

SOUTHWEST RESEARCH INSTITUTE

POST OFFICE DRAWER 28510 • 6220 CULEBRA ROAD • SAN ANTONIO, TEXAS, USA 78284 • (512) 584-5111 • TELEX 244846

CHEMISTRY AND CHEMICAL ENGINEERING DIVISION
DEPARTMENT OF FIRE TECHNOLOGY

MODIFIED E108 EVALUATION ON EXTERIOR WALL PANELS: INSTEEL 3-D WALL PANELS

FINAL REPORT

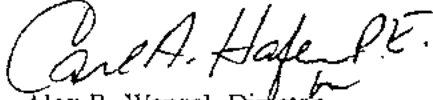
SwRI PROJECT NO. 01-2601-407

JANUARY 16, 1990

Prepared for:

INSTEEL CONSTRUCTION SYSTEMS
2610 STONEY LANIER DRIVE
BRUNSWICK, GEORGIA 31525

Approved by:



Alex B. Wenzel, Director
Department of Fire Technology
for
Dr. Robert E. Lyle, Vice President
Chemistry and Chemical Engineering Division

This report is for the information of the Client. It may be used in its entirety for the purpose of securing product acceptance from duly constituted approval authorities. Neither this report nor the name of the Institute shall be used in publicity or advertising.



SAN ANTONIO, TEXAS
DALLAS / FT. WORTH, TEXAS • HOUSTON, TEXAS • DETROIT, MICHIGAN • WASHINGTON, DC

I. INTRODUCTION

This report presents the results of an investigation of the fire performance characteristics of an exterior wall system submitted by Insteel Construction Systems, of Brunswick, Georgia. This report includes a description of the test materials, procedures used, and results. The results presented in this report apply only to the material tested which the Client claims to be a representative sample of the materials described in this report. The possibility of product variability has not been assessed.

This test was conducted in accordance with the general procedure described in Fire Research Group Report No. 78-13, University of California (Berkeley), December 1978, "A Summary Description of the Modified ASTM E108 Test Procedure."

This procedure is used to measure and describe the properties of materials, products, or assemblies in response to heat and flame under controlled laboratory conditions, and should not be used to describe or appraise the fire hazard or fire risk of materials, products, or assemblies under actual fire conditions. However, results of this test may be used as elements of a fire risk assessment which takes into account all of the factors which are pertinent to an assessment of the fire hazard of a particular end use.

There are no established criteria for the Modified E108 test. A proposed standard for this test procedure, where conditions for acceptable performance are defined, are contained in the 1984 Annual Report of the Code Development Committees, 62nd Annual Education and Code Development Conference, International Conference of Building Officials, September 1984. These conditions are as follows:

Section 17.??06. The performance of a test assembly shall be judged on the basis of visual observations both during and after the test in conjunction with temperature data. An exterior wall assembly shall be considered as meeting the requirements for acceptable performance if during the 15-minute test period:

1. Significant flame propagation does not occur over the exterior face of the test panel. Small, intermittent flames along seams, joints, or on the exterior face of the test assembly in the region of direct flame exposure may be ignored.
2. Significant flame propagation shall not occur vertically or laterally through the core insulation. Damage to the core insulation shall not extend to the limits of the test panels. Flame propagation may be judged to occur within



Department of Fire Technology

the test panels when temperatures within the insulation core outside the region of direct flame exposure exceed 750°F.

II. OBJECTIVE

The objective of this program was to evaluate an exterior wall system incorporating potentially combustible elements when tested in accordance with the Modified E108 test procedure.

III. TEST MATERIALS

The test panels were built at Southwest Research Institute by the Client. The system was described as INSTEEL 3-D WALL PANELS. Two wall assemblies were tested in this program. One wall assembly was tested in a damaged condition and the other undamaged. The panels were assembled in November 1989.

Each 6 x 10-ft wall panel consisted of a three-dimensional welded wire space frame integrated with a polystyrene insulation core. This reinforcement/insulation module was placed in position, and wythes of concrete were applied to both sides. Diagonal cross wires were welded to the welded wire fabric on each side. This is shown in Appendix B, Figure A.

According to the Client, three different configurations of reinforcement/insulation module (RIM) are manufactured (see Appendix B, Figures B, C, and D). The system tested in this program had a 2-1/2-in. insulation and a RIM thickness of 4 in. The concrete face was 1-1/2-in. thick, and the back was 3/4-in. The edges of the walls were 1/4-in. thick covered with concrete.

IV. TEST PROCEDURE

The test was designed to simulate a fire exposure to the exterior portion of a wall by a flame that emanates from an opening such as a window. The equipment utilized is the same as that described in ASTM E108 test procedure, "Standard Methods of Fire Tests of Roof Coverings." In these evaluations, the test specimen was positioned vertically, as opposed to being sloped as in the roof test, in order to simulate a fire exposure of an exterior wall system. Sketches of the test apparatus are shown in Figures 1 and 2. Figure 1 shows that



Department of Fire Technology

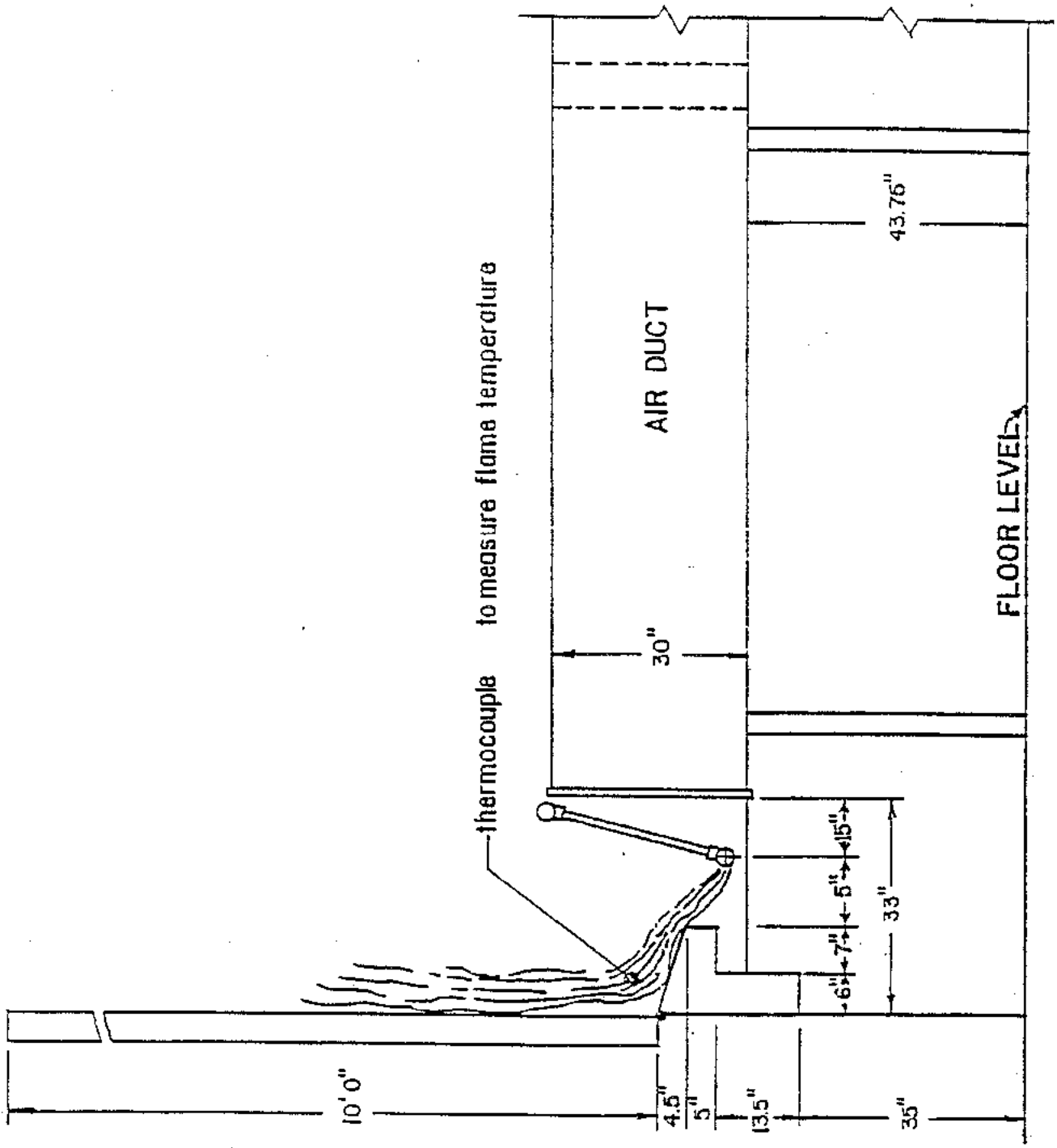


FIGURE 1. SCHEMATIC DIAGRAM OF MODIFIED E-1 APPARATUS FOR EVALUATION OF VERTICAL FIRE SPREAD

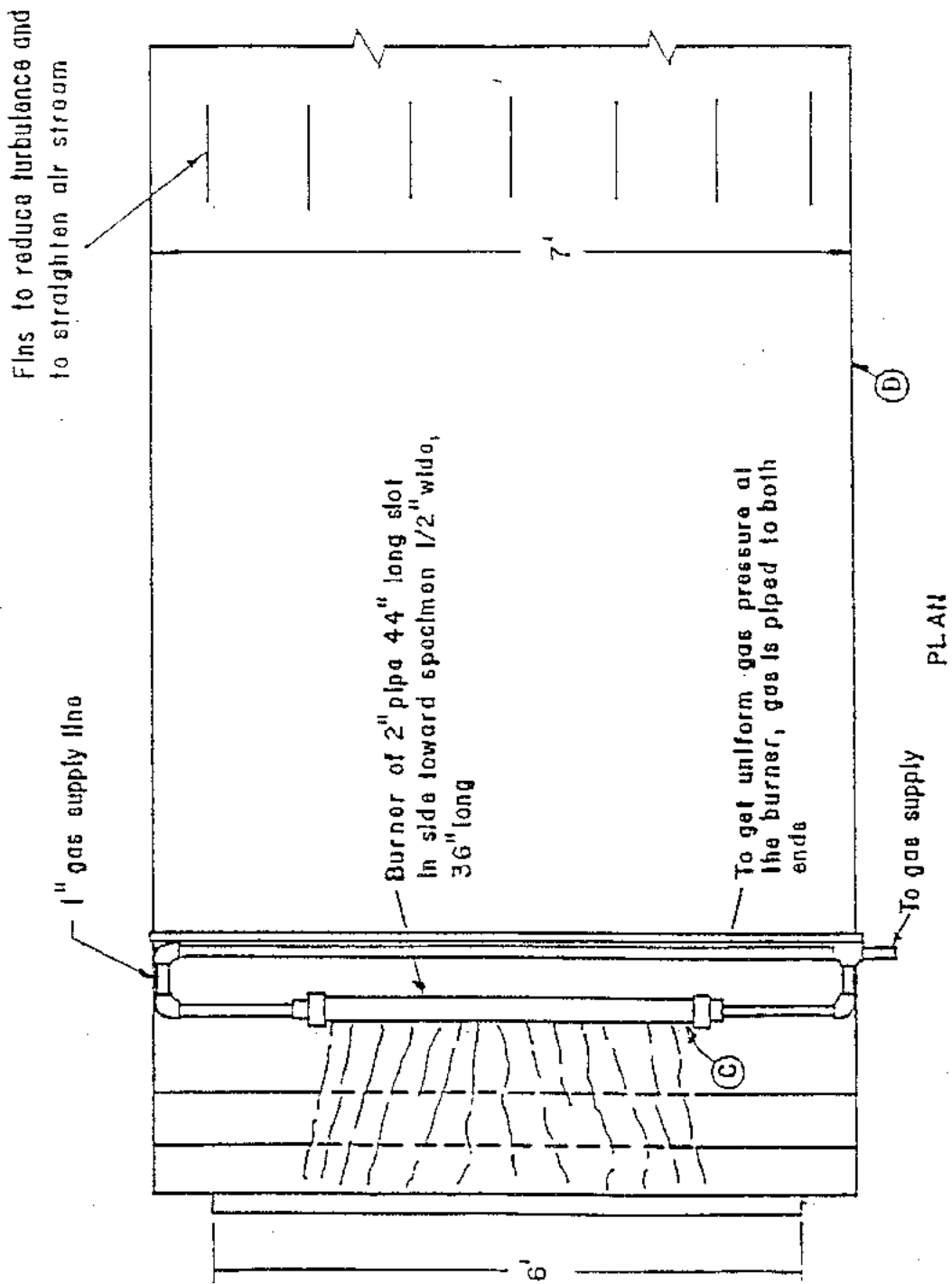


FIGURE 2. SCHEMATIC DIAGRAM OF VERTICAL PANEL TEST

the 6 x 10-ft test specimen is placed in a vertical position with the exposed face in the same position as the leading edge of a roof test specimen with respect to the simulated eave.

The air duct is open to the outside of the laboratory. An exhaust fan in the ceiling above the test specimen is used to pull air from the test room. The air velocity up the face of the test specimen is approximately 3 mph. The flame from the burner "attaches" to the specimen imposing a direct flame exposure.

Each panel was instrumented with thermocouples placed at various locations on the exposed face of the test panel, the interface of the insulation and exposed surface, and the insulation/unexposed concrete wythe interface. Figure 3 shows the thermocouple locations.

The panels were exposed to the fire source for the required 15 minutes.

V. CALIBRATION PROCEDURE

The calibration of the fire exposure is accomplished using a 6 x 8-ft panel constructed from Marinite board in order to obtain temperature and heat flux data when exposed to a 5- to 6-ft flame.

In the ASTM E108 and the Modified E108, natural gas (1000 Btu/ft³) is the fuel source for the burner. The gas flow rate required to produce a 5- to 6-ft flame was recorded during the calibration test and was then used during each subsequent test to ensure reproducibility of the flame source.

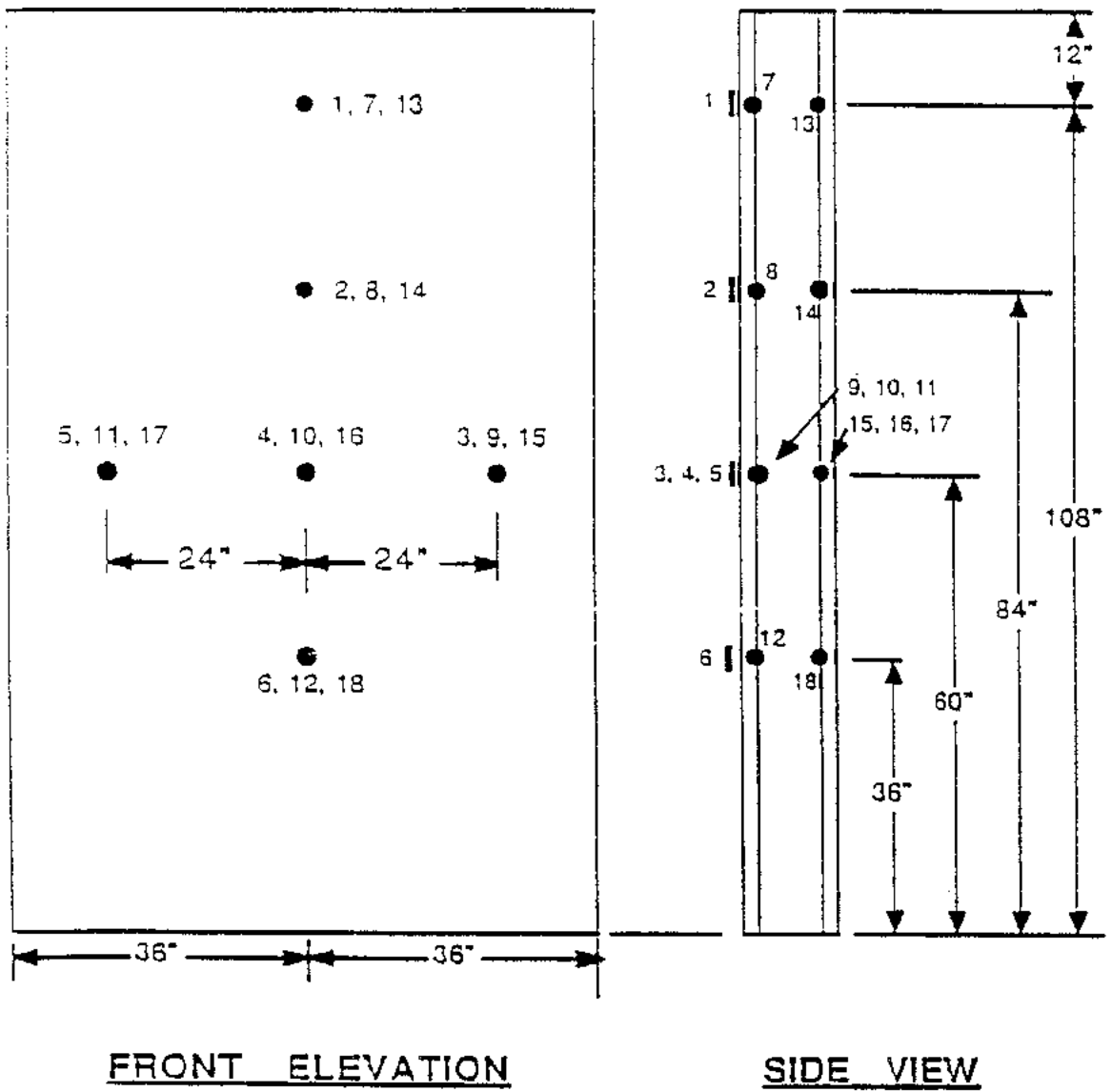
The calibration panel was instrumented as shown in Figure 4. Five 24-gauge type K thermocouples and three total heat flux transducers were mounted flush with the surface of the panel. A thermocouple was also located in the flame zone at the base of the mounted specimen as shown in Figure 3.

VI. TEST RESULTS

The test was conducted on December 13, 1989. The gas burner flame reached 5- to 6-ft levels during the tests, as specified by the test procedure. Temperature data are presented in Appendix A. Thermocouple nos. 2 through 6 were located on the exposed face



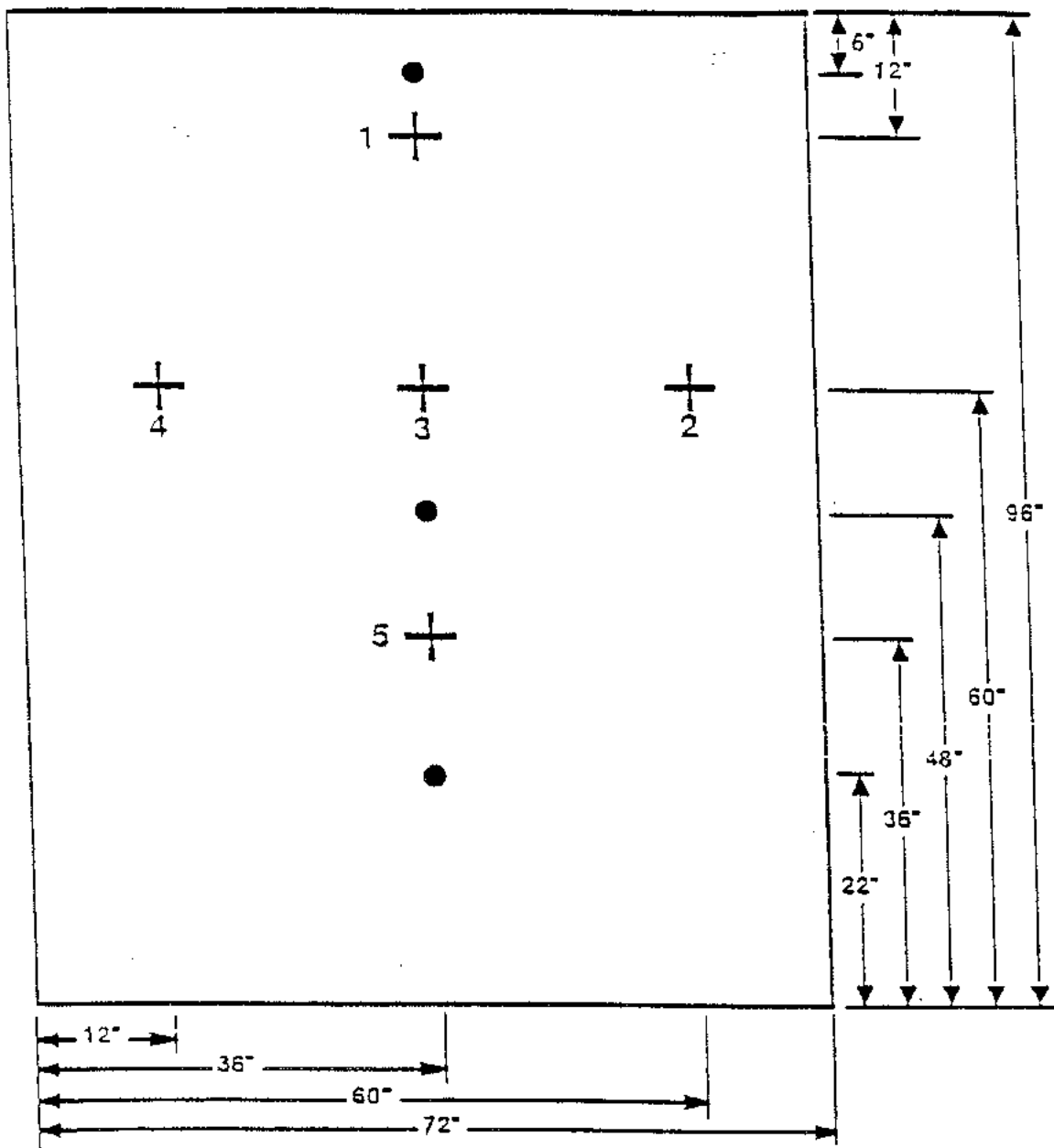
Department of Fire Technology



NOTE:

- Thermocouples 1-6 located on the finished surface
- Thermocouples 7-12 located between the insulation and finished surface
- Thermocouples 13-18 located between the insulation and the gypsum wallboard

FIGURE 3. LOCATION OF THERMOCOUPLES



⊕ Bare Thermocouple on Surface

● Watercooled Calorimeters

Scale: 3/4" = 1'

Calibration Panel.
Placement of Instrumentation

FIGURE 4.

of the panel. Thermocouple nos. 7 through 12 were placed on the interface of the insulation and exposed surface, and Thermocouple nos. 13 through 18 were located on the insulation/concrete wythes interface. Thermocouple No. 1 on the undamaged specimen was not located as specified by the test procedure. Therefore, the data for this thermocouple was omitted. This omission did not have any effect on the evaluation of the fire performance characteristics of the wall system.

Observations made during the test are presented in Appendix C. Photographs showing the damage sustained by the specimens as a result of the fire exposure are presented in Figures 5 and 6.

- Specimen No. 1: **Undamaged**--smoke developed during the test period was very light. There was no flame propagation over the exterior face outside the area of direct flame contact. Interior flame propagation did not occur in any direction. The maximum temperature within the insulation outside the region of direct flame contact was 42°F.
- Specimen No. 2: **Damaged**--smoke developed during the test period was light. Flame propagation did not occur over the exterior face outside the area of direct flame contact. Interior flame propagation did not occur in any direction. The maximum temperature within the insulation outside the region of direct flame contact was 61°F.



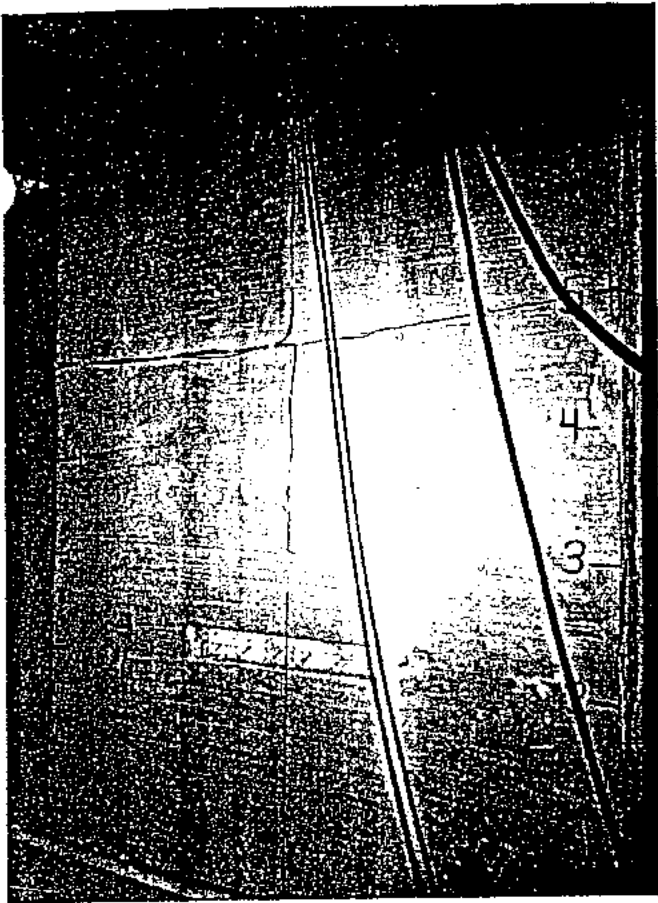


FIGURE 5.

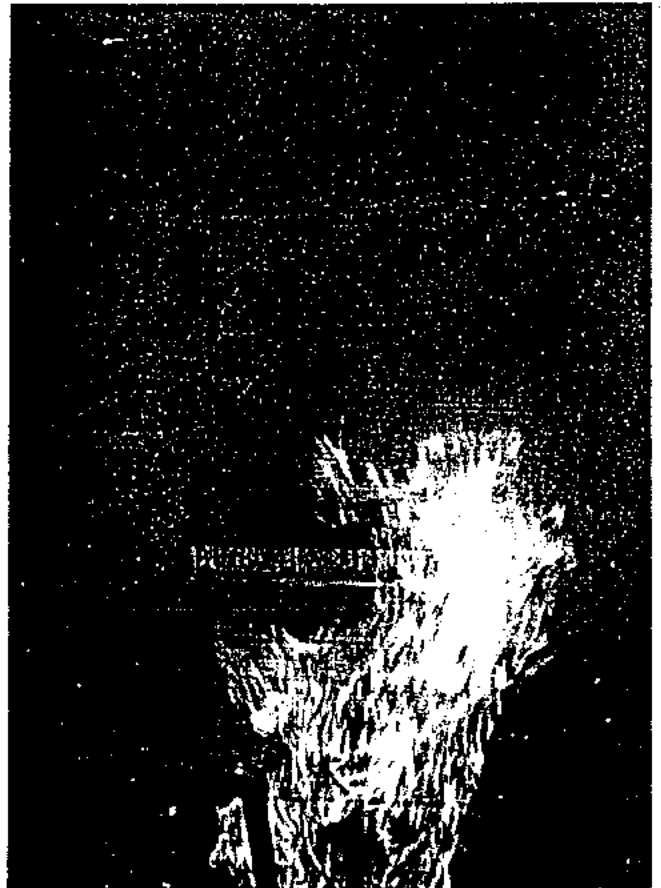
UNDAMAGED SPECIMEN AFTER
TEST



Department of Fire Technology



DAMAGED SPECIMEN BEFORE TEST



DAMAGED SPECIMEN DURING TEST



FIGURE 6.



Department of Fire Technology

PAGE NO. 1

INSTEEL INDUSTRIES, INC. - DAMAGED
FLAME THERMOCOUPLE
TEMPERATURE (DEGREES FAHRENHEIT)

DATE: 13 DECEMBER 1989
FILE: 347INSTEELD.DAT

SWRI PROJECT NO.: 01-2601-407
TEST TYPE: MOD E-108

MIN SEC	TC 19
0: 0	249
0: 10	1115
0: 20	1135
0: 30	1333
0: 40	1372
0: 50	1295
1: 0	1264
1: 10	1236
1: 20	1344
1: 30	1330
1: 40	1399
1: 50	1335
2: 0	1446
2: 10	1406
2: 20	1484
2: 30	1499
2: 40	1511
2: 50	1455
3: 0	1500
3: 10	1500
3: 20	1468
3: 30	1485
3: 40	1515

PAGE NO. 2

INSTEEL INDUSTRIES, INC. - DAMAGED
FLAME THERMOCOUPLE
TEMPERATURE (DEGREES FAHRENHEIT)

DATE: 13 DECEMBER 1989 SWRI PROJECT NO.: 01-2601-407
FILE: 347INSTEELD.DAT TEST TYPE: MOD E-108

MIN SEC	TC 19
3: 50	1434
4: 0	1461
4: 10	1520
4: 20	1478
4: 30	1501
4: 40	1581
4: 50	1466
5: 0	1534
5: 10	1537
5: 20	1571
5: 30	1532
5: 40	1485
5: 50	1491
6: 0	1514
6: 10	1515
6: 20	1537
6: 30	1502
6: 40	1524
6: 50	1487
7: 0	1540
7: 10	1527
7: 20	1501
7: 30	1518

PAGE NO. 3

INSTEEL INDUSTRIES, INC. - DAMAGED
FLAME THERMOCOUPLE
TEMPERATURE (DEGREES FAHRENHEIT)

DATE: 13 DECEMBER 1989
FILE: 347INSTEELD.DAT

SWRI PROJECT NO.: 01-2601-407
TEST TYPE: MOD E-108

MIN SEC	TC 19
7:40	1543
7:50	1543
8:0	1521
8:10	1523
8:20	1517
8:30	1574
8:40	1557
8:50	1558
9:0	1545
9:10	1486
9:20	1548
9:30	1580
9:40	1559
9:50	1461
10:0	1488
10:10	1559
10:20	1517
10:30	1642
10:40	1513
10:50	1528
11:0	1534
11:10	1567
11:20	1509

PAGE NO. 4

INSTEEL INDUSTRIES, INC. - DAMAGED
FLAME THERMOCOUPLE
TEMPERATURE (DEGREES FAHRENHEIT)

DATE: 13 DECEMBER 1989
FILE: 347INSTEEL.DAT

SWRI PROJECT NO.: 01-2601-407
TEST TYPE: MDD E-10B

MIN SEC	TC 19
11:30	1478
11:40	1549
11:50	1529
12: 0	1533
12:10	1443
12:20	1469
12:30	1565
12:40	1479
12:50	1526
13: 0	1551
13:10	1560
13:20	1543
13:30	1571
13:40	1567
13:50	1428
14: 0	1490
14:10	1588
14:20	1548
14:30	1500
14:40	1516
14:50	1600
15: 0	1318
15:10	597

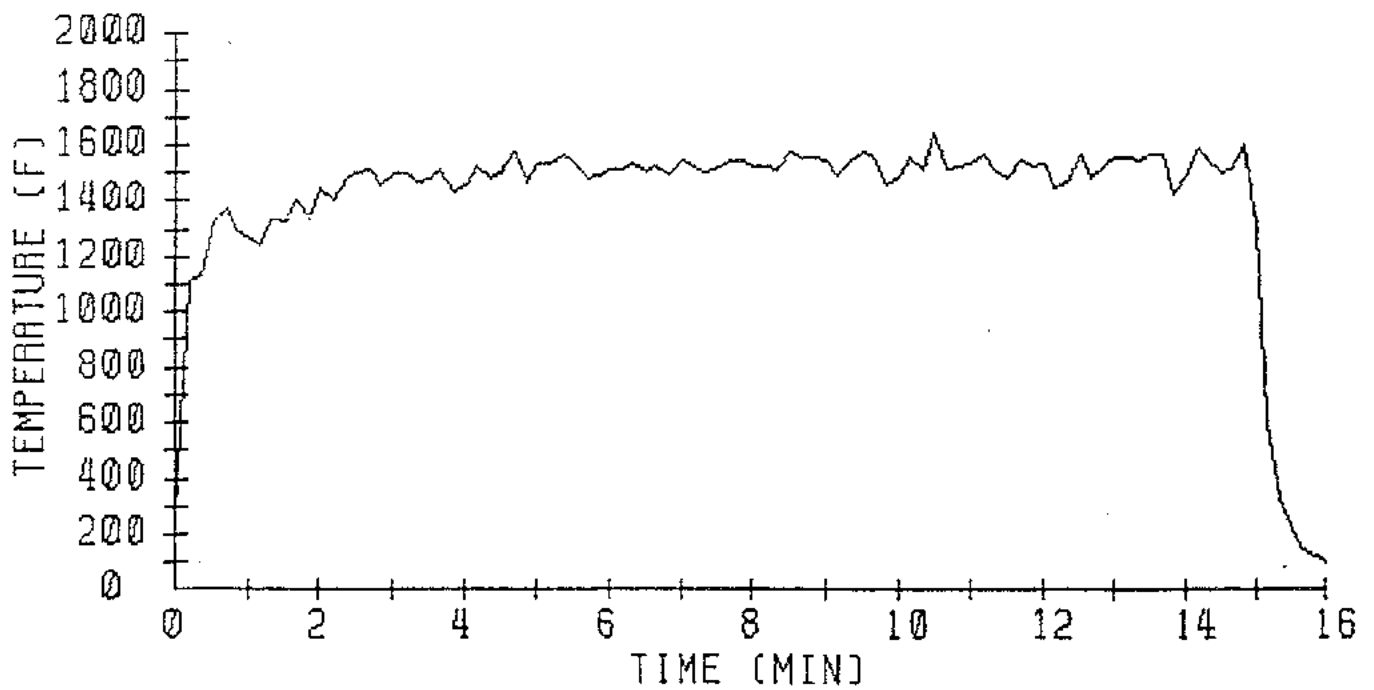
PAGE NO. 5
LAST PAGE

INSTEEL INDUSTRIES, INC. - DAMAGED
FLAME THERMOCOUPLE
TEMPERATURE (DEGREES FAHRENHEIT)

DATE: 13 DECEMBER 1989
FILE: 347INSTEELD.DAT

SWRI PROJECT NO.: 01-2601-407
TEST TYPE: MOD E-108

MIN SEC	TC 19
15:20	326
15:30	207
15:40	149
15:50	119
16: 0	104
16:10	95

INSTEEL INDUSTRIES, INC. - DAMAGED
FLAME THERMOCOUPLE

SWRI 01-2601-407

13 DECEMBER 1989

PAGE NO. 1

INSTEEL INDUSTRIES, INC. - DAMAGED
EXPOSED FACE THERMOCOUPLES
TEMPERATURE (DEGREES FAHRENHEIT)

DATE: 13 DECEMBER 1989
FILE: 347INSTEELD.DAT

SWRI PROJECT NO.: 01-2601-407
TEST TYPE: MOD E-108

MIN SEC	TC 01	TC 02	TC 03	TC 04	TC 05	TC 06
0: 0	50	53	51	53	79	56
0: 10	82	181	97	330	134	823
0: 20	114	280	124	495	146	1119
0: 30	138	333	123	523	180	1096
0: 40	158	370	118	588	192	1263
0: 50	168	368	123	600	221	1191
1: 0	172	365	125	609	210	1210
1: 10	170	355	142	599	210	1181
1: 20	169	355	139	641	243	1341
1: 30	173	360	133	636	223	1192
1: 40	170	343	128	584	267	1206
1: 50	175	354	117	601	244	1082
2: 0	183	367	109	630	221	1231
2: 10	182	363	118	636	237	1260
2: 20	183	358	124	636	224	1301
2: 30	180	346	126	602	240	1130
2: 40	180	346	134	591	210	1232
2: 50	178	344	133	562	195	1106
3: 0	182	366	121	587	212	1048
3: 10	186	381	121	643	239	1210
3: 20	183	359	131	593	243	1232
3: 30	187	382	140	630	234	1255
3: 40	186	377	134	599	259	1177

INSTEEL INDUSTRIES, INC. - DAMAGED
 EXPOSED FACE THERMOCOUPLES
 TEMPERATURE (DEGREES FAHRENHEIT)

DATE: 13 DECEMBER 1989 SWRI PROJECT NO.: 01-2601-407
 FILE: 347INSTEELD.DAT TEST TYPE: MOD E-108

MIN SEC	TC 01	TC 02	TC 03	TC 04	TC 05	TC 06
3:50	181	356	138	562	218	1104
4: 0	183	352	130	565	217	1163
4:10	187	367	129	621	202	1273
4:20	187	369	134	605	214	1106
4:30	184	373	137	614	228	1262
4:40	183	369	113	566	259	1121
4:50	188	374	101	621	229	1158
5: 0	184	348	103	516	234	1101
5:10	190	358	100	540	235	1138
5:20	192	363	104	541	216	1082
5:30	195	382	102	623	204	1316
5:40	193	392	99	632	248	1195
5:50	195	372	99	607	248	1227
6: 0	194	357	97	557	241	1146
6:10	191	369	106	590	247	1203
6:20	196	376	124	570	254	1043
6:30	200	362	117	555	250	1143
6:40	201	370	123	638	240	1252
6:50	200	380	138	645	211	1163
7: 0	192	387	138	693	220	1278
7:10	190	374	139	662	200	1232
7:20	188	360	163	622	217	1174
7:30	185	346	145	576	255	1071

PAGE NO. 3

INSTEEL INDUSTRIES, INC. - DAMAGED
 EXPOSED FACE THERMOCOUPLES
 TEMPERATURE (DEGREES FAHRENHEIT)

DATE: 13 DECEMBER 1989 SWRI PROJECT NO.: 01-2601-407
 FILE: 347INSTEELD.DAT TEST TYPE: MOD E-108

MIN SEC	TC 01	TC 02	TC 03	TC 04	TC 05	TC 06
7:40	190	367	133	583	213	1019
7:50	196	391	132	625	222	1251
8:0	196	382	146	629	203	1210
8:10	192	381	143	623	241	1205
8:20	185	345	141	579	260	1044
8:30	189	376	127	648	264	1199
8:40	194	374	112	623	277	1252
8:50	194	384	109	617	260	1200
9:0	189	365	105	578	259	1182
9:10	194	393	117	647	271	1158
9:20	197	381	129	650	235	1125
9:30	196	371	154	634	221	1225
9:40	196	386	154	664	226	1216
9:50	201	390	148	662	227	1255
10:0	196	381	153	655	236	1142
10:10	189	370	151	651	219	1227
10:20	194	382	132	597	236	1005
10:30	201	392	114	638	241	1183
10:40	200	397	126	626	251	1169
10:50	200	406	136	716	245	1277
11:0	203	401	138	656	251	1212
11:10	197	396	162	646	271	1152
11:20	193	381	133	606	281	1224

PAGE NO. 4

INSTEEL INDUSTRIES, INC. - DAMAGED
 EXPOSED FACE THERMOCOUPLES
 TEMPERATURE (DEGREES FAHRENHEIT)

DATE: 13 DECEMBER 1989 SWRI PROJECT NO.: 01-2601-407
 FILE: 347INSTEELD.DAT TEST TYPE: MOD E-108

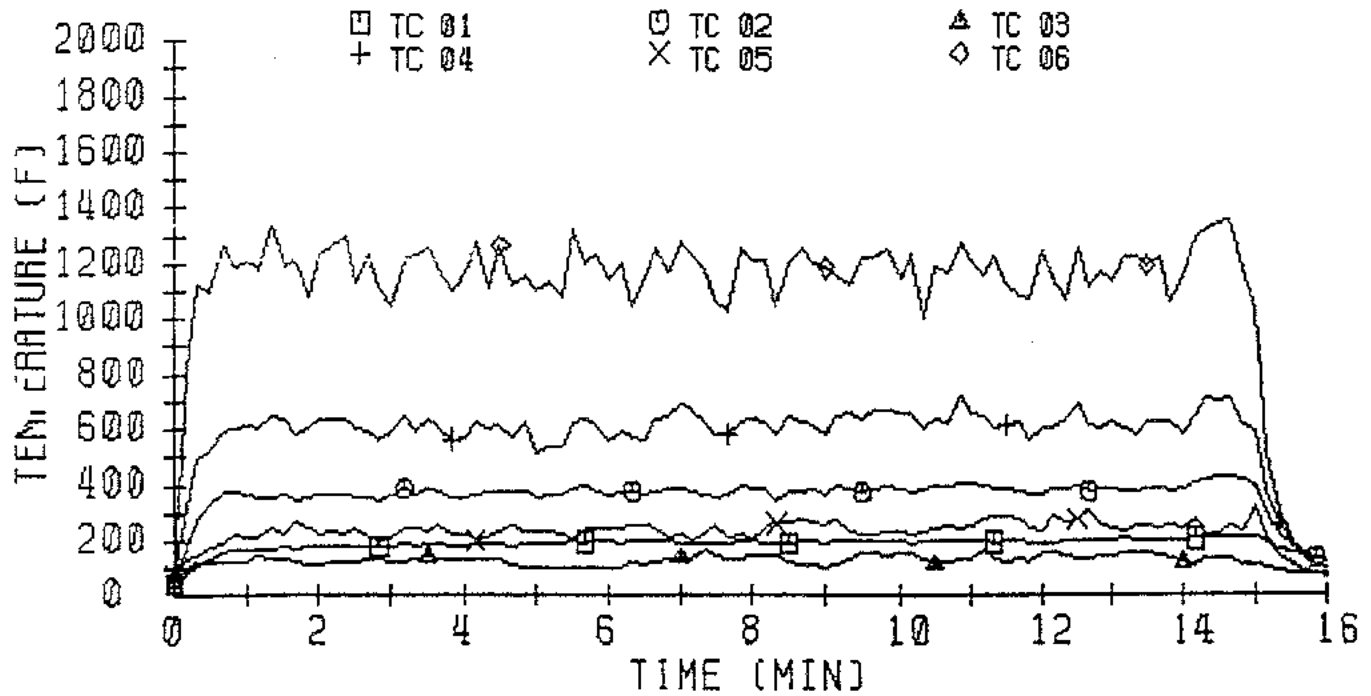
MIN SEC	TC 01	TC 02	TC 03	TC 04	TC 05	TC 06
11:30	196	382	118	610	288	1119
11:40	197	378	129	619	273	1078
11:50	193	367	124	557	248	1073
12: 0	193	363	158	599	230	1237
12:10	190	380	151	606	291	1143
12:20	194	380	148	633	262	1064
12:30	197	394	135	690	274	1253
12:40	198	373	139	615	310	1109
12:50	199	382	144	604	253	1170
13: 0	201	382	144	622	240	1128
13:10	205	373	155	606	228	1215
13:20	200	371	154	584	253	1216
13:30	199	379	151	621	250	1187
13:40	202	381	149	621	239	1223
13:50	200	372	134	625	256	1061
14: 0	202	385	118	578	248	1145
14:10	205	404	117	639	280	1289
14:20	215	412	137	705	225	1318
14:30	215	422	132	702	224	1336
14:40	213	429	132	706	259	1348
14:50	213	420	117	611	237	1180
15: 0	210	394	112	587	318	1023
15:10	192	292	97	373	205	506

PAGE NO. 5
LAST PAGE

INSTEEL INDUSTRIES, INC. - DAMAGED
EXPOSED FACE THERMOCOUPLES
TEMPERATURE (DEGREES FAHRENHEIT)

DATE: 13 DECEMBER 1989 SWRI PROJECT NO.: 01-2601-407
FILE: 347INSTEELD.DAT TEST TYPE: MOD E-108

MIN SEC	TC 01	TC 02	TC 03	TC 04	TC 05	TC 06
15:20	169	225	87	258	144	303
15:30	153	182	81	186	111	192
15:40	141	155	77	156	94	140
15:50	131	137	75	133	85	110
16: 0	124	125	73	126	79	98
16:10	118	119	72	116	76	89

INSTEEL INDUSTRIES, INC. - DAMAGED
EXPOSED FACE THERMOCOUPLES

SVRI 01-2601-407

13 DECEMBER 1989

PAGE NO. 1

INSTEEL INDUSTRIES, INC. - DAMAGED
 BACK OF EXPOSED FACE THERMOCOUPLES
 TEMPERATURE (DEGREES FAHRENHEIT)

DATE: 13 DECEMBER 1989 SWRI PROJECT NO.: 01-2601-407
 FILE: 347INSTEELD.DAT TEST TYPE: MDD E-108

MIN SEC	TC 07	TC 08	TC 09	TC 10	TC 11	TC 12
0: 0	46	45	45	45	45	44
0: 10	47	46	46	45	46	45
0: 20	47	46	46	46	46	45
0: 30	47	46	46	45	46	45
0: 40	47	46	46	46	46	45
0: 50	47	46	46	45	46	44
1: 0	47	46	46	45	46	44
1: 10	47	46	46	45	46	45
1: 20	47	46	46	45	46	45
1: 30	47	46	46	46	46	45
1: 40	47	46	46	46	46	45
1: 50	47	46	46	45	46	45
2: 0	47	46	46	45	46	45
2: 10	47	46	46	45	46	45
2: 20	47	46	46	46	47	45
2: 30	47	46	46	46	47	45
2: 40	47	46	46	45	46	45
2: 50	47	46	46	45	46	45
3: 0	47	46	46	46	46	46
3: 10	47	47	46	46	47	46
3: 20	47	47	46	46	47	46
3: 30	48	47	46	46	47	47
3: 40	48	47	47	47	47	48

PAGE NO. 2

INSTEEL INDUSTRIES, INC. - DAMAGED
 BACK OF EXPOSED FACE THERMOCOUPLES
 TEMPERATURE (DEGREES FAHRENHEIT)

DATE: 13 DECEMBER 1989 SWRI PROJECT NO.: 01-2601-407
 FILE: 347INSTEELD.DAT TEST TYPE: MOD E-108

MIN SEC	TC 07	TC 08	TC 09	TC 10	TC 11	TC 12
3:50	48	47	47	47	47	48
4:0	48	48	47	47	47	49
4:10	48	48	47	48	47	49
4:20	48	48	47	48	47	50
4:30	48	48	47	49	47	51
4:40	48	49	47	49	47	52
4:50	49	49	47	49	47	53
5:0	49	49	47	50	47	54
5:10	49	49	47	50	48	55
5:20	49	50	47	51	48	56
5:30	49	50	47	51	48	57
5:40	49	50	47	52	48	58
5:50	49	51	47	52	48	59
6:0	50	51	47	53	48	60
6:10	50	51	48	54	48	61
6:20	50	52	48	54	48	63
6:30	51	52	48	55	48	64
6:40	51	53	48	56	49	66
6:50	51	53	48	57	49	67
7:0	51	54	48	57	49	68
7:10	52	54	49	58	49	70
7:20	52	55	49	59	49	72
7:30	53	55	49	60	50	73

PAGE NO. 3

INSTEEL INDUSTRIES, INC. - DAMAGED
 BACK OF EXPOSED FACE THERMOCOUPLES
 TEMPERATURE (DEGREES FAHRENHEIT)

DATE: 13 DECEMBER 1989 SWRI PROJECT NO.: 01-2601-407
 FILE: 347INSTEELD.DAT TEST TYPE: MOD E-10B

MIN SEC	TC 07	TC 08	TC 09	TC 10	TC 11	TC 12
7:40	53	56	49	61	50	75
7:50	53	56	49	62	50	76
8:0	53	56	49	62	50	77
8:10	53	57	49	63	50	79
8:20	54	57	49	64	50	81
8:30	54	58	50	65	50	82
8:40	55	59	50	66	51	84
8:50	55	59	50	67	51	86
9:0	55	59	50	68	51	87
9:10	55	60	50	68	51	89
9:20	56	61	50	70	51	91
9:30	57	61	51	71	52	93
9:40	57	62	51	72	52	94
9:50	57	62	51	73	52	96
10:0	57	63	51	73	52	97
10:10	58	63	51	74	52	99
10:20	58	64	51	76	53	102
10:30	59	65	52	77	53	104
10:40	59	65	52	78	53	106
10:50	60	66	52	79	53	108
11:0	60	66	52	80	53	110
11:10	60	67	52	81	53	112
11:20	60	67	52	82	53	114

INSTEEL INDUSTRIES, INC. - DAMAGED
 BACK OF EXPOSED FACE THERMOCOUPLES
 TEMPERATURE (DEGREES FAHRENHEIT)

DATE: 13 DECEMBER 1989 SWRI PROJECT NO.: 01-2601-407
 FILE: 347INSTEEL.DAT TEST TYPE: MOD E-108

MIN SEC	TC 07	TC 08	TC 09	TC 10	TC 11	TC 12
11:30	61	68	52	83	54	118
11:40	61	68	52	84	54	121
11:50	62	69	53	85	54	124
12: 0	62	70	53	86	54	127
12:10	63	71	53	87	55	131
12:20	63	71	53	88	55	135
12:30	63	72	53	89	55	140
12:40	64	72	54	91	56	145
12:50	64	73	54	92	56	150
13: 0	65	74	54	93	56	154
13:10	65	74	54	94	56	158
13:20	66	75	54	95	56	162
13:30	66	75	54	96	56	165
13:40	66	76	54	97	57	168
13:50	67	76	55	98	57	171
14: 0	67	77	55	99	57	174
14:10	68	78	55	100	58	177
14:20	68	79	56	102	58	179
14:30	68	79	55	102	58	182
14:40	69	80	56	103	58	184
14:50	70	81	56	105	59	186
15: 0	69	81	56	105	58	187
15:10	70	82	56	107	59	187

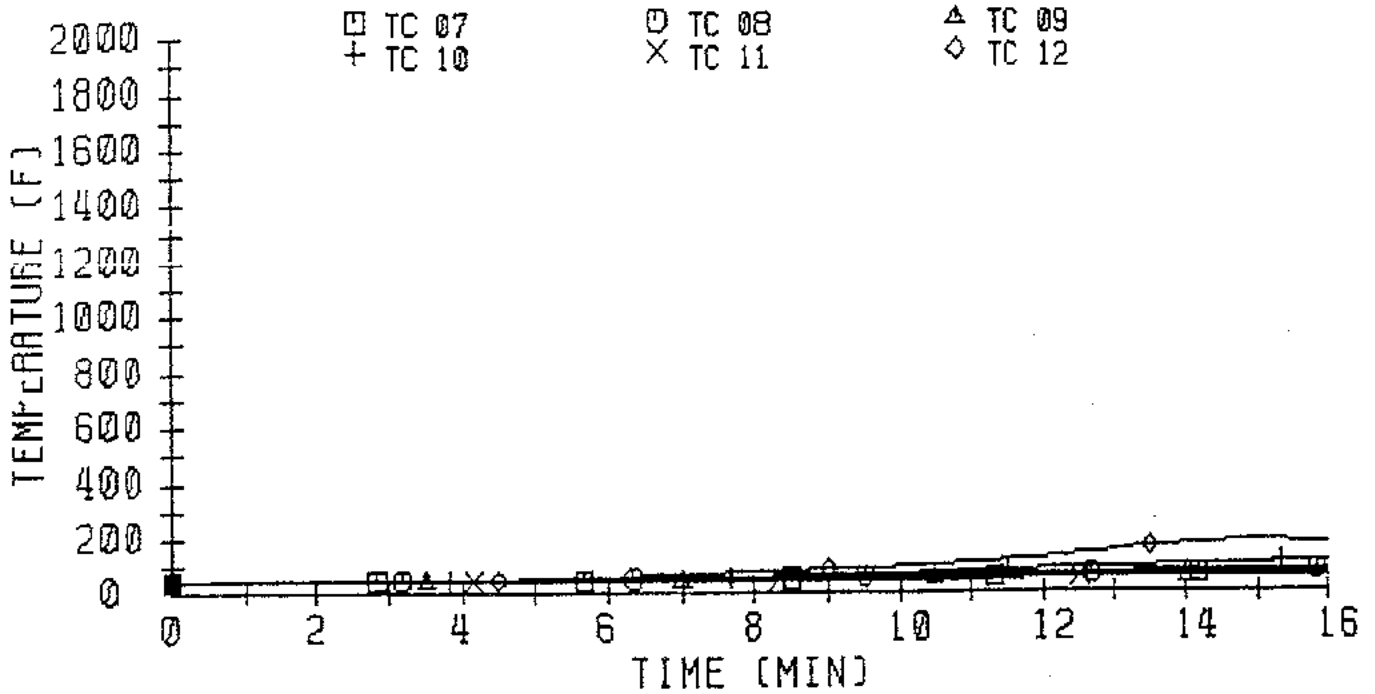
PAGE NO. 5
LAST PAGE

INSTEEL INDUSTRIES, INC. - DAMAGED
BACK OF EXPOSED FACE THERMOCOUPLES
TEMPERATURE (DEGREES FAHRENHEIT)

DATE: 13 DECEMBER 1989 SWRI PROJECT NO.: 01-2601-407
FILE: 347INSTEELD.DAT TEST TYPE: MOD E-108

MIN SEC	TC 07	TC 08	TC 09	TC 10	TC 11	TC 12
15:20	71	83	57	108	59	185
15:30	71	83	56	109	59	183
15:40	71	84	57	110	60	182
15:50	72	84	57	111	60	182
16: 0	72	84	57	112	60	180
16:10	73	86	57	115	60	180

INSTEEL INDUSTRIES, INC. - DAMAGED
BACK OF EXPOSED FACE THERMOCOUPLES



SWRI 01-2601-407

13 DECEMBER 1989

PAGE NO. 1

INSTEEL INDUSTRIES, INC. - DAMAGED
INSULATION/UNEXPOSED CONCRETE INTERFACE TCS
TEMPERATURE (DEGREES FAHRENHEIT)

DATE: 13 DECEMBER 1989 SWRI PROJECT NO.: 01-2601-407
FILE: 347INSTEELD.DAT TEST TYPE: MOD E-108

MIN SEC	TC 13	TC 14	TC 15	TC 16	TC 17	TC 18
0: 0	52	49	52	50	56	50
0: 10	53	50	52	51	56	50
0: 20	53	50	52	51	57	50
0: 30	53	50	52	51	57	50
0: 40	53	50	52	51	57	50
0: 50	53	50	52	51	56	50
1: 0	52	50	52	51	56	50
1: 10	53	50	52	51	57	50
1: 20	53	50	52	51	57	50
1: 30	53	50	52	51	57	50
1: 40	53	50	52	51	57	50
1: 50	53	50	52	51	57	50
2: 0	53	50	52	51	57	50
2: 10	53	50	52	51	57	50
2: 20	53	50	52	51	57	50
2: 30	53	50	52	51	57	50
2: 40	53	50	52	51	57	50
2: 50	53	50	52	51	57	50
3: 0	53	50	52	51	57	50
3: 10	53	50	52	51	57	50
3: 20	53	50	52	51	58	50
3: 30	53	50	52	51	58	50
3: 40	53	50	52	51	58	50

PAGE NO. 2

INSTEEL INDUSTRIES, INC. -- DAMAGED
INSULATION/UNEXPOSED CONCRETE INTERFACE TCS
TEMPERATURE (DEGREES FAHRENHEIT)

DATE: 13 DECEMBER 1989 SWRI PROJECT NO.: 01-2601-407
FILE: 347INSTEEL.DAT TEST TYPE: MOD E-10B

MIN SEC	TC 13	TC 14	TC 15	TC 16	TC 17	TC 18
3:50	53	50	53	51	58	50
4: 0	53	50	53	51	58	50
4:10	53	50	53	51	58	50
4:20	53	50	53	51	58	50
4:30	53	50	53	51	58	50
4:40	53	50	53	51	58	50
4:50	53	50	53	51	58	50
5: 0	53	50	52	51	58	50
5:10	53	50	52	51	58	50
5:20	53	50	52	51	58	50
5:30	53	50	52	51	58	50
5:40	53	50	52	51	58	50
5:50	53	50	52	51	58	50
6: 0	53	50	52	51	58	50
6:10	53	50	52	51	58	50
6:20	53	50	52	51	59	50
6:30	53	50	53	51	59	50
6:40	53	50	53	51	59	51
6:50	53	50	53	51	59	51
7: 0	53	50	53	51	59	51
7:10	53	50	53	51	59	51
7:20	54	51	53	52	59	51
7:30	54	51	53	52	59	51

INSTEEL INDUSTRIES, INC. - DAMAGED
 INSULATION/UNEXPOSED CONCRETE INTERFACE TCS
 TEMPERATURE (DEGREES FAHRENHEIT)

DATE: 13 DECEMBER 1989 SWRI PROJECT NO.: 01-2601-407
 FILE: 347INSTEELD.DAT TEST TYPE: MOD E-108

MIN SEC	TC 13	TC 14	TC 15	TC 16	TC 17	TC 18
7:40	54	51	53	52	59	51
7:50	54	51	53	52	59	51
8:0	53	50	53	51	59	51
8:10	53	50	52	51	59	50
8:20	53	50	53	51	59	50
8:30	54	51	53	51	59	51
8:40	54	51	53	52	60	51
8:50	54	51	53	52	60	51
9:0	54	51	53	51	59	51
9:10	53	50	53	51	59	51
9:20	54	51	53	52	60	51
9:30	54	51	53	52	60	51
9:40	54	51	53	52	60	51
9:50	54	51	53	52	60	51
10:0	54	50	53	51	59	51
10:10	54	51	53	52	60	51
10:20	54	51	53	52	60	51
10:30	54	51	53	52	60	52
10:40	54	51	53	52	60	52
10:50	54	51	53	52	60	52
11:0	54	51	53	52	60	52
11:10	54	51	53	52	60	52
11:20	54	51	53	52	60	53

PAGE NO. 4

INSTEEL INDUSTRIES, INC. - DAMAGED
INSULATION/UNEXPOSED CONCRETE INTERFACE TCS
TEMPERATURE (DEGREES FAHRENHEIT)

DATE: 13 DECEMBER 1989 SWRI PROJECT NO.: 01-2601-407
FILE: 347INSTEELD.DAT TEST TYPE: MOD E-108

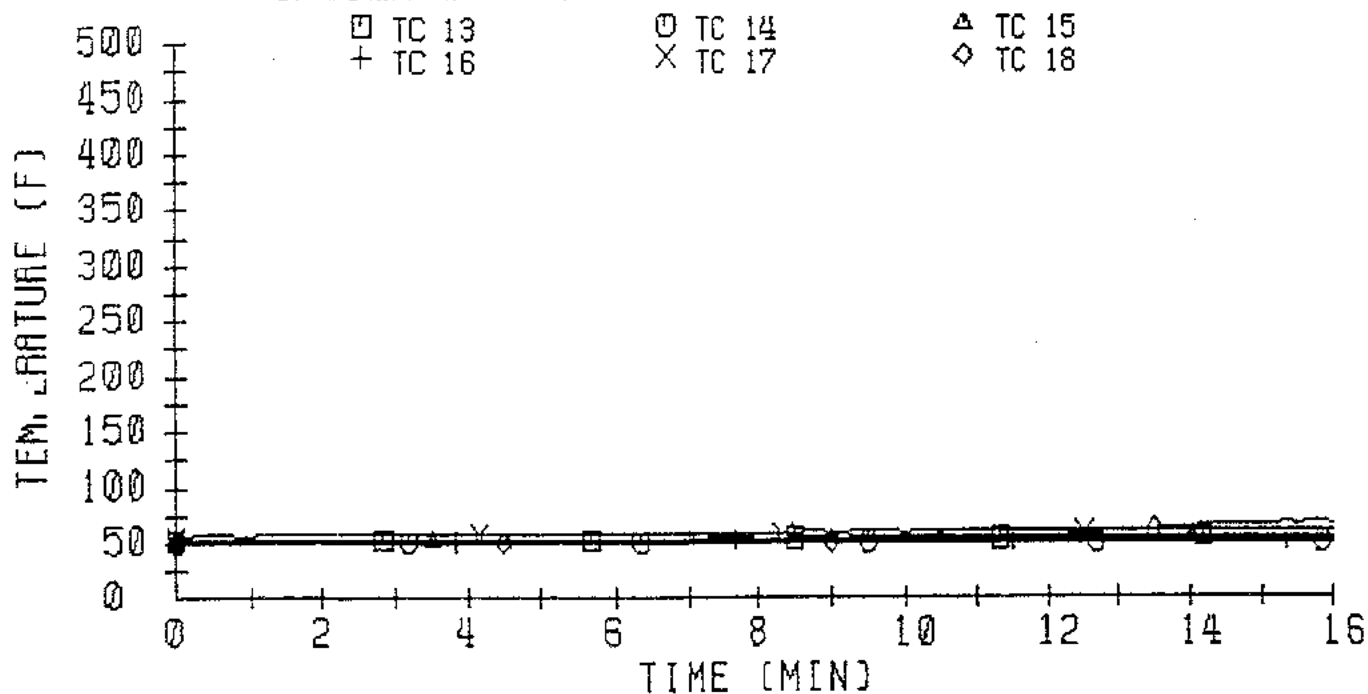
MIN SEC	TC 13	TC 14	TC 15	TC 16	TC 17	TC 18
11:30	54	51	53	52	60	53
11:40	54	51	53	52	60	54
11:50	54	51	53	52	60	55
12: 0	54	51	53	52	60	55
12:10	54	51	53	52	61	56
12:20	54	51	53	52	61	57
12:30	54	51	53	52	61	58
12:40	54	51	53	52	61	59
12:50	54	51	53	52	61	60
13: 0	54	51	53	52	61	60
13:10	54	51	53	52	61	61
13:20	54	51	53	52	61	62
13:30	54	51	53	52	61	62
13:40	54	51	53	52	61	63
13:50	54	51	53	52	61	63
14: 0	54	51	53	52	61	64
14:10	55	51	53	52	61	65
14:20	55	51	54	53	61	65
14:30	54	51	53	52	61	65
14:40	54	51	53	52	61	66
14:50	55	51	54	53	61	67
15: 0	54	51	53	52	61	67
15:10	55	51	54	52	61	67

PAGE NO. 5
LAST PAGE

INSTEEL INDUSTRIES, INC. - DAMAGED
INSULATION/UNEXPOSED CONCRETE INTERFACE TCS
TEMPERATURE (DEGREES FAHRENHEIT)

DATE: 13 DECEMBER 1989 SMRI PROJECT NO.: 01-2601-407
FILE: 347INSTEELD.DAT TEST TYPE: MOD E-108

MIN SEC	TC 13	TC 14	TC 15	TC 16	TC 17	TC 18
15:20	55	51	54	53	62	68
15:30	54	51	53	52	61	67
15:40	55	51	54	53	61	68
15:50	55	51	54	53	62	68
16: 0	54	51	53	52	61	67
16:10	55	51	54	53	61	68

INSTEEL INDUSTRIES, INC. - DAMAGED
INSULATION/UNEXP. CONCRETE INTERFACE TCS

SWRI 01-2601-407

13 DECEMBER 1989

PAGE NO. 1

INSTEEL INDUSTRIES, INC. - UNDATED
FLAME THERMOCOUPLE
TEMPERATURE (DEGREES FAHRENHEIT)

DATE: 18 DECEMBER 1989 SWRI PROJECT NO.: 01-2601-407
FILE: 352INSTEEL.DAT TEST TYPE: MDD E-108

MIN SEC	TC 19
0: 0	264
0: 10	1258
0: 20	1407
0: 30	1268
0: 40	1329
0: 50	1401
1: 0	1491
1: 10	1483
1: 20	1404
1: 30	1473
1: 40	1481
1: 50	1504
2: 0	1418
2: 10	1446
2: 20	1413
2: 30	1475
2: 40	1448
2: 50	1345
3: 0	1502
3: 10	1501
3: 20	1451
3: 30	1518
3: 40	1535

PAGE NO. 2

INSTEEL INDUSTRIES, INC. - UNDAMAGED
FLAME THERMOCOUPLE
TEMPERATURE (DEGREES FAHRENHEIT)

DATE: 18 DECEMBER 1989 SWRI PROJECT NO.: 01-2601-407
FILE: 352INSTEEL.DAT TEST TYPE: MDD E-108

MIN SEC	TC 19
3:50	1491
4: 0	1503
4:10	1518
4:20	1529
4:30	1425
4:40	1447
4:50	1457
5: 0	1452
5:10	1452
5:20	1528
5:30	1505
5:40	1496
5:50	1475
6: 0	1414
6:10	1481
6:20	1515
6:30	1493
6:40	1462
6:50	1534
7: 0	1473
7:10	1493
7:20	1425
7:30	1456

PAGE NO. 3

INSTEEL INDUSTRIES, INC. - UNDATED
FLAME THERMOCOUPLE
TEMPERATURE (DEGREES FAHRENHEIT)

DATE: 18 DECEMBER 1989 SWRI PROJECT NO.: 01-2601-407
FILE: 352INSTEEL.DAT TEST TYPE: MOD E-108

MIN SEC	TC 19
7:40	1545
7:50	1522
8:0	1508
8:10	1435
8:20	1488
8:30	1521
8:40	1535
8:50	1536
9:0	1493
9:10	1500
9:20	1488
9:30	1459
9:40	1534
9:50	1521
10:0	1524
10:10	1425
10:20	1469
10:30	1469
10:40	1502
10:50	1513
11:0	1457
11:10	1444
11:20	1552

PAGE NO. 4

INSTEEL INDUSTRIES, INC. - UNDATED
FLAME THERMOCOUPLE
TEMPERATURE (DEGREES FAHRENHEIT)

DATE: 18 DECEMBER 1989
FILE: 352INSTEEL.DAT

SWRI PROJECT NO.: 01-2601-407
TEST TYPE: MOD E-108

MIN SEC	TC 19
11:30	1442
11:40	1454
11:50	1512
12: 0	1540
12:10	1469
12:20	1504
12:30	1448
12:40	1476
12:50	1504
13: 0	1527
13:10	1562
13:20	1439
13:30	1479
13:40	1475
13:50	1512
14: 0	1525
14:10	1534
14:20	1545
14:30	1445
14:40	1524
14:50	1468
15: 0	1383
15:10	609

PAGE NO. 5

INSTEEL INDUSTRIES, INC. - UNDATED
FLAME THERMOCOUPLE
TEMPERATURE (DEGREES FAHRENHEIT)

DATE: 18 DECEMBER 1989
FILE: 352INSTEEL.DAT
SMRI PROJECT NO.: 01-2601-407
TEST TYPE: MOD E-108

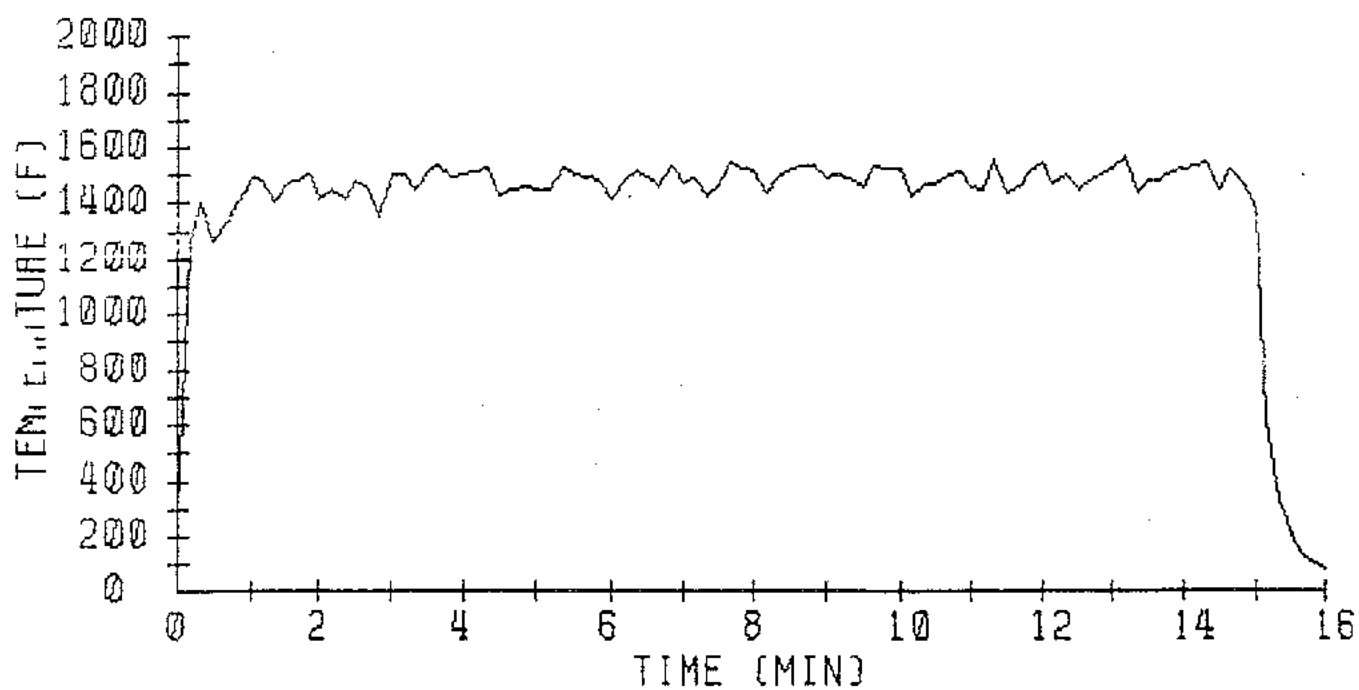
MIN SEC	TC 19
15:20	327
15:30	199
15:40	133
15:50	100
16: 0	85
16:10	77
16:20	72
16:30	70
16:40	69
16:50	65
17: 0	68
17:10	65
17:20	64
17:30	61
17:40	60
17:50	59
18: 0	60
18:10	59
18:20	59
18:30	58
18:40	59
18:50	58
19: 0	58

PAGE NO. 6
LAST PAGE

INSTEEL INDUSTRIES, INC. - UNDAMAGED
FLAME THERMOCOUPLE
TEMPERATURE (DEGREES FAHRENHEIT)

DATE: 18 DECEMBER 1989 SWRI PROJECT NO.: 01-2601-407
FILE: 352INSTEEL.DAT TEST TYPE: MOD E-108

MIN SEC	TC 19
19:10	57
19:20	57
19:30	61
19:40	62
19:50	62
20: 0	63

INSTEEL INDUSTRIES, INC. - UNDATED
FLAME THERMOCOUPLE

SWRI 01-2601-407

18 DECEMBER 1989

PAGE NO. 1

INSTEEL INDUSTRIES, INC. - UNDATED
 EXPOSED FACE THERMOCOUPLES
 TEMPERATURE (DEGREES FAHRENHEIT)

DATE: 18 DECEMBER 1989 SWRI PROJECT NO.: 01-2601-407
 FILE: 352INSTEEL.DAT TEST TYPE: MOD E-108

MIN SEC	TC 02	TC 03	TC 04	TC 05	TC 06
0: 0	45	52	43	42	43
0: 10	198	62	290	87	406
0: 20	317	80	433	104	643
0: 30	362	87	462	96	675
0: 40	372	90	446	99	693
0: 50	364	100	455	104	721
1: 0	395	96	552	139	779
1: 10	424	101	553	128	982
1: 20	430	116	525	125	1001
1: 30	429	121	557	124	937
1: 40	428	122	553	138	963
1: 50	441	129	556	148	935
2: 0	466	135	644	145	1082
2: 10	482	154	621	130	1063
2: 20	479	142	628	122	1050
2: 30	462	146	595	113	993
2: 40	442	131	557	124	916
2: 50	443	153	557	127	914
3: 0	490	153	589	125	911
3: 10	472	153	604	122	950
3: 20	497	166	648	110	1100
3: 30	463	151	595	139	965
3: 40	472	162	612	130	1046

PAGE NO. 2

INSTEEL INDUSTRIES, INC. - UNDAMAGED
EXPOSED FACE THERMOCOUPLES
TEMPERATURE (DEGREES FAHRENHEIT)

DATE: 18 DECEMBER 1989 SWRI PROJECT NO.: 01-2601-407
FILE: 352INSTEEL.DAT TEST TYPE: MOD E-108

MIN SEC	TC 02	TC 03	TC 04	TC 05	TC 06
3:50	465	182	617	119	1000
4:0	454	185	611	117	1081
4:10	462	179	566	111	1032
4:20	462	171	589	137	1075
4:30	440	196	554	134	973
4:40	453	189	616	127	1103
4:50	452	162	567	131	945
5:0	451	150	595	133	993
5:10	450	159	593	130	930
5:20	423	162	532	144	936
5:30	434	172	540	139	1050
5:40	462	178	588	136	1051
5:50	464	180	599	135	1095
6:0	465	158	577	139	920
6:10	463	166	596	132	975
6:20	472	168	573	124	1022
6:30	486	164	616	135	1090
6:40	503	161	616	117	1046
6:50	473	166	569	128	957
7:0	498	160	589	118	955
7:10	480	172	579	120	1010
7:20	477	178	615	119	1019
7:30	453	182	548	114	879

PAGE NO. 3

INSTEEL INDUSTRIES, INC. - UNDAMAGED
 EXPOSED FACE THERMOCOUPLES
 TEMPERATURE (DEGREES FAHRENHEIT)

DATE: 18 DECEMBER 1989 SWRI PROJECT NO.: 01-2601-407
 FILE: 352INSTEEL.DAT TEST TYPE: MOD E-108

MIN SEC	TC 02	TC 03	TC 04	TC 05	TC 06
7: 40	449	173	576	123	1033
7: 50	446	164	549	129	946
8: 0	455	155	578	135	924
8: 10	456	179	565	124	940
8: 20	421	180	542	119	970
8: 30	466	189	620	112	1020
8: 40	450	188	595	118	1047
8: 50	450	182	590	112	1007
9: 0	442	197	560	118	868
9: 10	456	190	556	129	920
9: 20	455	189	586	131	987
9: 30	466	189	567	125	966
9: 40	472	195	579	131	939
9: 50	491	198	591	120	1072
10: 0	482	178	586	118	1002
10: 10	450	195	561	113	977
10: 20	446	204	558	116	988
10: 30	427	212	522	116	915
10: 40	459	195	580	112	1001
10: 50	452	196	564	106	977
11: 0	457	197	577	102	929
11: 10	469	179	597	115	1005
11: 20	467	166	569	115	974

PAGE NO. 3

INSTEEL INDUSTRIES, INC. - UNDATED
EXPOSED FACE THERMOCOUPLES
TEMPERATURE (DEGREES FAHRENHEIT)

DATE: 18 DECEMBER 1989 SWRI PROJECT NO.: 01-2601-407
FILE: 352INSTEEL.DAT TEST TYPE: MOD E-108

MIN SEC	TC 02	TC 03	TC 04	TC 05	TC 06
7:40	449	173	576	123	1033
7:50	446	164	549	129	946
8:0	455	155	578	135	924
8:10	456	179	565	124	940
8:20	421	180	542	119	970
8:30	466	189	620	112	1020
8:40	450	188	595	118	1047
8:50	450	182	590	112	1007
9:0	442	197	560	118	868
9:10	456	190	556	129	920
9:20	455	189	586	131	987
9:30	466	189	567	125	966
9:40	472	195	579	131	939
9:50	491	198	591	120	1072
10:0	482	178	586	118	1002
10:10	450	195	561	113	977
10:20	446	204	558	116	988
10:30	427	212	522	116	915
10:40	459	195	580	112	1001
10:50	452	196	564	108	977
11:0	457	197	577	102	929
11:10	469	179	597	115	1005
11:20	467	166	569	115	974

PAGE NO. 4

INSTEEL INDUSTRIES, INC. - UNDAMAGED
EXPOSED FACE THERMOCOUPLES
TEMPERATURE (DEGREES FAHRENHEIT)

DATE: 18 DECEMBER 1989 SWRI PROJECT NO.: 01-2601-407
FILE: 352INSTEEL.DAT TEST TYPE: MOD E-108

MIN SEC	TC 02	TC 03	TC 04	TC 05	TC 06
11:30	470	174	580	126	988
11:40	456	169	580	119	954
11:50	462	177	587	112	982
12: 0	491	181	559	115	963
12:10	460	171	533	130	902
12:20	457	182	565	135	883
12:30	467	186	550	131	889
12:40	465	182	522	125	842
12:50	441	172	566	130	983
13: 0	474	163	587	129	945
13:10	453	167	582	122	912
13:20	452	166	560	132	965
13:30	450	166	530	136	874
13:40	456	185	561	129	884
13:50	477	175	602	129	1079
14: 0	476	174	644	130	1023
14:10	478	169	627	144	989
14:20	489	156	614	143	1035
14:30	469	173	601	143	1030
14:40	470	173	624	142	997
14:50	468	200	615	121	1029
15: 0	447	200	580	137	880
15:10	327	156	362	108	507

PAGE NO. 5

INSTEEL INDUSTRIES, INC. - UNDATED
 EXPOSED FACE THERMOCOUPLES
 TEMPERATURE (DEGREES FAHRENHEIT)

DATE: 18 DECEMBER 1989 SWRI PROJECT NO.: 01-2601-407
 FILE: 352INSTEEL.DAT TEST TYPE: MOD E-108

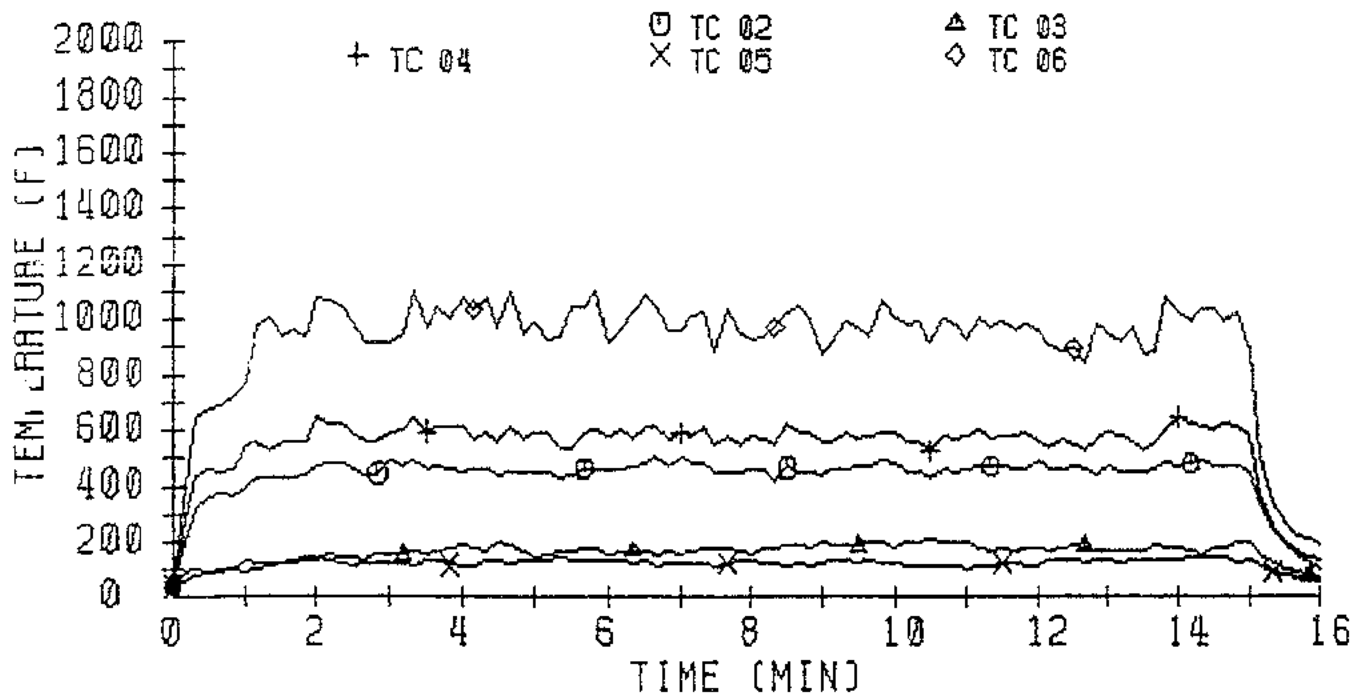
MIN SEC	TC 02	TC 03	TC 04	TC 05	TC 06
15:20	247	122	250	88	341
15:30	191	101	194	76	267
15:40	151	87	163	69	226
15:50	125	79	148	65	206
16:00	106	74	136	62	192
16:10	95	71	131	61	188
16:20	86	70	128	60	184
16:30	80	68	122	60	182
16:40	76	67	119	59	176
16:50	72	66	115	58	166
17:00	71	66	117	58	167
17:10	70	66	118	58	164
17:20	70	65	118	58	168
17:30	68	64	115	58	163
17:40	66	63	113	56	162
17:50	66	63	110	56	158
18:00	65	63	107	56	153
18:10	64	63	105	56	149
18:20	63	62	105	56	147
18:30	63	61	105	55	146
18:40	63	61	104	55	142
18:50	62	61	103	55	141
19:00	63	62	104	55	144

PAGE NO. 6
LAST PAGE

INSTEEL INDUSTRIES, INC. - UNDAMAGED
EXPOSED FACE THERMOCOUPLES
TEMPERATURE (DEGREES FAHRENHEIT)

DATE: 18 DECEMBER 1989 SWRI PROJECT NO.: 01-2601-407
FILE: 352INSTEEL.DAT TEST TYPE: MOD E-108

MIN SEC	TC 02	TC 03	TC 04	TC 05	TC 06
19:10	63	61	103	55	141
19:20	63	61	102	54	138
19:30	64	62	105	55	147
19:40	67	63	110	56	154
19:50	68	63	112	56	156
20: 0	69	63	112	56	157

INSTEEL INDUSTRIES, INC. - UNDAMAGED
EXPOSED FACE THERMOCOUPLES

SWRI 01-2601-407

18 DECEMBER 1989

PAGE NO. 3

INSTEEL INDUSTRIES, INC. - UN-DAMAGED
BACK OF EXPOSED FACE THERMOCOUPLES
TEMPERATURE (DEGREES FAHRENHEIT)

DATE: 18 DECEMBER 1989 SWRI PROJECT NO.: 01-2601-407
FILE: 352INSTEEL.DAT TEST TYPE: MOD E-108

MIN SEC	TC 07	TC 08	TC 09	TC 10	TC 11	TC 12
7:40	46	49	43	57	43	85
7:50	47	50	44	58	44	87
8:0	47	50	44	59	44	89
8:10	47	50	44	59	44	91
8:20	48	51	44	61	44	93
8:30	48	51	44	61	44	95
8:40	48	52	44	62	44	97
8:50	49	52	45	63	45	99
9:0	49	53	45	64	45	101
9:10	49	53	45	65	45	103
9:20	50	54	45	66	45	105
9:30	50	54	45	67	45	108
9:40	51	55	45	68	45	110
9:50	51	55	46	69	46	112
10:0	51	56	46	70	46	114
10:10	52	56	46	71	46	116
10:20	52	57	46	72	46	118
10:30	52	57	46	73	46	120
10:40	52	58	46	74	46	123
10:50	53	58	46	75	46	125
11:0	53	59	46	76	46	127
11:10	53	59	47	77	47	129
11:20	54	60	47	78	47	131

PAGE NO. 4

INSTEEL INDUSTRIES, INC. - UNDATED
BACK OF EXPOSED FACE THERMOCOUPLES
TEMPERATURE (DEGREES FAHRENHEIT)

DATE: 18 DECEMBER 1989 SWRI PROJECT NO.: 01-2601-407
FILE: 352INSTEEL.DAT TEST TYPE: MOD E-108

MIN SEC	TC 07	TC 08	TC 09	TC 10	TC 11	TC 12
11:30	54	61	47	79	47	134
11:40	55	61	47	80	47	136
11:50	55	61	47	81	47	138
12:00	55	62	48	82	48	140
12:10	56	63	48	83	48	143
12:20	56	63	48	84	48	145
12:30	56	64	48	85	48	147
12:40	57	64	48	86	48	149
12:50	57	65	49	87	48	151
13:00	57	65	49	88	48	153
13:10	58	66	49	89	49	155
13:20	58	66	49	90	49	158
13:30	59	67	50	91	49	160
13:40	59	68	50	92	49	162
13:50	60	68	50	93	50	164
14:00	60	68	50	94	50	166
14:10	60	69	50	95	50	168
14:20	60	69	51	96	50	170
14:30	61	70	51	97	50	172
14:40	61	71	51	98	50	175
14:50	62	71	51	100	51	177
15:00	62	72	52	101	51	179
15:10	63	72	52	102	51	181

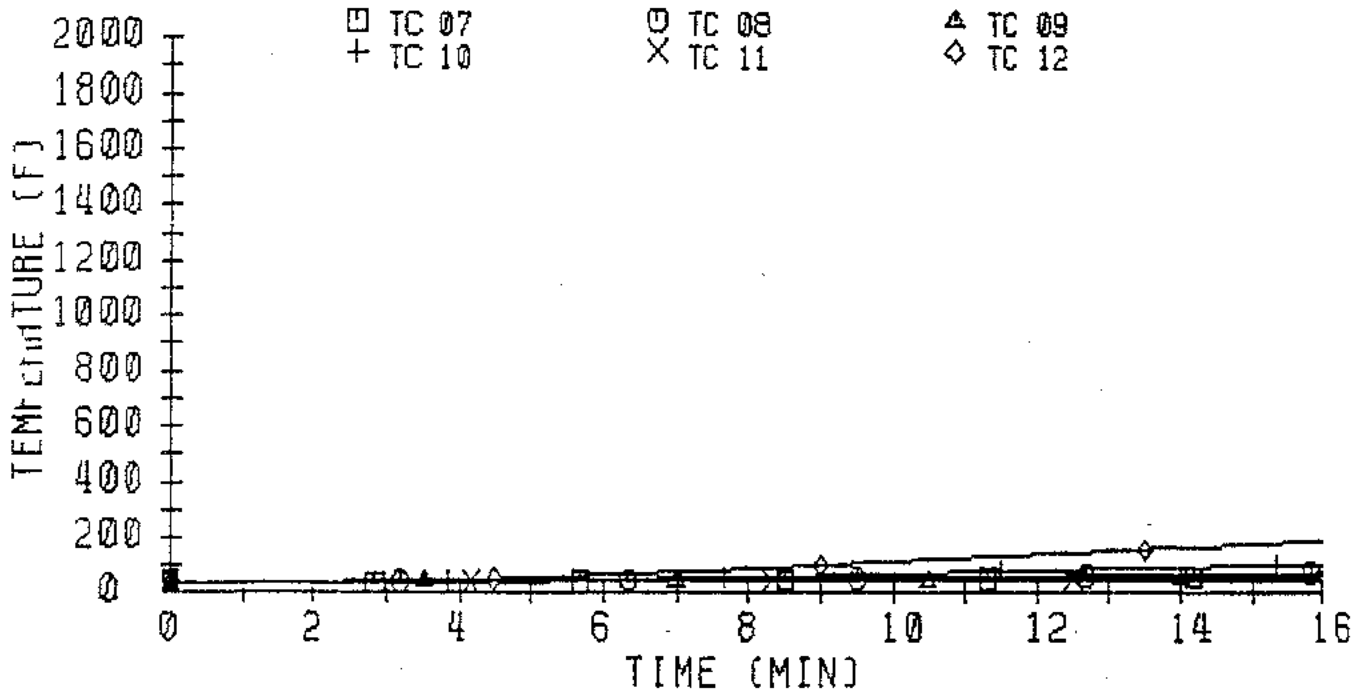
PAGE NO. 5

INSTEEL INDUSTRIES, INC. ~ UNDAMAGED
BACK OF EXPOSED FACE THERMOCOUPLES
TEMPERATURE (DEGREES FAHRENHEIT)

DATE: 18 DECEMBER 1989 SWRI PROJECT NO.: 01-2601-407
FILE: 352INSTEEL.DAT TEST TYPE: MOD E-108

MIN SEC	TC 07	TC 08	TC 09	TC 10	TC 11	TC 12
15:20	63	73	52	103	51	183
15:30	63	73	52	103	51	185
15:40	63	74	52	104	51	187
15:50	63	74	52	105	51	189
16:0	64	75	52	106	51	192
16:10	65	76	53	107	52	195
16:20	65	77	54	109	52	197
16:30	66	77	54	110	53	200
16:40	66	77	54	111	53	202
16:50	66	77	54	111	52	203
17:0	66	78	54	112	52	206
17:10	67	79	55	114	53	208
17:20	68	80	55	115	54	211
17:30	68	80	55	115	53	213
17:40	67	80	55	116	53	214
17:50	68	80	55	117	53	214
18:0	68	81	56	118	54	215
18:10	69	82	56	119	54	216
18:20	69	82	56	120	54	215
18:30	69	82	56	120	54	215
18:40	69	83	56	121	54	216
18:50	70	84	57	122	55	216
19:0	71	84	57	123	55	216

INSTEEL INDUSTRIES, INC. - UNDAMAGED
BACK OF EXPOSED FACE THERMOCOUPLES



SWRI 01-2601-407

18 DECEMBER 1989

PAGE NO. 1

INSTEEL INDUSTRIES, INC. - UNDATED
 INSULATION/UNEXPOSED CONCRETE INTERFACE TCS
 TEMPERATURE (DEGREES FAHRENHEIT)

DATE: 18 DECEMBER 1989 SWRI PROJECT NO.: 01-2601-407
 FILE: 352INSTEEL.DAT TEST TYPE: MOD E-108

MIN SEC	TC 13	TC 14	TC 15	TC 16	TC 17	TC 18
0: 0	41	41	41	41	41	41
0:10	41	41	41	41	41	41
0:20	41	41	41	41	41	41
0:30	41	40	41	41	41	41
0:40	40	40	41	40	41	40
0:50	40	40	41	40	41	41
1: 0	40	40	41	40	41	41
1:10	41	40	41	41	41	41
1:20	41	40	41	41	41	41
1:30	41	41	41	41	41	41
1:40	41	41	41	41	41	41
1:50	41	41	41	41	41	41
2: 0	40	40	41	41	41	41
2:10	40	40	40	40	40	40
2:20	40	40	41	40	41	41
2:30	41	40	41	41	41	41
2:40	41	41	41	41	41	41
2:50	40	40	41	41	41	41
3: 0	40	40	41	40	40	40
3:10	41	41	41	41	41	41
3:20	41	40	41	41	41	41
3:30	40	40	41	40	41	40
3:40	41	41	41	41	41	41

PAGE NO. 2

INSTEEL INDUSTRIES, INC. - UNDATED
INSULATION/UNEXPOSED CONCRETE INTERFACE TCS
TEMPERATURE (DEGREES FAHRENHEIT)

DATE: 18 DECEMBER 1989 SWRI PROJECT NO.: 01-2601-407
FILE: 352INSTEEL.DAT TEST TYPE: MOD E-108

MIN SEC	TC 13	TC 14	TC 15	TC 16	TC 17	TC 18
3:50	41	40	41	41	41	41
4: 0	41	40	41	41	41	41
4:10	41	41	41	41	41	41
4:20	40	40	41	40	41	40
4:30	41	41	41	41	41	41
4:40	41	40	41	41	41	41
4:50	40	40	41	41	41	41
5: 0	40	40	41	40	41	40
5:10	40	40	41	41	41	41
5:20	41	40	41	41	41	41
5:30	41	41	41	41	41	41
5:40	41	41	41	41	41	41
5:50	41	40	41	41	41	41
6: 0	41	40	41	41	41	41
6:10	40	40	41	40	41	41
6:20	41	40	41	41	41	41
6:30	41	40	41	41	41	41
6:40	41	40	41	41	41	41
6:50	41	41	41	41	41	41
7: 0	41	41	41	41	41	41
7:10	41	41	41	41	41	41
7:20	41	40	41	41	41	41
7:30	41	40	41	41	41	41

INSTEEL INDUSTRIES, INC. - UNDAMAGED
 INSULATION/UNEXPOSED CONCRETE INTERFACE TCS
 TEMPERATURE (DEGREES FAHRENHEIT)

DATE: 18 DECEMBER 1989 SWRI PROJECT NO.: 01-2601-407
 FILE: 352INSTEEL.DAT TEST TYPE: MOD E-108

MIN SEC	TC 13	TC 14	TC 15	TC 16	TC 17	TC 18
7:40	41	40	41	41	41	41
7:50	41	41	42	41	42	41
8:0	41	40	41	41	41	41
8:10	41	40	41	41	41	41
8:20	41	41	42	41	42	41
8:30	41	40	41	41	41	41
8:40	41	40	41	41	41	41
8:50	41	41	42	41	42	41
9:0	41	41	41	41	41	41
9:10	41	40	41	41	41	41
9:20	41	40	41	41	41	41
9:30	41	41	41	41	41	41
9:40	41	41	42	41	42	41
9:50	41	41	42	41	42	41
10:0	41	41	42	41	42	41
10:10	41	41	42	41	42	41
10:20	41	41	42	41	42	41
10:30	41	41	41	41	41	41
10:40	41	41	41	41	41	41
10:50	41	40	41	41	41	41
11:0	41	40	41	41	41	41
11:10	41	41	41	41	41	41
11:20	41	41	42	41	42	41

PAGE NO. 4

INSTEEL INDUSTRIES, INC. - UNDAMAGED
INSULATION/UNEXPOSED CONCRETE INTERFACE TCS
TEMPERATURE (DEGREES FAHRENHEIT)

DATE: 18 DECEMBER 1989 SWRI PROJECT NO.: 01-2601-407
FILE: 352INSTEEL.DAT TEST TYPE: MOD E-108

MIN SEC	TC 13	TC 14	TC 15	TC 16	TC 17	TC 18
11:30	42	41	42	41	42	41
11:40	41	41	42	41	42	41
11:50	41	41	41	41	41	41
12: 0	41	41	42	41	42	41
12:10	42	41	42	42	42	42
12:20	41	41	42	41	42	42
12:30	41	41	42	41	42	41
12:40	41	41	42	41	42	41
12:50	41	41	41	41	41	41
13: 0	41	41	41	41	41	41
13:10	41	41	42	41	42	41
13:20	42	41	42	41	42	41
13:30	42	41	42	42	42	42
13:40	42	41	42	42	42	42
13:50	42	41	42	42	42	42
14: 0	41	41	42	41	42	41
14:10	41	41	42	41	42	41
14:20	41	41	42	41	42	41
14:30	41	41	42	41	42	41
14:40	42	41	42	42	42	42
14:50	42	41	42	42	42	42
15: 0	42	41	42	42	42	42
15:10	42	41	42	42	42	42

PAGE NO. 5

INSTEEL INDUSTRIES, INC. - UNDAMAGED
 INSULATION/UNEXPOSED CONCRETE INTERFACE TCS
 TEMPERATURE (DEGREES FAHRENHEIT)

DATE: 18 DECEMBER 1989 SWRI PROJECT NO.: 01-2601-407
 FILE: 352INSTEEL.DAT TEST TYPE: MOD E-108

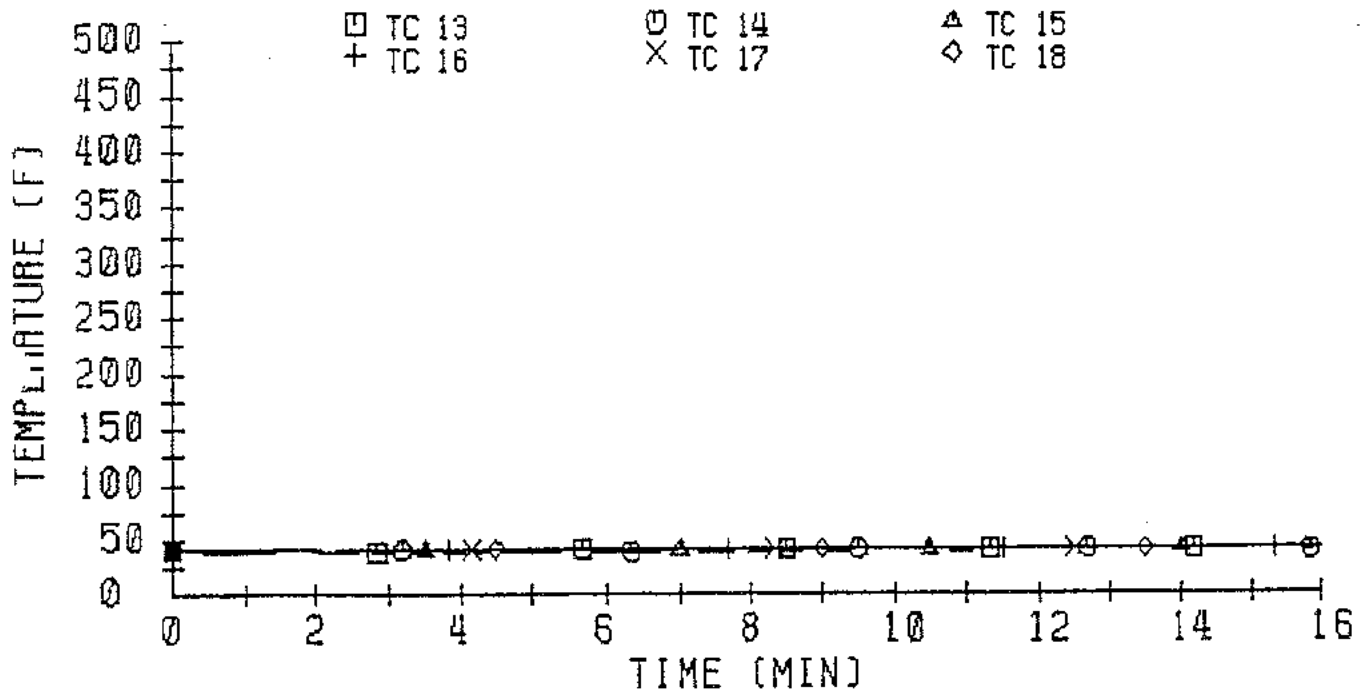
MIN SEC	TC 13	TC 14	TC 15	TC 16	TC 17	TC 18
15:20	42	41	42	42	42	42
15:30	42	41	42	42	42	42
15:40	41	41	42	41	42	41
15:50	41	40	41	41	41	41
16: 0	41	41	41	41	41	41
16:10	42	41	42	42	42	42
16:20	42	41	42	42	42	42
16:30	42	42	43	42	42	42
16:40	42	41	42	42	42	42
16:50	41	41	42	41	42	42
17: 0	41	41	42	42	42	42
17:10	42	41	42	42	42	42
17:20	42	42	43	42	43	43
17:30	42	41	42	42	42	42
17:40	41	41	42	41	42	42
17:50	42	41	42	42	42	42
18: 0	42	41	42	42	42	42
18:10	43	42	43	43	43	43
18:20	42	41	42	42	42	42
18:30	42	41	42	42	42	42
18:40	42	41	42	42	42	43
18:50	42	41	42	42	42	43
19: 0	42	42	42	42	42	44

PAGE NO. 6
LAST PAGE

INSTEEL INDUSTRIES, INC. - UNDATED
INSULATION/UNEXPOSED CONCRETE INTERFACE TCS
TEMPERATURE (DEGREES FAHRENHEIT)

DATE: 18 DECEMBER 1989 SWRI PROJECT NO.: 01-2601-407
FILE: 352INSTEEL.DAT TEST TYPE: MOD E-108

MIN SEC	TC 13	TC 14	TC 15	TC 16	TC 17	TC 18
19: 10	43	42	43	43	43	45
19: 20	42	42	42	42	42	45
19: 30	42	42	43	43	42	45
19: 40	43	42	43	43	43	45
19: 50	42	42	42	42	42	45
20: 0	42	42	42	42	42	45

INSTEEL INDUSTRIES, INC. - UNDAMAGED
INSULATION/UNEXP. CONCRETE INTERFACE TCS

SWRI 01-2601-407

18 DECEMBER 1989