

Cascade Refrigeration

김소희

Cascade Refrigeration : C1,C2-,C3

Input Condition of Natural Gas

Contents	Value
Pressure (bar)	53
Temperature (°C)	45
Flow Rate (Kg/hr)	625,000

Component	Mole%
Nitrogen	1.81
Methane	95.16
Ethane	2.95
Propane	8.1090E-02
I-Butane	1.4091E-03
N-Butane	6.8078E-04
I-Pentane	1.0844E-05
N-Pentane	6.0288E-06
N-Hexane	5.6613E-07
Total	100

Cascade Refrigeration

CO3

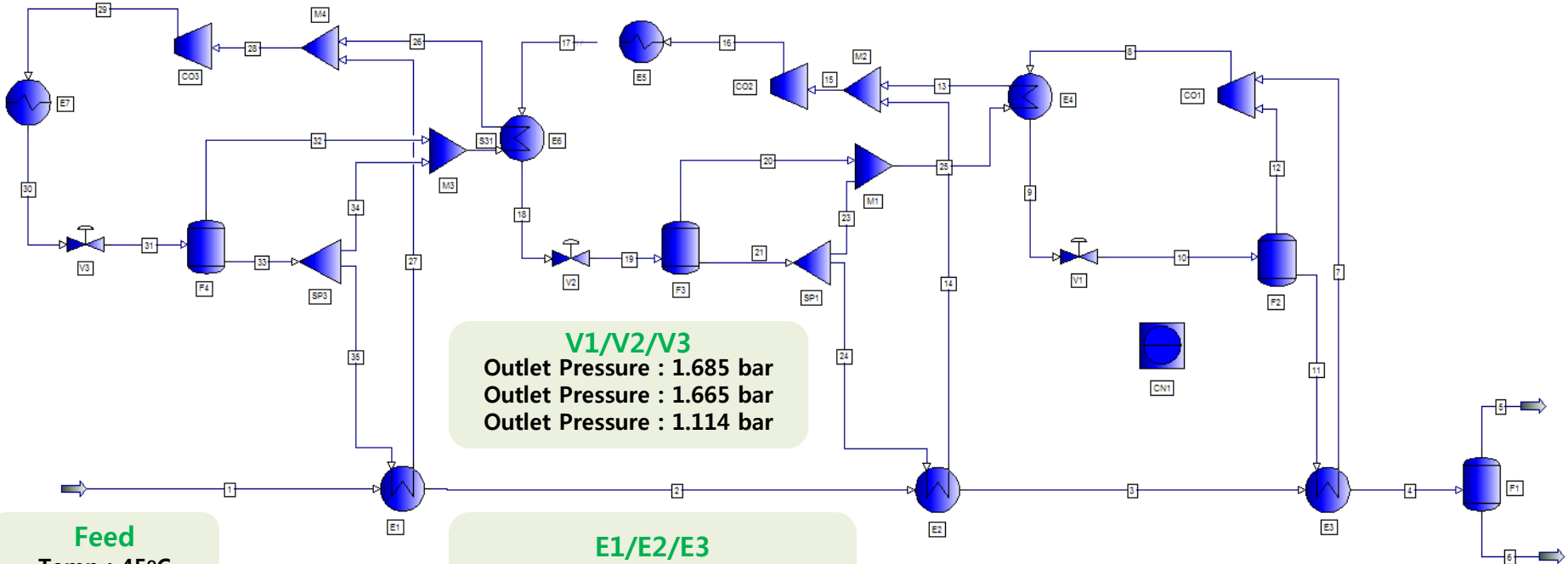
Outlet Pressure : 15.885 bar
Adiabatic Efficiency : 70%

CO2

Outlet Pressure : 16.39 bar
Adiabatic Efficiency : 70%

CO1

Outlet Pressure : 34.845bar
Adiabatic Efficiency : 70%



V1/V2/V3
Outlet Pressure : 1.685 bar
Outlet Pressure : 1.665 bar
Outlet Pressure : 1.114 bar

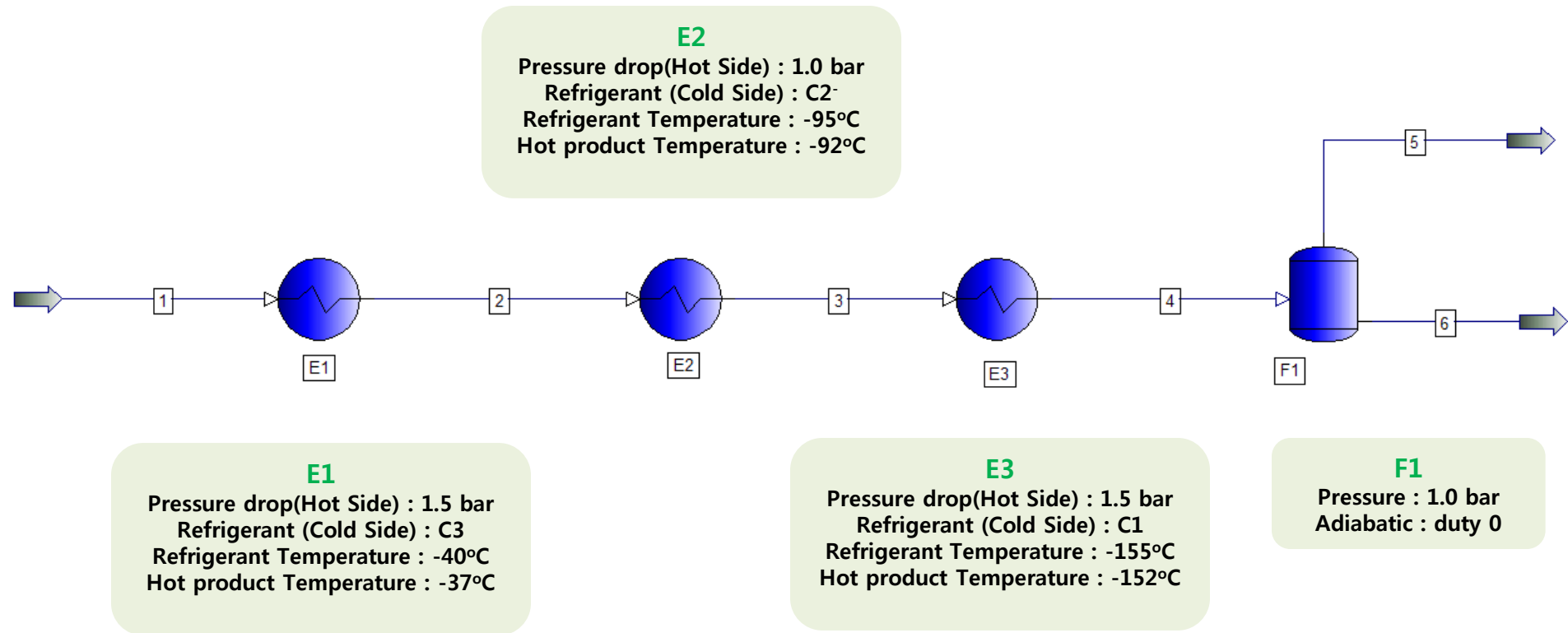
Feed
Temp : 45°C
Pressure : 53 bar

E1/E2/E3
Pressure drop(Hot Side) : 0.5bar
Cold Product Liquid Fraction: 0

E4/E5
Pressure drop(Hot Side) : 0.5bar
Hot outlet-Cold inlet Temperature Approach : 3

Product
Temp : -162°C
Pressure : 1.1 bar

Cascade Refrigeration



CN1 Condition

PRO/II - Feedback Controller

UDM Range Help Overview Status Notes

Unit: Description:

Specification
[Stream 6 Temperature in C = -162.00](#) within [an absolute tolerance of 1.0000e-006](#)

Variable
[Flash F1 Pressure in bar](#)

Parameters
Maximum Number of Iterations: Print Results for Each Iteration

Action if Minimum/Maximum Limits are reached

Accept as Solved if Limits are Reached

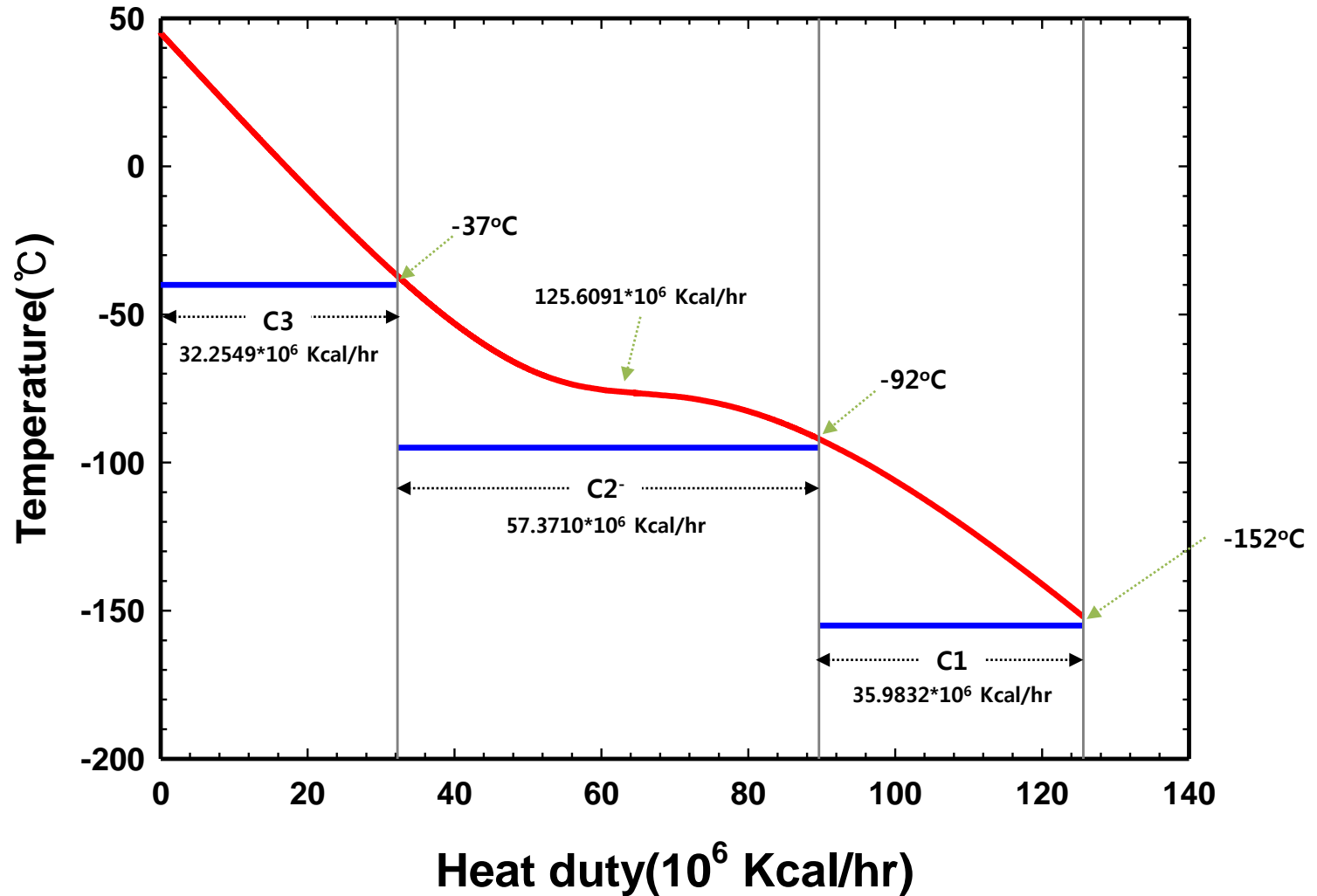
Fail Unit and Stop Calculations if Limits are Reached

Fail Unit and Continue Calculations if Limits are Reached

Next Unit Calculated after Control Variable is Changed:

Enter the controller specification

Heating-Curve



Cascade Refrigeration

C3-01

Pressure drop(Hot Side) : 0.5bar
 Minimum of [Hot Out-Cold In]
 and [Hot In-Cold Out] : 3 °C
 Refrigerant Component : C3
 Refrigerant Temp. : 11.075 °C

C3-02

Pressure drop(Hot Side) : 0.5bar
 Minimum of [Hot Out-Cold In]
 and [Hot In-Cold Out] : 3 °C
 Refrigerant Component : C3
 Refrigerant Temp. : -17.148 °C

C2-01

Pressure drop(Hot Side) : 0.5bar
 Minimum of [Hot Out-Cold In]
 and [Hot In-Cold Out] : 3 °C
 Refrigerant Component : C2
 Refrigerant Temp. : -69.74 °C

C2-02

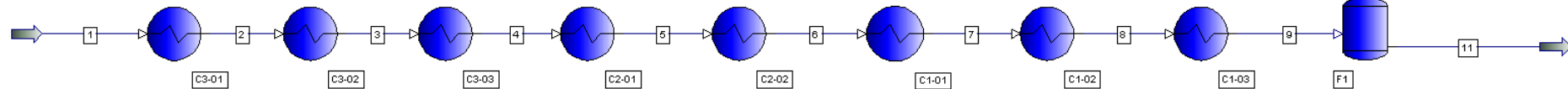
Pressure drop(Hot Side) : 0.5bar
 Hot Product Temp. : -92 °C
 Refrigerant Component : C2
 Refrigerant Temp. : -95 °C

C1-01

Pressure drop(Hot Side) : 0.5bar
 Minimum of [Hot Out-Cold In]
 and [Hot In-Cold Out] : 3 °C
 Refrigerant Component : C1
 Refrigerant Temp. : -118.78 °C

C1-02

Pressure drop(Hot Side) : 0.5bar
 Minimum of [Hot Out-Cold In]
 and [Hot In-Cold Out] : 3 °C
 Refrigerant Component : C1
 Refrigerant Temp. : -139.29 °C



Stream1

Pressure : 53bar
 Temperature : 45 °C
 Flow Rate : 625,000 kg/hr

F1

Adiabatic : duty 0

C3-03

Pressure drop(Hot Side) : 0.5bar
 Hot Product Temp. : -37 °C
 Refrigerant Component : C3
 Refrigerant Temp. : -40 °C

C1-03

Pressure drop(Hot Side) : 0.5bar
 Hot Product Temp. : -152 °C
 Refrigerant Component : C1
 Refrigerant Temp. : -155 °C

CN1 Condition

PRO/II - Feedback Controller

UDM Range Help Overview Status Notes

Unit: Description:

Specification
[Stream 11 Temperature in C = -162.00](#) within [an absolute tolerance of 1.0000e-006](#)

Variable
[Flash F1 Pressure in bar](#)

Parameters
Maximum Number of Iterations: Print Results for Each Iteration

Action if Minimum/Maximum Limits are reached

Accept as Solved if Limits are Reached

Fail Unit and Stop Calculations if Limits are Reached

Fail Unit and Continue Calculations if Limits are Reached

Next Unit Calculated after Control Variable is Changed:

Exit the window after saving all data

Cascade Heating Curve

