Summerset Otaihanga Retirement Village

Consent Report for Emergency Generator Installation

Acoustic and Mechanical



Powell Fenwick

Issue Authorisation

Issue	Description	Date
A	Consent	03 September 2026
B	Consent – Update	22 September 2026
C	Consent – Update	09 October 2026
D	Consent – Update	19 October 2026
E	Consent – Update	28 October 2026



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1. Introduction

Powell Fenwick has been engaged by Summerset to undertake a noise assessment of an emergency generator at the proposed Summerset Otaihanga site.

This report contains details on generator emissions and acoustic consent requirements for the proposed emergency generator supply for limited essential services in the Regional Main Building only. Any other consent requirements are beyond the scope of this report.

The proposed area for Summerset Otaihanga Retirement Village is zoned General Residential as per the Operative Kapiti Coast District Plan. Land to the north, east and south is also zoned Rural Lifestyle. Land to the west is a combination of Rural Lifestyle and General Residential. See Figure A1 in Appendix A for the site location and surrounding zones.

We have been advised that the preliminary assessment of the essential load would require a 450kVA generator. The current selection is the Inmesol IVR-440 unit.

2. Criteria

2.1 Generator Diesel Storage

The proposed 400kW (450kVA standby) diesel generator has a consumption of 83 litres per hour at 100% capacity.

The proposed diesel generator has an integral storage tank of 1800 litres. Diesel is a Hazardous substance and has the following classifications 3.1D, 6.1E, 6.7B, 9.1B defined by Worksafe.

For an above-ground diesel tank in the Kāpiti Coast (Greater Wellington Region), the main requirements come from:

1. Health and Safety at Work (Hazardous Substances) Regulations 2017 (WorkSafe)
2. Greater Wellington Regional Council environmental rules

The **Health and Safety at work (Hazardous Substances) Regulations 2017** cover the requirements of storage and require the following (These regulation can be confirmed by entering the 'diesel' substance into worksafe calculator):

There are several general requirements however for design requirements labelling of tank and fire extinguishers are required.

The **Natural Resources plan for The Wellington Region** covers the requirements for managing the hazard if the tank leaks so that a spill cannot enter stormwater drains, streams, etc.

There is no prescriptive requirement however Rule R48:Stormwater from an individual property -permitted activity, states

The discharge of stormwater into water, or onto or into land where it may enter a surface water body or coastal water, from an individual property is a permitted activity, provided the following conditions are met:

(a) the discharge does not originate from industrial or trade premises where hazardous substances are stored or used unless:

> *(i) hazardous substances cannot enter the stormwater system, or*
>
> *(ii) the stormwater contains no hazardous substances except petroleum hydrocarbons, and the stormwater is passed through an interceptor and the discharge does not contain more than 15 milligrams per litre of total petroleum hydrocarbons prior to release, and…*

To comply with requirements Worksafe and the regional plan will require secondary containment system.

The bund volume should be at least 110% of the tank volume and therefore the containment should be at least 1.1 x 1800 = 1980 litres.

2.2 Emissions to the Atmosphere

The location of the exhaust is governed by the **Natural Resources plan for The Wellington Region**, the extracts relevant to the permanent generator described in the preceding section are presented below:

Section 5.1.4 Large Scale combustion activities

Specifically *Rule 8 Diesel or kerosene blends – **permitted activity***

The discharge of contaminants into air from any large scale generator not exceeding a maximum generating capacity of 2MW, from the combustion of diesel or kerosene blends outside a polluted airshed is a permitted activity, provided the following conditions are met:

(a) the discharge shall not cause noxious, dangerous, offensive or objectionable odour, dust, particulate, smoke, vapours, droplets or ash beyond the boundary of the property, and

(b) the sulphur content of the kerosene shall not exceed 0.5% by weight, and

(c) when the maximum generating capacity is more than 1MW, the discharge shall occur via a chimney stack or chimney at least 9.5m above ground level, or at least 3m above the ridge line of the roof or building or other structure, whichever is the highest, within a radius of 50m of the chimney stack or chimney, and

(d) the discharge shall be directed vertically into air, and shall not be impeded by any obstruction above the chimney stack or chimney that decreases the vertical efflux velocity, and

(e) rain excluders shall not impede the vertical discharge of combustion gases, and

(f) the discharge shall not at any time increase the concentration of PM10 (calculated as a 24-hour mean) by more than 2.5µg/m3 in any part of a polluted airshed, and

(g) the fuel burning equipment is maintained by a suitably qualified person at least once per annum, with a copy of the maintenance report held by the operator and presented to the Wellington Regional Council on request.

Comments on Rule 8 are as follows

Rule 8 **Clause (a):** The generator discharge is 50m from the boundary and a generator of this size will cause similar impact as a vehicle. It is expected that this requirement will be met.

Rule 8 **Clause (b):** The NZ Engine Fuel Specifications Regulations 2011 schedule 2 states that diesel supplied must have a sulphur content of less than 10mg/kg [0.001%] which meets the requirements of clause (b)

Rule 8 **Clause (c):** The proposed generator is an INMESOL IVR-440 which has a capacity of 400kW at full load. It is unclear if the rule is based on the fuel input which is approximately 830 kW based on (83 l/hour) however both values are below the threshold of the 1 MW requirement for the flue to be extended.

Rule 8 **Clause (d)(e):** For compliance with both the design of the flue terminal will have a weather cowl and discharge vertically similar to the figure below (However actual diameter of exhaust is different):

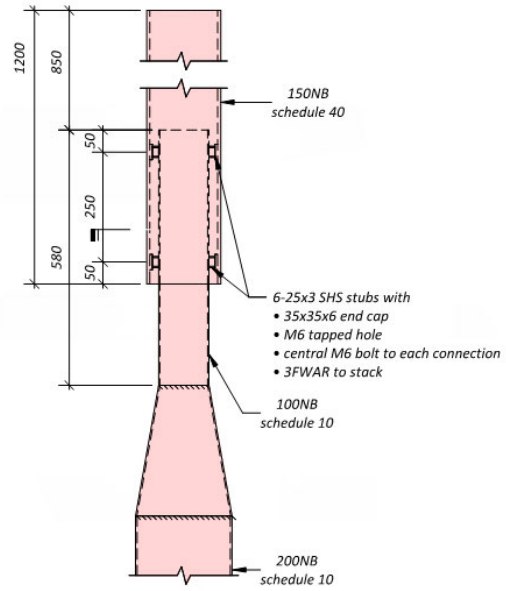


Figure 1 - Vertical discharge generator flue

Rule 8 **Clause (f):** No manufacturer-certified PM10 emission concentration data was available for the generator. Accordingly, particulate emissions have been estimated using:

+ Published engine power data (refer to attached data sheet).
+ Published exhaust flow data.
+ EU Stage 2 emission performance requirements and applicable to this engine family. PM Max 0.2 g/kWh
+ German TA-Luft -50% Compliance Values PM less than 0.05 g/m³

The strictest of the two standards above is the EU Stage 2 emission. Therefore the emission for the proposed generator with a Volvo TAD1344GE diesel motor is estimated:

Stated generator power 1500rpm @ 100% = PM10 ≈ 18,600 µg/m³ at the discharge point

+ From calculation of Motor power 354kW x 0.2 g/kwh = 70g/h / 3810 m^3/h (exhaust flow) = 0.0186 g/m^3

Although the exhaust gas contains particulate matter, emissions occur:

+ Through a dedicated exhaust stack.
+ At high discharge temperature (~440°C).
+ At high exit velocity.
+ For limited operating durations.

Rapid plume rise and atmospheric dilution are therefore expected.

Consequently:

Ground-level PM10 concentrations beyond the site boundary are expected to be substantially lower than the raw stack concentration and are unlikely to result in exceedance of ambient air quality criteria.

Rule 8 **Clause (g):** Will be met by maintenance of the generator during monthly testing and maintenance runs.

Additionally Rule 12 could be applied as it relates to emergency generators. It is interpreted that a generator up to 300kW can be used in all circumstances (a) to (c)(below) but only for emergency generation for up to 2 MW. The actual rules are as per excerpt, however conditions for compliance are essentially in parallel to rule 8. i.e. Rule 8 (a) and (f) are the same as Rule 12 (d) and (e)

Rule R12: Emergency power generators – permitted activity

The discharge of contaminants into air from combustion equipment not exceeding a maximum generating capacity of 300kW, but up to 2MW in (a) applies from the combustion of diesel, petrol, natural gas or liquefied petroleum gas, to provide emergency power generation, when:

(a) the electricity network is disrupted through weather, accidents, or any unforeseen circumstances, or

(b) the person operating the equipment is undertaking necessary maintenance or testing of the device, or

(c) the electricity connection is not available due to planned outages, or load shedding/peak load generation is required

is a permitted activity, provided the following conditions are met:

(d) the discharge into air shall not cause noxious, dangerous, offensive or objectionable odour, dust, particulate, smoke, vapours, droplets or ash beyond the boundary of the property, and

(e) the discharge shall not at any time increase the concentration of PM10 (calculated as a 24-hour mean) by more than 2.5µg/m3 in any part of a polluted airshed.

2.3 Resource Management Act

Under the Resource Management Act 1991, local authorities are required put in place district plans to manage the effects of land use activities. The principal tool in New Zealand to manage noise impacts is by zoning land to both sensitive and noise producing and separating them or providing reasonable mitigation (acoustic insulation) such that they are compatible and do not unreasonably interfere with each other's amenity and/or business operation.

Section 16 of the RMA also places a duty on the land occupier to avoid creating unreasonable noise effects by using the best practicable option for mitigation; this is additional to any consent condition.

2.4 Kapiti Coast District Plan

As noted above in the previous section, the land adjacent to the proposed Summerset Otaihanga Retirement Village is zoned Rural Lifestyle and General Residential zone as per the Operative Kapiti Coast District Plan.

Rule NOISE-R1 sets out noise limits for permitted activity. We note however that noise from fixed plant used solely for emergency purposes, including standby generator sets used to supply electricity only at times of electrical supply failure, are exempt from the permitted noise limits. Based on feedback from the planner, we understand this exception should apply to the proposed generator.

If however the permitted activity standards of rule NOISE-R1 are deemed to apply to the generator, noise emissions must comply with the 40 dB $L_{Aeq\,(15\,min)}$ limit at any point within residential or rural zoned land given it may operate during night time hours.

NOISE-R1 is reproduced below in part only.

NOISE-R1	Noise from non-residential activities and fixed plant located within the Residential Zones.
Permitted Activity	**Standards** 1. Excluding the activities provided for in Rules NOISE-R8 to NOISE R15, noise emission levels must comply with the limits in NOISE-Table 1. 2. Compliance locations in Rural Zones shall be at the notional boundary of any residential unit (excluding visitor accommodation which is not temporary residential rental accommodation). 3. Noise measurements must be undertaken in accordance with the procedures set out in NZS6801:2008 Acoustics - Measurement of Environmental Sound and must be assessed in accordance with NZS6802:2008 Acoustics – Environmental Noise. 4. The following activities are exempt from standard 1 above: a. any residential activity (excluding visitor accommodation which is not temporary residential rental accommodation) including non-commercial private gatherings, spontaneous social activities and non-commercial children's play; b. any warning device used by emergency services for emergency purposes; c. noise from fixed plant that is used solely for emergency purposes. Examples of such equipment are alarms, standby generator sets that are used to supply electricity only at times of electrical supply failure, or for plant used only during life threatening situations such as smoke fans or sprinkler pumps and is not used to generate power for the national grid; and d. vehicles on public roads or trains on rail lines, including at railway yards, railway sidings or stations and level crossing warning devices.

NOISE-Table 1	Noise when measured at or within the boundary of a subject site within:	Daytime (7am to 7pm)	Evening (7pm to 10pm)	Night Time (10pm to 7am)	
		$L_{Aeq(15min)}$	$L_{Aeq(15min)}$	$L_{Aeq(15min)}$	L_{AFmax}
	Residential Zones	50 dB	45 dB	40 dB	70 dB
	Rural Zones	55 dB	45 dB	40 dB	70 dB

3. Assessment

The noise from the permanent generator has been modelled using SoundPLAN 9.1, a proprietary noise modelling software which implements the principles of ISO 9613-2 for outdoor noise propagation. All local topography, buildings and other screening has been included into the model. We have included a 2.4 m high SmartWall acoustic fence around the entirety of the generator/transfomer enclosure on the site. Any access doors shall be on the western side of the enclosure facing away from the site boundary. We have not included any site boundary fences in our model.

Noise data has been obtained through the manufacturer data for INMESOL IVR-440 450 kVA genset resulting in 70 dBA at 7 m. We note that this noise level is given with a ±2 dB margin of error.

The generator shall be located as per Figure 2 below within the enclosure.

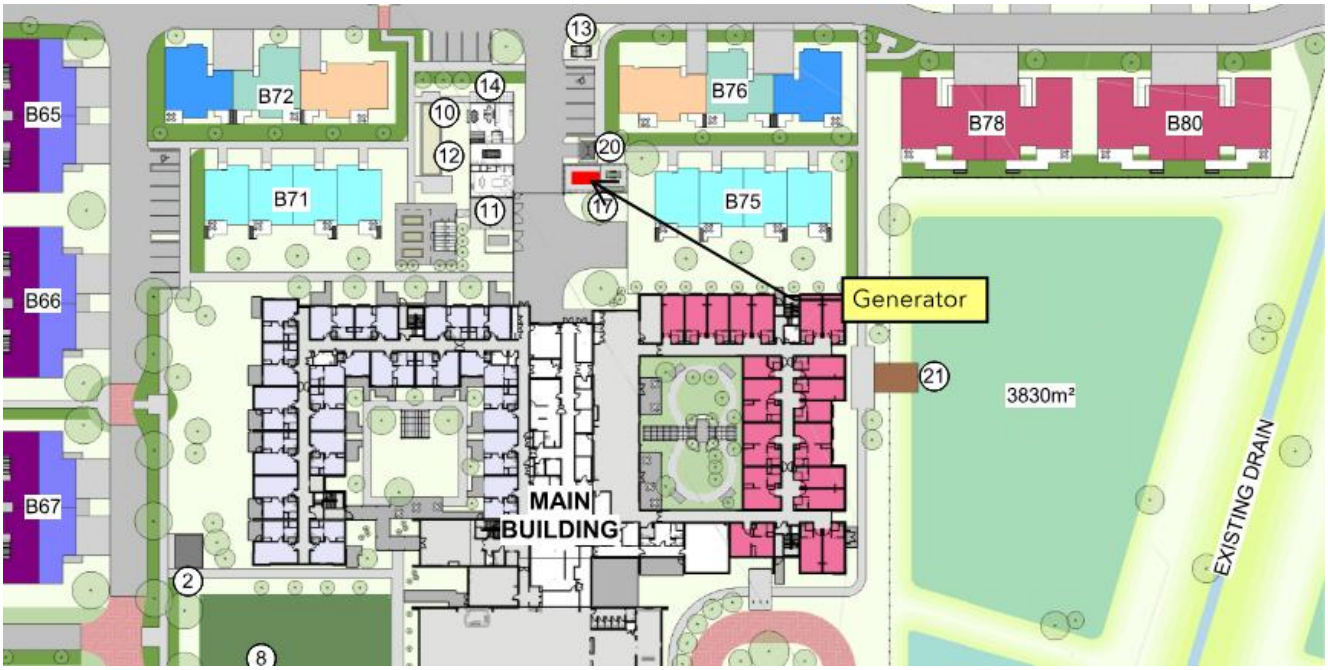


Figure 2: Generator location

A noise contour plot is presented in Figure B1 of Appendix B. Calculated noise levels are up to 52 dB $L_{Aeq(15min)}$ at adjacent Rural Lifestyle zoned sites to the east of the Summerset site. This exceeds the night time noise limit of 40 dB $L_{Aeq(15min)}$ at night time if the generator were not exempt from the permitted activity noise limits of Rule NOISE-R1.

If required, to mitigate noise from the generator a muffler should be fitted to the exhaust/air intake that provides a minimum transmission loss of 10 dB. A noise contour plot with this mitigation is presented in Figure B2 of Appendix B. With this mitigation, calculated noise levels are 40 dB $L_{Aeq(15min)}$ at all areas of the adjacent Rural Lifestyle zone with the exception of a small area of elevated terrain. This land is currently undeveloped, however if residential dwellings were constructed here we expect this area of elevated terrain would be flattened, eliminating the exceedance of the 40 dB $L_{Aeq(15min)}$ limit.

Notwithstanding the above any routine testing of the generator will only be carried out during day time hours.

4. Summary

Powell Fenwick has been commissioned by Summerset to undertake an assessment of a proposed emergency generator.

As the generator is used for supply of electricity only at times of electrical supply failure, we understand it is exempt from the permitted activity noise limits of rule NOISE-R1 of the Kapiti Coast District Plan. Calculated noise levels are up to 52 dB $L_{Aeq(15min)}$ at neighbouring Rural Lifestyle zoned land.

If the permitted activity noise limits of Rule NOISE-R1 are considered to apply to the generator, noise can be mitigated by adding a muffler to the exhaust/air intake of the generator that provided a minimum transmission loss of 10 dB. With this mitigation, calculated noise levels are 40 dB $L_{Aeq(15min)}$ at all areas of the adjacent Rural Lifestyle zone with the exception of a small area of elevated terrain. This land is currently undeveloped, however if residential dwellings were constructed here we expect this area of elevated terrain would be flattened, eliminating the exceedance of the 40 dB $L_{Aeq(15min)}$ limit.

The generator will meet the requirements of Natural Resources plan for The Wellington Region for a permitted activity of the discharge of contaminants into air.

This report is suitable to submit to Council as part of a resource consent application.

Appendix A.
Figures



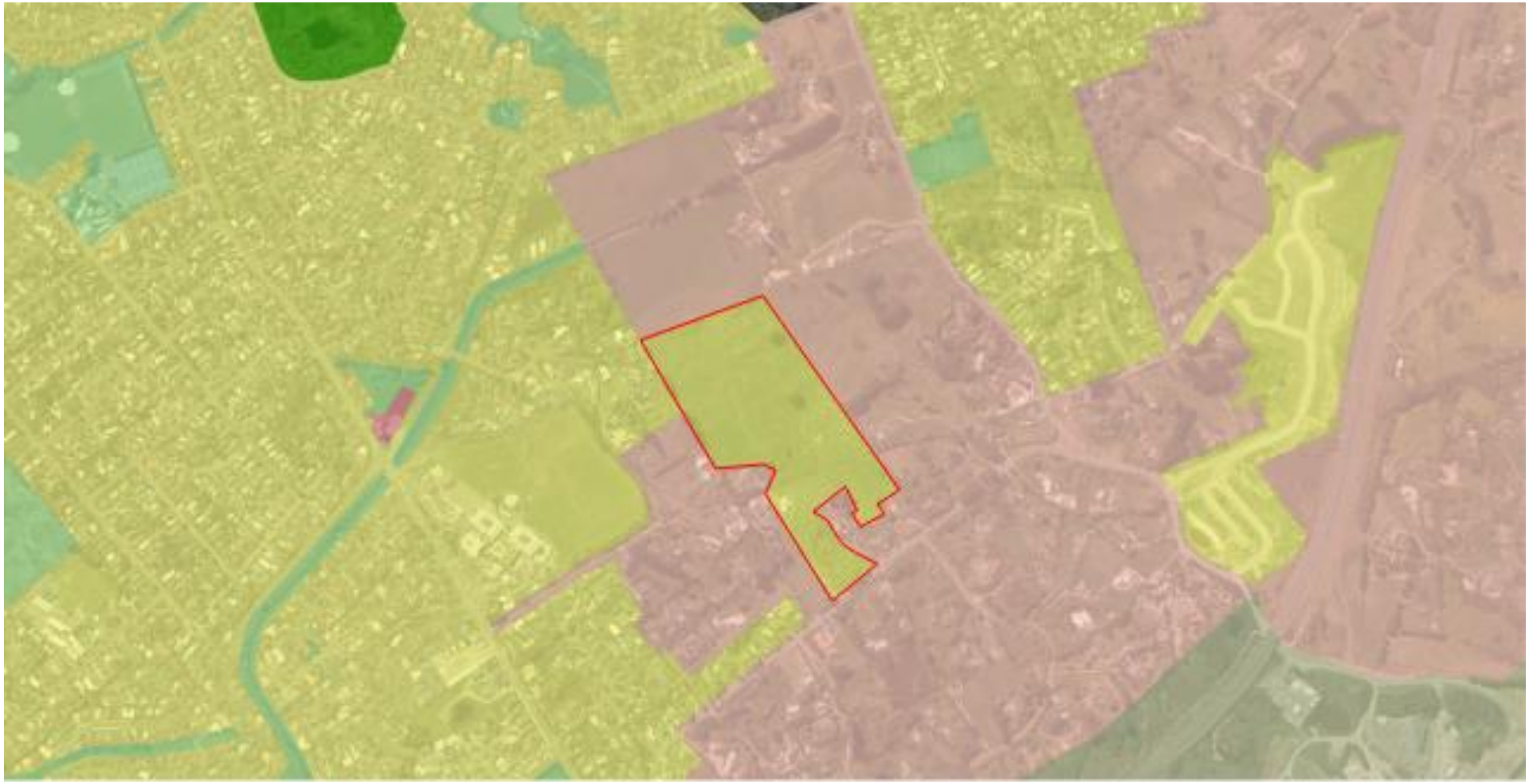


Figure A1: Site location and Zoning. The Summerset site is outlined in red. Pink areas are Rural Lifestyle Zone and yellow areas are General Residential Zone.



Figure A2: Summerset Otaihanga Plan & Generator Location (red shaded square)

Appendix B.
Noise Contour Plots





Figure B1: Ground floor (1.5 m) noise contour plot of 450 kVA generator with screening around generator compound.



Figure B2: Ground floor (1.5 m) noise contour plot of 450 kVA generator with screening around generator compound plus a muffler over the exhaust/air intake.

Appendix C.
Generator Motor Data



POWER GENERATORS INMESOL

Code: IVR0440540T7310630M

Model: IVR-440 - RENTAL RANGE | 400/230 V - THREE-PHASE | 1.500 R.P.M. | 50 Hz

ENGINE CHARACTERISTICS

MAKE	MODEL
VOLVO	TAD1344GE

General Data

Power PRP (kWm)	354
Power LTP (kWm)	389
No. cylinders	6
Cylinder capacity (L)	12.78
Diameter per stroke (mm)	131 x 158
Compression ratio	18.1
Cooling system	LIQUID
Injection	DIRECT
Suction	TURBO-INTERC.
Series regulator	ELECTRONIC
Fly wheel coupling	1-14

Lubrication system

Oil capacity (L)	36
Oil consumption (%)	0.05
Min. alarm oil pressure (bar)	2.2

Ventilation system

Air cooling flow (m^3/h)	23400
Combustion air flow (m^3/h)	1476
Max. back pressure for fan (mbar)	

Exhaust system

Exhaust gas flow (m^3/h)	3810
Exhaust back pressure (mbar)	100
Temp. exhaust gases (°C)	440

Electrical system

VDC (V)	24
Battery (Ah)	2 x 180
Engine start-up (kW)	7

POWER GENERATORS INMESOL SolanoGroup

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POWER GENERATORS
INMESOL

Code: IVR0440540T7310630M

Model: IVR-440 - RENTAL RANGE | 400/230 V - THREE-PHASE | 1.500 R.P.M. | 50 Hz

ALTERNATOR CHARACTERISTICS

MAKE	MODEL
STAMFORD	S4L1D-F

General Data

Power PRP (kVA)	415
Power LTP (kVA)	465
Efficiency Alt. 3/4 %	93.2
Efficiency Alt. 4/4 %	92.6
No. Poles	4
Voltage regulator	AS440
No. wires	12
Insulation	H
Xd (%)	254
X'd (%)	17
X	13
Degree of protection	IP23

GENERATOR SET CONSUMPTION

% POWER USED	LITRES/HOUR
50%	43
75%	63
100%	83

DIMENSIONS, CAPACITIES, APPROXIMATE WEIGHT

Dimensions (mm)		
LENGTH	WIDTH	HEIGHT
4260	1670	2450

FUEL TANK (LITRES)	WEIGHT (KG)
1800	4790

NOISE LEVEL (dB (A))
70+/-2dB(A)@7m

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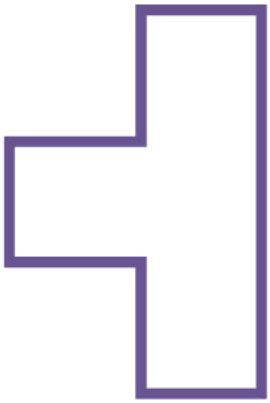
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