

Appendix 3L

Emission Rate for Cruise

| Cruise Name | Operation Mode | ME Power Rating (kW) | Assumed AE Power Rating (kW) ^[1] | Load Factor ^[2] | SO ₂ Emission Factor (0.50% Sulphur Content) (g/kWh) ^[3] | SO ₂ Emission Factor (0.10% Sulphur Content) (g/kWh) ^[4] | Emission Rate (g/s) |
|--|----------------|----------------------|---|----------------------------|--|--|---------------------|
| Spectrum of the Seas / Ovation of the Seas | Hotelling | 67200 | 18681.6 | 0.416 | 2.12 | 0.4240 | 0.9153 |
| World Dream | Hotelling | 76800 | 21350.4 | 0.416 | 2.12 | 0.4240 | 1.0461 |

| Cruise Name | Operation Mode | Boiler Power Rating (kW) ^[5] | SO ₂ Emission Factor (0.50% Sulphur Content) (g/kWh) ^[6] | SO ₂ Emission Factor (0.10% Sulphur Content) (g/kWh) ^[4] | Emission Rate (g/s) |
|--|----------------|---|--|--|---------------------|
| Spectrum of the Seas / Ovation of the Seas | Hotelling | 1000 | 2.83 | 0.5660 | 0.1572 |
| World Dream | Hotelling | 1000 | 2.83 | 0.5660 | 0.1572 |

| Cruise Name | AE Emission Rate (g/s) | Boiler Emission Rate (g/s) | Total Emission Rate (g/s) |
|--|------------------------|----------------------------|---------------------------|
| Spectrum of the Seas / Ovation of the Seas | 0.9153 | 0.1572 | 1.0725 |
| World Dream | 1.0461 | 0.1572 | 1.2033 |

Note:

[1] The information of AE Power Rating for Spectrum of the Seas / Ovation of the Seas / World Dream is not available. Assumed AE Power Rating (kW) = ME Power Rating (kW) x AE to ME Ratio (i.e. 0.278), where AE to ME Ratio refers to AE to ME Ratio for Cruise Ship in Table 3-19 of MVEIS, HKUST 2012.

[2] As the information of load factor for Spectrum of the Seas / Ovation of the Seas / World Dream is not available, load factor refers to load factor for Cruise / Ferry in Table 3-21 of MVEIS, HKUST 2012.

[3] Refer to Emission Factor for MGO (0.50% Sulphur Content) in Table 3-28 of MVEIS, HKUST 2012.

[4] Refer to Item A4 of Appendix E-2 in LC Paper No. CB(1)723/18-19(03), Review of Air Quality Objectives (AQOs) dated 25 March 2019, ocean-going vessels (OGVs) at berth use marine diesel with lower fuel sulphur content not exceeding 0.1%.

[5] As the information of boiler for Spectrum of the Seas / Ovation of the Seas / World Dream is not available, the power of the boiler refers to auxiliary boiler for Cruise / Ferry in Table 3-23 of MVEIS, HKUST 2012.

[6] Refer to Emission Factor for MGO (0.50% Sulphur Content) in Table 3-29 of MVEIS, HKUST 2012.

Main Engine of World Dream:

<https://vesselregister.dnvgl.com/VesselRegister/vesselDetails.html?vesselid=34080>

<https://marine.mandieselturbo.com/docs/default-source/shopwaredocuments/man-v48-60cr.pdf?sfvrsn=5>

Main Engine of Spectrum of the Seas / Ovation of the Seas:

<https://vesselregister.dnvgl.com/VesselRegister/vesselDetails.html?vesselid=34050>

<https://vesselregister.dnvgl.com/VesselRegister/vesselDetails.html?vesselid=36874>

<https://www.wartsila.com/marine/build/engines-and-generating-sets/diesel-engines/wartsila-46f>