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INPUT SUMMARY

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-  
FLUID PACKAGE: Basis-1(ASME Steam)
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-  
Property Package Type: AsmeSteamPkg  
Component List - 1: H2O /
```

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-  
FLOWSCHEET: Main
```

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-  
Fluid Package: Basis-1
```

UNIT OPERATION: PIPE (Pipe Segment)

Feed Stream = water input

Product Stream = water Out

Energy Stream = Q-100

GravityEnergyChange = 0 kJ/h

Segment Data: PipeSegmentNumber = 1 PipeLength = 500 m PipeNominalDiameter = 101.6

mmPipeSchedule = Schedule 40 PipeNominalDiameterSelection = 100

mmFittingOrPipeRoughness = 4.572e-05 m RadialHeatLosses = True

PlotOption = 1

PHCalcOption = 0

CorrosionModel = de Waard Model 1995

DoCalcCheck = False

DoPHCalc = False

MaterialCompFactor = Normalised steels

PlotOption = 0

ErosionModelConst = User Defined

DoCalcCheck = False

ErosionConst = 100

DoCalculations = False

Algorithm = 0

ModelOverride = False

VaporCalculationMode = 2

InitPressSelection = 2

```
PlotTypeSelected = 0
ProfileTypeSelected = 0
InitTempSelection = 0
StepTemperature = 5 C
MaxHIter = 100
```

STREAM: Q-100 (Energy Stream)
Heat Flow = 0 kJ/h

STREAM: water Out (Material Stream)

STREAM: water input (Material Stream)
Temperature = 25 C
Pressure = 1000 kPa
Mass Flow = 10000 kg/h
Composition Basis (In Mass Fractions):H2O = 1/

#####

OUTPUT SUMMARY

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Company Name Not Available Case Name: NoName.hsc
Bedford, MA
USA Unit Set: SI

Date/Time: Sat Dec 13 18:44:29 2025

Basis-1 (Fluid Package): Component List

Fluid Package: Basis-1

COMPONENT LIST

Component List - 1 [HYSYS Databanks]

COMPONENT	TYPE	MOLECULAR WEIGHT	BOILING PT (C)	IDEAL LIQ DENSITY (kg/m3)	CRITICAL TEMP (C)
H2O	Pure	18.02	100.0	998.0	374.1

(Continued..) Component List - 1 [HYSYS Databanks]

COMPONENT	CRITICAL PRES (kPa)	CRITICAL VOL (m ³ /kgmole)	ACENTRICITY	HEAT OF FORM (kJ/kgmole)
H2O	2.212e+004	5.710e-002	0.3440	-2.418e+005

Case (Simulation Case): Mass and Energy Balance, Utility Balance, Process CO2 Emissions

Simulation Case: Case

OVERALL MASS BALANCE

In Stream	Count	Mass Flow (kg/h)	Out Stream	Count	Mass Flow (kg/h)
water input	Yes	1.000e+004	water Out	Yes	1.000e+004
Total In MassFlow (kg/h)		1.000e+004	Total Out MassFlow (kg/h)		1.000e+004
Mass Imbalance (kg/h)		0.0000	Rel Mass Imbalance Pct (%)		0.00

OVERALL ENERGY BALANCE

InStream	Count	Energy Flow (kJ/h)	OutStream	Count	Energy Flow (kJ/h)
water input	Yes	-1.582e+08	water Out	Yes	-1.582e+08
		Q-100		Yes	0.000e-01
Total In EnergyFlow (kJ/h)		-1.582e+008	Total Out EnergyFlow (kJ/h)		-1.582e+008
Energy Imbalance (kJ/h)		0.0000	Rel Energy Imbalance Pct (%)		-0.00

OVERALL UTILITY BALANCE

Utility Name	Usage Info	Energy Flow	Mass Flow	Cost
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Hot Utility Summary		Cold Utility Summary	
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Utility Flow	---	Utility Flow	---
Utility Cost	---	Utility Cost	---
Carbon Emiss.	---	Carbon Emiss.	---
Carbon Fees	---	Carbon Fees	---

PROCESS CO2 EMISSIONS

Inlet Stream	Count	IPCC (1995)	IPCC (2007)	EPA (2009)	IPCC (2016)	IPCC (2021)
		(kg/h)	(kg/h)	(kg/h)	(kg/h)	(kg/h)
water input	Yes	0.000e-01	0.000e-01	0.000e-01	0.000e-01	0.000e-01
Total from Inlets	---	---	---	---	---	---
Total Carbon Fees from Inlets (Cost/s)				0.000e-01	0.000e-01	0.000e-01
0.000e-01	0.000e-01					
Outlet Stream	Count	IPCC (1995)	IPCC (2007)	EPA (2009)	IPCC (2016)	IPCC (2021)
		(kg/h)	(kg/h)	(kg/h)	(kg/h)	(kg/h)
water Out	Yes	0.000e-01	0.000e-01	0.000e-01	0.000e-01	0.000e-01
Total from Outlets	---	---	---	---	---	---
Total Carbon Fees from Outlets (Cost/s)				0.000e-01	0.000e-01	0.000e-01

0.000e-01 0.000e-01

All Material Streams (Case (Main)+ Templates): Conditions, Composition, K Value, Acid Gas Performance, Package Properties, H2 Conversion, Attachments

Material Stream: water Out

Fluid Package: Basis-1

Property Package: ASME Steam

CONDITIONS

	OVERALL	AQUEOUS PH.
Vapour / Phase Fraction	0.0000	1.0000
Temperature: (C)	25.00	25.00
Pressure: (kPa)	993.4	993.4
Molar Flow (kgmole/h)	555.1	555.1
Mass Flow (kg/h)	1.000e+004	1.000e+004
Std Ideal Liq VolFlow (m3/h)	10.02	10.02
Molar Enthalpy (kJ/kgmole)	-2.850e+05	-2.850e+05
Molar Entropy (kJ/kgmole-C)	6.609e+00	6.609e+00
Heat Flow (kJ/h)	-1.582e+08	-1.582e+08
Liq VolFlow @Std Cond (m3/h)	10.01	10.01

COMPOSITION

Overall Phase Vapour Fraction 0.0000

COMPONENTS	MOLE FLOW	MOLE FRAC	MASS FLOW	MASS FRAC	LIQVOL FLOW	LIQVOL FRAC
	(kgmole/h)		(kg/h)		(m3/h)	
H2O	555.1	1.0000	1.000e+004	1.0000	10.02	1.0000
Total	555.1	1.0000	1.000e+004	1.0000	10.02	1.0000
Aqueous Phase						Phase Fraction 1.000

COMPONENTS	MOLE FLOW	MOLE FRAC	MASS FLOW	MASS FRAC	LIQVOL FLOW	LIQVOL FRAC
	(kgmole/h)		(kg/h)		(m3/h)	
H2O	555.1	1.0000	1.000e+004	1.0000	10.02	1.0000
Total	555.1	1.0000	1.000e+004	1.0000	10.02	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
H2O	---	---	---

UNIT OPERATIONS

FEED TO PRODUCT FROM LOGICAL CONNECTION
Pipe Segment: PIPE

UTILITIES

(No utilities reference this stream)

PROCESS UTILITY

Material Stream: water input

Fluid Package: Basis-1

Property Package: ASME Steam

CONDITIONS

	OVERALL	AQUEOUS PH.
Vapour / Phase Fraction	0.0000	1.0000
Temperature: (C)	25.00	25.00
Pressure: (kPa)	1000	1000
Molar Flow (kgmole/h)	555.1	555.1
Mass Flow (kg/h)	1.000e+004	1.000e+004
Std Ideal Liq VolFlow (m ³ /h)	10.02	10.02
Molar Enthalpy (kJ/kgmole)	-2.850e+05	-2.850e+05
Molar Entropy (kJ/kgmole-C)	6.609e+00	6.609e+00
Heat Flow (kJ/h)	-1.582e+08	-1.582e+08
Liq VolFlow @Std Cond (m ³ /h)	10.01	10.01

COMPOSITION

Overall Phase Vapour Fraction 0.0000

COMPONENTS	MOLE FLOW	MOLE FRAC	MASS FLOW	MASS FRAC	LIQVOL FLOW	LIQVOL FRAC
	(kgmole/h)		(kg/h)		(m ³ /h)	
H2O	555.1	1.0000	1.000e+004	1.0000	10.02	1.0000
Total	555.1	1.0000	1.000e+004	1.0000	10.02	1.0000
Aqueous Phase						Phase Fraction 1.000

COMPONENTS	MOLE FLOW	MOLE FRAC	MASS FLOW	MASS FRAC	LIQVOL FLOW	LIQVOL FRAC
	(kgmole/h)		(kg/h)		(m ³ /h)	
H2O	555.1	1.0000	1.000e+004	1.0000	10.02	1.0000
Total	555.1	1.0000	1.000e+004	1.0000	10.02	1.0000

K VALUE

COMPONENTS	MIXED	LIGHT	HEAVY
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H2O	---	---	---
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UNIT OPERATIONS

FEED TO PRODUCT FROM LOGICAL CONNECTION

Pipe Segment: PIPE

UTILITIES

(No utilities reference this stream)

PROCESS UTILITY

All Unit Operations (Case (Main)+ Templates):

Pipe Segment: PIPE

CONNECTIONS

Inlet Stream

STREAM NAME FROM UNIT OPERATION
water input

Outlet Stream

STREAM NAME TO UNIT OPERATION
water Out

Energy Stream

STREAM NAME TO UNIT OPERATION
Q-100

PARAMETERS

Pressure Gradient/Pipe Parameters

Horizontal Pipe Flow Correlation: Beggs and Brill (1979)

Vertical Pipe Flow Correlation: Beggs and Brill (1979)

Inclined Pipe Flow Correlation: Beggs and Brill (1979)

Pressure Drop: 6.588 kPa

Fittings Parameters

Segment Number

Fitting Name

VH Factor

FT Factor

Data Source

Swage Parameters

Segment Number

Swage Name

Swage Angle (deg)

Inlet Diameter (mm)

Outlet Diameter (mm)

Swage Type

CALCULATION

Pressure Tolerance (kPa) 0.1000 Length Step Size (m) 1000

Temperature Tolerance (C) 1.000e-002 Flow Initial Guess (kgmole/h) 360.0

Heat Flow Tolerance (kJ/h) 0.3600 Flow Step Size (kgmole/h) 252.0

Length Initial Guess (m) 5000 Diam. Initial Guess (mm) 80.00

Always Use PH Flash Disabled Default Increments 5
Do Deposition Calcs Enabled Check Choke Flow Disabled
Is Pipe Choked No
Emulsions

Emulsion Viscosity Method: HYSYS

Constant K1: ---

Constant K2: ---

Constant K3: ---

Inversion Point: 0.5000

User Variables

SIZING

Segment Number 1
Fitting/Pipe Pipe
Distance (m) 500.0
Elevation Change (m) 0.0000
Schedule Schedule 40
Nominal Diameter (mm) 101.6
Outer Diameter (mm) 114.3
Inner Diameter (mm) 102.3
Material Mild Steel
Roughness (m) 4.572e-005
Conductivity (W/m-K) 45.00
Increments 5
Fitting No ---
HEAT TRANSFER

Heat Loss: 0.0000 kJ/h Ambient Temp: --- Overall HTC: ---

PROFILES

Data

Distance (m)	Elevation (m)	Increments
0.0000	0.0000	5
500.0	0.0000	

Pipe Table

Length (m)	0.0000	100.0	200.0	300.0
Elevation (m)	0.0000	0.0000	0.0000	0.0000
Pressure (kPa)	1000	998.7	997.4	996.0
Total dP (kPa)	---	1.318	1.318	1.318
Temperature (C)	25.00	25.00	25.00	25.00
Vapour Fraction	0.0000	0.0000	0.0000	0.0000
Heat Transferred (kJ/h-m)	---	0.0000	0.0000	0.0000
Flow Regime	Liquid Only	Liquid Only	Liquid Only	Liquid Only
Water Flow Regime				
Liquid HoldUp	1.000	1.000	1.000	1.000

Water HoldUp	---	---	---	---
Friction Gradient (kPa/m)	1.318e-002	1.318e-002	1.318e-002	1.318e-002
Static Gradient (kPa/m)	0.0000	0.0000	0.0000	0.0000
Accel. Gradient (kPa/m)	0.0000	0.0000	0.0000	0.0000
Liq. Reynolds	3.884e+004	3.884e+004	3.884e+004	3.884e+004
Vap. Reynolds	---	---	---	---
Liquid Velocity (m/s)	0.3391	0.3391	0.3391	0.3391
Vapour Velocity (m/s)	---	---	---	---
Deposit Thickness (mm)	---	---	---	---
Deposit Volume (m3)	---	---	---	---
Length (m)	400.0	500.0		
Elevation (m)	0.0000	0.0000		
Pressure (kPa)	994.7	993.4		
Total dP (kPa)	1.318	1.318		
Temperature (C)	25.00	25.00		
Vapour Fraction	0.0000	0.0000		
Heat Transferred (kJ/h-m)	0.0000	0.0000		
Flow Regime	Liquid Only	Liquid Only		
Water Flow Regime				
Liquid HoldUp	1.000	1.000		
Water HoldUp	---	---		
Friction Gradient (kPa/m)	1.318e-002	1.318e-002		
Static Gradient (kPa/m)	0.0000	0.0000		
Accel. Gradient (kPa/m)	0.0000	0.0000		
Liq. Reynolds	3.884e+004	3.884e+004		
Vap. Reynolds	---	---		
Liquid Velocity (m/s)	0.3391	0.3391		
Vapour Velocity (m/s)	---	---		
Deposit Thickness (mm)	---	---		
Deposit Volume (m3)	---	---		

FLOW ASSURANCE

CO₂ Corrosion

Model Options

Corrosion Model: de Waard Model 1995

Corrosion Inhibitor: ---

Composition Factor: Normalised steels Factor Fcr: --- Factor Fc: ---

pH: PH Specified

Input pH: 6.000

Corrosion Table

Length (m)

Temperature (C)

Pressure (kPa)

CO₂ Pressure (kPa)

PH of CO₂

Actual PH

Scale Factor
Scaling Temperature (C)
Mass Transfer Rate (mm/year)

Reaction Rate (mm/year)
Corrosion Rate (mm/year)
Scaled Corrosion Rate (mm/year)

Erosion

Model

Erosion Model: User Defined Empirical Constant: 100.0
Erosion Table

Length (m)
Bulk Density (kg/m³)
Bulk Velocity (m/s)
Erosion Velocity (m/s)
Hydrates

Model Options

Hydrate Model: Ng & Robinson
Override Ng and Robinson: False
Initial Pressure: From a Correlation
Initial Pressure User Input: ---
Hydrates Table

Distance (m) 0.0000 100.0 200.0 300.0 400.0

Pressure (kPa)

Temperature (C)

Formation

Hydrate Type

Mode

Inhibitors

Formation Temperature (C)

Type at Formation Temperature

Mode at Formation Temperature

Phases at Formation Temperature

Inhibitors at Formation Temperature

Distance (m) 500.0

Pressure (kPa)

Temperature (C)

Formation

Hydrate Type

Mode
Inhibitors
Formation Temperature (C)
Type at Formation Temperature

Mode at Formation Temperature

Phases at Formation Temperature

Inhibitors at Formation Temperature

SLUG ANALYSIS

Options

Translation Model Bendikson Velocity Parm. C0 --- Velocity Parm. U0 ---
Holdup Model Gregory et al Holdup Parm. --- Friction Model Colebrook
Frequency Model Hill & Wood Freq Parm. ---
Results

Not Calculated

WAX DEPOSITION

Methods

Method None Time Step 4.320e+004 seconds
Max. Time 6.048e+005 seconds Simulation Time ---
Properties

Density 881.0 kg/m3 Yield Strength 2.068 kPa
Thermal Conductivity 0.2596 W/m-K
Profile

Cell	1	2	3	4	5
Cum. Length (m)	100.000	200.000	300.000	400.000	500.000
Init. Dep. Thick. (mm)	---	---	---	---	---
Calc. Dep. Thick. (mm)	---	---	---	---	---
Dep. Volume (m3)	---	---	---	---	---
Dep. Rate (kg/s-m2)	---	---	---	---	---
Film Coefficient (kJ/h-m2-C)	4282.33	4282.35	4282.37	4282.39	4282.41

Wall Temperature (C) --- --- --- --- ---
Fluid Temperature (C) --- --- --- --- ---
Critical Deposition Temperature (C) --- --- --- --- ---

Limits

Allowable Max. Deposit Thickness --- Max. Deposit Thickness ---
Allowable Overall Pressure Drop --- Overall Pressure Drop 6.58842 kPa
Allowable Deposit Volume --- Deposit Volume ---

Allowable Plug Pressure Drop --- Plug Pressure Drop ---

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