DYNAMIC MODEL DATA

아래 열거한 자료들은 DYNAMIC SIMULATION 을 하기 위하여, MODELING 이 된 다음 관련 자료를 INPUT 하기 위한 필요한 자료이다.

UNIT OPERATION 에 대한 정확한 자료가 필수적이다.

특히 CONTROL VALVE 에 대한 자료 및 MOVING EQUIPMENT 에 대한 자료는 필수적이다.

특히 원심 압축기의 경우 SURGE CONTROL 및 CAPACITY CONTROL 혹은 LOAD SHARING 에 대한 압축기 VENDOR 혹은 전문업체의 ALGORITHM 을 LINK 하여 사용 할 수도 있으며, HYSIS 본래의 SOFTWARE 의 PID CONTROL SYSTEM 을 이용 하는 경우가 있다.

여기 열거한 자료는 REFRIGERATOR SYSTEM 에 대한 SAMPLE 이다.

암축기는 2 단으로 이루어져 있으며, 압축기는 STAND-BY COMPRESSOR 가 있다.

4.1 UNIT OPERATIONS SUMMARY

The following tables contain a summary of the equipment modelled.

Table 4.1.1 Compressor Unit Operations

<table>
<thead>
<tr>
<th>Unit Operations (Model Name)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>K-2509A1/B1</td>
<td>Propane refrigeration compressor 1st stage</td>
</tr>
<tr>
<td>K-2509A2/B2</td>
<td>Propane refrigeration compressor 2nd stage</td>
</tr>
</tbody>
</table>

Table 4.1.2 Separator Unit Operations
### Table 4.1.3 Air cooler Unit Operations

<table>
<thead>
<tr>
<th>Unit Operations (Model Name)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>V-2519A/B</td>
<td>Propane 1st stage KO drum</td>
</tr>
<tr>
<td>V-2520A/B</td>
<td>Propane second stage KO drum</td>
</tr>
<tr>
<td>V-2518</td>
<td>Propane economiser</td>
</tr>
<tr>
<td>V-2517</td>
<td>Propane surge drum</td>
</tr>
</tbody>
</table>

### Table 4.1.4 Heat exchanger Unit Operations

<table>
<thead>
<tr>
<th>Unit Operations (Model Name)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-2512A/B</td>
<td>Propane desuperheater</td>
</tr>
<tr>
<td>E-2513A/B/C/D</td>
<td>Propane condenser</td>
</tr>
</tbody>
</table>

### Table 4.1.5 Piping Unit Operations

<table>
<thead>
<tr>
<th>Unit Operations (Model Name)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CGP-100/200</td>
<td>Line from HV-408/411 to V-2519A/B</td>
</tr>
<tr>
<td>CGP-101/201</td>
<td>Line from V-2519A/B to K-2509A1/B1</td>
</tr>
<tr>
<td>CGP-102/202</td>
<td>Line from K-2509A2/B2 to E-2512A/B</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>----------</td>
<td>--------------------------------------</td>
</tr>
<tr>
<td>CGP-103/203</td>
<td>Line from E-2512A/B to FV-443/444</td>
</tr>
<tr>
<td>CGP-104/204</td>
<td>Line from HV-459/440 to V-2520A/B</td>
</tr>
<tr>
<td>CGP-105/205</td>
<td>Line from V-2520A/B to K-2519A2/B2</td>
</tr>
<tr>
<td>CGP-106/206</td>
<td>Line from FV-443/444 to V-2519A/B</td>
</tr>
<tr>
<td>CGP-107/207</td>
<td>Line from FV-428/440 to V-2520A/B</td>
</tr>
<tr>
<td>CGP-108</td>
<td>Line from HV-456/457 to E-2513</td>
</tr>
<tr>
<td>CGP-109</td>
<td>Line from V-2518 to HV-459/473</td>
</tr>
<tr>
<td>CGP-110</td>
<td>Line from E-2511 to HV-408/411</td>
</tr>
</tbody>
</table>

### 4.2 DYNAMIC MODEL DETAILS

The following size data of the unit operations were used for the dynamic simulations.

**Vessel (V-2519A/B, V-2520A/B, V-2517, V-2518)**

Figure 4.2.1 Data for V-2519A/B

![Model Details](image)

Figure 4.2.2 Data for V-2520A/B

![Model Details](image)
The holdup volumes of two air coolers are more important factors to affect the pressure than one of the cooling water exchanger.

Air coolers (E-2512A/B and E-2513)

Figure 4.2.3 Data for V-2517

Figure 4.2.4 Data for V-2518

Air coolers (E-2512A/B and E-2513)

The holdup volumes of two air coolers are more important factors to affect the pressure than one of the cooling water exchanger.

Figure 4.2.5 Data for E-2512A/B

Figure 4.2.6 Data for E-2514

Each compressor performance curves at compressor speed of 8341 rpm were used for dynamic modeling.

Figure 4.2.7 Compressor performance curve for K-2509A1/B1
Figure 4.2.8 Compressor performance curve for K-2509A2/B2

K-2509A2 Head Curves

K-2509A2 Efficiency Curve
Figure 4.2.8A Compressor Surge Controller for K-2509A1/B1
Figure 4.2.8B Compressor Surge Controller for K-2509A2/B2
Valves and Piping

Valve unit operation can be used as piping unit operation as well as its original valve operation in HYSYS dynamic simulation. The hold-up volume of pure valve unit operation is assumed as it was added to piping volume.

Figure 4.2.9 Data for HV-408/411, HV-459/473 and HV-456/457

<table>
<thead>
<tr>
<th>Dynamic Parameters</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Valve Opening [%]</td>
<td>100.00</td>
</tr>
<tr>
<td>Conductance (Cv) [USGPM]</td>
<td>7361</td>
</tr>
<tr>
<td>Mass Flow [kg/h]</td>
<td>2.321e04</td>
</tr>
<tr>
<td>Friction Delta P [kPa]</td>
<td>1.095</td>
</tr>
</tbody>
</table>

Figure 4.2.10 Data for FV-428/440 and FV-443/444

<table>
<thead>
<tr>
<th>Dynamic Parameters</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Valve Opening [%]</td>
<td>100.00</td>
</tr>
<tr>
<td>Conductance (Cv) [USGPM]</td>
<td>2462</td>
</tr>
<tr>
<td>Mass Flow [kg/h]</td>
<td>1.870e04</td>
</tr>
<tr>
<td>Friction Delta P [kPa]</td>
<td>1.070</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Valve Type and Sizing Method</th>
<th>Method: Cv</th>
<th>Cg</th>
<th>k</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linear</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quick Opening</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equal Percentage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size Valve</td>
<td>C1</td>
<td>25.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Km</td>
<td>3.585e+02</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cv [USGPM]</td>
<td>103.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cg</td>
<td>2975.0</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Valve Type and Sizing Method</th>
<th>Method: Cv</th>
<th>Cg</th>
<th>k</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linear</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quick Opening</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equal Percentage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size Valve</td>
<td>C1</td>
<td>25.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Km</td>
<td>3.585e+02</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cv [USGPM]</td>
<td>118.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cg</td>
<td>2950.0</td>
<td></td>
</tr>
</tbody>
</table>
Figure 4.2.11 Data for piping

<table>
<thead>
<tr>
<th>Name</th>
<th>CGP-100 @TPI</th>
<th>CGP-101 @TPI</th>
<th>CGP-102 @TPI</th>
<th>CGP-103 @TPI</th>
<th>CGP-104 @TPI</th>
<th>CGP-105 @TPI</th>
<th>CGP-106 @TPI</th>
<th>CGP-107 @TPI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feed diameter [m]</td>
<td>0.6804</td>
<td>0.6800</td>
<td>0.3048</td>
<td>0.3048</td>
<td>0.3556</td>
<td>0.3556</td>
<td>0.5080</td>
<td>0.5080</td>
</tr>
<tr>
<td>Pipe length [m]</td>
<td>7.000</td>
<td>27.00</td>
<td>58.00</td>
<td>25.00</td>
<td>5.000</td>
<td>57.00</td>
<td>49.00</td>
<td>49.00</td>
</tr>
<tr>
<td>Feed diameter [m]</td>
<td>0.3370</td>
<td>0.3370</td>
<td>0.3050</td>
<td></td>
<td>0.3370</td>
<td>0.3370</td>
<td>0.3050</td>
<td></td>
</tr>
<tr>
<td>Pipe length [m]</td>
<td>3.200</td>
<td>63.10</td>
<td>70.00</td>
<td></td>
<td>3.200</td>
<td>63.10</td>
<td>70.00</td>
<td></td>
</tr>
<tr>
<td>Pipe (holdup) volume [m³]</td>
<td>0.8000</td>
<td>7.400</td>
<td>5.110</td>
<td></td>
<td>0.8000</td>
<td>7.400</td>
<td>5.110</td>
<td></td>
</tr>
</tbody>
</table>