

Simulation Report

DWSIM 5.4

Details

Title:

Comments:

Object: MSTR-017

Type: Material Stream

Property	Value	
Temperature	87.4088	C
Pressure	1.01325	bar
Mass Flow	10.5513	kg/h
Molar Flow	0.310435	kmol/h
Volumetric Flow	8.99141	m3/h
Mixture Density	1.17349	kg/m3
Mixture Molar Weight	33.9888	kg/kmol
Mixture Specific Enthalpy	83.9035	kJ/kg
Mixture Specific Entropy	0.480339	kJ/[kg.K]
Mixture Molar Enthalpy	2851.78	kJ/kmol
Mixture Molar Entropy	16.3261	kJ/[kmol.K]
Mixture Thermal Conductivity	0.0158406	W/[m.K]
Mixture Molar Fraction		
Water	0.3066	
Acetonitrile	0.6934	
Ammonia	2.46823E-16	
Carbon dioxide	0	
Hydrogen cyanide	1.13887E-07	
Vapor Phase Density	1.17349	kg/m3
Vapor Phase Molar Weight	33.9888	kg/kmol
Vapor Phase Specific Enthalpy	83.9035	kJ/kg
Vapor Phase Specific Entropy	0.480339	kJ/[kg.K]
Vapor Phase Molar Enthalpy	2851.78	kJ/kmol
Vapor Phase Molar Entropy	16.3261	kJ/[kmol.K]
Vapor Phase Thermal Conductivity	0.0158406	W/[m.K]
Vapor Phase Kinematic Viscosity	8.58234E-06	m2/s
Vapor Phase Dynamic Viscosity	1.00713E-05	Pa.s
Vapor Phase Heat Capacity (Cp)	1.50408	kJ/[kg.K]
Vapor Phase Heat Capacity Ratio (Cp/Cv)	1.2164	
Vapor Phase Mass Flow	10.5513	kg/h
Vapor Phase Molar Flow	0.310435	kmol/h
Vapor Phase Volumetric Flow	8.99141	m3/h
Vapor Phase Compressibility Factor	0.979011	

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Vapor Phase Molar Fraction	1	
Vapor Phase Mass Fraction	1	
Vapor Phase Volumetric Fraction	1	
Vapor Phase Molar Fraction		
Water	0.3066	
Acetonitrile	0.6934	
Ammonia	2.46823E-16	
Carbon dioxide	0	
Hydrogen cyanide	1.13887E-07	
Liquid Phase (Mixture) Density	NaN	kg/m3
Liquid Phase (Mixture) Molar Weight	NaN	kg/kmol
Liquid Phase (Mixture) Specific Enthalpy	0	kJ/kg
Liquid Phase (Mixture) Specific Entropy	0	kJ/[kg.K]
Liquid Phase (Mixture) Molar Enthalpy	NaN	kJ/kmol
Liquid Phase (Mixture) Molar Entropy	NaN	kJ/[kmol.K]
Liquid Phase (Mixture) Thermal Conductivity	0	W/[m.K]
Liquid Phase (Mixture) Kinematic Viscosity	NaN	m2/s
Liquid Phase (Mixture) Dynamic Viscosity	0	Pa.s
Liquid Phase (Mixture) Heat Capacity (Cp)	0	kJ/[kg.K]
Liquid Phase (Mixture) Heat Capacity Ratio (Cp/Cv)	NaN	
Liquid Phase (Mixture) Mass Flow	0	kg/h
Liquid Phase (Mixture) Molar Flow	0	kmol/h
Liquid Phase (Mixture) Volumetric Flow	0	m3/h
Liquid Phase (Mixture) Compressibility Factor	0	
Liquid Phase (Mixture) Molar Fraction	0	
Liquid Phase (Mixture) Mass Fraction	0	
Liquid Phase (Mixture) Volumetric Fraction	0	
Liquid Phase Molar Fraction		
Water	NaN	
Acetonitrile	NaN	
Ammonia	NaN	
Carbon dioxide	NaN	
Hydrogen cyanide	NaN	

Object: MSTR-016

Type: Material Stream

Property	Value

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Temperature	84	C
Pressure	1.01325	bar
Mass Flow	45.006	kg/h
Molar Flow	1.713	kmol/h
Volumetric Flow	49.5427	m3/h
Mixture Density	0.90843	kg/m3
Mixture Molar Weight	26.2732	kg/kmol
Mixture Specific Enthalpy	85.3707	kJ/kg
Mixture Specific Entropy	0.622712	kJ/[kg.K]
Mixture Molar Enthalpy	2242.96	kJ/kmol
Mixture Molar Entropy	16.3606	kJ/[kmol.K]
Mixture Thermal Conductivity	0.0200459	W/[m.K]
Mixture Molar Fraction		
Water	0.582	
Acetonitrile	0.2603	
Ammonia	0.035	
Carbon dioxide	0.0701	
Hydrogen cyanide	0.0526	
Vapor Phase Density	0.90843	kg/m3
Vapor Phase Molar Weight	26.2732	kg/kmol
Vapor Phase Specific Enthalpy	85.3707	kJ/kg
Vapor Phase Specific Entropy	0.622712	kJ/[kg.K]
Vapor Phase Molar Enthalpy	2242.96	kJ/kmol
Vapor Phase Molar Entropy	16.3606	kJ/[kmol.K]
Vapor Phase Thermal Conductivity	0.0200459	W/[m.K]
Vapor Phase Kinematic Viscosity	1.25831E-05	m2/s
Vapor Phase Dynamic Viscosity	1.14309E-05	Pa.s
Vapor Phase Heat Capacity (Cp)	1.56781	kJ/[kg.K]
Vapor Phase Heat Capacity Ratio (Cp/Cv)	1.27156	
Vapor Phase Mass Flow	45.006	kg/h
Vapor Phase Molar Flow	1.713	kmol/h
Vapor Phase Volumetric Flow	49.5427	m3/h
Vapor Phase Compressibility Factor	0.986911	
Vapor Phase Molar Fraction	1	
Vapor Phase Mass Fraction	1	
Vapor Phase Volumetric Fraction	1	
Vapor Phase Molar Fraction		
Water	0.582	

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Acetonitrile	0.2603	
Ammonia	0.035	
Carbon dioxide	0.0701	
Hydrogen cyanide	0.0526	
Liquid Phase (Mixture) Density	NaN	kg/m3
Liquid Phase (Mixture) Molar Weight	NaN	kg/kmol
Liquid Phase (Mixture) Specific Enthalpy	0	kJ/kg
Liquid Phase (Mixture) Specific Entropy	0	kJ/[kg.K]
Liquid Phase (Mixture) Molar Enthalpy	NaN	kJ/kmol
Liquid Phase (Mixture) Molar Entropy	NaN	kJ/[kmol.K]
Liquid Phase (Mixture) Thermal Conductivity	0	W/[m.K]
Liquid Phase (Mixture) Kinematic Viscosity	NaN	m2/s
Liquid Phase (Mixture) Dynamic Viscosity	0	Pa.s
Liquid Phase (Mixture) Heat Capacity (Cp)	0	kJ/[kg.K]
Liquid Phase (Mixture) Heat Capacity Ratio (Cp/Cv)	NaN	
Liquid Phase (Mixture) Mass Flow	0	kg/h
Liquid Phase (Mixture) Molar Flow	0	kmol/h
Liquid Phase (Mixture) Volumetric Flow	0	m3/h
Liquid Phase (Mixture) Compressibility Factor	0	
Liquid Phase (Mixture) Molar Fraction	0	
Liquid Phase (Mixture) Mass Fraction	0	
Liquid Phase (Mixture) Volumetric Fraction	0	
Liquid Phase Molar Fraction		
Water	NaN	
Acetonitrile	NaN	
Ammonia	NaN	
Carbon dioxide	NaN	
Hydrogen cyanide	NaN	

Object: MSTR-014

Type: Material Stream

Property	Value	
Temperature	86.9641	C
Pressure	1.01325	bar
Mass Flow	10.5513	kg/h
Molar Flow	0.310435	kmol/h
Volumetric Flow	8.97966	m3/h

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Mixture Density	1.17502	kg/m3
Mixture Molar Weight	33.9888	kg/kmol
Mixture Specific Enthalpy	83.2344	kJ/kg
Mixture Specific Entropy	0.478482	kJ/[kg.K]
Mixture Molar Enthalpy	2829.04	kJ/kmol
Mixture Molar Entropy	16.263	kJ/[kmol.K]
Mixture Thermal Conductivity	0.0158077	W/[m.K]
Mixture Molar Fraction		
Water	0.3066	
Acetonitrile	0.6934	
Ammonia	2.46822E-16	
Carbon dioxide	0	
Hydrogen cyanide	1.13887E-07	
Vapor Phase Density	1.17502	kg/m3
Vapor Phase Molar Weight	33.9888	kg/kmol
Vapor Phase Specific Enthalpy	83.2344	kJ/kg
Vapor Phase Specific Entropy	0.478482	kJ/[kg.K]
Vapor Phase Molar Enthalpy	2829.04	kJ/kmol
Vapor Phase Molar Entropy	16.263	kJ/[kmol.K]
Vapor Phase Thermal Conductivity	0.0158077	W/[m.K]
Vapor Phase Kinematic Viscosity	8.56048E-06	m2/s
Vapor Phase Dynamic Viscosity	1.00588E-05	Pa.s
Vapor Phase Heat Capacity (Cp)	1.50331	kJ/[kg.K]
Vapor Phase Heat Capacity Ratio (Cp/Cv)	1.21662	
Vapor Phase Mass Flow	10.5513	kg/h
Vapor Phase Molar Flow	0.310435	kmol/h
Vapor Phase Volumetric Flow	8.97966	m3/h
Vapor Phase Compressibility Factor	0.978938	
Vapor Phase Molar Fraction	1	
Vapor Phase Mass Fraction	1	
Vapor Phase Volumetric Fraction	1	
Vapor Phase Molar Fraction		
Water	0.3066	
Acetonitrile	0.6934	
Ammonia	2.46822E-16	
Carbon dioxide	0	
Hydrogen cyanide	1.13887E-07	
Liquid Phase (Mixture) Density	NaN	kg/m3

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Liquid Phase (Mixture) Molar Weight	NaN	kg/kmol
Liquid Phase (Mixture) Specific Enthalpy	0	kJ/kg
Liquid Phase (Mixture) Specific Entropy	0	kJ/[kg.K]
Liquid Phase (Mixture) Molar Enthalpy	NaN	kJ/kmol
Liquid Phase (Mixture) Molar Entropy	NaN	kJ/[kmol.K]
Liquid Phase (Mixture) Thermal Conductivity	0	W/[m.K]
Liquid Phase (Mixture) Kinematic Viscosity	NaN	m2/s
Liquid Phase (Mixture) Dynamic Viscosity	0	Pa.s
Liquid Phase (Mixture) Heat Capacity (Cp)	0	kJ/[kg.K]
Liquid Phase (Mixture) Heat Capacity Ratio (Cp/Cv)	NaN	
Liquid Phase (Mixture) Mass Flow	0	kg/h
Liquid Phase (Mixture) Molar Flow	0	kmol/h
Liquid Phase (Mixture) Volumetric Flow	0	m3/h
Liquid Phase (Mixture) Compressibility Factor	0	
Liquid Phase (Mixture) Molar Fraction	0	
Liquid Phase (Mixture) Mass Fraction	0	
Liquid Phase (Mixture) Volumetric Fraction	0	
Liquid Phase Molar Fraction		
Water	NaN	
Acetonitrile	NaN	
Ammonia	NaN	
Carbon dioxide	NaN	
Hydrogen cyanide	NaN	

Object: MSTR-006

Type: Material Stream

Property	Value	
Temperature	-70.2884	C
Pressure	1.01325	bar
Mass Flow	11.7147	kg/h
Molar Flow	0.3426	kmol/h
Volumetric Flow	0.0168293	m3/h
Mixture Density	696.091	kg/m3
Mixture Molar Weight	34.1936	kg/kmol
Mixture Specific Enthalpy	-914.691	kJ/kg
Mixture Specific Entropy	-3.13088	kJ/[kg.K]
Mixture Molar Enthalpy	-31276.6	kJ/kmol

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Comments:

Mixture Molar Entropy	-107.056	kJ/[kmol.K]
Mixture Thermal Conductivity	0.275157	W/[m.K]
Mixture Molar Fraction		
Water	9.95189E-05	
Acetonitrile	0.211401	
Ammonia	0.175	
Carbon dioxide	0.3505	
Hydrogen cyanide	0.263	
Vapor Phase Density	2.64256	kg/m3
Vapor Phase Molar Weight	43.247	kg/kmol
Vapor Phase Specific Enthalpy	-78.4181	kJ/kg
Vapor Phase Specific Entropy	-0.258689	kJ/[kg.K]
Vapor Phase Molar Enthalpy	-3391.35	kJ/kmol
Vapor Phase Molar Entropy	-11.1875	kJ/[kmol.K]
Vapor Phase Thermal Conductivity	0.00972601	W/[m.K]
Vapor Phase Kinematic Viscosity	3.97104E-06	m2/s
Vapor Phase Dynamic Viscosity	1.04937E-05	Pa.s
Vapor Phase Heat Capacity (Cp)	0.7673	kJ/[kg.K]
Vapor Phase Heat Capacity Ratio (Cp/Cv)	1.36856	
Vapor Phase Mass Flow	3.35562E-06	kg/h
Vapor Phase Molar Flow	7.75919E-08	kmol/h
Vapor Phase Volumetric Flow	1.26983E-06	m3/h
Vapor Phase Compressibility Factor	0.98319	
Vapor Phase Molar Fraction	2.2648E-07	
Vapor Phase Mass Fraction	2.86445E-07	
Vapor Phase Volumetric Fraction	7.54538E-05	
Vapor Phase Molar Fraction		
Water	4.11395E-08	
Acetonitrile	1.54172E-05	
Ammonia	0.0279414	
Carbon dioxide	0.971537	
Hydrogen cyanide	0.000505855	
Liquid Phase (Mixture) Density	696.143	kg/m3
Liquid Phase (Mixture) Molar Weight	34.1936	kg/kmol
Liquid Phase (Mixture) Specific Enthalpy	-914.692	kJ/kg
Liquid Phase (Mixture) Specific Entropy	-3.13088	kJ/[kg.K]
Liquid Phase (Mixture) Molar Enthalpy	-31276.6	kJ/kmol
Liquid Phase (Mixture) Molar Entropy	-107.056	kJ/[kmol.K]

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Liquid Phase (Mixture) Thermal Conductivity	0.275157	W/[m.K]
Liquid Phase (Mixture) Kinematic Viscosity	1.3618E-05	m2/s
Liquid Phase (Mixture) Dynamic Viscosity	0.00948008	Pa.s
Liquid Phase (Mixture) Heat Capacity (Cp)	2.04025	kJ/[kg.K]
Liquid Phase (Mixture) Heat Capacity Ratio (Cp/Cv)	1.31485	
Liquid Phase (Mixture) Mass Flow	11.7147	kg/h
Liquid Phase (Mixture) Molar Flow	0.3426	kmol/h
Liquid Phase (Mixture) Volumetric Flow	0.016828	m3/h
Liquid Phase (Mixture) Compressibility Factor	0	
Liquid Phase (Mixture) Molar Fraction	1	
Liquid Phase (Mixture) Mass Fraction	1	
Liquid Phase (Mixture) Volumetric Fraction	0.999925	
Liquid Phase Molar Fraction		
Water	9.95189E-05	
Acetonitrile	0.211401	
Ammonia	0.175	
Carbon dioxide	0.3505	
Hydrogen cyanide	0.263	

Object: MSTR-005

Type: Material Stream

Property	Value	
Temperature	87.813	C
Pressure	1.01325	bar
Mass Flow	16.9097	kg/h
Molar Flow	0.5139	kmol/h
Volumetric Flow	14.9166	m3/h
Mixture Density	1.13362	kg/m3
Mixture Molar Weight	32.9047	kg/kmol
Mixture Specific Enthalpy	85.6369	kJ/kg
Mixture Specific Entropy	0.493452	kJ/[kg.K]
Mixture Molar Enthalpy	2817.86	kJ/kmol
Mixture Molar Entropy	16.2369	kJ/[kmol.K]
Mixture Thermal Conductivity	0.0163727	W/[m.K]
Mixture Molar Fraction		
Water	0.353657	
Acetonitrile	0.646343	

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Comments:

Ammonia	1.491E-16	
Carbon dioxide	7.5098E-22	
Hydrogen cyanide	6.90704E-08	
Vapor Phase Density	1.13362	kg/m3
Vapor Phase Molar Weight	32.9047	kg/kmol
Vapor Phase Specific Enthalpy	85.6369	kJ/kg
Vapor Phase Specific Entropy	0.493452	kJ/[kg.K]
Vapor Phase Molar Enthalpy	2817.86	kJ/kmol
Vapor Phase Molar Entropy	16.2369	kJ/[kmol.K]
Vapor Phase Thermal Conductivity	0.0163727	W/[m.K]
Vapor Phase Kinematic Viscosity	9.04295E-06	m2/s
Vapor Phase Dynamic Viscosity	1.02513E-05	Pa.s
Vapor Phase Heat Capacity (Cp)	1.51936	kJ/[kg.K]
Vapor Phase Heat Capacity Ratio (Cp/Cv)	1.22122	
Vapor Phase Mass Flow	16.9097	kg/h
Vapor Phase Molar Flow	0.5139	kmol/h
Vapor Phase Volumetric Flow	14.9166	m3/h
Vapor Phase Compressibility Factor	0.98002	
Vapor Phase Molar Fraction	1	
Vapor Phase Mass Fraction	1	
Vapor Phase Volumetric Fraction	1	
Vapor Phase Molar Fraction		
Water	0.353657	
Acetonitrile	0.646343	
Ammonia	1.491E-16	
Carbon dioxide	7.5098E-22	
Hydrogen cyanide	6.90704E-08	
Liquid Phase (Mixture) Density	NaN	kg/m3
Liquid Phase (Mixture) Molar Weight	NaN	kg/kmol
Liquid Phase (Mixture) Specific Enthalpy	0	kJ/kg
Liquid Phase (Mixture) Specific Entropy	0	kJ/[kg.K]
Liquid Phase (Mixture) Molar Enthalpy	NaN	kJ/kmol
Liquid Phase (Mixture) Molar Entropy	NaN	kJ/[kmol.K]
Liquid Phase (Mixture) Thermal Conductivity	0	W/[m.K]
Liquid Phase (Mixture) Kinematic Viscosity	NaN	m2/s
Liquid Phase (Mixture) Dynamic Viscosity	0	Pa.s
Liquid Phase (Mixture) Heat Capacity (Cp)	0	kJ/[kg.K]
Liquid Phase (Mixture) Heat Capacity Ratio (Cp/Cv)	NaN	

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Liquid Phase (Mixture) Mass Flow	0	kg/h
Liquid Phase (Mixture) Molar Flow	0	kmol/h
Liquid Phase (Mixture) Volumetric Flow	0	m3/h
Liquid Phase (Mixture) Compressibility Factor	0	
Liquid Phase (Mixture) Molar Fraction	0	
Liquid Phase (Mixture) Mass Fraction	0	
Liquid Phase (Mixture) Volumetric Fraction	0	
Liquid Phase Molar Fraction		
Water	NaN	
Acetonitrile	NaN	
Ammonia	NaN	
Carbon dioxide	NaN	
Hydrogen cyanide	NaN	

Object: MSTR-003

Type: Material Stream

Property	Value	
Temperature	98.897	C
Pressure	1.01325	bar
Mass Flow	16.3816	kg/h
Molar Flow	0.8565	kmol/h
Volumetric Flow	14.5715	m3/h
Mixture Density	1.12422	kg/m3
Mixture Molar Weight	19.1262	kg/kmol
Mixture Specific Enthalpy	-832.466	kJ/kg
Mixture Specific Entropy	-2.12772	kJ/[kg.K]
Mixture Molar Enthalpy	-15921.9	kJ/kmol
Mixture Molar Entropy	-40.6952	kJ/[kmol.K]
Mixture Thermal Conductivity	0.310806	W/[m.K]
Mixture Molar Fraction		
Water	0.951766	
Acetonitrile	0.048234	
Ammonia	2.17948E-19	
Carbon dioxide	3.24209E-20	
Hydrogen cyanide	2.07173E-10	
Vapor Phase Density	0.661305	kg/m3
Vapor Phase Molar Weight	19.9902	kg/kmol

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Vapor Phase Specific Enthalpy	127.847	kJ/kg
Vapor Phase Specific Entropy	0.468669	kJ/[kg.K]
Vapor Phase Molar Enthalpy	2555.69	kJ/kmol
Vapor Phase Molar Entropy	9.3688	kJ/[kmol.K]
Vapor Phase Thermal Conductivity	0.0232966	W/[m.K]
Vapor Phase Kinematic Viscosity	1.90108E-05	m2/s
Vapor Phase Dynamic Viscosity	1.25719E-05	Pa.s
Vapor Phase Heat Capacity (Cp)	1.82484	kJ/[kg.K]
Vapor Phase Heat Capacity Ratio (Cp/Cv)	1.31174	
Vapor Phase Mass Flow	9.63061	kg/h
Vapor Phase Molar Flow	0.481766	kmol/h
Vapor Phase Volumetric Flow	14.563	m3/h
Vapor Phase Compressibility Factor	0.990204	
Vapor Phase Molar Fraction	0.562482	
Vapor Phase Mass Fraction	0.587893	
Vapor Phase Volumetric Fraction	0.999422	
Vapor Phase Molar Fraction		
Water	0.914259	
Acetonitrile	0.0857413	
Ammonia	3.65793E-19	
Carbon dioxide	5.762E-20	
Hydrogen cyanide	3.68273E-10	
Liquid Phase (Mixture) Density	801.32	kg/m3
Liquid Phase (Mixture) Molar Weight	18.0153	kg/kmol
Liquid Phase (Mixture) Specific Enthalpy	-2202.41	kJ/kg
Liquid Phase (Mixture) Specific Entropy	-5.83163	kJ/[kg.K]
Liquid Phase (Mixture) Molar Enthalpy	-39677.1	kJ/kmol
Liquid Phase (Mixture) Molar Entropy	-105.059	kJ/[kmol.K]
Liquid Phase (Mixture) Thermal Conductivity	0.680434	W/[m.K]
Liquid Phase (Mixture) Kinematic Viscosity	1.4461E-07	m2/s
Liquid Phase (Mixture) Dynamic Viscosity	0.000281187	Pa.s
Liquid Phase (Mixture) Heat Capacity (Cp)	4.01761	kJ/[kg.K]
Liquid Phase (Mixture) Heat Capacity Ratio (Cp/Cv)	1.40814	
Liquid Phase (Mixture) Mass Flow	6.75095	kg/h
Liquid Phase (Mixture) Molar Flow	0.374734	kmol/h
Liquid Phase (Mixture) Volumetric Flow	0.00842479	m3/h
Liquid Phase (Mixture) Compressibility Factor	0	
Liquid Phase (Mixture) Molar Fraction	0.437518	

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Liquid Phase (Mixture) Mass Fraction	0.412107
Liquid Phase (Mixture) Volumetric Fraction	0.00057817
Liquid Phase Molar Fraction	
Water	0.999986
Acetonitrile	1.37936E-05
Ammonia	2.78757E-20
Carbon dioxide	2.43461E-23
Hydrogen cyanide	5.94551E-14

Object: MSTR-002

Type: Material Stream

Property	Value	
Temperature	-55.4899	C
Pressure	1.01325	bar
Mass Flow	28.6245	kg/h
Molar Flow	0.8565	kmol/h
Volumetric Flow	0.0471797	m3/h
Mixture Density	606.712	kg/m3
Mixture Molar Weight	33.4203	kg/kmol
Mixture Specific Enthalpy	-1219.31	kJ/kg
Mixture Specific Entropy	-3.64845	kJ/[kg.K]
Mixture Molar Enthalpy	-40749.7	kJ/kmol
Mixture Molar Entropy	-121.932	kJ/[kmol.K]
Mixture Thermal Conductivity	0.237272	W/[m.K]
Mixture Molar Fraction		
Water	0.212234	
Acetonitrile	0.472366	
Ammonia	0.07	
Carbon dioxide	0.1402	
Hydrogen cyanide	0.1052	
Vapor Phase Density	0	kg/m3
Vapor Phase Molar Weight	0	kg/kmol
Vapor Phase Specific Enthalpy	0	kJ/kg
Vapor Phase Specific Entropy	0	kJ/[kg.K]
Vapor Phase Molar Enthalpy	0	kJ/kmol
Vapor Phase Molar Entropy	0	kJ/[kmol.K]
Vapor Phase Thermal Conductivity	0	W/[m.K]

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Vapor Phase Kinematic Viscosity	0	m2/s
Vapor Phase Dynamic Viscosity	0	Pa.s
Vapor Phase Heat Capacity (Cp)	0	kJ/[kg.K]
Vapor Phase Heat Capacity Ratio (Cp/Cv)	NaN	
Vapor Phase Mass Flow	0	kg/h
Vapor Phase Molar Flow	0	kmol/h
Vapor Phase Volumetric Flow	0	m3/h
Vapor Phase Compressibility Factor	0	
Vapor Phase Molar Fraction	0	
Vapor Phase Mass Fraction	0	
Vapor Phase Volumetric Fraction	0	
Vapor Phase Molar Fraction		
Water	0	
Acetonitrile	0	
Ammonia	0	
Carbon dioxide	0	
Hydrogen cyanide	0	
Liquid Phase (Mixture) Density	606.712	kg/m3
Liquid Phase (Mixture) Molar Weight	33.4203	kg/kmol
Liquid Phase (Mixture) Specific Enthalpy	-1219.31	kJ/kg
Liquid Phase (Mixture) Specific Entropy	-3.64845	kJ/[kg.K]
Liquid Phase (Mixture) Molar Enthalpy	-40749.7	kJ/kmol
Liquid Phase (Mixture) Molar Entropy	-121.932	kJ/[kmol.K]
Liquid Phase (Mixture) Thermal Conductivity	0.237272	W/[m.K]
Liquid Phase (Mixture) Kinematic Viscosity	4.84986E-06	m2/s
Liquid Phase (Mixture) Dynamic Viscosity	0.00294247	Pa.s
Liquid Phase (Mixture) Heat Capacity (Cp)	2.26658	kJ/[kg.K]
Liquid Phase (Mixture) Heat Capacity Ratio (Cp/Cv)	1.23875	
Liquid Phase (Mixture) Mass Flow	28.6245	kg/h
Liquid Phase (Mixture) Molar Flow	0.8565	kmol/h
Liquid Phase (Mixture) Volumetric Flow	0.0471797	m3/h
Liquid Phase (Mixture) Compressibility Factor	0	
Liquid Phase (Mixture) Molar Fraction	1	
Liquid Phase (Mixture) Mass Fraction	1	
Liquid Phase (Mixture) Volumetric Fraction	1	
Liquid Phase Molar Fraction		
Water	0.212234	
Acetonitrile	0.472366	

Simulation Report

DWSIM 5.4

Details

Title:

Comments:

Ammonia	0.07
Carbon dioxide	0.1402
Hydrogen cyanide	0.1052

Object: MSTR-000

Type: Material Stream

Property	Value	
Temperature	84.1	C
Pressure	1.01325	bar
Mass Flow	45.006	kg/h
Molar Flow	1.713	kmol/h
Volumetric Flow	49.557	m3/h
Mixture Density	0.908166	kg/m3
Mixture Molar Weight	26.2732	kg/kmol
Mixture Specific Enthalpy	85.5276	kJ/kg
Mixture Specific Entropy	0.623151	kJ/[kg.K]
Mixture Molar Enthalpy	2247.08	kJ/kmol
Mixture Molar Entropy	16.3722	kJ/[kmol.K]
Mixture Thermal Conductivity	0.020054	W/[m.K]
Mixture Molar Fraction		
Water	0.582	
Acetonitrile	0.2603	
Ammonia	0.035	
Carbon dioxide	0.0701	
Hydrogen cyanide	0.0526	
Vapor Phase Density	0.908166	kg/m3
Vapor Phase Molar Weight	26.2732	kg/kmol
Vapor Phase Specific Enthalpy	85.5276	kJ/kg
Vapor Phase Specific Entropy	0.623151	kJ/[kg.K]
Vapor Phase Molar Enthalpy	2247.08	kJ/kmol
Vapor Phase Molar Entropy	16.3722	kJ/[kmol.K]
Vapor Phase Thermal Conductivity	0.020054	W/[m.K]
Vapor Phase Kinematic Viscosity	1.25905E-05	m2/s
Vapor Phase Dynamic Viscosity	1.14342E-05	Pa.s
Vapor Phase Heat Capacity (Cp)	1.56792	kJ/[kg.K]
Vapor Phase Heat Capacity Ratio (Cp/Cv)	1.27152	
Vapor Phase Mass Flow	45.006	kg/h

Simulation Report

DWSIM 5.4

Details

Title:

Comments:

Vapor Phase Molar Flow	1.713	kmol/h
Vapor Phase Volumetric Flow	49.557	m3/h
Vapor Phase Compressibility Factor	0.986921	
Vapor Phase Molar Fraction	1	
Vapor Phase Mass Fraction	1	
Vapor Phase Volumetric Fraction	1	
Vapor Phase Molar Fraction		
Water	0.582	
Acetonitrile	0.2603	
Ammonia	0.035	
Carbon dioxide	0.0701	
Hydrogen cyanide	0.0526	
Liquid Phase (Mixture) Density	NaN	kg/m3
Liquid Phase (Mixture) Molar Weight	NaN	kg/kmol
Liquid Phase (Mixture) Specific Enthalpy	0	kJ/kg
Liquid Phase (Mixture) Specific Entropy	0	kJ/[kg.K]
Liquid Phase (Mixture) Molar Enthalpy	NaN	kJ/kmol
Liquid Phase (Mixture) Molar Entropy	NaN	kJ/[kmol.K]
Liquid Phase (Mixture) Thermal Conductivity	0	W/[m.K]
Liquid Phase (Mixture) Kinematic Viscosity	NaN	m2/s
Liquid Phase (Mixture) Dynamic Viscosity	0	Pa.s
Liquid Phase (Mixture) Heat Capacity (Cp)	0	kJ/[kg.K]
Liquid Phase (Mixture) Heat Capacity Ratio (Cp/Cv)	NaN	
Liquid Phase (Mixture) Mass Flow	0	kg/h
Liquid Phase (Mixture) Molar Flow	0	kmol/h
Liquid Phase (Mixture) Volumetric Flow	0	m3/h
Liquid Phase (Mixture) Compressibility Factor	0	
Liquid Phase (Mixture) Molar Fraction	0	
Liquid Phase (Mixture) Mass Fraction	0	
Liquid Phase (Mixture) Volumetric Fraction	0	
Liquid Phase Molar Fraction		
Water	NaN	
Acetonitrile	NaN	
Ammonia	NaN	
Carbon dioxide	NaN	
Hydrogen cyanide	NaN	

Object: MSTR-008

Type: Material Stream

Simulation Report

DWSIM 5.4

Details

Title:

Comments:

Temperature	392.501	C
Pressure	7	bar
Mass Flow	16.9097	kg/h
Molar Flow	0.5139	kmol/h
Volumetric Flow	3.98016	m3/h
Mixture Density	4.24851	kg/m3
Mixture Molar Weight	32.9047	kg/kmol
Mixture Specific Enthalpy	613.746	kJ/kg
Mixture Specific Entropy	1.06065	kJ/[kg.K]
Mixture Molar Enthalpy	20195.1	kJ/kmol
Mixture Molar Entropy	34.9003	kJ/[kmol.K]
Mixture Thermal Conductivity	0.0477059	W/[m.K]
Mixture Molar Fraction		
Water	0.353657	
Acetonitrile	0.646343	
Ammonia	1.491E-16	
Carbon dioxide	7.5098E-22	
Hydrogen cyanide	6.90704E-08	
Vapor Phase Density	4.24851	kg/m3
Vapor Phase Molar Weight	32.9047	kg/kmol
Vapor Phase Specific Enthalpy	613.746	kJ/kg
Vapor Phase Specific Entropy	1.06065	kJ/[kg.K]
Vapor Phase Molar Enthalpy	20195.1	kJ/kmol
Vapor Phase Molar Entropy	34.9003	kJ/[kmol.K]
Vapor Phase Thermal Conductivity	0.0477059	W/[m.K]
Vapor Phase Kinematic Viscosity	4.49058E-06	m2/s
Vapor Phase Dynamic Viscosity	1.90783E-05	Pa.s
Vapor Phase Heat Capacity (Cp)	2.02735	kJ/[kg.K]
Vapor Phase Heat Capacity Ratio (Cp/Cv)	1.16115	
Vapor Phase Mass Flow	16.9097	kg/h
Vapor Phase Molar Flow	0.5139	kmol/h
Vapor Phase Volumetric Flow	3.98016	m3/h
Vapor Phase Compressibility Factor	0.979632	
Vapor Phase Molar Fraction	1	

Simulation Report

DWSIM 5.4

Details

Title:

Comments:

Vapor Phase Mass Fraction	1	
Vapor Phase Volumetric Fraction	1	
Vapor Phase Molar Fraction		
Water	0.353657	
Acetonitrile	0.646343	
Ammonia	1.491E-16	
Carbon dioxide	7.5098E-22	
Hydrogen cyanide	6.90704E-08	
Liquid Phase (Mixture) Density	NaN	kg/m3
Liquid Phase (Mixture) Molar Weight	NaN	kg/kmol
Liquid Phase (Mixture) Specific Enthalpy	0	kJ/kg
Liquid Phase (Mixture) Specific Entropy	0	kJ/[kg.K]
Liquid Phase (Mixture) Molar Enthalpy	NaN	kJ/kmol
Liquid Phase (Mixture) Molar Entropy	NaN	kJ/[kmol.K]
Liquid Phase (Mixture) Thermal Conductivity	0	W/[m.K]
Liquid Phase (Mixture) Kinematic Viscosity	NaN	m2/s
Liquid Phase (Mixture) Dynamic Viscosity	0	Pa.s
Liquid Phase (Mixture) Heat Capacity (Cp)	0	kJ/[kg.K]
Liquid Phase (Mixture) Heat Capacity Ratio (Cp/Cv)	NaN	
Liquid Phase (Mixture) Mass Flow	0	kg/h
Liquid Phase (Mixture) Molar Flow	0	kmol/h
Liquid Phase (Mixture) Volumetric Flow	0	m3/h
Liquid Phase (Mixture) Compressibility Factor	0	
Liquid Phase (Mixture) Molar Fraction	0	
Liquid Phase (Mixture) Mass Fraction	0	
Liquid Phase (Mixture) Volumetric Fraction	0	
Liquid Phase Molar Fraction		
Water	NaN	
Acetonitrile	NaN	
Ammonia	NaN	
Carbon dioxide	NaN	
Hydrogen cyanide	NaN	

Object: MSTR-011

Type: Material Stream

Property	Value	
Temperature	86.9641	C

Simulation Report

DWSIM 5.4

Details

Title:

Comments:

Pressure	1.01325	bar
Mass Flow	10.5513	kg/h
Molar Flow	0.310435	kmol/h
Volumetric Flow	8.97966	m3/h
Mixture Density	1.17502	kg/m3
Mixture Molar Weight	33.9888	kg/kmol
Mixture Specific Enthalpy	83.2344	kJ/kg
Mixture Specific Entropy	0.478482	kJ/[kg.K]
Mixture Molar Enthalpy	2829.04	kJ/kmol
Mixture Molar Entropy	16.263	kJ/[kmol.K]
Mixture Thermal Conductivity	0.0158077	W/[m.K]
Mixture Molar Fraction		
Water	0.3066	
Acetonitrile	0.6934	
Ammonia	2.46822E-16	
Carbon dioxide	0	
Hydrogen cyanide	1.13887E-07	
Vapor Phase Density	1.17502	kg/m3
Vapor Phase Molar Weight	33.9888	kg/kmol
Vapor Phase Specific Enthalpy	83.2344	kJ/kg
Vapor Phase Specific Entropy	0.478482	kJ/[kg.K]
Vapor Phase Molar Enthalpy	2829.04	kJ/kmol
Vapor Phase Molar Entropy	16.263	kJ/[kmol.K]
Vapor Phase Thermal Conductivity	0.0158077	W/[m.K]
Vapor Phase Kinematic Viscosity	8.56048E-06	m2/s
Vapor Phase Dynamic Viscosity	1.00588E-05	Pa.s
Vapor Phase Heat Capacity (Cp)	1.50331	kJ/[kg.K]
Vapor Phase Heat Capacity Ratio (Cp/Cv)	1.21662	
Vapor Phase Mass Flow	10.5513	kg/h
Vapor Phase Molar Flow	0.310435	kmol/h
Vapor Phase Volumetric Flow	8.97966	m3/h
Vapor Phase Compressibility Factor	0.978938	
Vapor Phase Molar Fraction	1	
Vapor Phase Mass Fraction	1	
Vapor Phase Volumetric Fraction	1	
Vapor Phase Molar Fraction		
Water	0.3066	
Acetonitrile	0.6934	

Simulation Report

DWSIM 5.4

Details

Title:

Comments:

Ammonia	2.46822E-16	
Carbon dioxide	0	
Hydrogen cyanide	1.13887E-07	
Liquid Phase (Mixture) Density	NaN	kg/m3
Liquid Phase (Mixture) Molar Weight	NaN	kg/kmol
Liquid Phase (Mixture) Specific Enthalpy	0	kJ/kg
Liquid Phase (Mixture) Specific Entropy	0	kJ/[kg.K]
Liquid Phase (Mixture) Molar Enthalpy	NaN	kJ/kmol
Liquid Phase (Mixture) Molar Entropy	NaN	kJ/[kmol.K]
Liquid Phase (Mixture) Thermal Conductivity	0	W/[m.K]
Liquid Phase (Mixture) Kinematic Viscosity	NaN	m2/s
Liquid Phase (Mixture) Dynamic Viscosity	0	Pa.s
Liquid Phase (Mixture) Heat Capacity (Cp)	0	kJ/[kg.K]
Liquid Phase (Mixture) Heat Capacity Ratio (Cp/Cv)	NaN	
Liquid Phase (Mixture) Mass Flow	0	kg/h
Liquid Phase (Mixture) Molar Flow	0	kmol/h
Liquid Phase (Mixture) Volumetric Flow	0	m3/h
Liquid Phase (Mixture) Compressibility Factor	0	
Liquid Phase (Mixture) Molar Fraction	0	
Liquid Phase (Mixture) Mass Fraction	0	
Liquid Phase (Mixture) Volumetric Fraction	0	
Liquid Phase Molar Fraction		
Water	NaN	
Acetonitrile	NaN	
Ammonia	NaN	
Carbon dioxide	NaN	
Hydrogen cyanide	NaN	

Object: MSTR-012

Type: Material Stream

Property	Value	
Temperature	162.27	C
Pressure	7.09275	bar
Mass Flow	6.35843	kg/h
Molar Flow	0.203465	kmol/h
Volumetric Flow	0.955127	m3/h
Mixture Density	6.65716	kg/m3

Simulation Report

DWSIM 5.4

Details

Title:

Comments:

Mixture Molar Weight	31.2508	kg/kmol
Mixture Specific Enthalpy	183.392	kJ/kg
Mixture Specific Entropy	0.251039	kJ/[kg.K]
Mixture Molar Enthalpy	5731.15	kJ/kmol
Mixture Molar Entropy	7.84515	kJ/[kmol.K]
Mixture Thermal Conductivity	0.0232913	W/[m.K]
Mixture Molar Fraction		
Water	0.425454	
Acetonitrile	0.574546	
Ammonia	1.39343E-25	
Carbon dioxide	0	
Hydrogen cyanide	6.91523E-10	
Vapor Phase Density	6.65716	kg/m3
Vapor Phase Molar Weight	31.2508	kg/kmol
Vapor Phase Specific Enthalpy	183.392	kJ/kg
Vapor Phase Specific Entropy	0.251039	kJ/[kg.K]
Vapor Phase Molar Enthalpy	5731.15	kJ/kmol
Vapor Phase Molar Entropy	7.84515	kJ/[kmol.K]
Vapor Phase Thermal Conductivity	0.0232913	W/[m.K]
Vapor Phase Kinematic Viscosity	1.93098E-06	m2/s
Vapor Phase Dynamic Viscosity	1.28549E-05	Pa.s
Vapor Phase Heat Capacity (Cp)	1.75698	kJ/[kg.K]
Vapor Phase Heat Capacity Ratio (Cp/Cv)	1.27147	
Vapor Phase Mass Flow	6.35843	kg/h
Vapor Phase Molar Flow	0.203465	kmol/h
Vapor Phase Volumetric Flow	0.955127	m3/h
Vapor Phase Compressibility Factor	0.919746	
Vapor Phase Molar Fraction	1	
Vapor Phase Mass Fraction	1	
Vapor Phase Volumetric Fraction	1	
Vapor Phase Molar Fraction		
Water	0.425454	
Acetonitrile	0.574546	
Ammonia	1.39343E-25	
Carbon dioxide	0	
Hydrogen cyanide	6.91523E-10	
Liquid Phase (Mixture) Density	NaN	kg/m3
Liquid Phase (Mixture) Molar Weight	NaN	kg/kmol

Simulation Report

DWSIM 5.4

Details

Title:

Comments:

Liquid Phase (Mixture) Specific Enthalpy	0	kJ/kg
Liquid Phase (Mixture) Specific Entropy	0	kJ/[kg.K]
Liquid Phase (Mixture) Molar Enthalpy	NaN	kJ/kmol
Liquid Phase (Mixture) Molar Entropy	NaN	kJ/[kmol.K]
Liquid Phase (Mixture) Thermal Conductivity	0	W/[m.K]
Liquid Phase (Mixture) Kinematic Viscosity	NaN	m2/s
Liquid Phase (Mixture) Dynamic Viscosity	0	Pa.s
Liquid Phase (Mixture) Heat Capacity (Cp)	0	kJ/[kg.K]
Liquid Phase (Mixture) Heat Capacity Ratio (Cp/Cv)	NaN	
Liquid Phase (Mixture) Mass Flow	0	kg/h
Liquid Phase (Mixture) Molar Flow	0	kmol/h
Liquid Phase (Mixture) Volumetric Flow	0	m3/h
Liquid Phase (Mixture) Compressibility Factor	0	
Liquid Phase (Mixture) Molar Fraction	0	
Liquid Phase (Mixture) Mass Fraction	0	
Liquid Phase (Mixture) Volumetric Fraction	0	
Liquid Phase Molar Fraction		
Water	NaN	
Acetonitrile	NaN	
Ammonia	NaN	
Carbon dioxide	NaN	
Hydrogen cyanide	NaN	

Object: ESTR-009

Type: Energy Stream

Property	Value	
Energy Flow	2.48061	kW

Object: PUMP-007

Type: Pump

Property	Value	
Pressure Increase (Head)	5.98675	bar
Efficiency	100	
Delta-T	304.688	C.
Power Required	2.48061	kW
Available NPSH	Infinity	m

Object: HE-015

Simulation Report

DWSIM 5.4

Details

Title:

Comments:

Global Heat Transfer Coefficient (U)	-0.625872	W/[m2.K]
Heat Exchange Area (A)	1	m2
Heat Load	-0.00196106	kW
Cold fluid outlet temperature	84	C
Hot fluid outlet temperature	87.4088	C
[Shell and Tube] Internal Shell Diameter	500	mm
[Shell and Tube] Shell Fouling Factor	0	K.m2/W
[Shell and Tube] Baffle Cut	20	%
[Shell and Tube] Shells in Series	1	
[Shell and Tube] Baffle Spacing	250	mm
[Shell and Tube] Internal Tube Diameter	50	mm
[Shell and Tube] External Tube Diameter	60	mm
[Shell and Tube] Tube Length	5	m
[Shell and Tube] Tube Fouling factor	0	K.m2/W
[Shell and Tube] Tube Passes Per Shell	2	
[Shell and Tube] Number of Tubes	160	
[Shell and Tube] Tube Pitch	40	mm
[Shell and Tube] Fouling Factor (Design)	0	K.m2/W
[Shell and Tube] LMTD Correction Factor (F)	1	
Logarithmic mean temperature difference LMTD	3.13332	C.
[Shell and Tube] Resistance heat transfer pipes	0	K.m2/W
[Shell and Tube] Resistance thermal conductivity pipes	0	K.m2/W
[Shell and Tube] Resistance heat transfer shell	0	K.m2/W
[Shell and Tube] Reynolds number shell	0	
[Shell and Tube] Reynolds number tubes	0	
Thermal Efficiency	-15.5552	%
Maximum Theoretical Heat Exchange	0.0126071	kW
Minimum Temperature Difference	0	C.
Heat Loss	0	kW