

# Evaluasi dan pengoptimalan kinerja pengolahan pada instalasi pengolahan air minum domestik: studi kasus: IPA Pulo Gadung PDAM Aetra Kota Jakarta = Evaluation and optimization of treatment performance in municipal drinking water treatment plant: case study: IPA Pulo Gadung PDAM Aetra Jakarta

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## Abstrak

### <b>ABSTRAK</b><br>

Air bersih merupakan salah satu kebutuhan mendasar bagi manusia. Saat ini, IPA Pulo Gadung dapat mengolah debit air sebesar 4.200 L/detik. Tujuan dari penelitian ini adalah 1 mengevaluasi desain unit pengolahan terhadap kriteria desain, 2 mengevaluasi kualitas air baku dan air bersih, 3 mengevaluasi efisiensi kinerja unit pengolahan, serta 4 menentukan debit pengoptimalan. Untuk mengetahui tingkat kinerja kualitas IPA Pulo Gadung, maka dilakukan pengujian kualitas air, yaitu kekeruhan SNI 06-6989.25-2005, E. Coli Most Probable Number, zat organik SNI 06-6989.22-2004, dan COD Standard Methods: 5220 D serta jar test. Selain itu, untuk mengetahui tingkat kinerja kuantitas, maka dilakukan evaluasi desain terhadap kriteria desain dan rancangan pengoptimalan kapasitas. Berdasarkan evaluasi desain, banyak aspek yang tidak memenuhi kriteria desain. Berdasarkan parameter COD, pada PP No. 82 Tahun 2001, air baku yang digunakan IPA Pulo Gadung tergolong dalam air Kelas IV air untuk mengairi pertanian. Air bersih hasil pengolahan, berdasarkan Permenkes No. 492 Tahun 2010, memiliki beberapa parameter kualitas air yang tidak memenuhi standar tersebut. Unit mixing well efektif dalam menghilangkan E. Coli 47,7, sedimentasi dan filtrasi menghilangkan kekeruhan 93,05 dan 97,32, serta reservoir menghilangkan E. Coli 73,04. Secara keseluruhan, IPA Pulo Gadung dapat menghilangkan kekeruhan sebesar 99,83, E. Coli sebesar 96,39, organik sebesar 40,16, dan COD sebesar 16,57. Dari uji jar test, koagulan optimal untuk air IPA Pulo Gadung adalah koagulan PAC 20 ppm. Dengan mengacu pada kriteria desain, debit optimal masing-masing unit adalah intake sebesar 9,33 m<sup>3</sup>/detik, saringan kasar 1,09 m<sup>3</sup>/detik, saringan halus 13,44 m<sup>3</sup>/detik, grit chamber 4,86 m<sup>3</sup>/detik, pompa 7,65 m<sup>3</sup>/detik, mixing well 18,9 m<sup>3</sup>/detik, flokulasi 3,09 m<sup>3</sup>/detik, sedimentasi 5,83 m<sup>3</sup>/detik, filtrasi 12 m<sup>3</sup>/detik, dan reservoir 16,57 m<sup>3</sup>/detik. Kesimpulannya adalah kinerja pengelolaan kualitas air IPA Pulo Gadung sudah baik dan kapasitasnya masih dapat ditingkatkan.

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### <b>ABSTRACT</b><br>

Clean water is one of the basic needs for human beings. Currently, IPA Pulo Gadung can treat 4,200 L sec of raw water. The objectives of this study are 1 to evaluate the design of the processing unit based on design criteria, 2 to evaluate the quality of raw and clean water, 3 to evaluate the efficiency of processing unit removal rate, and 4 to determine the flowrate optimization. To determine the removal rate of IPA Pulo Gadung, the water qualities to be tested are turbidity SNI 06 6989.25 2005, E. Coli Most Probable Number, organic matter SNI 06 6989.22 2004, and COD Standard Methods 5220 D and jar test. To determine the level of quantity performance, the unit design was evaluated to design criteria and determined the flowrate optimization. Based on design evaluation, many aspects do not meet the design criteria. Based on COD parameters, in PP No. 82 of 2001, raw water used by IPA Pulo Gadung classified in Class IV water water to

irrigate crop. Clean water produced, based on Permenkes No. 492 of 2010, has several water qualities that do not meet the standard. The mixing well unit is effective in removing E. Coli 47.7, sedimentation and filtration removing turbidity 93.05 and 97.32, and reservoir removing E. Coli 73.04. Overall, IPA Pulo Gadung can eliminate with the removal rate of turbidity 99.83, E. Coli 96.39, organic matter 40.16, and COD 16.57. From jar test, optimal coagulant for IPA Pulo Gadung is PAC 20 ppm. With reference to the design criteria, the optimal flowrate of each unit is intake 9.33 m<sup>3</sup> sec, coarse screen 1,09 m<sup>3</sup> sec, fine screen 13,44 m<sup>3</sup> sec, grit chamber 4.86 m<sup>3</sup> sec, pumping system 7.65 m<sup>3</sup> sec, mixing well 18.9 m<sup>3</sup> sec, flocculation 3,09 m<sup>3</sup> sec, sedimentation 5.83 m<sup>3</sup> sec, filtration 12 m<sup>3</sup> sec, and reservoir 16.57 m<sup>3</sup> sec. The conclusion is that the performance of water quality removal rate of IPA Pulo Gadung is good and the capacity can still be improved.