

LAMPIRAN

Lampiran 1 GL 0% J_L tetap J_G variasi

| Sudut 15° Pencampuran GL 0%, 10%, 20%,30% | | | | | |
|---|-------------|-------------|--|------------------------------|------------------------------|
| GL | JL (m/s) | JG (m/s) | $\frac{\Delta P}{\Delta Z} \left(\frac{\text{kPa}}{\text{m}} \right)$ | Grafik | |
| 0% | 0,033 | 0 | 43,28982237 | <p>— Pada JL = 0,033 m/s</p> | |
| | | 0,025 | 43,34918481 | | |
| | | 0,066 | 43,57020752 | | |
| | | 0,116 | 43,66231161 | | |
| | | 0,207 | 43,72190837 | | |
| | | 0,423 | 44,00092957 | | |
| | | 0,871 | 44,17430196 | | |
| | | 1,941 | 44,27068793 | | |
| | | 3 | 44,3937264 | | |
| | | 4,238 | 44,08669121 | | |
| | | 7 | 44,60900616 | | |
| | | 9,62 | 44,71053737 | | |
| | | 22,6 | 45,26034458 | | |
| | | 50 | 52,66911593 | | |
| | | 58,05 | 54,30789163 | | |
| | 66,3 | 55,31250318 | | | |
| | 0,091 | 0,091 | 0 | 43,35316695 | <p>— Pada JL = 0,091 m/s</p> |
| | | | 0,025 | 43,58380642 | |
| | | | 0,066 | 43,69752787 | |
| | | | 0,116 | 43,80142897 | |
| | | | 0,207 | 43,95758647 | |
| | | | 0,423 | 44,09032471 | |
| | | | 0,871 | 44,18242879 | |
| | | | 1,941 | 44,29952507 | |
| | | | 3 | 44,36121908 | |
| | | | 4,238 | 44,42403948 | |
| | | | 7 | 44,55962211 | |
| | | | 9,62 | 44,83804734 | |
| | | | 22,6 | 46,22781672 | |
| | | | 50 | 56,18946951 | |
| | | | 58,05 | 58,51412245 | |
| | 66,3 | 59,39347266 | | | |
| | 0,149 | 0,149 | 0 | 43,50605973 | <p>— Pada JL = 0,149</p> |
| | | | 0,025 | 43,76059208 | |
| | | | 0,066 | 44,0523995 | |
| | | | 0,116 | 44,04156372 | |
| | | | 0,207 | 44,30433126 | |
| | | | 0,423 | 44,33412964 | |
| | | | 0,871 | 44,63753133 | |
| | | | 1,941 | 44,66654325 | |
| | | | 3 | 44,72963542 | |
| | | | 4,238 | 44,73383428 | |
| 7 | | | 44,84438627 | | |
| 9,62 | | | 45,39419348 | | |
| 22,6 | | | 48,01718238 | | |
| 50 | | | 57,34358788 | | |
| 58,05 | | | 57,68204331 | | |
| 66,3 | 62,33248544 | | | | |

Lampiran 2 GL 0% J_L tetap J_G variasi

| Sudut 15° Pencampuran GL 0%, 10%, 20%, 30% | | | | Grafik |
|--|-------------|-------------|--|------------------------------|
| GL | JL (m/s) | JG (m/s) | $\frac{\Delta P}{\Delta Z} \left(\frac{\text{kPa}}{\text{m}} \right)$ | |
| 0% | 0,232 | 0 | 43,50654734 | <p>— Pada JL = 0,232 m/s</p> |
| | | 0,025 | 44,34155215 | |
| | | 0,066 | 44,05510844 | |
| | | 0,116 | 44,04427267 | |
| | | 0,207 | 44,46144999 | |
| | | 0,423 | 44,63482239 | |
| | | 0,871 | 44,63482239 | |
| | | 1,941 | 44,17631182 | |
| | | 3 | 45,02761922 | |
| | | 4,238 | 45,14803177 | |
| | | 7 | 45,22954389 | |
| | | 9,62 | 46,46373863 | |
| | | 22,6 | 50,21689884 | |
| | | 50 | 66,10818555 | |
| | | 58,05 | 63,6112438 | |
| | 66,3 | 71,31217473 | | |
| | 0,539 | 0 | 43,89985888 | <p>— Pada JL = 0,539...</p> |
| | | 0,025 | 44,4745071 | |
| | | 0,066 | 44,14450358 | |
| | | 0,116 | 44,18242879 | |
| | | 0,207 | 44,67545655 | |
| | | 0,423 | 44,87050049 | |
| | | 0,871 | 44,90300781 | |
| | | 1,941 | 45,1251412 | |
| | | 3 | 45,28225993 | |
| | | 4,238 | 46,08053146 | |
| | | 7 | 47,70096739 | |
| | | 9,62 | 49,69637531 | |
| | | 22,6 | 59,56722431 | |
| | | 50 | 82,01569883 | |
| | | 58,05 | 85,74930047 | |
| | 66,3 | 88,29305277 | | |
| | 0,7 | 0 | 44,30032202 | <p>— Pada JL = 0,7 m/s</p> |
| | | 0,025 | 44,53472692 | |
| | | 0,066 | 44,42623373 | |
| | | 0,116 | 44,58877035 | |
| | | 0,207 | 45,17932007 | |
| | | 0,423 | 45,47188599 | |
| | | 0,871 | 45,47730388 | |
| | | 1,941 | 45,55044536 | |
| | | 3 | 45,72652669 | |
| | | 4,238 | 46,71577875 | |
| | | 7 | 48,81545391 | |
| | | 9,62 | 51,52767542 | |
| | | 22,6 | 64,08262709 | |
| 50 | | 93,8251492 | | |
| 58,05 | | 98,35393417 | | |
| 66,3 | 114,3383002 | | | |

Lampiran 3 GL 0% J_L tetap J_G variasi

| Sudut 15° Pencampuran GL 0%, 10%, 20%,30% | | | | Grafik | |
|---|-------------|-------------|--|----------------------------------|----------------------------------|
| GL | JL (m/s) | JG (m/s) | $\frac{\Delta P}{\Delta Z} \left(\frac{\text{kPa}}{\text{m}} \right)$ | | |
| 0% | 0,879 | 0 | 44,58901415 | <p>..... Pada JL = 0,879 m/s</p> | |
| | | 0,025 | 44,70181457 | | |
| | | 0,066 | 44,95718669 | | |
| | | 0,116 | 45,57482585 | | |
| | | 0,207 | 45,63442261 | | |
| | | 0,423 | 45,62358683 | | |
| | | 0,871 | 45,62900472 | | |
| | | 1,941 | 45,76986979 | | |
| | | 3 | 46,0245105 | | |
| | | 4,238 | 48,48834896 | | |
| | | 7 | 50,48939148 | | |
| | | 9,62 | 54,65203562 | | |
| | | 22,6 | 70,54039667 | | |
| | | 50 | 110,0898367 | | |
| | | 58,05 | 118,8023685 | | |
| | 66,3 | 124,4062248 | | | |
| | 2,297 | 2,297 | 0 | 52,16049559 | <p>..... Pada JL = 2,297...</p> |
| | | | 0,025 | 52,33377579 | |
| | | | 0,066 | 52,8456307 | |
| | | | 0,116 | 53,28989746 | |
| | | | 0,207 | 53,84252197 | |
| | | | 0,423 | 53,85877564 | |
| | | | 0,871 | 53,92108134 | |
| | | | 1,941 | 54,07007324 | |
| | | | 3 | 54,14592367 | |
| | | | 4,238 | 63,66496215 | |
| | | | 7 | 65,86318868 | |
| | | | 9,62 | 76,40802287 | |
| | | | 22,6 | 113,1625915 | |
| | | | 50 | 166,1942818 | |
| | | | 58,05 | 167,7487278 | |
| | 66,3 | 170,4778697 | | | |
| | 4,935 | 4,935 | 0 | 82,22593995 | <p>..... Pada JL = 4,935 m/s</p> |
| | | | 0,025 | 85,33144591 | |
| | | | 0,066 | 87,47134888 | |
| | | | 0,116 | 88,13233114 | |
| | | | 0,207 | 87,98604818 | |
| | | | 0,423 | 88,68495565 | |
| | | | 0,871 | 88,70120931 | |
| 1,941 | | | 88,81498495 | | |
| 3 | | | 89,52472819 | | |
| 4,238 | | | 89,08625857 | | |
| 7 | | | 87,29689291 | | |
| 9,62 | | | 93,06615736 | | |
| 22,6 | | | 136,6870043 | | |
| 50 | | | 166,3517256 | | |
| 58,05 | | | 172,8608375 | | |
| 66,3 | 173,6569718 | | | | |

Lampiran 4 GL 10% J_L tetap J_G variasi

| Sudut 15° Pencampuran GL 0%, 10%, 20%,30% | | | | Grafik | |
|---|-------------|-------------|--|------------------------------|------------------------------|
| GL | JL (m/s) | JG (m/s) | $\frac{\Delta P}{\Delta Z} \left(\frac{\text{kPa}}{\text{m}} \right)$ | | |
| 10% | 0,033 | 0 | 46,45588269 | <p>— Pada JL = 0,033 m/s</p> | |
| | | 0,025 | 46,68110427 | | |
| | | 0,066 | 46,77142045 | | |
| | | 0,116 | 46,91114777 | | |
| | | 0,207 | 47,23115529 | | |
| | | 0,423 | 47,73149718 | | |
| | | 0,871 | 47,97513958 | | |
| | | 1,941 | 48,11548995 | | |
| | | 3 | 48,4482295 | | |
| | | 4,238 | 48,52397157 | | |
| | | 7 | 49,21009283 | | |
| | | 9,62 | 48,79028196 | | |
| | | 22,6 | 48,98083492 | | |
| | | 50 | 60,1119387 | | |
| | | 58,05 | 60,73827357 | | |
| | 66,3 | 65,57766602 | | | |
| | 0,091 | 0,091 | 0 | 46,70721849 | <p>— Pada JL = 0,091 m/s</p> |
| | | | 0,025 | 46,81717451 | |
| | | | 0,066 | 46,85740233 | |
| | | | 0,116 | 46,96478485 | |
| | | | 0,207 | 47,19331134 | |
| | | | 0,423 | 47,32632048 | |
| | | | 0,871 | 47,73675253 | |
| | | | 1,941 | 47,78388815 | |
| | | | 3 | 48,03674096 | |
| | | | 4,238 | 48,48496278 | |
| | | | 7 | 48,81046945 | |
| | | | 9,62 | 49,11032243 | |
| | | | 22,6 | 50,50014599 | |
| | | | 50 | 61,17909998 | |
| | | | 58,05 | 61,44576839 | |
| | 66,3 | 68,37708842 | | | |
| | 0,149 | 0,149 | 0 | 46,82549097 | <p>— Pada JL = 0,149</p> |
| | | | 0,025 | 46,90012237 | |
| | | | 0,066 | 47,08137779 | |
| | | | 0,116 | 47,55723084 | |
| | | | 0,207 | 48,03725566 | |
| | | | 0,423 | 48,17021061 | |
| | | | 0,871 | 48,59954423 | |
| 1,941 | | | 48,83883963 | | |
| 3 | | | 49,36471933 | | |
| 4,238 | | | 50,18509584 | | |
| 7 | | | 50,45444611 | | |
| 9,62 | | | 50,85553231 | | |
| 22,6 | | | 51,70099363 | | |
| 50 | | | 61,57753141 | | |
| 58,05 | | | 69,88997929 | | |
| 66,3 | 71,47259837 | | | | |

Lampiran 5 GL 10% J_L tetap J_G variasi

| Sudut 15° Pencampuran GL 0%, 10%, 20%,30% | | | | Grafik | |
|---|-------------|-------------|--|------------------------------|-----------------------------|
| GL | JL (m/s) | JG (m/s) | $\frac{\Delta P}{\Delta Z} \left(\frac{\text{kPa}}{\text{m}} \right)$ | | |
| 10% | 0,232 | 0 | 46,89912006 | <p>— Pada JL = 0,232 m/s</p> | |
| | | 0,025 | 47,03202084 | | |
| | | 0,066 | 47,17312971 | | |
| | | 0,116 | 47,91706991 | | |
| | | 0,207 | 48,36835122 | | |
| | | 0,423 | 48,76325256 | | |
| | | 0,871 | 49,20684568 | | |
| | | 1,941 | 49,49333998 | | |
| | | 3 | 53,06906437 | | |
| | | 4,238 | 53,63393331 | | |
| | | 7 | 54,37103689 | | |
| | | 9,62 | 54,8639021 | | |
| | | 22,6 | 58,17022205 | | |
| | | 50 | 67,61720263 | | |
| | 58,05 | 75,71095748 | | | |
| | 66,3 | 76,33696728 | | | |
| | 0,539 | 0,539 | 0 | 47,47317231 | <p>— Pada JL = 0,539...</p> |
| | | | 0,025 | 47,55151497 | |
| | | | 0,066 | 47,69655181 | |
| | | | 0,116 | 48,15514889 | |
| | | | 0,207 | 48,77601169 | |
| | | | 0,423 | 49,35353139 | |
| | | | 0,871 | 49,65319474 | |
| | | | 1,941 | 51,03410588 | |
| | | | 3 | 53,26402705 | |
| | | | 4,238 | 54,08085484 | |
| | | | 7 | 59,82365292 | |
| | | | 9,62 | 60,25131385 | |
| | | | 22,6 | 61,93324281 | |
| | | | 50 | 90,18839231 | |
| | 58,05 | 91,48332157 | | | |
| | 66,3 | 97,48051654 | | | |
| | 0,7 | 0,7 | 0 | 47,92591807 | <p>— Pada JL = 0,7 m/s</p> |
| | | | 0,025 | 48,07442237 | |
| | | | 0,066 | 48,26369626 | |
| | | | 0,116 | 49,03376768 | |
| 0,207 | | | 49,60497555 | | |
| 0,423 | | | 50,31504387 | | |
| 0,871 | | | 51,05271632 | | |
| 1,941 | | | 52,35482428 | | |
| 3 | | | 56,24996023 | | |
| 4,238 | | | 58,40592724 | | |
| 7 | | | 62,03813311 | | |
| 9,62 | | | 64,22598439 | | |
| 22,6 | | | 72,91654662 | | |
| 50 | | | 96,22882202 | | |
| 58,05 | 105,8888068 | | | | |
| 66,3 | 117,6534784 | | | | |

Lampiran 6 GL 10% J_L tetap J_G variasi

| Sudut 15° Pencampuran GL 0%, 10%, 20%,30% | | | | | |
|---|-------------|-------------|--|----------------------------------|----------------------------------|
| GL | JL (m/s) | JG (m/s) | $\frac{\Delta P}{\Delta Z} \left(\frac{\text{kPa}}{\text{m}} \right)$ | Grafik | |
| 10% | 0,879 | 0 | 48,4885115 | <p>..... Pada JL = 0,879 m/s</p> | |
| | | 0,025 | 48,63205842 | | |
| | | 0,066 | 49,08019898 | | |
| | | 0,116 | 49,61567587 | | |
| | | 0,207 | 50,20018465 | | |
| | | 0,423 | 50,96063932 | | |
| | | 0,871 | 51,43700707 | | |
| | | 1,941 | 53,18454664 | | |
| | | 3 | 56,66621651 | | |
| | | 4,238 | 60,72632713 | | |
| | | 7 | 64,10391384 | | |
| | | 9,62 | 66,63087623 | | |
| | | 22,6 | 77,73139604 | | |
| | | 50 | 123,9224075 | | |
| | | 58,05 | 126,287207 | | |
| | 66,3 | 136,6434716 | | | |
| | | 2,297 | 0 | 59,10467168 | <p>..... Pada JL = 2,297...</p> |
| | 0,025 | | 61,2718813 | | |
| | 0,066 | | 61,45714596 | | |
| | 0,116 | | 61,99668627 | | |
| | 0,207 | | 62,97052444 | | |
| | 0,423 | | 65,03771936 | | |
| | 0,871 | | 68,98654657 | | |
| | 1,941 | | 71,18818637 | | |
| | 3 | | 73,8400797 | | |
| | 4,238 | | 94,81372402 | | |
| | 7 | | 107,5937298 | | |
| | 9,62 | | 122,8545148 | | |
| | 22,6 | | 135,0286161 | | |
| | 50 | | 182,7261795 | | |
| | 58,05 | | 191,0802096 | | |
| | 66,3 | 191,9319015 | | | |
| | | 4,935 | 0 | 88,03063815 | <p>..... Pada JL = 4,935 m/s</p> |
| | 0,025 | | 88,13774262 | | |
| | 0,066 | | 88,51681862 | | |
| | 0,116 | | 92,50233982 | | |
| | 0,207 | | 97,57698203 | | |
| | 0,423 | | 99,47779363 | | |
| | 0,871 | | 100,7796307 | | |
| | 1,941 | | 107,0248295 | | |
| | 3 | | 129,578709 | | |
| | 4,238 | | 131,8065172 | | |
| | 7 | | 132,9206516 | | |
| | 9,62 | | 139,077918 | | |
| | 22,6 | | 152,3097534 | | |
| 50 | 172,6533901 | | | | |
| 58,05 | 179,4431023 | | | | |
| 66,3 | 190,8051435 | | | | |

Lampiran 7 GL 20% J_L tetap J_G variasi

| Sudut 15° Pencampuran GL 0%, 10%, 20%,30% | | | | Grafik |
|---|----------|-------------|--|------------------------------|
| GL | JL (m/s) | JG (m/s) | $\frac{\Delta P}{\Delta Z} \left(\frac{\text{kPa}}{\text{m}} \right)$ | |
| 20% | 0,033 | 0 | 45,9444883 | <p>— Pada JL = 0,033 m/s</p> |
| | | 0,025 | 46,08882082 | |
| | | 0,066 | 46,56369865 | |
| | | 0,116 | 47,03647595 | |
| | | 0,207 | 47,11171796 | |
| | | 0,423 | 47,25041587 | |
| | | 0,871 | 47,3693385 | |
| | | 1,941 | 47,46919017 | |
| | | 3 | 47,92117742 | |
| | | 4,238 | 48,27789113 | |
| | | 7 | 48,34862164 | |
| | | 9,62 | 48,40721714 | |
| | | 22,6 | 48,55591002 | |
| | | 50 | 55,02275456 | |
| | | 58,05 | 59,00598535 | |
| | 66,3 | 62,42342617 | | |
| | 0,091 | 0 | 46,58285088 | <p>— Pada JL = 0,091 m/s</p> |
| | | 0,025 | 46,6594869 | |
| | | 0,066 | 46,66701776 | |
| | | 0,116 | 46,67908585 | |
| | | 0,207 | 47,08105272 | |
| | | 0,423 | 47,31610776 | |
| | | 0,871 | 47,63904094 | |
| | | 1,941 | 47,7140245 | |
| | | 3 | 47,91741199 | |
| | | 4,238 | 48,44767626 | |
| | | 7 | 48,60003871 | |
| | | 9,62 | 48,95818815 | |
| | | 22,6 | 49,53204636 | |
| | | 50 | 57,10977895 | |
| | | 58,05 | 57,64493078 | |
| | 66,3 | 60,59291165 | | |
| | 0,149 | 0 | 46,65555893 | <p>— Pada JL = 0,149</p> |
| | | 0,025 | 46,67942473 | |
| | | 0,066 | 46,8597862 | |
| | | 0,116 | 46,90415869 | |
| 0,207 | | 46,92079161 | | |
| 0,423 | | 47,31610776 | | |
| 0,871 | | 47,63904094 | | |
| 1,941 | | 47,7140245 | | |
| 3 | | 48,7798313 | | |
| 4,238 | | 49,3735234 | | |
| 7 | | 49,4896829 | | |
| 9,62 | | 50,10623849 | | |
| 22,6 | | 50,26552438 | | |
| 50 | | 61,16132931 | | |
| 58,05 | | 63,10946616 | | |
| 66,3 | | 64,58435055 | | |

Lampiran 8 GL 20% J_L tetap J_G variasi

| Sudut 15° Pencampuran GL 0%, 10%, 20%,30% | | | | Grafik | |
|---|----------|-------------|--|------------------------------|-----------------------------|
| GL | JL (m/s) | JG (m/s) | $\frac{\Delta P}{\Delta Z} \left(\frac{\text{kPa}}{\text{m}} \right)$ | | |
| 20% | 0,232 | 0 | 46,26238284 | <p>— Pada JL = 0,232 m/s</p> | |
| | | 0,025 | 46,39184326 | | |
| | | 0,066 | 46,5804941 | | |
| | | 0,116 | 46,8305296 | | |
| | | 0,207 | 47,12415201 | | |
| | | 0,423 | 47,18082311 | | |
| | | 0,871 | 47,55392593 | | |
| | | 1,941 | 48,00821578 | | |
| | | 3 | 49,17623103 | | |
| | | 4,238 | 50,00557414 | | |
| | | 7 | 50,84160834 | | |
| | | 9,62 | 51,42202661 | | |
| | | 22,6 | 54,95524768 | | |
| | | 50 | 66,10818555 | | |
| | | 58,05 | 74,52193735 | | |
| | 66,3 | 75,7060272 | | | |
| | 0,539 | 0,539 | 0 | 47,1146978 | <p>— Pada JL = 0,539...</p> |
| | | | 0,025 | 47,37053044 | |
| | | | 0,066 | 47,64670302 | |
| | | | 0,116 | 47,96471015 | |
| | | | 0,207 | 48,05185686 | |
| | | | 0,423 | 48,1997381 | |
| | | | 0,871 | 49,50501553 | |
| | | | 1,941 | 50,28039648 | |
| | | | 3 | 52,68561339 | |
| | | | 4,238 | 52,99960706 | |
| | | | 7 | 56,57294758 | |
| | | | 9,62 | 57,37850617 | |
| | | | 22,6 | 63,73336298 | |
| | | | 50 | 86,89699864 | |
| | | | 58,05 | 89,30579136 | |
| | 66,3 | 95,57905479 | | | |
| | 0,7 | 0,7 | 0 | 47,5796338 | <p>— Pada JL = 0,7 m/s</p> |
| | | | 0,025 | 47,92109615 | |
| | | | 0,066 | 48,17887923 | |
| | | | 0,116 | 48,3833503 | |
| 0,207 | | | 48,45982378 | | |
| 0,423 | | | 48,90438853 | | |
| 0,871 | | | 49,33879474 | | |
| 1,941 | | | 50,29423918 | | |
| 3 | | | 56,04749378 | | |
| 4,238 | | | 57,04416834 | | |
| 7 | | | 60,83636442 | | |
| 9,62 | | | 61,682205 | | |
| 22,6 | | | 70,08941172 | | |
| 50 | | | 95,39853078 | | |
| 58,05 | | | 104,8117308 | | |
| 66,3 | | | 116,4229678 | | |

Lampiran 9 GL 20% J_L tetap J_G variasi

| Sudut 15° Pencampuran GL 0%, 10%, 20%,30% | | | | Grafik | |
|---|----------|-------------|--|----------------------------------|----------------------------------|
| GL | JL (m/s) | JG (m/s) | $\frac{\Delta P}{\Delta Z} \left(\frac{\text{kPa}}{\text{m}} \right)$ | | |
| 20% | 0,879 | 0 | 48,168206 | <p>••••• Pada JL = 0,879 m/s</p> | |
| | | 0,025 | 48,27455912 | | |
| | | 0,066 | 48,99811214 | | |
| | | 0,116 | 49,11454838 | | |
| | | 0,207 | 49,61472774 | | |
| | | 0,423 | 50,68199738 | | |
| | | 0,871 | 50,89112783 | | |
| | | 1,941 | 52,0865305 | | |
| | | 3 | 56,28658515 | | |
| | | 4,238 | 58,26842126 | | |
| | | 7 | 62,95050534 | | |
| | | 9,62 | 65,39725037 | | |
| | | 22,6 | 76,13826626 | | |
| | | 50 | 112,1174269 | | |
| | | 58,05 | 125,7837227 | | |
| | 66,3 | 132,4559594 | | | |
| | 2,297 | 2,297 | 0 | 60,00393312 | <p>••••• Pada JL = 2,297...</p> |
| | | | 0,025 | 60,46391176 | |
| | | | 0,066 | 60,57338017 | |
| | | | 0,116 | 60,92646389 | |
| | | | 0,207 | 62,44244295 | |
| | | | 0,423 | 64,04093644 | |
| | | | 0,871 | 67,13557953 | |
| | | | 1,941 | 70,81275387 | |
| | | | 3 | 72,13943195 | |
| | | | 4,238 | 92,45645541 | |
| | | | 7 | 106,1409553 | |
| | | | 9,62 | 110,9172023 | |
| | | | 22,6 | 128,0798234 | |
| | | | 50 | 169,0659517 | |
| | | | 58,05 | 172,859421 | |
| | 66,3 | 173,5483325 | | | |
| | 4,935 | 4,935 | 0 | 91,64398902 | <p>••••• Pada JL = 4,935 m/s</p> |
| | | | 0,025 | 94,46443282 | |
| | | | 0,066 | 94,71631041 | |
| | | | 0,116 | 94,8232595 | |
| 0,207 | | | 96,31707941 | | |
| 0,423 | | | 97,7183618 | | |
| 0,871 | | | 97,98080426 | | |
| 1,941 | | | 104,6105376 | | |
| 3 | | | 126,4722278 | | |
| 4,238 | | | 128,6286012 | | |
| 7 | | | 129,7930948 | | |
| 9,62 | | | 134,9354013 | | |
| 22,6 | | | 150,6942478 | | |
| 50 | | | 170,5736685 | | |
| 58,05 | | | 174,0713482 | | |
| 66,3 | | | 174,3085975 | | |

Lampiran 10 GL 30% J_L tetap J_G variasi

| Sudut 15° Pencampuran GL 0%, 10%, 20%,30% | | | | Grafik |
|---|-------------|----------|--|------------------------------|
| GL | JL (m/s) | JG (m/s) | $\frac{\Delta P}{\Delta Z} \left(\frac{\text{kPa}}{\text{m}} \right)$ | |
| 30% | 0,033 | 0 | 46,45588269 | <p>— Pada JL = 0,033 m/s</p> |
| | | 0,025 | 46,68110427 | |
| | | 0,066 | 46,77142045 | |
| | | 0,116 | 46,91114777 | |
| | | 0,207 | 47,23115529 | |
| | | 0,423 | 47,73149718 | |
| | | 0,871 | 47,97513958 | |
| | | 1,941 | 48,11548995 | |
| | | 3 | 48,4482295 | |
| | | 4,238 | 48,52397157 | |
| | | 7 | 49,21009283 | |
| | | 9,62 | 48,79028196 | |
| | | 22,6 | 48,98083492 | |
| | | 50 | 60,1119387 | |
| | | 58,05 | 60,73827357 | |
| 66,3 | 65,57766602 | | | |
| 30% | 0,091 | 0 | 46,70721849 | <p>— Pada JL = 0,091 m/s</p> |
| | | 0,025 | 46,81717451 | |
| | | 0,066 | 46,85740233 | |
| | | 0,116 | 46,96478485 | |
| | | 0,207 | 47,19331134 | |
| | | 0,423 | 47,32632048 | |
| | | 0,871 | 47,73675253 | |
| | | 1,941 | 47,78388815 | |
| | | 3 | 48,03674096 | |
| | | 4,238 | 48,48496278 | |
| | | 7 | 48,81046945 | |
| | | 9,62 | 49,11032243 | |
| | | 22,6 | 50,50014599 | |
| | | 50 | 61,17909998 | |
| | | 58,05 | 61,44576839 | |
| 66,3 | 68,37708842 | | | |
| 30% | 0,149 | 0 | 46,82549097 | <p>— Pada JL = 0,149</p> |
| | | 0,025 | 46,90012237 | |
| | | 0,066 | 47,08137779 | |
| | | 0,116 | 47,55723084 | |
| | | 0,207 | 48,03725566 | |
| | | 0,423 | 48,17021061 | |
| | | 0,871 | 48,59954423 | |
| | | 1,941 | 48,83883963 | |
| | | 3 | 49,36471933 | |
| | | 4,238 | 50,18509584 | |
| | | 7 | 50,45444611 | |
| | | 9,62 | 50,85553231 | |
| | | 22,6 | 51,70099363 | |
| | | 50 | 61,57753141 | |
| | | 58,05 | 69,88997929 | |
| 66,3 | 71,47259837 | | | |

Lampiran 11 GL 30% J_L tetap J_G variasi

| Sudut 15° Pencampuran GL 0%, 10%, 20%,30% | | | | Grafik |
|---|-------------|-------------|--|--------|
| GL | JL (m/s) | JG (m/s) | $\frac{\Delta P}{\Delta Z} \left(\frac{\text{kPa}}{\text{m}} \right)$ | |
| 30% | 0,232 | 0 | 46,89912006 | |
| | | 0,025 | 47,03202084 | |
| | | 0,066 | 47,17312971 | |
| | | 0,116 | 47,91706991 | |
| | | 0,207 | 48,36835122 | |
| | | 0,423 | 48,76325256 | |
| | | 0,871 | 49,20684568 | |
| | | 1,941 | 49,49333998 | |
| | | 3 | 53,06906437 | |
| | | 4,238 | 53,63393331 | |
| | | 7 | 54,37103689 | |
| | | 9,62 | 54,8639021 | |
| | | 22,6 | 58,17022205 | |
| | | 50 | 67,61720263 | |
| | | 58,05 | 75,71095748 | |
| | 66,3 | 76,33696728 | | |
| | 0,539 | 0 | 47,47317231 | |
| | | 0,025 | 47,55151497 | |
| | | 0,066 | 47,69655181 | |
| | | 0,116 | 48,15514889 | |
| | | 0,207 | 48,77601169 | |
| | | 0,423 | 49,35353139 | |
| | | 0,871 | 49,65319474 | |
| | | 1,941 | 51,03410588 | |
| | | 3 | 53,26402705 | |
| | | 4,238 | 54,08085484 | |
| | | 7 | 59,82365292 | |
| | | 9,62 | 60,25131385 | |
| | | 22,6 | 61,93324281 | |
| | | 50 | 90,18839231 | |
| | | 58,05 | 91,48332157 | |
| | 66,3 | 97,48051654 | | |
| | 0,7 | 0 | 47,92591807 | |
| | | 0,025 | 48,07442237 | |
| | | 0,066 | 48,26369626 | |
| | | 0,116 | 49,03376768 | |
| | | 0,207 | 49,60497555 | |
| | | 0,423 | 50,31504387 | |
| | | 0,871 | 51,05271632 | |
| | | 1,941 | 52,35482428 | |
| | | 3 | 56,24996023 | |
| | | 4,238 | 58,40592724 | |
| | | 7 | 62,03813311 | |
| | | 9,62 | 64,22598439 | |
| | | 22,6 | 72,91654662 | |
| 50 | | 96,22882202 | | |
| 58,05 | | 105,8888068 | | |
| 66,3 | 117,6534784 | | | |

Lampiran 12 GL 30% J_L tetap J_G variasi

| Sudut 15° Pencampuran GL 0%, 10%, 20%,30% | | | | Grafik |
|---|-------------|----------|--|----------------------------------|
| GL | JL (m/s) | JG (m/s) | $\frac{\Delta P}{\Delta Z} \left(\frac{\text{kPa}}{\text{m}} \right)$ | |
| 30% | 0,879 | 0 | 48,4885115 | <p>..... Pada JL = 0,879 m/s</p> |
| | | 0,025 | 48,63205842 | |
| | | 0,066 | 49,08019898 | |
| | | 0,116 | 49,61567587 | |
| | | 0,207 | 50,20018465 | |
| | | 0,423 | 50,96063932 | |
| | | 0,871 | 51,43700707 | |
| | | 1,941 | 53,18454664 | |
| | | 3 | 56,66621651 | |
| | | 4,238 | 60,72632713 | |
| | | 7 | 64,10391384 | |
| | | 9,62 | 66,63087623 | |
| | | 22,6 | 77,73139604 | |
| | | 50 | 123,9224075 | |
| | | 58,05 | 126,287207 | |
| 66,3 | 136,6434716 | | | |
| 30% | 2,297 | 0 | 59,10467168 | <p>..... Pada JL = 2,297...</p> |
| | | 0,025 | 61,2718813 | |
| | | 0,066 | 61,45714596 | |
| | | 0,116 | 61,99668627 | |
| | | 0,207 | 62,97052444 | |
| | | 0,423 | 65,03771936 | |
| | | 0,871 | 68,98654657 | |
| | | 1,941 | 71,18818637 | |
| | | 3 | 73,8400797 | |
| | | 4,238 | 94,81372402 | |
| | | 7 | 107,5937298 | |
| | | 9,62 | 122,8545148 | |
| | | 22,6 | 135,0286161 | |
| | | 50 | 182,7261795 | |
| | | 58,05 | 191,0802096 | |
| 66,3 | 191,9319015 | | | |
| 30% | 4,935 | 0 | 88,03063815 | <p>..... Pada JL = 4,935 m/s</p> |
| | | 0,025 | 88,13774262 | |
| | | 0,066 | 88,51681862 | |
| | | 0,116 | 92,50233982 | |
| | | 0,207 | 97,57698203 | |
| | | 0,423 | 99,47779363 | |
| | | 0,871 | 100,7796307 | |
| | | 1,941 | 107,0248295 | |
| | | 3 | 129,578709 | |
| | | 4,238 | 131,8065172 | |
| | | 7 | 132,9206516 | |
| | | 9,62 | 139,077918 | |
| | | 22,6 | 152,3097534 | |
| | | 50 | 172,6533901 | |
| | | 58,05 | 179,4431023 | |
| 66,3 | 190,8051435 | | | |

Lampiran 13 GL 0% J_G tetap J_L variasi

| Sudut 15° Pencampuran GL 0%, 10%, 20%,30% | | | | |
|---|----------------|----------------|---------------|---|
| GL | J _G | J _L | ΔP/ΔZ (kPa/m) | Grafik |
| 0% | 0 | 0,033 | 45,74389102 | <p>..... Pada J_G = 0 m/s</p> |
| | | 0,091 | 46,51504602 | |
| | | 0,149 | 46,55481332 | |
| | | 0,232 | 46,63310179 | |
| | | 0,539 | 47,07444289 | |
| | | 0,7 | 47,49492513 | |
| | | 0,879 | 47,89370873 | |
| | | 2,297 | 65,36300932 | |
| | | 4,935 | 85,84844781 | |
| | 0,025 | 0,033 | 45,76905711 | <p>..... Pada J_G = 0,025 m/s</p> |
| | | 0,091 | 46,57437189 | |
| | | 0,149 | 46,58090044 | |
| | | 0,232 | 47,04041856 | |
| | | 0,539 | 47,23353916 | |
| | | 0,7 | 47,58301998 | |
| | | 0,879 | 48,03403201 | |
| | | 2,297 | 65,74719171 | |
| | | 4,935 | 86,3034149 | |
| | 0,066 | 0,033 | 46,02811339 | <p>..... Pada J_G = 0,066 m/s</p> |
| | | 0,091 | 46,58225491 | |
| | | 0,149 | 46,81416758 | |
| | | 0,232 | 47,30080223 | |
| | | 0,539 | 47,66702432 | |
| | | 0,7 | 48,00588609 | |
| | | 0,879 | 48,74369399 | |
| | | 2,297 | 65,81207091 | |
| | | 4,935 | 87,26040343 | |
| | 0,116 | 0,033 | 46,0734882 | <p>..... Pada J_G = 0,116...</p> |
| | | 0,091 | 46,67668869 | |
| | | 0,149 | 46,87124503 | |
| | | 0,232 | 47,46252617 | |
| | | 0,539 | 48,27992283 | |
| | | 0,7 | 48,31860655 | |
| | | 0,879 | 48,79310512 | |
| | | 2,297 | 67,12777777 | |
| | | 4,935 | 90,16926716 | |

Lampiran 14 GL 0% J_G tetap J_L variasi

| Sudut 15° Pencampuran GL 0%, 10%, 20%,30% | | | | |
|---|-------|-------|-----------------------------|--------------------------------|
| GL | JG | JL | $\Delta P/\Delta Z$ (kPa/m) | Grafik |
| 0% | 0,207 | 0,033 | 46,14665677 | <p>--- Pada JG = 0,207 m/s</p> |
| | | 0,091 | 47,25802801 | |
| | | 0,149 | 46,97589152 | |
| | | 0,232 | 47,94119651 | |
| | | 0,539 | 48,80106942 | |
| | | 0,7 | 48,42964615 | |
| | | 0,879 | 48,83866956 | |
| | | 2,297 | 68,94095505 | |
| | | 4,935 | 93,98029041 | |
| | 0,423 | 0,033 | 46,19127307 | <p>--- Pada JG = 0,423...</p> |
| | | 0,091 | 47,56103554 | |
| | | 0,149 | 46,97762525 | |
| | | 0,232 | 48,06889612 | |
| | | 0,539 | 49,00399639 | |
| | | 0,7 | 48,58933838 | |
| | | 0,879 | 49,2950453 | |
| | | 2,297 | 70,37217127 | |
| | | 4,935 | 94,30211292 | |
| | 0,871 | 0,033 | 46,39931995 | <p>--- Pada JG = 0,871 m/s</p> |
| | | 0,091 | 47,67853331 | |
| | | 0,149 | 47,16072275 | |
| | | 0,232 | 48,30286759 | |
| | | 0,539 | 49,45414156 | |
| | | 0,7 | 49,00797854 | |
| | | 0,879 | 49,78669149 | |
| | | 2,297 | 70,83978913 | |
| | | 4,935 | 97,4508807 | |
| | 1,941 | 0,033 | 46,5097094 | <p>--- Pada JG = 1,941...</p> |
| | | 0,091 | 47,70270111 | |
| | | 0,149 | 47,57818054 | |
| | | 0,232 | 48,4128507 | |
| | | 0,539 | 50,14527436 | |
| | | 0,7 | 49,08981573 | |
| | | 0,879 | 50,55968857 | |
| | | 2,297 | 74,66516977 | |
| | | 4,935 | 107,2057056 | |

Lampiran 15 GL 0% J_G tetap J_L variasi

| Sudut 15° Pencampuran GL 0%, 10%, 20%,30% | | | | |
|---|-------|-------|---------------|----------------------------|
| GL | JG | JL | ΔP/ΔZ (kPa/m) | Grafik |
| 0% | 3 | 0,033 | 44,3937264 | <p>• Pada JG = 3 m/s</p> |
| | | 0,091 | 44,36121908 | |
| | | 0,149 | 44,72963542 | |
| | | 0,232 | 45,02761922 | |
| | | 0,539 | 45,28225993 | |
| | | 0,7 | 45,72652669 | |
| | | 0,879 | 46,0245105 | |
| | | 2,297 | 54,14592367 | |
| | | 4,935 | 89,52472819 | |
| | 4,238 | 0,033 | 44,08669121 | <p>Pada JG = 4,238...</p> |
| | | 0,091 | 44,42403948 | |
| | | 0,149 | 44,73383428 | |
| | | 0,232 | 45,14803177 | |
| | | 0,539 | 46,08053146 | |
| | | 0,7 | 46,71577875 | |
| | | 0,879 | 48,48834896 | |
| | | 2,297 | 63,66496215 | |
| | | 4,935 | 89,08625857 | |
| | 7 | 0,033 | 44,60900616 | <p>Pada JG = 7 m/s</p> |
| | | 0,091 | 44,55962211 | |
| | | 0,149 | 44,84438627 | |
| | | 0,232 | 45,22954389 | |
| | | 0,539 | 47,70096739 | |
| | | 0,7 | 48,81545391 | |
| | | 0,879 | 50,48939148 | |
| | | 2,297 | 65,86318868 | |
| | | 4,935 | 87,29689291 | |
| | 9,62 | 0,033 | 44,71053737 | <p>• Pada JG = 9,62...</p> |
| | | 0,091 | 44,83804734 | |
| | | 0,149 | 45,39419348 | |
| | | 0,232 | 46,46373863 | |
| | | 0,539 | 49,69637531 | |
| | | 0,7 | 51,52767542 | |
| | | 0,879 | 54,65203562 | |
| | | 2,297 | 76,40802287 | |
| | | 4,935 | 93,06615736 | |

Lampiran 16 GL 0% J_G tetap J_L variasi

| Sudut 15° Pencampuran GL 0%, 10%, 20%, 30% | | | | |
|--|-------|-------|-----------------------------|--|
| GL | J_G | J_L | $\Delta P/\Delta Z$ (kPa/m) | Grafik |
| 0% | 22,6 | 0,033 | 45,26034458 | <p>Pada $J_G = 22,2$ m/s</p> |
| | | 0,091 | 46,22781672 | |
| | | 0,149 | 48,01718238 | |
| | | 0,232 | 50,21689884 | |
| | | 0,539 | 59,56722431 | |
| | | 0,7 | 64,08262709 | |
| | | 0,879 | 70,54039667 | |
| | | 2,297 | 113,1625915 | |
| | | 4,935 | 136,6870043 | |
| | 50 | 0,033 | 52,66911593 | <p>Pada $J_G = 50$ m/s</p> |
| | | 0,091 | 56,18946951 | |
| | | 0,149 | 57,34358788 | |
| | | 0,232 | 66,10818555 | |
| | | 0,539 | 82,01569883 | |
| | | 0,7 | 93,8251492 | |
| | | 0,879 | 110,0898367 | |
| | | 2,297 | 166,1942818 | |
| | | 4,935 | 166,3517256 | |
| | 58,05 | 0,033 | 54,30789163 | <p>Pada $J_G = 58,05$ m/s</p> |
| | | 0,091 | 58,51412245 | |
| | | 0,149 | 57,68204331 | |
| | | 0,232 | 63,6112438 | |
| | | 0,539 | 85,74930047 | |
| | | 0,7 | 98,35393417 | |
| | | 0,879 | 118,8023685 | |
| | | 2,297 | 167,7487278 | |
| | | 4,935 | 172,8608375 | |
| | 66,3 | 0,033 | 55,31250318 | <p>Pada $J_G = 66,3$ m/s</p> |
| | | 0,091 | 59,39347266 | |
| | | 0,149 | 62,33248544 | |
| | | 0,232 | 71,31217473 | |
| | | 0,539 | 88,29305277 | |
| | | 0,7 | 114,3383002 | |
| | | 0,879 | 124,4062248 | |
| | | 2,297 | 170,4778697 | |
| | | 4,935 | 173,6569718 | |

Lampiran 17 GL 10% J_G tetap J_L variasi

| Sudut 15° Pencampuran GL 0%, 10%, 20%,30% | | | | |
|---|-------|-------|---------------|----------------------------------|
| GL | JG | JL | ΔP/ΔZ (kPa/m) | Grafik |
| 10% | 0 | 0,033 | 45,74389102 | <p>..... Pada JG = 0 m/s</p> |
| | | 0,091 | 46,51504602 | |
| | | 0,149 | 46,55481332 | |
| | | 0,232 | 46,63310179 | |
| | | 0,539 | 47,07444289 | |
| | | 0,7 | 47,49492513 | |
| | | 0,879 | 47,89370873 | |
| | | 2,297 | 65,36300932 | |
| | | 4,935 | 85,84844781 | |
| | 0,025 | 0,033 | 45,76905711 | <p>..... Pada JG = 0,025 m/s</p> |
| | | 0,091 | 46,57437189 | |
| | | 0,149 | 46,58090044 | |
| | | 0,232 | 47,04041856 | |
| | | 0,539 | 47,23353916 | |
| | | 0,7 | 47,58301998 | |
| | | 0,879 | 48,03403201 | |
| | | 2,297 | 65,74719171 | |
| | | 4,935 | 86,3034149 | |
| | 0,066 | 0,033 | 46,02811339 | <p>..... Pada JG = 0,066 m/s</p> |
| | | 0,091 | 46,58225491 | |
| | | 0,149 | 46,81416758 | |
| | | 0,232 | 47,30080223 | |
| | | 0,539 | 47,66702432 | |
| | | 0,7 | 48,00588609 | |
| | | 0,879 | 48,74369399 | |
| | | 2,297 | 65,81207091 | |
| | | 4,935 | 87,26040343 | |
| | 0,116 | 0,033 | 46,0734882 | <p>..... Pada JG = 0,116...</p> |
| | | 0,091 | 46,67668869 | |
| | | 0,149 | 46,87124503 | |
| | | 0,232 | 47,46252617 | |
| | | 0,539 | 48,27992283 | |
| | | 0,7 | 48,31860655 | |
| | | 0,879 | 48,79310512 | |
| | | 2,297 | 67,12777777 | |
| | | 4,935 | 90,16926716 | |

Lampiran 18 GL 10% J_G tetap J_L variasi

| Sudut 15° Pencampuran GL 0%, 10%, 20%,30% | | | | |
|---|-------|-------|-----------------------------|--|
| GL | J_G | J_L | $\Delta P/\Delta Z$ (kPa/m) | Grafik |
| 10% | 0,207 | 0,033 | 46,14665677 | <p>— Pada $J_G = 0,207$ m/s</p> |
| | | 0,091 | 47,25802801 | |
| | | 0,149 | 46,97589152 | |
| | | 0,232 | 47,94119651 | |
| | | 0,539 | 48,80106942 | |
| | | 0,7 | 48,42964615 | |
| | | 0,879 | 48,83866956 | |
| | | 2,297 | 68,94095505 | |
| | | 4,935 | 93,98029041 | |
| | 0,423 | 0,033 | 46,19127307 | <p>— Pada $J_G = 0,423...$</p> |
| | | 0,091 | 47,56103554 | |
| | | 0,149 | 46,97762525 | |
| | | 0,232 | 48,06889612 | |
| | | 0,539 | 49,00399639 | |
| | | 0,7 | 48,58933838 | |
| | | 0,879 | 49,2950453 | |
| | | 2,297 | 70,37217127 | |
| | | 4,935 | 94,30211292 | |
| | 0,871 | 0,033 | 46,39931995 | <p>— Pada $J_G = 0,871$ m/s</p> |
| | | 0,091 | 47,67853331 | |
| | | 0,149 | 47,16072275 | |
| | | 0,232 | 48,30286759 | |
| | | 0,539 | 49,45414156 | |
| | | 0,7 | 49,00797854 | |
| | | 0,879 | 49,78669149 | |
| | | 2,297 | 70,83978913 | |
| | | 4,935 | 97,4508807 | |
| | 1,941 | 0,033 | 46,5097094 | <p>— Pada $J_G = 1,941...$</p> |
| | | 0,091 | 47,70270111 | |
| | | 0,149 | 47,57818054 | |
| | | 0,232 | 48,4128507 | |
| | | 0,539 | 50,14527436 | |
| | | 0,7 | 49,08981573 | |
| | | 0,879 | 50,55968857 | |
| | | 2,297 | 74,66516977 | |
| | | 4,935 | 107,2057056 | |

Lampiran 19 GL 10% J_G tetap J_L variasi

| Sudut 15° Pencampuran GL 0%, 10%, 20%,30% | | | | |
|---|-------|-------|---------------|----------------------------|
| GL | JG | JL | ΔP/ΔZ (kPa/m) | Grafik |
| 10% | 3 | 0,033 | 46,66858895 | <p>• Pada JG = 3 m/s</p> |
| | | 0,091 | 48,31931087 | |
| | | 0,149 | 47,69305727 | |
| | | 0,232 | 48,52413411 | |
| | | 0,539 | 50,86246721 | |
| | | 0,7 | 50,98461348 | |
| | | 0,879 | 52,7351058 | |
| | | 2,297 | 82,18235305 | |
| | | 4,935 | 116,3893227 | |
| | 4,238 | 0,033 | 46,79588221 | <p>Pada JG = 4,238...</p> |
| | | 0,091 | 48,36235599 | |
| | | 0,149 | 48,17955647 | |
| | | 0,232 | 48,82553118 | |
| | | 0,539 | 51,63031729 | |
| | | 0,7 | 51,66255372 | |
| | | 0,879 | 56,1810447 | |
| | | 2,297 | 89,6598503 | |
| | | 4,935 | 120,9197872 | |
| | 7 | 0,033 | 47,28205634 | <p>Pada JG = 7 m/s</p> |
| | | 0,091 | 48,50939745 | |
| | | 0,149 | 48,98351678 | |
| | | 0,232 | 49,08079494 | |
| | | 0,539 | 52,79686971 | |
| | | 0,7 | 54,99325416 | |
| | | 0,879 | 59,60341579 | |
| | | 2,297 | 100,3536764 | |
| | | 4,935 | 125,7592068 | |
| | 9,62 | 0,033 | 47,69246131 | <p>• Pada JG = 9,62...</p> |
| | | 0,091 | 48,90883261 | |
| | | 0,149 | 49,24276269 | |
| | | 0,232 | 49,65362818 | |
| | | 0,539 | 55,74495895 | |
| | | 0,7 | 56,48821182 | |
| | | 0,879 | 63,49733271 | |
| | | 2,297 | 103,0535993 | |
| | | 4,935 | 133,5676557 | |

Lampiran 20 GL 10% J_G tetap J_L variasi

| Sudut 15° Pencampuran GL 0%, 10%, 20%,30% | | | | |
|---|-------|-------|-----------------------------|--|
| GL | J_G | J_L | $\Delta P/\Delta Z$ (kPa/m) | Grafik |
| 10% | 22,6 | 0,033 | 48,08999879 | <p>Pada $J_G = 22,2$ m/s</p> |
| | | 0,091 | 49,08103875 | |
| | | 0,149 | 49,60898478 | |
| | | 0,232 | 51,90389352 | |
| | | 0,539 | 62,13384009 | |
| | | 0,7 | 68,81870042 | |
| | | 0,879 | 75,39146466 | |
| | | 2,297 | 121,9553351 | |
| | | 4,935 | 150,5374541 | |
| | 50 | 0,033 | 55,36589646 | <p>Pada $J_G = 50$ m/s</p> |
| | | 0,091 | 55,91218204 | |
| | | 0,149 | 59,88463124 | |
| | | 0,232 | 65,39857775 | |
| | | 0,539 | 86,13164078 | |
| | | 0,7 | 93,41536729 | |
| | | 0,879 | 109,5006956 | |
| | | 2,297 | 136,7402892 | |
| | | 4,935 | 156,1310165 | |
| | 58,05 | 0,033 | 55,55235859 | <p>Pada $J_G = 58,05$ m/s</p> |
| | | 0,091 | 56,66720976 | |
| | | 0,149 | 65,44658023 | |
| | | 0,232 | 72,60499101 | |
| | | 0,539 | 93,04863049 | |
| | | 0,7 | 103,4271355 | |
| | | 0,879 | 125,1687383 | |
| | | 2,297 | 145,1982887 | |
| | | 4,935 | 159,5975163 | |
| | 66,3 | 0,033 | 55,79027957 | <p>Pada $J_G = 66,3$ m/s</p> |
| | | 0,091 | 56,74715975 | |
| | | 0,149 | 66,79029757 | |
| | | 0,232 | 75,06224674 | |
| | | 0,539 | 95,02336917 | |
| | | 0,7 | 113,40897 | |
| | | 0,879 | 130,9591596 | |
| | | 2,297 | 154,4529613 | |
| | | 4,935 | 161,3297503 | |

Lampiran 21 GL 20% J_G tetap J_L variasi

| Sudut 15° Pencampuran GL 0%, 10%, 20%,30% | | | | |
|---|-------|-------|-----------------------------|----------------------------------|
| GL | JG | JL | $\Delta P/\Delta Z$ (kPa/m) | Grafik |
| 20% | 0 | 0,033 | 45,9444883 | <p>..... Pada JG = 0 m/s</p> |
| | | 0,091 | 46,58285088 | |
| | | 0,149 | 46,65555893 | |
| | | 0,232 | 46,26238284 | |
| | | 0,539 | 47,1146978 | |
| | | 0,7 | 47,5796338 | |
| | | 0,879 | 48,168206 | |
| | | 2,297 | 60,00393312 | |
| | | 4,935 | 91,64398902 | |
| | 0,025 | 0,033 | 46,08882082 | <p>..... Pada JG = 0,025 m/s</p> |
| | | 0,091 | 46,6594869 | |
| | | 0,149 | 46,67942473 | |
| | | 0,232 | 46,39184326 | |
| | | 0,539 | 47,37053044 | |
| | | 0,7 | 47,92109615 | |
| | | 0,879 | 48,27455912 | |
| | | 2,297 | 60,46391176 | |
| | | 4,935 | 94,46443282 | |
| | 0,066 | 0,033 | 46,56369865 | <p>..... Pada JG = 0,066 m/s</p> |
| | | 0,091 | 46,66701776 | |
| | | 0,149 | 46,8597862 | |
| | | 0,232 | 46,5804941 | |
| | | 0,539 | 47,64670302 | |
| | | 0,7 | 48,17887923 | |
| | | 0,879 | 48,99811214 | |
| | | 2,297 | 60,57338017 | |
| | | 4,935 | 94,71631041 | |
| | 0,116 | 0,033 | 47,03647595 | <p>..... Pada JG = 0,116...</p> |
| | | 0,091 | 46,67908585 | |
| | | 0,149 | 46,90415869 | |
| | | 0,232 | 46,8305296 | |
| | | 0,539 | 47,96471015 | |
| | | 0,7 | 48,3833503 | |
| | | 0,879 | 49,11454838 | |
| | | 2,297 | 60,92646389 | |
| | | 4,935 | 94,8232595 | |

Lampiran 22 GL 20% J_G tetap J_L variasi

| Sudut 15° Pencampuran GL 0%, 10%, 20%,30% | | | | |
|---|----------------|----------------|---------------|---|
| GL | J _G | J _L | ΔP/ΔZ (kPa/m) | Grafik |
| 20% | 0,207 | 0,033 | 47,11171796 | <p>— Pada J_G = 0,207 m/s</p> |
| | | 0,091 | 47,08105272 | |
| | | 0,149 | 46,92079161 | |
| | | 0,232 | 47,12415201 | |
| | | 0,539 | 48,05185686 | |
| | | 0,7 | 48,45982378 | |
| | | 0,879 | 49,61472774 | |
| | | 2,297 | 62,44244295 | |
| | | 4,935 | 96,31707941 | |
| | 0,423 | 0,033 | 47,25041587 | <p>— Pada J_G = 0,423...</p> |
| | | 0,091 | 47,31610776 | |
| | | 0,149 | 47,31610776 | |
| | | 0,232 | 47,18082311 | |
| | | 0,539 | 48,1997381 | |
| | | 0,7 | 48,90438853 | |
| | | 0,879 | 50,68199738 | |
| | | 2,297 | 64,04093644 | |
| | | 4,935 | 97,7183618 | |
| | 0,871 | 0,033 | 47,3693385 | <p>— Pada J_G = 0,871 m/s</p> |
| | | 0,091 | 47,63904094 | |
| | | 0,149 | 47,63904094 | |
| | | 0,232 | 47,55392593 | |
| | | 0,539 | 49,50501553 | |
| | | 0,7 | 49,33879474 | |
| | | 0,879 | 50,89112783 | |
| | | 2,297 | 67,13557953 | |
| | | 4,935 | 97,98080426 | |
| | 1,941 | 0,033 | 47,46919017 | <p>— Pada J_G = 1,941...</p> |
| | | 0,091 | 47,7140245 | |
| | | 0,149 | 47,7140245 | |
| | | 0,232 | 48,00821578 | |
| | | 0,539 | 50,28039648 | |
| | | 0,7 | 50,29423918 | |
| | | 0,879 | 52,0865305 | |
| | | 2,297 | 70,81275387 | |
| | | 4,935 | 104,6105376 | |

Lampiran 23 GL 20% J_G tetap J_L variasi

| Sudut 15° Pencampuran GL 0%, 10%, 20%,30% | | | | |
|---|-------|-------|---------------|----------------------------|
| GL | JG | JL | ΔP/ΔZ (kPa/m) | Grafik |
| 20% | 3 | 0,033 | 47,92117742 | <p>• Pada JG = 3 m/s</p> |
| | | 0,091 | 47,91741199 | |
| | | 0,149 | 48,7798313 | |
| | | 0,232 | 49,17623103 | |
| | | 0,539 | 52,68561339 | |
| | | 0,7 | 56,04749378 | |
| | | 0,879 | 56,28658515 | |
| | | 2,297 | 72,13943195 | |
| | | 4,935 | 126,4722278 | |
| | 4,238 | 0,033 | 48,27789113 | <p>Pada JG = 4,238...</p> |
| | | 0,091 | 48,44767626 | |
| | | 0,149 | 49,3735234 | |
| | | 0,232 | 50,00557414 | |
| | | 0,539 | 52,99960706 | |
| | | 0,7 | 57,04416834 | |
| | | 0,879 | 58,26842126 | |
| | | 2,297 | 92,45645541 | |
| | | 4,935 | 128,6286012 | |
| | 7 | 0,033 | 48,34862164 | <p>Pada JG = 7 m/s</p> |
| | | 0,091 | 48,60003871 | |
| | | 0,149 | 49,4896829 | |
| | | 0,232 | 50,84160834 | |
| | | 0,539 | 56,57294758 | |
| | | 0,7 | 60,83636442 | |
| | | 0,879 | 62,95050534 | |
| | | 2,297 | 106,1409553 | |
| | | 4,935 | 129,7930948 | |
| | 9,62 | 0,033 | 48,40721714 | <p>• Pada JG = 9,62...</p> |
| | | 0,091 | 48,95818815 | |
| | | 0,149 | 50,10623849 | |
| | | 0,232 | 51,42202661 | |
| | | 0,539 | 57,37850617 | |
| | | 0,7 | 61,682205 | |
| | | 0,879 | 65,39725037 | |
| | | 2,297 | 110,9172023 | |
| | | 4,935 | 134,9354013 | |

Lampiran 24 GL 20% J_G tetap J_L variasi

| Sudut 15° Pencampuran GL 0%, 10%, 20%,30% | | | | |
|---|-------|-------|---------------|----------------------------|
| GL | JG | JL | ΔP/ΔZ (kPa/m) | Grafik |
| 20% | 22,6 | 0,033 | 48,55591002 | <p>Pada JG = 22,2 m/s</p> |
| | | 0,091 | 49,53204636 | |
| | | 0,149 | 50,26552438 | |
| | | 0,232 | 54,95524768 | |
| | | 0,539 | 63,73336298 | |
| | | 0,7 | 70,08941172 | |
| | | 0,879 | 76,13826626 | |
| | | 2,297 | 128,0798234 | |
| | | 4,935 | 150,6942478 | |
| | 50 | 0,033 | 55,02275456 | <p>Pada JG = 50 m/s</p> |
| | | 0,091 | 57,10977895 | |
| | | 0,149 | 61,16132931 | |
| | | 0,232 | 66,10818555 | |
| | | 0,539 | 86,89699864 | |
| | | 0,7 | 95,39853078 | |
| | | 0,879 | 112,1174269 | |
| | | 2,297 | 169,0659517 | |
| | | 4,935 | 170,5736685 | |
| | 58,05 | 0,033 | 59,00598535 | <p>Pada JG = 58,05 m/s</p> |
| | | 0,091 | 57,64493078 | |
| | | 0,149 | 63,10946616 | |
| | | 0,232 | 74,52193735 | |
| | | 0,539 | 89,30579136 | |
| | | 0,7 | 104,8117308 | |
| | | 0,879 | 125,7837227 | |
| | | 2,297 | 172,859421 | |
| | | 4,935 | 174,0713482 | |
| | 66,3 | 0,033 | 62,42342617 | <p>Pada JG = 66,3 m/s</p> |
| | | 0,091 | 60,59291165 | |
| | | 0,149 | 64,58435055 | |
| | | 0,232 | 75,7060272 | |
| | | 0,539 | 95,57905479 | |
| | | 0,7 | 116,4229678 | |
| | | 0,879 | 132,4559594 | |
| | | 2,297 | 173,5483325 | |
| | | 4,935 | 174,3085975 | |

Lampiran 25 GL 30% J_G tetap J_L variasi

| Sudut 15° Pencampuran GL 0%, 10%, 20%,30% | | | | |
|---|-------|-------|---------------|----------------------------------|
| GL | JG | JL | ΔP/ΔZ (kPa/m) | Grafik |
| 30% | 0 | 0,033 | 46,45588269 | <p>..... Pada JG = 0 m/s</p> |
| | | 0,091 | 46,70721849 | |
| | | 0,149 | 46,82549097 | |
| | | 0,232 | 46,89912006 | |
| | | 0,539 | 47,47317231 | |
| | | 0,7 | 47,92591807 | |
| | | 0,879 | 48,4885115 | |
| | | 2,297 | 59,10467168 | |
| | | 4,935 | 88,03063815 | |
| | 0,025 | 0,033 | 46,68110427 | <p>..... Pada JG = 0,025 m/s</p> |
| | | 0,091 | 46,81717451 | |
| | | 0,149 | 46,90012237 | |
| | | 0,232 | 47,03202084 | |
| | | 0,539 | 47,55151497 | |
| | | 0,7 | 48,07442237 | |
| | | 0,879 | 48,63205842 | |
| | | 2,297 | 61,2718813 | |
| | | 4,935 | 88,13774262 | |
| | 0,066 | 0,033 | 46,77142045 | <p>..... Pada JG = 0,066 m/s</p> |
| | | 0,091 | 46,85740233 | |
| | | 0,149 | 47,08137779 | |
| | | 0,232 | 47,17312971 | |
| | | 0,539 | 47,69655181 | |
| | | 0,7 | 48,26369626 | |
| | | 0,879 | 49,08019898 | |
| | | 2,297 | 61,45714596 | |
| | | 4,935 | 88,51681862 | |
| | 0,116 | 0,033 | 46,91114777 | <p>..... Pada JG = 0,116...</p> |
| | | 0,091 | 46,96478485 | |
| | | 0,149 | 47,55723084 | |
| | | 0,232 | 47,91706991 | |
| | | 0,539 | 48,15514889 | |
| | | 0,7 | 49,03376768 | |
| | | 0,879 | 49,61567587 | |
| | | 2,297 | 61,99668627 | |
| | | 4,935 | 92,50233982 | |

Lampiran 26 GL 30% J_G tetap J_L variasi

| Sudut 15° Pencampuran GL 0%, 10%, 20%,30% | | | | |
|---|-------|-------|---------------|--------------------------------|
| GL | JG | JL | ΔP/ΔZ (kPa/m) | Grafik |
| 30% | 0,207 | 0,033 | 47,23115529 | <p>--- Pada JG = 0,207 m/s</p> |
| | | 0,091 | 47,19331134 | |
| | | 0,149 | 48,03725566 | |
| | | 0,232 | 48,36835122 | |
| | | 0,539 | 48,77601169 | |
| | | 0,7 | 49,60497555 | |
| | | 0,879 | 50,20018465 | |
| | | 2,297 | 62,97052444 | |
| | | 4,935 | 97,57698203 | |
| | 0,423 | 0,033 | 47,73149718 | <p>--- Pada JG = 0,423...</p> |
| | | 0,091 | 47,32632048 | |
| | | 0,149 | 48,17021061 | |
| | | 0,232 | 48,76325256 | |
| | | 0,539 | 49,35353139 | |
| | | 0,7 | 50,31504387 | |
| | | 0,879 | 50,96063932 | |
| | | 2,297 | 65,03771936 | |
| | | 4,935 | 99,47779363 | |
| | 0,871 | 0,033 | 47,97513958 | <p>--- Pada JG = 0,871 m/s</p> |
| | | 0,091 | 47,73675253 | |
| | | 0,149 | 48,59954423 | |
| | | 0,232 | 49,20684568 | |
| | | 0,539 | 49,65319474 | |
| | | 0,7 | 51,05271632 | |
| | | 0,879 | 51,43700707 | |
| | | 2,297 | 68,98654657 | |
| | | 4,935 | 100,7796307 | |
| | 1,941 | 0,033 | 48,11548995 | <p>--- Pada JG = 1,941...</p> |
| | | 0,091 | 47,78388815 | |
| | | 0,149 | 48,83883963 | |
| | | 0,232 | 49,49333998 | |
| | | 0,539 | 51,03410588 | |
| | | 0,7 | 52,35482428 | |
| | | 0,879 | 53,18454664 | |
| | | 2,297 | 71,18818637 | |
| | | 4,935 | 107,0248295 | |

Lampiran 27 GL 30% J_G tetap J_L variasi

| Sudut 15° Pencampuran GL 0%, 10%, 20%, 30% | | | | |
|--|-------|-------|-----------------------------|--|
| GL | J_G | J_L | $\Delta P/\Delta Z$ (kPa/m) | Grafik |
| 30% | 3 | 0,033 | 48,4482295 | <p>• Pada $J_G = 3$ m/s</p> |
| | | 0,091 | 48,03674096 | |
| | | 0,149 | 49,36471933 | |
| | | 0,232 | 53,06906437 | |
| | | 0,539 | 53,26402705 | |
| | | 0,7 | 56,24996023 | |
| | | 0,879 | 56,66621651 | |
| | | 2,297 | 73,8400797 | |
| | | 4,935 | 129,578709 | |
| | 4,238 | 0,033 | 48,52397157 | <p>Pada $J_G = 4,238...$</p> |
| | | 0,091 | 48,48496278 | |
| | | 0,149 | 50,18509584 | |
| | | 0,232 | 53,63393331 | |
| | | 0,539 | 54,08085484 | |
| | | 0,7 | 58,40592724 | |
| | | 0,879 | 60,72632713 | |
| | | 2,297 | 94,81372402 | |
| | | 4,935 | 131,8065172 | |
| | 7 | 0,033 | 49,21009283 | <p>Pada $J_G = 7$ m/s</p> |
| | | 0,091 | 48,81046945 | |
| | | 0,149 | 50,45444611 | |
| | | 0,232 | 54,37103689 | |
| | | 0,539 | 59,82365292 | |
| | | 0,7 | 62,03813311 | |
| | | 0,879 | 64,10391384 | |
| | | 2,297 | 107,5937298 | |
| | | 4,935 | 132,9206516 | |
| | 9,62 | 0,033 | 48,79028196 | <p>• Pada $J_G = 9,62...$</p> |
| | | 0,091 | 49,11032243 | |
| | | 0,149 | 50,85553231 | |
| | | 0,232 | 54,8639021 | |
| | | 0,539 | 60,25131385 | |
| | | 0,7 | 64,22598439 | |
| | | 0,879 | 66,63087623 | |
| | | 2,297 | 122,8545148 | |
| | | 4,935 | 139,077918 | |

Lampiran 28 GL 30% J_G tetap J_L variasi

| Sudut 15° Pencampuran GL 0%, 10%, 20%, 30% | | | | |
|--|-------|-------|-----------------------------|--|
| GL | J_G | J_L | $\Delta P/\Delta Z$ (kPa/m) | Grafik |
| 30% | 22,6 | 0,033 | 48,55591002 | <p>Pada $J_G = 22,2$ m/s</p> |
| | | 0,091 | 49,53204636 | |
| | | 0,149 | 50,26552438 | |
| | | 0,232 | 54,95524768 | |
| | | 0,539 | 63,73336298 | |
| | | 0,7 | 70,08941172 | |
| | | 0,879 | 76,13826626 | |
| | | 2,297 | 128,0798234 | |
| | | 4,935 | 150,6942478 | |
| | 50 | 0,033 | 55,02275456 | <p>Pada $J_G = 50$ m/s</p> |
| | | 0,091 | 57,10977895 | |
| | | 0,149 | 61,16132931 | |
| | | 0,232 | 66,10818555 | |
| | | 0,539 | 86,89699864 | |
| | | 0,7 | 95,39853078 | |
| | | 0,879 | 112,1174269 | |
| | | 2,297 | 169,0659517 | |
| | | 4,935 | 170,5736685 | |
| | 58,05 | 0,033 | 59,00598535 | <p>Pada $J_G = 58,05$ m/s</p> |
| | | 0,091 | 57,64493078 | |
| | | 0,149 | 63,10946616 | |
| | | 0,232 | 74,52193735 | |
| | | 0,539 | 89,30579136 | |
| | | 0,7 | 104,8117308 | |
| | | 0,879 | 125,7837227 | |
| | | 2,297 | 172,859421 | |
| | | 4,935 | 174,0713482 | |
| | 66,3 | 0,033 | 62,42342617 | <p>Pada $J_G = 66,3$ m/s</p> |
| | | 0,091 | 60,59291165 | |
| | | 0,149 | 64,58435055 | |
| | | 0,232 | 75,7060272 | |
| | | 0,539 | 95,57905479 | |
| | | 0,7 | 116,4229678 | |
| | | 0,879 | 132,4559594 | |
| | | 2,297 | 173,5483325 | |
| | | 4,935 | 174,3085975 | |