
79319846_komplett

07/26/2005 ASU KOSICE

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REBIS

AutoPIPE 6.20 MODEL PAGE 2

**
** AUTOPIPE SYSTEM INFORMATION **
**

SYSTEM NAME : 79319846_komplett

PROJECT ID : ASU KOSICE

DESCRIPTION :

PREPARED BY : _____
WEGSTEIN

CHECKED BY : _____
FRICKHOEFER

PIPING CODE : B31.3

VERTICAL AXIS : Z

AMBIENT TEMPERATURE : 20.0 deg C

COMPONENT LIBRARY : HANAU_AL

MATERIAL LIBRARY : AUTOB313

MODEL REVISION NUMBER : 0

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C O M P O N E N T D A T A L I S T I N G

*** SEGMENT A , LINE # 79319846

From A01 to A02, DX= 499.68 mm, DY= -349.88 mm, L= 610.00 mm Run

PIPE DATA:

Pipe Id= 400MX6.0, Material= AL, Poisson= 0.300, Nom Size= 400 mm,
OD= 406.00 mm, Sch= NS, Wall Thk= 101.500 mm, Mill= 12.688 mm, Cor= 0 mm,
Pipe Density= 2707.12 kg/m3, Pipe Unit Wgt= 2577.69 N/m, Insul Thk= 0 mm,
Lining Thk= 0 mm, Long Weld factor= 1.00, Circ Weld factor= 1.00,
Long Modulus= 0.06899 x10⁶ N/m, Hoop Modulus= 0.06899 x10⁶ N/m,
Shear Modulus= 0.02653 x10⁶ N/m, Sc= 103.4 N/mm2, Syc= 0 N/mm2

OPERATING DATA:

P1= 0 N/mm2, T1= -196.00 deg C, Exp1= -3.84587 mm/m,
E1= 0.07646 x10⁶ N/m, Sh1= 71.00 N/mm2

POINT DATA:

A01, Coordinates, X= 0.00 mm, Y= 0.00 mm, Z= 0.00 mm

From A02 to A04, DZ= 2471.78 mm Bend

COMPONENT DATA (Bend, TIP= A02, Near= A02 N, Far= A02 F):

Elbow, Radius= 609.99 mm, Bend angle= 90.00 deg, End flanges= 0,
Flex= 1.000, SIFI= 1.00, SIFO= 1.00

PIPE DATA (A02 F to A04 N):

Pipe Id= 400MX4.0, Nom Size= 400 mm, Sch= 4.0, Wall Thk= 4.000 mm,
Mill= 0.500 mm

POINT DATA:

A02, Coordinates, X= 499.68 mm, Y= -349.88 mm, Z= 0.00 mm
A02 N, Coordinates, X= 0.01 mm, Y= 0.00 mm, Z= 0.00 mm
A02 F, Coordinates, X= 499.68 mm, Y= -349.88 mm, Z= 609.99 mm

SUPPORT DATA:

A02 N, Anchor, KTX= Rigid, KTY= Rigid, KTZ= Rigid, KRX= Rigid,
KRY= Rigid, KRZ= Rigid

From A04 to A05, DX= -499.68 mm, DY= 349.88 mm, L= 610.00 mm Bend

COMPONENT DATA (Bend, TIP= A04, Near= A04 N, Far= A04 F):

Elbow, Radius= 609.99 mm, Bend angle= 90.00 deg, End flanges= 0,
Flex= 1.000, SIFI= 1.00, SIFO= 1.00

PIPE DATA (A04 N to A04 F):

Pipe Id= 400MX6.0, Nom Size= 400 mm, Sch= NS, Wall Thk= 101.500 mm,
Mill= 12.688 mm

POINT DATA:

A04, Coordinates, X= 499.68 mm, Y= -349.88 mm, Z= 2471.78 mm
A04 N, Coordinates, X= 499.68 mm, Y= -349.88 mm, Z= 1861.79 mm

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C O M P O N E N T D A T A L I S T I N G

A04 F, Coordinates, X= 0.01 mm, Y= 0.00 mm, Z= 2471.78 mm

A05, Coordinates, X= 0.00 mm, Y= 0.00 mm, Z= 2471.78 mm

SUPPORT DATA:

A04 F, Anchor, KTX= Rigid, KTY= Rigid, KTZ= Rigid, KRX= Rigid,
KRY= Rigid, KRZ= Rigid

Number of points in the system: 8

Weight of Empty Pipes + Weight of Contents = Total Weight of System
520.8 kg + 0.0 kg = 520.8 kg

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C O O R D I N A T E S D A T A L I S T I N G

POINT -----COORDINATE (mm) -----
NAME X Y Z

*** SEGMENT A , LINE # 79319846
A01 0.00 0.00 0.00
A02 N 0.01 0.00 0.00
A02 499.68 -349.88 0.00
A02 F 499.68 -349.88 609.99
A04 N 499.68 -349.88 1861.79
A04 499.68 -349.88 2471.78
A04 F 0.01 0.00 2471.78
A05 0.00 0.00 2471.78

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P I P E D A T A L I S T I N G

Pipe ID/ Material	Nom/ Sch	O.D. mm	-----Thickness(mm)----- W.Th. Corr Mill Insu Ling	Spec Grav	Weight(N/m) Pipe Other Total	ZL/ ZC
400MX6.0 AL	400 NS	406.00	101.5 0 13 0 0	0	2578 0 2578	1.00 1.00
400MX4.0 AL	400 4.0	406.00	4.000 0 0.50 0 0	0	134 0 134	1.00 1.00

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M A T E R I A L D A T A L I S T I N G

Material Name	Pipe ID	Density kg/m3	Pois. Ratio	Temper. deg C	Modulus x10 ⁶ N/ Axial	Hoop	Shear	Expans. mm/m
AL	400MX6.0	2707.1	0.30	20.0 -196.0	0.06899 0.07646	0.06899	0.02653	-3.8459
AL	400MX4.0	2707.1	0.30	20.0 -196.0	0.06899 0.07646	0.06899	0.02653	-3.8459

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M A T E R I A L A L L O W A B L E D A T A L I S T I N G

Material Name	Pipe ID	Temper. deg C	Allow. N/mm2	Yield N/mm2
AL	400MX6.0	20.0 -196.0	103.42 71.00	0.00
AL	400MX4.0	20.0 -196.0	103.42 71.00	0.00

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TEMPERATURE AND PRESSURE DATA

	-----C A S E 1-----			-----C A S E 2-----			-----C A S E 3-----		
POINT	PRESS.	TEMPER	EXPAN.	PRESS.	TEMPER	EXPAN.	PRESS.	TEMPER	EXPAN.
NAME	N/mm2	deg C	mm/m	N/mm2	deg C	mm/m	N/mm2	deg C	mm/m

*** SEGMENT A , LINE # 79319846

A01	0	-196	-3.846
A05	0	-196	-3.846

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H O T M O D U L U S (x10⁶ N/)

POINT

NAME	CASE 1	CASE 2	CASE 3
------	--------	--------	--------

*** SEGMENT A , LINE # 79319846

A01 0.07646

A05 0.07646

* Non-standard material

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	H O T			A L L O W A B L E S (N/mm2)					
	-----C A S E 1-----			-----C A S E 2-----			-----C A S E 3-----		
POINT	NOT	NOT		NOT	NOT		NOT	NOT	
NAME	ALLOW	USED	USED	ALLOW	USED	USED	ALLOW	USED	USED
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

*** SEGMENT A , LINE # 79319846

A01 71.00*

A05 71.00*

< User-defined code allowable

* Non-code material

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THERMAL ANCHOR MOVEMENTS AND DISPLACEMENTS

POINT NAME	LOAD CASE	DX (mm)	DY (mm)	DZ (mm)	RX (deg)	RY (deg)	RZ (deg)
A02 N	Thermal 1	-3.80	2.70	-117.80	0.000	0.000	0.000
A04 F	Thermal 1	-3.80	2.70	-127.90	0.000	0.000	0.000

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Point name	Load combination	TRANSLATIONS (mm)			ROTATIONS (deg)		
		X	Y	Z	X	Y	Z
*** Segment A begin		*** Line # 79319846					
A01	T1	-3.800	2.700	-117.800	0.000	0.000	0.000
A02 N	T1	-3.800	2.700	-117.800	0.000	0.000	0.000
A02 F	T1	-5.613	3.969	-120.271	0.007	0.010	0.000
A04 N	T1	-5.613	3.969	-125.429	-0.007	-0.010	0.000
A04 F	T1	-3.800	2.700	-127.900	0.000	0.000	0.000
A05	T1	-3.800	2.700	-127.900	0.000	0.000	0.000
*** Segment A end		*** Line # 79319846					

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R E S T R A I N T R E A C T I O N S

Point name	Load combination	FORCES (N)				MOMENTS (Nm)			
		X	Y	Z	Result	X	Y	Z	Result
A02 N	Anchor T1	0	0	-95947	95947	32212	46003	0	56160
A04 F	Anchor T1	0	0	95947	95947	-32212	-46003	0	56160

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G L O B A L F O R C E S & M O M E N T S

Point name	Load combination	X	FORCES (N Y	Z	Result	X	MOMENTS (Nm Y	Z	Result
*** Segment A begin *** Line # 79319846									
A01	T1	0	0	0	0	0	0	0	0
A02 N-	T1	0	0	0	0	0	0	0	0
A02 N+	T1	0	0	95947	95947	-32212	-46003	0	56160
A02 F	T1	0	0	95947	95947	1358	1939	0	2367
A04 N	T1	0	0	95947	95947	1358	1939	0	2367
A04 F-	T1	0	0	95947	95947	-32212	-46003	0	56160
A04 F+	T1	0	0	0	0	0	0	0	0
A05	T1	0	0	0	0	0	0	0	0
*** Segment A end *** Line # 79319846									

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ASME B31.3S (2001) CODE COMPLIANCE									
(Moments in Nm)						(Stress in N/mm2)			
Point	Load	In-Pl.	Out-Pl.	Torsion	S.I.F	Eq. Load	Code	Code	
name	combination	Moment	Moment	Moment	In Out	no. type	Stress	Allow.	

A01	Max P					(3a) HOOP	0	71
	Max P	0	0	1.00	1.00	(18) SUST	0	71
	Cold to T1	0	0	0	1.00	1.00	(17) DISP	0
A02 N-	Max P					(3a) HOOP	0	71
	Max P	0	0	1.00	1.00	(18) SUST	0	71
	Cold to T1	0	0	0	1.00	1.00	(17) DISP	0
A02 N+	Max P					(3a) HOOP	0	71
	Max P	0	0	1.00	1.00	(18) SUST	0	71
	Cold to T1	56160	0	0	1.00	1.00	(17) DISP	9
A02 F-	Max P					(3a) HOOP	0	71
	Max P	0	0	1.00	1.00	(18) SUST	0	71
	Cold to T1	2367	0	0	1.00	1.00	(17) DISP	0
A02 F+	Max P					(3a) HOOP	0	71
	Max P	0	0	1.00	1.00	(18) SUST	0	71
	Cold to T1	1939	1358	0	1.00	1.00	(17) DISP	5
A04 N-	Max P					(3a) HOOP	0	71
	Max P	0	0	1.00	1.00	(18) SUST	0	71
	Cold to T1	1939	1358	0	1.00	1.00	(17) DISP	5
A04 N+	Max P					(3a) HOOP	0	71
	Max P	0	0	1.00	1.00	(18) SUST	0	71
	Cold to T1	2367	0	0	1.00	1.00	(17) DISP	0
A04 F-	Max P					(3a) HOOP	0	71
	Max P	0	0	1.00	1.00	(18) SUST	0	71
	Cold to T1	56160	0	0	1.00	1.00	(17) DISP	9
A04 F+	Max P					(3a) HOOP	0	71
	Max P	0	0	1.00	1.00	(18) SUST	0	71
	Cold to T1	0	0	0	1.00	1.00	(17) DISP	0
A05	Max P					(3a) HOOP	0	71
	Max P	0	0	1.00	1.00	(18) SUST	0	71
	Cold to T1	0	0	0	1.00	1.00	(17) DISP	0

*** Segment A end *** Line # 79319846

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S Y S T E M S U M M A R Y

Maximum displacements (mm)

Maximum X :	-5.613	Point : A04 N	Load Comb.: T1
Maximum Y :	3.969	Point : A04 N	Load Comb.: T1
Maximum Z :	-127.900	Point : A04 F	Load Comb.: T1
Max. total:	127.985	Point : A04 F	Load Comb.: T1

Maximum rotations (deg)

Maximum X :	-0.007	Point : A04 N	Load Comb.: T1
Maximum Y :	-0.010	Point : A04 N	Load Comb.: T1
Maximum Z :	0.000	Point : A04 N	Load Comb.: T1
Max. total:	0.012	Point : A04 N	Load Comb.: T1

Maximum restraint forces (N)

Maximum X :	0	Point : A04 F	Load Comb.: T1
Maximum Y :	0	Point : A04 F	Load Comb.: T1
Maximum Z :	-95947	Point : A02 N	Load Comb.: T1
Max. total:	95947	Point : A02 N	Load Comb.: T1

Maximum restraint moments (Nm)

Maximum X :	-32212	Point : A04 F	Load Comb.: T1
Maximum Y :	-46003	Point : A04 F	Load Comb.: T1
Max. total:	56160	Point : A04 F	Load Comb.: T1

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S Y S T E M S U M M A R Y

Maximum pipe forces (N)

Maximum X :	0	Point : A04 F	Load Comb.: T1
Maximum Y :	0	Point : A04 F	Load Comb.: T1
Maximum Z :	95947	Point : A02 N	Load Comb.: T1
Max. total:	95947	Point : A02 N	Load Comb.: T1

Maximum pipe moments (Nm)

Maximum X :	-32212	Point : A04 F	Load Comb.: T1
Maximum Y :	-46003	Point : A04 F	Load Comb.: T1
Maximum Z :	0	Point : A04 F	Load Comb.: T1
Max. total:	56160	Point : A04 F	Load Comb.: T1

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S Y S T E M S U M M A R Y

Maximum displacement stress

Point : A04 F
Stress N/mm2 : 9
Allowable N/mm2 : 147
Ratio : 0.06
Load combination : Cold to T1

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S Y S T E M S U M M A R Y

Maximum displacement stress ratio

Point : A04 F
Stress N/mm2 : 9
Allowable N/mm2 : 147
Ratio : 0.06
Load combination : Cold to T1

* * * The system satisfies ASME B31.3 code requirements * * *
* * * for the selected options * * *