

UFQ3878
UF10 2000 Emissions Page EA Compliant Stand Alone Flare Stack

| | | | |
|--|--|-------------------------|-------|
| Customer | ANAERGIA | | |
| Customer's reference | 126-AW003-PBIOSE-01-PS-01 | | |
| Our Reference No. | UFQ3878 | | |
| Machine type | UF10-2000 High Temperature Enclosed Flare Stack | | |
| Turndown Ratio | 5:1 | | |
| Design Flow | 2000 | Nm3hr | |
| Design Turndown | 400 | Nm3hr | |
| Pilot System | Uniflare Fire Blaster | | |
| Use environment | Site in open air with restricted access. | | |
| Hazardous area classification in compliance with ATEX requirements. | Zone 2 in sphere 200 mm radius around all positive gas pipe connections and 100 mm radius around all negative pressure gas pipe connections | | |
| Maximum design emissions Normalised at 0°C, 101.3 k Pa and 3% O2: | Carbon monoxide (CO) | 50 mg Nm-3 | |
| | Oxides of nitrogen (NOx) | 150 mg Nm-3 | |
| | Total volatile organic carbon as carbon | 10 mg Nm-3 | |
| | Non-methane volatile organic carbon | 5 mg Nm-3 | |
| Operation | Unattended Intermittent use | | |
| Design Media | 70% | Methane CH ⁴ | |
| Design Burner Pressure | Minimum Burner inlet Pressure | 80 | mbarg |
| Thermal Rating | 13.96 | MW | |
| Design Destruction Efficiency | >99.7% | | |
| Design Combustion temperature | 1000°C Fully refractory line with automated combustion control | | |
| Minimum retention time | > 0.3 seconds | | |
| Control system | PLC controlled with Hardwired interface. Remote Start Stop. Status and Information available for Remote and site SCADA system. | | |
| Safety systems | CE marked equipment Piltz PNOZ monitoring e-stop circuit Gas pressure protection IS barriers Local Isolators Flash back protected Flame arrestor Pressure and Temperature monitoring DSEAR and ATEX compliant | | |

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Design Calculation Page

| | | | | | |
|--|--|---------|------------------------|----------------|-----------------------|
| CALCULATION OF RETENTION TIME | | | | | |
| CALCULATION OF COMPOSITION OF COMBUSTION PRODUCTS BS 5854 | | | | | |
| per one volume of fuel @ 15° C and 1013 mbar | | | | | |
| Constituent | Percentage in fuel | rel den | rel den fuel to air | | |
| CH4 | 70% | 0.554 | 0.3878 | | |
| CO2 | 30% | 1.5198 | 0.45594 | | |
| | 1 | OK | 0.84374 | | |
| STOICHIOMETRIC AIR PER UNIT VOLUME OF METHANE IS 9.55 | | | | | |
| | biogas flow rate | 2000 | m3h-1 > | 1400 | m3h-1 CH4 |
| | min air required | 13370 | m3h-1 | | |
| | excess air | 200% | | | |
| | specific volume of air | 0.819 | m3 kg-1 | | |
| | mass flow rate of air | 48974 | kg h-1 | | |
| | mass flow rate of biogas | 2060 | kg h-1 | | |
| | total mass flow rate | 51035 | kg h-1 | | |
| fuel gases above their dew point have a specific volume similar to air at the relevant temperature | | | | | |
| | the volume of 1 kg of flue gases at | 1000 | ° C is | | |
| | | 4 | m3 kg-1 | | |
| | therefore the volume flow rate | 194902 | m3 h-1 | | |
| | | 54 | m3 s-1 | | |
| | hot face diameter | 2.448 | m | | |
| | area | 4.71 | m2 | | |
| | velocity | 11.5 | m s-1 | | |
| | height above flame | 5.5 | m | | |
| | retention time | 0.48 | s | | |
| | Retention time at sample port | 0.39 | s | | Port 1m down from top |
| | Heat release turn down ratio | 5 | :1 | | |
| | Combustion heat release full load | 13.96 | MW | | |
| | Minimum heat release | 2.79 | MW | Created | RPB |
| EA Guidance on Landfill Gas Flaring 4.8.7 Page 24 | | | | Checked | MIJ |