Penilaian Bahan/Barangan Elektrik: Pematuhan kepada Standard, Spesifikasi & FAT Bahan/Barangan Generator Sets

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Standards

Main standards

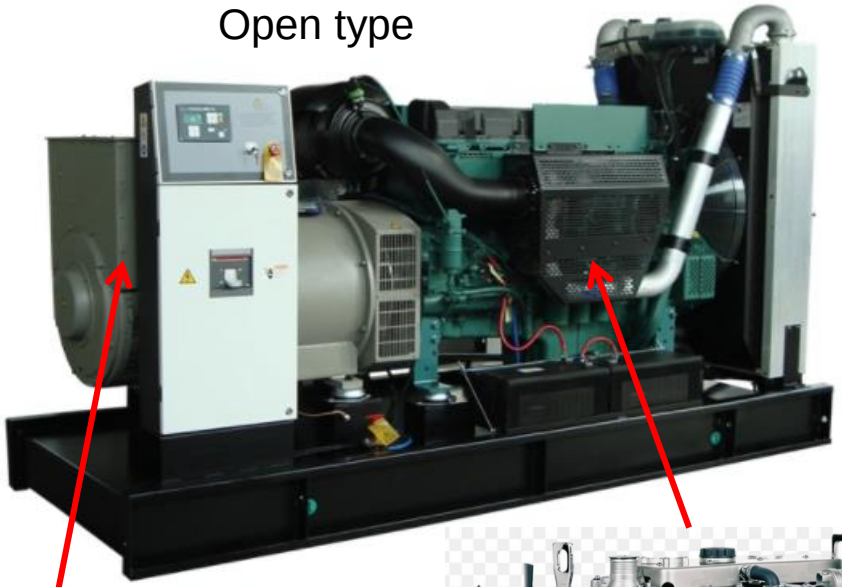
- ISO 3046 : Reciprocating internal combustion engines (series – part 1, 3, 4, 5, 6, 7)
- ISO 8528 : Reciprocating internal combustion engine driven alternating current generating sets (series – part 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12)
- IEC 60034 : Rotating electrical machines

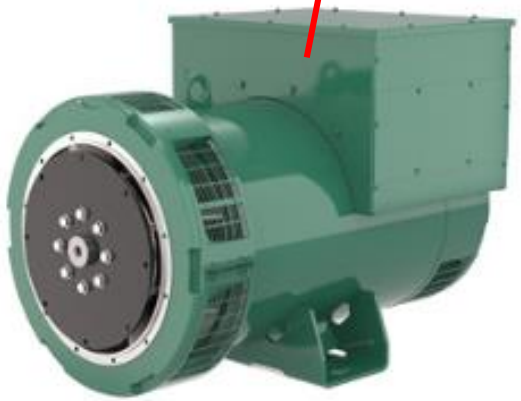
RIC = Reciprocating Internal Combustions

Three Phase Generator Set

Canopy type

Open type



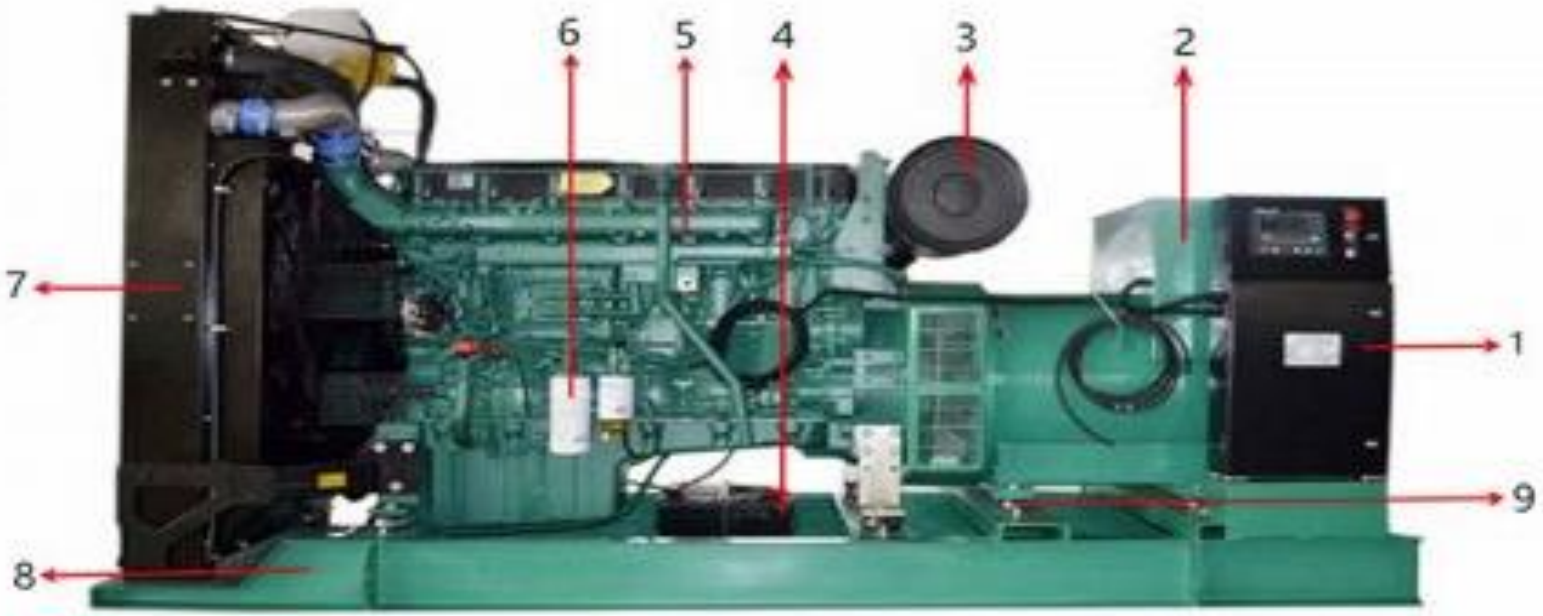


Alternator

Engine

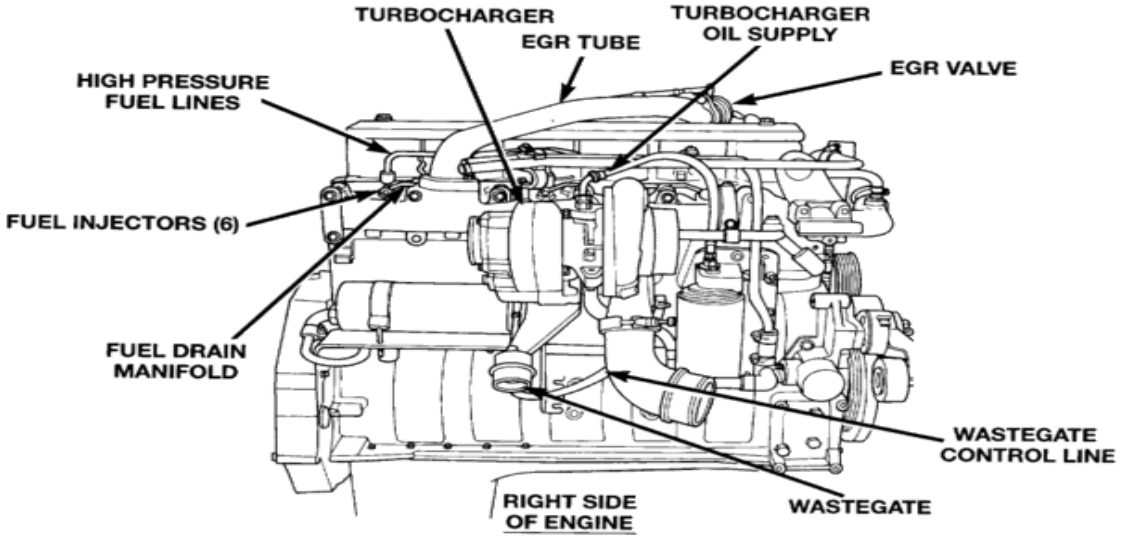
Three Phase Generator Set

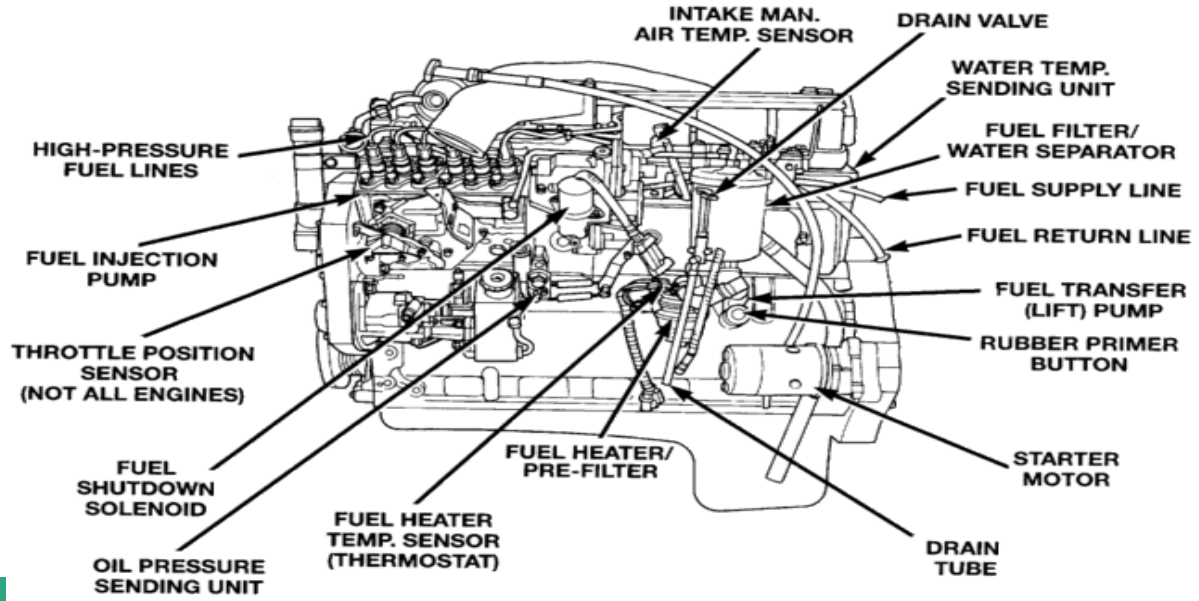
Main components of diesel generator



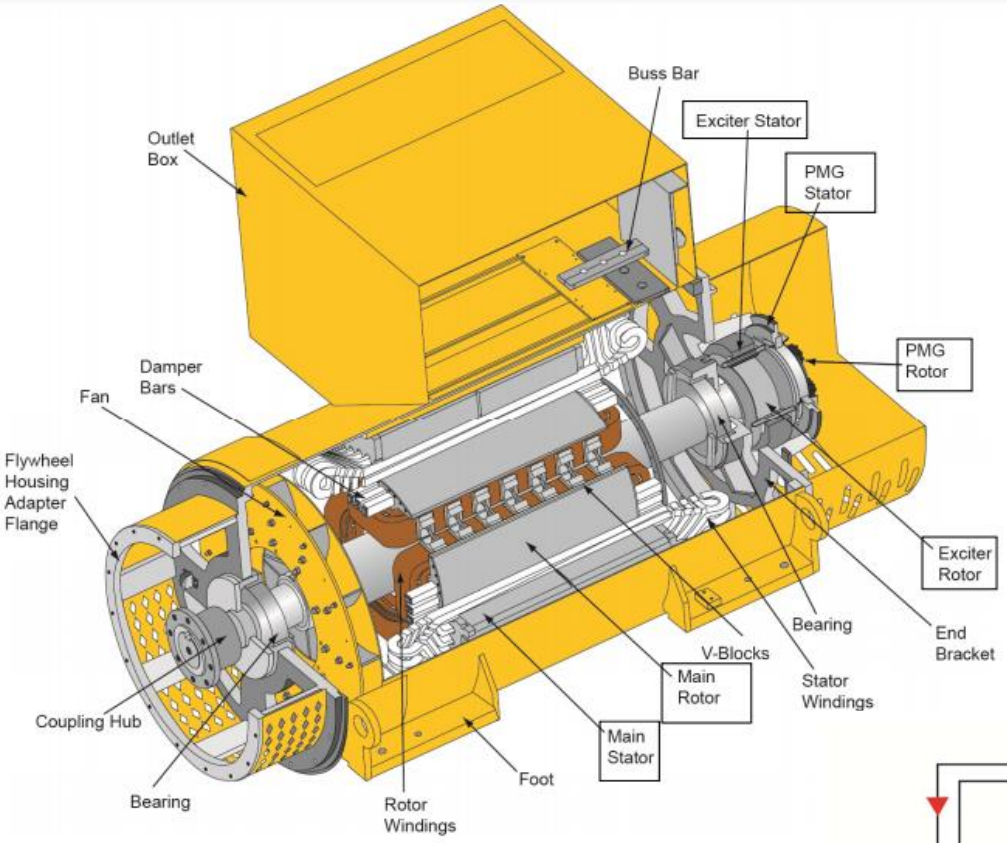
1.Intelligent control panel
2.AC synchronous generator
3.Air filter
4.Starter battery
5.Engine motor
6.Fuel filter.
7.Radiator
8.Base frame
9.Cushion

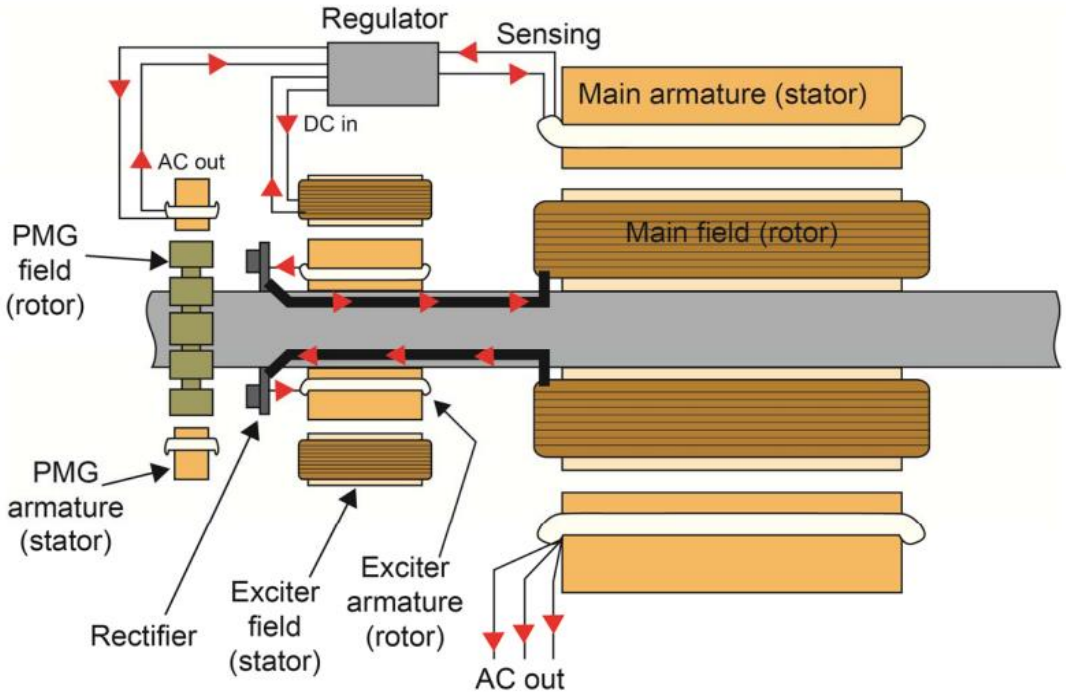
Engine Components





Alternator Components





Generator Set

Generator Set

- A generator set consist of one or more RIC engines, one or more a.c alternators (generators) and the components necessary to couple them together as a whole

- The prime movers are RIC engines and prime movers may be two types such as;
  - **i) Compression ignition engines (diesel engine)**
  - ii) Spark-ignition engines (petrol or gas engine)

- Two types of alternators which may be used on generator sets such as;
  - **i) synchronous**
  - ii) asynchronous

Generator Set

- Auxiliaries are items of equipment additional to those already installed/fitted on the generator set as supplied but essential to its proper and save operation such as;

i) Starting system
ii) Air intake and exhaust gas system
iii) Cooling system
iv) Lubricating oil system
v) Fuel system
vi) Auxiliary electrical power supply

$$kVA = \frac{The\ engine\ net\ (kWb)\ x\ alternator\ efficiency}{power\ factor}$$

$$kWe = kWb\ x\ alternator\ efficiency$$

$$kWb : - not\ include\ battery\ charging\ alternator\ power$$
$$- radiator\ cooling\ fan\ power$$

Engine (ISO 8528 -2)

- The power of the RIC engine shall be declared by the engine manufacturer in accordance with the requirement of ISO 3046-1.

- The main characteristics of the RIC engine to be used by the generator set manufacturer shall be given by the engine manufacturer and shall include at least;

  i) The power in the conditions as per ISO 8528-1 and in the service conditions

  ii) The declared speed

  iii) The consumption of fuel and lubricating oil in the conditions as per ISO 8528-1

Alternator (ISO 8528-3 & IEC 60034-1)

- The generator rating class shall be specified in accordance with the requirement of IEC 60034-1. In the case of alternators for RIC engine driven generator sets, the continuous rating (duty type S1) or rating with discrete constant loads (duty type S10) shall be specified.

- The maximum continuous rating based on duty type S1 is called the basic continuous rating (BR)

- For duty type S10, there is a peak continuous (PR) where the permissible alternator temperature rises are increased by a specific amount according to the thermal classification

- The alternator shall be capable of delivering its BR over the whole range of operating conditions (e.g. minimum to maximum coolant temperatures) with total temperatures not exceeding 40 °C plus the temperature rises specified in Table 7 of IEC 60034-1.

Standard Reference Conditions

Engine (ISO 3046-1)

- Total barometric pressure = 100 kPa (1 bar)
- Air temperature = 25 °C
- Charge air coolant temp. = 25 °C
- Relative humidity = 30 %

Alternator (IEC 60034-1 & ISO 8528-3)

- Cooling air temperature < 40 °C
- Coolant temp. at cooler inlet < 25 °C
- Altitude = 1000m a.s.l

Generator Set (ISO 8528-1)

- Total barometric pressure = 100 kPa
- Air ambient temperature = 25 °C
- Relative humidity = 30 %

Site Operating Conditions

Operating Condition (L-S5)

- Total barometric pressure = 750 mm Hg.
- Air ambient temperature = 40 °C
- Relative humidity = 95 %

Note : 1) 750 mm Hg. = 100 kPa

2) Where the site operating conditions **differ** from the standard reference conditions, any necessary adjustment to the generator set power shall be made in order to determine the site rated power of the generator set. (ISO 8528-1)

Derating Factor

- Operating site conditions which may affect the power rating of generator set such as;

i) Altitude
ii) Temperature *(site barometric pressure, max. and min air temperatures, highest and lowest engine room temperature, relative humidity, max. min cooling water temperatures)*

Altitude (m)	1000	1500	2000	2500	3000	3500	4000
Derating factor	1	0.975	0.949	0.922	0.894	0.866	0.837

Ambient T °C	25	40	45	50	55	60 (*)
Class H	1.076	1	0.973	0.946	0.918	0.889
Class F	1.095	1	0.966	0.931	0.894	0.856
Class B	1.140	1	0.949	0.894	0.837	0.775

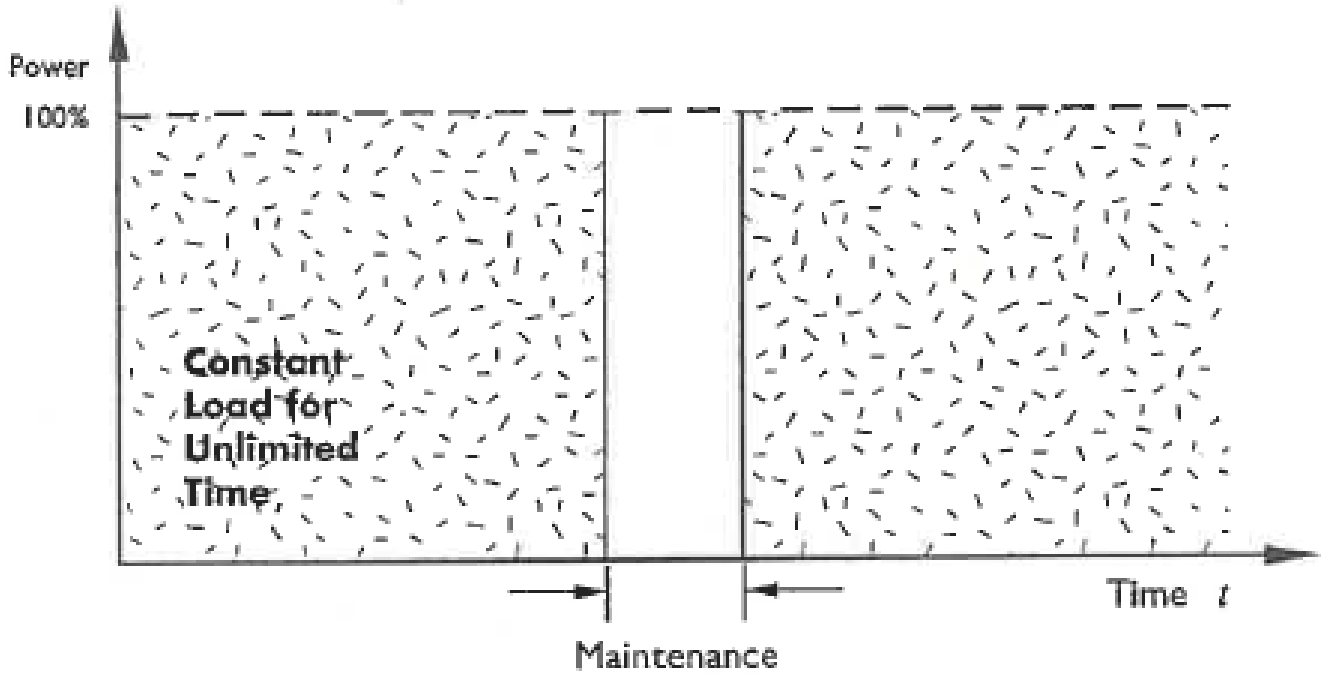
(*) External AVR if ≥ 56 °C

e.g. - Leroy Somer Alternator

Rated Output Generator Set (kW)= kWe X Derating Factor

Power Rating Categories

- **Continuous Power (COP)**
  - The maximum power which the generator set is capable of delivering continuously while supplying a **constant electrical load** when operated for an **unlimited number of hours per year** under the agreed operating conditions with the maintenance intervals and procedures being carried out as prescribed by the manufacturer.



Power Rating Categories

- **Prime Power (PRP)**

  - The maximum power which the generator set is capable of delivering continuously while supplying a **variable electrical load** when operated for an **unlimited number of hours per year** under the agreed operating conditions with the maintenance intervals and procedures being carried out as prescribed by the manufacturer.

  - The permissible average power output (P_{pp}) over 24 hours of operation **shall not exceed 70%** of the PRP unless otherwise agreed by the RIC engine manufacturer.

  - It can be necessary to provide additional electrical power for **transient load conditions and sudden applied load**. This additional power is usually **10%** of the rated power of the generator set for a period of **one (1) hour** with or without interruptions within **12 hours** of operation.

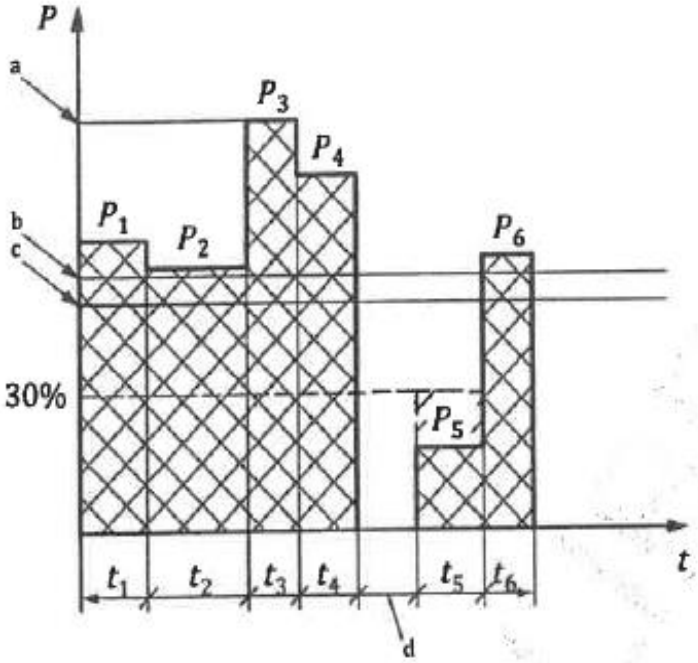
  - When determining the actual average power output (P_{pa}) of a variable power sequence, power of less than 30% of the PRP **shall be taken as 30%** and time at standstill shall not be counted.

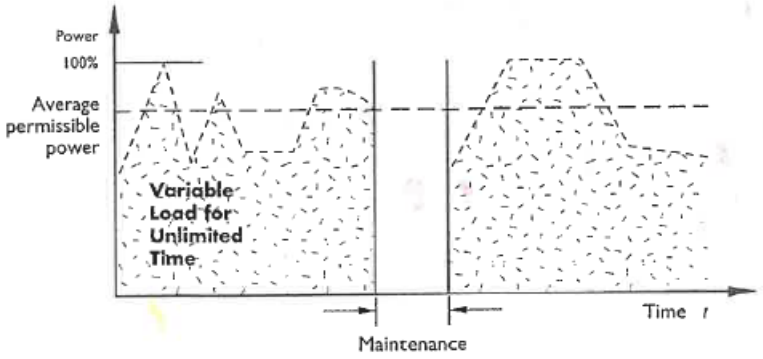
Power Rating Categories

- The actual average power output (Ppa) is calculated as shown in formula below;

$$P_{pa} = \frac{P_1 t_1 + P_2 t_2 + P_3 t_3 + \ldots + P_n t_n}{t_1 + t_2 + t_3 + \ldots + t_n} = \frac{\sum_{i=1}^{n} P_i t_i}{\sum_{i=1}^{n} t_i}$$

where $P_1, P_2 \ldots P_i$ is the power at time $t_1, t_2 \ldots t_i$.





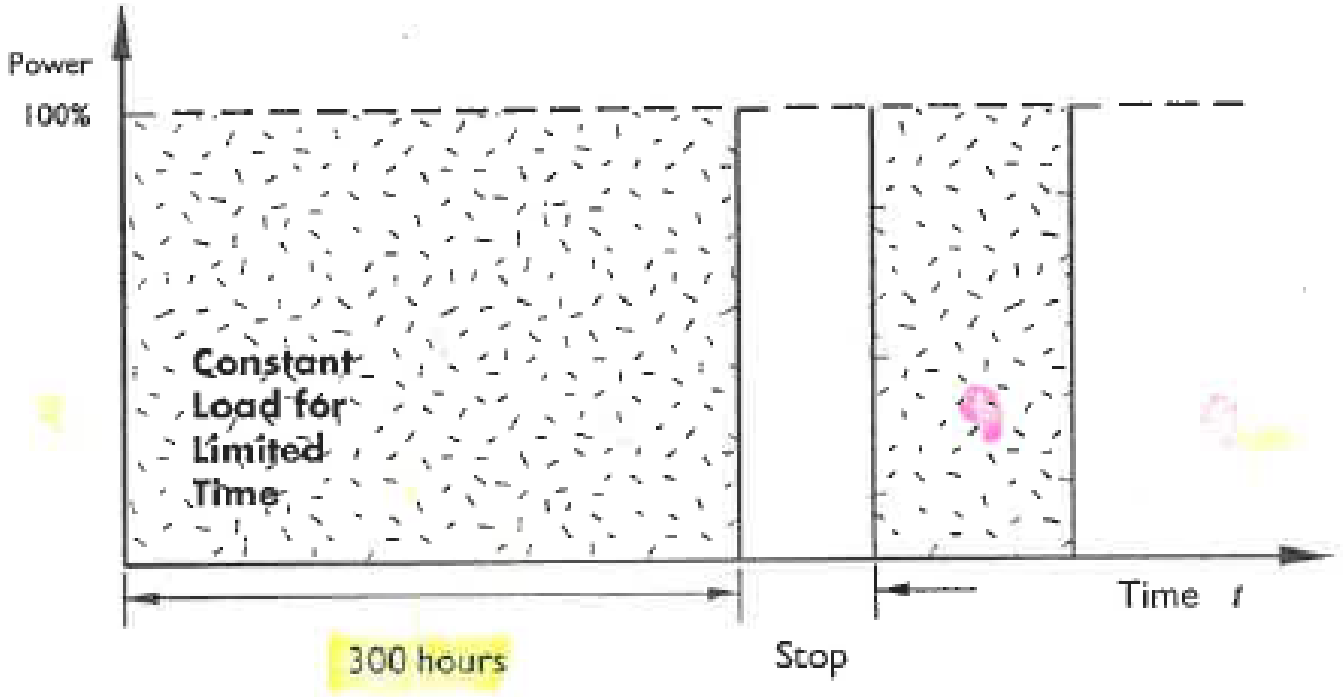
Key

t	time
P	power
a	Prime power (100 %).
b	Permissible average power during a 24 h period (P_{pp}).
c	Actual average power over a 24 h period (P_{pa}).
d	Stop.

NOTE $t_1 + t_2 + t_3 + \ldots \ldots \ldots + t_n = 24$ h.

Power Rating Categories

- **Limited-time running power (LTP)**
  - The maximum power available, under the agreed operating conditions, for which the generator set is capable of delivering for up to **500 hours of operation per year** with the maintenance intervals and procedures being carried out as prescribed by the manufacturer.



Power Rating Categories

- **Emergency standby power (ESP)**

  - The maximum power available during a **variable electrical power sequence**, under the stated operating conditions for which a generator set is capable of delivering in the **event of a utility power outage** or under test conditions for up to **200 hours of operation per year** with the maintenance intervals and procedures being carried out as prescribed by the manufacturer.

  - The permissible average power output (P_{pp}) over 24 hours of operation **shall not exceed 70%** of the ESP unless otherwise agreed by the RIC engine manufacturer.

  - The actual average power output (P_{pa}) shall be **below or equal** to the permissible average power output (P_{pp}) defined for ESP.

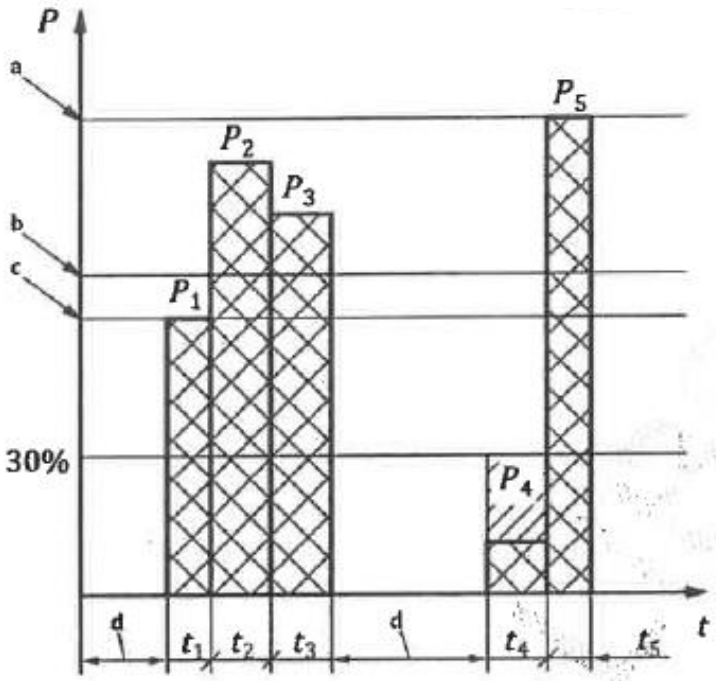
  - When determining the actual average power output (P_{pa}) of a variable power sequence, power of less than 30% of the ESP **shall be taken as 30%** and time at standstill shall not be counted.

Power Rating Categories

- The actual average power output (Ppa) is calculated as shown in formula below;

$$P_{pa} = \frac{P_1 t_1 + P_2 t_2 + P_3 t_3 + \ldots + P_n t_n}{t_1 + t_2 + t_3 + \ldots + t_n} = \frac{\sum_{i=1}^{n} P_i t_i}{\sum_{i=1}^{n} t_i}$$

where $P_1, P_2 \ldots P_i$ is the power at time $t_1, t_2 \ldots t_i$.



Key

t	time
P	power
a	Emergency standby power (100 %).
b	Permissible average power during a 24 h period (P_{pp}).
c	Actual average power over a 24 h period (P_{pa}).
d	Stop.

NOTE $t_1 + t_2 + t_3 + \ldots \ldots \ldots + t_n = 24$ h

JKR Specification

- L-S5 : Specification for Three Phase Generator Set

Description	Requirement
General	- Diesel engine directly coupled to a three phase alternator - 415 v, three phase, 4 wire, 50 Hz, 0.8 lagging power factor - Supplied by the supplier registered with JKR - Engine and alternator must provided with name plate
Generator Set	- Designed for cold starting and be capable of supplying the rated kVA specified in not more than 15 seconds from initiation of the starting procedure - Performance class G2 (ISO 8528-5) (Table 4) - Configured and mounted on a base frame - Spring type vibration damper shall be installed and supplied together with generator set by the registered generator set supplier/manufacturer
Engine	- Multi cylinder, vee/in line configuration, four stroke, direct injection, naturally aspirated or turbo charged, water cooled with fan and radiator, instant starting. - Engine speed shall be 1500 rpm - Capable to meet any transient load requirements caused by motor starting and/or any load profile - Able to withstand an overload of 10% at rated speed for one (1) hour in any period of twelve (12) hours consecutive running

JKR Specification

Description	Requirement
Fuel System	- Capable of operating on Class A fuel
Engine Governing	- Comply with ISO 3046-4 (Speed governing) - Performance class G2 - Governor shall be of proportional integral differential (PID) electronic type for parallel operation or rated at or more than 1000 kVA
Engine Instrumentation	- Complete with all instruments and gauges necessary such as elapsed hours running meter, lubricating oil pressure gauge, cooling water temperature gauge, tachometer, etc.
Alternator and exciter	- 415 v, three phase, 4 wire, 50 Hz, duty type S1 - Screen protected, drip-proof, revolving fields, self regulating, brushless, salient pole type - Insulation class H and temperature rise limits class F - Fitted with winding heaters c/w automatic thermostat control for alternator of rated capacity at and exceeding 1000 kVA

JKR Specification

Description	Requirement
Voltage Regulations and Waveform	- AVR shall be of three phase sensing electronic type equipped with radio frequency interference (RFI) compliance and encapsulated to provide protection against moisture and salt-spray - AVR shall be mounted on anti-vibration mounts

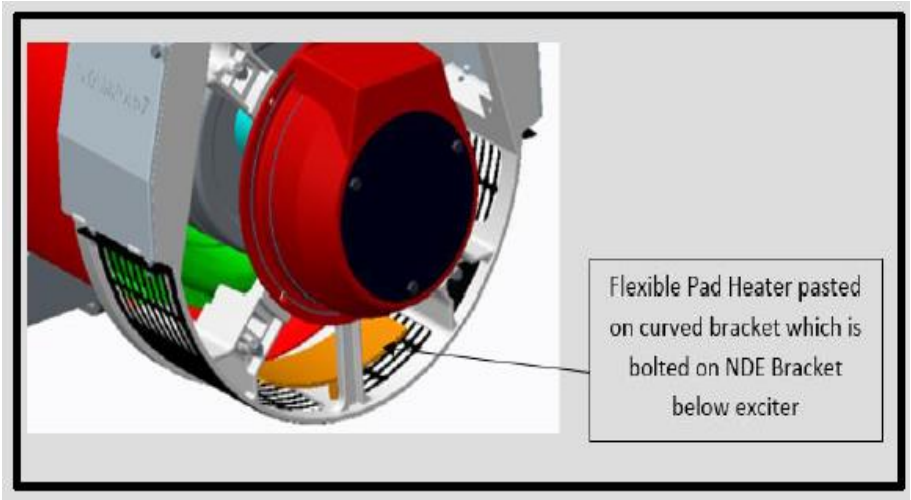
Anti-Condensation Heaters / Winding Heaters / Space Heaters

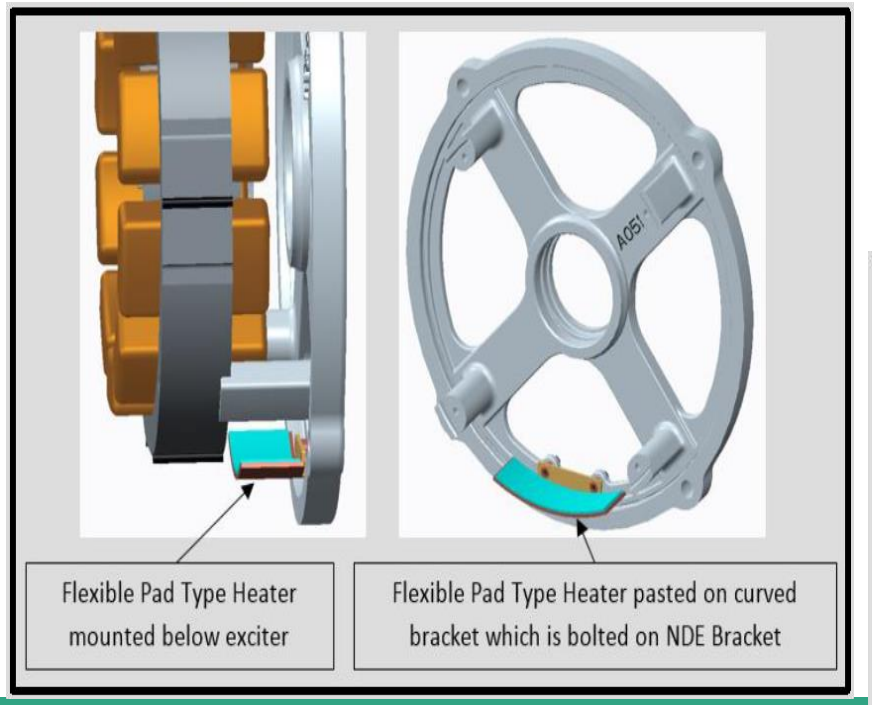
- For alternator of rated capacity at **exceeding 1000 kVA**, the alternator shall be fitted with winding heaters to prevent moisture in the winding.
- Type of winding heaters such as;

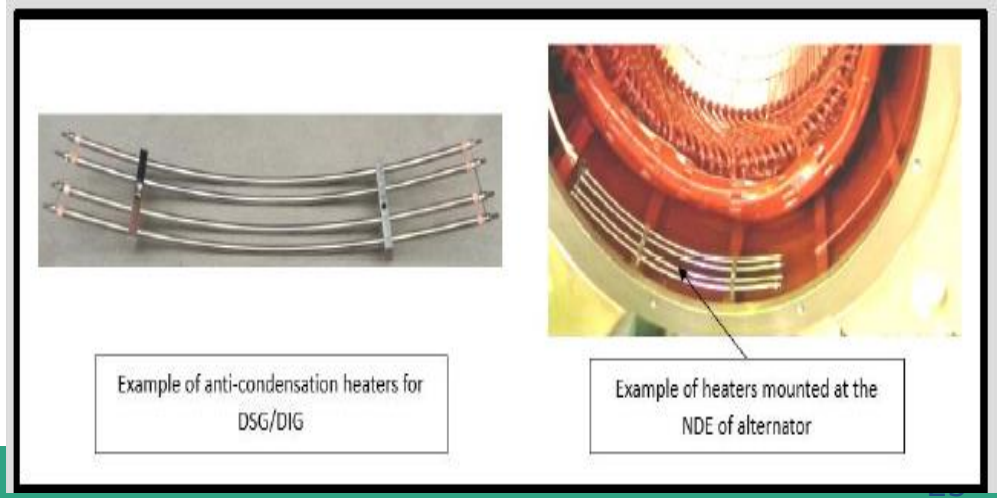
  i) Flexible pad type heater

  ii) Cartridge type heater

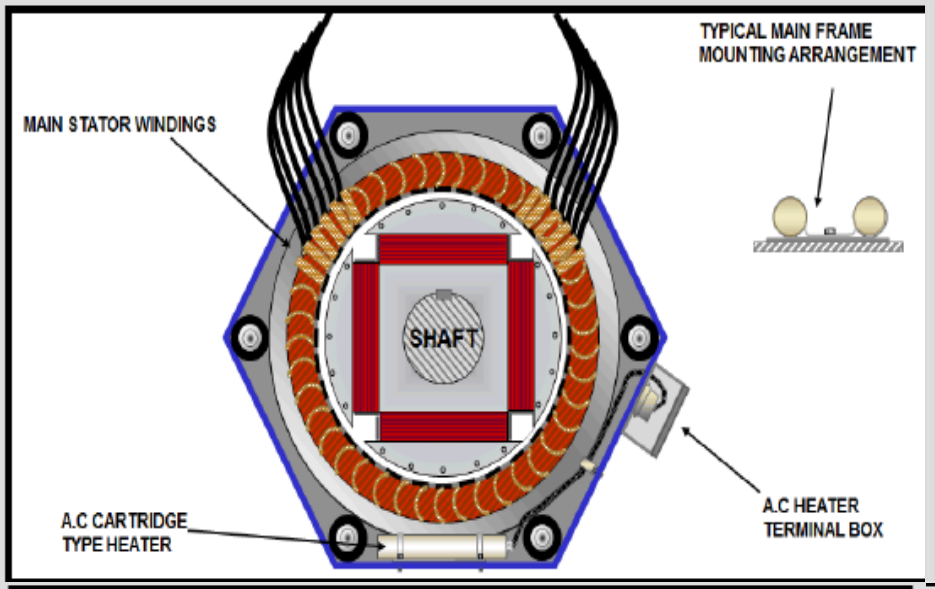
  iii) Two circular ring tubular heater

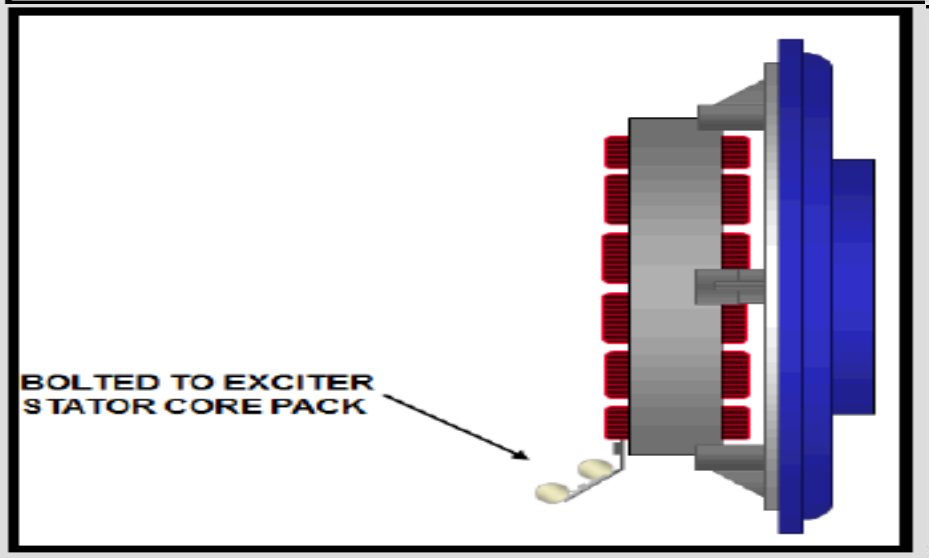


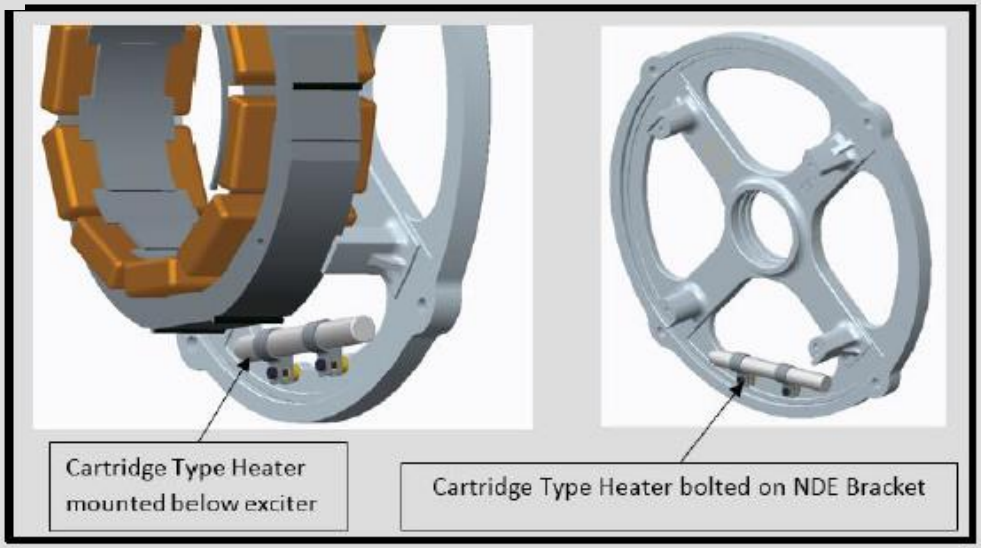




Anti-Condensation Heaters / Winding Heaters / Space Heaters







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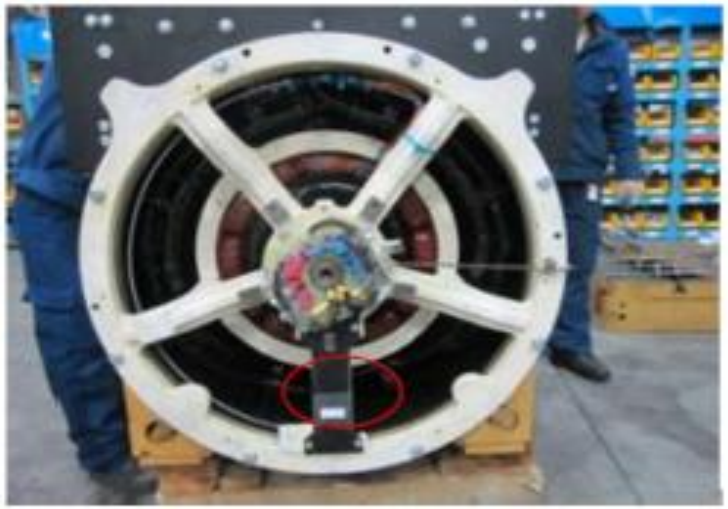
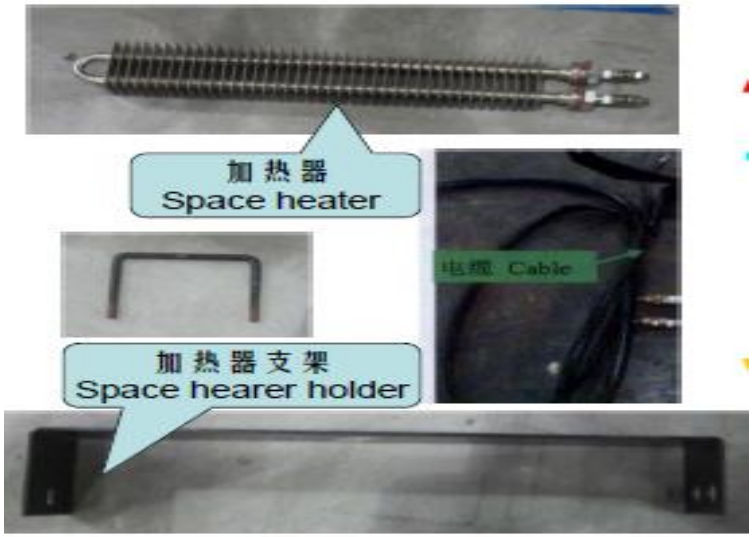
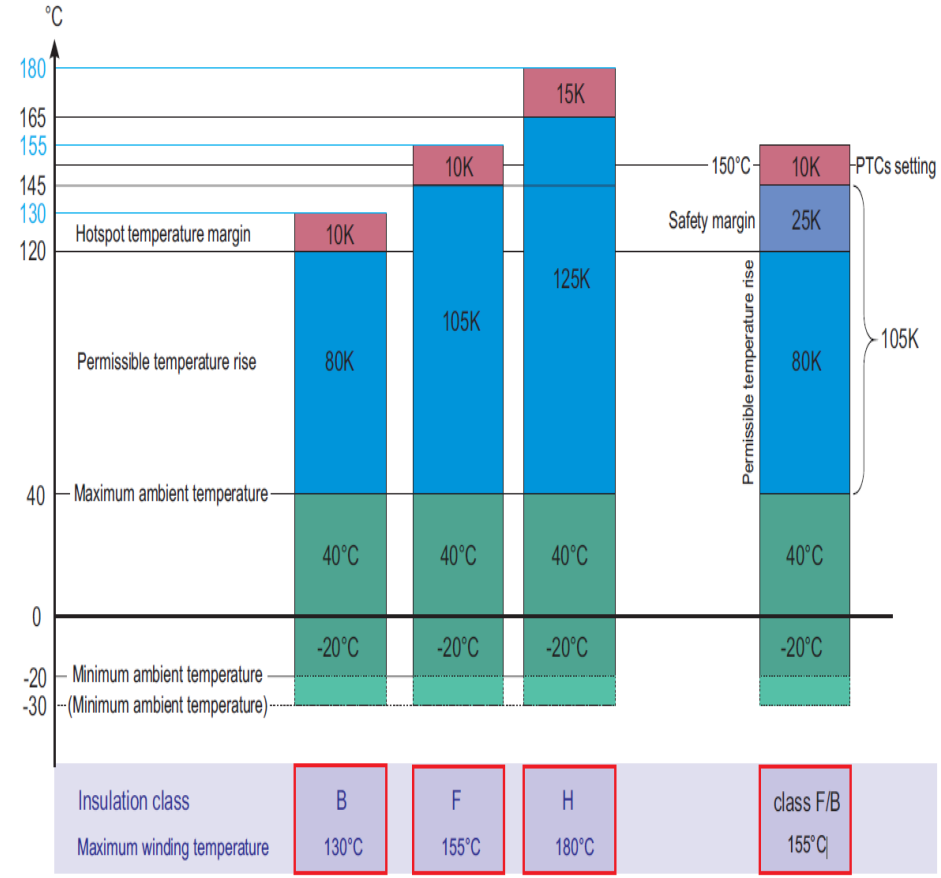
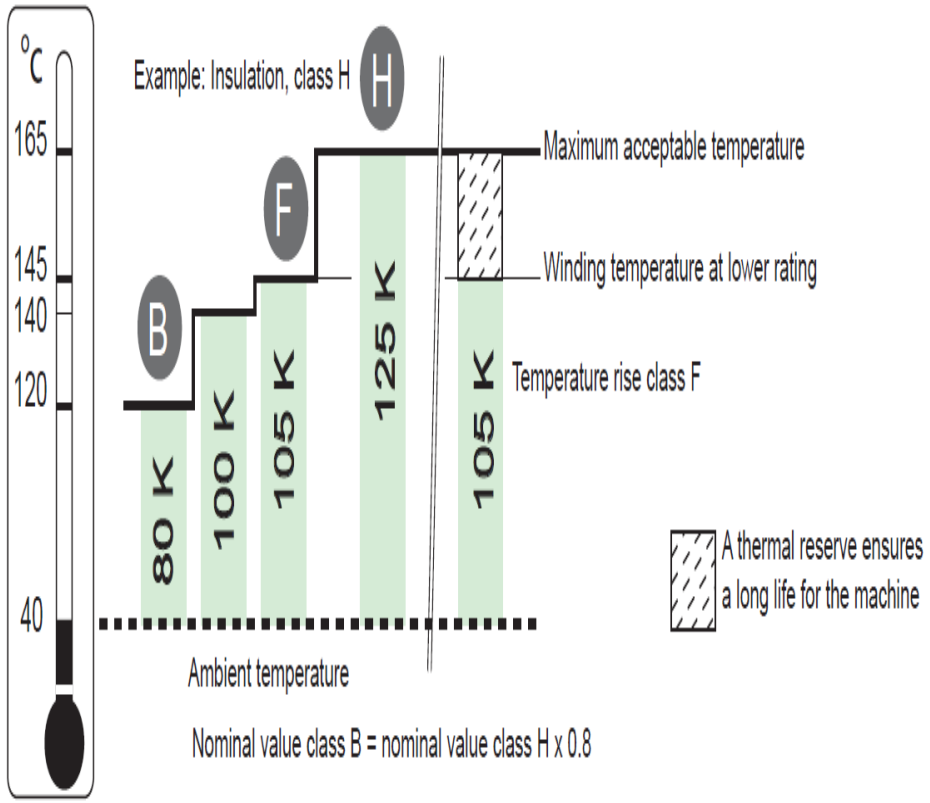




Insulation Class and Temperature Rise

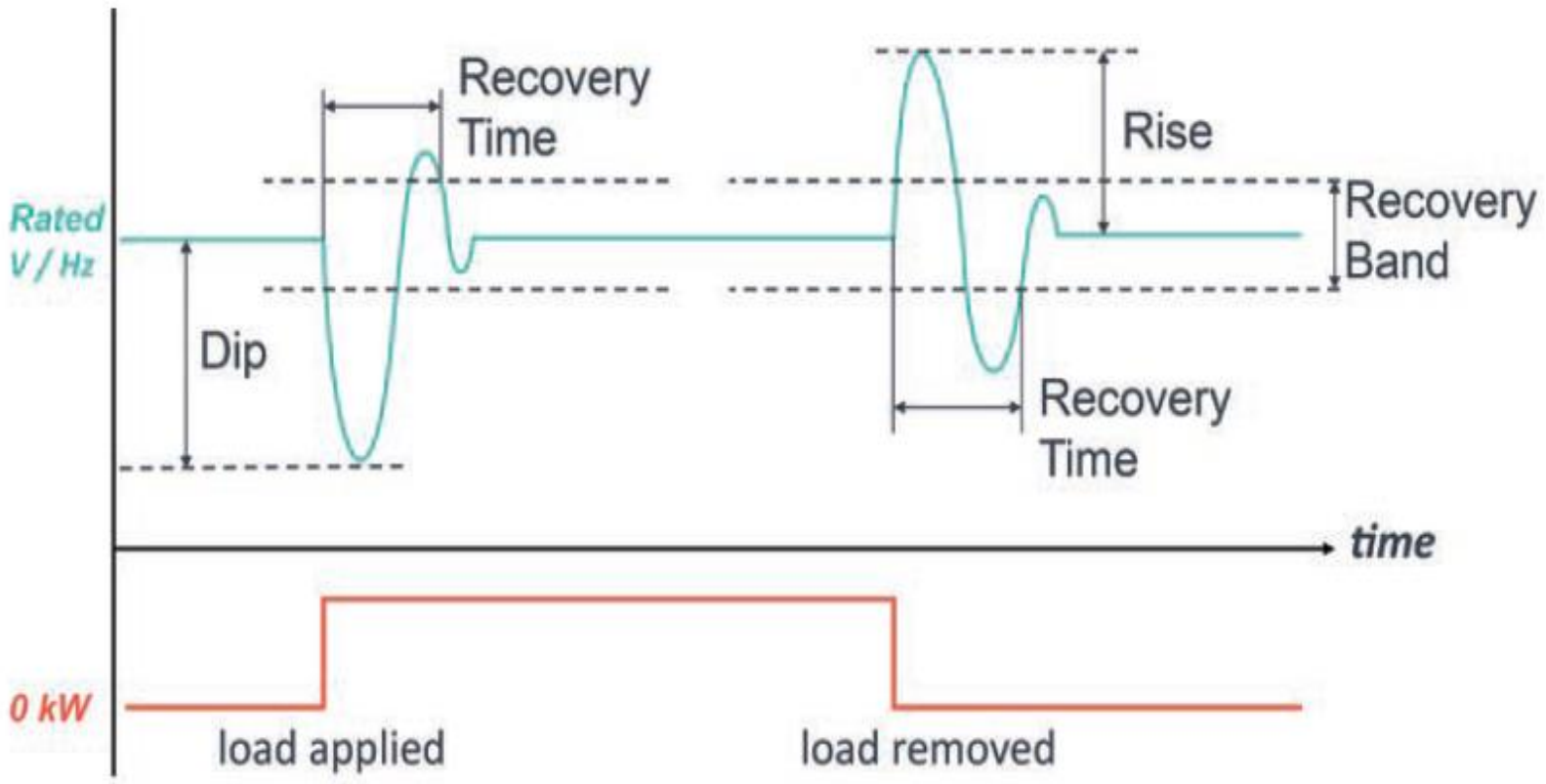




Performance Class (ISO 8528-1 & ISO 8528-5)

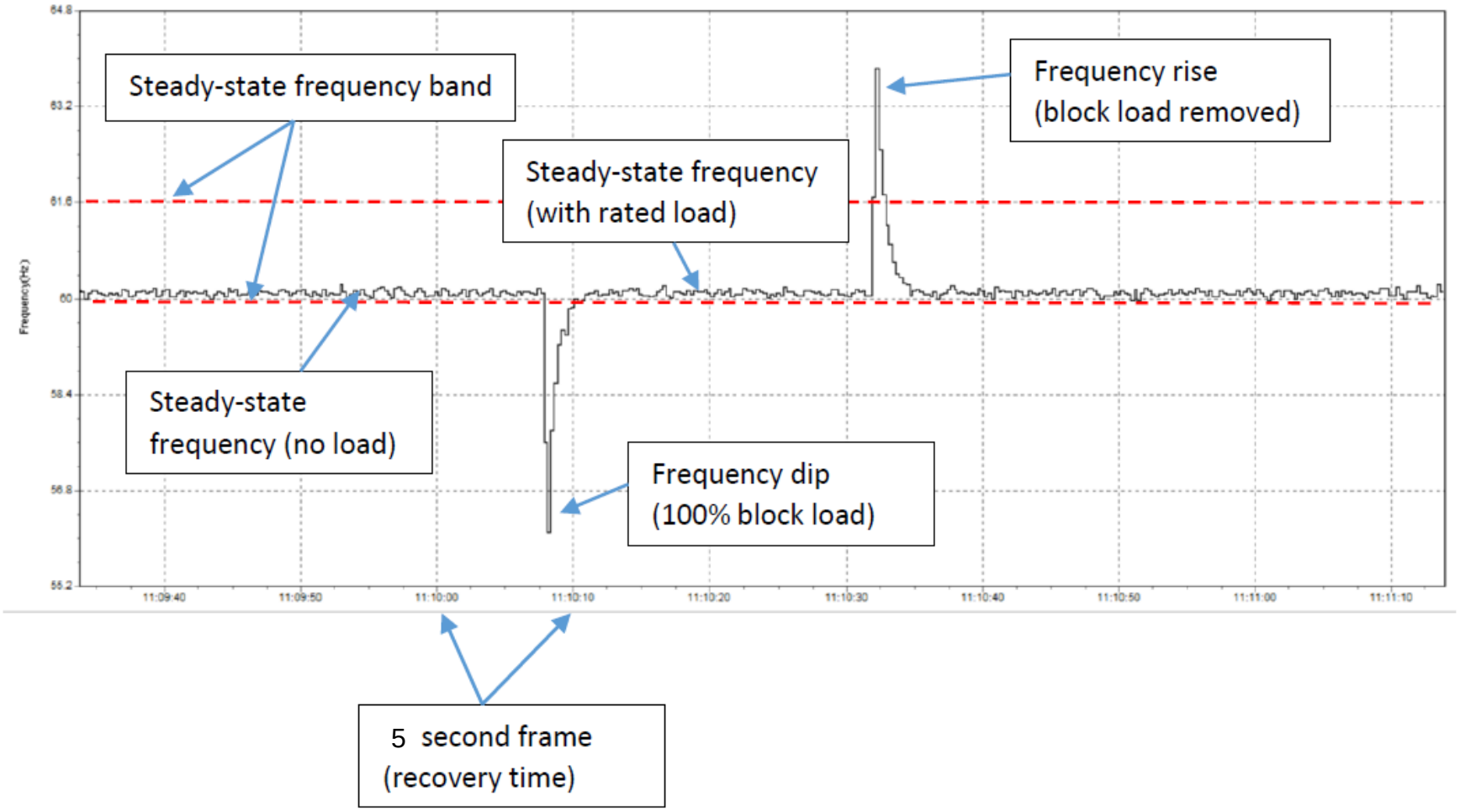
Class	Description
Class G1	- This applies to generating set applications where the connected loads are such that only basic parameters of voltage and frequency need to be specified. (e.g. general-purpose applications, lighting and other simple electrical loads).
Class G2	- This applies to generating set applications where its voltage characteristics are very similar to those for the commercial public utility electrical power system with which it operates. When load changes occur, there may be temporary but acceptable deviations of voltage and frequency. (e.g. Lighting systems, pumps, fans and hoists).
Class G3	- This applies to applications where the connected equipment makes severe demands on the stability and level of the frequency, voltage and waveform characteristics of the electrical power supplied by the generating set. (e.g. Telecommunications and thyristor-controlled loads. It should be remembered that both rectifier and thyristor-controlled loads may need special consideration with respect to their effect on generator set voltage waveform.)
Class G4	- This applies to applications where the demands made on the stability and level of the frequency, voltage and waveform characteristics of the electrical power supplied by the generating set are exceptionally severe. (e.g. Data processing equipment or computer system)

Transient Characteristics

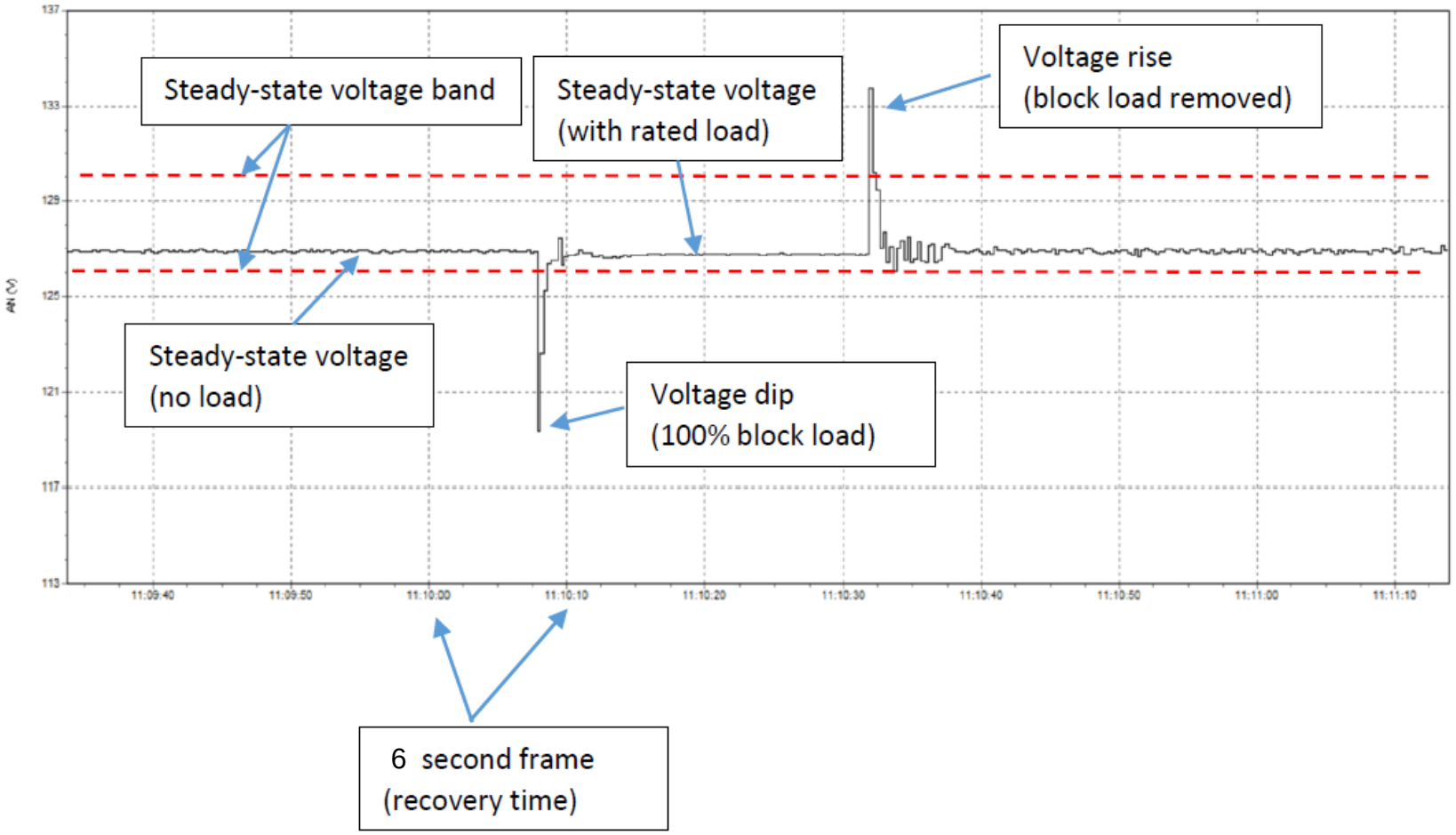


Typical transient characteristics when applying or removing loads

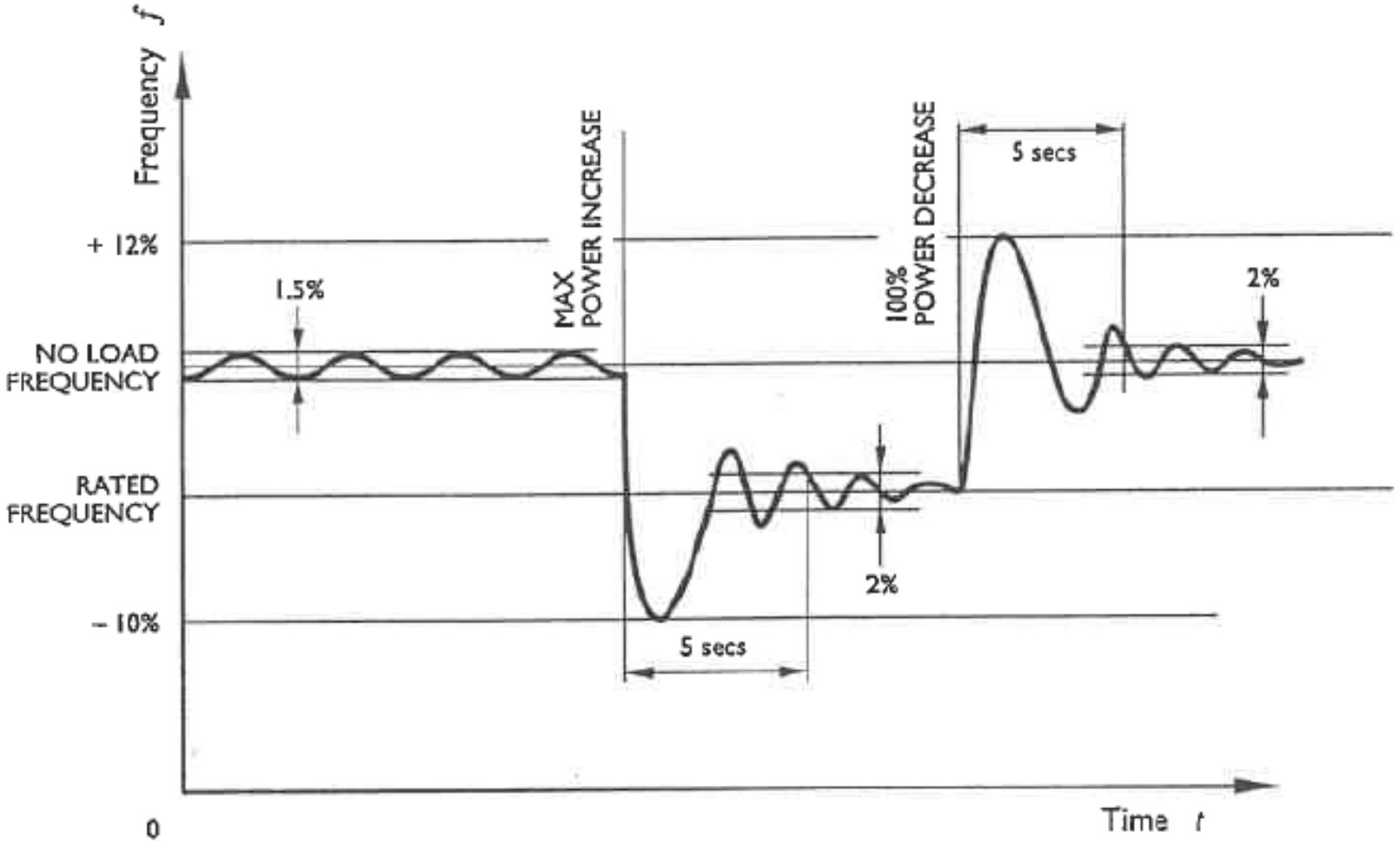
Transient frequency response



Transient voltage response

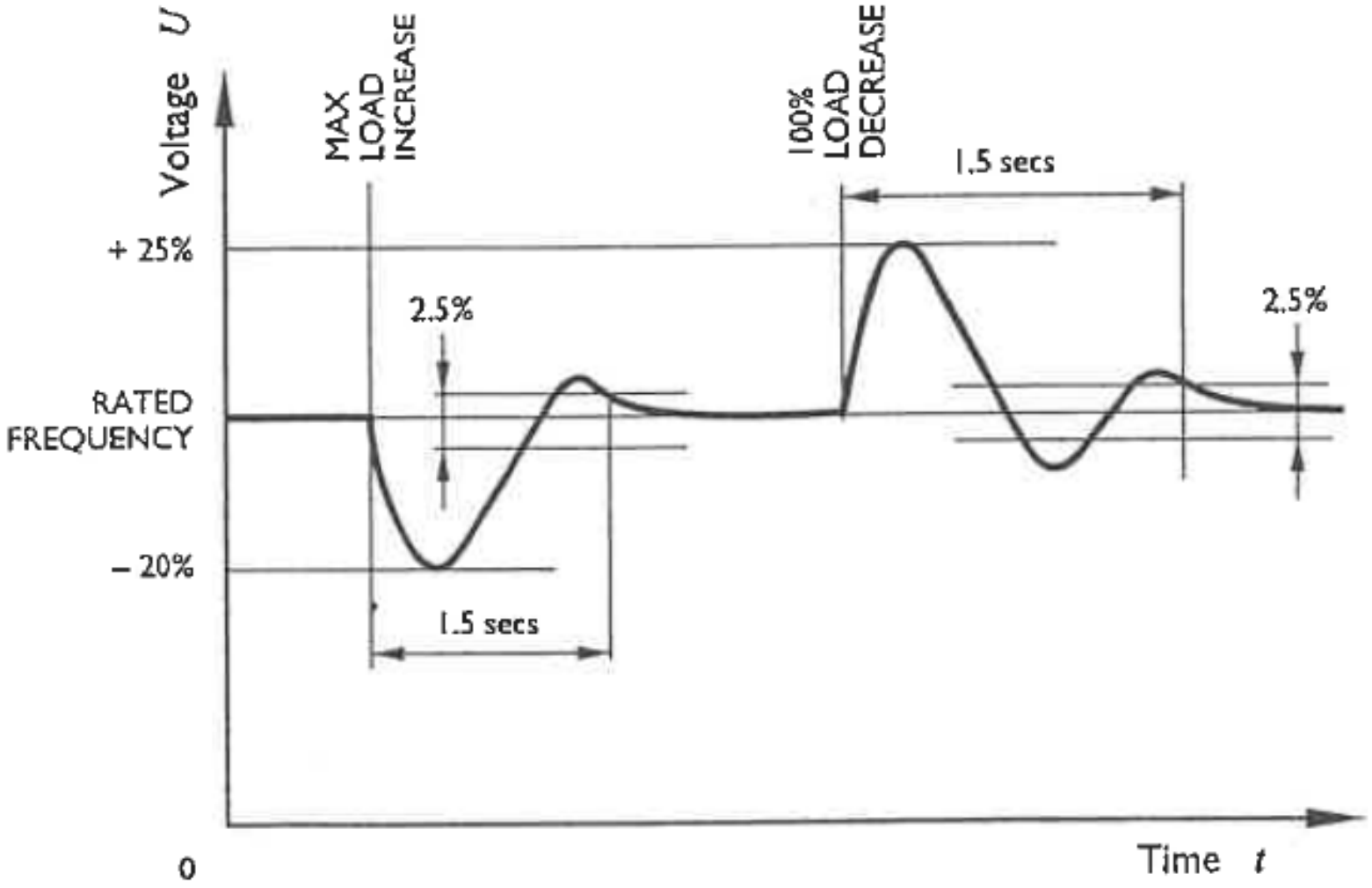


Operating Limit of Performance Class G2 (ISO 8528-5)



Transient Frequency Response

Operating Limit of Performance Class G2 (ISO 8528-5)



Transient Voltage Response

ISO 8528-5: Table 4 – Performance Class Operating Limit Values

Performance Class	G1	G2	G3	G4
Voltage:				
Steady-state voltage deviation	± 5%	± 2.5%	± 1.00%	AMC
Transient Voltage deviation (Max. voltage dip – max. load increase)	≤ - 25%	≤ - 20%	≤ - 15%	AMC
Transient Voltage deviation (Max. voltage rise – 100%. load decrease)	≤ + 35%	≤ + 25%	≤ + 20%	AMC
Voltage recovery time	≤ 10%	≤ 6%	≤ 4%	AMC

Performance Class Operating Limit Values (Voltage)

NOTE : AMC = Agreement between Manufacturer and Customer

ISO 8528-5: Table 4 – Performance Class Operating Limit Values

Performance Class	G1	G2	G3	G4
Frequency:				
Steady-state frequency band	≤ 2.5%	≤ 1.5%	≤ 0.5%	AMC
Transient frequency deviation (Max. frequency dip – max. load increase)	≤ - 15%	≤ - 10%	≤ - 7%	AMC
Transient frequency deviation (Max. frequency rise – 100%. load decrease)	≤ + 18%	≤ + 12%	≤ + 10%	AMC
Frequency recovery time	≤ 10%	≤ 5%	≤ 3%	AMC

Performance Class Operating Limit Values (Frequency)

NOTE : AMC = Agreement between Manufacturer and Customer

ISO 8528-5: Table 4 – Performance Class Operating Limit Values (Overall)

#	Parameter		Symbol	Unit	Operating limit values – Performance Class				Notes
					G1	G2	G3	G4	
1	Frequency droop	Isochronous	δf_{st}	%	0	0	0	AMC	(1)
		Droop mode			(≤ - 8)	(≤ - 5)	(≤ - 3)	AMC	
2	Steady-state frequency band		β_f	%	≤ ± 2.5	≤ ± 1.5	≤ ± 0.5	AMC	
3	Related range of downward frequency setting		$\delta_{fs,do}$	%	> 2.5			AMC	(1)
					(> 10.5)	(> 7.5)	(> 5.5)	AMC	
4	Related range of upward freq. setting		$\delta_{fs,up}$	%	> + 2.5			AMC	
5	Rate of change of frequency setting		v_f	%/s	0.2 to 1			AMC	
6	Transient frequency difference from initial frequency	100% load decrease	δf_d	%	≤ + 18	≤ + 12	≤ + 10	AMC	
		BMEP load increase			≤ - 15	≤ - 10	≤ - 7	AMC	(1)
					(≤ - 23)	(≤ - 15)	(≤ - 10)	AMC	
7	Transient frequency deviation from rated frequency	100% load decrease	δf_{dyn}	%	≤ + 18	≤ + 12	≤ + 10	AMC	
		BMEP load increase			≤ - 15	≤ - 10	≤ - 7	AMC	
					≤ - 25	≤ - 20	≤ - 15	AMC	(2)
8	Frequency recovery time		$t_{f,in}$	s	≤ + 10	≤ + 5	≤ + 3	AMC	
			$t_{f,de}$					AMC	
9	Related frequency recovery band		α_f	%	3.5	2	2	AMC	
10	Steady-state voltage deviation		δU_{st}	%	≤ ± 5	≤ ± 2.5	≤ ± 1	AMC	
					≤ ± 10	≤ ± 10	≤ ± 1	AMC	(3)
11	Voltage unbalance		$\delta U_{2,0}$	%	1	1	1	1	
					0.5	0.5	0.5	0.5	(4)
12	Related range of voltage setting		δU_s	%	≤ ± 5	≤ ± 5	≤ ± 5	AMC	
13	Rate of change of voltage setting		v_U	%/s	0.2 to 1			AMC	
14	Transient voltage deviation	100% load decrease	δU_{dyn}	%	≤ + 35	≤ + 25	≤ + 20	AMC	
		BMEP load increase			≤ - 25	≤ - 20	≤ - 15	AMC	
15	Voltage recovery time		$t_{U,in}$	s	≤ + 10	≤ + 6	≤ + 4	AMC	
			$t_{U,de}$	s	≤ + 10	≤ + 6	≤ + 4	AMC	
16	Voltage modulation		$\hat{U}_{mod,s}$	%	AMC	0.3	0.3	AMC	
17	Active power sharing	between 80% and 100% of the nominal rating	ΔP	%	–	≤ + 5	≤ + 5	AMC	
		between 20% and 80% of the nominal rating			–	≤ + 10	≤ + 10	AMC	
18	Reactive power sharing	between 20% and 100% of the nominal rating	ΔQ	%	–	≤ + 10	≤ + 10	AMC	

Rating Plate for Generator Set

The rating plate shall indicate the following;

- ✓ Manufacturer name or Brand name
- ✓ Serial number
- ✓ Model number
- ✓ Year of manufacturer
- ✓ Rated Power (kW & kVA) with one of the prefixes (COP, PRP, LTP or ESP)
- ✓ Performance class
- ✓ Rated power factor
- ✓ Rated frequency (Hz)
- ✓ Rated Voltage (V)
- ✓ Rated Current (A)
- ✓ Mass (kg)
- ✓ Ambient temperature (°C)
- ✓ Altitude (m)

General set

Manufacturer			—
Serial No.			—
Year of manufacture			—
Rated power	[ ] [ ]		kW
Rated power factor			—
Maximum site altitude of installation			m
Maximum ambient temperature			°C
Rated frequency			Hz
Rated voltage			V
Rated current			A
Mass			kg
Performance class			—

ISO 8528-5

Rating Plate for Engine

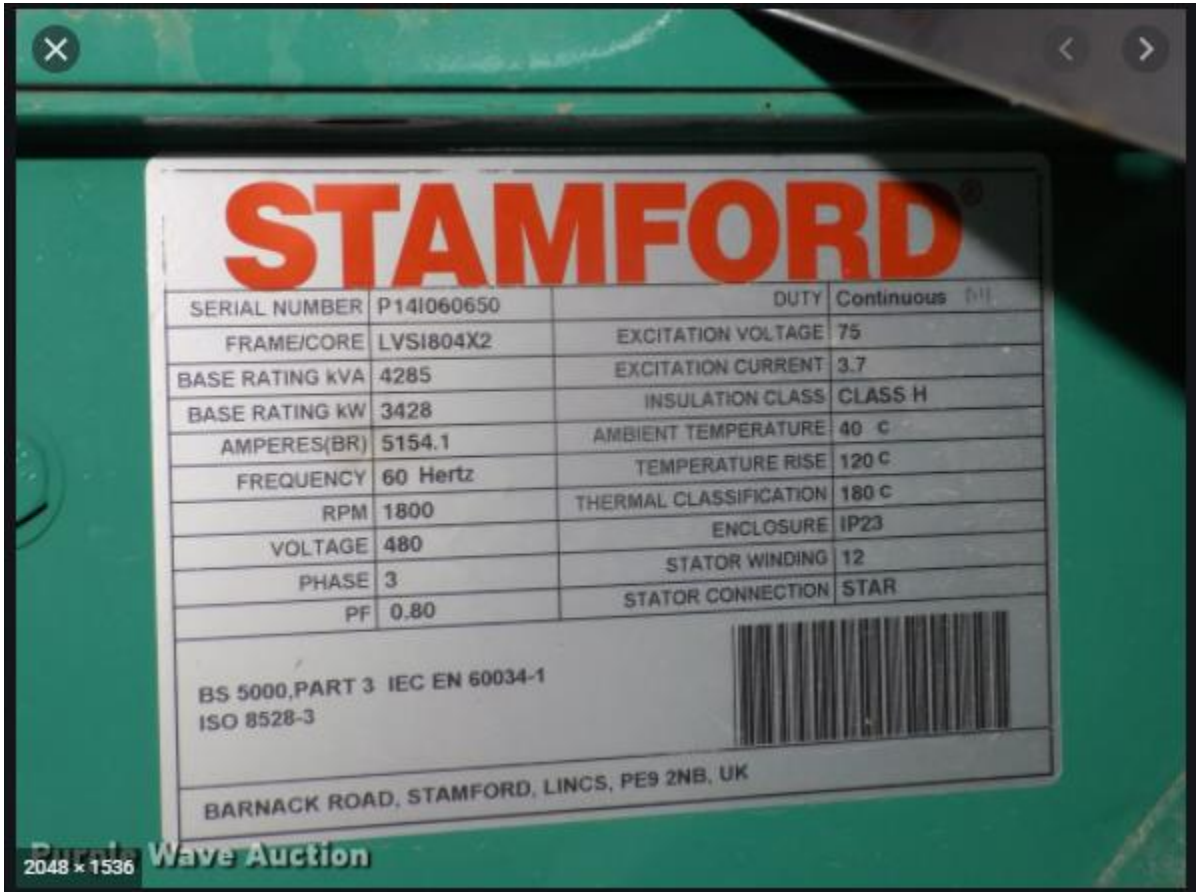
The rating plate shall indicate the following;

- ✓ Manufacturer name or brand name
- ✓ Model number
- ✓ Serial number
- ✓ Rated Power (kW)
- ✓ Rated speed (rpm)

Rating Plate for Alternator

The rating plate shall indicate the following;

- ✓ Manufacturer name or Brand name
- ✓ Serial number
- ✓ Rated Power (kW/ kVA)
- ✓ Insulation class
- ✓ Temperature rise
- ✓ Rated power factor
- ✓ Rated frequency (Hz)
- ✓ Rated Voltage (V)
- ✓ Rated Current (A)
- ✓ Rated speed (rpm)
- ✓ Duty class
- ✓ Frame size



Factory Acceptance Test (FAT)

Requirements

i. FAT shall be made at the manufacturer/supplier factory (as per EMAL registration)
ii. Approved shop drawing
iii. Calibration cert. for equipment
iv. Country of Origin Cert. *(shipping document for imported product)*
v. Custom cert. *(imported product)*
vi. Existing test result from manufacturer *(engine and alternator)*
vii. Visual inspection
- Name plate *(generator set, engine and alternator)*
- dimension
- All parameter according to L-S5
- etc.

iv. Test according to Appendix B (L-S5)

Before commencement of any tests stated hereinafter, due advance notice not less than fourteen (14) days providing details of dates, times, location/place, types of tests, test methods/procedures and test records/formats and details of competent persons responsible for the tests shall be given to and agreed by S.O.'s Representative. All test methods/procedures and test records/formats other than those specified in this specification shall be approved by the S.O.'s Representative before tests being carried out.

Factory Acceptance Test (FAT)

Appendix B (L-S5) : Generator Set Test Results

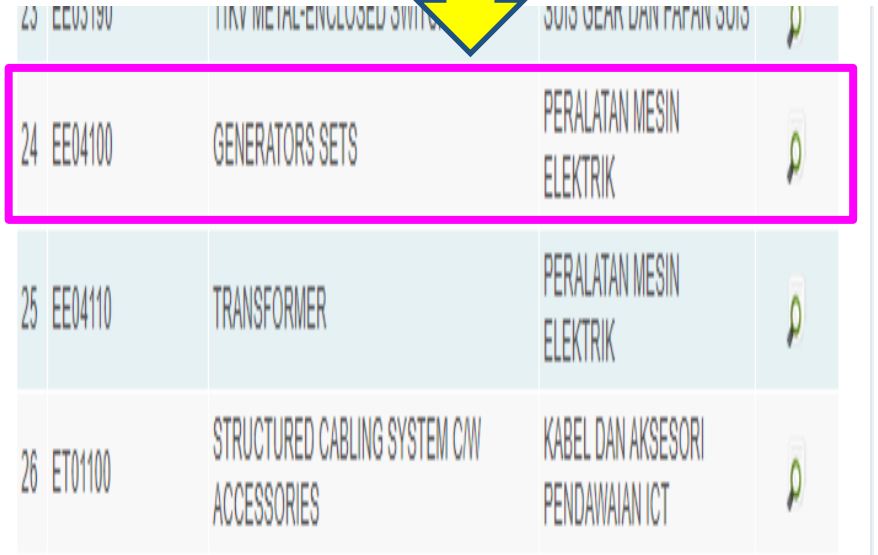
No	Test Item	Acceptance Criteria
Routine Test		
1	Test Site Condition	Barometric pressure : 750 mmHg. Temperature : 40 °C Relative humidity : 95%
2	Insulation Resistance Test (500 V, MΩ)	**Alternator** Armature Insulation > 20MΩ Field Insulation > 20MΩ **Exciter** Armature Insulation > 20MΩ Field Insulation > 20MΩ (e.g : Leroy Somer)
3	No load Voltage Range Test	Based on AVR maximum and minimum Set

Routine Test

No	Test Item	Acceptance Criteria
Routine Test		
4	Protective Device Test	Values for warning and shut down based on manufacturer recommendations
5	Sudden Load Increase / Decrease Test	As per Table 4 ISO 8528-5
6	Alternator Performance Test	- Technical specification data for alternator - JKR specification (L-S5)
7	Engine Performance Test	- Technical specification data for engine - JKR specification (L-S5)

JKR ELECTRICAL MATERIAL APPROVED LIST (EMAL)

https://jmal.jkr.gov.my/emalv3



Electrical Material Approved List (EMAL)

https://jmal.jkr.gov.my/

Electrical Material Approved List (EMAL)

Pengumuman

Kepada semua pengguna EMAL; Tuan/puan disarankan untuk mendapat PERAKUAN BERTULIS daripada pembekal berdaftar bahawa bahan/barangan yang dibekalkan adalah TULEN dan MENEPATI kualiti seperti pendaftaran dengan CKE, JKR . Sekian, Harap maklum.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21

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- Bahan/Barangan Di Gantung Kelulusan
- Bahan/Barangan Di Tarik Balik Kelulusan

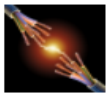
Admin

- LOGIN

Pertanyaan

- Borang Pertanyaan

Pengenalan



EMAL adalah laman web yang memaparkan senarai bahan/barangan elektrik yang diluluskan oleh Jawatankuasa Kelulusan Bahan, Cawangan Kejuruteraan Elektrik JKR Malaysia. Senarai bahan/barangan elektrik tersebut adalah digunakan oleh Cawangan Kejuruteraan Elektrik JKR sahaja dan **tidak boleh digunakan untuk apa jua pengiklanan atau apa jua tujuan lain.**

SENARAI KATEGORI

Displaying 1-26 of 26 results.

No	Kumpulan	Nama Kategori	Nama Sub kumpulan	
1	EE01100	CABLES	KABEL DAN AKSESORI PENDAWAIAN	
2	EE01110	G.S CONDUITS & HIGH IMPACT PVC CONDUITS	KABEL DAN AKSESORI PENDAWAIAN	
3	EE01120	BUSDUCT TRUNKING SYSTEM / CABLE MANAGEMENT SYSTEM	KABEL DAN AKSESORI PENDAWAIAN	
4	EE01130	SWITCHES	KABEL DAN AKSESORI PENDAWAIAN	
5	EE01160	EARTHING SYSTEM & ACCESSORIES	KABEL DAN AKSESORI PENDAWAIAN	
6	EE01170	LIGHTNING PROTECTION SYSTEM	KABEL DAN AKSESORI PENDAWAIAN	
7	EE01171	SOCKET OUTLETS	KABEL DAN AKSESORI PENDAWAIAN	
8	EE02160	FLUORESCENT LUMINAIRES	KELENGKAPAN ELEKTRIK	
9	EE02170	EMERGENCY LIGHT & LUMINOUS SIGN	KELENGKAPAN ELEKTRIK	
10	EE02180	FANS	KELENGKAPAN ELEKTRIK	
11	EE02200	OUTDOOR LUMINAIRES	KELENGKAPAN ELEKTRIK	
12	EE02210	INDOOR LUMINAIRES (LED)	KELENGKAPAN ELEKTRIK	
13	EE02212	TRAFFIC LIGHT SYSTEM	KELENGKAPAN ELEKTRIK	
14	EE03100	L.V. SWITCHBOARD/CONSUMER UNIT	SUIS GEAR DAN PAPAN SUIS	
15	EE03110	SURGE PROTECTIVE DEVICE (SPD)	SUIS GEAR DAN PAPAN SUIS	
16	EE03120	PROTECTION RELAYS	SUIS GEAR DAN PAPAN SUIS	
17	EE03130	POWER FACTOR CORRECTION	SUIS GEAR DAN PAPAN SUIS	
18	EE03140	CIRCUIT BREAKER (ACB, MCCB & MCB)	SUIS GEAR DAN PAPAN SUIS	
19	EE03150	RESIDUAL CURRENT DEVICE (RCD)	SUIS GEAR DAN PAPAN SUIS	
20	EE03160	FUSE SWITCHGEARS	SUIS GEAR DAN PAPAN SUIS	
21	EE03170	ISOLATORS	SUIS GEAR DAN PAPAN SUIS	
22	EE03180	CONTACTORS	SUIS GEAR DAN PAPAN SUIS	
23	EE03190	11KV METAL-ENCLOSED SWITCHGEAR	SUIS GEAR DAN PAPAN SUIS	
24	EE04100	GENERATORS SETS	PERALATAN MESIN ELEKTRIK	
25	EE04110	TRANSFORMER	PERALATAN MESIN ELEKTRIK	
26	ET01100	STRUCTURED CABLING SYSTEM C/W ACCESSORIES	KABEL DAN AKSESORI PENDAWAIAN ICT	

Electrical Material Approved List (EMAL)

Pengumuman

Adalah dimaklumkan bahawa Cawangan Kejuruteraan Elektrik telah membuat ketetapan bagi pendaftaran bahan/barangan Structure Cabling System C/W Accessories bagi komponen Horizontal Cabling hendaklah merangkumi perkakasan hujung ke hujung (end-to-end solution) untuk setiap jenis/kategori kabel dan

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- Bahan/Barangan Di Gantung Kelulusan
- Bahan/Barangan Di Tarik Balik

DETAIL BAHAN/BARANGAN YANG DILULUSKAN

Displaying 1-25 of 25 results.

No	Kod Barang	Nama Barang	Nama Pengeluar	Jenama	Negara Pengeluar	
1	EE041001.ME1.A1	GENERATOR SET	VPM POWER SDN BHD	VOLVO PENTA (ENGINE),MARELLI (ALTERNATOR)	SWEDEN JERMAN MALAYSIA MALAYSIA	
2	EE041001.ME44.A491	GENERATOR SET	HATAN ENGINEERING SDN.BHD	LISTER PETTER (ENGINE) & MARELLI (ALTERNATOR)	UNITED KINGDOM ITALI	
3	EE041001.ME44.A167	GENERATOR SET	HATAN ENGINEERING SDN.BHD	LISTER PETTER (ENGINE), MECC ALTE SPA (ALTERNATOR)	UNITED KINGDOM ITALI	
4	EE041001.ME154.A162	GENERATOR SET	SIME DARBY INDUSTRIAL POWER SDN BHD	PERKINS(ENGINE), MARELLI(ALTERNATOR)	UNITED KINGDOM INDIA ITALI	
5	EE041001.ME1.A379	GENERATOR SET	VPM POWER SDN BHD	VOLVO PENTA (ENGINE), MECCALTE (ALTERNATOR)	SWEDEN JERMAN CHINA INDIA ITALI MALAYSIA	
6	EE041001.ME456.A395	GENERATOR SET	BNC POWER (M) SDN BHD	GREAVES	INDIA UNITED KINGDOM	
7	EE041001.ME464.A402	GENERATOR SET	FG GENERATOR SDN BHD	FG WILSON	UNITED KINGDOM PERANCIS	
8	EE041001.ME499.A445	GENERATOR SET	UMW INDUSTRIAL POWER SERVICES SDN. BHD	SDEC (GENERATOR SET), SDEC(ENGINE) , KAIJIELI (ALTERNATOR)	CHINA	

Electrical Material Approved List (EMAL)

Pengumuman

Mesyuarat Jawatankuasa Kelulusan Bahan Bil 5/2020 telah menetapkan nilai efficacy minimum bagi Road Lighting Luminaires (LED) dan Amenities Lighting Luminaires (LED) adalah 100 lm/W. Ketetapan ini mula berkuatkuasa pada 15 Ogos 2021 atau tamat tempoh kelulusan sedia ada (yang mana terdahulu). Tuan/puan selaku pengilang/pembekal berdaftar hendaklah memastikan bahawa bahan/barangan yang didaftarkan mematuhi perkara ini.

Adalah dimaklumkan bahawa Cawangan Kejuruteraan Elektrik telah membuat ketetapan bagi pendaftaran bahan/barangan Structure Cabling System C/W Accessories bagi komponen Horizontal Cabling hendaklah merangkumi perkakasan hujung ke hujung (end-to-end solution) untuk setiap jenis/kategori kabel dan disertakan sampel bahan/barangan yang berkenaan. Laporan pengujian makmal (Channel Testing) perlu menyatakan bahan kabel, patch cord, modular jack dan patch panel dalam satu laporan.

Adalah dimaklumkan bahawa Cawangan Kejuruteraan Elektrik akan mendaftarkan bahan/barangan T8 Luminaires (LED) di bawah kategori Indoor Luminaires (LED). Sehubungan dengan itu, tuan/puan adalah dijemput untuk mengemukakan permohonan pendaftaran bahan/barangan tersebut dengan pejabat ini berdasarkan keperluan di Lampiran A surat kami bil (41) dlm. PKR(L) 6/2/27 di Bahagian Rujukan *

MAKLUMAT BAHAN/BARANGAN YANG DILULUSKAN

Keterangan Barangan	GENERATOR SET
Kod Barangan	EE041001.ME1.A1
Nama Syarikat	VPM POWER SDN BHD
Status Syarikat	PENGILANG
Alamat	NO. 13, JALAN ANGGERIK MOKARA 31/62, KOTA KEMUNING 40460 SHAH ALAM SELANGOR
No Telefon	03-51211443
No Fax	03-51211442
Email	razaki@vpmpower.com
Website	www.vpmpower.com
Jenama	VOLVO PENTA (ENGINE),MARELLI (ALTERNATOR)
No Laporan	-
Tarikh Tamat	15-10-2023
Rujukan	ISO 3046 & ISO 8528-2 (ENGINE), IEC 60034 (ALTERNATOR) & ISO 8528 (GENERATOR SET)
Catatan	I) SPEED: 1500 rpm; INSULATION CLASS: H II) OEM: 1. HATAN ENGINEERING SD. BHD. 2. WCM POWER SDN. BHD. 3. G - POWER GENERATION SDN. BHD. 4. POWERTRADE ENERGY SDN. BHD. 5. ANJUR EKAR SD. BHD. 6. SAFESIDE POWER SDN. BHD. 7. DYNAMIC POWER SOLUTIONS SDN. BHD. 8. EL POWER TECHNOLOGIES SDN. BHD.
Negara	SWEDEN ENGINE JERMAN ENGINE MALAYSIA ALTENATOR MALAYSIA GENERATOR SETS

Bil	GENSET MODEL	GENSET RATED POWER (kW)	GENSET RATED POWER (kVA)	ASPIRATION	ENGINE MODEL	COUNTRY OF ORIGIN	ALTENATOR MODEL	RATING AT TEMP. RISE CLASS F (kVA)	RATED OUTPUT (kw)
1	TAD530GE X MXB-E 225SB4	64.0	80	Turbocharged Aftercooled	TAD530GE	JERMAN	MXB-E 225SB4	91.0	75.0
2	TAD531GE X MXB-E 225MA4	80.0	100	Turbocharged Aftercooled	TAD531GE	JERMAN	MXB-E 225MA4	110.0	88.0
3	TAD532GE x MXB-E 225LA4	104.0	130.0	Turbocharged Aftercooled	TAD532GE	JERMAN	MXB-E 225LA4	137.0	113.0

Boleh melakukan FAT di salah satu syarikat yang terdapat di dalam pendaftaran ini

Thank You !

mzamrir@jkr.gov.my