Listing Report on 1-Hour Fire-Rated Wall Assembly

Client
Intermat
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USA

Reported by
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Test Number: WHI 495 1687
Test Date: 8/7/2002
Issue Date: 8/19/2002

Testing supervised by:

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Project Engineer

Report reviewed by:

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General Manager

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Introduction
Intertek Testing Services (ITS) Antioch, California Laboratory conducted a 1 hour fire test for the client, Intermat. The test conformed to the following standards: *UL 263 (1997), ASTM E119 (1998), NFPA 251 (1999), UBC 7-1 (1997), ULC CAN/ULC-S101-M89 (1989).* The steel stud gypsum wallboard wall with Sure-Board Series 200 on the unexposed face was tested for 60 minutes.

ITS personnel witnessed construction of test assembly by Carl Elliot of Intermat on August 6, 2002 at Antioch, CA. The test samples were received at the ITS Antioch, CA laboratory on August 6, 2002. The samples were in satisfactory condition when received.

Carl Elliott of Intermat witnessed the test.

Test Materials

Studs:	20 gauge, 3-5/8" wide studs and track manufactured by Cemco.
Exposed Face:	USG Firecode Type X, 4' x 9' x 0-5/8", average 2199 lb/1000 sq ft, fastened with #8 x 1-7/8" fine thread drywall TEK screws, 8" on center on the edge and 12" on center in the field.
Unexposed Face:	Sure-Board Series 200, 4' x 9' x 0.656", average 3361 lb/1000 sq ft, fastened with #8 x 2" bugle head TEK screws, 6" on center on the edge and 12" on center in the field.

Test Assembly Construction
The wall was framed and then set into the test assembly. Sure-Board Series 200 was installed on the unexposed face with #8 x 2" bugle head TEK screws 6" on center on edge and 12" on center in field. Type X, 5/8" thick gypsum wallboard was installed on the exposed face with #8 x 1-7/8" fine thread TEK drywall screws 8" on center on edge and 12" on center in field.

The seams were taped and mudded. The fasteners were also mudded.

Fire Endurance Test
Data acquisition began after burner ignition and positioning of the test assembly. To maintain the time-temperature curve specified in Section 5 of ASTM E-199 (1998), temperatures within the furnace were monitored with nine thermocouples and controlled by adjusting fuel flow to the burners.

Conditions of the exposed and unexposed faces of the test assembly were periodically observed and recorded (see Appendix B). Unexposed surface temperatures were recorded with nine thermocouples on the unexposed face and three finish thermocouples.

One taut wire across the unexposed face of the test assembly at midheight elevation was used as a reference to read the movement of the wall during the test. From these readings, calculations of movement were made.

Three pressure-taps were installed through the vertical centerline of the furnace wall adjacent to the wall at the bottom, midheight and top elevations to measure furnace pressures. The pressure taps were attached to pressure gauges and transducers. Readings from these gauges and transducers were monitored for controlling furnace pressure by adjusting dampers in the furnace exhaust stacks to maintain the neutral pressure level in the furnace at 1/3 from the top of the wall after five minutes test time.

The table of test results and the graph of the furnace curve are included in Appendix C.

The assembly passed the fire endurance test. At the conclusion of the test the average and maximum temperature rise on the unexposed face was 179°F and 213°F, respectively. The standard allows an average and maximum temperature-rise of 250°F and 325°F, respectively.

Test assembly movement was within the allowable limits specified in the test standards.

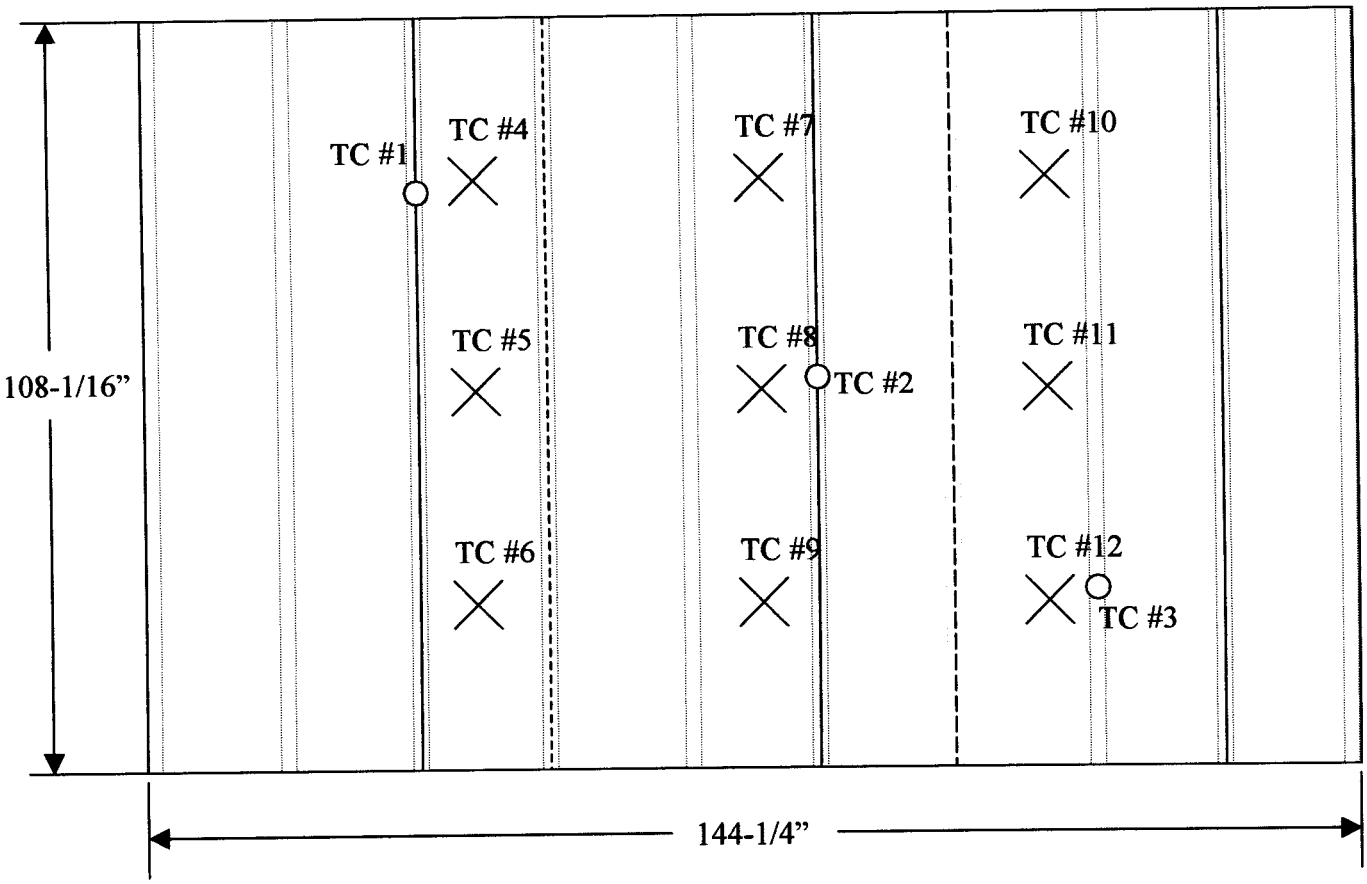
Hose Stream Test
Immediately after the fire test, the exposed face of the wall assembly was subjected to the hose stream test for 1 minute 5 seconds (1.5 sec/ft^2 or 16.15 sec/m^2), with a water pressure of 30 psi (207kPa).

No through-openings developed.

Conclusion
The wall assembly described in this report complied with the *Standard for Fire Tests of Building Construction and Materials, UL 263 (1997), ASTM E119 (1998), NFPA 251 (1999), UBC 7-1 (1997), ULC CAN/ULC-S101-M89 (1989)* for a 1 hour fire-rating.

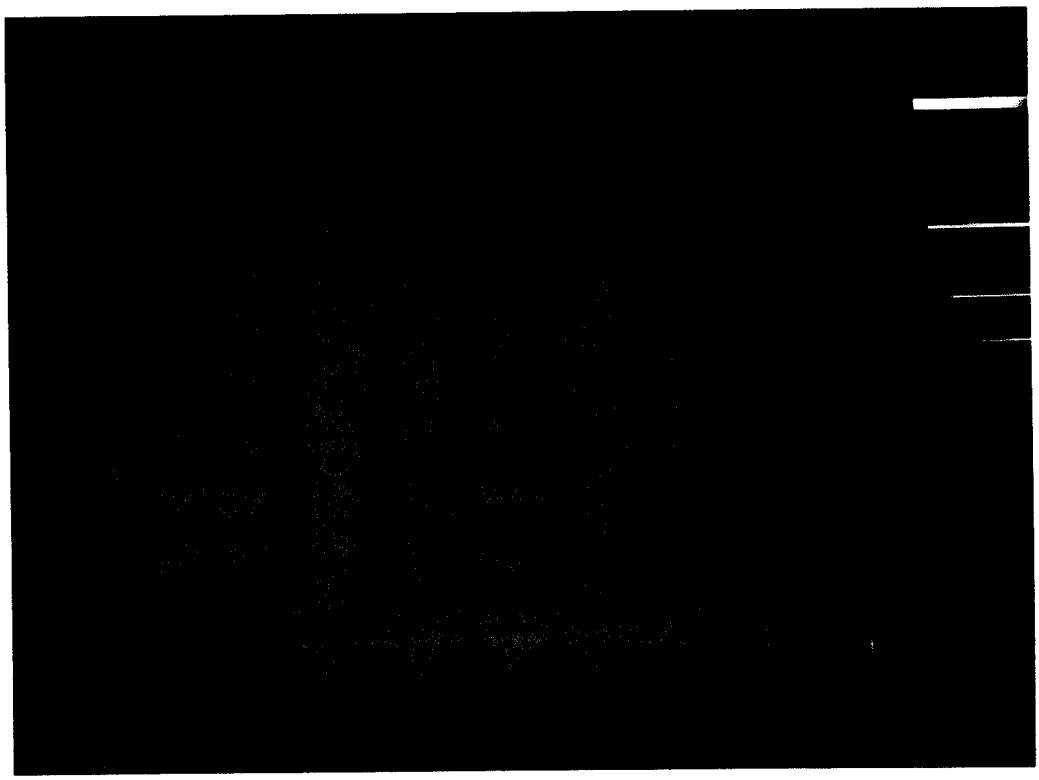
Appendix A - Figures and Photos

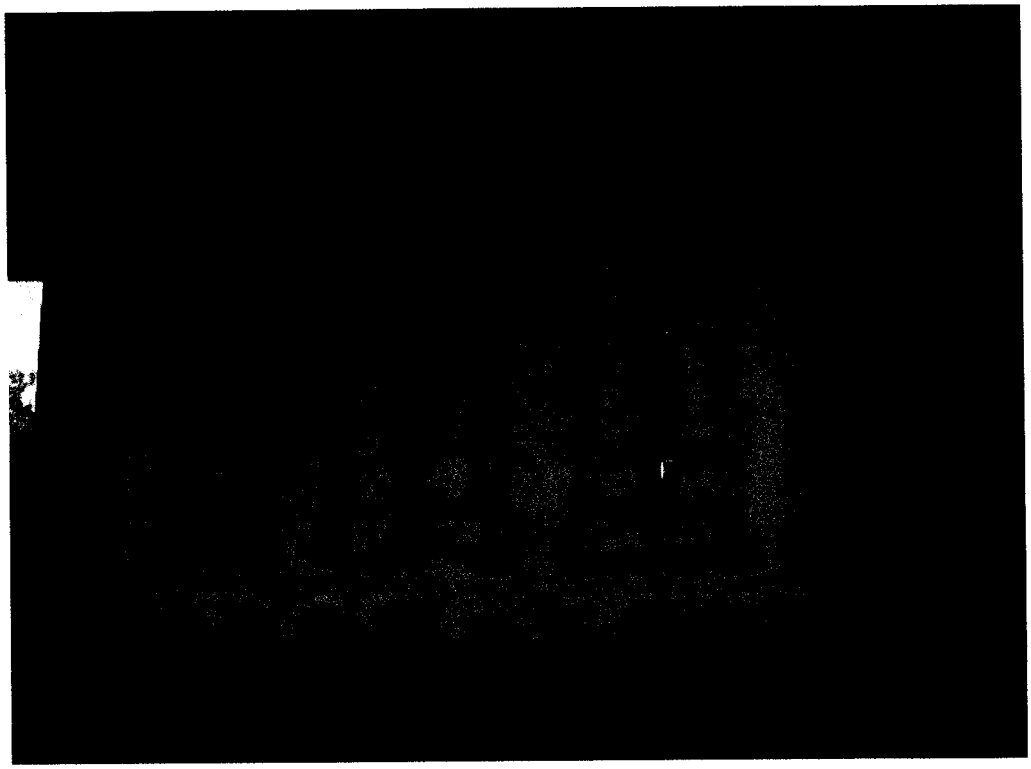
Figure 1 – Unexposed TC Locations



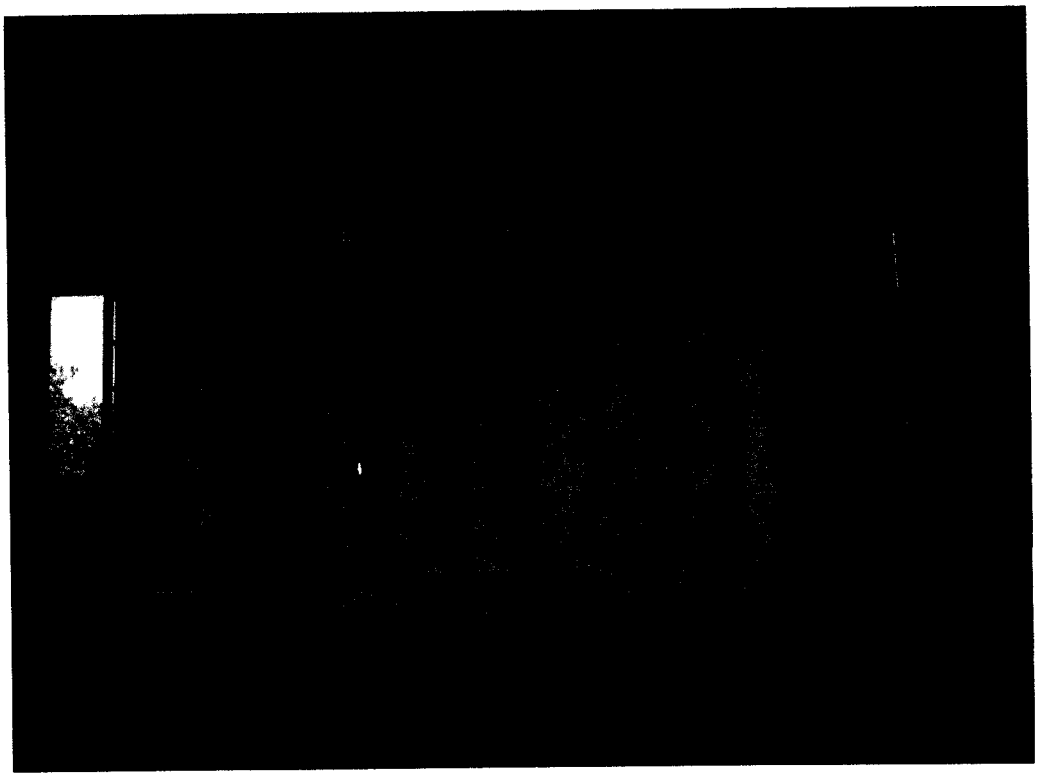
Finish Thermocouples: TC 1-3
Unexposed Thermocouples: TC 4-12

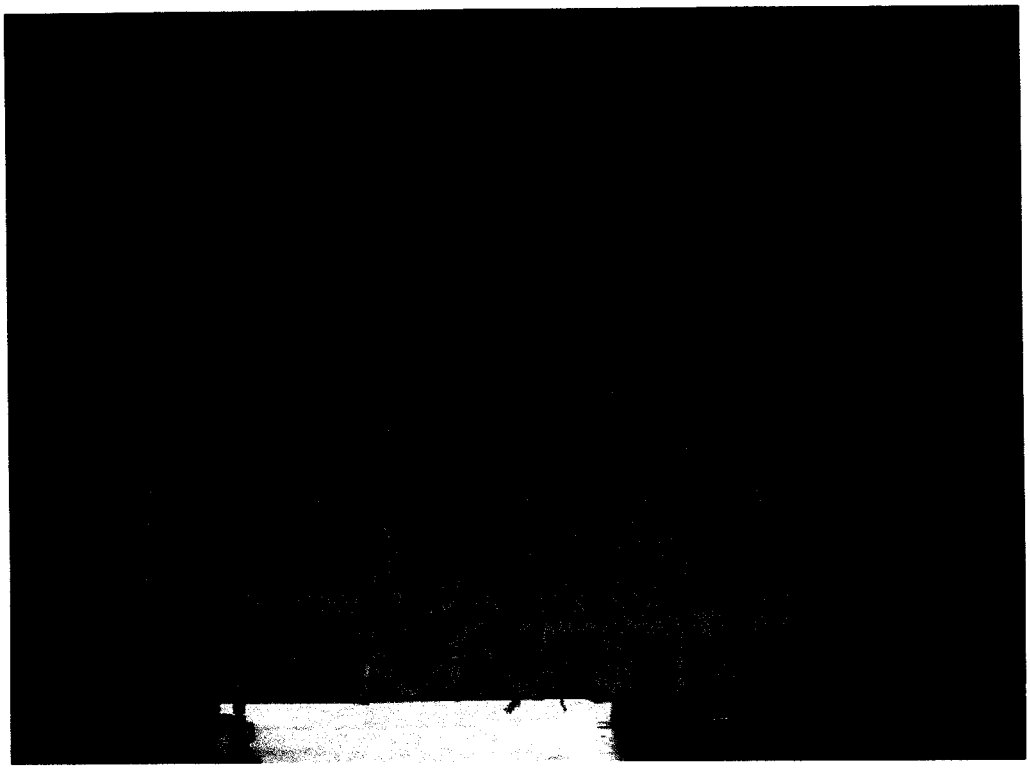
Before Fire Endurance Test



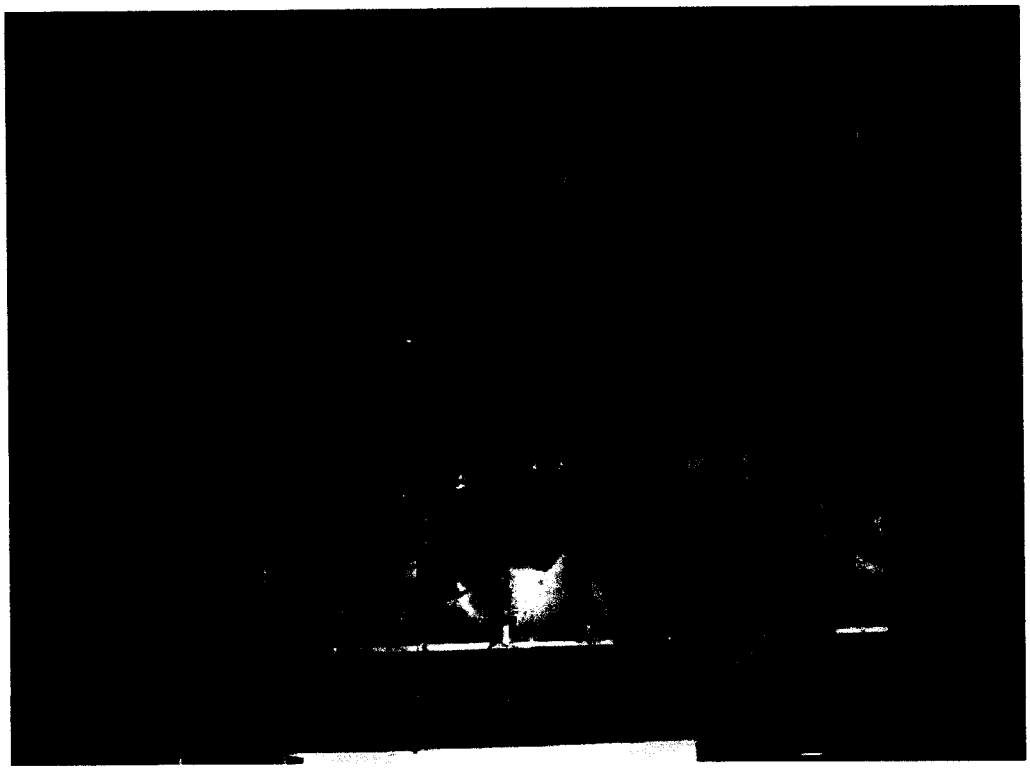


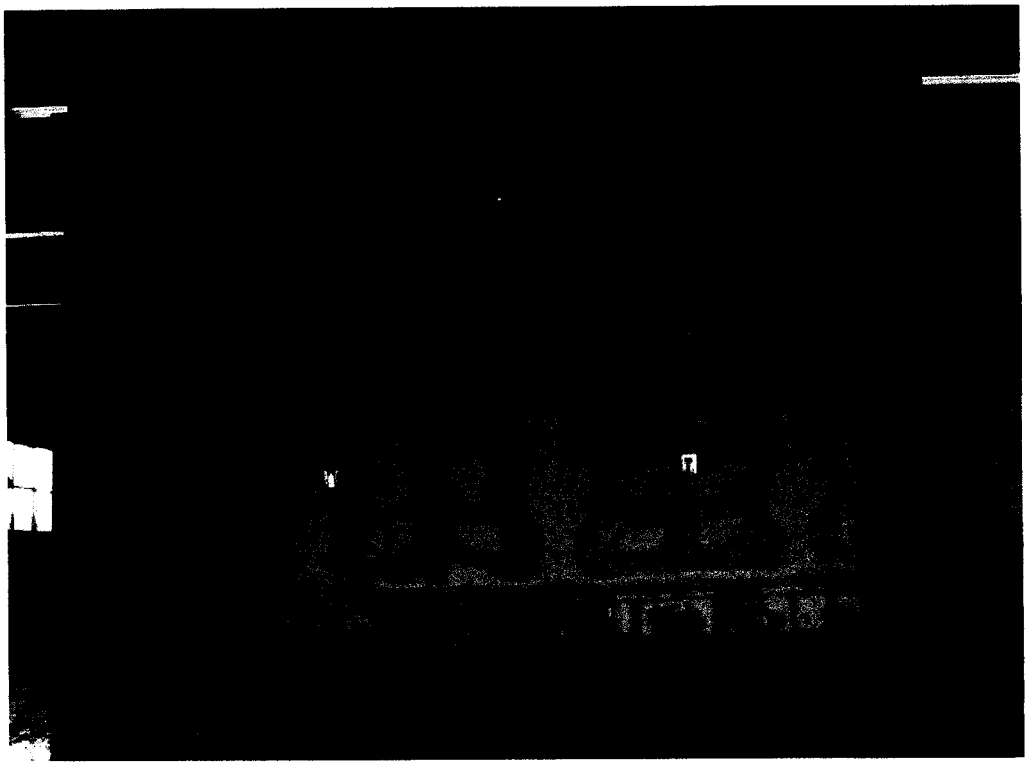
After Fire Endurance Test





Hose Stream Test



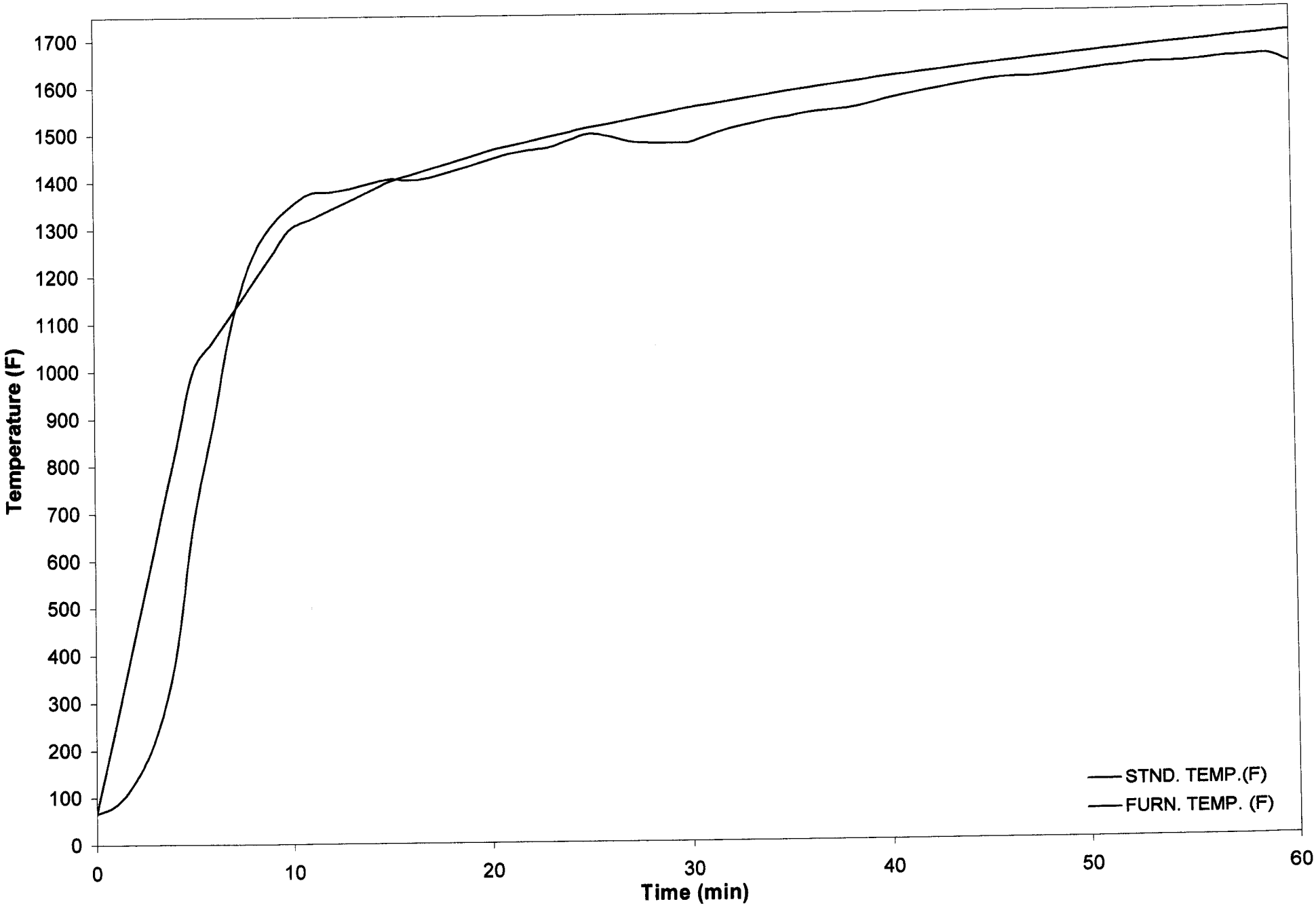


Appendix B - Test Observations

Approximate Test Time, Min	Exposed Face	Unexposed Face
4	Ignition of face	No change
12	Mud falling into furnace; tape loosening off joints	No change
30	Joints opened to 1/4"; large crack opened across assembly 1/3 down from top	Wall bowing into furnace
40	Joints opened to 1/2"	Fasteners turning brown; more bowing into furnace
55	No change	No change
60	Stopped test	No change

Appendix C - Test Data

Furnace Performance



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Test Data

TIME (MIN)	0	1	2	3	4	5	6	7	8	9	10	11	12
STND. TEMP.(F)	68	254	441	627	814	1000	1060	1120	1180	1240	1300	1320	1340
FURN. TEMP. (F)	67	85	137	225	385	684	879	1099	1231	1304	1347	1374	1378
STND. AREA (DEG-MIN)	6	175	530	1072	1800	2715	3747	4840	5992	7205	8477	9788	11118
TEST AREA (DEG-MIN)	6	78	191	371	674	1229	2021	3038	4213	5489	6816	8181	9558
AMBIENT (F)	67	68	68	68	68	68	68	69	69	69	68	68	68
FURN. 1 (F)	67	100	166	297	536	825	1037	1193	1304	1355	1390	1411	1419
FURN. 2 (F)	67	100	164	282	481	776	1004	1163	1273	1325	1367	1387	1390
FURN. 3 (F)	66	90	151	266	457	736	933	1095	1211	1281	1323	1350	1359
FURN. 4 (F)	67	101	167	291	530	847	1053	1203	1316	1364	1397	1414	1415
FURN. 5 (F)	67	100	158	255	437	719	955	1140	1269	1330	1373	1395	1397
FURN. 6 (F)	67	81	120	202	362	634	890	1087	1228	1300	1348	1371	1372
FURN. 7 (F)	67	95	141	223	429	728	956	1127	1255	1315	1355	1375	1376
FURN. 8 (F)	67	91	131	194	328	576	822	1031	1181	1266	1318	1347	1353
FURN. 9 (F)	67	90	127	202	363	632	870	1076	1205	1263	1306	1327	1328
FINISH 1 (F)	66	66	69	78	104	171	200	220	220	219	216	216	215
FINISH 2 (F)	65	65	65	67	93	118	145	175	190	199	204	207	209
FINISH 3 (F)	67	67	71	82	116	161	185	200	206	208	209	209	210
UNEXP. 1 (F)	67	67	67	67	67	67	68	72	78	87	95	103	110
UNEXP. 2 (F)	67	67	67	67	67	67	68	71	76	82	89	97	103
UNEXP. 3 (F)	67	67	67	67	67	67	68	70	74	80	86	93	99
UNEXP. 4 (F)	67	67	67	67	67	67	70	75	84	94	103	111	117
UNEXP. 5 (F)	67	67	67	67	67	68	69	74	81	90	99	107	114
UNEXP. 6 (F)	67	67	67	67	67	67	68	71	77	83	91	99	107
UNEXP. 7 (F)	67	67	67	67	67	67	69	72	79	87	95	103	110
UNEXP. 8 (F)	67	67	67	67	67	67	69	73	80	89	98	106	113
UNEXP. 9 (F)	67	67	67	67	67	67	68	70	75	82	91	99	107
PRESSURE 1(IN. W.C.)	-0.007	-0.085	-0.102	-0.048	-0.043	-0.029	-0.016	-0.014	-0.020	-0.016	-0.012	-0.016	-0.017
PRESSURE 2(IN. W.C.)	-0.021	-0.117	-0.144	-0.095	-0.095	-0.080	-0.071	-0.069	-0.076	-0.072	-0.067	-0.072	-0.072
PRESSURE 3(IN. W.C.)	-0.021	-0.131	-0.169	-0.122	-0.129	-0.111	-0.106	-0.104	-0.112	-0.107	-0.102	-0.106	-0.108
AVG FURNACE (F)	67	94	147	246	436	719	947	1124	1249	1311	1353	1375	1379
MIN FURNACE (F)	66	81	120	194	328	576	822	1031	1181	1263	1306	1327	1328
MAX FURNACE (F)	67	101	167	297	536	847	1053	1203	1316	1364	1397	1414	1419
AVG UNEXP. (F)	67	67	67	67	67	67	69	72	78	86	94	102	109
MIN UNEXP. (F)	67	67	67	67	67	67	68	70	74	80	86	93	99
MAX UNEXP. (F)	67	67	67	67	67	68	70	75	84	94	103	111	117

Test Data

TIME (MIN)	13	14	15	16	17	18	19	20	21	22	23	24	25
STND. TEMP.(F)	1359	1379	1399	1412	1424	1437	1449	1462	1472	1481	1491	1500	1510
FURN. TEMP. (F)	1385	1395	1404	1402	1406	1419	1430	1443	1456	1462	1468	1483	1496
STND. AREA (DEG-MIN)	12469	13839	15229	16634	18053	19484	20928	22384	23851	25328	26814	28310	29816
TEST AREA (DEG-MIN)	10939	12329	13730	15133	16536	17949	19374	20811	22261	23722	25186	26662	28153
AMBIENT (F)	68	68	69	69	69	68	69	69	69	69	69	69	69
FURN. 1 (F)	1430	1442	1449	1449	1456	1468	1479	1492	1504	1508	1515	1529	1537
FURN. 2 (F)	1398	1410	1418	1417	1424	1438	1449	1460	1472	1478	1485	1499	1509
FURN. 3 (F)	1370	1382	1390	1392	1398	1409	1420	1436	1452	1457	1465	1477	1485
FURN. 4 (F)	1423	1434	1440	1438	1445	1459	1470	1482	1494	1498	1511	1542	1557
FURN. 5 (F)	1404	1413	1419	1416	1422	1434	1446	1457	1469	1473	1479	1493	1504
FURN. 6 (F)	1378	1388	1395	1394	1401	1412	1422	1436	1450	1454	1460	1473	1484
FURN. 7 (F)	1384	1394	1400	1397	1403	1417	1430	1440	1452	1457	1465	1481	1493
FURN. 8 (F)	1361	1372	1379	1376	1382	1394	1405	1415	1425	1428	1434	1447	1459
FURN. 9 (F)	1330	1339	1343	1336	1341	1355	1367	1388	1406	1412	1418	1430	1440
FINISH 1 (F)	215	219	226	255	272	279	287	301	324	384	464	528	582
FINISH 2 (F)	211	213	217	219	223	227	282	299	252	288	457	331	592
FINISH 3 (F)	210	210	210	217	238	250	261	274	305	372	439	495	547
UNEXP. 1 (F)	115	119	123	126	128	131	133	135	137	138	140	143	147
UNEXP. 2 (F)	109	114	118	121	124	126	129	131	132	134	136	138	142
UNEXP. 3 (F)	105	110	114	118	121	123	126	128	130	132	133	135	138
UNEXP. 4 (F)	122	126	129	132	134	136	138	141	143	144	147	152	163
UNEXP. 5 (F)	120	124	128	130	133	135	137	139	141	143	145	149	155
UNEXP. 6 (F)	113	118	122	125	128	130	133	135	137	139	141	144	149
UNEXP. 7 (F)	115	120	123	125	127	129	130	131	132	134	136	141	148
UNEXP. 8 (F)	119	123	126	128	130	132	133	135	136	137	140	144	149
UNEXP. 9 (F)	113	118	122	125	127	130	131	133	134	135	137	140	144
PRESSURE 1(IN. W.C.)	-0.023	-0.025	-0.023	-0.014	-0.012	-0.011	-0.011	-0.009	-0.013	-0.015	-0.014	-0.014	-0.017
PRESSURE 2(IN. W.C.)	-0.078	-0.081	-0.078	-0.069	-0.067	-0.066	-0.068	-0.066	-0.069	-0.070	-0.071	-0.071	-0.073
PRESSURE 3(IN. W.C.)	-0.111	-0.113	-0.112	-0.104	-0.102	-0.101	-0.100	-0.100	-0.103	-0.105	-0.102	-0.105	-0.107
AVG FURNACE (F)	1387	1397	1404	1402	1408	1421	1432	1445	1458	1463	1470	1486	1496
MIN FURNACE (F)	1330	1339	1343	1336	1341	1355	1367	1388	1406	1412	1418	1430	1440
MAX FURNACE (F)	1430	1442	1449	1449	1456	1468	1479	1492	1504	1508	1515	1542	1557
AVG UNEXP. (F)	115	119	123	126	128	130	132	134	136	137	139	143	148
MIN UNEXP. (F)	105	110	114	118	121	123	126	128	130	132	133	135	138
MAX UNEXP. (F)	122	126	129	132	134	136	138	141	143	144	147	152	163

Test Data

TIME (MIN)	26	27	28	29	30	31	32	33	34	35	36	37	38
STND. TEMP.(F)	1518	1526	1534	1542	1550	1557	1564	1570	1577	1584	1590	1596	1601
FURN. TEMP. (F)	1491	1480	1476	1475	1477	1490	1504	1514	1523	1529	1537	1542	1546
STND. AREA (DEG-MIN)	31330	32852	34383	35921	37467	39021	40582	42149	43723	45304	46891	48484	50083
TEST AREA (DEG-MIN)	29648	31132	32610	34086	35561	37044	38542	40051	41570	43097	44630	46170	47715
AMBIENT (F)	69	69	69	70	69	69	70	70	71	70	70	70	70
FURN. 1 (F)	1527	1518	1516	1516	1521	1536	1548	1559	1567	1573	1581	1584	1588
FURN. 2 (F)	1502	1495	1493	1492	1495	1509	1522	1531	1540	1547	1553	1559	1563
FURN. 3 (F)	1480	1473	1470	1471	1474	1488	1501	1511	1519	1528	1535	1539	1543
FURN. 4 (F)	1536	1515	1508	1505	1509	1524	1536	1545	1554	1559	1567	1571	1574
FURN. 5 (F)	1498	1490	1486	1485	1488	1501	1515	1524	1533	1540	1547	1552	1555
FURN. 6 (F)	1479	1471	1469	1468	1472	1485	1497	1508	1517	1524	1532	1537	1540
FURN. 7 (F)	1485	1475	1473	1472	1476	1491	1503	1513	1522	1528	1535	1539	1543
FURN. 8 (F)	1454	1446	1443	1442	1445	1458	1472	1482	1491	1499	1507	1511	1515
FURN. 9 (F)	1434	1427	1426	1426	1428	1442	1455	1465	1474	1481	1489	1493	1497
FINISH 1 (F)	632	681	729	773	804	833	859	884	912	926	940	955	971
FINISH 2 (F)	642	692	749	799	835	867	894	923	950	970	984	1005	1026
FINISH 3 (F)	609	665	726	775	817	847	875	899	919	945	972	1001	1040
UNEXP. 1 (F)	158	176	185	184	185	185	188	191	194	196	199	202	204
UNEXP. 2 (F)	149	166	173	174	177	179	182	185	189	192	194	197	199
UNEXP. 3 (F)	141	145	150	156	163	169	174	180	187	193	197	200	203
UNEXP. 4 (F)	183	190	193	197	200	202	204	206	209	209	211	214	216
UNEXP. 5 (F)	174	189	193	196	198	200	200	201	203	205	208	210	212
UNEXP. 6 (F)	161	182	190	191	192	194	196	198	201	204	206	209	212
UNEXP. 7 (F)	162	176	185	193	194	196	197	198	199	198	199	202	205
UNEXP. 8 (F)	163	186	192	193	197	199	201	203	205	206	206	209	212
UNEXP. 9 (F)	151	169	186	190	191	194	196	199	201	203	203	204	207
PRESSURE 1(IN. W.C.)	-0.007	-0.008	-0.010	-0.015	-0.007	-0.008	-0.009	-0.004	-0.011	-0.011	-0.012	-0.009	-0.009
PRESSURE 2(IN. W.C.)	-0.064	-0.063	-0.066	-0.069	-0.063	-0.064	-0.065	-0.060	-0.067	-0.067	-0.067	-0.065	-0.065
PRESSURE 3(IN. W.C.)	-0.096	-0.098	-0.099	-0.103	-0.097	-0.099	-0.099	-0.097	-0.100	-0.100	-0.102	-0.099	-0.098
AVG FURNACE (F)	1488	1479	1476	1475	1479	1492	1505	1515	1524	1531	1539	1543	1547
MIN FURNACE (F)	1434	1427	1426	1426	1428	1442	1455	1465	1474	1481	1489	1493	1497
MAX FURNACE (F)	1536	1518	1516	1516	1521	1536	1548	1559	1567	1573	1581	1584	1588
AVG UNEXP. (F)	160	175	183	186	188	191	193	196	199	201	203	205	208
MIN UNEXP. (F)	141	145	150	156	163	169	174	180	187	192	194	197	199
MAX UNEXP. (F)	183	190	193	197	200	202	204	206	209	209	211	214	216

Test Data

TIME (MIN)	39	40	41	42	43	44	45	46	47	48	49	50	51
STND. TEMP.(F)	1607	1613	1618	1623	1628	1633	1638	1643	1647	1652	1656	1661	1665
FURN. TEMP. (F)	1554	1565	1574	1582	1589	1597	1604	1608	1608	1612	1617	1622	1628
STND. AREA (DEG-MIN)	51687	53298	54913	56534	58160	59790	61426	63067	64712	66361	68016	69675	71338
TEST AREA (DEG-MIN)	49264	50824	52394	53972	55558	57152	58753	60358	61966	63576	65191	66811	68436
AMBIENT (F)	70	70	70	70	70	71	71	71	70	70	72	71	71
FURN. 1 (F)	1595	1607	1615	1622	1629	1635	1642	1646	1647	1649	1654	1659	1665
FURN. 2 (F)	1571	1582	1591	1599	1606	1612	1618	1622	1622	1627	1631	1636	1641
FURN. 3 (F)	1553	1562	1572	1579	1588	1594	1601	1604	1606	1611	1617	1621	1626
FURN. 4 (F)	1583	1594	1603	1611	1618	1625	1632	1637	1637	1640	1644	1649	1655
FURN. 5 (F)	1564	1576	1586	1594	1602	1609	1615	1619	1618	1622	1627	1633	1637
FURN. 6 (F)	1549	1560	1569	1577	1585	1592	1598	1602	1603	1608	1614	1620	1624
FURN. 7 (F)	1552	1563	1572	1580	1588	1596	1602	1606	1606	1610	1616	1622	1627
FURN. 8 (F)	1523	1535	1543	1552	1560	1568	1574	1578	1578	1582	1587	1593	1598
FURN. 9 (F)	1506	1518	1526	1535	1542	1551	1557	1561	1561	1566	1572	1577	1582
FINISH 1 (F)	984	995	1003	1011	1016	1019	1021	1022	1023	1023	1024	1028	1032
FINISH 2 (F)	1044	1051	1057	1063	1065	1068	1072	1080	1086	1087	1084	1082	1082
FINISH 3 (F)	1086	1055	1031	1012	1001	995	992	990	990	989	989	990	992
UNEXP. 1 (F)	207	209	212	215	217	219	220	222	223	223	223	224	226
UNEXP. 2 (F)	202	205	209	210	211	212	213	214	215	214	215	217	218
UNEXP. 3 (F)	205	207	213	215	216	217	219	220	222	223	224	225	226
UNEXP. 4 (F)	218	220	221	223	225	226	227	228	230	232	234	235	237
UNEXP. 5 (F)	214	217	219	222	222	223	225	227	229	230	232	233	234
UNEXP. 6 (F)	213	215	216	218	220	221	223	224	225	226	227	228	229
UNEXP. 7 (F)	208	211	214	218	218	220	223	225	227	228	230	232	233
UNEXP. 8 (F)	216	219	220	223	225	227	230	232	234	236	238	240	241
UNEXP. 9 (F)	209	211	214	217	220	222	224	225	227	229	230	231	233
PRESSURE 1(IN. W.C.)	-0.006	-0.007	-0.006	-0.006	-0.005	-0.004	-0.007	-0.011	-0.010	-0.010	-0.008	-0.007	-0.005
PRESSURE 2(IN. W.C.)	-0.064	-0.063	-0.063	-0.063	-0.061	-0.060	-0.064	-0.068	-0.067	-0.067	-0.064	-0.064	-0.062
PRESSURE 3(IN. W.C.)	-0.097	-0.098	-0.097	-0.097	-0.096	-0.094	-0.098	-0.101	-0.099	-0.101	-0.098	-0.098	-0.096
AVG FURNACE (F)	1555	1566	1575	1583	1591	1598	1604	1608	1609	1613	1618	1623	1628
MIN FURNACE (F)	1506	1518	1526	1535	1542	1551	1557	1561	1561	1566	1572	1577	1582
MAX FURNACE (F)	1595	1607	1615	1622	1629	1635	1642	1646	1647	1649	1654	1659	1665
AVG UNEXP. (F)	210	213	215	218	219	221	223	224	226	227	228	229	231
MIN UNEXP. (F)	202	205	209	210	211	212	213	214	215	214	215	217	218
MAX UNEXP. (F)	218	220	221	223	225	227	230	232	234	236	238	240	241

Test Data

TIME (MIN)	52	53	54	55	56	57	58	59	60
STND. TEMP.(F)	1669	1673	1677	1681	1685	1689	1692	1696	1700
FURN. TEMP. (F)	1632	1636	1636	1638	1642	1646	1648	1650	1633
STND. AREA (DEG-MIN)	73005	74676	76351	78030	79713	81400	83091	84785	86484
TEST AREA (DEG-MIN)	70066	71700	73337	74973	76613	78257	79904	81553	83202
AMBIENT (F)	71	73	72	71	71	72	72	71	71
FURN. 1 (F)	1670	1674	1672	1675	1679	1684	1686	1687	1637
FURN. 2 (F)	1644	1648	1649	1651	1654	1659	1660	1662	1618
FURN. 3 (F)	1629	1635	1633	1637	1640	1643	1646	1648	1596
FURN. 4 (F)	1658	1663	1662	1664	1669	1672	1675	1677	1622
FURN. 5 (F)	1641	1645	1644	1647	1650	1654	1655	1657	1609
FURN. 6 (F)	1628	1632	1631	1634	1638	1640	1643	1646	1595
FURN. 7 (F)	1631	1635	1635	1637	1641	1645	1647	1650	1584
FURN. 8 (F)	1603	1607	1607	1610	1613	1617	1619	1621	1578
FURN. 9 (F)	1587	1591	1591	1593	1597	1601	1603	1605	1557
FINISH 1 (F)	1037	1044	1047	1049	1050	1052	1054	1056	-
FINISH 2 (F)	1085	1090	1096	1102	1109	1116	1123	1131	-
FINISH 3 (F)	996	999	1004	1008	1011	1015	1020	1024	-
UNEXP. 1 (F)	227	229	230	231	232	233	235	236	109
UNEXP. 2 (F)	220	222	223	224	225	226	228	229	111
UNEXP. 3 (F)	226	228	229	230	231	232	234	235	121
UNEXP. 4 (F)	238	240	242	243	244	246	247	249	121
UNEXP. 5 (F)	236	237	239	240	241	243	244	246	104
UNEXP. 6 (F)	230	231	232	234	235	236	237	239	104
UNEXP. 7 (F)	235	237	239	241	243	246	250	256	122
UNEXP. 8 (F)	243	245	248	252	257	264	273	280	121
UNEXP. 9 (F)	234	235	236	238	239	240	241	242	111
PRESSURE 1(IN. W.C.)	-0.004	-0.008	-0.008	-0.006	-0.005	-0.010	-0.009	-0.009	0.000
PRESSURE 2(IN. W.C.)	-0.061	-0.065	-0.065	-0.063	-0.062	-0.067	-0.066	-0.065	-0.014
PRESSURE 3(IN. W.C.)	-0.096	-0.097	-0.098	-0.099	-0.095	-0.100	-0.100	-0.099	-0.053
AVG FURNACE (F)	1633	1636	1636	1639	1642	1646	1648	1650	1600
MIN FURNACE (F)	1587	1591	1591	1593	1597	1601	1603	1605	1557
MAX FURNACE (F)	1670	1674	1672	1675	1679	1684	1686	1687	1637
AVG UNEXP. (F)	232	234	235	237	239	241	243	246	114
MIN UNEXP. (F)	220	222	223	224	225	226	228	229	104
MAX UNEXP. (F)	243	245	248	252	257	264	273	280	122