



Emissions Compliance Statement

Progen certifies that Progen 20/710 engines Operating on **Diesel Heavy Fuel Oil** per the specifications provided (see below), will be equipped to meet the following emissions when operating on Diesel Heavy Fuel. Progen guarantees that 20/710 engine driven RICE generator units target emissions meet the local site emissions requirements in Macedonia.

Engine Cycle Data

| Load | Speed | Power | Exhaust Flow | Exhaust Temp. | Fuel Cons. | NO _x | O ₂ | H ₂ O |
|------|-------|-------|--------------|---------------|------------|-----------------|----------------|------------------|
| % | | bhp | acfm (cfm) | ° F | | g/bhp-hr | % | % |
| 100 | Rated | 5,000 | 31,500 | 650 | | 4.55 | 11 | 12.5 |

Emission Data (100% Load)

| Emission | Raw Engine Emissions | | | | | | Target Outlet Emissions | | | | | | Calculated Reduction |
|-------------------|--|--------------|---------|----------------------------------|-------|---------|--|--------------|---------|----------------------------------|-------|---------|----------------------|
| | mg/ Nm ³ @ 15% O ₂ | g/bhp- hr | tons/yr | ppmvd @ 15% O ₂ | ppmvd | g/kW-hr | mg/ Nm ³ @ 15% O ₂ | g/bhp- hr | tons/yr | ppmvd @ 15% O ₂ | ppmvd | g/kW-hr | |
| NO _x * | 658 | 4.55 | 219.68 | 318 | 534 | 6.102 | 400 | 2.77 | 133.63 | 194 | 325 | 3.712 | 39.2% |

System Specifications

SCR System Specifications (SP-CBL144-TBD, ACIS II, SP-42" Mixing Section (2 Mixer), SP-Dust Blower)

| | |
|---|--------------------------------------|
| SCR Catalyst Space Velocity: | 8,598 1/hr |
| Sound Attenuation: | 25-30 dBA insertion loss |
| Reactant: | Aqueous Ammonia |
| Percent Concentration: | 19% |
| Design Exhaust Flow Rate: | 31,500 acfm (cfm) |
| Design Exhaust Temperature ¹ : | 650° F |
| Exhaust Temperature Limits: | 572° F – 977° F |
| SCR Catalyst Volume: | 103 ft ³ |
| System Dosing Capacity: | 60 L/hr |
| System Pressure Loss: | 4.0 inH ₂ O (Clean) |
| Total Catalyst Volume: | 103 ft ³ |
| Estimated Reactant Consumption: | 11.1 gal/hr (42.0 L/hr) / Per Engine |

STANDARD SPECIFICATION FOR LIQUID FUELS – FUEL OILS
MKC 1003:2012

Table 2 - Requirements and testing methods for fuel oils - fuel oil M

| Parameters | Unit | Fuel oil M-1 | | Methods of examination |
|---|--------------------|------------------|------|---|
| | | min | maks | |
| Density at 15 °C | g/ml | It is registered | | MKS EN ISO 12185 MKS EN ISO 3675 ASTM D 4052 ASTM D 1298 |
| Flash point, closed container | °C | 80,0 | | MKS EN ISO 2719 ASTM D 93 |
| Kinematic viscosity ¹⁾ - at 100°C | mm ² /s | - | 28 | MKS EN ISO 3104 ASTM D 445 |
| Sulfur content | % m/m | - | 1,0 | MKS EN ISO 8754 ASTM D 4294 |
| Water content | % m/m | | 1,0 | MKS ISO 3733 ASTM D 95 |
| Water and mechanical sediments | % v/v | - | 1,5 | MKS ISO 3734 ASTM D 1796 |
| Sodr`ina na kCarbon residue | % m/m | - | 12.0 | MKS EN ISO 10370 MKS ISO 6615 ASTM D 4530 ASTM D 189 |
| Ash content | % m/m | - | 0,2 | MKS EN ISO 6245 ASTM D 482 |
| Net heat combustion ²⁾ | MJ/kg | 39,7 | - | ASTM D 4868 |

1) For oils that require preheating for use (M-1 and M-2), the viscosity is measured and declared at the same temperature

2) Calculating method