TANAMI EXPANSION 2 (TE 2)

PE16D - WALL THICKNESS

CALCULATION

DOCUMENT NO: TE2-00000-50CA-S4081-000003
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Rev	Date	Description	Initiated	Checked	Approved
A	13/02/2020	Issued for Internal Review	L Scott	R Kanyika	K Wiehl
0	21/02/2020	Issued for Use	L Scott	R Kanyika	K Wiehl
1	06/05/2020	Re-issued for Use	L Scott	R Kanyika	K Wiehl
			Lucas Scott 2020.05.07 11:11:07 +02'00'	Rex Kanyika 2020.05.07 11:38:38 +02'00'	Karl Wiehl 2020.05.07 12:37:55 +02'00'

REVISION CONTROL

Revision Number	Purpose / Change	Author	Date
A	Issued for Internal Review	L Scott	13/02/2020
0	Update Internal Review Comments and Issued for Use	L Scott	21/02/2020
1	Alignment Change PE16M to PE16D and Re-issued for Use	L Scott	06/05/2020

PE16D - WALL THICKNESS CALCULATION

1) Static Water Pressure in System

formula:

Pr = ρgh

Line Size	20	25	32	40	50	63	75	90	110	125	140	160	180	200	225	250	280	315
Inputs:																		
where:																		
unit:																		
ρ = Rho - Density of Fluid (fluid density as determined by Process Eng group) kg/m³	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00	1000.00
g = Gravitational Force m/s²	9.81	9.81	9.81	9.81	9.81	9.81	9.81	9.81	9.81	9.81	9.81	9.81	9.81	9.81	9.81	9.81	9.81	9.81
h = Total Vertical length of Pipe Line m	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Outputs:																		
Pr = Internal design static pressure Pa	981000	981000	981000	981000	981000	981000	981000	981000	981000	981000	981000	981000	981000	981000	981000	981000	981000	981000
Pr = Internal design static pressure MPa	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98

2) Wall Thickness required for Static Pressure Only

formula:

Pressure design wall thickness

T = PDm / (2S + P)

Design Stress

S = MRS / C

Line Size	20	25	32	40	50	63	75	90	110	125	140	160	180	200	225	250	280	315
Inputs:																		
where:																		
unit:																		
P = Maximum design operating pressure MPa	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Dm = Minimum outside dia of pipe as listed in tables of standards mm	20.00	25.00	32.00	40.00	50.00	63.00	75.00	90.00	110.00	125.00	140.00	160.00	180.00	200.00	225.00	250.00	280.00	315.00
MRS = Minimum required strength = PE rating (i.e. PE100 = 10MPa) MPa	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
C = Overall service (design) coefficient	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
S = Design Stress MPa	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Pressure de-rating factor (to temperature 20ºc - 25ºc)	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Outputs:																		
T = Minimum required wall thickness mm	1.155	1.444	1.849	2.311	2.889	3.640	4.333	5.199	6.355	7.221	8.088	9.243	10.399	11.554	12.998	14.443	16.176	18.198
Minimum required wall thickness to temperature de-rating factor mm	1.424	1.780	2.278	2.847	3.559	4.485	5.339	6.407	7.830	8.898	9.966	11.390	12.813	14.237	16.017	17.796	19.932	22.423
Next minimum standard manufacturers wall thickness available mm	1.800	2.300	2.900	3.600	4.500	5.700	6.800	8.200	10.000	11.400	12.700	14.500	16.400	18.200	20.500	22.700	25.500	28.600
Material Grade Selected	PE100	PN16	PN16	PN16	PN16	PN16	PN16	PN16	PN16	PN16	PN16	PN16	PN16	PN16	PN16	PN16	PN16	PN16
Selected SDR	SDR 11	SDR 11	SDR 11	SDR 11	SDR 11	SDR 11	SDR 11	SDR 11	SDR 11	SDR 11	SDR 11	SDR 11	SDR 11	SDR 11	SDR 11	SDR 11	SDR 11	SDR 11
Pressure Rating	PN16	PN16	PN16	PN16	PN16	PN16	PN16	PN16	PN16	PN16	PN16	PN16	PN16	PN16	PN16	PN16	PN16	PN16