



**PT GRINVIRO BIOTEKNO INDONESIA**

Water & Waste Water Treatment System

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**Jakarta – Surabaya – Makassar**

No. : 021/01/PTC/MBR/2025

Surabaya, DD MM YYYY *[now]*

**{{DIP\_Customer Information.B4}}**

{{DIP\_Customer Information.B10}}, {{DIP\_Customer Information.B9}} - {{DIP\_Customer Information.B8}}

Up : {{DIP\_Customer Information.B16}} - {{DIP\_Customer Information.B4}}

Perihal : Proposal Sistem {{DIP\_Project Information.B3}} – {{DIP\_Technical Information.B21}}

Mula – mula kami mengucapkan banyak terimakasih telah diberikan kesempatan untuk mengajukan proposal {{DIP\_Project Information.B3}} dengan menggunakan teknologi pengolahan secara fisik, kimia, dan biologi. Sistem yang kami ajukan diharapkan mampu mengolah air limbah industri dengan effluent yang sesuai dengan target yang diinginkan. Besar harapan kami teknologi dapat diaplikasikan untuk pengolahan sistem {{DIP\_Project Information.B3}} {{DIP\_Customer Information.B4}}. Sekali lagi terimakasih atas kesempatan yang telah diberikan kepada kami.

Hormat kami,

Tia Amelia

Product Strategist Engineer

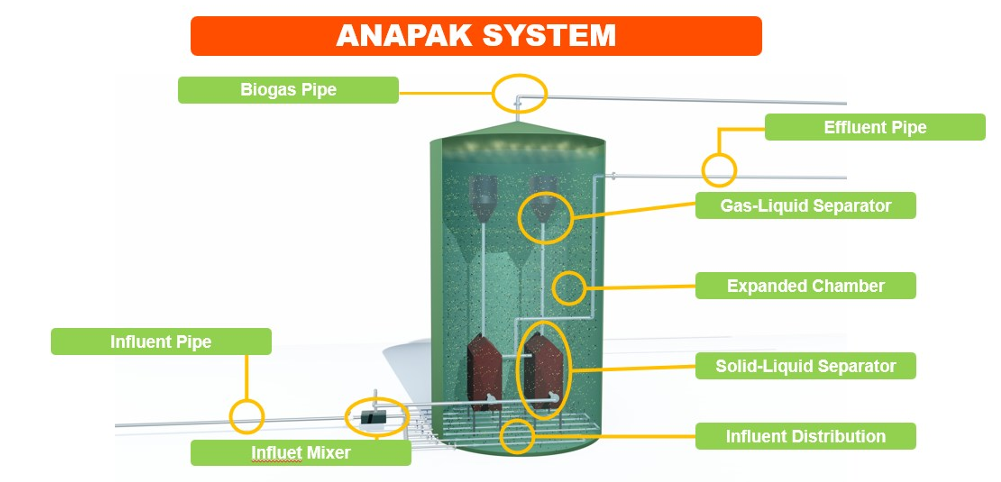
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**I. PROCESS DESCRIPTION *(based on block diagram)***

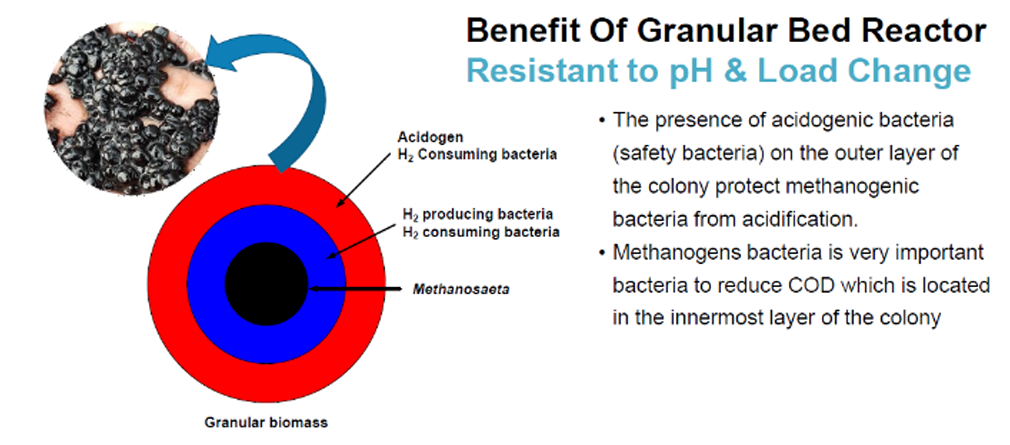
**ANAEROBIC SYSTEM (BIOGENIC WTE)**

**Anaerobic ANAPAK FX – High-Rate Granular Bed Reactor**

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Dalam reaktor ANAPAK-FX koloni bakteri akan membentuk suatu lumpur aktif yang disebut sebagai granulated sludge, dimana sludge yang terbentuk merupakan gabungan jutaan koloni bakter yang berbeda – beda dalam suatu gumpalan yang mirip seperti batu kerikil kecil. Granulated sludge merupakaan keistimewaan dalam proses Anaerobic Granular Bed Reactor (AGBR) dimana sludge yang padat dan berat berbentuk granular cenderung tenggelam kedasar reaktor dan tidak terbuang keluar. Sludge yang pada dan berat akan bekerja optimal dalam menyerap organik secara efisien sehingga menghasilkan kualitas limbah cair olahan dengan COD yang lebih rendah.

Salah satu bagian penting dalam sistem ANAPAK-FX adalah sistem pemisahan biogas, solid dan effluent atau disebut sebagai GLSS (Gas – Liguid – Solid Seperator) atau 3-Phase Separator (3PS). Kegagalan dari sistem 3PS akan menyebabkan sistem ANAPAK tidak bekerja optimal dan menghasilkan effluent dengan kualitas rendah. Sistem GLSS ANAPAK-FX didesain sedemikian rupa menggunakan spesial GLSS sehingga level granular sludge dapat dipertahankan sampai berkisar 70-80% dari volume reaktor. Konsentrasi biomass yang sangat tinggi pada sistem ANAPAK-FX memungkinkan sistem bekerja pada OLR yang sangat tinggi berkisr 20 – 35 Kg.COD/m3. ANAPAK FX-Anaerobic System merupakan pengembangan teknologi dari sistem teknologi WWTP Konvensional. Anapak FX Anaerobic System sangat cocok di aplikasikan pada sistem Waste Water Treatment Plant (WWTP) dengan paremeter COD yang sangat tinggi dengan lahan yang terbatas.

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**II. DESIGN BASIS**

**II.1 DESIGN DATA**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Waste Water Information** | | | | |
| **1.** | **Source** | **Wastewater** | | **Remarks** |
| a. | COD | {{DIP\_Technical Information.B10}} | 5 | Maximum Value |
| b. | BOD | {{DIP\_Technical Information.B11}} | mg/liter | Maximum Value |
| c. | TSS | {{DIP\_Technical Information.B12}} | mg/liter | Maximum Value |
| d. | FOG | {{DIP\_Technical Information.B13}} | mg/liter | Maximum Value |
| e. | pH | {{DIP\_Technical Information.B9}} | - | Maximum Value |
| f. | Temperature | 33 | Deg C | Maximum Value |
| g. | Flow Rate | {{DIP\_Technical Information.B21}} | CMD |  |
| **2.** | **WWTP Effluent Warranty** | | | **Remarks** |
| a. | pH | {{DIP\_Technical Information.B24}} |  | Permenkes RI No. 2 Tahun 2023 untuk Parameter Wajib Air Minum |
| b. | COD | {{DIP\_Technical Information.B25}} | mg/liter |
| c. | BOD | {{DIP\_Technical Information.B26}} | NTU |
| d. | TSS | {{DIP\_Technical Information.B27}} | TCU |
| e. | FOG | {{DIP\_Technical Information.B28}} | CFU/100ml |

**II.2 MAIN SYSTEM DESIGN**

|  |  |  |  |
| --- | --- | --- | --- |
| **No** | **Design System** | | |
| **1.** | **Biological System – Anaerobic System** | | **Remarks** |
|  | Organic Removal System | Anaerobic System |  |
|  | Anaerobic Type | ANAPAK FX |  |
|  | Operation Profile | Automatic system:   * Automatic pH Controller System * Automatic influent Flow control system |  |
|  | Biomass Type | Granular biomass |  |
|  | Mixing System | ANAPAK FX System |  |
|  | GLS Separator System | Modular 3 Phase Separator |  |
|  | Reactor Type | Bolted Panel Tank |  |
|  | Max. Feed Flowrate | 84 CMD | [C20] |
|  | Max. Organic Load Design | 5275 Kg.COD/day | [C21] |
|  | Feed COD | 64000 mg/L | [C22] |
|  | COD removal | 70% - 80% | \*Estimated |
|  | pH Adjustment | Automatic pH Adjustment |  |
|  | Biogas Flare System | Open Flare System |  |
|  | Surplus Sludge Per Day | 93.8 Kg.DS/day | [C23] |
|  | Biogas Production | 2200-2300 NCBM/day | \*Estimated [C24] |
|  | Methane Production | 1300-1400 NCBM/day | \*Estimated [C25] |
|  | H2S Content (biogas) | < 0,8% | \*Estimated |

in DATA\_OUTPUT

**IV. BILL OF MATERIAL**

**IV.1 MECHANICAL AND ELECTRICAL WORK FOR PHASE 1**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No** | **Specifications** | | | |
| **1** | **All Transfer Pump** | | | |
|  | **ANAPAK-FX 1 Feed Pump (TP-04)**  Pump Type  Material   * Pump Body * Impeller * Shaft   Flowrate  Total Head  Power | End Suction Pump  SS304  SS304  SS304  15 CMh  30 meter  3 kW /3 phase/ 380V | 2 unit  (1W+1S) | CNP/LEO/  LEP/EQUAL  (SBT\_  PUMP B19 DATA ENGINE) |
| **2** | **Anaerobic System** | | | |
|  | **BIOGENIC Anaerobic Reactor**  Tank Type  Dimension  Complete With | Bolted Tank with Epoxy Lining  D: 6.31 m, H: 13.65 m  Tank Cover / Ladder / Walk Way platform/ Manhole/Feed & Outlet Nozzle/Drain Nozzle | 2 set | BIOGENIC – Grinviro  [C30-C31 in DATA\_OUTPUT] |
|  | **Feed Distribution**  Type  Material   * Feed lateral * Feed Nozzle * Inner lateral feed | Bottom Feed Lateral Distribution  SUS304  SUS304  SUS304 | 1 lot | BIOGENIC – Grinviro |
|  | **Sludge Sampling Profile**  Type  Pipe material  Sludge Sampling  Sampling Port Material | Gravity Sampling Profile  SS304  Along Tank Height  SS304 | 1 lot | BIOGENIC – Grinviro |
|  | **Three Phase Separator**  GLSS System  Settler Type Material  Complete with | ANAPAK FX Double Stage Settler  Carbon steel with Epoxy lining  Granular Biomass Venturi Mixer | 1 lot | BIOGENIC – Grinviro |
| **3** | **Biogas Flare System** | | | |
|  | **Biogas Flare system**  Flaring System  Ignition Equipment  Biogas Housing Chamber  Gas Sealer | Open Flare System  High Voltage Spark Transformer  SS304  Non-Return Water Sealer with SS304 Housing | 1 set | FLOWREX |
| **4** | **Chemical Dosing System** | | | |
|  | **Dosing Pump**  Capacity  Power  Application | 5.5 - 60 LPH  0.09 – 0.37 kW/3 phase/380 V  For : Caustic/Nutrient | 1 lot | NEWDOSE/SEKO/  EQUAL |
|  | **Agitator**  Power | 0.55 kW/3 phase/380 V | 1 lot | FLOWREX |
|  | **Chemical Tank**  Capacity  Application  Material | 100 – 1000 L  For : Caustic/Nutrient  PE | 1 lot | CANATURE |
| **5** | **Instrument** | | | |
|  | **Digital Flowmeter**  Flowmeter Type  Position  Transmitter Type  Display  Material  Output Signal | Electromagnetic Flowmeter  Inlet dan outlet WWTP, ANAPAK system (Inlet dan recycle line)  Compact Type  LCD Display  Body Casing: ABS  Electrode: SS316L  4 – 20 mA | 1 lot | FLOWREX |
|  | **Pressure Transmitter**  Type  Sensor  Pressure Range | Digital Pressure Transmitter  Piezo electric  0.00 – 20 bar | 1 lot | FLOWREX |
|  | **pH Sensor**  Type  Location  Temperature  Measurement Range  Analog Output | pH Sensor with Temperature Compensation  ANAPAK system (Inlet dan output line)  Auto recognition with NTC10K  0.00 – 14.00  4 – 20 mA | 1 lot | FLOWREX |
|  | **Pressure Gauge**  Type  Location  Model | Bourdon tube  (See PID)  232,5 – dia 65 mm | 1 lot | FLOWREX |
|  | **Level Control**  Type  Location | Level switch indicator controller  SEE PID | 1 lot | FLOWREX |
| **6** | **System Pipe Connection** | | | |
|  | **Pipe**  All water transfer  Header ANAPAK  Lateral Inner ANAPAK | HDPE  SS  HDPE | 1 lot | LOCAL/  EQUAL |
|  | Manual Valve  All pipe isolation valves | Lever handle Butterfly Valve  (Aluminum Body/SS304 Disc/EPDM seat)  3pc Ball Valve | 1 lot | 1. COVNA/ EQUAL |
|  | Automatic Valve  Automatic Valve Drive  Valve Type | Motorized Actuator  Butterfly Valve System | 1. 1 lot   1 lot | COVNA/ EQUAL |
| **7** | **Electrical System** | | | |
|  | Panel Type  Control System  Pump/Dosing control  Cable Tray  Cable  PC SCADA | Standing Panel Indoor Application  Double Exhaust Fan System  Material : Carbon Steel With Corrotion Prevention  PLC System with HMI  Component MCC  Variable Speed Drive  Galvanized Metal Tray  Power Cable & Signal Cable  SIMATIC WINCC v7.5 sp2 | 1 lot  1 lot  1 lot  1 lot  1 lot  1 lot  1 lot | Grinviro  SIEMENS/  EQUAL  Schneider  SAJ  Local  ETERNA/  EQUAL  LOCAL |
| **8** | **Design / Installation / Commissioning** | | | |
|  | * + - Material Shipping     - Biomass Seeding     - Installation     - Operator Training & Transfer Knowledge | To {{DIP\_Customer Information.B10}}  All Anaerobic and Aerobic Reactor  All Mechanical & Electrical  During Commissioning time | 1 lot | By Grinviro |

# **V. SPLIT OF RESPONSIBILITY**

TABLE:DIP\_Data Input.A3:D62

**VI. TERMS AND CONDITIONS**

TABLE:DIP\_Data Input.A68:B102