## DAFTAR TABEL

<table>
<thead>
<tr>
<th>Tabel</th>
<th>Halaman</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 Data impor <em>isobutyl palmitate</em> di Indonesia</td>
<td>3</td>
</tr>
<tr>
<td>1.2 Data impor <em>isobutyl palmitate</em> negara tetangga</td>
<td>4</td>
</tr>
<tr>
<td>1.3 Harga bahan baku dan produk</td>
<td>5</td>
</tr>
<tr>
<td>1.4 Estimasi kebutuhan Isobutil Palmitat</td>
<td>6</td>
</tr>
<tr>
<td>2.1 Perbandingan Proses Pembuatan <em>isobutyl palmitate</em></td>
<td>17</td>
</tr>
<tr>
<td>4.1 Neraca Massa ST-101</td>
<td>24</td>
</tr>
<tr>
<td>4.2 Neraca Massa <em>Mixed Point</em> 101</td>
<td>24</td>
</tr>
<tr>
<td>4.3 Neraca Massa SI-101</td>
<td>24</td>
</tr>
<tr>
<td>4.4 Neraca Massa <em>Melter</em> 101</td>
<td>24</td>
</tr>
<tr>
<td>4.5 Neraca Massa <em>Mixed Point</em> 102</td>
<td>25</td>
</tr>
<tr>
<td>4.6 Neraca Massa Reaktor 201</td>
<td>25</td>
</tr>
<tr>
<td>4.7 Neraca Massa <em>Centrifuge</em> 31</td>
<td>25</td>
</tr>
<tr>
<td>4.8 Neraca Massa <em>Distillation column</em> 401</td>
<td>26</td>
</tr>
<tr>
<td>4.9 Neraca Massa <em>Condensor</em> 401</td>
<td>26</td>
</tr>
<tr>
<td>4.10 Neraca Massa <em>Reboiler</em> 401</td>
<td>26</td>
</tr>
<tr>
<td>4.11 Neraca Massa <em>Distilation column</em> 402</td>
<td>27</td>
</tr>
<tr>
<td>4.12 Neraca Massa <em>Condensor</em> 402</td>
<td>27</td>
</tr>
<tr>
<td>4.13 Neraca Massa <em>Reboiler</em> 402</td>
<td>27</td>
</tr>
<tr>
<td>4.14 Neraca Massa <em>Distilation column</em> 403</td>
<td>28</td>
</tr>
<tr>
<td>4.15 Neraca Massa <em>Condensor</em> 403</td>
<td>28</td>
</tr>
<tr>
<td>4.16 Neraca Massa <em>Reboiler</em> 403</td>
<td>28</td>
</tr>
<tr>
<td>4.17 Neraca Massa Total</td>
<td>29</td>
</tr>
<tr>
<td>4.18 Neraca Energi <em>Mixed point</em> 101</td>
<td>29</td>
</tr>
<tr>
<td>4.19 Neraca Energi <em>Melter</em> 101</td>
<td>29</td>
</tr>
<tr>
<td>4.20 Neraca Energi <em>Heater</em> 101</td>
<td>30</td>
</tr>
<tr>
<td>4.21 Neraca Energi <em>Mixed Point</em> 102</td>
<td>30</td>
</tr>
<tr>
<td>4.22 Neraca Energi Reaktor 201</td>
<td>30</td>
</tr>
</tbody>
</table>
4.23. Neraca Energi *Centrifuge* 301 .............................................. 30
4.24. Neraca Energi *Destillation column* 401 .................................... 31
4.25. Neraca Energi *Destillation column* 402 .................................... 31
4.26. Neraca Energi *Destillation column* 403 .................................... 31
4.27. Neraca Energi *Cooler* 501 ....................................................... 31
4.28. Neraca Energi *Cooler* 502 ....................................................... 32

5.1. Spesifikasi Tangki Isobutanol (ST - 101) ...................................... 33
5.2. Spesifikasi Pompa - 101 (PP-101) .............................................. 34
5.3. Spesifikasi *Heater* – 101 (HE-101) ........................................... 34
5.4. Spesifikasi Silo Asam Palmitat (SI - 101) .................................... 35
5.5. Spesifikasi Bucket Elevator – 101 (BC-101) .................................. 35
5.6. Spesifikasi Hopper (HO-101) .................................................... 35
5.7. Spesifikasi *Melter* - 101 (ME-101) ........................................... 36
5.8. Spesifikasi Pompa - 102 (PP-102) .............................................. 36
5.9. Spesifikasi Hopper (HO-101) .................................................... 37
5.10. Spesifikasi Reaktor - 201 (RE-201) .......................................... 37
5.11. Spesifikasi Pompa - 201 (PP-201) .............................................. 38
5.12. Spesifikasi *Centrifuge* (CF-301) .............................................. 38
5.13. Spesifikasi Pompa - 301 (PP-301) .............................................. 38
5.14. Spesifikasi *Distillation Column* - 401 .................................... 39
5.15. Spesifikasi *Condensor*-401 .................................................... 39
5.16. Spesifikasi *Accumulator*-401 ................................................ 40
5.17. Spesifikasi *Reboiler* -401 ...................................................... 40
5.18. Spesifikasi *Distillation Column* - 402 .................................... 41
5.19. Spesifikasi *Condensor*-402 .................................................... 41
5.20. Spesifikasi *Accumulator*-402 ................................................ 42
5.21. Spesifikasi *Reboiler* - 402 ...................................................... 43
5.22. Spesifikasi Pompa - 402 (PP-402) .............................................. 43
5.23. Spesifikasi Pompa - 403 (PP-403) .............................................. 44
5.24. Spesifikasi Pompa - 401 (PP-401) .............................................. 44
5.25. Spesifikasi *Distillation Column* - 403 .................................... 45
5.26. Spesifikasi *Condensor*-403 .................................................... 45
<table>
<thead>
<tr>
<th>No.</th>
<th>Spesifikasi</th>
<th>Halaman</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.27</td>
<td>Spesifikasi <em>Accumulator</em>-403</td>
<td>46</td>
</tr>
<tr>
<td>5.28</td>
<td>Spesifikasi <em>Reboiler</em> - 403</td>
<td>46</td>
</tr>
<tr>
<td>5.29</td>
<td>Spesifikasi Pompa – 405 (PP-405)</td>
<td>47</td>
</tr>
<tr>
<td>5.30</td>
<td>Spesifikasi <em>Cooler</em> 501</td>
<td>47</td>
</tr>
<tr>
<td>5.31</td>
<td>Spesifikasi Pompa – 404 (PP-404)</td>
<td>48</td>
</tr>
<tr>
<td>5.32</td>
<td>Spesifikasi <em>Cooler</em> 502</td>
<td>48</td>
</tr>
<tr>
<td>5.33</td>
<td>Spesifikasi Tangki Penyimpanan Produk (ST-501)</td>
<td>49</td>
</tr>
<tr>
<td>5.34</td>
<td>Spesifikasi Bak Sedimentasi - 101 (BS-101)</td>
<td>50</td>
</tr>
<tr>
<td>5.35</td>
<td>Spesifikasi Bak Penggumpal - 101 (BP-101)</td>
<td>50</td>
</tr>
<tr>
<td>5.36</td>
<td>Spesifikasi Tangki Alum -101 (TP-01)</td>
<td>51</td>
</tr>
<tr>
<td>5.37</td>
<td>Spesifikasi Tangki Klorin-102 (TP – 02)</td>
<td>51</td>
</tr>
<tr>
<td>5.38</td>
<td>Spesifikasi Tangki Soda Kaustik-103 (TP-03)</td>
<td>52</td>
</tr>
<tr>
<td>5.39</td>
<td>Spesifikasi <em>Clarifier</em> (CL-101)</td>
<td>52</td>
</tr>
<tr>
<td>5.40</td>
<td>Spesifikasi <em>Sand Filter</em> (SF-101)</td>
<td>53</td>
</tr>
<tr>
<td>5.41</td>
<td>Spesifikasi Tangki Penyimpanan Air Filter (TP - 04)</td>
<td>53</td>
</tr>
<tr>
<td>5.42</td>
<td>Spesifikasi <em>Hot Basin</em> - 101 (HB-101)</td>
<td>54</td>
</tr>
<tr>
<td>5.43</td>
<td>Spesifikasi <em>Cooling Tower</em> -101 (CT -101)</td>
<td>54</td>
</tr>
<tr>
<td>5.44</td>
<td>Spesifikasi Tangki Inhibitor (TP– 05)</td>
<td>55</td>
</tr>
<tr>
<td>5.45</td>
<td>Spesifikasi Tangki Dispersant (TP– 06)</td>
<td>55</td>
</tr>
<tr>
<td>5.46</td>
<td>Spesifikasi <em>Cold Basin</em> -101 (CB-101)</td>
<td>56</td>
</tr>
<tr>
<td>5.47</td>
<td>Spesifikasi Tangki air kondensat (TP-07)</td>
<td>56</td>
</tr>
<tr>
<td>5.48</td>
<td>Spesifikasi <em>Cation Exchanger</em> (CE–301)</td>
<td>57</td>
</tr>
<tr>
<td>5.49</td>
<td>Spesifikasi Tangki Penyimpanan Asam Sulfat (TP–08)</td>
<td>57</td>
</tr>
<tr>
<td>5.50</td>
<td>Spesifikasi <em>Anion Exchanger</em> (AE–301)</td>
<td>58</td>
</tr>
<tr>
<td>5.51</td>
<td>Spesifikasi <em>Deaerator</em> (DA-401)</td>
<td>58</td>
</tr>
<tr>
<td>5.52</td>
<td>Spesifikasi Tangki Penyimpanan Air Demin (TP-09)</td>
<td>59</td>
</tr>
<tr>
<td>5.53</td>
<td>Spesifikasi Tangki Penyimpanan Hidrazin (TP-401)</td>
<td>60</td>
</tr>
<tr>
<td>5.54</td>
<td>Spesifikasi <em>Boiler</em> (B-401)</td>
<td>60</td>
</tr>
<tr>
<td>5.55</td>
<td>Spesifikasi Pompa Utilitas -01 (PU-01)</td>
<td>61</td>
</tr>
<tr>
<td>5.56</td>
<td>Spesifikasi Pompa Utilitas -02 (PU-02)</td>
<td>61</td>
</tr>
<tr>
<td>5.57</td>
<td>Spesifikasi Pompa Utilitas -03 (PU-03)</td>
<td>62</td>
</tr>
<tr>
<td>5.58</td>
<td>Spesifikasi Pompa Utilitas -04 (PU-04)</td>
<td>62</td>
</tr>
</tbody>
</table>
5.59. Spesifikasi Pompa Utilitas -05 (PU-05) ................................... 63
5.60. Spesifikasi Pompa Utilitas -06 (PU-06) ................................... 63
5.61. Spesifikasi Pompa Utilitas -07 (PU-07) ................................... 64
5.62. Spesifikasi Pompa Utilitas -08 (PU-08) ................................... 64
5.63. Spesifikasi Pompa Utilitas -09 (PU-09) ................................... 65
5.64. Spesifikasi Pompa Utilitas -10 (PU-10) ................................... 65
5.65. Spesifikasi Pompa Utilitas -11 (PU-11) ................................... 66
5.66. Spesifikasi Pompa Utilitas -12 (PU-12) ................................... 66
5.67. Spesifikasi Pompa Utilitas -13 (PU-13) ................................... 67
5.68. Spesifikasi Pompa Utilitas -14 (PU-14) ................................... 67
5.69. Spesifikasi Pompa Utilitas -15 (PU-15) ................................... 68
5.70. Spesifikasi Cyclone ............................................................... 68
5.71. Spesifikasi Air Dryer (AD-401) ............................................. 69
5.72. Spesifikasi Air Compressor (AC-401) ..................................... 69

6.1. Kebutuhan air untuk General Uses ........................................ 71
6.2. Kebutuhan air untuk air pendingin ......................................... 73
6.3. Kebutuhan air untuk pembangkit steam ................................ 77
6.4. Tingkatan Kebutuhan Informasi dan Sistem Pengendalian ...... 94
6.5. Pengendalian Variabel Utama Proses ...................................... 94
8.1. Jadwal kerja regu shift ......................................................... 120
8.2. Perincian Tingkat Pendidikan ............................................... 121
8.3. Jumlah Operator Berdasarkan Jenis Alat ................................. 122
8.4. Penggolongan Tenaga Kerja .................................................. 123
9.1. Fixed capital investment ....................................................... 133
9.2. Manufacturing cost ............................................................. 134
9.3. General Expenses ............................................................... 135
9.4. Hasil Uji Kelayakan Ekonomi ............................................... 138