



Energy - Upstream Design Appraisal Document

Lloyd's Register EMEA
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Quote this reference on all future communications
CESD/1091882/WGR/O-17520

CLIENT: MECH-TOOL ENGINEERING LIMITED
 SUBJECT: MECHANICAL, THERMODYNAMIC AND ACOUSTIC PERFORMANCE OF STAINLESS STEEL VENTILATED CLADDING SYSTEM OF MECH-TOOL ENGINEERING LIMITED MANUFACTURE

- The documents and drawings listed below have been examined with respect to structural aspects for compliance with AISC ASD:

Document No.	Rev.	Title	Status
Technical Note MTE0012	1	The Performance of Mech-Tool Ventilated Radiant Heatshields	AC
MT-CAL-70002-01	0	Technical Report The Mechanical, Thermal, Aerodynamic and Acoustic Performance of Mech-Tool Engineering Limited's Ventilated Cladding System	AC

Drawing No.	Rev.	Title	Status
EC70002/70002-0003	1	Radiant Heatshield Tests Test Specimen Single Skin	RI
EC70002/70002-0004	1	Radiant Heatshield Testing Test Specimen Double Skin	RI

2. Conditions of Acceptance

- The heatshields and their connections have been designed and appraised in accordance with the thermal performances tabulated below, which were established by the Building Research Establishment and documented in BRE Global test report no. 264852, dated 13 September 2010 entitled *The Thermodynamic Performance of Mech-Tool Engineering's Ventilated Cladding Product*

Panel Type	Average Incident Heat Flux Reduction (%)						
	Distance from Back Face of the Panel (mm)						
	1850	1500	1000	750	500	250	58
Single Skin - 40% Open Area	95	94	91	89	86	81	64
Single Skin - 32% Open Area	96	95	92	89	87	82	69
Single Skin - 23% Open Area	97	97	95	93	91	88	76
Double Skin Panel	98	98	97	95	95	94	91

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2.2 The heatshields and their connections have been designed and appraised in accordance with the aerodynamic performances tabulated below, which were established by the Building Research Establishment and documented in BRE Global test report no. 260-261, entitled *The Aerodynamic Performance of Mech-Tool Engineering's Ventilated Cladding Product*.

Panel Type	Average Percentage Wind Velocity Reduction (%)					
	Distance from Back Face of the Panel (mm)					
	65	365	565	940	1065	1565
Single Skin - 40% Open Area	62.6	72.2	73.6	84.4	88.5	96.5
Single Skin - 32% Open Area	72.1	81.1	81.4	91.5	94.6	98.2
Single Skin - 23% Open Area	76.2	87.5	89.1	97.2	98.1	97.9
Double Skin Panel	80.1	94.1	93.5	97.9	98.1	98.8

2.3 The results of the testing summarised in BRE Global test report no. 260262, dated 5 May 2010 entitled *The Acoustic Performance of Mech-Tool Engineering Ventilated Cladding Product* were such that it was determined that the introduction of the cladding panels to the supporting frame caused no direct increase in noise measured (within the limits of experimental error).

2.4 The mechanical performances of the heatshields and their connections, tabulated below, have been designed and appraised using design documentation presented in document Technical Note MTE0012 *The Performance of Mech-Tool Ventilated Radiant Heatshields Rev 1*

Maximum Pressure on Single Skin Perforated Heatshield - mbar									
Panel Span (mm)	40% Open Area Single Skin			32% Open Area Single Skin			23% Open Area Single Skin		
	1.5 thk	2.0 thk	2.5 thk	1.5 thk	2.0 thk	2.5 thk	1.5 thk	2.0 thk	2.5 thk
500	830	1106	1383	1026	1367	1709	1319	1758	2198
1000	207	277	346	256	342	427	330	440	549
1500	92	123	154	114	152	190	147	195	244
2000	52	69	86	64	85	107	82	110	137
2500	33	44	55	41	55	68	53	70	88
3000	23	31	38	28	38	47	37	49	61
3500	17	23	28	21	28	35	27	36	45
4000	13	17	22	16	21	27	21	27	34
4500	10	14	17	13	17	21	16	22	27
5000	8	10	13	10	13	16	13	17	21

Maximum Pressure on Double Skin Perforated Heatshield - mbar									
Panel Span (mm)	40% Open Area Primary Skin			32% Open Area Primary Skin			23% Open Area Primary Skin		
	1.5 thk	2.0 thk	2.5 thk	1.5 thk	2.0 thk	2.5 thk	1.5 thk	2.0 thk	2.5 thk
500	789	1034	1289	975	1278	1593	1253	1643	2048
1000	197	258	322	244	319	398	313	411	512
1500	88	115	143	108	142	177	139	183	228
2000	49	65	81	61	80	100	78	103	128
2500	32	41	52	39	51	64	50	66	82
3000	22	29	36	27	35	44	35	46	57
3500	16	21	26	20	26	33	26	34	42
4000	12	16	20	15	20	25	20	26	32
4500	10	13	16	12	16	20	15	20	25
5000	8	10	13	10	13	16	13	16	20

In preparing this report, the undersigned surveyor is acting as an independent person in accordance with the applicable policy on conflict of interest.



GAVIN REID
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Appraisal Status Key

AC Approved/Accepted with conditions
RI Retained as supporting documentation for information only

