Dynamic Simulation for T-9 Storage Tank (Holding Case)

CASE 1: 19,642 Kg/Hr (Holding: 52°C), No Liquid Draw

Workshop Description

- Estimation of vapor flow rate coming out from the T-9 tank for holding case (52°C) using dynamic simulation.
- Schematic diagram for T-9 tank holding case is shown below in Figure 1.



• Feed conditions and compositions for stream NGL-TOT & HOT-FEED are shown in Table 1.

Table 1				
Stream	NGL-TOT	HOT-FEED		
Temperature (°C)	-39.0	42.0		
Pressure (bar)	1.50	2.5		
Component				
Ethane	0.020	0.020		
Propane	0.976	0.976		
Iso-butane	0.003	0.003		
N-butane	0.001	0.001		
Flowrate	6,900 Kmole/hr	42m ³ /hr		

Building a Steady State Simulation for T-9 tank.

• Open the Component List View.

Add Component	Selected Components	_	Components Availab	le in the Component Library		
Components Traditional	Propane i-Butane		Match		View Filters	
- Electrolyte	n-Butane		Sim Name	C Full Name / Synonym	C Formula	
Other		<add pure<="" td=""><td>Methane</td><td>C1</td><td>CH4 CEM12</td><td>-</td></add>	Methane	C1	CH4 CEM12	-
			n-Pentane	nC5	C5H12	
		<-Substitute->	n-Hexane n-Heptane	C6 C7	C9H14 C7H16	
			n-Octane	C8	CSH18	
		Remove>	n-Decane	C10	C10H22	
		t	nC11 nC12	C11 C12	C11H24 C12H26	
		Sort List	n-C13	C13	C13H28	
		Vess Concorner!	n-C15	C15	C15H32	
		Tourseautonieur	n-C16	C16	C16H34	•
			F Show Synonym	Cluster		
Selected Compo	nent by Type					_
		n Francisco	and the st			
Delete		Name Compon	ent List - 1			

• Open the Fluid Package View.

🐣 Fluid Package: Basis-1 👘		
Property Package Selection (none) GCEDS Kabadi Danner Lee-Keler Plocker MBWR Peng Robinson PRSV Sour SRK Sour SRK SRK Zudkevitch Joffee	Property Package Filter C All Types C EDSs C Activity Models C Chao Seader Models C Vapour Press Models C Miscellaneous Types	EDS Enthalpy Method Specification C Equation of State C Lee-Kester Peng Robinson Options C HYSYS C Standard Use EDS Density S Smooth Liquid Density
Component List Selection		Advanced Thermodynamics
Set Up Parameters Bir	hary Coeffs StabTest Phase	Order Rxns Tabular Notes Edit Properties

• Selecting a Unit Set.

Variables Units Formats	Ces (HYSYS,PRF) Available Unit Sets CUH-1 EuroSI Field Navd Lear			Clone
	Unit Set Name CJH-			View ∐sers
		Unit		⊻iew
	Vapour Fraction	Unitless		
	Temperature	C	× _	A <u>d</u> d
	Pressure	bar	×	Delete
	Flow	kgmole/h	× –	
	Mass Flow	kg/h	× 💆	
Varia	ables Reports Files	Resources Extensions	Oil Input	Tray Sizing
Sa <u>v</u> e Preference S	iet		Lo <u>a</u> d Prei	ference Set

Adding Streams

In HYSYS, there are two types of streams, Material and Energy . Material streams have a composition and parameters such as temperature, pressure and flow rate. They are used to represent Process Streams. Energy streams have only one parameter, Heat Flow. They represent heating and cooling duties in a plant we well as power to drive pumps and compressors.

Entering Stream conditions and compositions for streams TOT-NGL & HOT-FEED.

TOT-NGL		_	
Worksheet Conditions Properties Composition K Value User Variables Notes Cost Parameters	Stream Name Vapour / Phase Fraction Temperature [C] Pressure [bar] Molar Flow [kgmole/h] Mass Flow [kg/h] Std Ideal Liq Vol Flow [m3/h] Molar Enthalpy [Btu/Ibmole] Molar Entropy [UserUnit*] Heat Flow [kcal/h] Liq Vol Flow @Std Cond [barrel/day] Fluid Package	TOT <er -3: 1: -3: -3: -3: -3: -3: -3: -3: -3</er 	-NGL npty> 9.000 900.0 npty> npty> npty> npty> s-1
Worksheet At	tachments Dynamics		'
Delete	Define from Other Stream	\$	\$

TOT-NGL		
TOT-NGL Worksheet Conditions Properties Composition K Value User Variables Notes Cost Parameters	Ethane Propane i-Butane n-Butane I Total 1.0	Mole Fractions 0.020000 0.376000 0.003000 0.001000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.000
Worksheet At	Edit Edit Prope tachments Dynamics OK Define from Other Stream	erties Basjs h 4 4

HOT-FEED					
Worksheet	Stream Name	HOT-FEED			
Cardillana	Vapour / Phase Fraction	1.00000			
Conditions	Temperature [C]	30.000			
Properties	Pressure [bar]	2.5000			
Composition	Molar Flow [kgmole/h]	482.52			
Composition	Mass Flow [kg/h]	21169			
K Value	Std Ideal Liq Vol Flow [m3/h]	42.000			
User Variables	Molar Enthalpy [Btu/lbmole]	-4.451e+004			
11.1	Molar Entropy [UserUnit*]	156.73			
Notes	Heat Flow [kcal/h]	-1.1939e+07			
Cost Parameters	Liq Vol Flow @Std Cond [barrel/day]	6313.3			
	Fluid Package	Basis-1 👘			
	•	•			
	,				
Worksheet At	tachments Dynamics				
	OK				
	N				
Delete	Define from Other Stream				

Worksheet	Ethana	Mole Fractions		
Conditions	Propane	0.976000		
Properties	i-Butane n-Butane	0.003000		
Composition				
K Value				
User Variables				
Notes		•		
Cost Parameters	Total 1.	00000		
	Edit Edit Properties Basis			
Worksheet	ttachments Dynamics			
	OK			
	Defens from Others Charge			

• For VLV-100 (Connection Tab)

₩ VLV-100		<u>- 0 ×</u>
Design Connections Parameters	Name VLV-100	
User Variables		
Notes	Injet Outlet TOT3NGL TOT-NGL-FEED T	
	Fluid Package Basis-1	
Design Rating	Worksheet Dynamics	
Delete	Unknown Delta P	Ignored

• For VLV-100 (Parameters Tab)

₩ VLV-100		
Design Connections Parameters User Variables Notes	Delta P 0.471000 psi	
Design Rating	Worksheet Dynamics	
Delete	OK	Ignored

• For VLV-101 (Connection Tab)

₩ VLV-101		
Design	Name VLV-101	
Connections	<u></u>	
Parameters	N 4	
User Variables		
Notes	Inlet Outlet	
	HOT-FEED	
	Fluid <u>P</u> ackage	
	Basis-1	
Design Rating	Worksheet Dynamics	
Delete	Unknown Delta P	Ignored

• For VLV-101 (Parameters Tab)

× VLV-101			
Design Connections Parameters User Variables Notes	Deka P	221.284 psi	
Design Rating	Worksheet Dynamic	CS	·

• For VLV-102 (Connection Tab)

₩ VLV-102				
Design Connections	<u>N</u> ame	/LV-102		
Parameters User Variables Notes	Injet LIQUID	->	Outlet	
	Fluid <u>P</u> ackage Basis-1	•		
Design Rating	Worksheet Dynamics	Unknown	Delta P	

• For VLV-103 (Connection Tab)

₩ VLV-103		
Design Connections	Name VLV-103	
Parameters User Variables		
Notes	Injet Dytet	
	Fluid Backage	
Design Rating	Worksheet Dynamics	,
Delete	Unknown Delta P	[] Ignored

• For VLV-103 (Parameters Tab)

 VLV-103 	
Design Connections	Name VLV-103
Parameters User Variables Notes	
	Fluid <u>Package</u> Basis-1
Design Rating	Vorksheet Dynamics OK

• For VLV-104 (Connection Tab)

₩ VLV-104		
Design Connections	Name VLV-104	
Parameters User Variables Notes	Injet Ogliet TSV3 V TSV6 V	
	Fluid Package Basis-1	
Design Rating	Worksheet Dynamics Unknown Delta P	[gnored

• For VLV-103 (Parameters Tab)

₩ VLV-104		
Design Connections Parameters User Variables Notes	Deta P 5.0000 psi	
Design Rating	Worksheet Dynamics	
Delete	OK	<u> ∏</u> <u>I</u> gnored

• For RV-100 (Connection Tab)

🗏 RV-100	
Design Connections Parameters User Variables Notes	Name RV-100 RV Inlet Outlet T94/2 T
- Design Rating	Fluid Package Basis-1
Delete	Unknown Product Stream Pressure

• For RV-100 (Parameters Tab)

💐 RV-100		<u> </u>
Design Connections Parameters User Variables Notes	Set Pressure Full Open Pressure 1.075	
Design Rating	Worksheet Dynamics	
Delete	Unknown Product Stream Pressure	🦳 Ignored

• For T-9 (Connection Tab)

📕 T-9		<u>_ ×</u>
Design	Name T-9	
Connections Parameters User Variables Notes	Injets HIDT-FEED2 TOT-NGL2 VAPOR VAPOR Liquid Outlet Liquid Outlet VAPOR	
Design Reaction	ons Rating Worksheet Dynamics	
Delete	Unknown Duty [Ignored

• For T-9 (Parameters Tab)

T-9		_ 🗆 🗵
Design		
Connections	Delta P	
Parameters	0.0000 psi	
User Variables		
Notes	MMMM -	
	→ \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	
	Heating C Cooling	
	Duty 3.6577e+05 kcal/h Liquid Level 50.00 %	
	· · · · · · · · · · · · · · · · · · ·	
	Туре	
	C Segarator C 3 Phase Sep (• Tank	
Design Reacti	ions Rating Worksheet Dynamics	
Delete	ΠΚ	lanored
	· · · · · · · · · · · · · · · · · · ·	

• For T-9 (Parameters Tab)

VLV-102			_ 🗆 ×
Design			
Connections	Delta P	5.00000 psi	
Parameters			
Notes			
	adada at Durani		
	orksneet J Dynami	<u>cs</u>	
Delete		OK	Ignored

- Save your case as T9-Holding-52C-Steady.hsc.
- Flowsheet Configuration (1)



Transitioning from Steady State to Dynamics

All unit operations in the simulation need to be sized using actual plant equipment or predetermined sizing techniques. Vessels should be sized to accommodate actual plant flow rates and pressures while maintaining acceptable residence times.

- Sizing the Valves
 - Valve type (linear, quick opening or equal percentage)
 - The normal valve opening position
 - The pressure drop across the valve
 - The current flow rate

M VLV-100			
Bating	Sizing Conditions		1
Sizing (dynamics	Inlet Pressure [bar]	1.500	
	Valve Opening [%]	43.87	
	Delta P (psi)	0.4710 Current	
	Flow Hate [kg/h]	3.027e+005 C User Input	
	Valve Type and Sizing Method	Method: • Cv C Cq C k	
	C Quick Opening	C1 25.0	
	C Equal Percentage	Km 3.585e-002 Cv [USGPM] 5118	
	Size Valve	Cg 1.2795e+0C	
Design Rating	Worksheet Dynamics		
Delete		OK	Ignored
× VLV-101			<u>- 0 ×</u>
Bating	Sizing Conditions		
Sizing (dynamics	Inlet Pressure [bar]	16.28	
	Valve Opening [%]	43.87	
	Delta P [psi]	221.3 Current	
		2.117e+004 O User Input	
	Valve Type and Sizing Method	Method: • Cv C Cg C k	
	C Quick Opening	C1 <u>25.0</u>	
	C Equal Percentage	Km 3.585e-002 Cv [USGPM] 42.65	
	Size Valve	Cg 1066.3	
Design Rating	Worksheet Dynamics		,
Delete		nk l	lanored
<u></u>			
M VLV-102			_ 🗆 🗵
₩ VLV-102 Rating	Sizing Conditions		<u> </u>
X VLV-102 Rating Sizing (dynamics	Sizing Conditions	1.458 43 90	<u>_ </u>
VLV-102 Rating Sizing (dynamics	Sizing Conditions Inlet Pressure [bar] Molecular Weight Valve Opening [2] []	1.468 43.90 50.00	<u>-0×</u>
₩ VLV-102 Rating Sizing (dynamics	Sizing Conditions [Inlet Pressure [bar] Molecular Weight Valve Opening [2] Delta P [psi] Flow Rate (ka/h)	1.468 43.90 5.000 © Current 3.156e-005 © Lirent	_ [] ×
₩ VLV-102 Rating Sizing (dynamics	Sizing Conditions Intel Pressure [bar] Molecular Weight Valve Opening [2] Dette P [pai] Flow Rate [kg/h] Valve Tune and Grine Method	1.468 43.90 5.000 3.156e+005 C User Input	_D×
Y VLV-102 Rating Sizing (dynamics	-Sizing Conditions Intel Pressure [bar] Molecular Weight Valve Opening [2] Date P [psi] Flow Rate [kg/h] −Valve Type and Sizing Method C Linear	1.468 43.30 5.000 3.156e+005 C User Input	_ D ×
Y VLV-102 Rating Sizing (dynamics	-Sizing Conditions Intel Pressure [bar] Molecular Weight Valve Opening [2] [] Dette P [psi] Flow Rate [kg/h] ⊂Valve Type and Sizing Method C Linear C Quick Opening	1.468 43.90 50.00 © Current 3.156e4005 © User Input Method: © Cv< © Cg © k [1] 250 Xm 3.566.002	
VLV-102 Rating Sizing (dynamics	Sizing Conditions Intel Pressure [bar] Molecular Weight Valve Opening [2] Deta P [psi] Flow Rate (kg/h] -Valve Type and Sizing Method C Linear C Quick Opening C Equal Percentage C Case Version	1.466	
VLV-102 Rating Sizing (dynamics	Sizing Conditions Intel Pressure [bar] Molecular Weight Valve Opening [%] Dette P [psi] Flow Rate [kg/h] Flow Rate [kg/h] Calve Type and Sizing Method C Linear C Quick Opening C Equal Percentage Size Valve	1.466 43.30 50.00 3.156e0.05 Current User Input	
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VLV-102 Rating Sizing (dynamics	Sizing Conditions Intel Pressure [bar] Molecular Weight Valve Opening [3] Delta P [pai] Flow Rate (kg/h) -Valve Type and Sizing Method © Linear © Quick Opening © Equal Percentage Size Valve Worksheet Dynamics	1.468 43.90 50.00 50.00 0 0.156e+005 C User Input Method: © Cv C Cg C k Ci 25.0 Km 3.565e+002 Cy 1762 Cg 4.4060	_ D X
VLV-102 Rating Sizing (dynamics Design Rating Delete VLV-103 Rating	Sizing Conditions Intel Pressure [bar] Molecular Weight Valve Opening [3] Delta P [pai] Flow Rate (kg/h) Culturear Culture (kg/h) Equal Percentage Size Valve Worksheet Dynamics Sizing Conditions	1.463 43.90 50.00 50.00 50.00 Current 3.156e-005 User Input Method: © Cv © Cg © k C1 25.0 Ev [USGPM] 1762 Cg 44060	Ignored
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₩ VI V-104		
VLV 104		
Bating	Sizing Conditions	
Sizing (dunamics	Inlet Pressure [bar] 1.020	
Sizing (dynamics	Molecular Weight 42.84	
	Valve Opening [%] 50.00	
	Delta P [psi] 5.000 (• Current	
	C User Input	
	Valve Type and Sizing Method	
	C Quick Opening C1 25.0	
	C Equal Percentage Km 3.585e-002	
	Cv [USGPM] 999.7	
	Size valve Ug 24992	
Design_Rating	Worksheet Dynamics	
Delete	OK	🔲 Ignored
RV-100		
Bating	Valve Type	
naung .	Quick Opening C Linear C Equal Percentage	
Sizing		
	Capacity Correction Factors and Parameters	
	Viscosity Coefficient 1.000	
	Discharge Coefficient 1.000	
	Back Pressure Coefficient 1.000	
	Valve Head Differential Coefficient 1.000	
	Johnce Area 2.4303	
Design Rating	Worksheet Dynamics	
Delete	Valve is Open	Ignored

Note that the normal valve opening percent of VLV-102 should be 0.0 percent instead of 50.0 percent for a holding case.

- Sizing the Separator
 - Open the dynamic tab of the separator.
 - Enter 182.1 ft for a vessel diameter and 78.74 ft for vessel height.

👤 T-9				
Rating Sizing Heat Loss	© Evlinder ○ Evlinder ○ Sphere □ This separator	Orientation: C Vertical Volume (R3) Diameter (R) Height (R) has a boot	C Horizontal 2.051e-006 1821 78.74	Quick Size
Design Reaction	ons Rating Wo	orksheet Dynamics		
Delete		OK		Ignored

• Save your case as T9-Holding-52C-Sizing.hsc.

Making Pressure-Flow and Dynamics Specifications

- Analysis of the Process Flowsheet
 - For the current simulation, the boundary streams are TOT-NGL, HOT-FEED, LIQUID2, T9-V3, and T9-V4. All boundary streams in the Flowsheet must have a pressure specification.
 - On the Dynamics tab of the TOT-NGL, HOT-FEED, LIQUID2, T9-V4, T9-V5 and T9-V6, select the Pressure Specification by checking the box Active.

TOT-NGL	
Dynamics Specs Stripchart	Dynamic Specifications Pressure Specification Pressure Active 1.500 bar
	Flow Specification Molar C Mass C Ideal LiqVol C Std. LiqVol Molar Flow Active 6900 kgmole/h
	Feeder block
Worksheet At	achments Dynamics
	OK
Delete	Define from Other Stream 🔶 🕈 🔿

HOT-FEED	
Dynamics Specs Stripchart	Dynamic Specifications Pressure Specification Pressure Active 16.28 bar
	Flow Specification
	C Molar C Mass C Ideal LiqVol C Std. LiqVol Ideal Liquid Volume Flow Active 42.00 m3/h
	Feeder block
Worksheet A	ttachments Dynamics
	. OK
Delete	Define from Other Stream 💠 🜩

LIQUID2	
Dynamics Specs Stripchart	Dynamic Specifications Pressure Specification Pressure Active 1.123 bar
	Flow Specification Molar C Mass C Ideal LiqVol C Std. LiqVol Molar Flow Active 7189 kgmole/h
	Product block
Worksheet A	tachments Dynamics
Delete	OK Define from Other Stream 💠 🜩

^{>} T9-V4	
Dynamics Specs Stripchart	Dynamic Specifications Pressure Specification Pressure Active 1.438 bar
	Flow Specification Molar C Mass C Ideal LiqVol C Std. LiqVol Molar Flow Active 58.06 kgmole/h
	Product block
_Worksheet _A	tachments Dynamics
Delete	Define from Other Stream 🕈 🗭

T9-V5	
Dynamics Specs Stripchart	Dynamic Specifications Pressure Active O.9950 bar
	Flow Specification Molar Mass C Ideal LiqVol C Std. LiqVol Molar Molar Flow Active Active 58.06 kgmole/h Image: Std. LiqVol Image: Std. LiqVol Image: Std. LiqVol
	Product block
Worksheet At	achments Dynamics
Delete	Define from Other Stream 🔶 🗢 🔿

Dynamics Specs Stripchart	Pynamic Specifications Pressure Specification Pressure Active 0.9855 bar
	Flow Specification Molar C Mass C Ideal LiqVol C Std. LiqVol Molar Flow Active 206.4 kgmole/h E
	Product block
Worksheet A	ttachments Dynamics

• Save your case as T9-Holding-52C-Specs.hsc.

Controllers

- Controllers can added to the Flowsheet using the same methods as for other unit operations. The PID Controller button on the palette represents this unit operation. Once the Controller has been added to the Flowsheet.
 - Make the necessary connections for the Process Variable Source and Output Target Object.
 - Select the Minimum and Maximum values for the Process Variable. These values should bracket all possible PV values.
 - Size the valve controller range. This is not necessary if a valve was chosen as the Output Target Object.
 - Select Controller Action, Reverse or Direct.
 - Input Controller Tuning Parameters.
 - If desired, choose the mode of the controller, Off, Manual, or Automatic.
- Add the Proposed Control Strategy for the Flash Drum System
 - Table 2 **Controller Settings** Connections **PIC-100 Controller Name Process Variable Source** Stream TOT-NGL Pressure **Output Target Variable** VLV-100 **Parameters** Action Direct PV Minimum 1.1 bar PV Maximum 2.1 bar Mode Auto Set Point 1.50 bar Kc 1 Ti 5
- Add a Flow Controller that will control the Stream TOT-NGL Flowrate to Tank T-9.

- Insert a Controller Face Plate for monitoring by pressing the Face Plate button on the property view.



PIC-100	
Name PIC-100	
Process Variable So Object: TOT-NO Variable: Pressure	al Select PV
Optional <u>R</u> emote Setpoin	t Source
Connections F	Parameters Monitor Stripchart User Variables Unknown Ranges for PV Face Plate Control Valve
PIC-100	
Parameters Configuration Advanced Autotuner IMC Design Scheduling	Mode Auto SP Mode: © Local Mode Auto Execution Internal SP 1.500 bar PV 1.500 bar OP 79.40 %
Alarms PV Conditioning Signal Processing FeedForward	Current T <u>uning Kc 1 1.00 Ti 5.00 Td <empty> Range</empty></u>
Connections P	PV Minimum 1.1000 bar PV Maximum 2.1000 bar arameters Monitor Stripchart User Variables
Delete	OK F <u>a</u> ce Plate Control Valve

- Add another controller to control the pressure inside the Separator.

Table 3		
Controller Setting		
Connections		
Controller Name	PIC-101	
Process Variable Source	Separator, T-9 Vessel Pressure	
Output Target Variable	VLV-101	
Parameters		
Action	Reverse	
PV Minimum	0.7 bar	
PV Maximum	1.7 bar	
Mode	Auto	
Set Point	1.032 bar	
Кс	1	
Ti	5	

Insert a Face Plate for Tank-PC.

-

PIC-101 Exec:Int Sp: L PV: 1.0357 bar OP: 46.37 Auto T	
PIC-101	
Name PIC-101	
Process Variable S Object: T-9 Variable: Vessel	ource Select P⊻ Pressure
_	
Optional <u>R</u> emote Setpoi	nt Source
Connections	Parameters Monitor Stripchart User Variables Unknown Ranges for PV Face Plate Control Valve,
PIC-101	
Parameters	Action:
Configuration	SP Mode: SP Local C Bemote
Advanced	Kecution Internal
IMC Design	SP 1.032 bar
Scheduling	DP 1.036 bar 0P 46 37 %
Alarms	
Alarms PV Conditioning	Current Tuning
Alarms PV Conditioning Signal Processing	Current Tuning Kc J 1.00 Ti 5.00
Alarms PV Conditioning Signal Processing FeedForward	Current Tuning Kc J 1.00 Ti 5.00 Td <empty></empty>
Alarms PV Conditioning Signal Processing FeedForward	Current Tuning Kc 1.00 Ti 5.00 Td <empty></empty>
Alarms PV Conditioning Signal Processing FeedForward	Current Tuning Kc 1.00 Ti 5.00 Td <empty> Range PV Minimum 0.7000 bar</empty>
Alarms PV Conditioning Signal Processing FeedForward	Current Tuning Kc 1.00 Ti 5.00 Td <empty> Range PV Minimum 0.7000 bar PV Maximum 1.7000 bar</empty>
Alarms PV Conditioning Signal Processing FeedForward	Current Tyring Kc 1.00 Ti 5.00 Td <empty> Range PV Minimum PV Maximum 1.7000 bar</empty>
Alarms PV Conditioning Signal Processing FeedForward	Current Tuning Kc 1.00 Ti 5.00 Td <empty> Range PV Minimum 0.7000 bar PV Maximum 1.7000 bar PV Maximum 1.7000 bar</empty>

- Add a Level Controller to control the level of liquid in the tank.

Table 4		
Controller Settings		
Connections		
Controller Name	LIC-100	
Process Variable Source	Separator, T-9 Liquid Percent Level	
Output Target Variable	VLV-102	

Parameters		
Action	Direct	
PV Minimum	0 percent	
PV Maximum	100 percent	
Mode	Auto	
Set Point	0 %	
Кс	1	
Ti	2	

LIC-100 ×1 Exec:Int Sp: L PV: 72.691 OP: 0.00 Auto ▼ Tuning

LIC-100				
Name LIC-100				
Process Variable Source Object: T-9 Variable: Liquid Percent Le	evel	Select P	<u>v</u>	
<u> </u>	\bigcirc		OP >	
Optional <u>R</u> emote Setpoint Source		O <u>u</u> tput Tar VLV-102	get Object	
	SP		elect OP	
Connections Parameter	s <u>Monitor</u>	Stripchart	User Variab	
U	nknown Rang	es for PV		
Delete	Face Plate		Control V	ajve

LIC-100		
Parameters Configuration	Operational Parameters Action: O Reverse SP Mode: © Local	Direct Direct <u>Bemote</u>
Advanced Autotuner IMC Design Scheduling	Mode Execution SP PV OP	Auto internal 100.00 % 72.69 % 0.00 %
Alarms PV Conditioning Signal Processing FeedForward	Current T <u>u</u> ning	1.00 2.00 <empty></empty>
	Range PV Minimum	0.0000 % 100.0000 %
<u>Connections</u> P	arameters Monitor Stripc	shart User Variables
Delete	F <u>a</u> ce Plate	Control Vajve

- Add a Level Controller to control the level of liquid in the tank.

Table 5				
Controller Settings				
Connections				
Controller Name	PIC-102			
Process Variable Source	Stream, T9-V1 Liquid Percent Level			
Output Target Variable	VLV-103			
Parameters				
Action	Direct			
PV Minimum	0.0981 bar			
PV Maximum	2.1575 bar			
Mode	Auto			
Set Point	1.068 bar			
Кс	1			
Ti	5			

PIC-102	<u>- 🗆 ×</u>
Name PIC-102	
Process Variable Source Object: T3-V1 Select PV Variable: Pressure	
PV OP Optional Bemote Setpoint Source SP SP	
Connections Parameters Monitor Stripchart User Va	riables
Unknown Ranges for PV	
Delete Face Plate Contr	ol Vajve

PIC-102		
Parameters	Operational Parameters	C Direct
Configuration	SP Mode: C Local	C Remote
Advanced	Mode	Man
Autotuner	Execution	Internal
IMC Design	SP	1.036 bar
nic bosgn	PV	1.036 bar
Scheduling		50.00 %
Alarms		
PV Conditioning	Current Luning	
Signal Processing	Kc	1.00
FaadFannard		5.00
reeuroiwaiu		<empty></empty>
	Range	
	PV Minimum	0.7000 bar
	PV Maximum	1.7000 bar
Connections P	arameters Monitor Strip	chart User Variables
	OK	
Delete	Face Plate	Control Valve

• Save your case as T9-Holding-52C-Controllers.hsc.

Strip Charts

While the Flowsheet is now running dynamically, it is difficult to observe the simulation variables. Using a strip chart allows the user to observe several variables in real time as the dynamic simulation runs.

- Press the hot key (Ctrl><D> to create a strip chart.
- Select the Variables page and press the Insert button.
- Add the following two variables.
 - TOT-NGL Mass Flow
 - HOT-Feed Mass Flow
- Select the Strip Charts page tab.
- Change the name to Feed System.
- Add the following three variables.
 - T9-V4 Mass Flow
 - T9-V5 Mass Flow
 - T9-V6 Mass Flow
- Select the Strip Charts page tab.
- Change the name to Product Vapor Stream.
- Add the following variable.
 - LIQUID2 Mass Flow
- Select the Strip Charts page tab.
- Change the name to Product Liquid Stream.
- Add the following variable.
 - T-9 Vessel Pressure
- Select the Strip Charts page tab.
- Change the name to T9 Vessel Pressure
- Save your case as T9-Holding-52C-Dynamics-0.hsc.

View Results

- T9-V4 Stream Mass Flowrate = Nearly zero flow.
- T9-V5 Stream Mass Flowrate = 9,837.8 Kg/hr
- T9-V6 Stream Mass Flowrate = 9,743.7 Kg/hr











