# APPENDIX E—EQUIVALENT INITIAL FLAW SIZE

This appendix contains the equivalent initial flaw size (EIFS) specimen drawings, strain gage locations, inspection area and rivet numbering, nondestructive inspection references, scanning electron microscope (SEM) results, measured specimen dimensions, finite element method stress plots, strain survey, residual strength caused by rivet installation, average EIFS sizes, crack growth histories and the correlation, as discussed in section 6.

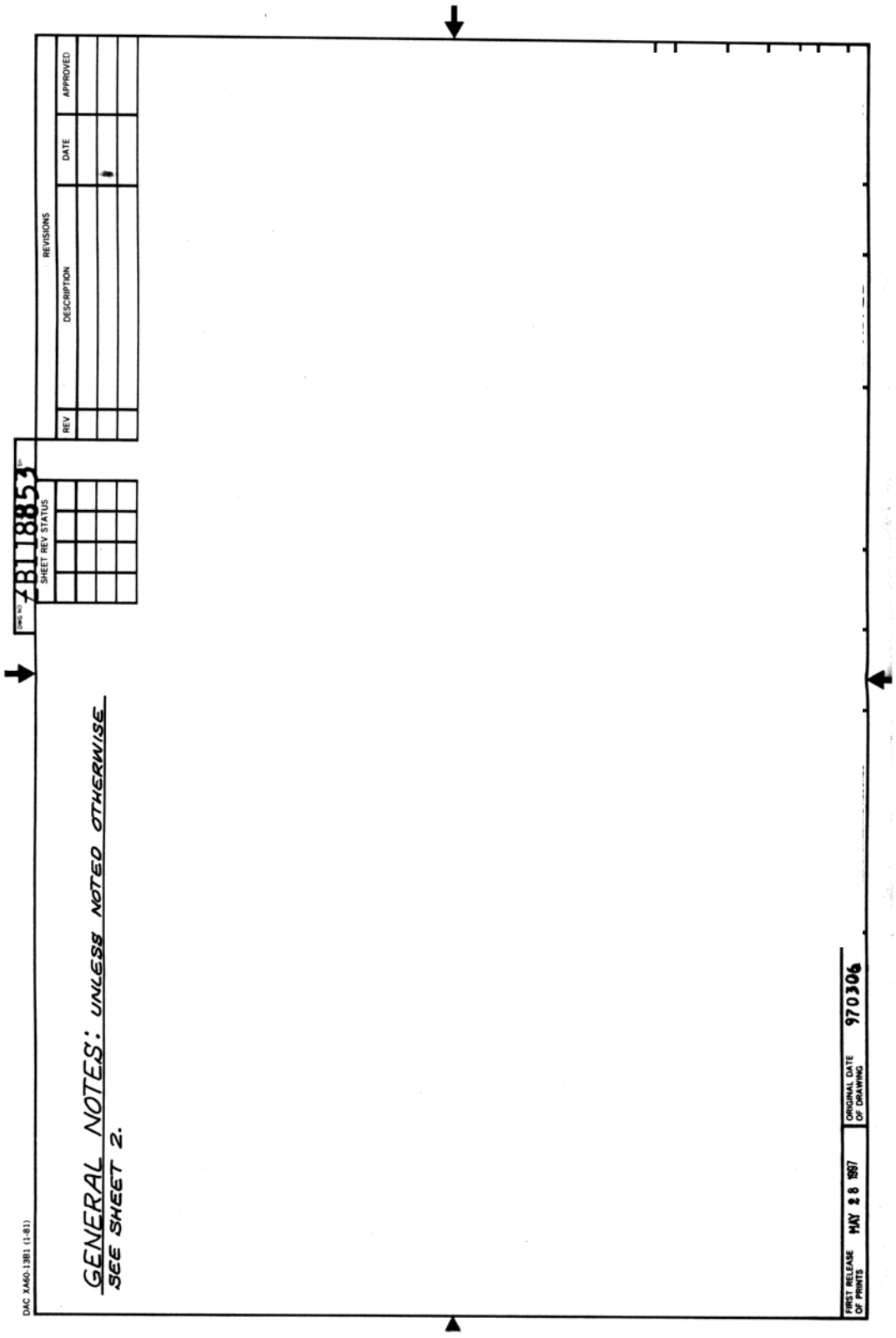



FIGURE E-1. EQUIVALENT INITIAL FLAW SIZE PANEL ASSEMBLY DRAWINGS

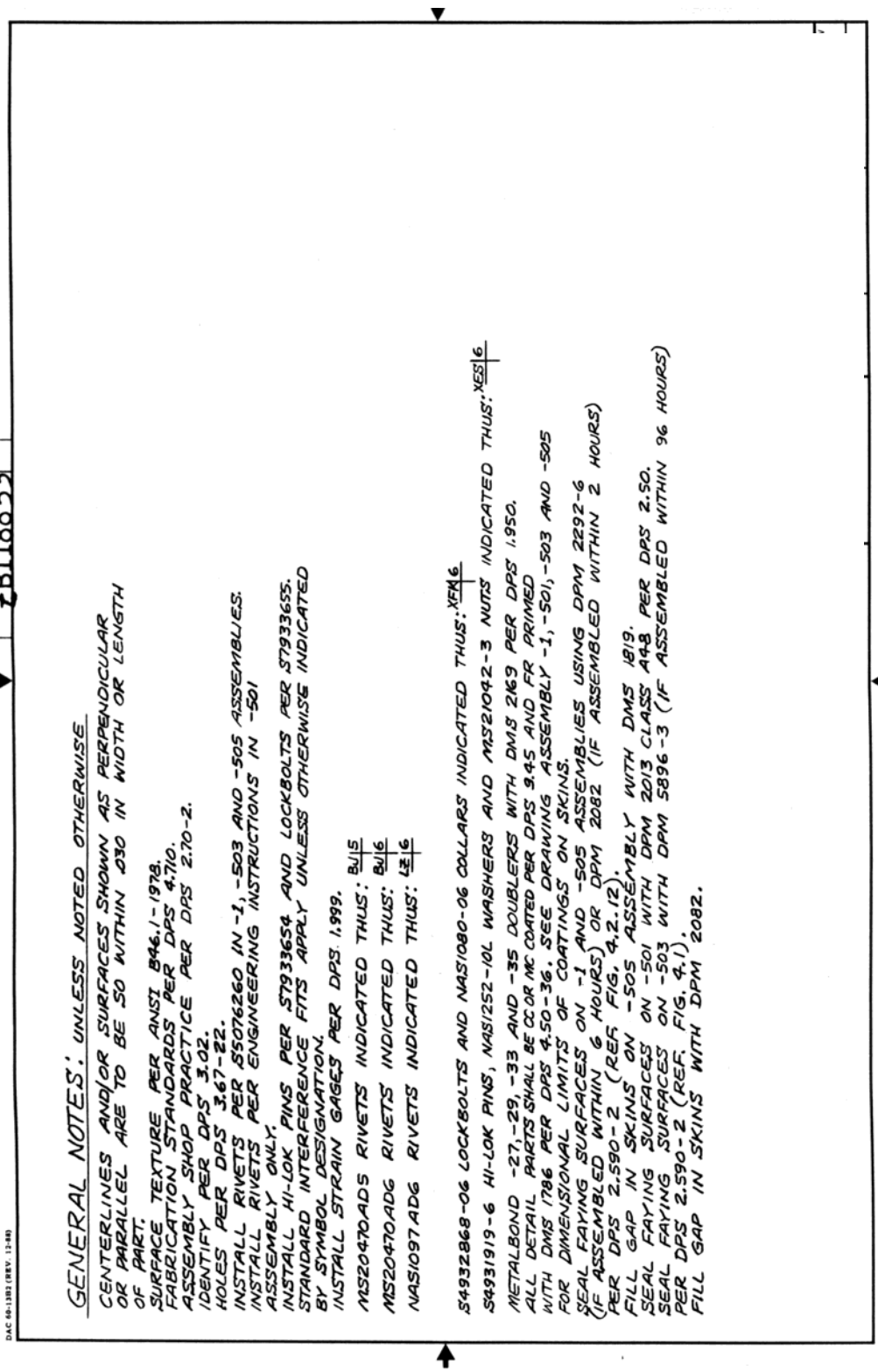



FIGURE E-1. EQUIVALENT INITIAL FLAW SIZE PANEL ASSEMBLY DRAWINGS
(Continued)

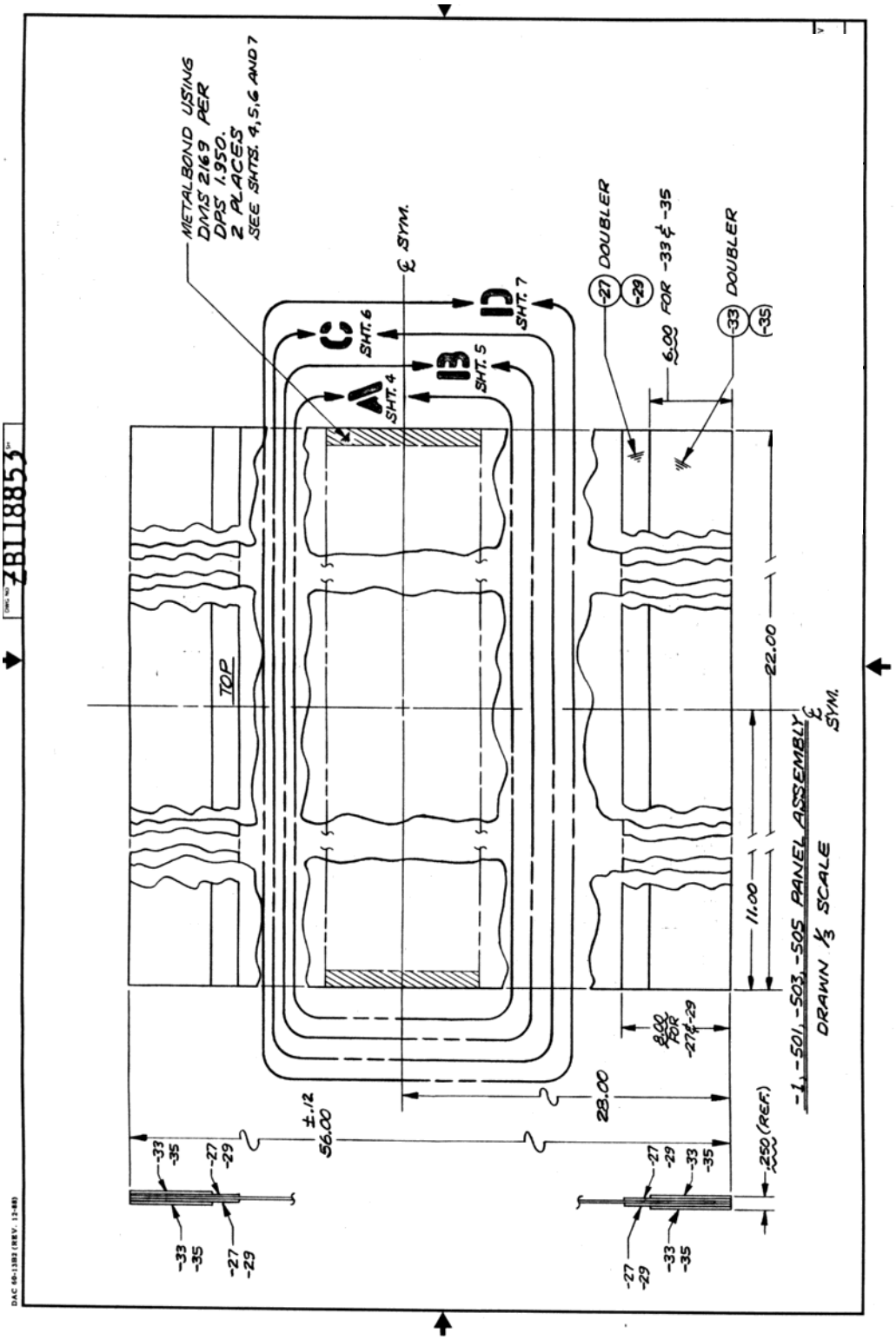



FIGURE E-1. EQUIVALENT INITIAL FLAW SIZE PANEL ASSEMBLY DRAWINGS
(Continued)

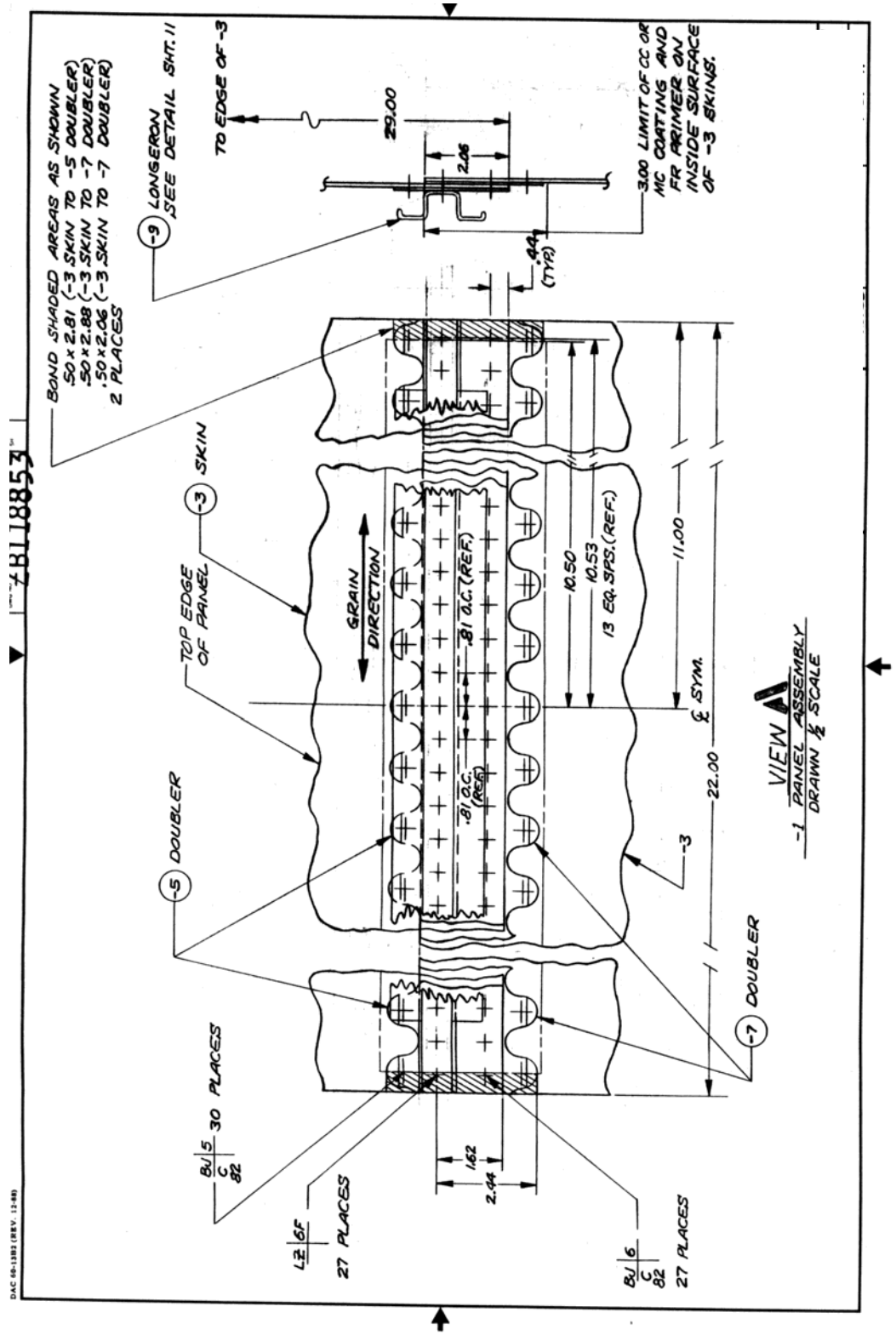



FIGURE E-1. EQUIVALENT INITIAL FLAW SIZE PANEL ASSEMBLY DRAWINGS
(Continued)

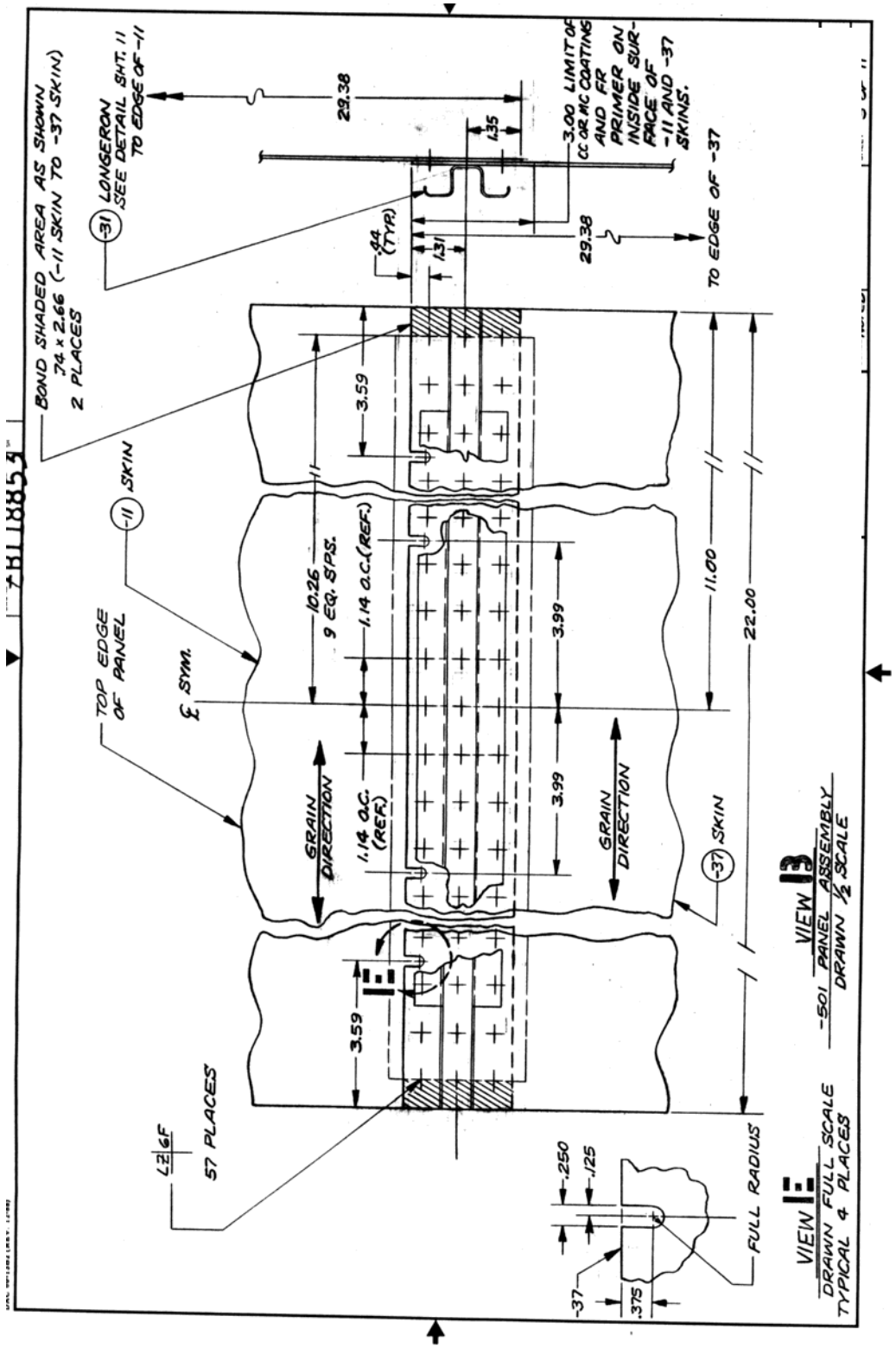



FIGURE E-1. EQUIVALENT INITIAL FLAW SIZE PANEL ASSEMBLY DRAWINGS
(Continued)

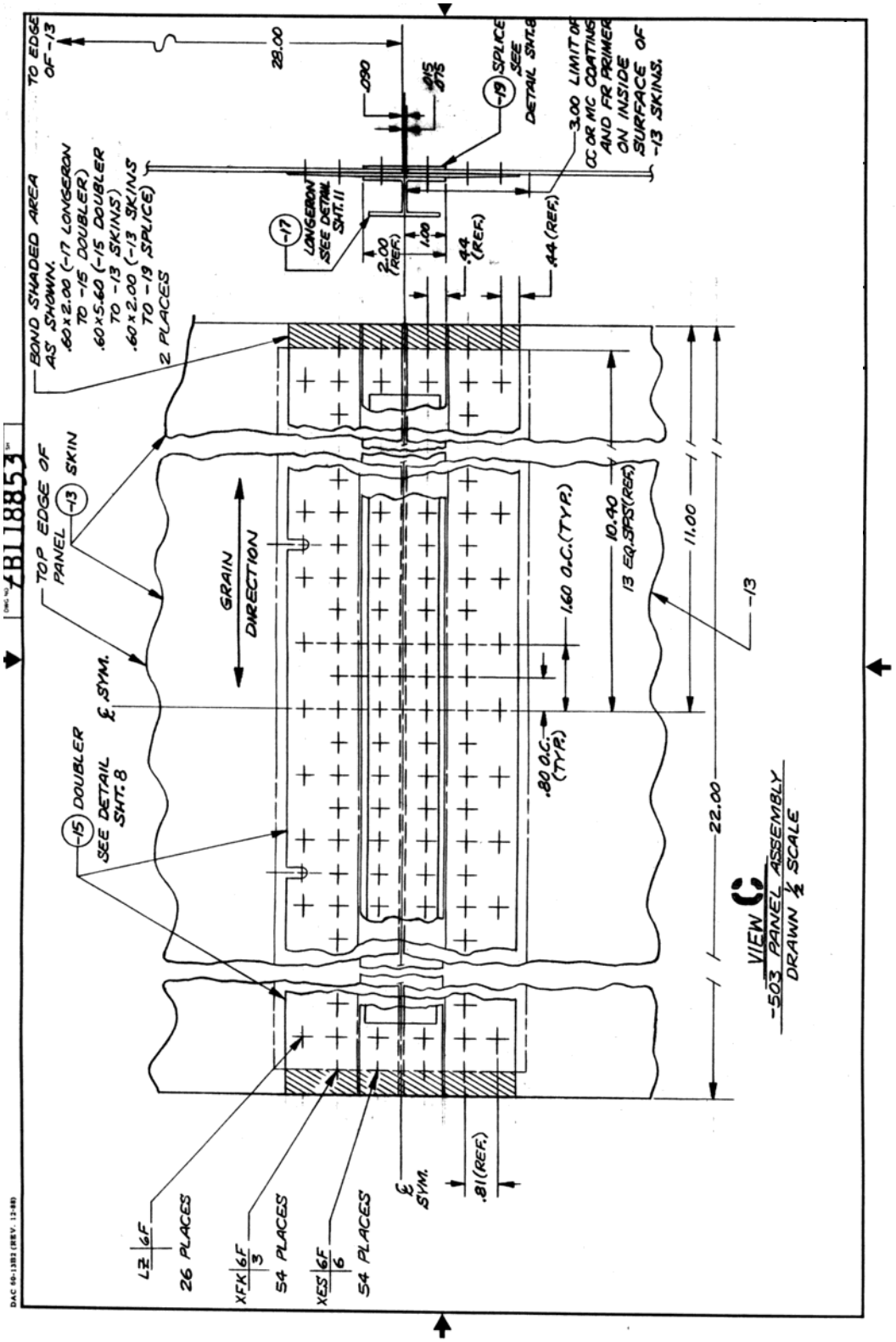



FIGURE E-1. EQUIVALENT INITIAL FLAW SIZE PANEL ASSEMBLY DRAWINGS (Continued)

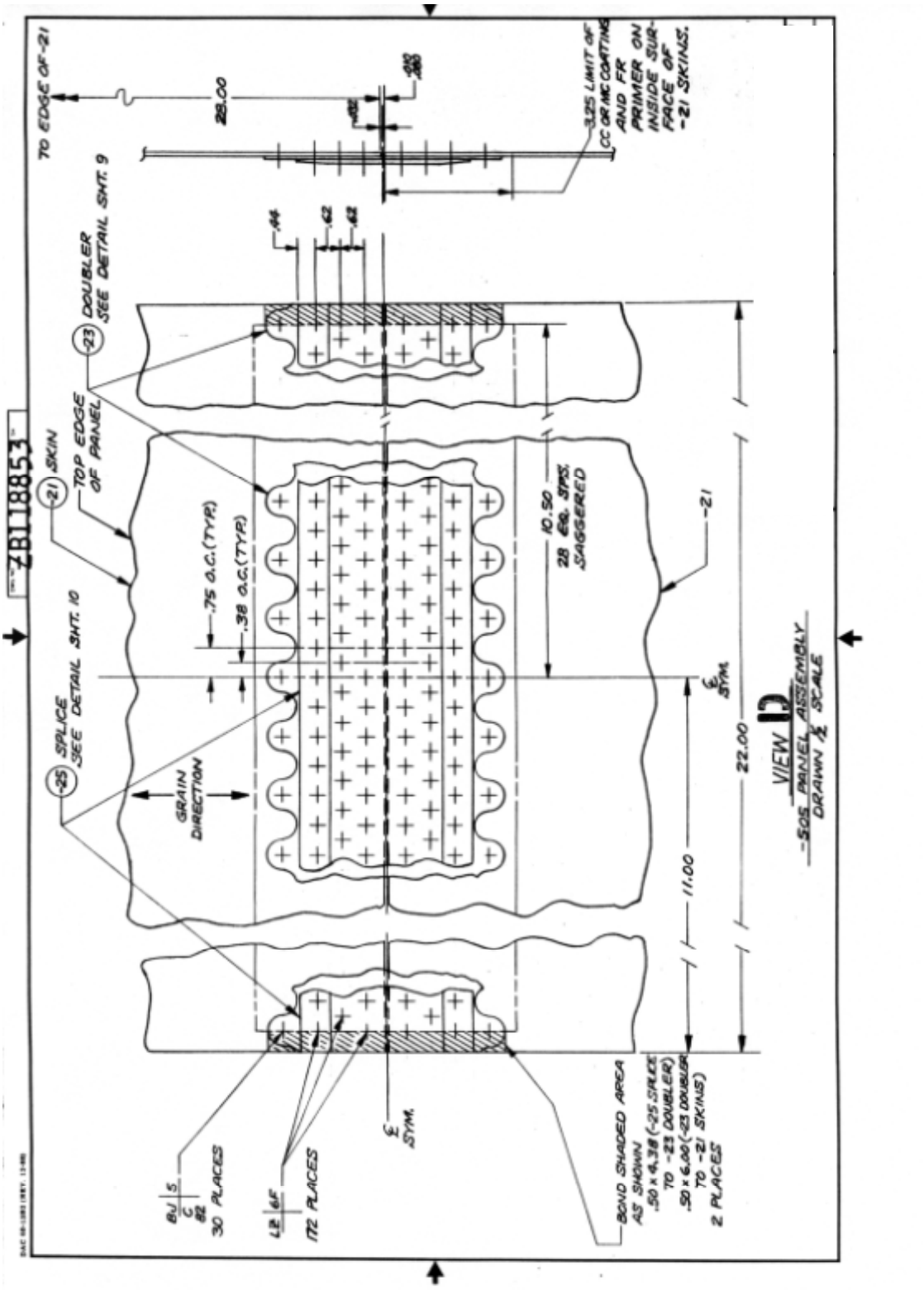



FIGURE E-1. EQUIVALENT INITIAL FLAW SIZE PANEL ASSEMBLY DRAWINGS (Continued)

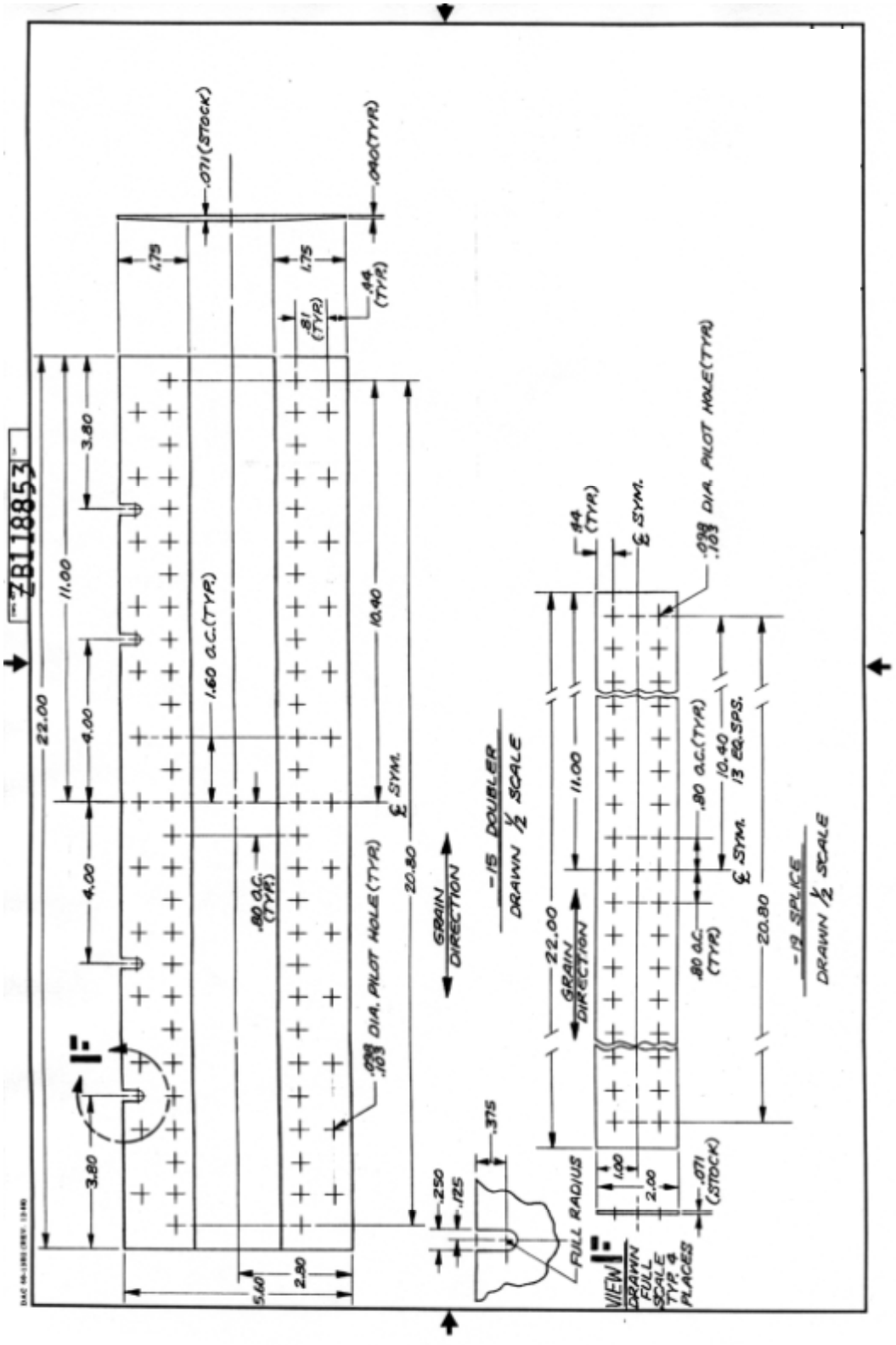



FIGURE E-1. EQUIVALENT INITIAL FLAW SIZE PANEL ASSEMBLY DRAWINGS
(Continued)

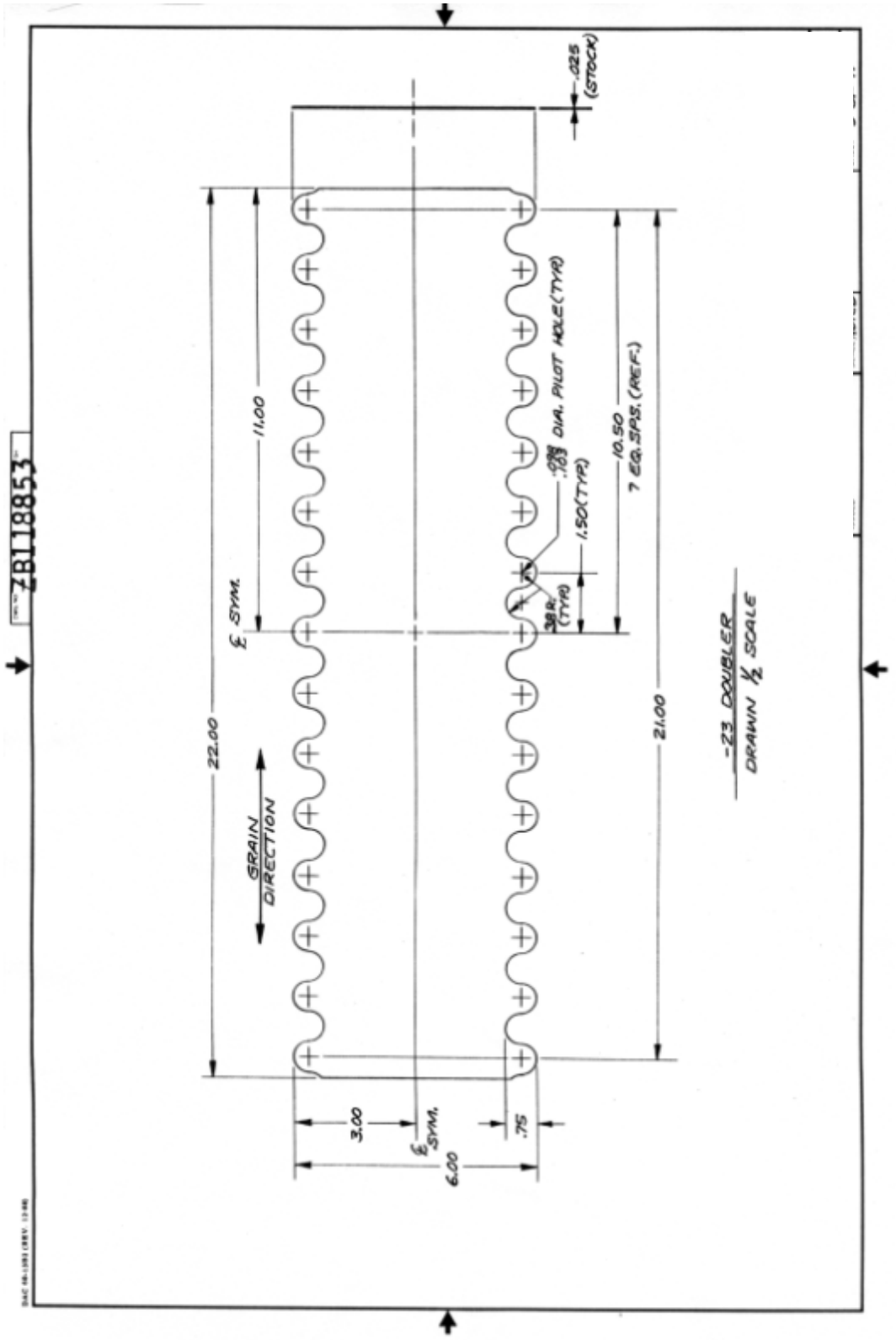



FIGURE E-1. EQUIVALENT INITIAL FLAW SIZE PANEL ASSEMBLY DRAWINGS (Continued)

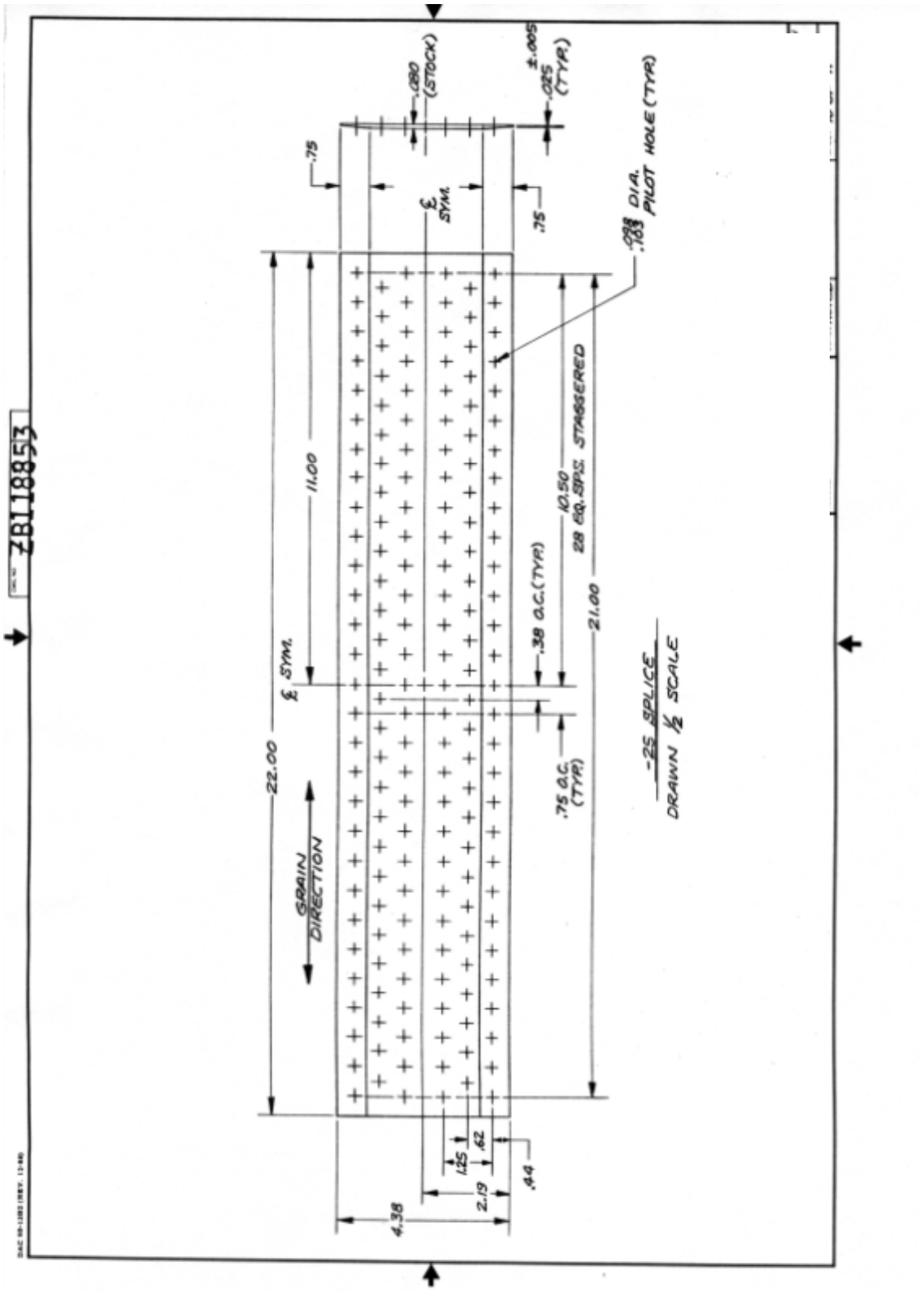



FIGURE E-1. EQUIVALENT INITIAL FLAW SIZE PANEL ASSEMBLY DRAWINGS (Continued)

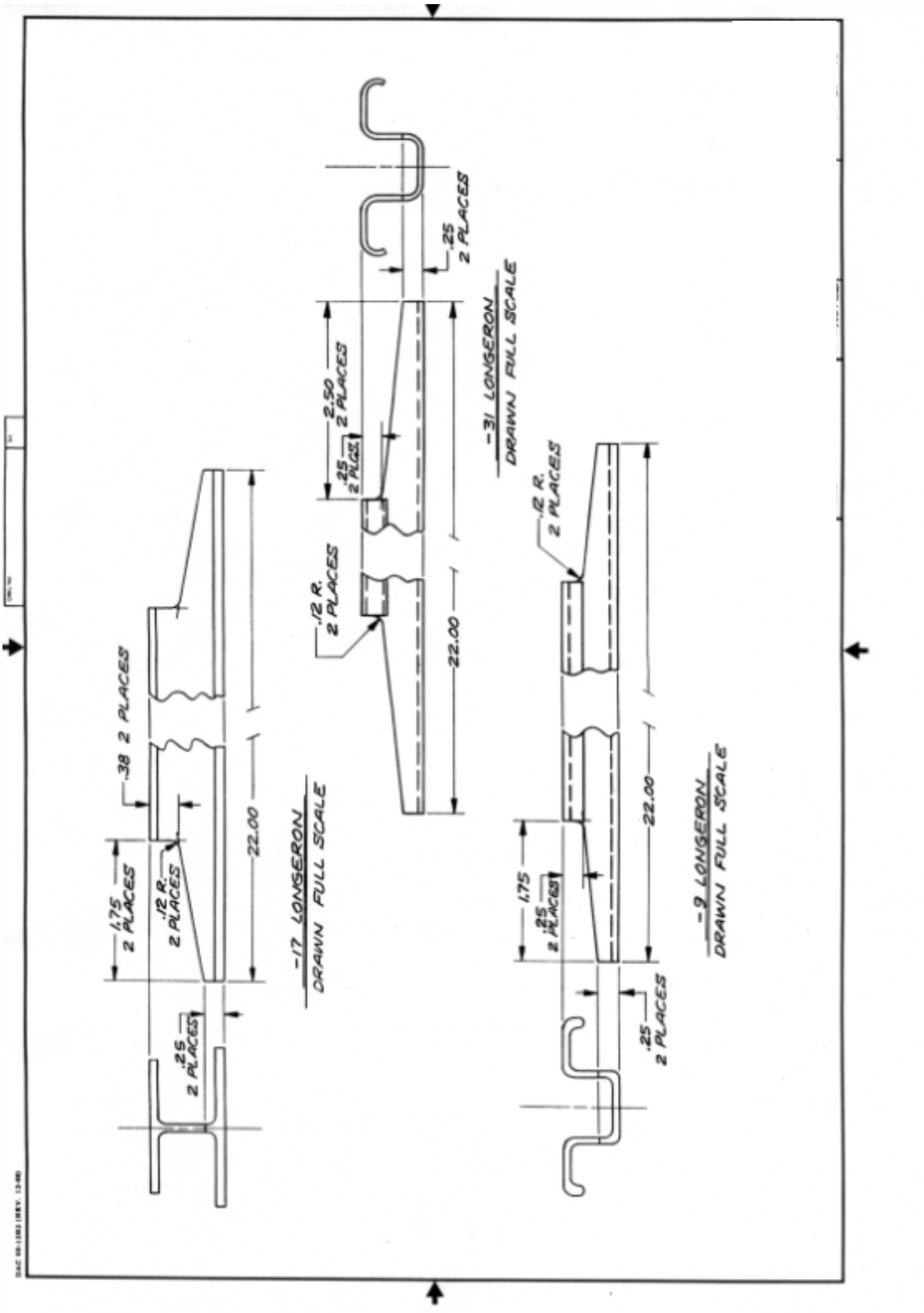



FIGURE E-1. EQUIVALENT INITIAL FLAW SIZE PANEL ASSEMBLY DRAWINGS (Continued)

**DRAWING PARTS LIST** DOUGLAS AIRCRAFT COMPANY MCDONNELL DOUGLAS CAGE CODE 96677

DAC 25-44008-4D (REV 2-93)

DWG SIZE B DWG NO. PLZ5118853 REV

CONTRACT NUMBER

TITLE (NOUN PHRASE) PANEL ASSEMBLY

SHEET 1 OF 3

ENGINEER/DRAFTSMAN E.L. HAYMAN DATE 1-27-97

DESIGN GROUP ATLAS DEPT

QUANTITY REQUIRED PER NOTED DASH NUMBER

NOTE: DRAWING CONFIGURATIONS ARE INDICATED THUS: OTHER DASH NUMBERS ASSEMBLE INTO DRAWING CONFIGURATIONS AS NOTED

C/C CONTROL CODE

B BULK MATL — P1 PURCH DAC PART–SUP MATL
C CUST FURN CUST INSTL — P2 PURCH DAC PART–DAC MATL
D CUST FURN DAC INSTL — R REWORK OR REPAIR PART
F CUST FURN INSTL CHECK — S DAC STANDARD PART
G GOVT OR IND STANDARD — V SUPPLIER ITEM–SPEC CONT
L COMM REF ITEM — X PROCESS REQ'D BY SCN
M MAKE FROM ITEM — Z REF DRAWING
M– MAKE FROM DAC ITEM — – DAC DRAWING NOT STD PART

| ZPRSX | PART OR IDENTIFYING NO. | NOMENCLATURE OR DESCRIPTION | CAGE NO. | C.C | STOCK SIZE | PARTS LIST CODE OR (MATERIAL DESCRIPTION) | MATERIAL SPECIFICATION (AND/OR SUPPLIER) | NOTES | ITEM FIND NO. | ZONE | I P R S X |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | -3 | SKIN | | | .063×22×29 GR. XWISE. | AL SHEET CLAD 2024-T3 | QQ-A-250/5 TEMP T3 | | | | |
| | -5 | DOUBLER | | | MAKE FROM S00056-3-3000 | | | | | | |
| | -7 | DOUBLER | | | MAKE FROM S00056-10-3000 | | | | | | |
| | -9 | LONGERON | | | MAKE FROM S00067-2200 | | | | | | |
| | -11 | SKIN | | | .063×22×30 GR. XWISE. | AL SHEET CLAD 2024-T3 | QQ-A-250/5 TEMP T3 | | | | |
| | -13 | SKIN | | | .090×22×28 GR. XWISE. | AL SHEET CLAD 2024-T3 | QQ-A-250/5 TEMP T3 | | | | |
| | -15 | DOUBLER | | | .071×6×22 GR. LONG. | AL SHEET CLAD 2024-T3 | QQ-A-250/5 TEMP T3 | | | | |
| | -17 | LONGERON | | | MAKE FROM 1D05147 (22.00 LONG) | | | | | | |
| | -19 | SPLICE | | | .071×2×22 GR. LONG | AL SHEET CLAD 2024-T3 | QQ-A-250/5 TEMP T3 | | | | |
| | -21 | SKIN | | | .063×22×28 GR. LONG. | AL SHEET CLAD 2024-T3 | QQ-A-250/5 TEMP T3 | | | | |
| | -23 | DOUBLER | | | .025×6×22 GR. LONG. | AL SHEET CLAD 7075-T6 | QQ-A-250/13 TEMP T6 | | | | |
| | -25 | SPLICE | | | .080×5×22 GR. LONG. | AL SHEET CLAD 7075-T6 | QQ-A-250/13 TEMP T6 | | | | |

FIGURE E-1. EQUIVALENT INITIAL FLAW SIZE PANEL ASSEMBLY DRAWINGS (Continued)

DRAWING PARTS LIST
DOUGLAS AIRCRAFT COMPANY
MCDONNELL DOUGLAS
CAGE CODE 81877
DAC 25-4608-4D (REV 2-93)

C/C CONTROL CODE
B BULK MATL
C CUST FURN CUST INSTL
D CUST FURN DAC INSTL
F CUST FURN INSTL CHECK
G GOVT OR IND STANDARD
L COMMERCIAL ITEM
M MAKE FROM ITEM
M– MAKE FROM DAC ITEM
P1 PURCH DAC PART–SUP MATL
P2 PURCH DAC PART–DAC MATL
R REWORK OR REPAIR PART
S DAC STANDARD PART
V SUPPLIER ITEM–SPEC CONT
X PROCESS REQD BY SCN
Z REF DRAWING PART
– DAC DRAWING NOT STD PART

CONTRACT NUMBER
TITLE (NOUN PHRASE) PANEL ASSEMBLY
DWG SIZE B
DWG NO. PLZB118853 REV
SHEET 2 OF 3

QUANTITY REQUIRED PER NOTED DASH NUMBER
NOTE: DRAWING CONFIGURATIONS ARE INDICATED THUS "OTHER DASH NUMBERS ASSEMBLE INTO DRAWING CONFIGURATIONS AS NOTED

| #REM | PART OR IDENTIFYING NO. | NOMENCLATURE OR DESCRIPTION | CAGE NO. | C/C | STOCK SIZE | PARTS LIST CODE (MATERIAL DESCRIPTION) | MATERIAL SPECIFICATION (AND/OR SUPPLIER) | NOTES | ITEM FIELD NO. | ZONE | J R S X |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | -27 | DOUBLER | | | .040×8×22 GR. LONG. | AL SHEET CLAD 2024-T3 | QQ-A-250/5 TEMPT3 | | | | |
| | -29 | DOUBLER | | | .050×8×22 GR. LONG. | AL SHEET CLAD 2024-T3 | QQ-A-250/5 TEMPT3 | | | | |
| | -31 | LONGERON | | | MAKE | FROM S2777 | 922-6-2200 | | | | |
| | -33 | DOUBLER | | | .040×6×22 GR. LONG. | AL SHEET CLAD 2024-T3 | QQ-A-250/5 TEMPT3 | | | | |
| | -35 | DOUBLER | | | .050×6×22 GR. LONG. | AL SHEET CLAD 2024-T3 | QQ-A-250/5 TEMPT3 | | | | |
| | -37 | SKIN | | | .063×22×30 GR. XWISE | AL SHEET CLAD 2024-T3 | QQ-A-250/5 TEMPT3 | | | | |

ENGINEER/DRAFTSMAN C.L. HAYMAN DATE 1-27-97
DESIGN GROUP ATAS DEDT

FIGURE E-1. EQUIVALENT INITIAL FLAW SIZE PANEL ASSEMBLY DRAWINGS (Continued)

DRAWING PARTS LIST
DOUGLAS AIRCRAFT COMPANY MCDONNELL DOUGLAS
CAGE CODE 80277
DAC 25-4608-40 (REV 2-93)

C/C CONTROL CODE
B BULK MATL
C CUST FURN CUST INSTL
D CUST FURN DAC INSTL
F CUST FURN INSTL CHECK
G GOVT OR IND STANDARD
L COMAL SEE ITEM
M MAKE FROM ITEM
M– MAKE FROM DAC ITEM
P1 PURCH DAC PART–SUP MATL
P2 PURCH DAC PART–DAC MATL
R REWORK OR REPAIR PART
S DAC STANDARD PART
V SUPPLIER ITEM–SPEC CONT
X PROCESS REQD BY SCN
Z REF COMMAT LIST
1 DAC DRAWING NOT STD PART

CONTRACT NUMBER
TITLE (NOUN PHRASE) PANEL ASSEMBLY
DWG SIZE B
DWG NO. PLZB118853 REV
SHEET 3 OF 3
ENGINEER/DRAFTSMAN E.L. HAYMAN DATE 1-27-97
DESIGN GROUP ATAS DEPT

QUANTITY REQUIRED PER NOTED DASH NUMBER
NOTE: DRAWING CONFIGURATIONS ARE INDICATED THUS '-' OTHER DASH NUMBERS ASSEMBLE INTO DRAWING CONFIGURATIONS AS NOTED

| ITEM | PART OR IDENTIFYING NO. | NOMENCLATURE OR DESCRIPTION | CAGE NO. | C/C | STOCK SIZE | PARTS LIST CODE OR (MATERIAL DESCRIPTION) | MATERIAL SPECIFICATION (AND/OR SUPPLIER) | NOTES | ITEM FIND NO. | ZONE | I.P.S.X |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | MS20470AD5 | RIVET | | | INDICATED | THUS | BJ5 | | | | |
| 2 | MS20470AD6 | RIVET | | | INDICATED | THUS | BJ6 | | | | |
| 3 | NAS1097AD6 | RIVET | | | INDICATED | THUS | LZ6 | | | | |
| 4 | S4932868-06 | LOCKBOLT | | | INDICATED | THUS | XFK6 | | | | |
| 5 | NAS1080-06 | COLLAR | | | | | | | | | |
| 6 | S4931919-6 | PIN | | | INDICATED | THUS | XES6 | | | | |
| 7 | NAS1252-10L | WASHER | | | | | | | | | |
| 8 | MS21042-3 | NUT | | | | | | | | | |
| 9 | | | | | | | | | | | |
| 10 | | | | | | | | | | | |
| 11 | | | | | | | | | | | |
| 12 | | | | | | | | | | | |

FIGURE E-1. EQUIVALENT INITIAL FLAW SIZE PANEL ASSEMBLY DRAWINGS
(Continued)

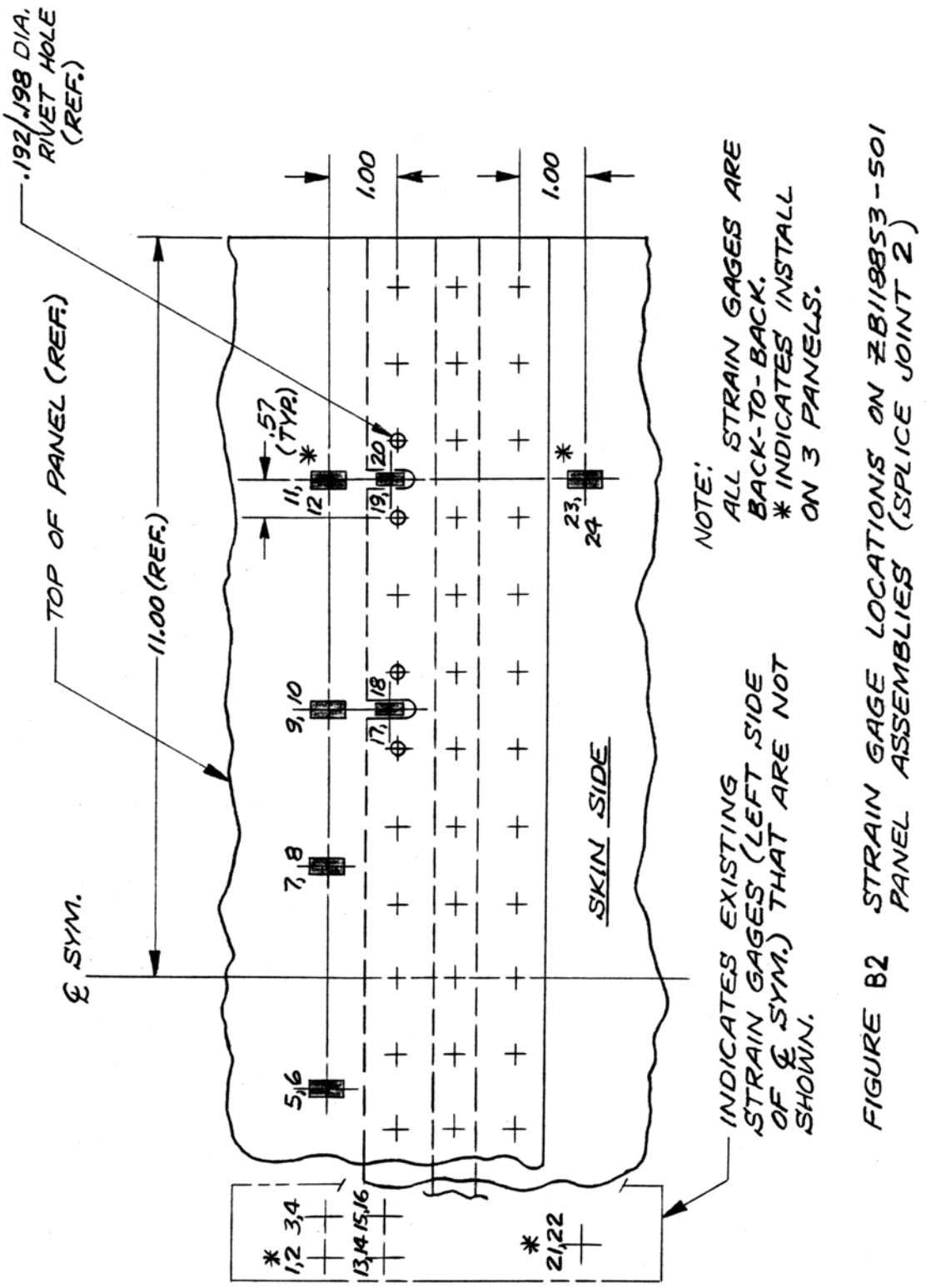



FIGURE B2 STRAIN GAGE LOCATIONS ON ZB11883S3-501 PANEL ASSEMBLIES (SPLICE JOINT 2)

FIGURE E-2. STRAIN GAGE LOCATIONS FOR EIFS PANELS

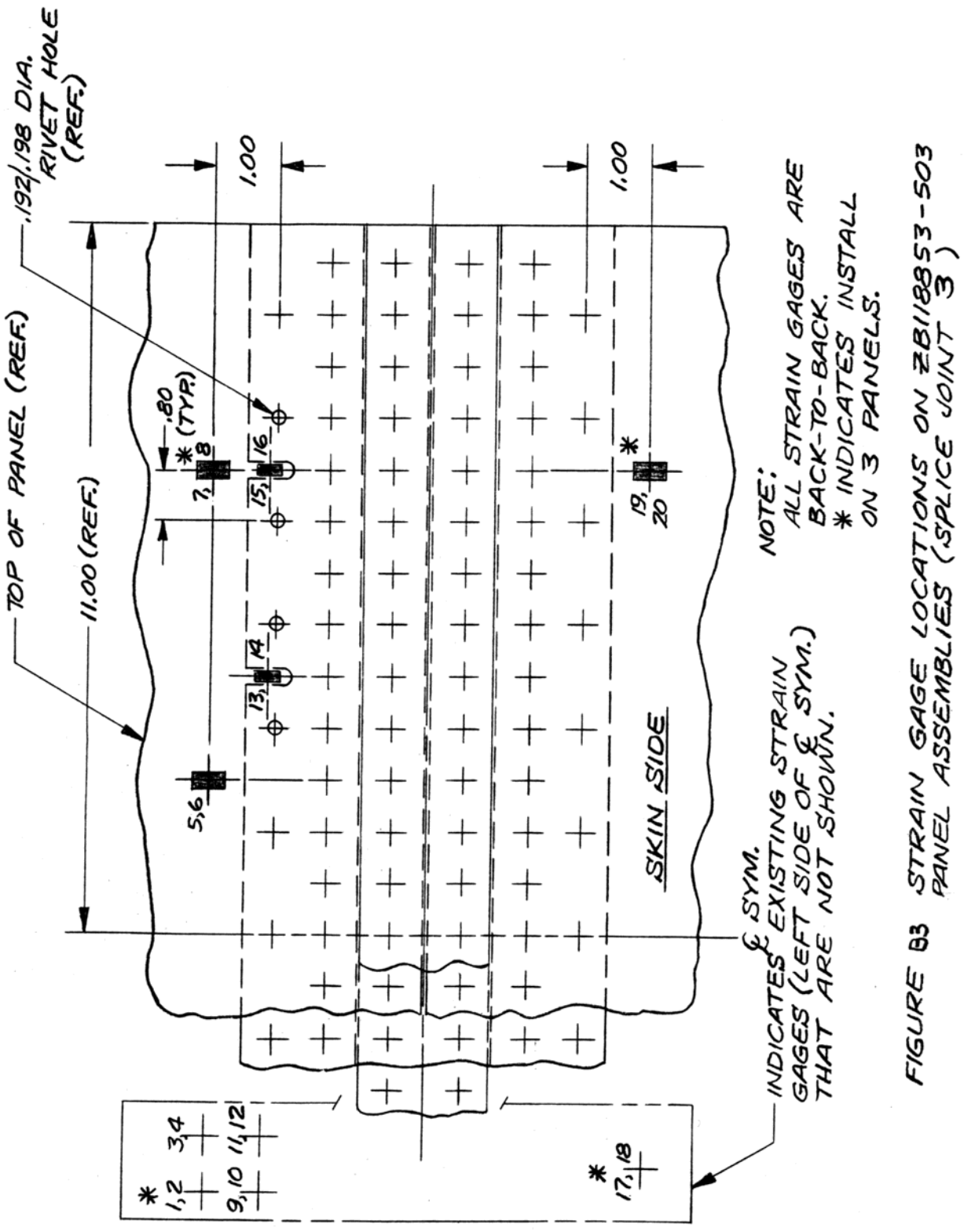



FIGURE B3 STRAIN GAGE LOCATIONS ON ZB188853-503 PANEL ASSEMBLIES (SPLICE JOINT 3)

FIGURE E-2. STRAIN GAGE LOCATIONS FOR EIFS PANELS (Continued)

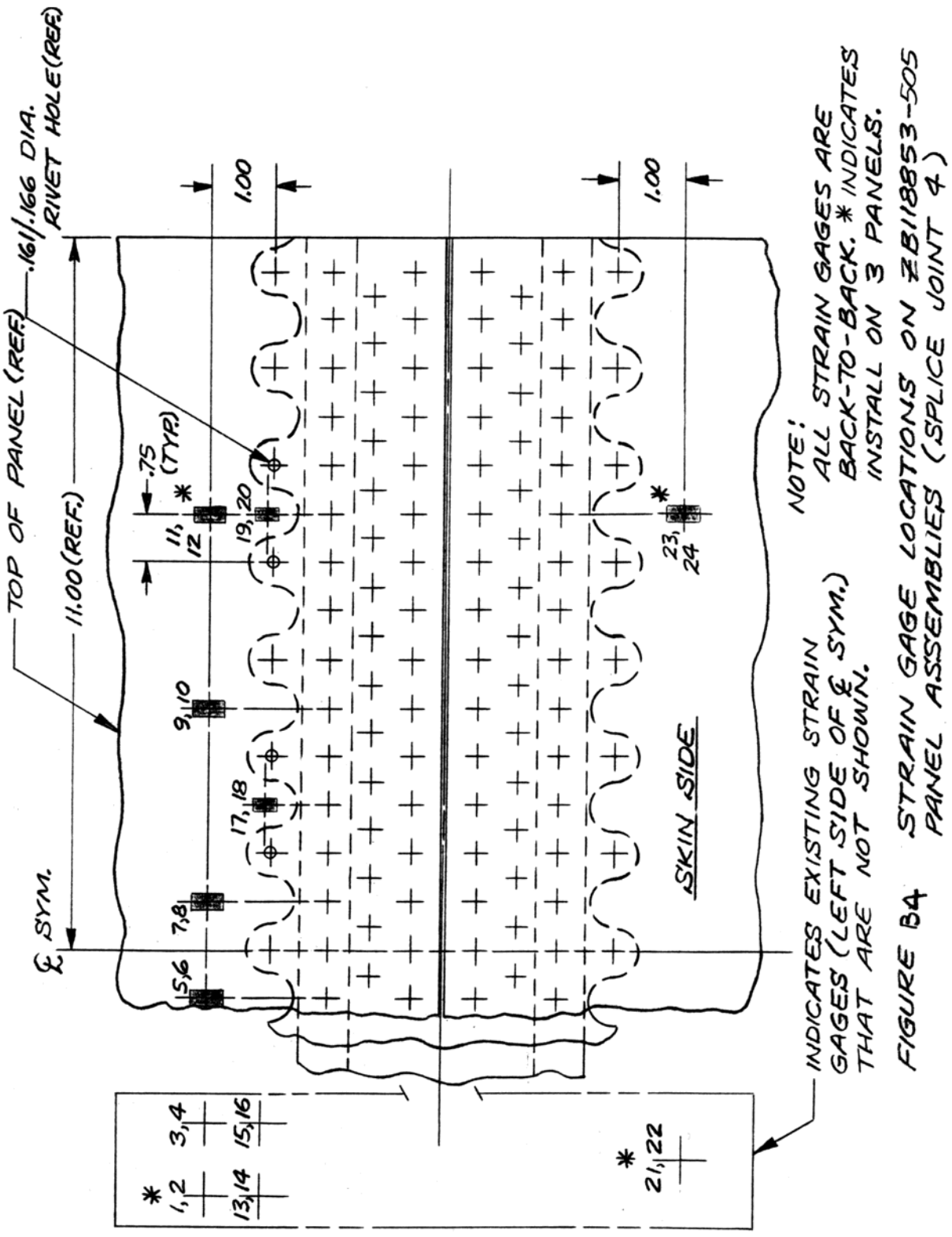



FIGURE B4 STRAIN GAGE LOCATIONS ON ZB118853-505 PANEL ASSEMBLIES (SPLICE JOINT 4)

FIGURE E-2. STRAIN GAGE LOCATIONS FOR EIFS PANELS Continued)

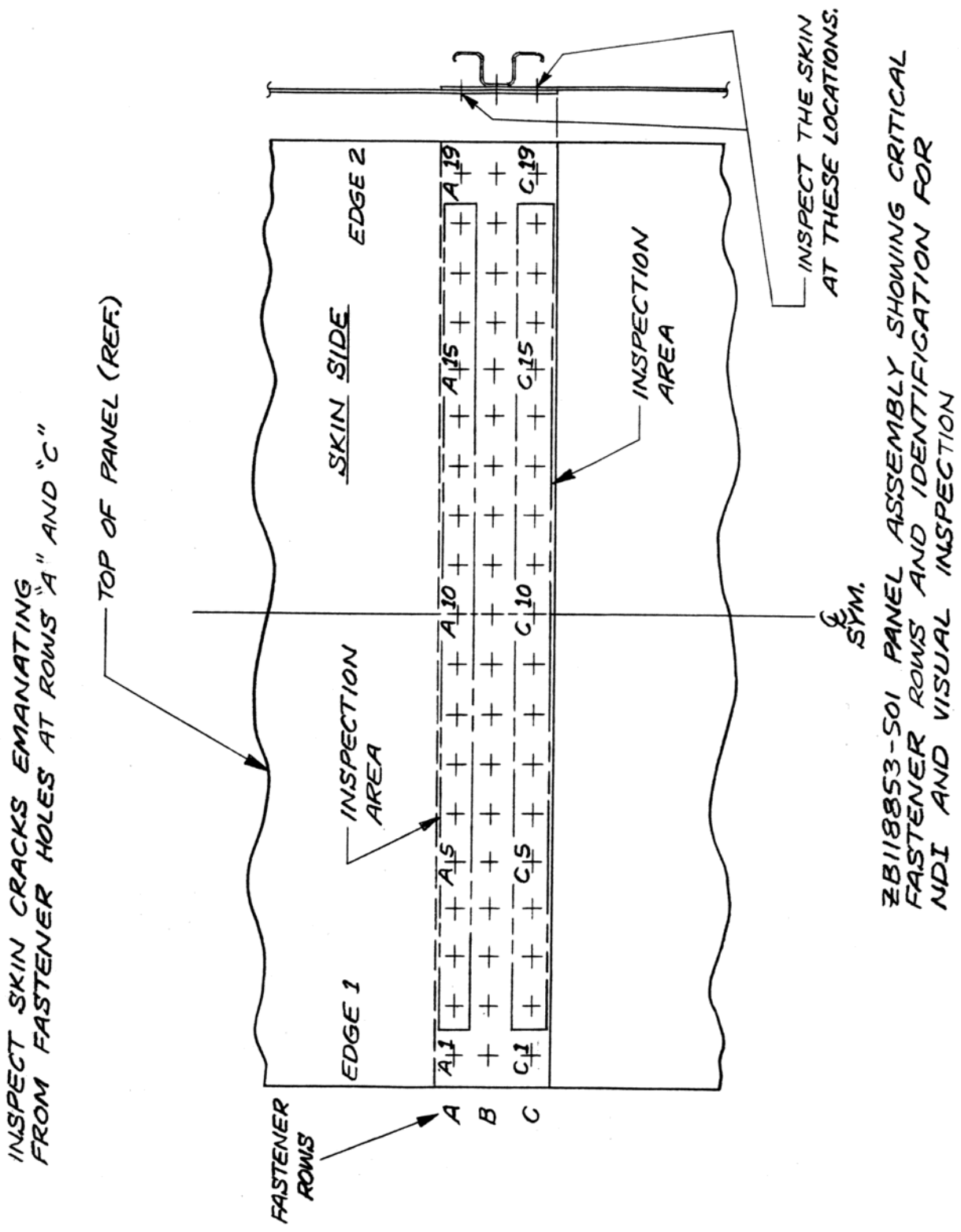



FIGURE E-3. EIFS PANELS INSPECTION AREA AND RIVET NUMBERING

FIGURE E-3. EIFS PANELS INSPECTION AREA AND RIVET NUMBERING (Continued)

FIGURE E-3. EIFS PANELS INSPECTION AREA AND RIVET NUMBERING (Continued)

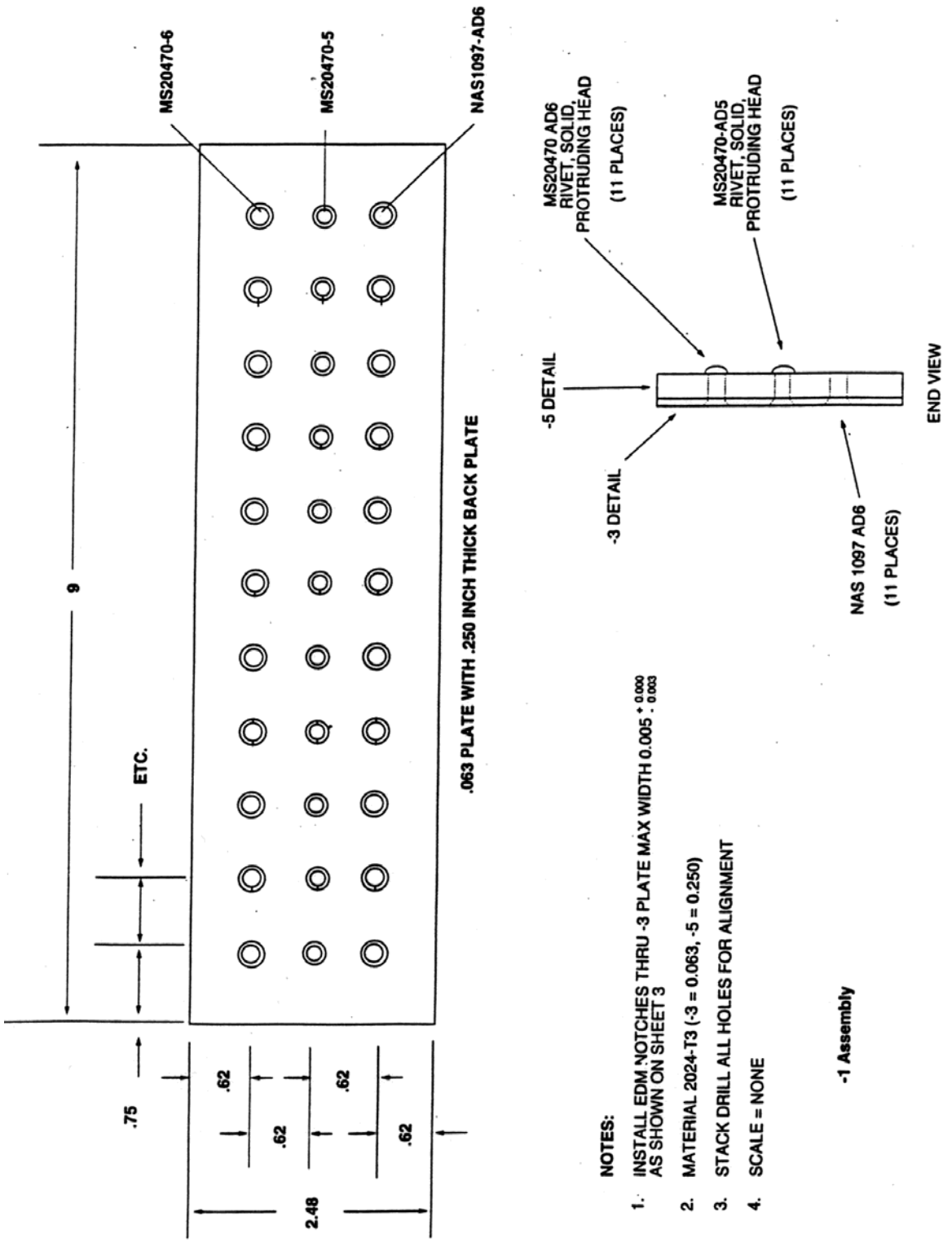



FIGURE E-4. DESCRIPTION OF 0.063-inch SKIN REFERENCE STANDARD

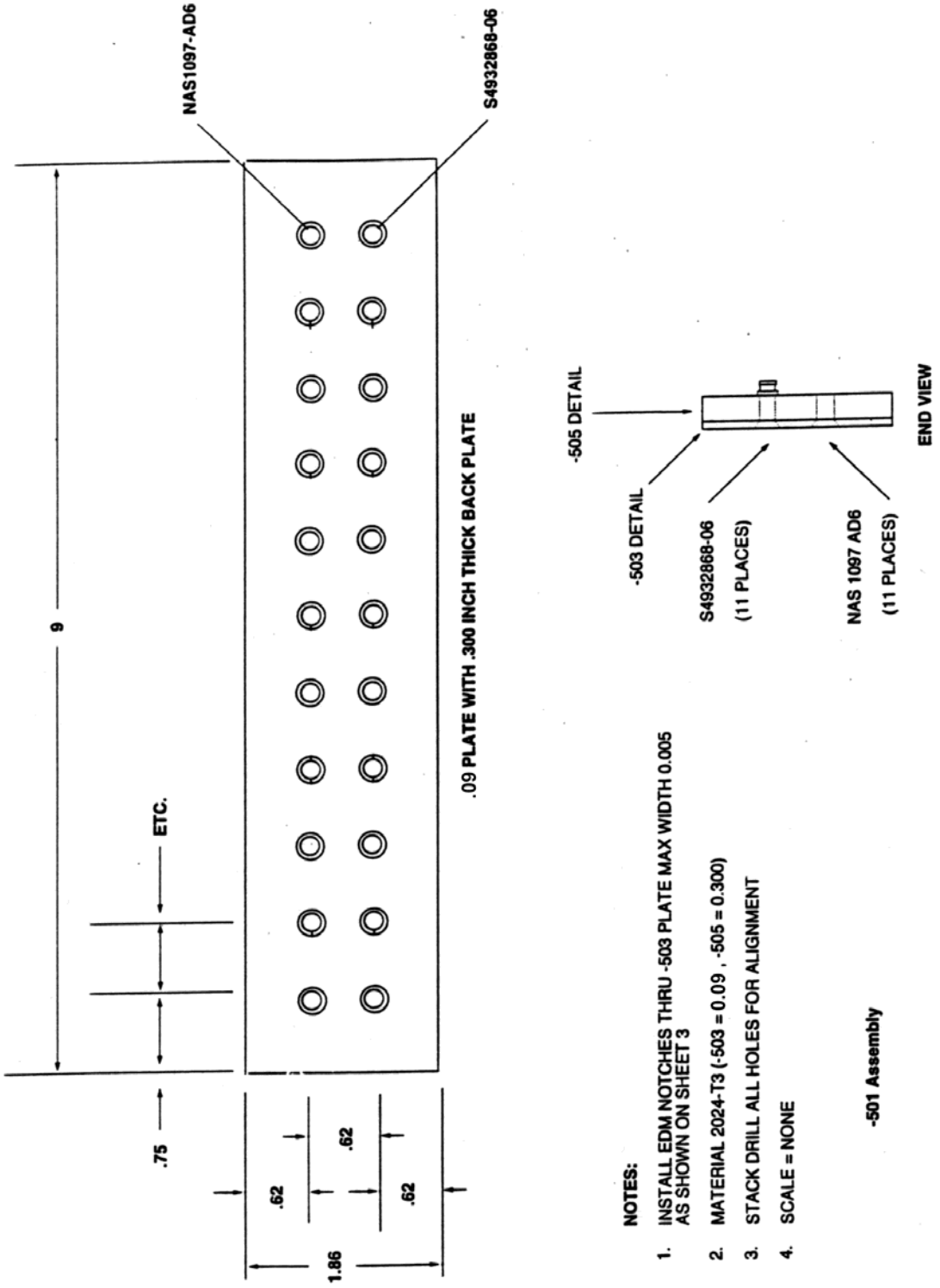
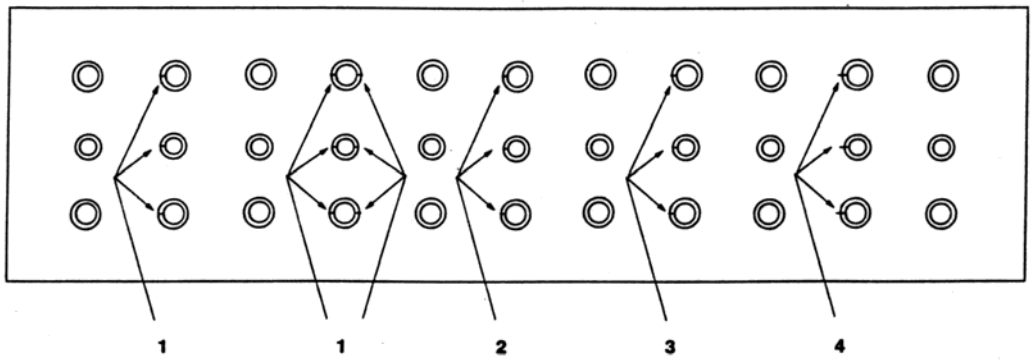



FIGURE E-5. DESCRIPTION OF 0.090-inch SKIN REFERENCE STANDARD




**NOTES:**

1. INSTALL EDM NOTCH THRU PLATE 0.030 LONG X .005 WIDTH +.000 OR -.003 INCH (9 PLACES)
2. INSTALL EDM NOTCH THRU PLATE 0.040 LONG X .005 WIDTH +.000 OR -.003 INCH (3 PLACES)
3. INSTALL EDM NOTCH THRU PLATE 0.050 LONG X .005 WIDTH +.000 OR -.003 INCH (3 PLACES)
4. INSTALL EDM NOTCH THRU PLATE 0.075 LONG X .005 WIDTH +.000 OR -.003 INCH (3 PLACES)
5. NO SCALE

**EDM INSTALLATION**

FIGURE E-6. DESCRIPTION OF EDM INSTALLATION FOR (3 ROWS) 0.063-inch SKIN ASSEMBLY

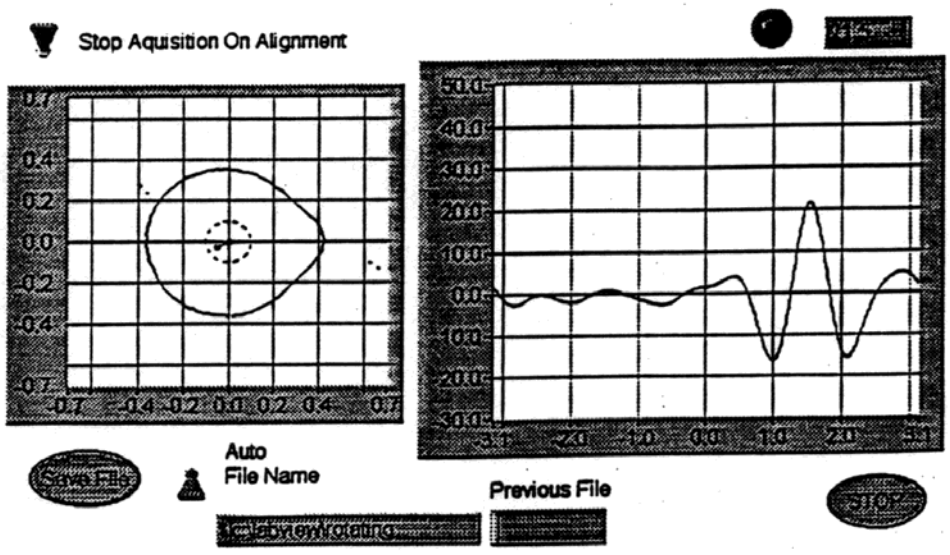
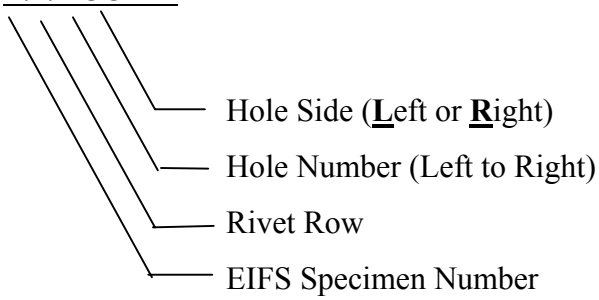



FIGURE E-7. FRONT PANEL OF THE ROTATING PROBE SYSTEM DISPLAY

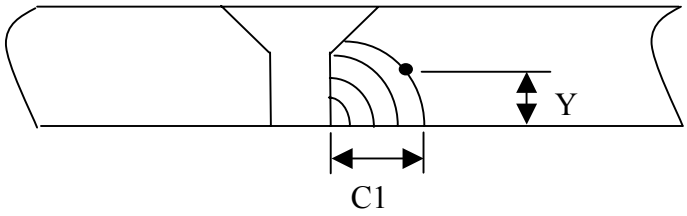
Figure E-8 contains the data obtained during the SEM fractographic investigation of all EIFS panel fracture surfaces for which marker bands could be detected.

The crack naming convention is as follows:




The parameters in the table are:

Groups - Number of marker cycle blocks, either 10, 4, or 6 blocks (see section 6.5)
y - The distance from the faying surface to the crack front in the thickness direction (mm)
c1 - Crack length (mm)



| Groups | y | 3C14R Cycles | c1 |
|---|---|---|---|
| 10 | 0.12 | 147660 | 0.16 |
| 4 | 0.19 | 151420 | 0.25 |
| 6 | 0.11 | 154960 | 0.40 |
| 10 | 0.30 | 158830 | 0.42 |
| 4 | 0.16 | 162590 | 0.63 |

| Groups | y | 3C17R Cycles | c1 |
|---|---|---|---|
| 10 | 0.16 | 116020 | 0.34 |
| 4 | 0.12 | 123320 | 0.43 |
| 6 | 0.15 | 130950 | 0.52 |
| 10 | 0.12 | 138360 | 0.62 |
| 4 | 0.16 | 145660 | 0.69 |
| 6 | 0.19 | 153290 | 0.76 |
| 10 | 0.16 | 160700 | 0.85 |
| 4 | 0.21 | 168000 | 0.94 |
| fracture | 0.25 | 170000 | 1.01 |

| Groups | y | 3D13R Cycles | c1 |
|---|---|---|---|
| 4 | 0.155 | 157860 | 0.20 |
| 6 | | | |
| 10 | 0.159 | 165270 | 0.26 |
| 4 | 0.184 | 169030 | 0.31 |
| fracture | | 170000 | 0.32 |

| Groups | y | 3D15L Cycles | c1 |
|---|---|---|---|
| 10 | 0.16 | 91810 | 0.27 |
| 4 | 0.23 | 95570 | 0.33 |
| 6 | 0.26 | 99110 | 0.43 |
| 10 | 0.28 | 102980 | 0.51 |
| 4 | 0.29 | 106740 | 0.58 |
| 6 | 0.26 | 110280 | 0.67 |
| 10 | 0.26 | 114150 | 0.76 |
| 4 | 0.26 | 117910 | 0.86 |
| 6 | 0.34 | 121450 | 0.93 |
| 10 | 0.32 | 125320 | 1.04 |
| 4 | 0.39 | 129080 | 1.13 |
| 6 | 0.32 | 132620 | 1.25 |
| 10 | 0.31 | 136490 | 1.40 |
| 4 | 0.33 | 140250 | 1.53 |
| 6 | 0.37 | 143790 | 1.69 |
| 10 | 0.35 | 147660 | 1.88 |
| 4 | 0.41 | 151420 | 2.12 |
| 6 | 0.42 | 154960 | 2.37 |
| 4 | 0.17 | 162590 | 2.80 |
| 10 | 0.32 | 170000 | 3.33 |

FIGURE E-8. EIFS PANELS SEM CRACK GROWTH DATA

| Groups | y | 3D15L Cycles | c1 |
|---|---|---|---|
| 10 | 0.105 | 98290 | 0.298 |
| 4 | | 102050 | |
| 6 | | 105590 | |
| 10 | 0.277 | 109460 | 0.420 |
| 4 | 0.194 | 113220 | 0.536 |
| 6 | 0.248 | 116760 | 0.598 |
| 10 | 0.336 | 120630 | 0.677 |
| 4 | 0.238 | 124390 | 0.792 |
| 6 | 0.326 | 127930 | 0.865 |
| 10 | 0.388 | 131800 | 0.955 |
| 4 | 0.255 | 135560 | 1.109 |
| 6 | 0.438 | 139100 | 1.178 |
| 10 | 0.401 | 142970 | 1.325 |
| 4 | 0.402 | 146730 | 1.493 |
| 6 | 0.505 | 150270 | 1.631 |
| 10 | 0.476 | 154140 | 1.809 |
| 4 | 0.413 | 157900 | 2.049 |
| 6 | 0.410 | 161440 | 2.328 |
| 10 | 0.354 | 165310 | 2.731 |
| 4 | 0.308 | 169070 | 3.297 |
| fracture | | 170000 | 3.458 |

| Groups | y | 4C9R Cycles | c1 |
|---|---|---|---|
| 4 | 0.06 | 138250 | 0.057 |
| 6? | 0.07 | 141790 | 0.134 |
| 10 | 0.10 | 145660 | 0.171 |
| 4 | 0.17 | 149420 | 0.245 |
| 6 | 0.15 | 152960 | 0.311 |
| 10 | 0.22 | 156830 | 0.431 |
| 4 | 0.24 | 160590 | 0.502 |
| 6 | 0.22 | 164130 | 0.606 |
| 10 | 0.30 | 168000 | 0.706 |
| fracture | 0.37 | 170000 | 0.874 |

| Groups | y | 4C10R Cycles | c1 |
|---|---|---|---|
| 10? | 0.21 | -18,470 | 0.249 |
| 4? | 0.15 | -14,710 | 0.351 |
| 6 | 0.23 | -11,170 | 0.375 |
| 10 | 0.28 | -7,300 | 0.435 |
| 4 | 0.24 | -3,540 | 0.535 |
| fracture | 0.26 | 170,000 | 0.656 |

| Groups | y | 4C11R Cycles | c1 |
|---|---|---|---|
| 10 | 0.16 | 127020 | 0.065 |
| 10 | 0.20 | 135190 | 0.093 |
| 10 | 0.23 | 143360 | 0.120 |
| 10 | 0.29 | 151530 | 0.216 |
| 4 | 0.20 | 155290 | 0.225 |
| 6 | 0.19 | 158830 | 0.278 |
| 10 | 0.07 | 162700 | 0.411 |
| 4 | 0.17 | 166460 | 0.447 |
| 6 | 0.16 | 170000 | 0.481 |

| Groups | y | 4C12R Cycles | c1 |
|---|---|---|---|
| 4 | 0.16 | 145,660 | 0.160 |
| 6 | 0.24 | 149,200 | 0.195 |
| 10 | 0.25 | 153,070 | 0.300 |
| 4 | 0.18 | 156,830 | 0.413 |
| 6 | 0.25 | 160,370 | 0.460 |
| 10 | 0.22 | 164,240 | 0.593 |
| 4 | 0.28 | 168,000 | 0.660 |
| fracture | 0.29 | 170,000 | 0.706 |

FIGURE E-8. EIFS PANELS SEM CRACK GROWTH DATA (Continued)

| Groups | y | 7A6L Cycles | c1 | Groups | y | 7A6R Cycles | c1 |
|---|---|---|---|---|---|---|---|
| 6 | 0.34 | 80200 | 0.67 | 10 | 0.23 | 28500 | 0.09 |
| 10 | 0.45 | 82070 | 0.73 | 4 | 0.20 | 30260 | 0.14 |
| 4 | | | | 6 | 0.22 | 31800 | 0.16 |
| 6 | 0.46 | 85370 | 0.84 | 10 | 0.19 | 33670 | 0.21 |
| 10 | 0.43 | 87240 | 0.87 | 4 | | | |
| 4 | 0.35 | 89000 | 0.90 | 6 | 0.22 | 36970 | 0.26 |
| 6 | 0.26 | 90540 | 0.91 | 10 | 0.20 | 38840 | 0.32 |
| 10 | 0.28 | 92410 | 0.93 | 4 | | | |
| 4 | | | | 6 | 0.24 | 42140 | 0.37 |
| 6 | 0.35 | 95710 | 1.00 | 10 | 0.22 | 44010 | 0.41 |
| 10 | 0.58 | 97580 | 1.02 | 4 | 0.25 | 45770 | 0.44 |
| 4 | 0.71 | 99340 | 1.10 | 6 | | | |
| 6 | 0.60 | 100880 | 1.16 | 10 | 0.10 | 49180 | 0.34 |
| 10 | 0.70 | 102750 | 1.21 | 4 | 0.05 | 50940 | 0.38 |
| 4 | 0.52 | 104510 | 1.30 | 6 | 0.09 | 52480 | 0.41 |
| 6 | 0.32 | 106050 | 1.36 | 10 | 0.10 | 54350 | 0.45 |
| 10 | 0.49 | 107920 | 1.44 | 4 | 0.12 | 56110 | 0.49 |
| 4 | 0.33 | 109680 | 1.50 | 6 | 0.05 | 57650 | 0.54 |
| 6 | 0.51 | 111220 | 1.52 | 10 | | | |
| 10 | 0.52 | 113090 | 1.57 | 4 | | | |
| 4 | 0.45 | 114850 | 1.64 | 6 | 0.09 | 62820 | 0.64 |
| 6 | 0.48 | 116390 | 1.69 | 10 | 0.10 | 64690 | 0.68 |
| 10 | 0.47 | 118260 | 1.74 | 4 | | | |
| 4 | 0.54 | 120020 | 1.79 | 6 | 0.09 | 67990 | 0.74 |
| 6 | 0.54 | 121560 | 1.83 | 10 | 0.11 | 69860 | 0.77 |
| 10 | 0.54 | 123430 | 1.90 | 4 | 0.10 | 71620 | 0.80 |
| 4 | 0.56 | 125190 | 1.96 | 6 | 0.15 | 73160 | 0.86 |
| 6 | 0.23 | 126730 | 2.06 | 10 | 0.23 | 75030 | 0.94 |
| 10 | 0.28 | 128600 | 2.12 | 4 | 0.23 | 76790 | 0.99 |
| 4 | 0.37 | 130360 | 2.18 | 6 | 0.29 | 78330 | 1.05 |
| 6 | 0.57 | 131900 | 2.23 | 10 | 0.09 | 80200 | 1.09 |
| 10 | 0.55 | 133770 | 2.31 | 4 | 0.08 | 81960 | 1.13 |
| 4 | 0.58 | 135530 | 2.38 | 6 | 0.08 | 83500 | 1.18 |
| 6 | 0.39 | 137070 | 2.47 | 10 | 0.13 | 85370 | 1.22 |
| 10 | 0.37 | 138940 | 2.56 | 4 | | | |
| 4 | 0.27 | 140700 | 2.65 | 6 | 0.18 | 88670 | 1.28 |
| 6 | 0.30 | 142240 | 2.75 | 10 | 0.19 | 90540 | 1.32 |
| 10 | 0.19 | 144110 | 2.91 | 4 | 0.25 | 92300 | 1.34 |
| 4 | 0.23 | 145870 | 3.00 | 6 | 0.30 | 93840 | 1.37 |
| 6 | 0.27 | 147410 | 3.12 | 10 | 0.34 | 95710 | 1.39 |
| | | | | 4 | 0.38 | 97470 | 1.41 |
| | | | | 10 | | | |
| | | | | 4 | 0.37 | 100880 | 1.49 |
| | | | | 6 | | | |

FIGURE E-8. EIFS PANELS SEM CRACK GROWTH DATA (Continued)

| 7A7L | | | | 7A6R (cont.) | | | |
|---|---|---|---|---|---|---|---|
| Groups | y | Cycles | c1 | Groups | y | Cycles | c1 |
| 6 | 0.28 | 93840 | 1.06 | 10 | 0.46 | 104180 | 1.53 |
| 10 | 0.24 | 95710 | 1.10 | 4 | 0.46 | 106050 | 1.56 |
| 4 | | | | 6 | 0.45 | 107810 | 1.59 |
| 6 | 0.18 | 99010 | 1.16 | 10 | 0.54 | 109350 | 1.63 |
| 10 | 0.07 | 100880 | 1.21 | 4 | 0.53 | 111220 | 1.67 |
| 4 | | | | 6 | 0.55 | 112980 | 1.7 |
| 6 | 0.28 | 104180 | 1.31 | 10 | 0.50 | 114520 | 1.75 |
| 10 | 0.36 | 106050 | 1.37 | 4 | 0.48 | 116390 | 1.78 |
| 4 | 0.37 | 107810 | 1.42 | 6 | | | |
| 6 | | | | 10 | 0.41 | 119690 | 1.91 |
| 10 | 0.40 | 111220 | 1.50 | 4 | 0.47 | 121560 | 1.93 |
| 4 | 0.47 | 112980 | 1.53 | 6 | 0.43 | 123320 | 2.01 |
| 6 | 0.50 | 114520 | 1.57 | 10 | 0.36 | 124860 | 2.07 |
| 10 | 0.47 | 116390 | 1.60 | 4 | 0.30 | 126730 | 2.14 |
| 4 | | | | 6 | 0.32 | 128490 | 2.19 |
| 6 | 0.52 | 119690 | 1.65 | 10 | 0.35 | 130030 | 2.24 |
| 10 | 0.31 | 121560 | 1.70 | 4 | 0.33 | 131900 | 2.29 |
| 4 | 0.37 | 123320 | 1.71 | 6 | 0.36 | 133660 | 2.33 |
| 6 | 0.39 | 124860 | 1.75 | 10 | 0.35 | 135200 | 2.4 |
| 10 | 0.42 | 126730 | 1.79 | 4 | 0.30 | 137070 | 2.49 |
| 4 | 0.46 | 128490 | 1.82 | 6 | 0.26 | 138830 | 2.57 |
| 6 | 0.37 | 130030 | 1.82 | 10 | 0.19 | 140370 | 2.65 |
| 10 | 0.40 | 131900 | 1.86 | 4 | 0.26 | 142240 | 2.74 |
| 4 | 0.39 | 133660 | 1.91 | 6 | 0.24 | 144000 | 2.83 |
| 6 | 0.28 | 135200 | 1.96 | 10 | 0.35 | 145540 | 2.89 |
| 10 | 0.34 | 137070 | 2.01 | 4 | 0.55 | 147410 | 3.01 |
| 4 | 0.34 | 138830 | 2.06 | | | | |
| 6 | 0.38 | 140370 | 2.11 | | | | |
| 10 | 0.38 | 142240 | 2.16 | | | | |
| 4 | 0.40 | 144000 | 2.20 | | | | |
| 6 | 0.39 | 145540 | 2.26 | | | | |
| 10 | 0.38 | 147410 | 2.33 | | | | |

FIGURE E-8. EIFS PANELS SEM CRACK GROWTH DATA (Continued)

| Groups | y | 7A7R Cycles | c1 | Groups | y | 7A8L Cycles | c1 |
|---|---|---|---|---|---|---|---|
| 4 | 0.18 | 71730 | 0.23 | 10 | 0.54 | 126730 | 0.38 |
| 6 | | | | 4 | | | |
| 10 | 0.19 | 75030 | 0.28 | 6 | 0.57 | 130360 | 0.46 |
| 4 | 0.25 | 76900 | 0.31 | 10 | 0.51 | 131900 | 0.52 |
| 6 | | | | 4 | | | |
| 10 | 0.26 | 80200 | 0.38 | 6 | 0.46 | 135530 | 0.58 |
| 4 | | | | 10 | 0.47 | 137070 | 0.62 |
| 6 | 0.25 | 83830 | 0.46 | 4 | | | |
| 10 | 0.22 | 85370 | 0.49 | 6 | 0.13 | 140700 | 0.68 |
| 4 | 0.21 | 87240 | 0.53 | 10 | 0.18 | 142240 | 0.71 |
| 6 | 0.21 | 89000 | 0.56 | 4 | 0.16 | 144110 | 0.74 |
| 10 | 0.21 | 90540 | 0.59 | 6 | 0.13 | 145870 | 0.77 |
| 4 | 0.22 | 92410 | 0.62 | 10 | 0.08 | 147410 | 0.81 |
| 6 | 0.20 | 94170 | 0.66 | | | | |
| 10 | | | | | | | |
| 4 | | | | | | | |
| 6 | 0.21 | 99340 | 0.71 | | | | |
| 10 | 0.13 | 100880 | 0.74 | | | | |
| 4 | 0.15 | 102750 | 0.78 | | | | |
| 6 | 0.13 | 104510 | 0.82 | | | | |
| 10 | 0.18 | 106050 | 0.87 | | | | |
| 4 | 0.22 | 107920 | 0.91 | | | | |
| 6 | | | | | | | |
| 10 | | | | | | | |
| 4 | | | | | | | |
| 6 | 0.21 | 114850 | 0.99 | | | | |
| 10 | 0.36 | 116390 | 1.02 | | | | |
| 4 | | | | | | | |
| 6 | 0.35 | 120020 | 1.09 | | | | |
| 10 | 0.35 | 121560 | 1.12 | | | | |
| 4 | 0.26 | 123430 | 1.13 | | | | |
| 6 | 0.29 | 125190 | 1.15 | | | | |
| 10 | 0.32 | 126730 | 1.22 | | | | |
| 4 | 0.35 | 128600 | 1.24 | | | | |
| 6 | 0.38 | 130360 | 1.27 | | | | |
| 10 | 0.39 | 131900 | 1.29 | | | | |
| 4 | 0.43 | 133770 | 1.29 | | | | |
| 6 | 0.42 | 135530 | 1.34 | | | | |
| 10 | 0.44 | 137070 | 1.36 | | | | |
| 4 | 0.45 | 138940 | 1.41 | | | | |
| 6 | 0.38 | 140700 | 1.45 | | | | |
| 10 | 0.31 | 142240 | 1.43 | | | | |
| 4 | 0.33 | 144110 | 1.58 | | | | |
| 6 | 0.25 | 145870 | 1.63 | | | | |
| 10 | 0.33 | 147410 | 1.70 | | | | |

FIGURE E-8. EIFS PANELS SEM CRACK GROWTH DATA (Continued)

| | | 7A12R | | | | 7A13R | |
|---|---|---|---|---|---|---|---|
| Groups | y | Cycles | c1 | Groups | y | Cycles | c1 |
| 6 | 0.25 | 57760 | 0.23 | 10 | 0.03 | 57650 | 0.18 |
| 10 | 0.19 | 59520 | 0.29 | 4 | 0.08 | 59520 | 0.22 |
| 4 | 0.22 | 61390 | 0.34 | 6 | 0.06 | 61060 | 0.25 |
| 6 | 0.24 | 62930 | 0.37 | 10 | 0.07 | 62820 | 0.29 |
| 10 | 0.25 | 64690 | 0.41 | 4 | 0.04 | 64690 | 0.31 |
| 4 | 0.24 | 66560 | 0.44 | 6 | 0.04 | 66230 | 0.34 |
| 6 | 0.24 | 68100 | 0.47 | 10 | 0.07 | 67990 | 0.39 |
| 10 | 0.24 | 69860 | 0.49 | 4 | 0.08 | 69860 | 0.42 |
| 4 | 0.24 | 71730 | 0.52 | 6 | 0.07 | 71400 | 0.44 |
| 6 | 0.20 | 73270 | 0.56 | 10 | 0.08 | 73160 | 0.48 |
| 10 | 0.26 | 75030 | 0.58 | 4 | | | |
| 4 | | | | 6 | | | |
| 6 | 0.25 | 78440 | 0.63 | 10 | 0.06 | 78330 | 0.51 |
| 10 | 0.28 | 80200 | 0.65 | 4 | 0.08 | 80200 | 0.52 |
| 4 | 0.28 | 82070 | 0.69 | 6 | | | |
| 6 | 0.28 | 83610 | 0.72 | 10 | 0.13 | 83500 | 0.58 |
| 10 | 0.31 | 85370 | 0.76 | 4 | 0.11 | 85370 | 0.60 |
| 4 | 0.38 | 87240 | 0.77 | 6 | 0.11 | 86910 | 0.62 |
| 6 | 0.40 | 88780 | 0.80 | 10 | 0.11 | 88670 | 0.64 |
| 10 | 0.33 | 90540 | 0.84 | 4 | | | |
| 4 | | | | 6 | | | |
| 6 | 0.34 | 93950 | 0.90 | 10 | 0.11 | 93840 | 0.69 |
| 10 | 0.33 | 95710 | 0.94 | 4 | 0.14 | 95710 | 0.74 |
| 4 | 0.36 | 97580 | 0.97 | 6 | 0.14 | 97250 | 0.78 |
| 6 | | | | 10 | 0.13 | 99010 | 0.82 |
| 10 | 0.40 | 100880 | 1.02 | 4 | 0.13 | 100880 | 0.85 |
| 4 | 0.38 | 102750 | 1.06 | 6 | | | |
| 6 | 0.38 | 104290 | 1.10 | 10 | 0.14 | 104180 | 0.90 |
| 10 | 0.33 | 106050 | 1.19 | 4 | | | |
| 4 | 0.28 | 107920 | 1.26 | 6 | 0.12 | 107590 | 0.94 |
| 6 | 0.30 | 109460 | 1.29 | 10 | 0.12 | 109350 | 0.96 |
| 10 | 0.34 | 111220 | 1.32 | 4 | 0.11 | 111220 | 0.98 |
| 4 | 0.33 | 113090 | 1.38 | 6 | 0.12 | 112760 | 1.01 |
| 6 | 0.36 | 114630 | 1.42 | 10 | 0.14 | 114520 | 1.04 |
| 10 | 0.36 | 116390 | 1.47 | 4 | 0.13 | 116390 | 1.07 |
| 4 | 0.33 | 118260 | 1.54 | 6 | 0.13 | 117930 | 1.10 |
| 6 | 0.38 | 119800 | 1.58 | 10 | 0.12 | 119690 | 1.13 |
| 10 | 0.43 | 121560 | 1.64 | 4 | 0.13 | 121560 | 1.16 |
| 4 | 0.54 | 123430 | 1.67 | 6 | | | |
| 6 | 0.58 | 124970 | 1.72 | 10 | 0.13 | 124860 | 1.22 |
| 10 | 0.63 | 126730 | 1.79 | 4 | 0.13 | 126730 | 1.26 |
| 4 | 0.64 | 128600 | 1.88 | 6 | | | |
| 6 | 0.70 | 130140 | 1.96 | 10 | 0.04 | 130030 | 1.35 |
| 10 | 0.77 | 131900 | 2.05 | 4 | 0.01 | 131900 | 1.43 |
| 4 | 0.80 | 133770 | 2.17 | 6 | | | |
| 6 | 0.91 | 135310 | 2.22 | 10 | 0.01 | 135200 | 1.52 |
| 10 | 0.97 | 137070 | 2.36 | 4 | | | |
| 4 | 0.68 | 138940 | 2.32 | 6 | 0.05 | 138610 | 1.61 |
| 6 | 0.59 | 140480 | 2.37 | 10 | 0.07 | 140370 | 1.67 |
| 10 | 0.58 | 142240 | 2.37 | 4 | 0.09 | 142240 | 1.73 |
| 4 | 0.66 | 144110 | 2.68 | 6 | 0.07 | 143780 | 1.83 |
| 6 | 0.65 | 145650 | 2.92 | 10 | 0.09 | 145540 | 1.99 |
| 10 | 0.34 | 147410 | 3.28 | 4 | 0.02 | 147410 | 2.21 |

FIGURE E-8. EIFS PANELS SEM CRACK GROWTH DATA (Continued)

| | | 7A14L | | | | 7A14R | |
|---|---|---|---|---|---|---|---|
| Groups | y | Cycles | c1 | Groups | y | Cycles | c1 |
| 4 | 0.58 | 66560 | 0.83 | 4 | 0.07 | 40710 | 0.12 |
| 6 | 0.58 | 68100 | 0.89 | 6 | 0.07 | 42250 | 0.13 |
| 10 | 0.75 | 69860 | 0.94 | 10 | 0.07 | 44010 | 0.15 |
| 4 | | | | 4 | | | |
| 6 | | | | 6 | | | |
| 10 | | | | 10 | | | |
| 4 | | | | 4 | 0.12 | 51050 | 0.20 |
| 6 | 0.75 | 78440 | 1.07 | 6 | 0.12 | 52590 | 0.22 |
| 10 | 0.75 | 80200 | 1.14 | 10 | 0.17 | 54350 | 0.25 |
| 4 | | | | 4 | 0.15 | 56220 | 0.28 |
| 6 | | | | 6 | | | |
| 10 | 0.80 | 85370 | 1.26 | 10 | 0.18 | 59520 | 0.34 |
| 4 | | | | 4 | | | |
| 6 | 0.84 | 88780 | 1.32 | 6 | 0.19 | 62930 | 0.42 |
| 10 | 0.82 | 90540 | 1.38 | 10 | 0.22 | 64690 | 0.45 |
| 4 | | | | 4 | 0.2 | 66560 | 0.49 |
| 6 | 0.72 | 93950 | 1.45 | 6 | 0.23 | 68100 | 0.52 |
| 10 | 0.72 | 95710 | 1.49 | 10 | 0.22 | 69860 | 0.56 |
| 4 | | | | 4 | | | |
| 6 | 0.68 | 99120 | 1.61 | 6 | 0.13 | 73270 | 0.67 |
| 10 | 0.50 | 100880 | 1.64 | 10 | 0.16 | 75030 | 0.71 |
| 4 | 0.45 | 102750 | 1.72 | 4 | 0.15 | 76900 | 0.74 |
| 6 | 0.45 | 104290 | 1.74 | 6 | 0.12 | 78440 | 0.79 |
| 10 | 0.47 | 106050 | 1.78 | 10 | 0.12 | 80200 | 0.83 |
| 4 | 0.50 | 107920 | 1.81 | 4 | 0.1 | 82070 | 0.88 |
| 6 | | | | 6 | 0.12 | 83610 | 0.92 |
| 10 | 0.60 | 111220 | 1.88 | 10 | 0.07 | 85370 | 0.98 |
| 4 | 0.63 | 113090 | 1.92 | 4 | | | |
| 6 | 0.61 | 114630 | 1.97 | 6 | 0.1 | 88780 | 1.05 |
| 10 | 0.64 | 116390 | 2.03 | 10 | 0.1 | 90540 | 1.09 |
| 4 | 0.68 | 118260 | 2.07 | 4 | 0.12 | 92410 | 1.13 |
| 6 | 0.72 | 119800 | 2.11 | 6 | 0.1 | 93950 | 1.17 |
| 10 | 0.70 | 121560 | 2.18 | 10 | 0.12 | 95710 | 1.20 |
| 4 | 0.72 | 123430 | 2.24 | 4 | 0.11 | 97580 | 1.26 |
| 6 | 0.71 | 124970 | 2.32 | 6 | 0.06 | 99120 | 1.31 |
| 10 | 0.66 | 126730 | 2.41 | 10 | 0.08 | 100880 | 1.34 |
| 4 | 0.59 | 128600 | 2.51 | 4 | 0.09 | 102750 | 1.38 |
| 6 | 0.77 | 130140 | 2.53 | 6 | 0.09 | 104290 | 1.43 |
| 10 | 0.74 | 131900 | 2.63 | 10 | 0.11 | 106050 | 1.48 |
| 4 | 0.69 | 133770 | 2.74 | 4 | 0.099 | 107920 | 1.52 |
| 6 | 0.84 | 135310 | 2.77 | 6 | 0.12 | 109460 | 1.56 |
| 10 | 0.89 | 137070 | 2.86 | 10 | 0.08 | 111220 | 1.60 |
| 4 | 0.90 | 138940 | 2.97 | 4 | 0.07 | 113090 | 1.65 |
| 6 | 0.85 | 140480 | 3.12 | 6 | 0.07 | 114630 | 1.68 |
| 10 | 0.84 | 142240 | 3.26 | 10 | 0.15 | 116390 | 1.72 |
| 4 | 0.84 | 144110 | 3.40 | 4 | 0.16 | 118260 | 1.77 |
| 6 | 0.83 | 145650 | 3.58 | 6 | 0.22 | 119800 | 1.82 |
| 10 | 0.85 | 147410 | 3.79 | 10 | 0.24 | 121560 | 1.87 |
| | | | | 4 | | | |
| | | | | 6 | 0.26 | 124970 | 1.96 |
| | | | | 10 | 0.3 | 126730 | 1.99 |
| | | | | 4 | 0.21 | 128600 | 2.08 |
| | | | | 6 | 0.26 | 130140 | 2.15 |
| | | | | 10 | 0.26 | 131900 | 2.22 |
| | | | | 4 | 0.25 | 133770 | 2.28 |
| | | | | 6 | 0.2 | 135310 | 2.37 |
| | | | | 10 | 0.27 | 137070 | 2.43 |
| | | | | 4 | 0.27 | 138940 | 2.52 |
| | | | | 6 | 0.32 | 140480 | 2.60 |
| | | | | 10 | 0.25 | 142240 | 2.72 |
| | | | | 4 | 0.28 | 144110 | 2.86 |
| | | | | 6 | 0.26 | 145650 | 3.03 |
| | | | | 10 | 0.26 | 147410 | 3.23 |

FIGURE E-8. EIFS PANELS SEM CRACK GROWTH DATA (Continued)

| Groups | y | 7A15R Cycles | c1 | Groups | y | 7A16L Cycles | c1 |
|---|---|---|---|---|---|---|---|
| 6 | 0.05 | 42250 | 0.23 | 10 | 0.34 | 75030 | 0.83 |
| 10 | 0.08 | 44010 | 0.26 | 4 | | | |
| 4 | | | | 6 | | | |
| 6 | 0.11 | 47420 | 0.30 | 10 | 0.27 | 80200 | 0.89 |
| 10 | 0.10 | 49180 | 0.34 | 4 | | | |
| 4 | | | | 6 | | | |
| 6 | 0.04 | 52590 | 0.43 | 10 | 0.23 | 85370 | 0.93 |
| 10 | 0.05 | 54350 | 0.41 | 4 | | | |
| 4 | 0.10 | 56220 | 0.44 | 6 | 0.24 | 88780 | 0.99 |
| 6 | 0.08 | 57760 | 0.47 | 10 | | | |
| 10 | 0.14 | 59520 | 0.49 | 4 | | | |
| 4 | 0.12 | 61390 | 0.52 | 6 | 0.26 | 93950 | 1.08 |
| 6 | 0.07 | 62930 | 0.54 | 10 | 0.20 | 95710 | 1.13 |
| 10 | 0.04 | 64690 | 0.56 | 4 | 0.22 | 97580 | 1.17 |
| 4 | 0.01 | 66560 | 0.59 | 6 | 0.26 | 99120 | 1.19 |
| 6 | 0.03 | 68100 | 0.60 | 10 | 0.20 | 100880 | 1.24 |
| 10 | 0.03 | 69860 | 0.62 | 4 | | | |
| 4 | 0.02 | 71730 | 0.64 | 6 | 0.24 | 104290 | 1.29 |
| 6 | 0.02 | 73270 | 0.66 | 10 | 0.24 | 106050 | 1.33 |
| 10 | 0.01 | 75030 | 0.69 | 4 | | | |
| 4 | 0.01 | 76900 | 0.71 | 6 | 0.19 | 109460 | 1.42 |
| 6 | | | | 10 | 0.31 | 111220 | 1.44 |
| 10 | 0.03 | 80200 | 0.74 | 4 | 0.34 | 113090 | 1.51 |
| 4 | | | | 6 | 0.33 | 114630 | 1.55 |
| 6 | 0.04 | 83610 | 0.77 | 10 | 0.19 | 116390 | 1.60 |
| 10 | 0.10 | 85370 | 0.80 | 4 | | | |
| 4 | 0.07 | 87240 | 0.84 | 6 | 0.08 | 119800 | 1.71 |
| 6 | 0.05 | 88780 | 0.85 | 10 | 0.03 | 121560 | 1.75 |
| 10 | 0.02 | 90540 | 0.87 | 4 | 0.06 | 123430 | 1.80 |
| 4 | | | | 6 | 0.01 | 124970 | 1.85 |
| 6 | | | | 10 | 0.06 | 126730 | 1.91 |
| 10 | 0.02 | 95710 | 0.94 | 4 | 0.04 | 128600 | 1.96 |
| 4 | 0.02 | 97580 | 0.97 | 6 | 0.11 | 130140 | 2.01 |
| 6 | | | | 10 | 0.08 | 131900 | 2.08 |
| 10 | 0.02 | 100880 | 1.00 | 4 | 0.13 | 133770 | 2.13 |
| 4 | | | | 6 | 0.16 | 135310 | 2.19 |
| 6 | | | | 10 | 0.13 | 137070 | 2.29 |
| 10 | 0.05 | 106050 | 1.05 | 4 | 0.17 | 138940 | 2.36 |
| 4 | 0.06 | 107920 | 1.09 | 6 | 0.11 | 140480 | 2.45 |
| 6 | | | | 10 | 0.10 | 142240 | 2.56 |
| 10 | 0.10 | 111220 | 1.12 | 4 | 0.10 | 144110 | 2.66 |
| 4 | | | | | | | |
| 6 | 0.17 | 114630 | 1.15 | | | | |
| 10 | 0.18 | 116390 | 1.17 | | | | |
| 4 | | | | | | | |
| 6 | 0.26 | 119800 | 1.19 | | | | |
| 10 | 0.25 | 121560 | 1.24 | | | | |
| 4 | | | | | | | |
| 6 | 0.24 | 124970 | 1.29 | | | | |
| 10 | 0.23 | 126730 | 1.33 | | | | |
| 4 | 0.26 | 128600 | 1.39 | | | | |
| 6 | 0.23 | 130140 | 1.45 | | | | |
| 10 | 0.23 | 131900 | 1.49 | | | | |
| 4 | 0.24 | 133770 | 1.55 | | | | |
| 6 | 0.21 | 135310 | 1.60 | | | | |
| 10 | 0.21 | 137070 | 1.65 | | | | |
| 4 | | | | | | | |
| 6 | 0.27 | 140480 | 1.75 | | | | |
| 10 | 0.23 | 142240 | 1.84 | | | | |
| 4 | 0.20 | 144110 | 1.96 | | | | |

FIGURE E-8. EIFS PANELS SEM CRACK GROWTH DATA (Continued)

| Groups | y | 7A16R Cycles | c1 | Groups | y | 7A17L Cycles | c1 |
|---|---|---|---|---|---|---|---|
| 6 | 0.13 | 104290 | 0.02 | 6 | 0.11 | 78440 | 0.32 |
| 10 | 0.18 | 106050 | 0.05 | 10 | | | |
| 4 | | | | 4 | 0.18 | 82070 | 0.38 |
| 6 | | | | 6 | 0.18 | 83610 | 0.41 |
| 10 | 0.14 | 111220 | 0.09 | 10 | 0.19 | 85370 | 0.44 |
| 4 | 0.15 | 113090 | 0.12 | 4 | 0.20 | 87240 | 0.46 |
| 6 | | | | 6 | 0.22 | 88780 | 0.49 |
| 10 | 0.07 | 116390 | 0.17 | 10 | 0.22 | 90540 | 0.53 |
| 4 | 0.11 | 118260 | 0.21 | 4 | 0.22 | 92410 | 0.56 |
| 6 | 0.11 | 119800 | 0.23 | 6 | 0.19 | 93950 | 0.59 |
| 10 | | 121560 | 0.26 | 10 | 0.21 | 95710 | 0.64 |
| 4 | | 123430 | 0.28 | 4 | 0.22 | 97580 | 0.66 |
| 6 | 0.01 | 124970 | 0.31 | 6 | | | |
| 10 | | 126730 | 0.34 | 10 | 0.20 | 100880 | 0.73 |
| 4 | 0.01 | 128600 | 0.37 | 4 | 0.19 | 102750 | 0.75 |
| 6 | 0.03 | 130140 | 0.45 | 6 | 0.23 | 104290 | 0.79 |
| 10 | 0.04 | 131900 | 0.48 | 10 | 0.12 | 106050 | 0.84 |
| 4 | | | | 4 | 0.12 | 107920 | 0.87 |
| 6 | 0.04 | 135310 | 0.52 | 6 | 0.12 | 109460 | 0.92 |
| 10 | 0.05 | 137070 | 0.54 | 10 | 0.18 | 111220 | 0.96 |
| 4 | | | | 4 | 0.18 | 113090 | 1.02 |
| 6 | 0.10 | 140480 | 0.57 | 6 | 0.16 | 114630 | 1.07 |
| 10 | 0.05 | 142240 | 0.62 | 10 | 0.23 | 116390 | 1.13 |
| 4 | 0.07 | 144110 | 0.66 | 4 | 0.28 | 118260 | 1.19 |
| | | | | 6 | 0.22 | 119800 | 1.27 |
| | | | | 10 | 0.23 | 121560 | 1.35 |
| | | | | 4 | 0.29 | 123430 | 1.43 |
| | | | | 6 | 0.35 | 124970 | 1.50 |
| | | | | 10 | 0.35 | 126730 | 1.59 |
| | | | | 4 | 0.40 | 128600 | 1.67 |
| | | | | 6 | 0.35 | 130140 | 1.76 |
| | | | | 10 | 0.37 | 131900 | 1.85 |
| | | | | 4 | 0.43 | 133770 | 1.95 |
| | | | | 6 | 0.32 | 135310 | 2.06 |
| | | | | 10 | 0.40 | 137070 | 2.17 |
| | | | | 4 | 0.33 | 138940 | 2.28 |
| | | | | 6 | 0.43 | 140480 | 2.39 |
| | | | | 10 | 0.48 | 142240 | 2.52 |
| | | | | 4 | 0.54 | 144110 | 2.66 |
| | | | | 6 | 0.52 | 145650 | 2.79 |
| | | | | 10 | 0.43 | 147410 | 2.94 |

FIGURE E-8. EIFS PANELS SEM CRACK GROWTH DATA (Continued)

| Groups | y | 7A17R Cycles | c1 |
|---|---|---|---|
| 10 | 0.06 | 23,330 | 0.14 |
| 4 | | | |
| 6 | | | |
| 10 | 0.06 | 28,500 | 0.25 |
| 4 | 0.04 | 30,370 | 0.28 |
| 6 | 0.02 | 31,910 | 0.31 |
| 10 | 0.03 | 33,670 | 0.33 |
| 4 | 0.02 | 35,540 | 0.37 |
| 6 | | | |
| 10 | 0.04 | 38,840 | 0.42 |
| 4 | 0.01 | 40,710 | 0.47 |
| 6 | 0.01 | 42,250 | 0.48 |
| 10 | 0.04 | 44,010 | 0.50 |
| 4 | | | |
| 6 | 0.08 | 47,420 | 0.53 |
| 10 | 0.10 | 49,180 | 0.57 |
| 4 | 0.10 | 51,050 | 0.60 |
| 6 | 0.10 | 52,590 | 0.63 |
| 10 | 0.10 | 54,350 | 0.67 |
| 4 | 0.11 | 56,220 | 0.69 |
| 6 | 0.11 | 57,760 | 0.71 |
| 10 | | | |
| 4 | | | |
| 6 | | | |
| 10 | | | |
| 4 | | | |
| 6 | 0.19 | 68,100 | 0.88 |
| 10 | 0.14 | 69,860 | 0.91 |
| 4 | | | |
| 6 | | | |
| 10 | 0.20 | 75,030 | 0.99 |
| 4 | 0.19 | 76,900 | 1.02 |
| 6 | 0.17 | 78,440 | 1.05 |
| 10 | 0.23 | 80,200 | 1.08 |
| 4 | 0.23 | 82,070 | 1.11 |
| 6 | 0.20 | 83,610 | 1.13 |
| 10 | 0.19 | 85,370 | 1.16 |
| 4 | | | |
| 6 | 0.17 | 88,780 | 1.21 |
| 10 | 0.15 | 90,540 | 1.24 |
| 4 | | | |

| Groups | y | 7A17R (cont.) Cycles | c1 |
|---|---|---|---|
| 6 | 0.12 | 93,950 | 1.28 |
| 10 | 0.12 | 95,710 | 1.31 |
| 4 | 0.12 | 97,580 | 1.34 |
| 6 | 0.15 | 99,120 | 1.38 |
| 10 | 0.07 | 100,880 | 1.40 |
| 4 | | | |
| 6 | 0.01 | 104,290 | 1.46 |
| 10 | 0.09 | 106,050 | 1.51 |
| 4 | 0.17 | 107,920 | 1.56 |
| 6 | 0.07 | 109,460 | 1.58 |
| 10 | 0.10 | 111,220 | 1.64 |
| 4 | 0.17 | 113,090 | 1.68 |
| 6 | 0.07 | 114,630 | 1.71 |
| 10 | 0.06 | 116,390 | 1.75 |
| 4 | 0.08 | 118,260 | 1.79 |
| 6 | 0.08 | 119,800 | 1.84 |
| 10 | 0.08 | 121,560 | 1.90 |
| 4 | 0.11 | 123,430 | 1.98 |
| 6 | 0.18 | 124,970 | 2.03 |
| 10 | 0.10 | 126,730 | 2.10 |
| 4 | 0.10 | 128,600 | 2.17 |
| 6 | | 130,140 | 2.23 |
| 10 | | 131,900 | 2.31 |
| 4 | 0.02 | 133,770 | 2.39 |
| 6 | 0.02 | 135,310 | 2.47 |
| 10 | 0.03 | 137,070 | 2.55 |
| 4 | 0.02 | 138,940 | 2.67 |
| 6 | 0.01 | 140,480 | 2.77 |
| 10 | 0.01 | 142,240 | 2.90 |
| 4 | 0.02 | 144,110 | 3.03 |

FIGURE E-8. EIFS PANELS SEM CRACK GROWTH DATA (Continued)

| Groups | y | 8A10L Cycles | c1 |
|---|---|---|---|
| 4 | 0.206 | 65340 | 0.292 |
| 6 | 0.026 | 67210 | 0.386 |
| 10 | 0.222 | 68970 | 0.38 |
| 4 | 0.036 | 70510 | 0.455 |
| 6 | 0.154 | 72380 | 0.448 |
| 10 | 0.255 | 74140 | 0.441 |
| 4 | | 75680 | |
| 6 | | 77550 | |
| 10 | 0.298 | 79310 | 0.451 |
| 4 | | 80850 | |
| 6 | | 82720 | |
| 10 | 0.226 | 84480 | 0.593 |
| 4 | 0.230 | 86020 | 0.604 |
| 6 | 0.345 | 87890 | 0.555 |
| 10 | 0.255 | 89650 | 0.639 |
| 4 | | 91190 | |
| 6 | 0.061 | 93060 | 0.723 |
| 10 | 0.408 | 94820 | 0.658 |
| 4 | | 96360 | |
| 6 | 0.091 | 98230 | 0.781 |
| 10 | 0.080 | 99990 | 0.816 |
| 4 | | 101530 | |
| 6 | 0.076 | 103400 | 0.983 |
| 10 | -0.115 | 105160 | 1.078 |
| 4 | | 106700 | |
| 6 | 0.276 | 108570 | 1.242 |
| 10 | 0.122 | 110330 | 1.392 |
| 4 | 0.179 | 111870 | 1.487 |
| 6 | 0.081 | 113740 | 1.647 |
| 10 | 0.225 | 115500 | 1.746 |
| 4 | 0.145 | 117040 | 1.893 |
| 6 | 0.285 | 118910 | 2.042 |
| 10 | 0.247 | 120670 | 2.202 |
| 4 | 0.185 | 122210 | 2.419 |
| 6 | 0.055 | 124080 | 2.621 |
| 10 | 0.038 | 125840 | 2.875 |
| 4 | 0.314 | 127380 | 3.206 |
| 6 | 0.322 | 129250 | 3.563 |
| fracture | | 130000 | 3.962 |

| Groups | y | 8A10R Cycles | c1 |
|---|---|---|---|
| 6 | 0.286 | 65340 | 0.222 |
| 10 | 0.232 | 67210 | 0.33 |
| 4 | | 68970 | |
| 6 | 0.158 | 70510 | 0.407 |
| 10 | 0.149 | 72380 | 0.424 |
| 4 | | 74140 | |
| 6 | | 75680 | |
| 10 | -0.028 | 77550 | 0.518 |
| 4 | 0.120 | 79310 | 0.561 |
| 6 | -0.061 | 80850 | 0.594 |
| 10 | | 82720 | |
| 4 | | 84480 | |
| 6 | 0.201 | 86020 | 0.656 |
| 10 | 0.523 | 87890 | 0.507 |
| 4 | | 89650 | |
| 6 | 0.260 | 91190 | 0.789 |
| 10 | 0.313 | 93060 | 0.817 |
| 4 | | 94820 | |
| 6 | 0.320 | 96360 | 0.877 |
| 10 | | 98230 | |
| 4 | 0.226 | 99990 | 0.977 |
| 6 | 0.118 | 101530 | 1.059 |
| 10 | 0.243 | 103400 | 1.061 |
| 4 | | 105160 | |
| 6 | 0.330 | 106700 | 1.199 |
| 10 | 0.341 | 108570 | 1.275 |
| 4 | | 110330 | |
| 6 | 0.262 | 111870 | 1.443 |
| 10 | 0.379 | 113740 | 1.491 |
| 4 | | 115500 | |
| 6 | 0.515 | 117040 | 1.748 |
| 10 | 0.365 | 118910 | 1.824 |
| 4 | | 120670 | |
| 6 | 0.236 | 122210 | 2.074 |
| 10 | 0.101 | 124080 | 2.259 |
| 4 | 0.259 | 125840 | 2.402 |
| 6 | 0.409 | 127380 | 2.658 |
| 10 | 0.341 | 129250 | 3.164 |
| fracture | | 130000 | 3.936 |

| Groups | y | 8A19L Cycles | c1 |
|---|---|---|---|
| 6 | 0.070 | 122210 | 0.53 |
| 10 | 0.095 | 124080 | 0.764 |
| 4 | 0.183 | 125840 | 1.033 |
| 6 | 0.122 | 127380 | 1.343 |
| 10 | 0.308 | 129250 | 1.728 |
| fracture | | 130000 | 5.06 |

FIGURE E-8. EIFS PANELS SEM CRACK GROWTH DATA (Continued)

| 9A5L | | | |
|---|---|---|---|
| Groups | y | Cycles | c1 |
| 10 | 0.299 | 481850 | 1.116 |
| 4 | 0.296 | 485610 | 1.390 |
| 6 | 0.176 | 489150 | 1.744 |
| 10 | 0.305 | 493020 | 2.211 |
| fracture | | 498063 | 3.000 |
| μ = | 0.269 | | |
| σ = | 0.062 | | |

| 9A5R | | | |
|---|---|---|---|
| Groups | y | Cycles | c1 |
| 6 | 0.139 | 468510 | 0.391 |
| 10 | 0.342 | 470480 | 0.347 |
| 4 | | 474240 | |
| 6 | 0.303 | 477780 | 0.561 |
| 10 | 0.096 | 479750 | 0.683 |
| 4 | | 483510 | |
| 6 | 0.107 | 487050 | 0.810 |
| 10 | 0.125 | 489020 | 1.081 |
| 4 | 0.054 | 492780 | 1.300 |
| 6 | 0.233 | 496320 | 1.661 |
| fracture | | 498063 | 1.882 |

| 10F5R | | | |
|---|---|---|---|
| Groups | y | Cycles | c1 |
| 10 | 0.200 | 119760 | 0.148 |
| 4 | 0.144 | 123520 | 0.225 |
| 6 | 0.134 | 127060 | 0.278 |
| 10 | 0.141 | 130930 | 0.312 |
| 4 | 0.137 | 134690 | 0.358 |
| 6 | 0.178 | 138230 | 0.404 |
| 10 | 0.091 | 142100 | 0.465 |
| 4 | 0.074 | 145860 | 0.527 |
| 6 | 0.173 | 149400 | 0.586 |
| 10 | 0.192 | 153270 | 0.747 |
| 4 | 0.077 | 157030 | 1.079 |

| 10F6L | | | |
|---|---|---|---|
| Groups | y | Cycles | c1 |
| 6 | 0.116 | 126010 | 0.321 |
| 10 | 0.167 | 129880 | 0.376 |
| 4 | 0.228 | 133640 | 0.456 |
| 6 | 0.222 | 137180 | 0.548 |
| 10 | 0.201 | 141050 | 0.643 |
| 4 | 0.126 | 144810 | 0.734 |
| 6 | 0.195 | 148350 | 0.835 |
| 10 | 0.226 | 152220 | 1.044 |
| 4 | 0.227 | 155980 | 1.348 |
| 6 | 0.146 | 159520 | 1.777 |
| 10 | 0.241 | 163390 | 2.407 |

| 10F6R | | | |
|---|---|---|---|
| Groups | y | Cycles | c1 |
| 4 | 0.099 | 122470 | 0.228 |
| 6 | 0.066 | 126010 | 0.322 |
| 10 | 0.097 | 129880 | 0.413 |
| 6 | 0.112 | 137180 | 0.661 |
| 10 | 0.097 | 141050 | 0.835 |
| 4 | 0.065 | 144810 | 1.006 |
| 6 | 0.063 | 148350 | 1.236 |
| 10 | 0.112 | 152220 | 1.559 |
| 4 | 0.058 | 155980 | 2.024 |
| 6 | 0.186 | 159520 | 2.597 |
| 10 | 0.166 | 163390 | 3.457 |

| 10F7L | | | |
|---|---|---|---|
| Groups | y | Cycles | c1 |
| 10 | 0.152 | 129880 | 0.252 |
| 6 | 0.146 | 137180 | 0.389 |
| 10 | 0.125 | 141050 | 0.47 |
| 4 | 0.122 | 144810 | 0.54 |
| 6 | 0.189 | 148350 | 0.655 |
| 10 | 0.182 | 152220 | 0.931 |
| 4 | 0.188 | 155980 | 1.291 |
| 6 | 0.142 | 159520 | 1.843 |
| 10 | 0.218 | 163390 | 2.637 |

FIGURE E-8. EIFS PANELS SEM CRACK GROWTH DATA (Continued)

| Groups | y | 10F7R Cycles | c1 |
|---|---|---|---|
| 10 | 0.211 | 143950 | 0.482 |
| 4 | 0.254 | 147710 | 0.662 |
| 6 | 0.209 | 151250 | 0.931 |
| 10 | 0.208 | 154220 | 1.298 |
| 4 | 0.223 | 157980 | 2.053 |

| Groups | y | 10F8L Cycles | c1 |
|---|---|---|---|
| 10 | 0.136 | 88200 | 0.145 |
| 10 | 0.136 | 96370 | 0.212 |
| 4 | 0.108 | 100130 | 0.255 |
| 10 | 0.131 | 107540 | 0.330 |
| 4 | 0.113 | 111300 | 0.369 |
| 6 | 0.118 | 114840 | 0.417 |
| 10 | 0.132 | 118710 | 0.445 |
| 4 | 0.139 | 122470 | 0.479 |
| 6 | 0.166 | 126010 | 0.511 |
| 10 | 0.137 | 129880 | 0.571 |
| 4 | 0.179 | 133640 | 0.616 |
| 6 | 0.100 | 137180 | 0.670 |
| 10 | 0.173 | 141050 | 0.728 |
| 4 | 0.087 | 144810 | 0.815 |
| 6 | 0.206 | 148350 | 0.902 |
| 10 | 0.180 | 152220 | 1.012 |
| 4 | 0.186 | 155980 | 1.169 |
| 6 | 0.203 | 159520 | 1.337 |
| 10 | 0.226 | 163390 | 1.711 |

| Groups | y | 10F8R Cycles | c1 |
|---|---|---|---|
| 4 | 0.135 | 128350 | 0.287 |
| 6 | 0.201 | 131890 | 0.294 |
| 10 | 0.215 | 135760 | 0.346 |
| 4 | 0.344 | 139520 | 0.261 |
| 6 | 0.292 | 143060 | 0.503 |
| 10 | 0.100 | 146930 | 0.759 |
| 4 | 0.323 | 150690 | 1.020 |
| 6 | 0.228 | 154230 | 1.293 |
| 10 | 0.207 | 158100 | 1.680 |
| fracture | | 165390 | 1.750 |

| Groups | y | 10F10R Cycles | c1 |
|---|---|---|---|
| 6 | 0.124 | 131890 | 0.517 |
| 10 | 0.088 | 135760 | 0.810 |
| 4 | 0.347 | 139520 | 1.117 |
| 6 | 0.077 | 143060 | 1.393 |
| 10 | 0.195 | 146930 | 1.690 |
| 4 | 0.213 | 150690 | 1.977 |
| 6 | 0.181 | 154230 | 2.288 |
| 10 | 0.125 | 158100 | 2.656 |
| fracture | | 165390 | 3.071 |

FIGURE E-8. EIFS PANELS SEM CRACK GROWTH DATA (Continued)

| Groups | y | 11F6L Cycles | c1 |
|---|---|---|---|
| 10 | 0.234 | 127590 | 0.527 |
| 4 | | 131350 | |
| 6 | 0.731 | 134890 | 0.550 |
| 10 | 0.424 | 138760 | 1.026 |
| 4 | 0.289 | 142520 | 1.361 |
| 6 | 0.219 | 146060 | 1.806 |
| 10 | 0.258 | 149930 | 2.460 |
| fracture | | 154827 | |

| Groups | y | 11F6R Cycles | c1 |
|---|---|---|---|
| 10 | 0.003 | 106250 | 0.673 |
| 4 | | 110010 | |
| 6 | | 113550 | |
| 10 | 0.301 | 117420 | 0.827 |
| 4 | | 121180 | |
| 6 | 0.294 | 124720 | 0.872 |
| 10 | 0.095 | 128590 | 1.021 |
| 4 | 0.197 | 132350 | 1.127 |
| 6 | 0.559 | 135890 | 1.183 |
| 10 | 0.163 | 139760 | 1.491 |
| 4 | 0.214 | 143520 | 1.929 |
| 6 | 0.375 | 147060 | 2.501 |
| fracture | | 154287 | |

| Groups | y | 11F7L Cycles | c1 |
|---|---|---|---|
| 10 | 0.377 | 128590 | 0.491 |
| 4 | 0.673 | 132350 | 0.554 |
| 6 | 0.233 | 135890 | 0.954 |
| 10 | 0.263 | 139760 | 1.251 |
| 4 | 0.336 | 143520 | 1.645 |
| 6 | 0.29 | 147060 | 2.185 |
| fracture | | 154827 | 2.300 |

| Groups | y | 11F7R Cycles | c1 |
|---|---|---|---|
| 10 | 0.318 | 127590 | 0.483 |
| 4 | 0.341 | 131350 | 0.627 |
| 6 | 0.662 | 134890 | 0.665 |
| 10 | 0.318 | 138760 | 1.081 |
| 4 | 0.634 | 142520 | 1.455 |
| 6 | 0.532 | 146060 | 1.913 |
| 10 | 0.714 | 149930 | 2.622 |
| fracture | | 154297 | 3.300 |

| Groups | y | 11F8L Cycles | c1 | dc1/dN |
|---|---|---|---|---|
| 10 | 0.217 | 128590 | 0.393 | 2.56E-05 |
| 4 | | 132350 | | |
| 6 | 0.226 | 135890 | 0.580 | 1.86E-05 |
| 10 | 0.409 | 139760 | 0.652 | 5.98E-05 |
| 4 | 0.269 | 143520 | 0.877 | 7.54E-05 |
| 6 | 0.27 | 147060 | 1.144 | |
| fracture | | 154287 | | |

| Groups | y | 11F8R Cycles | c1 | dc1/dN |
|---|---|---|---|---|
| 10 | 0.19 | 127590 | 0.163 | 4.23E-05 |
| 4 | 0.283 | 131350 | 0.322 | 6.89E-05 |
| 6 | 0.132 | 134890 | 0.566 | 5.89E-05 |
| 10 | 0.187 | 138760 | 0.794 | 6.33E-05 |
| 4 | 0.354 | 142520 | 1.032 | 7.37E-05 |
| 6 | 0.277 | 146060 | 1.293 | 9.04E-05 |
| 10 | 0.261 | 149930 | 1.643 | 2.23E-05 |
| fracture | | 154287 | 1.740 | |

FIGURE E-8. EIFS PANELS SEM CRACK GROWTH DATA (Continued)

| 11F9R | | | |
|---|---|---|---|
| Groups | y | Cycles | c1 |
| 6 | 0.196 | 124720 | 0.584 |
| 10 | 0.29 | 128590 | 0.913 |
| 4 | 0.388 | 132350 | 1.199 |
| 6 | 0.445 | 135890 | 1.504 |
| 10 | 0.844 | 139760 | 2.075 |
| 4 | 0.439 | 143520 | 2.627 |
| 6 | 0.096 | 147060 | 3.185 |

| 11F10R | | | |
|---|---|---|---|
| Groups | y | Cycles | c1 |
| 6 | 0.178 | 123720 | 0.477 |
| 10 | 0.28 | 127590 | 0.776 |
| 4 | 0.344 | 131350 | 1.067 |
| 6 | 0.142 | 134890 | 1.329 |
| 10 | 0.293 | 138760 | 1.617 |
| 4 | 0.195 | 142520 | 1.888 |
| 6 | 0.217 | 146060 | 2.201 |
| 10 | 0.144 | 149930 | 2.555 |
| fracture | | 154827 | 2.800 |

| 15E2R | | | |
|---|---|---|---|
| Flights | y | Cycles | c1 |
| 20 | 0.08 | 171287 | 0.40 |
| 21 | 0.09 | 179853 | 0.57 |
| 22 | 0.18 | 188419 | 0.74 |
| 23 | 0.21 | 196985 | 0.97 |
| 24 | 0.24 | 205551 | 1.26 |
| 25 | 0.29 | 214117 | 1.56 |
| 25.5 | 0.00 | 218484 | 1.86 |

| 15E11R | | | |
|---|---|---|---|
| Flights | y | Cycles | c1 |
| 18 | 0.26 | 154155 | 0.71 |
| 19 | 0.21 | 162721 | 1.06 |
| 20 | 0.15 | 171287 | 1.43 |
| 21 | 0.15 | 179853 | 1.84 |
| 22 | 0.15 | 188419 | 2.26 |
| 23 | 0.18 | 196985 | 2.79 |
| 24 | 0.14 | 205551 | 3.45 |
| 25 | 0.25 | 214117 | 4.30 |
| 25.5 | 0.00 | 218484 | 4.75 |

| 15E16L | | | |
|---|---|---|---|
| Flights | y | Cycles | c1 |
| 19 | 0.27 | 162721 | 0.28 |
| 20 | 0.24 | 171287 | 0.41 |
| 21 | 0.25 | 179853 | 0.56 |
| 22 | 0.31 | 188419 | 0.72 |
| 23 | 0.27 | 196985 | 0.99 |
| 24 | 0.17 | 205551 | 1.27 |
| 25 | 0.05 | 214117 | 1.75 |
| 25.5 | 0.00 | 218484 | 2.22 |

| 15E16R | | | |
|---|---|---|---|
| Flights | y | Cycles | c1 |
| 13 | 0.40 | 111325 | 0.12 |
| 14 | 0.32 | 119891 | 0.26 |
| 15 | 0.31 | 128457 | 0.41 |
| 16 | 0.39 | 137023 | 0.59 |
| 17 | 0.32 | 145589 | 0.82 |
| 18 | 0.43 | 154155 | 1.00 |
| 19 | 0.43 | 162721 | 1.25 |
| 20 | 0.39 | 171287 | 1.58 |
| 21 | 0.21 | 179853 | 1.96 |
| 22 | 0.19 | 188419 | 2.40 |
| 23 | 0.24 | 196985 | 2.98 |
| 24 | 0.20 | 205551 | 3.67 |
| 25 | 0.23 | 214117 | 4.57 |
| 25.5 | 0.00 | 218484 | 5.22 |

FIGURE E-8. EIFS PANELS SEM CRACK GROWTH DATA (Continued)

| 15E20L | | | |
|---|---|---|---|
| Flights | y | Cycles | c1 |
| 16 | 0.28 | 137023 | 0.43 |
| 18 | 0.18 | 154155 | 0.76 |
| 19 | 0.20 | 162721 | 1.05 |
| 20 | 0.38 | 171287 | 1.35 |
| 21 | 0.42 | 179853 | 1.72 |
| 22 | 0.26 | 188419 | 2.29 |
| 23 | 0.26 | 196985 | 2.96 |
| 24 | 0.31 | 205551 | 3.93 |
| 25 | 0.31 | 214117 | 5.33 |
| 25.5 | 0.00 | 218484 | 6.33 |

| 15E26R | | | |
|---|---|---|---|
| Flights | y | Cycles | c1 |
| 19 | 0.23 | 162721 | 0.65 |
| 20 | 0.23 | 171287 | 1.00 |
| 21 | 0.23 | 179853 | 1.38 |
| 22 | 0.25 | 188419 | 1.88 |
| 23 | 0.25 | 196985 | 2.46 |
| 24 | 0.19 | 205551 | 3.32 |
| 25 | 0.24 | 214117 | 4.23 |
| 25.5 | 0.00 | 218484 | 4.87 |

| 15E28R | | | |
|---|---|---|---|
| Flights | y | Cycles | c1 |
| 23 | 0.22 | 196985 | 0.44 |
| 24 | 0.18 | 205551 | 0.70 |
| 25 | 0.23 | 214117 | 1.07 |
| 25.5 | 0.00 | 218484 | 1.56 |

FIGURE E-8. EIFS PANELS SEM CRACK GROWTH DATA (Continued)

Article ID: ZB5118853-1 #1 (EIFS-1) Date: 17-Nov-97

Measurements Taken By: McCann / Grommon

| | | | | | |
|---|---|---|---|---|---|
| Top Skin Width @ Grips: | 22.063 | inches | | | |
| Top Skin Width @ Splice: | 22.000 | inches | | | |
| Top Skin Length (Left): | 23.219 | inches | | | |
| Top Skin Length (Right): | 23.438 | inches | | | |
| Bottom Skin Width @ Grips: | 22.063 | inches | | | |
| Bottom Skin Width @ Splice: | 22.031 | inches | | | |
| Bottom Skin Length (Left): | 23.250 | inches | | | |
| Bottom Skin Length (Right): | 23.281 | inches | | | |
| Splice Overlap (Left): | 2.072 | inches | | | |
| Splice Overlap (Right): | 2.065 | inches | | | |
| A1 - B1 Measurement: | 0.811 | inches | | | |
| A15 - B27 Measurement: | 0.740 | inches | | | |
| A1 - C1 Measurement: | 2.006 | inches | | | |
| A15 - C27 Measurement: | 1.950 | inches | | | |
| A1 - D1 Measurement: | 2.827 | inches | | | |
| A15 - D15 Measurement: | 2.835 | inches | | | |
| B1 - C1 Measurement: | 1.207 | inches | | | |
| B27 - C27 Measurement: | 1.205 | inches | | | |
| S.G. #1 Above A1 - A15 Line: | 0.998 | inches | from Panel Center: | 6.715 | inches |
| S.G. #2 Above A1 - A15 Line: | 0.977 | inches | from Panel Center: | * | inches |
| S.G. #3 Above A1 - A15 Line: | 0.993 | inches | from Panel Center: | 3.729 | inches |
| S.G. #4 Above A1 - A15 Line: | 0.977 | inches | from Panel Center: | * | inches |
| S.G. #5 Above A1 - A15 Line: | 0.977 | inches | from Panel Center: | 0.693 | inches |
| S.G. #6 Above A1 - A15 Line: | 0.977 | inches | from Panel Center: | * | inches |
| S.G. #7 Above A1 - A15 Line: | 0.977 | inches | from Panel Center: | 0.793 | inches |
| S.G. #8 Above A1 - A15 Line: | 0.983 | inches | from Panel Center: | * | inches |
| S.G. #9 Above A1 - A15 Line: | 0.980 | inches | from Panel Center: | 3.803 | inches |
| S.G. #10 Above A1 - A15 Line: | 0.993 | inches | from Panel Center: | * | inches |
| S.G. #11 Above A1 - A15 Line: | 0.979 | inches | from Panel Center: | 6.768 | inches |
| S.G. #12 Above A1 - A15 Line: | 0.999 | inches | from Panel Center: | * | inches |
| S.G. #13 Above A1 - A15 Line: | 0.064 | inches | from Panel Center: | 6.717 | inches |
| S.G. #14 Above A1 - A15 Line: | 0.120 | inches | from Panel Center: | * | inches |
| S.G. #15 Above A1 - A15 Line: | 0.059 | inches | from Panel Center: | 2.182 | inches |
| S.G. #16 Above A1 - A15 Line: | 0.111 | inches | from Panel Center: | * | inches |
| S.G. #17 Above A1 - A15 Line: | 0.070 | inches | from Panel Center: | 2.261 | inches |
| S.G. #18 Above A1 - A15 Line: | 0.095 | inches | from Panel Center: | * | inches |
| S.G. #19 Above A1 - A15 Line: | 0.072 | inches | from Panel Center: | 6.774 | inches |
| S.G. #20 Above A1 - A15 Line: | 0.105 | inches | from Panel Center: | * | inches |
| S.G. #21 Below D1 - D15 Line: | 0.975 | inches | from Panel Center: | 5.299 | inches |
| S.G. #22 Below D1 - D15 Line: | 1.000 | inches | from Panel Center: | * | inches |
| S.G. #23 Below D1 - D15 Line: | 0.973 | inches | from Panel Center: | 5.208 | inches |
| S.G. #24 Below D1 - D15 Line: | 0.993 | inches | from Panel Center: | * | inches |

* Inaccessable on back of panel in test fixture.

FIGURE E-9. MEASURED EIFS SPECIMEN DIMENSIONS

Article ID: ZB5118853-1 #1 (EIFS-2) Date: 20-Nov-97

Measurements Taken By: McCann / Grommon

| | | | | | |
|---|---|---|---|---|---|
| Top Skin Width @ Grips: | 22.063 | inches | | | |
| Top Skin Width @ Splice: | 22.063 | inches | | | |
| Top Skin Length (Left): | 23.375 | inches | | | |
| Top Skin Length (Right): | 23.375 | inches | | | |
| Bottom Skin Width @ Grips: | 22.031 | inches | | | |
| Bottom Skin Width @ Splice: | 22.000 | inches | | | |
| Bottom Skin Length (Left): | 23.281 | inches | | | |
| Bottom Skin Length (Right): | 23.344 | inches | | | |
| Splice Overlap (Left): | 2.078 | inches | | | |
| Splice Overlap (Right): | 2.068 | inches | | | |
| A1 - B1 Measurement: | 0.812 | inches | | | |
| A15 - B27 Measurement: | 0.800 | inches | | | |
| A1 - C1 Measurement: | 1.995 | inches | | | |
| A15 - C27 Measurement: | 1.991 | inches | | | |
| A1 - D1 Measurement: | 2.834 | inches | | | |
| A15 - D15 Measurement: | 2.820 | inches | | | |
| B1 - C1 Measurement: | 1.205 | inches | | | |
| B27 - C27 Measurement: | 1.205 | inches | | | |
| S.G. #1 Above A1 - A15 Line: | 0.995 | inches | from Panel Center: | 6.769 | inches |
| S.G. #2 Above A1 - A15 Line: | 0.998 | inches | from Panel Center: | 6.773 | inches |
| S.G. #3 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #4 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #5 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #6 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #7 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #8 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #9 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #10 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #11 Above A1 - A15 Line: | 1.028 | inches | from Panel Center: | 6.691 | inches |
| S.G. #12 Above A1 - A15 Line: | 0.977 | inches | from Panel Center: | 6.719 | inches |
| S.G. #13 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #14 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #15 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #16 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #17 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #18 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #19 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #20 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #21 Below D1 - D15 Line: | 1.020 | inches | from Panel Center: | 6.783 | inches |
| S.G. #22 Below D1 - D15 Line: | 1.046 | inches | from Panel Center: | 6.786 | inches |
| S.G. #23 Below D1 - D15 Line: | 1.008 | inches | from Panel Center: | 6.671 | inches |
| S.G. #24 Below D1 - D15 Line: | 1.016 | inches | from Panel Center: | 6.695 | inches |

FIGURE E-9. MEASURED EIFS SPECIMEN DIMENSIONS (Continued)

Article ID: ZB5118853-1 #1 (EIFS-3) Date: 01-Dec-97

Measurements Taken By: MCCann / Grommon

| | | | | | |
|---|---|---|---|---|---|
| Top Skin Width @ Grips: | 22.063 | inches | | | |
| Top Skin Width @ Splice: | 22.063 | inches | | | |
| Top Skin Length (Left): | 23.281 | inches | | | |
| Top Skin Length (Right): | 23.313 | inches | | | |
| Bottom Skin Width @ Grips: | 22.094 | inches | | | |
| Bottom Skin Width @ Splice: | 22.063 | inches | | | |
| Bottom Skin Length (Left): | 23.250 | inches | | | |
| Bottom Skin Length (Right): | 23.344 | inches | | | |
| Splice Overlap (Left): | 2.060 | inches | | | |
| Splice Overlap (Right): | 2.071 | inches | | | |
| A1 - B1 Measurement: | 0.801 | inches | | | |
| A15 - B27 Measurement: | 0.844 | inches | | | |
| A1 - C1 Measurement: | 1.979 | inches | | | |
| A15 - C27 Measurement: | 2.026 | inches | | | |
| A1 - D1 Measurement: | 1.817 | inches | | | |
| A15 - D15 Measurement: | 2.864 | inches | | | |
| B1 - C1 Measurement: | 1.209 | inches | | | |
| B27 - C27 Measurement: | 1.211 | inches | | | |
| S.G. #1 Above A1 - A15 Line: | 1.047 | inches | from Panel Center: | 6.801 | inches |
| S.G. #2 Above A1 - A15 Line: | 1.020 | inches | from Panel Center: | 6.788 | inches |
| S.G. #3 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #4 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #5 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #6 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #7 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #8 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #9 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #10 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #11 Above A1 - A15 Line: | 1.024 | inches | from Panel Center: | 6.750 | inches |
| S.G. #12 Above A1 - A15 Line: | 1.018 | inches | from Panel Center: | 6.734 | inches |
| S.G. #13 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #14 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #15 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #16 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #17 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #18 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #19 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #20 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #21 Below D1 - D15 Line: | 1.024 | inches | from Panel Center: | 6.787 | inches |
| S.G. #22 Below D1 - D15 Line: | 0.993 | inches | from Panel Center: | 6.768 | inches |
| S.G. #23 Below D1 - D15 Line: | 0.984 | inches | from Panel Center: | 6.764 | inches |
| S.G. #24 Below D1 - D15 Line: | 1.009 | inches | from Panel Center: | 6.748 | inches |

FIGURE E-9. MEASURED EIFS SPECIMEN DIMENSIONS (Continued)

Article ID: ZB5118853-1 #4 (EIFS-4) Date: 13-Jan-98

Measurements Taken By: McCann & Grommon

| | | | | | |
|---|---|---|---|---|---|
| Top Skin Width @ Grips: | 22.125 | inches | | | |
| Top Skin Width @ Splice: | 22.031 | inches | | | |
| Top Skin Length (Left): | 23.313 | inches | | | |
| Top Skin Length (Right): | 23.313 | inches | | | |
| Bottom Skin Width @ Grips: | 22.125 | inches | | | |
| Bottom Skin Width @ Splice: | 22.063 | inches | | | |
| Bottom Skin Length (Left): | 23.188 | inches | | | |
| Bottom Skin Length (Right): | 23.188 | inches | | | |
| Splice Overlap (Left): | 2.680 | inches | | | |
| Splice Overlap (Right): | 2.530 | inches | | | |
| A1 - B1 Measurement: | 0.800 | inches | | | |
| A15 - B27 Measurement: | 0.807 | inches | | | |
| A1 - C1 Measurement: | 1.963 | inches | | | |
| A15 - C27 Measurement: | 2.005 | inches | | | |
| A1 - D1 Measurement: | 2.804 | inches | | | |
| A15 - D15 Measurement: | 1.869 | inches | | | |
| B1 - C1 Measurement: | 1.170 | inches | | | |
| B27 - C27 Measurement: | 1.185 | inches | | | |
| S.G. #1 Above A1 - A15 Line: | 1.004 | inches | from Panel Center: | 6.807 | inches |
| S.G. #2 Above A1 - A15 Line: | 0.983 | inches | from Panel Center: | 6.734 | inches |
| S.G. #3 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #4 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #5 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #6 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #7 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #8 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #9 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #10 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #11 Above A1 - A15 Line: | 0.977 | inches | from Panel Center: | 6.767 | inches |
| S.G. #12 Above A1 - A15 Line: | 0.989 | inches | from Panel Center: | 6.821 | inches |
| S.G. #13 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #14 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #15 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #16 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #17 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #18 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #19 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #20 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #21 Below D1 - D15 Line: | 0.983 | inches | from Panel Center: | 6.813 | inches |
| S.G. #22 Below D1 - D15 Line: | 0.983 | inches | from Panel Center: | 6.756 | inches |
| S.G. #23 Below D1 - D15 Line: | 0.981 | inches | from Panel Center: | 6.761 | inches |
| S.G. #24 Below D1 - D15 Line: | 1.001 | inches | from Panel Center: | 6.788 | inches |

FIGURE E-9. MEASURED EIFS SPECIMEN DIMENSIONS (Continued)

Article ID: ZB5118853-1 #1 (EIFS-5) Date: 05-Nov-97

Measurements Taken By: Sean Coghlan

| | | |
|---|---|---|
| Top Panel Width @ Grips: | | inches |
| Top Skin Width @ Splice: | | inches |
| Top Skin Length (Left): | | inches |
| Top Skin Length (Right): | | inches |
| Bottom Skin Width @ Grips: | | inches |
| Bottom Skin Width @ Splice: | | inches |
| Bottom Skin Length (Left): | | inches |
| Bottom Skin Length (Right): | | inches |
| A2 - C2 Measurement: | 1.669 | inches |
| A1 - C1 Measurement: | 1.672 | inches |
| A18 - C18 Measurement: | 1.637 | inches |
| A19-C19 Measurement: | 1.650 | inches |
| S.G. #1 Above A1 - A19 Line: | | inches |
| S.G. #2 Above A1 - A19 Line: | | inches |
| S.G. #3 Above A1 - A19 Line: | | inches |
| S.G. #4 Above A1 - A19 Line: | | inches |
| S.G. #5 Above A1 - A19 Line: | | inches |
| S.G. #6 Above A1 - A19 Line: | | inches |
| S.G. #7 Above A1 - A19 Line: | | inches |
| S.G. #8 Above A1 - A19 Line: | | inches |
| S.G. #9 Above A1 - A19 Line: | | inches |
| S.G. #10 Above A1 - A19 Line: | | inches |
| S.G. #11 Above A1 - A19 Line: | | inches |
| S.G. #12 Above A1 - A19 Line: | | inches |
| S.G. #13 Above A1 - A19 Line: | | inches |
| S.G. #14 Above A1 - A19 Line: | | inches |
| S.G. #15 Above A1 - A19 Line: | | inches |
| S.G. #16 Above A1 - A19 Line: | | inches |
| S.G. #17 Above A1 - A19 Line: | | inches |
| S.G. #18 Above A1 - A19 Line: | | inches |
| S.G. #19 Above A1 - A19 Line: | | inches |
| S.G. #20 Above A1 - A19 Line: | | inches |
| S.G. #21 Below C1 - C19 Line: | | inches |
| S.G. #22 Below C1 - C19 Line: | | inches |
| S.G. #23 Below C1 - C19 Line: | | inches |
| S.G. #24 Below C1 - C19 Line: | | inches |

FIGURE E-9. MEASURED EIFS SPECIMEN DIMENSIONS (Continued)

Article ID: ZB5118853-1 #1 (EIFS-6) Date: 05-Nov-97

Measurements Taken By: Sean Coghlan

| | | |
|---|---|---|
| Top Panel Width @ Grips: | | inches |
| Top Skin Width @ Splice: | | inches |
| Top Skin Length (Left): | | inches |
| Top Skin Length (Right): | | inches |
| Bottom Skin Width @ Grips: | | inches |
| Bottom Skin Width @ Splice: | | inches |
| Bottom Skin Length (Left): | | inches |
| Bottom Skin Length (Right): | | inches |
| A1 - C1 Measurement: | 1.676 | inches |
| A2 - C2 Measurement: | 1.687 | inches |
| A18 - C18 Measurement: | 1.617 | inches |
| A19 - C19 Measurement: | 1.644 | inches |
| S.G. #1 Above A1 - A19 Line: | | inches |
| S.G. #2 Above A1 - A19 Line: | | inches |
| S.G. #3 Above A1 - A19 Line: | | inches |
| S.G. #4 Above A1 - A19 Line: | | inches |
| S.G. #5 Above A1 - A19 Line: | | inches |
| S.G. #6 Above A1 - A19 Line: | | inches |
| S.G. #7 Above A1 - A19 Line: | | inches |
| S.G. #8 Above A1 - A19 Line: | | inches |
| S.G. #9 Above A1 - A19 Line: | | inches |
| S.G. #10 Above A1 - A19 Line: | | inches |
| S.G. #11 Above A1 - A19 Line: | | inches |
| S.G. #12 Above A1 - A19 Line: | | inches |
| S.G. #13 Above A1 - A19 Line: | | inches |
| S.G. #14 Above A1 - A19 Line: | | inches |
| S.G. #15 Above A1 - A19 Line: | | inches |
| S.G. #16 Above A1 - A19 Line: | | inches |
| S.G. #17 Above A1 - A19 Line: | | inches |
| S.G. #18 Above A1 - A19 Line: | | inches |
| S.G. #19 Above A1 - A19 Line: | | inches |
| S.G. #20 Above A1 - A19 Line: | | inches |
| S.G. #21 Below C1 - C19 Line: | | inches |
| S.G. #22 Below C1 - C19 Line: | 1.008 | inches |
| S.G. #23 Below C1 - C19 Line: | | inches |
| S.G. #24 Below C1 - C19 Line: | 0.970 | inches |

FIGURE E-9. MEASURED EIFS SPECIMEN DIMENSIONS (Continued)

Article ID: ZB5118853-1 #1 (EIFS-7) Date: 31-Oct-97

Measurements Taken By: Anselmo, McCann, Smith

| | | |
|---|---|---|
| Top Panel Width @ Grips: | | inches |
| Top Skin Width @ Splice: | | inches |
| Top Skin Length (Left): | | inches |
| Top Skin Length (Right): | | inches |
| Bottom Skin Width @ Grips: | | inches |
| Bottom Skin Width @ Splice: | | inches |
| Bottom Skin Length (Left): | | inches |
| Bottom Skin Length (Right): | | inches |
| A2 - C2 Measurement: | 1.675 | inches |
| A18 - C18 Measurement: | 1.637 | inches |
| S.G. #1 Above A1 - A19 Line: | 1.010 | inches |
| S.G. #2 Above A1 - A19 Line: | 1.025 | inches |
| S.G. #3 Above A1 - A19 Line: | | inches |
| S.G. #4 Above A1 - A19 Line: | | inches |
| S.G. #5 Above A1 - A19 Line: | | inches |
| S.G. #6 Above A1 - A19 Line: | | inches |
| S.G. #7 Above A1 - A19 Line: | | inches |
| S.G. #8 Above A1 - A19 Line: | | inches |
| S.G. #9 Above A1 - A19 Line: | | inches |
| S.G. #10 Above A1 - A19 Line: | | inches |
| S.G. #11 Above A1 - A19 Line: | 0.973 | inches |
| S.G. #12 Above A1 - A19 Line: | 1.011 | inches |
| S.G. #13 Above A1 - A19 Line: | | inches |
| S.G. #14 Above A1 - A19 Line: | | inches |
| S.G. #15 Above A1 - A19 Line: | | inches |
| S.G. #16 Above A1 - A19 Line: | | inches |
| S.G. #17 Above A1 - A19 Line: | | inches |
| S.G. #18 Above A1 - A19 Line: | | inches |
| S.G. #19 Above A1 - A19 Line: | | inches |
| S.G. #20 Above A1 - A19 Line: | | inches |
| S.G. #21 Below C1 - C19 Line: | 0.977 | inches |
| S.G. #22 Below C1 - C19 Line: | 1.016 | inches |
| S.G. #23 Below C1 - C19 Line: | | inches |
| S.G. #24 Below C1 - C19 Line: | | inches |

FIGURE E-9. MEASURED EIFS SPECIMEN DIMENSIONS (Continued)

Article ID: ZB5118853-1 #4 (EIFS-8) Date: 12-Feb-98

Measurements Taken By: Larry Mack, Jeff Vannorsdall

| | | | |
|---|---|---|---|
| Top Panel Width @ Grips: | 21.934 | inches | |
| Top Skin Width @ Splice: | 21.973 | inches | |
| Top Skin Length (Left): | 24.125 | inches | |
| Top Skin Length (Right): | 24.187 | inches | |
| Bottom Skin Width @ Grips: | 21.930 | inches | |
| Bottom Skin Width @ Splice: | 21.971 | inches | |
| Bottom Skin Length (Left): | 24.062 | inches | |
| Bottom Skin Length (Right): | 24.125 | inches | |
| A2 - C2 Measurement: | 1.655 | inches | |
| A18 - C18 Measurement: | 1.653 | inches | |
| S.G. #1 Above A1 - A19 Line: | 0.987 | inches | |
| S.G. #2 Above A1 - A19 Line: | 1.014 | inches | |
| S.G. #3 Above A1 - A19 Line: | | inches | |
| S.G. #4 Above A1 - A19 Line: | | inches | |
| S.G. #5 Above A1 - A19 Line: | | inches | |
| S.G. #6 Above A1 - A19 Line: | | inches | |
| S.G. #7 Above A1 - A19 Line: | | inches | |
| S.G. #8 Above A1 - A19 Line: | | inches | |
| S.G. #9 Above A1 - A19 Line: | | inches | |
| S.G. #10 Above A1 - A19 Line: | | inches | |
| S.G. #11 Above A1 - A19 Line: | 0.983 | inches | |
| S.G. #12 Above A1 - A19 Line: | 1.032 | inches | |
| S.G. #13 Above A1 - A19 Line: | | inches | |
| S.G. #14 Above A1 - A19 Line: | | inches | |
| S.G. #15 Above A1 - A19 Line: | | inches | |
| S.G. #16 Above A1 - A19 Line: | | inches | |
| S.G. #17 Above A1 - A19 Line: | | inches | |
| S.G. #18 Above A1 - A19 Line: | | inches | |
| S.G. #19 Above A1 - A19 Line: | | inches | |
| S.G. #20 Above A1 - A19 Line: | | inches | |
| S.G. #21 Below C1 - C19 Line: | 0.987 | inches | 26.073 |
| S.G. #22 Below C1 - C19 Line: | 1.000 | inches | 26.060 |
| S.G. #23 Below C1 - C19 Line: | 0.973 | inches | 26.087 |
| S.G. #24 Below C1 - C19 Line: | 0.986 | inches | 26.074 |

FIGURE E-9. MEASURED EIFS SPECIMEN DIMENSIONS (Continued)

Article ID: ZB5118853-503 #1 (EIFS-9) Date: 14-Jan-98

Measurements Taken By: McCann / Grommon

| | | | | | |
|---|---|---|---|---|---|
| Top Skin Width @ Grips: | 22.063 | inches | | | |
| Top Skin Width @ Splice: | 21.875 | inches | | | |
| Top Skin Length (Left): | 22.100 | inches | | | |
| Top Skin Length (Right): | 22.150 | inches | | | |
| Bottom Skin Width @ Grips: | 22.063 | inches | | | |
| Bottom Skin Width @ Splice: | 22.031 | inches | | | |
| Bottom Skin Length (Left): | 22.150 | inches | | | |
| Bottom Skin Length (Right): | 22.080 | inches | | | |
| Splice Overlap (Left): | | inches | | | |
| Splice Overlap (Right): | | inches | | | |
| A1 - B2 Measurement: | 0.803 | inches | A1 - F1 Measurement: | 4.732 | inches |
| A13 - B26 Measurement: | 0.779 | inches | A13 - F13 Measurement: | 4.681 | inches |
| A1 - C2 Measurement: | 1.744 | inches | | | |
| A13 - C26 Measurement: | 1.726 | inches | | | |
| A1 - D2 Measurement: | 2.914 | inches | | | |
| A13 - D26 Measurement: | 2.880 | inches | | | |
| A1 - E2 Measurement: | 3.885 | inches | | | |
| A13 - E26 Measurement: | 3.859 | inches | | | |
| S.G. #1 Above A1 - A13 Line: | 0.968 | inches | from Panel Center: | 7.275 | inches |
| S.G. #2 Above A1 - A13 Line: | 1.007 | inches | from Panel Center: | 7.250 | inches |
| S.G. #3 Above A1 - A13 Line: | 1.007 | inches | from Panel Center: | 4.096 | inches |
| S.G. #4 Above A1 - A13 Line: | 1.003 | inches | from Panel Center: | 2.472 | inches |
| S.G. #5 Above A1 - A13 Line: | 0.994 | inches | from Panel Center: | 2.430 | inches |
| S.G. #6 Above A1 - A13 Line: | 1.003 | inches | from Panel Center: | 2.472 | inches |
| S.G. #7 Above A1 - A13 Line: | 1.009 | inches | from Panel Center: | 7.181 | inches |
| S.G. #8 Above A1 - A13 Line: | 1.003 | inches | from Panel Center: | 7.218 | inches |
| S.G. #9 Above A1 - A13 Line: | 0.127 | inches | from Panel Center: | 2.275 | inches |
| S.G. #10 Above A1 - A13 Line: | 0.150 | inches | from Panel Center: | 2.250 | inches |
| S.G. #11 Above A1 - A13 Line: | 0.121 | inches | from Panel Center: | 4.093 | inches |
| S.G. #12 Above A1 - A13 Line: | 0.152 | inches | from Panel Center: | 4.045 | inches |
| S.G. #13 Above A1 - A13 Line: | 0.125 | inches | from Panel Center: | 3.977 | inches |
| S.G. #14 Above A1 - A13 Line: | 0.165 | inches | from Panel Center: | 3.986 | inches |
| S.G. #15 Above A1 - A13 Line: | 0.125 | inches | from Panel Center: | 7.181 | inches |
| S.G. #16 Above A1 - A13 Line: | 0.971 | inches | from Panel Center: | 7.218 | inches |
| S.G. #17 Above A1 - A13 Line: | 1.003 | inches | from Panel Center: | 7.308 | inches |
| S.G. #18 Above F1 - F13 Line: | 1.003 | inches | from Panel Center: | 7.224 | inches |
| S.G. #19 Above F1 - F13 Line: | 1.020 | inches | from Panel Center: | 7.235 | inches |
| S.G. #20 Above F1 - F13 Line: | | inches | from Panel Center: | 7.164 | inches |

FIGURE E-9. MEASURED EIFS SPECIMEN DIMENSIONS (Continued)

Article ID: ZB5118853-503 #2 (EIFS-10) Date: 02-Mar-98

Measurements Taken By: Jeff Vannorsdall / Larry Mack

| | | | | | |
|---|---|---|---|---|---|
| Top Skin Width @ Grips: | 22.090 | inches | | | |
| Top Skin Width @ Splice: | 22.065 | inches | | | |
| Top Skin Length (Left): | 22.140 | inches | | | |
| Top Skin Length (Right): | 22.150 | inches | | | |
| Bottom Skin Width @ Grips: | 22.025 | inches | | | |
| Bottom Skin Width @ Splice: | 22.045 | inches | | | |
| Bottom Skin Length (Left): | 22.070 | inches | | | |
| Bottom Skin Length (Right): | 22.060 | inches | | | |
| Splice Overlap (Left): | | inches | | | |
| Splice Overlap (Right): | | inches | | | |
| A1 - B2 Measurement: | 0.815 | inches | A1 - F1 Measurement: | 4.730 | inches |
| A13 - B26 Measurement: | 0.825 | inches | A13 - F13 Measurement: | 4.792 | inches |
| A1 - C2 Measurement: | 1.777 | inches | | | |
| A13 - C26 Measurement: | 1.820 | inches | | | |
| A1 - D2 Measurement: | 2.884 | inches | | | |
| A13 - D26 Measurement: | 2.923 | inches | | | |
| A1 - E2 Measurement: | 3.895 | inches | | | |
| A13 - E26 Measurement: | 3.938 | inches | | | |
| S.G. #1 Above A1 - A13 Line: | 1.000 | inches | from Panel Center: | 7.210 | inches |
| S.G. #2 Above A1 - A13 Line: | 1.011 | inches | from Panel Center: | 7.265 | inches |
| S.G. #3 Above A1 - A13 Line: | | inches | from Panel Center: | | inches |
| S.G. #4 Above A1 - A13 Line: | | inches | from Panel Center: | | inches |
| S.G. #5 Above A1 - A13 Line: | | inches | from Panel Center: | | inches |
| S.G. #6 Above A1 - A13 Line: | | inches | from Panel Center: | | inches |
| S.G. #7 Above A1 - A13 Line: | 1.000 | inches | from Panel Center: | 7.110 | inches |
| S.G. #8 Above A1 - A13 Line: | 1.011 | inches | from Panel Center: | 7.155 | inches |
| S.G. #9 Above A1 - A13 Line: | | inches | from Panel Center: | | inches |
| S.G. #10 Above A1 - A13 Line: | | inches | from Panel Center: | | inches |
| S.G. #11 Above A1 - A13 Line: | | inches | from Panel Center: | | inches |
| S.G. #12 Above A1 - A13 Line: | | inches | from Panel Center: | | inches |
| S.G. #13 Above A1 - A13 Line: | | inches | from Panel Center: | | inches |
| S.G. #14 Above A1 - A13 Line: | | inches | from Panel Center: | | inches |
| S.G. #15 Above A1 - A13 Line: | | inches | from Panel Center: | | inches |
| S.G. #16 Above A1 - A13 Line: | | inches | from Panel Center: | | inches |
| S.G. #17 Above A1 - A13 Line: | 0.982 | inches | from Panel Center: | 7.210 | inches |
| S.G. #18 Above F1 - F13 Line: | 1.000 | inches | from Panel Center: | 7.233 | inches |
| S.G. #19 Above F1 - F13 Line: | 0.984 | inches | from Panel Center: | 7.130 | inches |
| S.G. #20 Above F1 - F13 Line: | 1.000 | inches | from Panel Center: | 7.135 | inches |

FIGURE E-9. MEASURED EIFS SPECIMEN DIMENSIONS (Continued)

Article ID: ZB5118853-503 #3 (EIFS-11) Date: 02-Mar-98

Measurements Taken By: J. Vannorsdall / L. Mack

| | | | | | |
|---|---|---|---|---|---|
| Top Skin Width @ Grips: | 22.059 | inches | | | |
| Top Skin Width @ Splice: | 22.018 | inches | | | |
| Top Skin Length (Left): | 22.100 | inches | | | |
| Top Skin Length (Right): | 22.130 | inches | | | |
| Bottom Skin Width @ Grips: | 22.043 | inches | | | |
| Bottom Skin Width @ Splice: | 22.028 | inches | | | |
| Bottom Skin Length (Left): | 22.000 | inches | | | |
| Bottom Skin Length (Right): | 22.020 | inches | | | |
| Splice Overlap (Left): | | inches | | | |
| Splice Overlap (Right): | | inches | | | |
| A1 - B2 Measurement: | 0.800 | inches | A1 - F1 Measurement: | 4.723 | inches |
| A13 - B26 Measurement: | 0.775 | inches | A13 - F13 Measurement: | 4.684 | inches |
| A1 - C2 Measurement: | 1.789 | inches | | | |
| A13 - C26 Measurement: | 1.815 | inches | | | |
| A1 - D2 Measurement: | 2.944 | inches | | | |
| A13 - D26 Measurement: | 2.954 | inches | | | |
| A1 - E2 Measurement: | 3.915 | inches | | | |
| A13 - E26 Measurement: | 3.873 | inches | | | |
| S.G. #1 Above A1 - A13 Line: | 0.995 | inches | from Panel Center: | 7.210 | inches |
| S.G. #2 Above A1 - A13 Line: | 1.006 | inches | from Panel Center: | 7.255 | inches |
| S.G. #3 Above A1 - A13 Line: | | inches | from Panel Center: | | inches |
| S.G. #4 Above A1 - A13 Line: | | inches | from Panel Center: | | inches |
| S.G. #5 Above A1 - A13 Line: | | inches | from Panel Center: | | inches |
| S.G. #6 Above A1 - A13 Line: | | inches | from Panel Center: | | inches |
| S.G. #7 Above A1 - A13 Line: | 0.995 | inches | from Panel Center: | 7.130 | inches |
| S.G. #8 Above A1 - A13 Line: | 1.021 | inches | from Panel Center: | 7.140 | inches |
| S.G. #9 Above A1 - A13 Line: | | inches | from Panel Center: | | inches |
| S.G. #10 Above A1 - A13 Line: | | inches | from Panel Center: | | inches |
| S.G. #11 Above A1 - A13 Line: | | inches | from Panel Center: | | inches |
| S.G. #12 Above A1 - A13 Line: | | inches | from Panel Center: | | inches |
| S.G. #13 Above A1 - A13 Line: | | inches | from Panel Center: | | inches |
| S.G. #14 Above A1 - A13 Line: | | inches | from Panel Center: | | inches |
| S.G. #15 Above A1 - A13 Line: | | inches | from Panel Center: | | inches |
| S.G. #16 Above A1 - A13 Line: | | inches | from Panel Center: | | inches |
| S.G. #17 Above A1 - A13 Line: | 0.991 | inches | from Panel Center: | 7.220 | inches |
| S.G. #18 Above F1 - F13 Line: | 0.988 | inches | from Panel Center: | 7.185 | inches |
| S.G. #19 Above F1 - F13 Line: | 1.003 | inches | from Panel Center: | 7.040 | inches |
| S.G. #20 Above F1 - F13 Line: | 0.971 | inches | from Panel Center: | 7.220 | inches |

FIGURE E-9. MEASURED EIFS SPECIMEN DIMENSIONS (Continued)

Article ID: ZB5118853-503 #4 (EIFS-12) Date: 01-Apr-98

Measurements Taken By: J. Vannorsdall/L. Mack

| | | | | | |
|---|---|---|---|---|---|
| Top Skin Width @ Grips: | 22.067 | inches | | | |
| Top Skin Width @ Splice: | 22.126 | inches | | | |
| Top Skin Length (Left): | 22.060 | inches | | | |
| Top Skin Length (Right): | 22.130 | inches | | | |
| Bottom Skin Width @ Grips: | 22.083 | inches | | | |
| Bottom Skin Width @ Splice: | 22.045 | inches | | | |
| Bottom Skin Length (Left): | 22.240 | inches | | | |
| Bottom Skin Length (Right): | 22.160 | inches | | | |
| Splice Overlap (Left): | | inches | | | |
| Splice Overlap (Right): | | inches | | | |
| A1 - B2 Measurement: | 0.782 | inches | A1 - F1 Measurement: | 4.696 | inches |
| A13 - B26 Measurement: | 0.775 | inches | A13 - F13 Measurement: | 4.696 | inches |
| A1 - C2 Measurement: | 1.725 | inches | | | |
| A13 - C26 Measurement: | 1.800 | inches | | | |
| A1 - D2 Measurement: | 2.863 | inches | | | |
| A13 - D26 Measurement: | 2.951 | inches | | | |
| A1 - E2 Measurement: | 3.869 | inches | | | |
| A13 - E26 Measurement: | 3.902 | inches | | | |
| S.G. #1 Above A1 - A13 Line: | 1.023 | inches | from Panel Center: | 7.185 | inches |
| S.G. #2 Above A1 - A13 Line: | 1.018 | inches | from Panel Center: | 7.210 | inches |
| S.G. #3 Above A1 - A13 Line: | | inches | from Panel Center: | | inches |
| S.G. #4 Above A1 - A13 Line: | | inches | from Panel Center: | | inches |
| S.G. #5 Above A1 - A13 Line: | | inches | from Panel Center: | | inches |
| S.G. #6 Above A1 - A13 Line: | | inches | from Panel Center: | | inches |
| S.G. #7 Above A1 - A13 Line: | 0.997 | inches | from Panel Center: | 7.210 | inches |
| S.G. #8 Above A1 - A13 Line: | 1.024 | inches | from Panel Center: | 7.220 | inches |
| S.G. #9 Above A1 - A13 Line: | | inches | from Panel Center: | | inches |
| S.G. #10 Above A1 - A13 Line: | | inches | from Panel Center: | | inches |
| S.G. #11 Above A1 - A13 Line: | | inches | from Panel Center: | | inches |
| S.G. #12 Above A1 - A13 Line: | | inches | from Panel Center: | | inches |
| S.G. #13 Above A1 - A13 Line: | | inches | from Panel Center: | | inches |
| S.G. #14 Above A1 - A13 Line: | | inches | from Panel Center: | | inches |
| S.G. #15 Above A1 - A13 Line: | | inches | from Panel Center: | | inches |
| S.G. #16 Above A1 - A13 Line: | | inches | from Panel Center: | | inches |
| S.G. #17 Above A1 - A13 Line: | 1.004 | inches | from Panel Center: | 7.240 | inches |
| S.G. #18 Above F1 - F13 Line: | 1.015 | inches | from Panel Center: | 7.130 | inches |
| S.G. #19 Above F1 - F13 Line: | 0.996 | inches | from Panel Center: | 7.270 | inches |
| S.G. #20 Above F1 - F13 Line: | 1.024 | inches | from Panel Center: | 7.140 | inches |

FIGURE E-9. MEASURED EIFS SPECIMEN DIMENSIONS (Continued)

Article ID: ZB5118853-505 #1 (EIFS-13) Date: 01-Apr-98

Measurements Taken By: Jeff Vannorsdall

| | | | | | |
|---|---|---|---|---|---|
| Top Skin Width @ Grips: | 22.027 | inches | | | |
| Top Skin Width @ Splice: | 22.057 | inches | | | |
| Top Skin Length (Left): | 22.200 | inches | | | |
| Top Skin Length (Right): | 22.140 | inches | | | |
| Bottom Skin Width @ Grips: | 22.025 | inches | | | |
| Bottom Skin Width @ Splice: | 22.047 | inches | | | |
| Bottom Skin Length (Left): | 22.160 | inches | | | |
| Bottom Skin Length (Right): | 22.200 | inches | | | |
| A1 - B1 Measurement: | 0.855 | inches | A1 - F1 Measurement: | 3.714 | inches |
| A15 - B29 Measurement: | 0.907 | inches | A15 - F28 Measurement: | 3.772 | inches |
| A1 - C1 Measurement: | 1.490 | inches | A1 - G1 Measurement: | 4.365 | inches |
| A15 - C28 Measurement: | 1.542 | inches | IA15 - G29 Measurement: | 4.425 | inches |
| A1 - D1 Measurement: | 2.102 | inches | A1 - H1 Measurement: | 5.248 | inches |
| A15 - D29 Measurement: | 2.144 | inches | A15 - H15 Measurement: | 5.310 | inches |
| A1 - E1 Measurement: | 3.092 | inches | | | |
| A15 - E29 Measurement: | 3.169 | inches | | | |
| S.G. #1 Above A1 - A15 Line: | 1.000 | inches | from Panel Center: | 6.800 | inches |
| S.G. #2 Above A1 - A15 Line: | 0.982 | inches | from Panel Center: | 6.800 | inches |
| S.G. #3 Above A1 - A15 Line: | 1.000 | inches | from Panel Center: | 3.820 | inches |
| S.G. #4 Above A1 - A15 Line: | 0.965 | inches | from Panel Center: | 3.840 | inches |
| S.G. #5 Above A1 - A15 Line: | 1.000 | inches | from Panel Center: | 0.820 | inches |
| S.G. #6 Above A1 - A15 Line: | 0.975 | inches | from Panel Center: | 0.800 | inches |
| S.G. #7 Above A1 - A15 Line: | 1.000 | inches | from Panel Center: | 0.700 | inches |
| S.G. #8 Above A1 - A15 Line: | 0.990 | inches | from Panel Center: | 0.700 | inches |
| S.G. #9 Above A1 - A15 Line: | 1.000 | inches | from Panel Center: | 3.640 | inches |
| S.G. #10 Above A1 - A15 Line: | 0.964 | inches | from Panel Center: | 3.680 | inches |
| S.G. #11 Above A1 - A15 Line: | 1.000 | inches | from Panel Center: | 6.640 | inches |
| S.G. #12 Above A1 - A15 Line: | 0.971 | inches | from Panel Center: | 6.680 | inches |
| S.G. #13 Above A1 - A15 Line: | 0.075 | inches | from Panel Center: | 6.840 | inches |
| S.G. #14 Above A1 - A15 Line: | c/l | inches | from Panel Center: | 6.800 | inches |
| S.G. #15 Above A1 - A15 Line: | 0.065 | inches | from Panel Center: | 2.340 | inches |
| S.G. #16 Above A1 - A15 Line: | c/l | inches | from Panel Center: | 2.320 | inches |
| S.G. #17 Above A1 - A15 Line: | 0.035 | inches | from Panel Center: | 2.260 | inches |
| S.G. #18 Above A1 - A15 Line: | c/l | inches | from Panel Center: | 2.200 | inches |
| S.G. #19 Above A1 - A15 Line: | 0.018 | inches | from Panel Center: | 6.620 | inches |
| S.G. #20 Above A1 - A15 Line: | c/l | inches | from Panel Center: | 6.700 | inches |
| S.G. #21 Below H1 - H15 Line: | 1.000 | inches | from Panel Center: | 6.780 | inches |
| S.G. #22 Below H1 - H15 Line: | 0.995 | inches | from Panel Center: | 6.760 | inches |
| S.G. #23 Below H1 - H15 Line: | 1.000 | inches | from Panel Center: | 6.700 | inches |
| S.G. #24 Below H1 - H15 Line: | 1.000 | inches | from Panel Center: | 6.720 | inches |

FIGURE E-9. MEASURED EIFS SPECIMEN DIMENSIONS (Continued)

Article ID: ZB5118853-505 #2 (EIFS-14) Date: 09-Apr-98

Measurements Taken By: J. Vannorsdall & L. Mack

| | | | | | |
|---|---|---|---|---|---|
| Top Skin Width @ Grips: | 22.035 | inches | | | |
| Top Skin Width @ Splice: | 22.055 | inches | | | |
| Top Skin Length (Left): | | inches | | | |
| Top Skin Length (Right): | | inches | | | |
| Bottom Skin Width @ Grips: | 22.008 | inches | | | |
| Bottom Skin Width @ Splice: | 22.035 | inches | | | |
| Bottom Skin Length (Left): | | inches | | | |
| Bottom Skin Length (Right): | | inches | | | |
| A1 - B1 Measurement: | 0.870 | inches | A1 - F1 Measurement: | 3.735 | inches |
| A15 - B29 Measurement: | 0.823 | inches | A15 - F28 Measurement: | 3.717 | inches |
| A1 - C1 Measurement: | 1.492 | inches | A1 - G1 Measurement: | 4.359 | inches |
| A15 - C28 Measurement: | 1.463 | inches | IA15 - G29 Measurement: | 4.337 | inches |
| A1 - D1 Measurement: | 2.103 | inches | A1 - H1 Measurement: | 5.250 | inches |
| A15 - D29 Measurement: | 2.078 | inches | A15 - H15 Measurement: | 5.182 | inches |
| A1 - E1 Measurement: | 3.128 | inches | | | |
| A15 - E29 Measurement: | 3.081 | inches | | | |
| S.G. #1 Above A1 - A15 Line: | 1.000 | inches | from Panel Center: | 6.735 | inches |
| S.G. #2 Above A1 - A15 Line: | 0.970 | inches | from Panel Center: | 6.700 | inches |
| S.G. #3 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #4 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #5 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #6 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #7 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #8 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #9 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #10 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #11 Above A1 - A15 Line: | 1.020 | inches | from Panel Center: | 6.760 | inches |
| S.G. #12 Above A1 - A15 Line: | 1.039 | inches | from Panel Center: | 6.775 | inches |
| S.G. #13 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #14 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #15 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #16 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #17 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #18 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #19 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #20 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #21 Below H1 - H15 Line: | 1.000 | inches | from Panel Center: | 6.735 | inches |
| S.G. #22 Below H1 - H15 Line: | 0.972 | inches | from Panel Center: | 6.700 | inches |
| S.G. #23 Below H1 - H15 Line: | 1.000 | inches | from Panel Center: | 6.770 | inches |
| S.G. #24 Below H1 - H15 Line: | 1.000 | inches | from Panel Center: | 6.775 | inches |

FIGURE E-9. MEASURED EIFS SPECIMEN DIMENSIONS (Continued)

Article ID: ZB5118853-505 #3 (EIFS-15) Date: 09-Apr-98

Measurements Taken By: J. Vannorsdall & L. Mack

| | | | | | |
|---|---|---|---|---|---|
| Top Skin Width @ Grips: | 22.035 | inches | | | |
| Top Skin Width @ Splice: | 22.055 | inches | | | |
| Top Skin Length (Left): | 22.100 | inches | | | |
| Top Skin Length (Right): | 22.100 | inches | | | |
| Bottom Skin Width @ Grips: | 22.020 | inches | | | |
| Bottom Skin Width @ Splice: | 22.006 | inches | | | |
| Bottom Skin Length (Left): | 22.240 | inches | | | |
| Bottom Skin Length (Right): | 22.300 | inches | | | |
| A1 - B1 Measurement: | 0.847 | inches | A1 - F1 Measurement: | 3.746 | inches |
| A15 - B29 Measurement: | 0.925 | inches | A15 - F28 Measurement: | 3.775 | inches |
| A1 - C1 Measurement: | 1.470 | inches | A1 - G1 Measurement: | 4.333 | inches |
| A15 - C28 Measurement: | 1.546 | inches | IA15 - G29 Measurement: | 4.400 | inches |
| A1 - D1 Measurement: | 2.095 | inches | A1 - H1 Measurement: | 5.217 | inches |
| A15 - D29 Measurement: | 2.160 | inches | A15 - H15 Measurement: | 5.230 | inches |
| A1 - E1 Measurement: | 3.090 | inches | | | |
| A15 - E29 Measurement: | 3.150 | inches | | | |
| S.G. #1 Above A1 - A15 Line: | 0.960 | inches | from Panel Center: | 2.750 | inches |
| S.G. #2 Above A1 - A15 Line: | 1.000 | inches | from Panel Center: | 6.720 | inches |
| S.G. #3 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #4 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #5 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #6 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #7 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #8 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #9 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #10 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #11 Above A1 - A15 Line: | 0.926 | inches | from Panel Center: | 6.740 | inches |
| S.G. #12 Above A1 - A15 Line: | 0.957 | inches | from Panel Center: | 6.700 | inches |
| S.G. #13 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #14 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #15 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #16 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #17 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #18 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #19 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #20 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #21 Below H1 - H15 Line: | 1.019 | inches | from Panel Center: | 6.780 | inches |
| S.G. #22 Below H1 - H15 Line: | 1.080 | inches | from Panel Center: | 6.735 | inches |
| S.G. #23 Below H1 - H15 Line: | 1.059 | inches | from Panel Center: | 6.750 | inches |
| S.G. #24 Below H1 - H15 Line: | 1.021 | inches | from Panel Center: | 6.730 | inches |

FIGURE E-9. MEASURED EIFS SPECIMEN DIMENSIONS (Continued)

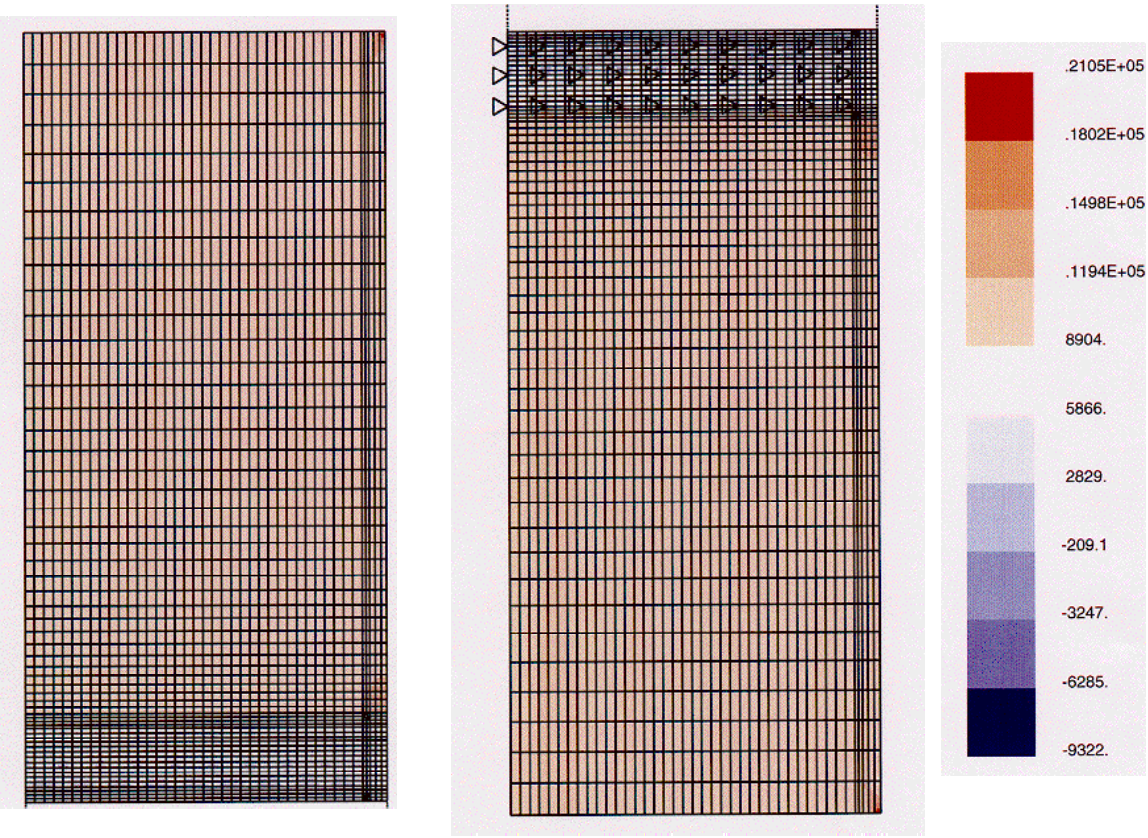
Article ID: ZB5118853-505 #4 (EIFS-16) Date: 09-Apr-98

Measurements Taken By: J. Vannorsdall

| | | | | | |
|---|---|---|---|---|---|
| Top Skin Width @ Grips: | 22.000 | inches | | | |
| Top Skin Width @ Splice: | 22.010 | inches | | | |
| Top Skin Length (Left): | 22.200 | inches | | | |
| Top Skin Length (Right): | 22.140 | inches | | | |
| Bottom Skin Width @ Grips: | 22.029 | inches | | | |
| Bottom Skin Width @ Splice: | 22.050 | inches | | | |
| Bottom Skin Length (Left): | 22.100 | inches | | | |
| Bottom Skin Length (Right): | 22.140 | inches | | | |
| A1 - B1 Measurement: | 0.875 | inches | A1 - F1 Measurement: | 3.750 | inches |
| A15 - B29 Measurement: | 0.860 | inches | A15 - F28 Measurement: | 3.740 | inches |
| A1 - C1 Measurement: | 1.500 | inches | A1 - G1 Measurement: | 4.491 | inches |
| A15 - C28 Measurement: | 1.480 | inches | A15 - G29 Measurement: | 4.385 | inches |
| A1 - D1 Measurement: | 2.150 | inches | A1 - H1 Measurement: | 5.265 | inches |
| A15 - D29 Measurement: | 2.120 | inches | A15 - H15 Measurement: | 5.250 | inches |
| A1 - E1 Measurement: | 3.150 | inches | | | |
| A15 - E29 Measurement: | 3.110 | inches | | | |
| S.G. #1 Above A1 - A15 Line: | 0.975 | inches | from Panel Center: | 6.760 | inches |
| S.G. #2 Above A1 - A15 Line: | 1.000 | inches | from Panel Center: | 6.800 | inches |
| S.G. #3 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #4 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #5 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #6 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #7 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #8 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #9 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #10 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #11 Above A1 - A15 Line: | 1.038 | inches | from Panel Center: | 6.700 | inches |
| S.G. #12 Above A1 - A15 Line: | 1.000 | inches | from Panel Center: | 6.780 | inches |
| S.G. #13 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #14 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #15 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #16 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #17 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #18 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #19 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #20 Above A1 - A15 Line: | | inches | from Panel Center: | | inches |
| S.G. #21 Below H1 - H15 Line: | 1.030 | inches | from Panel Center: | 6.780 | inches |
| S.G. #22 Below H1 - H15 Line: | 0.970 | inches | from Panel Center: | 6.780 | inches |
| S.G. #23 Below H1 - H15 Line: | 0.975 | inches | from Panel Center: | 6.730 | inches |
| S.G. #24 Below H1 - H15 Line: | 1.000 | inches | from Panel Center: | 6.780 | inches |

FIGURE E-9. MEASURED EIFS SPECIMEN DIMENSIONS (Continued)

The following pages contain the stress fringe plots for the EIFS finite element models, which are detailed in section 6.10.4.




Upper Skin Skin

FIGURE E-10. STRESS DISTRIBUTION FOR SKIN, 10 ksi—TYPE 2 EIFS TEST SPECIMEN

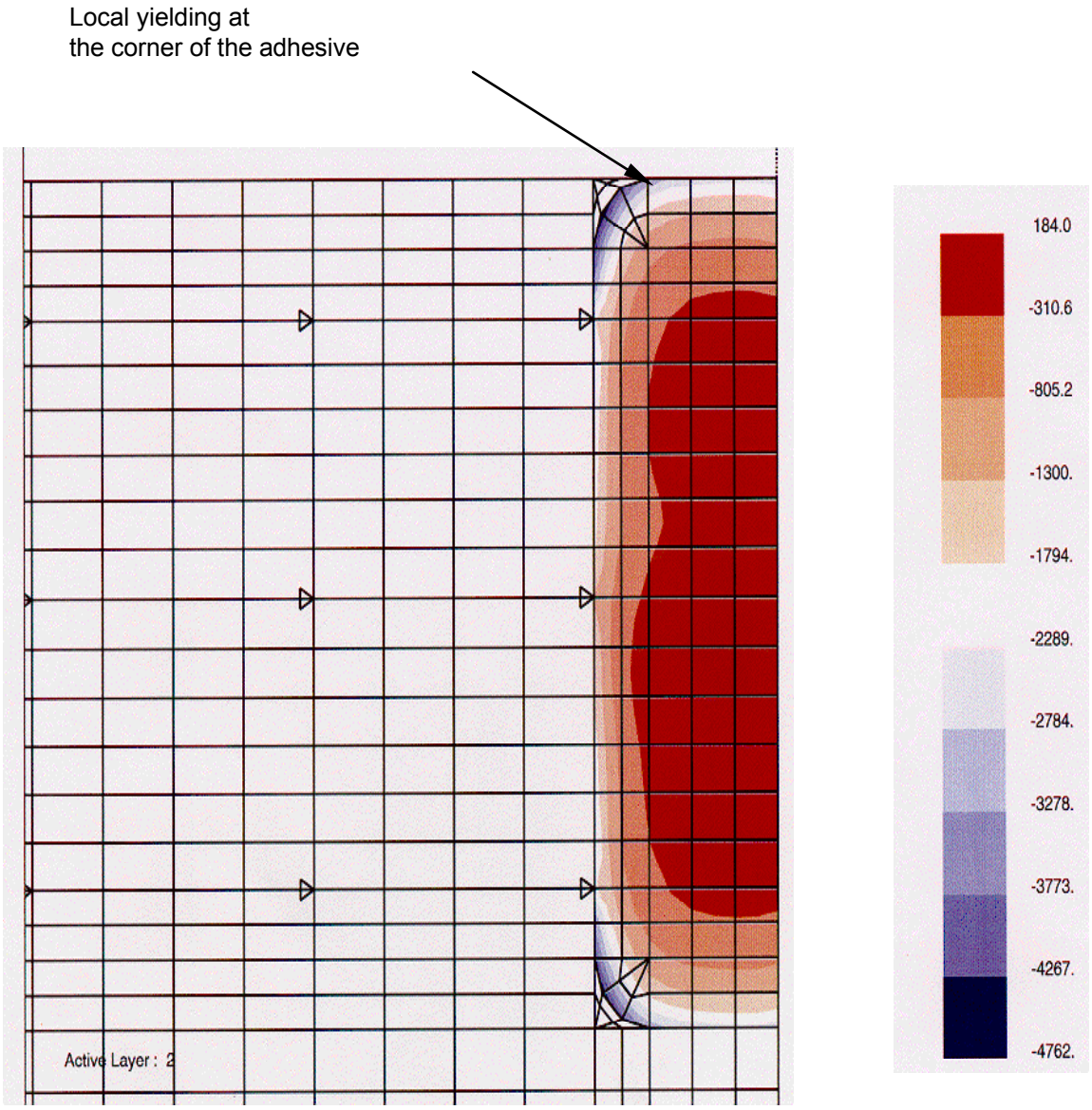



FIGURE E-11. STRESS DISTRIBUTION FOR SKIN, WITH EDGE BOUNDING, 10 ksi—TYPE 2 EIFS TEST SPECIMEN

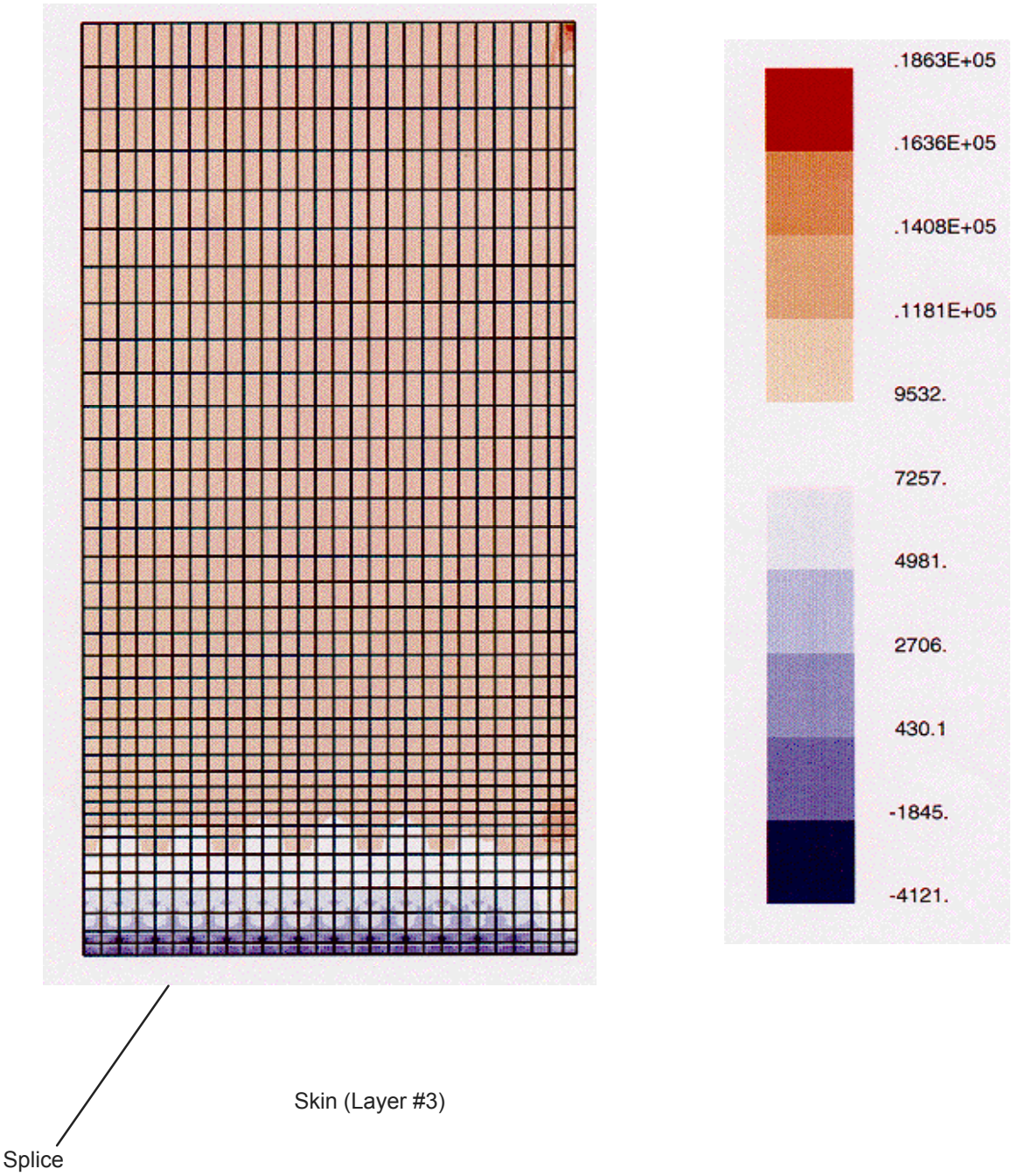



FIGURE E-12. STRESS DISTRIBUTION FOR SKIN, WITH EDGE BOUNDING, 10 ksi—TYPE 3 EIFS TEST SPECIMEN

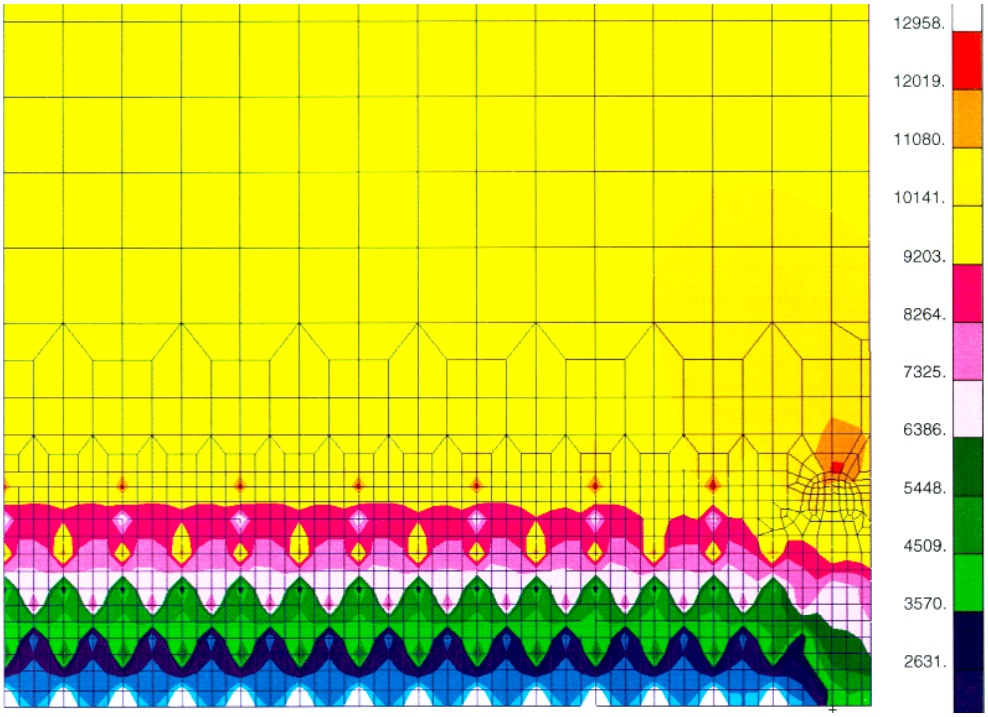



FIGURE E-13. STRESS DISTRIBUTION FOR SKIN, 10 ksi—TYPE 4 EIFS TEST SPECIMEN

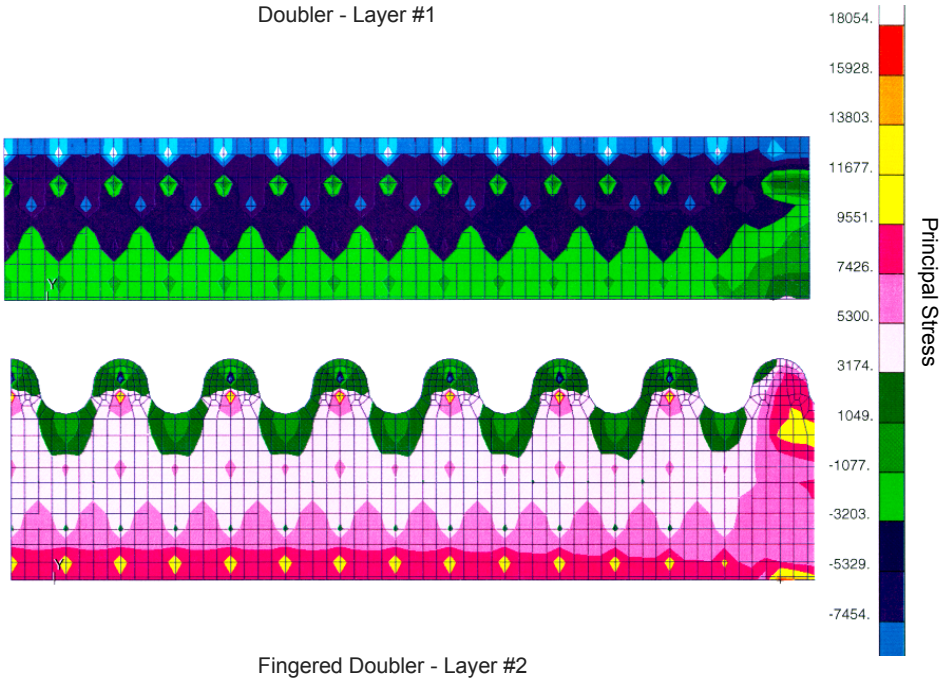



FIGURE E-14. STRESS DISTRIBUTION FOR DOUBLERS, 10 ksi—TYPE 4 EIFS TEST SPECIMEN

The following pages contain the strain predictions and measured results for the EIFS panels, which are detailed in section 6.10.4.

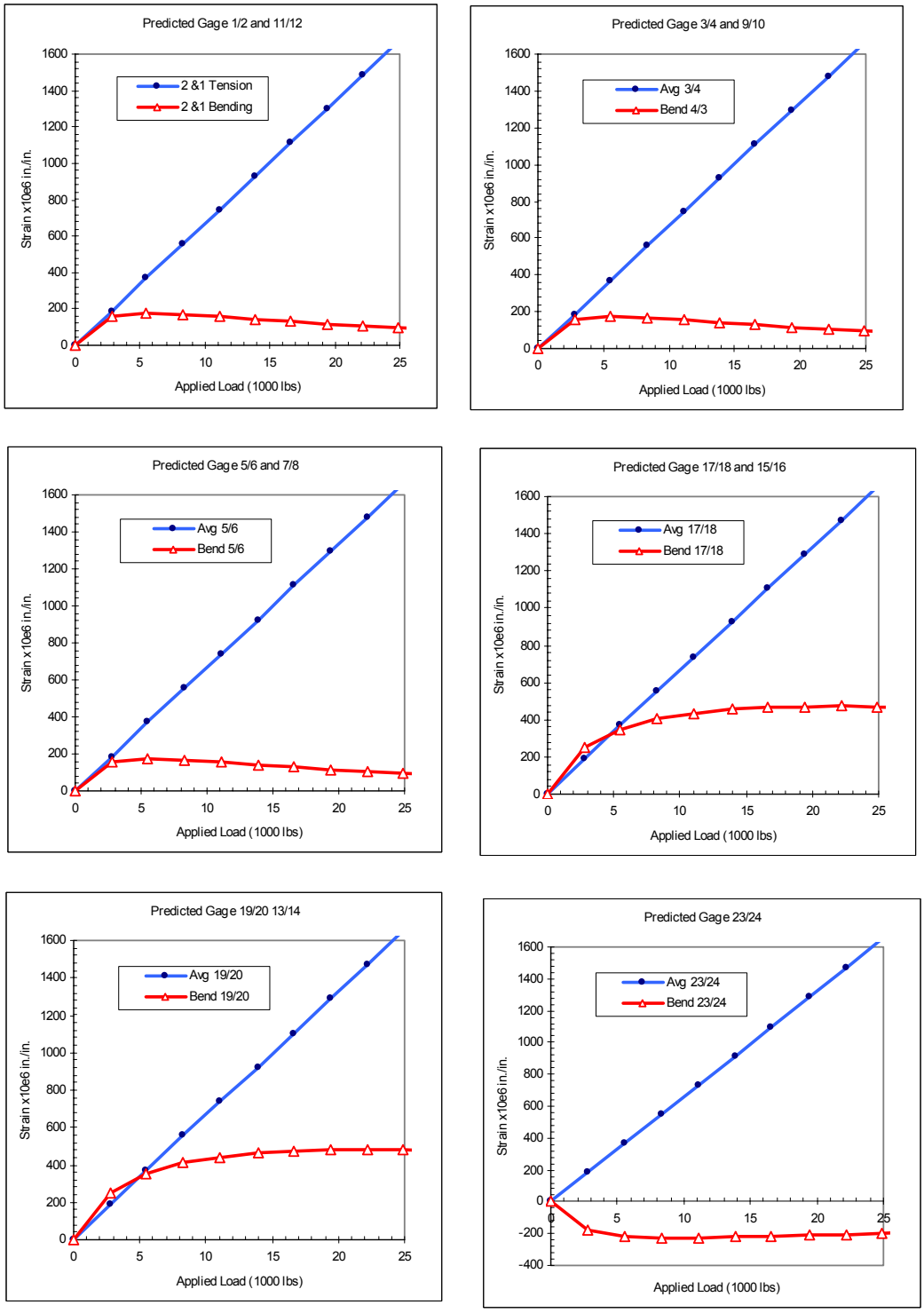



FIGURE E-15. PREDICTED STRAIN FOR EIFS TYPE 1 EIFS PANELS

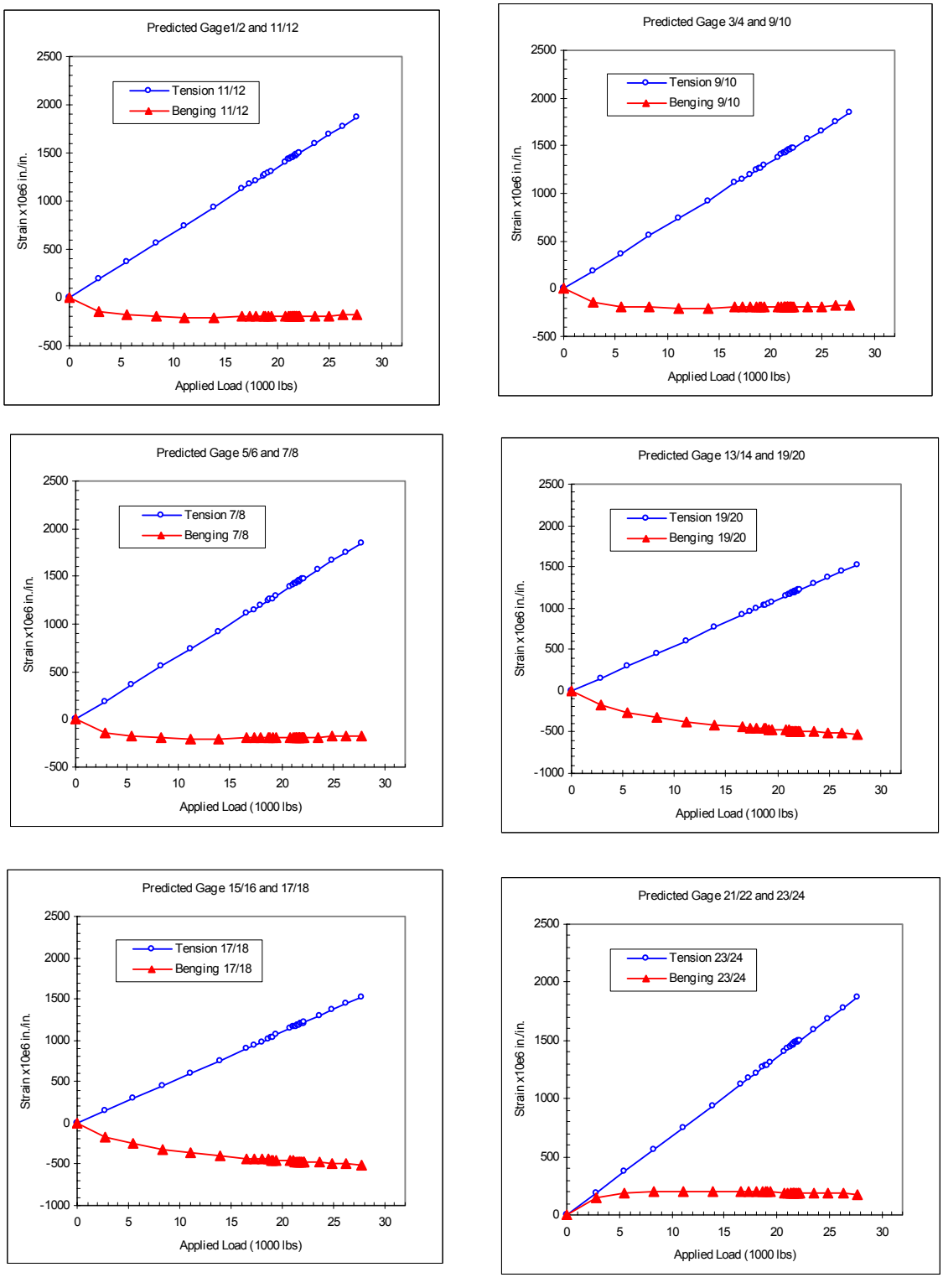
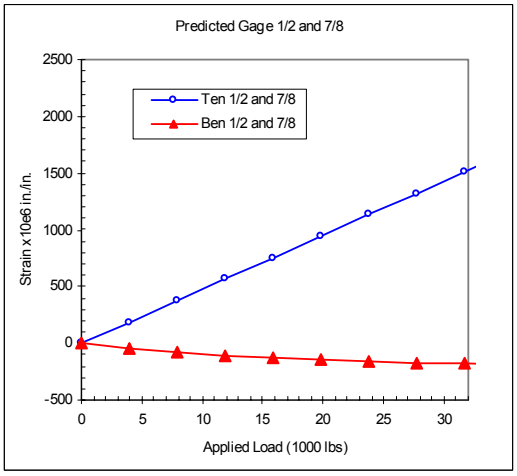
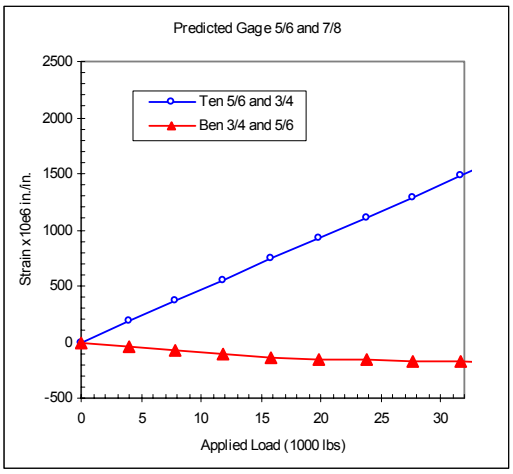
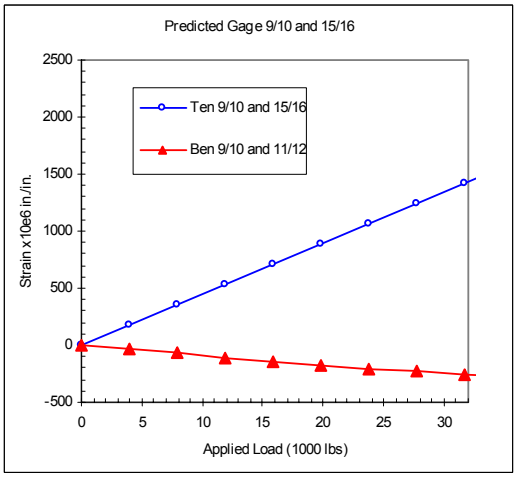
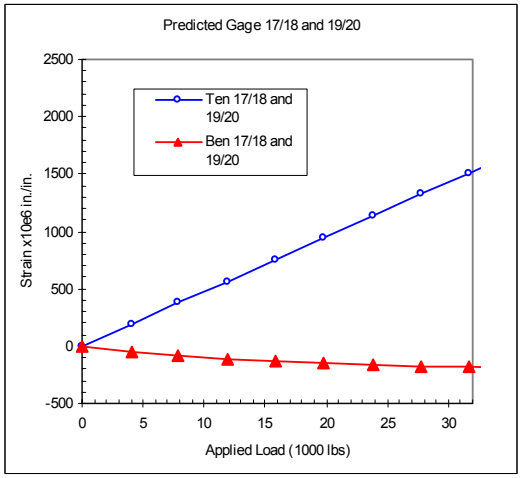



FIGURE E-16. PREDICTED STRAIN FOR EIFS TYPE 2 EIFS PANELS



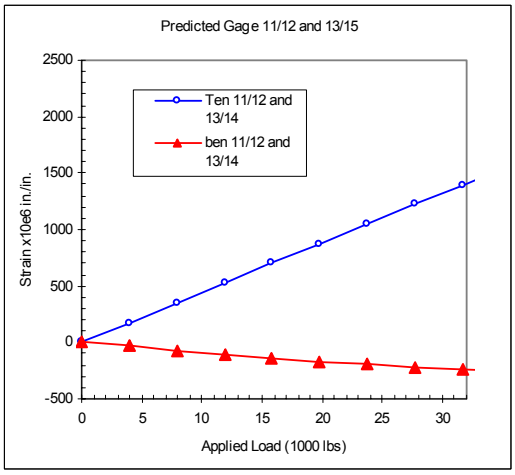




FIGURE E-17. PREDICTED STRAIN FOR EIFS TYPE 3 EIFS PANELS

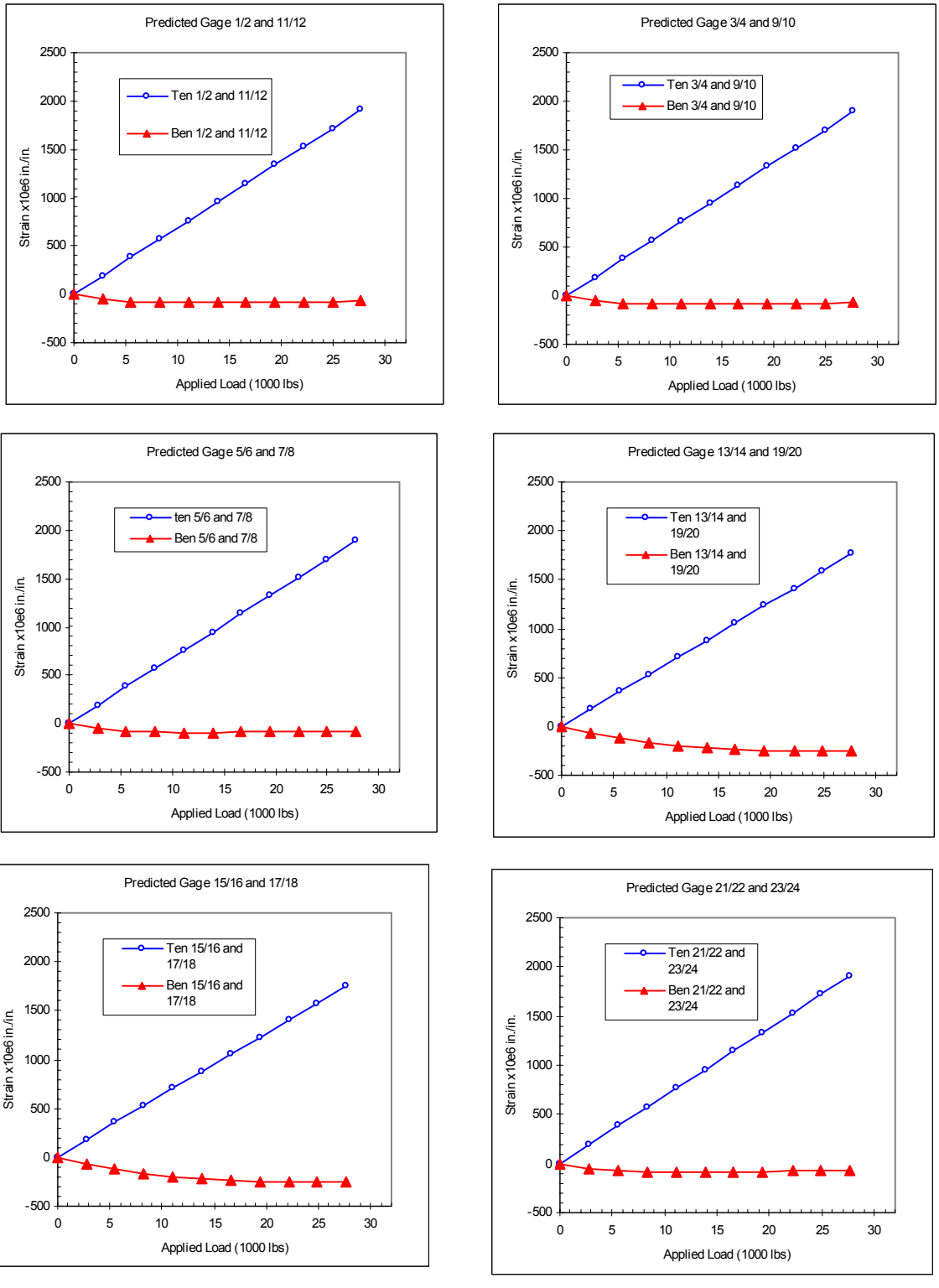
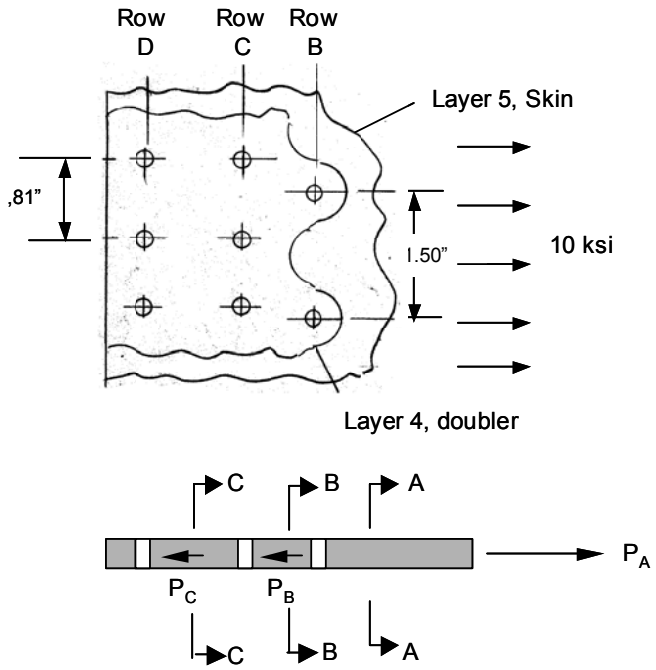



FIGURE E-18. PREDICTED STRAIN FOR EIFS TYPE 4 EIFS PANELS

Example of bearing stress factor and bypass stress factor calculation.

From figure 6-12, the fastener loads for the fastener rows B, C, and D in layer 5 (skin) are listed below:

At Row B $F_b$=121 lbs
At Row C $F_c$=225 lbs
At Row D $F_d$=210 lbs




The bearing stress at each fastener row can be calculated as shown below:

At Row B $\sigma_b$=121 lbs/0.1563″/0.063″ =12,288 psi
At Row C $\sigma_b$=225 lbs/0.188″/0.063″ =18,997 psi
At Row D $\sigma_b$=210 lbs/0.188″/0.063″ =17,730 psi

Where 0.1563″ and 0.188″ are the respective fastener diameters and 0.063″ is the thickness of the skin.

The total force per linear length, $P_A$, applied at the right end of the skin and the internal forces $P_B$ and $P_C$ at sections B-B and C-C, respectively, are shown below:

$P_A$ = 0.063″ x 10,000 psi = 630 lbs/in.
$P_B$ = 630 lbs/in - 121 lbs/1.5″ = 630 lbs/in - 80.67 lbs/in = 549.3 lbs/in
$P_C$ = 549.3 lbs/in - 225 lbs/0.81″ = 549.3 lbs/in - 277.8 lbs/in =316.5 lbs/in

The average bypass stresses at sections B-B and C-C can be calculated as shown below:

At section B-B $\sigma_{bp}$= 549.3 lbs/in/0.063 in. = 8719 psi
At section C-C $\sigma_{bp}$= 316.5 lbs/in/0.063 in. = 5024 psi

At fastener row B

The bearing stress factor = 12,280 psi/10,000 psi = 1.228
The bypass factor = 8719 psi/10,000 psi = 0.872

At fastener row C

The bearing stress factor = 18,997 psi/8,719 psi = 2.18
The bypass factor = 5024 psi/8719 psi = 0.576

At fastener row D

The bearing stress factor = 17,730 psi/5,024 psi = 3.53
The bypass factor = 0 psi/5,024 psi = 0.00

E.1 ORIGINAL CRACK GROWTH ANALYSIS.

Formulation of Geometric Correction Factor, $\beta$.

The Newman-Raju* $K$ solution for symmetric corner cracks emanating from an open hole subjected to far-field tensile and bending was used as the basic crack growth model. To account for the effects that are pertinent to crack growth in a countersunk hole subjected to far-field stress, bending stress, bypass and bearing stresses, and preload caused by rivet squeezing force, the geometry correction factors were modified to include all of these factors, as shown in figures E-20 and E-21.

In the closure-based crack growth model, the crack growth rate is expressed as a function of the effective stress-intensity factor (SIF) range ($\Delta K_{eff}$):

$$da/dN = f\left(\Delta K_{eff}\right)$$

and

$$\Delta K_{eff} = \beta_{Total} \Delta\sigma_{eff} \sqrt{\pi a}$$

where $\Delta\sigma_{eff}$ is the effective range of a reference stress, without considering the effects of preload in the riveted joint. The effective SIF $\Delta K_{eff}$ is further modified to include the effects of the rivet contact forces in the FASTRAN-II code. The procedure to include the effects of the contact stress is discussed in the next section. The extreme fiber stress, including tensile and bending

*Newman, J. C., Jr. and Raju, I. S. (1984), "Stress-Intensity Factor Equations for Cracks in Three-Dimensional Finite Bodies Subjected to Tension and Bending Loads," NASA-TM-85793.

stress, is used as the reference stress. The $\beta_{Total}$ is the compounded geometry correction factor. $\beta_{Total}$ is expressed as follows:

$$\beta_{Total} = \beta_{csk} \times \beta_{fw} \times \beta_{neatfit} \times \beta_{LH}$$

where

$\beta_{csk}$ = The countersunk hole correction factor. The correction factor is based on the published FAA report DOT/FAA/CT-93/68 for a corner crack emanating from an open countersunk hole subjected to far-field tensile stress. The $\beta_{csk}$ factor is normalized to the well-known Newman-Raju solution of symmetrical corner cracks emanating from a straight shank, open hole subjected to far-field tensile stress. The normalized correction factors for the countersunk hole are shown in table E-1.

$\beta_{neatfit}$ = The correction factor accounting for a through-the-thickness crack emanating from a hole filled with a close-tolerance fastener, under far-field tensile stress. The factor was derived based on a two-dimensional finite element model. This factor is approximately 0.77 when the crack is small and quickly approaches 1.0 as the crack becomes larger. For the depth direction, this factor remains approximately 0.77.

$\beta_{fw}$ = The correction factor accounting for adjacent crack tips in a series of periodic, colinear, equal-sized cracks. Treating the individual periodic crack as a single crack in a narrow strip of tensile specimen, the $\beta_{fw}$ is the same as the finite width correction factor for a middle-crack tension (M(T)) specimen. The width of the M(T) specimen is equal to the pitch of the fasteners, such that

$$\beta_{fw} = \sqrt{csc(\pi a/(P))}$$

This correction factor is applied to the surface crack tip only. $P$ is the pitch of the fasteners.

$\beta_{LH}$ = The compounded solution for a symmetrical corner crack emanating from a loaded hole. The solution is based on Newman-Raju's solution for an open hole modified to include the effects of the bearing as follows:

$$\beta_{LH} = \left(1 - F_{bndg}\right) \times \left(0.50 \times \left(1 + F_{bypass}\right) + F_{brng} \times \beta_{newman} \Big/ \beta_{bowie}\right)$$

where $\beta_{newman}$ is the Newman-Raju solution for symmetrical corner cracks from an open hole and $\beta_{bowie}$ is Bowie's solution for symmetrical through-the-thickness cracks for an open hole. $F_{bndg}$ is the bending stress factor, $F_{bypass}$ is the bypass stress factor, and $F_{brng}$ is the bearing stress factor.

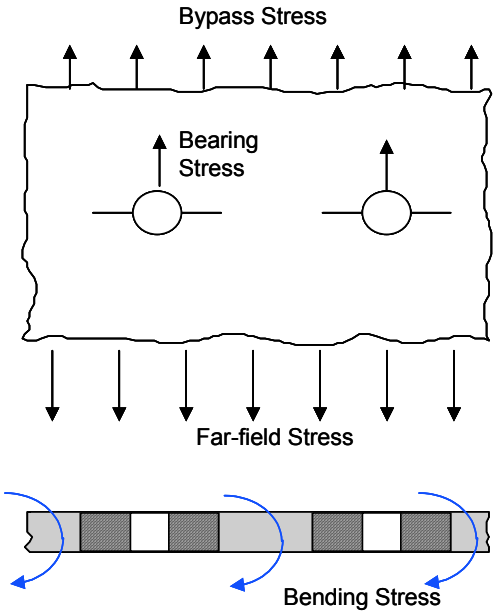
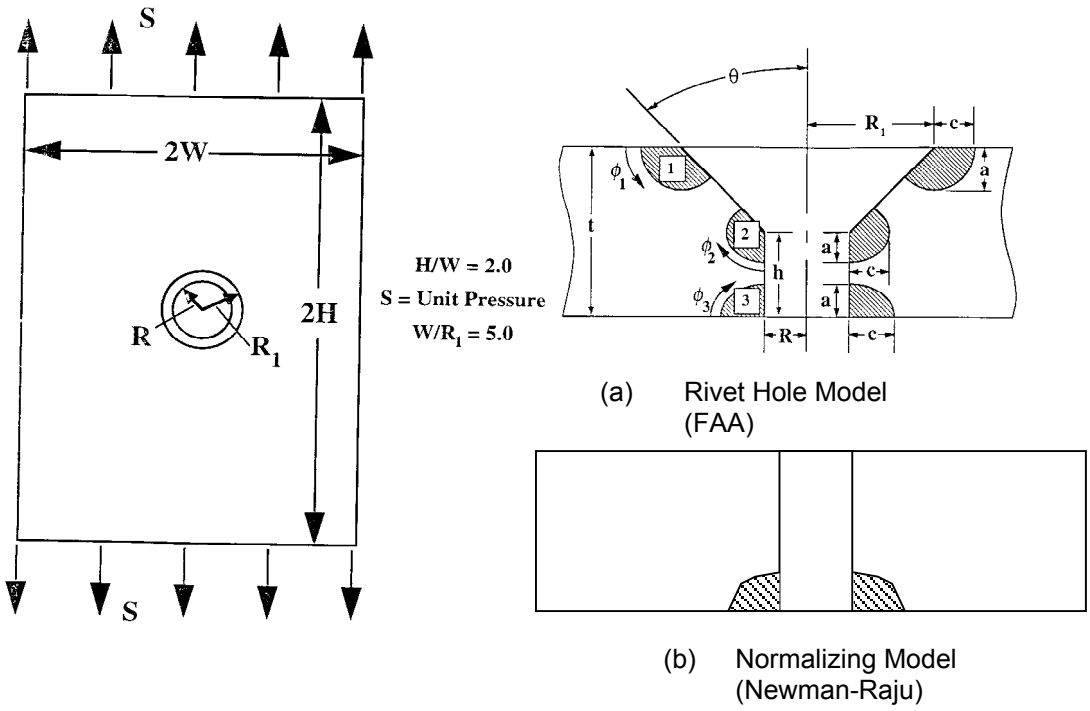



FIGURE E-19. ANALYTICAL CRACK GROWTH MODEL FOR EQUAL-SIZED COLINEAR HOLES WITH MSD




Note: Correction factors from the countersunk hole (a) to be normalized to that of Newman-Raju's model (b)

FIGURE E-20. GEOMETRY CORRECTION FACTOR FOR COUNTRSUNK

TABLE E-1. NORMALIZED GEOMETRY CORRECTION FACTOR FOR COUNTERSUNK HOLES

(a) Correction factor for the crack length (c) at location 3 in figure E-20

| | | Crack Depth/Thickness (a/t) | | |
|---|---|---|---|---|
| | | 0.20 | 0.30 | 0.40 |
| Crack depth/Length (a/c) | 0.40 | 1.12 | 1.15 | 1.10 |
| | 0.70 | 1.22 | 1.18 | 1.20 |
| | 2.00 | 0.99 | 1.04 | 1.08 |

(b) Correction factor for the crack depth (a) at location 3 in figure E-20

| | | Crack Depth/Thickness (a/t) | | |
|---|---|---|---|---|
| | | 0.20 | 0.30 | 0.40 |
| Crack depth/Length (a/c) | 0.40 | 1.15 | 1.14 | 1.11 |
| | 0.70 | 1.18 | 1.17 | 1.14 |
| | 2.00 | 1.04 | 1.11 | 1.17 |

E.2 EFFECTS OF THE RIVET SURFACE CONTACT STRESS.

The effects of the residual stress in the fastener hole, as a result of rivet installation, is a very complex problem for the following reasons: (1) the actual residual stress is difficult to determine, (2) the contact force distribution is not linear in respect to the various external loads, and (3) the pattern of contact force changes as the crack size changes. However, some attempts were made during this widespread fatigue damage program to include these effects in the crack growth equation.

When a preload is present, the general equation for stress-intensity factor $K = \beta_{Total}\sigma\sqrt{\pi a}$ is no longer true, because $K$ is now a function of the preload stress, the local bearing stress, and the far-field reference stress. Making the solution more difficult is the fact that the relation among these stresses, and the relation between any type of stress and the crack length, are mostly nonlinear in nature. For example, even a small variation in the far-field stress level sometimes changes the local stress distribution pattern completely. Therefore, with preload, the effective stress-intensity factor range can only be expressed as, $\Delta K_{eff} = K'_{\max} - K'_x$, where the $K'_{\max}$ and $K'_x$ correspond to the $K$ under maximum and minimum far-field stress. $K_{\max}$ and $K_x$ can only be

determined on a case by case basis, according to the magnitude of prestress, the magnitude of far-field stress, and the a/R ratio (a: crack length, R: hole radius). The following steps outline the procedures required to determine the $\Delta K_{eff}$, and to implement it into the FASTRAN-II code.

E.2.1 Step 1: Determine the Residual Stress in the Riveted Joint.

The effect of diametric expansion of the rivet during installation is very similar to that of a fastener in an interference-fit hole. The level of the interference in the riveted joint was investigated using the computer code NIKE2D. The strain and stress in a rivet during and after the installation can be analyzed by applying a compressive load to the initially undeformed rivet until a 30% upset is reached. This analysis effort was funded by Boeing's internal IRAD. The predicted residual stress in the hoop and radial direction are shown in figures E-21 and E-22, respectively. The results indicated that there is a contact stress, approximately 7 ksi, at the shank of the fastener.

E.2.2 Step 2: Determine the Corresponding Interference-Fit Level of the Residual Stress.

This 7-ksi stress level corresponds to an approximate 0.15% interference between the fastener and the hole, based on the classic solution for oversized fasteners. The interference is defined as $(d_o-d_i)/d_i$, where $d_o$ is the diameter of the fastener before installation, and $d_i$ is the diameter of the hole. This 0.15% interference is subsequently used in the crack growth analyses.

E.2.3 Step 3: Determine the $K_{max}$ and $K_{min}$ as a Function of Interference-Fit Levels, Crack Length, and Applied Stress.

The effects of the interference fit on the $K$ solution were analyzed using a NASTRAN finite element model, as shown in figure E-23. The model represented a strip of skin containing only one hole. Symmetry boundary conditions are applied to the two lateral edges simulating an infinitely repeated fastener hole pattern. The ratio between the width of the strip and the hole radius resulted in a bearing stress factor of 2.4 and a bypass stress factor of 0.66. The interference between the fastener and the hole was simulated by applying an elevated temperature to the fastener. Four interference levels were considered: 0%, 0.15%, 0.50%, and 1%, under two far-field stress levels: 15 ksi (max stress) and 1.5 ksi (min stress). The stress contour and the deformed shapes of symmetrical cracks emanating from the hole under various load cases are shown in figure E-24 for preload only and for maximum applied stress.

The effects of the interference on the $K$ solution as a function of crack length are plotted in figure E-25. The effects of the interference for a constant crack length can be seen in figure E-26. This figure shows that for a/R = 0.125 with 15-ksi far-field tensile stress, the SIF decreases initially for interference less than 0.5% and then increases as the level of interference increases. The normalized $K$ solution for various crack lengths under three interference levels are shown in figure E-27 for the case with 15-ksi tensile stress and in figure E-28 for the case with 1.5-ksi tensile stress.

E.2.4 Step 4: Determine the Effective $\Delta K$ for Interference-Fit Hole.

The crack growth rates in the closure-based model are a function of the effective SIF range, $\Delta K_{eff}$, which, in turn, is a function of the effective stress range, $\Delta K = (\sigma_{max} - \sigma_x)\sqrt{\pi a}$, as shown in figure E-29. For cases with fastener preload, $\Delta K_{eff}$ is expressed as the modified $K'_{\max}$ and $K'_x$, where $K_x$ is the larger of $K'_{\min}$ or $K'_{open}$, as shown in figure E-30.

The effective SIF range for the preloaded hole is:

$$\Delta K_{eff} = K'_{\max} - K'_x \tag{E-1}$$

by substituting $K'_{\max}$ and $K'_x$ with modified reference stresses, one has

$$K'_{\max} = \sigma'_{\max}\beta\sqrt{\pi a} \tag{E-2}$$

$$\text{and } K'_x = \sigma'_x\beta\sqrt{\pi a} \tag{E-3}$$

where

$$\sigma'_{\max} = \sigma_{\max}\left(\frac{K'_{\max}}{K_{\max}}\right) \tag{E-4}$$

and

$$\sigma'_x = \sigma_x\left(\frac{K'_{\min}}{K_{\max}}\right) \tag{E-5}$$

$\sigma_x$ is the larger of $\sigma_{min}$ or $\sigma_{open}$.

By substituting the reference stress ($\sigma_{max}$, $\sigma_{min}$) with modified stresses ($\sigma'_{max}$, $\sigma'_{min}$), the effects of the preload can be included in the closure-based crack growth model. The ratio of $K'_{\max}/K_{\max}$ for 15 ksi, and $K'_{\min}/K_{\max}$ for the 1.5 ksi case, are shown in figures E-27 and E-28, respectively. An example of the preload effects on the crack growth prediction is depicted in figure E-31. The analyses indicated that as one would have expected, the crack growth lives increase with higher level of interference.

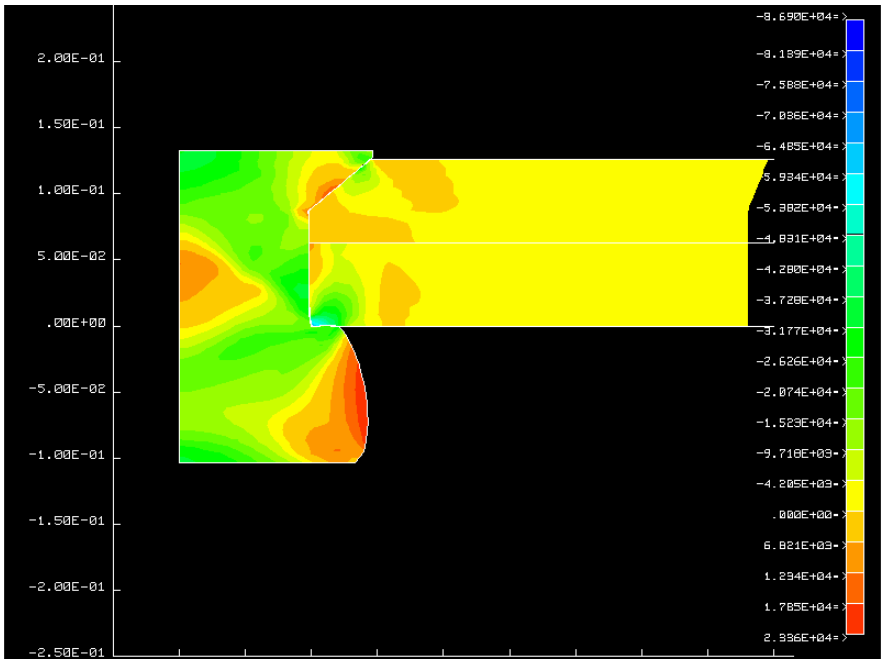



FIGURE E-21. RESIDUAL STRESS IN THE RADIAL DIRECTION DUE TO INSTALLATION

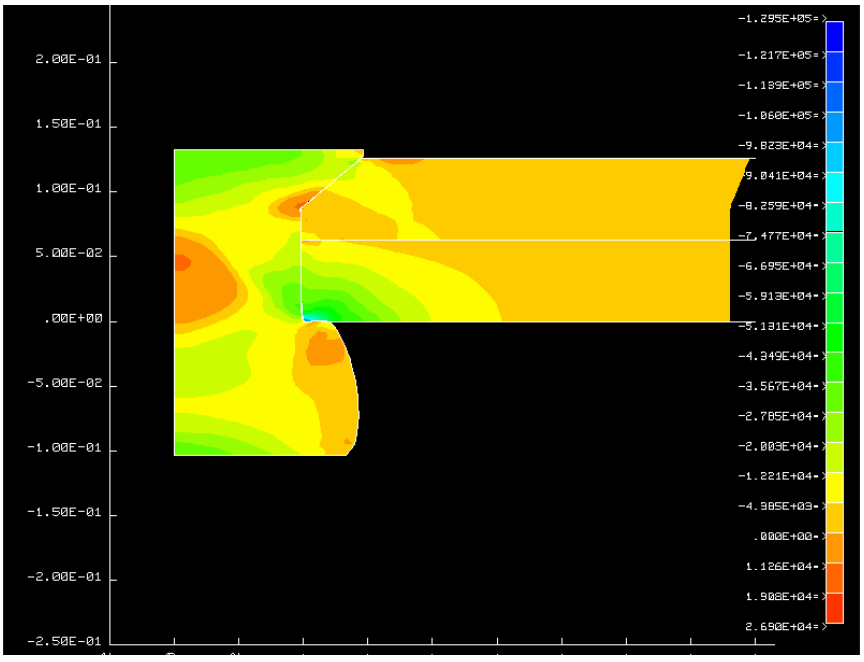



FIGURE E-22. RESIDUAL STRESS IN THE TANGENTIAL DIRECTION DUE TO INSTALLATION

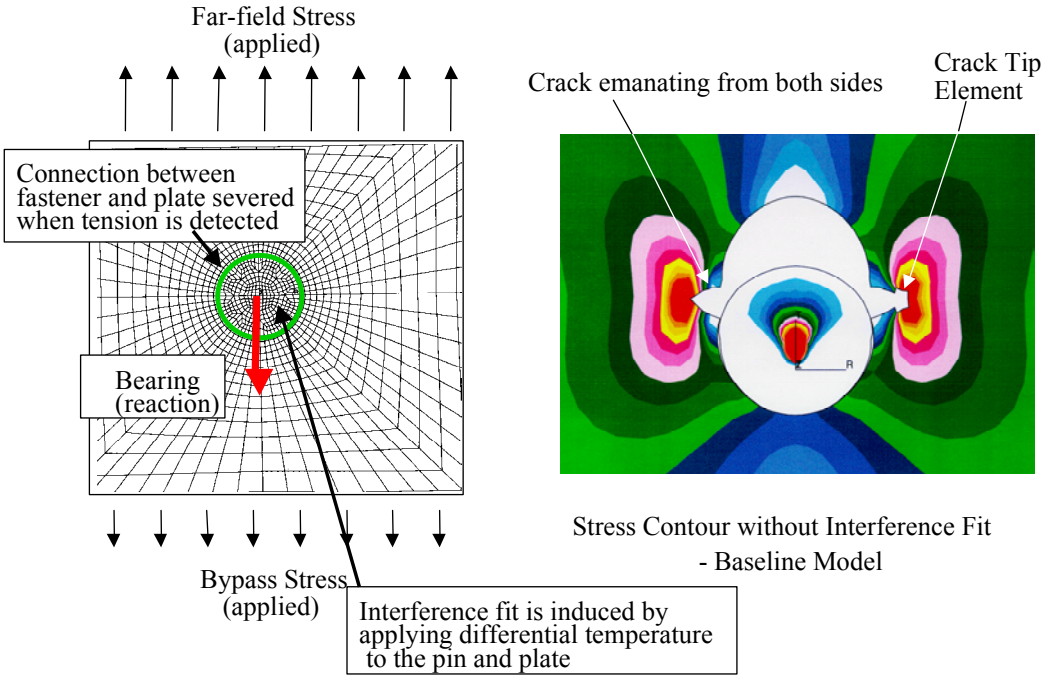



FIGURE E-23. FINITE ELEMENT MODEL FOR EFFECTS OF INTERFERENCE FIT TO THE SIF

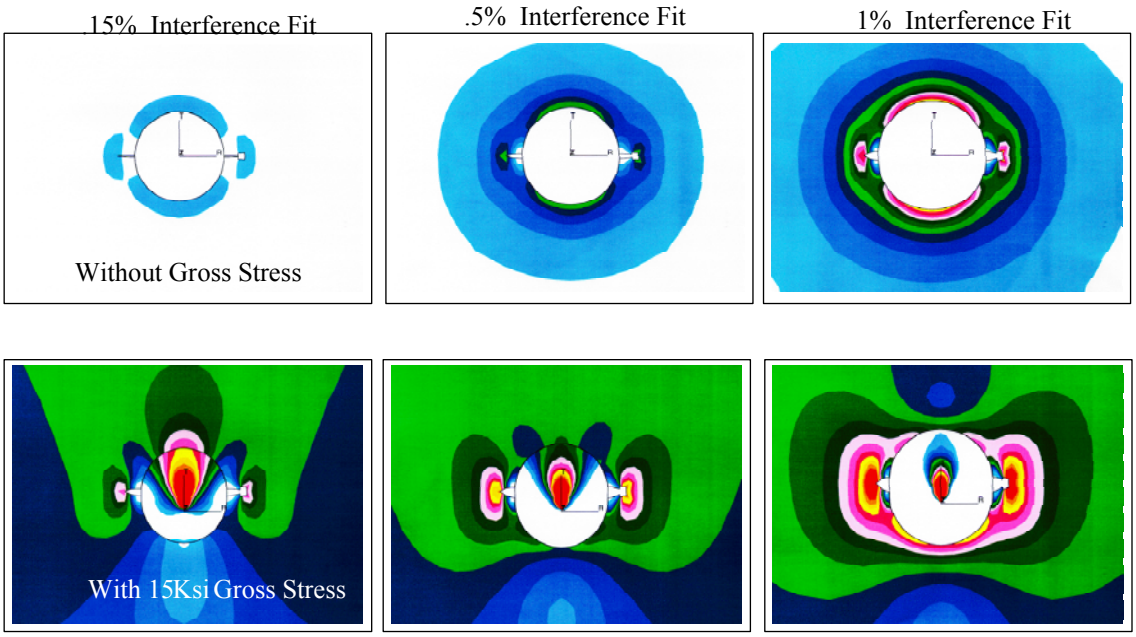



FIGURE E-24. STRESS CONTOUR AND DEFORMED SHAPE OF FASTENER HOLE WITH VARIOUS INTERFERENCE FIT

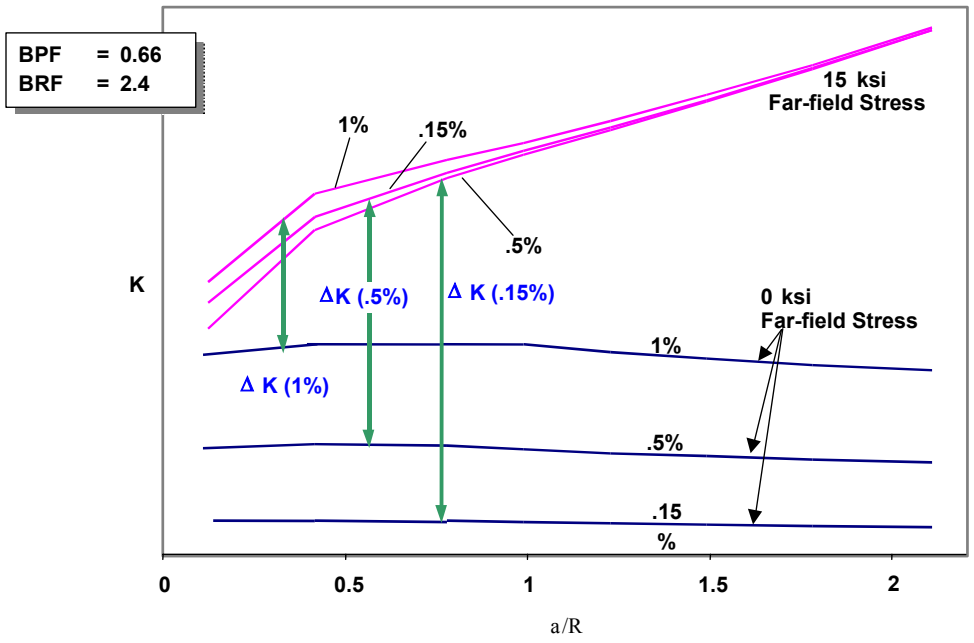
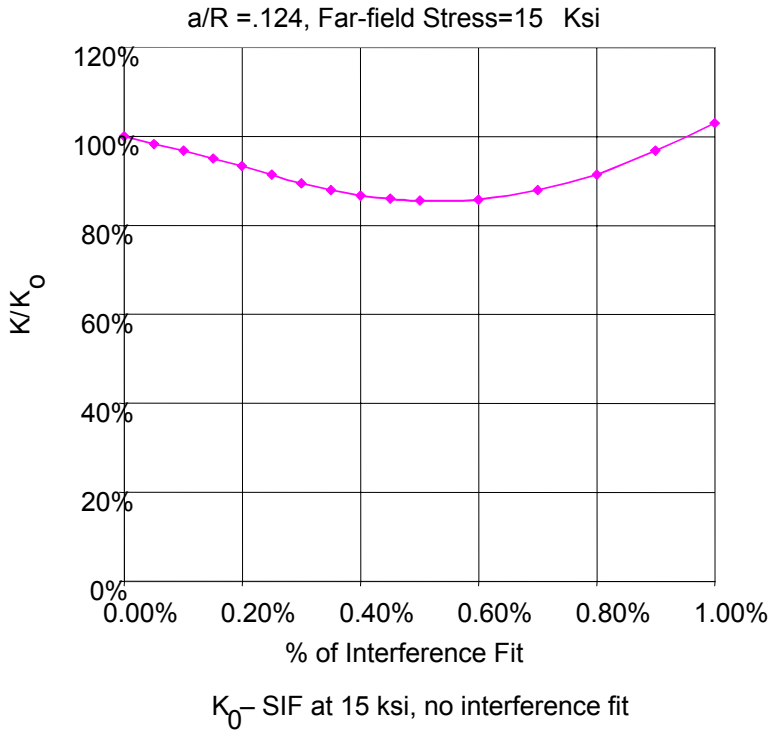



FIGURE E-25. EFFECTS OF INTERFERENCE FIT TO THE SIF




$K_0$– SIF at 15 ksi, no interference fit

FIGURE E-26. EFFECTS OF INTERFERENCE FIT FOR A CONSTANT CRACK LENGTH

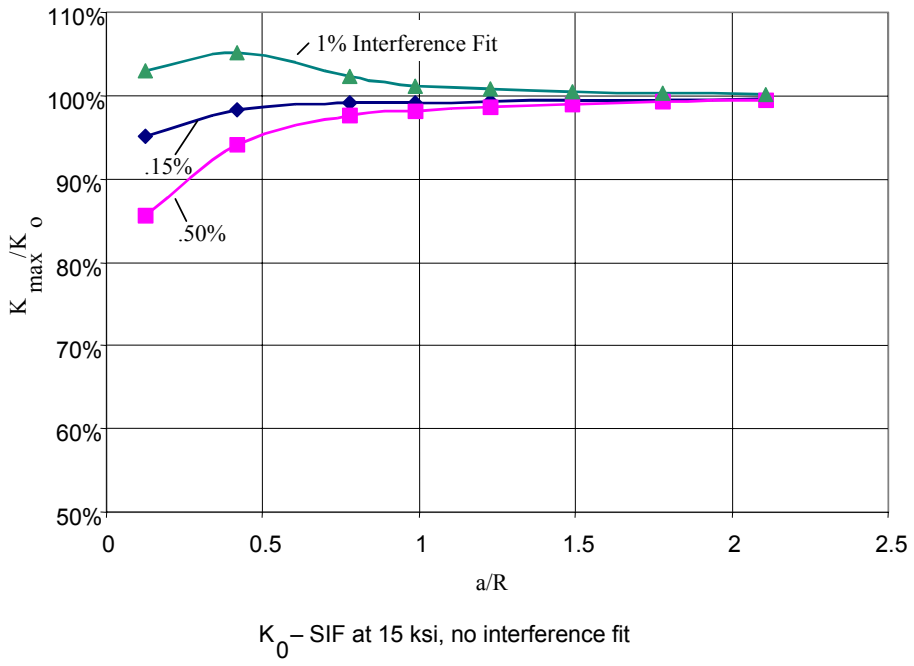



FIGURE E-27. NORMALIZED SIF UNDER 15 ksi FAR-FIELD STRESS

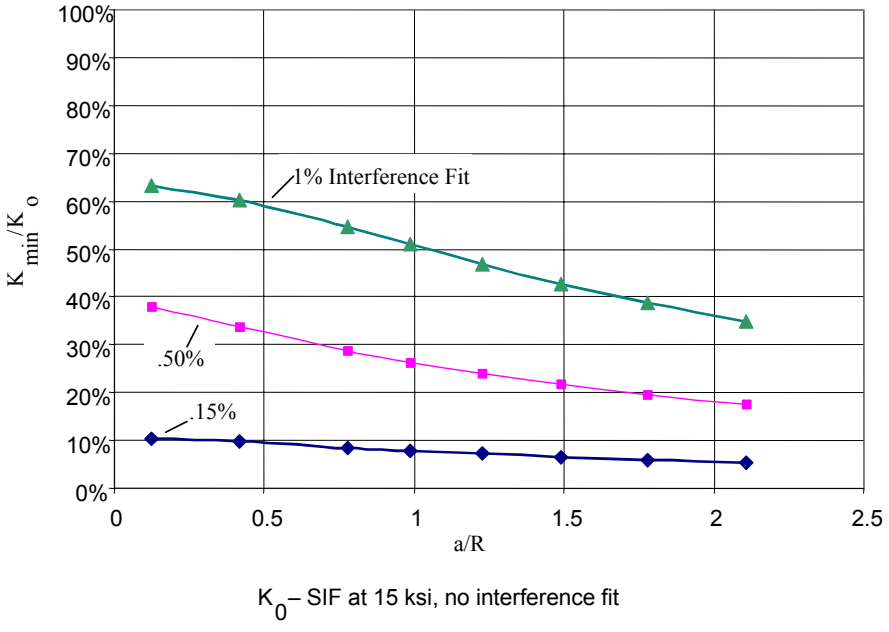



FIGURE E-28. NORMALIZED SIF UNDER 1.5 ksi FAR-FIELD STRESS

$$\frac{da}{dN} = f(\Delta K_{eff})$$

$$\Delta K_{eff} = (\sigma_{max} - \sigma_x)\sqrt{\pi c_x}F$$

$\sigma_x = \sigma_{min}$ or $\sigma'_o$

$c_x$ = current crack length and cycle rate

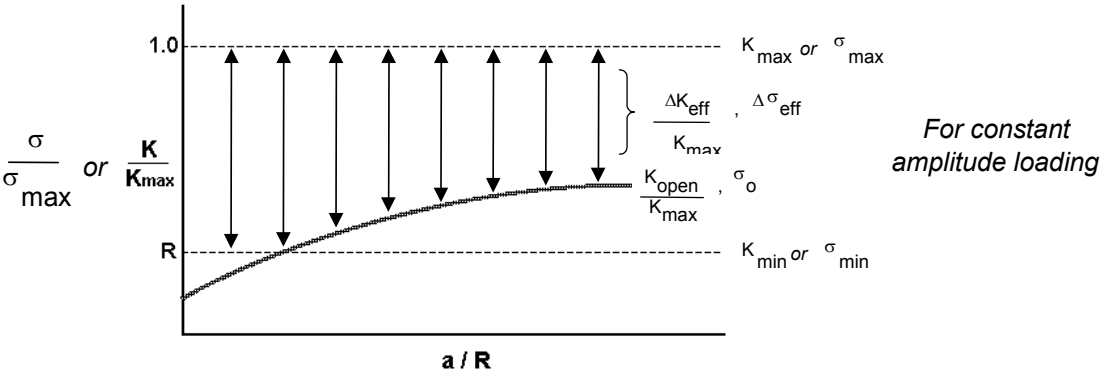
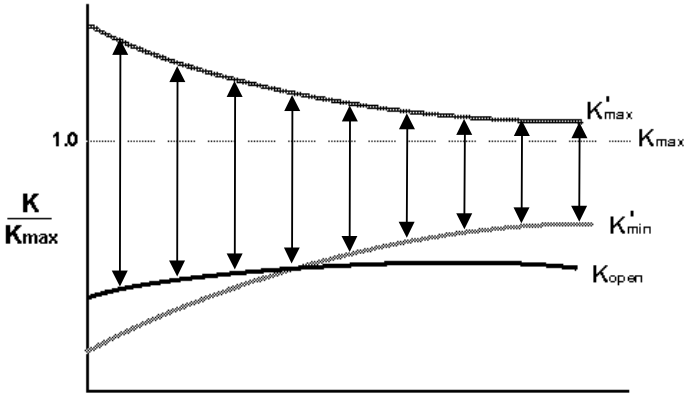



FIGURE E-29. ORIGINAL CLOSURE-BASED CRACK GROWTH RATE EQUATIONS




$$\Delta K_{eff} = K'_{max} - K_x$$
$$= (\sigma'_{max} - \sigma_x)\sqrt{\pi c_x}F$$

*where* $\sigma'_{max} = \sigma_{max}\left(\frac{K'_{max}}{K_{max}}\right)$

$\sigma_x$ — opening stress or $\sigma'_{min}$

$\sigma'_{min} = \sigma_{min}\left(\frac{K'_{min}}{K_{max}}\right)$

FIGURE E-30. MODIFIED CRACK GROWTH RATE EQUATION IN CLOSURE-BASED CODE

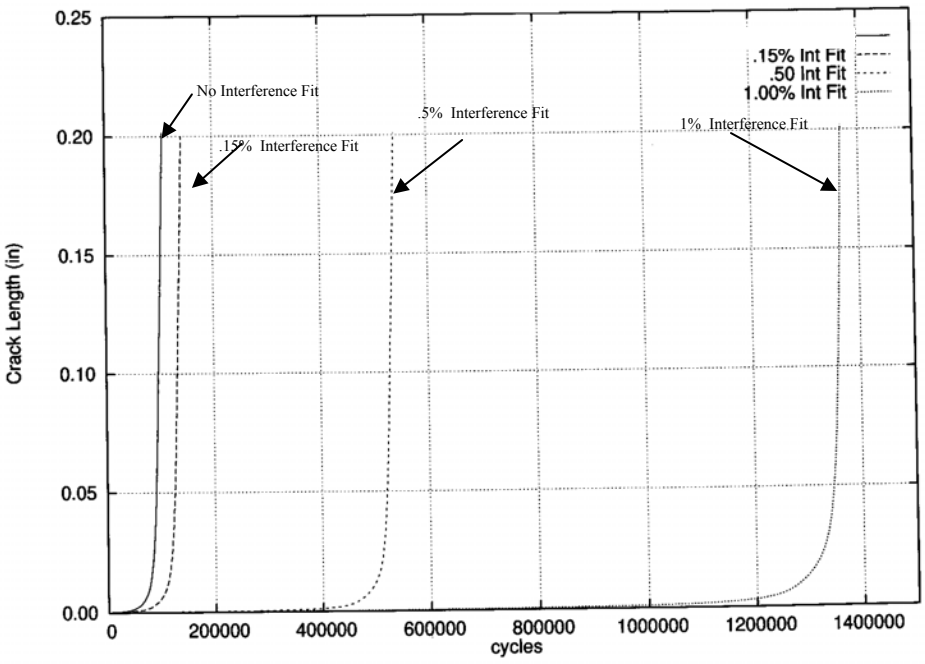



FIGURE E-31. COMPARISON OF CRACK GROWTH WITH/WITHOUT INTERFERENCE FIT

The following pages contain the comparison of the measured crack growth history and the collapsed crack growth history for EIFS test panels, which were discussed in section 6.10.5.2.

TABLE E-2. MODIFED NUMBER OF CYCLES

| Crack Location | Modified Cycles |
|---|---|
| 03C14R | 147079 |
| 03C17R | 110886 |
| 03D13R | 157873 |
| 03D15L | 76578 |
| 03D15R | 83602 |
| 04C09R | 121879 |
| 04C10R | 124113 |
| 04C11R | 127026 |
| 04C12R | 122870 |
| 07A06L | 26438 |
| 07A06R | 19200 |
| 07A07L | 30412 |
| 07A07R | 54134 |
| 07A08L | 96503 |
| 07A12R | 33201 |
| 07A13R | 46681 |
| 07A14L | 12576 |
| 07A14R | 26338 |
| 07A15R | 35948 |
| 07A16L | 26730 |
| 07A16R | 104195 |
| 07A17L | 44193 |
| 07A17R | 16292 |
| 15E02R | 149639 |
| 15E11R | 115205 |
| 15E02R | 149639 |
| 15E11R | 115205 |
| 15E16L | 148994 |
| 15E16R | 111282 |

| Crack Location | Modified Cycles |
|---|---|
| 15E16L | 148994 |
| 15E16R | 111282 |
| 15E20L | 113105 |
| 15E26R | 120876 |
| 15E28R | 164982 |
| 08A10L | 65029 |
| 08A10R | 65290 |
| 08A19L | 84339 |
| 09A05L | 459985 |
| 09A05R | 468512 |
| 10F05R | 105134 |
| 10F06L | 95609 |
| 10F06R | 90114 |
| 10F07L | 99483 |
| 10F07R | 97410 |
| 10F08L | 88216 |
| 10F08R | 101305 |
| 10F10R | 82816 |
| 11F06L | 116718 |
| 11F06R | 106207 |
| 11F07L | 116368 |
| 11F07R | 115643 |
| 11F08L | 123908 |
| 11F08R | 123995 |
| 11F09R | 107679 |
| 11F10R | 111206 |
| 15E20L | 113105 |
| 15E26R | 120876 |
| 15E28R | 164982 |

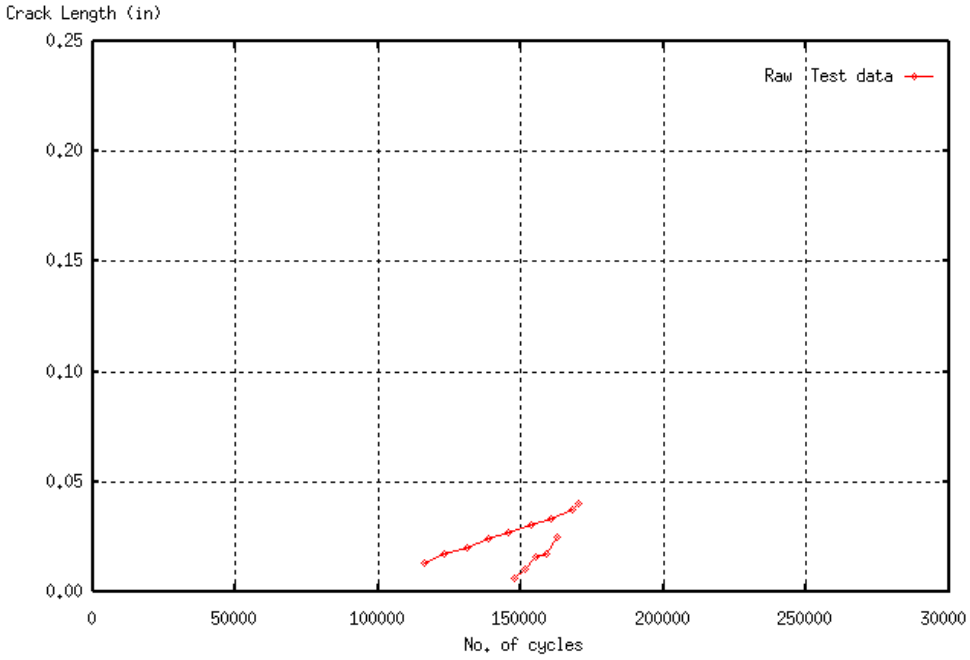



FIGURE E-32. CRACK GROWTH HISTORY FOR EIFS-3, ROW C

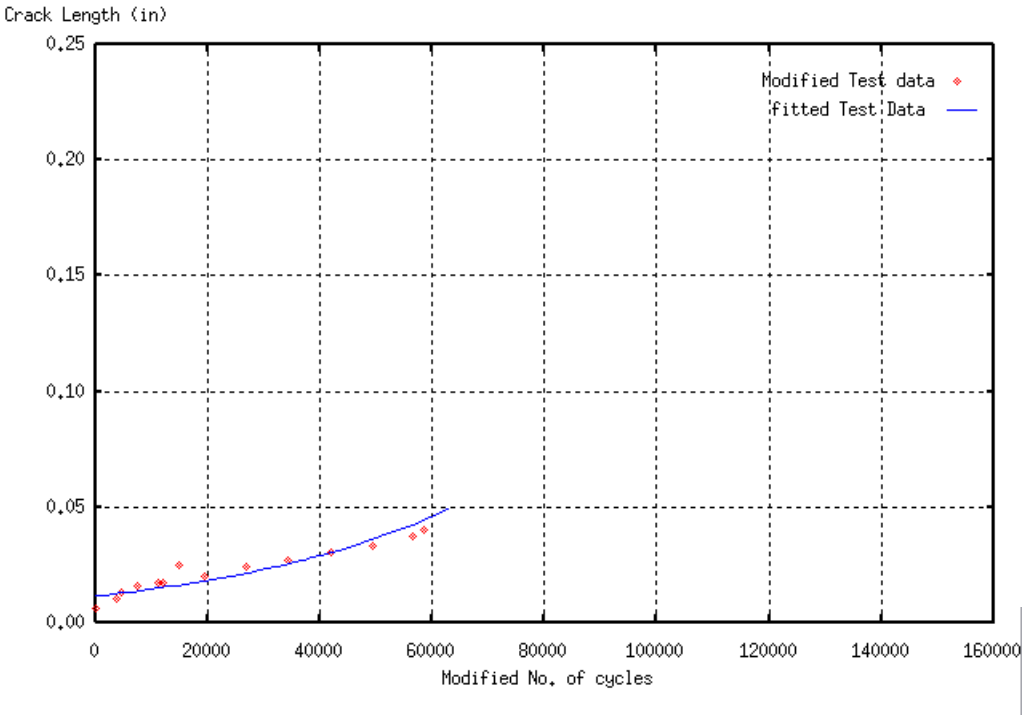



FIGURE E-33. MODIFIED CRACK GROWTH HISTORY FOR EIFS-3, ROW C

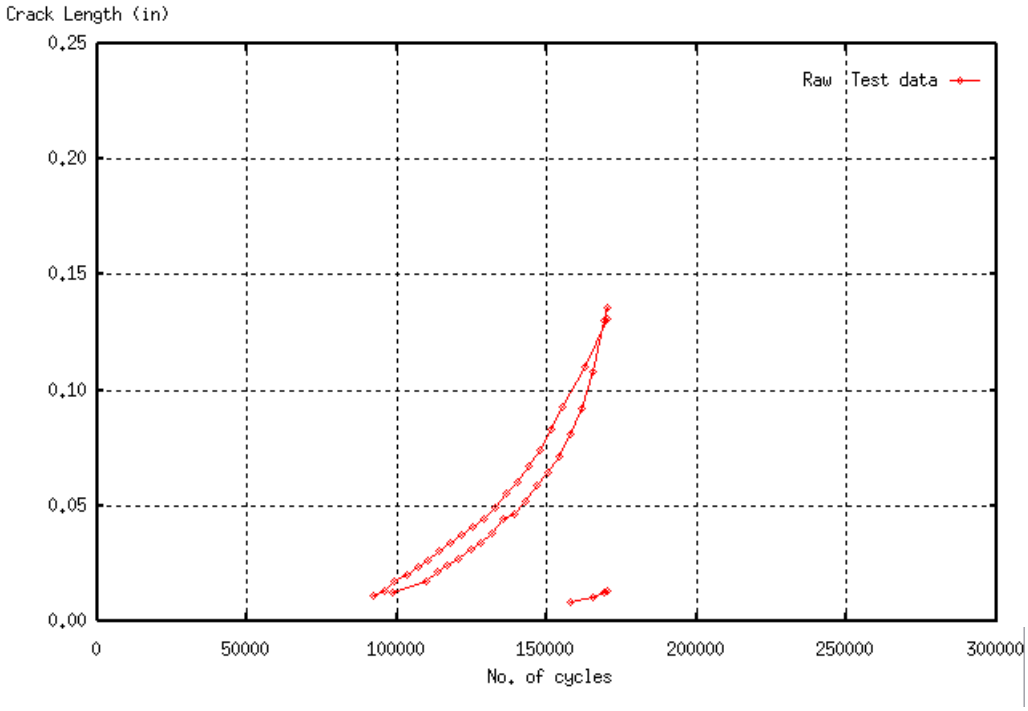



FIGURE E-34. CRACK GROWTH HISTORY FOR EIFS-3, ROW D

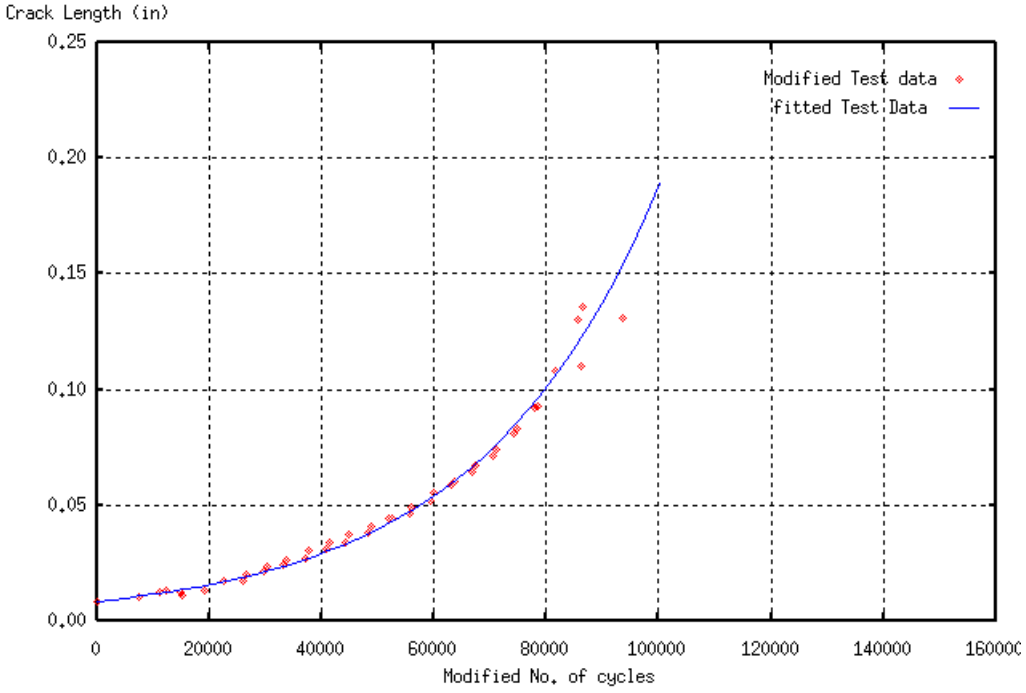



FIGURE E-35. MODIFIED CRACK GROWTH HISTORY FOR EIFS-3, ROW D

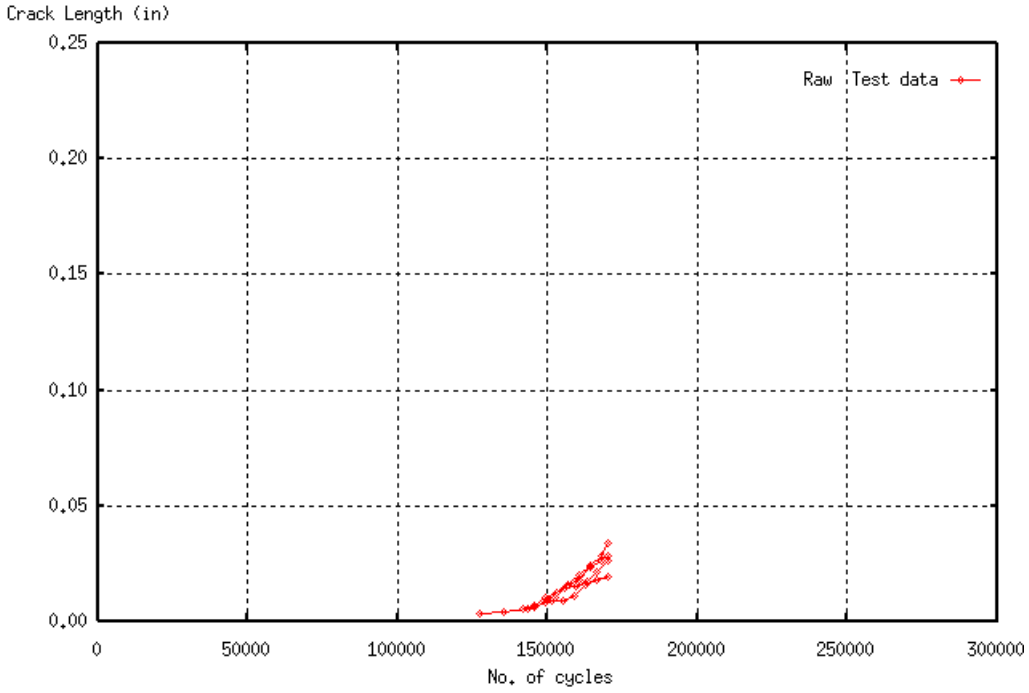



FIGURE E-36. CRACK GROWTH HISTORY FOR EIFS-4

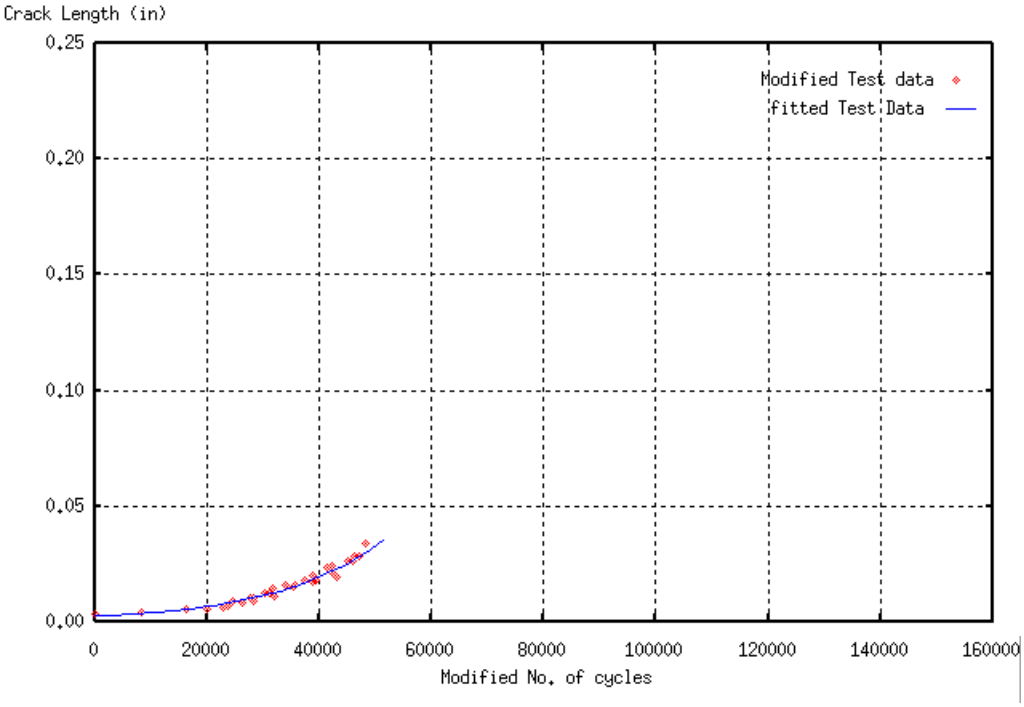



FIGURE E-37. MODIFIED CRACK GROWTH HISTORY FOR EIFS-4

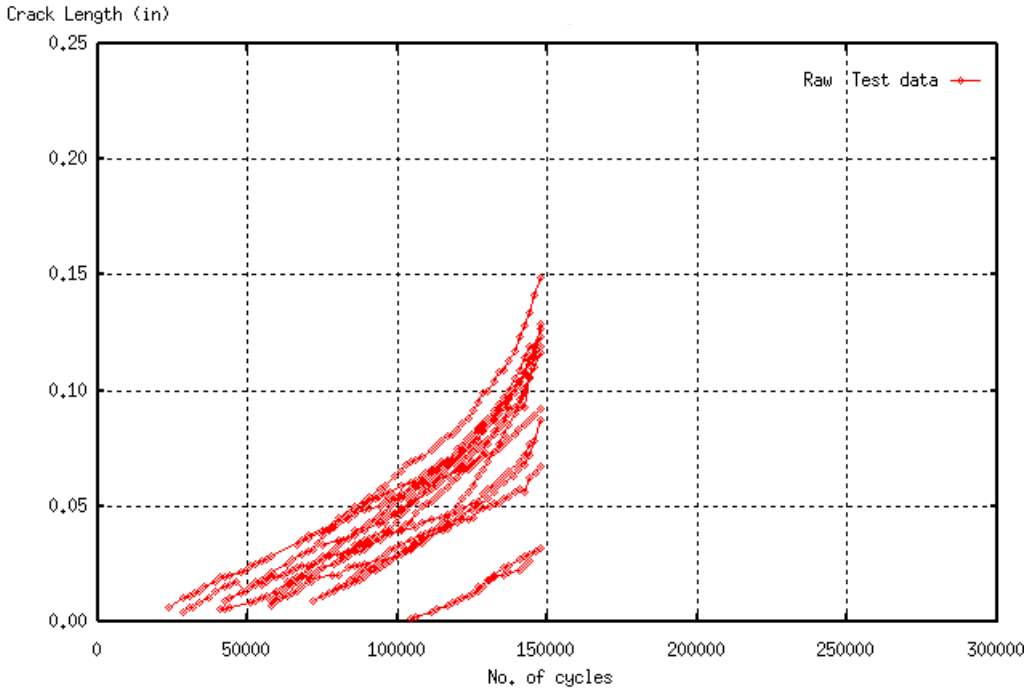



FIGURE E-38. CRACK GROWTH HISTORY FOR EIFS-7

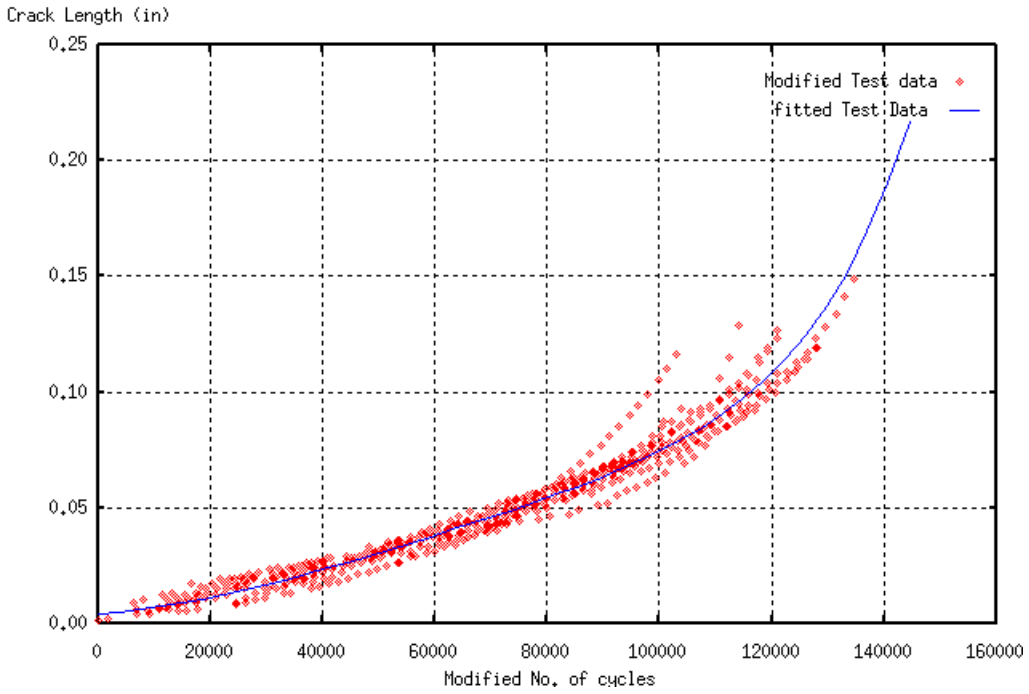



FIGURE E-39. MODIFIED CRACK GROWTH HISTORY FOR EIFS-7

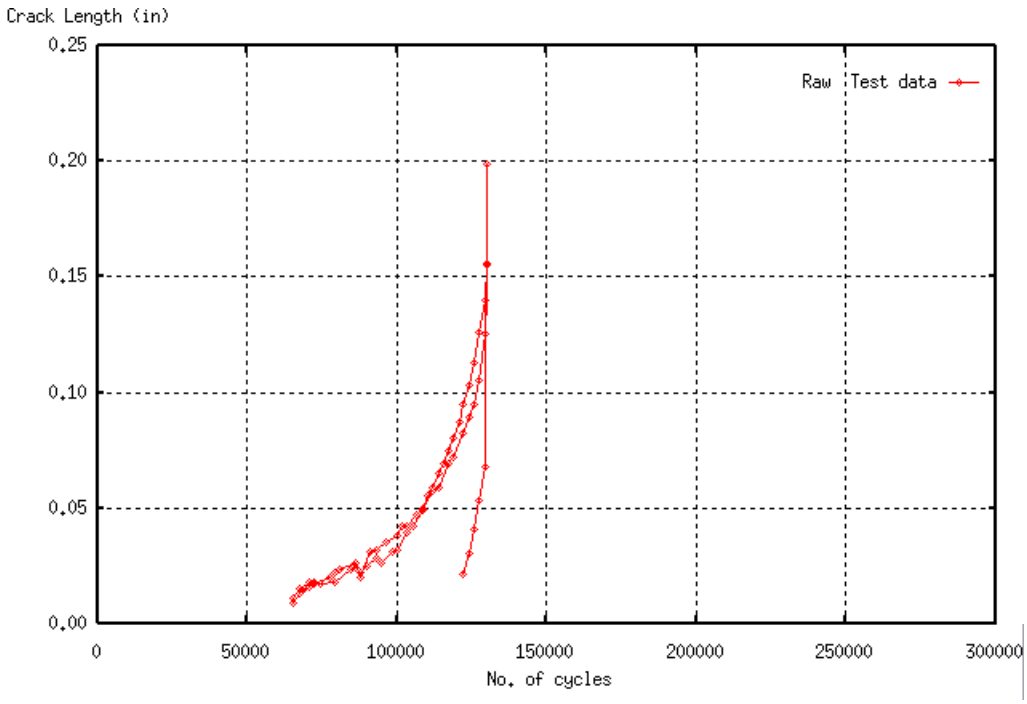



FIGURE E-40. CRACK GROWTH HISTORY FOR EIFS-8

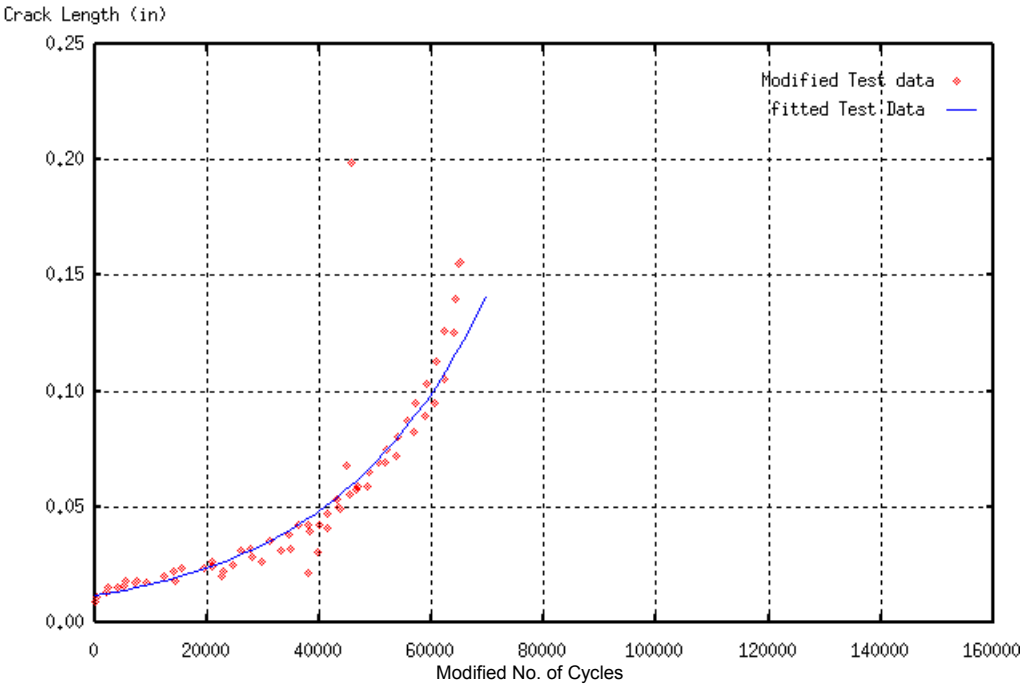



FIGURE E-41. MODIFIED CRACK GROWTH HISTORY FOR EIFS-8

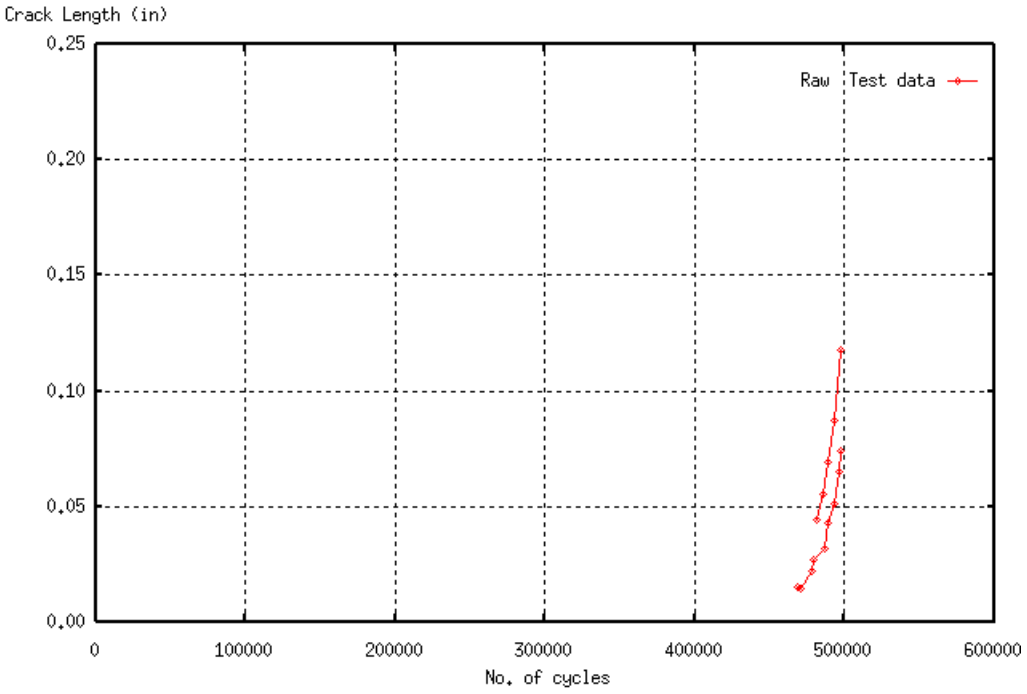



FIGURE E-42. CRACK GROWTH HISTORY FOR EIFS-9

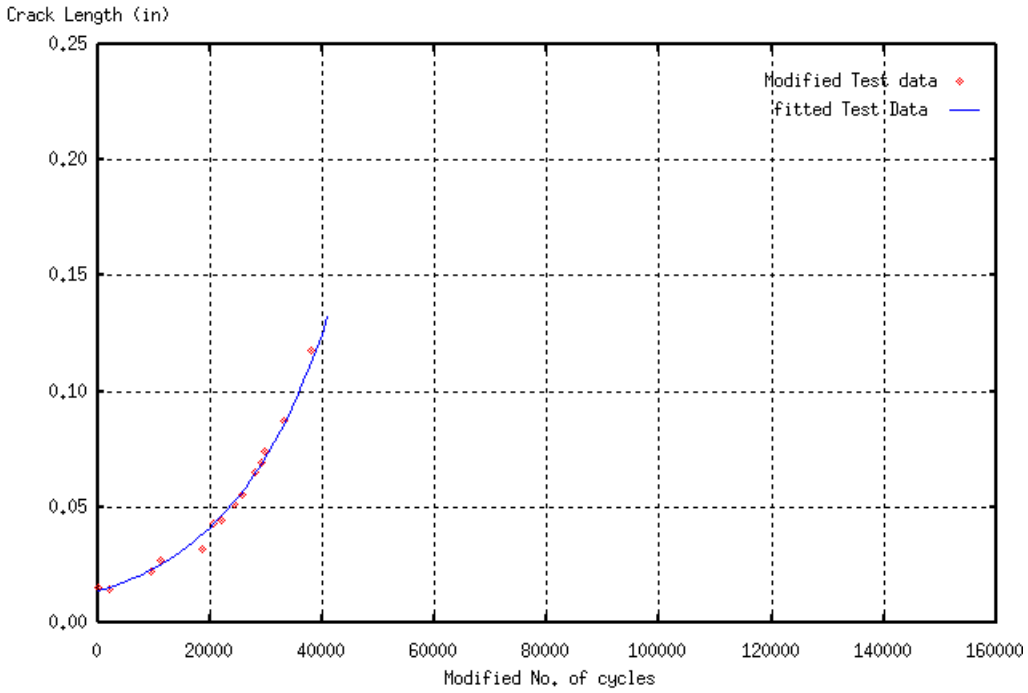



FIGURE E-43. MODIFIED CRACK GROWTH HISTORY FOR EIFS-9

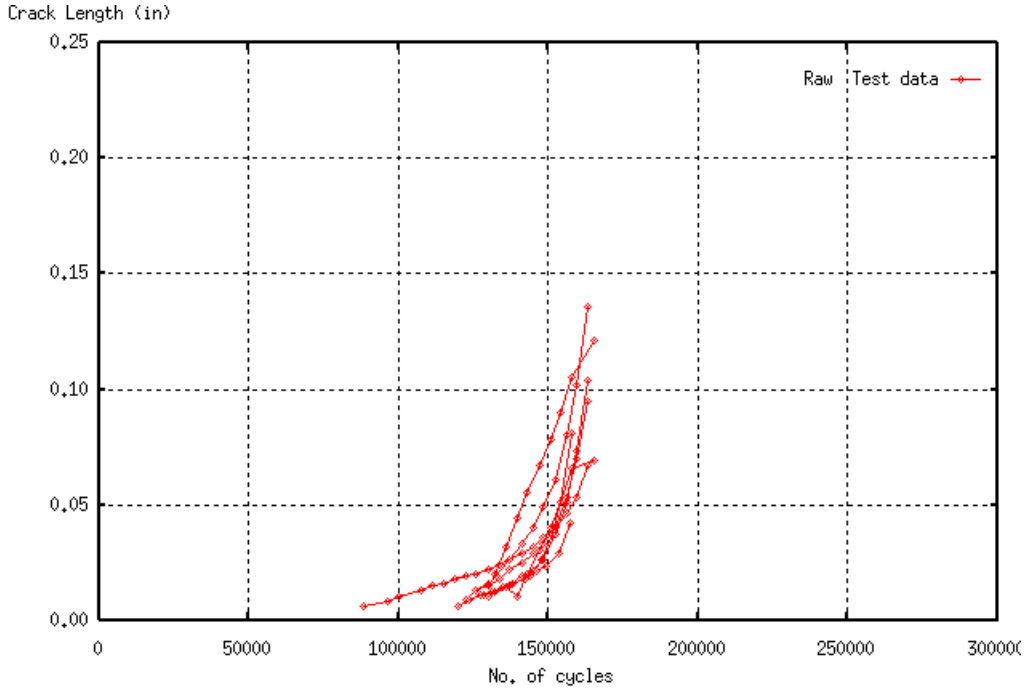



FIGURE E-44. CRACK GROWTH HISTORY FOR EIFS-10

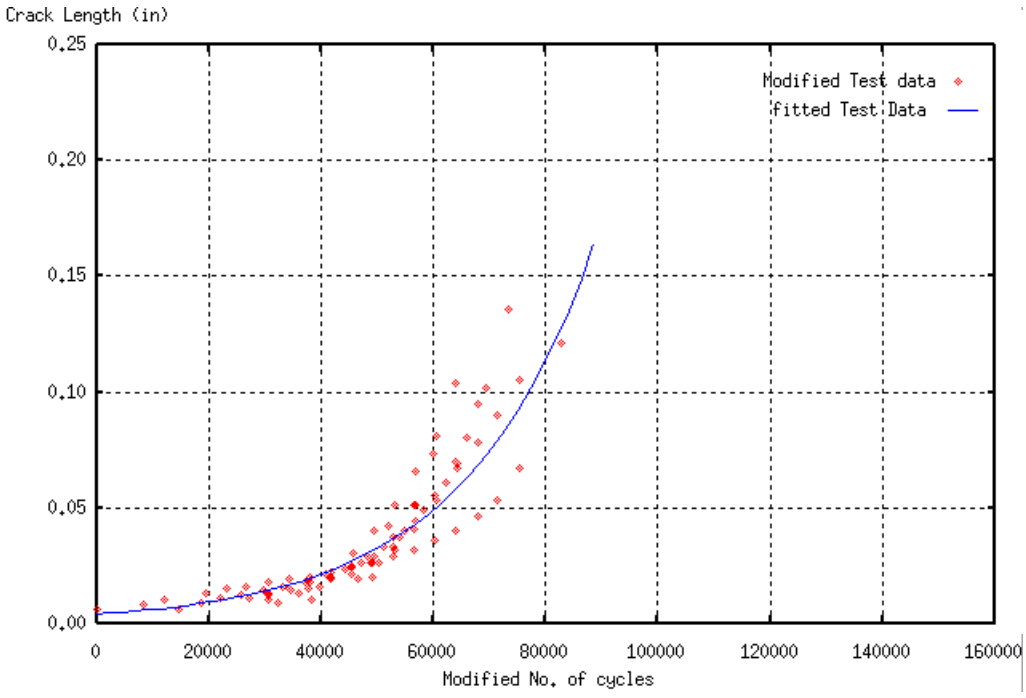



FIGURE E-45. MODIFIED CRACK GROWTH HISTORY FOR EIFS-10

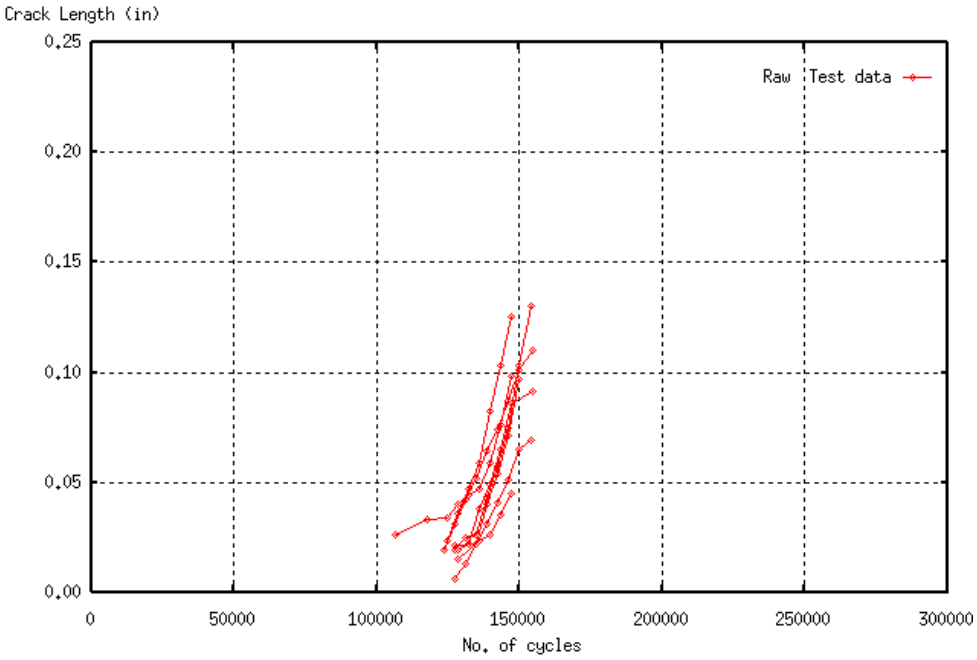



FIGURE E-46. CRACK GROWTH HISTORY FOR EIFS-11

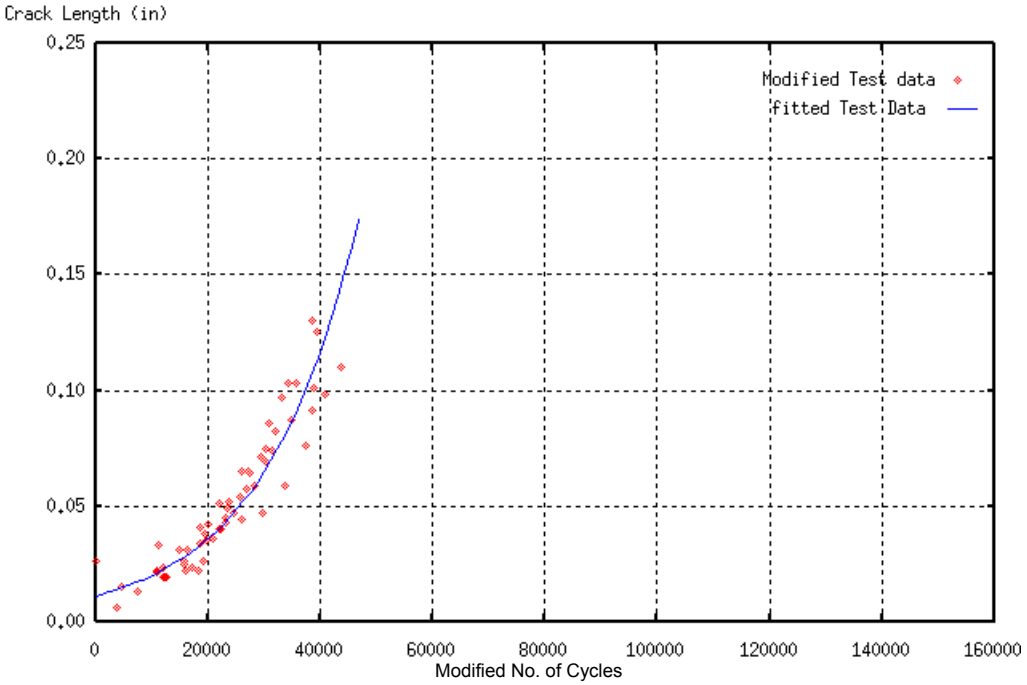



FIGURE E-47. MODIFIED CRACK GROWTH HISTORY FOR EIFS-11

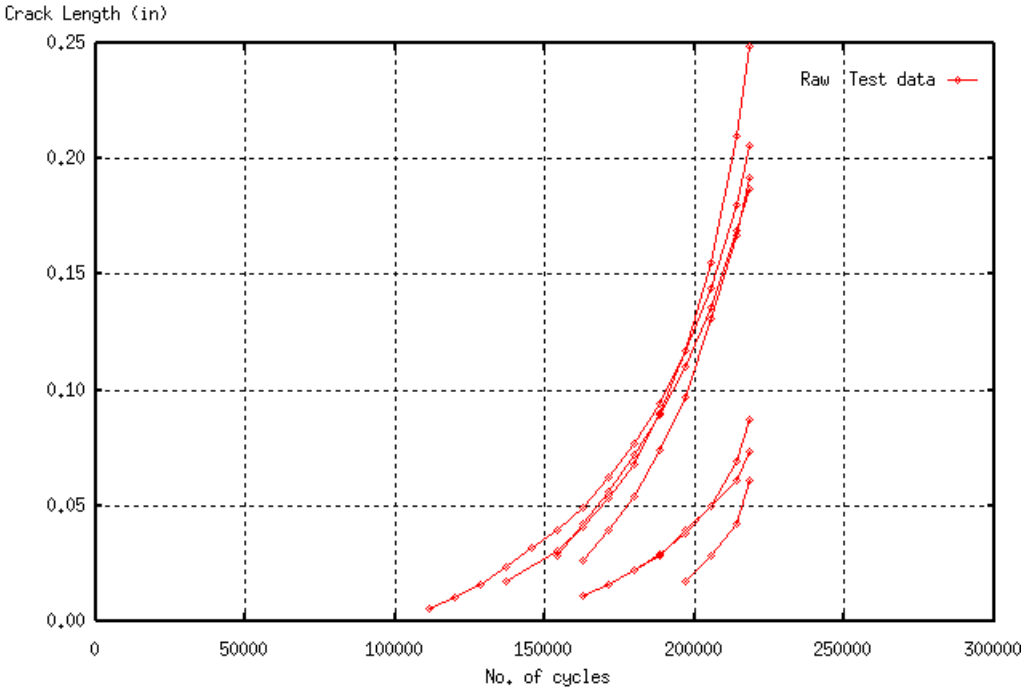



FIGURE E-48. CRACK GROWTH HISTORY FOR EIFS-15

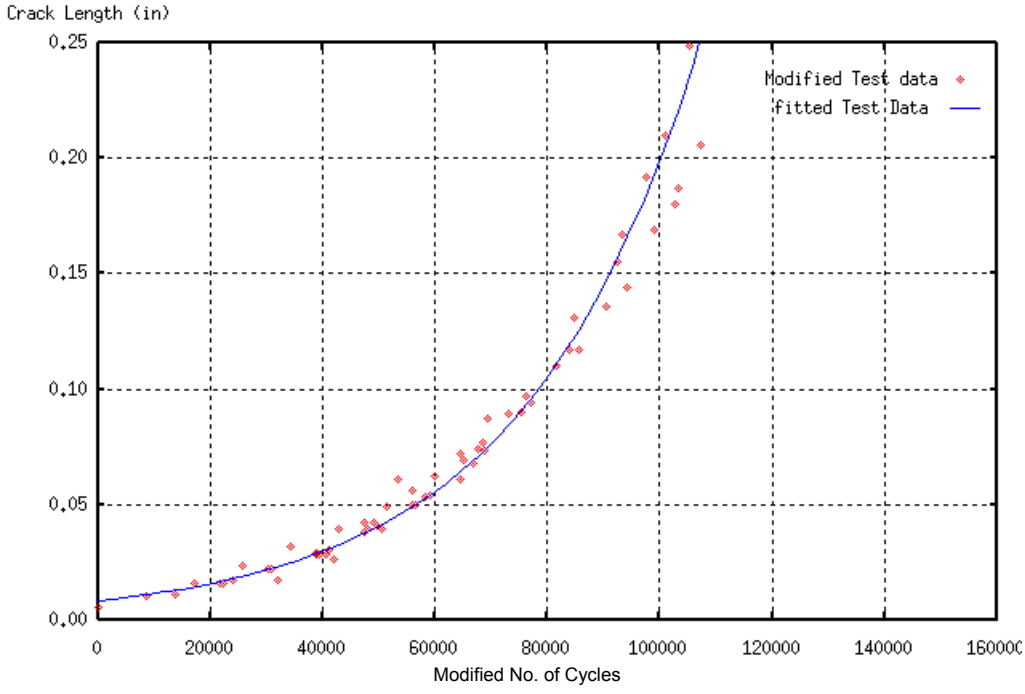



FIGURE E-49. MODIFIED CRACK GROWTH HISTORY FOR EIFS-15

TABLE E-3. AVERAGE EIFS FOR EIFS-3

| Crack ID | No. of Data | EIFS Based on $\beta_u$ | EIFS Based on $\beta_{u7}$ |
|---|---|---|---|
| 03C14R | 5 | 6.39E-04 | 5.15E-04 |
| 03C17R | 9 | 9.63E-04 | 8.65E-04 |
| Total/Average | 14 | 0.0008 | 0.00069 |

| Crack ID | No. of Data | EIFS Based on $\beta_u$ | EIFS Based on $\beta_{u7}$ |
|---|---|---|---|
| 03D13R | 4 | 3.48E-04 | 2.47E-04 |
| 03D15L | 20 | 8.76E-04 | 1.16E-03 |
| 03D15R | 19 | 7.94E-04 | 1.07E-03 |
| Total/Average | 43 | 0.00067 | 0.00083 |

TABLE E-4. AVERAGE EIFS FOR EIFS-4

| Crack ID | No. of Data | EIFS Based on $\beta_u$ | EIFS Based on $\beta_{u7}$ |
|---|---|---|---|
| 04C09R | 8 | 1.23E-04 | 3.40E-04 |
| 04C10R | 6 | 1.23E-04 | 3.39E-04 |
| 04C11R | 9 | 1.20E-04 | 2.82E-04 |
| 04C12R | 8 | 1.23E-04 | 3.38E-04 |
| Total/Average | 31 | 0.00012 | 0.00032 |

TABLE E-5. AVERAGE EIFS FOR EIFS-7 USING ORIGINAL TEST RESULTS
($\beta_u$ are identical to $\beta_{u7}$ for the original set of EIFS-7 test data)

| Crack ID | No. of Data | EIFS Based on $\beta_u$ and $\beta_{u7}$ |
|---|---|---|
| 07A06L | 38 | 9.91E-04 |
| 07A06R | 54 | 1.25E-03 |
| 07A07L | 28 | 8.27E-04 |
| 07A07R | 36 | 4.80E-04 |
| 07A08L | 10 | 2.57E-04 |
| 07A12R | 50 | 8.06E-04 |
| 07A13R | 42 | 5.63E-04 |
| 07A14L | 38 | 1.56E-03 |
| Total/Average | 296 | 0.00084 |

TABLE E-6. AVERAGE EIFS FOR EIFS-7 USING COMPLETE TEST RESULTS

| Crack ID | No. of Data | EIFS Based on $\beta_u$ | EIFS Based on $\beta_{u7}$ |
|---|---|---|---|
| 07A06L | 38 | 6.70E-04 | 4.82E-04 |
| 07A06R | 60 | 8.90E-04 | 6.85E-04 |
| 07A07L | 28 | 5.68E-04 | 4.27E-04 |
| 07A07R | 36 | 3.06E-04 | 3.39E-04 |
| 07A08L | 10 | 1.60E-04 | 2.01E-04 |
| 07A12R | 50 | 5.33E-04 | 4.74E-04 |
| 07A13R | 42 | 3.66E-04 | 3.96E-04 |
| 07A14L | 38 | 1.17E-03 | 6.41E-04 |
| 07A14R | 55 | 6.67E-04 | 5.40E-04 |
| 07A15R | 46 | 5.03E-04 | 5.29E-04 |
| 07A16L | 31 | 6.42E-04 | 4.80E-04 |
| 07A16R | 19 | 1.39E-04 | 1.76E-04 |
| 07A17L | 39 | 4.08E-04 | 3.77E-04 |
| 07A17R | 57 | 9.99E-04 | 7.68E-04 |
| Total/Average | 549 | 0.00057 | 0.00047 |

TABLE E-7. AVERAGE EIFS FOR EIFS-8

| Crack ID | No. of Data | EIFS Based on $\beta_u$ | EIFS Based on $\beta_{u7}$ |
|---|---|---|---|
| 08A10L | 31 | 1.31E-03 | 5.12E-04 |
| 08A10R | 27 | 1.30E-03 | 4.98E-04 |
| 08A19L | 6 | 9.31E-04 | 3.60E-04 |
| Total/Average | 64 | 0.0012 | 0.00046 |

TABLE E-8. AVERAGE EIFS FOR EIFS-9

| Crack ID | No. of Data | EIFS Based on $\beta_u$ | EIFS Based on $\beta_{u7}$ |
|---|---|---|---|
| 09A05L | 5 | 4.44E-05 | 7.67E-05 |
| 09A05R | 9 | 4.01E-05 | 6.69E-05 |
| Total/Average | 14 | 0.00014 | 0.00007 |

TABLE E-9. AVERAGE EIFS FOR EIFS-10

| Crack ID | No. of Data | EIFS Based on $\beta_u$ | EIFS Based on $\beta_{u7}$ |
|---|---|---|---|
| 10F05R | 11 | 3.02E-04 | 1.93E-04 |
| 10F06L | 11 | 3.35E-04 | 2.25E-04 |
| 10F06R | 11 | 3.57E-04 | 2.45E-04 |
| 10F07L | 9 | 3.21E-04 | 2.17E-04 |
| 10F07R | 5 | 3.28E-04 | 2.26E-04 |
| 10F08L | 19 | 3.70E-04 | 2.40E-04 |
| 10F08R | 10 | 3.15E-04 | 2.09E-04 |
| 10F10R | 9 | 4.01E-04 | 2.80E-04 |
| Total/Average | 85 | 0.00034 | 0.00023 |

TABLE E-10. AVERAGE EIFS FOR EIFS-11

| Crack ID | No. of Data | EIFS Based on $\beta_u$ | EIFS Based on $\beta_{u7}$ |
|---|---|---|---|
| 11F06L | 6 | 3.10E-04 | 2.74E-04 |
| 11F06R | 9 | 3.58E-04 | 3.26E-04 |
| 11F07L | 7 | 3.10E-04 | 2.78E-04 |
| 11F07R | 8 | 3.13E-04 | 2.84E-04 |
| 11F08L | 5 | 2.91E-04 | 2.27E-04 |
| 11F08R | 8 | 2.80E-04 | 2.33E-04 |
| 11F09R | 7 | 3.45E-04 | 3.39E-04 |
| 11F10R | 9 | 3.29E-04 | 3.14E-04 |
| Total/Average | 59 | 0.00032 | 0.00028 |

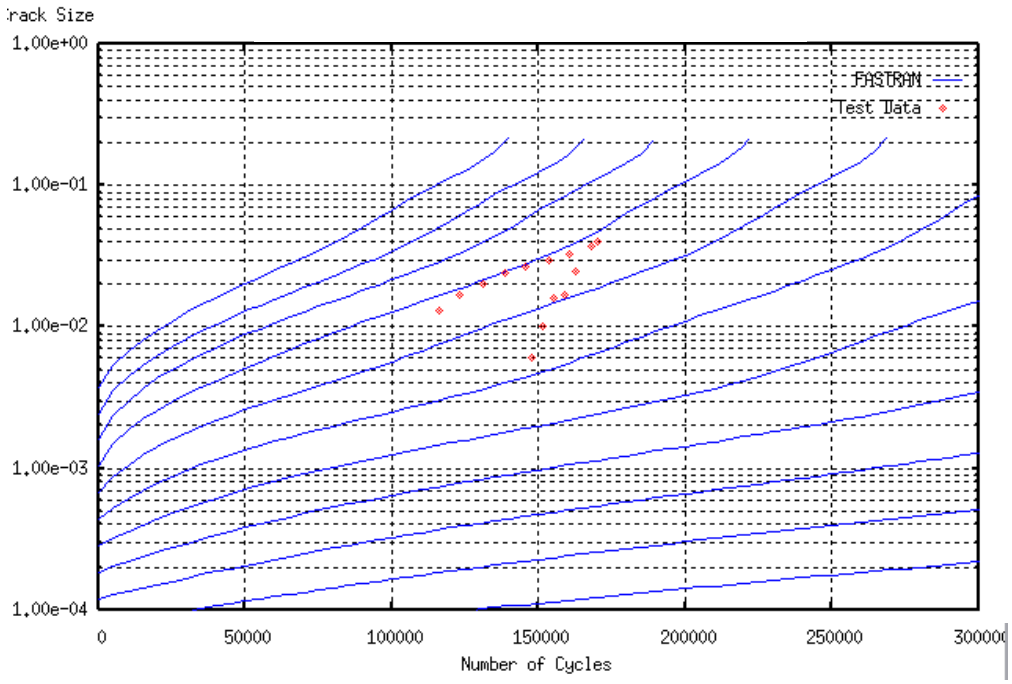



FIGURE E-50. COMPARISON OF CRACK GROWTH HISTORY FOR EIFS-3, ROW C, USING BEST-MATCHED $\beta_u$

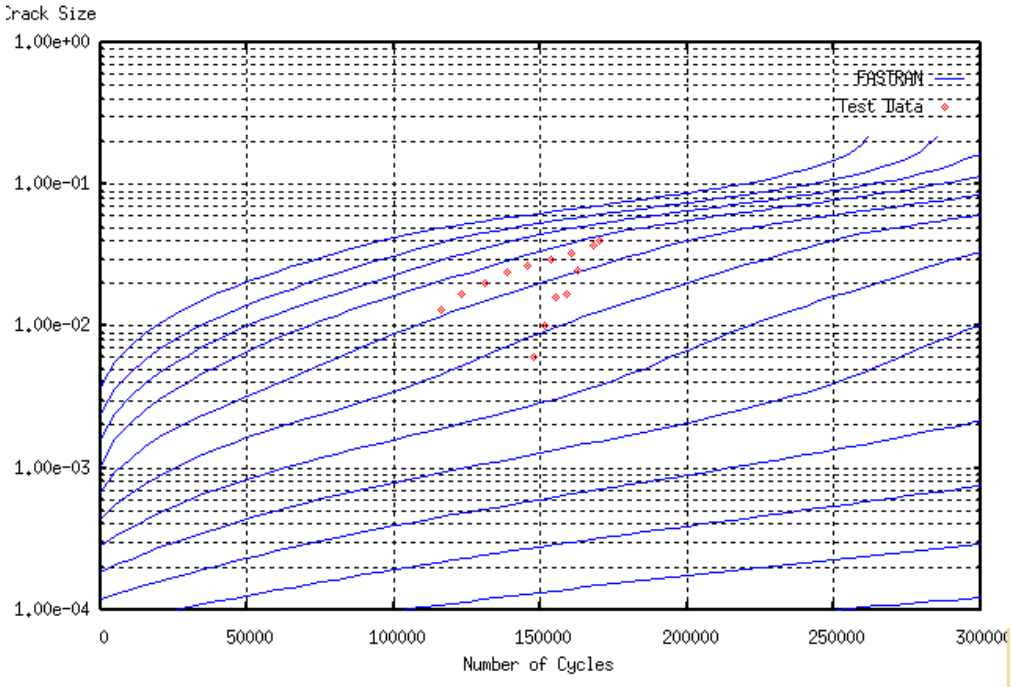



FIGURE E-51. COMPARISON OF CRACK GROWTH HISTORY FOR EIFS-3, ROW C, USING $\beta_{u7}$

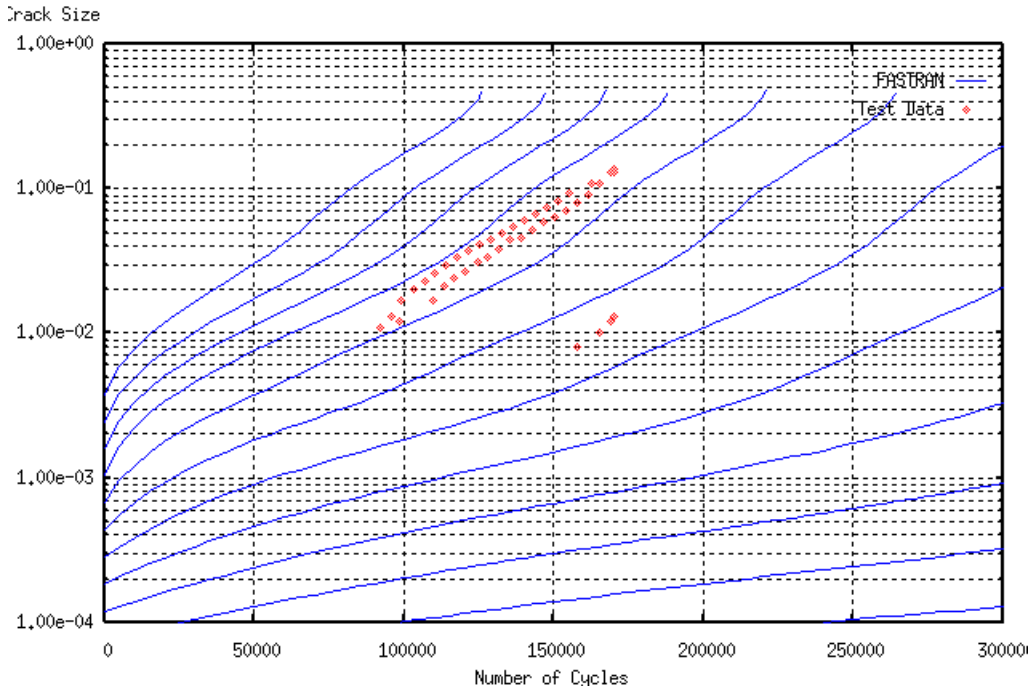



FIGURE E-52. COMPARISON OF CRACK GROWTH HISTORY FOR EIFS-3, ROW D, USING BEST-MATCHED $\beta_u$

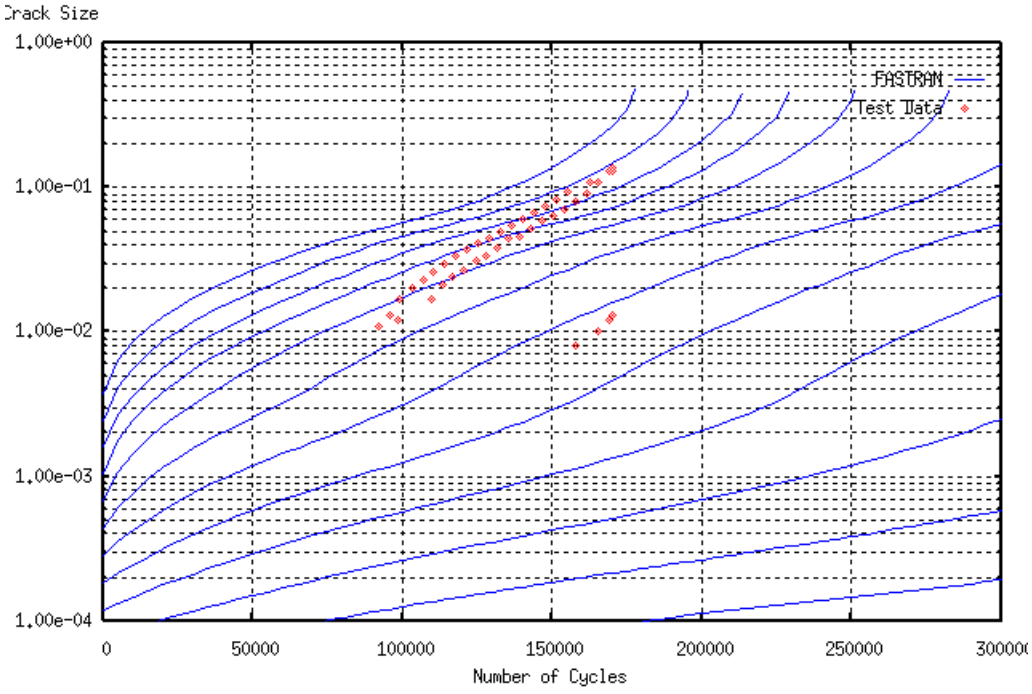



FIGURE E-53. COMPARISON OF CRACK GROWTH HISTORY FOR EIFS-3, ROW D, USING BEST-MATCHED $\beta_{u7}$

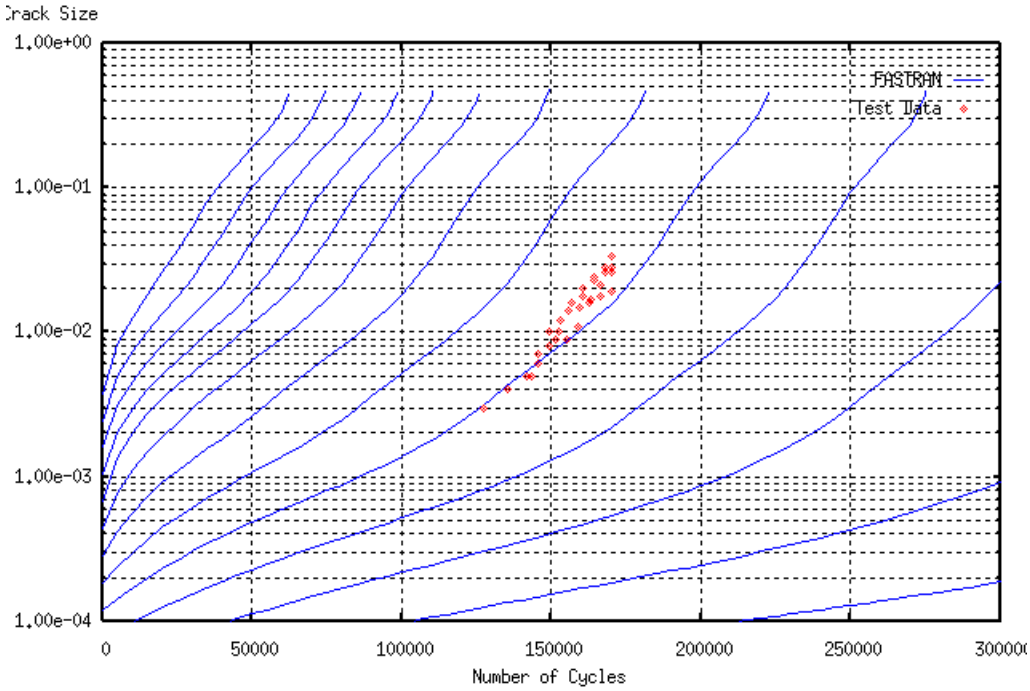



FIGURE E-54. COMPARISON OF CRACK GROWTH HISTORY FOR EIFS-4 USING BEST-MATCHED $\beta_u$

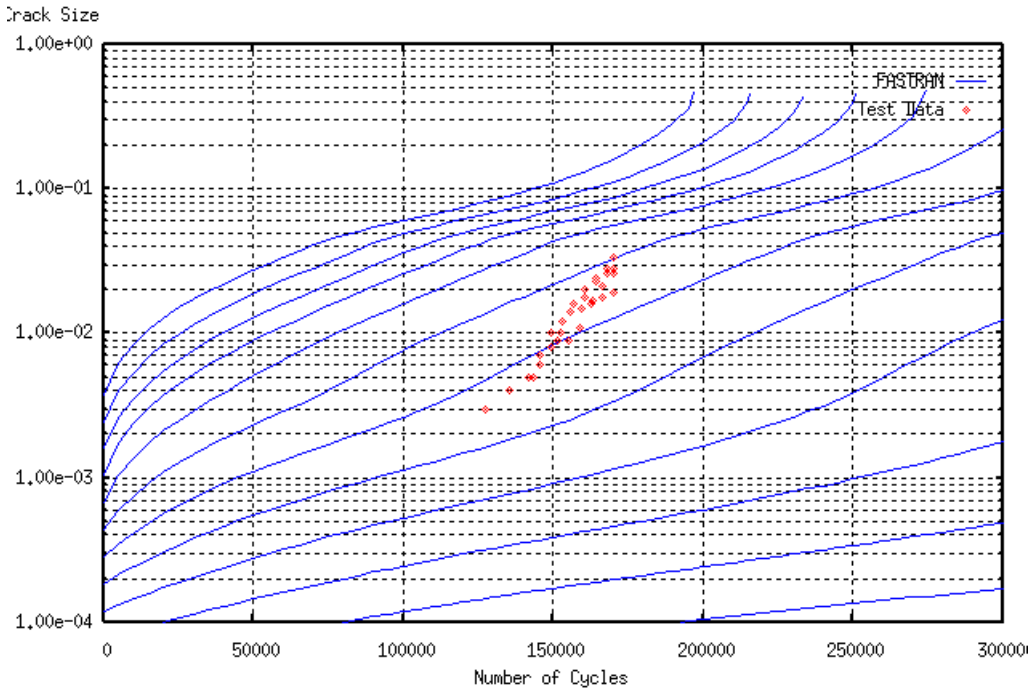



FIGURE E-55. COMPARISON OF CRACK GROWTH HISTORY FOR EIFS-4 USING BEST-MATCHED $\beta_{u7}$

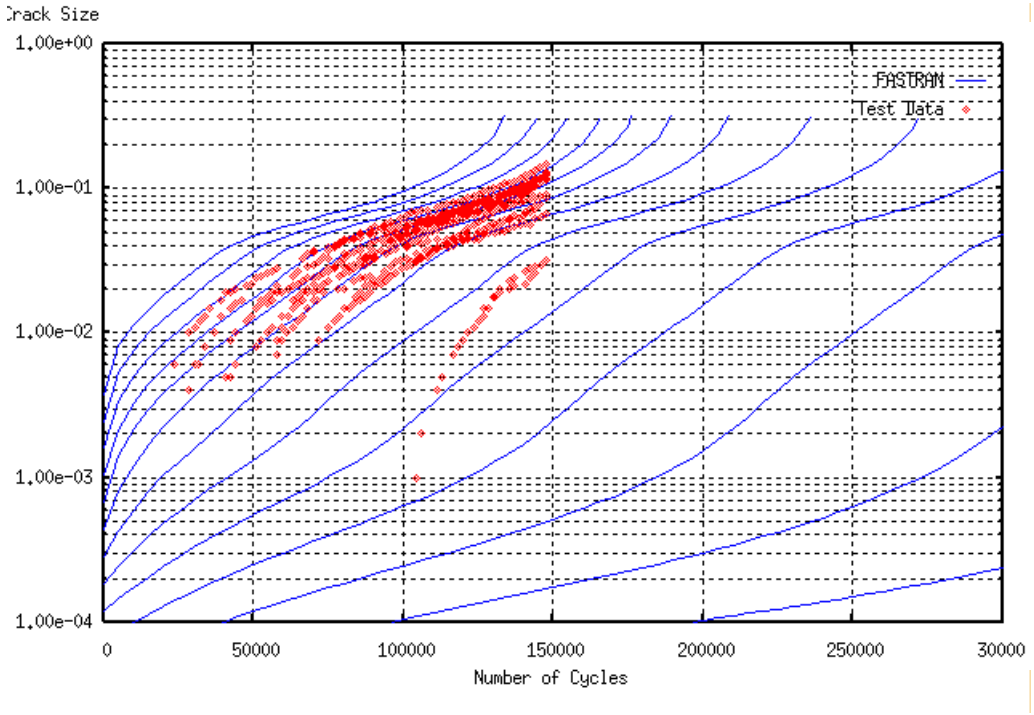



FIGURE E-56. COMPARISON OF CRACK GROWTH HISTORY FOR EIFS-7 USING BEST-MATCHED $\beta_u$

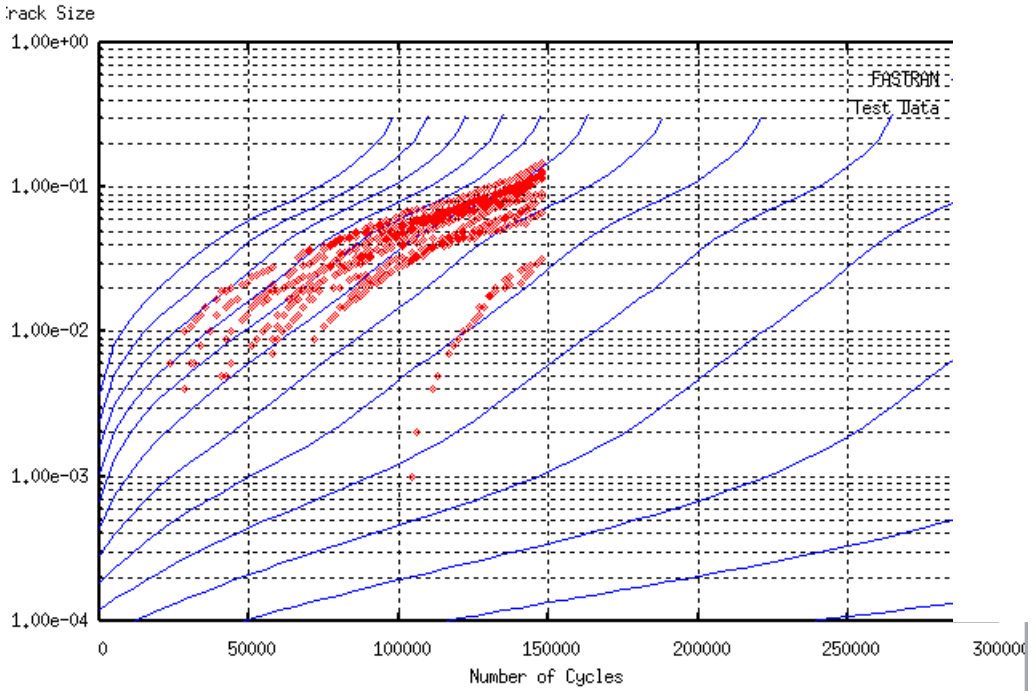



FIGURE E-57. COMPARISON OF CRACK GROWTH HISTORY FOR EIFS-7 USING BEST-MATCHED $\beta_{u7}$

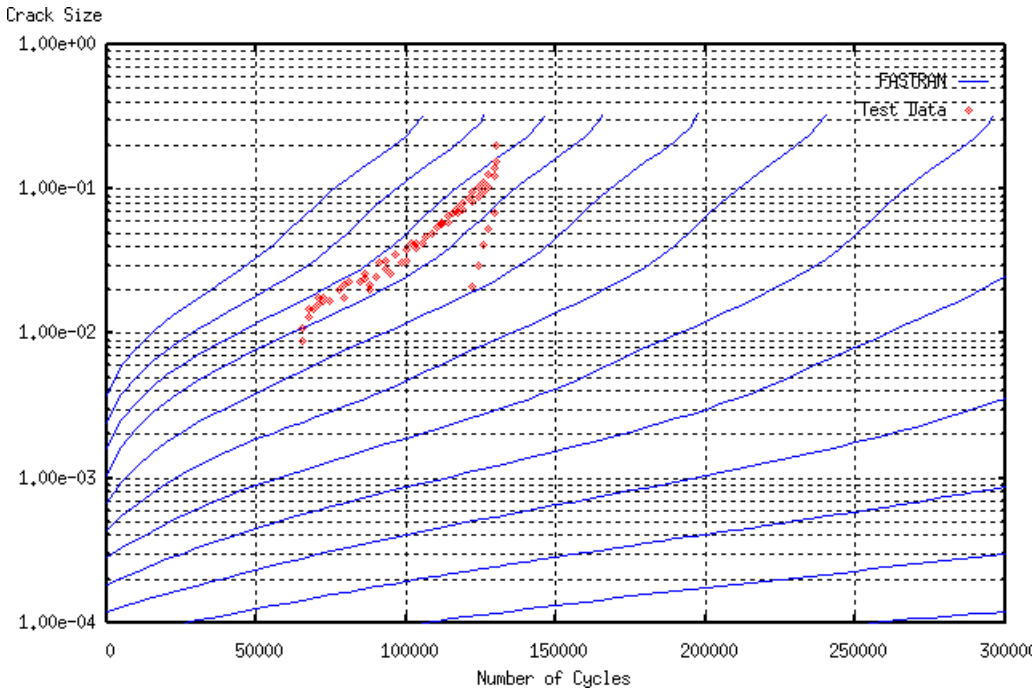



FIGURE E-58. COMPARISON OF CRACK GROWTH HISTORY FOR EIFS-8 USING BEST-MATCHED $\beta_u$

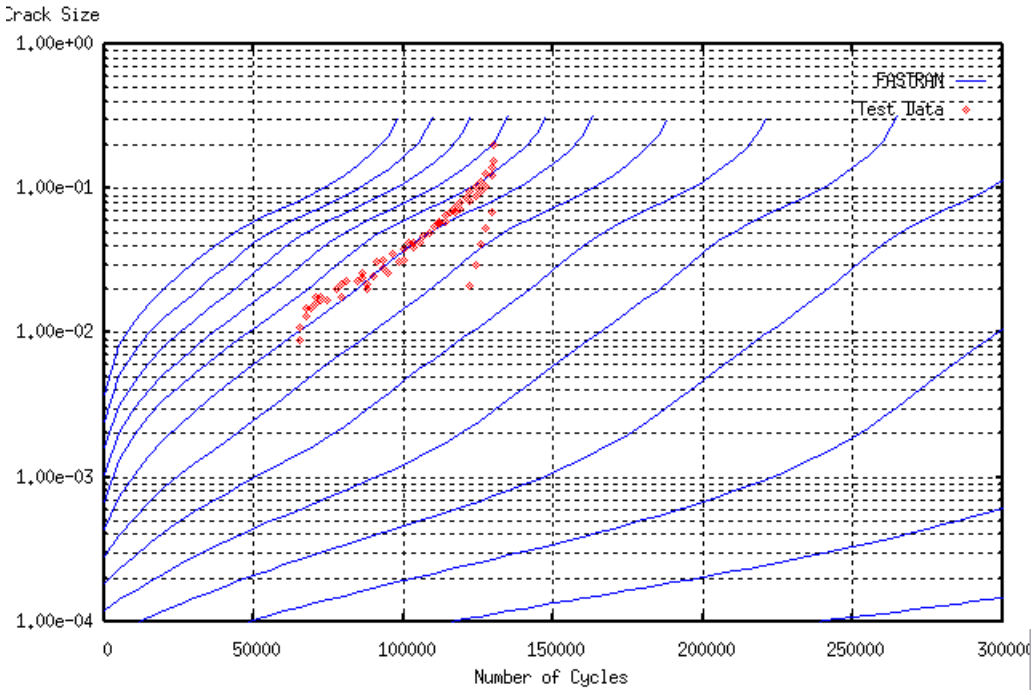



FIGURE E-59. COMPARISON OF CRACK GROWTH HISTORY FOR EIFS-8 USING BEST-MATCHED $\beta_{u7}$

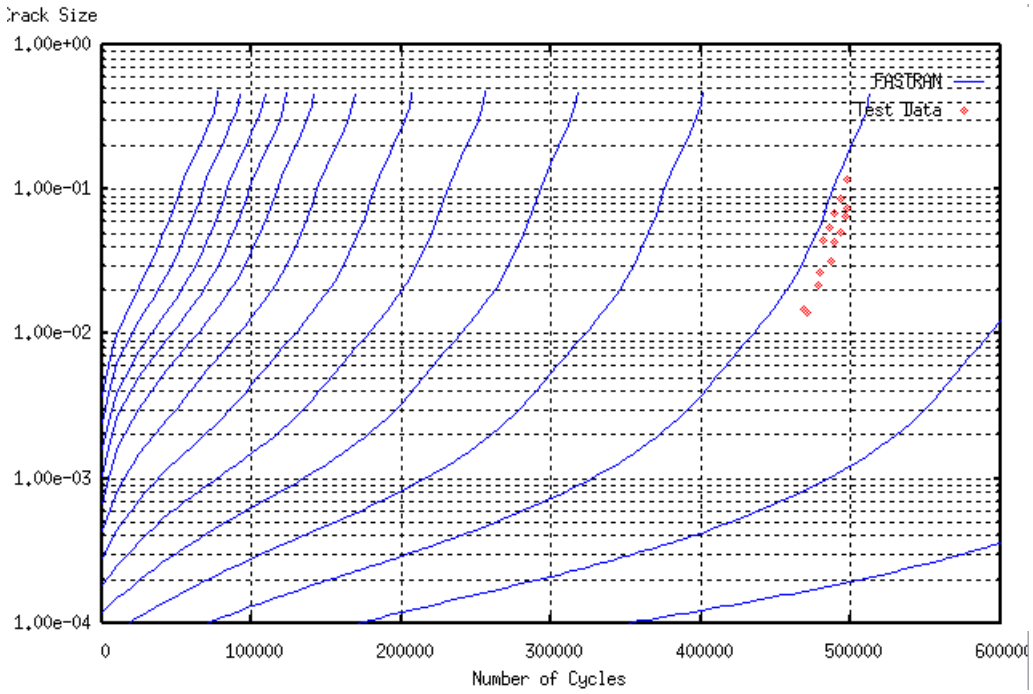



FIGURE E-60. COMPARISON OF CRACK GROWTH HISTORY FOR EIFS-9 USING BEST-MATCHED $\beta_u$

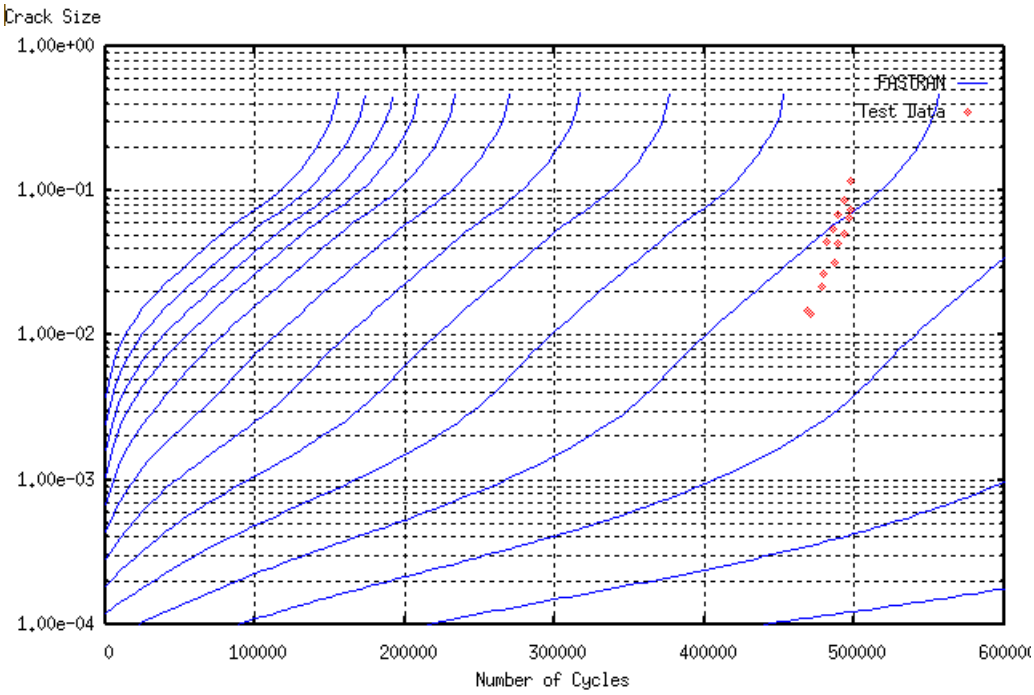



FIGURE E-61. COMPARISON OF CRACK GROWTH HISTORY FOR EIFS-9 USING BEST-MATCHED $\beta_{u7}$

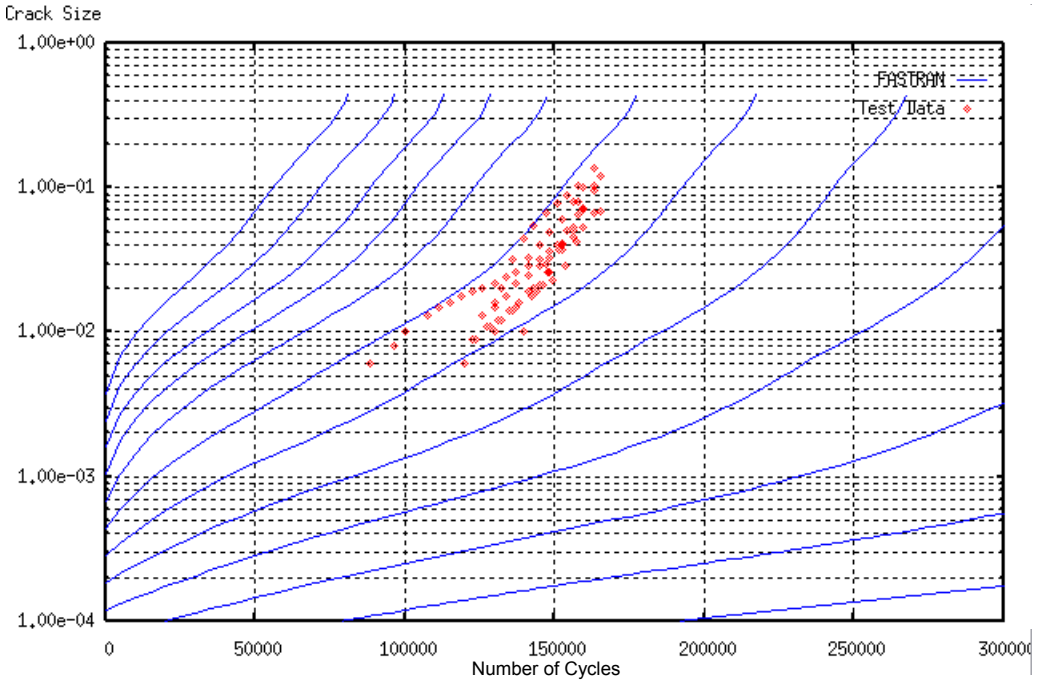



FIGURE E-62. COMPARISON OF CRACK GROWTH HISTORY FOR SPECIMEN NO. 10 USING BEST-MATCHED $\beta_u$

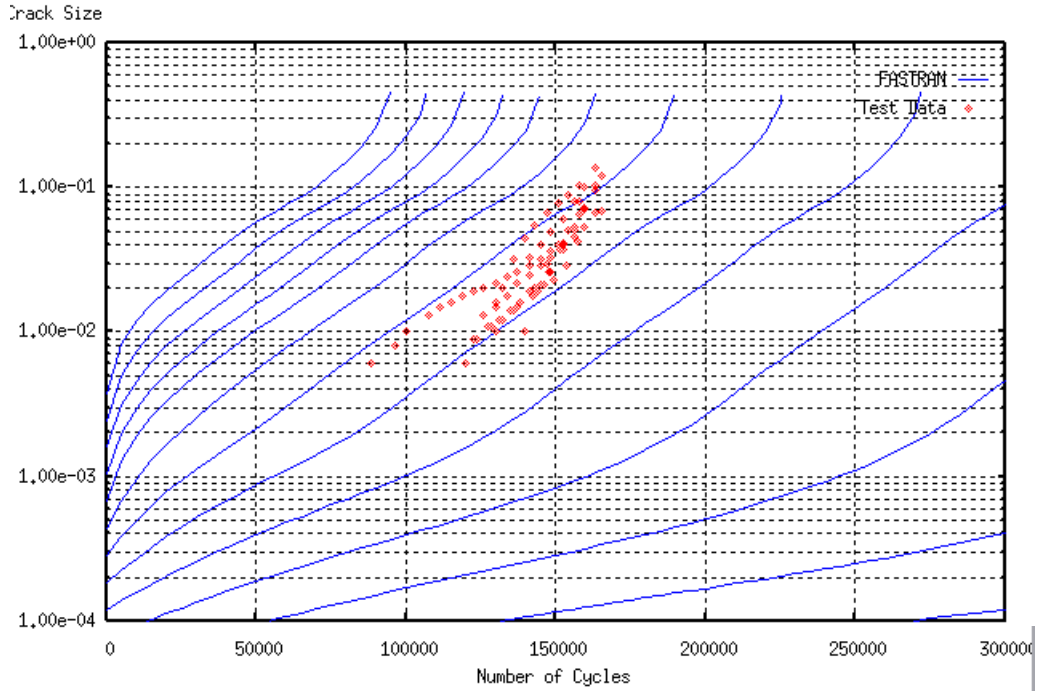



FIGURE E-63. COMPARISON OF CRACK GROWTH HISTORY FOR EIFS-10 USING BEST-MATCHED $\beta_{u7}$

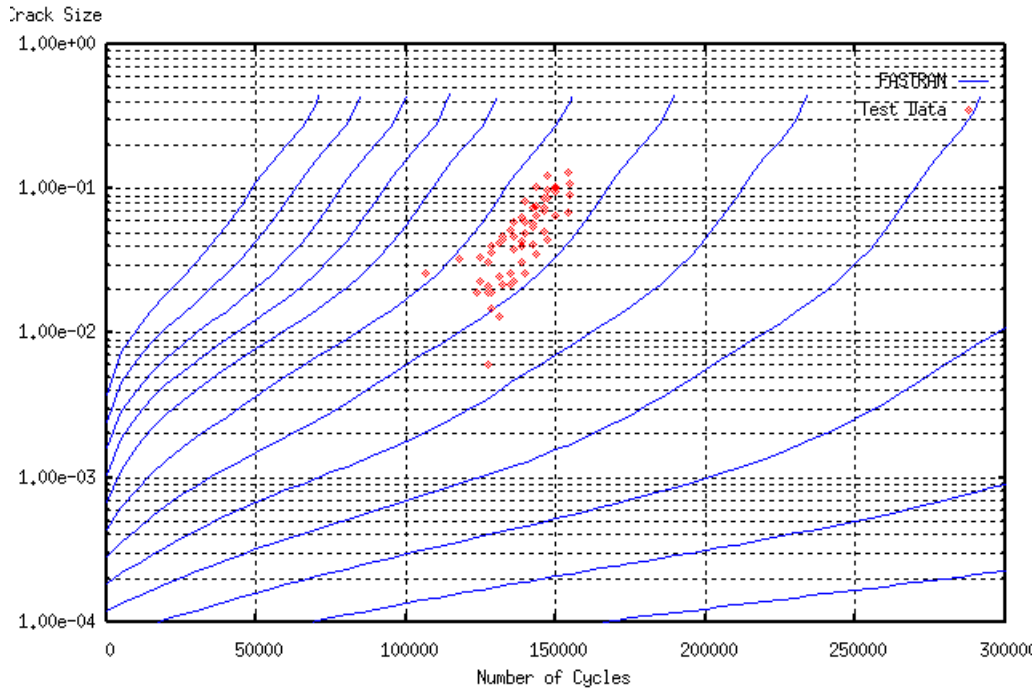



FIGURE E-64. COMPARISON OF CRACK GROWTH HISTORY FOR EIFS-11 USING BEST-MATCHED $\beta_u$

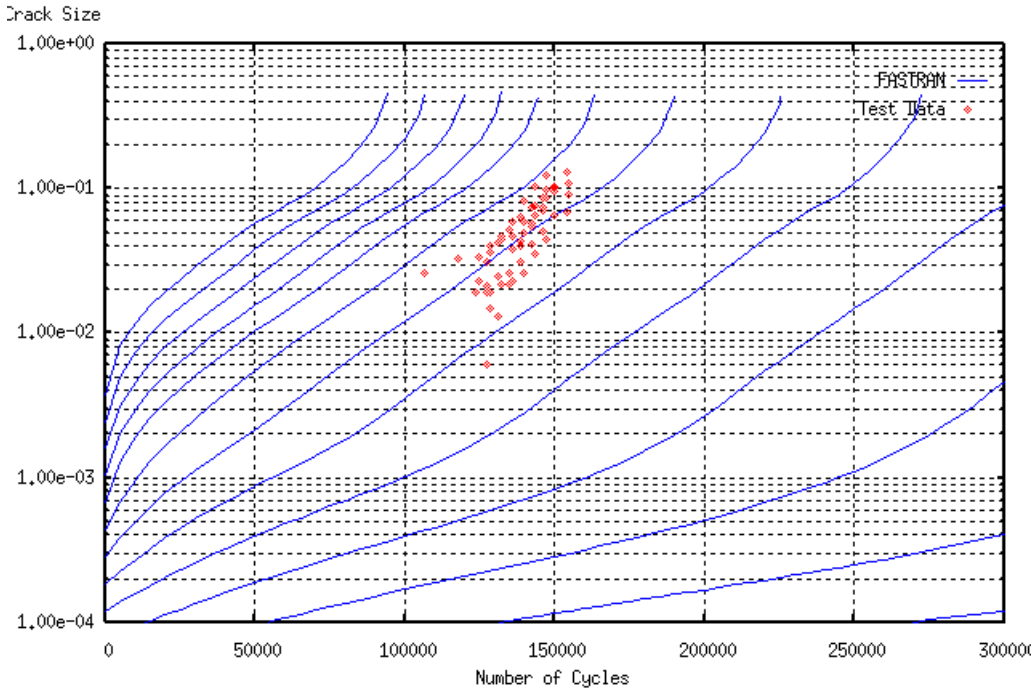



FIGURE E-65. COMPARISON OF CRACK GROWTH HISTORY FOR EIFS-11 USING BEST-MATCHED $\beta_{u7}$

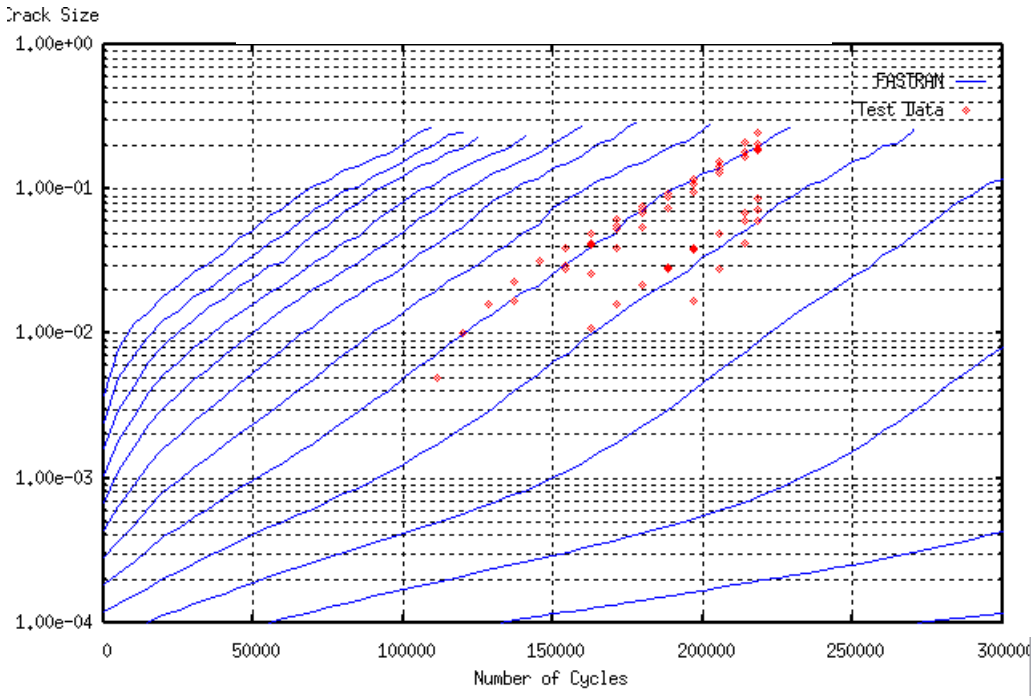



FIGURE E-66. COMPARISON OF CRACK GROWTH HISTORY FOR EIFS-15 USING BEST-MATCHED $\beta_u$

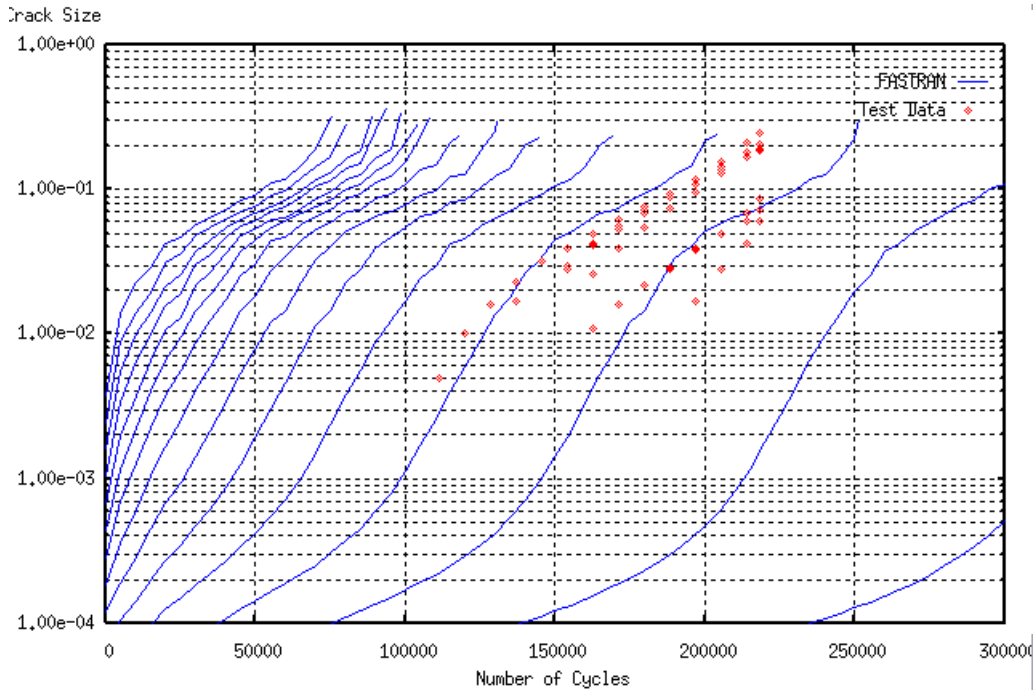



FIGURE E-67. COMPARISON OF CRACK GROWTH HISTORY FOR EIFS-15 USING BEST-MATCHED $\beta_{u7}$