

## **Improving 1,2-Ethylene Dichloride Yield and Purity with Reducing Carbon Emissions from Ethylene through Waste Treatment Method Modification**

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Table S1. Mass and Energy balances of modified process

|                                           |          |            |                     |             |             |             |            |                     |              |              |
|-------------------------------------------|----------|------------|---------------------|-------------|-------------|-------------|------------|---------------------|--------------|--------------|
| Data                                      | Unit     | Clorin in  | Ethylene to MIX-100 | Ethylene in | to E-100    | to CSTR     | Air in     | Ethylene to MIX-101 | to K-100     | to E-101     |
| Total Phase Properties                    |          |            |                     |             |             |             |            |                     |              |              |
| Vapour Fraction                           | -        | 1.0000     | 1.0000              | 1.0000      | 1.0000      | 1.0000      | 1.0000     | 1.0000              | 1.0000       | 1.0000       |
| Temperature                               | C        | 25.0000    | 25.0000             | 25.0000     | 24.9589     | 60.0000     | 25.0000    | 25.0000             | 24.8339      | 137.0438     |
| Pressure                                  | atm      | 1.5000     | 1.5000              | 1.5000      | 1.5000      | 1.5000      | 1.5000     | 1.5000              | 1.5000       | 4.0000       |
| Molar Flow                                | kgmole/h | 368.0000   | 387.5000            | 775.0000    | 755.5000    | 755.5000    | 1000.0000  | 387.5000            | 2187.5000    | 2187.5000    |
| Mass Flow                                 | kg/h     | 26093.30   | 10870.85            | 21741.70    | 36964.15    | 36964.15    | 28850.27   | 10870.85            | 68889.76     | 68889.76     |
| Liquid Volume Flow                        | m³/h     | 16.7123    | 28.3667             | 56.7333     | 45.0790     | 45.0790     | 33.3509    | 28.3667             | 95.2321      | 95.2321      |
| Heat Flow                                 | kJ/h     | -43052.71  | 20251621.27         | 40503242.55 | 20208568.56 | 21276158.18 | -10202.87  | 20251621.27         | -53694087.96 | -45658834.52 |
| Vapour Fraction - 2                       | -        | 1.0000     | 1.0000              | 1.0000      | 1.0000      | 1.0000      | 1.0000     | 1.0000              | 1.0000       | 1.0000       |
| Temperature - 2                           | C        | 25.0000    | 25.0000             | 25.0000     | 24.9589     | 60.0000     | 25.0000    | 25.0000             | 24.8339      | 137.0438     |
| Pressure - 2                              | atm      | 1.5000     | 1.5000              | 1.5000      | 1.5000      | 1.5000      | 1.5000     | 1.5000              | 1.5000       | 4.0000       |
| Molecular Weight                          |          | 70.9057    | 28.0538             | 28.0538     | 48.9267     | 48.9267     | 28.8503    | 28.0538             | 31.4925      | 31.4925      |
| Molar Flow - 2                            | kgmole/h | 368.0000   | 387.5000            | 775.0000    | 755.5000    | 755.5000    | 1000.0000  | 387.5000            | 2187.5000    | 2187.5000    |
| Mass Flow - 2                             | kg/h     | 26093.2979 | 10870.8477          | 21741.6955  | 36964.1456  | 36964.1456  | 28850.2704 | 10870.8477          | 68889.7582   | 68889.7582   |
| Heat Flow - 2                             | kJ/h     | -43052.71  | 20251621.27         | 40503242.55 | 20208568.56 | 21276158.18 | -10202.87  | 20251621.27         | -53694087.96 | -45658834.52 |
| Std Gas Flow                              | STD_m³/h | 8701.15    | 9162.22             | 18324.44    | 17863.37    | 17863.37    | 23644.44   | 9162.22             | 51722.20     | 51722.20     |
| Vapour Phase Properties                   |          |            |                     |             |             |             |            |                     |              |              |
| Phase - Mass Flow (Vapour Phase)          | kg/h     | 26093.30   | 10870.85            | 21741.70    | 36964.15    | 36964.15    | 28850.27   | 10870.85            | 68889.76     | 68889.76     |
| Phase Molecular Weight (Vapour Phase)     | -        | 70.9057    | 28.0538             | 28.0538     | 48.9267     | 48.9267     | 28.8503    | 28.0538             | 31.4925      | 31.4925      |
| Phase Mass Density (Vapour Phase)         | kg/m³    | 4.4252     | 1.7352              | 1.7352      | 3.0389      | 2.7095      | 1.7693     | 1.7352              | 1.9392       | 3.7515       |
| Phase Actual Volume Flow (Vapour Phase)   | m3/h     | 5896.56    | 6264.78             | 12529.55    | 12163.63    | 13642.29    | 16305.77   | 6264.78             | 35524.95     | 18363.49     |
| Phase Z Factor (Vapour Phase)             | -        | 0.9824     | 0.9912              | 0.9912      | 0.9873      | 0.9908      | 0.9997     | 0.9912              | 0.9963       | 0.9976       |
| Phase Cp/Cv (Vapour Phase)                | -        | 1.3426     | 1.2419              | 1.2419      | 1.2827      | 1.2654      | 1.4019     | 1.2419              | 1.3589       | 1.3323       |
| Phase Viscosity (Vapour Phase)            | cP       | 0.0137     | 0.0102              | 0.0102      | 0.0117      | 0.0130      | 0.0188     | 0.0102              | 0.0150       | 0.0202       |
| Phase Mass Heat Capacity (Vapour Phase)   | kJ/kg-C  | 0.4877     | 1.5787              | 1.5787      | 0.8084      | 0.8403      | 1.0130     | 1.5787              | 1.0193       | 1.0838       |
| Phase Thermal Conductivity (Vapour Phase) | W/m-K    | 0.0092     | 0.0215              | 0.0215      | 0.0145      | 0.0168      | 0.0260     | 0.0215              | 0.0217       | 0.0297       |
| Liquid Phase Properties                   |          |            |                     |             |             |             |            |                     |              |              |
| Phase Mass Flow (Liquid Phase)            | kg/h     | <empty>    | <empty>             | <empty>     | <empty>     | <empty>     | <empty>    | <empty>             | <empty>      | <empty>      |
| Phase Molecular Weight (Liquid Phase)     | -        | <empty>    | <empty>             | <empty>     | <empty>     | <empty>     | <empty>    | <empty>             | <empty>      | <empty>      |
| Phase Mass Density (Liquid Phase)         | kg/m³    | <empty>    | <empty>             | <empty>     | <empty>     | <empty>     | <empty>    | <empty>             | <empty>      | <empty>      |
| Phase Actual Volume Flow (Liquid Phase)   | m3/h     | <empty>    | <empty>             | <empty>     | <empty>     | <empty>     | <empty>    | <empty>             | <empty>      | <empty>      |
| Phase Viscosity (Liquid Phase)            | cP       | <empty>    | <empty>             | <empty>     | <empty>     | <empty>     | <empty>    | <empty>             | <empty>      | <empty>      |
| Phase Mass Heat Capacity (Liquid Phase)   | kJ/kg-C  | <empty>    | <empty>             | <empty>     | <empty>     | <empty>     | <empty>    | <empty>             | <empty>      | <empty>      |
| Phase Z Factor (Liquid Phase)             | -        | <empty>    | <empty>             | <empty>     | <empty>     | <empty>     | <empty>    | <empty>             | <empty>      | <empty>      |
| Phase Surface Tension (Liquid Phase)      | dyne/cm  | <empty>    | <empty>             | <empty>     | <empty>     | <empty>     | <empty>    | <empty>             | <empty>      | <empty>      |

|                        |          |             |             |                   |                   |                    |                |              |              |                         |
|------------------------|----------|-------------|-------------|-------------------|-------------------|--------------------|----------------|--------------|--------------|-------------------------|
| Data                   | Unit     | to PFR      | HCl in      | Product of CSTR 2 | Product of CSTR 1 | Product of MIX-102 | Product of PFR | to E-102     | to V-100     | Vapour Product of V-100 |
| Total Phase Properties |          |             |             |                   |                   |                    |                |              |              |                         |
| Vapour Fraction        | -        | 1.0000      | 1.0000      | 0.0000            | 1.0000            | 0.0576             | 1.0000         | 0.8973       | 0.4124       | 1.0000                  |
| Temperature            | C        | 225.0000    | 25.0000     | 60.0000           | 60.0000           | 60.0000            | 225.0000       | 71.7760      | 15.0000      | 15.0000                 |
| Pressure               | atm      | 4.0000      | 1.5000      | 1.5000            | 1.5000            | 1.5000             | 4.0000         | 1.5000       | 1.5000       | 1.5000                  |
| Molar Flow             | kgmole/h | 2187.5000   | 800.0000    | 365.1911          | 22.3090           | 387.5000           | 1606.2498      | 2157.3925    | 2157.3925    | 889.7710                |
| Mass Flow              | kg/h     | 68889.76    | 29168.64    | 35916.51          | 1047.75           | 36964.26           | 68889.60       | 117687.30    | 117687.30    | 27170.68                |
| Liquid Volume Flow     | m³/h     | 95.2321     | 33.5145     | 28.8927           | 1.6686            | 30.5613            | 66.6211        | 106.8771     | 106.8771     | 32.8613                 |
| Heat Flow              | kJ/h     | -38940639.8 | -73935506.4 | -58417170.5       | 123933.65         | -58293236.8        | -131785450.8   | -222422913.1 | -270451095.8 | -7755034.5              |
| Vapour Fraction - 2    | -        | 1.0000      | 1.0000      | 0.0000            | 1.0000            | 0.0576             | 1.0000         | 0.8973       | 0.4124       | 1.0000                  |
| Temperature - 2        | C        | 225.0000    | 25.0000     | 60.0000           | 60.0000           | 60.0000            | 225.0000       | 71.7760      | 15.0000      | 15.0000                 |
| Pressure - 2           | atm      | 4.0000      | 1.5000      | 1.5000            | 1.5000            | 1.5000             | 4.0000         | 1.5000       | 1.5000       | 1.5000                  |
| Molecular Weight       | -        | 31.4925     | 36.4608     | 98.3499           | 46.9653           | 95.3916            | 42.8885        | 54.5507      | 54.5507      | 30.5367                 |

|                                           |          |              |              |              |           |              |               |               |               |             |
|-------------------------------------------|----------|--------------|--------------|--------------|-----------|--------------|---------------|---------------|---------------|-------------|
| Molar Flow - 2                            | kgmole/h | 2187.5000    | 800.0000     | 365.1911     | 22.3090   | 387.5000     | 1606.2498     | 2157.3925     | 2157.3925     | 889.7710    |
| Mass Flow - 2                             | kg/h     | 68889.7582   | 29168.6401   | 35916.5078   | 1047.7480 | 36964.2558   | 68889.6021    | 117687.2986   | 117687.2986   | 27170.6777  |
| Heat Flow - 2                             | kJ/h     | -38940639.77 | -73935506.37 | -58417170.48 | 123933.65 | -58293236.83 | -131785450.77 | -222422913.07 | -270451095.78 | -7755034.46 |
| Std Gas Flow                              | STD_m³/h | 51722.20     | 18915.55     | 8634.74      | 527.48    | 9162.22      | 37978.87      | 51010.33      | 51010.33      | 21038.13    |
| Vapour Phase Properties                   |          |              |              |              |           |              |               |               |               |             |
| Phase - Mass Flow (Vapour Phase)          | kg/h     | 68889.76     | 29168.64     | 0.00         | 1047.75   | 1047.75      | 68889.60      | 98576.75      | 27170.68      | 27170.68    |
| Phase Molecular Weight (Vapour Phase)     | -        | 31.4925      | 36.4608      | 46.9653      | 46.9653   | 46.9653      | 42.8885       | 50.9195       | 30.5367       | 30.5367     |
| Phase Mass Density (Vapour Phase)         | kg/m³    | 3.0827       | 2.2538       | 2.6125       | 2.6125    | 2.6125       | 4.2223        | 2.7318        | 1.9400        | 1.9400      |
| Phase Actual Volume Flow (Vapour Phase)   | m³/h     | 22347.07     | 12941.76     | 0.00         | 401.05    | 401.05       | 16315.49      | 36084.74      | 14005.85      | 14005.85    |
| Phase Z Factor (Vapour Phase)             | -        | 0.9997       | 0.9919       | 0.9864       | 0.9864    | 0.9864       | 0.9940        | 0.9878        | 0.9986        | 0.9986      |
| Phase Cp/Cv (Vapour Phase)                | -        | 1.3091       | 1.4038       | 1.1825       | 1.1825    | 1.1825       | 1.2110        | 1.2103        | 1.3710        | 1.3710      |
| Phase Viscosity (Vapour Phase)            | cP       | 0.0237       | 0.0136       | 0.0111       | 0.0111    | 0.0111       | 0.0216        | 0.0137        | 0.0172        | 0.0172      |
| Phase Mass Heat Capacity (Vapour Phase)   | kJ/kg-C  | 1.1342       | 0.8189       | 1.2107       | 1.2107    | 1.2107       | 1.1580        | 0.9879        | 1.0191        | 1.0191      |
| Phase Thermal Conductivity (Vapour Phase) | W/m-K    | 0.0357       | 0.0170       | 0.0199       | 0.0199    | 0.0199       | 0.0317        | 0.0195        | 0.0239        | 0.0239      |
| Liquid Phase Properties                   |          |              |              |              |           |              |               |               |               |             |
| Phase Mass Flow (Liquid Phase)            | kg/h     | <empty>      | <empty>      | 35916.5078   | 0.0000    | 35916.5076   | <empty>       | 19110.5455    | 83842.9619    | 0.0000      |
| Phase Molecular Weight (Liquid Phase)     | -        | <empty>      | <empty>      | 98.3499      | 98.3499   | 98.3499      | <empty>       | 86.2943       | 93.4491       | 93.4491     |
| Phase Mass Density (Liquid Phase)         | kg/m3    | <empty>      | <empty>      | 1180.6330    | 1180.6330 | 1180.6330    | <empty>       | 1162.3426     | 1246.9747     | 1246.9747   |
| Phase Actual Volume Flow (Liquid Phase)   | m³/h     | <empty>      | <empty>      | 30.4214      | 0.0000    | 30.4214      | <empty>       | 16.4414       | 67.2371       | 0.0000      |
| Phase Viscosity (Liquid Phase)            | cP       | <empty>      | <empty>      | 0.4912       | 0.4912    | 0.4912       | <empty>       | 0.4533        | 0.8512        | 0.8512      |
| Phase Mass Heat Capacity (Liquid Phase)   | kJ/kg-C  | <empty>      | <empty>      | 1.3231       | 1.3231    | 1.3231       | <empty>       | 1.4373        | 1.2754        | 1.2754      |
| Phase Z Factor (Liquid Phase)             | -        | <empty>      | <empty>      | 0.0046       | 0.0046    | 0.0046       | <empty>       | 0.0039        | 0.0048        | 0.0048      |
| Phase Surface Tension (Liquid Phase)      | dyne/cm  | <empty>      | <empty>      | 26.2338      | 26.2338   | 26.2338      | <empty>       | 30.8779       | 35.5786       | 35.5786     |

| Data                                      | Unit     | Liquid Product of V-100 | Water in     | Water to Extractor | Product 1 of Extractor | Product 2 of Extractor | Vapour Product of Reboiled Absorber | Liquid Product of Reboiled Absorber | Product of E-103 | Recycle Product |
|-------------------------------------------|----------|-------------------------|--------------|--------------------|------------------------|------------------------|-------------------------------------|-------------------------------------|------------------|-----------------|
| Total Phase Properties                    |          |                         |              |                    |                        |                        |                                     |                                     |                  |                 |
| Vapour Fraction                           | -        | 0.0000                  | 0.0000       | 0.0000             | 0.0000                 | 0.0000                 | 1.0000                              | 0.0000                              | 0.0049           | 0.0049          |
| Temperature                               | C        | 15.0000                 | 15.0000      | 15.0177            | 14.8922                | 14.8952                | 126.6082                            | 136.8787                            | 60.0000          | 60.0000         |
| Pressure                                  | atm      | 1.5000                  | 1.0000       | 4.0000             | 4.0000                 | 4.0000                 | 4.0000                              | 4.0000                              | 4.0000           | 4.0000          |
| Molar Flow                                | kgmole/h | 1267.6214               | 100.0000     | 100.0000           | 897.0498               | 470.5716               | 163.9425                            | 733.1073                            | 163.9425         | 163.6426        |
| Mass Flow                                 | kg/h     | 90516.62                | 1801.51      | 1801.51            | 83840.03               | 8478.10                | 11855.25                            | 71984.78                            | 11855.25         | 11833.44        |
| Liquid Volume Flow                        | m³/h     | 74.0158                 | 1.8051       | 1.8051             | 67.3259                | 8.4951                 | 9.7127                              | 57.6132                             | 9.7127           | 9.6948          |
| Heat Flow                                 | kJ/h     | -262696061.32           | -28715571.80 | -28714852.30       | -156287365.91          | -135125262.53          | -25894157.84                        | -111541561.26                       | -32403106.30     | -32344225.47    |
| Vapour Fraction - 2                       | -        | 0.0000                  | 0.0000       | 0.0000             | 0.0000                 | 0.0000                 | 1.0000                              | 0.0000                              | 0.0049           | 0.0049          |
| Temperature - 2                           | C        | 15.0000                 | 15.0000      | 15.0177            | 14.8922                | 14.8952                | 126.6082                            | 136.8787                            | 60.0000          | 60.0000         |
| Pressure - 2                              | atm      | 1.5000                  | 1.0000       | 4.0000             | 4.0000                 | 4.0000                 | 4.0000                              | 4.0000                              | 4.0000           | 4.0000          |
| Molecular Weight                          |          | 71.4067                 | 18.0151      | 18.0151            | 93.4620                | 18.0166                | 72.3135                             | 98.1913                             | 72.3135          | 72.3127         |
| Molar Flow - 2                            | kgmole/h | 1267.6214               | 100.0000     | 100.0000           | 897.0498               | 470.5716               | 163.9425                            | 733.1073                            | 163.9425         | 163.6426        |
| Mass Flow - 2                             | kg/h     | 90516.6209              | 1801.5100    | 1801.5100          | 83840.0306             | 8478.1003              | 11855.2540                          | 71984.7766                          | 11855.2540       | 11833.4408      |
| Heat Flow - 2                             | kJ/h     | -262696061.32           | -28715571.80 | -28714852.30       | -156287365.91          | -135125262.53          | -25894157.84                        | -111541561.26                       | -32403106.30     | -32344225.47    |
| Std Gas Flow                              | STD_m³/h | 29972.19                | 2364.44      | 2364.44            | 21210.24               | 11126.40               | 3876.33                             | 17333.91                            | 3876.33          | 3869.24         |
| Vapour Phase Properties                   |          |                         |              |                    |                        |                        |                                     |                                     |                  |                 |
| Phase - Mass Flow (Vapour Phase)          | kg/h     | 0.00                    | <empty>      | <empty>            | <empty>                | <empty>                | 11855.25                            | <empty>                             | 28.25            | 28.19           |
| Phase Molecular Weight (Vapour Phase)     | -        | 30.5367                 | <empty>      | <empty>            | <empty>                | <empty>                | 72.3135                             | <empty>                             | 35.1412          | 35.1402         |
| Phase Mass Density (Vapour Phase)         | kg/m³    | 1.9400                  | <empty>      | <empty>            | <empty>                | <empty>                | 9.3690                              | <empty>                             | 5.1850           | 5.1848          |
| Phase Actual Volume Flow (Vapour Phase)   | m³/h     | 0.00                    | <empty>      | <empty>            | <empty>                | <empty>                | 1265.37                             | <empty>                             | 5.45             | 5.44            |
| Phase Z Factor (Vapour Phase)             | -        | 0.9986                  | <empty>      | <empty>            | <empty>                | <empty>                | 0.9412                              | <empty>                             | 0.9917           | 0.9917          |
| Phase Cp/Cv (Vapour Phase)                | -        | 1.3710                  | <empty>      | <empty>            | <empty>                | <empty>                | 1.1602                              | <empty>                             | 1.3161           | 1.3161          |
| Phase Viscosity (Vapour Phase)            | cP       | 0.0172                  | <empty>      | <empty>            | <empty>                | <empty>                | 0.0118                              | <empty>                             | 0.0170           | 0.0170          |
| Phase Mass Heat Capacity (Vapour Phase)   | kJ/kg-C  | 1.0191                  | <empty>      | <empty>            | <empty>                | <empty>                | 1.0410                              | <empty>                             | 1.0351           | 1.0351          |
| Phase Thermal Conductivity (Vapour Phase) | W/m-K    | 0.0239                  | <empty>      | <empty>            | <empty>                | <empty>                | 0.0170                              | <empty>                             | 0.0242           | 0.0242          |
| Liquid Phase Properties                   |          |                         |              |                    |                        |                        |                                     |                                     |                  |                 |

|                                         |         |            |         |         |            |         |         |            |            |            |
|-----------------------------------------|---------|------------|---------|---------|------------|---------|---------|------------|------------|------------|
| Phase Mass Flow (Liquid Phase)          | kg/h    | 83842.9619 | <empty> | <empty> | 83840.0306 | <empty> | <empty> | 71984.7766 | 11216.2099 | 11195.5296 |
| Phase Molecular Weight (Liquid Phase)   | -       | 93.4491    | <empty> | <empty> | 93.4620    | <empty> | <empty> | 98.1913    | 86.7678    | 86.7682    |
| Phase Mass Density (Liquid Phase)       | kg/m3   | 1246.9747  | <empty> | <empty> | 1247.3694  | <empty> | <empty> | 1061.5414  | 1178.1107  | 1178.1114  |
| Phase Actual Volume Flow (Liquid Phase) | m³/h    | 67.2371    | <empty> | <empty> | 67.2135    | <empty> | <empty> | 67.8116    | 9.5205     | 9.5029     |
| Phase Viscosity (Liquid Phase)          | cP      | 0.8512     | <empty> | <empty> | 0.8525     | <empty> | <empty> | 0.2500     | 0.5039     | 0.5039     |
| Phase Mass Heat Capacity (Liquid Phase) | kJ/kg·C | 1.2754     | <empty> | <empty> | 1.2748     | <empty> | <empty> | 1.5045     | 1.4068     | 1.4068     |
| Phase Z Factor (Liquid Phase)           | -       | 0.0048     | <empty> | <empty> | 0.0127     | <empty> | <empty> | 0.0110     | 0.0108     | 0.0108     |
| Phase Surface Tension (Liquid Phase)    | dyne/cm | 35.5786    | <empty> | <empty> | 35.5882    | <empty> | <empty> | 16.4271    | 31.7517    | 31.7519    |

| Data                                  | Unit | Clorin in | Ethylene to MIX-100 | Ethylene in | to E-100 | to CSTR | Air in | Ethylene to MIX-101 | to K-100 | to E-101 |
|---------------------------------------|------|-----------|---------------------|-------------|----------|---------|--------|---------------------|----------|----------|
| Composition                           |      |           |                     |             |          |         |        |                     |          |          |
| Comp Mole Frac (Ethylene)             | -    | 0         | 1                   | 1           | 0.5129   | 0.5129  | 0      | 1                   | 0.1771   | 0.1771   |
| Comp Mole Frac (Cl <sub>2</sub> )     | -    | 1         | 0                   | 0           | 0.4871   | 0.4871  | 0      | 0                   | 0        | 0        |
| Comp Mole Frac (12-ClC <sub>2</sub> ) | -    | 0         | 0                   | 0           | 0        | 0       | 0      | 0                   | 0        | 0        |
| Comp Mole Frac (HCl)                  | -    | 0         | 0                   | 0           | 0        | 0       | 0      | 0                   | 0.3657   | 0.3657   |
| Comp Mole Frac (Oxygen)               | -    | 0         | 0                   | 0           | 0        | 0       | 0.21   | 0                   | 0.0960   | 0.0960   |
| Comp Mole Frac (H <sub>2</sub> O)     | -    | 0         | 0                   | 0           | 0        | 0       | 0      | 0                   | 0        | 0        |
| Comp Mole Frac (VinylCl)              | -    | 0         | 0                   | 0           | 0        | 0       | 0      | 0                   | 0        | 0        |
| Comp Mole Frac (Nitrogen)             | -    | 0         | 0                   | 0           | 0        | 0       | 0.79   | 0                   | 0.3611   | 0.3611   |

| Data                                  | Unit | to PFR | HCl in | Product of CSTR 2 | Product of CSTR 1 | Product of MIX-102 | Product of PFR | to E-102    | to V-100 | Vapour Product of V-100 |
|---------------------------------------|------|--------|--------|-------------------|-------------------|--------------------|----------------|-------------|----------|-------------------------|
| Composition                           |      |        |        |                   |                   |                    |                |             |          |                         |
| Comp Mole Frac (Ethylene)             | -    | 0.1771 | 0      | 0.0086            | 0.7333            | 0.0503             | 1.00E-40       | 0.009180168 | 0.0092   | 0.0219                  |
| Comp Mole Frac (Cl <sub>2</sub> )     | -    | 0      | 0      | 5.92E-08          | 5.97E-07          | 9.01E-08           | 0              | 2.07E-08    | 2.07E-08 | 3.91E-08                |
| Comp Mole Frac (12-ClC <sub>2</sub> ) | -    | 0      | 0      | 0.9914            | 0.2667            | 0.9497             | 0.2412         | 0.4009      | 0.4009   | 0.0328                  |
| Comp Mole Frac (HCl)                  | -    | 0.3657 | 1      | 0                 | 0                 | 0                  | 0.0156         | 0.0121      | 0.0121   | 0.0281                  |
| Comp Mole Frac (Oxygen)               | -    | 0.0960 | 0      | 0                 | 0                 | 0                  | 0.0101         | 0.0075      | 0.0075   | 0.0183                  |
| Comp Mole Frac (H <sub>2</sub> O)     | -    | 0      | 0      | 0                 | 0                 | 0                  | 0.2412         | 0.2038      | 0.2038   | 0.0111                  |
| Comp Mole Frac (VinylCl)              | -    | 0      | 0      | 0                 | 0                 | 0                  | 0              | 0           | 0        | 0                       |
| Comp Mole Frac (Nitrogen)             | -    | 0.3611 | 0      | 0                 | 0                 | 0                  | 0.4918         | 0.3665      | 0.3665   | 0.8879                  |

| Data                                  | Unit | Liquid Product of V-100 | Water in | Water to Extractor | Product 1 of Extractor | Product 2 of Extractor | Vapour Product of Reboiled Absorber | Liquid Product of Reboiled Absorber | Product of E-103 | Recycle Product |
|---------------------------------------|------|-------------------------|----------|--------------------|------------------------|------------------------|-------------------------------------|-------------------------------------|------------------|-----------------|
| Composition                           |      |                         |          |                    |                        |                        |                                     |                                     |                  |                 |
| Comp Mole Frac (Ethylene)             | -    | 0.0002                  | 0        | 0                  | 0.0003                 | 1.04E-11               | 0.001865593                         | 1.89E-29                            | 0.0019           | 0.0019          |
| Comp Mole Frac (Cl <sub>2</sub> )     | -    | 7.77E-09                | 0        | 0                  | 1.10E-08               | 3.40E-11               | 6.00E-08                            | 7.63E-21                            | 6.00E-08         | 5.92E-08        |
| Comp Mole Frac (12-ClC <sub>2</sub> ) | -    | 0.6593                  | 0        | 0                  | 0.9316                 | 1.51E-05               | 0.6684                              | 0.9905                              | 0.6684           | 0.6684          |
| Comp Mole Frac (HCl)                  | -    | 0.0009                  | 0        | 0                  | 0.0013                 | 1.04E-05               | 0.007060362                         | 1.36E-24                            | 0.0071           | 0.0071          |
| Comp Mole Frac (Oxygen)               | -    | 2.58E-05                | 0        | 0                  | 3.64E-05               | 4.80E-08               | 0.000199133                         | 9.90E-31                            | 0.0002           | 0.0002          |
| Comp Mole Frac (H <sub>2</sub> O)     | -    | 0.338990633             | 1        | 1                  | 0.0659                 | 1.0000                 | 0.3184                              | 0.0095                              | 0.3184           | 0.3184          |
| Comp Mole Frac (VinylCl)              | -    | 0                       | 0        | 0                  | 0                      | 0                      | 0                                   | 0                                   | 0                | 0               |
| Comp Mole Frac (Nitrogen)             | -    | 0.0005                  | 0        | 0                  | 0.0007                 | 8.32E-06               | 0.0041                              | 9.99E-31                            | 0.0041           | 0.0041          |

|               |      |             |             |              |             |          |             |             |             |             |
|---------------|------|-------------|-------------|--------------|-------------|----------|-------------|-------------|-------------|-------------|
| Data          | Unit | Q-100       | Q-102       | Q-103        | Q-101       | Q-104    | Q-105       | Q-106       | Q-107       | Q-108       |
| Energi Stream |      |             |             |              |             |          |             |             |             |             |
| Heat Flow     | kJ/h | 1067589.618 | 6718194.754 | -79569395.01 | 8035253.439 | 92844811 | 48028182.71 | 719.4983333 | 18851329.92 | 6508948.464 |