

The specimen details

Diameter of bolt	d (mm)	20
Diameter of bolt hole	d ₀ (mm)	22
End distance	e ₁ (mm)	60
Edge distance	e ₂ (mm)	50
Spacing between centres of bolts in the direction of load transfer	p ₁ (mm)	60
Spacing between rows of bolts	p ₂ (mm)	103
Thickness of end plate	t _p (mm)	10
Horizontal distance of lever arm	B _L (mm)	490
Vertical distance of lever arm	D _L (mm)	51.7

Steel Grade		S275	S355
Dimension of Members		UB305x16 5x40	UC254x25 4x89
Depth of Section	D (mm)	303.4	260.3
Width of Section	B (mm)	165	256.3
Thickness of Web	t (mm)	6	10.3
Thickness of Flange	T (mm)	10.2	17.3
Root Radius	r (mm)	8.9	12.7
Depth between Fillets	d (mm)	265.2	200.3

Nominal Temperature

650°C

Time	Thermocouple	Jack Displacement	Load Angle	Beam Rotation	Column Rotation	Connection Rotation	Force Rotation	F3 from F1	F3 from F2	F3 Average	Tension	Shear	Moment
(minute)	Average(°C)	(mm)	$\alpha(^{\circ})$	($^{\circ}$)	($^{\circ}$)	($^{\circ}$)	($^{\circ}$)	(kN)	(kN)	(kN)	(kN)	(kN)	(kN*m)
0	646.896	2.334											
1	646.934	2.331											
2	647.050	2.344											
3	647.181	2.348	40.89	0.000	0.000	0.000	73.579	-4.48	-4.89	-4.68	-3.54	-3.07	-1744.69
4	647.258	3.691	40.89	0.052	0.017	0.035	73.528	-2.97	-2.63	-2.80	-2.12	-1.83	-1042.64
5	647.435	5.198	40.81	0.086	0.021	0.065	73.579	-1.85	-1.44	-1.65	-1.25	-1.08	-612.55
6	647.478	6.919	40.63	0.116	0.015	0.101	73.730	-1.78	-3.11	-2.44	-1.85	-1.59	-905.72
7	647.608	8.442	41.15	0.114	0.014	0.099	73.213	-2.38	-2.72	-2.55	-1.92	-1.68	-952.57
8	647.693	9.996	41.57	0.145	0.038	0.107	72.758	-1.48	-2.91	-2.19	-1.64	-1.45	-825.71
9	647.738	11.578	41.50	0.242	0.060	0.182	72.732	-1.19	-0.87	-1.03	-0.77	-0.68	-387.32
10	647.900	13.133	41.43	0.350	0.053	0.297	72.690	-1.45	-2.67	-2.06	-1.54	-1.36	-774.53
11	648.027	14.755	41.32	0.487	0.058	0.429	72.665	-0.90	-0.67	-0.79	-0.59	-0.52	-294.86
12	648.107	16.390	41.19	0.600	0.046	0.553	72.683	-0.75	-1.73	-1.24	-0.93	-0.82	-464.47
13	648.279	17.999	41.08	0.753	0.056	0.697	72.638	-1.35	-1.11	-1.23	-0.92	-0.81	-458.14
14	648.280	19.517	41.05	0.829	0.019	0.809	72.598	-0.20	-0.53	-0.37	-0.28	-0.24	-137.59
15	648.395	20.888	40.94	0.976	0.057	0.919	72.557	-0.54	-0.07	-0.30	-0.23	-0.20	-112.83
16	648.489	22.345	40.81	1.107	0.051	1.056	72.551	0.13	0.50	0.32	0.24	0.21	117.44
17	648.556	23.899	40.69	1.248	0.054	1.194	72.530	-0.24	0.09	-0.07	-0.06	-0.05	-27.15
18	648.694	25.495	40.52	1.439	0.059	1.380	72.514	-0.39	-0.52	-0.45	-0.34	-0.29	-167.58
19	648.750	27.082	40.47	1.531	0.087	1.444	72.475	-0.02	-0.73	-0.38	-0.29	-0.24	-139.13
20	648.855	28.556	40.31	1.730	0.077	1.653	72.433	0.24	-0.62	-0.19	-0.14	-0.12	-69.25
21	648.926	30.224	40.24	1.831	0.096	1.735	72.399	1.06	0.69	0.87	0.67	0.56	321.83
22	648.961	31.810	40.11	2.014	0.095	1.919	72.351	1.17	1.66	1.41	1.08	0.91	519.66

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23	649.153	33.542	40.00	2.140	0.066	2.074	72.328	0.87	1.38	1.12	0.86	0.72	412.51
24	649.203	35.041	39.90	2.277	0.069	2.208	72.293	1.73	0.79	1.26	0.97	0.81	461.55
25	649.247	36.682	39.77	2.434	0.081	2.353	72.266	2.48	2.25	2.36	1.82	1.51	863.32
26	649.382	38.151	39.64	2.583	0.096	2.487	72.252	2.85	2.71	2.78	2.14	1.77	1012.37
27	649.328	39.688	39.47	2.756	0.100	2.655	72.250	3.19	2.74	2.96	2.29	1.88	1076.45
28	649.481	41.307	39.27	2.944	0.110	2.834	72.257	2.52	2.92	2.72	2.10	1.72	983.85
29	649.571	42.903	39.12	3.081	0.139	2.941	72.270	3.04	3.83	3.43	2.66	2.17	1238.79
30	649.614	44.513	38.92	3.291	0.139	3.152	72.266	2.97	2.98	2.97	2.31	1.87	1069.44
31	649.684	45.988	38.76	3.426	0.123	3.303	72.290	3.45	3.98	3.71	2.89	2.32	1330.50
32	649.685	47.608	38.55	3.615	0.138	3.476	72.303	4.27	5.25	4.76	3.72	2.97	1699.92
33	649.767	49.162	38.39	3.769	0.168	3.601	72.311	5.16	6.12	5.64	4.42	3.50	2007.52
34	649.779	50.677	38.21	3.931	0.172	3.759	72.328	6.62	7.31	6.97	5.47	4.31	2471.32
35	649.713	52.224	38.11	4.045	0.177	3.868	72.317	7.89	8.44	8.16	6.42	5.04	2890.80
36	649.764	53.962	37.98	4.172	0.189	3.982	72.316	9.34	9.90	9.62	7.58	5.92	3397.78
37	649.653	55.557	37.93	4.268	0.197	4.071	72.277	10.76	10.17	10.46	8.25	6.43	3692.36
38	649.685	57.159	37.84	4.388	0.203	4.185	72.245	10.80	10.82	10.81	8.54	6.63	3807.40
39	649.732	58.706	37.76	4.502	0.238	4.264	72.206	11.51	11.55	11.53	9.11	7.06	4055.33
40	649.712	60.334	37.66	4.616	0.247	4.369	72.201	12.92	12.18	12.55	9.94	7.67	4406.36
41	649.783	61.969	37.53	4.751	0.228	4.522	72.187	13.30	12.52	12.91	10.24	7.87	4521.42
42	649.715	63.548	37.43	4.885	0.259	4.626	72.162	13.89	13.32	13.61	10.81	8.27	4755.71
43	649.752	65.103	37.33	4.988	0.264	4.723	72.159	14.15	14.86	14.50	11.53	8.79	5059.13
44	649.772	66.657	37.27	5.090	0.255	4.835	72.109	14.41	15.07	14.74	11.73	8.93	5136.54
45	649.722	68.221	37.21	5.205	0.314	4.891	72.062	15.09	15.14	15.11	12.04	9.14	5259.64
46	649.757	69.719	37.10	5.343	0.275	5.068	72.029	15.38	15.03	15.21	12.13	9.17	5280.53
47	649.770	71.195	37.02	5.473	0.289	5.184	71.984	14.75	14.52	14.64	11.69	8.81	5074.77
48	649.834	72.861	36.92	5.604	0.283	5.321	71.948	15.24	15.77	15.50	12.39	9.31	5364.62
49	649.882	74.527	36.85	5.716	0.306	5.410	71.902	16.17	15.61	15.89	12.71	9.53	5490.90
50	649.912	76.114	36.73	5.867	0.312	5.555	71.875	15.79	15.37	15.58	12.49	9.32	5371.79
51	649.932	77.703	36.63	5.994	0.296	5.697	71.848	15.94	16.06	16.00	12.84	9.54	5504.11
52	649.928	79.424	36.53	6.121	0.312	5.809	71.822	16.57	15.95	16.26	13.06	9.68	5582.48

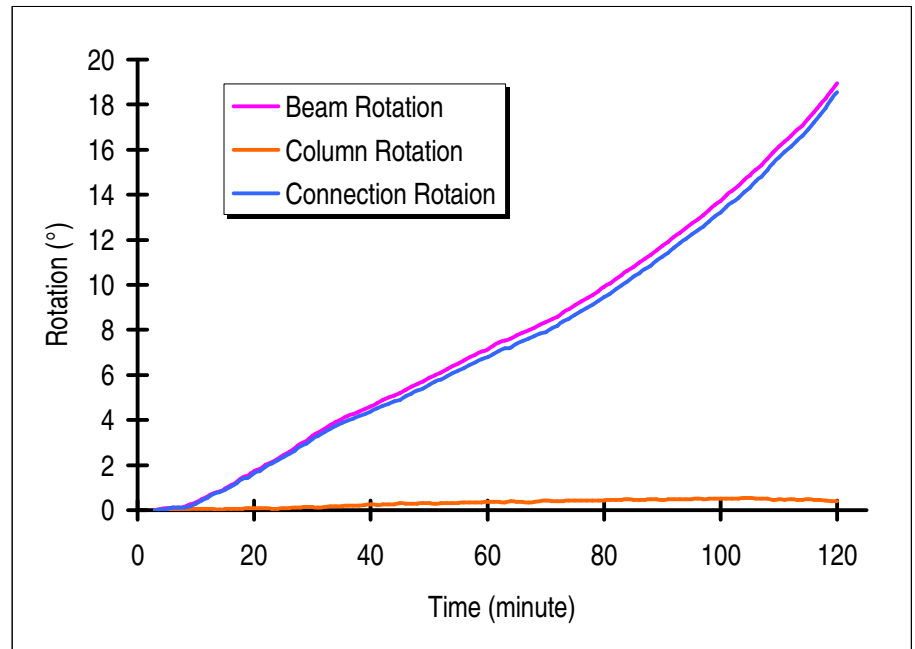
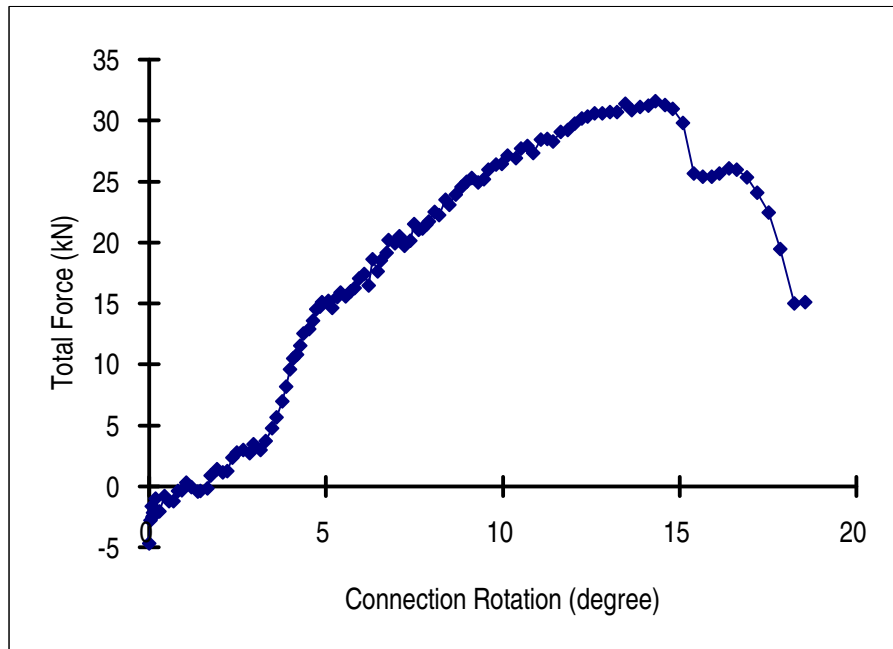
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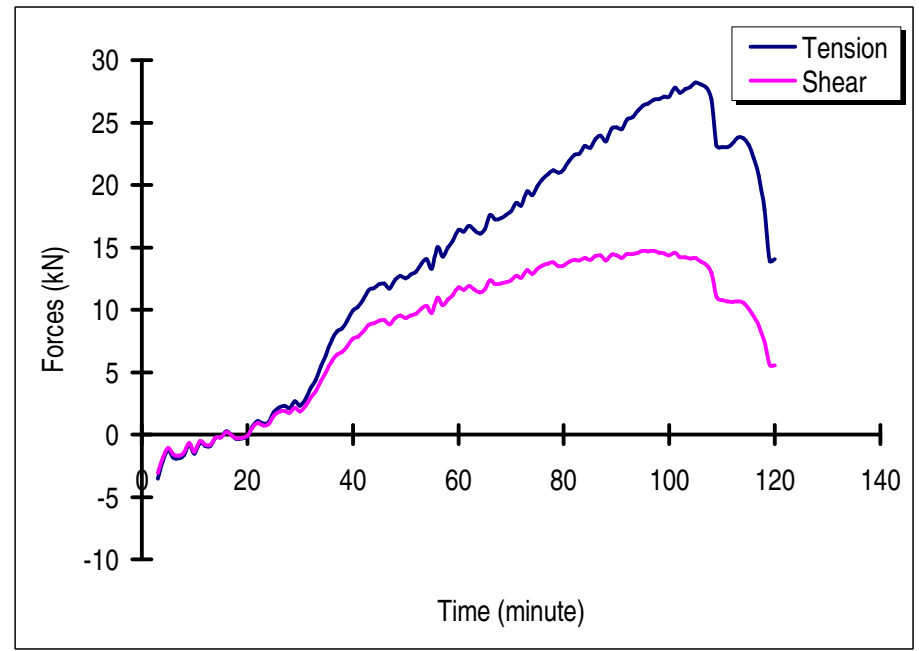
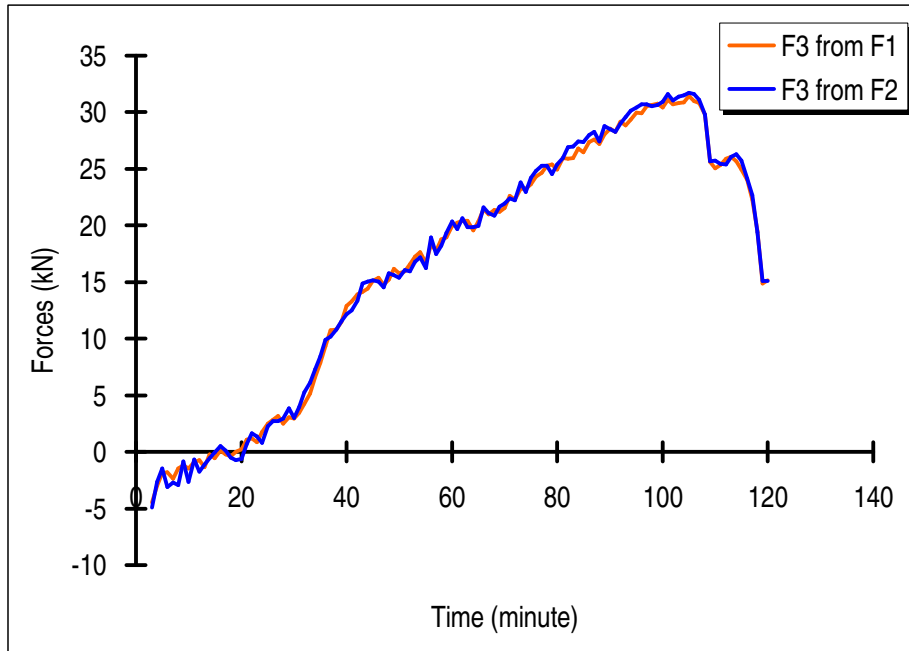
53	649.943	81.037	36.42	6.252	0.313	5.939	71.801	17.27	16.80	17.03	13.71	10.11	5835.81
54	650.001	82.653	36.29	6.395	0.320	6.074	71.787	17.66	17.17	17.42	14.04	10.31	5951.36
55	649.955	84.209	36.22	6.508	0.305	6.202	71.749	16.69	16.25	16.47	13.29	9.73	5620.53
56	650.085	85.731	36.08	6.644	0.335	6.309	71.744	18.31	18.92	18.61	15.04	10.96	6333.80
57	650.064	87.302	35.97	6.787	0.328	6.459	71.712	17.74	17.49	17.61	14.25	10.35	5979.64
58	650.009	88.704	35.90	6.897	0.338	6.559	71.680	18.80	18.20	18.50	14.99	10.85	6270.89
59	650.097	90.316	35.75	7.055	0.349	6.706	71.665	18.96	19.34	19.15	15.54	11.19	6472.56
60	650.103	91.878	35.70	7.134	0.357	6.777	71.637	19.98	20.38	20.18	16.39	11.78	6814.42
61	650.168	93.434	35.53	7.305	0.359	6.945	71.633	20.22	19.68	19.95	16.24	11.60	6713.61
62	650.187	94.957	35.41	7.436	0.357	7.079	71.624	20.42	20.61	20.52	16.72	11.89	6885.54
63	650.120	96.408	35.35	7.533	0.343	7.190	71.585	20.43	19.86	20.15	16.43	11.66	6753.21
64	650.235	97.698	35.29	7.604	0.386	7.217	71.577	19.55	19.85	19.70	16.08	11.38	6595.89
65	650.158	98.996	35.17	7.743	0.365	7.377	71.561	20.37	19.97	20.17	16.49	11.62	6734.56
66	650.247	100.495	35.07	7.870	0.372	7.498	71.533	21.44	21.59	21.51	17.61	12.36	7169.35
67	650.369	101.865	34.96	7.982	0.355	7.627	71.527	20.97	21.07	21.02	17.23	12.05	6989.03
68	650.346	103.260	34.87	8.090	0.366	7.724	71.517	21.37	20.88	21.13	17.34	12.08	7010.28
69	650.443	104.567	34.75	8.230	0.384	7.846	71.496	21.23	21.64	21.43	17.61	12.22	7093.93
70	650.428	106.034	34.64	8.339	0.428	7.911	71.497	21.52	21.92	21.72	17.87	12.35	7172.45
71	650.541	107.501	34.48	8.468	0.387	8.081	71.525	22.64	22.38	22.51	18.55	12.74	7406.52
72	650.575	108.911	34.33	8.581	0.389	8.191	71.559	22.30	22.23	22.26	18.38	12.56	7303.24
73	650.550	110.449	34.10	8.783	0.403	8.380	71.593	23.27	23.79	23.53	19.48	13.19	7678.58
74	650.677	111.958	33.92	8.912	0.421	8.491	71.640	23.24	22.94	23.09	19.16	12.89	7507.42
75	650.731	113.584	33.69	9.099	0.421	8.678	71.683	23.66	24.20	23.93	19.91	13.27	7741.19
76	650.713	115.171	33.50	9.251	0.422	8.829	71.718	24.29	24.80	24.55	20.47	13.55	7908.98
77	650.781	116.693	33.29	9.404	0.430	8.974	71.781	24.66	25.29	24.97	20.88	13.71	8006.86
78	650.807	118.190	33.06	9.558	0.437	9.121	71.855	25.27	25.28	25.28	21.18	13.79	8062.85
79	650.942	119.810	32.80	9.724	0.426	9.298	71.952	25.36	24.52	24.94	20.97	13.51	7909.32
80	650.972	121.388	32.53	9.908	0.439	9.468	72.039	24.93	25.39	25.16	21.21	13.53	7929.02
81	650.936	122.991	32.27	10.058	0.467	9.591	72.143	25.97	25.95	25.96	21.95	13.86	8134.81
82	651.107	124.643	31.97	10.264	0.450	9.814	72.239	25.92	26.91	26.42	22.41	13.99	8218.72

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83	651.134	126.349	31.77	10.419	0.453	9.966	72.279	25.96	26.95	26.45	22.49	13.93	8192.68
84	651.148	128.009	31.51	10.626	0.489	10.137	72.333	26.83	27.43	27.13	23.13	14.18	8350.40
85	651.208	129.604	31.32	10.806	0.441	10.365	72.348	26.45	27.37	26.91	22.99	13.99	8244.73
86	651.274	131.294	31.11	10.987	0.463	10.524	72.376	27.36	28.02	27.69	23.71	14.31	8441.15
87	651.453	132.842	30.90	11.162	0.464	10.698	72.408	27.60	28.26	27.93	23.96	14.34	8471.27
88	651.476	134.405	30.71	11.336	0.472	10.864	72.427	27.21	27.44	27.33	23.49	13.96	8250.92
89	651.647	135.975	30.47	11.543	0.471	11.072	72.463	28.06	28.79	28.43	24.50	14.41	8531.91
90	651.711	137.642	30.26	11.726	0.464	11.262	72.482	28.53	28.49	28.51	24.63	14.37	8515.19
91	651.803	139.205	30.05	11.898	0.470	11.428	72.520	28.27	28.29	28.28	24.48	14.16	8401.78
92	651.931	140.807	29.82	12.122	0.484	11.638	72.527	29.15	28.99	29.07	25.22	14.46	8587.78
93	652.006	142.515	29.60	12.309	0.474	11.835	72.561	28.86	29.59	29.23	25.41	14.44	8584.69
94	652.147	144.133	29.36	12.522	0.485	12.037	72.589	29.35	30.15	29.75	25.93	14.59	8685.45
95	652.267	145.681	29.13	12.735	0.495	12.240	72.604	29.94	30.45	30.19	26.37	14.70	8763.94
96	652.295	147.308	28.91	12.903	0.501	12.402	72.657	29.91	30.72	30.31	26.53	14.66	8748.14
97	652.370	148.967	28.72	13.084	0.493	12.591	72.668	30.52	30.70	30.61	26.84	14.71	8790.03
98	652.419	150.419	28.46	13.312	0.503	12.809	72.702	30.66	30.53	30.59	26.90	14.58	8724.49
99	652.550	152.093	28.18	13.542	0.515	13.027	72.753	30.75	30.66	30.70	27.06	14.50	8690.71
100	652.686	153.704	27.95	13.735	0.512	13.223	72.785	30.44	30.91	30.68	27.10	14.38	8631.83
101	652.645	155.332	27.64	13.983	0.510	13.473	72.845	31.12	31.61	31.36	27.78	14.55	8752.31
102	652.749	156.935	27.43	14.172	0.519	13.653	72.871	30.68	31.05	30.86	27.39	14.22	8561.68
103	652.795	158.544	27.16	14.397	0.523	13.874	72.919	30.81	31.39	31.10	27.67	14.19	8563.29
104	652.813	160.075	26.88	14.648	0.527	14.121	72.948	30.90	31.49	31.19	27.83	14.10	8522.61
105	652.883	161.664	26.61	14.858	0.533	14.325	73.001	31.42	31.72	31.57	28.23	14.14	8562.03
106	652.952	163.322	26.30	15.100	0.507	14.593	73.074	30.96	31.63	31.30	28.06	13.87	8412.71
107	653.034	164.781	26.06	15.318	0.521	14.797	73.095	30.81	31.11	30.96	27.81	13.60	8263.82
108	653.124	166.528	25.75	15.591	0.505	15.086	73.132	29.80	29.82	29.81	26.85	12.95	7887.56
109	653.142	168.084	25.43	15.873	0.468	15.405	73.166	25.60	25.67	25.63	23.15	11.01	6719.09
110	653.241	169.806	25.13	16.132	0.477	15.655	73.206	25.07	25.76	25.41	23.01	10.79	6602.34
111	653.218	171.376	24.84	16.375	0.460	15.915	73.259	25.33	25.47	25.40	23.05	10.67	6540.64
112	653.307	173.083	24.53	16.610	0.476	16.134	73.337	25.89	25.37	25.63	23.32	10.64	6538.74

113	653.373	174.839	24.20	16.864	0.465	16.399	73.408	26.08	26.08	26.08	23.79	10.69	6586.44
114	653.409	176.459	23.93	17.084	0.465	16.619	73.460	25.67	26.31	25.99	23.76	10.54	6508.71
115	653.444	178.261	23.55	17.377	0.476	16.901	73.546	24.93	25.75	25.34	23.23	10.12	6271.13
116	653.383	179.745	23.19	17.666	0.463	17.203	73.615	24.03	24.13	24.08	22.14	9.48	5891.96
117	653.474	181.539	22.81	17.971	0.455	17.516	73.688	22.26	22.68	22.47	20.71	8.71	5431.37
118	653.536	183.232	22.40	18.280	0.428	17.852	73.788	19.52	19.39	19.45	17.98	7.41	4638.68
119	653.635	184.761	21.99	18.622	0.386	18.236	73.859	14.90	15.08	14.99	13.90	5.61	3525.73
120	653.720	186.357	21.56	18.941	0.388	18.553	73.973	15.14	15.11	15.13	14.07	5.56	3505.80





Photographs after Test

