

TEMPERATURE CONTROLS PTY LTD

ACN: 075 298 592 ABN: 76 075 298 592



Quality
Endorsed
Company

7 YAMMA STREET SEFTON, NSW 2162 AUSTRALIA

PHONE: 61 2 9721 8644 FAX: 61 2 9738 9339

INTERNET: www.temperature.com.au EMAIL: sales@temperature.com.au

ISO9001:2000

Lic 14412

THEMOCOUPLS * RTD SENSORS * THERMOWELLS * EXTENSION CABLES * LEVEL SWITCHES

CLIENT: MGJV

PLANT: STANWELL
MAGNESIUM
PROJECT

JOB NO.: KG000


CLIENT ORDER NO.: CN-SAMPLE

Sample Calculation

INSTRUMENT CALCULATION SHEET FOR THERMOWELL STRESS

KWIKGATE DOCUMENT NO: KG000-I-CS-0001						PAGE: 1 OF 3
REVISION	DATE	PREP	VERI	APPR	STATUS	REVISION DETAILS
0	11/02/2003	GS	DDI	DDI	For Client Info	
MANUFACTURER NAME : Temperature Controls Pty Ltd						
MANUFACTURER DOCUMENT No. : TC-SAMPLE-01						
CLIENT DOCUMENT NO. : SAMPLE-001						

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 dillic@bigpond.net.au	KwikGate Pty Ltd ACN 72 050 816 227 ph : 61 (0)412 880 800 fax: 61 (0)2 9389 7838	Calculation Sheet for Thermowell Stress		Client Name: MgJV Plant Name: Stanwell Project Name.: Stanwell Magnesium Project Contract No.: CN-SAMPLE	
GENERAL		UNIT		Rev	
Tag No.			31-00-0-TW-413	0	
PID No.			31-B-301	0	
Measuring Pt. Description			MgCl2aq fm Evap VE-003 to Evap Recirc Pump PU-009A/B	0	
Line/Equipment No.			400-PP-31000111-N1-9	0	
DATA SOURCE					
Process Data Source			Client Data Sh. No.DS-31-J-TE-413 Sht 1 of 4 Rev.0	0	
Pipe Data Source			Client Data Sh. No.DS-31-J-TE-413 Sht 1 of 4 Rev.1	0	
Rated Conditions Data Source			Client Data Sh. No.DS-31-J-TE-413 Sht 1 of 4 Rev.2	0	
TW Data Source			Temperature Controls Pty Ltd	0	
Stress Data Source			AS1210	0	
Referenced Standard			ASME PTC 19.3.	0	
VIBRATION LIMITATION (DYNAMIC STRESS) ON STEM LENGTH "L"					
Fluid Velocity	m/s		1.74	0	
TW Bore Diameter	mm		6.5	0	
Stem Major Diameter	mm		28	0	
Stem Minor Diameter	mm		18	0	
Strouhal (wake) frequency			21	0	
Well Material			316	0	
Well Length	mm		330	0	
Operating Temperature Tf	°C		170	0	
Modul of Elasticity @ Tf	Pa		1.908E+11	0	
Specific Weight	kg/m ³		8025	0	
Constant			2.11	0	
Natural frequency	1/s		122	0	
Frequaney ratio (Max 0.8)			0.174	0	
Maximum permissible Well Length for Frequency ratio=0.8	mm		707	0	
Magnification Factor			0.03	0	
VIBRATION STRESS INSIDE THE TOLERANCE?			ACTUAL FREQUENCY RATIO OF 0.174 IS LESS THEN ALLOWED (DYNAMIC STRESS RELATED) OF 0.8 FOR THE SELECTED THERMOWELL MATERIAL AND LENGTH, FLUID VELOCITY AND OPERATING	YES	
BENDING STRESS LIMITATION (STATIC STRESS) ON STEM LENGTH "L"					
Fluid Velocity	m/s		1.74	0	
Well Material			316	0	
Operating Temperature Tf	°C		170	0	
Magnification Factor			0.03	0	
Allowable Stress @ Tf	Pa		103000000	0	
Density of flowing fluid	kg/m ³		1350	0	
Operating Pressure Pf	kPag		1000	0	
Constant 1			0.409	0	
Constant 2			37.77	0	
Constant 3			0.120	0	
Maximum Allowed Well Length	mm		2177	0	
BENDING STRESS INSIDE THE TOLERANCE?			ACTUAL THERMOWELL STEM LENGTH OF 330mm IS LESS THEN ALLOWED (STATIC STRESS RELATED) OF 2176.88mm FOR THE SELECTED THERMOWELL MATERIAL, FLUID VELOCITY AND OPERATING COND.	YES	
STATIC PRESSURE RELATED STRESS					
Maximum Rated Pressure P _D	kPag		1000	0	
Maximum Rated Temperature T _D	°C		170	0	
Allowable Stress @ T _D	Pa		103000000	0	
Constant 1			0.409226963	0	
Maximum Allowed Pressure	kPag		42150	0	
MAXIMUM PRESSURE STRESS INSIDE THE TOL			ACTUAL MAXIMUM RATED PRESSURE OF 1000 kPag IS LESS THEN ALLOWED (STRESS RELATED) OF 42150 kPag FOR THE SELECTED THERMOWELL MATERIAL 316.	YES	
VENDOR					
Vendor Name			Temperature Controls Pty Ltd	0	
Manufacturer Name			Temperature Controls Pty Ltd	0	
REMARKS					
Remark 1			This is Sample Calculation for the Client Info.	0	
Remark 2				0	
Remark 3				0	
Remark 4				0	
Remark 5				0	
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