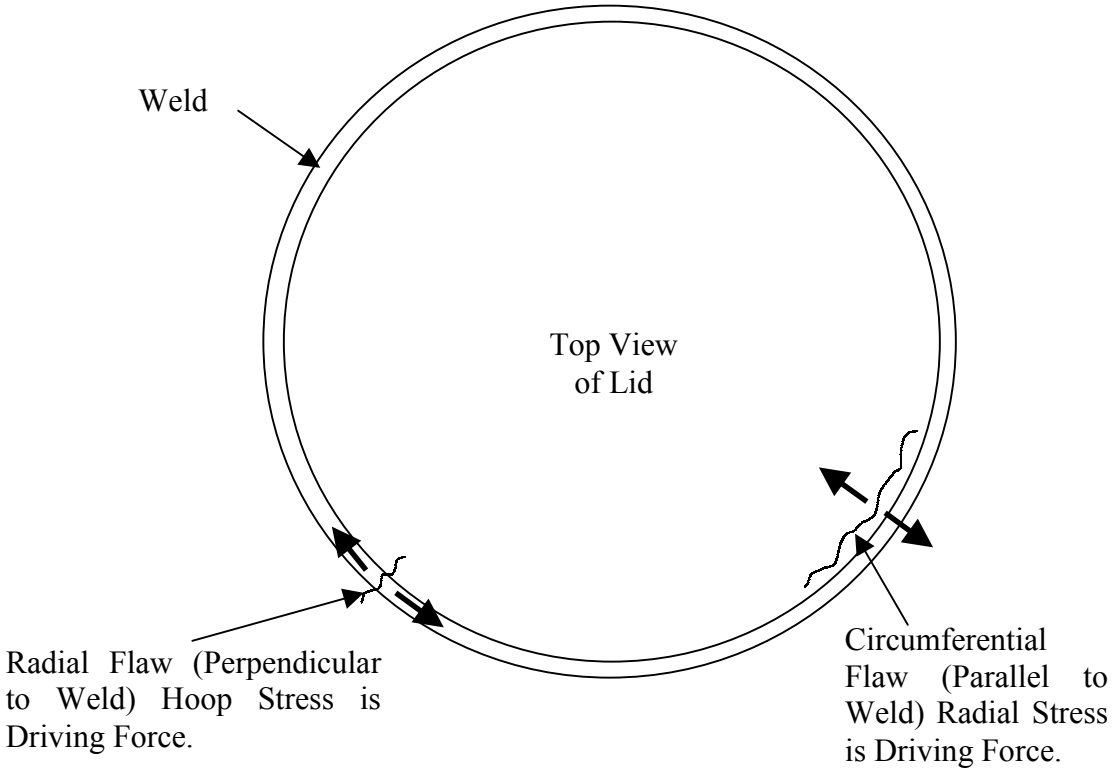


Figure 11. Flaw Orientation for Lid Welds

A simplified solution was developed by using fracture mechanics to evaluate the parameter $(K_I)_{PCCRACK}$. Then a geometry correction factor, G, which is usually a function of the crack size "a", was evaluated from the results of finite element analysis. Finally, the true stress intensity factor K_I was derived from $(K_I)_{PCCRACK}$ and G using the following relationship:

$$K_I = G\left(K_I\right)_{PCCRACK} \qquad \text{(Eq. 2)}$$

For a circumferential flaw $(K_I)_{PCCRACK}$ was derived from a single edge cracked plate (SECP) with an infinitely long flaw. For a radial flaw $(K_I)_{PCCRACK}$ was derived from an elliptical surface crack in an infinite plate with a crack aspect ration of 0.5 (a semi-circular crack). In either case, the stress distribution was calculated by using a third order polynomial of the type represented by equation 4. The model of a circular crack in an infinite plate is a better representation of a radial crack in the closure weld than an infinite crack in a SECP. It is judged that a radial crack in the closure weld would not grow into a long semi-elliptical crack due to the rapid decay of hoop stress in the radial distance away from the weld and base metal interface (see Figure 10).

The stress intensity factor for an SECP with an infinitely long flaw is (Buchalet and Bamford 1976, Equation 2, p. 388):

$$(K_I)_{SECP} = \sqrt{(\pi a)}\left[A_0F_1 + \left(\frac{2a}{\pi}\right)A_1F_2 + \left(\frac{a^2}{2}\right)A_2F_3 + \frac{4a^3}{3\pi}A_3F_4\right] \qquad \text{(Eq. 3)}$$

where F_0, F_1, F_2, and F_3 are magnification factors and A_0, A_1, A_2, A_3 are coefficients of the third-order polynomial fit of the through-wall stress distribution (or profile):

$$\sigma = A_0 + A_1x + A_2x^2 + A_3x^3 \quad \text{(Eq. 4)}$$

where x is the distance from the outer surface of the closure lid.

The magnification factors F_0, F_1, F_2, and F_3 are functions of the crack depth ("a") versus thickness ("h") ratio (a/h) and are graphically presented in Buchalet and Bamford (1976, Figure 6), which are converted into digitized look-up tables for calculating the stress intensity factor.

The SECP stress intensity factor is for the ideal geometry and must be modified by the geometry correction factor G to consider the actual geometry. Figure 12 shows the G factor distribution in the closure weld of the outer lid of the WP as a result of curve fit based on the exact G values calculated at four discrete points corresponding to crack-versus-thickness ratios of 0.2, 0.3, 0.4 and 0.6. Figure 12 indicates that, for shallow flaws, the correction factor is near 1. For deeper flaws, the correction becomes significant, and using the SECP solution would be very conservative. Figure 13 shows both the simplified SECP solution and the scaled final solution of stress intensity factor for a circumferential flaw started at the outer surface of the outer lid of the original WP design. Figure 14 shows the stress intensity factor for a radial flaw started at the outer surface of the outer lid of the original WP design. The simplified solution was obtained from a fracture mechanics crack model which contains a semi-circular surface flaw in a flat plate and is judged to be close to the final solution. Therefore, the geometrical correction factor is assumed to be equal to unity for the case of radial crack.

The calculated stress intensity factor versus crack depth curves for the improved WP design are presented in Attachment I.

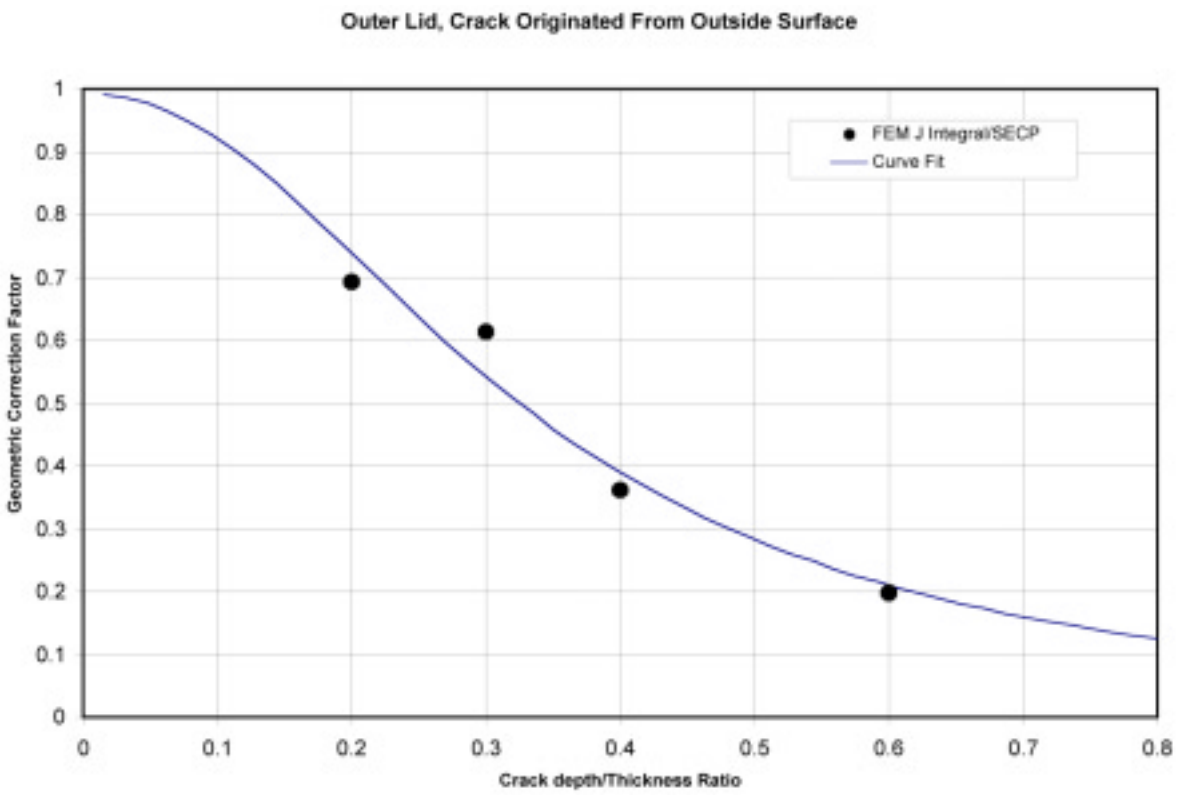


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Figure 12. Outer Lid Circumferential Flaw Geometric Correction Factor

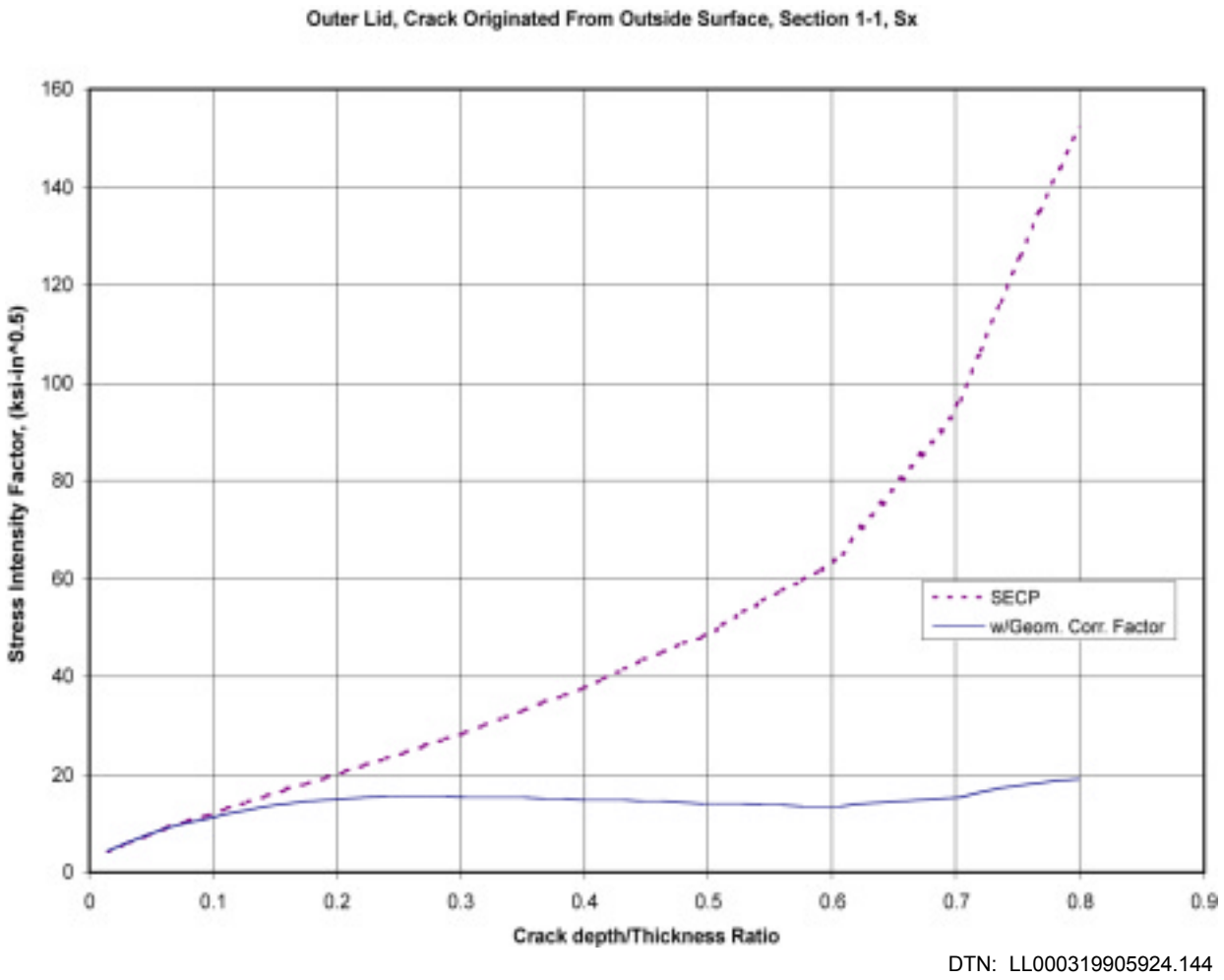

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Figure 13. Stress Intensity Factors for Circumferential Flaw in Outer Lid

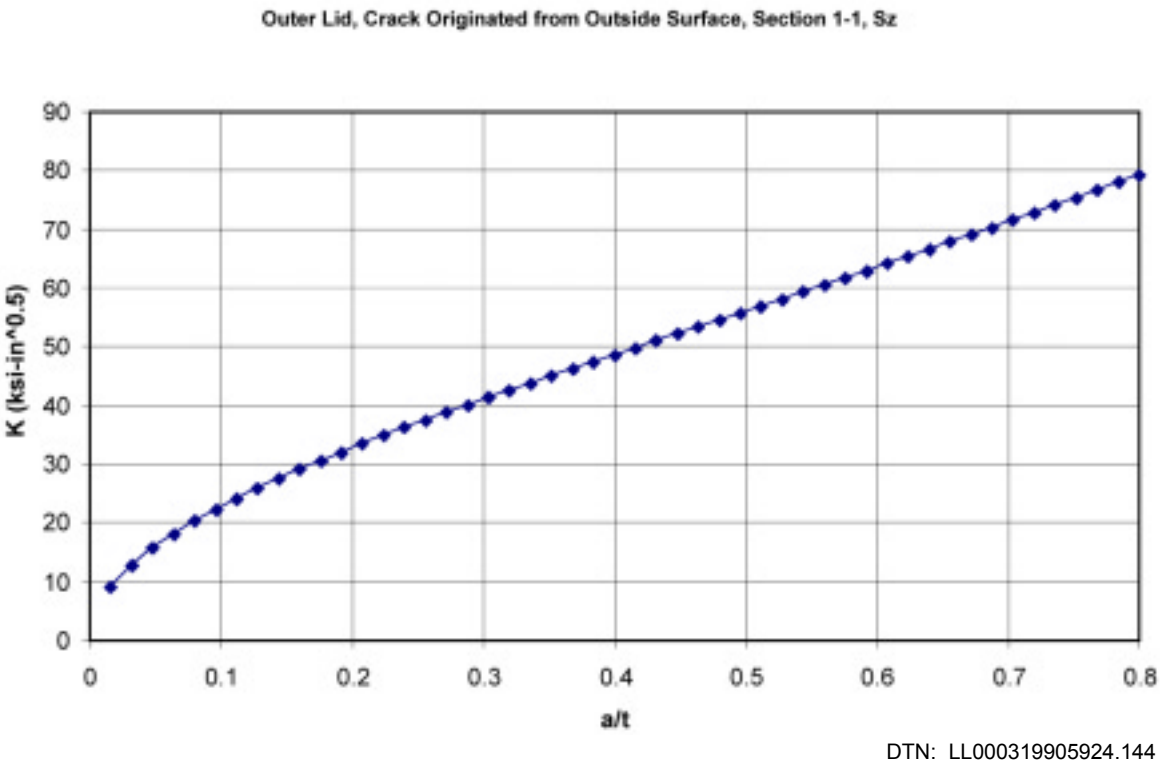

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Figure 14. Stress Intensity Factor for Radial Flaw in Outer Lid

6.2.2.3 Impact of Corrosion

The results presented in Section 6.2.2.2 were performed for the as-built condition. Thus, the full thickness for all the waste package components was used. In order to simulate the effect of wall thinning caused by general corrosion, a layer of elements from the outside surface of the outer lid was removed. The thickness of this layer is 0.125 inch, which is equivalent to the removal of 12.7% of the wall of the outer lid. The general corrosion rates are very low for the Alloy 22 material. The rate at the 50^{th} percentile is approximately 0.05 μm/year and the maximum rate 0.731 μm/year based on the 6-month and 12-month data (DTN: LL991208505924.099). The 0.125-inch removal is the amount of material subject to general corrosion in 4,300 years (at the maximum general corrosion rate of 0.731 μm/year) or 63,500 years (at the 50^{th} percentile general corrosion rate of 0.05 μm/year). More recent data representing 24 months of exposure (DTN: LL991208505924.099) indicated that the corrosion rates are much lower, i.e., the mean corrosion rate is 0.01 μm/year and the maximum rate is 0.07 μm/year.

This can be simulated using a computer program by assigning a death status to the elements which comprise the outer row. Since these elements contributed to the equilibrium state, removal of these elements causes a redistribution of the stress pattern. Analysis of stress redistribution corresponding to the new equilibrium condition can be accomplished using a computer program.

Figure 15 shows the row of elements which was removed to simulate the general corrosion of the outer lid surface. Figures 16 and 17 show, respectively, the through-wall radial stress profiles (with and without corrosion effects) and hoop stress profiles at Section 1-1 in Figure 15. These results demonstrate the redistribution of the residual stress. In general, stress appears to be not very sensitive to the effects of corrosion.

Figures 18 and 19 show the stress intensity factor distribution for Section 1-1 in Figure 15 for circumferential and radial cracks. These figures show the stress intensity factor as a function of distance from the outside surface and normalized distance from the outside surface. These figures demonstrate that the overall effect of general corrosion is small.

6.2.2.4 Mitigation of Weld Residual Stress

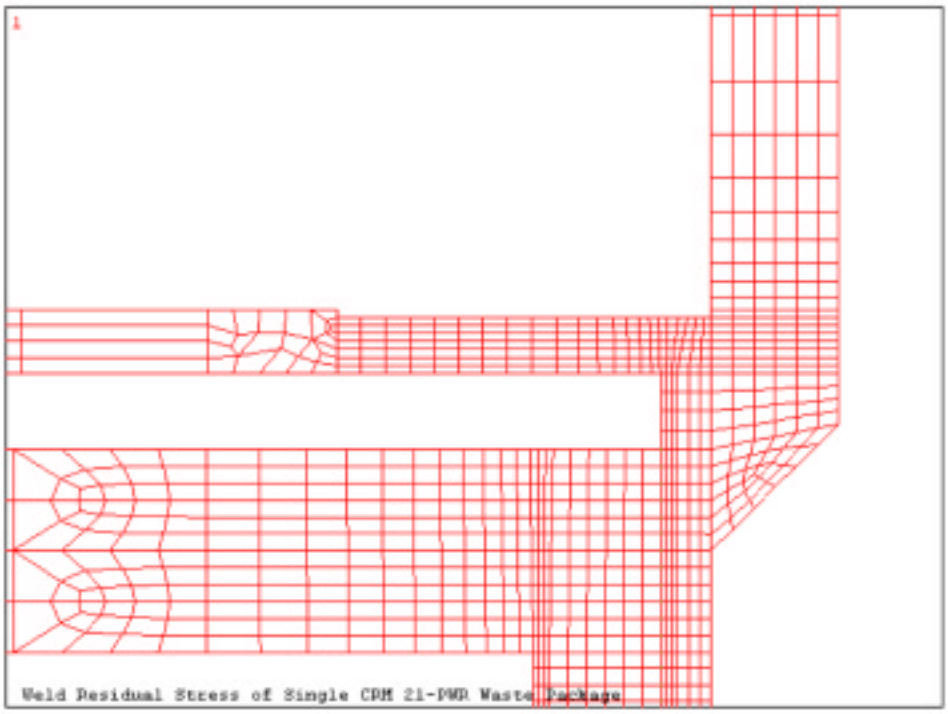
Stress is one of the three basic factors that cause initiation and propagation of cracks in structural components due to stress corrosion cracking. The other two factors are metallurgical susceptibility and environment. SCC can be reduced to a manageable state if the weld residual stress in the WP can be effectively mitigated.

Weld residual stress can be mitigated by optimizing the geometrical configuration of the WP design. Residual stress can also be mitigated through specially designed weld processes, such as "narrow-groove" and other low heat input welding processes as well as spray cooling of final weld passes to produce compressive outer surface stress.

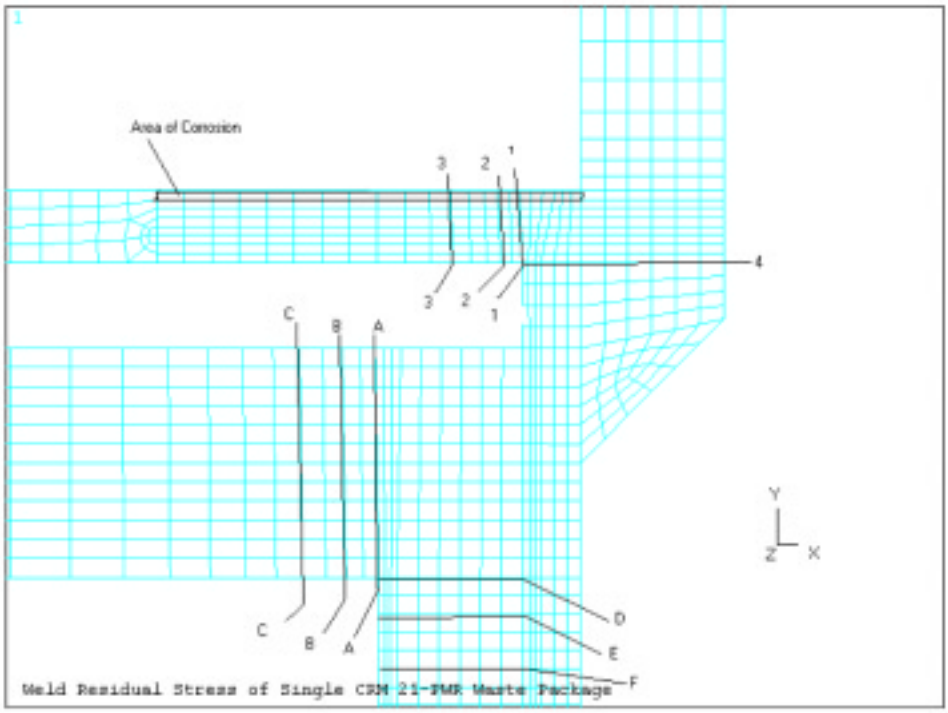
For the final closure welds of the WP, special localized stress-relief treatments can be applied without heating the spent fuel elements within the WP. As indicated in Section 6.2.2, two such types of treatments will be used for the improved WP design. The first treatment, (which will be used for the outer lid of the outer barrier, involves use of induction heating coils to effect a

localized annealing of the weld region. The induction heat annealing process to be applied to the WP includes rapid local weld heat up at about 1,000 to 1,120°C for short hold time (about one minute) followed by rapid cool down to <500°C in about 10 minutes.

(a)



(b)



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NOTE: (a) Finite element model
(b) Sections for stress profile

Figure 15. Finite Element Model Used for Study of Corrosion

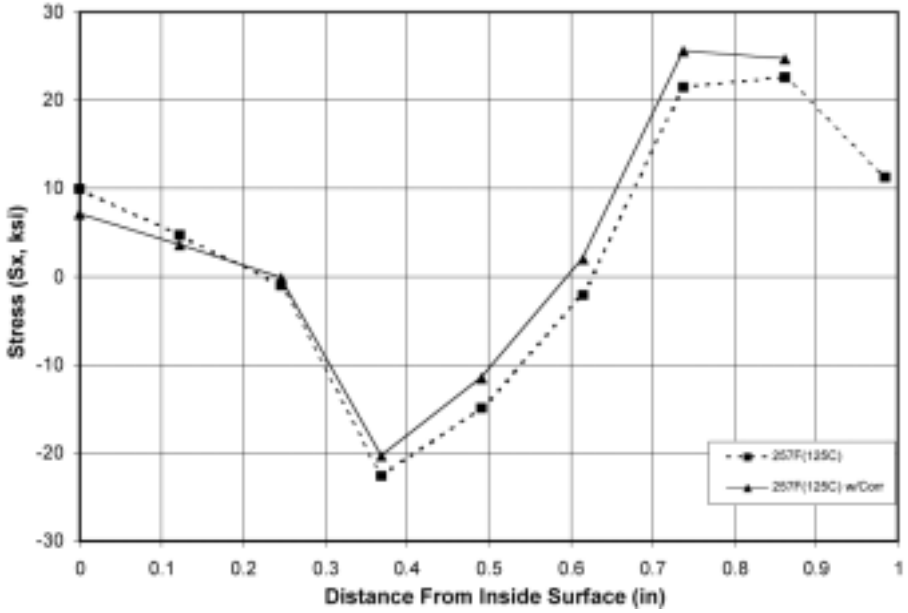

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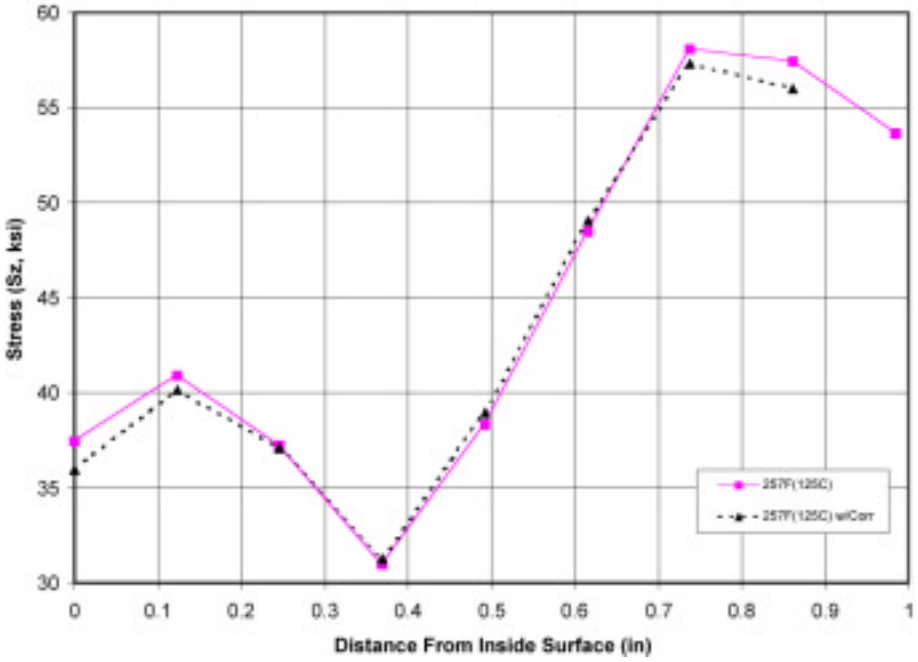
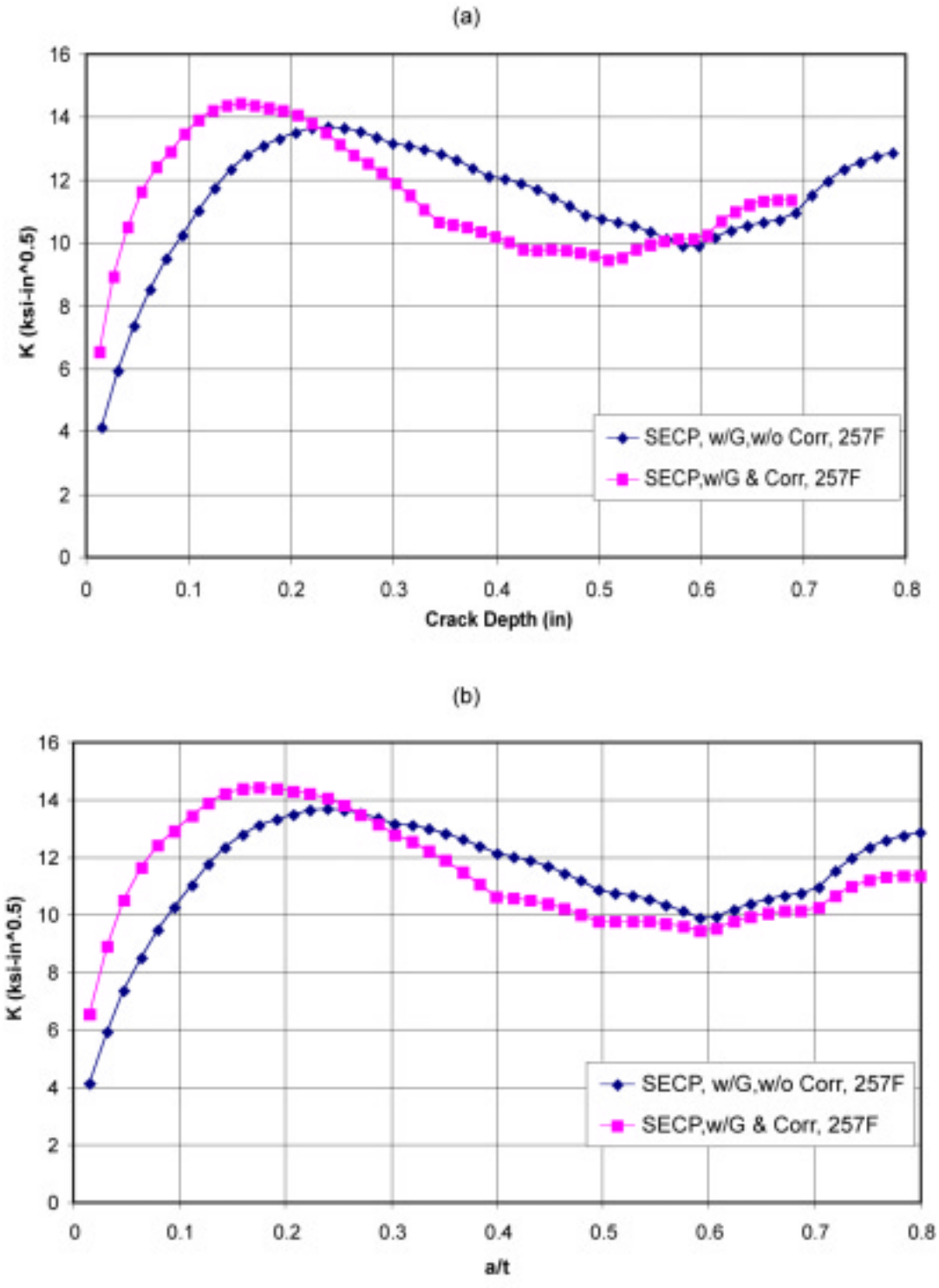
Figure 16. Effect of Corrosion on Radial Stress in Outer Lid



DTN: LL000319905924.144

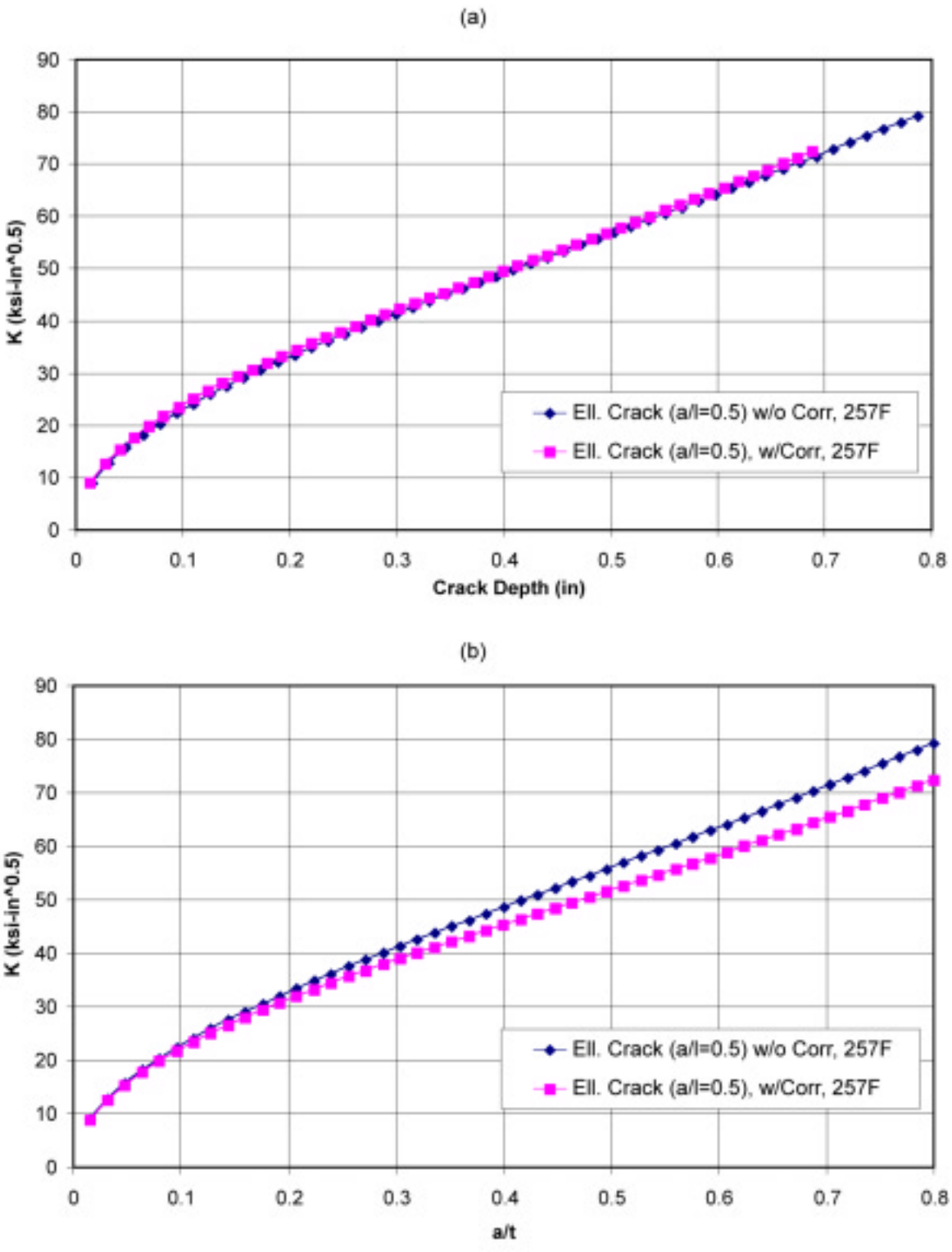
Figure 17. Effect of Corrosion on Hoop Stress in Outer Lid



DTN: LL000319905924.144

NOTE: (a) X-axis is crack depth in inches.
(b) X-axis is shown as the ratio of crack depth (a) vs. thickness (t).

Figure 18. Stress Intensity Factor for Full-Circumference Flaw in Outer Lid



DTN: LL000319905924.144

NOTE: (a) X-axis is crack depth in inches.
(b) X-axis is shown as the ratio of crack depth (a) vs. thickness (t).

Figure 19. Stress Intensity Factor for Radial Elliptical Crack in Outer Lid

The second treatment, which will be used for the inner lid of the outer barrier, involves use of the laser peening process, where a high powered laser beam introduces shock pulses on the material surface. Laser peening is similar to the traditional shot-peening procedure but is a much improved technology. For laser peening, the intense stream of tiny metal or ceramic balls used in the traditional shot-peening is replaced by high-energy lasers with pulse lengths in the tens of nanoseconds, short enough to generate a rapid yet energetic shock. This process can produce an uniform layer of highly shocked and compressed material that is extremely resistant to cracks and corrosion.

According to measured data (DTN: LL000313305924.138), laser peening is capable of producing a compressive surface layer of about 60 mils (1.5 mm) with compressive stress in the range of 20 to 60 ksi for a one inch thick Alloy 22 plate. The depth of stress reduction may be increased by repeated application of laser peening. A typical example is shown in Figure 20 for stress profiles at the weld center line for stress component 1 (S1, parallel to the weld center line) and stress component 3 (S3, perpendicular to the weld center line) before and after laser peening.

To demonstrate the effect of laser peening on the stress intensity factor, the weld induced residual stress in the outer lid of the original design was reduced from tensile stress to 40 ksi compression stress for a depth of 0.06 in at the outside surface (see Figure 21). The residual stress then varies linearly from 0.06 in. to 0.12 in. From this point on, the stress remains undisturbed. The stress intensity factor was calculated for the reduced stress profile and compared to the stress intensity factor previously calculated for the original stress profile as shown in Figure 22.

6.2.2.5 Uncertainty and Variability of Residual Stress and Stress Intensity Factor in WP

To characterize the uncertainty of the weld residual stress calculated by the finite element analysis, it is assumed that (1) the calculated residual stress is the mean (Sm); and (2) the residual stress has a normal distribution and bounded by ±(three standard deviations) of the mean. For the welds not subjected to any types of stress relief heat treatment (such as the weld in the outer closure lid of the original WP design), the uncertainty range within the two bounding stress at the inside surface of the closure lid is assumed to be ±35% of the yield strength of the material (Mohr 1996, p. 37). For the thinner inner lid of the outer barrier of the improved WP design, however, the range of variation is assumed to be ±20%. For welds that are subjected to induction heat annealing or laser peening (such as the dual lids of the outer barrier of the improved WP design), the range is assumed to be ±5% of the yield strength. The yield strength, Sy, of Alloy 22 is addressed in Sections 4.1.1 and 6.2.2.1. The yield strength at 120°C (257°F), i.e., the operation temperature of WP, is 46.72 ksi based on interpolation of data in CRWMS M&O (1999c, p. 33).

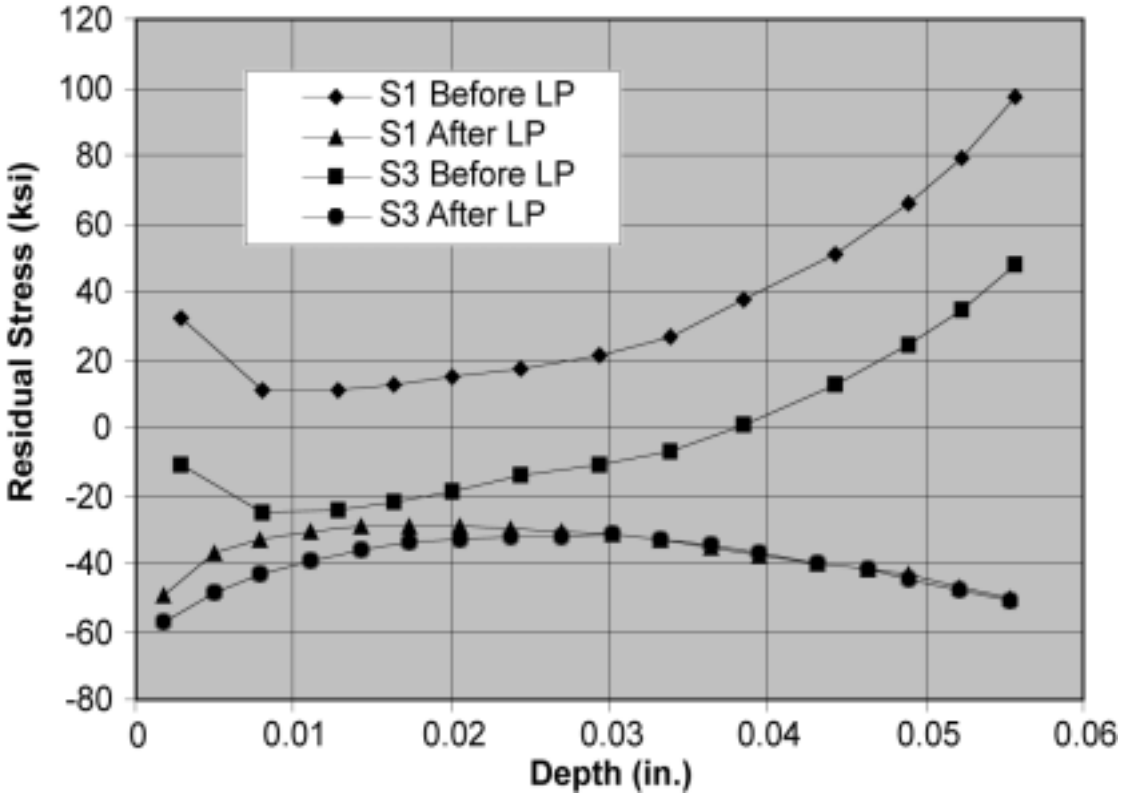


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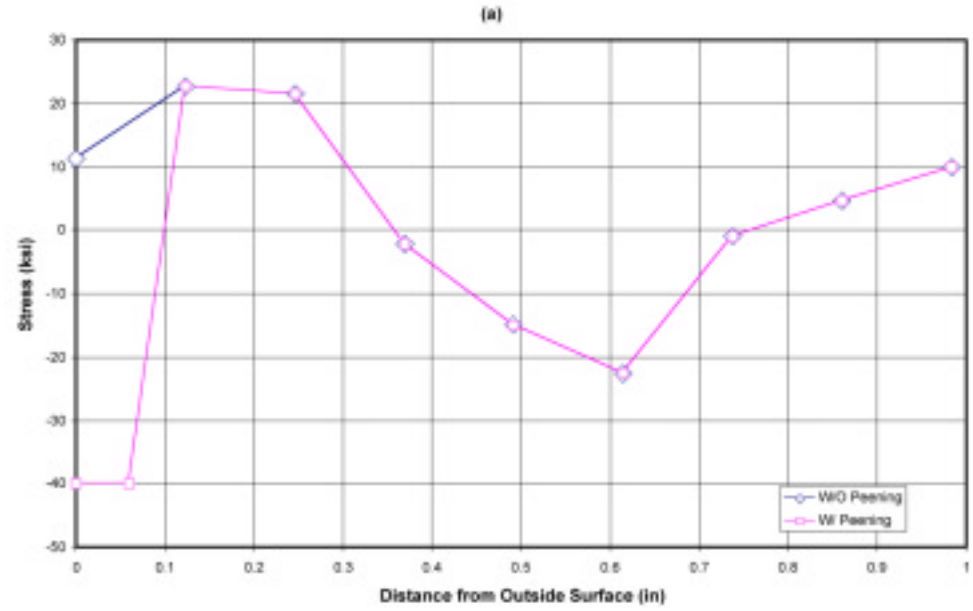
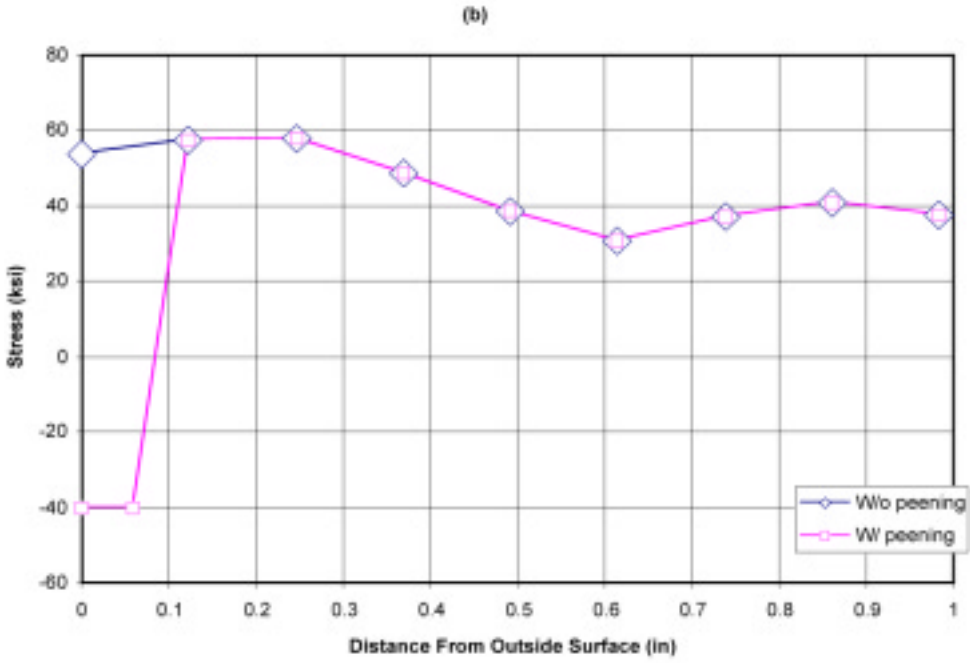
Figure 20. Mitigation of Weld Stress in Alloy 22 with Laser Peening

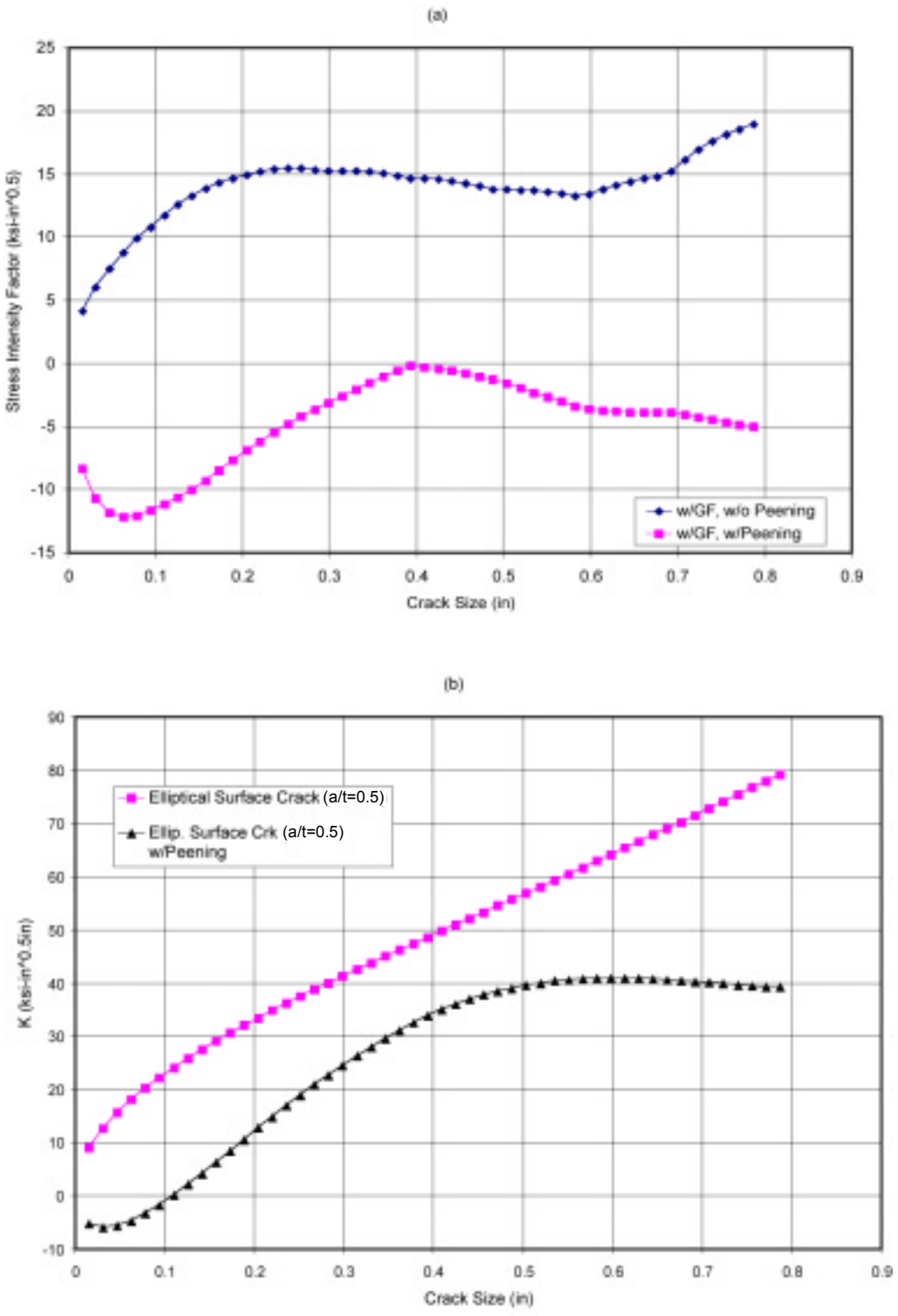




DTN: LL000319905924.144

NOTE: (a) Radial Stress, Sx
(b) Hoop Stress, Sz

Figure 21. Stress in Outer Lid with and without Laser Peening



DTN: LL000319905924.144

NOTE: (a) Stress Intensity Factor Plots due to Radial Stress
(b) Stress Intensity Factor Plots due to Hoop Stress

Figure 22. Stress Intensity Factors with and without Laser Peening

The minimum and maximum stresses, Smin and Smax, in the weld, therefore, can be obtained from the mean stress, Sm, by the following equations:

$$Smin = Sm(Sm,i - \Delta S)/Sm,i \quad \text{(Eq. 5)}$$

$$Smax = Sm(Sm,i + \Delta S)/Sm,i \quad \text{(Eq. 6)}$$

where Sm,i is the mean residual stress on inside surface and ΔS is one-half the difference between the maximum and minimum stresses at the inner surface (Smax,i and Smin,i) of the WP lid. For the welds not subjected to any types of stress relief heat treatment, ΔS = 0.35 Sy (or 0.25 Sy for the thinner inner lid of the outer barrier of the improved WP design and, for welds that are subjected to induction heat annealing or laser peening (such as the dual lids of the outer barrier of the improved WP design), ΔS = 0.05 Sy.

It was stated in Section 6.2.2.1 that, although the determination of weld residual stress for the WP welds is a three-dimensional problem, a two-dimensional axisymmetric modeling approach has been used for the finite element analyses of the weld residual stresses. The result of this assumption is that the stress distribution is axisymmetrical about the WP axial centerline, i.e., constant along the circumference. An investigation of cause of cracking in austenitic stainless steel piping (Klepfer 1975, Figure 9-95, pp. 9-119) indicated that the residual stress for a 26 inch pipe inside surface shows a sinusoidal distribution around the circumference with a range of about 5 ksi about the mean stress. Based on this conclusion, it is assumed that the variability of the mean stress along the circumference can be represented by the following equation:

$$Sm(\theta) = Sm(0^o) - \nabla S(1 - \cos(\theta)) \quad \text{(Eq. 7)}$$

where,

θ is the angle measured from a reference location ($\theta = 0^o$) on the circumference

∇S is taken to be 2.5 ksi.

Stress intensity factor is calculated from mean stress as described in Section 6.4.2.2 is assumed to be the mean stress intensity factor. Variability and uncertainty for stress intensity factor are handled similarly to those for stress because stress intensity factor is a linear function of stress.

Radial and hoop stress profiles and stress intensity profiles with uncertainty and variability are presented in Attachment I.

6.3 SCC MODEL A: THE THRESHOLD MODEL

6.3.1 Introduction

SCC is frequently discussed in terms of crack initiation (incubation and nucleation) and propagation (growth). However, there may be a gradual transition from crack initiation to crack growth with no separation of stages, or there may be a repeated succession of short steps of

initiation and growth. In any event, from an engineering standpoint, it is convenient to hypothesize the process in two generic stages, initiation and propagation.

The initiation stage is dominated by electrochemical factors that cause localized breakdown of oxide film, formation of corrosion pits and fissures, localized concentration of stress, and nucleation of SCC. In the propagation stage, the driving force for crack growth shifts its dominance from electrochemical factor to chiefly mechanical factors, which are generally characterized by the fracture mechanics based stress intensity factor, K_I. Others, however, believe that the same elements of film rupture and crack tip embrittlement contribute to both initiation and growth.

The Threshold Model assumes that there exists a threshold value of the stress intensity (K_{ISCC}) such that any pre-existing crack will not grow or is in an arrest state if $K_I(a, \sigma) < K_{ISCC}$. Pre-existing cracks are usually caused by manufacturing processes (especially welding).

The concept of threshold stress intensity factor (K_{ISCC}) has been commonly used to assess the susceptibility of material to SCC. The description of this concept can be found in Jones and Ricker (1987, pp. 145-163) and Sprowls (1987, pp. 245-292). The applicability of this model to Alloy 22 (the material to be used for the outer shell of the WP) was experimentally verified by Roy et al. (1998). Test results for Titanium GR-12 from Roy et al. (1998) are assumed to be applicable to Titanium GR-7 (material for the DS) and 316NG stainless steel (material for the inner shell of the WP). This assumption will be verified by ongoing and planned test activities at LLNL and elsewhere.

To apply the method, it is necessary to obtain values of (1) stress intensity factor $K_I(a, \sigma)$ as a function of crack size correspondent to the stress state at and near the crack site and (2) the threshold stress intensity factor K_{ISCC}. This method is considered to be conservative if the threshold K_{ISCC} can be accurately determined experimentally. This method is conservative because it ignores the fact that the crack growth does not necessarily lead to a failure state in cases where the stress intensity factor exceeds the threshold.

The calculations of stress intensity factor for the closure welds in the inner and outer lids of the WP were described in Section 6.2. A crack will be either circumferential or radial as shown in Figure 11.

6.3.2 Threshold Stress Intensity Factor

Currently, only limited experimental data are available for use to estimate the value of K_{ISCC} of Alloy 22 in waste package relevant environments. These data comprise those of DTN: LL000313105924.136 for Alloy 22 tested in 110°C BSW, and Roy et al. (1998) tested at LLNL in 5% NaCl acidic brine (pH = 2.7). Based on the results of DTN: LL000313105924.136 tested at a K_I of 30 MPa $(m)^{1/2}$ in 110°C BSW with a pH of ~13.4, it can be concluded that a K_{ISCC} of 30 MPa $(m)^{1/2}$ represents a reasonable mean value since DTN: LL000313105924.136 needed to periodically load cycle his compact tension test specimen to maintain SCC crack growth. Under fully constant load, the crack growth arrested indicating that the K_I value tested was very near the K_{ISCC} value. DTN: LL000313105924.136 results are corroborated by those of Roy et al. (1998).

Susceptibility to SCC of Alloy 22 was evaluated by Roy et al. (1998) using the National Association of Corrosion Engineers (NACE) Standard Double-Cantilever-Beam (DCB) Test (NACE 1990, Section 9, Method D) with wedge-loaded precracked DCB test specimens in deaerated acidic brine (pH ≈ 2.7) at 90°C. The NACE Standard DCB Test is a crack-arrest type of fracture mechanics test for measuring the resistance of metallic materials to propagation of SCC, expressed in terms of a critical stress intensity, K_{ISCC}.

Duplicate samples of each material were loaded at four different initial stress intensity factor (K_I) values ranging between 20 and 39 ksi $(in.)^{1/2}$ (or 22 and 43 Mpa $(m)^{1/2}$). Both metallography and compliance methods were used to determine the final crack length. The final stress intensity factor (K_f) for SCC was computed from the measured final wedge load and the average crack length. The results indicate that substantial crack growth occurred in alloy 22 specimens between two and five months. However, eight-month data suggest that the cracking may have arrested after five months, because no significant crack growth was observed between the five- and eight-month tests.

The final stress intensity factor K_f of Roy et al. (1998) is taken to be the SCC threshold value K_{ISCC}. In accordance with Roy et al. (1998, Table 1), the K_f values for the eight Alloy 22 specimens are 27.96, 28.73, 28.78, 29.58, 29.66, 30.94, 31.98, and 32.39 ksi $(in.)^{1/2}$ For quantification of uncertainty associated with K_{ISCC}, a normal distribution is assumed. The mean value, $(K_{ISCC})_M$, and the standard deviation, $(K_{ISCC})_\sigma$, can be calculated:

$$(K_{ISCC})_M = 30.00 \text{ ksi } (in.)^{1/2} \text{ or } 33.00 \text{ Mpa } (m)^{1/2} \quad \text{(Eq. 8)}$$

$$(K_{ISCC})_\sigma = 1.61 \text{ ksi } (in.)^{1/2} \text{ or } 1.77 \text{ Mpa } (m)^{1/2} \quad \text{(Eq. 9)}$$

The K_{ISCC} value can vary in accordance with different environmental conditions. In the absence of more data needed for the assessment of the variability of K_{ISCC}, the values obtained by DTN: LL000313105924.136 and the distribution derived from Roy et al. (1998) will be used for all Yucca Mountain conditions.

6.4 SCC MODEL B: THE SLIP DISSOLUTION MODEL

6.4.1 Introduction

Environmental cracking has historically been separated into "initiation" and "propagation" phases. This distinction is almost always arbitrary, for initiation is invariably defined as the time at which a crack can be detected optically, or when the load has relaxed by a specific amount (in a strain-controlled test); in these cases, initiation generally corresponds to a crack depth of significant metallurgical dimensions (e.g., ≥ 2 mm). A lifetime prediction model can be achieved via a fundamental understanding of the cracking mechanism. The formulation of such a fundamentally based model of crack propagation requires the choice of a working hypothesis for the cracking mechanism and the evaluation of the parameters of importance in the mechanism. For the systems of interest, the slip dissolution/film rupture mechanism has been chosen. This cracking mechanism has been successfully applied to model the SCC for stainless steel, low-alloy steel, and nickel-based alloys in light water reactor environments (Ford and Andresen 1988, pp. 798-800; Andresen and Ford 1994, pp. 61-70).

6.4.2 Slip Dissolution/Film Rupture Mechanism

In accordance with the slip dissolution/film rupture theory, crack advance is Faradaically related to the metal oxidation that occurs when the protective film at the crack tip is ruptured. Figure 23 (Ford and Andresen 1988, Figure 2; Andresen and Ford 1994, Figure 1) schematically shows the change in oxidation current and charge densities with time following the rupture of a protective film at the crack tip. The initial oxidation rate (and, hence, crack advance rate) will be rapid, typically controlled by activation or diffusion kinetics as the exposed metal rapidly dissolves. Availability of the balancing cathodic reduction current is also clearly necessary but is generally not limiting in hot water environments. However, in most (if not all) hot water cracking systems, a protective oxide reforms at the bared surface, and the rate of total oxidation (and crack tip advance) slows with time. Thus, crack advance can only be maintained if the film rupture process is repetitive. Therefore, for a given crack tip environment, corrosion potential, and metallurgical condition, crack growth will be controlled by the change in oxidation charge density with time and the frequency of film rupture at the strained crack tip. The latter parameter is determined by the fracture strain of the film, ε_f, and the strain rate at the crack tip, $\dot{\varepsilon}_{ct}$. By invoking Faraday's law, the average environmental crack growth rate, V_t, can be related to the strain rate at the crack tip, $\dot{\varepsilon}_{ct}$, by the following equation (Ford and Andresen 1988, Figure 2, p. 790; Andresen and Ford 1994, Figure 1, p. 62):

$$V_t = \frac{M}{z\rho F}\frac{Q_f}{\varepsilon_f}\dot{\varepsilon}_{ct} \qquad \text{(Eq. 10)}$$

where M, ρ = atomic weight and density of the crack tip metal
F = Faraday's constant
z = number of electrons involved in the oxidation of a metal atom
Q_f = oxidation charge density per film rupture
ε_f = fracture strain of the film

The time, t_f, to reach the fracture strain, ε_f, is:

$$t_f = \varepsilon_f / \dot{\varepsilon}_{ct} \qquad \text{(Eq. 11)}$$

Figure 24 show the schematic of oxidation current density vs. time following repeated oxide rupture events. Repassivation current transients exhibit an initially high bare surface dissolution current density, i_o, at an initial short time, t_o. Thereafter, oxide growth (or thickening) leads to a decay in the oxidation current density which often follows a power law relationship:

$$i_t = i_o\left[\frac{t}{t_o}\right]^{-n} \qquad \text{(Eq. 12)}$$

Because of this power law relationship, Equation 11 can be reformulated as follows (Andresen and Ford 1994, Equation 1, p. 62):

$$V_t = A(\dot{\varepsilon}_{ct})^n \qquad \text{(Eq. 13)}$$

where "A" and "n" are constants taken from the measured repassivation response. "n" is the slope on a log-log plot from Equation 12. These constants depend on the material and environment compositions at the crack tip.

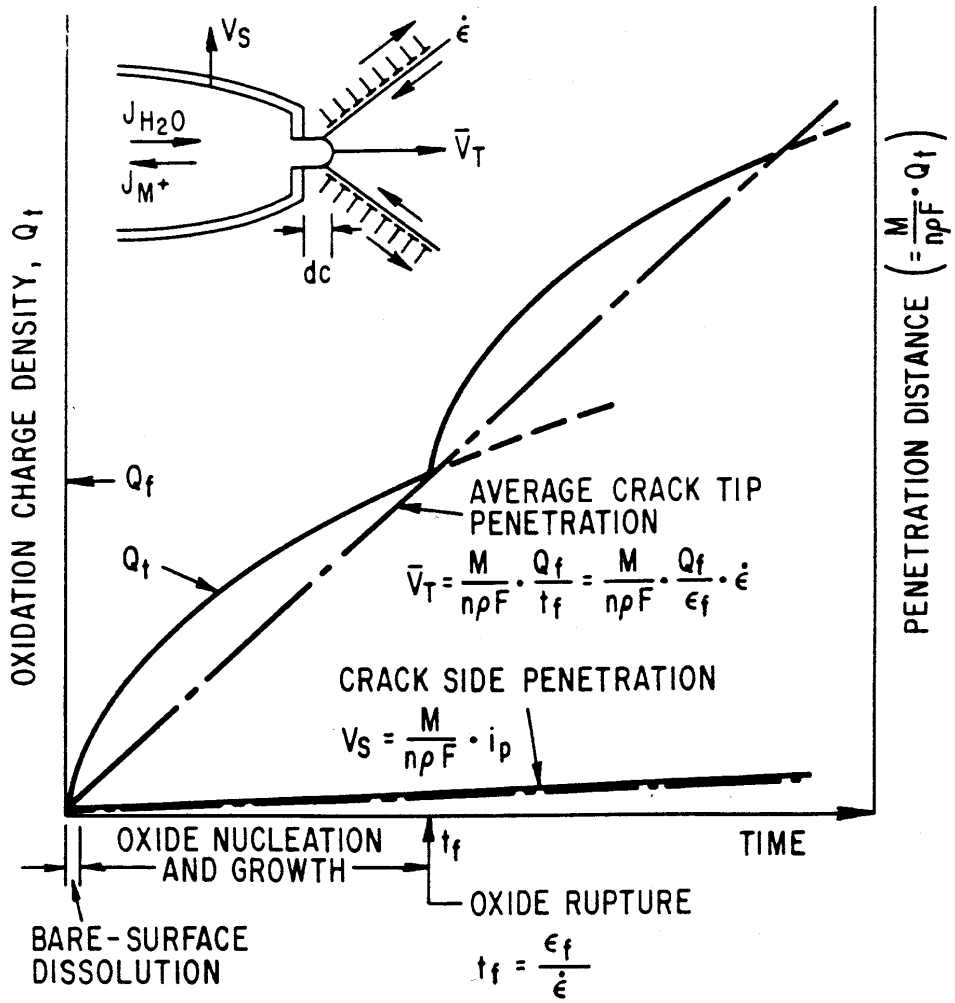


Figure 23. Schematic Oxidation Charge Density Versus Time for a Strained Crack Tip and Unstrained Crack Sides in the Slip Dissolution Mechanism

If a bare surface condition is maintained at the crack tip (i.e., $\varepsilon_f/\dot{\varepsilon}_{ct} < t_o$, or $t_f < t_o$), a maximum crack growth rate should result. Integration of Equation 12 leads to:

$$Q_f = \int_0^{t_f} i_t dt = i_o(t_f) = i_o\left(\varepsilon_f \Big/ \dot{\varepsilon}_{ct}\right) \qquad \text{(Eq. 14)}$$

Substitution of Equation 14 into Equation 10 yields the predicted maximum environmental crack growth rate:

$$V_{max} = \frac{M}{z\rho F} i_o \qquad \text{(Eq. 15)}$$

This expression for the maximum environmental crack growth rate is the quantitative basis for the early observations (discussed earlier in this section) relating the maximum oxidation current density on a straining surface to the maximum crack growth rate. However, these early correlations were obtained primarily for alloys in concentrated environments (boiling $MgCl_2$, 9M NaOH solutions, etc.) under dynamic straining conditions. By comparison, in relatively dilute environments it is expected that (a) the passivation rate can be high (e.g., in unaggressive chemistries or for lower-susceptibility materials) and thus "n" (in Equation 12) will be high; (b) the onset of repassivation is rapid, and thus t_o will be short; and (c) under constant load or displacement conditions, the periodicity of oxide rupture, $\varepsilon_f/\dot{\varepsilon}_{ct}$, will be much greater than t_o. Consequently, the oxidation charge rate Q is given by the following equation:

$$Q_f = \int_0^{t_f} i_t dt = \frac{i_o t_o^n}{(1-n)\left(\varepsilon_f \Big/ \dot{\varepsilon}_{ct}\right)^{n-1}} \qquad \text{(Eq. 16)}$$

Under these circumstances, a bare surface will not be maintained at the crack tip, and the crack propagation rate will be given by the substitution of Equation 16 into Equation 10:

$$V_t = \frac{M}{z\rho F} \frac{i_o t_o^n}{(1-n)\varepsilon_f^n} \dot{\varepsilon}_{ct}^n \qquad \text{(Eq. 17)}$$

This is an expanded version of Equation 13 and relates the parameters "A" and "n" to the specific oxidation rates (e.g., Equation 12) and the fracture strain of the oxide at the crack tip:

$$A = \frac{M}{z\rho F} \frac{i_o t_o^n}{(1-n)\varepsilon_f^n} \qquad \text{(Eq. 18)}$$

6.4.3 Model Quantification

Based on the assumption that the repassivation current follows a power law response (i.e., Equation 12), the Faradaic relationship between the oxidation rate following oxide rupture and crack advance increment per time (growth rate, V_t), coupled with the relationship between crack tip strain rate, $\dot{\varepsilon}_{ct}$ and periodicity of oxide rupture, distills to the appealing and elegant expression shown in Equation 13.

Evaluation of the crack advance mechanism leads to the conclusion that the film rupture/slip oxidation mechanism represents a justifiable model for hot water systems that is capable of being quantatively evaluated. The mechanism is justifiable because almost all engineering alloys depend on the presence of a stable oxide film to act as a kinetic barrier to rapid dissolution/oxidation, especially in hot water. It is quantifiable, because predictions result directly from measurements of repassivation kinetics, typically obtained by rapidly straining wires of base alloy or synthetic (e.g., representative of the grain boundary) composition (see Figure 24).

In accordance with Andresen and Ford (1994, p. 62), the model can be quantified by evaluating the following processes: (1) the steady-state and transient compositions of the environment at the crack tip as a function of the conditions in the bulk (external) solution; (2) the oxidation rates for the material/environmental system expected at a strained crack tip; and (3) the oxide fracture strain and the crack tip strain rate, defined in terms of engineering parameters such as the stress intensity factor. For practical application, empirical approaches have been used for the model quantification processes.

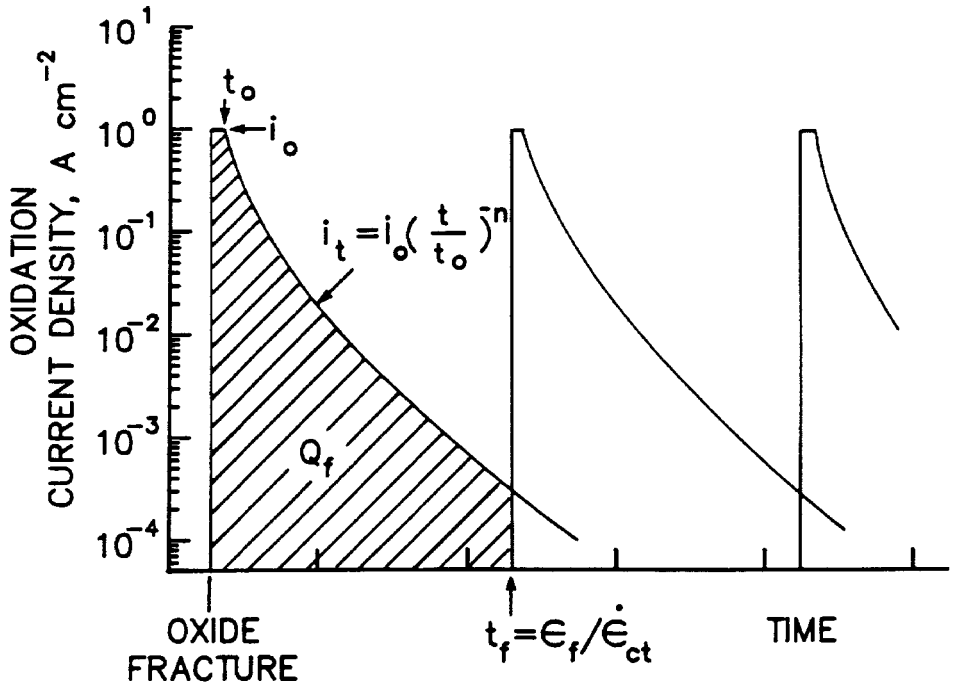
The initial application of the slip dissolution/film rupture model was on the quantitative prediction of cracking in austenitic type 304/316 stainless steels in 288^{o}C high-purity BWR water (Ford and Andresen 1988) The model quantification processes can be summarized by the following steps:

Step 1

Measurements of n can be obtained from repassivation tests based on the assumption that the repassivation current follows a power law response (Equation 12). Those tests typically involve rapidly straining wires to increase the anodic passive current density, and subsequently measuring the decay of the passive current density with time.

Step 2

Once n is known, the value of A can be determined from Equation 18 which relates the parameters “A” and “n” to the specific oxidation rates and the fracture strain of the oxide at the crack tip. Alternatively, “A” can be directly determined from “n” empirically. The empirical determination of A is based on SCC crack growth tests that measure the crack growth rate V_t at specific crack tip strain rate $\dot{\varepsilon}_{ct}$. The value of A is then calculated in accordance with Equation 13 from n, V_t and $\dot{\varepsilon}_{ct}$.



$$V = \frac{da}{dt} \; ; \; \bar{V}_{av} = \frac{M}{Z\zeta F} \cdot \frac{Q_f}{t_f}$$

FOR HIGH $\dot{\epsilon}_{ct}$ AND/OR LONG t_o :

$$\bar{V}_{av} = \frac{M}{Z\zeta F} \cdot i_o$$

FOR LOW $\dot{\epsilon}_{ct}$ AND/OR SHORT t_o :

$$\bar{V}_{av} = \frac{M}{Z\zeta F} \frac{i_o t_o^n}{(1-n)\epsilon_f^n} \dot{\epsilon}_{ct}^n = f(n)\, \dot{\epsilon}_{ct}^n$$

Figure 24. Schematic of Oxidation Current Density Versus Time Following Repeated Oxide Rupture Events

A plot of A versus n is shown in Figure 6 of Ford and Andresen 1988. It is observed from the plot that A can be expressed in terms of n by the following formulation:

$$A = 7.8 \times 10^{-3}\, n^{3.6} \qquad \text{(Eq. 19)}$$

Substitution of Equation 19 into Equation 13 leads to:

$$V_t = 7.8 \times 10^{-3}\, n^{3.6}\, (\dot{\varepsilon}_{ct})^n \qquad \text{(Eq. 20)}$$

where V_t has the unit of cm/s and $\dot{\varepsilon}_{ct}$ has the unit of s^{-1}

For 304 stainless steel in 288°C water, Figure 25 (Ford and Andresen. 1988, Figure 7, p. 791) indicates that Equation 20 with n = 0.54 is a good prediction model for observed crack growth rate versus crack tip strain rate relationships.

The crack tip strain rate, $\dot{\varepsilon}_{ct}$, in Equation 20 is related to the engineering stress parameters (such as the stress intensity factor) via the formulations in the Table 1 of Ford and Andresen (1988). For constant load, the relationship is:

$$\dot{\epsilon}_{ct} = 4 \times 10^{-14}\, K_I^4 \qquad \text{(Eq. 21)}$$

where the stress intensity factor K_I is in MPa $(m)^{1/2}$.

For constant load, substituting Equation 21 in Equation 13 leads to the following alternative crack growth rate equation:

$$V_t = \overline{A}(K_I)^{\overline{n}} \qquad \text{(Eq. 22)}$$

where

$$\overline{A} = A\left(4.1 \times 10^{-14}\right)^n \qquad \text{(Eq. 23)}$$

$$\overline{n} = 4n \qquad \text{(Eq. 24)}$$

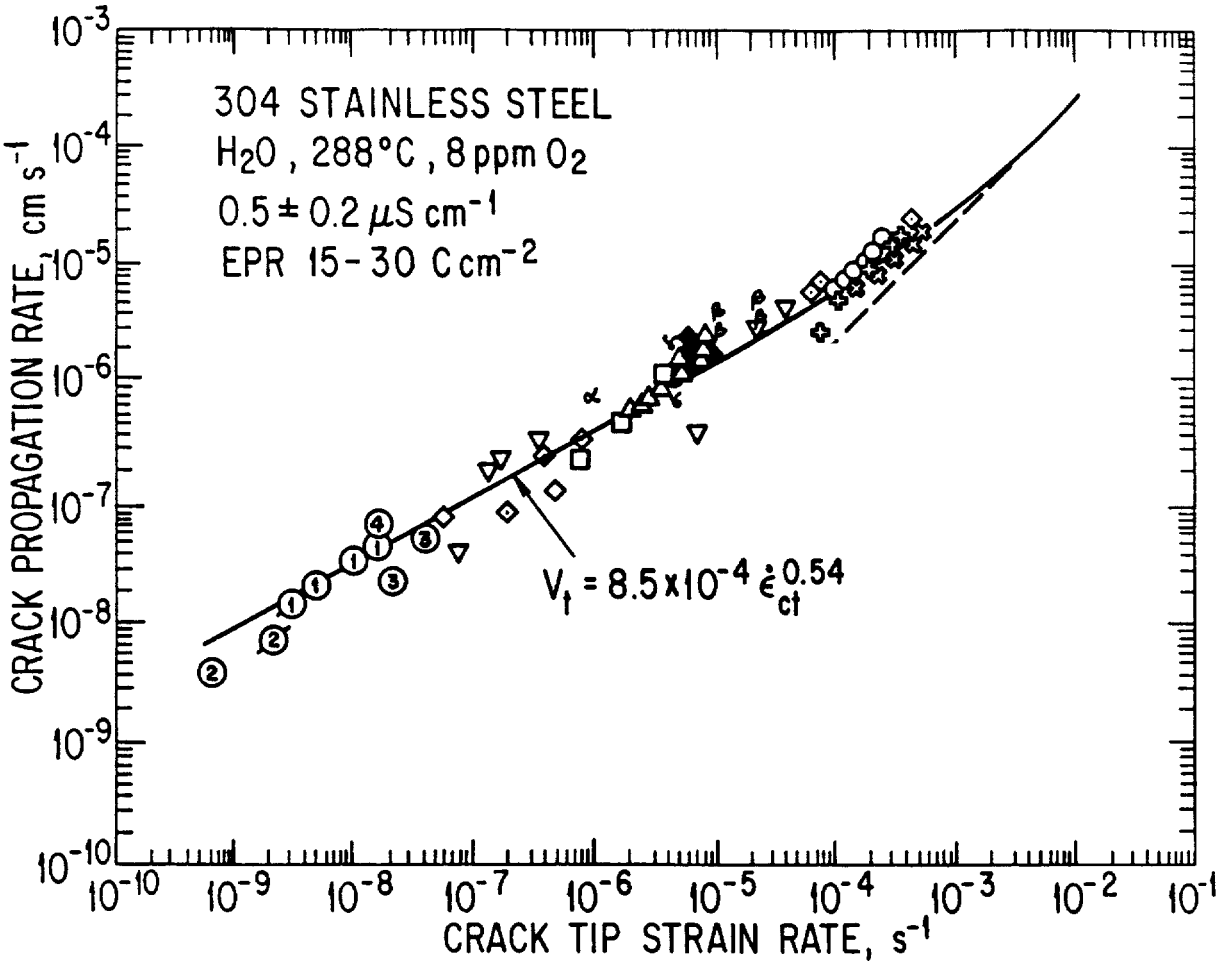


Figure 25. Crack Growth Rate (Presented by Observed Data Points and Predicted Curve) vs. Crack Tip Strain Rate for Sensitized Type 304 Stainless Steel in Oxygenated 288°C Water

6.4.4 Adaptation of Slip Dissolution Model To Alloy 22

Andresen and Ford (1994, p. 62), indicated that the slip dissolution model have been applied to stainless steels, low alloy and carbon steels, ductile nickel alloys, and irradiated stainless steels. Ford and Andresen (1988, p. 789), also used the slip dissolution model for 304/316L stainless steel, A533B/A508 low alloy steel and Inconel 600/182 nickel-based alloys. Therefore, there is ample reason to hypothesize that SCC of nickel-based alloy 22 occurs by the same fundamental mechanism characterized by the slip dissolution SCC model, i.e., Equation 13:

$$V_t = A\ (\dot{\varepsilon}_{ct})^n$$

The model quantification processes described in Section 6.4.3 for stainless steels are also applicable to alloy 22. However, pending the development of applicable data for Alloy 22, the model quantification for Alloy 22 has to be developed on the following assumptions:

(1) The relationship between A and n described by Equation 19 for stainless steels, with V_t in cm/s and K_I in MPa $(m)^{1/2}$, is also applicable to Alloy 22, i.e.,

$$A = 7.8 \times 10^{-3} n^{3.6}$$

For V_t in mm/s and K_I in MPa $(m)^{1/2}$, Equation 19 becomes:

$$A = 7.8 \times 10^{-2} n^{3.6} \quad \text{(Eq. 25)}$$

(2) For constant load condition, the alternative crack growth formulation, i.e., Equation 22, can be used:

$$V_t = \overline{A}(K_I)^{\overline{n}}$$

where $\overline{A}$ and $\overline{n}$ are expressed by Equations 23 and 24, respectively:

$$\overline{A} = A\left(4.1 \times 10^{-14}\right)^n$$

$$\overline{n} = 4n$$

For V_t in mm/s and K_I in MPa $(m)^{1/2}$, Equation 23 becomes:

$$\overline{A} = 7.8 \times 10^{-2} n^{3.6} \left(4.1 \times 10^{-14}\right)^n \quad \text{(Eq. 26)}$$

In summary, for constant load condition with V_t in mm/s and K_I in MPa $(m)^{1/2}$, the crack growth formulation is expressed by the following equation (or Equation 22):

$$V_t = \overline{A}(K_I)^{\overline{n}} \quad \text{(Eq. 27)}$$

where $\overline{A}$ and $\overline{n}$ are expressed by Equations 26 and 24, respectively:

$$\overline{A} = 7.8 \times 10^{-2} n^{3.6} \left(4.1 \times 10^{-14}\right)^n \quad \text{(Eq. 28)}$$

$$\overline{n} = 4n \quad \text{(Eq. 29)}$$

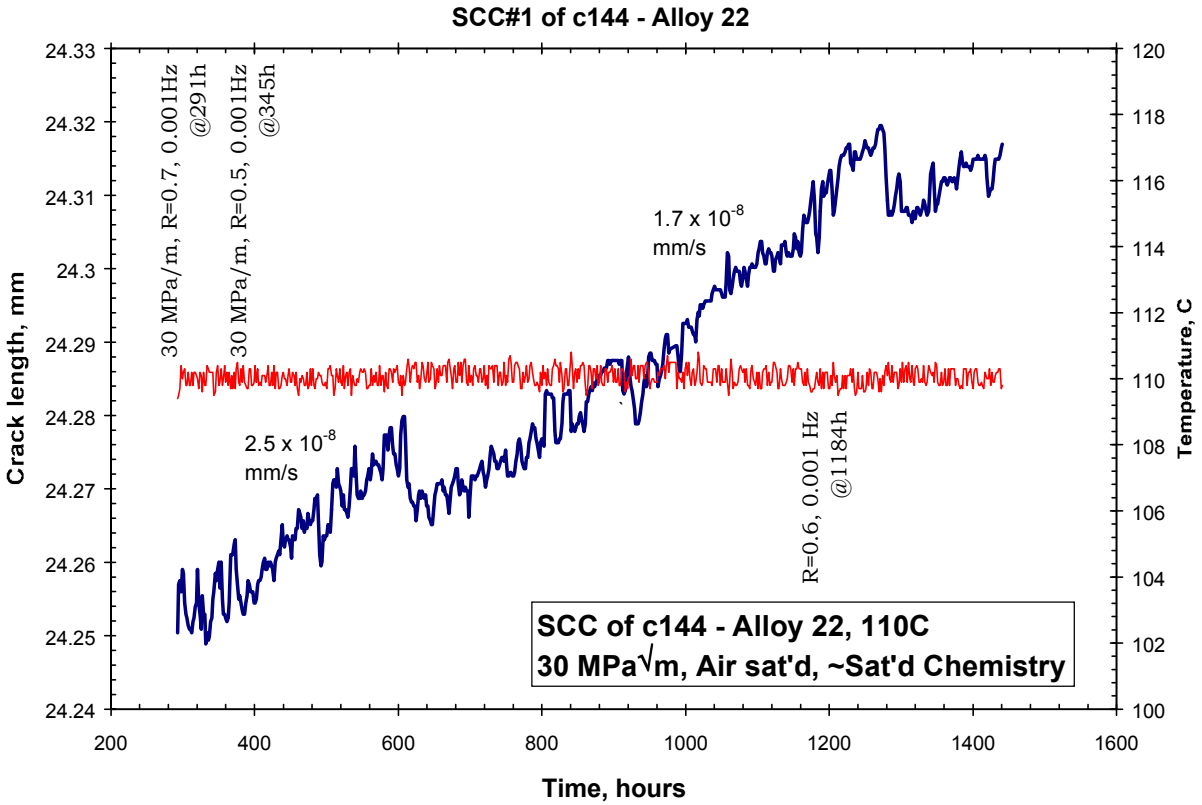
(3) The repassivation slope "n" is potentially more complex, although it is quantifiable, because predictions result directly from measurements of repassivation kinetics, typically obtained by rapidly straining wires of base alloy or synthetic (e.g., representative of the grain boundary) composition. However, in the absence of repassivation test data, an alternative approach has been followed.

The characterization of the slip dissolution model is that the SCC susceptibility decreases with increased n value. For 304 stainless steel in 288°C water with 0.5 μS cm^{-1} solution

conductivity, Ford and Andresen (1988, Figure 7, p. 791) indicates that n = 0.54 is a good prediction model for observed crack growth rate versus crack tip strain rate relationships. Therefore, for a highly SCC resistant material Alloy 22, the suggestion of n = 0.75 is likely to be appropriate

Recent SCC crack growth test results forAlloy 22 at 110°C and K_I = 30 MPa $(m)^{1/2}$ in a concentrated mixed salt environment for 1400 hours are depicted by Figure 26 (DTN: LL000313105924.136) which indicates an average crack growth rate about 2.1 x 10^{-8} mm/s. Use of Equations 22, 23, and 24 leads to a value of 0.84 for n (or 3.36 for $\bar{n}$ based on Equation 28 or 33).

For quantification of the uncertainty associated with n, 0.75 and 0.84, respectively, are assumed to represent the lower and upper bounds of n and a uniform distribution between the bounds is also assumed. $\bar{A}$ and $\bar{n}$ are then determined by Equations 28 and 29, respectively. The variability of n as a function of environmental factors is not available due to lack of data. A constant value is assumed for n.



DTN: LL000313105924.136

NOTE: Alloy 22 base metal at 110°C in a concentrated mixed salt environment with 5 psi over-pressure of laboratory air.

Figure 26. Crack Length and Temperature vs. Time Plot of the Stress Corrosion Cracking Response of Specimen c144

Ongoing and planned experimental activities at LLNL are designed to provide a more complete data base for quantifying the parameters "A" and "n" of the slip dissolution/film rupture crack growth model. The available data will be incorporated in a future version of this AMR.

6.5 MISCELLANEOUS TOPICS

6.5.1 Application of Threshold Stress Intensity Factor Model

Crack Size Distribution

Crack size is characterized by its depth and length. Size distribution of crack depth for pre-existing manufacture defects in WP closure weld is presented in CRWMS M&O (2000, Figure 6.2-4) in terms of probability of exceedance of the flaw size. Each of the curves in CRWMS M&O (2000, Figure 6.2-4) is associated with a flaw existence rate and can be used to determine the size (depth) of the flaw to be used in the crack growth simulation.

In order to determine the crack length, the following assumptions are considered:

(1) Surface flaws are semi-elliptical in shape with depth "a" and length "2c".

(2) The aspect ratio (γ) is the ratio of one-half of crack length ("c") vs. crack depth ("a"), i.e., $\gamma = c/a$. A semi-circular flaw has an aspect ratio of 1 ($\gamma = 1$).

(3) A crack maintains its aspect ratio during its growth until the depth reaches the wall thickness. Then, at this point, the shape instantaneously turns into a rectangular one.

(4) The crack aspect ratio is 1 for radial cracks in the closure weld.

(5) The crack aspect ratio is greater than 1 for circumferential cracks and assumes an exponential distribution based on one of the formulations given in Harris et al. (1981, Equation 2-10, p. 29):

$$P\gamma(>\gamma) = e^{-(\gamma-1)/\lambda} \qquad \text{(Eq. 30)}$$

where λ is the standard deviation of γ and assumes the value of 0.7. From Equation 30, the mean and median values (γ_{mean} and γ_{50}) and the standard deviation (γ_{sd}) of γ can be obtained by the following formulas.

$\gamma_{mean} = 1 + \lambda = 1.7$
$\gamma_{50} = 1 + \lambda \ln 2 = 1.485$
$\gamma_{sd} = \lambda = 0.7$

6.5.2 Application of Slip Dissolution Model

Threshold stress–It is generally assumed that crack initiation will not occur if the stress is below a threshold value. As a conservative estimate, the lower bound of this threshold stress was taken to be 20% of the yield strength while an upper bound for this was 30% of the yield strength. A uniform distribution between the lower bound and the upper bound was assumed to address the uncertainty of the threshold stress. The variability of the threshold stress versus temperature is represented by the variability of the yield strength as a function of the temperature. The yield strength of Alloy 22 at the operating temperature of WP (125°C or 257°F) is about 46.72 ksi (CRWMS M&O 1999c, p. 33).

Density of incipient cracks–Due to the lack of information on this subject, it is assumed that there always exits one insipient crack in each of the patches. Multiple cracks may grow together but only one becomes predominant.

Distribution of insipient crack size–The distribution of insipient cracks is assumed to be an exponential one with a maximum possible size of a_{max} = 0.05 mm and a median size a_{50} = 0.02 mm. Thus, the distribution can be expressed as follows:

$$P(a) = \frac{e^{-a/a_o}}{a_o\left(1-e^{-a_{max}/a_o}\right)} \qquad \text{(Eq. 31)}$$

where a_o is related to a_{max} and a_{50} by the following equation:

$$1 - 2e^{(-a_{50}/a_o)} + e^{(-a_{max}/a_o)} = 0 \qquad \text{(Eq. 32)}$$

For a_{max} = 0.05 mm and a median size a_{50} = 0.02 mm, a_o = 0.061 mm and the mean value is a_{mean} = 0.023 mm.

The complementary cumulative function is

$$P(>a) = P(a)a_o\left(1-e^{-\frac{a_{max}-a}{a_o}}\right) \text{ for } a \le a_{max} \qquad \text{(Eq. 33)}$$

Where P(>a) is the probability of exceedance function which determines the probability of having a crack of size > a. It can be seen that P(>0), probability of having a crack size > 0, is 1 and P(>a_{max}), probability of having a crack size > 0.05 mm is 0.

6.5.3 Patch Size for Performance Assessment

The surface of the WP is divided into many rectangular patches in the performance assessment. Patch size in terms of width and length will be determined by the size of the closure weld as well as the stress distribution in and near the weld since failure can only occur in the closure weld.

The width of a patch should be at least equal to the width of the weld (about 0.5 inches). Based on stress distributions shown in Figures 5 to 10, stress decay is observed at location away from the weld/metal interface. It is estimated that a patch width of 2 inches is sufficient to cover significant stress distribution. The length of the patch along the direction of the circumference is assumed to be equal to the width of the patch.

6.5.4 Estimate of Crack Opening

Leak through a crack can occur if the crack grows into a through-thickness crack. Leak rate depends on the size of crack opening, among other factors. A comprehensive finite element analysis may be attempted in order to estimate the crack opening. A simplified approach, however, is described. The following assumptions are made for the simplified approach:

1. A crack is either circumferential (perpendicular to the radial stress) or radial (perpendicular to the hoop stress) in the outer surface of the closure weld of the WP.

2. According to Section 6.5.1, a circumferential crack is assumed to have a semi-elliptical shape with depth "a" and length "2c". The length of a circumferential crack is determined by an exponential distribution described by Equation 30. The aspect ratio "c/a" for a radial crack is assumed to be "1", i.e., a semi-circular crack (c = a).

3. The crack length "2c" of a circumferential crack remains unchanged but the final length of a through-wall crack is at least twice the wall thickness. Under this assumption, most cracks will grow in both directions of the minor (depth "a") and major (length "2c") axes and assume the semi-circular shape (i.e., a = c) when they become through-wall cracks. According to fracture mechanics (Ewalds and Wanhill 1984, Section 2.5, p. 43), "a" tends to grow faster than "c" because the stress intensity factor tends to have a maximum value at the end of the minor axis and a minimum value at the end of the major axis. So eventually a semi-elliptical crack will become a semi-circular crack. The crack length "2c" will remain unchanged only for very long cracks with initial crack length greater than twice the wall thickness. For such long cracks, the occurrence rate is usually very low. The length of a semi-circular crack will always be equal to twice the crack depth.

4. The crack opening has an elliptical shape with length "2c" and a gap "δ."

Tada et al. (1973, p. B.5), showed that the opening of a crack, δ, with length 2c in an infinite sheet is given for plane stress condition as:

$$\delta = \frac{(4c)\sigma}{E} \qquad \text{(Eq. 34)}$$

where σ = stress
E = Young's modulus

The opening area, A_{cr}, for an elliptical crack, therefore, can be estimated by:

$$A_{cr} = \frac{\pi}{4}\delta(2c) = \frac{\left(2\pi c^2\right)\sigma}{E} \qquad \text{(Eq. 35)}$$

When Equations 34 and 35 are used to estimate the crack opening and opening area, σ is the maximum stress across the thickness of either the radial stress (for a circumferential crack) or the hoop stress (for a radial crack).

7. CONCLUSIONS

Two alternative models that deal with SCC have been adopted for the performance assessment of the material (Alloy 22) to be used for the WP outer barrier of the Enhanced Design Alternative II (EDA II) of the Yucca Mountain Program. Both models will be used in the performance assessment due to the critical functional requirement of the WP.

The first model (the Threshold Model) is based on the theory that there exists a threshold value (K_{ISCC}) for the stress intensity factor such that there is no growth of a pre-existing crack or flaw having a stress intensity factor less than the threshold value. The concept of threshold stress intensity factor (K_{ISCC} or K_{th}) has been commonly used to assess the susceptibility of material to SCC. The description of this concept can be found in Jones and Ricker (1987, pp. 145-163), and Sprowls (1987, pp. 245-282). The applicability of this model to Alloy 22 (the material to be used for the outer shell of the WP) was experimentally validated by Roy et al. (1998).

The second model (the Slip Dissolution/Film Rupture Model) relates crack initiation and the subsequent advance to the metal oxidation that occurs when the protective film at the crack tip is ruptured. The theory of slip dissolution and film rupture was successfully applied to assess the SCC crack propagation for light water reactors at high temperature. This model was adopted to assess the SCC capability of the materials to be used for the outer barrier of the WP (Alloy 22).

Model validation in this AMR has been accomplished by comparing experimental measurements of key model parameters to corroborative data available from the open scientific literature. Model parameters and the associated uncertainty and variability for both SCC models have been quantified. The application of the SCC models to the WP also requires input of weld residual stress profiles and stress intensity factor profiles along with uncertainty and variability. These input quantities have been developed for two alternative designs of the WP, i.e., the original design and an improved design. The improved design has incorporated special stress mitigation procedures used to eliminate or minimize the tensile weld residual stress in the final closure welds of the WP.

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The following data tracking numbers (DTNs) have been assigned to the data developed in this AMR:

- DTN: LL000315905924.139
- DTN: LL000316005924.140
- DTN: LL000316105924.141
- DTN: LL000319805924.143
- DTN: LL000319905924.144
- DTN: LL000320005924.145

8. INPUTS AND REFERENCES

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ATTACHMENT I

STRESS AND STRESS INTENSITY FACTOR PROFILES WITH UNCERTAINTY AND VARIABILITY

This attachment contains three Excel files: S&K_OL_Unan (stress and stress intensity factor profiles for the outer lid of the original WP design), S&K_OL_Anne (stress and stress intensity factor profiles for the outer lid of outer barrier of the improved WP design), and S&K_IL_Peen (stress and stress intensity factor profiles for the inner lid of outer barrier of the improved WP design).

The Excel File "S&K_OL_Unan" DTN: LL000315905924.139 contains the following six items:

a) UnAnneal,Sx – Excel tables containing radial stress and stress intensity factor profiles as a function of depth at location designated as 0, 18, 36, 54, 72, and 90 degrees along the circumference of the closure weld. Mean, maximum and minimum stress and stress intensity values are given at each of the locations to characterize uncertainty. Stress and stress intensity factor profiles are presented in the first table by British units, i.e., stress in ksi, distance in inches and stress intensity factor in ksi $(in)^{1/2}$ and in the second table by metric units, i.e., stress in MPa, distance in "m" and stress intensity factor in MPa $(m)^{1/2}$. The variability of the mean stress along the circumference is represented by Eq. 7.

   Mean stress intensity factor is calculated from mean stress at 0 degree. Variability and uncertainty for stress intensity factor are handled similarly to those for stress because stress intensity factor is a linear function of stress.

b) UnAnneal,SxPlt – Plot depicting mean, minimum and maximum radial stress profiles at 0 degree.

c) UnAnneal,KSxPlt – Plot depicting mean, minimum and maximum radial stress intensity factor profiles at 0 degree.

d) UnAnneal,Sz - Excel tables containing hoop stress and stress intensity factor profiles as a function of depth at location designated as 0, 18, 36, 54, 72, and 90 degrees along the circumference of the closure weld.

e) UnAnneal,SzPlt - Plot depicting mean, minimum and maximum hoop stress profiles at 0 degree.

f) UnAnneal,KSzPlt - Plot depicting mean, minimum and maximum hoop stress intensity factor profiles at 0 degree.

a) UnAnneal,Sx

Results in Metric Unit start in Cell A80

Angle(deg):	0						18					
(rad):	0						0.3141593					
	Scale Factor:	1	2.6109966		-0.610997			0.9880888	2.6109966		-0.610997	
	Mean		Min - Insided Surface		Max-Inside Surface		Mean		Min - Insided Surface		Max-Inside Surface	
Depth	Stress: Sx	K(Sx) w/GF	Stress: Sx	K(Sx) w/GF	Stress: Sx	K(Sx) w/GF	Stress: Sx	K(Sx) w/GF	Stress: Sx	K(Sx) w/GF	Stress: Sx	K(Sx) w/GF
(in)	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5
0.0157	17.3262	4.1085	45.2386	10.7273	-10.5862	-2.5103	17.2038	4.0596	44.9191	10.5995	-10.5115	-2.4804
0.0315	17.6440	5.9900	46.0684	15.6400	-10.7804	-3.6599	17.5216	5.9187	45.7489	15.4537	-10.7057	-3.6163
0.0472	17.8266	7.4983	46.5451	19.5782	-10.8920	-4.5815	17.7042	7.4090	46.2256	19.3450	-10.8172	-4.5269
0.0630	17.8825	8.7749	46.6910	22.9112	-10.9261	-5.3614	17.7601	8.6704	46.3716	22.6383	-10.8514	-5.2976
0.0787	17.8171	9.8632	46.5205	25.7528	-10.8862	-6.0264	17.6948	9.7457	46.2010	25.4461	-10.8114	-5.9546
0.0945	17.6360	10.7773	46.0475	28.1394	-10.7755	-6.5849	17.5136	10.6489	45.7280	27.8042	-10.7008	-6.5064
0.1102	17.3475	11.7022	45.2942	30.5544	-10.5992	-7.1500	17.2251	11.5628	44.9747	30.1904	-10.5245	-7.0648
0.1260	16.9541	12.5457	44.2672	32.7569	-10.3589	-7.6654	16.8318	12.3963	43.9477	32.3667	-10.2842	-7.5741
0.1417	16.4671	13.2583	42.9956	34.6173	-10.0614	-8.1008	16.3448	13.1003	42.6761	34.2050	-9.9866	-8.0043
0.1574	15.8904	13.8403	41.4899	36.1370	-9.7090	-8.4564	15.7681	13.6754	41.1704	35.7066	-9.6342	-8.3557
0.1732	15.2257	14.2933	39.7543	37.3197	-9.3029	-8.7331	15.1034	14.1230	39.4348	36.8752	-9.2281	-8.6291
0.1889	14.4876	14.6316	37.8270	38.2031	-8.8519	-8.9399	14.3652	14.4573	37.5075	37.7480	-8.7771	-8.8334
0.2047	13.6728	14.9314	35.6997	38.9857	-8.3540	-9.1230	13.5505	14.7535	35.3802	38.5214	-8.2793	-9.0143
0.2204	12.7979	15.2005	33.4153	39.6884	-7.8195	-9.2874	12.6756	15.0194	33.0958	39.2156	-7.7447	-9.1768
0.2362	11.8580	15.3600	30.9611	40.1050	-7.2452	-9.3849	11.7356	15.1771	30.6417	39.6273	-7.1704	-9.2731
0.2519	10.8710	15.4278	28.3843	40.2820	-6.6422	-9.4263	10.7487	15.2441	28.0648	39.8022	-6.5674	-9.3141
0.2676	9.8375	15.4084	25.6857	40.2312	-6.0107	-9.4145	9.7152	15.2249	25.3662	39.7520	-5.9359	-9.3023
0.2834	8.7565	15.3059	22.8633	39.9638	-5.3502	-9.3519	8.6342	15.1236	22.5438	39.4878	-5.2755	-9.2405
0.2991	7.6480	15.2077	19.9689	39.7071	-4.6729	-9.2918	7.5256	15.0265	19.6494	39.2342	-4.5981	-9.1812
0.3149	6.5040	15.2416	16.9819	39.7959	-3.9739	-9.3126	6.3816	15.0601	16.6624	39.3219	-3.8992	-9.2017
0.3306	5.3452	15.2188	13.9562	39.7363	-3.2659	-9.2987	5.2228	15.0376	13.6367	39.2630	-3.1911	-9.1879
0.3464	4.1630	15.1360	10.8695	39.5200	-2.5435	-9.2480	4.0406	14.9557	10.5500	39.0493	-2.4688	-9.1379
0.3621	2.9785	15.0102	7.7769	39.1915	-1.8199	-9.1712	2.8562	14.8314	7.4574	38.7247	-1.7451	-9.0619
0.3779	1.7830	14.8376	4.6554	38.7409	-1.0894	-9.0657	1.6607	14.6609	4.3360	38.2795	-1.0147	-8.9577
0.3936	0.5977	14.6343	1.5606	38.2102	-0.3652	-8.9415	0.4754	14.4600	1.2412	37.7551	-0.2904	-8.8350
0.4093	-0.5788	14.6292	-1.5112	38.1967	0.3536	-8.9384	-0.7011	14.4549	-1.8307	37.7417	0.4284	-8.8319
0.4251	-1.7477	14.5568	-4.5633	38.0079	1.0678	-8.8942	-1.8701	14.3834	-4.8827	37.5551	1.1426	-8.7882
0.4408	-2.8881	14.4335	-7.5407	37.6857	1.7646	-8.8188	-3.0104	14.2616	-7.8602	37.2369	1.8394	-8.7138
0.4566	-4.0082	14.2556	-10.4653	37.2212	2.4490	-8.7101	-4.1305	14.0858	-10.7848	36.7779	2.5237	-8.6064
0.4723	-5.0877	14.0383	-13.2838	36.6540	3.1085	-8.5774	-5.2100	13.8711	-13.6033	36.2174	3.1833	-8.4752
0.4881	-6.1341	13.7780	-16.0160	35.9742	3.7479	-8.4183	-6.2564	13.6139	-16.3355	35.5458	3.8227	-8.3180
0.5038	-7.1280	13.7401	-18.6112	35.8754	4.3552	-8.3952	-7.2504	13.5765	-18.9306	35.4481	4.4299	-8.2952
0.5196	-8.0759	13.7268	-21.0860	35.8407	4.9343	-8.3871	-8.1982	13.5633	-21.4055	35.4138	5.0091	-8.2872
0.5353	-8.9595	13.6652	-23.3932	35.6797	5.4742	-8.3494	-9.0819	13.5024	-23.7127	35.2547	5.5490	-8.2499
0.5510	-9.7789	13.5566	-25.5328	35.3962	5.9749	-8.2830	-9.9013	13.3951	-25.8523	34.9746	6.0497	-8.1844
0.5668	-10.5326	13.4026	-27.5005	34.9942	6.4354	-8.1889	-10.6549	13.2430	-27.8200	34.5773	6.5101	-8.0914
0.5825	-11.2047	13.2165	-29.2555	34.5084	6.8460	-8.0753	-11.3271	13.0591	-29.5750	34.0973	6.9208	-7.9791
0.5983	-11.7977	13.3386	-30.8037	34.8271	7.2083	-8.1498	-11.9200	13.1797	-31.1232	34.4122	7.2831	-8.0528
0.6140	-12.2978	13.7470	-32.1095	35.8933	7.5139	-8.3993	-12.4202	13.5832	-32.4290	35.4657	7.5887	-8.2993
0.6298	-12.7052	14.0864	-33.1733	36.7795	7.7628	-8.6067	-12.8276	13.9186	-33.4927	36.3414	7.8376	-8.5042
0.6455	-13.0086	14.3723	-33.9654	37.5260	7.9482	-8.7814	-13.1310	14.2011	-34.2849	37.0790	8.0230	-8.6768
0.6612	-13.2047	14.6077	-34.4774	38.1407	8.0680	-8.9253	-13.3271	14.4337	-34.7969	37.6864	8.1428	-8.8190
0.6770	-13.2875	14.7954	-34.6937	38.6307	8.1186	-9.0399	-13.4099	14.6192	-35.0132	38.1706	8.1934	-8.9323
0.6927	-13.2499	15.1705	-34.5954	39.6102	8.0956	-9.2691	-13.3722	14.9898	-34.9149	39.1384	8.1704	-9.1587
0.7085	-13.0850	16.0968	-34.1650	42.0286	7.9949	-9.8351	-13.2074	15.9050	-34.4845	41.5280	8.0697	-9.7179
0.7242	-12.7889	16.8867	-33.3918	44.0911	7.8140	-10.3177	-12.9113	16.6855	-33.7113	43.5659	7.8887	-10.1948
0.7400	-12.3515	17.5460	-32.2498	45.8126	7.5467	-10.7206	-12.4739	17.3370	-32.5693	45.2669	7.6215	-10.5929
0.7557	-11.7722	18.0973	-30.7373	47.2520	7.1928	-11.0574	-11.8946	17.8818	-31.0567	46.6892	7.2676	-10.9257
0.7715	-11.0374	18.5445	-28.8187	48.4195	6.7438	-11.3306	-11.1598	18.3236	-29.1382	47.8428	6.8186	-11.1956
0.7872	-10.1502	18.9087	-26.5022	49.3706	6.2018	-11.5532	-10.2726	18.6835	-26.8217	48.7825	6.2765	-11.4155

a) UnAnneal,Sx (continued)

36						54					
0.6283185						0.9424778					
	0.9550742	2.6109966		-0.610997			0.9078296	2.6109966		-0.610997	
Mean		Min - Insided Surface		Max-Inside Surface		Mean		Min - Insided Surface		Max-Inside Surface	
Stress: Sx (ksi)	K(Sx) w/GF ksi*in^0.5	Stress: Sx (ksi)	K(Sx) w/GF ksi*in^0.5	Stress: Sx (ksi)	K(Sx) w/GF ksi*in^0.5	Stress: Sx (ksi)	K(Sx) w/GF ksi*in^0.5	Stress: Sx (ksi)	K(Sx) w/GF ksi*in^0.5	Stress: Sx (ksi)	K(Sx) w/GF ksi*in^0.5
16.8487	3.9239	43.9920	10.2454	-10.2945	-2.3975	16.2956	3.7298	42.5479	9.7386	-9.9566	-2.2789
17.1665	5.7209	44.8218	14.9373	-10.4887	-3.4955	16.6135	5.4379	43.3777	14.1984	-10.1508	-3.3226
17.3491	7.1615	45.2985	18.6986	-10.6002	-4.3756	16.7960	6.8072	43.8544	17.7736	-10.2623	-4.1592
17.4050	8.3807	45.4444	21.8819	-10.6344	-5.1206	16.8519	7.9661	44.0003	20.7994	-10.2965	-4.8673
17.3397	9.4201	45.2738	24.5959	-10.5945	-5.7557	16.7866	8.9541	43.8297	23.3792	-10.2566	-5.4709
17.1585	10.2931	44.8008	26.8752	-10.4838	-6.2890	16.6054	9.7839	43.3568	25.5458	-10.1459	-5.9779
16.8700	11.1765	44.0475	29.1817	-10.3075	-6.8288	16.3169	10.6236	42.6034	27.7381	-9.9696	-6.4910
16.4767	11.9821	43.0205	31.2852	-10.0672	-7.3210	15.9236	11.3894	41.5764	29.7376	-9.7293	-6.9589
15.9897	12.6626	41.7490	33.0621	-9.7696	-7.7368	15.4366	12.0362	40.3049	31.4266	-9.4317	-7.3541
15.4130	13.2185	40.2432	34.5135	-9.4173	-8.0765	14.8599	12.5646	38.7991	32.8062	-9.0793	-7.6770
14.7483	13.6511	38.5077	35.6431	-9.0111	-8.3408	14.1952	12.9759	37.0636	33.8799	-8.6732	-7.9282
14.0101	13.9743	36.5804	36.4868	-8.5601	-8.5382	13.4570	13.2830	35.1363	34.6819	-8.2222	-8.1159
13.1954	14.2606	34.4530	37.2343	-8.0623	-8.7132	12.6423	13.5551	33.0089	35.3924	-7.7244	-8.2821
12.3205	14.5176	32.1687	37.9053	-7.5278	-8.8702	11.7674	13.7994	30.7246	36.0303	-7.1898	-8.4314
11.3805	14.6700	29.7145	38.3033	-6.9535	-8.9633	10.8274	13.9443	28.2704	36.4085	-6.6155	-8.5199
10.3936	14.7347	27.1376	38.4723	-6.3504	-9.0029	9.8405	14.0058	25.6935	36.5692	-6.0125	-8.5575
9.3601	14.7161	24.4391	38.4238	-5.7190	-8.9915	8.8070	13.9882	22.9950	36.5231	-5.3810	-8.5467
8.2791	14.6183	21.6167	38.1684	-5.0585	-8.9317	7.7260	13.8952	20.1726	36.2803	-4.7206	-8.4899
7.1705	14.5244	18.7223	37.9233	-4.3812	-8.8744	6.6175	13.8060	17.2782	36.0473	-4.0433	-8.4354
6.0265	14.5569	15.7353	38.0080	-3.6822	-8.8942	5.4735	13.8368	14.2912	36.1279	-3.3443	-8.4542
4.8677	14.5351	12.7095	37.9511	-2.9741	-8.8809	4.3146	13.8161	11.2654	36.0738	-2.6362	-8.4416
3.6855	14.4560	9.6228	37.7445	-2.2518	-8.8326	3.1324	13.7409	8.1787	35.8774	-1.9139	-8.3956
2.5011	14.3358	6.5303	37.4308	-1.5281	-8.7591	1.9480	13.6267	5.0862	35.5792	-1.1902	-8.3259
1.3056	14.1710	3.4088	37.0005	-0.7977	-8.6584	0.7525	13.4700	1.9647	35.1702	-0.4598	-8.2301
0.1203	13.9769	0.3140	36.4936	-0.0735	-8.5398	-0.4328	13.2855	-1.1301	34.6884	0.2645	-8.1174
-1.0562	13.9719	-2.7579	36.4807	0.6454	-8.5368	-1.6093	13.2808	-4.2019	34.6761	0.9833	-8.1145
-2.2252	13.9029	-5.8099	36.3003	1.3596	-8.4946	-2.7782	13.2151	-7.2540	34.5047	1.6975	-8.0744
-3.3655	13.7850	-8.7874	35.9927	2.0563	-8.4226	-3.9186	13.1031	-10.2314	34.2122	2.3943	-8.0060
-4.4856	13.6151	-11.7119	35.5490	2.7407	-8.3188	-5.0387	12.9416	-13.1560	33.7905	3.0786	-7.9073
-5.5651	13.4076	-14.5305	35.0073	3.4003	-8.1920	-6.1182	12.7444	-15.9746	33.2756	3.7382	-7.7868
-6.6115	13.1590	-17.2627	34.3581	4.0396	-8.0401	-7.1646	12.5081	-18.7068	32.6585	4.3776	-7.6424
-7.6054	13.1228	-19.8578	34.2637	4.6469	-8.0180	-8.1585	12.4737	-21.3019	32.5688	4.9848	-7.6214
-8.5533	13.1102	-22.3327	34.2306	5.2260	-8.0103	-9.1064	12.4616	-23.7768	32.5373	5.5640	-7.6140
-9.4370	13.0513	-24.6398	34.0768	5.7659	-7.9743	-9.9900	12.4056	-26.0839	32.3911	6.1039	-7.5798
-10.2564	12.9475	-26.7794	33.8060	6.2666	-7.9109	-10.8095	12.3071	-28.2235	32.1337	6.6046	-7.5196
-11.0100	12.8005	-28.7472	33.4220	6.7271	-7.8211	-11.5631	12.1673	-30.1913	31.7687	7.0650	-7.4342
-11.6822	12.6228	-30.5021	32.9580	7.1378	-7.7125	-12.2353	11.9984	-31.9462	31.3277	7.4757	-7.3310
-12.2751	12.7394	-32.0503	33.2624	7.5001	-7.7837	-12.8282	12.1092	-33.4944	31.6170	7.8380	-7.3987
-12.7753	13.1294	-33.3561	34.2807	7.8056	-8.0220	-13.3283	12.4799	-34.8002	32.5850	8.1436	-7.6252
-13.1827	13.4535	-34.4199	35.1272	8.0546	-8.2201	-13.7357	12.7880	-35.8640	33.3895	8.3925	-7.8135
-13.4861	13.7266	-35.2120	35.8401	8.2399	-8.3869	-14.0391	13.0476	-36.6561	34.0672	8.5779	-7.9720
-13.6822	13.9515	-35.7241	36.4272	8.3598	-8.5243	-14.2352	13.2613	-37.1682	34.6253	8.6977	-8.1026
-13.7650	14.1307	-35.9404	36.8952	8.4104	-8.6338	-14.3181	13.4317	-37.3844	35.0701	8.7483	-8.2067
-13.7273	14.4890	-35.8420	37.8307	8.3874	-8.8527	-14.2804	13.7723	-37.2861	35.9593	8.7253	-8.4148
-13.5625	15.3736	-35.4116	40.1405	8.2866	-9.3932	-14.1156	14.6131	-36.8557	38.1548	8.6246	-8.9286
-13.2664	16.1280	-34.6385	42.1103	8.1057	-9.8542	-13.8195	15.3302	-36.0826	40.0272	8.4436	-9.3667
-12.8290	16.7577	-33.4964	43.7544	7.8385	-10.2389	-13.3821	15.9288	-34.9405	41.5900	8.1764	-9.7324
-12.2497	17.2843	-31.9839	45.1292	7.4845	-10.5606	-12.8028	16.4293	-33.4280	42.8968	7.8224	-10.0382
-11.5149	17.7113	-30.0653	46.2443	7.0356	-10.8216	-12.0680	16.8352	-31.5094	43.9567	7.3735	-10.2863
-10.6277	18.0592	-27.7489	47.1526	6.4935	-11.0341	-11.1808	17.1659	-29.1930	44.8201	6.8314	-10.4883

a) UnAnneal,Sx (continued)

72						90					
1.2566371						1.5707963					
	0.8545629	2.6109966		-0.610997			0.8023753	2.6109966		-0.610997	
Mean		Min - Insided Surface		Max-Inside Surface		Mean		Min - Insided Surface		Max-Inside Surface	
Stress: Sx (ksi)	K(Sx) w/GF ksi*in^0.5	Stress: Sx (ksi)	K(Sx) w/GF ksi*in^0.5	Stress: Sx (ksi)	K(Sx) w/GF ksi*in^0.5	Stress: Sx (ksi)	K(Sx) w/GF ksi*in^0.5	Stress: Sx (ksi)	K(Sx) w/GF ksi*in^0.5	Stress: Sx (ksi)	K(Sx) w/GF ksi*in^0.5
15.5987	3.5110	40.7282	9.1672	-9.5308	-2.1452	14.8262	3.2966	38.7111	8.6073	-9.0587	-2.0142
15.9165	5.1189	41.5580	13.3653	-9.7249	-3.1276	15.1440	4.8063	39.5409	12.5491	-9.2529	-2.9366
16.0991	6.4078	42.0347	16.7308	-9.8365	-3.9151	15.3266	6.0165	40.0176	15.7090	-9.3645	-3.6761
16.1550	7.4987	42.1807	19.5790	-9.8707	-4.5817	15.3825	7.0407	40.1635	18.3834	-9.3986	-4.3019
16.0897	8.4287	42.0101	22.0074	-9.8307	-5.1499	15.3171	7.9140	39.9930	20.6634	-9.3587	-4.8354
15.9085	9.2098	41.5371	24.0469	-9.7201	-5.6272	15.1360	8.6474	39.5200	22.5783	-9.2480	-5.2835
15.6200	10.0002	40.7838	26.1106	-9.5438	-6.1101	14.8475	9.3895	38.7667	24.5161	-9.0717	-5.7370
15.2267	10.7211	39.7568	27.9928	-9.3034	-6.5506	14.4541	10.0664	37.7397	26.2833	-8.8314	-6.1505
14.7397	11.3300	38.4852	29.5827	-9.0059	-6.9226	13.9671	10.6381	36.4681	27.7761	-8.5339	-6.4998
14.1630	11.8274	36.9795	30.8813	-8.6535	-7.2265	13.3904	11.1051	34.9624	28.9954	-8.1815	-6.7852
13.4983	12.2145	35.2439	31.8920	-8.2474	-7.4630	12.7257	11.4686	33.2268	29.9444	-7.7754	-7.0073
12.7601	12.5036	33.3166	32.6469	-7.7964	-7.6397	11.9876	11.7400	31.2995	30.6532	-7.3244	-7.1731
11.9454	12.7598	31.1893	33.3158	-7.2986	-7.7962	11.1728	11.9806	29.1722	31.2812	-6.8265	-7.3201
11.0705	12.9898	28.9049	33.9162	-6.7640	-7.9367	10.2979	12.1965	26.8878	31.8450	-6.2920	-7.4520
10.1305	13.1261	26.4507	34.2723	-6.1897	-8.0200	9.3580	12.3245	24.4336	32.1793	-5.7177	-7.5302
9.1436	13.1840	23.8739	34.4235	-5.5867	-8.0554	8.3710	12.3789	21.8568	32.3213	-5.1147	-7.5635
8.1101	13.1674	21.1753	34.3801	-4.9552	-8.0453	7.3375	12.3633	19.1582	32.2805	-4.4832	-7.5539
7.0291	13.0799	18.3529	34.1516	-4.2948	-7.9918	6.2565	12.2811	16.3358	32.0659	-3.8227	-7.5037
5.9205	12.9959	15.4585	33.9323	-3.6174	-7.9405	5.1480	12.2022	13.4414	31.8600	-3.1454	-7.4555
4.7765	13.0249	12.4715	34.0081	-2.9184	-7.9582	4.0040	12.2295	10.4544	31.9312	-2.4464	-7.4722
3.6177	13.0054	9.4458	33.9572	-2.2104	-7.9463	2.8452	12.2112	7.4287	31.8834	-1.7384	-7.4610
2.4355	12.9347	6.3591	33.7723	-1.4881	-7.9030	1.6630	12.1447	4.3420	31.7099	-1.0161	-7.4204
1.2511	12.8271	3.2665	33.4916	-0.7644	-7.8373	0.4785	12.0438	1.2494	31.4463	-0.2924	-7.3587
0.0556	12.6797	0.1451	33.1066	-0.0339	-7.7472	-0.7170	11.9053	-1.8720	31.0848	0.4381	-7.2741
-1.1297	12.5060	-2.9498	32.6530	0.6903	-7.6411	-1.9023	11.7422	-4.9669	30.6589	1.1623	-7.1745
-2.3062	12.5015	-6.0216	32.6415	1.4091	-7.6384	-3.0788	11.7381	-8.0387	30.6481	1.8811	-7.1719
-3.4752	12.4397	-9.0736	32.4801	2.1233	-7.6006	-4.2477	11.6800	-11.0907	30.4966	2.5953	-7.1365
-4.6155	12.3343	-12.0511	32.2048	2.8201	-7.5362	-5.3881	11.5811	-14.0682	30.2381	3.2921	-7.0760
-5.7356	12.1823	-14.9757	31.8079	3.5044	-7.4433	-6.5082	11.4383	-16.9928	29.8654	3.9765	-6.9888
-6.8151	11.9966	-17.7942	31.3231	4.1640	-7.3299	-7.5877	11.2640	-19.8113	29.4102	4.6360	-6.8823
-7.8615	11.7741	-20.5264	30.7423	4.8034	-7.1940	-8.6341	11.0551	-22.5435	28.8648	5.2754	-6.7546
-8.8554	11.7418	-23.1215	30.6578	5.4106	-7.1742	-9.6280	11.0247	-25.1387	28.7855	5.8827	-6.7361
-9.8033	11.7305	-25.5964	30.6282	5.9898	-7.1673	-10.5759	11.0141	-27.6135	28.7577	6.4618	-6.7296
-10.6870	11.6777	-27.9036	30.4906	6.5297	-7.1351	-11.4595	10.9646	-29.9207	28.6285	7.0017	-6.6993
-11.5064	11.5850	-30.0432	30.2483	7.0304	-7.0784	-12.2789	10.8775	-32.0603	28.4010	7.5024	-6.6461
-12.2600	11.4534	-32.0109	29.9047	7.4908	-6.9980	-13.0326	10.7539	-34.0280	28.0785	7.9629	-6.5706
-12.9322	11.2944	-33.7659	29.4896	7.9015	-6.9008	-13.7047	10.6046	-35.7830	27.6886	8.3735	-6.4794
-13.5251	11.3987	-35.3141	29.7619	8.2638	-6.9646	-14.2977	10.7026	-37.3312	27.9444	8.7358	-6.5392
-14.0253	11.7476	-36.6199	30.6730	8.5694	-7.1778	-14.7978	11.0302	-38.6370	28.7999	9.0414	-6.7394
-14.4327	12.0377	-37.6836	31.4304	8.8183	-7.3550	-15.2052	11.3026	-39.7008	29.5110	9.2903	-6.9058
-14.7361	12.2820	-38.4758	32.0683	9.0037	-7.5043	-15.5086	11.5320	-40.4929	30.1099	9.4757	-7.0460
-14.9322	12.4832	-38.9878	32.5936	9.1235	-7.6272	-15.7047	11.7209	-41.0049	30.6032	9.5955	-7.1614
-15.0150	12.6436	-39.2041	33.0124	9.1741	-7.7252	-15.7875	11.8715	-41.2212	30.9963	9.6461	-7.2534
-14.9773	12.9642	-39.1058	33.8494	9.1511	-7.9211	-15.7499	12.1725	-41.1229	31.7822	9.6231	-7.4373
-14.8125	13.7557	-38.6754	35.9161	9.0504	-8.4047	-15.5850	12.9157	-40.6925	33.7227	9.5224	-7.8914
-14.5164	14.4307	-37.9022	37.6786	8.8695	-8.8171	-15.2889	13.5495	-39.9193	35.3776	9.3415	-8.2787
-14.0790	14.9942	-36.7602	39.1497	8.6022	-9.1614	-14.8515	14.0785	-38.7773	36.7589	9.0742	-8.6019
-13.4997	15.4653	-35.2476	40.3798	8.2483	-9.4492	-14.2722	14.5208	-37.2647	37.9139	8.7203	-8.8722
-12.7649	15.8474	-33.3291	41.3775	7.7993	-9.6827	-13.5374	14.8796	-35.3462	38.8506	8.2713	-9.0914
-11.8777	16.1587	-31.0126	42.1903	7.2572	-9.8729	-12.6502	15.1719	-33.0297	39.6137	7.7293	-9.2700

From Analyses	
Mean Stress: Sx (ksi)	K(Sx) w/GF ksi*in^0.5
17.3262	4.1085
17.6440	5.9900
17.8266	7.4983
17.8825	8.7749
17.8171	9.8632
17.6360	10.7773
17.3475	11.7022
16.9541	12.5457
16.4671	13.2583
15.8904	13.8403
15.2257	14.2933
14.4876	14.6316
13.6728	14.9314
12.7979	15.2005
11.8580	15.3600
10.8710	15.4278
9.8375	15.4084
8.7565	15.3059
7.6480	15.2077
6.5040	15.2416
5.3452	15.2188
4.1630	15.1360
2.9785	15.0102
1.7830	14.8376
0.5977	14.6343
-0.5788	14.6292
-1.7477	14.5568
-2.8881	14.4335
-4.0082	14.2556
-5.0877	14.0383
-6.1341	13.7780
-7.1280	13.7401
-8.0759	13.7268
-8.9595	13.6652
-9.7789	13.5566
-10.5326	13.4026
-11.2047	13.2165
-11.7977	13.3386
-12.2978	13.7470
-12.7052	14.0864
-13.0086	14.3723
-13.2047	14.6077
-13.2875	14.7954
-13.2499	15.1705
-13.0850	16.0968
-12.7889	16.8867
-12.3515	17.5460
-11.7722	18.0973
-11.0374	18.5445
-10.1502	18.9087

a) UnAnneal,Sx (continued)

In Metric Unit

Unit Conv: 1.0000 in = 25.4000 mm 1.0000 ksi = 6.8948 MPa 1.0000 ksi-in^0.5= 1.0988 MPa-m^0.5

	Mean		Min - Insided Surface		Max-Inside Surface		Mean		Min - Insided Surface		Max-Inside Surface	
Depth	Stress: Sx	K(Sx) w/GF	Stress: Sx	K(Sx) w/GF	Stress: Sx	K(Sx) w/GF	Stress: Sx	K(Sx) w/GF	Stress: Sx	K(Sx) w/GF	Stress: Sx	K(Sx) w/GF
(mm)	MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5
0.3988	119.4598	4.5146	311.9092	11.7876	-72.9896	-2.7584	118.6162	4.4608	309.7065	11.6472	-72.4741	-2.7256
0.8001	121.6510	6.5821	317.6305	17.1859	-74.3284	-4.0216	120.8074	6.5037	315.4277	16.9811	-73.8129	-3.9737
1.1989	122.9098	8.2395	320.9172	21.5133	-75.0975	-5.0343	122.0662	8.1414	318.7145	21.2571	-74.5820	-4.9743
1.6002	123.2952	9.6422	321.9234	25.1758	-75.3330	-5.8914	122.4516	9.5274	319.7206	24.8759	-74.8175	-5.8212
1.9990	122.8448	10.8381	320.7473	28.2983	-75.0578	-6.6221	122.0012	10.7090	318.5446	27.9612	-74.5423	-6.5432
2.4003	121.5958	11.8425	317.4862	30.9208	-74.2946	-7.2357	120.7521	11.7015	315.2835	30.5525	-73.7792	-7.1495
2.7991	119.6065	12.8589	312.2922	33.5744	-73.0792	-7.8567	118.7629	12.7057	310.0895	33.1745	-72.5637	-7.7631
3.2004	116.8946	13.7858	305.2114	35.9946	-71.4222	-8.4231	116.0510	13.6216	303.0087	35.5659	-70.9067	-8.3227
3.5992	113.5369	14.5688	296.4444	38.0390	-69.3706	-8.9015	112.6932	14.3952	294.2417	37.5859	-68.8552	-8.7954
3.9980	109.5607	15.2083	286.0626	39.7089	-66.9412	-9.2922	108.7171	15.0272	283.8599	39.2359	-66.4258	-9.1816
4.3993	104.9776	15.7061	274.0963	41.0085	-64.1410	-9.5964	104.1340	15.5190	271.8936	40.5200	-63.6255	-9.4821
4.7981	99.8883	16.0778	260.8080	41.9792	-61.0314	-9.8235	99.0447	15.8863	258.6053	41.4792	-60.5160	-9.7065
5.1994	94.2707	16.4072	246.1405	42.8392	-57.5991	-10.0248	93.4271	16.2118	243.9378	42.3289	-57.0836	-9.9053
5.5982	88.2385	16.7029	230.3905	43.6113	-53.9134	-10.2054	87.3949	16.5040	228.1878	43.0918	-53.3980	-10.0839
5.9995	81.7579	16.8783	213.4695	44.0691	-49.9538	-10.3126	80.9142	16.6772	211.2668	43.5442	-49.4383	-10.1897
6.3983	74.9532	16.9527	195.7027	44.2636	-45.7962	-10.3581	74.1096	16.7508	193.4999	43.7363	-45.2807	-10.2347
6.7970	67.8273	16.9314	177.0968	44.2078	-41.4422	-10.3450	66.9836	16.7297	174.8940	43.6812	-40.9268	-10.2218
7.1984	60.3743	16.8188	157.6370	43.9139	-36.8885	-10.2762	59.5306	16.6185	155.4343	43.3908	-36.3730	-10.1538
7.5971	52.7311	16.7108	137.6808	43.6319	-32.2185	-10.2103	51.8875	16.5118	135.4781	43.1122	-31.7031	-10.0886
7.9985	44.8434	16.7482	117.0860	43.7294	-27.3992	-10.2331	43.9998	16.5487	114.8833	43.2086	-26.8837	-10.1112
8.3972	36.8535	16.7231	96.2244	43.6640	-22.5174	-10.2178	36.0099	16.5239	94.0217	43.1439	-22.0019	-10.0961
8.7986	28.7025	16.6321	74.9422	43.4263	-17.5372	-10.1621	27.8589	16.4340	72.7395	42.9090	-17.0217	-10.0411
9.1973	20.5362	16.4938	53.6200	43.0653	-12.5476	-10.0777	19.6926	16.2974	51.4173	42.5523	-12.0321	-9.9576
9.5987	12.2935	16.3042	32.0982	42.5702	-7.5113	-9.9618	11.4498	16.1100	29.8954	42.0632	-6.9958	-9.8432
9.9974	4.1211	16.0808	10.7602	41.9870	-2.5180	-9.8253	3.2775	15.8893	8.5575	41.4869	-2.0025	-9.7083
10.3962	-3.9906	16.0751	-10.4195	41.9722	2.4383	-9.8219	-4.8343	15.8837	-12.6222	41.4722	2.9537	-9.7049
10.7975	-12.0500	15.9957	-31.4625	41.7647	7.3625	-9.7733	-12.8936	15.8052	-33.6653	41.2672	7.8780	-9.6569
11.1963	-19.9125	15.8601	-51.9914	41.4107	12.1665	-9.6905	-20.7561	15.6712	-54.1942	40.9175	12.6819	-9.5751
11.5976	-27.6353	15.6646	-72.1557	40.9003	16.8851	-9.5710	-28.4789	15.4780	-74.3584	40.4131	17.4005	-9.4570
11.9964	-35.0781	15.4259	-91.5889	40.2770	21.4326	-9.4252	-35.9218	15.2422	-93.7916	39.7972	21.9481	-9.3129
12.3977	-42.2929	15.1398	-110.4267	39.5301	25.8408	-9.2504	-43.1366	14.9595	-112.6294	39.0592	26.3563	-9.1402
12.7965	-49.1458	15.0982	-128.3194	39.4214	30.0279	-9.2250	-49.9894	14.9184	-130.5222	38.9519	30.5434	-9.1151
13.1978	-55.6811	15.0836	-145.3831	39.3834	34.0209	-9.2161	-56.5247	14.9040	-147.5858	38.9143	34.5364	-9.1063
13.5966	-61.7735	15.0159	-161.2905	39.2064	37.7434	-9.1746	-62.6172	14.8370	-163.4932	38.7394	38.2589	-9.0654
13.9954	-67.4234	14.8966	-176.0423	38.8949	41.1955	-9.1017	-68.2670	14.7191	-178.2450	38.4316	41.7109	-8.9933
14.3967	-72.6196	14.7274	-189.6095	38.4531	44.3703	-8.9984	-73.4632	14.5519	-191.8123	37.9951	44.8858	-8.8912
14.7955	-77.2538	14.5229	-201.7094	37.9193	47.2018	-8.8734	-78.0974	14.3499	-203.9122	37.4676	47.7173	-8.7678
15.1968	-81.3421	14.6570	-212.3841	38.2695	49.6998	-8.9554	-82.1858	14.4825	-214.5868	37.8136	50.2152	-8.8487
15.5956	-84.7903	15.1057	-221.3872	39.4411	51.8066	-9.2296	-85.6340	14.9258	-223.5900	38.9713	52.3221	-9.1196
15.9969	-87.5993	15.4787	-228.7216	40.4149	53.5229	-9.4575	-88.4430	15.2944	-230.9243	39.9335	54.0384	-9.3448
16.3957	-89.6911	15.7929	-234.1832	41.2351	54.8010	-9.6494	-90.5347	15.6048	-236.3859	40.7440	55.3164	-9.5345
16.7945	-91.0432	16.0516	-237.7135	41.9106	55.6271	-9.8075	-91.8868	15.8604	-239.9162	41.4114	56.1425	-9.6906
17.1958	-91.6143	16.2578	-239.2047	42.4491	55.9760	-9.9335	-92.4580	16.0642	-241.4074	41.9435	56.4915	-9.8152
17.5946	-91.3547	16.6700	-238.5269	43.5254	55.8174	-10.1853	-92.1984	16.4715	-240.7296	43.0070	56.3329	-10.0640
17.9959	-90.2182	17.6878	-235.5593	46.1829	55.1230	-10.8072	-91.0618	17.4771	-237.7621	45.6328	55.6385	-10.6785
18.3947	-88.1765	18.5558	-230.2285	48.4492	53.8755	-11.3375	-89.0201	18.3348	-232.4313	47.8721	54.3910	-11.2025
18.7960	-85.1608	19.2803	-222.3545	50.3408	52.0330	-11.7802	-86.0044	19.0507	-224.5573	49.7412	52.5484	-11.6399
19.1948	-81.1667	19.8861	-211.9259	51.9226	49.5926	-12.1503	-82.0103	19.6492	-214.1286	51.3041	50.1080	-12.0056
19.5961	-76.1004	20.3775	-198.6978	53.2055	46.4971	-12.4506	-76.9440	20.1347	-200.9005	52.5717	47.0125	-12.3023
19.9949	-69.9834	20.7777	-182.7265	54.2505	42.7596	-12.6951	-70.8271	20.5302	-184.9292	53.6043	43.2751	-12.5439

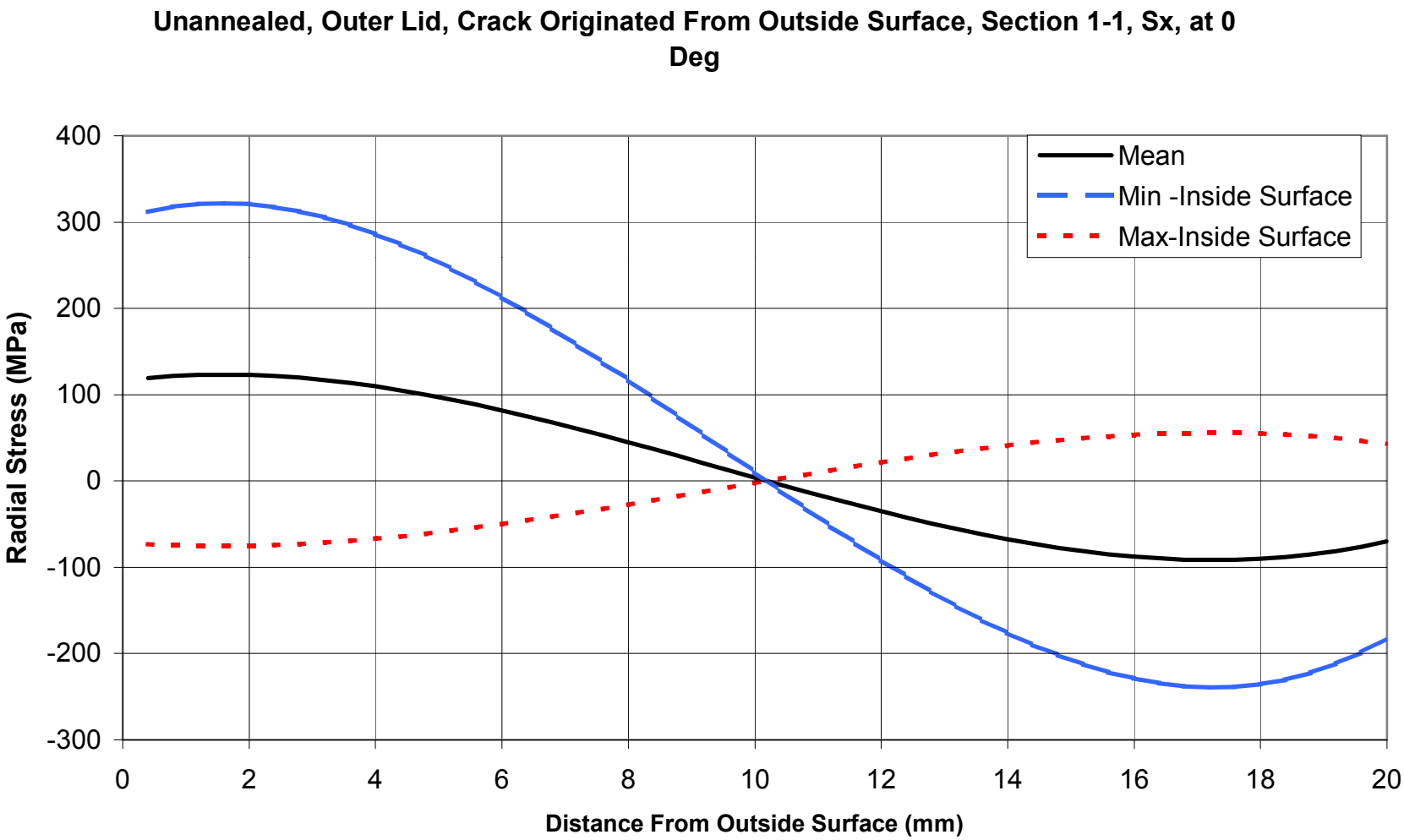
a) UnAnneal,Sx (continued)

Mean		Min - Insided Surface		Max-Inside Surface		Mean		Min - Insided Surface		Max-Inside Surface	
Stress: Sx	K(Sx) w/GF	Stress: Sx	K(Sx) w/GF	Stress: Sx	K(Sx) w/GF	Stress: Sx	K(Sx) w/GF	Stress: Sx	K(Sx) w/GF	Stress: Sx	K(Sx) w/GF
MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5
116.1679	4.3118	303.3140	11.2581	-70.9782	-2.6345	112.3545	4.0985	293.3573	10.7012	-68.6482	-2.5042
118.3591	6.2864	309.0352	16.4138	-72.3170	-3.8410	114.5457	5.9754	299.0785	15.6018	-69.9871	-3.6510
119.6179	7.8693	312.3219	20.5468	-73.0861	-4.8081	115.8045	7.4801	302.3653	19.5304	-70.7562	-4.5703
120.0033	9.2090	313.3281	24.0447	-73.3216	-5.6267	116.1899	8.7535	303.3715	22.8553	-70.9916	-5.3483
119.5528	10.3512	312.1521	27.0270	-73.0464	-6.3246	115.7395	9.8392	302.1954	25.6900	-70.7164	-6.0117
118.3038	11.3105	308.8909	29.5316	-72.2832	-6.9107	114.4905	10.7510	298.9343	28.0708	-69.9533	-6.5688
116.3146	12.2812	303.6970	32.0661	-71.0678	-7.5037	112.5012	11.6737	293.7403	30.4799	-68.7379	-7.1326
113.6026	13.1664	296.6161	34.3776	-69.4108	-8.0447	109.7893	12.5151	286.6595	32.6770	-67.0809	-7.6467
110.2449	13.9142	287.8491	36.3300	-67.3593	-8.5016	106.4316	13.2259	277.8925	34.5329	-65.0293	-8.0810
106.2687	14.5251	277.4673	37.9249	-64.9298	-8.8748	102.4554	13.8066	267.5107	36.0489	-62.5999	-8.4358
101.6857	15.0005	265.5010	39.1662	-62.1296	-9.1652	97.8723	14.2584	255.5444	37.2287	-59.7997	-8.7119
96.5963	15.3555	252.2127	40.0932	-59.0200	-9.3822	92.7830	14.5959	242.2561	38.1099	-56.6901	-8.9181
90.9787	15.6701	237.5452	40.9146	-55.5877	-9.5744	87.1654	14.8950	227.5886	38.8907	-53.2578	-9.1008
84.9466	15.9525	221.7952	41.6520	-51.9021	-9.7469	81.1332	15.1634	211.8386	39.5916	-49.5721	-9.2648
78.4659	16.1200	204.8742	42.0893	-47.9424	-9.8493	74.6526	15.3226	194.9176	40.0072	-45.6125	-9.3621
71.6613	16.1911	187.1074	42.2750	-43.7848	-9.8927	67.8479	15.3902	177.1508	40.1838	-41.4549	-9.4034
64.5353	16.1707	168.5015	42.2217	-39.4309	-9.8803	60.7220	15.3708	158.5448	40.1332	-37.1009	-9.3915
57.0823	16.0632	149.0417	41.9410	-34.8771	-9.8146	53.2690	15.2686	139.0851	39.8663	-32.5472	-9.3291
49.4392	15.9601	129.0855	41.6717	-30.2072	-9.7516	45.6258	15.1706	119.1289	39.6103	-27.8772	-9.2692
41.5515	15.9958	108.4907	41.7649	-25.3878	-9.7734	37.7381	15.2045	98.5341	39.6989	-23.0579	-9.2899
33.5616	15.9718	87.6291	41.7023	-20.5060	-9.7587	29.7482	15.1817	77.6725	39.6394	-18.1761	-9.2760
25.4106	15.8849	66.3470	41.4753	-15.5258	-9.7056	21.5972	15.0991	56.3903	39.4237	-13.1958	-9.2255
17.2443	15.7528	45.0247	41.1306	-10.5362	-9.6249	13.4309	14.9736	35.0681	39.0960	-8.2063	-9.1488
9.0015	15.5717	23.5029	40.6577	-5.4999	-9.5143	5.1882	14.8014	13.5463	38.6465	-3.1699	-9.0436
0.8292	15.3584	2.1649	40.1007	-0.5066	-9.3839	-2.9842	14.5987	-7.7917	38.1171	1.8233	-8.9197
-7.2826	15.3530	-19.0148	40.0865	4.4496	-9.3806	-11.0959	14.5935	-28.9714	38.1036	6.7796	-8.9166
-15.3420	15.2771	-40.0578	39.8884	9.3739	-9.3342	-19.1553	14.5213	-50.0144	37.9152	11.7038	-8.8725
-23.2044	15.1476	-60.5867	39.5503	14.1778	-9.2551	-27.0178	14.3983	-70.5433	37.5939	16.5078	-8.7973
-30.9272	14.9609	-80.7509	39.0628	18.8964	-9.1411	-34.7406	14.2208	-90.7076	37.1305	21.2264	-8.6889
-38.3701	14.7329	-100.1842	38.4675	23.4440	-9.0017	-42.1834	14.0041	-110.1408	36.5646	25.7739	-8.5564
-45.5849	14.4597	-119.0220	37.7541	27.8522	-8.8348	-49.3982	13.7444	-128.9786	35.8865	30.1821	-8.3978
-52.4377	14.4199	-136.9147	37.6504	32.0393	-8.8105	-56.2511	13.7066	-146.8714	35.7879	34.3692	-8.3747
-58.9730	14.4060	-153.9783	37.6140	36.0323	-8.8020	-62.7864	13.6934	-163.9350	35.7534	38.3623	-8.3666
-65.0655	14.3413	-169.8858	37.4450	39.7548	-8.7625	-68.8788	13.6319	-179.8424	35.5927	42.0847	-8.3290
-70.7154	14.2273	-184.6376	37.1475	43.2068	-8.6928	-74.5287	13.5235	-194.5942	35.3099	45.5368	-8.2628
-75.9116	14.0657	-198.2048	36.7256	46.3817	-8.5941	-79.7249	13.3699	-208.1615	34.9089	48.7116	-8.1690
-80.5458	13.8705	-210.3047	36.2157	49.2132	-8.4748	-84.3591	13.1843	-220.2614	34.4242	51.5431	-8.0556
-84.6341	13.9986	-220.9794	36.5502	51.7112	-8.5531	-88.4474	13.3061	-230.9360	34.7422	54.0411	-8.1300
-88.0823	14.4271	-229.9825	37.6691	53.8180	-8.8149	-91.8956	13.7134	-239.9392	35.8058	56.1479	-8.3789
-90.8913	14.7833	-237.3169	38.5992	55.5343	-9.0326	-94.7046	14.0521	-247.2735	36.6899	57.8642	-8.5858
-92.9831	15.0834	-242.7784	39.3826	56.8123	-9.2159	-96.7964	14.3372	-252.7351	37.4345	59.1423	-8.7600
-94.3351	15.3305	-246.3088	40.0278	57.6385	-9.3669	-98.1485	14.5721	-256.2654	38.0477	59.9684	-8.9035
-94.9063	15.5274	-247.8000	40.5421	57.9874	-9.4872	-98.7196	14.7593	-257.7566	38.5366	60.3174	-9.0179
-94.6467	15.9211	-247.1222	41.5700	57.8288	-9.7277	-98.4600	15.1335	-257.0788	39.5136	60.1587	-9.2465
-93.5101	16.8932	-244.1546	44.1081	57.1344	-10.3217	-97.3235	16.0575	-254.1112	41.9262	59.4643	-9.8111
-91.4684	17.7222	-238.8238	46.2726	55.8869	-10.8282	-95.2818	16.8455	-248.7804	43.9836	58.2169	-10.2926
-88.4527	18.4141	-230.9498	48.0792	54.0443	-11.2510	-92.2661	17.5032	-240.9064	45.7009	56.3743	-10.6944
-84.4586	18.9927	-220.5212	49.5899	51.6039	-11.6045	-88.2720	18.0532	-230.4778	47.1368	53.9339	-11.0304
-79.3923	19.4620	-207.2931	50.8152	48.5084	-11.8912	-83.2057	18.4993	-217.2497	48.3015	50.8384	-11.3030
-73.2754	19.8442	-191.3218	51.8133	44.7710	-12.1248	-77.0887	18.8626	-201.2784	49.2502	47.1010	-11.5250

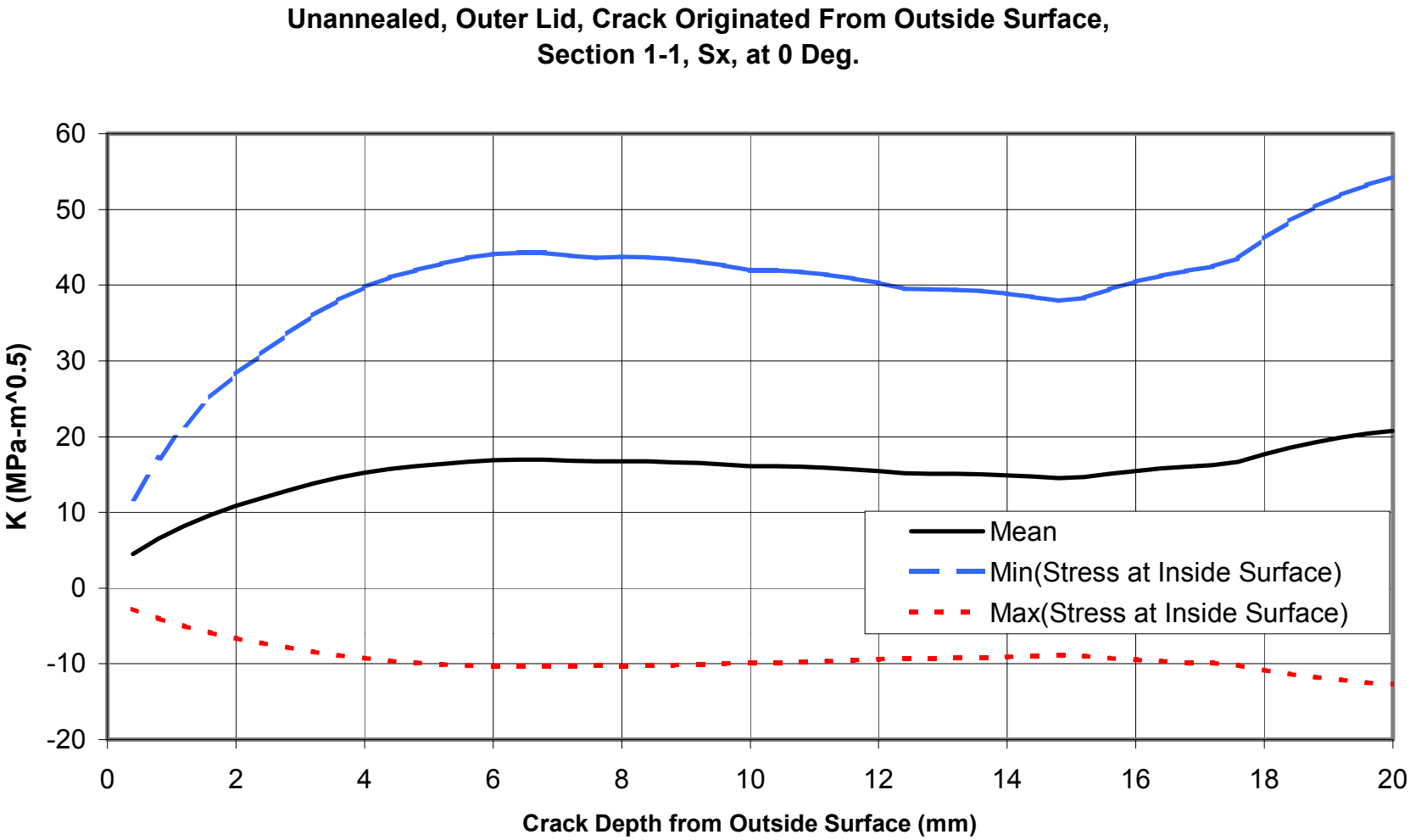
a) UnAnneal,Sx (continued)

Mean		Min - Insided Surface		Max-Inside Surface		Mean		Min - Insided Surface		Max-Inside Surface	
Stress: Sx	K(Sx) w/GF	Stress: Sx	K(Sx) w/GF	Stress: Sx	K(Sx) w/GF	Stress: Sx	K(Sx) w/GF	Stress: Sx	K(Sx) w/GF	Stress: Sx	K(Sx) w/GF
MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5
107.5494	3.8580	280.8112	10.0733	-65.7123	-2.3572	102.2229	3.6224	266.9038	9.4581	-62.4579	-2.2133
109.7406	5.6248	286.5324	14.6864	-67.0512	-3.4367	104.4141	5.2813	272.6250	13.7895	-63.7967	-3.2269
110.9994	7.0412	289.8192	18.3845	-67.8203	-4.3021	105.6730	6.6112	275.9117	17.2618	-64.5658	-4.0394
111.3848	8.2399	290.8254	21.5143	-68.0557	-5.0345	106.0583	7.7367	276.9179	20.2004	-64.8013	-4.7271
110.9344	9.2619	289.6493	24.1827	-67.7805	-5.6590	105.6079	8.6962	275.7419	22.7059	-64.5261	-5.3134
109.6854	10.1202	286.3882	26.4237	-67.0174	-6.1834	104.3589	9.5021	272.4807	24.8100	-63.7629	-5.8058
107.6961	10.9887	281.1942	28.6915	-65.8020	-6.7141	102.3696	10.3176	267.2868	26.9393	-62.5475	-6.3040
104.9842	11.7808	274.1134	30.7597	-64.1450	-7.1980	99.6577	11.0614	260.2059	28.8812	-60.8905	-6.7585
101.6265	12.4499	265.3464	32.5067	-62.0934	-7.6069	96.3000	11.6896	251.4389	30.5215	-58.8390	-7.1423
97.6503	12.9965	254.9646	33.9337	-59.6640	-7.9408	92.3238	12.2028	241.0571	31.8614	-56.4095	-7.4559
93.0672	13.4218	242.9983	35.0443	-56.8638	-8.2007	87.7408	12.6022	229.0908	32.9042	-53.6093	-7.6999
87.9779	13.7395	229.7100	35.8738	-53.7542	-8.3948	82.6514	12.9005	215.8025	33.6831	-50.4997	-7.8821
82.3603	14.0210	215.0425	36.6088	-50.3219	-8.5668	77.0338	13.1647	201.1350	34.3731	-47.0674	-8.0436
76.3281	14.2737	199.2925	37.2686	-46.6362	-8.7212	71.0016	13.4020	185.3850	34.9926	-43.3818	-8.1886
69.8475	14.4235	182.3715	37.6598	-42.6766	-8.8127	64.5210	13.5427	168.4640	35.3600	-39.4221	-8.2745
63.0428	14.4872	164.6047	37.8260	-38.5190	-8.8516	57.7164	13.6025	150.6972	35.5160	-35.2645	-8.3111
55.9169	14.4689	145.9987	37.7784	-34.1650	-8.8405	50.5904	13.5853	132.0913	35.4713	-30.9105	-8.3006
48.4639	14.3727	126.5390	37.5272	-29.6113	-8.7817	43.1374	13.4950	112.6315	35.2354	-26.3568	-8.2454
40.8207	14.2805	106.5828	37.2862	-24.9413	-8.7253	35.4942	13.4084	92.6753	35.0092	-21.6869	-8.1925
32.9330	14.3124	85.9880	37.3696	-20.1220	-8.7448	27.6065	13.4383	72.0805	35.0874	-16.8675	-8.2108
24.9431	14.2909	65.1264	37.3136	-15.2402	-8.7317	19.6166	13.4182	51.2189	35.0349	-11.9857	-8.1985
16.7921	14.2132	43.8442	37.1105	-10.2599	-8.6842	11.4656	13.3452	29.9368	34.8442	-7.0055	-8.1539
8.6258	14.0950	22.5220	36.8020	-5.2704	-8.6120	3.2993	13.2342	8.6145	34.5545	-2.0159	-8.0861
0.3831	13.9330	1.0002	36.3789	-0.2340	-8.5130	-4.9434	13.0821	-12.9073	34.1573	3.0204	-7.9931
-7.7893	13.7421	-20.3378	35.8805	4.7592	-8.3964	-13.1158	12.9029	-34.2453	33.6893	8.0137	-7.8836
-15.9010	13.7372	-41.5175	35.8678	9.7155	-8.3934	-21.2275	12.8983	-55.4250	33.6774	12.9699	-7.8808
-23.9604	13.6693	-62.5605	35.6905	14.6397	-8.3519	-29.2869	12.8345	-76.4680	33.5109	17.8942	-7.8419
-31.8229	13.5535	-83.0894	35.3881	19.4437	-8.2811	-37.1494	12.7258	-96.9969	33.2269	22.6981	-7.7754
-39.5457	13.3864	-103.2537	34.9519	24.1623	-8.1791	-44.8722	12.5689	-117.1611	32.8174	27.4168	-7.6796
-46.9885	13.1824	-122.6869	34.4192	28.7098	-8.0544	-52.3150	12.3774	-136.5944	32.3172	31.9643	-7.5625
-54.2033	12.9379	-141.5247	33.7809	33.1180	-7.9050	-59.5298	12.1478	-155.4322	31.7179	36.3725	-7.4223
-61.0562	12.9024	-159.4175	33.6881	37.3051	-7.8833	-66.3827	12.1144	-173.3249	31.6308	40.5596	-7.4019
-67.5915	12.8899	-176.4811	33.6556	41.2982	-7.8757	-72.9180	12.1027	-190.3885	31.6002	44.5526	-7.3947
-73.6839	12.8320	-192.3885	33.5043	45.0206	-7.8403	-79.0104	12.0484	-206.2960	31.4582	48.2751	-7.3615
-79.3338	12.7300	-207.1403	33.2381	48.4727	-7.7780	-84.6603	11.9526	-221.0477	31.2083	51.7272	-7.3030
-84.5300	12.5855	-220.7076	32.8606	51.6475	-7.6897	-89.8565	11.8169	-234.6150	30.8538	54.9020	-7.2201
-89.1642	12.4107	-232.8074	32.4044	54.4790	-7.5829	-94.4907	11.6528	-246.7149	30.4255	57.7335	-7.1198
-93.2525	12.5254	-243.4821	32.7037	56.9770	-7.6530	-98.5790	11.7604	-257.3895	30.7065	60.2315	-7.1856
-96.7007	12.9088	-252.4853	33.7049	59.0838	-7.8872	-102.0272	12.1205	-266.3927	31.6465	62.3383	-7.4056
-99.5097	13.2276	-259.8196	34.5371	60.8001	-8.0820	-104.8362	12.4198	-273.7271	32.4279	64.0546	-7.5884
-101.6015	13.4960	-265.2812	35.2380	62.0782	-8.2460	-106.9280	12.6718	-279.1886	33.0860	65.3326	-7.7424
-102.9536	13.7171	-268.8115	35.8153	62.9043	-8.3811	-108.2801	12.8794	-282.7189	33.6281	66.1588	-7.8693
-103.5247	13.8933	-270.3027	36.2754	63.2533	-8.4888	-108.8512	13.0449	-284.2102	34.0601	66.5077	-7.9704
-103.2651	14.2456	-269.6249	37.1952	63.0946	-8.7040	-108.5916	13.3756	-283.5323	34.9237	66.3491	-8.1725
-102.1286	15.1154	-266.6573	39.4662	62.4002	-9.2354	-107.4551	14.1923	-280.5648	37.0560	65.6547	-8.6714
-100.0869	15.8571	-261.3265	41.4029	61.1528	-9.6886	-105.4134	14.8887	-275.2340	38.8744	64.4072	-9.0970
-97.0712	16.4762	-253.4525	43.0194	59.3102	-10.0669	-102.3977	15.4700	-267.3600	40.3922	62.5646	-9.4521
-93.0771	16.9939	-243.0239	44.3711	56.8698	-10.3832	-98.4036	15.9561	-256.9314	41.6614	60.1242	-9.7491
-88.0108	17.4138	-229.7958	45.4674	53.7743	-10.6398	-93.3372	16.3504	-243.7032	42.6908	57.0287	-9.9900
-81.8938	17.7559	-213.8245	46.3605	50.0369	-10.8488	-87.2203	16.6715	-227.7320	43.5293	53.2913	-10.1862

b) UnAnneal,SxPlt



c) UnAnneal,KSxPlt



d) UnAnneal,Sz

Results in Metric Unit start in Cell A80

Angle(deg):	0						18					
(rad):	0						0.3141593					
	Scale Facto	1	0.5122261		1.4877739			0.9963501	0.5104393		1.4895607	
	Mean		Min - Insided Surface		Max-Inside Surface		Mean		Min - Insided Surface		Max-Inside Surface	
Depth	Stress: Sz	K(Sz)	Stress: Sz	K(Sz)	Stress: Sz	K(Sz)	Stress: Sz	K(Sz)	Stress: Sz	K(Sz)	Stress: Sz	K(Sz)
(in)	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5
0.0157	55.8471	8.3354	28.6063	4.2696	83.0879	12.4012	55.7247	8.3050	28.4441	4.2392	83.0054	12.3708
0.0315	56.1834	11.8067	28.7786	6.0477	83.5881	17.5657	56.0610	11.8067	28.6157	6.0266	83.5063	17.5868
0.0472	56.4321	14.4824	28.9060	7.4183	83.9582	21.5465	56.3097	14.4824	28.7427	7.3924	83.8768	21.5724
0.0630	56.5998	16.7477	28.9919	8.5786	84.2077	24.9168	56.4775	16.7477	28.8283	8.5487	84.1266	24.9467
0.0787	56.6878	18.7514	29.0370	9.6050	84.3386	27.8978	56.5654	18.7514	28.8732	9.5715	84.2576	27.9313
0.0945	56.7005	20.5696	29.0435	10.5363	84.3575	30.6029	56.5781	20.5696	28.8797	10.4995	84.2765	30.6397
0.1102	56.6411	22.2726	29.0130	11.4086	84.2691	33.1366	56.5187	22.2726	28.8494	11.3688	84.1881	33.1764
0.1260	56.5123	23.8767	28.9471	12.2303	84.0775	35.5231	56.3899	23.8767	28.7836	12.1876	83.9962	35.5658
0.1417	56.3190	25.3939	28.8480	13.0074	83.7899	37.7804	56.1966	25.3939	28.6850	12.9620	83.7082	37.8258
0.1574	56.0639	26.8384	28.7174	13.7473	83.4104	39.9295	55.9416	26.8384	28.5548	13.6994	83.3284	39.9774
0.1732	55.7483	28.2209	28.5557	14.4555	82.9409	41.9863	55.6260	28.2209	28.3937	14.4051	82.8582	42.0367
0.1889	55.3795	29.5495	28.3668	15.1360	82.3921	43.9630	55.2571	29.5495	28.2054	15.0832	82.3088	44.0158
0.2047	54.9561	30.8510	28.1500	15.8027	81.7623	45.8993	54.8337	30.8510	27.9893	15.7476	81.6782	45.9544
0.2204	54.4869	32.1331	27.9096	16.4594	81.0642	47.8068	54.3645	32.1331	27.7498	16.4020	80.9793	47.8642
0.2362	53.9692	33.3803	27.6445	17.0983	80.2940	49.6623	53.8469	33.3803	27.4856	17.0386	80.2082	49.7220
0.2519	53.4131	34.5961	27.3596	17.7210	79.4665	51.4712	53.2907	34.5961	27.2017	17.6592	79.3797	51.5330
0.2676	52.8185	35.7833	27.0550	18.3291	78.5820	53.2375	52.6962	35.7833	26.8982	18.2652	78.4942	53.3014
0.2834	52.1849	36.9444	26.7305	18.9239	77.6394	54.9649	52.0626	36.9444	26.5748	18.8579	77.5503	55.0309
0.2991	51.5236	38.0929	26.3917	19.5122	76.6554	56.6736	51.4012	38.0929	26.2372	19.4441	76.5652	56.7417
0.3149	50.8294	39.2556	26.0362	20.1077	75.6227	58.4035	50.7071	39.2556	25.8829	20.0376	75.5312	58.4736
0.3306	50.1146	40.3995	25.6700	20.6937	74.5592	60.1053	49.9923	40.3995	25.5180	20.6215	74.4665	60.1775
0.3464	49.3735	41.5257	25.2904	21.2705	73.4566	61.7809	49.2511	41.5257	25.1397	21.1963	73.3625	61.8551
0.3621	48.6187	42.6353	24.9038	21.8389	72.3336	63.4317	48.4963	42.6353	24.7544	21.7627	72.2382	63.5079
0.3779	47.8440	43.7292	24.5070	22.3992	71.1811	65.0592	47.7217	43.7292	24.3590	22.3211	71.0843	65.1373
0.3936	47.0626	44.8082	24.1067	22.9519	70.0186	66.6645	46.9403	44.8082	23.9602	22.8719	69.9204	66.7445
0.4093	46.2730	45.9428	23.7023	23.5331	68.8438	68.3525	46.1507	45.9428	23.5571	23.4510	68.7442	68.4346
0.4251	45.4734	47.0672	23.2927	24.1091	67.6542	70.0253	45.3511	47.0672	23.1490	24.0249	67.5532	70.1095
0.4408	44.6774	48.1818	22.8849	24.6800	66.4698	71.6836	44.5550	48.1818	22.7426	24.5939	66.3674	71.7697
0.4566	43.8780	49.2872	22.4755	25.2462	65.2806	73.3282	43.7557	49.2872	22.3346	25.1581	65.1767	73.4163
0.4723	43.0889	50.3838	22.0713	25.8079	64.1065	74.9597	42.9665	50.3838	21.9318	25.7179	64.0012	75.0497
0.4881	42.3033	51.4721	21.6688	26.3654	62.9377	76.5788	42.1809	51.4721	21.5308	26.2734	62.8310	76.6708
0.5038	41.5345	52.6014	21.2751	26.9438	61.7940	78.2590	41.4122	52.6014	21.1384	26.8498	61.6859	78.3530
0.5196	40.7762	53.7418	20.8866	27.5280	60.6657	79.9556	40.6538	53.7418	20.7513	27.4319	60.5563	80.0517
0.5353	40.0412	54.8779	20.5102	28.1099	59.5723	81.6459	39.9189	54.8779	20.3762	28.0118	59.4616	81.7440
0.5510	39.3281	56.0100	20.1449	28.6898	58.5113	83.3302	39.2057	56.0100	20.0121	28.5897	58.3993	83.4303
0.5668	38.6359	57.1385	19.7903	29.2678	57.4815	85.0092	38.5135	57.1385	19.6588	29.1657	57.3682	85.1113
0.5825	37.9767	58.2638	19.4526	29.8442	56.5007	86.6834	37.8543	58.2638	19.3223	29.7401	56.3863	86.7875
0.5983	37.3455	59.4170	19.1293	30.4349	55.5616	88.3991	37.2231	59.4170	19.0001	30.3288	55.4461	88.5052
0.6140	36.7536	60.5975	18.8261	31.0396	54.6810	90.1554	36.6312	60.5975	18.6980	30.9313	54.5644	90.2637
0.6298	36.1969	61.7742	18.5410	31.6424	53.8528	91.9060	36.0745	61.7742	18.4139	31.5320	53.7352	92.0164
0.6455	35.6858	62.9471	18.2792	32.2432	53.0923	93.6510	35.5634	62.9471	18.1530	32.1307	52.9738	93.7635
0.6612	35.2199	64.1163	18.0405	32.8420	52.3992	95.3906	35.0975	64.1163	17.9152	32.7275	52.2799	95.5051
0.6770	34.8001	65.2817	17.8255	33.4390	51.7747	97.1244	34.6778	65.2817	17.7009	33.3223	51.6546	97.2411
0.6927	34.4351	66.4653	17.6386	34.0453	51.2316	98.8853	34.3127	66.4653	17.5146	33.9265	51.1109	99.0041
0.7085	34.1236	67.7132	17.4790	34.6845	50.7682	100.7419	34.0012	67.7132	17.3556	34.5635	50.6469	100.8629
0.7242	33.8729	68.9610	17.3506	35.3236	50.3952	102.5984	33.7505	68.9610	17.2276	35.2004	50.2734	102.7216
0.7400	33.6831	70.2087	17.2534	35.9627	50.1129	104.4547	33.5608	70.2087	17.1307	35.8373	49.9908	104.5801
0.7557	33.5601	71.4563	17.1904	36.6018	49.9298	106.3108	33.4377	71.4563	17.0679	36.4741	49.8075	106.4385
0.7715	33.5056	72.7041	17.1625	37.2409	49.8488	108.1673	33.3833	72.7041	17.0401	37.1110	49.7264	108.2972
0.7872	33.5237	73.9520	17.1717	37.8801	49.8757	110.0239	33.4014	73.9520	17.0494	37.7480	49.7534	110.1560

d) UnAnneal,Sz (continued)

36						54					
0.6283185						0.9424778					
	0.9857576	0.5051787		1.4948213			0.9692595	0.4967562		1.5032438	
Mean		Min - Insided Surface		Max-Inside Surface		Mean		Min - Insided Surface		Max-Inside Surface	
Stress: Sz (ksi)	K(Sz) ksi*in^0.5	Stress: Sz (ksi)	K(Sz) ksi*in^0.5	Stress: Sz (ksi)	K(Sz) ksi*in^0.5	Stress: Sz (ksi)	K(Sz) ksi*in^0.5	Stress: Sz (ksi)	K(Sz) ksi*in^0.5	Stress: Sz (ksi)	K(Sz) ksi*in^0.5
55.3696	8.3050	27.9716	4.1955	82.7677	12.4145	54.8166	8.3050	27.2305	4.1256	82.4027	12.4844
55.7059	11.7636	28.1414	5.9427	83.2704	17.5845	55.1528	11.7636	27.3975	5.8436	82.9082	17.6836
55.9546	14.4295	28.2671	7.2895	83.6422	21.5696	55.4015	14.4295	27.5211	7.1680	83.2820	21.6911
56.1224	16.6866	28.3518	8.4297	83.8929	24.9434	55.5693	16.6866	27.6044	8.2892	83.5342	25.0840
56.2103	18.6830	28.3963	9.4382	84.0244	27.9277	55.6572	18.6830	27.6481	9.2809	83.6664	28.0850
56.2230	20.4945	28.4027	10.3534	84.0433	30.6356	55.6699	20.4945	27.6544	10.1808	83.6855	30.8083
56.1636	22.1913	28.3727	11.2106	83.9546	33.1720	55.6105	22.1913	27.6249	11.0237	83.5962	33.3589
56.0348	23.7896	28.3076	12.0180	83.7620	35.5611	55.4817	23.7896	27.5609	11.8176	83.4025	35.7615
55.8415	25.3012	28.2099	12.7816	83.4731	37.8208	55.2884	25.3012	27.4649	12.5685	83.1120	38.0339
55.5865	26.7404	28.0811	13.5087	83.0918	39.9722	55.0334	26.7404	27.3382	13.2835	82.7286	40.1974
55.2709	28.1179	27.9217	14.2046	82.6201	42.0312	54.7178	28.1179	27.1814	13.9677	82.2542	42.2681
54.9020	29.4416	27.7353	14.8733	82.0687	44.0100	54.3489	29.4416	26.9982	14.6253	81.6997	44.2580
54.4786	30.7384	27.5215	15.5284	81.4358	45.9484	53.9256	30.7384	26.7879	15.2695	81.0633	46.2073
54.0094	32.0158	27.2844	16.1737	80.7344	47.8579	53.4563	32.0158	26.5548	15.9041	80.3579	48.1276
53.4918	33.2585	27.0229	16.8015	79.9606	49.7155	52.9387	33.2585	26.2976	16.5213	79.5798	49.9956
52.9356	34.4698	26.7419	17.4134	79.1293	51.5262	52.3825	34.4698	26.0213	17.1231	78.7437	51.8166
52.3411	35.6527	26.4416	18.0110	78.2406	53.2944	51.7880	35.6527	25.7260	17.7107	77.8500	53.5947
51.7075	36.8096	26.1215	18.5954	77.2934	55.0237	51.1544	36.8096	25.4113	18.2854	76.8975	55.3337
51.0461	37.9539	25.7874	19.1735	76.3048	56.7342	50.4930	37.9539	25.0827	18.8538	75.9033	57.0539
50.3520	39.1123	25.4367	19.7587	75.2672	58.4659	49.7989	39.1123	24.7379	19.4293	74.8599	58.7954
49.6372	40.2520	25.0756	20.3345	74.1987	60.1696	49.0841	40.2520	24.3828	19.9955	73.7854	60.5086
48.8960	41.3741	24.7012	20.9013	73.0908	61.8469	48.3429	41.3741	24.0147	20.5529	72.6712	62.1954
48.1412	42.4797	24.3199	21.4598	71.9625	63.4995	47.5881	42.4797	23.6397	21.1020	71.5366	63.8573
47.3666	43.5696	23.9286	22.0104	70.8045	65.1288	46.8135	43.5696	23.2549	21.6435	70.3721	65.4957
46.5852	44.6447	23.5338	22.5535	69.6365	66.7358	46.0321	44.6447	22.8667	22.1775	69.1975	67.1118
45.7956	45.7751	23.1349	23.1246	68.4562	68.4256	45.2425	45.7751	22.4745	22.7391	68.0105	68.8112
44.9960	46.8954	22.7310	23.6906	67.2610	70.1003	44.4429	46.8954	22.0773	23.2956	66.8085	70.4952
44.1999	48.0059	22.3288	24.2516	66.0710	71.7603	43.6468	48.0059	21.6818	23.8472	65.6118	72.1646
43.4006	49.1073	21.9250	24.8080	64.8761	73.4066	42.8475	49.1073	21.2847	24.3944	64.4102	73.8203
42.6114	50.1999	21.5264	25.3599	63.6965	75.0399	42.0583	50.1999	20.8927	24.9371	63.2239	75.4627
41.8258	51.2842	21.1295	25.9077	62.5221	76.6608	41.2727	51.2842	20.5025	25.4758	62.0430	77.0927
41.0571	52.4094	20.7412	26.4761	61.3730	78.3427	40.5040	52.4094	20.1206	26.0347	60.8874	78.7841
40.2987	53.5456	20.3581	27.0501	60.2394	80.0412	39.7456	53.5456	19.7439	26.5991	59.7474	80.4922
39.5638	54.6776	19.9868	27.6220	59.1407	81.7332	39.0107	54.6776	19.3788	27.1614	58.6426	82.1938
38.8506	55.8056	19.6265	28.1918	58.0748	83.4194	38.2976	55.8056	19.0245	27.7218	57.5706	83.8894
38.1584	56.9299	19.2768	28.7598	57.0400	85.1001	37.6053	56.9299	18.6807	28.2803	56.5300	85.5796
37.4992	58.0511	18.9438	29.3262	56.0546	86.7761	36.9461	58.0511	18.3532	28.8373	55.5391	87.2650
36.8680	59.2001	18.6249	29.9066	55.1111	88.4936	36.3149	59.2001	18.0397	29.4080	54.5902	88.9922
36.2761	60.3763	18.3259	30.5008	54.2263	90.2518	35.7230	60.3763	17.7456	29.9923	53.7004	90.7603
35.7194	61.5487	18.0447	31.0931	53.3942	92.0044	35.1663	61.5487	17.4691	30.5747	52.8636	92.5227
35.2083	62.7173	17.7865	31.6835	52.6301	93.7512	34.6552	62.7173	17.2152	31.1552	52.0952	94.2795
34.7424	63.8823	17.5511	32.2720	51.9337	95.4926	34.1893	63.8823	16.9838	31.7339	51.3949	96.0306
34.3227	65.0434	17.3391	32.8586	51.3062	97.2283	33.7696	65.0434	16.7752	32.3107	50.7639	97.7761
33.9576	66.2227	17.1547	33.4543	50.7606	98.9911	33.4046	66.2227	16.5939	32.8965	50.2152	99.5489
33.6461	67.4661	16.9973	34.0824	50.2950	100.8497	33.0931	67.4661	16.4392	33.5142	49.7469	101.4179
33.3954	68.7093	16.8706	34.7105	49.9202	102.7081	32.8423	68.7093	16.3146	34.1318	49.3700	103.2868
33.2057	69.9524	16.7748	35.3385	49.6365	104.5664	32.6526	69.9524	16.2204	34.7493	49.0848	105.1556
33.0826	71.1955	16.7126	35.9664	49.4526	106.4245	32.5296	71.1955	16.1593	35.3668	48.8999	107.0242
33.0282	72.4387	16.6851	36.5945	49.3712	108.2830	32.4751	72.4387	16.1322	35.9844	48.8180	108.8931
33.0463	73.6821	16.6943	37.2226	49.3983	110.1415	32.4932	73.6821	16.1412	36.6020	48.8452	110.7621

d) UnAnneal,Sz (continued)

72						90					
1.2566371						1.5707963					
	0.9484706	0.4857259		1.5142741			0.925426	0.4729196		1.5270804	
Mean		Min - Insided Surface		Max-Inside Surface		Mean		Min - Insided Surface		Max-Inside Surface	
Stress: Sz (ksi)	K(Sz) ksi*in^0.5	Stress: Sz (ksi)	K(Sz) ksi*in^0.5	Stress: Sz (ksi)	K(Sz) ksi*in^0.5	Stress: Sz (ksi)	K(Sz) ksi*in^0.5	Stress: Sz (ksi)	K(Sz) ksi*in^0.5	Stress: Sz (ksi)	K(Sz) ksi*in^0.5
54.1196	8.3050	26.2873	4.0339	81.9520	12.5760	53.3471	8.3050	25.2289	3.9276	81.4653	12.6824
54.4559	11.7636	26.4506	5.7139	82.4612	17.8133	53.6834	11.7636	25.3879	5.5632	81.9788	17.9640
54.7046	14.4295	26.5715	7.0088	82.8378	21.8503	53.9321	14.4295	25.5055	6.8240	82.3586	22.0351
54.8724	16.6866	26.6529	8.1051	83.0918	25.2680	54.0998	16.6866	25.5849	7.8914	82.6148	25.4817
54.9603	18.6830	26.6956	9.0748	83.2250	28.2911	54.1878	18.6830	25.6265	8.8355	82.7491	28.5304
54.9730	20.4945	26.7018	9.9547	83.2442	31.0343	54.2005	20.4945	25.6325	9.6923	82.7685	31.2968
54.9136	22.1913	26.6730	10.7789	83.1543	33.6037	54.1411	22.1913	25.6044	10.4947	82.6778	33.8879
54.7848	23.7896	26.6104	11.5552	82.9592	36.0239	54.0123	23.7896	25.5435	11.2505	82.4811	36.3286
54.5915	25.3012	26.5165	12.2895	82.6665	38.3130	53.8190	25.3012	25.4520	11.9654	82.1859	38.6370
54.3365	26.7404	26.3926	12.9885	82.2803	40.4924	53.5639	26.7404	25.3314	12.6461	81.7964	40.8348
54.0209	28.1179	26.2393	13.6576	81.8024	42.5782	53.2483	28.1179	25.1822	13.2975	81.3145	42.9383
53.6520	29.4416	26.0602	14.3006	81.2439	44.5827	52.8795	29.4416	25.0077	13.9235	80.7512	44.9598
53.2286	30.7384	25.8545	14.9304	80.6028	46.5464	52.4561	30.7384	24.8075	14.5368	80.1047	46.9400
52.7594	32.0158	25.6266	15.5509	79.8922	48.4807	51.9869	32.0158	24.5856	15.1409	79.3881	48.8907
52.2418	33.2585	25.3752	16.1545	79.1084	50.3624	51.4692	33.2585	24.3408	15.7286	78.5977	50.7883
51.6856	34.4698	25.1050	16.7429	78.2662	52.1968	50.9131	34.4698	24.0778	16.3015	77.7483	52.6382
51.0911	35.6527	24.8163	17.3174	77.3659	53.9880	50.3185	35.6527	23.7966	16.8609	76.8405	54.4445
50.4575	36.8096	24.5085	17.8794	76.4064	55.7398	49.6849	36.8096	23.4970	17.4080	75.8729	56.2112
49.7961	37.9539	24.1873	18.4352	75.4049	57.4726	49.0236	37.9539	23.1842	17.9491	74.8629	57.9586
49.1020	39.1123	23.8501	18.9979	74.3538	59.2268	48.3294	39.1123	22.8559	18.4970	73.8029	59.7277
48.3872	40.2520	23.5029	19.5515	73.2714	60.9526	47.6146	40.2520	22.5179	19.0360	72.7114	61.4681
47.6460	41.3741	23.1429	20.0965	72.1491	62.6518	46.8735	41.3741	22.1674	19.5666	71.5796	63.1816
46.8912	42.4797	22.7763	20.6335	71.0062	64.3259	46.1187	42.4797	21.8104	20.0895	70.4269	64.8699
46.1166	43.5696	22.4000	21.1629	69.8331	65.9763	45.3440	43.5696	21.4441	20.6049	69.2440	66.5343
45.3352	44.6447	22.0205	21.6851	68.6499	67.6042	44.5626	44.6447	21.0745	21.1133	68.0507	68.1760
44.5456	45.7751	21.6369	22.2342	67.4542	69.3161	43.7730	45.7751	20.7011	21.6479	66.8449	69.9023
43.7460	46.8954	21.2486	22.7783	66.2434	71.0125	42.9734	46.8954	20.3230	22.1778	65.6239	71.6131
42.9499	48.0059	20.8619	23.3177	65.0379	72.6942	42.1774	48.0059	19.9465	22.7030	64.4082	73.3089
42.1506	49.1073	20.4736	23.8527	63.8275	74.3619	41.3780	49.1073	19.5685	23.2238	63.1876	74.9908
41.3614	50.1999	20.0903	24.3834	62.6325	76.0164	40.5889	50.1999	19.1953	23.7405	61.9825	76.6593
40.5758	51.2842	19.7087	24.9101	61.4429	77.6584	39.8033	51.2842	18.8238	24.2533	60.7828	78.3151
39.8071	52.4094	19.3353	25.4566	60.2788	79.3622	39.0345	52.4094	18.4602	24.7854	59.6088	80.0334
39.0487	53.5456	18.9670	26.0085	59.1305	81.0828	38.2762	53.5456	18.1016	25.3228	58.4508	81.7685
38.3138	54.6776	18.6100	26.5583	58.0175	82.7969	37.5412	54.6776	17.7540	25.8581	57.3284	83.4971
37.6006	55.8056	18.2636	27.1062	56.9377	84.5049	36.8281	55.8056	17.4167	26.3915	56.2395	85.2196
36.9084	56.9299	17.9274	27.6524	55.8895	86.2075	36.1359	56.9299	17.0894	26.9233	55.1824	86.9366
36.2492	58.0511	17.6072	28.1969	54.8913	87.9053	35.4767	58.0511	16.7776	27.4535	54.1757	88.6488
35.6180	59.2001	17.3006	28.7550	53.9354	89.6452	34.8455	59.2001	16.4791	27.9969	53.2118	90.4034
35.0261	60.3763	17.0131	29.3263	53.0392	91.4263	34.2536	60.3763	16.1992	28.5531	52.3080	92.1995
34.4694	61.5487	16.7427	29.8958	52.1962	93.2016	33.6969	61.5487	15.9359	29.1076	51.4578	93.9899
33.9583	62.7173	16.4944	30.4634	51.4222	94.9713	33.1858	62.7173	15.6942	29.6603	50.6773	95.7744
33.4924	63.8823	16.2681	31.0293	50.7167	96.7353	32.7199	63.8823	15.4739	30.2112	49.9659	97.5534
33.0727	65.0434	16.0642	31.5933	50.0811	98.4936	32.3001	65.0434	15.2754	30.7603	49.3249	99.3265
32.7076	66.2227	15.8870	32.1661	49.5283	100.2793	31.9351	66.2227	15.1027	31.3180	48.7675	101.1274
32.3961	67.4661	15.7356	32.7700	49.0566	102.1621	31.6236	67.4661	14.9554	31.9060	48.2918	103.0261
32.1454	68.7093	15.6139	33.3739	48.6770	104.0447	31.3729	68.7093	14.8368	32.4940	47.9089	104.9246
31.9557	69.9524	15.5217	33.9777	48.3896	105.9272	31.1831	69.9524	14.7471	33.0819	47.6191	106.8230
31.8326	71.1955	15.4619	34.5815	48.2033	107.8095	31.0601	71.1955	14.6889	33.6697	47.4313	108.7212
31.7782	72.4387	15.4355	35.1854	48.1209	109.6921	31.0056	72.4387	14.6632	34.2577	47.3481	110.6198
31.7963	73.6821	15.4443	35.7893	48.1483	111.5749	31.0237	73.6821	14.6717	34.8457	47.3757	112.5185

From Analyses	
Mean	
Stress: Sz (ksi)	K(Sz) ksi*in^0.5
55.8471	8.3354
56.1834	11.8067
56.4321	14.4824
56.5998	16.7477
56.6878	18.7514
56.7005	20.5696
56.6411	22.2726
56.5123	23.8767
56.3190	25.3939
56.0639	26.8384
55.7483	28.2209
55.3795	29.5495
54.9561	30.8510
54.4869	32.1331
53.9692	33.3803
53.4131	34.5961
52.8185	35.7833
52.1849	36.9444
51.5236	38.0929
50.8294	39.2556
50.1146	40.3995
49.3735	41.5257
48.6187	42.6353
47.8440	43.7292
47.0626	44.8082
46.2730	45.9428
45.4734	47.0672
44.6774	48.1818
43.8780	49.2872
43.0889	50.3838
42.3033	51.4721
41.5345	52.6014
40.7762	53.7418
40.0412	54.8779
39.3281	56.0100
38.6359	57.1385
37.9767	58.2638
37.3455	59.4170
36.7536	60.5975
36.1969	61.7742
35.6858	62.9471
35.2199	64.1163
34.8001	65.2817
34.4351	66.4653
34.1236	67.7132
33.8729	68.9610
33.6831	70.2087
33.5601	71.4563
33.5056	72.7041
33.5237	73.9520

d) UnAnneal,Sz (continued)

In Metric Unit

Unit Conv: 1.0000 in = 25.4000 mm 1.0000 ksi = 6.8948 MPa 1.0000 ksi-in^0.5= 1.0988 MPa-m^0.5

Depth (mm)	Mean Stress: Sz MPa	K(Sz) MPa*m^0.5	Min - Insided Surface Stress: Sz MPa	K(Sz) MPa*m^0.5	Max-Inside Surface Stress: Sz MPa	K(Sz) MPa*m^0.5	Mean Stress: Sz MPa	K(Sz) MPa*m^0.5	Min - Insided Surface Stress: Sz MPa	K(Sz) MPa*m^0.5	Max-Inside Surface Stress: Sz MPa	K(Sz) MPa*m^0.5
0.3988	385.0522	9.1593	197.2338	4.6916	572.8706	13.6270	384.2086	9.1259	196.1151	4.6582	572.3020	13.5935
0.8001	387.3707	12.9737	198.4214	6.6455	576.3199	19.3019	386.5270	12.9737	197.2986	6.6223	575.7555	19.3251
1.1989	389.0855	15.9139	199.2998	8.1515	578.8713	23.6763	388.2419	15.9139	198.1739	8.1231	578.3099	23.7047
1.6002	390.2419	18.4031	199.8921	9.4265	580.5918	27.3796	389.3983	18.4031	198.7642	9.3937	580.0324	27.4125
1.9990	390.8484	20.6048	200.2028	10.5543	581.4940	30.6553	390.0048	20.6048	199.0738	10.5175	580.9358	30.6922
2.4003	390.9359	22.6028	200.2476	11.5777	581.6242	33.6278	390.0923	22.6028	199.1184	11.5373	581.0661	33.6682
2.7991	390.5265	24.4741	200.0379	12.5363	581.0151	36.4119	389.6829	24.4741	198.9095	12.4925	580.4563	36.4556
3.2004	389.6383	26.2367	199.5829	13.4391	579.6936	39.0343	388.7946	26.2367	198.4561	13.3923	579.1332	39.0812
3.5992	388.3055	27.9039	198.9002	14.2931	577.7108	41.5147	387.4619	27.9039	197.7758	14.2433	577.1480	41.5646
3.9980	386.5472	29.4912	197.9996	15.1062	575.0948	43.8762	385.7035	29.4912	196.8782	15.0535	574.5288	43.9289
4.3993	384.3711	31.0103	196.8849	15.8843	571.8573	46.1364	383.5275	31.0103	195.7675	15.8289	571.2875	46.1918
4.7981	381.8281	32.4703	195.5823	16.6321	568.0739	48.3084	380.9845	32.4703	194.4694	16.5741	567.4995	48.3664
5.1994	378.9090	33.9004	194.0871	17.3647	563.7309	50.4361	378.0653	33.9004	192.9794	17.3041	563.1513	50.4967
5.5982	375.6738	35.3092	192.4300	18.0863	558.9177	52.5322	374.8302	35.3092	191.3281	18.0232	558.3323	52.5952
5.9995	372.1047	36.6797	190.6018	18.7883	553.6077	54.5711	371.2611	36.6797	189.5063	18.7228	553.0160	54.6367
6.3983	368.2700	38.0157	188.6375	19.4726	547.9025	56.5587	367.4264	38.0157	187.5489	19.4047	547.3039	56.6267
6.7970	364.1710	39.3202	186.5379	20.1408	541.8041	58.4996	363.3274	39.3202	185.4566	20.0706	541.1982	58.5699
7.1984	359.8023	40.5961	184.3002	20.7944	535.3045	60.3978	358.9587	40.5961	183.2266	20.7218	534.6908	60.4703
7.5971	355.2424	41.8581	181.9645	21.4408	528.5204	62.2754	354.3988	41.8581	180.8991	21.3660	527.8985	62.3502
7.9985	350.4565	43.1357	179.5130	22.0953	521.4000	64.1762	349.6129	43.1357	178.4561	22.0182	520.7696	64.2533
8.3972	345.5282	44.3927	176.9886	22.7391	514.0678	66.0463	344.6846	44.3927	175.9405	22.6598	513.4286	66.1256
8.7986	340.4181	45.6302	174.3711	23.3730	506.4652	67.8875	339.5745	45.6302	173.3322	23.2915	505.8168	67.9690
9.1973	335.2140	46.8495	171.7054	23.9975	498.7226	69.7015	334.3704	46.8495	170.6758	23.9138	498.0650	69.7852
9.5987	329.8729	48.0515	168.9695	24.6132	490.7763	71.4898	329.0293	48.0515	167.9495	24.5274	490.1090	71.5757
9.9974	324.4855	49.2372	166.2100	25.2206	482.7610	73.2538	323.6419	49.2372	165.1995	25.1326	482.0842	73.3418
10.3962	319.0413	50.4839	163.4213	25.8592	474.6613	75.1087	318.1977	50.4839	162.4206	25.7690	473.9747	75.1989
10.7975	313.5283	51.7195	160.5974	26.4921	466.4593	76.9469	312.6847	51.7195	159.6066	26.3996	465.7629	77.0393
11.1963	308.0395	52.9442	157.7859	27.1194	458.2932	78.7690	307.1959	52.9442	156.8049	27.0248	457.5869	78.8637
11.5976	302.5282	54.1589	154.9629	27.7416	450.0936	80.5762	301.6846	54.1589	153.9917	27.6448	449.3775	80.6730
11.9964	297.0873	55.3639	152.1759	28.3588	441.9988	82.3689	296.2437	55.3639	151.2144	28.2599	441.2730	82.4679
12.3977	291.6709	56.5598	149.4014	28.9714	433.9403	84.1481	290.8272	56.5598	148.4496	28.8703	433.2048	84.2492
12.7965	286.3704	57.8007	146.6864	29.6070	426.0544	85.9943	285.5268	57.8007	145.7441	29.5037	425.3095	86.0976
13.1978	281.1418	59.0538	144.0082	30.2489	418.2755	87.8587	280.2982	59.0538	143.0752	30.1434	417.5212	87.9642
13.5966	276.0744	60.3022	141.4125	30.8884	410.7363	89.7160	275.2308	60.3022	140.4886	30.7806	409.9730	89.8238
13.9954	271.1577	61.5462	138.8941	31.5256	403.4213	91.5668	270.3140	61.5462	137.9789	31.4156	402.6492	91.6768
14.3967	266.3850	62.7862	136.4494	32.1608	396.3207	93.4117	265.5414	62.7862	135.5428	32.0486	395.5400	93.5239
14.7955	261.8399	64.0228	134.1213	32.7941	389.5586	95.2514	260.9963	64.0228	133.2228	32.6797	388.7699	95.3658
15.1968	257.4879	65.2900	131.8920	33.4432	383.0837	97.1367	256.6442	65.2900	131.0013	33.3266	382.2872	97.2534
15.5956	253.4070	66.5871	129.8017	34.1077	377.0123	99.0666	252.5634	66.5871	128.9183	33.9887	376.2085	99.1856
15.9969	249.5687	67.8801	127.8356	34.7700	371.3018	100.9903	248.7251	67.8801	126.9590	34.6487	370.4911	101.1116
16.3957	246.0446	69.1690	126.0305	35.4302	366.0587	102.9078	245.2010	69.1690	125.1602	35.3066	365.2417	103.0314
16.7945	242.8325	70.4537	124.3852	36.0883	361.2799	104.8192	241.9889	70.4537	123.5206	35.9624	360.4571	104.9451
17.1958	239.9383	71.7343	122.9027	36.7442	356.9739	106.7245	239.0947	71.7343	122.0433	36.6160	356.1460	106.8527
17.5946	237.4217	73.0349	121.6136	37.4104	353.2297	108.6595	236.5780	73.0349	120.7587	37.2799	352.3973	108.7900
17.9959	235.2739	74.4062	120.5134	38.1128	350.0343	110.6996	234.4302	74.4062	119.6624	37.9798	349.1980	110.8325
18.3947	233.5452	75.7773	119.6279	38.8151	347.4624	112.7395	232.7015	75.7773	118.7800	38.6797	346.6231	112.8749
18.7960	232.2369	77.1483	118.9578	39.5174	345.5160	114.7793	231.3933	77.1483	118.1122	39.3795	344.6743	114.9171
19.1948	231.3887	78.5193	118.5234	40.2196	344.2541	116.8189	230.5451	78.5193	117.6793	40.0793	343.4109	116.9592
19.5961	231.0131	79.8904	118.3310	40.9219	343.6953	118.8588	230.1695	79.8904	117.4876	40.7792	342.8514	119.0016
19.9949	231.1380	81.2616	118.3949	41.6243	343.8811	120.8989	230.2944	81.2616	117.5513	41.4791	343.0374	121.0441

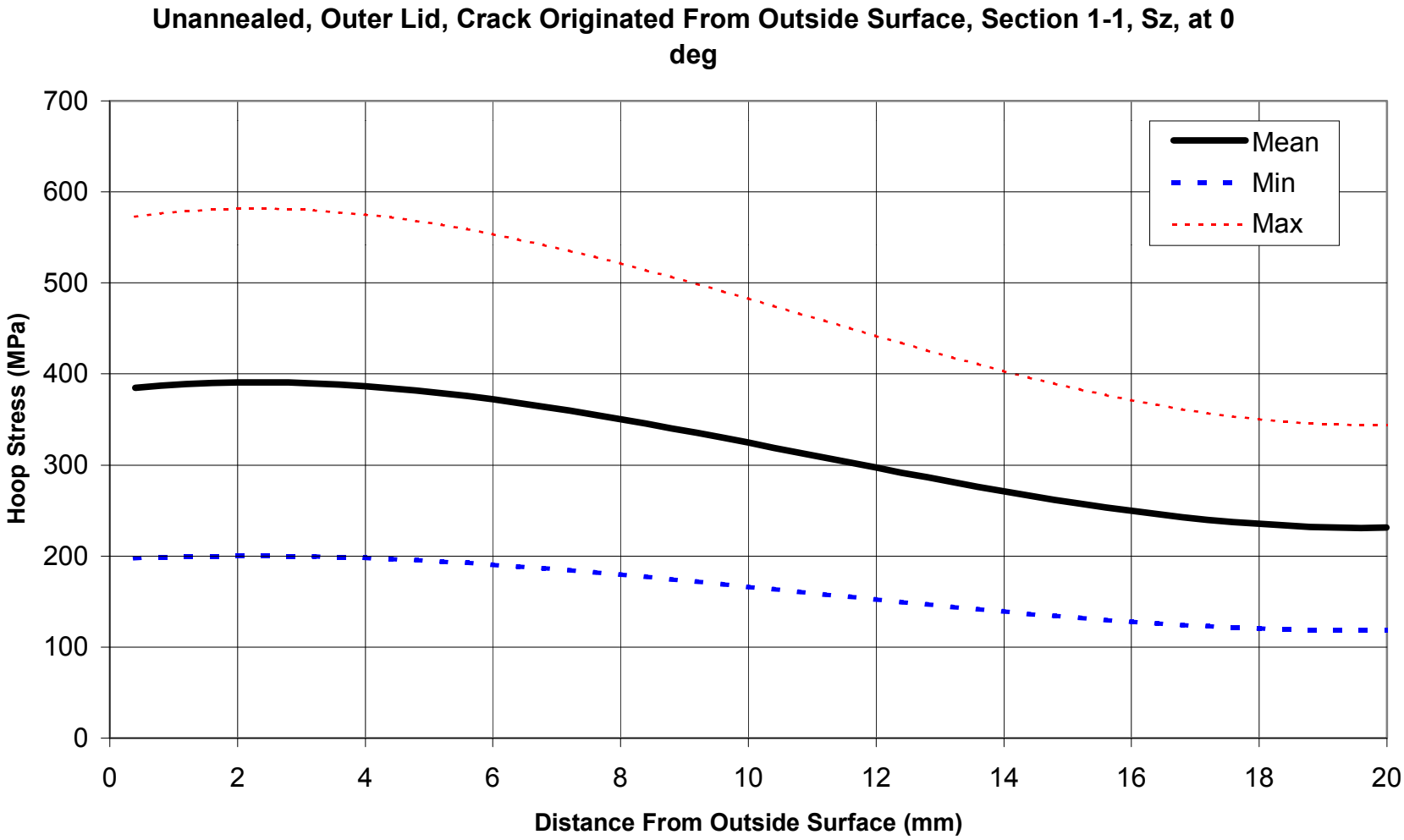
d) UnAnneal,Sz (continued)

Mean		Min - Insided Surface		Max-Inside Surface		Mean		Min - Insided Surface		Max-Inside Surface	
Stress: Sz	K(Sz)	Stress: Sz	K(Sz)	Stress: Sz	K(Sz)	Stress: Sz	K(Sz)	Stress: Sz	K(Sz)	Stress: Sz	K(Sz)
MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5
381.7602	9.1259	192.8572	4.6102	570.6633	13.6416	377.9469	9.1259	187.7475	4.5333	568.1463	13.7184
384.0787	12.9264	194.0284	6.5301	574.1290	19.3226	380.2654	12.9264	188.8992	6.4212	571.6315	19.4315
385.7936	15.8558	194.8947	8.0100	576.6924	23.7016	381.9802	15.8558	189.7510	7.8765	574.2094	23.8351
386.9500	18.3359	195.4789	9.2629	578.4211	27.4089	383.1366	18.3359	190.3255	9.1085	575.9478	27.5634
387.5564	20.5296	195.7853	10.3711	579.3276	30.6881	383.7431	20.5296	190.6268	10.1982	576.8594	30.8611
387.6440	22.5203	195.8295	11.3768	579.4585	33.6638	383.8306	22.5203	190.6702	11.1871	576.9910	33.8534
387.2346	24.3848	195.6227	12.3187	578.8465	36.4509	383.4212	24.3848	190.4669	12.1133	576.3756	36.6562
386.3463	26.1410	195.1739	13.2059	577.5187	39.0761	382.5330	26.1410	190.0256	12.9857	575.0403	39.2963
385.0136	27.8021	194.5007	14.0450	575.5265	41.5591	381.2002	27.8021	189.3636	13.8108	573.0369	41.7933
383.2552	29.3835	193.6124	14.8439	572.8980	43.9232	379.4419	29.3835	188.4901	14.5965	570.3936	44.1706
381.0792	30.8972	192.5131	15.6086	569.6453	46.1857	377.2658	30.8972	187.4091	15.3484	567.1225	46.4460
378.5361	32.3517	191.2284	16.3434	565.8439	48.3601	374.7228	32.3517	186.1459	16.0709	563.2997	48.6326
375.6170	33.7767	189.7537	17.0633	561.4803	50.4901	371.8037	33.7767	184.6958	16.7788	558.9116	50.7746
372.3819	35.1804	188.1194	17.7724	556.6443	52.5883	368.5685	35.1804	183.0887	17.4761	554.0484	52.8847
368.8128	36.5458	186.3164	18.4622	551.3092	54.6295	364.9994	36.5458	181.3157	18.1544	548.6832	54.9373
364.9781	37.8769	184.3791	19.1346	545.5770	56.6192	361.1647	37.8769	179.4108	18.8156	542.9186	56.9383
360.8791	39.1767	182.3084	19.7912	539.4497	58.5622	357.0657	39.1767	177.3746	19.4613	536.7568	58.8922
356.5104	40.4479	180.1015	20.4334	532.9193	60.4624	352.6970	40.4479	175.2044	20.0928	530.1897	60.8031
351.9505	41.7053	177.7979	21.0686	526.1031	62.3420	348.1371	41.7053	172.9393	20.7174	523.3350	62.6933
347.1645	42.9783	175.3801	21.7117	518.9489	64.2449	343.3512	42.9783	170.5618	21.3497	516.1406	64.6069
342.2363	44.2307	172.8905	22.3444	511.5820	66.1170	338.4229	44.2307	168.1137	21.9719	508.7321	66.4895
337.1262	45.4637	170.3090	22.9673	503.9434	67.9601	333.3128	45.4637	165.5752	22.5844	501.0504	68.3430
331.9220	46.6785	167.6800	23.5810	496.1641	69.7760	328.1087	46.6785	162.9900	23.1878	493.2274	70.1692
326.5809	47.8761	164.9817	24.1860	488.1801	71.5663	322.7676	47.8761	160.3368	23.7828	485.1984	71.9695
321.1935	49.0575	162.2601	24.7828	480.1269	73.3321	317.3802	49.0575	157.6606	24.3696	477.0998	73.7453
315.7493	50.2997	159.5098	25.4103	471.9888	75.1890	311.9360	50.2997	154.9561	24.9867	468.9159	75.6127
310.2364	51.5307	156.7248	26.0322	463.7480	77.0292	306.4230	51.5307	152.2175	25.5982	460.6285	77.4632
304.7476	52.7510	153.9520	26.6487	455.5432	78.8533	300.9342	52.7510	149.4909	26.2044	452.3775	79.2976
299.2363	53.9612	151.1678	27.2601	447.3048	80.6624	295.4229	53.9612	146.7532	26.8056	444.0927	81.1169
293.7954	55.1618	148.4192	27.8666	439.1716	82.4571	289.9820	55.1618	144.0504	27.4020	435.9137	82.9217
288.3789	56.3533	145.6829	28.4685	431.0749	84.2381	284.5655	56.3533	141.3597	27.9939	427.7714	84.7128
283.0785	57.5897	143.0052	29.0931	423.1517	86.0863	279.2651	57.5897	138.7267	28.6080	419.8036	86.5714
277.8499	58.8383	140.3639	29.7238	415.3359	87.9527	274.0365	58.8383	136.1293	29.2283	411.9437	88.4483
272.7825	60.0821	137.8039	30.3522	407.7610	89.8120	268.9691	60.0821	133.6121	29.8462	404.3262	90.3180
267.8657	61.3216	135.3201	30.9783	400.4114	91.6648	264.0524	61.3216	131.1696	30.4619	396.9351	92.1813
263.0931	62.5571	132.9090	31.6025	393.2771	93.5116	259.2797	62.5571	128.7988	31.0756	389.7606	94.0385
258.5480	63.7891	130.6129	32.2249	386.4830	95.3533	254.7346	63.7891	126.5410	31.6876	382.9283	95.8906
254.1959	65.0517	128.4144	32.8627	379.9775	97.2406	250.3826	65.0517	124.3791	32.3148	376.3861	97.7885
250.1151	66.3441	126.3528	33.5156	373.8773	99.1726	246.3017	66.3441	122.3519	32.9568	370.2515	99.7314
246.2767	67.6324	124.4138	34.1664	368.1397	101.0983	242.4634	67.6324	120.4452	33.5968	364.4816	101.6680
242.7526	68.9165	122.6335	34.8152	362.8718	103.0179	238.9393	68.9165	118.6946	34.2347	359.1840	103.5983
239.5406	70.1966	121.0108	35.4618	358.0703	104.9314	235.7272	70.1966	117.0990	34.8706	354.3555	105.5226
236.6463	71.4725	119.5487	36.1064	353.7440	106.8386	232.8330	71.4725	115.6612	35.5044	350.0048	107.4406
234.1297	72.7684	118.2773	36.7610	349.9821	108.7757	230.3164	72.7684	114.4111	36.1481	346.2216	109.3886
231.9819	74.1346	117.1923	37.4512	346.7715	110.8180	228.1686	74.1346	113.3441	36.8268	342.9930	111.4424
230.2532	75.5007	116.3190	38.1414	344.1874	112.8601	226.4399	75.5007	112.4854	37.5055	340.3943	113.4960
228.9449	76.8668	115.6581	38.8314	342.2318	114.9021	225.1316	76.8668	111.8355	38.1840	338.4277	115.5495
228.0968	78.2327	115.2296	39.5215	340.9639	116.9439	224.2834	78.2327	111.4142	38.8626	337.1527	117.6028
227.7212	79.5988	115.0399	40.2116	340.4025	118.9860	223.9078	79.5988	111.2276	39.5412	336.5881	119.6564
227.8460	80.9650	115.1030	40.9018	340.5891	121.0283	224.0327	80.9650	111.2896	40.2199	336.7758	121.7102

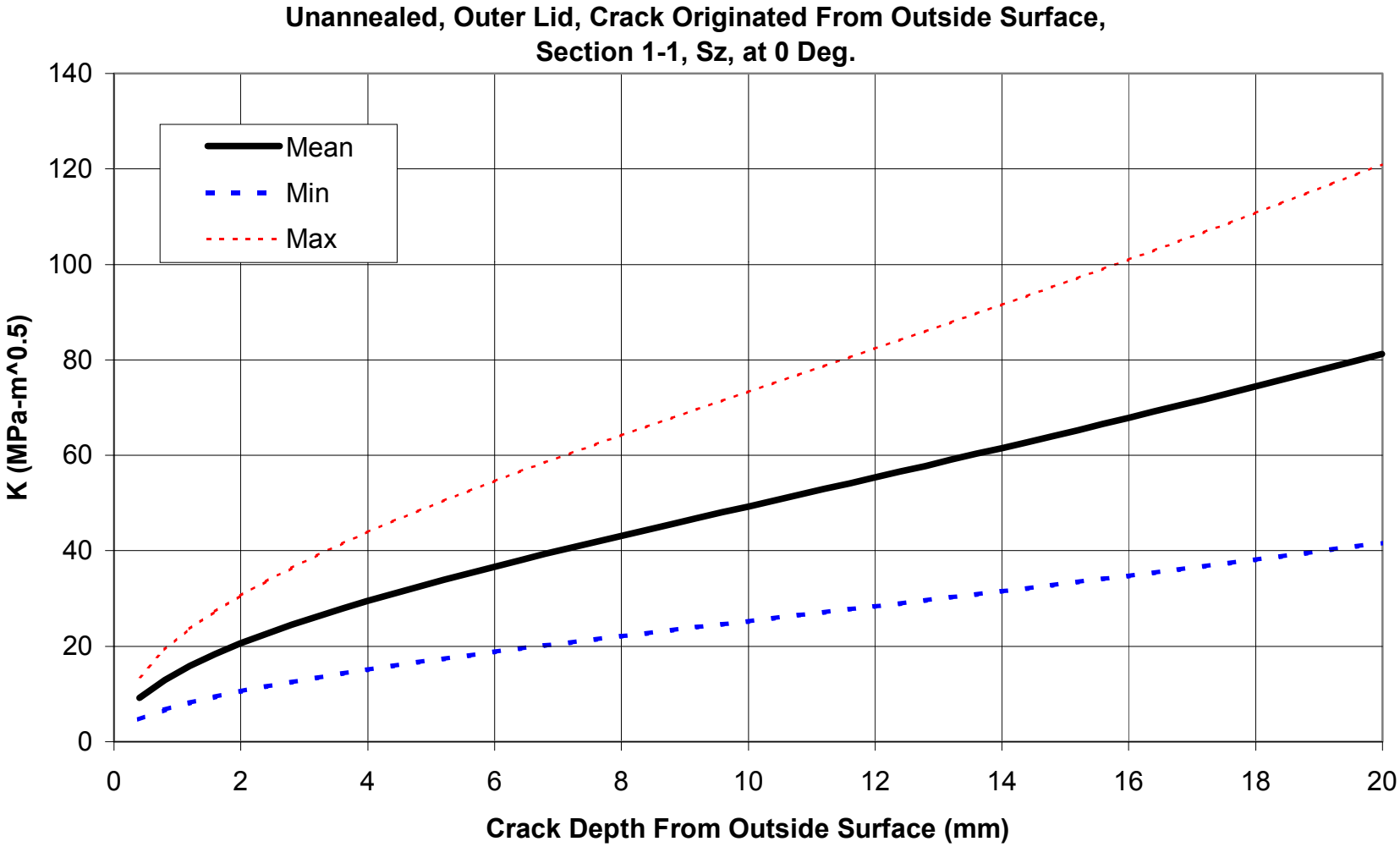
d) UnAnneal,Sz (continued)

Mean		Min - Insided Surface		Max-Inside Surface		Mean		Min - Insided Surface		Max-Inside Surface	
Stress: Sz	K(Sz)	Stress: Sz	K(Sz)	Stress: Sz	K(Sz)	Stress: Sz	K(Sz)	Stress: Sz	K(Sz)	Stress: Sz	K(Sz)
MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5
373.1418	9.1259	181.2446	4.4327	565.0390	13.8191	367.8153	9.1259	173.9471	4.3158	561.6835	13.9359
375.4603	12.9264	182.3708	6.2787	568.5497	19.5740	370.1338	12.9264	175.0435	6.1131	565.2240	19.7396
377.1751	15.8558	183.2037	7.7016	571.1465	24.0100	371.8486	15.8558	175.8545	7.4985	567.8427	24.2131
378.3315	18.3359	183.7654	8.9062	572.8977	27.7656	373.0050	18.3359	176.4014	8.6714	569.6087	28.0004
378.9380	20.5296	184.0600	9.9718	573.8160	31.0875	373.6115	20.5296	176.6882	9.7089	570.5348	31.3504
379.0255	22.5203	184.1025	10.9387	573.9485	34.1019	373.6990	22.5203	176.7296	10.6503	570.6684	34.3903
378.6161	24.3848	183.9037	11.8443	573.3286	36.9252	373.2896	24.3848	176.5360	11.5320	570.0432	37.2375
377.7279	26.1410	183.4722	12.6974	571.9835	39.5846	372.4014	26.1410	176.1159	12.3626	568.6868	39.9194
376.3951	27.8021	182.8249	13.5042	569.9654	42.0999	371.0686	27.8021	175.4856	13.1481	566.6516	42.4560
374.6368	29.3835	181.9708	14.2724	567.3027	44.4947	369.3103	29.3835	174.6541	13.8961	563.9664	44.8710
372.4607	30.8972	180.9138	15.0075	564.0076	46.7868	367.1342	30.8972	173.6250	14.6119	560.6435	47.1824
369.9177	32.3517	179.6786	15.7141	560.1568	48.9894	364.5912	32.3517	172.4223	15.2998	556.7601	49.4037
366.9986	33.7767	178.2607	16.4062	555.7364	51.1471	361.6721	33.7767	171.0418	15.9737	552.3023	51.5797
363.7634	35.1804	176.6893	17.0880	550.8375	53.2727	358.4369	35.1804	169.5119	16.6375	547.3620	53.7232
360.1943	36.5458	174.9557	17.7513	545.4330	55.3404	354.8678	36.5458	167.8240	17.2832	541.9117	55.8084
356.3596	37.8769	173.0931	18.3978	539.6261	57.3561	351.0331	37.8769	166.0105	17.9127	536.0558	57.8411
352.2606	39.1767	171.1021	19.0291	533.4191	59.3243	346.9341	39.1767	164.0720	18.5274	529.7963	59.8260
347.8919	40.4479	168.9801	19.6466	526.8038	61.2492	342.5655	40.4479	162.0059	19.1286	523.1250	61.7672
343.3320	41.7053	166.7653	20.2574	519.8988	63.1533	338.0055	41.7053	159.8495	19.7233	516.1616	63.6874
338.5461	42.9783	164.4406	20.8757	512.6516	65.0809	333.2196	42.9783	157.5861	20.3253	508.8531	65.6313
333.6178	44.2307	162.0468	21.4840	505.1888	66.9774	328.2913	44.2307	155.2554	20.9176	501.3272	67.5438
328.5077	45.4637	159.5647	22.0829	497.4507	68.8445	323.1812	45.4637	152.8387	21.5007	493.5237	69.4267
323.3036	46.6785	157.0369	22.6730	489.5703	70.6840	317.9771	46.6785	150.3776	22.0752	485.5766	71.2818
317.9625	47.8761	154.4426	23.2547	481.4823	72.4976	312.6360	47.8761	147.8517	22.6416	477.4203	73.1107
312.5751	49.0575	151.8258	23.8285	473.3244	74.2864	307.2486	49.0575	145.3039	23.2002	469.1933	74.9147
307.1309	50.2997	149.1814	24.4318	465.0804	76.1675	301.8044	50.2997	142.7292	23.7877	460.8796	76.8116
301.6179	51.5307	146.5037	25.0298	456.7322	78.0316	296.2915	51.5307	140.1220	24.3699	452.4609	78.6915
296.1291	52.7510	143.8376	25.6225	448.4207	79.8795	290.8026	52.7510	137.5263	24.9470	444.0790	80.5550
290.6178	53.9612	141.1606	26.2104	440.0751	81.7121	285.2913	53.9612	134.9199	25.5193	435.6628	82.4031
285.1769	55.1618	138.5178	26.7935	431.8361	83.5301	279.8505	55.1618	132.3468	26.0871	427.3541	84.2365
279.7605	56.3533	135.8869	27.3723	423.6340	85.3344	274.4340	56.3533	129.7852	26.6506	419.0827	86.0560
274.4600	57.5897	133.3123	27.9728	415.6077	87.2066	269.1335	57.5897	127.2785	27.2353	410.9885	87.9441
269.2314	58.8383	130.7727	28.5793	407.6902	89.0973	263.9050	58.8383	124.8058	27.8258	403.0041	89.8508
264.1640	60.0821	128.3113	29.1834	400.0167	90.9808	258.8375	60.0821	122.4093	28.4140	395.2657	91.7502
259.2473	61.3216	125.9231	29.7855	392.5714	92.8576	253.9208	61.3216	120.0841	29.0002	387.7574	93.6429
254.4746	62.5571	123.6049	30.3856	385.3443	94.7286	249.1481	62.5571	117.8270	29.5845	380.4692	95.5297
249.9295	63.7891	121.3973	30.9840	378.4618	96.5942	244.6031	63.7891	115.6776	30.1671	373.5285	97.4111
245.5775	65.0517	119.2833	31.5973	371.8716	98.5060	240.2510	65.0517	113.6194	30.7642	366.8826	99.3391
241.4966	66.3441	117.3012	32.2250	365.6921	100.4632	236.1701	66.3441	111.6895	31.3754	360.6508	101.3128
237.6583	67.6324	115.4368	32.8508	359.8798	102.4140	232.3318	67.6324	109.8743	31.9847	354.7893	103.2801
234.1342	68.9165	113.7250	33.4745	354.5433	104.3585	228.8077	68.9165	108.2077	32.5920	349.4077	105.2411
230.9221	70.1966	112.1649	34.0963	349.6794	106.2969	225.5956	70.1966	106.6886	33.1973	344.5027	107.1958
228.0279	71.4725	110.7591	34.7161	345.2967	108.2290	222.7014	71.4725	105.3199	33.8008	340.0830	109.1443
225.5113	72.7684	109.5367	35.3455	341.4859	110.1912	220.1848	72.7684	104.1297	34.4136	336.2398	111.1231
223.3635	74.1346	108.4934	36.0091	338.2335	112.2601	218.0370	74.1346	103.1140	35.0597	332.9600	113.2095
221.6348	75.5007	107.6538	36.6727	335.6158	114.3288	216.3083	75.5007	102.2964	35.7058	330.3201	115.2957
220.3265	76.8668	107.0183	37.3362	333.6347	116.3973	215.0000	76.8668	101.6777	36.3518	328.3223	117.3817
219.4783	78.2327	106.6063	37.9996	332.3503	118.4657	214.1518	78.2327	101.2766	36.9978	327.0271	119.4676
219.1027	79.5988	106.4239	38.6632	331.7816	120.5344	213.7762	79.5988	101.0990	37.6438	326.4535	121.5538
219.2276	80.9650	106.4845	39.3268	331.9707	122.6033	213.9011	80.9650	101.1580	38.2900	326.6442	123.6401

e) UnAnneal,SzPlt



f) UnAnneal,KSzPlt



The Excel File "S&K_OL_Anne" DTN: LL000316005924.140 contains the following six items:

a) Anneal,Sx – Excel tables containing radial stress and stress intensity factor profiles as a function of depth at location designated as 0, 18, 36, 54, 72, and 90 degrees along the circumference of the closure weld. Mean, maximum and minimum stress and stress intensity values are given at each of the locations to characterize uncertainty. Stress and stress intensity factor profiles are presented in the first table by British units, i.e., stress in ksi, distance in inches and stress intensity factor in ksi $(in)^{1/2}$ and in the second table by metric units, i.e., stress in MPa, distance in "m" and stress intensity factor in MPa $(m)^{1/2}$. The variability of the mean stress along the circumference is represented by Eq. 7.

   Mean stress intensity factor is calculated from mean stress at 0 degree. Variability and uncertainty for stress intensity factor are handled similarly to those for stress because stress intensity factor is a linear function of stress.

b) Anneal,SxPlt – Plot depicting mean, minimum and maximum radial stress profiles at 0 degree.

c) Anneal,KSxPlt – Plot depicting mean, minimum and maximum radial stress intensity factor profiles at 0 degree.

d) Anneal,Sz - Excel tables containing hoop stress and stress intensity factor profiles as a function of depth at location designated as 0, 18, 36, 54, 72, and 90 degrees along the circumference of the closure weld.

e) Anneal,SzPlt - Plot depicting mean, minimum and maximum hoop stress profiles at 0 degree.

f) Anneal,KSzPlt - Plot depicting mean, minimum and maximum hoop stress intensity factor profiles at 0 degree.

a) Anneal,Sx

Results in Metric Unit start in Cell A80

Angle(deg):	0						18					
(rad):	0						0.3141593					
	Scale Facto		1	0.9438128		1.0561872		0.9970569	0.943647		1.056353	
	Mean		Min - Insided Surface		Max-Inside Surface		Mean		Min - Insided Surface		Max-Inside Surface	
Depth	Stress: Sx	K(Sx)	Stress: Sx	K(Sx)	Stress: Sx	K(Sx)	Stress: Sx	K(Sx)	Stress: Sx	K(Sx)	Stress: Sx	K(Sx)
(in)	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5
0.0157	-45.1465	-10.8011	-42.6099	-10.1942	-47.6832	-11.408	-45.2689	-10.8011	-42.7178	-10.1924	-47.8199	-11.4098
0.0315	-45.0425	-15.3576	-42.5117	-14.4947	-47.5733	-16.2205	-45.1649	-15.3576	-42.6197	-14.4921	-47.7101	-16.223
0.0472	-44.7939	-18.8061	-42.2771	-17.7494	-47.3108	-19.8627	-44.9163	-18.8061	-42.3851	-17.7463	-47.4475	-19.8659
0.063	-44.4024	-21.5861	-41.9076	-20.3732	-46.8973	-22.7989	-44.5248	-21.5861	-42.0157	-20.3696	-47.0339	-22.8025
0.0787	-43.8779	-23.8549	-41.4125	-22.5146	-46.3432	-25.1952	-44.0002	-23.8549	-41.5207	-22.5106	-46.4798	-25.1992
0.0945	-43.2184	-25.6802	-40.7901	-24.2373	-45.6467	-27.1231	-43.3407	-25.6802	-40.8984	-24.233	-45.7831	-27.1273
0.1102	-42.4372	-27.5487	-40.0528	-26.0008	-44.8217	-29.0966	-42.5596	-27.5487	-40.1612	-25.9963	-44.958	-29.1012
0.126	-41.5293	-29.2357	-39.1959	-27.593	-43.8627	-30.8783	-41.6517	-29.2357	-39.3045	-27.5881	-43.9989	-30.8832
0.1417	-40.5110	-30.6253	-38.2348	-28.9046	-42.7872	-32.3461	-40.6334	-30.6253	-38.3436	-28.8995	-42.9232	-32.3512
0.1574	-39.3818	-31.7267	-37.169	-29.9441	-41.5945	-33.5094	-39.5041	-31.7267	-37.2779	-29.9388	-41.7303	-33.5146
0.1732	-38.1382	-32.5484	-35.9953	-30.7196	-40.2811	-34.3772	-38.2605	-32.5484	-36.1044	-30.7142	-40.4166	-34.3826
0.1889	-36.8009	-33.1262	-34.7331	-31.2649	-38.8686	-34.9874	-36.9232	-33.1262	-34.8425	-31.2594	-39.004	-34.9929
0.2047	-35.3577	-33.6432	-33.371	-31.7529	-37.3443	-35.5336	-35.4800	-33.6432	-33.4806	-31.7473	-37.4794	-35.5391
0.2204	-33.8317	-34.1217	-31.9308	-32.2045	-35.7326	-36.039	-33.9541	-34.1217	-32.0406	-32.1989	-35.8675	-36.0446
0.2362	-32.2084	-34.3764	-30.3987	-32.4448	-34.0181	-36.3079	-32.3308	-34.3764	-30.5088	-32.4391	-34.1527	-36.3136
0.2519	-30.5132	-34.4474	-28.7988	-32.5119	-32.2277	-36.3829	-30.6356	-34.4474	-28.9092	-32.5062	-32.362	-36.3886
0.2676	-28.7409	-34.3448	-27.1261	-32.4151	-30.3558	-36.2746	-28.8633	-34.3448	-27.2368	-32.4094	-30.4898	-36.2803
0.2834	-26.8844	-34.0772	-25.3739	-32.1625	-28.395	-35.9919	-27.0068	-34.0772	-25.4849	-32.1568	-28.5287	-35.9976
0.2991	-24.9720	-33.8240	-23.5689	-31.9235	-26.3751	-35.7245	-25.0944	-33.8240	-23.6802	-31.9179	-26.5085	-35.7301
0.3149	-22.9842	-33.8356	-21.6928	-31.9344	-24.2756	-35.7367	-23.1066	-33.8356	-21.8044	-31.9288	-24.4087	-35.7423
0.3306	-20.9511	-33.7259	-19.7739	-31.831	-22.1283	-35.6209	-21.0734	-33.7259	-19.8859	-31.8254	-22.261	-35.6265
0.3464	-18.8516	-33.4876	-17.7924	-31.606	-19.9108	-35.3692	-18.9739	-33.4876	-17.9047	-31.6005	-20.0432	-35.3747
0.3621	-16.7171	-33.1575	-15.7779	-31.2945	-17.6564	-35.0205	-16.8395	-33.1575	-15.8905	-31.289	-17.7885	-35.026
0.3779	-14.5255	-32.7266	-13.7093	-30.8878	-15.3416	-34.5655	-14.6478	-32.7266	-13.8224	-30.8824	-15.4733	-34.5709
0.3936	-12.3091	-32.2294	-11.6175	-30.4186	-13.0008	-34.0403	-12.4315	-32.2294	-11.731	-30.4132	-13.1321	-34.0457
0.4093	-10.0593	-32.3361	-9.49406	-30.5192	-10.6245	-34.153	-10.1816	-32.3361	-9.60786	-30.5138	-10.7554	-34.1583
0.4251	-7.7660	-32.2985	-7.32969	-30.4838	-8.2024	-34.1133	-7.8884	-32.2985	-7.44387	-30.4784	-8.33294	-34.1187
0.4408	-5.4634	-32.1512	-5.1564	-30.3447	-5.77034	-33.9577	-5.5857	-32.1512	-5.27096	-30.3394	-5.9005	-33.963
0.4566	-3.1268	-31.8851	-2.95111	-30.0936	-3.30248	-33.6767	-3.2492	-31.8851	-3.06606	-30.0883	-3.43226	-33.682
0.4723	-0.7907	-31.5321	-0.74632	-29.7604	-0.83518	-33.3039	-0.9131	-31.5321	-0.86165	-29.7552	-0.96456	-33.3091
0.4881	1.5696	-31.0829	1.481448	-29.3365	1.657835	-32.8294	1.4473	-31.0829	1.365724	-29.3313	1.528841	-32.8346
0.5038	3.9196	-31.1242	3.699414	-29.3755	4.139881	-32.873	3.7973	-31.1242	3.5833	-29.3703	4.011278	-32.8782
0.5196	6.2843	-31.2134	5.931217	-29.4596	6.637413	-32.9672	6.1620	-31.2134	5.814711	-29.4544	6.509201	-32.9723
0.5353	8.6289	-31.1875	8.144031	-29.4351	9.113694	-32.9398	8.5065	-31.1875	8.027137	-29.4299	8.985871	-32.945
0.551	10.9634	-31.0482	10.34743	-29.3037	11.57944	-32.7927	10.8411	-31.0482	10.23015	-29.2986	11.45201	-32.7979
0.5668	13.2979	-30.7979	12.55077	-29.0675	14.04511	-32.5284	13.1756	-30.7979	12.4331	-29.0624	13.91806	-32.5335
0.5825	15.5980	-30.4646	14.72156	-28.7529	16.47437	-32.1764	15.4756	-30.4646	14.60351	-28.7479	16.3477	-32.1814
0.5983	17.8879	-30.7221	16.88285	-28.9959	18.89299	-32.4483	17.7656	-30.7221	16.76442	-28.9908	18.76671	-32.4534
0.614	20.1340	-31.5105	19.0027	-29.74	21.26525	-33.281	20.0116	-31.5105	18.8839	-29.7348	21.13933	-33.2862
0.6298	22.3599	-32.1161	21.10351	-30.3116	23.61619	-33.9206	22.2375	-32.1161	20.98434	-30.3063	23.49064	-33.926
0.6455	24.5325	-32.5721	23.15411	-30.742	25.91093	-34.4023	24.4102	-32.5721	23.03458	-30.7366	25.78575	-34.4077
0.6612	26.6614	-32.8835	25.16334	-31.0359	28.15939	-34.7312	26.5390	-32.8835	25.04345	-31.0304	28.03456	-34.7366
0.677	28.7546	-33.0546	27.139	-31.1974	30.37028	-34.9118	28.6323	-33.0546	27.01877	-31.1919	30.2458	-34.9173
0.6927	30.7810	-33.6447	29.05151	-31.7543	32.5105	-35.5351	30.6586	-33.6447	28.93094	-31.7487	32.38635	-35.5407
0.7085	32.7614	-35.5374	30.92061	-33.5407	34.60215	-37.5342	32.6390	-35.5374	30.79971	-33.5348	34.47833	-37.5401
0.7242	34.6658	-37.0871	32.71807	-35.0033	36.61363	-39.1709	34.5435	-37.0871	32.59686	-34.9971	36.49012	-39.1771
0.74	36.5138	-38.3030	34.46218	-36.1508	38.56539	-40.4551	36.3914	-38.3030	34.34066	-36.1445	38.44219	-40.4615
0.7557	38.2769	-39.2299	36.12627	-37.0256	40.42761	-41.4341	38.1546	-39.2299	36.00445	-37.0191	40.30471	-41.4406
0.7715	39.9729	-39.8727	37.72693	-37.6324	42.21885	-42.1131	39.8505	-39.8727	37.60483	-37.6258	42.09623	-42.1197
0.7872	41.5753	-40.2740	39.23932	-38.0111	43.91132	-42.5369	41.4530	-40.2740	39.11696	-38.0045	43.78896	-42.5436

a) Anneal,Sx (continued)

36						54					
0.6283185						0.9424778					
	0.9885158	0.9431601		1.0568399			0.9752128	0.9423847		1.0576153	
Mean		Min - Insided Surface		Max-Inside Surface		Mean		Min - Insided Surface		Max-Inside Surface	
Stress: Sx (ksi)	K(Sx) ksi*in^0.5	Stress: Sx (ksi)	K(Sx) ksi*in^0.5	Stress: Sx (ksi)	K(Sx) ksi*in^0.5	Stress: Sx (ksi)	K(Sx) ksi*in^0.5	Stress: Sx (ksi)	K(Sx) ksi*in^0.5	Stress: Sx (ksi)	K(Sx) ksi*in^0.5
-45.6240	-10.8011	-43.0307	-10.1872	-48.2172	-11.415	-46.1770	-10.8011	-43.5165	-10.1788	-48.8375	-11.4234
-45.5200	-15.3576	-42.9326	-14.4847	-48.1073	-16.2305	-46.0731	-15.3576	-43.4186	-14.4727	-48.7276	-16.2424
-45.2714	-18.8061	-42.6982	-17.7371	-47.8446	-19.875	-45.8245	-18.8061	-43.1843	-17.7226	-48.4647	-19.8896
-44.8799	-21.5861	-42.3289	-20.3591	-47.4309	-22.813	-45.4330	-21.5861	-42.8153	-20.3424	-48.0506	-22.8297
-44.3553	-23.8549	-41.8342	-22.499	-46.8765	-25.2108	-44.9084	-23.8549	-42.321	-22.4805	-47.4958	-25.2293
-43.6958	-25.6802	-41.2122	-24.2205	-46.1795	-27.1398	-44.2489	-25.6802	-41.6995	-24.2006	-46.7983	-27.1597
-42.9147	-27.5487	-40.4754	-25.9829	-45.354	-29.1146	-43.4678	-27.5487	-40.9634	-25.9615	-45.9722	-29.136
-42.0068	-29.2357	-39.6191	-27.5739	-44.3945	-30.8974	-42.5599	-29.2357	-40.1078	-27.5512	-45.012	-30.9201
-40.9885	-30.6253	-38.6587	-28.8846	-43.3183	-32.3661	-41.5416	-30.6253	-39.1481	-28.8609	-43.935	-32.3898
-39.8592	-31.7267	-37.5936	-29.9234	-42.1248	-33.5301	-40.4123	-31.7267	-38.0839	-29.8988	-42.7407	-33.5547
-38.6156	-32.5484	-36.4207	-30.6983	-40.8105	-34.3984	-39.1687	-32.5484	-36.912	-30.6731	-41.4254	-34.4237
-37.2783	-33.1262	-35.1594	-31.2433	-39.3972	-35.0091	-37.8314	-33.1262	-35.6517	-31.2176	-40.0111	-35.0347
-35.8351	-33.6432	-33.7983	-31.731	-37.872	-35.5555	-36.3882	-33.6432	-34.2917	-31.7049	-38.4847	-35.5816
-34.3092	-34.1217	-32.359	-32.1823	-36.2593	-36.0612	-34.8622	-34.1217	-32.8536	-32.1558	-36.8708	-36.0877
-32.6859	-34.3764	-30.828	-32.4224	-34.5437	-36.3303	-33.2390	-34.3764	-31.3239	-32.3958	-35.154	-36.357
-30.9907	-34.4474	-29.2292	-32.4894	-32.7522	-36.4054	-31.5438	-34.4474	-29.7264	-32.4627	-33.3612	-36.4321
-29.2184	-34.3448	-27.5576	-32.3927	-30.8792	-36.297	-29.7715	-34.3448	-28.0562	-32.366	-31.4868	-36.3236
-27.3619	-34.0772	-25.8066	-32.1403	-28.9171	-36.0141	-27.9150	-34.0772	-26.3066	-32.1138	-29.5233	-36.0406
-25.4495	-33.8240	-24.0029	-31.9014	-26.896	-35.7465	-26.0025	-33.8240	-24.5044	-31.8752	-27.5007	-35.7728
-23.4617	-33.8356	-22.1281	-31.9124	-24.7952	-35.7588	-24.0148	-33.8356	-22.6311	-31.8861	-25.3984	-35.785
-21.4285	-33.7259	-20.2105	-31.809	-22.6465	-35.6429	-21.9816	-33.7259	-20.7151	-31.7828	-23.2481	-35.6691
-19.3290	-33.4876	-18.2304	-31.5842	-20.4277	-35.391	-19.8821	-33.4876	-18.7366	-31.5582	-21.0276	-35.417
-17.1946	-33.1575	-16.2173	-31.2728	-18.1719	-35.0422	-17.7477	-33.1575	-16.7251	-31.2471	-18.7702	-35.0679
-15.0029	-32.7266	-14.1502	-30.8665	-15.8557	-34.5868	-15.5560	-32.7266	-14.6597	-30.8411	-16.4523	-34.6122
-12.7866	-32.2294	-12.0598	-30.3975	-13.5134	-34.0614	-13.3397	-32.2294	-12.5711	-30.3725	-14.1083	-34.0864
-10.5367	-32.3361	-9.93781	-30.4981	-11.1356	-34.1741	-11.0898	-32.3361	-10.4509	-30.473	-11.7287	-34.1991
-8.2435	-32.2985	-7.77494	-30.4627	-8.71206	-34.1344	-8.7966	-32.2985	-8.28977	-30.4376	-9.3034	-34.1594
-5.9408	-32.1512	-5.60315	-30.3237	-6.27851	-33.9786	-6.4939	-32.1512	-6.11976	-30.2988	-6.86806	-34.0036
-3.6043	-31.8851	-3.39939	-30.0728	-3.80912	-33.6975	-4.1573	-31.8851	-3.91781	-30.0481	-4.39686	-33.7222
-1.2682	-31.5321	-1.19612	-29.7399	-1.34029	-33.3244	-1.8213	-31.5321	-1.71635	-29.7154	-1.92622	-33.3489
1.0922	-31.0829	1.030104	-29.3162	1.154264	-32.8497	0.5391	-31.0829	0.508044	-29.2921	0.570165	-32.8738
3.4422	-31.1242	3.246536	-29.3551	3.637844	-32.8933	2.8891	-31.1242	2.722654	-29.331	3.055568	-32.9175
5.8069	-31.2134	5.476796	-29.4392	6.136919	-32.9875	5.2538	-31.2134	4.95108	-29.415	5.556476	-33.0117
8.1514	-31.1875	7.68808	-29.4148	8.61473	-32.9601	7.5983	-31.1875	7.160546	-29.3906	8.036106	-32.9843
10.4860	-31.0482	9.889959	-29.2834	11.082	-32.813	9.9329	-31.0482	9.360615	-29.2594	10.50519	-32.8371
12.8205	-30.7979	12.09177	-29.0474	13.5492	-32.5485	12.2674	-30.7979	11.56061	-29.0235	12.97419	-32.5724
15.1205	-30.4646	14.26106	-28.733	15.97995	-32.1963	14.5674	-30.4646	13.72812	-28.7094	15.40673	-32.2199
17.4105	-30.7221	16.42085	-28.9758	18.40007	-32.4683	16.8574	-30.7221	15.88614	-28.952	17.82863	-32.4921
19.6565	-31.5105	18.53924	-29.7195	20.77379	-33.3016	19.1034	-31.5105	18.00279	-29.695	20.20409	-33.326
21.8824	-32.1161	20.6386	-30.2906	23.12619	-33.9416	21.3293	-32.1161	20.10042	-30.2657	22.55821	-33.9665
24.0551	-32.5721	22.68777	-30.7207	25.42235	-34.4235	23.5020	-32.5721	22.14791	-30.6955	24.85606	-34.4488
26.1839	-32.8835	24.69561	-31.0144	27.6722	-34.7526	25.6308	-32.8835	24.1541	-30.9889	27.10756	-34.7781
28.2772	-33.0546	26.66991	-31.1758	29.88446	-34.9334	27.7241	-33.0546	26.12677	-31.1502	29.32144	-34.9591
30.3035	-33.6447	28.5811	-31.7323	32.026	-35.557	29.7505	-33.6447	28.03639	-31.7062	31.46455	-35.5831
32.2839	-35.5374	30.44891	-33.5175	34.11894	-37.5574	31.7308	-35.5374	29.90266	-33.4899	33.55903	-37.5849
34.1884	-37.0871	32.24513	-34.9791	36.13166	-39.1951	33.6353	-37.0871	31.6974	-34.9503	35.57322	-39.2239
36.0363	-38.3030	33.98802	-36.1258	38.08463	-40.4801	35.4832	-38.3030	33.43887	-36.0961	37.52762	-40.5098
37.7995	-39.2299	35.65096	-37	39.948	-41.4597	37.2464	-39.2299	35.10044	-36.9696	39.39237	-41.4901
39.4954	-39.8727	37.25051	-37.6064	41.74035	-42.1391	38.9424	-39.8727	36.69868	-37.5755	41.18603	-42.17
41.0979	-40.2740	38.76186	-37.9849	43.43386	-42.5632	40.5448	-40.2740	38.20878	-37.9536	42.88078	-42.5944

a) Anneal,Sx (continued)

72						90					
1.2566371						1.5707963					
	0.9584499	0.941377		1.058623			0.9398682	0.940218		1.059782	
Mean		Min - Insided Surface		Max-Inside Surface		Mean		Min - Insided Surface		Max-Inside Surface	
Stress: Sx	K(Sx)	Stress: Sx	K(Sx)	Stress: Sx	K(Sx)	Stress: Sx	K(Sx)	Stress: Sx	K(Sx)	Stress: Sx	K(Sx)
(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5
-46.8740	-10.8011	-44.1261	-10.1679	-49.6219	-11.4343	-47.6465	-10.8011	-44.80	-10.16	-50.49	-11.45
-46.7700	-15.3576	-44.0282	-14.4573	-49.5118	-16.2579	-47.5425	-15.3576	-44.70	-14.44	-50.38	-16.28
-46.5214	-18.8061	-43.7942	-17.7036	-49.2486	-19.9085	-47.2939	-18.8061	-44.47	-17.68	-50.12	-19.93
-46.1299	-21.5861	-43.4256	-20.3206	-48.8342	-22.8515	-46.9024	-21.5861	-44.10	-20.30	-49.71	-22.88
-45.6053	-23.8549	-42.9318	-22.4565	-48.2788	-25.2533	-46.3779	-23.8549	-43.61	-22.43	-49.15	-25.28
-44.9458	-25.6802	-42.311	-24.1747	-47.5807	-27.1856	-45.7184	-25.6802	-42.99	-24.14	-48.45	-27.22
-44.1647	-27.5487	-41.5756	-25.9337	-46.7538	-29.1637	-44.9372	-27.5487	-42.25	-25.90	-47.62	-29.20
-43.2568	-29.2357	-40.7209	-27.5218	-45.7926	-30.9495	-44.0293	-29.2357	-41.40	-27.49	-46.66	-30.98
-42.2385	-30.6253	-39.7623	-28.83	-44.7146	-32.4207	-43.0110	-30.6253	-40.44	-28.79	-45.58	-32.46
-41.1092	-31.7267	-38.6993	-29.8668	-43.5192	-33.5867	-41.8818	-31.7267	-39.38	-29.83	-44.39	-33.62
-39.8656	-32.5484	-37.5286	-30.6403	-42.2027	-34.4565	-40.6382	-32.5484	-38.21	-30.60	-43.07	-34.49
-38.5283	-33.1262	-36.2697	-31.1842	-40.787	-35.0681	-39.3009	-33.1262	-36.95	-31.15	-41.65	-35.11
-37.0851	-33.6432	-34.9111	-31.671	-39.2592	-35.6155	-37.8577	-33.6432	-35.59	-31.63	-40.12	-35.65
-35.5592	-34.1217	-33.4746	-32.1214	-37.6437	-36.1221	-36.3317	-34.1217	-34.16	-32.08	-38.50	-36.16
-33.9359	-34.3764	-31.9465	-32.3611	-35.9253	-36.3916	-34.7084	-34.3764	-32.63	-32.32	-36.78	-36.43
-32.2407	-34.4474	-30.3506	-32.428	-34.1307	-36.4668	-33.0132	-34.4474	-31.04	-32.39	-34.99	-36.51
-30.4684	-34.3448	-28.6823	-32.3314	-32.2546	-36.3582	-31.2409	-34.3448	-29.37	-32.29	-33.11	-36.40
-28.6119	-34.0772	-26.9346	-32.0795	-30.2892	-36.0749	-29.3844	-34.0772	-27.63	-32.04	-31.14	-36.11
-26.6995	-33.8240	-25.1343	-31.8411	-28.2647	-35.8069	-27.4720	-33.8240	-25.83	-31.80	-29.11	-35.85
-24.7117	-33.8356	-23.263	-31.852	-26.1603	-35.8191	-25.4842	-33.8356	-23.96	-31.81	-27.01	-35.86
-22.6785	-33.7259	-21.3491	-31.7488	-24.008	-35.7031	-23.4511	-33.7259	-22.05	-31.71	-24.85	-35.74
-20.5790	-33.4876	-19.3726	-31.5245	-21.7854	-35.4507	-21.3516	-33.4876	-20.08	-31.49	-22.63	-35.49
-18.4446	-33.1575	-17.3633	-31.2137	-19.5259	-35.1013	-19.2171	-33.1575	-18.07	-31.18	-20.37	-35.14
-16.2529	-32.7266	-15.3001	-30.8081	-17.2057	-34.6452	-17.0255	-32.7266	-16.01	-30.77	-18.04	-34.68
-14.0366	-32.2294	-13.2137	-30.3401	-14.8595	-34.1188	-14.8091	-32.2294	-13.92	-30.30	-15.69	-34.16
-11.7867	-32.3361	-11.0957	-30.4404	-12.4777	-34.2317	-12.5593	-32.3361	-11.81	-30.40	-13.31	-34.27
-9.4935	-32.2985	-8.93697	-30.4051	-10.05	-34.192	-10.2660	-32.2985	-9.65	-30.37	-10.88	-34.23
-7.1908	-32.1512	-6.76928	-30.2664	-7.61238	-34.036	-7.9634	-32.1512	-7.49	-30.23	-8.44	-34.07
-4.8543	-31.8851	-4.56968	-30.0159	-5.13883	-33.7543	-5.6268	-31.8851	-5.29	-29.98	-5.96	-33.79
-2.5182	-31.5321	-2.37058	-29.6836	-2.66583	-33.3807	-3.2907	-31.5321	-3.09	-29.65	-3.49	-33.42
-0.1578	-31.0829	-0.14856	-29.2608	-0.16707	-32.9051	-0.9304	-31.0829	-0.87	-29.22	-0.99	-32.94
2.1922	-31.1242	2.063677	-29.2996	2.320703	-32.9488	1.4196	-31.1242	1.33	-29.26	1.50	-32.98
4.5569	-31.2134	4.289721	-29.3836	4.823994	-33.0432	3.7843	-31.2134	3.56	-29.35	4.01	-33.08
6.9014	-31.1875	6.496824	-29.3592	7.305986	-33.0158	6.1289	-31.1875	5.76	-29.32	6.50	-33.05
9.2360	-31.0482	8.694541	-29.2281	9.777422	-32.8684	8.4634	-31.0482	7.96	-29.19	8.97	-32.90
11.5705	-30.7979	10.89219	-28.9925	12.24878	-32.6034	10.7979	-30.7979	10.15	-28.96	11.44	-32.64
13.8705	-30.4646	13.05738	-28.6787	14.68364	-32.2506	13.0980	-30.4646	12.31	-28.64	13.88	-32.29
16.1605	-30.7221	15.21309	-28.9211	17.10784	-32.5231	15.3879	-30.7221	14.47	-28.89	16.31	-32.56
18.4065	-31.5105	17.32747	-29.6633	19.48556	-33.3578	17.6340	-31.5105	16.58	-29.63	18.69	-33.39
20.6324	-32.1161	19.42286	-30.2334	21.84193	-33.9989	19.8599	-32.1161	18.67	-30.20	21.05	-34.04
22.8051	-32.5721	21.46816	-30.6627	24.14196	-34.4816	22.0325	-32.5721	20.72	-30.62	23.35	-34.52
24.9339	-32.8835	23.47221	-30.9558	26.39561	-34.8113	24.1614	-32.8835	22.72	-30.92	25.61	-34.85
27.0272	-33.0546	25.44277	-31.1168	28.6116	-34.9924	26.2546	-33.0546	24.69	-31.08	27.82	-35.03
29.0535	-33.6447	27.35034	-31.6723	30.75675	-35.617	28.2810	-33.6447	26.59	-31.63	29.97	-35.66
31.0339	-35.5374	29.21462	-33.4541	32.85322	-37.6207	30.2614	-35.5374	28.45	-33.41	32.07	-37.66
32.9384	-37.0871	31.00745	-34.913	34.86934	-39.2613	32.1658	-37.0871	30.24	-34.87	34.09	-39.30
34.7863	-38.3030	32.74705	-36.0575	36.8256	-40.5484	34.0138	-38.3030	31.98	-36.01	36.05	-40.59
36.5495	-39.2299	34.40684	-36.9301	38.69212	-41.5296	35.7769	-39.2299	33.64	-36.88	37.92	-41.58
38.2454	-39.8727	36.00337	-37.5353	40.48749	-42.2102	37.4729	-39.8727	35.23	-37.49	39.71	-42.26
39.8479	-40.2740	37.51186	-37.913	42.18386	-42.635	39.0753	-40.2740	36.74	-37.87	41.41	-42.68

From Analyses	
Mean	
Stress: Sx	K(Sx)
(ksi)	ksi*in^0.5
-45.1465	-10.8011
-45.0425	-15.3576
-44.7939	-18.8061
-44.4024	-21.5861
-43.8779	-23.8549
-43.2184	-25.6802
-42.4372	-27.5487
-41.5293	-29.2357
-40.5110	-30.6253
-39.3818	-31.7267
-38.1382	-32.5484
-36.8009	-33.1262
-35.3577	-33.6432
-33.8317	-34.1217
-32.2084	-34.3764
-30.5132	-34.4474
-28.7409	-34.3448
-26.8844	-34.0772
-24.9720	-33.824
-22.9842	-33.8356
-20.9511	-33.7259
-18.8516	-33.4876
-16.7171	-33.1575
-14.5255	-32.7266
-12.3091	-32.2294
-10.0593	-32.3361
-7.7660	-32.2985
-5.4634	-32.1512
-3.1268	-31.8851
-0.7907	-31.5321
1.5696	-31.0829
3.9196	-31.1242
6.2843	-31.2134
8.6289	-31.1875
10.9634	-31.0482
13.2979	-30.7979
15.5980	-30.4646
17.8879	-30.7221
20.1340	-31.5105
22.3599	-32.1161
24.5325	-32.5721
26.6614	-32.8835
28.7546	-33.0546
30.7810	-33.6447
32.7614	-35.5374
34.6658	-37.0871
36.5138	-38.303
38.2769	-39.2299
39.9729	-39.8727
41.5753	-40.274

a) Anneal,Sx (continued)

In Metric Unit

Unit Conv: 1.0000 in = 25.4000 mm 1.0000 ksi = 6.8948 MPa 1.0000 ksi-in^0.5= 1.0988 MPa-m^0.5

Depth (mm)	Mean Stress: Sx MPa	K(Sx) MPa*m^0.5	Min - Insided Surface Stress: Sx MPa	K(Sx) MPa*m^0.5	Max-Inside Surface Stress: Sx MPa	K(Sx) MPa*m^0.5	Mean Stress: Sx MPa	K(Sx) MPa*m^0.5	Min - Insided Surface Stress: Sx MPa	K(Sx) MPa*m^0.5	Max-Inside Surface Stress: Sx MPa	K(Sx) MPa*m^0.5
0.3988	-311.2742	-11.8687	-293.7846	-11.2019	-328.7638	-12.5356	-312.1178	-11.8687	-294.5290	-11.1999	-329.7066	-12.5376
0.8001	-310.5573	-16.8756	-293.1080	-15.9274	-328.0066	-17.8238	-311.4009	-16.8756	-293.8525	-15.9246	-328.9493	-17.8266
1.1989	-308.8433	-20.6649	-291.4902	-19.5038	-326.1963	-21.8260	-309.6869	-20.6649	-292.2351	-19.5004	-327.1387	-21.8295
1.6002	-306.1440	-23.7197	-288.9427	-22.3869	-323.3454	-25.0524	-306.9877	-23.7197	-289.6880	-22.3830	-324.2873	-25.0564
1.9990	-302.5272	-26.2128	-285.5290	-24.7400	-319.5253	-27.6856	-303.3708	-26.2128	-286.2749	-24.7356	-320.4666	-27.6900
2.4003	-297.9803	-28.2185	-281.2376	-26.6330	-314.7230	-29.8040	-298.8239	-28.2185	-281.9843	-26.6283	-315.6635	-29.8087
2.7991	-292.5944	-30.2717	-276.1544	-28.5708	-309.0345	-31.9726	-293.4380	-30.2717	-276.9019	-28.5658	-309.9742	-31.9776
3.2004	-286.3346	-32.1254	-270.2463	-30.3204	-302.4230	-33.9304	-287.1783	-32.1254	-270.9949	-30.3150	-303.3616	-33.9358
3.5992	-279.3137	-33.6524	-263.6198	-31.7616	-295.0075	-35.5433	-280.1573	-33.6524	-264.3696	-31.7560	-295.9450	-35.5489
3.9980	-271.5277	-34.8627	-256.2713	-32.9039	-286.7841	-36.8215	-272.3713	-34.8627	-257.0224	-32.8981	-287.7203	-36.8273
4.3993	-262.9535	-35.7656	-248.1789	-33.7560	-277.7281	-37.7751	-263.7971	-35.7656	-248.9313	-33.7501	-278.6629	-37.7810
4.7981	-253.7330	-36.4005	-239.4764	-34.3552	-267.9895	-38.4457	-254.5766	-36.4005	-240.2305	-34.3492	-268.9228	-38.4517
5.1994	-243.7825	-36.9686	-230.0850	-34.8915	-257.4799	-39.0458	-244.6261	-36.9686	-230.8407	-34.8853	-258.4115	-39.0519
5.5982	-233.2613	-37.4944	-220.1550	-35.3877	-246.3676	-39.6012	-234.1050	-37.4944	-220.9124	-35.3815	-247.2975	-39.6074
5.9995	-222.0692	-37.7742	-209.5918	-35.6518	-234.5467	-39.8966	-222.9129	-37.7742	-210.3511	-35.6455	-235.4747	-39.9029
6.3983	-210.3813	-37.8523	-198.5606	-35.7255	-222.2020	-39.9791	-211.2249	-37.8523	-199.3218	-35.7192	-223.1281	-39.9854
6.7970	-198.1618	-37.7396	-187.0277	-35.6191	-209.2960	-39.8601	-199.0055	-37.7396	-187.7909	-35.6128	-210.2200	-39.8663
7.1984	-185.3615	-37.4455	-174.9466	-35.3415	-195.7765	-39.5495	-186.2052	-37.4455	-175.7119	-35.3353	-196.6984	-39.5557
7.5971	-172.1759	-37.1673	-162.5018	-35.0789	-181.8499	-39.2556	-173.0195	-37.1673	-163.2693	-35.0728	-182.7697	-39.2617
7.9985	-158.4706	-37.1800	-149.5666	-35.0909	-167.3746	-39.2690	-159.3142	-37.1800	-150.3364	-35.0848	-168.2921	-39.2752
8.3972	-144.4526	-37.0595	-136.3362	-34.9772	-152.5690	-39.1418	-145.2962	-37.0595	-137.1084	-34.9711	-153.4841	-39.1479
8.7986	-129.9771	-36.7976	-122.6740	-34.7301	-137.2801	-38.8652	-130.8207	-36.7976	-123.4486	-34.7240	-138.1928	-38.8713
9.1973	-115.2606	-36.4349	-108.7845	-34.3877	-121.7368	-38.4821	-116.1043	-36.4349	-109.5615	-34.3817	-122.6471	-38.4881
9.5987	-100.1496	-35.9614	-94.5225	-33.9409	-105.7767	-37.9820	-100.9932	-35.9614	-95.3019	-33.9349	-106.6845	-37.9880
9.9974	-84.8686	-35.4151	-80.1001	-33.4252	-89.6371	-37.4050	-85.7122	-35.4151	-80.8821	-33.4194	-90.5424	-37.4109
10.3962	-69.3562	-35.5323	-65.4592	-33.5358	-73.2531	-37.5287	-70.1998	-35.5323	-66.2438	-33.5299	-74.1558	-37.5346
10.7975	-53.5450	-35.4910	-50.5365	-33.4969	-56.5535	-37.4852	-54.3886	-35.4910	-51.3237	-33.4910	-57.4536	-37.4910
11.1963	-37.6686	-35.3291	-35.5521	-33.3441	-39.7851	-37.3141	-38.5123	-35.3291	-36.3420	-33.3382	-40.6825	-37.3200
11.5976	-21.5585	-35.0368	-20.3472	-33.0681	-22.7698	-37.0054	-22.4021	-35.0368	-21.1397	-33.0623	-23.6646	-37.0112
11.9964	-5.4520	-34.6489	-5.1457	-32.7021	-5.7584	-36.5957	-6.2957	-34.6489	-5.9409	-32.6963	-6.6504	-36.6015
12.3977	10.8223	-34.1553	10.2142	-32.2362	11.4304	-36.0744	9.9787	-34.1553	9.4163	-32.2305	10.5410	-36.0800
12.7965	27.0250	-34.2007	25.5066	-32.2790	28.5435	-36.1223	26.1814	-34.2007	24.7060	-32.2733	27.6568	-36.1280
13.1978	43.3288	-34.2986	40.8943	-32.3715	45.7634	-36.2257	42.4852	-34.2986	40.0910	-32.3658	44.8794	-36.2314
13.5966	59.4939	-34.2701	56.1511	-32.3446	62.8367	-36.1957	58.6503	-34.2701	55.3452	-32.3389	61.9554	-36.2013
13.9954	75.5902	-34.1171	71.3430	-32.2002	79.8375	-36.0341	74.7466	-34.1171	70.5344	-32.1945	78.9588	-36.0397
14.3967	91.6861	-33.8421	86.5345	-31.9406	96.8376	-35.7436	90.8424	-33.8421	85.7232	-31.9350	95.9617	-35.7492
14.7955	107.5442	-33.4759	101.5016	-31.5949	113.5868	-35.3568	106.7005	-33.4759	100.6876	-31.5894	112.7134	-35.3623
15.1968	123.3329	-33.7587	116.4031	-31.8619	130.2626	-35.6556	122.4892	-33.7587	115.5866	-31.8563	129.3919	-35.6612
15.5956	138.8189	-34.6251	131.0190	-32.6796	146.6187	-36.5706	137.9752	-34.6251	130.1999	-32.6739	145.7506	-36.5763
15.9969	154.1657	-35.2906	145.5036	-33.3077	162.8279	-37.2734	153.3221	-35.2906	144.6819	-33.3018	161.9623	-37.2793
16.3957	169.1458	-35.7917	159.6419	-33.7806	178.6496	-37.8027	168.3021	-35.7917	158.8178	-33.7747	177.7865	-37.8086
16.7945	183.8236	-36.1338	173.4951	-34.1036	194.1522	-38.1641	182.9800	-36.1338	172.6685	-34.0976	193.2915	-38.1701
17.1958	198.2563	-36.3218	187.1168	-34.2810	209.3957	-38.3626	197.4126	-36.3218	186.2878	-34.2750	208.5374	-38.3687
17.5946	212.2276	-36.9702	200.3031	-34.8930	224.1520	-39.0475	211.3839	-36.9702	199.4718	-34.8868	223.2960	-39.0536
17.9959	225.8818	-39.0500	213.1901	-36.8559	238.5734	-41.2442	225.0381	-39.0500	212.3565	-36.8495	237.7197	-41.2506
18.3947	239.0126	-40.7529	225.5832	-38.4631	252.4421	-43.0427	238.1690	-40.7529	224.7474	-38.4564	251.5905	-43.0495
18.7960	251.7537	-42.0889	237.6083	-39.7241	265.8990	-44.4538	250.9100	-42.0889	236.7705	-39.7171	265.0496	-44.4608
19.1948	263.9102	-43.1075	249.0818	-40.6854	278.7386	-45.5295	263.0666	-43.1075	248.2420	-40.6782	277.8912	-45.5367
19.5961	275.6034	-43.8139	260.1180	-41.3521	291.0887	-46.2757	274.7597	-43.8139	259.2762	-41.3448	290.2433	-46.2829
19.9949	286.6517	-44.2548	270.5456	-41.7683	302.7579	-46.7414	285.8081	-44.2548	269.7019	-41.7609	301.9142	-46.7487

a) Anneal,Sx (continued)

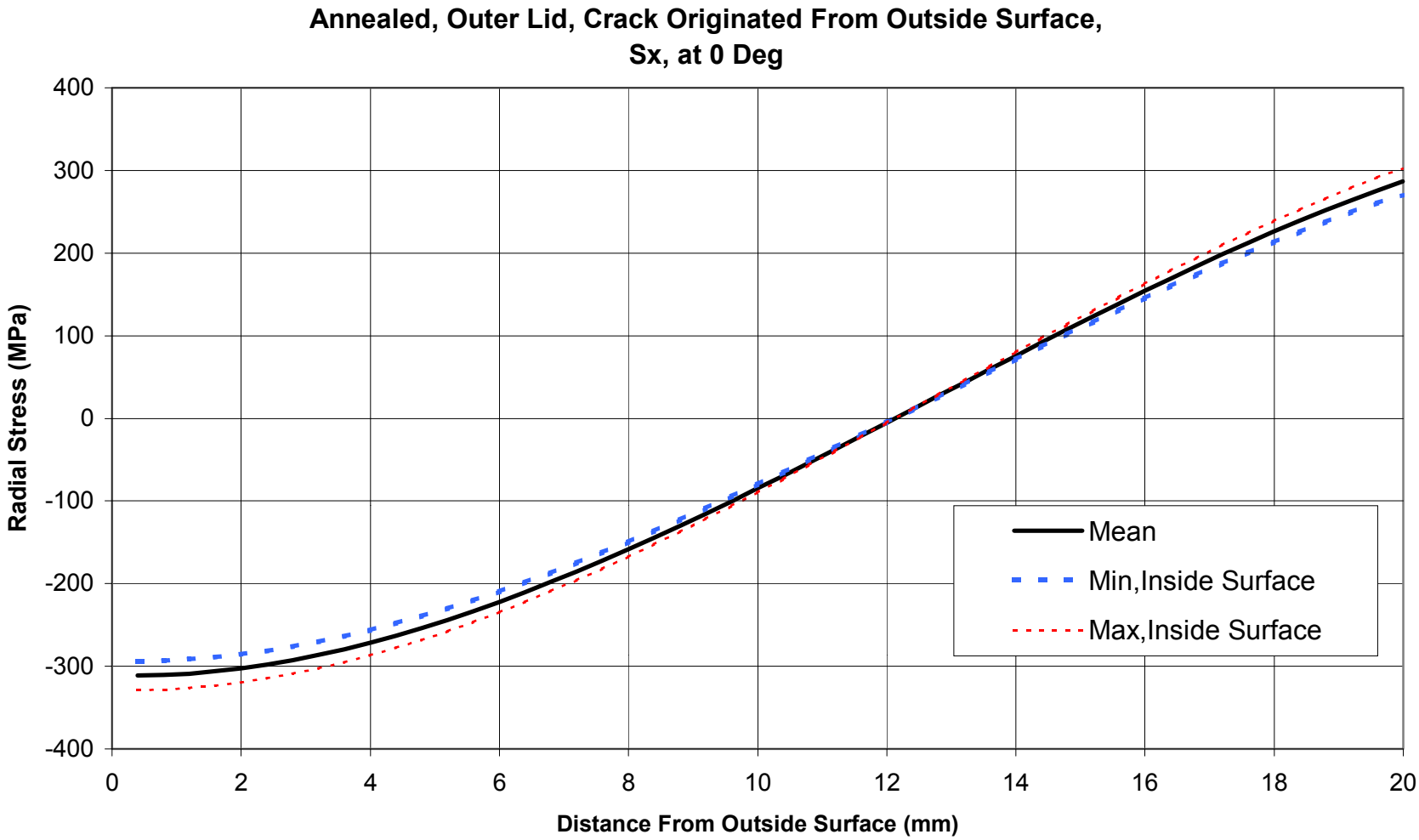
5

Mean Stress: Sx MPa	K(Sx) MPa*m^0.5	Min - Insided Surface Stress: Sx MPa	K(Sx) MPa*m^0.5	Max-Inside Surface Stress: Sx MPa	K(Sx) MPa*m^0.5	Mean Stress: Sx MPa	K(Sx) MPa*m^0.5	Min - Insided Surface Stress: Sx MPa	K(Sx) MPa*m^0.5	Max-Inside Surface Stress: Sx MPa	K(Sx) MPa*m^0.5
-314.5661	-11.8687	-296.6862	-11.1941	-332.4461	-12.5433	-318.3795	-11.8687	-300.0360	-11.1849	-336.7230	-12.5525
-313.8492	-16.8756	-296.0101	-15.9164	-331.6884	-17.8348	-317.6626	-16.8756	-299.3604	-15.9033	-335.9648	-17.8479
-312.1352	-20.6649	-294.3935	-19.4903	-329.8770	-21.8395	-315.9486	-20.6649	-297.7451	-19.4743	-334.1521	-21.8555
-309.4360	-23.7197	-291.8477	-22.3715	-327.0243	-25.0679	-313.2493	-23.7197	-295.2014	-22.3531	-331.2973	-25.0863
-305.8191	-26.2128	-288.4364	-24.7229	-323.2018	-27.7027	-309.6325	-26.2128	-291.7929	-24.7025	-327.4720	-27.7231
-301.2722	-28.2185	-284.1479	-26.6145	-318.3965	-29.8224	-305.0856	-28.2185	-287.5080	-26.5927	-322.6632	-29.8443
-295.8864	-30.2717	-279.0682	-28.5511	-312.7045	-31.9924	-299.6997	-30.2717	-282.4324	-28.5276	-316.9670	-32.0158
-289.6266	-32.1254	-273.1642	-30.2994	-306.0890	-33.9514	-293.4399	-32.1254	-276.5333	-30.2745	-310.3466	-33.9763
-282.6056	-33.6524	-266.5423	-31.7396	-298.6689	-35.5652	-286.4190	-33.6524	-269.9168	-31.7135	-302.9211	-35.5913
-274.8196	-34.8627	-259.1989	-32.8811	-290.4404	-36.8443	-278.6330	-34.8627	-262.5795	-32.8541	-294.6865	-36.8713
-266.2454	-35.7656	-251.1121	-33.7326	-281.3788	-37.7985	-270.0588	-35.7656	-254.4993	-33.7049	-285.6183	-37.8262
-257.0249	-36.4005	-242.4157	-34.3315	-271.6342	-38.4695	-260.8383	-36.4005	-245.8100	-34.3032	-275.8666	-38.4977
-247.0744	-36.9686	-233.0307	-34.8673	-261.1181	-39.0699	-250.8878	-36.9686	-236.4328	-34.8387	-265.3428	-39.0986
-236.5533	-37.4944	-223.1076	-35.3633	-249.9990	-39.6256	-240.3666	-37.4944	-226.5178	-35.3342	-254.2154	-39.6547
-225.3612	-37.7742	-212.5517	-35.6271	-238.1707	-39.9213	-229.1745	-37.7742	-215.9706	-35.5978	-242.3785	-39.9506
-213.6733	-37.8523	-201.5281	-35.7008	-225.8184	-40.0038	-217.4866	-37.8523	-204.9561	-35.6714	-230.0172	-40.0332
-201.4538	-37.7396	-190.0032	-35.5945	-212.9044	-39.8847	-205.2671	-37.7396	-193.4406	-35.5652	-217.0937	-39.9140
-188.6535	-37.4455	-177.9304	-35.3171	-199.3765	-39.5739	-192.4668	-37.4455	-181.3778	-35.2881	-203.5559	-39.6029
-175.4678	-37.1673	-165.4942	-35.0547	-185.4414	-39.2798	-179.2812	-37.1673	-168.9518	-35.0259	-189.6105	-39.3087
-161.7625	-37.1800	-152.5680	-35.0667	-170.9571	-39.2933	-165.5759	-37.1800	-156.0362	-35.0378	-175.1156	-39.3221
-147.7446	-37.0595	-139.3468	-34.9531	-156.1424	-39.1660	-151.5579	-37.0595	-142.8259	-34.9243	-160.2900	-39.1947
-133.2690	-36.7976	-125.6940	-34.7060	-140.8440	-38.8892	-137.0824	-36.7976	-129.1843	-34.6775	-144.9804	-38.9177
-118.5526	-36.4349	-111.8141	-34.3640	-125.2911	-38.5059	-122.3659	-36.4349	-115.3158	-34.3357	-129.4161	-38.5341
-103.4415	-35.9614	-97.5619	-33.9174	-109.3211	-38.0055	-107.2549	-35.9614	-101.0754	-33.8895	-113.4344	-38.0334
-88.1605	-35.4151	-83.1495	-33.4021	-93.1716	-37.4281	-91.9739	-35.4151	-86.6748	-33.3747	-97.2730	-37.4556
-72.6481	-35.5323	-68.5188	-33.5126	-76.7774	-37.5519	-76.4615	-35.5323	-72.0561	-33.4851	-80.8668	-37.5795
-56.8370	-35.4910	-53.6063	-33.4737	-60.0676	-37.5083	-60.6503	-35.4910	-57.1559	-33.4462	-64.1447	-37.5358
-40.9606	-35.3291	-38.6324	-33.3210	-43.2888	-37.3372	-44.7739	-35.3291	-42.1943	-33.2936	-47.3536	-37.3646
-24.8505	-35.0368	-23.4380	-33.0453	-26.2630	-37.0283	-28.6638	-35.0368	-27.0123	-33.0181	-30.3153	-37.0554
-8.7440	-34.6489	-8.2470	-32.6794	-9.2410	-36.6183	-12.5573	-34.6489	-11.8338	-32.6526	-13.2808	-36.6452
7.5303	-34.1553	7.1023	-32.2139	7.9584	-36.0966	3.7170	-34.1553	3.5028	-32.1874	3.9312	-36.1231
23.7331	-34.2007	22.3841	-32.2567	25.0820	-36.1446	19.9197	-34.2007	18.7720	-32.2302	21.0674	-36.1711
40.0369	-34.2986	37.7612	-32.3491	42.3126	-36.2481	36.2235	-34.2986	34.1365	-32.3225	38.3106	-36.2747
56.2020	-34.2701	53.0074	-32.3222	59.3965	-36.2180	52.3886	-34.2701	49.3702	-32.2956	55.4070	-36.2446
72.2983	-34.1171	68.1889	-32.1779	76.4077	-36.0563	68.4849	-34.1171	64.5392	-32.1514	72.4307	-36.0828
88.3941	-33.8421	83.3698	-31.9185	93.4184	-35.7657	84.5808	-33.8421	79.7076	-31.8923	89.4539	-35.7919
104.2522	-33.4759	98.3265	-31.5731	110.1779	-35.3786	100.4389	-33.4759	94.6520	-31.5471	106.2257	-35.4046
120.0409	-33.7587	113.2178	-31.8399	126.8640	-35.6776	116.2276	-33.7587	109.5311	-31.8137	122.9241	-35.7038
135.5269	-34.6251	127.8236	-32.6570	143.2303	-36.5932	131.7136	-34.6251	124.1249	-32.6302	139.3023	-36.6200
150.8738	-35.2906	142.2981	-33.2847	159.4494	-37.2965	147.0604	-35.2906	138.5875	-33.2573	155.5334	-37.3238
165.8538	-35.7917	156.4267	-33.7573	175.2809	-37.8261	162.0405	-35.7917	152.7045	-33.7295	171.3765	-37.8538
180.5317	-36.1338	170.2703	-34.0800	190.7931	-38.1877	176.7183	-36.1338	166.5366	-34.0520	186.9000	-38.2157
194.9643	-36.3218	183.8825	-34.2573	206.0461	-38.3863	191.1510	-36.3218	180.1377	-34.2291	202.1642	-38.4145
208.9356	-36.9702	197.0597	-34.8688	220.8115	-39.0716	205.1223	-36.9702	193.3041	-34.8402	216.9404	-39.1003
222.5898	-39.0500	209.9378	-36.8304	235.2418	-41.2696	218.7765	-39.0500	206.1716	-36.8002	231.3813	-41.2999
235.7207	-40.7529	222.3223	-38.4365	249.1190	-43.0693	231.9073	-40.7529	218.5459	-38.4049	245.2687	-43.1009
248.4617	-42.0889	234.3392	-39.6966	262.5843	-44.4813	244.6484	-42.0889	230.5529	-39.6640	258.7438	-44.5139
260.6182	-43.1075	245.8047	-40.6572	275.4318	-45.5577	256.8049	-43.1075	242.0090	-40.6238	271.6008	-45.5911
272.3114	-43.8139	256.8332	-41.3235	287.7896	-46.3043	268.4981	-43.8139	253.0285	-41.2895	283.9677	-46.3382
283.3598	-44.2548	267.2536	-41.7394	299.4659	-46.7703	279.5464	-44.2548	263.4403	-41.7051	295.6526	-46.8046

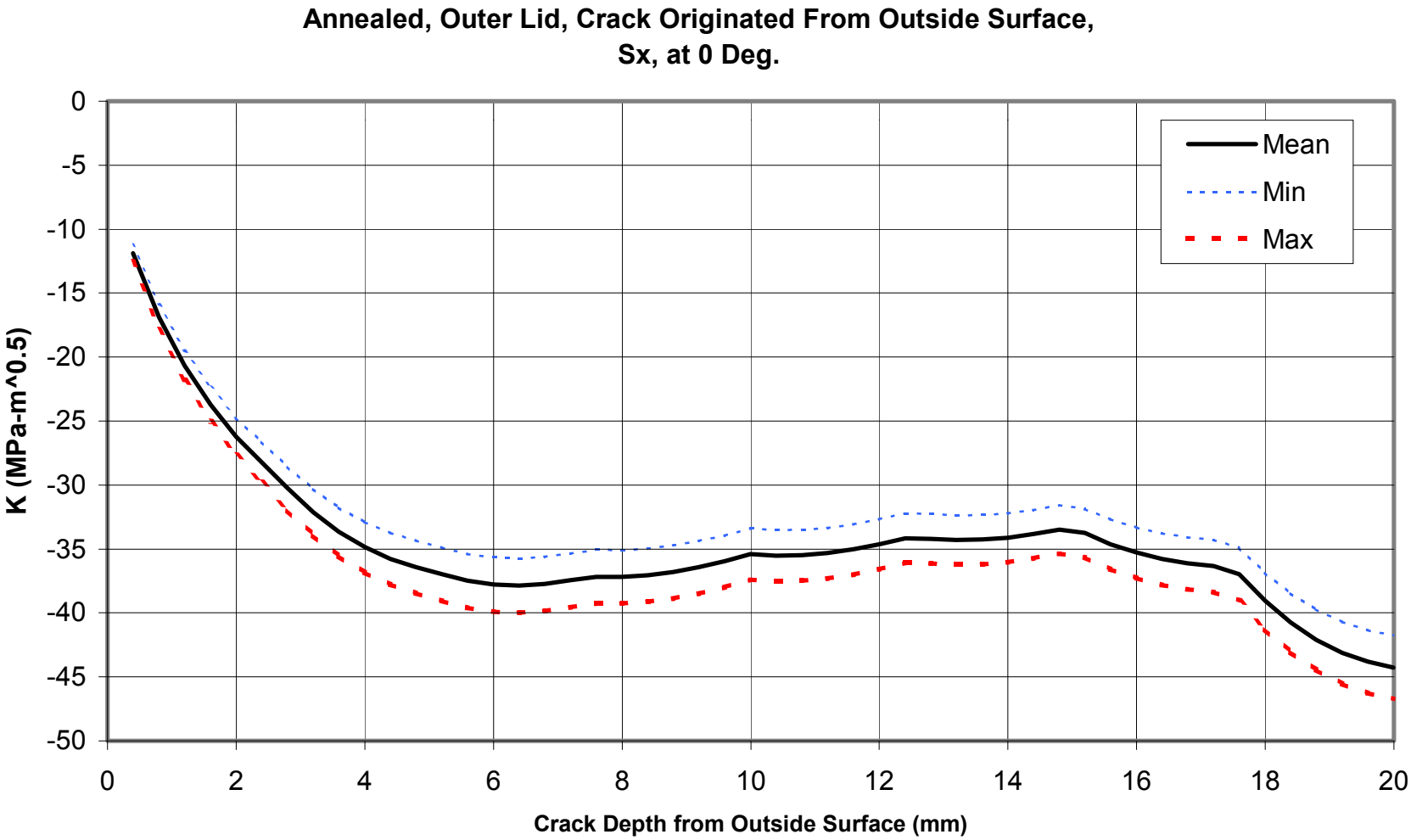
a) Anneal,Sx (continued)

Mean Stress: Sx MPa	K(Sx) MPa*m^0.5	Min - Insided Surface Stress: Sx MPa	K(Sx) MPa*m^0.5	Max-Inside Surface Stress: Sx MPa	K(Sx) MPa*m^0.5	Mean Stress: Sx MPa	K(Sx) MPa*m^0.5	Min - Insided Surface Stress: Sx MPa	K(Sx) MPa*m^0.5	Max-Inside Surface Stress: Sx MPa	K(Sx) MPa*m^0.5
-323.1846	-11.8687	-304.2386	-11.1729	-342.1306	-12.5645	-328.5111	-11.8687	-308.8720	-11.1592	-348.1501	-12.5783
-322.4677	-16.8756	-303.5637	-15.8863	-341.3717	-17.8649	-327.7942	-16.8756	-308.1980	-15.8667	-347.3904	-17.8844
-320.7537	-20.6649	-301.9501	-19.4535	-339.5572	-21.8764	-326.0802	-20.6649	-306.5864	-19.4295	-345.5739	-21.9003
-318.0544	-23.7197	-299.4091	-22.3292	-336.6997	-25.1102	-323.3809	-23.7197	-304.0486	-22.3017	-342.7133	-25.1377
-314.4376	-26.2128	-296.0043	-24.6761	-332.8708	-27.7495	-319.7640	-26.2128	-300.6479	-24.6457	-338.8802	-27.7798
-309.8907	-28.2185	-291.7240	-26.5642	-328.0574	-29.8727	-315.2172	-28.2185	-296.3729	-26.5315	-334.0615	-29.9054
-304.5048	-30.2717	-286.6538	-28.4971	-322.3558	-32.0464	-309.8313	-30.2717	-291.3090	-28.4620	-328.3536	-32.0814
-298.2450	-32.1254	-280.7610	-30.2421	-315.7291	-34.0087	-303.5715	-32.1254	-285.4234	-30.2049	-321.7196	-34.0459
-291.2241	-33.6524	-274.1516	-31.6796	-308.2965	-35.6252	-296.5505	-33.6524	-278.8222	-31.6406	-314.2789	-35.6643
-283.4381	-34.8627	-266.8221	-32.8189	-300.0541	-36.9065	-288.7646	-34.8627	-271.5017	-32.7785	-306.0275	-36.9469
-274.8639	-35.7656	-258.7505	-33.6689	-290.9772	-37.8622	-280.1904	-35.7656	-263.4400	-33.6274	-296.9407	-37.9037
-265.6434	-36.4005	-250.0706	-34.2666	-281.2162	-38.5344	-270.9699	-36.4005	-254.7708	-34.2244	-287.1690	-38.5766
-255.6929	-36.9686	-240.7034	-34.8014	-270.6824	-39.1358	-261.0194	-36.9686	-245.4151	-34.7586	-276.6236	-39.1787
-245.1717	-37.4944	-230.7990	-35.2964	-259.5444	-39.6925	-250.4982	-37.4944	-235.5229	-35.2530	-265.4735	-39.7359
-233.9796	-37.7742	-220.2631	-35.5598	-247.6962	-39.9887	-239.3061	-37.7742	-224.9999	-35.5160	-253.6123	-40.0324
-222.2917	-37.8523	-209.2603	-35.6333	-235.3231	-40.0713	-227.6182	-37.8523	-214.0107	-35.5894	-241.2257	-40.1152
-210.0722	-37.7396	-197.7572	-35.5272	-222.3873	-39.9520	-215.3987	-37.7396	-202.5218	-35.4834	-228.2757	-39.9957
-197.2719	-37.4455	-185.7073	-35.2503	-208.8366	-39.6407	-202.5984	-37.4455	-190.4867	-35.2069	-214.7102	-39.6841
-184.0863	-37.1673	-173.2946	-34.9884	-194.8780	-39.3461	-189.4128	-37.1673	-178.0893	-34.9453	-200.7362	-39.3892
-170.3810	-37.1800	-160.3928	-35.0004	-180.3692	-39.3596	-175.7075	-37.1800	-165.2033	-34.9573	-186.2116	-39.4027
-156.3630	-37.0595	-147.1965	-34.8870	-165.5295	-39.2321	-161.6895	-37.0595	-152.0234	-34.8440	-171.3556	-39.2750
-141.8875	-36.7976	-133.5696	-34.6404	-150.2053	-38.9548	-147.2140	-36.7976	-138.4132	-34.5978	-156.0147	-38.9974
-127.1710	-36.4349	-119.7159	-34.2990	-134.6262	-38.5708	-132.4975	-36.4349	-124.5766	-34.2568	-140.4185	-38.6131
-112.0600	-35.9614	-105.4907	-33.8533	-118.6293	-38.0696	-117.3865	-35.9614	-110.3689	-33.8116	-124.4041	-38.1113
-96.7790	-35.4151	-91.1055	-33.3390	-102.4524	-37.4912	-102.1055	-35.4151	-96.0014	-33.2979	-108.2095	-37.5323
-81.2666	-35.5323	-76.5025	-33.4493	-86.0307	-37.6153	-86.5931	-35.5323	-81.4164	-33.4081	-91.7698	-37.6565
-65.4554	-35.4910	-61.6182	-33.4104	-69.2926	-37.5716	-70.7819	-35.4910	-66.5504	-33.3693	-75.0134	-37.6127
-49.5790	-35.3291	-46.6726	-33.2580	-52.4855	-37.4002	-54.9055	-35.3291	-51.6232	-33.2171	-58.1879	-37.4411
-33.4689	-35.0368	-31.5069	-32.9828	-35.4310	-37.0907	-38.7954	-35.0368	-36.4761	-32.9422	-41.1147	-37.1313
-17.3624	-34.6489	-16.3446	-32.6177	-18.3803	-36.6801	-22.6889	-34.6489	-21.3325	-32.5775	-24.0453	-36.7203
-1.0881	-34.1553	-1.0243	-32.1530	-1.1519	-36.1575	-6.4146	-34.1553	-6.0311	-32.1134	-6.7981	-36.1971
15.1146	-34.2007	14.2286	-32.1957	16.0007	-36.2056	9.7881	-34.2007	9.2030	-32.1561	10.3733	-36.2452
31.4184	-34.2986	29.5766	-32.2879	33.2603	-36.3093	26.0919	-34.2986	24.5321	-32.2482	27.6518	-36.3490
47.5835	-34.2701	44.7940	-32.2611	50.3730	-36.2791	42.2570	-34.2701	39.7308	-32.2214	44.7832	-36.3188
63.6798	-34.1171	59.9467	-32.1171	67.4130	-36.1172	58.3534	-34.1171	54.8649	-32.0775	61.8418	-36.1567
79.7757	-33.8421	75.0990	-31.8582	84.4523	-35.8260	74.4492	-33.8421	69.9984	-31.8190	78.8999	-35.8652
95.6338	-33.4759	90.0274	-31.5134	101.2401	-35.4383	90.3073	-33.4759	84.9085	-31.4746	95.7060	-35.4771
111.4225	-33.7587	104.8906	-31.7797	117.9544	-35.7378	106.0960	-33.7587	99.7533	-31.7406	112.4386	-35.7769
126.9085	-34.6251	119.4687	-32.5953	134.3482	-36.6549	121.5820	-34.6251	114.3136	-32.5552	128.8504	-36.6951
142.2553	-35.2906	133.9159	-33.2217	150.5948	-37.3594	136.9288	-35.2906	128.7430	-33.1808	145.1147	-37.4003
157.2354	-35.7917	148.0178	-33.6935	166.4530	-37.8899	151.9089	-35.7917	142.8275	-33.6520	160.9903	-37.9314
171.9132	-36.1338	161.8352	-34.0156	181.9913	-38.2521	166.5867	-36.1338	156.6278	-33.9737	176.5456	-38.2940
186.3459	-36.3218	175.4217	-34.1925	197.2700	-38.4511	181.0194	-36.3218	170.1977	-34.1504	191.8411	-38.4932
200.3172	-36.9702	188.5740	-34.8029	212.0603	-39.1375	194.9907	-36.9702	183.3337	-34.7601	206.6476	-39.1804
213.9714	-39.0500	201.4277	-36.7608	226.5150	-41.3393	208.6449	-39.0500	196.1717	-36.7156	221.1181	-41.3845
227.1022	-40.7529	213.7888	-38.3639	240.4156	-43.1420	221.7757	-40.7529	208.5175	-38.3166	235.0339	-43.1892
239.8433	-42.0889	225.7829	-39.6216	253.9036	-44.5563	234.5168	-42.0889	220.4969	-39.5728	248.5366	-44.6051
251.9998	-43.1075	237.2268	-40.5804	266.7728	-45.6345	246.6733	-43.1075	231.9267	-40.5304	261.4199	-45.6845
263.6930	-43.8139	248.2345	-41.2454	279.1514	-46.3824	258.3665	-43.8139	242.9208	-41.1946	273.8121	-46.4332
274.7413	-44.2548	258.6352	-41.6605	290.8475	-46.8492	269.4148	-44.2548	253.3087	-41.6092	285.5210	-46.9005

b) Anneal,SxPlt



c) Anneal,KSxPlt



d) Anneal,Sz

Results in Metric Unit start in Cell A80

Angle(deg):	0						18					
(rad):	0						0.3141593					
	Scale Facto	1	0.9633573		1.0366427			0.9980807	0.9632869		1.0367131	
	Mean		Min - Insided Surface		Max-Inside Surface		Mean		Min - Insided Surface		Max-Inside Surface	
Depth	Stress: Sz	K(Sz)	Stress: Sz	K(Sz)	Stress: Sz	K(Sz)	Stress: Sz	K(Sz)	Stress: Sz	K(Sz)	Stress: Sz	K(Sz)
(in)	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5
0.0157	-49.4942	-7.3686	-47.6806	-7.09858	-51.3078	-7.63858	-49.6165	-7.3686	-47.795	-7.09806	-51.4381	-7.6391
0.0315	-47.2336	-10.0912	-45.5029	-9.72143	-48.9644	-10.461	-47.3560	-10.0912	-45.6174	-9.72072	-49.0946	-10.4617
0.0472	-44.9282	-11.9466	-43.2819	-11.5088	-46.5745	-12.3844	-45.0505	-11.9466	-43.3966	-11.508	-46.7045	-12.3852
0.063	-42.5521	-13.3085	-40.9929	-12.8208	-44.1113	-13.7962	-42.6745	-13.3085	-41.1077	-12.8199	-44.2412	-13.7971
0.0787	-40.1391	-14.3253	-38.6683	-13.8004	-41.6099	-14.8502	-40.2615	-14.3253	-38.7833	-13.7994	-41.7396	-14.8512
0.0945	-37.6621	-15.0749	-36.2821	-14.5225	-39.0421	-15.6273	-37.7845	-15.0749	-36.3973	-14.5215	-39.1716	-15.6283
0.1102	-35.1561	-15.6222	-33.8679	-15.0498	-36.4443	-16.1946	-35.2784	-15.6222	-33.9832	-15.0487	-36.5736	-16.1957
0.126	-32.5927	-15.9898	-31.3985	-15.4039	-33.787	-16.5757	-32.7151	-15.9898	-31.514	-15.4028	-33.9162	-16.5768
0.1417	-30.0082	-16.1945	-28.9086	-15.6011	-31.1078	-16.7879	-30.1305	-16.1945	-29.0244	-15.5999	-31.2367	-16.7891
0.1574	-27.3899	-16.2531	-26.3863	-15.6575	-28.3935	-16.8487	-27.5123	-16.2531	-26.5022	-15.6564	-28.5223	-16.8498
0.1732	-24.7245	-16.1787	-23.8186	-15.5859	-25.6305	-16.7715	-24.8469	-16.1787	-23.9347	-15.5847	-25.7591	-16.7727
0.1889	-22.0494	-15.9818	-21.2415	-15.3962	-22.8574	-16.5674	-22.1718	-15.9818	-21.3578	-15.3951	-22.9858	-16.5685
0.2047	-19.3342	-15.6779	-18.6257	-15.1034	-20.0426	-16.2524	-19.4566	-15.6779	-18.7422	-15.1023	-20.1709	-16.2535
0.2204	-16.6168	-15.2753	-16.0079	-14.7156	-17.2257	-15.835	-16.7392	-15.2753	-16.1246	-14.7145	-17.3537	-15.8361
0.2362	-13.8663	-14.7741	-13.3582	-14.2327	-14.3744	-15.3155	-13.9886	-14.7741	-13.4751	-14.2317	-14.5022	-15.3165
0.2519	-11.1211	-14.1800	-10.7136	-13.6604	-11.5286	-14.6996	-11.2435	-14.1800	-10.8307	-13.6594	-11.6562	-14.7006
0.2676	-8.3675	-13.4983	-8.06085	-13.0037	-8.67406	-13.9929	-8.4898	-13.4983	-8.17813	-13.0027	-8.8015	-13.9939
0.2834	-5.5914	-12.7337	-5.38652	-12.2671	-5.79629	-13.2003	-5.7138	-12.7337	-5.504	-12.2662	-5.92354	-13.2012
0.2991	-2.8317	-11.8875	-2.72794	-11.4519	-2.93546	-12.3231	-2.9541	-11.8875	-2.84561	-11.4511	-3.06251	-12.3239
0.3149	-0.0568	-10.9549	-0.05475	-10.5535	-0.05892	-11.3563	-0.1792	-10.9549	-0.17262	-10.5527	-0.18577	-11.3571
0.3306	2.6944	-9.9481	2.595708	-9.58356	2.79317	-10.3126	2.5721	-9.9481	2.477651	-9.58285	2.666509	-10.3133
0.3464	5.4535	-8.8705	5.25369	-8.54546	5.653354	-9.19554	5.3312	-8.8705	5.135439	-8.54484	5.526887	-9.19616
0.3621	8.1819	-7.7257	7.88206	-7.4426	8.481671	-8.00878	8.0595	-7.7257	7.763617	-7.44206	8.355397	-8.00932
0.3779	10.9106	-6.5170	10.51078	-6.27819	11.31037	-6.75579	10.7882	-6.5170	10.39215	-6.27773	11.18428	-6.75625
0.3936	13.6015	-5.2477	13.10309	-5.05542	14.09988	-5.44	13.4791	-5.2477	12.98426	-5.05505	13.97399	-5.44037
0.4093	16.2683	-3.9381	15.67221	-3.79376	16.86444	-4.08236	16.1460	-3.9381	15.55319	-3.79348	16.73873	-4.08264
0.4251	18.9242	-2.5762	18.23076	-2.48176	19.61763	-2.67056	18.8018	-2.5762	18.11156	-2.48158	19.49211	-2.67074
0.4408	21.5319	-1.1653	20.74289	-1.12256	22.32086	-1.20796	21.4095	-1.1653	20.6235	-1.12248	22.19552	-1.20804
0.4566	24.1209	0.2914	23.23706	0.280769	25.00476	0.302127	23.9986	0.2914	23.11749	0.280748	24.87961	0.302148
0.4723	26.6549	1.7908	25.67821	1.725132	27.63163	1.856368	26.5326	1.7908	25.55847	1.725006	27.50665	1.856494
0.4881	29.1625	3.3295	28.09394	3.20745	30.23112	3.45145	29.0402	3.3295	27.97401	3.207215	30.10633	3.451685
0.5038	31.6084	4.9280	30.45016	4.747425	32.76659	5.108575	31.4860	4.9280	30.33006	4.747078	32.64196	5.108922
0.5196	34.0200	6.5694	32.77337	6.328718	35.26654	6.810162	33.8976	6.5694	32.65311	6.328255	35.14208	6.810625
0.5353	36.3631	8.2429	35.03069	7.940887	37.69557	8.544973	36.2408	8.2429	34.91026	7.940306	37.57129	8.545554
0.551	38.6497	9.9452	37.23349	9.58082	40.06595	10.30966	38.5274	9.9452	37.1129	9.580119	39.94182	10.31036
0.5668	40.8901	11.6731	39.39178	11.24537	42.38843	12.10083	40.7677	11.6731	39.27103	11.24454	42.26446	12.10166
0.5825	43.0523	13.4231	41.47474	12.93124	44.62985	13.91496	42.9299	13.4231	41.35384	12.9303	44.50603	13.9159
0.5983	45.1602	15.2267	43.5054	14.66875	46.81498	15.78465	45.0378	15.2267	43.38435	14.66768	46.69131	15.78572
0.614	47.1835	17.0815	45.45456	16.45559	48.91241	17.70741	47.0611	17.0815	45.33336	16.45438	48.78889	17.70862
0.6298	49.1443	18.9498	47.34352	18.25543	50.94508	19.64417	49.0219	18.9498	47.22219	18.25409	50.82169	19.64551
0.6455	51.0142	20.8278	49.1449	20.06461	52.88349	21.59099	50.8918	20.8278	49.02344	20.06315	52.76023	21.59245
0.6612	52.8022	22.7120	50.8674	21.87977	54.73703	23.54423	52.6799	22.7120	50.74581	21.87817	54.6139	23.54583
0.677	54.5153	24.5988	52.51774	23.69743	56.51291	25.50017	54.3930	24.5988	52.39603	23.6957	56.3899	25.5019
0.6927	56.1282	26.5139	54.07153	25.54236	58.18491	27.48544	56.0059	26.5139	53.94971	25.54049	58.06201	27.48731
0.7085	57.6578	28.5148	55.54505	27.46994	59.77052	29.55966	57.5354	28.5148	55.42312	27.46793	59.64774	29.56167
0.7242	59.0810	30.5099	56.91616	29.39194	61.24594	31.62786	58.9587	30.5099	56.79413	29.38979	61.12325	31.63001
0.74	60.4125	32.4951	58.19881	31.30439	62.62616	33.68581	60.2901	32.4951	58.07668	31.3021	62.50356	33.6881
0.7557	61.6316	34.4662	59.37326	33.20327	63.88996	35.72913	61.5093	34.4662	59.25105	33.20084	63.76745	35.73156
0.7715	62.7503	36.4189	60.45097	35.08441	65.04965	37.75339	62.6280	36.4189	60.32868	35.08185	64.92722	37.75595
0.7872	63.7508	38.3490	61.41481	36.94379	66.08681	39.75421	63.6284	38.3490	61.29245	36.94109	65.96445	39.75691

d) Anneal,Sz (continued)

36						54					
0.6283185						0.9424778					
	0.9925106	0.9630808		1.0369192			0.9838349	0.9627553		1.0372447	
Mean		Min - Insided Surface		Max-Inside Surface		Mean		Min - Insided Surface		Max-Inside Surface	
Stress: Sz (ksi)	K(Sz) ksi*in^0.5	Stress: Sz (ksi)	K(Sz) ksi*in^0.5	Stress: Sz (ksi)	K(Sz) ksi*in^0.5	Stress: Sz (ksi)	K(Sz) ksi*in^0.5	Stress: Sz (ksi)	K(Sz) ksi*in^0.5	Stress: Sz (ksi)	K(Sz) ksi*in^0.5
-49.9716	-7.3686	-48.1267	-7.09654	-51.8165	-7.64062	-50.5247	-7.3686	-48.6429	-7.09414	-52.4065	-7.64302
-47.7111	-10.0912	-45.9496	-9.71864	-49.4725	-10.4638	-48.2642	-10.0912	-46.4666	-9.71536	-50.0617	-10.467
-45.4056	-11.9466	-43.7293	-11.5055	-47.082	-12.3877	-45.9587	-11.9466	-44.247	-11.5017	-47.6704	-12.3915
-43.0295	-13.3085	-41.4409	-12.8172	-44.6182	-13.7998	-43.5826	-13.3085	-41.9594	-12.8128	-45.2059	-13.8042
-40.6166	-14.3253	-39.117	-13.7964	-42.1161	-14.8542	-41.1696	-14.3253	-39.6363	-13.7918	-42.703	-14.8588
-38.1396	-15.0749	-36.7315	-14.5183	-39.5476	-15.6315	-38.6926	-15.0749	-37.2515	-14.5134	-40.1337	-15.6364
-35.6335	-15.6222	-34.318	-15.0454	-36.9491	-16.199	-36.1866	-15.6222	-34.8388	-15.0404	-37.5344	-16.204
-33.0702	-15.9898	-31.8493	-15.3995	-34.2911	-16.5801	-33.6233	-15.9898	-32.371	-15.3943	-34.8756	-16.5853
-30.4856	-16.1945	-29.3601	-15.5966	-31.6111	-16.7924	-31.0387	-16.1945	-29.8827	-15.5913	-32.1947	-16.7977
-27.8674	-16.2531	-26.8385	-15.653	-28.8962	-16.8532	-28.4204	-16.2531	-27.3619	-15.6478	-29.4789	-16.8584
-25.2020	-16.1787	-24.2715	-15.5814	-26.1324	-16.776	-25.7551	-16.1787	-24.7958	-15.5761	-26.7143	-16.7813
-22.5269	-15.9818	-21.6952	-15.3918	-23.3586	-16.5718	-23.0800	-15.9818	-22.2204	-15.3866	-23.9396	-16.577
-19.8117	-15.6779	-19.0802	-15.0991	-20.5431	-16.2567	-20.3647	-15.6779	-19.6063	-15.094	-21.1232	-16.2618
-17.0943	-15.2753	-16.4632	-14.7113	-17.7254	-15.8393	-17.6473	-15.2753	-16.9901	-14.7064	-18.3046	-15.8442
-14.3437	-14.7741	-13.8142	-14.2287	-14.8733	-15.3195	-14.8968	-14.7741	-14.342	-14.2238	-15.4517	-15.3244
-11.5986	-14.1800	-11.1703	-13.6565	-12.0268	-14.7035	-12.1516	-14.1800	-11.699	-13.6519	-12.6042	-14.7081
-8.8449	-13.4983	-8.51837	-13	-9.17146	-13.9966	-9.3980	-13.4983	-9.04797	-12.9956	-9.74802	-14.001
-6.0689	-12.7337	-5.84481	-12.2636	-6.29292	-13.2038	-6.6219	-12.7337	-6.37531	-12.2594	-6.86858	-13.208
-3.3092	-11.8875	-3.18699	-11.4486	-3.43133	-12.3264	-3.8622	-11.8875	-3.71839	-11.4448	-4.00609	-12.3302
-0.5343	-10.9549	-0.51457	-10.5505	-0.55402	-11.3593	-1.0874	-10.9549	-1.04687	-10.5469	-1.12787	-11.3629
2.2170	-9.9481	2.135132	-9.58081	2.298831	-10.3154	1.6639	-9.9481	1.601931	-9.57757	1.725874	-10.3186
4.9761	-8.8705	4.792352	-8.54301	5.159777	-9.19799	4.4230	-8.8705	4.258252	-8.54012	4.587718	-9.20088
7.7044	-7.7257	7.419968	-7.44046	7.988848	-8.01092	7.1513	-7.7257	6.884979	-7.43795	7.417678	-8.01343
10.4331	-6.5170	10.04793	-6.27639	10.8183	-6.75759	9.8800	-6.5170	9.512057	-6.27427	10.24802	-6.75971
13.1240	-5.2477	12.6395	-5.05397	13.60855	-5.44145	12.5709	-5.2477	12.10274	-5.05226	13.03915	-5.44316
15.7909	-3.9381	15.20788	-3.79267	16.37385	-4.08345	15.2378	-3.9381	14.67026	-3.79139	15.80531	-4.08473
18.4467	-2.5762	17.7657	-2.48105	19.12778	-2.67127	17.8937	-2.5762	17.22721	-2.48021	18.5601	-2.67211
21.0544	-1.1653	20.2771	-1.12224	21.83172	-1.20828	20.5013	-1.1653	19.73777	-1.12186	21.2649	-1.20866
23.6435	0.2914	22.77056	0.280688	24.51635	0.302208	23.0904	0.2914	22.23038	0.280593	23.95037	0.302303
26.1775	1.7908	25.21101	1.724637	27.14391	1.856863	25.6244	1.7908	24.67001	1.724054	26.57876	1.857446
28.6851	3.3295	27.62604	3.206529	29.7441	3.452371	28.1320	3.3295	27.08422	3.205446	29.17976	3.453454
31.1309	4.9280	29.98159	4.746062	32.28024	5.109938	30.5778	4.9280	29.43897	4.744458	31.7167	5.111542
33.5425	6.5694	32.30414	6.326902	34.78086	6.811978	32.9894	6.5694	31.76074	6.324763	34.2181	6.814117
35.8857	8.2429	34.5608	7.938608	37.21054	8.547252	35.3326	8.2429	34.01664	7.935924	36.64855	8.549936
38.1723	9.9452	36.76298	9.57807	39.58155	10.31241	37.6192	9.9452	36.21807	9.574832	39.0203	10.31565
40.4126	11.6731	38.92064	11.24214	41.90465	12.10406	39.8596	11.6731	38.37501	11.23834	41.34413	12.10786
42.5748	13.4231	41.00301	12.92753	44.14667	13.91867	42.0218	13.4231	40.45667	12.92316	43.58685	13.92304
44.6827	15.2267	43.03308	14.66454	46.33238	15.78886	44.1297	15.2267	42.48606	14.65959	45.77325	15.79381
46.7060	17.0815	44.98168	16.45087	48.43038	17.71213	46.1529	17.0815	44.43399	16.4453	47.8719	17.7177
48.6668	18.9498	46.8701	18.25019	50.46358	19.64941	48.1138	18.9498	46.32178	18.24402	49.90575	19.65558
50.5367	20.8278	48.67096	20.05885	52.40251	21.59675	49.9837	20.8278	48.12203	20.05207	51.84529	21.60353
52.3248	22.7120	50.39297	21.87349	54.25655	23.55051	51.7717	22.7120	49.84346	21.8661	53.6999	23.5579
54.0379	24.5988	52.04284	23.69063	56.0329	25.50697	53.4848	24.5988	51.49276	23.68262	55.47682	25.51498
55.6508	26.5139	53.59618	25.53503	57.70534	27.49277	55.0977	26.5139	53.04558	25.5264	57.14978	27.5014
57.1803	28.5148	55.06928	27.46206	59.29138	29.56754	56.6273	28.5148	54.51818	27.45277	58.73632	29.57683
58.6036	30.5099	56.43999	29.3835	60.76719	31.6363	58.0505	30.5099	55.88844	29.37357	60.21259	31.64623
59.9350	32.4951	57.72227	31.29541	62.14778	33.69479	59.3819	32.4951	57.17028	31.28483	61.59361	33.70537
61.1542	34.4662	58.89639	33.19374	63.41191	35.73866	60.6011	34.4662	58.344	33.18252	62.85814	35.74988
62.2729	36.4189	59.97379	35.07434	64.57192	37.76346	61.7198	36.4189	59.42104	35.06249	64.01851	37.77531
63.2733	38.3490	60.93735	36.93319	65.60935	39.76481	62.7203	38.3490	60.38427	36.9207	65.05627	39.7773

d) Anneal,Sz (continued)

72						90					
1.2566371						1.5707963					
	0.972903	0.9623368		1.0376632			0.9607848	0.9618617		1.0381383	
Mean		Min - Insided Surface		Max-Inside Surface		Mean		Min - Insided Surface		Max-Inside Surface	
Stress: Sz	K(Sz)	Stress: Sz	K(Sz)	Stress: Sz	K(Sz)	Stress: Sz	K(Sz)	Stress: Sz	K(Sz)	Stress: Sz	K(Sz)
(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5
-51.2216	-7.3686	-49.2925	-7.09106	-53.1508	-7.6461	-51.9942	-7.3686	-50.01	-7.09	-53.98	-7.65
-48.9611	-10.0912	-47.117	-9.71113	-50.8051	-10.4713	-49.7336	-10.0912	-47.84	-9.71	-51.63	-10.48
-46.6556	-11.9466	-44.8984	-11.4967	-48.4128	-12.3965	-47.4282	-11.9466	-45.62	-11.49	-49.24	-12.40
-44.2795	-13.3085	-42.6118	-12.8073	-45.9473	-13.8097	-45.0521	-13.3085	-43.33	-12.80	-46.77	-13.82
-41.8666	-14.3253	-40.2897	-13.7858	-43.4434	-14.8648	-42.6391	-14.3253	-41.01	-13.78	-44.27	-14.87
-39.3896	-15.0749	-37.906	-14.5071	-40.8731	-15.6427	-40.1621	-15.0749	-38.63	-14.50	-41.69	-15.65
-36.8835	-15.6222	-35.4944	-15.0338	-38.2727	-16.2106	-37.6561	-15.6222	-36.22	-15.03	-39.09	-16.22
-34.3202	-15.9898	-33.0276	-15.3876	-35.6128	-16.592	-35.0927	-15.9898	-33.75	-15.38	-36.43	-16.60
-31.7356	-16.1945	-30.5404	-15.5846	-32.9309	-16.8044	-32.5082	-16.1945	-31.27	-15.58	-33.75	-16.81
-29.1174	-16.2531	-28.0207	-15.641	-30.214	-16.8652	-29.8899	-16.2531	-28.75	-15.63	-31.03	-16.87
-26.4520	-16.1787	-25.4557	-15.5694	-27.4482	-16.788	-27.2245	-16.1787	-26.19	-15.56	-28.26	-16.80
-23.7769	-15.9818	-22.8814	-15.3799	-24.6724	-16.5837	-24.5494	-15.9818	-23.61	-15.37	-25.49	-16.59
-21.0617	-15.6779	-20.2684	-15.0874	-21.8549	-16.2684	-21.8342	-15.6779	-21.00	-15.08	-22.67	-16.28
-18.3443	-15.2753	-17.6534	-14.7	-19.0352	-15.8506	-19.1168	-15.2753	-18.39	-14.69	-19.85	-15.86
-15.5937	-14.7741	-15.0064	-14.2177	-16.1811	-15.3305	-16.3663	-14.7741	-15.74	-14.21	-16.99	-15.34
-12.8486	-14.1800	-12.3646	-13.6459	-13.3325	-14.7141	-13.6211	-14.1800	-13.10	-13.64	-14.14	-14.72
-10.0949	-13.4983	-9.71471	-12.9899	-10.4751	-14.0067	-10.8675	-13.4983	-10.45	-12.98	-11.28	-14.01
-7.3189	-12.7337	-7.04321	-12.2541	-7.59452	-13.2133	-8.0914	-12.7337	-7.78	-12.25	-8.40	-13.22
-4.5592	-11.8875	-4.38745	-11.4398	-4.73087	-12.3352	-5.3317	-11.8875	-5.13	-11.43	-5.54	-12.34
-1.7843	-10.9549	-1.71709	-10.5423	-1.8515	-11.3675	-2.5568	-10.9549	-2.46	-10.54	-2.65	-11.37
0.9670	-9.9481	0.930562	-9.5734	1.003401	-10.3228	0.1944	-9.9481	0.19	-9.57	0.20	-10.33
3.7261	-8.8705	3.585729	-8.53641	3.8664	-9.20459	2.9535	-8.8705	2.84	-8.53	3.07	-9.21
6.4544	-7.7257	6.211314	-7.43472	6.697502	-8.01666	5.6819	-7.7257	5.47	-7.43	5.90	-8.02
9.1831	-6.5170	8.83725	-6.27154	9.528982	-6.76244	8.4106	-6.5170	8.09	-6.27	8.73	-6.77
11.8740	-5.2477	11.42681	-5.05006	12.32124	-5.44536	11.1015	-5.2477	10.68	-5.05	11.52	-5.45
14.5409	-3.9381	13.99321	-3.78974	15.08852	-4.08638	13.7683	-3.9381	13.24	-3.79	14.29	-4.09
17.1967	-2.5762	16.54905	-2.47913	17.84442	-2.67319	16.4242	-2.5762	15.80	-2.48	17.05	-2.67
19.8044	-1.1653	19.05852	-1.12137	20.55031	-1.20915	19.0319	-1.1653	18.31	-1.12	19.76	-1.21
22.3935	0.2914	21.55004	0.280471	23.23686	0.302425	21.6209	0.2914	20.80	0.28	22.45	0.30
24.9275	1.7908	23.98861	1.723305	25.86631	1.858195	24.1549	1.7908	23.23	1.72	25.08	1.86
27.4351	3.3295	26.40178	3.204052	28.46836	3.454848	26.6625	3.3295	25.65	3.20	27.68	3.46
29.8809	4.9280	28.7555	4.742396	31.00633	5.113604	29.1084	4.9280	28.00	4.74	30.22	5.12
32.2925	6.5694	31.07626	6.322014	33.50874	6.816866	31.5200	6.5694	30.32	6.32	32.72	6.82
34.6357	8.2429	33.33118	7.932475	35.94017	8.553385	33.8631	8.2429	32.57	7.93	35.15	8.56
36.9223	9.9452	35.53165	9.57067	38.31288	10.31981	36.1497	9.9452	34.77	9.57	37.53	10.32
39.1626	11.6731	37.68765	11.23345	40.63764	12.11275	38.3901	11.6731	36.93	11.23	39.85	12.12
41.3248	13.4231	39.76841	12.91754	42.88127	13.92866	40.5523	13.4231	39.01	12.91	42.10	13.94
43.4327	15.2267	41.79692	14.65321	45.06855	15.80019	42.6602	15.2267	41.03	14.65	44.29	15.81
45.4560	17.0815	43.74401	16.43816	47.16805	17.72484	44.6835	17.0815	42.98	16.43	46.39	17.73
47.4168	18.9498	45.63097	18.23609	49.20271	19.66351	46.6443	18.9498	44.87	18.23	48.42	19.67
49.2867	20.8278	47.43044	20.04336	51.14303	21.61224	48.5142	20.8278	46.66	20.03	50.36	21.62
51.0748	22.7120	49.15112	21.85659	52.9984	23.56741	50.3022	22.7120	48.38	21.85	52.22	23.58
52.7879	24.5988	50.79971	23.67233	54.77603	25.52527	52.0153	24.5988	50.03	23.66	54.00	25.54
54.4008	26.5139	52.35185	25.5153	56.44967	27.5125	53.6282	26.5139	51.58	25.50	55.67	27.53
55.9303	28.5148	53.82381	27.44084	58.03685	29.58876	55.1578	28.5148	53.05	27.43	57.26	29.60
57.3536	30.5099	55.19347	29.3608	59.51371	31.659	56.5810	30.5099	54.42	29.35	58.74	31.67
58.6850	32.4951	56.47476	31.27123	60.89529	33.71897	57.9125	32.4951	55.70	31.26	60.12	33.73
59.9042	34.4662	57.64797	33.16809	62.16034	35.76431	59.1316	34.4662	56.88	33.15	61.39	35.78
61.0229	36.4189	58.72454	35.04725	63.32117	37.79055	60.2503	36.4189	57.95	35.03	62.55	37.81
62.0233	38.3490	59.68735	36.90465	64.35935	39.79335	61.2508	38.3490	58.91	36.89	63.59	39.81

From Analyses	
Mean	
Stress: Sz	K(Sz)
(ksi)	ksi*in^0.5
-49.4942	-7.36858
-47.2336	-10.0912
-44.9282	-11.9466
-42.5521	-13.3085
-40.1391	-14.3253
-37.6621	-15.0749
-35.1561	-15.6222
-32.5927	-15.9898
-30.0082	-16.1945
-27.3899	-16.2531
-24.7245	-16.1787
-22.0494	-15.9818
-19.3342	-15.6779
-16.6168	-15.2753
-13.8663	-14.7741
-11.1211	-14.18
-8.3675	-13.4983
-5.5914	-12.7337
-2.8317	-11.8875
-0.0568	-10.9549
2.6944	-9.94808
5.4535	-8.8705
8.1819	-7.72569
10.9106	-6.51699
13.6015	-5.24771
16.2683	-3.93806
18.9242	-2.57616
21.5319	-1.16526
24.1209	0.291448
26.6549	1.79075
29.1625	3.32945
31.6084	4.928
34.0200	6.56944
36.3631	8.24293
38.6497	9.94524
40.8901	11.6731
43.0523	13.4231
45.1602	15.2267
47.1835	17.0815
49.1443	18.9498
51.0142	20.8278
52.8022	22.712
54.5153	24.5988
56.1282	26.5139
57.6578	28.5148
59.0810	30.5099
60.4125	32.4951
61.6316	34.4662
62.7503	36.4189
63.7508	38.349

d) Anneal,Sz (continued)

In Metric Unit

Unit Conv: 1.0000 in = 25.4000 mm 1.0000 ksi = 6.8948 MPa 1.0000 ksi-in^0.5= 1.0988 MPa-m^0.5

Depth (mm)	Mean Stress: Sz MPa	K(Sz) MPa*m^0.5	Min - Insided Surface Stress: Sz MPa	K(Sz) MPa*m^0.5	Max-Inside Surface Stress: Sz MPa	K(Sz) MPa*m^0.5	Mean Stress: Sz MPa	K(Sz) MPa*m^0.5	Min - Insided Surface Stress: Sz MPa	K(Sz) MPa*m^0.5	Max-Inside Surface Stress: Sz MPa	K(Sz) MPa*m^0.5
0.3988	-341.2503	-8.0969	-328.7460	-7.8002	-353.7547	-8.3936	-342.0940	-8.0969	-329.5346	-7.7996	-354.6533	-8.3942
0.8001	-325.6644	-11.0886	-313.7311	-10.6823	-337.5976	-11.4950	-326.5080	-11.0886	-314.5209	-10.6815	-338.4951	-11.4957
1.1989	-309.7688	-13.1274	-298.4180	-12.6464	-321.1195	-13.6085	-310.6124	-13.1274	-299.2089	-12.6455	-322.0160	-13.6094
1.6002	-293.3863	-14.6240	-282.6359	-14.0881	-304.1368	-15.1598	-294.2300	-14.6240	-283.4279	-14.0871	-305.0321	-15.1608
1.9990	-276.7493	-15.7413	-266.6085	-15.1645	-286.8902	-16.3181	-277.5930	-15.7413	-267.4017	-15.1633	-287.7843	-16.3192
2.4003	-259.6710	-16.5649	-250.1560	-15.9580	-269.1861	-17.1719	-260.5147	-16.5649	-250.9503	-15.9568	-270.0790	-17.1731
2.7991	-242.3926	-17.1663	-233.5107	-16.5373	-251.2745	-17.7954	-243.2362	-17.1663	-234.3062	-16.5361	-252.1662	-17.7966
3.2004	-224.7190	-17.5703	-216.4847	-16.9265	-232.9533	-18.2141	-225.5627	-17.5703	-217.2816	-16.9252	-233.8438	-18.2153
3.5992	-206.8991	-17.7952	-199.3178	-17.1431	-214.4805	-18.4473	-207.7427	-17.7952	-200.1159	-17.1419	-215.3696	-18.4485
3.9980	-188.8467	-17.8596	-181.9268	-17.2052	-195.7665	-18.5140	-189.6903	-17.8596	-182.7262	-17.2039	-196.6544	-18.5153
4.3993	-170.4696	-17.7779	-164.2231	-17.1264	-176.7160	-18.4293	-171.3132	-17.7779	-165.0238	-17.1252	-177.6027	-18.4305
4.7981	-152.0255	-17.5615	-146.4549	-16.9180	-157.5961	-18.2050	-152.8691	-17.5615	-147.2568	-16.9168	-158.4814	-18.2062
5.1994	-133.3046	-17.2276	-128.4199	-16.5963	-138.1892	-17.8588	-134.1482	-17.2276	-129.2232	-16.5951	-139.0732	-17.8600
5.5982	-114.5688	-16.7852	-110.3707	-16.1701	-118.7669	-17.4002	-115.4124	-16.7852	-111.1753	-16.1689	-119.6496	-17.4014
5.9995	-95.6047	-16.2344	-92.1015	-15.6395	-99.1079	-16.8293	-96.4483	-16.2344	-92.9074	-15.6384	-99.9892	-16.8304
6.3983	-76.6772	-15.5816	-73.8676	-15.0106	-79.4869	-16.1525	-77.5209	-15.5816	-74.6748	-15.0095	-80.3669	-16.1536
6.7970	-57.6916	-14.8325	-55.5776	-14.2890	-59.8056	-15.3760	-58.5352	-14.8325	-56.3862	-14.2880	-60.6842	-15.3771
7.1984	-38.5514	-13.9923	-37.1388	-13.4796	-39.9640	-14.5051	-39.3950	-13.9923	-37.9487	-13.4786	-40.8413	-14.5060
7.5971	-19.5239	-13.0625	-18.8085	-12.5839	-20.2393	-13.5411	-20.3675	-13.0625	-19.6198	-12.5829	-21.1153	-13.5421
7.9985	-0.3919	-12.0377	-0.3775	-11.5966	-0.4062	-12.4788	-1.2355	-12.0377	-1.1901	-11.5958	-1.2809	-12.4797
8.3972	18.5775	-10.9314	17.8968	-10.5308	19.2582	-11.3319	17.7339	-10.9314	17.0828	-10.5301	18.3849	-11.3327
8.7986	37.6007	-9.7473	36.2229	-9.3901	38.9785	-10.1045	36.7571	-9.7473	35.4076	-9.3894	38.1065	-10.1051
9.1973	56.4120	-8.4893	54.3449	-8.1782	58.4791	-8.8004	55.5683	-8.4893	53.5283	-8.1777	57.6084	-8.8010
9.5987	75.2258	-7.1611	72.4693	-6.8987	77.9822	-7.4236	74.3821	-7.1611	71.6513	-6.8982	77.1129	-7.4241
9.9974	93.7789	-5.7664	90.3426	-5.5551	97.2152	-5.9777	92.9353	-5.7664	89.5233	-5.5547	96.3472	-5.9781
10.3962	112.1661	-4.3273	108.0561	-4.1687	116.2762	-4.4859	111.3225	-4.3273	107.2355	-4.1684	115.4095	-4.4862
10.7975	130.4777	-2.8308	125.6967	-2.7271	135.2588	-2.9345	129.6341	-2.8308	124.8748	-2.7269	134.3934	-2.9347
11.1963	148.4570	-1.2804	143.0172	-1.2335	153.8969	-1.3274	147.6134	-1.2804	142.1940	-1.2334	153.0327	-1.3274
11.5976	166.3078	0.3203	160.2139	0.3085	172.4018	0.3320	165.4642	0.3203	159.3895	0.3085	171.5389	0.3320
11.9964	183.7792	1.9678	177.0450	1.8956	190.5134	2.0399	182.9356	1.9678	176.2194	1.8955	189.6517	2.0400
12.3977	201.0685	3.6585	193.7009	3.5245	208.4362	3.7926	200.2249	3.6585	192.8740	3.5242	207.5758	3.7929
12.7965	217.9320	5.4151	209.9464	5.2167	225.9177	5.6135	217.0884	5.4151	209.1184	5.2163	225.0584	5.6139
13.1978	234.5593	7.2188	225.9644	6.9543	243.1542	7.4833	233.7157	7.2188	225.1353	6.9538	242.2961	7.4838
13.5966	250.7150	9.0577	241.5281	8.7258	259.9018	9.3896	249.8713	9.0577	240.6978	8.7251	259.0449	9.3902
13.9954	266.4804	10.9283	256.7159	10.5278	276.2450	11.3287	265.6368	10.9283	255.8844	10.5270	275.3892	11.3295
14.3967	281.9273	12.8269	271.5968	12.3569	292.2579	13.2969	281.0837	12.8269	270.7642	12.3560	291.4032	13.2978
14.7955	296.8351	14.7499	285.9583	14.2094	307.7120	15.2904	295.9915	14.7499	285.1247	14.2084	306.8583	15.2914
15.1968	311.3685	16.7318	299.9592	16.1187	322.7779	17.3448	310.5249	16.7318	299.1246	16.1175	321.9253	17.3460
15.5956	325.3187	18.7699	313.3981	18.0821	337.2392	19.4577	324.4750	18.7699	312.5625	18.0808	336.3875	19.4590
15.9969	338.8380	20.8229	326.4221	20.0598	351.2539	21.5859	337.9944	20.8229	325.5855	20.0584	350.4032	21.5873
16.3957	351.7305	22.8865	338.8421	22.0479	364.6188	23.7251	350.8868	22.8865	338.0047	22.0462	363.7690	23.7267
16.7945	364.0584	24.9569	350.7184	24.0424	377.3985	25.8714	363.2148	24.9569	349.8801	24.0407	376.5496	25.8732
17.1958	375.8699	27.0302	362.0971	26.0398	389.6428	28.0207	375.0263	27.0302	361.2579	26.0379	388.7947	28.0226
17.5946	386.9904	29.1346	372.8101	28.0670	401.1708	30.2022	386.1468	29.1346	371.9701	28.0650	400.3235	30.2042
17.9959	397.5364	31.3333	382.9696	30.1852	412.1032	32.4814	396.6928	31.3333	382.1290	30.1829	411.2566	32.4836
18.3947	407.3495	33.5256	392.4231	32.2971	422.2758	34.7541	406.5058	33.5256	391.5817	32.2948	421.4299	34.7564
18.7960	416.5294	35.7070	401.2666	34.3986	431.7921	37.0154	415.6857	35.7070	400.4246	34.3961	430.9469	37.0179
19.1948	424.9350	37.8729	409.3642	36.4852	440.5057	39.2607	424.0913	37.8729	408.5216	36.4825	439.6611	39.2634
19.5961	432.6482	40.0187	416.7948	38.5523	448.5015	41.4850	431.8045	40.0187	415.9516	38.5494	447.6574	41.4879
19.9949	439.5463	42.1395	423.4402	40.5954	455.6525	43.6836	438.7027	42.1395	422.5965	40.5925	454.8088	43.6866

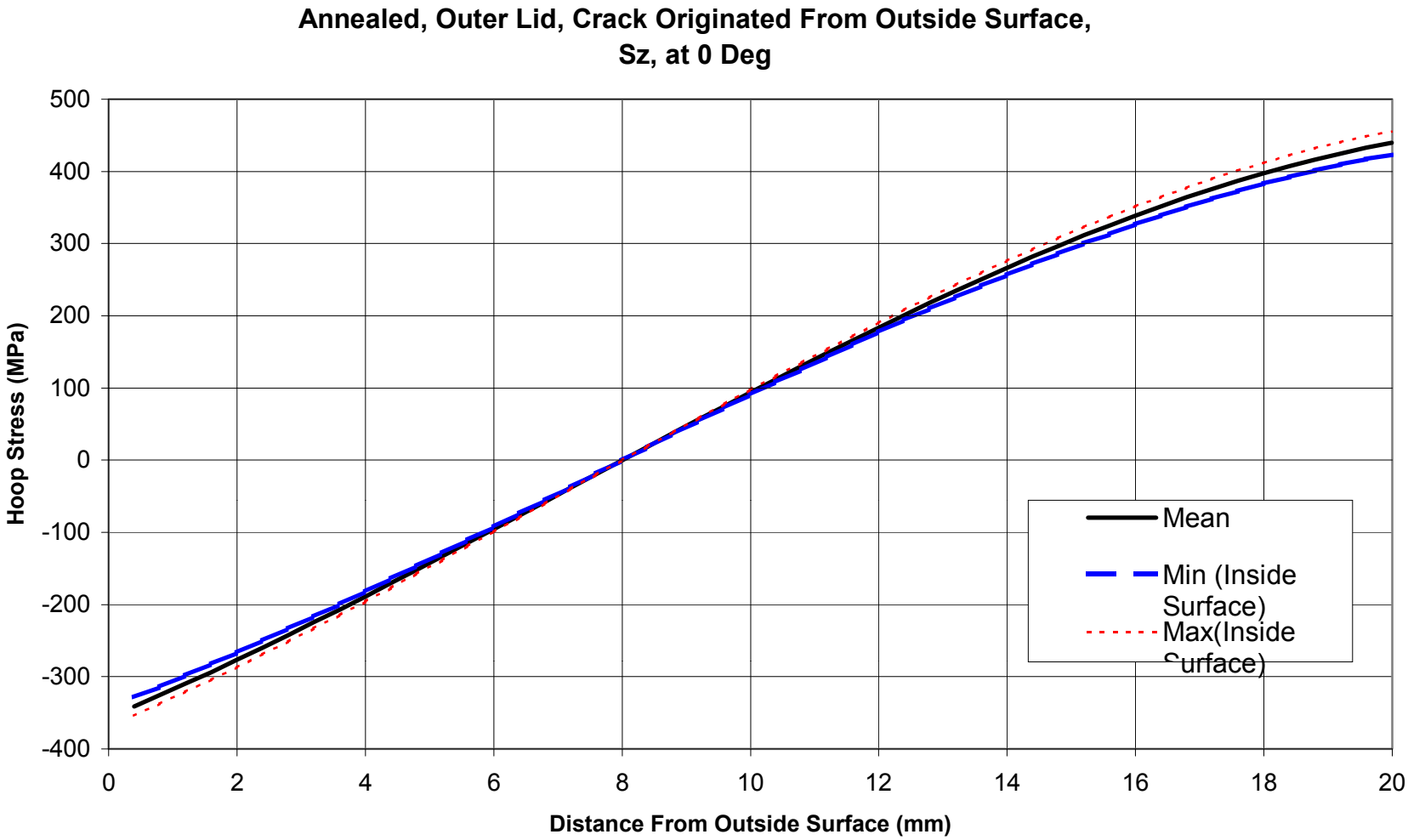
d) Anneal,Sz (continued)

Mean		Min - Insided Surface		Max-Inside Surface		Mean		Min - Insided Surface		Max-Inside Surface	
Stress: Sz	K(Sz)	Stress: Sz	K(Sz)	Stress: Sz	K(Sz)	Stress: Sz	K(Sz)	Stress: Sz	K(Sz)	Stress: Sz	K(Sz)
MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5
-344.5423	-8.0969	-331.8221	-7.7980	-357.2625	-8.3958	-348.3556	-8.0969	-335.3812	-7.7953	-361.3301	-8.3985
-328.9563	-11.0886	-316.8115	-10.6793	-341.1011	-11.4980	-332.7697	-11.0886	-320.3757	-10.6757	-345.1636	-11.5016
-313.0607	-13.1274	-301.5028	-12.6428	-324.6187	-13.6121	-316.8741	-13.1274	-305.0722	-12.6385	-328.6760	-13.6164
-296.6783	-14.6240	-285.7252	-14.0840	-307.6314	-15.1639	-300.4916	-14.6240	-289.2999	-14.0793	-311.6834	-15.1686
-280.0413	-15.7413	-269.7024	-15.1601	-290.3802	-16.3224	-283.8546	-15.7413	-273.2825	-15.1550	-294.4267	-16.3275
-262.9630	-16.5649	-253.2546	-15.9534	-272.6714	-17.1765	-266.7763	-16.5649	-256.8403	-15.9480	-276.7123	-17.1819
-245.6845	-17.1663	-236.6140	-16.5326	-254.7550	-17.8001	-249.4979	-17.1663	-240.2054	-16.5270	-258.7903	-17.8057
-228.0110	-17.5703	-219.5930	-16.9216	-236.4290	-18.2190	-231.8243	-17.5703	-223.1901	-16.9159	-240.4586	-18.2247
-210.1911	-17.7952	-202.4310	-17.1382	-217.9511	-18.4522	-214.0044	-17.7952	-206.0339	-17.1324	-221.9750	-18.4580
-192.1386	-17.8596	-185.0450	-17.2002	-199.2322	-18.5190	-195.9520	-17.8596	-188.6538	-17.1944	-203.2501	-18.5248
-173.7615	-17.7779	-167.3464	-17.1215	-180.1767	-18.4342	-177.5749	-17.7779	-170.9611	-17.1157	-184.1886	-18.4400
-155.3174	-17.5615	-149.5832	-16.9131	-161.0516	-18.2098	-159.1308	-17.5615	-153.2040	-16.9074	-165.0576	-18.2156
-136.5965	-17.2276	-131.5535	-16.5915	-141.6395	-17.8636	-140.4099	-17.2276	-135.1803	-16.5859	-145.6394	-17.8692
-117.8607	-16.7852	-113.5094	-16.1655	-122.2121	-17.4049	-121.6741	-16.7852	-117.1424	-16.1600	-126.2058	-17.4103
-98.8966	-16.2344	-95.2454	-15.6351	-102.5478	-16.8338	-102.7100	-16.2344	-98.8846	-15.6298	-106.5354	-16.8391
-79.9692	-15.5816	-77.0168	-15.0063	-82.9216	-16.1569	-83.7825	-15.5816	-80.6621	-15.0013	-86.9030	-16.1619
-60.9835	-14.8325	-58.7321	-14.2849	-63.2350	-15.3801	-64.7969	-14.8325	-62.3835	-14.2801	-67.2102	-15.3849
-41.8433	-13.9923	-40.2985	-13.4758	-43.3882	-14.5089	-45.6567	-13.9923	-43.9562	-13.4712	-47.3572	-14.5135
-22.8158	-13.0625	-21.9735	-12.5802	-23.6582	-13.5448	-26.6292	-13.0625	-25.6374	-12.5760	-27.6210	-13.5490
-3.6838	-12.0377	-3.5478	-11.5933	-3.8198	-12.4821	-7.4972	-12.0377	-7.2179	-11.5894	-7.7764	-12.4861
15.2855	-10.9314	14.7212	-10.5278	15.8499	-11.3350	11.4722	-10.9314	11.0449	-10.5242	11.8995	-11.3385
34.3088	-9.7473	33.0421	-9.3874	35.5754	-10.1071	30.4954	-9.7473	29.3596	-9.3843	31.6312	-10.1103
53.1200	-8.4893	51.1589	-8.1759	55.0812	-8.8027	49.3067	-8.4893	47.4703	-8.1731	51.1431	-8.8055
71.9338	-7.1611	69.2781	-6.8968	74.5895	-7.4255	68.1204	-7.1611	65.5833	-6.8944	70.6576	-7.4279
90.4870	-5.7664	87.1463	-5.5535	93.8277	-5.9793	86.6736	-5.7664	83.4455	-5.5516	89.9018	-5.9812
108.8742	-4.3273	104.8546	-4.1675	112.8937	-4.4871	105.0608	-4.3273	101.1479	-4.1661	108.9738	-4.4885
127.1858	-2.8308	122.4902	-2.7263	131.8814	-2.9353	123.3724	-2.8308	118.7775	-2.7254	127.9674	-2.9362
145.1651	-1.2804	139.8057	-1.2332	150.5244	-1.3277	141.3517	-1.2804	136.0871	-1.2327	146.6163	-1.3281
163.0159	0.3203	156.9974	0.3084	169.0343	0.3321	159.2025	0.3203	153.2731	0.3083	165.1320	0.3322
180.4872	1.9678	173.8238	1.8951	187.1507	2.0404	176.6739	1.9678	170.0937	1.8945	183.2541	2.0410
197.7766	3.6585	190.4748	3.5235	205.0783	3.7936	193.9632	3.6585	186.7391	3.5223	201.1874	3.7948
214.6401	5.4151	206.7158	5.2152	222.5644	5.6150	210.8267	5.4151	202.9746	5.2134	218.6789	5.6168
231.2674	7.2188	222.7292	6.9523	239.8056	7.4853	227.4540	7.2188	218.9826	6.9499	235.9255	7.4876
247.4230	9.0577	238.2883	8.7233	256.5577	9.3921	243.6097	9.0577	234.5365	8.7203	252.6828	9.3950
263.1885	10.9283	253.4718	10.5248	272.9052	11.3317	259.3751	10.9283	249.7148	10.5212	269.0355	11.3353
278.6354	12.8269	268.3484	12.3533	288.9224	13.3005	274.8220	12.8269	264.5863	12.3492	285.0577	13.3046
293.5432	14.7499	282.7058	14.2053	304.3805	15.2944	289.7298	14.7499	278.9389	14.2005	300.5207	15.2992
308.0766	16.7318	296.7027	16.1140	319.4505	17.3495	304.2632	16.7318	292.9310	16.1086	315.5954	17.3549
322.0267	18.7699	310.1378	18.0769	333.9157	19.4629	318.2134	18.7699	306.3616	18.0708	330.0651	19.4690
335.5461	20.8229	323.1580	20.0541	347.9341	21.5916	331.7327	20.8229	319.3774	20.0473	344.0880	21.5984
348.4385	22.8865	335.5745	22.0415	361.3026	23.7314	344.6252	22.8865	331.7897	22.0341	357.4606	23.7389
360.7665	24.9569	347.4473	24.0355	374.0857	25.8783	356.9531	24.9569	343.6585	24.0274	370.2478	25.8864
372.5780	27.0302	358.8227	26.0323	386.3332	28.0282	368.7646	27.0302	355.0301	26.0235	382.4992	28.0370
383.6985	29.1346	369.5326	28.0590	397.8643	30.2102	379.8851	29.1346	365.7364	28.0495	394.0339	30.2197
394.2445	31.3333	379.6893	30.1765	408.7997	32.4901	390.4311	31.3333	375.8896	30.1663	404.9726	32.5003
404.0575	33.5256	389.1401	32.2879	418.9750	34.7633	400.2442	33.5256	385.3372	32.2769	415.1512	34.7742
413.2374	35.7070	397.9810	34.3887	428.4938	37.0253	409.4241	35.7070	394.1752	34.3771	424.6730	37.0369
421.6430	37.8729	406.0763	36.4747	437.2097	39.2712	417.8297	37.8729	402.2677	36.4624	433.3916	39.2835
429.3562	40.0187	413.5047	38.5412	445.2077	41.4961	425.5429	40.0187	409.6936	38.5282	441.3921	41.5091
436.2544	42.1395	420.1482	40.5838	452.3605	43.6953	432.4410	42.1395	416.3349	40.5701	448.5472	43.7090

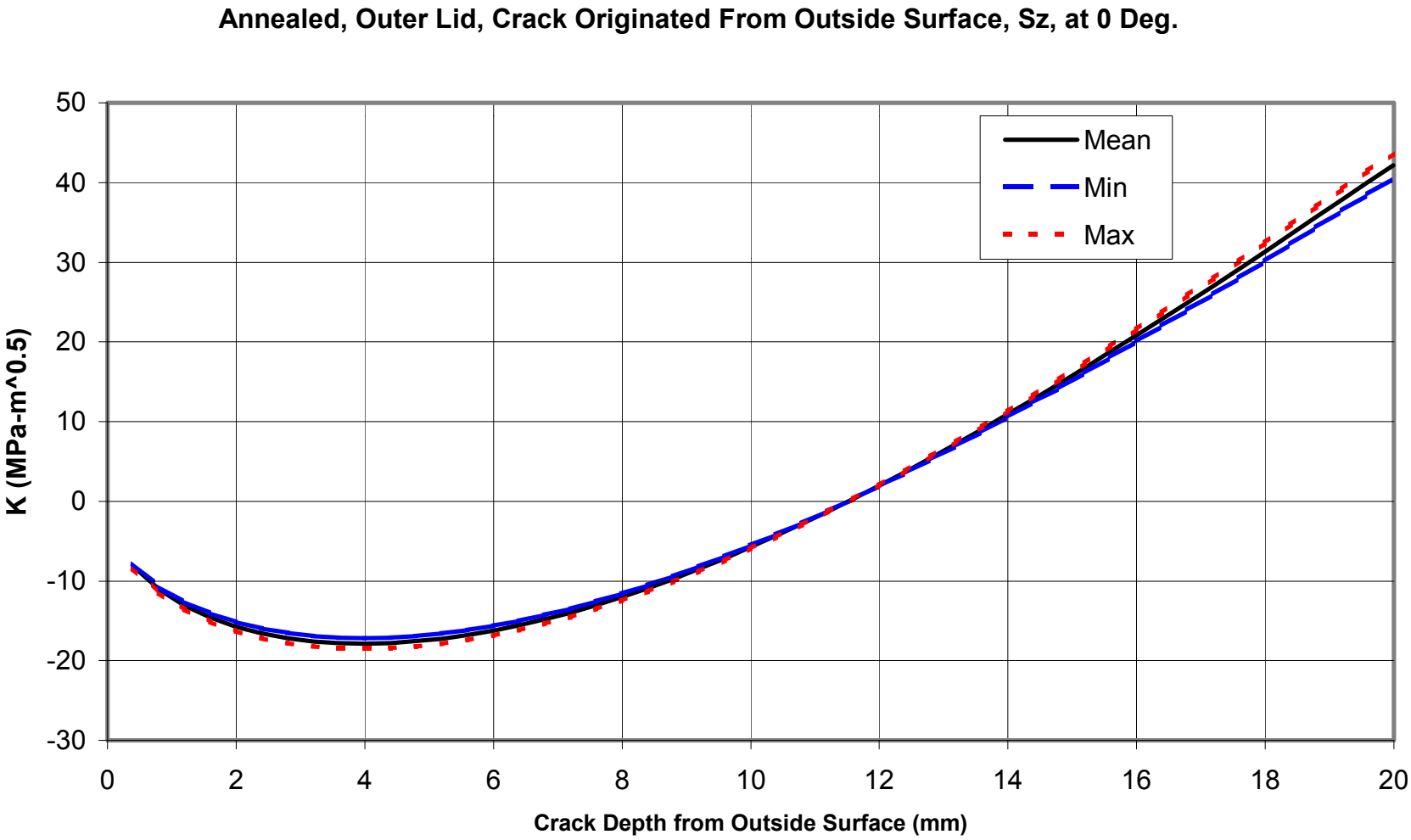
d) Anneal,Sz (continued)

Mean		Min - Insided Surface		Max-Inside Surface		Mean		Min - Insided Surface		Max-Inside Surface	
Stress: Sz	K(Sz)	Stress: Sz	K(Sz)	Stress: Sz	K(Sz)	Stress: Sz	K(Sz)	Stress: Sz	K(Sz)	Stress: Sz	K(Sz)
MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	
-353.1607	-8.0969	-339.8596	-7.7920	-366.4619	-8.4019	-358.4872	-8.0969	-344.8152	-7.7881	-372.1593	-8.4057
-337.5748	-11.0886	-324.8606	-10.6710	-350.2889	-11.5063	-342.9012	-11.0886	-329.8236	-10.6657	-355.9789	-11.5115
-321.6792	-13.1274	-309.5637	-12.6330	-333.7947	-13.6219	-327.0057	-13.1274	-314.5342	-12.6268	-339.4771	-13.6281
-305.2967	-14.6240	-293.7983	-14.0732	-316.7952	-15.1747	-310.6232	-14.6240	-298.7766	-14.0662	-322.4699	-15.1817
-288.6597	-15.7413	-277.7879	-15.1484	-299.5316	-16.3341	-293.9862	-15.7413	-282.7741	-15.1409	-305.1983	-16.3416
-271.5814	-16.5649	-261.3528	-15.9411	-281.8101	-17.1888	-276.9079	-16.5649	-266.3471	-15.9332	-287.4687	-17.1967
-254.3030	-17.1663	-244.7251	-16.5198	-263.8808	-17.8129	-259.6295	-17.1663	-249.7276	-16.5117	-269.5313	-17.8210
-236.6294	-17.5703	-227.7172	-16.9085	-245.5417	-18.2320	-241.9559	-17.5703	-232.7281	-16.9002	-251.1837	-18.2404
-218.8095	-17.7952	-210.5684	-17.1250	-227.0506	-18.4654	-224.1360	-17.7952	-215.5878	-17.1165	-232.6842	-18.4739
-200.7571	-17.8596	-193.1959	-17.1870	-208.3182	-18.5323	-206.0835	-17.8596	-198.2239	-17.1785	-213.9432	-18.5407
-182.3800	-17.7779	-175.5110	-17.1083	-189.2490	-18.4474	-187.7065	-17.7779	-180.5477	-17.0998	-194.8653	-18.4559
-163.9359	-17.5615	-157.7615	-16.9001	-170.1102	-18.2229	-169.2624	-17.5615	-162.8070	-16.8917	-175.7177	-18.2313
-145.2150	-17.2276	-139.7457	-16.5787	-150.6842	-17.8764	-150.5415	-17.2276	-144.8001	-16.5705	-156.2828	-17.8846
-126.4792	-16.7852	-121.7156	-16.1530	-131.2428	-17.4173	-131.8057	-16.7852	-126.7788	-16.1450	-136.8325	-17.4253
-107.5151	-16.2344	-103.4657	-15.6230	-111.5644	-16.8459	-112.8416	-16.2344	-108.5380	-15.6153	-117.1452	-16.8536
-88.5876	-15.5816	-85.2511	-14.9947	-91.9241	-16.1684	-93.9141	-15.5816	-90.3324	-14.9873	-97.4958	-16.1758
-69.6020	-14.8325	-66.9806	-14.2739	-72.2234	-15.3912	-74.9285	-14.8325	-72.0708	-14.2668	-77.7861	-15.3982
-50.4618	-13.9923	-48.5612	-13.4653	-52.3623	-14.5193	-55.7883	-13.9923	-53.6606	-13.4587	-57.9160	-14.5260
-31.4343	-13.0625	-30.2504	-12.5705	-32.6182	-13.5545	-36.7608	-13.0625	-35.3588	-12.5643	-38.1628	-13.5607
-12.3023	-12.0377	-11.8389	-11.5843	-12.7656	-12.4911	-17.6288	-12.0377	-16.9564	-11.5786	-18.3011	-12.4968
6.6671	-10.9314	6.4160	-10.5197	6.9182	-11.3431	1.3406	-10.9314	1.2895	-10.5145	1.3917	-11.3483
25.6903	-9.7473	24.7227	-9.3802	26.6579	-10.1144	20.3638	-9.7473	19.5872	-9.3755	21.1405	-10.1190
44.5016	-8.4893	42.8255	-8.1696	46.1776	-8.8091	39.1751	-8.4893	37.6810	-8.1656	40.6692	-8.8131
63.3154	-7.1611	60.9307	-6.8914	65.7000	-7.4309	57.9889	-7.1611	55.7773	-6.8880	60.2005	-7.4343
81.8685	-5.7664	78.7851	-5.5492	84.9520	-5.9836	76.5420	-5.7664	73.6228	-5.5465	79.4612	-5.9863
100.2557	-4.3273	96.4798	-4.1643	104.0317	-4.4903	94.9292	-4.3273	91.3088	-4.1623	98.5497	-4.4923
118.5673	-2.8308	114.1017	-2.7242	123.0330	-2.9374	113.2408	-2.8308	108.9220	-2.7228	117.5597	-2.9388
136.5466	-1.2804	131.4038	-1.2322	141.6894	-1.3287	131.2201	-1.2804	126.2156	-1.2316	136.2246	-1.3293
154.3974	0.3203	148.5823	0.3082	160.2125	0.3323	149.0709	0.3203	143.3856	0.3080	154.7562	0.3325
171.8688	1.9678	165.3957	1.8936	178.3419	2.0419	166.5423	1.9678	160.1907	1.8927	172.8939	2.0428
189.1581	3.6585	182.0338	3.5208	196.2825	3.7963	183.8317	3.6585	176.8206	3.5190	190.8427	3.7981
206.0216	5.4151	198.2622	5.2111	213.7811	5.6190	200.6952	5.4151	193.0410	5.2086	208.3493	5.6216
222.6489	7.2188	214.2632	6.9469	231.0346	7.4907	217.3224	7.2188	209.0341	6.9435	225.6107	7.4941
238.8046	9.0577	229.8104	8.7165	247.7987	9.3988	233.4781	9.0577	224.5736	8.7122	242.3825	9.4031
254.5700	10.9283	244.9821	10.5167	264.1580	11.3399	249.2435	10.9283	239.7378	10.5115	258.7493	11.3450
270.0169	12.8269	259.8472	12.3438	280.1866	13.3100	264.6904	12.8269	254.5956	12.3377	274.7853	13.3161
284.9247	14.7499	274.1935	14.1944	295.6559	15.3054	279.5982	14.7499	268.9348	14.1873	290.2616	15.3124
299.4581	16.7318	288.1796	16.1016	310.7367	17.3619	294.1317	16.7318	282.9140	16.0936	305.3493	17.3699
313.4083	18.7699	301.6043	18.0630	325.2122	19.4768	308.0818	18.7699	296.3321	18.0540	319.8315	19.4857
326.9276	20.8229	314.6145	20.0386	339.2408	21.6071	321.6011	20.8229	309.3358	20.0287	333.8664	21.6170
339.8201	22.8865	327.0213	22.0245	352.6188	23.7485	334.4936	22.8865	321.7366	22.0136	347.2506	23.7593
352.1480	24.9569	338.8850	24.0170	365.4111	25.8969	346.8216	24.9569	333.5944	24.0051	360.0487	25.9087
363.9595	27.0302	350.2516	26.0122	377.6674	28.0483	358.6330	27.0302	344.9554	25.9993	372.3107	28.0611
375.0800	29.1346	360.9533	28.0373	389.2068	30.2319	369.7535	29.1346	355.6518	28.0235	383.8553	30.2458
385.6260	31.3333	371.1021	30.1532	400.1500	32.5134	380.2995	31.3333	365.7956	30.1383	394.8035	32.5283
395.4391	33.5256	380.5456	32.2629	410.3326	34.7883	390.1126	33.5256	375.2344	32.2470	404.9908	34.8042
404.6190	35.7070	389.3797	34.3622	419.8582	37.0519	399.2925	35.7070	384.0642	34.3452	414.5208	37.0688
413.0246	37.8729	397.4687	36.4465	428.5804	39.2994	407.6981	37.8729	392.1492	36.4285	423.2470	39.3174
420.7378	40.0187	404.8914	38.5114	436.5841	41.5259	415.4113	40.0187	399.5682	38.4924	431.2543	41.5449
427.6359	42.1395	411.5298	40.5524	443.7421	43.7266	422.3094	42.1395	406.2033	40.5324	438.4156	43.7467

e) Anneal,SzPlt



f) Anneal,KSzPlt



The Excel File "S&K_IL_Peen" DTN: LL000316105924.141 contains the following nine items:

a) Peening,1-1,Sn – Excel tables containing radial stress and stress intensity factor profiles as a function of depth at location designated as 0, 18, 36, 54, 72, and 90 degrees along the circumference of the closure weld. Mean, maximum and minimum stress and stress intensity values are given at each of the locations to characterize uncertainty. Stress and stress intensity factor profiles are presented in the first table by British units, i.e., stress in ksi, distance in inches and stress intensity factor in ksi $(in)^{1/2}$ and in the second table by metric units, i.e., stress in MPa, distance in "m" and stress intensity factor in MPa $(m)^{1/2}$. The variability of the mean stress along the circumference is represented by Eq. 7.

   Mean stress intensity factor is calculated from mean stress at 0 degree. Variability and uncertainty for stress intensity factor are handled similarly to those for stress because stress intensity factor is a linear function of stress.

b) Peening,1-1,SnPlt – Plot depicting mean, minimum and maximum radial stress profiles at 0 degree.

c) Peening,1-1,SnPlt – Plot depicting mean, minimum and maximum radial stress intensity factor profiles at 0 degree.

d) Peening,2-2,Sz - Excel tables containing hoop stress and stress intensity factor profiles as a function of depth at location designated as 0, 18, 36, 54, 72, and 90 degrees along the circumference of the closure weld.

e) Peening,2-2,SzPlt - Plot depicting mean, minimum and maximum hoop stress profiles at 0 degree.

f) Peening,2-2,SzPlt - Plot depicting mean, minimum and maximum hoop stress intensity factor profiles at 0 degree.

g) Peening,3-3,Sy - Excel tables containing longitudinal stress and stress intensity factor profiles as a function of depth at location designated as 0, 18, 36, 54, 72, and 90 degrees along the circumference of the closure weld.

h) Peening,3-3,SyPlt - Plot depicting mean, minimum and maximum longitudinal stress profiles at 0 degree.

i) Peening,3-3,SyPlt - Plot depicting mean, minimum and maximum longitudinal stress intensity factor profiles at 0 degree.

a) Peening,1-1,Sn

Results in Metric Unit start in Cell A80

Angle(deg):	0						18					
(rad):	0						0.3141593					
	Scale Facto	1	1.0765414		0.9234586			1.0040092	1.0762357		0.9237643	
	Mean		Min - Insided Surface		Max-Inside Surface		Mean		Min - Insided Surface		Max-Inside Surface	
Depth	Stress: Sn	K(Sn)	Stress: Sn	K(Sn)	Stress: Sn	K(Sn)	Stress: Sn	K(Sn)	Stress: Sn	K(Sn)	Stress: Sn	K(Sn)
(in)	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5
0	-41.3810	0.0000	-44.5484	0	-38.2136	0	-41.5034	0.0000	-44.6674	0	-38.3393	0
0.0096	-40.2878	-7.6201	-43.3715	-8.20341	-37.2041	-7.03689	-40.4102	-7.6507	-43.4909	-8.23396	-37.3295	-7.06744
0.0193	-39.2619	-10.6697	-42.2671	-11.4864	-36.2568	-9.85303	-39.3843	-10.7125	-42.3868	-11.5292	-36.3818	-9.89581
0.0289	-38.3219	-12.8956	-41.2551	-13.8827	-35.3887	-11.9086	-38.4443	-12.9473	-41.3751	-13.9344	-35.5134	-11.9603
0.0386	-37.4454	-14.6408	-40.3116	-15.7614	-34.5793	-13.5202	-37.5678	-14.6995	-40.4318	-15.8201	-34.7038	-13.5789
0.0482	-36.6480	-16.0391	-39.4531	-17.2667	-33.8429	-14.8114	-36.7704	-16.1034	-39.5736	-17.331	-33.9672	-14.8757
0.0578	-35.9176	-17.1555	-38.6668	-18.4686	-33.1684	-15.8424	-36.0400	-17.2243	-38.7875	-18.5374	-33.2924	-15.9112
0.0675	-35.2450	-18.3226	-37.9427	-19.725	-32.5473	-16.9202	-35.3674	-18.3961	-38.0636	-19.7985	-32.6711	-16.9936
0.0771	-34.6415	-19.4042	-37.293	-20.8894	-31.99	-17.919	-34.7638	-19.4820	-37.4141	-20.9672	-32.1136	-17.9968
0.0868	-34.0917	-20.3059	-36.7012	-21.8602	-31.4823	-18.7517	-34.2141	-20.3873	-36.8224	-21.9416	-31.6058	-18.8331
0.0964	-33.6045	-21.0525	-36.1767	-22.6639	-31.0324	-19.4411	-33.7269	-21.1369	-36.2981	-22.7483	-31.1557	-19.5255
0.106	-33.1712	-21.6490	-35.7102	-23.3061	-30.6323	-19.992	-33.2936	-21.7358	-35.8318	-23.3929	-30.7554	-20.0788
0.1157	-32.7856	-22.0976	-35.295	-23.789	-30.2761	-20.4062	-32.9079	-22.1862	-35.4167	-23.8776	-30.3992	-20.4948
0.1253	-32.4529	-22.5599	-34.9369	-24.2866	-29.9689	-20.8331	-32.5752	-22.6503	-35.0586	-24.3771	-30.0918	-20.9236
0.135	-32.1635	-23.0234	-34.6254	-24.7856	-29.7017	-21.2611	-32.2859	-23.1157	-34.7472	-24.8779	-29.8245	-21.3534
0.1446	-31.9208	-23.3889	-34.3641	-25.1791	-29.4776	-21.5987	-32.0432	-23.4827	-34.486	-25.2729	-29.6004	-21.6925
0.1542	-31.7190	-23.6565	-34.1469	-25.4672	-29.2912	-21.8458	-31.8414	-23.7514	-34.2688	-25.5621	-29.4139	-21.9407
0.1639	-31.5540	-23.8240	-33.9692	-25.6476	-29.1388	-22.0005	-31.6763	-23.9195	-34.0912	-25.7431	-29.2615	-22.096
0.1735	-31.4264	-23.9270	-33.8319	-25.7584	-29.021	-22.0956	-31.5488	-24.0229	-33.954	-25.8543	-29.1437	-22.1915
0.1832	-31.3311	-24.0306	-33.7292	-25.8699	-28.933	-22.1913	-31.4535	-24.1269	-33.8514	-25.9663	-29.0556	-22.2876
0.1928	-31.2673	-24.3168	-33.6606	-26.178	-28.8741	-22.4555	-31.3897	-24.4143	-33.7827	-26.2755	-28.9967	-22.553
0.2024	-31.2313	-24.5290	-33.6218	-26.4065	-28.8409	-22.6515	-31.3537	-24.6273	-33.744	-26.5048	-28.9634	-22.7498
0.2121	-31.2205	-24.6615	-33.6102	-26.5492	-28.8309	-22.7739	-31.3429	-24.7604	-33.7324	-26.648	-28.9535	-22.8728
0.2217	-31.2325	-24.7492	-33.6231	-26.6436	-28.842	-22.8549	-31.3549	-24.8484	-33.7453	-26.7428	-28.9645	-22.9541
0.2314	-31.2649	-24.7719	-33.658	-26.668	-28.8718	-22.8758	-31.3873	-24.8712	-33.7801	-26.7673	-28.9944	-22.9751
0.241	-31.3144	-24.7634	-33.7112	-26.6588	-28.9175	-22.868	-31.4367	-24.8627	-33.8333	-26.7581	-29.0401	-22.9672
0.2506	-31.3785	-25.3225	-33.7803	-27.2608	-28.9768	-23.3843	-31.5009	-25.4241	-33.9024	-27.3623	-29.0994	-23.4858
0.2603	-31.4556	-25.7974	-33.8633	-27.7719	-29.048	-23.8228	-31.5780	-25.9008	-33.9854	-27.8753	-29.1706	-23.9262
0.2699	-31.5415	-26.2220	-33.9557	-28.2291	-29.1273	-24.215	-31.6639	-26.3272	-34.0778	-28.3342	-29.2499	-24.3201
0.2796	-31.6352	-26.5747	-34.0566	-28.6088	-29.2138	-24.5406	-31.7576	-26.6812	-34.1786	-28.7153	-29.3365	-24.6472
0.2892	-31.7322	-26.8891	-34.1611	-28.9472	-29.3034	-24.831	-31.8546	-26.9969	-34.2831	-29.055	-29.4261	-24.9388
0.2988	-31.8309	-27.1563	-34.2673	-29.2349	-29.3945	-25.0777	-31.9533	-27.2652	-34.3892	-29.3438	-29.5173	-25.1866
0.3085	-31.9296	-27.7799	-34.3735	-29.9062	-29.4857	-25.6536	-32.0520	-27.8913	-34.4955	-30.0176	-29.6085	-25.765
0.3181	-32.0237	-28.4827	-34.4748	-30.6628	-29.5725	-26.3026	-32.1460	-28.5969	-34.5967	-30.777	-29.6953	-26.4168
0.3278	-32.1124	-29.0993	-34.5703	-31.3266	-29.6545	-26.872	-32.2348	-29.2160	-34.6922	-31.4433	-29.7773	-26.9887
0.3374	-32.1913	-29.6650	-34.6553	-31.9356	-29.7274	-27.3944	-32.3137	-29.7839	-34.7772	-32.0545	-29.8502	-27.5133
0.347	-32.2588	-30.1704	-34.728	-32.4797	-29.7897	-27.8611	-32.3812	-30.2914	-34.8498	-32.6007	-29.9126	-27.9821
0.3567	-32.3128	-30.6064	-34.786	-32.949	-29.8395	-28.2637	-32.4351	-30.7291	-34.9079	-33.0717	-29.9624	-28.3864
0.3663	-32.3494	-31.4897	-34.8255	-33.9	-29.8733	-29.0794	-32.4718	-31.6159	-34.9473	-34.0262	-29.9962	-29.2057
0.376	-32.3668	-32.7421	-34.8442	-35.2483	-29.8894	-30.236	-32.4892	-32.8734	-34.966	-35.3795	-30.0123	-30.3673
0.3856	-32.3620	-33.9002	-34.839	-36.495	-29.885	-31.3055	-32.4844	-34.0361	-34.9608	-36.6309	-30.0079	-31.4414
0.3952	-32.3327	-34.9570	-34.8075	-37.6327	-29.8579	-32.2813	-32.4551	-35.0972	-34.9293	-37.7728	-29.9808	-32.4215
0.4049	-32.2755	-35.9036	-34.7459	-38.6518	-29.8051	-33.1555	-32.3979	-36.0476	-34.8678	-38.7957	-29.928	-33.2995
0.4145	-32.1890	-36.7785	-34.6528	-39.5936	-29.7253	-33.9635	-32.3114	-36.9260	-34.7747	-39.7411	-29.8481	-34.1109
0.4242	-32.0688	-38.1413	-34.5234	-41.0606	-29.6142	-35.2219	-32.1911	-38.2942	-34.6453	-41.2136	-29.737	-35.3748
0.4338	-31.9146	-41.1143	-34.3574	-44.2612	-29.4718	-37.9674	-32.0370	-41.2791	-34.4793	-44.4261	-29.5946	-38.1322
0.4434	-31.7228	-43.8843	-34.1509	-47.2433	-29.2947	-40.5254	-31.8452	-44.0603	-34.2729	-47.4192	-29.4174	-40.7013
0.4531	-31.4882	-46.4456	-33.8983	-50.0006	-29.078	-42.8906	-31.6106	-46.6318	-34.0204	-50.1868	-29.2007	-43.0768
0.4627	-31.2130	-48.8477	-33.602	-52.5865	-28.8239	-45.1088	-31.3353	-49.0435	-33.7242	-52.7824	-28.9464	-45.3046
0.4724	-30.8887	-51.0630	-33.2529	-54.9714	-28.5244	-47.1546	-31.0110	-51.2677	-33.3752	-55.1761	-28.6469	-47.3593
0.482	-30.5194	-53.1424	-32.8554	-57.2099	-28.1834	-49.0748	-30.6418	-53.3554	-32.9778	-57.423	-28.3058	-49.2878

a) Peening,1-1,Sn (continued)

36						54					
0.6283185						0.9424778					
	1.0156444	1.0753624		0.9246376			1.0337666	1.0740412		0.9259588	
Mean		Min - Insided Surface		Max-Inside Surface		Mean		Min - Insided Surface		Max-Inside Surface	
Stress: Sn (ksi)	K(Sn) ksi*in^0.5	Stress: Sn (ksi)	K(Sn) ksi*in^0.5	Stress: Sn (ksi)	K(Sn) ksi*in^0.5	Stress: Sn (ksi)	K(Sn) ksi*in^0.5	Stress: Sn (ksi)	K(Sn) ksi*in^0.5	Stress: Sn (ksi)	K(Sn) ksi*in^0.5
-41.8585	0.0000	-45.013	0	-38.7039	0	-42.4115	0.0000	-45.5517	0	-39.2713	0
-40.7653	-7.7394	-43.8374	-8.32262	-37.6931	-7.15611	-41.3184	-7.8775	-44.3776	-8.46071	-38.2591	-7.2942
-39.7394	-10.8366	-42.7343	-11.6533	-36.7445	-10.0199	-40.2925	-11.0300	-43.2758	-11.8467	-37.3092	-10.2133
-38.7994	-13.0974	-41.7234	-14.0844	-35.8753	-12.1103	-39.3524	-13.3311	-42.2661	-14.3181	-36.4387	-12.344
-37.9229	-14.8698	-40.7809	-15.9905	-35.0649	-13.7492	-38.4760	-15.1352	-41.3248	-16.2558	-35.6272	-14.0145
-37.1255	-16.2900	-39.9233	-17.5176	-34.3276	-15.0623	-37.6786	-16.5806	-40.4683	-17.8083	-34.8888	-15.353
-36.3951	-17.4239	-39.1379	-18.737	-33.6523	-16.1108	-36.9482	-17.7348	-39.6838	-19.0479	-34.2125	-16.4217
-35.7225	-18.6092	-38.4146	-20.0117	-33.0304	-17.2068	-36.2756	-18.9413	-38.9614	-20.3437	-33.5897	-17.5389
-35.1189	-19.7077	-37.7656	-21.193	-32.4723	-18.2225	-35.6720	-20.0594	-38.3132	-21.5446	-33.0308	-18.5742
-34.5692	-20.6236	-37.1744	-22.1778	-31.964	-19.0693	-35.1223	-20.9916	-37.7228	-22.5458	-32.5218	-19.4373
-34.0820	-21.3819	-36.6505	-22.9932	-31.5135	-19.7705	-34.6351	-21.7634	-37.1995	-23.3748	-32.0706	-20.152
-33.6487	-21.9877	-36.1845	-23.6448	-31.1129	-20.3307	-34.2018	-22.3800	-36.7341	-24.0371	-31.6694	-20.723
-33.2630	-22.4433	-35.7698	-24.1347	-30.7563	-20.7519	-33.8161	-22.8438	-36.3199	-24.5351	-31.3123	-21.1524
-32.9303	-22.9128	-35.412	-24.6396	-30.4486	-21.186	-33.4834	-23.3216	-35.9626	-25.0484	-31.0043	-21.5949
-32.6410	-23.3836	-35.1009	-25.1458	-30.1811	-21.6213	-33.1941	-23.8008	-35.6518	-25.563	-30.7363	-22.0386
-32.3983	-23.7548	-34.8399	-25.545	-29.9567	-21.9646	-32.9514	-24.1787	-35.3911	-25.9689	-30.5116	-22.3885
-32.1965	-24.0266	-34.6229	-25.8373	-29.7701	-22.2159	-32.7496	-24.4553	-35.1744	-26.266	-30.3248	-22.6446
-32.0314	-24.1967	-34.4454	-26.0203	-29.6175	-22.3732	-32.5845	-24.6285	-34.9971	-26.452	-30.1719	-22.805
-31.9039	-24.3013	-34.3083	-26.1327	-29.4996	-22.4699	-32.4570	-24.7349	-34.8601	-26.5663	-30.0538	-22.9035
-31.8086	-24.4065	-34.2057	-26.2459	-29.4114	-22.5672	-32.3617	-24.8420	-34.7578	-26.6813	-29.9656	-23.0027
-31.7448	-24.6972	-34.1372	-26.5584	-29.3524	-22.8359	-32.2979	-25.1379	-34.6893	-26.9991	-29.9065	-23.2766
-31.7088	-24.9127	-34.0985	-26.7902	-29.3192	-23.0352	-32.2619	-25.3572	-34.6506	-27.2347	-29.8732	-23.4798
-31.6980	-25.0474	-34.0868	-26.935	-29.3092	-23.1597	-32.2511	-25.4943	-34.639	-27.3819	-29.8632	-23.6066
-31.7100	-25.1364	-34.0997	-27.0307	-29.3203	-23.2421	-32.2631	-25.5849	-34.6519	-27.4793	-29.8743	-23.6906
-31.7424	-25.1594	-34.1345	-27.0555	-29.3502	-23.2634	-32.2954	-25.6084	-34.6866	-27.5044	-29.9042	-23.7123
-31.7918	-25.1508	-34.1877	-27.0462	-29.3959	-23.2554	-32.3449	-25.5996	-34.7397	-27.495	-29.95	-23.7041
-31.8560	-25.7187	-34.2567	-27.6569	-29.4552	-23.7805	-32.4091	-26.1776	-34.8087	-28.1158	-30.0094	-24.2394
-31.9331	-26.2009	-34.3396	-28.1755	-29.5265	-24.2264	-32.4862	-26.6684	-34.8915	-28.643	-30.0809	-24.6939
-32.0190	-26.6323	-34.432	-28.6393	-29.6059	-24.6252	-32.5720	-27.1075	-34.9837	-29.1145	-30.1604	-25.1004
-32.1127	-26.9904	-34.5328	-29.0245	-29.6926	-24.9564	-32.6658	-27.4720	-35.0844	-29.5061	-30.2471	-25.438
-32.2097	-27.3097	-34.6371	-29.3679	-29.7823	-25.2516	-32.7628	-27.7970	-35.1886	-29.8552	-30.337	-25.7389
-32.3084	-27.5811	-34.7432	-29.6597	-29.8735	-25.5026	-32.8614	-28.0733	-35.2945	-30.1519	-30.4283	-25.9947
-32.4071	-28.2145	-34.8493	-30.3408	-29.9648	-26.0882	-32.9601	-28.7179	-35.4005	-30.8442	-30.5197	-26.5916
-32.5011	-28.9283	-34.9505	-31.1084	-30.0518	-26.7482	-33.0542	-29.4445	-35.5016	-31.6246	-30.6068	-27.2644
-32.5899	-29.5546	-35.0459	-31.7819	-30.1338	-27.3273	-33.1429	-30.0819	-35.5969	-32.3092	-30.689	-27.8546
-32.6688	-30.1290	-35.1308	-32.3996	-30.2068	-27.8585	-33.2219	-30.6666	-35.6817	-32.9372	-30.7621	-28.396
-32.7363	-30.6424	-35.2034	-32.9517	-30.2692	-28.3331	-33.2894	-31.1892	-35.7542	-33.4985	-30.8246	-28.8799
-32.7902	-31.0852	-35.2614	-33.4278	-30.3191	-28.7425	-33.3433	-31.6398	-35.8121	-33.9825	-30.8745	-29.2972
-32.8269	-31.9823	-35.3008	-34.3926	-30.3529	-29.5721	-33.3799	-32.5530	-35.8514	-34.9633	-30.9084	-30.1427
-32.8443	-33.2544	-35.3195	-35.7605	-30.369	-30.7482	-33.3973	-33.8477	-35.8701	-36.3539	-30.9246	-31.3416
-32.8395	-34.4306	-35.3143	-37.0253	-30.3646	-31.8358	-33.3926	-35.0449	-35.865	-37.6397	-30.9201	-32.4502
-32.8102	-35.5039	-35.2828	-38.1795	-30.3375	-32.8282	-33.3632	-36.1374	-35.8335	-38.813	-30.893	-33.4617
-32.7530	-36.4653	-35.2213	-39.2134	-30.2846	-33.7172	-33.3061	-37.1160	-35.7721	-39.8641	-30.84	-34.3679
-32.6665	-37.3539	-35.1283	-40.169	-30.2047	-34.5388	-33.2196	-38.0204	-35.6792	-40.8355	-30.76	-35.2053
-32.5462	-38.7380	-34.999	-41.6573	-30.0935	-35.8186	-33.0993	-39.4292	-35.55	-42.3485	-30.6486	-36.5098
-32.3921	-41.7575	-34.8332	-44.9045	-29.9509	-38.6106	-32.9451	-42.5026	-35.3844	-45.6495	-30.5058	-39.3556
-32.2003	-44.5709	-34.627	-47.9298	-29.7736	-41.2119	-32.7534	-45.3662	-35.1785	-48.7251	-30.3283	-42.0072
-31.9657	-47.1722	-34.3747	-50.7272	-29.5566	-43.6172	-32.5187	-48.0139	-34.9265	-51.5689	-30.111	-44.4589
-31.6904	-49.6119	-34.0787	-53.3507	-29.3021	-45.873	-32.2435	-50.4971	-34.6308	-54.2359	-29.8561	-46.7582
-31.3661	-51.8618	-33.73	-55.7703	-29.0023	-47.9534	-31.9192	-52.7872	-34.2826	-56.6956	-29.5559	-48.8788
-30.9969	-53.9737	-33.3329	-58.0413	-28.6609	-49.9061	-31.5500	-54.9368	-33.886	-59.0044	-29.214	-50.8692

a) Peening,1-1,Sn (continued)

72						90						From Analyses	
1.2566371						1.5707963							
	1.0566019	1.0724411		0.9275589			1.081915	1.0707462		0.9292538			
Mean		Min - Insided Surface		Max-Inside Surface		Mean		Min - Insided Surface		Max-Inside Surface		Mean	
Stress: Sn (ksi)	K(Sn) ksi*in^0.5	Stress: Sn (ksi)	K(Sn) ksi*in^0.5	Stress: Sn (ksi)	K(Sn) ksi*in^0.5	Stress: Sn (ksi)	K(Sn) ksi*in^0.5	Stress: Sn (ksi)	K(Sn) ksi*in^0.5	Stress: Sn (ksi)	K(Sn) ksi*in^0.5	Stress: Sn (ksi)	K(Sn) ksi*in^0.5
-43.1085	0.0000	-46.2313	0	-39.9856	0	-43.8810	0.0000	-46.9854	0	-40.7766	0	-41.3810	0
-42.0153	-8.0515	-45.0589	-8.63472	-38.9716	-7.46821	-42.7878	-8.2444	-45.8149	-8.82761	-39.7607	-7.6611	-40.2878	-7.62015
-40.9894	-11.2736	-43.9587	-12.0903	-38.0201	-10.457	-41.7619	-11.5437	-44.7164	-12.3604	-38.8074	-10.727	-39.2619	-10.6697
-40.0494	-13.6255	-42.9506	-14.6126	-37.1481	-12.6385	-40.8219	-13.9520	-43.7099	-14.939	-37.9339	-12.9649	-38.3219	-12.8956
-39.1729	-15.4695	-42.0106	-16.5901	-36.3352	-14.3489	-39.9454	-15.8401	-42.7714	-16.9607	-37.1195	-14.7195	-37.4454	-14.6408
-38.3755	-16.9469	-41.1554	-18.1746	-35.5955	-15.7193	-39.1480	-17.3529	-41.9176	-18.5806	-36.3784	-16.1253	-36.6480	-16.0391
-37.6451	-18.1265	-40.3721	-19.4396	-34.918	-16.8134	-38.4176	-18.5608	-41.1355	-19.8739	-35.6997	-17.2477	-35.9176	-17.1555
-36.9725	-19.3597	-39.6508	-20.7621	-34.2942	-17.9573	-37.7450	-19.8235	-40.4153	-21.2259	-35.0747	-18.4211	-35.2450	-18.3226
-36.3689	-20.5025	-39.0035	-21.9877	-33.7343	-19.0173	-37.1415	-20.9937	-39.7691	-22.4789	-34.5139	-19.5085	-34.6415	-19.4042
-35.8192	-21.4553	-38.414	-23.0095	-33.2244	-19.901	-36.5917	-21.9693	-39.1805	-23.5235	-34.003	-20.415	-34.0917	-20.3059
-35.3320	-22.2441	-37.8915	-23.8555	-32.7725	-20.6327	-36.1045	-22.7770	-38.6588	-24.3884	-33.5503	-21.1656	-33.6045	-21.0525
-34.8987	-22.8744	-37.4268	-24.5315	-32.3706	-21.2174	-35.6712	-23.4224	-38.1948	-25.0795	-33.1476	-21.7654	-33.1712	-21.649
-34.5130	-23.3484	-37.0132	-25.0397	-32.0129	-21.657	-35.2856	-23.9077	-37.7819	-25.5991	-32.7893	-22.2163	-32.7856	-22.0976
-34.1803	-23.8368	-36.6564	-25.5636	-31.7043	-22.11	-34.9529	-24.4079	-37.4257	-26.1346	-32.4801	-22.6811	-32.4529	-22.5599
-33.8910	-24.3266	-36.3461	-26.0888	-31.4359	-22.5643	-34.6635	-24.9093	-37.1158	-26.6716	-32.2112	-23.1471	-32.1635	-23.0234
-33.6483	-24.7128	-36.0858	-26.503	-31.2108	-22.9225	-34.4208	-25.3048	-36.856	-27.095	-31.9857	-23.5146	-31.9208	-23.3889
-33.4465	-24.9955	-35.8694	-26.8062	-31.0236	-23.1848	-34.2190	-25.5943	-36.6399	-27.405	-31.7982	-23.7836	-31.7190	-23.6565
-33.2814	-25.1725	-35.6924	-26.996	-30.8705	-23.349	-34.0540	-25.7756	-36.4632	-27.5991	-31.6448	-23.952	-31.5540	-23.824
-33.1539	-25.2813	-35.5556	-27.1127	-30.7522	-23.4499	-33.9264	-25.8869	-36.3266	-27.7183	-31.5263	-24.0555	-31.4264	-23.927
-33.0586	-25.3908	-35.4534	-27.2301	-30.6638	-23.5514	-33.8311	-25.9990	-36.2245	-27.8384	-31.4377	-24.1597	-31.3311	-24.0306
-32.9948	-25.6931	-35.385	-27.5544	-30.6046	-23.8319	-33.7673	-26.3087	-36.1562	-28.1699	-31.3784	-24.4474	-31.2673	-24.3168
-32.9588	-25.9174	-35.3464	-27.7948	-30.5712	-24.0399	-33.7313	-26.5383	-36.1177	-28.4158	-31.345	-24.6608	-31.2313	-24.529
-32.9480	-26.0574	-35.3348	-27.9451	-30.5612	-24.1698	-33.7205	-26.6817	-36.1061	-28.5693	-31.3349	-24.7941	-31.2205	-24.6615
-32.9600	-26.1501	-35.3477	-28.0444	-30.5723	-24.2557	-33.7325	-26.7766	-36.119	-28.6709	-31.3461	-24.8822	-31.2325	-24.7492
-32.9924	-26.1740	-35.3824	-28.0701	-30.6024	-24.278	-33.7649	-26.8011	-36.1536	-28.6972	-31.3762	-24.905	-31.2649	-24.7719
-33.0418	-26.1650	-35.4354	-28.0605	-30.6482	-24.2696	-33.8144	-26.7919	-36.2066	-28.6873	-31.4221	-24.8965	-31.3144	-24.7634
-33.1060	-26.7558	-35.5042	-28.6941	-30.7077	-24.8176	-33.8785	-27.3968	-36.2753	-29.335	-31.4817	-25.4586	-31.3785	-25.3225
-33.1831	-27.2575	-35.5869	-29.2321	-30.7793	-25.283	-33.9556	-27.9105	-36.3579	-29.8851	-31.5534	-25.936	-31.4556	-25.7974
-33.2690	-27.7062	-35.679	-29.7133	-30.8589	-25.6992	-34.0415	-28.3700	-36.4498	-30.3771	-31.6332	-26.3629	-31.5415	-26.222
-33.3627	-28.0789	-35.7795	-30.1129	-30.9458	-26.0448	-34.1352	-28.7516	-36.5502	-30.7856	-31.7203	-26.7175	-31.6352	-26.5747
-33.4597	-28.4111	-35.8836	-30.4692	-31.0358	-26.3529	-34.2322	-29.0917	-36.654	-31.1498	-31.8104	-27.0336	-31.7322	-26.8891
-33.5584	-28.6934	-35.9894	-30.772	-31.1274	-26.6148	-34.3309	-29.3808	-36.7597	-31.4594	-31.9021	-27.3022	-31.8309	-27.1563
-33.6571	-29.3523	-36.0952	-31.4786	-31.2189	-27.226	-34.4296	-30.0555	-36.8654	-32.1818	-31.9938	-27.9292	-31.9296	-27.7799
-33.7511	-30.0949	-36.1961	-32.275	-31.3062	-27.9148	-34.5237	-30.8159	-36.9661	-32.996	-32.0812	-28.6358	-32.0237	-28.4827
-33.8399	-30.7464	-36.2913	-32.9737	-31.3885	-28.5191	-34.6124	-31.4830	-37.0611	-33.7103	-32.1637	-29.2557	-32.1124	-29.0993
-33.9188	-31.3440	-36.3759	-33.6146	-31.4617	-29.0735	-34.6913	-32.0950	-37.1456	-34.3656	-32.2371	-29.8244	-32.1913	-29.665
-33.9863	-31.8781	-36.4483	-34.1874	-31.5243	-29.5688	-34.7588	-32.6418	-37.2179	-34.9511	-32.2998	-30.3325	-32.2588	-30.1704
-34.0402	-32.3387	-36.5061	-34.6814	-31.5743	-29.9961	-34.8128	-33.1135	-37.2757	-35.4561	-32.3499	-30.7708	-32.3128	-30.6064
-34.0769	-33.2721	-36.5454	-35.6823	-31.6083	-30.8618	-34.8494	-34.0692	-37.3149	-36.4794	-32.3839	-31.6589	-32.3494	-31.4897
-34.0943	-34.5954	-36.5641	-37.1015	-31.6244	-32.0893	-34.8668	-35.4242	-37.3335	-37.9303	-32.4001	-32.9181	-32.3668	-32.7421
-34.0895	-35.8190	-36.5589	-38.4138	-31.62	-33.2243	-34.8620	-36.6772	-37.3284	-39.2719	-32.3957	-34.0824	-32.3620	-33.9002
-34.0602	-36.9356	-36.5275	-39.6113	-31.5928	-34.26	-34.8327	-37.8205	-37.297	-40.4962	-32.3684	-35.1448	-32.3327	-34.957
-34.0030	-37.9359	-36.4662	-40.684	-31.5398	-35.1877	-34.7755	-38.8447	-37.2358	-41.5928	-32.3153	-36.0966	-32.2755	-35.9036
-33.9165	-38.8603	-36.3735	-41.6753	-31.4596	-36.0452	-34.6890	-39.7912	-37.1432	-42.6063	-32.2349	-36.9762	-32.1890	-36.7785
-33.7962	-40.3001	-36.2445	-43.2195	-31.348	-37.3807	-34.5688	-41.2656	-37.0144	-44.185	-32.1232	-38.3462	-32.0688	-38.1413
-33.6421	-43.4415	-36.0791	-46.5884	-31.205	-40.2945	-34.4146	-44.4822	-36.8493	-47.6291	-31.9799	-41.3352	-31.9146	-41.1143
-33.4503	-46.3683	-35.8734	-49.7272	-31.0271	-43.0093	-34.2228	-47.4791	-36.644	-50.8381	-31.8017	-44.1202	-31.7228	-43.8843
-33.2157	-49.0745	-35.6218	-52.6295	-30.8095	-45.5195	-33.9882	-50.2502	-36.3927	-53.8052	-31.5837	-46.6952	-31.4882	-46.4456
-32.9404	-51.6125	-35.3266	-55.3514	-30.5542	-47.8737	-33.7130	-52.8490	-36.098	-56.5879	-31.3279	-49.1102	-31.2130	-48.8477
-32.6161	-53.9532	-34.9789	-57.8617	-30.2534	-50.0448	-33.3887	-55.2458	-35.7508	-59.1542	-31.0266	-51.3374	-30.8887	-51.063
-32.2469	-56.1503	-34.5829	-60.2179	-29.9109	-52.0827	-33.0194	-57.4955	-35.3554	-61.5631	-30.6834	-53.4279	-30.5194	-53.1424

a) Peening,1-1,Sn (continued)

In Metric Unit

Unit Conv: 1.0000 in = 25.4000 mm 1.0000 ksi = 6.8948 MPa 1.0000 ksi-in^0.5= 1.0988 MPa-m^0.5

	Mean		Min - Insided Surface		Max-Inside Surface		Mean		Min - Insided Surface		Max-Inside Surface	
Depth	Stress: Sn	K(Sn)	Stress: Sn	K(Sn)	Stress: Sn	K(Sn)	Stress: Sn	K(Sn)	Stress: Sn	K(Sn)	Stress: Sn	K(Sn)
(mm)	MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5
0.0000	-285.3119	0.0000	-307.1501	0.0000	-263.4738	0.0000	-286.1556	0.0000	-307.9708	0.0000	-264.3403	0.0000
0.2438	-277.7747	-8.3733	-299.0359	-9.0143	-256.5134	-7.7324	-278.6183	-8.4069	-299.8590	-9.0478	-257.3777	-7.7660
0.4902	-270.7015	-11.7243	-291.4214	-12.6217	-249.9817	-10.8269	-271.5452	-11.7713	-292.2466	-12.6687	-250.8437	-10.8739
0.7341	-264.2202	-14.1703	-284.4439	-15.2549	-243.9964	-13.0857	-265.0638	-14.2271	-285.2711	-15.3117	-244.8565	-13.1425
0.9804	-258.1772	-16.0879	-277.9385	-17.3193	-238.4160	-14.8565	-259.0209	-16.1524	-278.7675	-17.3838	-239.2742	-14.9210
1.2243	-252.6792	-17.6244	-272.0196	-18.9734	-233.3388	-16.2754	-253.5228	-17.6951	-272.8503	-19.0441	-234.1953	-16.3461
1.4681	-247.6433	-18.8512	-266.5982	-20.2941	-228.6883	-17.4083	-248.4869	-18.9268	-267.4305	-20.3697	-229.5433	-17.4839
1.7145	-243.0059	-20.1337	-261.6059	-21.6747	-224.4059	-18.5926	-243.8495	-20.2144	-262.4396	-21.7554	-225.2595	-18.6733
1.9583	-238.8446	-21.3221	-257.1260	-22.9542	-220.5631	-19.6901	-239.6882	-21.4076	-257.9610	-23.0397	-221.4154	-19.7756
2.2047	-235.0543	-22.3130	-253.0456	-24.0209	-217.0629	-20.6051	-235.8979	-22.4025	-253.8817	-24.1103	-217.9140	-20.6946
2.4486	-231.6950	-23.1334	-249.4293	-24.9041	-213.9607	-21.3627	-232.5386	-23.2261	-250.2664	-24.9968	-214.8109	-21.4555
2.6924	-228.7077	-23.7889	-246.2133	-25.6097	-211.2021	-21.9681	-229.5513	-23.8843	-247.0513	-25.7051	-212.0513	-22.0634
2.9388	-226.0487	-24.2818	-243.3507	-26.1404	-208.7466	-22.4232	-226.8923	-24.3791	-244.1896	-26.2377	-209.5950	-22.5206
3.1826	-223.7547	-24.7898	-240.8812	-26.6872	-206.6282	-22.8923	-224.5983	-24.8891	-241.7207	-26.7866	-207.4759	-22.9917
3.4290	-221.7596	-25.2991	-238.7334	-27.2355	-204.7858	-23.3627	-222.6033	-25.4005	-239.5736	-27.3369	-205.6329	-23.4641
3.6728	-220.0865	-25.7007	-236.9322	-27.6679	-203.2407	-23.7336	-220.9301	-25.8038	-237.7729	-27.7709	-204.0873	-23.8366
3.9167	-218.6950	-25.9948	-235.4343	-27.9845	-201.9558	-24.0051	-219.5387	-26.0990	-236.2754	-28.0887	-202.8020	-24.1093
4.1631	-217.5570	-26.1789	-234.2091	-28.1826	-200.9049	-24.1751	-218.4006	-26.2838	-235.0506	-28.2876	-201.7507	-24.2801
4.4069	-216.6777	-26.2920	-233.2625	-28.3044	-200.0929	-24.2795	-217.5214	-26.3974	-234.1042	-28.4098	-200.9385	-24.3850
4.6533	-216.0205	-26.4058	-232.5550	-28.4270	-199.4860	-24.3847	-216.8641	-26.5117	-233.3969	-28.5328	-200.3313	-24.4906
4.8971	-215.5807	-26.7203	-232.0815	-28.7655	-199.0799	-24.6751	-216.4243	-26.8274	-232.9236	-28.8726	-199.9251	-24.7822
5.1410	-215.3325	-26.9535	-231.8144	-29.0166	-198.8507	-24.8904	-216.1762	-27.0616	-232.6565	-29.1246	-199.6958	-24.9985
5.3873	-215.2581	-27.0992	-231.7342	-29.1734	-198.7819	-25.0249	-216.1017	-27.2078	-232.5764	-29.2820	-199.6270	-25.1336
5.6312	-215.3408	-27.1955	-231.8232	-29.2771	-198.8583	-25.1139	-216.1844	-27.3045	-232.6654	-29.3861	-199.7034	-25.2230
5.8776	-215.5639	-27.2204	-232.0635	-29.3039	-199.0644	-25.1369	-216.4076	-27.3296	-232.9055	-29.4130	-199.9096	-25.2461
6.1214	-215.9049	-27.2111	-232.4305	-29.2938	-199.3792	-25.1283	-216.7485	-27.3202	-233.2725	-29.4029	-200.2245	-25.2374
6.3652	-216.3472	-27.8255	-232.9068	-29.9553	-199.7877	-25.6957	-217.1909	-27.9370	-233.7486	-30.0668	-200.6332	-25.8072
6.6116	-216.8790	-28.3472	-233.4792	-30.5170	-200.2787	-26.1775	-217.7226	-28.4609	-234.3208	-30.6306	-201.1244	-26.2912
6.8555	-217.4709	-28.8139	-234.1165	-31.0193	-200.8254	-26.6084	-218.3146	-28.9294	-234.9579	-31.1349	-201.6712	-26.7240
7.1018	-218.1171	-29.2014	-234.8121	-31.4365	-201.4221	-26.9663	-218.9608	-29.3185	-235.6534	-31.5536	-202.2681	-27.0834
7.3457	-218.7861	-29.5469	-235.5323	-31.8084	-202.0399	-27.2853	-219.6297	-29.6653	-236.3734	-31.9269	-202.8861	-27.4038
7.5895	-219.4663	-29.8405	-236.2646	-32.1245	-202.6681	-27.5565	-220.3100	-29.9601	-237.1055	-32.2442	-203.5145	-27.6761
7.8359	-220.1468	-30.5258	-236.9972	-32.8622	-203.2965	-28.1893	-220.9904	-30.6481	-237.8378	-32.9846	-204.1431	-28.3117
8.0797	-220.7954	-31.2980	-237.6954	-33.6936	-203.8954	-28.9024	-221.6390	-31.4235	-238.5358	-33.8191	-204.7422	-29.0279
8.3261	-221.4072	-31.9756	-238.3540	-34.4231	-204.4604	-29.5282	-222.2508	-32.1038	-239.1943	-34.5513	-205.3074	-29.6563
8.5700	-221.9515	-32.5971	-238.9400	-35.0922	-204.9630	-30.1021	-222.7951	-32.7278	-239.7801	-35.2228	-205.8102	-30.2328
8.8138	-222.4169	-33.1526	-239.4410	-35.6901	-205.3928	-30.6150	-223.2606	-33.2855	-240.2810	-35.8230	-206.2401	-30.7479
9.0602	-222.7888	-33.6316	-239.8413	-36.2058	-205.7362	-31.0574	-223.6324	-33.7664	-240.6812	-36.3406	-206.5836	-31.1922
9.3040	-223.0412	-34.6022	-240.1131	-37.2507	-205.9694	-31.9537	-223.8849	-34.7410	-240.9529	-37.3895	-206.8169	-32.0925
9.5504	-223.1613	-35.9785	-240.2423	-38.7323	-206.0802	-33.2246	-224.0049	-36.1227	-241.0821	-38.8766	-206.9277	-33.3689
9.7942	-223.1282	-37.2510	-240.2068	-40.1023	-206.0497	-34.3998	-223.9719	-37.4004	-241.0465	-40.2516	-206.8972	-34.5491
10.0381	-222.9261	-38.4123	-239.9892	-41.3524	-205.8631	-35.4721	-223.7698	-38.5663	-240.8290	-41.5064	-206.7105	-35.6261
10.2845	-222.5319	-39.4525	-239.5648	-42.4722	-205.4990	-36.4327	-223.3756	-39.6106	-240.4048	-42.6304	-206.3464	-36.5909
10.5283	-221.9356	-40.4138	-238.9229	-43.5072	-204.9484	-37.3205	-222.7793	-40.5759	-239.7630	-43.6692	-205.7955	-37.4825
10.7747	-221.1065	-41.9113	-238.0303	-45.1192	-204.1827	-38.7033	-221.9501	-42.0793	-238.8706	-45.2872	-205.0296	-38.8713
11.0185	-220.0434	-45.1782	-236.8858	-48.6362	-203.2010	-41.7202	-220.8870	-45.3593	-237.7265	-48.8173	-204.0475	-41.9013
11.2624	-218.7211	-48.2220	-235.4623	-51.9130	-201.9799	-44.5310	-219.5647	-48.4153	-236.3034	-52.1063	-202.8261	-44.7243
11.5087	-217.1035	-51.0364	-233.7209	-54.9428	-200.4861	-47.1300	-217.9471	-51.2410	-234.5625	-55.1474	-201.3318	-47.3346
11.7526	-215.2057	-53.6759	-231.6779	-57.7843	-198.7336	-49.5675	-216.0494	-53.8911	-232.5200	-57.9995	-199.5787	-49.7827
11.9990	-212.9700	-56.1102	-229.2710	-60.4050	-196.6689	-51.8155	-213.8136	-56.3352	-230.1138	-60.6299	-197.5134	-52.0404
12.2428	-210.4242	-58.3951	-226.5303	-62.8647	-194.3180	-53.9255	-211.2678	-58.6292	-227.3739	-63.0989	-195.1616	-54.1596

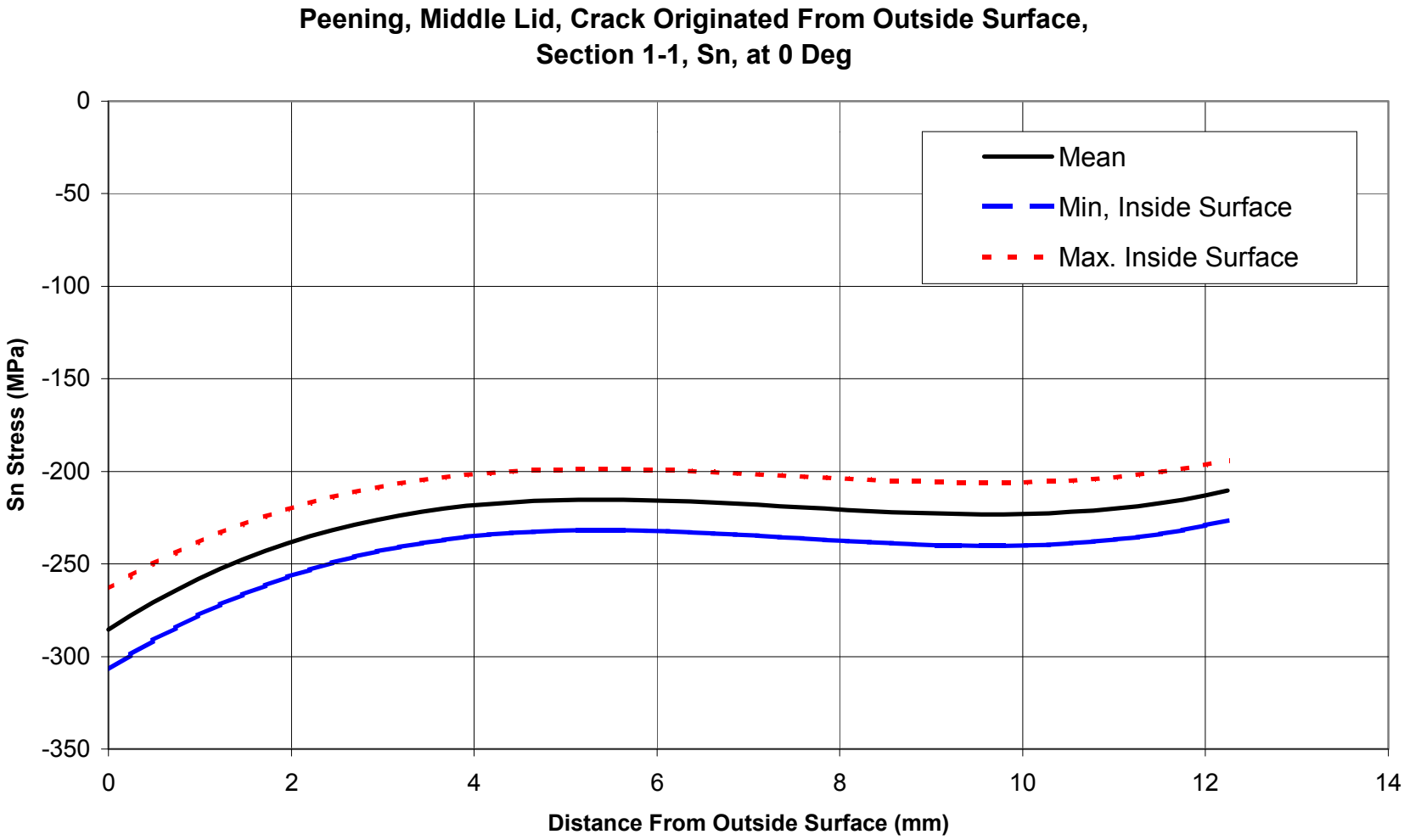
a) Peening,1-1,Sn (continued)

Mean		Min - Insided Surface		Max-Inside Surface		Mean		Min - Insided Surface		Max-Inside Surface	
Stress: Sn	K(Sn)	Stress: Sn	K(Sn)	Stress: Sn	K(Sn)	Stress: Sn	K(Sn)	Stress: Sn	K(Sn)	Stress: Sn	K(Sn)
MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5
-288.6039	0.0000	-310.3538	0.0000	-266.8540	0.0000	-292.4172	0.0000	-314.0682	0.0000	-270.7663	0.0000
-281.0666	-8.5043	-302.2485	-9.1453	-259.8848	-7.8634	-284.8800	-8.6561	-305.9729	-9.2970	-263.7871	-8.0152
-273.9935	-11.9077	-294.6423	-12.8051	-253.3447	-11.0104	-277.8068	-12.1202	-298.3760	-13.0176	-257.2377	-11.2228
-267.5121	-14.3919	-287.6725	-15.4766	-247.3518	-13.3073	-271.3255	-14.6487	-291.4148	-15.7334	-251.2362	-13.5641
-261.4692	-16.3396	-281.1741	-17.5710	-241.7643	-15.1082	-265.2825	-16.6312	-284.9244	-17.8626	-245.6407	-15.3998
-255.9712	-17.9001	-275.2618	-19.2491	-236.6806	-16.5511	-259.7845	-18.2195	-279.0193	-19.5685	-240.5497	-16.8705
-250.9352	-19.1461	-269.8463	-20.5890	-232.0241	-17.7032	-254.7486	-19.4877	-273.6105	-20.9306	-235.8867	-18.0448
-246.2978	-20.4486	-264.8594	-21.9897	-227.7362	-18.9076	-250.1112	-20.8135	-268.6297	-22.3546	-231.5926	-19.2724
-242.1365	-21.6557	-260.3845	-23.2877	-223.8885	-20.0237	-245.9499	-22.0421	-264.1603	-23.6741	-227.7394	-20.4101
-238.3462	-22.6621	-256.3085	-24.3700	-220.3839	-20.9542	-242.1596	-23.0664	-260.0894	-24.7743	-224.2298	-21.3586
-234.9870	-23.4953	-252.6961	-25.2660	-217.2778	-21.7246	-238.8003	-23.9145	-256.4814	-25.6852	-221.1192	-22.1439
-231.9996	-24.1610	-249.4837	-25.9819	-214.5156	-22.3402	-235.8130	-24.5922	-253.2729	-26.4130	-218.3531	-22.7713
-229.3406	-24.6617	-246.6243	-26.5202	-212.0570	-22.8031	-233.1540	-25.1017	-250.4170	-26.9603	-215.8910	-23.2431
-227.0467	-25.1776	-244.1574	-27.0750	-209.9359	-23.2801	-230.8600	-25.6268	-247.9532	-27.5243	-213.7668	-23.7294
-225.0516	-25.6949	-242.0120	-27.6313	-208.0912	-23.7584	-228.8649	-26.1533	-245.8104	-28.0898	-211.9195	-24.2169
-223.3784	-26.1028	-240.2127	-28.0700	-206.5441	-24.1356	-227.1918	-26.5686	-244.0133	-28.5357	-210.3702	-24.6014
-221.9870	-26.4015	-238.7165	-28.3912	-205.2575	-24.4118	-225.8003	-26.8726	-242.5189	-28.8622	-209.0818	-24.8829
-220.8490	-26.5884	-237.4927	-28.5922	-204.2053	-24.5847	-224.6623	-27.0628	-241.2966	-29.0666	-208.0280	-25.0591
-219.9697	-26.7033	-236.5471	-28.7157	-203.3922	-24.6909	-223.7830	-27.1798	-240.3522	-29.1922	-207.2138	-25.1673
-219.3124	-26.8189	-235.8403	-28.8401	-202.7845	-24.7978	-223.1258	-27.2975	-239.6463	-29.3186	-206.6053	-25.2763
-218.8727	-27.1383	-235.3674	-29.1835	-202.3779	-25.0931	-222.6860	-27.6226	-239.1740	-29.6678	-206.1981	-25.5773
-218.6245	-27.3752	-235.1005	-29.4382	-202.1484	-25.3121	-222.4378	-27.8636	-238.9074	-29.9267	-205.9683	-25.8006
-218.5500	-27.5231	-235.0205	-29.5973	-202.0796	-25.4489	-222.3634	-28.0142	-238.8274	-30.0884	-205.8993	-25.9400
-218.6327	-27.6210	-235.1094	-29.7025	-202.1560	-25.5394	-222.4461	-28.1138	-238.9162	-30.1954	-205.9759	-26.0322
-218.8559	-27.6463	-235.3494	-29.7298	-202.3624	-25.5628	-222.6692	-28.1396	-239.1559	-30.2231	-206.1825	-26.0561
-219.1968	-27.6368	-235.7160	-29.7195	-202.6776	-25.5540	-223.0102	-28.1299	-239.5221	-30.2127	-206.4982	-26.0471
-219.6392	-28.2608	-236.1917	-30.3906	-203.0867	-26.1310	-223.4526	-28.7651	-239.9973	-30.8949	-206.9078	-26.6353
-220.1709	-28.7907	-236.7635	-30.9605	-203.5783	-26.6210	-223.9843	-29.3044	-240.5683	-31.4742	-207.4002	-27.1347
-220.7629	-29.2647	-237.4001	-31.4701	-204.1257	-27.0592	-224.5762	-29.7868	-241.2041	-31.9923	-207.9483	-27.5814
-221.4091	-29.6583	-238.0950	-31.8934	-204.7232	-27.4231	-225.2224	-30.1875	-241.8982	-32.4226	-208.5467	-27.9523
-222.0780	-30.0091	-238.8144	-32.2707	-205.3417	-27.7476	-225.8914	-30.5446	-242.6167	-32.8061	-209.1661	-28.2830
-222.7583	-30.3073	-239.5459	-32.5914	-205.9707	-28.0233	-226.5716	-30.8481	-243.3473	-33.1322	-209.7960	-28.5641
-223.4388	-31.0033	-240.2776	-33.3398	-206.5999	-28.6668	-227.2521	-31.5565	-244.0781	-33.8930	-210.4261	-29.2200
-224.0873	-31.7877	-240.9751	-34.1832	-207.1996	-29.3921	-227.9007	-32.3548	-244.7747	-34.7504	-211.0266	-29.9593
-224.6991	-32.4758	-241.6330	-34.9233	-207.7653	-30.0284	-228.5125	-33.0553	-245.4318	-35.5028	-211.5931	-30.6079
-225.2435	-33.1071	-242.2183	-35.6021	-208.2686	-30.6121	-229.0568	-33.6978	-246.0164	-36.1929	-212.0971	-31.2028
-225.7089	-33.6712	-242.7188	-36.2087	-208.6989	-31.1337	-229.5222	-34.2720	-246.5163	-36.8095	-212.5281	-31.7345
-226.0807	-34.1577	-243.1187	-36.7319	-209.0427	-31.5835	-229.8941	-34.7672	-246.9157	-37.3414	-212.8724	-32.1930
-226.3332	-35.1436	-243.3902	-37.7921	-209.2762	-32.4951	-230.1465	-35.7706	-247.1869	-38.4191	-213.1062	-33.1221
-226.4532	-36.5413	-243.5193	-39.2952	-209.3872	-33.7875	-230.2666	-37.1933	-247.3158	-39.9472	-213.2173	-34.4395
-226.4202	-37.8338	-243.4837	-40.6850	-209.3566	-34.9826	-230.2335	-38.5089	-247.2803	-41.3601	-213.1867	-35.6576
-226.2181	-39.0132	-243.2664	-41.9533	-209.1698	-36.0731	-230.0314	-39.7093	-247.0633	-42.6494	-212.9996	-36.7692
-225.8239	-40.0697	-242.8425	-43.0894	-208.8053	-37.0499	-229.6372	-40.7846	-246.6399	-43.8044	-212.6346	-37.7649
-225.2276	-41.0461	-242.2013	-44.1394	-208.2539	-37.9527	-229.0409	-41.7785	-245.9994	-44.8718	-212.0825	-38.6851
-224.3984	-42.5669	-241.3096	-45.7749	-207.4872	-39.3590	-228.2118	-43.3265	-245.1089	-46.5344	-211.3147	-40.1185
-223.3354	-45.8849	-240.1664	-49.3429	-206.5043	-42.4270	-227.1487	-46.7037	-243.9671	-50.1617	-210.3303	-43.2457
-222.0131	-48.9764	-238.7445	-52.6674	-205.2816	-45.2854	-225.8264	-49.8503	-242.5469	-53.5413	-209.1059	-46.1593
-220.3954	-51.8348	-237.0049	-55.7412	-203.7859	-47.9284	-224.2088	-52.7597	-240.8095	-56.6661	-207.6081	-48.8533
-218.4977	-54.5156	-234.9642	-58.6241	-202.0312	-50.4072	-222.3110	-55.4884	-238.7712	-59.5968	-205.8508	-51.3799
-216.2619	-56.9880	-232.5599	-61.2828	-199.9639	-52.6933	-220.0753	-58.0049	-236.3699	-62.2996	-203.7806	-53.7101
-213.7161	-59.3087	-229.8223	-63.7783	-197.6100	-54.8390	-217.5295	-60.3669	-233.6356	-64.8366	-201.4233	-55.8973

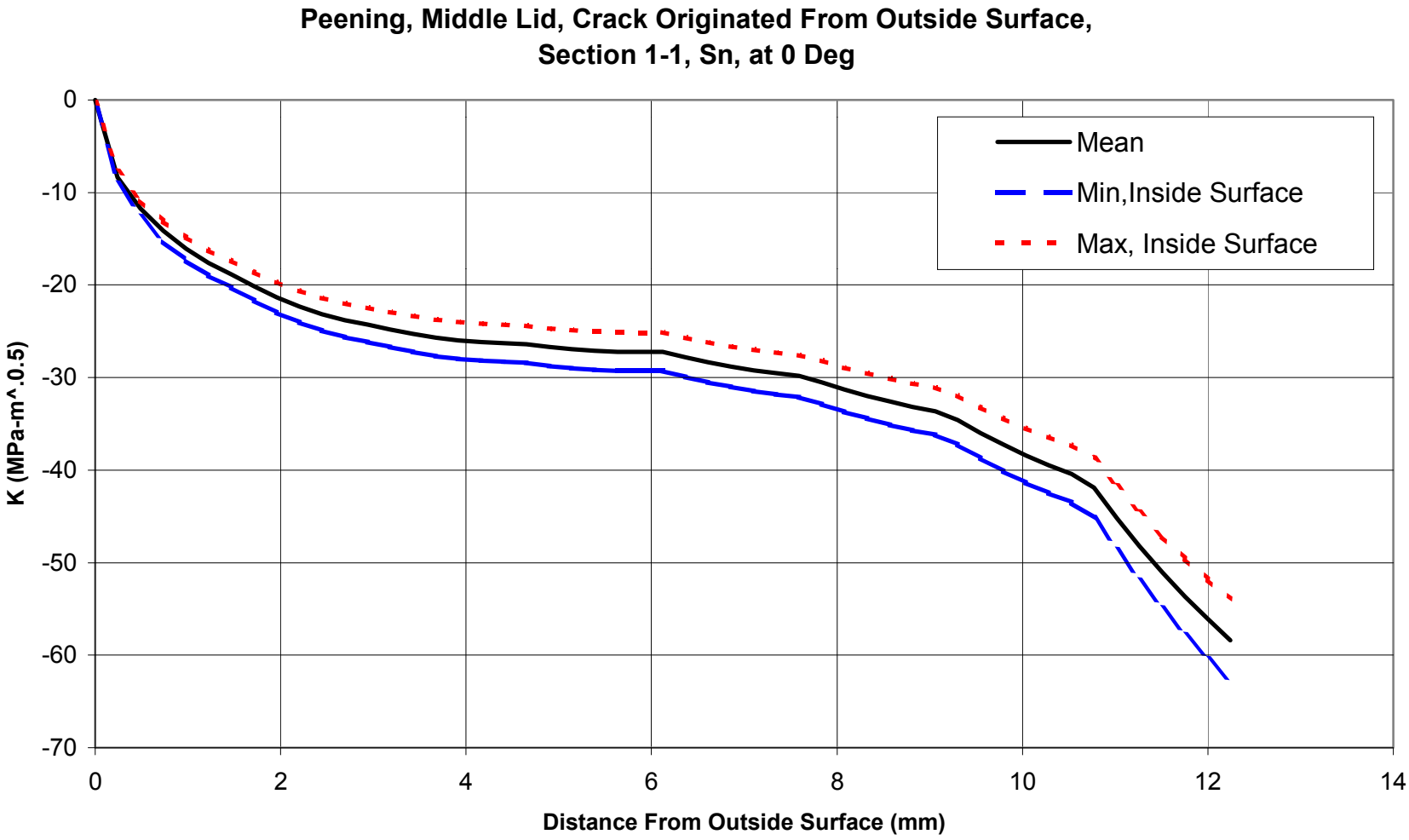
a) Peening,1-1,Sn (continued)

Mean		Min - Insided Surface		Max-Inside Surface		Mean		Min - Insided Surface		Max-Inside Surface	
Stress: Sn	K(Sn)	Stress: Sn	K(Sn)	Stress: Sn	K(Sn)	Stress: Sn	K(Sn)	Stress: Sn	K(Sn)	Stress: Sn	K(Sn)
MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5
-297.2223	0.0000	-318.7534	0.0000	-275.6912	0.0000	-302.5488	0.0000	-323.9530	0.0000	-281.1447	0.0000
-289.6851	-8.8473	-310.6702	-9.4882	-268.7000	-8.2064	-295.0116	-9.0593	-315.8825	-9.7002	-274.1406	-8.4183
-282.6119	-12.3879	-303.0846	-13.2853	-262.1392	-11.4905	-287.9384	-12.6847	-308.3090	-13.5821	-267.5679	-11.7873
-276.1306	-14.9723	-296.1338	-16.0569	-256.1274	-13.8877	-281.4571	-15.3310	-301.3691	-16.4156	-261.5450	-14.2464
-270.0876	-16.9985	-289.6531	-18.2299	-250.5222	-15.7672	-275.4141	-17.4058	-294.8986	-18.6372	-255.9296	-16.1744
-264.5896	-18.6220	-283.7568	-19.9710	-245.4225	-17.2730	-269.9161	-19.0681	-289.0116	-20.4171	-250.8206	-17.7191
-259.5537	-19.9182	-278.3560	-21.3611	-240.7513	-18.4753	-264.8801	-20.3954	-283.6194	-21.8383	-246.1409	-18.9525
-254.9163	-21.2733	-273.3827	-22.8143	-236.4499	-19.7322	-260.2428	-21.7829	-278.6540	-23.3240	-241.8316	-20.2419
-250.7550	-22.5290	-268.9199	-24.1610	-232.5900	-20.8970	-256.0815	-23.0688	-274.1982	-24.7008	-237.9647	-21.4367
-246.9647	-23.5760	-264.8550	-25.2838	-229.0743	-21.8681	-252.2911	-24.1408	-270.1398	-25.8486	-234.4425	-22.4329
-243.6054	-24.4428	-261.2524	-26.2135	-225.9584	-22.6721	-248.9319	-25.0284	-266.5429	-26.7990	-231.3209	-23.2577
-240.6181	-25.1354	-258.0487	-26.9562	-223.1874	-23.3145	-245.9446	-25.7376	-263.3442	-27.5584	-228.5449	-23.9167
-237.9591	-25.6562	-255.1971	-27.5147	-220.7211	-23.7976	-243.2856	-26.2708	-260.4971	-28.1294	-226.0740	-24.4123
-235.6651	-26.1929	-252.7369	-28.0903	-218.5933	-24.2955	-240.9916	-26.8204	-258.0408	-28.7179	-223.9424	-24.9230
-233.6700	-26.7311	-250.5973	-28.6675	-216.7427	-24.7946	-238.9965	-27.3715	-255.9046	-29.3079	-222.0884	-25.4350
-231.9969	-27.1554	-248.8030	-29.1226	-215.1908	-25.1883	-237.3233	-27.8060	-254.1131	-29.7732	-220.5336	-25.8388
-230.6054	-27.4662	-247.3107	-29.4558	-213.9001	-25.4765	-235.9319	-28.1242	-252.6232	-30.1138	-219.2407	-26.1345
-229.4674	-27.6606	-246.0903	-29.6644	-212.8446	-25.6569	-234.7939	-28.3233	-251.4047	-30.3271	-218.1831	-26.3195
-228.5881	-27.7801	-245.1473	-29.7926	-212.0290	-25.7677	-233.9146	-28.4457	-250.4632	-30.4581	-217.3660	-26.4333
-227.9309	-27.9005	-244.4424	-29.9216	-211.4193	-25.8793	-233.2574	-28.5689	-249.7594	-30.5900	-216.7553	-26.5477
-227.4911	-28.2327	-243.9708	-30.2779	-211.0114	-26.1875	-232.8176	-28.9091	-249.2886	-30.9543	-216.3466	-26.8639
-227.2429	-28.4791	-243.7046	-30.5422	-210.7812	-26.4161	-232.5694	-29.1614	-249.0228	-31.2245	-216.1160	-27.0983
-227.1685	-28.6330	-243.6248	-30.7072	-210.7121	-26.5588	-232.4950	-29.3190	-248.9431	-31.3932	-216.0468	-27.2448
-227.2512	-28.7348	-243.7135	-30.8164	-210.7888	-26.6532	-232.5776	-29.4232	-249.0316	-31.5048	-216.1237	-27.3416
-227.4743	-28.7612	-243.9528	-30.8446	-210.9958	-26.6777	-232.8008	-29.4502	-249.2706	-31.5337	-216.3310	-27.3667
-227.8153	-28.7513	-244.3184	-30.8340	-211.3121	-26.6685	-233.1418	-29.4401	-249.6357	-31.5228	-216.6479	-27.3573
-228.2576	-29.4005	-244.7929	-31.5303	-211.7224	-27.2707	-233.5841	-30.1048	-250.1093	-32.2346	-217.0590	-27.9750
-228.7894	-29.9517	-245.3631	-32.1215	-212.2156	-27.7820	-234.1159	-30.6693	-250.6787	-32.8390	-217.5530	-28.4996
-229.3813	-30.4448	-245.9980	-32.6503	-212.7647	-28.2394	-234.7078	-31.1742	-251.3125	-33.3796	-218.1031	-28.9687
-230.0275	-30.8543	-246.6910	-33.0894	-213.3641	-28.6192	-235.3540	-31.5935	-252.0044	-33.8286	-218.7036	-29.3583
-230.6965	-31.2193	-247.4084	-33.4808	-213.9846	-28.9577	-236.0230	-31.9672	-252.7207	-34.2288	-219.3253	-29.7057
-231.3767	-31.5295	-248.1379	-33.8136	-214.6156	-29.2455	-236.7032	-32.2849	-253.4491	-34.5689	-219.9574	-30.0009
-232.0572	-32.2536	-248.8677	-34.5900	-215.2467	-29.9171	-237.3837	-33.0263	-254.1777	-35.3627	-220.5897	-30.6898
-232.7058	-33.0695	-249.5632	-35.4651	-215.8483	-30.6740	-238.0323	-33.8618	-254.8722	-36.2574	-221.1924	-31.4662
-233.3176	-33.7855	-250.2194	-36.2329	-216.4158	-31.3380	-238.6441	-34.5949	-255.5272	-37.0423	-221.7609	-32.1474
-233.8619	-34.4422	-250.8031	-36.9372	-216.9207	-31.9472	-239.1884	-35.2673	-256.1101	-37.7624	-222.2667	-32.7723
-234.3273	-35.0290	-251.3022	-37.5666	-217.3524	-32.4915	-239.6538	-35.8682	-256.6084	-38.4058	-222.6992	-33.3307
-234.6992	-35.5352	-251.7010	-38.1094	-217.6973	-32.9610	-240.0257	-36.3865	-257.0066	-38.9607	-223.0448	-33.8123
-234.9516	-36.5608	-251.9718	-39.2093	-217.9315	-33.9123	-240.2781	-37.4367	-257.2769	-40.0852	-223.2794	-34.7882
-235.0717	-38.0149	-252.1005	-40.7688	-218.0428	-35.2611	-240.3982	-38.9256	-257.4054	-41.6795	-223.3909	-36.1718
-235.0386	-39.3595	-252.0651	-42.2107	-218.0122	-36.5083	-240.3651	-40.3024	-257.3700	-43.1537	-223.3602	-37.4512
-234.8365	-40.5865	-251.8483	-43.5266	-217.8247	-37.6463	-240.1630	-41.5588	-257.1536	-44.4989	-223.1724	-38.6187
-234.4423	-41.6856	-251.4256	-44.7053	-217.4591	-38.6658	-239.7688	-42.6842	-256.7316	-45.7040	-222.8061	-39.6645
-233.8460	-42.7013	-250.7861	-45.7947	-216.9060	-39.6080	-239.1725	-43.7243	-256.0931	-46.8177	-222.2520	-40.6310
-233.0169	-44.2835	-249.8969	-47.4915	-216.1369	-41.0756	-238.3434	-45.3444	-255.2053	-48.5524	-221.4815	-42.1365
-231.9538	-47.7353	-248.7568	-51.1933	-215.1508	-44.2773	-237.2803	-48.8789	-254.0670	-52.3369	-220.4936	-45.4209
-230.6315	-50.9514	-247.3387	-54.6424	-213.9243	-47.2605	-235.9580	-52.1721	-252.6511	-55.8631	-219.2649	-48.4811
-229.0139	-53.9251	-245.6039	-57.8315	-212.4239	-50.0187	-234.3404	-55.2170	-250.9191	-59.1234	-217.7617	-51.3106
-227.1161	-56.7141	-243.5687	-60.8225	-210.6636	-52.6056	-232.4426	-58.0728	-248.8870	-62.1812	-215.9982	-53.9643
-224.8804	-59.2861	-241.1709	-63.5809	-208.5898	-54.9914	-230.2068	-60.7065	-246.4931	-65.0012	-213.9206	-56.4117
-222.3346	-61.7004	-238.4407	-66.1700	-206.2284	-57.2307	-227.6610	-63.1785	-243.7672	-67.6482	-211.5549	-58.7089

b) Peening,1-1,SnPlt



c) Peening,1-1,KSnPlt



d) Peening,2-2,Sz

Results in Metric Unit start in Cell A80

Angle(deg):	0						18					
0	0						0.3141593					
	Scale Facto	1	1.1408727		0.8591273			0.9926752	1.1398408		0.8601592	
	Mean		Min - Insided Surface		Max-Inside Surface		Mean		Min - Insided Surface		Max-Inside Surface	
Depth	Stress: Sz	K(Sz)	Stress: Sz	K(Sz)	Stress: Sz	K(Sz)	Stress: Sz	K(Sz)	Stress: Sz	K(Sz)	Stress: Sz	K(Sz)
(in)	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5
0	-63.4860	0.0000	-72.4294	0	-54.5426	0	-63.6084	0.0000	-72.5034	0	-54.7133	0
0.0129	-55.3171	-6.5540	-63.1098	-7.47727	-47.5244	-5.63071	-55.4395	-6.5060	-63.1922	-7.41579	-47.6868	-5.59618
0.0259	-47.5652	-9.1471	-54.2658	-10.4356	-40.8645	-7.85848	-47.6875	-9.0800	-54.3562	-10.3498	-41.0189	-7.81029
0.0388	-40.3382	-11.0540	-46.0207	-12.6112	-34.6556	-9.49679	-40.4605	-10.9730	-46.1185	-12.5075	-34.8025	-9.43855
0.0517	-33.5634	-12.5925	-38.2915	-14.3664	-28.8352	-10.8186	-33.6857	-12.5003	-38.3963	-14.2483	-28.9751	-10.7522
0.0646	-27.2295	-13.8878	-31.0654	-15.8442	-23.3936	-11.9314	-27.3519	-13.7861	-31.1768	-15.7139	-23.527	-11.8582
0.0776	-21.2813	-15.0050	-24.2793	-17.1188	-18.2834	-12.8912	-21.4037	-14.8951	-24.3968	-16.978	-18.4106	-12.8121
0.0905	-15.7989	-16.0248	-18.0246	-18.2823	-13.5733	-13.7673	-15.9213	-15.9074	-18.1477	-18.1319	-13.6949	-13.6829
0.1034	-10.7237	-16.9489	-12.2344	-19.3365	-9.21305	-14.5613	-10.8461	-16.8248	-12.3628	-19.1775	-9.32937	-14.472
0.1163	-6.0445	-17.6055	-6.89597	-20.0856	-5.19297	-15.1254	-6.1668	-17.4765	-7.0292	-19.9205	-5.30445	-15.0326
0.1293	-1.7181	-16.6298	-1.96012	-18.9725	-1.47605	-14.2871	-1.8404	-16.5080	-2.09781	-18.8165	-1.58307	-14.1995
0.1422	2.2002	-15.5243	2.510108	-17.7112	1.890222	-13.3374	2.0778	-15.4106	2.368368	-17.5656	1.787244	-13.2556
0.1551	5.7563	-14.3200	6.567178	-16.3373	4.945374	-12.3027	5.6339	-14.2151	6.421769	-16.203	4.846066	-12.2273
0.1681	8.9850	-13.1110	10.25073	-14.958	7.719252	-11.264	8.8626	-13.0150	10.10199	-14.835	7.623276	-11.1949
0.181	11.8480	-11.9171	13.517	-13.5959	10.1789	-10.2383	11.7256	-11.8298	13.36531	-13.4841	10.08588	-10.1755
0.1939	14.3826	-10.6877	16.40868	-12.1933	12.35646	-9.1821	14.2602	-10.6094	16.25437	-12.093	12.26605	-9.12579
0.2068	16.6001	-9.4384	18.93859	-10.768	14.26159	-8.10877	16.4777	-9.3692	18.78199	-10.6794	14.17347	-8.05904
0.2198	18.5254	-8.1832	21.13513	-9.336	15.91568	-7.03042	18.4030	-8.1233	20.97654	-9.25923	15.82955	-6.98731
0.2327	20.1402	-6.9345	22.9774	-7.91142	17.303	-5.95764	20.0178	-6.8837	22.81715	-7.84636	17.21853	-5.92111
0.2456	21.4717	-5.7183	24.49647	-6.52383	18.44692	-4.91273	21.3493	-5.6764	24.33485	-6.47019	18.36383	-4.8826
0.2585	22.5311	-4.5699	25.70515	-5.21362	19.35711	-3.92608	22.4088	-4.5364	25.54243	-5.17075	19.27511	-3.90201
0.2715	23.3349	-3.4507	26.6222	-3.9368	20.04769	-2.96458	23.2126	-3.4254	26.45865	-3.90443	19.96652	-2.9464
0.2844	23.8821	-2.3685	27.24641	-2.70219	20.51775	-2.03487	23.7597	-2.3512	27.0823	-2.67997	20.43714	-2.02239
0.2973	24.1910	-1.3304	27.5988	-1.51777	20.78311	-1.14295	24.0686	-1.3206	27.43437	-1.50529	20.70283	-1.13594
0.3102	24.2728	-0.3424	27.69219	-0.39065	20.85344	-0.29418	24.1505	-0.3399	27.52767	-0.38744	20.77323	-0.29238
0.3232	24.1370	0.5896	27.53728	0.67269	20.73678	0.506566	24.0147	0.5853	27.3729	0.667159	20.65644	0.503459
0.3361	23.7970	1.4586	27.14936	1.664043	20.44466	1.253097	23.6747	1.4479	26.98533	1.65036	20.36397	1.245413
0.349	23.2638	2.2659	26.541	2.585126	19.98654	1.946714	23.1414	2.2493	26.37752	2.56387	19.9053	1.934776
0.362	22.5423	3.0074	25.71792	3.431106	19.36672	2.583774	22.4200	2.9854	25.55519	3.402893	19.28474	2.567929
0.3749	21.6551	3.6794	24.70568	4.19767	18.60446	3.16103	21.5327	3.6524	24.54386	4.163154	18.52156	3.141645
0.3878	20.6084	4.2784	23.51156	4.881075	17.70524	3.675665	20.4860	4.2470	23.35083	4.84094	17.62126	3.653123
0.4007	19.4135	4.8016	22.14839	5.478037	16.67871	4.125203	19.2912	4.7664	21.98888	5.432993	16.59349	4.099905
0.4137	18.0709	5.2867	20.61662	6.031452	15.52522	4.541948	17.9486	5.2480	20.4585	5.981857	15.43862	4.514095
0.4266	16.6125	5.7037	18.95273	6.507184	14.27224	4.900196	16.4901	5.6619	18.79612	6.453678	14.18414	4.870145
0.4395	15.0397	6.0373	17.15835	6.887733	12.92099	5.186767	14.9173	5.9930	17.00336	6.831098	12.83126	5.154958
0.4524	13.3637	6.2859	15.24629	7.171434	11.48113	5.400406	13.2414	6.2399	15.09303	7.112466	11.38967	5.367288
0.4654	11.5818	6.4487	13.21337	7.35718	9.95025	5.54028	11.4595	6.4015	13.06195	7.296684	9.856953	5.506304
0.4783	9.7327	6.5251	11.10377	7.444263	8.361625	5.605857	9.6103	6.4773	10.95425	7.383051	8.26642	5.571479
0.4912	7.8142	6.5267	8.91505	7.446111	6.713425	5.607249	7.6919	6.4789	8.767517	7.384884	6.61624	5.572863
0.5042	5.8222	6.4451	6.642337	7.353038	5.001972	5.537162	5.6998	6.3979	6.49686	7.292577	4.902732	5.503205
0.5171	3.7984	6.2659	4.333496	7.148548	3.263313	5.383172	3.6760	6.2200	4.190107	7.089769	3.161985	5.350159
0.53	1.7391	5.9897	1.984106	6.833439	1.494119	5.145881	1.6168	5.9458	1.842842	6.777251	1.390666	5.114323
0.5429	-0.3445	5.6177	-0.39301	6.409126	-0.29596	4.826354	-0.4668	5.5766	-0.53213	6.356426	-0.40156	4.796756
0.5559	-2.4574	5.1518	-2.8036	5.877582	-2.11124	4.426078	-2.5798	5.1141	-2.94054	5.829253	-2.21902	4.398935
0.5688	-4.5559	4.7451	-5.19768	5.413521	-3.91408	4.076619	-4.6782	4.7103	-5.33245	5.369007	-4.02403	4.051619
0.5817	-6.6448	4.7191	-7.58092	5.383858	-5.70877	4.054282	-6.7672	4.6845	-7.71354	5.339588	-5.82087	4.029419
0.5946	-8.7131	4.6345	-9.94051	5.287409	-7.48564	3.981651	-8.8354	4.6006	-10.071	5.243932	-7.59988	3.957234
0.6076	-10.7650	4.4962	-12.2815	5.129614	-9.24847	3.862826	-10.8873	4.4633	-12.4098	5.087436	-9.36483	3.839137
0.6205	-12.7576	4.3093	-14.5548	4.916374	-10.9604	3.702246	-12.8800	4.2777	-14.6811	4.875948	-11.0788	3.679542
0.6334	-14.6958	4.0795	-16.766	4.654201	-12.6255	3.504819	-14.8181	4.0496	-16.8903	4.615932	-12.7459	3.483325
0.6464	-16.5824	3.8131	-18.9184	4.350216	-14.2464	3.275904	-16.7047	3.7851	-19.0407	4.314446	-14.3687	3.255814

d) Peening,2-2,Sz (continued)

36						54					
0.6283185						0.9424778					
	0.9720127	1.13693		0.86307			0.9414896	1.1326301		0.8673699	
Mean		Min - Insided Surface		Max-Inside Surface		Mean		Min - Insided Surface		Max-Inside Surface	
Stress: Sz (ksi)	K(Sz) ksi*in^0.5	Stress: Sz (ksi)	K(Sz) ksi*in^0.5	Stress: Sz (ksi)	K(Sz) ksi*in^0.5	Stress: Sz (ksi)	K(Sz) ksi*in^0.5	Stress: Sz (ksi)	K(Sz) ksi*in^0.5	Stress: Sz (ksi)	K(Sz) ksi*in^0.5
-63.9635	0.0000	-72.722	0	-55.2049	0	-64.5165	0.0000	-73.0734	0	-55.9597	0
-55.7946	-6.3706	-63.4345	-7.24288	-48.1546	-5.49824	-56.3476	-6.1705	-63.821	-6.98891	-48.8742	-5.35212
-48.0426	-8.8910	-54.6211	-10.1085	-41.4642	-7.6736	-48.5957	-8.6119	-55.041	-9.75404	-42.1505	-7.46966
-40.8156	-10.7446	-46.4045	-12.2159	-35.2267	-9.27337	-41.3687	-10.4072	-46.8554	-11.7875	-35.882	-9.02691
-34.0408	-12.2401	-38.702	-13.9161	-29.3796	-10.564	-34.5939	-11.8557	-39.1821	-13.4281	-30.0057	-10.2833
-27.7070	-13.4991	-31.5009	-15.3476	-23.9131	-11.6507	-28.2601	-13.0752	-32.0082	-14.8094	-24.5119	-11.3411
-21.7588	-14.5851	-24.7382	-16.5822	-18.7794	-12.5879	-22.3119	-14.1271	-25.2711	-16.0007	-19.3526	-12.2534
-16.2764	-15.5763	-18.5051	-17.7092	-14.0477	-13.4434	-16.8295	-15.0872	-19.0616	-17.0882	-14.5974	-13.0862
-11.2012	-16.4745	-12.735	-18.7304	-9.66741	-14.2187	-11.7543	-15.9572	-13.3132	-18.0736	-10.1953	-13.8408
-6.5219	-17.1128	-7.41497	-19.456	-5.62888	-14.7695	-7.0750	-16.5754	-8.01336	-18.7738	-6.13665	-14.377
-2.1955	-16.1644	-2.49618	-18.3778	-1.89491	-13.951	-2.7486	-15.6568	-3.11317	-17.7333	-2.38407	-13.5802
1.7227	-15.0898	1.958598	-17.1561	1.486817	-13.0236	1.1696	-14.6160	1.324756	-16.5545	1.0145	-12.6774
5.2788	-13.9192	6.001647	-15.8252	4.55599	-12.0133	4.7257	-13.4821	5.352515	-15.2703	4.098964	-11.694
8.5075	-12.7441	9.672471	-14.4891	7.342598	-10.999	7.9545	-12.3439	9.009456	-13.981	6.899455	-10.7067
11.3705	-11.5836	12.92746	-13.1697	9.813531	-9.99743	10.8174	-11.2198	12.25213	-12.7079	9.382699	-9.73174
13.9051	-10.3886	15.80914	-11.8111	12.00109	-8.96607	13.3520	-10.0624	15.12292	-11.3969	11.58115	-8.72779
16.1226	-9.1742	18.33031	-10.4305	13.91496	-7.918	15.5696	-8.8861	17.63455	-10.0647	13.50456	-7.70757
18.0479	-7.9542	20.51925	-9.04335	15.57664	-6.86502	17.4949	-7.7044	19.81522	-8.72624	15.17452	-6.68257
19.6627	-6.7405	22.35516	-7.66342	16.97032	-5.81748	19.1097	-6.5288	21.64418	-7.3947	16.57515	-5.66287
20.9942	-5.5582	23.86898	-6.31933	18.1195	-4.79715	20.4412	-5.3837	23.15227	-6.09774	17.73005	-4.66966
22.0537	-4.4420	25.07348	-5.05019	19.03386	-3.83372	21.5006	-4.3025	24.35222	-4.8731	18.64897	-3.73183
22.8575	-3.3541	25.98736	-3.81339	19.72761	-2.89484	22.3044	-3.2488	25.26265	-3.67968	19.34617	-2.8179
23.4046	-2.3022	26.60942	-2.61749	20.19983	-1.987	22.8515	-2.2299	25.88235	-2.5257	19.82074	-1.93419
23.7135	-1.2931	26.96059	-1.47019	20.46641	-1.11606	23.1604	-1.2525	26.23219	-1.41864	20.08865	-1.0864
23.7954	-0.3328	27.05365	-0.37841	20.53705	-0.28726	23.2423	-0.3224	26.3249	-0.36514	20.15965	-0.27962
23.6596	0.5731	26.89928	0.651604	20.41987	0.494648	23.1065	0.5551	26.17111	0.628755	20.04187	0.481502
23.3196	1.4177	26.5127	1.611881	20.1264	1.223616	22.7665	1.3732	25.78599	1.55536	19.74695	1.191097
22.7863	2.2025	25.90644	2.504092	19.66618	1.900914	22.2332	2.1333	25.18203	2.416285	19.28443	1.850395
22.0649	2.9233	25.0862	3.323553	19.04352	2.522987	21.5118	2.8315	24.36489	3.207012	18.65867	2.455935
21.1776	3.5764	24.07746	4.066088	18.27776	3.086662	20.6245	3.4641	23.35997	3.92351	17.8891	3.00463
20.1309	4.1586	22.88747	4.728071	17.37441	3.589189	19.5779	4.0280	22.17448	4.562281	16.98125	3.493801
18.9361	4.6672	21.52901	5.30632	16.34317	4.028151	18.3830	4.5207	20.82115	5.120253	15.94487	3.921098
17.5935	5.1387	20.00254	5.842387	15.18439	4.435092	17.0404	4.9774	19.30045	5.637523	14.78032	4.317223
16.1350	5.5441	18.3444	6.303207	13.92566	4.784911	15.5819	5.3700	17.64859	6.082184	13.51531	4.657746
14.5622	5.8683	16.55622	6.671828	12.56821	5.06474	14.0091	5.6840	15.86717	6.437879	12.1511	4.930137
12.8863	6.1100	14.65077	6.946636	11.12174	5.273353	12.3332	5.9181	13.96892	6.703051	10.69742	5.133206
11.1044	6.2682	12.62487	7.126559	9.583834	5.409936	10.5513	6.0714	11.95069	6.876665	9.151857	5.26616
9.2552	6.3424	10.52256	7.210912	7.987918	5.473971	8.7022	6.1433	9.856327	6.95806	7.54799	5.328493
7.3368	6.3440	8.341405	7.212702	6.332154	5.47533	6.7837	6.1448	7.683424	6.959787	5.883977	5.329816
5.3447	6.2647	6.076546	7.122547	4.612847	5.406891	4.7916	6.0680	5.42713	6.872794	4.156104	5.263196
3.3209	6.0905	3.775684	6.924467	2.86621	5.256524	2.7679	5.8992	3.13497	6.681659	2.400765	5.116825
1.2617	5.8220	1.434413	6.619236	1.088897	5.024816	0.7086	5.6392	0.802554	6.387131	0.614597	4.891274
-0.8219	5.4605	-0.93449	6.208223	-0.70939	4.712806	-1.3750	5.2890	-1.55739	5.990531	-1.19265	4.587557
-2.9349	5.0076	-3.33675	5.693341	-2.53301	4.321947	-3.4880	4.8504	-3.95057	5.493703	-3.02535	4.207086
-5.0333	4.6123	-5.72255	5.243826	-4.34412	3.98071	-5.5864	4.4674	-6.32735	5.059951	-4.84549	3.874918
-7.1223	4.5870	-8.09756	5.215094	-6.14705	3.958899	-7.6754	4.4430	-8.69337	5.032225	-6.6574	3.853686
-9.1905	4.5048	-10.449	5.121668	-7.93207	3.887977	-9.7436	4.3634	-11.0359	4.942075	-8.45132	3.784649
-11.2424	4.3704	-12.7818	4.96882	-9.703	3.771946	-11.7955	4.2331	-13.3599	4.794587	-10.2311	3.671702
-13.2351	4.1887	-15.0474	4.762264	-11.4228	3.615145	-13.7882	4.0572	-15.6169	4.595274	-11.9594	3.519067
-15.1732	3.9653	-17.2509	4.508309	-13.0956	3.422362	-15.7263	3.8408	-17.8121	4.350224	-13.6405	3.331408
-17.0598	3.7063	-19.3958	4.213852	-14.7238	3.198833	-17.6129	3.5900	-19.9489	4.066093	-15.2769	3.11382

d) Peening,2-2,Sz (continued)

72						90					
1.2566371						1.5707963					
	0.905654	1.1275819		0.8724181			0.8689889	1.1224168		0.8775832	
Mean		Min - Insided Surface		Max-Inside Surface		Mean		Min - Insided Surface		Max-Inside Surface	
Stress: Sz	K(Sz)	Stress: Sz	K(Sz)	Stress: Sz	K(Sz)	Stress: Sz	K(Sz)	Stress: Sz	K(Sz)	Stress: Sz	K(Sz)
(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5
-65.2135	0.0000	-73.5335	0	-56.8934	0	-65.9860	0.0000	-74.0638	0	-57.9082	0
-57.0446	-5.9356	-64.3224	-6.69293	-49.7667	-5.17837	-57.8171	-5.6953	-64.8949	-6.39255	-50.7393	-4.99814
-49.2926	-8.2841	-55.5815	-9.34096	-43.0038	-7.22717	-50.0652	-7.9487	-56.194	-8.92174	-43.9364	-6.97563
-42.0656	-10.0111	-47.4324	-11.2883	-36.6988	-8.73386	-42.8382	-9.6058	-48.0823	-10.7817	-37.594	-8.42989
-35.2908	-11.4044	-39.7933	-12.8594	-30.7883	-9.94945	-36.0634	-10.9427	-40.4781	-12.2823	-31.6486	-9.60317
-28.9570	-12.5775	-32.6514	-14.1822	-25.2626	-10.9729	-29.7295	-12.0683	-33.3689	-13.5457	-26.0901	-10.591
-23.0088	-13.5893	-25.9443	-15.3231	-20.0733	-11.8556	-23.7813	-13.0392	-26.6926	-14.6354	-20.8701	-11.443
-17.5264	-14.5129	-19.7624	-16.3645	-15.2903	-12.6613	-18.2989	-13.9254	-20.539	-15.6301	-16.0588	-12.2207
-12.4512	-15.3498	-14.0397	-17.3082	-10.8626	-13.3915	-13.2237	-14.7284	-14.8425	-16.5314	-11.6049	-12.9254
-7.7719	-15.9445	-8.76348	-17.9787	-6.78037	-13.9103	-8.5445	-15.2990	-9.59045	-17.1718	-7.49848	-13.4261
-3.4455	-15.0608	-3.88513	-16.9823	-3.00595	-13.1394	-4.2181	-14.4511	-4.73445	-16.2202	-3.70172	-12.6821
0.4727	-14.0596	0.533016	-15.8534	0.412398	-12.2659	-0.2998	-13.4904	-0.33654	-15.1419	-0.26313	-11.839
4.0288	-12.9690	4.542823	-14.6236	3.514814	-11.3144	3.2563	-12.4439	3.654899	-13.9673	2.857653	-10.9206
7.2575	-11.8740	8.183465	-13.3889	6.331605	-10.3591	6.4850	-11.3933	7.278864	-12.788	5.69112	-9.99858
10.1205	-10.7928	11.41168	-12.1697	8.829302	-9.41581	9.3480	-10.3558	10.4923	-11.6236	8.203605	-9.0881
12.6551	-9.6794	14.26968	-10.9143	11.04055	-8.44445	11.8826	-9.2875	13.3372	-10.4244	10.42795	-8.15055
14.8726	-8.5479	16.77011	-9.63846	12.97516	-7.45735	14.1001	-8.2018	15.82618	-9.20589	12.374	-7.1978
16.7979	-7.4112	18.94106	-8.35669	14.65483	-6.46563	16.0254	-7.1111	17.98718	-7.98164	14.06363	-6.2406
18.4127	-6.2803	20.76188	-7.08154	16.06361	-5.47903	17.6402	-6.0260	19.79966	-6.76372	15.48074	-5.28834
19.7442	-5.1788	22.26325	-5.8395	17.22523	-4.51806	18.9717	-4.9691	21.29415	-5.57743	16.64924	-4.36082
20.8037	-4.1387	23.45785	-4.66673	18.1495	-3.61068	20.0311	-3.9711	22.48328	-4.45728	17.57899	-3.48501
21.6075	-3.1251	24.36421	-3.52384	18.85076	-2.72642	20.8349	-2.9986	23.38549	-3.36569	18.2844	-2.63153
22.1546	-2.1451	24.98115	-2.41874	19.3281	-1.8714	21.3821	-2.0582	23.99961	-2.31019	18.76456	-1.80626
22.4635	-1.2048	25.32944	-1.35856	19.59756	-1.05113	21.6910	-1.1561	24.34629	-1.29759	19.03562	-1.01455
22.5454	-0.3101	25.42173	-0.34968	19.66897	-0.27055	21.7728	-0.2976	24.43817	-0.33398	19.10745	-0.26113
22.4096	0.5340	25.26863	0.602128	19.55052	0.46587	21.6370	0.5124	24.28576	0.575104	18.98829	0.449656
22.0696	1.3210	24.88523	1.48949	19.25388	1.152429	21.2970	1.2675	23.90412	1.422642	18.6899	1.11232
21.5363	2.0521	24.28395	2.313955	18.78867	1.790324	20.7638	1.9691	23.3056	2.210105	18.22194	1.728013
20.8149	2.7237	23.47046	3.071195	18.15926	2.376205	20.0423	2.6134	22.49584	2.93336	17.5888	2.293504
19.9276	3.3322	22.47001	3.757349	17.38521	2.907087	19.1551	3.1973	21.49997	3.588719	16.81017	2.805909
18.8809	3.8747	21.28981	4.369067	16.47208	3.380378	18.1084	3.7179	20.32517	4.172984	15.89163	3.262728
17.6861	4.3486	19.94252	4.90341	15.42967	3.793803	16.9135	4.1726	18.98405	4.683345	14.84305	3.661764
16.3435	4.7879	18.42859	5.398773	14.25833	4.177069	15.5709	4.5941	17.47706	5.156476	13.66478	4.031691
14.8850	5.1656	16.78409	5.824603	12.98597	4.506536	14.1125	4.9564	15.84009	5.563195	12.38488	4.349691
13.3122	5.4677	15.01061	6.165234	11.61382	4.770085	12.5397	5.2463	14.07474	5.888539	11.0046	4.604068
11.6363	5.6929	13.12083	6.419175	10.15168	4.966562	10.8637	5.4624	12.19361	6.131083	9.53381	4.793706
9.8544	5.8403	11.11159	6.585437	8.597116	5.095199	9.0818	5.6039	10.19358	6.289883	7.970045	4.917866
8.0052	5.9094	9.026562	6.663385	6.983915	5.155508	7.2327	5.6702	8.118099	6.364333	6.347292	4.976076
6.0868	5.9109	6.863343	6.665039	5.310217	5.156788	5.3142	5.6716	5.964789	6.365913	4.663686	4.977312
4.0947	5.8370	4.617106	6.58173	3.572288	5.092331	3.3222	5.6007	3.728842	6.286342	2.915467	4.915098
2.0709	5.6747	2.335162	6.39869	1.806732	4.950712	1.2984	5.4450	1.457351	6.111518	1.139458	4.778408
0.0117	5.4246	0.013142	6.116635	0.010168	4.732484	-0.7609	5.2049	-0.85403	5.842121	-0.66774	4.567775
-2.0719	5.0877	-2.33628	5.736831	-1.8076	4.438627	-2.8445	4.8818	-3.1927	5.479362	-2.49627	4.284145
-4.1849	4.6658	-4.71879	5.261044	-3.65096	4.070507	-4.9574	4.4769	-5.56429	5.024929	-4.35055	3.928837
-6.2833	4.2974	-7.08498	4.845661	-5.4817	3.749122	-7.0559	4.1234	-7.91964	4.628188	-6.19212	3.618638
-8.3723	4.2738	-9.44046	4.81911	-7.30415	3.728579	-9.1448	4.1008	-10.2643	4.602829	-8.02536	3.59881
-10.4405	4.1973	-11.7726	4.732778	-9.10851	3.661784	-11.2131	4.0274	-12.5857	4.520371	-9.84041	3.534339
-12.4924	4.0720	-14.0862	4.591536	-10.8986	3.552504	-13.2650	3.9072	-14.8888	4.385468	-11.6411	3.428863
-14.4851	3.9027	-16.3331	4.400663	-12.6371	3.404824	-15.2576	3.7447	-17.1254	4.203162	-13.3898	3.286323
-16.4232	3.6946	-18.5185	4.165992	-14.3279	3.223257	-17.1958	3.5450	-19.3008	3.979022	-15.0907	3.111075
-18.3098	3.4533	-20.6458	3.893893	-15.9738	3.012733	-19.0824	3.3135	-21.4184	3.719136	-16.7464	2.907878

From Analyses	
Mean	
Stress: Sz	K(Sz)
(ksi)	ksi*in^0.5
-63.4860	0
-55.3171	-6.55399
-47.5652	-9.14705
-40.3382	-11.054
-33.5634	-12.5925
-27.2295	-13.8878
-21.2813	-15.005
-15.7989	-16.0248
-10.7237	-16.9489
-6.0445	-17.6055
-1.7181	-16.6298
2.2002	-15.5243
5.7563	-14.32
8.9850	-13.111
11.8480	-11.9171
14.3826	-10.6877
16.6001	-9.43838
18.5254	-8.18321
20.1402	-6.93453
21.4717	-5.71828
22.5311	-4.56985
23.3349	-3.45069
23.8821	-2.36853
24.1910	-1.33036
24.2728	-0.34242
24.1370	0.589628
23.7970	1.45857
23.2638	2.26592
22.5423	3.00744
21.6551	3.67935
20.6084	4.27837
19.4135	4.80162
18.0709	5.2867
16.6125	5.70369
15.0397	6.03725
13.3637	6.28592
11.5818	6.44873
9.7327	6.52506
7.8142	6.52668
5.8222	6.4451
3.7984	6.26586
1.7391	5.98966
-0.3445	5.61774
-2.4574	5.15183
-4.5559	4.74507
-6.6448	4.71907
-8.7131	4.63453
-10.7650	4.49622
-12.7576	4.30931
-14.6958	4.07951
-16.5824	3.81306

d) Peening,2-2,Sz (continued)

In Metric Unit

Unit Conv: 1.0000 in = 25.4000 mm 1.0000 ksi = 6.8948 MPa 1.0000 ksi-in^0.5= 1.0988 MPa-m^0.5

	Mean		Min - Insided Surface		Max-Inside Surface		Mean		Min - Insided Surface		Max-Inside Surface	
Depth (mm)	Stress: Sz (ksi)	K(Sz) ksi*in^0.5	Stress: Sz (ksi)	K(Sz) ksi*in^0.5	Stress: Sz (ksi)	K(Sz) ksi*in^0.5	Stress: Sz (ksi)	K(Sz) ksi*in^0.5	Stress: Sz (ksi)	K(Sz) ksi*in^0.5	Stress: Sz (ksi)	K(Sz) ksi*in^0.5
0.0000	-437.7205	0.0000	-499.3834	0.0000	-376.0577	0.0000	-438.5642	0.0000	-499.8933	0.0000	-377.2350	0.0000
0.3277	-381.3980	-7.2018	-435.1266	-8.2163	-327.6695	-6.1873	-382.2417	-7.1491	-435.6946	-8.1488	-328.7887	-6.1493
0.6579	-327.9504	-10.0512	-374.1496	-11.4671	-281.7511	-8.6352	-328.7940	-9.9775	-374.7728	-11.3728	-282.8152	-8.5823
0.9855	-278.1218	-12.1466	-317.3016	-13.8577	-238.9420	-10.4355	-278.9654	-12.0576	-317.9762	-13.7438	-239.9547	-10.3715
1.3132	-231.4112	-13.8372	-264.0107	-15.7865	-198.8117	-11.8879	-232.2548	-13.7358	-264.7335	-15.6567	-199.7761	-11.8150
1.6408	-187.7410	-15.2605	-214.1885	-17.4103	-161.2934	-13.1107	-188.5846	-15.1487	-214.9564	-17.2671	-162.2128	-13.0303
1.9710	-146.7295	-16.4881	-167.3997	-18.8109	-126.0594	-14.1654	-147.5732	-16.3674	-168.2099	-18.6562	-126.9364	-14.0785
2.2987	-108.9299	-17.6087	-124.2751	-20.0893	-93.5846	-15.1281	-109.7735	-17.4798	-125.1243	-19.9241	-94.4227	-15.0354
2.6264	-73.9375	-18.6242	-84.3533	-21.2478	-63.5218	-16.0005	-74.7812	-18.4878	-85.2386	-21.0731	-64.3237	-15.9024
2.9540	-41.6751	-19.3457	-47.5460	-22.0710	-35.8042	-16.6204	-42.5188	-19.2040	-48.4646	-21.8895	-36.5729	-16.5185
3.2842	-11.8458	-18.2735	-13.5145	-20.8478	-10.1770	-15.6993	-12.6894	-18.1397	-14.4639	-20.6764	-10.9149	-15.6030
3.6119	15.1696	-17.0588	17.3066	-19.4619	13.0326	-14.6557	14.3260	-16.9338	16.3293	-19.3019	12.3226	-14.5658
3.9395	39.6881	-15.7354	45.2791	-17.9521	34.0972	-13.5187	38.8445	-15.6202	44.2765	-17.8045	33.4124	-13.4358
4.2697	61.9493	-14.4069	70.6763	-16.4365	53.2224	-12.3774	61.1057	-14.3014	69.6508	-16.3013	52.5606	-12.3015
4.5974	81.6887	-13.0950	93.1965	-14.9398	70.1810	-11.2503	80.8451	-12.9991	92.1506	-14.8169	69.5397	-11.1813
4.9251	99.1643	-11.7441	113.1339	-13.3985	85.1948	-10.0897	98.3207	-11.6581	112.0699	-13.2884	84.5715	-10.0278
5.2527	114.4536	-10.3713	130.5770	-11.8323	98.3302	-8.9103	113.6100	-10.2953	129.4973	-11.7350	97.7227	-8.8556
5.5829	127.7282	-8.9921	145.7216	-10.2588	109.7348	-7.7253	126.8845	-8.9262	144.6282	-10.1744	109.1409	-7.6780
5.9106	138.8618	-7.6200	158.4236	-8.6934	119.3000	-6.5465	138.0182	-7.5641	157.3187	-8.6219	118.7176	-6.5064
6.2382	148.0421	-6.2835	168.8972	-7.1687	127.1870	-5.3983	147.1985	-6.2375	167.7829	-7.1097	126.6141	-5.3652
6.5659	155.3467	-5.0215	177.2308	-5.7289	133.4626	-4.3141	154.5030	-4.9848	176.1089	-5.6818	132.8972	-4.2877
6.8961	160.8888	-3.7918	183.5536	-4.3259	138.2239	-3.2576	160.0451	-3.7640	182.4260	-4.2904	137.6643	-3.2376
7.2238	164.6611	-2.6026	187.8574	-2.9693	141.4649	-2.2360	163.8175	-2.5836	186.7259	-2.9449	140.9091	-2.2223
7.5514	166.7908	-1.4619	190.2870	-1.6678	143.2945	-1.2559	165.9471	-1.4511	189.1533	-1.6541	142.7410	-1.2482
7.8791	167.3551	-0.3763	190.9309	-0.4293	143.7794	-0.3233	166.5115	-0.3735	189.7966	-0.4257	143.2264	-0.3213
8.2093	166.4189	0.6479	189.8628	0.7392	142.9751	0.5566	165.5753	0.6432	188.7295	0.7331	142.4211	0.5532
8.5369	164.0746	1.6027	187.1882	1.8285	140.9610	1.3770	163.2310	1.5910	186.0573	1.8135	140.4046	1.3685
8.8646	160.3980	2.4899	182.9937	2.8406	137.8023	2.1391	159.5544	2.4717	181.8666	2.8173	137.2422	2.1260
9.1948	155.4238	3.3047	177.3188	3.7702	133.5288	2.8392	154.5802	3.2805	176.1968	3.7392	132.9636	2.8218
9.5225	149.3064	4.0430	170.3396	4.6126	128.2732	3.4735	148.4628	4.0134	169.2240	4.5747	127.7017	3.4522
9.8501	142.0899	4.7013	162.1065	5.3635	122.0733	4.0390	141.2463	4.6668	160.9983	5.3194	121.4943	4.0142
10.1778	133.8517	5.2762	152.7077	6.0195	114.9956	4.5330	133.0081	5.2376	151.6080	5.9700	114.4081	4.5052
10.5080	124.5946	5.8093	142.1466	6.6276	107.0426	4.9909	123.7510	5.7667	141.0564	6.5731	106.4455	4.9603
10.8356	114.5391	6.2675	130.6745	7.1504	98.4036	5.3845	113.6954	6.2216	129.5947	7.0916	97.7962	5.3515
11.1633	103.6949	6.6340	118.3026	7.5685	89.0871	5.6994	102.8512	6.5854	117.2340	7.5063	88.4684	5.6645
11.4910	92.1395	6.9072	105.1195	7.8803	79.1596	5.9342	91.2959	6.8566	104.0628	7.8155	78.5290	5.8978
11.8212	79.8538	7.0861	91.1030	8.0844	68.6046	6.0879	79.0101	7.0342	90.0590	8.0179	67.9613	6.0506
12.1488	67.1046	7.1700	76.5578	8.1801	57.6514	6.1600	66.2609	7.1175	75.5269	8.1128	56.9950	6.1222
12.4765	53.8773	7.1718	61.4671	8.1821	46.2874	6.1615	53.0336	7.1193	60.4499	8.1148	45.6174	6.1237
12.8067	40.1423	7.0822	45.7973	8.0798	34.4874	6.0845	39.2987	7.0303	44.7943	8.0134	33.8031	6.0472
13.1343	26.1891	6.8852	29.8784	7.8551	22.4998	5.9153	25.3454	6.8348	28.8898	7.7905	21.8011	5.8790
13.4620	11.9908	6.5817	13.6799	7.5089	10.3016	5.6545	11.1471	6.5335	12.7059	7.4471	9.5883	5.6198
13.7897	-2.3751	6.1730	-2.7097	7.0426	-2.0405	5.3034	-3.2188	6.1278	-3.6689	6.9847	-2.7686	5.2709
14.1199	-16.9433	5.6611	-19.3302	6.4585	-14.5565	4.8636	-17.7870	5.6196	-20.2743	6.4054	-15.2996	4.8337
14.4475	-31.4117	5.2141	-35.8367	5.9486	-26.9866	4.4796	-32.2553	5.1759	-36.7659	5.8997	-27.7447	4.4521
14.7752	-45.8146	5.1855	-52.2686	5.9160	-39.3606	4.4550	-46.6582	5.1475	-53.1830	5.8674	-40.1335	4.4277
15.1028	-60.0745	5.0926	-68.5374	5.8100	-51.6117	4.3752	-60.9182	5.0553	-69.4370	5.7623	-52.3993	4.3484
15.4330	-74.2218	4.9406	-84.6776	5.6366	-63.7660	4.2446	-75.0654	4.9045	-85.5627	5.5903	-64.5682	4.2186
15.7607	-87.9608	4.7353	-100.3520	5.4023	-75.5695	4.0682	-88.8044	4.7006	-101.2229	5.3579	-76.3859	4.0432
16.0884	-101.3237	4.4827	-115.5975	5.1142	-87.0500	3.8512	-102.1674	4.4499	-116.4545	5.0722	-87.8802	3.8276
16.4186	-114.3313	4.1900	-130.4374	4.7802	-98.2251	3.5997	-115.1749	4.1593	-131.2811	4.7409	-99.0688	3.5776

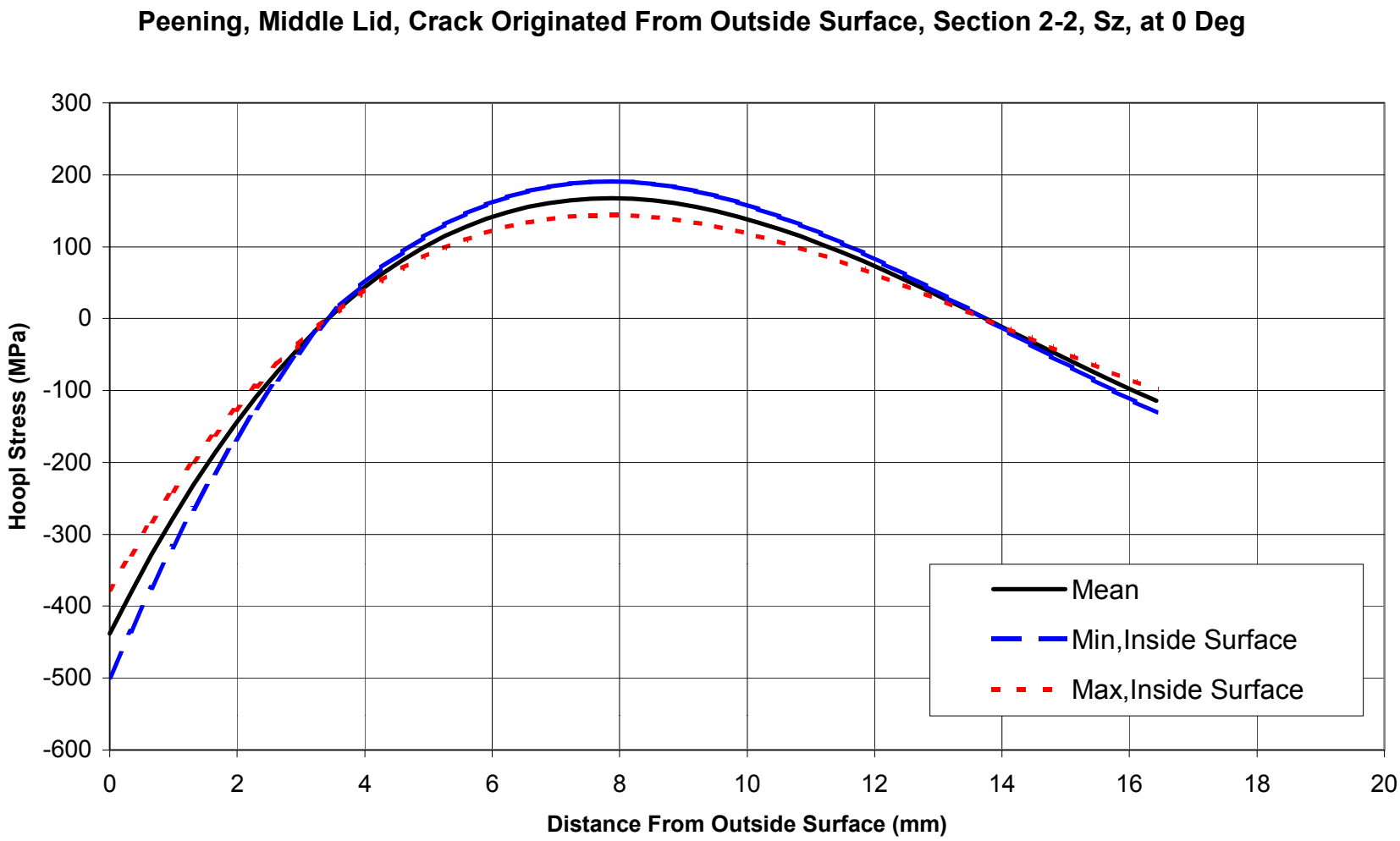
d) Peening,2-2,Sz (continued)

Mean		Min - Insided Surface		Max-Inside Surface		Mean		Min - Insided Surface		Max-Inside Surface	
Stress: Sz (ksi)	K(Sz) ksi*in^0.5	Stress: Sz (ksi)	K(Sz) ksi*in^0.5	Stress: Sz (ksi)	K(Sz) ksi*in^0.5	Stress: Sz (ksi)	K(Sz) ksi*in^0.5	Stress: Sz (ksi)	K(Sz) ksi*in^0.5	Stress: Sz (ksi)	K(Sz) ksi*in^0.5
-441.0125	0.0000	-501.4003	0.0000	-380.6246	0.0000	-444.8258	0.0000	-503.8232	0.0000	-385.8285	0.0000
-384.6900	-7.0002	-437.3656	-7.9588	-332.0144	-6.0417	-388.5033	-6.7804	-440.0306	-7.6797	-336.9761	-5.8811
-331.2423	-9.7699	-376.5993	-11.1077	-285.8853	-8.4321	-335.0557	-9.4631	-379.4941	-10.7182	-290.6172	-8.2080
-281.4138	-11.8067	-319.9477	-13.4233	-242.8798	-10.1900	-285.2271	-11.4359	-323.0568	-12.9527	-247.3974	-9.9192
-234.7031	-13.4499	-266.8410	-15.2916	-202.5652	-11.6082	-238.5165	-13.0276	-270.1509	-14.7554	-206.8820	-11.2997
-191.0329	-14.8334	-217.1911	-16.8646	-164.8748	-12.8023	-194.8463	-14.3676	-220.6888	-16.2732	-169.0038	-12.4620
-150.0215	-16.0267	-170.5640	-18.2212	-129.4791	-13.8321	-153.8349	-15.5234	-174.2380	-17.5823	-133.4317	-13.4645
-112.2218	-17.1159	-127.5883	-19.4596	-96.8553	-14.7722	-116.0352	-16.5784	-131.4249	-18.7772	-100.6454	-14.3796
-77.2295	-18.1029	-87.8045	-20.5818	-66.6545	-15.6241	-81.0428	-17.5345	-91.7916	-19.8601	-70.2941	-15.2089
-44.9671	-18.8042	-51.1244	-21.3791	-38.8097	-16.2294	-48.7804	-18.2138	-55.2502	-20.6295	-42.3107	-15.7981
-15.1377	-17.7621	-17.2105	-20.1943	-13.0649	-15.3299	-18.9511	-17.2043	-21.4646	-19.4862	-16.4376	-14.9225
11.8776	-16.5813	13.5041	-18.8518	10.2512	-14.3109	8.0643	-16.0607	9.1339	-18.1908	6.9947	-13.9305
36.3962	-15.2950	41.3799	-17.3894	31.4124	-13.2007	32.5828	-14.8147	36.9043	-16.7796	28.2614	-12.8499
58.6574	-14.0037	66.6893	-15.9212	50.6254	-12.0862	54.8440	-13.5640	62.1180	-15.3630	47.5701	-11.7650
78.3968	-12.7285	89.1317	-14.4714	67.6619	-10.9856	74.5834	-12.3288	84.4755	-13.9640	64.6914	-10.6937
95.8724	-11.4154	109.0002	-12.9785	82.7446	-9.8523	92.0590	-11.0570	104.2688	-12.5234	79.8492	-9.5905
111.1617	-10.0810	126.3830	-11.4614	95.9403	-8.7006	107.3483	-9.7645	121.5859	-11.0595	93.1107	-8.4694
124.4362	-8.7404	141.4753	-9.9372	107.3972	-7.5436	120.6229	-8.4659	136.6211	-9.5888	104.6246	-7.3431
135.5698	-7.4067	154.1334	-8.4209	117.0063	-6.3925	131.7565	-7.1741	149.2314	-8.1256	114.2816	-6.2226
144.7502	-6.1076	164.5708	-6.9440	124.9295	-5.2713	140.9368	-5.9158	159.6293	-6.7005	122.2444	-5.1312
152.0547	-4.8810	172.8756	-5.5494	131.2339	-4.2127	148.2414	-4.7277	167.9027	-5.3548	128.5801	-4.1007
157.5968	-3.6856	179.1766	-4.1903	136.0171	-3.1810	153.7835	-3.5699	174.1798	-4.0434	133.3872	-3.0964
161.3692	-2.5298	183.4655	-2.8762	139.2729	-2.1834	157.5558	-2.4504	178.4525	-2.7754	136.6592	-2.1254
163.4988	-1.4209	185.8867	-1.6155	141.1109	-1.2264	159.6855	-1.3763	180.8646	-1.5589	138.5064	-1.1938
164.0632	-0.3657	186.5284	-0.4158	141.5980	-0.3157	160.2498	-0.3542	181.5038	-0.4012	138.9959	-0.3073
163.1270	0.6298	185.4640	0.7160	140.7900	0.5435	159.3136	0.6100	180.4434	0.6909	138.1839	0.5291
160.7826	1.5579	182.7986	1.7712	138.7667	1.3446	156.9693	1.5090	177.7882	1.7091	136.1504	1.3088
157.1061	2.4202	178.6186	2.7516	135.5935	2.0888	153.2927	2.3442	173.6240	2.6551	132.9615	2.0333
152.1319	3.2122	172.9633	3.6521	131.3004	2.7724	148.3185	3.1113	167.9900	3.5240	128.6470	2.6987
146.0145	3.9299	166.0083	4.4680	126.0207	3.3918	142.2011	3.8065	161.0613	4.3113	123.3410	3.3016
138.7980	4.5697	157.8036	5.1954	119.7924	3.9440	134.9846	4.4262	152.8876	5.0132	117.0816	3.8391
130.5597	5.1286	148.4373	5.8308	112.6822	4.4263	126.7464	4.9675	143.5568	5.6264	109.9360	4.3087
121.3027	5.6467	137.9126	6.4199	104.6927	4.8735	117.4893	5.4694	133.0719	6.1948	101.9067	4.7440
111.2471	6.0921	126.4802	6.9262	96.0140	5.2579	107.4338	5.9007	121.6827	6.6834	93.1848	5.1181
100.4029	6.4483	114.1511	7.3313	86.6547	5.5654	96.5896	6.2458	109.4003	7.0742	83.7789	5.4174
88.8476	6.7139	101.0135	7.6333	76.6817	5.7946	85.0342	6.5031	96.3123	7.3656	73.7561	5.6406
76.5618	6.8878	87.0454	7.8310	66.0782	5.9447	72.7485	6.6715	82.3971	7.5564	63.0998	5.7867
63.8126	6.9693	72.5505	7.9237	55.0748	6.0150	59.9993	6.7505	67.9570	7.6458	52.0416	5.8552
50.5853	6.9711	57.5120	7.9256	43.6587	6.0165	46.7720	6.7522	52.9753	7.6477	40.5686	5.8566
36.8504	6.8839	41.8963	7.8266	31.8045	5.9413	33.0370	6.6678	37.4187	7.5521	28.6553	5.7834
22.8971	6.6925	26.0324	7.6089	19.7618	5.7761	19.0838	6.4823	21.6149	7.3421	16.5527	5.6226
8.6988	6.3975	9.8899	7.2735	7.5077	5.5215	4.8855	6.1966	5.5334	7.0185	4.2375	5.3747
-5.6671	6.0002	-6.4431	6.8219	-4.8911	5.1786	-9.4804	5.8118	-10.7378	6.5827	-8.2230	5.0410
-20.2353	5.5026	-23.0061	6.2561	-17.4645	4.7491	-24.0486	5.3298	-27.2382	6.0367	-20.8590	4.6229
-34.7037	5.0682	-39.4556	5.7621	-29.9517	4.3742	-38.5170	4.9090	-43.6255	5.5601	-33.4085	4.2579
-49.1066	5.0404	-55.8307	5.7306	-42.3824	4.3502	-52.9199	4.8821	-59.9387	5.5296	-45.9011	4.2346
-63.3665	4.9501	-72.0433	5.6279	-54.6897	4.2723	-67.1798	4.7946	-76.0899	5.4306	-58.2698	4.1587
-77.5138	4.8024	-88.1277	5.4600	-66.8998	4.1448	-81.3271	4.6516	-92.1135	5.2685	-70.5407	4.0346
-91.2527	4.6027	-103.7480	5.2330	-78.7575	3.9725	-95.0661	4.4582	-107.6747	5.0495	-82.4574	3.8669
-104.6157	4.3573	-118.9407	4.9539	-90.2906	3.7606	-108.4290	4.2205	-122.8100	4.7802	-94.0481	3.6607
-117.6232	4.0727	-133.7294	4.6304	-101.5171	3.5150	-121.4366	3.9448	-137.5427	4.4680	-105.3304	3.4216

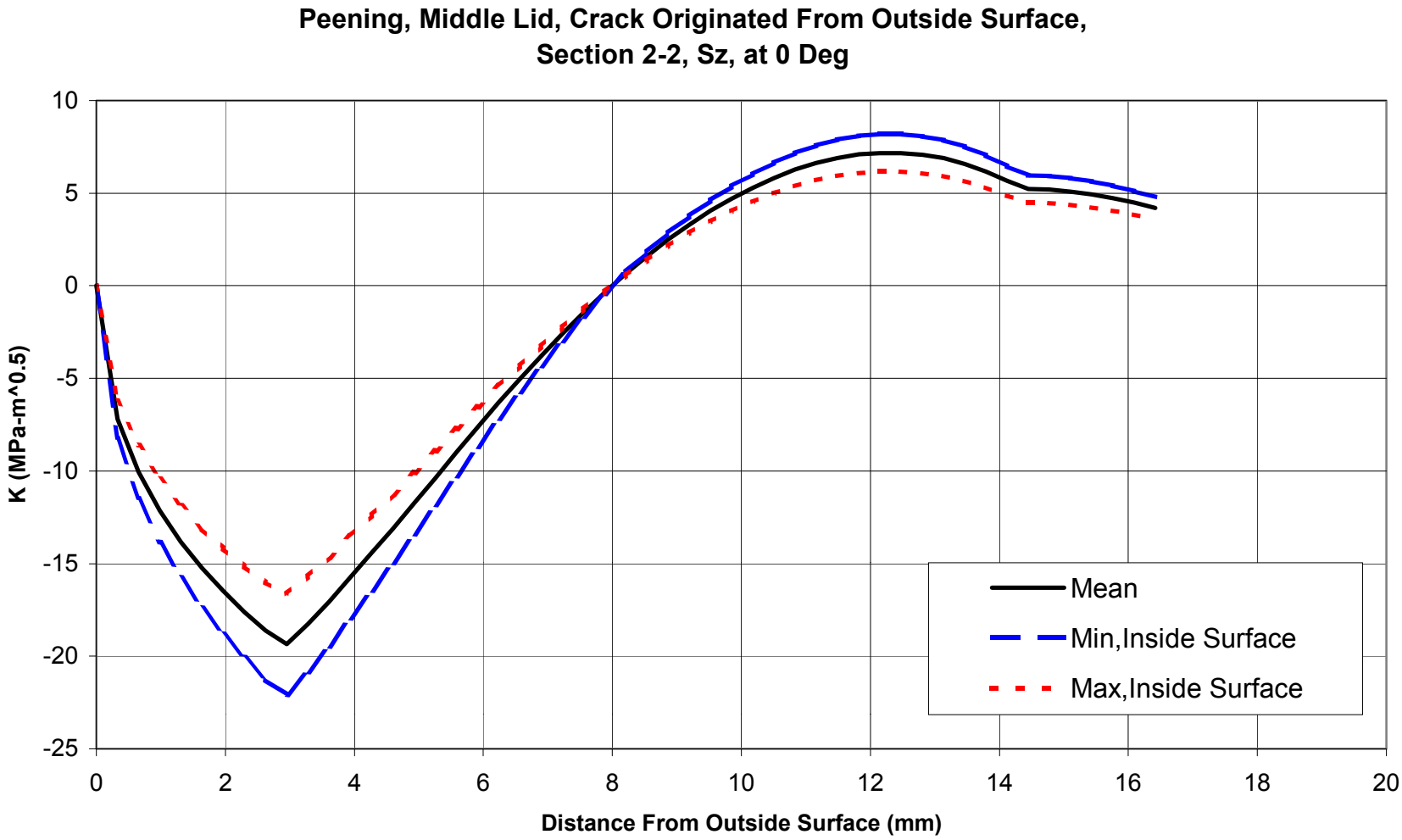
d) Peening,2-2,Sz (continued)

Mean		Min - Insided Surface		Max-Inside Surface		Mean		Min - Insided Surface		Max-Inside Surface	
Stress: Sz (ksi)	K(Sz) ksi*in^0.5	Stress: Sz (ksi)	K(Sz) ksi*in^0.5	Stress: Sz (ksi)	K(Sz) ksi*in^0.5	Stress: Sz (ksi)	K(Sz) ksi*in^0.5	Stress: Sz (ksi)	K(Sz) ksi*in^0.5	Stress: Sz (ksi)	K(Sz) ksi*in^0.5
-449.6309	0.0000	-506.9957	0.0000	-392.2662	0.0000	-454.9574	0.0000	-510.6519	0.0000	-399.2630	0.0000
-393.3084	-6.5223	-443.4875	-7.3545	-343.1294	-5.6902	-398.6349	-6.2583	-447.4345	-7.0244	-349.8353	-5.4922
-339.8608	-9.1029	-383.2208	-10.2642	-296.5007	-7.9415	-345.1872	-8.7344	-387.4440	-9.8036	-302.9305	-7.6651
-290.0322	-11.0006	-327.0351	-12.4041	-253.0293	-9.5971	-295.3587	-10.5553	-331.5156	-11.8474	-259.2018	-9.2631
-243.3216	-12.5317	-274.3650	-14.1305	-212.2781	-10.9329	-248.6481	-12.0244	-279.0868	-13.4963	-218.2094	-10.5524
-199.6514	-13.8207	-225.1233	-15.5840	-174.1795	-12.0575	-204.9779	-13.2612	-230.0706	-14.8846	-179.8851	-11.6378
-158.6399	-14.9325	-178.8795	-16.8377	-138.4004	-13.0274	-163.9664	-14.3280	-184.0387	-16.0820	-143.8942	-12.5740
-120.8402	-15.9474	-136.2573	-17.9820	-105.4232	-13.9128	-126.1667	-15.3018	-141.6117	-17.1750	-110.7218	-13.4286
-85.8479	-16.8671	-96.8006	-19.0190	-74.8953	-14.7151	-91.1744	-16.1842	-102.3357	-18.1654	-80.0132	-14.2030
-53.5855	-17.5205	-60.4221	-19.7558	-46.7490	-15.2852	-58.9120	-16.8112	-66.1238	-18.8692	-51.7002	-14.7532
-23.7562	-16.5495	-26.7870	-18.6609	-20.7253	-14.4381	-29.0827	-15.8795	-32.6429	-17.8234	-25.5225	-13.9356
3.2592	-15.4493	3.6750	-17.4204	2.8434	-13.4783	-2.0673	-14.8239	-2.3204	-16.6386	-1.8142	-13.0092
27.7777	-14.2509	31.3217	-16.0690	24.2338	-12.4327	22.4512	-13.6739	25.1996	-15.3478	19.7028	-12.0000
50.0389	-13.0477	56.4230	-14.7123	43.6549	-11.3830	44.7124	-12.5195	50.1860	-14.0521	39.2389	-10.9869
69.7783	-11.8596	78.6808	-13.3726	60.8759	-10.3465	64.4518	-11.3794	72.3418	-12.7725	56.5619	-9.9864
87.2539	-10.6361	98.3860	-11.9931	76.1219	-9.2791	81.9274	-10.2055	91.9567	-11.4548	71.8982	-8.9562
102.5432	-9.3928	115.6259	-10.5912	89.4605	-8.1945	97.2167	-9.0125	109.1177	-10.1158	85.3158	-7.9093
115.8178	-8.1437	130.5940	-9.1827	101.0415	-7.1047	110.4913	-7.8140	124.0173	-8.7706	96.9653	-6.8574
126.9514	-6.9010	143.1481	-7.7815	110.7547	-6.0206	121.6249	-6.6217	136.5138	-7.4323	106.7360	-5.8111
136.1317	-5.6907	153.4997	-6.4167	118.7638	-4.9646	130.8052	-5.4603	146.8180	-6.1287	114.7925	-4.7919
143.4363	-4.5478	161.7362	-5.1280	125.1364	-3.9676	138.1098	-4.3637	155.0167	-4.8979	121.2028	-3.8295
148.9784	-3.4340	167.9853	-3.8721	129.9714	-2.9959	143.6519	-3.2950	161.2373	-3.6984	126.0665	-2.8916
152.7507	-2.3571	172.2390	-2.6578	133.2625	-2.0564	147.4243	-2.2617	165.4715	-2.5385	129.3771	-1.9848
154.8804	-1.3239	174.6403	-1.4928	135.1204	-1.1550	149.5539	-1.2703	167.8618	-1.4258	131.2460	-1.1148
155.4447	-0.3408	175.2767	-0.3842	135.6128	-0.2973	150.1182	-0.3270	168.4952	-0.3670	131.7412	-0.2869
154.5085	0.5868	174.2210	0.6616	134.7961	0.5119	149.1821	0.5630	167.4444	0.6319	130.9197	0.4941
152.1642	1.4515	171.5776	1.6367	132.7508	1.2663	146.8377	1.3928	164.8131	1.5633	128.8623	1.2223
148.4876	2.2550	167.4320	2.5427	129.5433	1.9673	143.1611	2.1637	160.6865	2.4286	125.6358	1.8988
143.5134	2.9929	161.8231	3.3748	125.2037	2.6111	138.1869	2.8718	155.1033	3.2233	121.2705	2.5202
137.3960	3.6616	154.9253	4.1287	119.8668	3.1944	132.0696	3.5133	148.2371	3.9434	115.9020	3.0833
130.1795	4.2577	146.7881	4.8009	113.5710	3.7145	124.8530	4.0853	140.1371	4.5855	109.5689	3.5852
121.9413	4.7784	137.4988	5.3881	106.3838	4.1688	116.6148	4.5850	130.8904	5.1463	102.3392	4.0237
112.6842	5.2612	127.0607	5.9324	98.3077	4.5899	107.3577	5.0482	120.5001	5.6662	94.2153	4.4302
102.6287	5.6761	115.7222	6.4003	89.5351	4.9520	97.3022	5.4464	109.2136	6.1131	85.3907	4.7796
91.7845	6.0081	103.4945	6.7746	80.0744	5.2416	86.4580	5.7649	97.0419	6.4706	75.8741	5.0591
80.2291	6.2556	90.4649	7.0537	69.9934	5.4575	74.9026	6.0023	84.0720	6.7371	65.7333	5.2675
67.9434	6.4176	76.6117	7.2364	59.2750	5.5988	62.6169	6.1578	70.2822	6.9116	54.9515	5.4040
55.1942	6.4936	62.2359	7.3220	48.1524	5.6651	49.8677	6.2307	55.9723	6.9934	43.7630	5.4679
41.9669	6.4952	47.3211	7.3238	36.6127	5.6665	36.6404	6.2322	41.1258	6.9951	32.1550	5.4693
28.2319	6.4140	31.8338	7.2323	24.6301	5.5957	22.9054	6.1543	25.7095	6.9077	20.1014	5.4009
14.2787	6.2356	16.1004	7.0312	12.4570	5.4401	8.9522	5.9832	10.0481	6.7156	7.8563	5.2507
0.0804	5.9607	0.0906	6.7212	0.0701	5.2003	-5.2461	5.7194	-5.8883	6.4196	-4.6039	5.0193
-14.2855	5.5906	-16.1081	6.3039	-12.4630	4.8774	-19.6120	5.3643	-22.0129	6.0210	-17.2112	4.7076
-28.8537	5.1270	-32.5349	5.7811	-25.1725	4.4728	-34.1802	4.9194	-38.3644	5.5216	-29.9960	4.3172
-43.3221	4.7222	-48.8492	5.3246	-37.7950	4.1197	-48.6486	4.5310	-54.6040	5.0857	-42.6932	3.9763
-57.7250	4.6963	-65.0897	5.2954	-50.3603	4.0971	-63.0515	4.5062	-70.7701	5.0578	-55.3329	3.9545
-71.9849	4.6122	-81.1689	5.2006	-62.8010	4.0237	-77.3114	4.4254	-86.7757	4.9672	-67.8472	3.8837
-86.1322	4.4745	-97.1211	5.0454	-75.1433	3.9036	-91.4587	4.2934	-102.6548	4.8189	-80.2626	3.7678
-99.8712	4.2885	-112.6129	4.8356	-87.1294	3.7414	-105.1977	4.1149	-118.0756	4.6186	-92.3197	3.6112
-113.2341	4.0598	-127.6807	4.5778	-98.7875	3.5419	-118.5606	3.8955	-133.0744	4.3723	-104.0468	3.4186
-126.2417	3.7946	-142.3478	4.2788	-110.1355	3.3105	-131.5682	3.6410	-147.6743	4.0867	-115.4620	3.1953

e) Peening,2-2,SzPlt



f) Peening,2-2,KSzPlt



g) Peening,3-3,Sy

Results in Metric Unit start in Cell A80

Angle(deg):	0						18					
(rad):	0						0.3141593					
	Scale Facto	1	1.0970014		0.9029986			1.0050809	1.0965111		0.9034889	
	Mean		Min - Insided Surface		Max-Inside Surface		Mean		Min - Insided Surface		Max-Inside Surface	
Depth	Stress: Sy	K(Sy)	Stress: Sy	K(Sy)	Stress: Sy	K(Sy)	Stress: Sy	K(Sy)	Stress: Sy	K(Sy)	Stress: Sy	K(Sy)
(in)	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5	(ksi)	ksi*in^0.5
0	-27.7030	0.0000	-30.3902	0	-25.0158	0	-27.8254	0.0000	-30.5108	0	-25.1399	0
0.0315	-22.6771	-8.6321	-24.8768	-9.46947	-20.4774	-7.79481	-22.7995	-8.6760	-24.9999	-9.51333	-20.5991	-7.83867
0.063	-18.0137	-10.8760	-19.761	-11.931	-16.2663	-9.82101	-18.1360	-10.9313	-19.8864	-11.9862	-16.3857	-9.87627
0.0945	-13.7026	-11.7730	-15.0318	-12.915	-12.3735	-10.631	-13.8250	-11.8328	-15.1593	-12.9748	-12.4907	-10.6908
0.126	-9.7340	-11.9020	-10.6782	-13.0565	-8.78975	-10.7475	-9.8563	-11.9625	-10.8076	-13.117	-8.90508	-10.808
0.1575	-6.0977	-11.5176	-6.68915	-12.6348	-5.50619	-10.4004	-6.2200	-11.5761	-6.82033	-12.6933	-5.61973	-10.4589
0.189	-2.7837	-10.7664	-3.05376	-11.8108	-2.51371	-9.72204	-2.9061	-10.8211	-3.18656	-11.8655	-2.62562	-9.77675
0.2205	0.2179	-9.8049	0.238997	-10.7559	0.196731	-8.85377	0.0955	-9.8547	0.104722	-10.8058	0.086288	-8.90358
0.252	2.9171	-8.6471	3.200099	-9.48587	2.634167	-7.80831	2.7948	-8.6910	3.064501	-9.5298	2.525048	-7.85224
0.2835	5.3241	-7.3200	5.840535	-8.03002	4.807646	-6.60992	5.2017	-7.3572	5.703757	-8.06721	4.699707	-6.64711
0.315	7.4488	-5.8620	8.171291	-6.4306	6.726212	-5.29336	7.3264	-5.8918	8.033471	-6.46038	6.619315	-5.32314
0.3465	9.3011	-4.3046	10.20335	-4.72216	8.398908	-3.88706	9.1788	-4.3265	10.06463	-4.74403	8.292919	-3.90893
0.378	10.8912	-2.6742	11.94771	-2.93361	9.834778	-2.41481	10.7689	-2.6878	11.8082	-2.9472	9.729569	-2.4284
0.4096	12.2330	-1.0168	13.41958	-1.11543	11.04635	-0.91817	12.1106	-1.0220	13.27941	-1.1206	10.9418	-0.92334
0.4411	13.3278	0.6555	14.62065	0.719136	12.03501	0.591958	13.2055	0.6589	14.47995	0.722467	11.931	0.595289
0.4726	14.1905	2.3512	15.56701	2.579281	12.81401	2.123139	14.0682	2.3632	15.42589	2.591227	12.71042	2.135086
0.5041	14.8310	4.0541	16.26965	4.447397	13.39239	3.660883	14.7087	4.0747	16.12821	4.467996	13.28911	3.681481
0.5356	15.2594	5.7497	16.73954	6.30744	13.77918	5.19198	15.1370	5.7789	16.59789	6.336654	13.67612	5.221194
0.5671	15.4856	7.4245	16.98769	8.144665	13.98344	6.704295	15.3632	7.4622	16.84593	8.182388	13.88049	6.742018
0.5986	15.5196	8.9989	17.02506	9.87185	14.01421	8.12603	15.3973	9.0447	16.88328	9.917573	13.91127	8.171753
0.6301	15.3716	10.3206	16.86266	11.32171	13.88052	9.319487	15.2492	10.3730	16.72095	11.37415	13.77751	9.371925
0.6616	15.0514	11.5756	16.51146	12.69845	13.59143	10.45275	14.9291	11.6344	16.36991	12.75726	13.48826	10.51156
0.6931	14.5692	12.7531	15.98245	13.99017	13.15598	11.51603	14.4469	12.8179	15.84113	14.05497	13.05257	11.58083
0.7246	13.9349	13.8432	15.28662	15.18601	12.5832	12.50039	13.8126	13.9135	15.14562	15.25635	12.47949	12.57073
0.7561	13.1586	14.8365	14.43495	16.27566	11.88215	13.39734	13.0362	14.9119	14.29433	16.35104	11.77806	13.47272
0.7876	12.2502	15.7243	13.43844	17.24958	11.06187	14.19902	12.1278	15.8042	13.29826	17.32947	10.95733	14.27891
0.8191	11.2197	16.5800	12.30806	18.18828	10.1314	14.97172	11.0974	16.6642	12.16839	18.27252	10.02635	15.05596
0.8506	10.0773	17.3357	11.05481	19.01729	9.099785	15.65411	9.9549	17.4238	10.9157	19.10537	8.994177	15.74219
0.8821	8.8329	17.9853	9.689667	19.7299	7.976066	16.2407	8.7105	18.0767	9.551168	19.82128	7.869848	16.33208
0.9136	7.4965	18.5238	8.223623	20.32063	6.769289	16.72697	7.3741	18.6179	8.085779	20.41475	6.662415	16.82108
0.9451	6.0781	18.9464	6.667661	20.78423	5.488496	17.10857	5.9557	19.0427	6.530513	20.88049	5.380927	17.20484
0.9766	4.5878	19.2492	5.032769	21.1164	4.142732	17.382	4.4654	19.3470	4.896352	21.2142	4.034432	17.4798
1.0081	3.0355	19.6333	3.329933	21.53776	2.74104	17.72884	2.9131	19.7331	3.194277	21.63751	2.631979	17.8286
1.0396	1.4313	19.9797	1.57014	21.91776	1.292463	18.04164	1.3089	20.0812	1.43527	22.01927	1.182615	18.14316
1.0711	-0.2148	20.2206	-0.23562	22.18203	-0.19395	18.25917	-0.3371	20.3233	-0.36969	22.28477	-0.30461	18.36191
1.1026	-1.8928	20.3544	-2.07637	22.32881	-1.70917	18.37999	-2.0151	20.4578	-2.20961	22.43222	-1.82065	18.48341
1.1341	-3.5926	20.3802	-3.94112	22.35711	-3.24414	18.40329	-3.7150	20.4837	-4.07353	22.46066	-3.35645	18.50684
1.1656	-5.3044	20.2977	-5.81888	22.26661	-4.78982	18.32879	-5.4267	20.4008	-5.95045	22.36974	-4.90297	18.43192
1.1972	-7.0233	19.6149	-7.70462	21.51757	-6.34207	17.71223	-7.1457	19.7146	-7.83535	21.61723	-6.45607	17.81189
1.2287	-8.7287	18.2776	-9.5754	20.05055	-7.88201	16.50465	-8.8511	18.3705	-9.70529	20.14342	-7.99684	16.59751
1.2602	-10.4158	16.7612	-11.4262	18.38706	-9.40549	15.13534	-10.5382	16.8464	-11.5553	18.47222	-9.52115	15.2205
1.2917	-12.0748	15.0671	-13.246	16.52863	-10.9035	13.60557	-12.1971	15.1437	-13.3743	16.60518	-11.02	13.68212
1.3232	-13.6954	13.1979	-15.0239	14.47812	-12.3669	11.91768	-13.8178	13.2650	-15.1513	14.54517	-12.4842	11.98474
1.3547	-15.2678	11.1571	-16.7488	12.23935	-13.7868	10.07485	-15.3902	11.2138	-16.8755	12.29604	-13.9049	10.13153
1.3862	-16.7820	9.2645	-18.4098	10.16318	-15.1541	8.365839	-16.9043	9.3116	-18.5358	10.21025	-15.2729	8.412911
1.4177	-18.2278	8.1613	-19.9959	8.952947	-16.4597	7.369633	-18.3502	8.2028	-20.1211	8.994413	-16.5792	7.4111
1.4492	-19.5953	6.9066	-21.4961	7.576528	-17.6946	6.236632	-19.7177	6.9417	-21.6207	7.61162	-17.8147	6.271724
1.4807	-20.8745	5.5030	-22.8994	6.036832	-18.8497	4.969228	-20.9969	5.5310	-23.0233	6.064792	-18.9705	4.997189
1.5122	-22.0554	3.9546	-24.1948	4.33818	-19.916	3.57098	-22.1778	3.9747	-24.3182	4.358273	-20.0374	3.591073
1.5437	-23.1280	2.2664	-25.3714	2.486266	-20.8845	2.046574	-23.2503	2.2779	-25.4942	2.497781	-21.0064	2.058089
1.5752	-24.0821	0.4448	-26.4181	0.487891	-21.7461	0.401609	-24.2045	0.4470	-26.5405	0.490151	-21.8685	0.403868

g) Peening,3-3,Sy (continued)

36						54					
0.6283185						0.9424778					
	1.0198262	1.0951156		0.9048844			1.0427926	1.0930208		0.9069792	
Mean		Min - Insided Surface		Max-Inside Surface		Mean		Min - Insided Surface		Max-Inside Surface	
Stress: Sy (ksi)	K(Sy) ksi*in^0.5	Stress: Sy (ksi)	K(Sy) ksi*in^0.5	Stress: Sy (ksi)	K(Sy) ksi*in^0.5	Stress: Sy (ksi)	K(Sy) ksi*in^0.5	Stress: Sy (ksi)	K(Sy) ksi*in^0.5	Stress: Sy (ksi)	K(Sy) ksi*in^0.5
-28.1805	0.0000	-30.8609	0	-25.5001	0	-28.7335	0.0000	-31.4064	0	-26.0607	0
-23.1546	-8.8033	-25.357	-9.64061	-20.9522	-7.96595	-23.7077	-9.0015	-25.913	-9.83886	-21.5024	-8.1642
-18.4911	-11.0916	-20.2499	-12.1466	-16.7323	-10.0366	-19.0442	-11.3414	-20.8157	-12.3964	-17.2727	-10.2864
-14.1801	-12.0064	-15.5288	-13.1484	-12.8313	-10.8644	-14.7332	-12.2768	-16.1037	-13.4188	-13.3627	-11.1348
-10.2114	-12.1380	-11.1827	-13.2925	-9.24015	-10.9835	-10.7645	-12.4113	-11.7658	-13.5658	-9.76318	-11.2568
-6.5751	-11.7460	-7.20052	-12.8632	-5.94973	-10.6287	-7.1282	-12.0105	-7.79128	-13.1277	-6.46513	-10.8932
-3.2612	-10.9799	-3.57138	-12.0242	-2.951	-9.9355	-3.8143	-11.2271	-4.16908	-12.2715	-3.45946	-10.1828
-0.2596	-9.9992	-0.28429	-10.9503	-0.2349	-9.04816	-0.8127	-10.2244	-0.88827	-11.1755	-0.73708	-9.27334
2.4397	-8.8185	2.671727	-9.65731	2.207624	-7.97975	1.8866	-9.0171	2.062089	-9.8559	1.711103	-8.17834
4.8466	-7.4651	5.307624	-8.17514	4.385643	-6.75505	4.2936	-7.6332	4.692944	-8.34326	3.894164	-6.92316
6.9713	-5.9782	7.634373	-6.54682	6.308215	-5.40958	6.4182	-6.1128	7.015242	-6.68145	5.821187	-5.54421
8.8237	-4.3900	9.662943	-4.80751	7.984404	-3.9724	8.2706	-4.4888	9.039932	-4.90637	7.501257	-4.07126
10.4138	-2.7272	11.4043	-2.98663	9.423272	-2.46783	9.8607	-2.7886	10.77796	-3.04805	8.943456	-2.52924
11.7555	-1.0370	12.87364	-1.13559	10.63737	-0.93833	11.2024	-1.0603	12.24448	-1.15894	10.16037	-0.96168
12.8504	0.6685	14.07265	0.732133	11.6281	0.604955	12.2973	0.6836	13.4412	0.747189	11.15339	0.620011
13.7131	2.3978	15.01738	2.625896	12.40873	2.169755	13.1600	2.4518	14.38413	2.679895	11.93582	2.223754
14.3536	4.1345	15.71881	4.527776	12.98831	3.741261	13.8005	4.2276	15.08421	4.620885	12.51675	3.83437
14.7819	5.8637	16.1879	6.421435	13.37592	5.305975	14.2288	5.9958	15.5524	6.553485	12.90525	5.438025
15.0081	7.5717	16.43561	8.291865	13.5806	6.851494	14.4550	7.7422	15.79965	8.462378	13.11041	7.022008
15.0422	9.1774	16.47292	10.05026	13.61143	8.304445	14.4891	9.3840	15.83689	10.25694	13.14131	8.511118
14.8941	10.5252	16.3108	11.52633	13.47747	9.524106	14.3411	10.7622	15.67507	11.76336	13.00704	9.761133
14.5740	11.8051	15.9602	12.92795	13.18777	10.68225	14.0209	12.0710	15.32514	13.1938	12.71667	10.9481
14.0918	13.0059	15.4321	14.24301	12.75141	11.76888	13.5387	13.2988	14.79805	14.53591	12.2793	12.06177
13.4575	14.1177	14.73747	15.46047	12.17744	12.77485	12.9044	14.4356	14.10475	15.7784	11.704	13.09278
12.6811	15.1307	13.88727	16.56981	11.47493	13.69149	12.1280	15.4714	13.25617	16.91055	10.99986	14.03223
11.7727	16.0361	12.89247	17.56133	10.65293	14.51077	11.2196	16.3972	12.26328	17.92246	10.17596	14.8719
10.7423	16.9087	11.76403	18.517	9.720516	15.30044	10.1892	17.2895	11.137	18.89779	9.241387	15.68122
9.5998	17.6794	10.51293	19.36099	8.686745	15.99781	9.0468	18.0775	9.888297	19.75913	8.205223	16.39595
8.3554	18.3419	9.150139	20.08648	7.560679	16.59728	7.8023	18.7549	8.528109	20.49954	7.076551	17.01034
7.0190	18.8911	7.686615	20.68789	6.351382	17.09422	6.4659	19.3165	7.067384	21.11332	5.864454	17.51965
5.6006	19.3220	6.133328	21.15986	5.067914	17.48421	5.0475	19.7572	5.517068	21.59499	4.578015	17.91934
4.1103	19.6308	4.501246	21.49804	3.71934	17.76364	3.5572	20.0729	3.888109	21.94012	3.226319	18.20572
2.5580	20.0226	2.801338	21.92701	2.31472	18.1181	2.0049	20.4735	2.191452	22.37792	1.818448	18.569
0.9538	20.3758	1.044569	22.31388	0.863118	18.43776	0.4008	20.8347	0.438044	22.77274	0.363485	18.89662
-0.6922	20.6215	-0.75809	22.58293	-0.6264	18.66007	-1.2453	21.0859	-1.36117	23.04732	-1.12949	19.12447
-2.3702	20.7580	-2.59568	22.73236	-2.14478	18.78355	-2.9233	21.2254	-3.19524	23.19982	-2.65138	19.25101
-4.0701	20.7843	-4.45722	22.76117	-3.68296	18.80735	-4.6232	21.2523	-5.05322	23.22923	-4.19312	19.27541
-5.7818	20.7001	-6.33175	22.66903	-5.23187	18.73122	-6.3349	21.1663	-6.92416	23.1352	-5.74561	19.19739
-7.5008	20.0038	-8.21425	21.90646	-6.78736	18.10112	-8.0539	20.4543	-8.80307	22.35695	-7.30471	18.5516
-9.2062	18.6400	-10.0818	20.41293	-8.33051	16.86702	-9.7592	19.0597	-10.6671	20.8327	-8.85143	17.28679
-10.8933	17.0935	-11.9294	18.71937	-9.85718	15.46765	-11.4464	17.4785	-12.5111	19.10432	-10.3816	15.8526
-12.5522	15.3658	-13.7461	16.82735	-11.3583	13.90429	-13.1053	15.7119	-14.3244	17.17339	-11.8862	14.25033
-14.1729	13.4596	-15.5209	14.73978	-12.8248	12.17935	-14.7260	13.7627	-16.0958	15.04289	-13.3561	12.48246
-15.7453	11.3783	-17.2429	12.46056	-14.2477	10.29605	-16.2984	11.6345	-17.8145	12.7168	-14.7823	10.55229
-17.2594	9.4482	-18.9011	10.34686	-15.6178	8.54952	-17.8125	9.6610	-19.4694	10.55963	-16.1556	8.762292
-18.7053	8.3231	-20.4844	9.114754	-16.9261	7.531441	-19.2583	8.5105	-21.0498	9.30219	-17.4669	7.718876
-20.0728	7.0435	-21.982	7.713459	-18.1636	6.373563	-20.6259	7.2021	-22.5445	7.872079	-18.7072	6.532183
-21.3520	5.6121	-23.3829	6.145936	-19.3211	5.078333	-21.9051	5.7385	-23.9427	6.272321	-19.8675	5.204717
-22.5329	4.0330	-24.6761	4.416584	-20.3897	3.649385	-23.0860	4.1238	-25.2334	4.507407	-20.9385	3.740207
-23.6054	2.3114	-25.8507	2.531201	-21.3602	2.091509	-24.1585	2.3634	-26.4057	2.583252	-21.9112	2.14356
-24.5596	0.4536	-26.8956	0.496709	-22.2236	0.410426	-25.1127	0.4638	-27.4487	0.506923	-22.7767	0.420641

g) Peening,3-3,Sy (continued)

72						90					
1.2566371						1.5707963					
	1.071732	1.090509		0.909491			1.1038115	1.0878786		0.9121214	
Mean		Min - Insided Surface		Max-Inside Surface		Mean		Min - Insided Surface		Max-Inside Surface	
Stress: Sy (ksi)	K(Sy) ksi*in^0.5	Stress: Sy (ksi)	K(Sy) ksi*in^0.5	Stress: Sy (ksi)	K(Sy) ksi*in^0.5	Stress: Sy (ksi)	K(Sy) ksi*in^0.5	Stress: Sy (ksi)	K(Sy) ksi*in^0.5	Stress: Sy (ksi)	K(Sy) ksi*in^0.5
-29.4305	0.0000	-32.0942	0	-26.7667	0	-30.2030	0.0000	-32.86	0.00	-27.55	0.00
-24.4046	-9.2513	-26.6134	-10.0887	-22.1958	-8.41401	-25.1771	-9.5283	-27.39	-10.37	-22.96	-8.69
-19.7411	-11.6562	-21.5279	-12.7111	-17.9544	-10.6012	-20.5137	-12.0051	-22.32	-13.06	-18.71	-10.95
-15.4301	-12.6175	-16.8266	-13.7595	-14.0335	-11.4755	-16.2026	-12.9952	-17.63	-14.14	-14.78	-11.85
-11.4614	-12.7558	-12.4988	-13.9103	-10.4241	-11.6012	-12.2340	-13.1376	-13.31	-14.29	-11.16	-11.98
-7.8251	-12.3438	-8.53337	-13.461	-7.11688	-11.2266	-8.5977	-12.7133	-9.35	-13.83	-7.84	-11.60
-4.5112	-11.5387	-4.91949	-12.5831	-4.10289	-10.4943	-5.2837	-11.8841	-5.75	-12.93	-4.82	-10.84
-1.5096	-10.5082	-1.64623	-11.4593	-1.37296	-9.55709	-2.2821	-10.8227	-2.48	-11.77	-2.08	-9.87
1.1897	-9.2674	1.297352	-10.1061	1.081999	-8.42858	0.4171	-9.5448	0.45	-10.38	0.38	-8.71
3.5966	-7.8450	3.922161	-8.55509	3.271105	-7.135	2.8241	-8.0799	3.07	-8.79	2.58	-7.37
5.7213	-6.2825	6.239123	-6.85109	5.203465	-5.71385	4.9488	-6.4705	5.38	-7.04	4.51	-5.90
7.5737	-4.6134	8.25916	-5.03094	6.888188	-4.19583	6.8011	-4.7515	7.40	-5.17	6.20	-4.33
9.1638	-2.8660	9.993192	-3.12544	8.334381	-2.60663	8.3912	-2.9518	9.13	-3.21	7.65	-2.69
10.5055	-1.0897	11.45635	-1.18837	9.55466	-0.99111	9.7330	-1.1224	10.59	-1.22	8.88	-1.02
11.6004	0.7026	12.65031	0.76616	10.55044	0.638982	10.8278	0.7236	11.78	0.79	9.88	0.66
12.4631	2.5199	13.59107	2.747938	11.33504	2.291796	11.6905	2.5953	12.72	2.82	10.66	2.37
13.1036	4.3450	14.28955	4.738209	11.91757	3.951694	12.3310	4.4750	13.41	4.87	11.25	4.08
13.5319	6.1621	14.75667	6.719878	12.30715	5.604418	12.7594	6.3466	13.88	6.90	11.64	5.79
13.7581	7.9571	15.00334	8.677238	12.51287	7.236867	12.9856	8.1952	14.13	8.92	11.84	7.48
13.7922	9.6445	15.04049	10.51736	12.54386	8.771542	13.0196	9.9331	14.16	10.81	11.88	9.06
13.6441	11.0609	14.87905	12.06203	12.40921	10.0598	12.8716	11.3920	14.00	12.39	11.74	10.39
13.3240	12.4059	14.52993	13.52879	12.11804	11.28309	12.5514	12.7773	13.65	13.90	11.45	11.65
12.8418	13.6679	14.00405	14.90497	11.67946	12.43084	12.0692	14.0770	13.13	15.31	11.01	12.84
12.2075	14.8362	13.31234	16.17901	11.10257	13.49339	11.4349	15.2803	12.44	16.62	10.43	13.94
11.4311	15.9008	12.46571	17.33991	10.39648	14.46159	10.6586	16.3767	11.60	17.82	9.72	14.94
10.5227	16.8522	11.4751	18.37751	9.570298	15.32696	9.7502	17.3567	10.61	18.88	8.89	15.83
9.4923	17.7693	10.35141	19.3776	8.633137	16.16103	8.7197	18.3012	9.49	19.91	7.95	16.69
8.3498	18.5792	9.105575	20.26081	7.594104	16.89764	7.5773	19.1353	8.24	20.82	6.91	17.45
7.1054	19.2754	7.748513	21.02002	6.462306	17.53082	6.3329	19.8524	6.89	21.60	5.78	18.11
5.7690	19.8525	6.291145	21.64938	5.246852	18.05571	4.9965	20.4468	5.44	22.24	4.56	18.65
4.3506	20.3055	4.744392	22.14329	3.956851	18.46763	3.5781	20.9133	3.89	22.75	3.26	19.08
2.8603	20.6300	3.119175	22.49718	2.601411	18.76278	2.0878	21.2475	2.27	23.11	1.90	19.38
1.3080	21.0416	1.426417	22.94609	1.189641	19.13718	0.5355	21.6715	0.58	23.58	0.49	19.77
-0.2962	21.4129	-0.32296	23.35094	-0.26935	19.47482	-1.0687	22.0538	-1.16	23.99	-0.97	20.12
-1.9422	21.6711	-2.11804	23.63249	-1.76646	19.70964	-2.7148	22.3197	-2.95	24.28	-2.48	20.36
-3.6202	21.8145	-3.94789	23.78887	-3.29257	19.84006	-4.3928	22.4674	-4.78	24.44	-4.01	20.49
-5.3201	21.8421	-5.8016	23.81902	-4.83857	19.8652	-6.0926	22.4959	-6.63	24.47	-5.56	20.52
-7.0318	21.7537	-7.66825	23.7226	-6.39537	19.78479	-7.8044	22.4048	-8.49	24.37	-7.12	20.44
-8.7508	21.0219	-9.54283	22.92459	-7.95878	19.11924	-9.5233	21.6512	-10.36	23.55	-8.69	19.75
-10.4562	19.5887	-11.4025	21.36164	-9.50979	17.81573	-11.2287	20.1750	-12.22	21.95	-10.24	18.40
-12.1433	17.9635	-13.2424	19.58937	-11.0442	16.33765	-12.9158	18.5012	-14.05	20.13	-11.78	16.88
-13.8022	16.1479	-15.0514	17.60942	-12.553	14.68636	-14.5748	16.6312	-15.86	18.09	-13.29	15.17
-15.4229	14.1446	-16.8188	15.42483	-14.027	12.8644	-16.1954	14.5680	-17.62	15.85	-14.77	13.29
-16.9953	11.9574	-18.5335	13.03968	-15.4571	10.87517	-17.7678	12.3153	-19.33	13.40	-16.21	11.23
-18.5094	9.9291	-20.1847	10.82774	-16.8341	9.030401	-19.2820	10.2263	-20.98	11.12	-17.59	9.33
-19.9553	8.7467	-21.7614	9.538372	-18.1491	7.955059	-20.7278	9.0085	-22.55	9.80	-18.91	8.22
-21.3228	7.4020	-23.2527	8.071951	-19.3929	6.732054	-22.0953	7.6236	-24.04	8.29	-20.15	6.95
-22.6020	5.8978	-24.6477	6.431575	-20.5563	5.363971	-23.3745	6.0743	-25.43	6.61	-21.32	5.54
-23.7829	4.2382	-25.9354	4.62185	-21.6303	3.85465	-24.5554	4.3651	-26.71	4.75	-22.40	3.98
-24.8554	2.4290	-27.1051	2.648841	-22.6058	2.209149	-25.6280	2.5017	-27.88	2.72	-23.38	2.28
-25.8096	0.4767	-28.1456	0.519794	-23.4736	0.433511	-26.5821	0.4909	-28.92	0.53	-24.25	0.45

From Analyses	
Mean Stress: Sy (ksi)	K(Sy) ksi*in^0.5
-27.7030	0
-22.6771	-8.63214
-18.0137	-10.876
-13.7026	-11.773
-9.7340	-11.902
-6.0977	-11.5176
-2.7837	-10.7664
0.2179	-9.80485
2.9171	-8.64709
5.3241	-7.31997
7.4488	-5.86198
9.3011	-4.30461
10.8912	-2.67421
12.2330	-1.0168
13.3278	0.655547
14.1905	2.35121
14.8310	4.05414
15.2594	5.74971
15.4856	7.42448
15.5196	8.99894
15.3716	10.3206
15.0514	11.5756
14.5692	12.7531
13.9349	13.8432
13.1586	14.8365
12.2502	15.7243
11.2197	16.58
10.0773	17.3357
8.8329	17.9853
7.4965	18.5238
6.0781	18.9464
4.5878	19.2492
3.0355	19.6333
1.4313	19.9797
-0.2148	20.2206
-1.8928	20.3544
-3.5926	20.3802
-5.3044	20.2977
-7.0233	19.6149
-8.7287	18.2776
-10.4158	16.7612
-12.0748	15.0671
-13.6954	13.1979
-15.2678	11.1571
-16.7820	9.26451
-18.2278	8.16129
-19.5953	6.90658
-20.8745	5.50303
-22.0554	3.95458
-23.1280	2.26642
-24.0821	0.44475

g) Peening,3-3,Sy (continued)

In Metric Unit

Unit Conv: 1.0000 in = 25.4000 mm 1.0000 ksi = 6.8948 MPa 1.0000 ksi-in^0.5= 1.0988 MPa-m^0.5

	Mean		Min - Insided Surface		Max-Inside Surface		Mean		Min - Insided Surface		Max-Inside Surface	
Depth	Stress: Sy	K(Sy)	Stress: Sy	K(Sy)	Stress: Sy	K(Sy)	Stress: Sy	K(Sy)	Stress: Sy	K(Sy)	Stress: Sy	K(Sy)
(mm)	MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5
0.0000	-191.0055	0.0000	-209.5333	0.0000	-172.4777	0.0000	-191.8491	0.0000	-210.3646	0.0000	-173.3335	0.0000
0.8001	-156.3533	-9.4854	-171.5198	-10.4055	-141.1868	-8.5653	-157.1969	-9.5336	-172.3682	-10.4537	-142.0257	-8.6135
1.6002	-124.1999	-11.9510	-136.2475	-13.1103	-112.1524	-10.7918	-125.0436	-12.0117	-137.1117	-13.1710	-112.9755	-10.8525
2.4003	-94.4763	-12.9367	-103.6406	-14.1916	-85.3120	-11.6818	-95.3199	-13.0024	-104.5193	-14.2573	-86.1205	-11.7475
3.2004	-67.1133	-13.0784	-73.6234	-14.3471	-60.6032	-11.8098	-67.9569	-13.1449	-74.5155	-14.4135	-61.3983	-11.8763
4.0005	-42.0419	-12.6560	-46.1201	-13.8837	-37.9638	-11.4284	-42.8856	-12.7203	-47.0245	-13.9480	-38.7466	-11.4927
4.8006	-19.1932	-11.8306	-21.0549	-12.9782	-17.3314	-10.6830	-20.0368	-11.8907	-21.9706	-13.0383	-18.1030	-10.7431
5.6007	1.5021	-10.7740	1.6478	-11.8191	1.3564	-9.7289	0.6585	-10.8287	0.7220	-11.8738	0.5949	-9.7836
6.4008	20.1129	-9.5018	22.0639	-10.4235	18.1619	-8.5801	19.2693	-9.5501	21.1290	-10.4718	17.4096	-8.6284
7.2009	36.7083	-8.0435	40.2691	-8.8237	33.1476	-7.2633	35.8647	-8.0844	39.3260	-8.8646	32.4033	-7.3041
8.0010	51.3573	-6.4414	56.3391	-7.0662	46.3756	-5.8166	50.5137	-6.4741	55.3888	-7.0989	45.6386	-5.8493
8.8011	64.1290	-4.7301	70.3496	-5.1889	57.9084	-4.2713	63.2854	-4.7541	69.3931	-5.2129	57.1777	-4.2953
9.6012	75.0925	-2.9385	82.3766	-3.2236	67.8084	-2.6535	74.2488	-2.9535	81.4147	-3.2385	67.0830	-2.6684
10.4038	84.3433	-1.1173	92.5247	-1.2257	76.1619	-1.0089	83.4997	-1.1230	91.5583	-1.2314	75.4410	-1.0146
11.2039	91.8922	0.7203	100.8058	0.7902	82.9785	0.6505	91.0485	0.7240	99.8357	0.7939	82.2613	0.6541
12.0040	97.8401	2.5836	107.3308	2.8342	88.3495	2.3330	96.9965	2.5967	106.3577	2.8474	87.6353	2.3461
12.8041	102.2563	4.4549	112.1753	4.8870	92.3373	4.0227	101.4126	4.4775	111.2001	4.9096	91.6252	4.0454
13.6042	105.2096	6.3180	115.4151	6.9309	95.0041	5.7052	104.3660	6.3501	114.4384	6.9630	94.2935	5.7373
14.4043	106.7692	8.1583	117.1260	8.9497	96.4124	7.3670	105.9256	8.1998	116.1486	8.9912	95.7026	7.4084
15.2044	107.0041	9.8884	117.3837	10.8476	96.6246	8.9292	106.1605	9.9387	116.4061	10.8979	95.9148	8.9795
16.0045	105.9834	11.3407	116.2639	12.4408	95.7028	10.2407	105.1397	11.3983	115.2869	12.4984	94.9926	10.2983
16.8046	103.7760	12.7198	113.8425	13.9536	93.7096	11.4859	102.9324	12.7844	112.8665	14.0182	92.9983	11.5506
17.6047	100.4512	14.0137	110.1951	15.3730	90.7073	12.6543	99.6075	14.0849	109.2208	15.4442	89.9943	12.7255
18.4048	96.0778	15.2115	105.3975	16.6870	86.7581	13.7360	95.2342	15.2888	104.4253	16.7643	86.0430	13.8133
19.2049	90.7250	16.3030	99.5255	17.8844	81.9246	14.7216	89.8814	16.3858	98.5559	17.9672	81.2068	14.8044
20.0050	84.4618	17.2785	92.6548	18.9546	76.2689	15.6025	83.6182	17.3663	91.6883	19.0424	75.5481	15.6903
20.8051	77.3573	18.2188	84.8611	19.9861	69.8536	16.4516	76.5137	18.3114	83.8981	20.0786	69.1293	16.5441
21.6052	69.4805	19.0492	76.2202	20.8970	62.7408	17.2014	68.6369	19.1460	75.2611	20.9938	62.0127	17.2982
22.4053	60.9005	19.7630	66.8079	21.6801	54.9930	17.8460	60.0568	19.8634	65.8530	21.7805	54.2607	17.9464
23.2054	51.6862	20.3547	56.6999	22.3292	46.6726	18.3803	50.8426	20.4582	55.7495	22.4326	45.9357	18.4837
24.0055	41.9069	20.8191	45.9719	22.8386	37.8418	18.7996	41.0632	20.9249	45.0263	22.9444	37.1002	18.9054
24.8056	31.6314	21.1518	34.6997	23.2036	28.5631	19.1001	30.7878	21.2593	33.7592	23.3111	27.8164	19.2076
25.6057	20.9289	21.5739	22.9591	23.6666	18.8988	19.4812	20.0853	21.6835	22.0238	23.7762	18.1469	19.5908
26.4058	9.8685	21.9546	10.8257	24.0842	8.9112	19.8249	9.0248	22.0661	9.8958	24.1957	8.1538	19.9365
27.2059	-1.4809	22.2193	-1.6246	24.3746	-1.3373	20.0640	-2.3246	22.3322	-2.5489	24.4875	-2.1002	20.1769
28.0060	-13.0502	22.3663	-14.3161	24.5359	-11.7843	20.1967	-13.8938	22.4799	-15.2347	24.6495	-12.5529	20.3104
28.8061	-24.7703	22.3946	-27.1731	24.5670	-22.3676	20.2223	-25.6140	22.5084	-28.0860	24.6807	-23.1419	20.3361
29.6062	-36.5722	22.3040	-40.1198	24.4675	-33.0247	20.1405	-37.4158	22.4173	-41.0269	24.5808	-33.8048	20.2538
30.4089	-48.4243	21.5537	-53.1215	23.6444	-43.7271	19.4630	-49.2679	21.6632	-54.0228	23.7539	-44.5130	19.5725
31.2090	-60.1823	20.0842	-66.0201	22.0324	-54.3445	18.1360	-61.0259	20.1863	-66.9156	22.1345	-55.1363	18.2381
32.0091	-71.8147	18.4179	-78.7809	20.2045	-64.8486	16.6314	-72.6584	18.5115	-79.6707	20.2981	-65.6460	16.7249
32.8092	-83.2525	16.5564	-91.3281	18.1624	-75.1769	14.9504	-84.0961	16.6405	-92.2124	18.2465	-75.9799	15.0345
33.6093	-94.4266	14.5024	-103.5861	15.9092	-85.2671	13.0957	-95.2702	14.5761	-104.4649	15.9829	-86.0756	13.1693
34.4094	-105.2680	12.2599	-115.4791	13.4491	-95.0568	11.0707	-106.1116	12.3222	-116.3525	13.5114	-95.8706	11.1330
35.2095	-115.7075	10.1802	-126.9313	11.1677	-104.4837	9.1927	-116.5511	10.2320	-127.7996	11.2195	-105.3027	9.2445
36.0096	-125.6762	8.9680	-137.8670	9.8379	-113.4855	8.0981	-126.5199	9.0135	-138.7304	9.8834	-114.3093	8.1436
36.8097	-135.1050	7.5892	-148.2104	8.3254	-121.9997	6.8531	-135.9487	7.6278	-149.0692	8.3640	-122.8281	6.8916
37.6098	-143.9249	6.0470	-157.8858	6.6335	-129.9640	5.4604	-144.7686	6.0777	-158.7403	6.6643	-130.7968	5.4911
38.4099	-152.0668	4.3455	-166.8175	4.7670	-137.3161	3.9239	-152.9104	4.3675	-167.6680	4.7891	-138.1529	3.9460
39.2100	-159.4616	2.4904	-174.9296	2.7320	-143.9936	2.2489	-160.3053	2.5031	-175.7765	2.7447	-144.8340	2.2615
40.0101	-166.0404	0.4887	-182.1465	0.5361	-149.9342	0.4413	-166.8840	0.4912	-182.9902	0.5386	-150.7779	0.4438

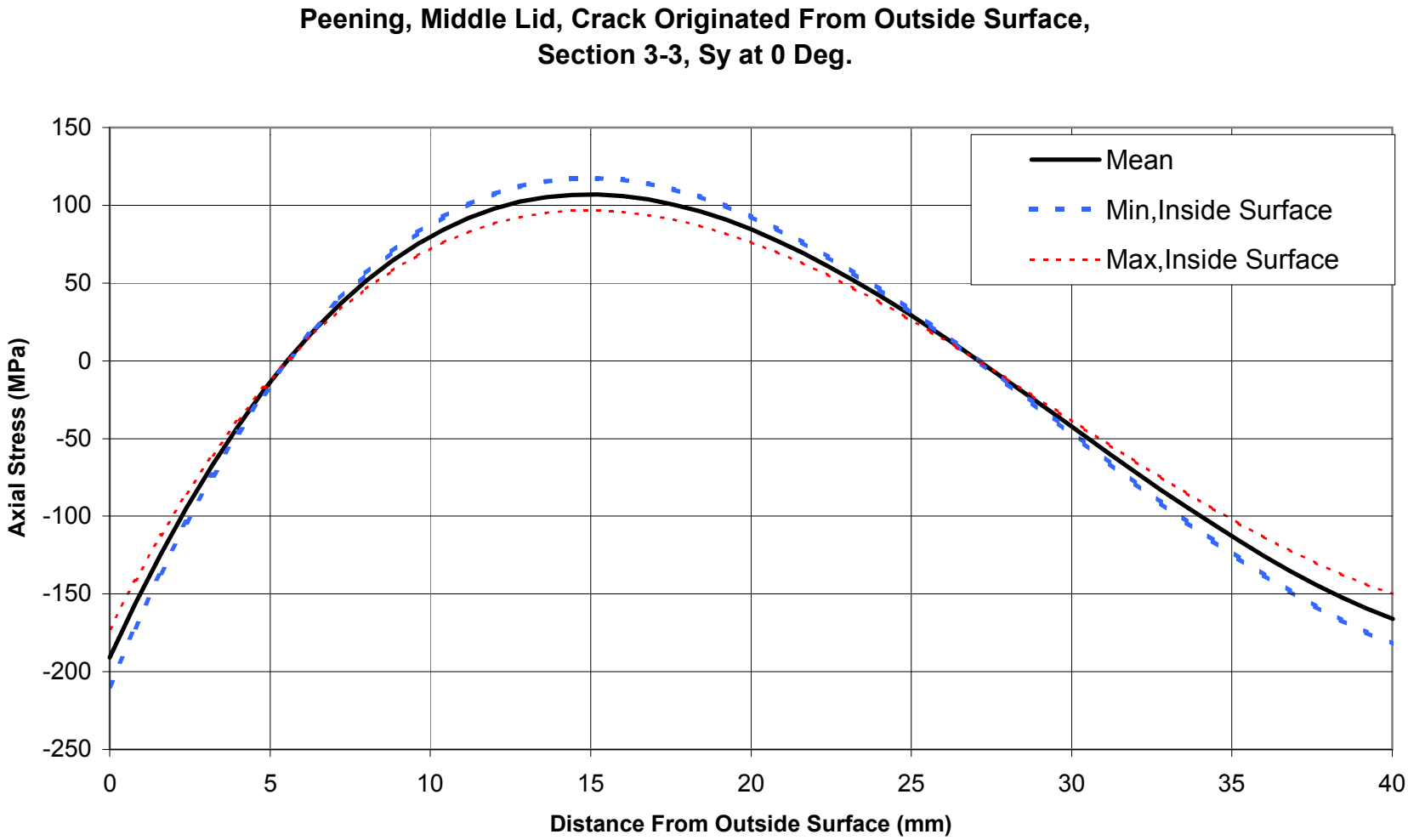
g) Peening,3-3,Sy (continued)

Mean		Min - Insided Surface		Max-Inside Surface		Mean		Min - Insided Surface		Max-Inside Surface	
Stress: Sy	K(Sy)	Stress: Sy	K(Sy)	Stress: Sy	K(Sy)	Stress: Sy	K(Sy)	Stress: Sy	K(Sy)	Stress: Sy	K(Sy)
MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5
-194.2974	0.0000	-212.7781	0.0000	-175.8167	0.0000	-198.1108	0.0000	-216.5392	0.0000	-179.6823	0.0000
-159.6453	-9.6734	-174.8300	-10.5935	-144.4605	-8.7533	-163.4586	-9.8913	-178.6637	-10.8114	-148.2536	-8.9712
-127.4919	-12.1880	-139.6184	-13.3472	-115.3654	-11.0287	-131.3052	-12.4624	-143.5194	-13.6217	-119.0911	-11.3032
-97.7682	-13.1932	-107.0675	-14.4480	-88.4690	-11.9383	-101.5816	-13.4903	-111.0308	-14.7451	-92.1324	-12.2354
-70.4053	-13.3377	-77.1019	-14.6064	-63.7086	-12.0691	-74.2186	-13.6381	-81.1225	-14.9067	-67.3147	-12.3695
-45.3339	-12.9070	-49.6459	-14.1346	-41.0219	-11.6793	-49.1472	-13.1976	-53.7190	-14.4253	-44.5755	-11.9700
-22.4851	-12.0651	-24.6238	-13.2127	-20.3464	-10.9176	-26.2985	-12.3368	-28.7448	-13.4844	-23.8522	-11.1893
-1.7898	-10.9876	-1.9601	-12.0327	-1.6196	-9.9425	-5.6032	-11.2350	-6.1244	-12.2801	-5.0820	-10.1899
16.8210	-9.6902	18.4209	-10.6119	15.2210	-8.7685	13.0076	-9.9084	14.2176	-10.8301	11.7976	-8.9867
33.4164	-8.2030	36.5948	-8.9832	30.2379	-7.4227	29.6030	-8.3877	32.3567	-9.1679	26.8493	-7.6075
48.0654	-6.5691	52.6371	-7.1939	43.4936	-5.9443	44.2520	-6.7170	48.3684	-7.3419	40.1357	-6.0922
60.8371	-4.8239	66.6236	-5.2827	55.0505	-4.3650	57.0237	-4.9325	62.3281	-5.3913	51.7193	-4.4737
71.8005	-2.9968	78.6299	-3.2818	64.9712	-2.7118	67.9872	-3.0643	74.3114	-3.3493	61.6630	-2.7792
81.0513	-1.1395	88.7606	-1.2478	73.3421	-1.0311	77.2380	-1.1651	84.4227	-1.2735	70.0533	-1.0567
88.6002	0.7346	97.0275	0.8045	80.1729	0.6648	84.7869	0.7512	92.6738	0.8210	76.8999	0.6813
94.5482	2.6348	103.5412	2.8854	85.5552	2.3842	90.7348	2.6942	99.1751	2.9448	82.2946	2.4436
98.9643	4.5432	108.3774	4.9753	89.5513	4.1111	95.1510	4.6455	104.0020	5.0776	86.2999	4.2134
101.9177	6.4433	111.6116	7.0561	92.2237	5.8304	98.1043	6.5884	107.2301	7.2013	88.9786	5.9755
103.4773	8.3201	113.3196	9.1115	93.6349	7.5287	99.6639	8.5075	108.9347	9.2988	90.3931	7.7161
103.7122	10.0845	113.5768	11.0437	93.8475	9.1253	99.8988	10.3116	109.1915	11.2708	90.6061	9.3524
102.6914	11.5656	112.4590	12.6656	92.9239	10.4655	98.8781	11.8260	108.0758	12.9261	89.6804	10.7260
100.4841	12.9720	110.0417	14.2058	90.9265	11.7381	96.6707	13.2641	105.6631	14.4979	87.6784	12.0302
97.1592	14.2915	106.4006	15.6508	87.9179	12.9321	93.3459	14.6133	102.0290	15.9727	84.6628	13.2540
92.7859	15.5131	101.6113	16.9886	83.9605	14.0376	88.9725	15.8624	97.2488	17.3380	80.6962	14.3869
87.4331	16.6262	95.7493	18.2076	79.1168	15.0448	83.6197	17.0006	91.3981	18.5820	75.8414	15.4192
81.1699	17.6211	88.8904	19.2971	73.4494	15.9451	77.3565	18.0179	84.5523	19.6940	70.1608	16.3419
74.0654	18.5800	81.1101	20.3473	67.0206	16.8128	70.2520	18.9984	76.7869	20.7657	63.7171	17.2312
66.1886	19.4269	72.4841	21.2747	59.8930	17.5791	62.3752	19.8644	68.1774	21.7122	56.5730	18.0166
57.6085	20.1548	63.0880	22.0719	52.1290	18.2378	53.7952	20.6087	58.7992	22.5258	48.7911	18.6917
48.3943	20.7583	52.9973	22.7327	43.7912	18.7839	44.5809	21.2258	48.7279	23.2002	40.4340	19.2513
38.6149	21.2319	42.2878	23.2514	34.9420	19.2124	34.8016	21.7100	38.0388	23.7295	31.5643	19.6905
28.3395	21.5712	31.0350	23.6230	25.6439	19.5195	24.5261	22.0570	26.8076	24.1088	22.2447	20.0052
17.6370	22.0016	19.3145	24.0943	15.9594	19.9089	13.8236	22.4971	15.1095	24.5898	12.5378	20.4044
6.5765	22.3898	7.2021	24.5195	5.9510	20.2602	2.7632	22.8940	3.0202	25.0237	2.5061	20.7644
-4.7729	22.6598	-5.2269	24.8151	-4.3189	20.5045	-8.5862	23.1701	-9.3849	25.3254	-7.7875	21.0148
-16.3422	22.8097	-17.8966	24.9793	-14.7878	20.6402	-20.1555	23.3234	-22.0304	25.4930	-18.2806	21.1538
-28.0623	22.8386	-30.7314	25.0110	-25.3931	20.6663	-31.8756	23.3530	-34.8407	25.5253	-28.9105	21.1807
-39.8642	22.7462	-43.6559	24.9097	-36.0725	20.5827	-43.6775	23.2584	-47.7404	25.4219	-39.6146	21.0949
-51.7162	21.9810	-56.6353	24.0718	-46.7972	19.8903	-55.5296	22.4760	-60.6950	24.5668	-50.3642	20.3853
-63.4743	20.4824	-69.5117	22.4306	-57.4369	18.5342	-67.2876	20.9437	-73.5468	22.8919	-61.0285	18.9955
-75.1067	18.7831	-82.2505	20.5697	-67.9629	16.9965	-78.9200	19.2061	-86.2612	20.9926	-71.5788	17.4195
-86.5445	16.8846	-94.7762	18.4906	-78.3127	15.2786	-90.3578	17.2649	-98.7630	18.8709	-81.9527	15.6589
-97.7186	14.7899	-107.0131	16.1967	-88.4240	13.3832	-101.5319	15.1230	-110.9765	16.5298	-92.0873	13.7163
-108.5599	12.5030	-118.8857	13.6922	-98.2342	11.3137	-112.3733	12.7845	-122.8263	13.9738	-101.9202	11.5953
-118.9995	10.3821	-130.3182	11.3696	-107.6808	9.3946	-122.8128	10.6159	-134.2370	11.6034	-111.3887	9.6284
-128.9682	9.1458	-141.2351	10.0157	-116.7013	8.2759	-132.7815	9.3517	-145.1330	10.2216	-120.4301	8.4818
-138.3970	7.7397	-151.5607	8.4759	-125.2333	7.0035	-142.2103	7.9140	-155.4389	8.6502	-128.9818	7.1778
-147.2169	6.1669	-161.2195	6.7534	-133.2142	5.5803	-151.0302	6.3057	-165.0792	6.8923	-136.9813	5.7192
-155.3588	4.4316	-170.1358	4.8531	-140.5817	4.0101	-159.1721	4.5314	-173.9784	4.9529	-144.3658	4.1099
-162.7536	2.5398	-178.2340	2.7814	-147.2732	2.2982	-166.5669	2.5970	-182.0611	2.8386	-151.0727	2.3554
-169.3323	0.4984	-185.4385	0.5458	-153.2262	0.4510	-173.1457	0.5096	-189.2518	0.5570	-157.0395	0.4622

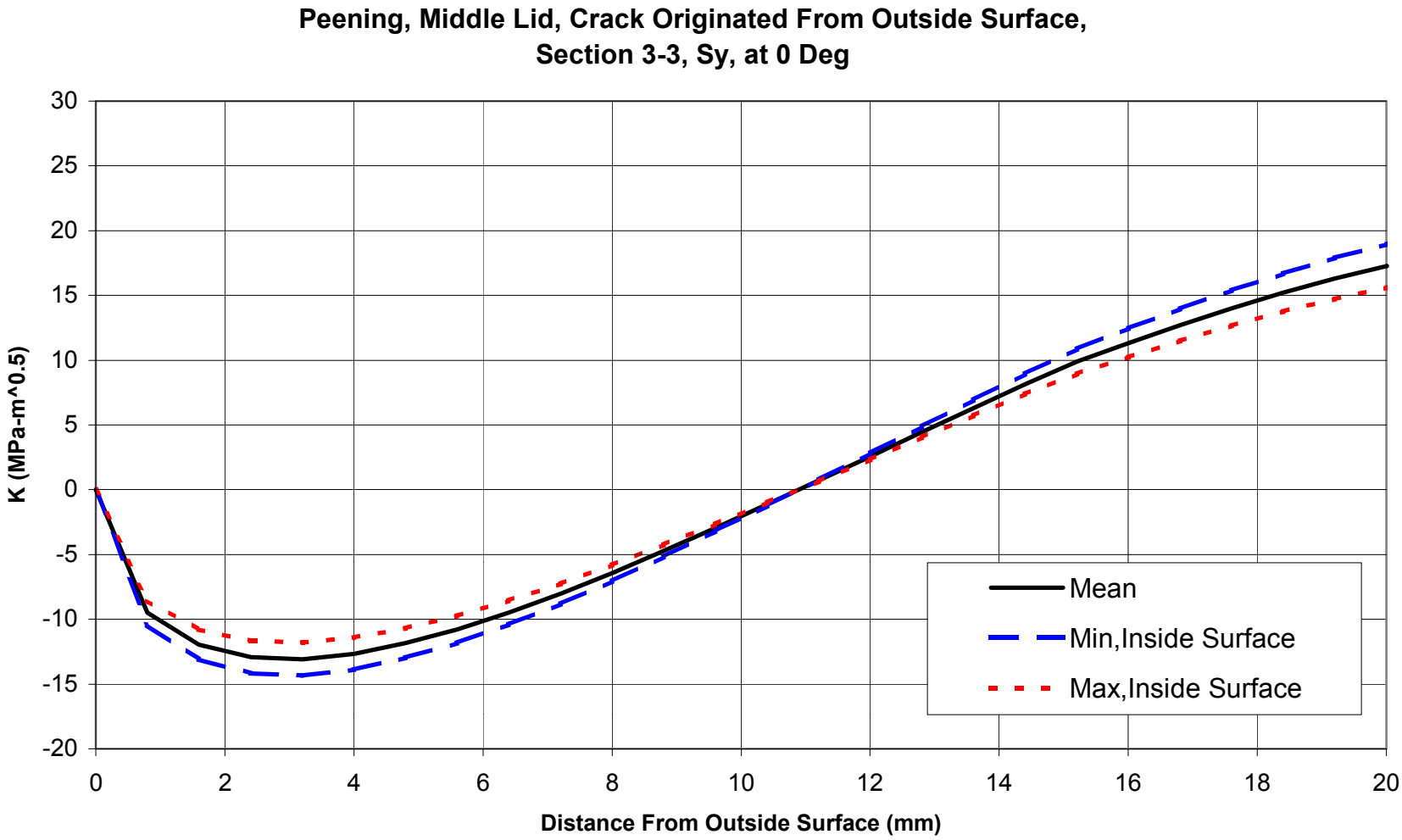
g) Peening,3-3,Sy (continued)

Mean		Min - Insided Surface		Max-Inside Surface		Mean		Min - Insided Surface		Max-Inside Surface	
Stress: Sy	K(Sy)	Stress: Sy	K(Sy)	Stress: Sy	K(Sy)	Stress: Sy	K(Sy)	Stress: Sy	K(Sy)	Stress: Sy	K(Sy)
MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5	MPa	MPa*m^0.5
-202.9159	0.0000	-221.2816	0.0000	-184.5501	0.0000	-208.2423	0.0000	-226.5424	0.0000	-189.9423	0.0000
-168.2637	-10.1658	-183.4931	-11.0859	-153.0343	-9.2457	-173.5902	-10.4701	-188.8451	-11.3902	-158.3353	-9.5500
-136.1103	-12.8083	-148.4296	-13.9676	-123.7911	-11.6490	-141.4368	-13.1917	-153.8661	-14.3509	-129.0076	-12.0324
-106.3867	-13.8647	-116.0156	-15.1195	-96.7577	-12.6098	-111.7132	-14.2797	-121.5304	-15.5345	-101.8960	-13.0248
-79.0237	-14.0166	-86.1761	-15.2852	-71.8713	-12.7479	-84.3502	-14.4361	-91.7628	-15.7047	-76.9376	-13.1675
-53.9523	-13.5639	-58.8355	-14.7915	-49.0692	-12.3362	-59.2788	-13.9699	-64.4882	-15.1975	-54.0695	-12.7422
-31.1036	-12.6792	-33.9187	-13.8268	-28.2884	-11.5316	-36.4300	-13.0587	-39.6315	-14.2063	-33.2286	-11.9111
-10.4083	-11.5468	-11.3503	-12.5919	-9.4662	-10.5017	-15.7348	-11.8925	-17.1175	-12.9375	-14.3520	-10.8474
8.2025	-10.1834	8.9449	-11.1051	7.4601	-9.2617	2.8760	-10.4882	3.1288	-11.4099	2.6233	-9.5665
24.7979	-8.6205	27.0423	-9.4007	22.5535	-7.8402	19.4714	-8.8785	21.1825	-9.6587	17.7603	-8.0983
39.4469	-6.9034	43.0172	-7.5283	35.8766	-6.2786	34.1204	-7.1101	37.1189	-7.7349	31.1220	-6.4853
52.2186	-5.0694	56.9449	-5.5282	47.4924	-4.6106	46.8921	-5.2211	51.0130	-5.6800	42.7713	-4.7623
63.1821	-3.1493	68.9006	-3.4344	57.4635	-2.8643	57.8556	-3.2436	62.9399	-3.5286	52.7713	-2.9585
72.4329	-1.1974	78.9887	-1.3058	65.8771	-1.0891	67.1064	-1.2333	73.0036	-1.3417	61.2092	-1.1249
79.9818	0.7720	87.2208	0.8419	72.7427	0.7021	74.6553	0.7951	81.2159	0.8650	68.0947	0.7252
85.9297	2.7689	93.7072	3.0196	78.1523	2.5183	80.6032	2.8518	87.6865	3.1024	73.5199	2.6012
90.3459	4.7744	98.5230	5.2065	82.1688	4.3423	85.0194	4.9173	92.4908	5.3495	77.5480	4.4852
93.2992	6.7712	101.7436	7.3841	84.8548	6.1584	87.9727	6.9739	95.7036	7.5868	80.2418	6.3611
94.8588	8.7436	103.4444	9.5349	86.2732	7.9522	89.5323	9.0053	97.4003	9.7966	81.6643	8.2139
95.0937	10.5977	103.7005	11.5569	86.4869	9.6385	89.7672	10.9150	97.6558	11.8741	81.8786	9.9558
94.0730	12.1542	102.5874	13.2543	85.5585	11.0541	88.7465	12.5180	96.5454	13.6181	80.9476	11.4179
91.8656	13.6322	100.1803	14.8660	83.5510	12.3983	86.5392	14.0402	94.1441	15.2741	78.9342	12.8064
88.5408	15.0189	96.5545	16.3782	80.5270	13.6595	83.2143	15.4684	90.5270	16.8278	75.9015	14.1091
84.1674	16.3027	91.7853	17.7782	76.5495	14.8271	78.8409	16.7906	85.7694	18.2662	71.9125	15.3151
78.8146	17.4724	85.9481	19.0538	71.6812	15.8910	73.4881	17.9954	79.9462	19.5768	67.0301	16.4140
72.5514	18.5180	79.1180	20.1940	65.9849	16.8419	67.2250	19.0722	73.1326	20.7483	61.3173	17.3962
65.4469	19.5257	71.3705	21.2929	59.5234	17.7584	60.1204	20.1101	65.4037	21.8774	54.8371	18.3429
57.5701	20.4156	62.7807	22.2635	52.3595	18.5678	52.2436	21.0267	56.8347	22.8745	47.6525	19.1789
48.9901	21.1807	53.4241	23.0977	44.5560	19.2636	43.6636	21.8146	47.5007	23.7317	39.8265	19.8976
39.7758	21.8148	43.3759	23.7893	36.1758	19.8404	34.4493	22.4678	37.4767	24.4422	31.4220	20.4934
29.9965	22.3125	32.7114	24.3320	27.2815	20.2930	24.6700	22.9804	26.8379	24.9999	22.5020	20.9609
19.7210	22.6691	21.5060	24.7209	17.9361	20.6174	14.3945	23.3477	15.6595	25.3994	13.1296	21.2959
9.0185	23.1215	9.8348	25.2142	8.2023	21.0288	3.6920	23.8135	4.0165	25.9062	3.3676	21.7208
-2.0419	23.5294	-2.2267	25.6590	-1.8571	21.3998	-7.3684	24.2337	-8.0159	26.3633	-6.7209	22.1041
-13.3913	23.8131	-14.6034	25.9684	-12.1793	21.6578	-18.7178	24.5259	-20.3627	26.6812	-17.0729	22.3706
-24.9606	23.9707	-27.2198	26.1402	-22.7014	21.8011	-30.2871	24.6882	-32.9487	26.8577	-27.6255	22.5186
-36.6807	24.0011	-40.0007	26.1734	-33.3608	21.8287	-42.0072	24.7195	-45.6987	26.8918	-38.3157	22.5471
-48.4826	23.9039	-52.8707	26.0674	-44.0945	21.7404	-53.8091	24.6194	-58.5378	26.7829	-49.0804	22.4559
-60.3347	23.0998	-65.7955	25.1905	-54.8739	21.0090	-65.6612	23.7912	-71.4314	25.8820	-59.8910	21.7005
-72.0927	21.5249	-78.6177	23.4731	-65.5677	19.5767	-77.4192	22.1692	-84.2227	24.1174	-70.6157	20.2210
-83.7251	19.7391	-91.3030	21.5256	-76.1472	17.9525	-89.0516	20.3299	-96.8774	22.1165	-81.2259	18.5434
-95.1629	17.7440	-103.7760	19.3500	-86.5498	16.1380	-100.4894	18.2751	-109.3203	19.8811	-91.6585	16.6691
-106.3370	15.5427	-115.9615	16.9495	-96.7125	14.1360	-111.6635	16.0079	-121.4763	17.4147	-101.8507	14.6012
-117.1784	13.1393	-127.7841	14.3286	-106.5727	11.9501	-122.5048	13.5326	-133.2704	14.7218	-111.7393	12.3434
-127.6179	10.9105	-139.1685	11.8980	-116.0673	9.9230	-132.9444	11.2371	-144.6274	12.2246	-121.2614	10.2496
-137.5866	9.6113	-150.0395	10.4812	-125.1338	8.7414	-142.9131	9.8990	-155.4721	10.7689	-130.3541	9.0290
-147.0154	8.1336	-160.3217	8.8698	-133.7092	7.3975	-152.3419	8.3771	-165.7295	9.1133	-138.9543	7.6409
-155.8353	6.4807	-169.9398	7.0673	-141.7308	5.8942	-161.1618	6.6747	-175.3245	7.2613	-146.9991	6.0881
-163.9772	4.6572	-178.8186	5.0787	-149.1358	4.2357	-169.3037	4.7966	-184.1819	5.2181	-154.4255	4.3751
-171.3720	2.6691	-186.8828	2.9107	-155.8613	2.4275	-176.6985	2.7490	-192.2265	2.9906	-161.1705	2.5074
-177.9508	0.5238	-194.0569	0.5712	-161.8446	0.4764	-183.2773	0.5394	-199.3834	0.5868	-167.1711	0.4920

h) Peening,3-3,SyPlt



i) Peening,3-3,KSyPlt



The analysis for the inner lid of the outer barrier of the improved WP design was based on the following assumptions:

a) The outer lid in the original WP design model was cut in half to simulate the inner lid of the outer barrier of the improved WP design. The thickness of the lid in the model is 0.492 in (12.5 mm) compared to the actual middle lid thickness of 10 mm.

b) Two weld segments were used for the weld in the inner lid.

c) Welding parameters remains unchanged.

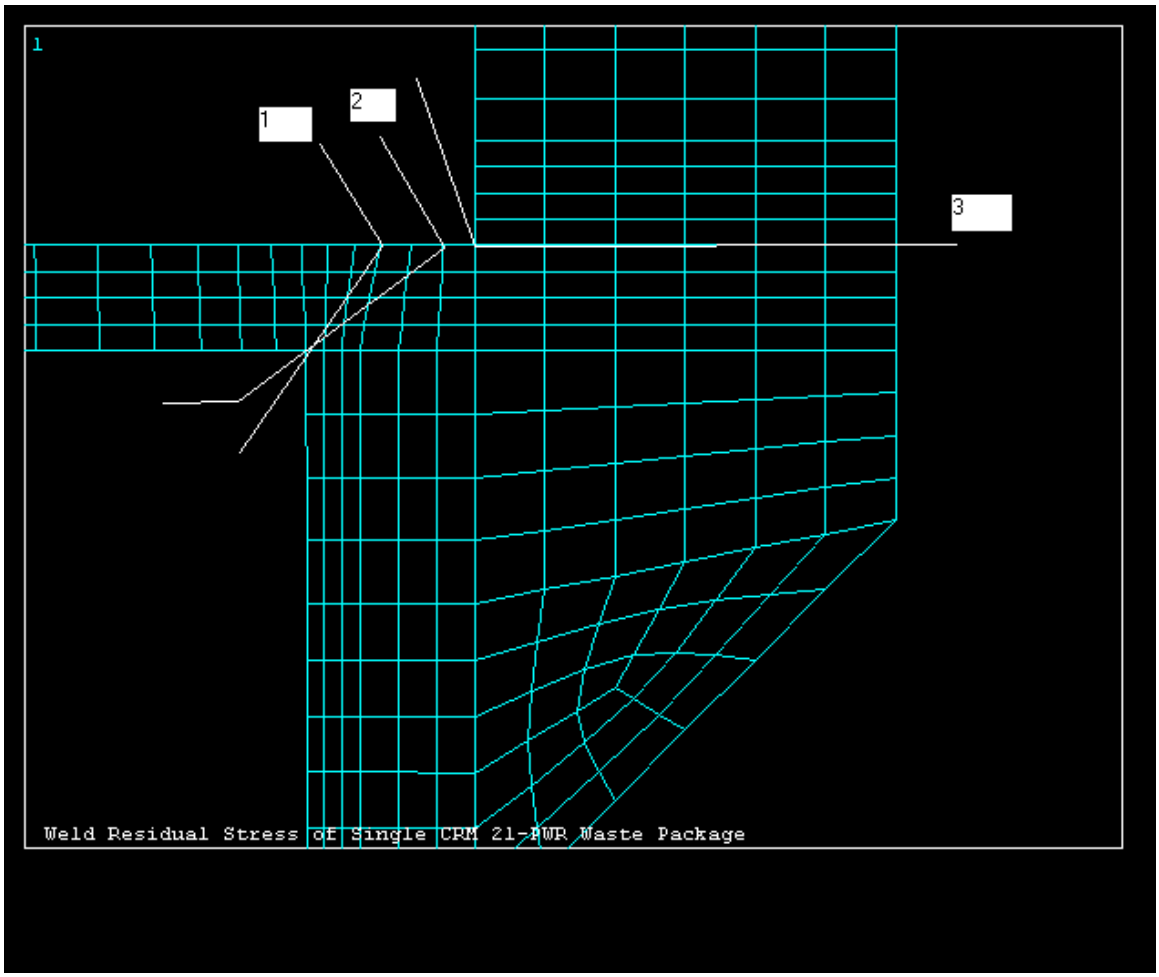
d) Residual stress distribution in the butt weld is used as the representative residual stress distribution for the fillet weld.

e) Crack geometric factor from single edge crack plate to full circumferential crack in the plate for the CRM-21-PWR outer lid is assumed to be applicable for the middle lid fillet weld.

Various stress distributions were presented for three critical sections shown in Figure AI-1. The stress component Sn along section 1-1 is a combination of radial and longitudinal stresses and is perpendicular to Section 1-1. Section 2-2 is defined based on hoop stress. Section 3-3 is selected based on the longitudinal stress in the cylindrical wall.

The residual stresses were calculated based on the peening residual stress of –40 ksi to a depth of 0.06 inch (1.5 mm) and linearly interpolated from –40 ksi to the existing residual stress at 0.123 inch (3.12 mm).

For fracture mechanics evaluation, single edge crack plate with geometric correction factor was used for Section 1-1. Elliptical crack in an .infinite plate with a/t=0.1was used for Section 2-2. Full circumferential crack was use for Section 3-3.



DTN: LL000319805924.143

Figure AI-1. Sections For Output of Stresses and Stress Intensity Factors