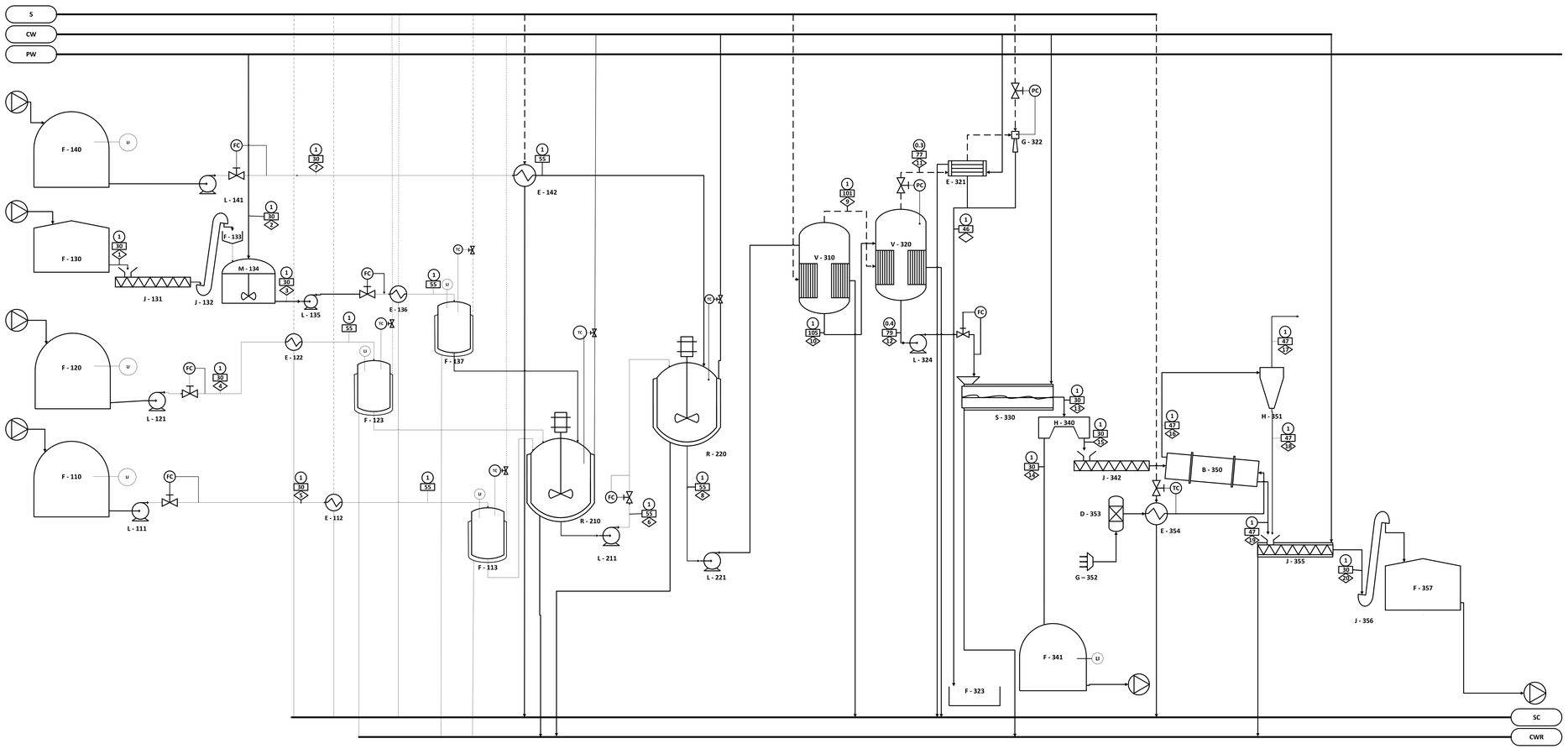
# PABRIK PENTAERITRITOL DARI FORMALDEHID, ASETALDEHID DAN KALSIUM HIDROKSIDA DENGAN PROSES CROSSED ALDOL REACTION




| KETERANGAN | |
|---|---|
| ▭ | Temperatur (°C) |
| ◯ | Tekanan (atm) |
| S | Steam |
| CW | Cooling Water |
| PW | Process Water |
| SC | Steam Condensate |
| CWR | Cooling Water Return |

| NO | KODE | NAMA ALAT |
|---|---|---|
| 1 | F - 110 | Tangki Penyimpanan Formaldehid |
| 2 | L - 111 | Pompa 1 |
| 3 | E - 112 | Heater 1 |
| 4 | F - 113 | Tangki Penyimpanan Sementara Formaldehid |
| 5 | F – 120 | Tangki Penyimpanan Asetaldehid |
| 6 | L - 121 | Pompa 2 |
| 7 | E - 122 | Heater 2 |
| 8 | F - 123 | Tangki Penyimpanan sementara Asetaldehid |
| 9 | F - 130 | Gudang Penyimpanan Kalsium Hidroksida |
| 10 | J - 131 | Screw Conveyor 1 |
| 11 | J - 132 | Bucket Elevator |
| 12 | F - 133 | Hopper |
| 13 | M - 134 | Tangki Mixer |
| 14 | L -135 | Pompa 3 |
| 15 | E -136 | Heater 3 |
| 16 | F - 137 | Tangki Penyimpanan Sementara Kalsium Hidroksida |
| 17 | F - 140 | Tangki Penyimpanan Asam Format |
| 18 | L - 141 | Pompa 4 |
| 19 | E - 142 | Heater 4 |
| 20 | R - 210 | Reaktor Kondensasi |
| 21 | L - 211 | Pompa 5 |
| 22 | R - 220 | Reaktor Netralisasi |
| 23 | L - 221 | Pompa 6 |
| 24 | V - 310 | Evaporator 1 |
| 25 | V - 320 | Evaporator 2 |
| 26 | E - 321 | Kondensor |
| 27 | G - 322 | Steam Ejector |
| 28 | F - 323 | Hot Well |
| 29 | S - 330 | Kristalizer |
| 30 | L - 324 | Pompa 7 |
| 31 | S - 330 | Cooling Crystalizer |
| 32 | H - 340 | Sentrifuge |
| 33 | F - 341 | Tangki Penyimpanan Mother Liquor |
| 34 | J – 342 | Screw Conveyor 2 |
| 35 | B - 350 | Rotary Dryer |
| 36 | H - 351 | Cyclone |
| 37 | G - 352 | Blower Udara |
| 38 | D - 353 | Molecular Sieve Tray |
| 39 | E - 354 | Heater 5 |
| 40 | J – 355 | Cooling Screw Conveyor |
| 41 | J - 356 | Bucket Elevator 2 |
| 42 | F - 357 | Gudang Penyimpanan Pentaeritritol 99% |

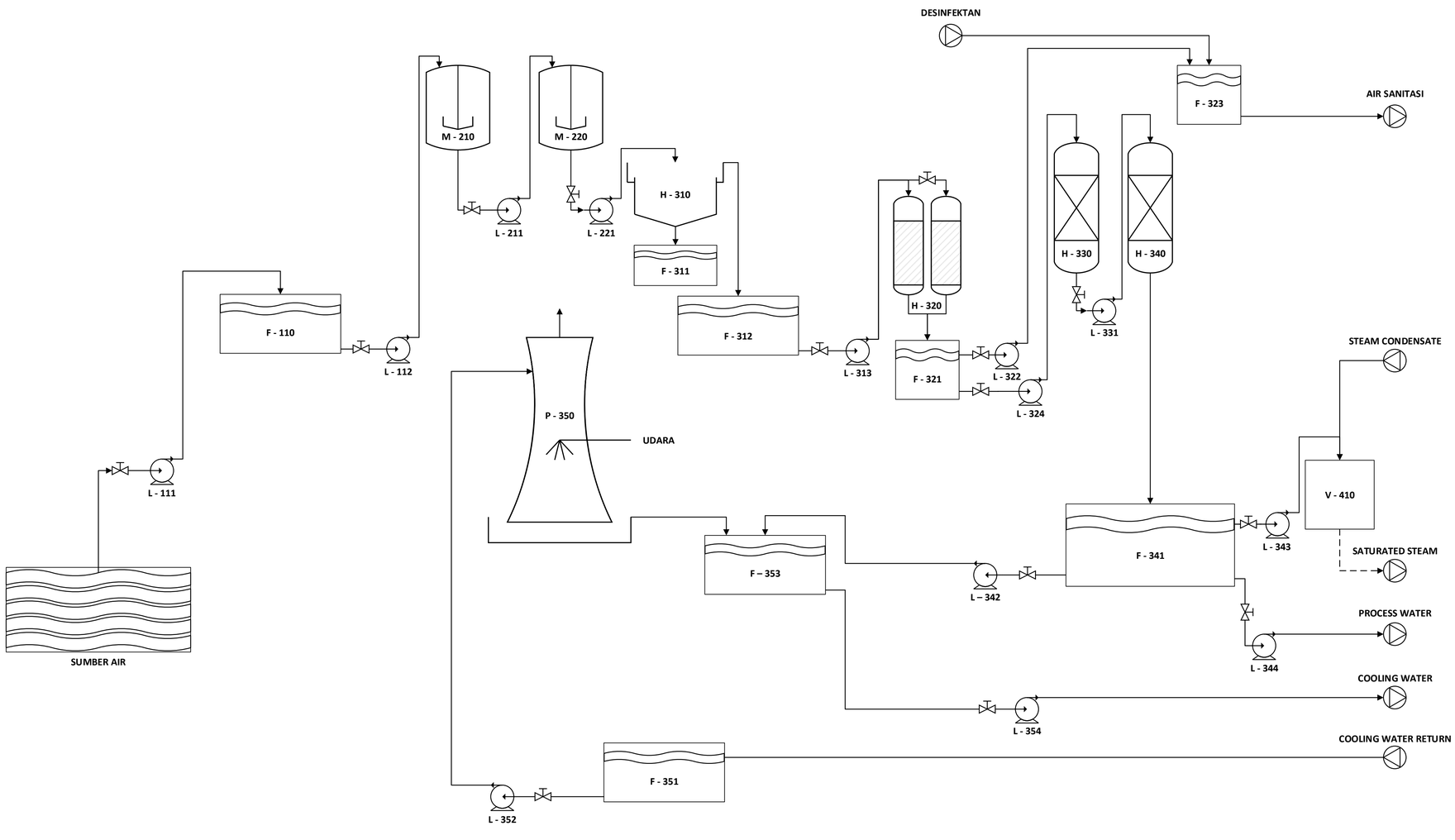
| Komponen | Aliran Massa (kg) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| $CH_2O_{(aq)}$ | | | | | 5.213,8642 | 579,3182 | | 579,3182 | | 376,5569 | | 173,7955 | 173,7955 | 165,1057 | 8,6898 | | | | | 0,5170 |
| $CH_2O_{(g)}$ | | | | | | | | | 202,7614 | | 202,7614 | | | | | 8,6029 | 8,1727 | 0,4301 | 0,0869 | |
| $CH_3OH_{(l)}$ | | | | | 140,9152 | 140,9152 | | 140,9152 | | 91,5949 | | 42,2746 | 42,2746 | 40,1608 | 2,1137 | | | | | 0,1258 |
| $CH_3OH_{(g)}$ | | | | | | | | | 49,3203 | | 49,3203 | | | | | 2,0926 | 1,9880 | 0,1046 | 0,0211 | |
| $CH_3CHO_{(l)}$ | | | | 1.699,83 | | | | | | | | | | | | | | | | |
| $Ca(OH)_{2(s)}$ | 2.859,3540 | | | | | | | | | | | | | | | | | | | |
| $Ca(OH)_{2(aq)}$ | | | 2.859,3540 | | | 1.429,677 | | | | | | | | | | | | | | |
| $CH_2O_{(l)}$ | | | | | | | 1.775,8093 | | | | | | | | | | | | | |
| $C_5H_{12}O_{4(aq)}$ | | | | | | 5.253,7253 | | 5.253,7253 | | 5.253,7253 | | 5.253,7253 | 2,3166 | 2,2008 | 0,1158 | 52,5141 | 0,1089 | 0,0057 | 0,0012 | 0,0069 |
| $C_5H_{12}O_{4(s)}$ | | | | | | | | | | | | | 5.251,4087 | | 5.251,4078 | 0,1147 | 2,6257 | 49,8884 | 5.198,8946 | 5.248,7830 |
| $Ca(HCOO)_{2(aq)}$ | | | | | | 2.510,3276 | | 5.020,6552 | | 5.020,6552 | | 5.020,6552 | 5.020,6552 | 4.769,6224 | 251,0328 | 248,5224 | 236,0963 | 12,4261 | 2,5103 | 14,9364 |
| $H_2O_{(l)}$ | 150,4923 | 2.708,8617 | 2.859,3540 | 17,17 | 8.736,7453 | 11.613,2693 | 197,3121 | 12.505,7402 | | 8.321,2659 | | 4.136,7916 | 4.136,7916 | 3.929,9520 | 206,8396 | 204,7712 | 194,5326 | 10,2386 | 2,0684 | 12,3070 |
| $H_2O_{(g)}$ | | | | | | | | | 4.184,4743 | | 4.184,4743 | | | | | | | | | |
| $Udara_{(g)}$ | | | | | | | | | | | | | | | | | | | | |
| **TOTAL** | 3.009,8463 | 2.708,8617 | 5.718,708 | 1.717 | 14.091,5247 | 21.527,2326 | 1.973.1214 | 23.500,3541 / 43% | 4.436,556 | 19.063,7982 / 53% | 4.348,3274 | 14.715,4708 / 70% | 14.715,4708 | 8.907,0418 | 5.724,6118 | 520,9852 | 447,6711 | 73,3063 | 5.203,6267 | 5.276,9386 |

| Digambar Oleh: | | |
|---|---|---|
| Adibi Siraj | (20031010137) | |
| Dosen Pembimbing | Ir. Sani, M.T. | |

**FLOWSHEET**
**PABRIK PENTAERITRITOL DARI FOEMALDEHID, ASETALDEHID, DAN KALSIUM HIDROKSIDA DENGAN PROSES *CROSSED ALDOL REACTION***

**PROGRAM STUDI TEKNIK KIMIA**
**FAKULTAS TEKNIK DAN SAINS**
**UNIVERSITAS PEMBANGUNAN NASIONAL "VETERAN" JAWA TIMUR**
**2025**

# FLOWSHEET UTILITAS




| NO | KODE | NAMA ALAT |
|---|---|---|
| 1 | F – 110 | Bak Penampung Air Sungai |
| 2 | L - 111 | Pompa 1 |
| 3 | L - 112 | Pompa 2 |
| 4 | M - 210 | Tangki Koagulasi |
| 5 | L - 211 | Pompa 3 |
| 6 | M - 220 | Tangki Floakulasi |
| 7 | L - 221 | Pompa 4 |
| 8 | H - 310 | Clarifier |
| 9 | F - 311 | Bak Penampung Flok |
| 10 | F - 312 | Bak Penampung Air Jernih |
| 11 | L - 313 | Pompa 5 |
| 12 | H - 320 | Sand Filter |
| 13 | F - 321 | Bak Penampung Air Bersih 1 |
| 14 | L - 322 | Pompa 6 |
| 15 | F - 323 | Bak Penampung Air Sanitasi |
| 16 | L - 324 | Pompa 7 |
| 17 | H - 330 | Tangki Kation Exchanger |
| 18 | L - 331 | Pompa 8 |
| 19 | H - 340 | Tangki Anion Exchanger |
| 20 | F - 341 | Bak Penampung Air Demineralisasi |
| 21 | L - 342 | Pompa 9 |
| 22 | L - 343 | Pompa 10 |
| 23 | L - 344 | Pompa 11 |
| 24 | V - 410 | Reboiler |
| 25 | P - 350 | Cooling Tower |
| 26 | F - 351 | Bak Penampung Cooling Water Return |
| 27 | L - 352 | Pompa 12 |
| 28 | F - 353 | Bak Penampung Cooling Water |
| 29 | L - 354 | Pompa 13 |

| Digambar Oleh: | | |
|---|---|---|
| Adibi Siraj | (20031010137) | |
| Dosen Pembimbing : | Ir. Sani, MT. | |

**FLOWSHEET UTILITAS UNIT PENGOLAHAN AIR PABRIK PENTAERITRITOL DARI FORMALDEHID, ASETALDEHID, DAN KALSIUM HIDROKSIDA DENGAN PROSES *CROSSED ALDOL REACTION***

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