SEALXPERT PRODUCTS

Composite Repair Engineering Calculation Report
For

Revision List					
0	23/6/2014	For submision	Yogesh	Sam	
Revision	Date	Description	Prepared By	Verified by	Approved by
Installation :		-			
Location :		-			
Project Title :		Leak repair on DN100 Pipe			
Project No :		-			

SEALXPERT COMPOSITE REPAIR ENGINEERING REPORT

1. CUSTOMER INFORMATION	
Company	-
Contact Person	-
Telephone	-
Email	-

2. PIPE DETAILS			
Installation	-		
Location	-		
Pipe Identification	NIL		
Pipe Material/ Grade	Carbon Steel	Nominal Pipe Dia.	4"
Pipe OD, D (inch)	4.5	Pipe ID (inch)	3.548
PipeWall Thk, t (inch)	0.226	Current Wall Thk, t_s (inch)	0.226
Pipe Schedule	SCH 40	Yield Strength, S (psi)	35,000
Medium	Water		
Design Temp, Min (°C)	-	Operating Temp Min (°C)	-
Design Temp, Max (°C)	120	Operating Temp Max, T_o (°C)	75
Design Pressure, P (psi)	2000	Operating Pressure (psi)	500
Install Temp, T_i (°C)	45	Install Pressure, P_{live} (psi)	0
Design Factor, Df	0.2	MAWP, Ps (psi) ASME B31G	1100

3. DEFECT INFORMATION			
Defect Location	Straight pipe section		
Defect Length, d (inch)	1	Defect Width (inch)	1
Percent of Wall Lost	0%	Repair in-service	Yes / No
Restriction on Surface Preparation	Nil		
Constraint during repair	Nil		
Repair Method	ASME PCC2: 2011 Article 4.1 & ISO 24817		
Repair Conditions	- Restricted to the following defects		
	(a) External corrosion or damage (e.g. dents, gouges, fretting or wear at supports)		
	(b) Internal corrosion and/ or erosion		
	(c) Leaks		
	(d) manufacturing or fabrication defects		

ITEM NO.	DESCRIPTION	VALUES
	ASME PCC2: 2011 ARTICLE 4.1 TYPE A DESIGN CASE	
1	**INSTALLATION DATA**	
	Service factor, f	0.67
	Wrap axial Tension strength, S_{wa} (psi)	37,000
	Axial Tensile and Thrust load on pipe, F (psi)	0
	Tensile Modulus of pipe, E_s (psi)	29,000,000
	Tensile Modulus of composite repair, E_c (psi)	3,500,000
	Thickness of each layers (inch)	0.032
	Long term strength of laminate, S_{lt} (psi)	37,000
	Specified Minimum Yield Strength (SMYS) of pipe, s (psi)	25,000
	Thermal expansion coefficient of pipe, α_s	6.50E-06
	Thermal expansion coefficient of composite repair, α_c	1.77E-06
	Temperture derating factor, f_T	1.01
	Allowable Axial strain for repair laminate, ε_{ao}	0.0025
	Allowable Circumferential strain for repair laminate, ε_{co}	0.003
	Poisson ratio of composite repair, v_{ca}	0.20
2	**FORMULA**	
	Repair thickness (mm), $t_{repair} = \frac{PD}{2E_c t_{repair}} - s\frac{t_s}{E_c t_{repair}} - \frac{P_{live}D}{2(E_c t_{repair} + E_s t_s)}$	0
	Allowable circumferential strain $\epsilon_c = f_T \epsilon_{c0} - \Delta T\,(\alpha_s - \alpha_c)$	2.38E-03
	Repair thickness (mm), $t_{repair} = \frac{1}{\epsilon_c E_c}\left(\frac{PD}{2} - st_s\right)$	0.00
	Minimum repair thickness (mm) (circumferential direction) $t_{min} = \frac{1}{\epsilon_c}\left(\frac{PD}{2}\frac{1}{E_c} - \frac{F}{\pi D}\frac{v_{ca}}{E_c}\right)$	13.70
	Minimum repair thickness (mm) (axial direction) $t_{min} = \frac{1}{\epsilon_a}\left(\frac{F}{\pi D}\frac{1}{E_a} - \frac{PD}{2}\frac{v_{ca}}{E_c}\right)$	0.00
	No of layers $n = \frac{t_{repair}}{t_{layer}}$	16.76
	No of layers (axial direction) $n_{axial} = \frac{t_{repair}}{t_{layer}}$	0.00
	Axial length of repair (mm) $L_{over} = 2.5\sqrt{(Dt)/2}$	45.28
	Axial length of taper (mm) $l_{taper} = 5(t_{repair} + \textit{epoxy thickness})$	30
	Total length of repair (mm) $L = 2L_{over} + L_{defect} + 2L_{taper}$	175.96

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ITEM NO.	DESCRIPTION	VALUES
3	MATERIAL REQUIRED	
	Size of Unocated fiberglass repair tapes to be applied	-
	Layers of uncoated fiberglass repair tapes	17.0
	Quantity of Wrap Seal PLUS Wet-Out A&B (1 KG)	9.0
	Type of SealXpert repair putty to be applied	-
	Quantity of SealXpert repair putty	-

Information provided by the customer shall be be used as the basis of the composite repair in accordance to ASME standards. When using this calculation report, the customer has agreed that:

(a) Seller & Manufacturer only obligation shall be to replace such quantity of products proven to be defectives. Responsibility of the Manufacturer and the Distributor is limited to replacement of the product only.

(b) Customer is to ensure that all proposed repairs must be installed or supervised by Certificed Applicator or Technicians.

(c) Neither seller nor manufacturer shall be liable for any injury, loss nor damage, direct or consequential, arising out of the use of or inability to use the products.