

## GUIDE TO GRADE SELECTION

Type of electrical machines	Recommended grade
<b>D.C. stationary machines</b>	
Flush mica	
industrial sizes	E30, E21
fractional hp	E30, E21
Recessed mica	
without interpoles	E21, E30, E33
with interpoles	
small--up to 10kw	E21, E17
medium--less than 500kw	
speed less than 18m/s	E17, E21
speed greater than 18m/s	E17
large--greater than 500kw	
speed less than 18m/s	E17, E33
speed greater than 18m/s	E33, E36N
Special working conditions	
long periods of light load runing	E17, E21
heaby fluctuation loads	E33, E36N
steel mill motors	E33, E21
mill generators	E33N, E36N
electrochemical processes	E30, E21
high speed exciters	E33, E33N, E36N
marine conditions	E33N, E21, E17, E36N
rotating amplifiers and cross-field machines	E30, E25
rotating and motor convertors	E21, E33F
with interopoles-supply voltage less than 100V	
classified by voltage	
6V	CG82
12V	CG82
30V	CG72
50V	CG50, CG72
75V	CG50, CG25
>75V	E21
plating generators	E21, CG50
welding generators	E21, CG72
exciters	CG72, CG50, E17

Type of electrical machines	Recommended grade
<b>Mobile machines</b>	
Automobile	
startor motors	
6~12V	CG72,
24V	CG50
alternators	CG50
generators	E25
accessory motors	CG72,CG50
Battery vehicles	
up to 40V	CG72,CG50
over 40V	CG50,E17,E21
Traction	
D.C. Traction motors---Collected supply	
medium speed duty	E33,E33N,E36N,E33F
high speed duty	E33,E33N,E36N,E33F
trolley buses and trams	E21,E30,E33
D.C.Traction motors--Diesel electric	
low/medium speed duty	E33,E21,E25
high speed duty	E33,E36N,E33F
D.C.Generators--Diesel electric	
low/medium speed locomotives	E21,E25,E33
high speed locomotives	E33,E36N,E21
A.C. Traction motors(a.c.commutator motors)	E21,E33,E33F
Traction auxiliaries	
auxiliary generators/excitors	E21,E33
compressor motors	E21,E17,E25
tration motor blower motors	E33,E33N,E21
ventilating fan motors	E21,E25,E33
oil/water pump motors	E21,E25
lighting generators	E21,E33
motor-generator sets	
motor	E21,E33
generator	E21,E33N
Mobile cranes	
110~200V.d.c.	E17,E21,CG50
Domestic application and portable tools	
flush mica	E30
recessed mica	E30,E21

Type of electrical machines	Recommended grade
<b>A.C. stationary machines</b>	
Slip ring--Synchronous	
D.C.excitation rings-alternators and synchronous motors	
3000 rpm high speed steel rings	E17
1500 rpm medium speed bronze rings	E17,CG50
500 rpm low speed steel and cast-iron rings	E17,E21
Carrying a.c.-rotary convertors and rotating armature alternators	CG72,E17
Slip ring--Asynchronous--induction motors	
slip ring short circuiting gear	
brushes lifted	CG82
brushes not lifted	CG72,CG50
rings shorted at controller	
bronze rings	CG82,CG72,E17
cast-iron rings	E17,CG72,CG50
steel-rings	CG72
cupro-nickel rings	E17
Slip ring-polyphase commutator motors	
bronze rings	CG82
Commutator-Single phase	
fractional hp motors	
flush insulation	
Over 12000rpm mica	E30,E21,
Over 12000rpm paper	E21,E30,E25
up to 12000 rpm	NG634,E30
recessed insulation	
over 12000rpm	E21 ,E30
up to 12000 rpm	E21,E30,NG634
thyristor feed	E21,E33
compensated series motors	E21,E30,NG634,
Commutator--Polyphase	
starter fed motors	E36N,E21
rotor fed motors	E36N,E21
frequency changers	E21,E25