

# **General Technical Particulars**

	Units	
Type of Cell		10TBS1325
Nominal Voltage per cell	Volts	2
Manufacturer's Name		Exide Industries Ltd.
Standards to which battery is manufactured		IS 1651
IS Nomenclature		
Number of cells in the battery bank		n
Nominal Voltage of Battery	Volts	2 X n
Declared Capacity at 27 degree C upto 1.80 ecv Initial	АН	1325
Rated	AH	1325
End of Life	АН	1060
Rated Capacity at mimimum ambient temperature	Ah	As per formula: Ct=C27{1+0.0043(t-27)}
Rated Capacity at maximum ambient temperature	Ah	As per formula: Ct=C27{1+0.0043(t-27)}
Capacity in AH at various end cell voltages and duration of discharge	า	
	E.C.V.	Ah output
1 hour	1.67	675.75
2 hour	1.70	850.65
3 hour	1.75	989.78
4 hour	1.76	1049.40
5 hour 6 hour	1.77 1.77	1136.85 1187.20
7 hour	1.78	1228.28
8 hour	1.78	1258.75
9 hour	1.80	1297.18
10 Hour	1.80	1325.00
Maximum momentary current for 1 min till 1.60 e.c.v		2385
Maximum momentary current for 1 min till 1.60 e.c.v  Expected life of battery under normal operation & maintainence conditions	Years	2385 15 years in stand-by float application
Expected life of battery under normal operation &	Years milli ohms	
Expected life of battery under normal operation & maintainence conditions	_	15 years in stand-by float application
Expected life of battery under normal operation & maintainence conditions  Internal Resistance of cell (IR)  Loss in capacity in 28 days due to self discharge  Recommended Charging rate for	milli ohms	15 years in stand-by float application 0.512
Expected life of battery under normal operation & maintainence conditions  Internal Resistance of cell (IR)  Loss in capacity in 28 days due to self discharge  Recommended Charging rate for a) Float Charging	milli ohms // %	15 years in stand-by float application  0.512  <8%
Expected life of battery under normal operation & maintainence conditions  Internal Resistance of cell (IR)  Loss in capacity in 28 days due to self discharge  Recommended Charging rate for a) Float Charging i) Limit current	milli ohms	15 years in stand-by float application  0.512  <8%  198.75
Expected life of battery under normal operation & maintainence conditions  Internal Resistance of cell (IR)  Loss in capacity in 28 days due to self discharge  Recommended Charging rate for a) Float Charging	milli ohms %	15 years in stand-by float application  0.512  <8%
Expected life of battery under normal operation & maintainence conditions  Internal Resistance of cell (IR)  Loss in capacity in 28 days due to self discharge  Recommended Charging rate for a) Float Charging i) Limit current ii) Voltage	milli ohms %	15 years in stand-by float application  0.512  <8%  198.75
Expected life of battery under normal operation & maintainence conditions  Internal Resistance of cell (IR)  Loss in capacity in 28 days due to self discharge  Recommended Charging rate for a) Float Charging i) Limit current ii) Voltage b) Boost charging i) Starting Current ii) Finishing current	milli ohms %  A V A A	15 years in stand-by float application  0.512  <8%  198.75 2.23 vpc  159 79.5
Expected life of battery under normal operation & maintainence conditions  Internal Resistance of cell (IR)  Loss in capacity in 28 days due to self discharge  Recommended Charging rate for a) Float Charging i) Limit current ii) Voltage b) Boost charging i) Starting Current	milli ohms %  A V A	15 years in stand-by float application  0.512  <8%  198.75 2.23 vpc  159
Expected life of battery under normal operation & maintainence conditions  Internal Resistance of cell (IR)  Loss in capacity in 28 days due to self discharge  Recommended Charging rate for a) Float Charging i) Limit current ii) Voltage b) Boost charging i) Starting Current ii) Finishing current iii) Voltage  Trickle Charging Rate	milli ohms %  A V A A V	15 years in stand-by float application  0.512  <8%  198.75 2.23 vpc  159 79.5 2.75
Expected life of battery under normal operation & maintainence conditions  Internal Resistance of cell (IR)  Loss in capacity in 28 days due to self discharge  Recommended Charging rate for a) Float Charging i) Limit current ii) Voltage b) Boost charging i) Starting Current ii) Finishing current iii) Finishing current iii) Voltage  Trickle Charging Rate i) Minimum	milli ohms %  A V A A V	15 years in stand-by float application  0.512  <8%  198.75 2.23 vpc  159 79.5 2.75
Expected life of battery under normal operation & maintainence conditions  Internal Resistance of cell (IR)  Loss in capacity in 28 days due to self discharge  Recommended Charging rate for a) Float Charging i) Limit current ii) Voltage b) Boost charging i) Starting Current ii) Finishing current iii) Voltage  Trickle Charging Rate	milli ohms %  A V A A V	15 years in stand-by float application  0.512  <8%  198.75 2.23 vpc  159 79.5 2.75
Expected life of battery under normal operation & maintainence conditions  Internal Resistance of cell (IR)  Loss in capacity in 28 days due to self discharge  Recommended Charging rate for a) Float Charging i) Limit current ii) Voltage b) Boost charging i) Starting Current ii) Finishing current iii) Voltage  Trickle Charging Rate i) Minimum ii) Maximum  Equalising charge	milli ohms %  A V A A V  MA MA MA	15 years in stand-by float application  0.512  <8%  198.75 2.23 vpc  159 79.5 2.75  1325 5300
Expected life of battery under normal operation & maintainence conditions  Internal Resistance of cell (IR)  Loss in capacity in 28 days due to self discharge  Recommended Charging rate for a) Float Charging i) Limit current ii) Voltage b) Boost charging i) Starting Current ii) Finishing current iii) Voltage  Trickle Charging Rate i) Minimum ii) Maximum  Equalising charge a) Voltage	milli ohms %  A V A A V  MA V  MA V	15 years in stand-by float application  0.512  <8%  198.75 2.23 vpc  159 79.5 2.75  1325 5300  2.3
Expected life of battery under normal operation & maintainence conditions  Internal Resistance of cell (IR)  Loss in capacity in 28 days due to self discharge  Recommended Charging rate for a) Float Charging i) Limit current ii) Voltage b) Boost charging i) Starting Current ii) Finishing current iii) Voltage  Trickle Charging Rate i) Minimum ii) Maximum  Equalising charge a) Voltage b) Current	milli ohms %  A V A A V  MA V  MA V  A A A A A A A A	15 years in stand-by float application  0.512  <8%  198.75 2.23 vpc  159 79.5 2.75  1325 5300  2.3 66.25
Expected life of battery under normal operation & maintainence conditions  Internal Resistance of cell (IR)  Loss in capacity in 28 days due to self discharge  Recommended Charging rate for a) Float Charging i) Limit current ii) Voltage b) Boost charging i) Starting Current ii) Finishing current iii) Voltage  Trickle Charging Rate i) Minimum ii) Maximum  Equalising charge a) Voltage	milli ohms %  A V A A V  MA V  MA V	15 years in stand-by float application  0.512  <8%  198.75 2.23 vpc  159 79.5 2.75  1325 5300  2.3
Expected life of battery under normal operation & maintainence conditions  Internal Resistance of cell (IR)  Loss in capacity in 28 days due to self discharge  Recommended Charging rate for a) Float Charging i) Limit current ii) Voltage b) Boost charging i) Starting Current ii) Finishing current iii) Voltage  Trickle Charging Rate i) Minimum ii) Maximum  Equalising charge a) Voltage b) Current c) Duration d) Interval between succesive equalising charge	milli ohms %  A V A A V  MA W  T A Hrs.	15 years in stand-by float application  0.512  <8%  198.75 2.23 vpc  159 79.5 2.75  1325 5300  2.3 66.25 6
Expected life of battery under normal operation & maintainence conditions  Internal Resistance of cell (IR)  Loss in capacity in 28 days due to self discharge  Recommended Charging rate for a) Float Charging i) Limit current ii) Voltage b) Boost charging i) Starting Current ii) Finishing current iii) Voltage  Trickle Charging Rate i) Minimum ii) Maximum  Equalising charge a) Voltage b) Current c) Duration d) Interval between succesive equalising charge  Recommended Specific gravity at 27 deg C	milli ohms %  A V A A V  MA W  T A Hrs.	15 years in stand-by float application  0.512  <8%  198.75 2.23 vpc  159 79.5 2.75  1325 5300  2.3 66.25 6 3
Expected life of battery under normal operation & maintainence conditions  Internal Resistance of cell (IR)  Loss in capacity in 28 days due to self discharge  Recommended Charging rate for a) Float Charging i) Limit current ii) Voltage b) Boost charging i) Starting Current ii) Finishing current iii) Voltage  Trickle Charging Rate i) Minimum ii) Maximum  Equalising charge a) Voltage b) Current c) Duration d) Interval between succesive equalising charge  Recommended Specific gravity at 27 deg C a) for first filling	milli ohms %  A V A A V  MA W  T A Hrs.	15 years in stand-by float application  0.512  <8%  198.75 2.23 vpc  159 79.5 2.75  1325 5300  2.3 66.25 6 3  1.220 +/- 0.005
Expected life of battery under normal operation & maintainence conditions  Internal Resistance of cell (IR)  Loss in capacity in 28 days due to self discharge  Recommended Charging rate for a) Float Charging i) Limit current ii) Voltage b) Boost charging i) Starting Current ii) Finishing current iii) Voltage  Trickle Charging Rate i) Minimum ii) Maximum  Equalising charge a) Voltage b) Current c) Duration d) Interval between succesive equalising charge  Recommended Specific gravity at 27 deg C	milli ohms %  A V A A V  MA W  T A Hrs.	15 years in stand-by float application  0.512  <8%  198.75 2.23 vpc  159 79.5 2.75  1325 5300  2.3 66.25 6 3



Explosion proof microporous ceramic made

Permissible max. temperature of Electrolyte		INDUSTRIES LIMITED
i) During Initial Charging     ii) During Normal Operation	deg C deg C	50 45
Overall dimensions		
Each Cell L */-3x W*/-3 x H*/5	mm	210 X 275 X 871
Complete Battery	mm	Depends on the battery layout
Distance between cell centres	mm	220
Quantity of Electrolyte per Cell	litres	29.6
Quantity of Electrolyte for battery (Including 10% extra)	litres	n X electrolyte per cell X 1.1
Weight(+/-5%)		
Each cell without acid	kg	70.1
with acid	kg	106.2
Complete Battery without acid with acid	kg kg	n X each cell weight without acid n X each cell weight with acid
Material and type of Plates i) Positive Plates		
Material		Lead-Antimony alloy spine
Height of Positive Plate	mm	570
Thickness of Positive Plate	mm	9.3
Area of Positive Plate	sqm	0.205
No. of positive plates per cell		10
Whether positive plates of individual cells are interchangeable		Yes, but not recommended
ii) Negative Plates		
Material		Lead - Calcium alloy grid
Height of Negative Plate	mm	564
Thickness of Negative Plate	mm	4.5
Area of Negative Plate	sqm	0.2053
No. of negative plates per cell		11
Whether negative plates of individual cells are interchangeable		Yes, but not recommended
Material and type of Separators		
Material		Synthetic fibre based material
Thickness of separator	mm	1.7
Clearance between bottom of the plate and the bottom of the container	mm	43
Clearance between top of the plates and top of container	mm	148
Whether explosion vents are offerred		YES

Type of Vent and Filling Plugs

Container Thickness of Container mm Material of Container Transparent SAN Cover Type of cover Adhesive sealed Material of Cover Opaque SAN Connections Material of Inter-Cell Connectors Insulated Lead Plated Copper Thickness of Inter-Cell Connectors mm Method of connection Bolted Inter-row, Inter-tier connectors and end take-offs furnished? Yes Material of Bolt, Nut and Washer for Inter-Cell and Cable Connections Lead plated MS Racks Racks a) Number of racks per battery Depends on the battery layout b) Number of cells per rack Depends on the battery layout c) Type of racks Depends on the battery layout d) Material of rack Steel / Teak wood e) Dimensions of the racks Depends on the battery layout Ventilation requirements Cubic content of battery rooms  $m^3$ To be provided by customer Gas generation per single cell per hour Lit 42.4 No. of air exchanges required per hour Depends on the size of battery room

Gasification Voltage per Cell Volt 2.36

Recommended Max. period of cell storage before the first Charge (After Installation and filling of Electrolyte) 12 - 18 hours Recommended Storage life of Battery (Dry shelf life) 12 months



# **General Technical Particulars**

Ocheral rechinical ranticulars	Units	
Type of Cell	Offics	11TBS1450
Nominal Voltage per cell	Volts	2
Manufacturer's Name		Exide Industries Ltd.
Standards to which battery is manufactured		IS 1651
IS Nomenclature		
Number of cells in the battery bank		n
Nominal Voltage of Battery	Volts	2 X n
Declared Capacity at 27 degree C upto 1.80 ecv Initial Rated End of Life	AH AH AH	1450 1450 1160
Rated Capacity at mimimum ambient temperature	Ah	As per formula: Ct=C27{1+0.0043(t-27)}
Rated Capacity at maximum ambient temperature	Ah	As per formula: Ct=C27{1+0.0043(t-27)}
Capacity in AH at various end cell voltages and duration of discharge	1	
	E.C.V.	Ah output
1 hour	1.67	739.50
2 hour	1.70	930.90
3 hour	1.75	1083.15
4 hour	1.76	1148.40
5 hour	1.77	1244.10
6 hour	1.77	1299.20
7 hour	1.78	1344.15
8 hour	1.78	1377.50
9 hour	1.80	1419.55
10 Hour	1.80	1450.00
Maximum momentary current for 1 min till 1.60 e.c.v		2610
Expected life of battery under normal operation & maintainence conditions	Years	15 years in stand-by float application
Internal Resistance of cell (IR)	milli ohms	0.22
Loss in capacity in 28 days due to self discharge	%	<8%
Recommended Charging rate for		
a) Float Charging		047.5
i) Limit current	A	217.5
ii) Voltage	V	2.23 vpc
b) Boost charging		
i) Starting Current	Α	174
ii) Finishing current	Α	87
iii) Voltage	V	2.75
Trickle Charging Rate		
i) Minimum ii) Maximum	mA mA	1450 5800
Equalising charge		
Equalising charge a) Voltage		23
a) Voltage	V	2.3 72.5
a) Voltage b) Current	V A	72.5
a) Voltage b) Current c) Duration	V A Hrs.	72.5 6
a) Voltage b) Current	V A	72.5
a) Voltage     b) Current     c) Duration     d) Interval between succesive equalising charge	V A Hrs.	72.5 6
a) Voltage b) Current c) Duration d) Interval between succesive equalising charge  Recommended Specific gravity at 27 deg C	V A Hrs.	72.5 6 3
a) Voltage b) Current c) Duration d) Interval between succesive equalising charge  Recommended Specific gravity at 27 deg C a) for first filling	V A Hrs.	72.5 6 3 1.220 +/- 0.005
a) Voltage b) Current c) Duration d) Interval between succesive equalising charge  Recommended Specific gravity at 27 deg C	V A Hrs.	72.5 6 3



Permissible max. temperature of Electrolyte i) During Initial Charging ii) During Normal Operation	deg C deg C	50 45
Overall dimensions		
Each Cell L x W x H (tolerance of +/- 2 mm in each case)	mm	210 X 275 X 871
Complete Battery	mm	Depends on the battery layout
Distance between cell centres	mm	220
Quantity of Electrolyte per Cell	litres	28.7
Quantity of Electrolyte for battery (Including 10% extra)	litres	n X electrolyte per cell X 1.1
Weight(+/-5%) Each cell		
without acid with acid	kg kg	77.6 112.6
Complete Battery without acid with acid	kg kg	n X each cell weight without acid n X each cell weight with acid
Material and type of Plates i) Positive Plates		
Material		Lead-Antimony alloy spine
Height of Positive Plate	mm	570
Thickness of Positive Plate	mm	9.3
Area of Positive Plate	sqm	0.205
No. of positive plates per cell		11
No. of positive plates per cell  Whether positive plates of individual cells are interchangeable		11 Yes, but not recommended
Whether positive plates of individual cells are		
Whether positive plates of individual cells are interchangeable		
Whether positive plates of individual cells are interchangeable  ii) Negative Plates	mm	Yes, but not recommended
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material	mm mm	Yes, but not recommended  Lead - Calcium alloy grid
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate		Yes, but not recommended  Lead - Calcium alloy grid  564
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable  Material and type of Separators	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053  12  Yes, but not recommended
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable  Material and type of Separators  Material	mm sqm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053  12  Yes, but not recommended  Synthetic fibre based material
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable  Material and type of Separators  Material  Thickness of separator  Clearance between bottom of the plate and the bottom	mm sqm mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053  12  Yes, but not recommended  Synthetic fibre based material  1.7
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable  Material and type of Separators  Material  Thickness of separator  Clearance between bottom of the plate and the bottom of the container  Clearance between top of the plates and top of	mm sqm mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053  12  Yes, but not recommended  Synthetic fibre based material  1.7



Thickness of Container mm

Transparent SAN Material of Container

Cover

Adhesive sealed Type of cover

Material of Cover Opaque SAN

Connections

Insulated Lead Plated Copper Material of Inter-Cell Connectors

Thickness of Inter-Cell Connectors mm

Method of connection Bolted

Inter-row, Inter-tier connectors and end take-offs Yes

Material of Bolt, Nut and Washer for Inter-Cell and

Cable Connections Lead plated MS

Racks

Racks

a) Number of racks per battery Depends on the battery layout Depends on the battery layout b) Number of cells per rack c) Type of racks Depends on the battery layout Steel / Teak wood

d) Material of rack

e) Dimensions of the racks Depends on the battery layout

Ventilation requirements

Cubic content of battery rooms  $m^3$ To be provided by customer

Gas generation per single cell per hour Lit 46.4

Depends on the size of battery room No. of air exchanges required per hour

Gasification Voltage per Cell Volt 2.36

Recommended Max. period of cell storage before the first Charge (After Installation and filling of Electrolyte) 12 - 18 hours



General Technical Particulars		
Type of Cell	Units	12TBS1500
Nominal Voltage per cell	Volts	2
Manufacturer's Name		Exide Industries Ltd.
Standards to which battery is manufactured		IS 1651
IS Nomenclature		
Number of cells in the battery bank		n
Nominal Voltage of Battery	Volts	2 X n
Declared Capacity at 27 degree C upto 1.80 ecv Initial Rated End of Life	AH AH AH	1500 1500 1200
Rated Capacity at mimimum ambient temperature	Ah	As per formula: Ct=C27{1+0.0043(t-27)}
Rated Capacity at maximum ambient temperature	Ah	As per formula: Ct=C27{1+0.0043(t-27)}
Capacity in AH at various end cell voltages and duration of discharge	n	
1 hour 2 hour 3 hour 4 hour 5 hour 6 hour 7 hour 8 hour 9 hour 10 Hour  Maximum momentary current for 1 min till 1.60 e.c.v  Expected life of battery under normal operation & maintainence conditions  Internal Resistance of cell (IR)  Loss in capacity in 28 days due to self discharge  Recommended Charging rate for a) Float Charging i) Limit current ii) Voltage b) Boost charging i) Starting Current	E.C.V. 1.67 1.70 1.75 1.76 1.77 1.78 1.78 1.80 1.80  Years milli ohms  %  A V	Ah output 765.00 963.00 1120.50 1188.00 1287.00 1344.00 1390.50 1425.00 1468.50 1500.00  2700  15 years in stand-by float application  0.38  <8%  225 2.23 vpc 180
ii) Finishing current iii) Voltage	A V	90 2.75
Trickle Charging Rate i) Minimum ii) Maximum	mA mA	<b>1500</b> 6000
Equalising charge a) Voltage b) Current c) Duration d) Interval between succesive equalising charge	V A Hrs. Months	2.3 75 6 3
Recommended Specific gravity at 27 deg C a) for first filling b) at full charge c) when Battery is discharged at 10 hours rate		1.220 +/- 0.005 1.240 +/- 0.005 1.160 - 1.130



Permissible max. temperature of Electrolyte i) During Initial Charging ii) During Normal Operation	deg C deg C	50 45
Overall dimensions		
Each Cell L <sup>+/-3</sup> x W <sup>+/-3</sup> x H <sup>+/5</sup>	mm	210 X 275 X 871
Complete Battery	mm	Depends on the battery layout
Distance between cell centres	mm	220
Quantity of Electrolyte per Cell	litres	28.1
Quantity of Electrolyte for battery (Including 10% extra)	litres	n X electrolyte per cell X 1.1
Weight(+/-5%) Each cell without acid	kg	81.5
with acid	kg	115.8
Complete Battery without acid with acid	kg kg	n X each cell weight without acid n X each cell weight with acid
Material and type of Plates i) Positive Plates		
Material		Lead-Antimony alloy spine
Height of Positive Plate	mm	570
Thickness of Positive Plate	mm	9.3
Area of Positive Plate	sqm	0.205
No. of positive plates per cell		12
No. of positive plates per cell  Whether positive plates of individual cells are interchangeable		12 Yes, but not recommended
Whether positive plates of individual cells are		
Whether positive plates of individual cells are interchangeable		
Whether positive plates of individual cells are interchangeable  ii) Negative Plates	mm	Yes, but not recommended
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material	mm mm	Yes, but not recommended  Lead - Calcium alloy grid
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate		Yes, but not recommended  Lead - Calcium alloy grid  564
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable  Material and type of Separators	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053  12  Yes, but not recommended
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable  Material and type of Separators  Material	mm sqm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053  12  Yes, but not recommended  Synthetic fibre based material
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable  Material and type of Separators  Material  Thickness of separator  Clearance between bottom of the plate and the bottom	mm sqm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053  12  Yes, but not recommended  Synthetic fibre based material  1.7
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable  Material and type of Separators  Material  Thickness of separator  Clearance between bottom of the plate and the bottom of the container  Clearance between top of the plates and top of	mm sqm mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053  12  Yes, but not recommended  Synthetic fibre based material  1.7



Thickness of Container mm

Material of Container Transparent SAN

Cover

Type of cover Adhesive sealed

Material of Cover Opaque SAN

Connections

Material of Inter-Cell Connectors Insulated Lead Plated Copper

Thickness of Inter-Cell Connectors mm

Method of connection Bolted

Inter-row, Inter-tier connectors and end take-offs furnished?

Yes

Material of Bolt, Nut and Washer for Inter-Cell and Lead plated MS Cable Connections

Racks

Racks

a) Number of racks per battery Depends on the battery layout b) Number of cells per rack Depends on the battery layout c) Type of racks Depends on the battery layout

d) Material of rack Steel / Teak wood Depends on the battery layout

e) Dimensions of the racks Ventilation requirements

 $m^3$ Cubic content of battery rooms To be provided by customer

Gas generation per single cell per hour Lit 48

No. of air exchanges required per hour Depends on the size of battery room

Gasification Voltage per Cell Volt 2.36

Recommended Max. period of cell storage before the first Charge (After Installation and filling of Electrolyte) 12 - 18 hours



<b>General Technical Particulars</b>		
	Units	
Type of Cell		12TBS1600
Nominal Voltage per cell	Volts	2
Manufacturer's Name		Exide Industries Ltd.
Standards to which battery is manufactured		IS 1651
IS Nomenclature		
Number of cells in the battery bank		n
Nominal Voltage of Battery	Volts	2 X n
Declared Capacity at 27 degree C upto 1.80 ecv		
Initial	AH	1600
Rated	AH	1600
End of Life	AH	1280
Rated Capacity at mimimum ambient temperature	Ah	As per formula: Ct=C27{1+0.0043(t-27)}
Rated Capacity at maximum ambient temperature	Ah	As per formula: Ct=C27{1+0.0043(t-27)}
Capacity in AH at various end cell voltages and duration	1	
of discharge	E.C.V.	Ab output
1 hour	1.67	<b>Ah output</b> 816.00
2 hour	1.70	1027.20
3 hour	1.75	1195.20
4 hour	1.76	1267.20
5 hour	1.77	1372.80
6 hour	1.77	1433.60
7 hour	1.78	1483.20
8 hour	1.78	1520.00
9 hour	1.80	1566.40
10 Hour	1.80	1600.00
Maximum momentary current for 1 min till 1.60 e.c.v		2880
Expected life of bottom under normal exerction 9		
Expected life of battery under normal operation & maintainence conditions	Years	15 years in stand-by float application
Internal Resistance of cell (IR)	milli ohms	0.38
Loss in capacity in 28 days due to self discharge	%	<8%
Recommended Charging rate for		
a) Float Charging		
i) Limit current	Α	240
ii) Voltage	V	2.23 vpc
b) Boost charging		400
i) Starting Current	A	192
ii) Finishing current	A	96
iii) Voltage	V	2.75
Trickle Charging Rate		
i) Minimum	mA	1600
ii) Maximum	mA	6400
Equalising charge		a -
a) Voltage	V	2.3
b) Current	A	80
c) Duration	Hrs.	6
d) Interval between succesive equalising charge	Months	3
Recommended Specific gravity at 27 deg C		
a) for first filling		1.220 +/- 0.005
b) at full charge		1.240 +/- 0.005
c) when Battery is discharged at 10 hours rate		1.160 - 1.130
,		



Permissible max. temperature of Electrolyte i) During Initial Charging ii) During Normal Operation	deg C deg C	50 45
Overall dimensions		
Each Cell L x W x H (tolerance of +/- 2 mm in each case) Complete Battery	mm mm	210 X 275 X 871  Depends on the battery layout
Distance between cell centres	mm	220
Quantity of Electrolyte per Cell	litres	27.8
Quality of Electronic por Con	00	2.10
Quantity of Electrolyte for battery (Including 10% extra)	litres	n X electrolyte per cell X 1.1
Weight(+/-5%) Each cell		
without acid	kg	84.0
with acid	kg	117.9
Complete Battery without acid with acid	kg kg	n X each cell weight without acid n X each cell weight with acid
Material and type of Plates i) Positive Plates		
Material		Lead-Antimony alloy spine
Height of Positive Plate	mm	570
Thickness of Positive Plate	mm	9.3
Area of Positive Plate	sqm	0.205
No. of positive plates per cell		12
No. of positive plates per cell  Whether positive plates of individual cells are interchangeable		12 Yes, but not recommended
Whether positive plates of individual cells are		
Whether positive plates of individual cells are interchangeable		
Whether positive plates of individual cells are interchangeable  ii) Negative Plates	mm	Yes, but not recommended
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material	mm mm	Yes, but not recommended  Lead - Calcium alloy grid
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate		Yes, but not recommended  Lead - Calcium alloy grid  564
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable  Material and type of Separators	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053  13  Yes, but not recommended
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable  Material and type of Separators  Material	mm   sqm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053  13  Yes, but not recommended  Synthetic fibre based material
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable  Material and type of Separators  Material  Thickness of separator  Clearance between bottom of the plate and the bottom	mm sqm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053  13  Yes, but not recommended  Synthetic fibre based material  1.7
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable  Material and type of Separators  Material  Thickness of separator  Clearance between bottom of the plate and the bottom of the container  Clearance between top of the plates and top of	mm sqm mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053  13  Yes, but not recommended  Synthetic fibre based material  1.7



Thickness of Container mm 8

Material of Container Transparent SAN

Cover

Type of cover Adhesive sealed

Material of Cover Opaque SAN

Connections

Material of Inter-Cell Connectors Insulated Lead Plated Copper

Thickness of Inter-Cell Connectors mm 5

Method of connection Bolted

Inter-row, Inter-tier connectors and end take-offs

furnished? Yes

Material of Bolt, Nut and Washer for Inter-Cell and
Cable Connections

Lead plated MS

Racks

Racks

a) Number of racks per battery
b) Number of cells per rack
c) Type of racks
Depends on the battery layout
c) Type of racks
Depends on the battery layout

d) Material of rack
e) Dimensions of the racks
Steel / Teak wood
Depends on the battery layout

Ventilation requirements

Cubic content of battery rooms m<sup>3</sup> To be provided by customer

Gas generation per single cell per hour Lit 51.2

No. of air exchanges required per hour Depends on the size of battery room

Gasification Voltage per Cell Volt 2.36

Recommended Max. period of cell storage before the first Charge (After Installation and filling of Electrolyte) 12 - 18 hours



Nominal Voltage per cell   Volts   2	General Technical Particulars	11.5	
Manufacturer's Name	Type of Cell	Units	13TBS1700
Standards to which battery is manufactured   IS 1651	Nominal Voltage per cell	Volts	2
Number of cells in the battery bank	Manufacturer's Name		Exide Industries Ltd.
Number of cells in the battery bank   n	Standards to which battery is manufactured		IS 1651
Nominal Voltage of Battery	IS Nomenclature		
Declared Capacity at 27 degree C upto 1.80 ecv Initial Rated	Number of cells in the battery bank		n
Initial Rated Rated Rated Rated Rated Rated Capacity at minimum ambient temperature Rated Capacity at minimum ambient temperature Rated Capacity in AH at various end cell voltages and duration of discharge   E.C.V.	Nominal Voltage of Battery	Volts	2 X n
Rated   End of Life		٨Ц	1700
Rated Capacity at minimum ambient temperature			
Rated Capacity at mimimum ambient temperature         Ah         As per formula: Ct=C27(1+0.0043(t-27))           Rated Capacity in AH at various end cell voltages and duration of discharge         E.C.V.         Ah output           1 hour         1.67         867.00           2 hour         1.70         1091.40           3 hour         1.75         1269.90           4 hour         1.76         1346.40           5 hour         1.77         1458.60           6 hour         1.77         1523.20           7 hour         1.78         1575.90           8 hour         1.78         1651.00           9 hour         1.80         1664.30           10 Hour         1.80         1700.00           Maximum momentary current for 1 min till 1.60 e.c.v         3060           Expected life of battery under normal operation & maintainence conditions         Years         15 years in stand-by float application           Internal Resistance of cell (IR)         milli ohms         0.22           Loss in capacity in 28 days due to self discharge         %         <8%			
Rated Capacity at maximum ambient temperature			
Capacity in AH at various end cell voltages and duration of discharge    E.C.V.			
Thour	Capacity in AH at various end cell voltages and duration		,
1 hour	or discharge	E C V	Ab autmut
2 hour 3 hour 1.70 1091.40 3 hour 1.75 1269.90 4 4 hour 1.76 1346.40 5 hour 1.76 1346.40 5 hour 1.77 1458.60 6 6 hour 1.77 1458.60 6 6 hour 1.77 1523.20 7 hour 1.78 1575.90 8 hour 1.78 1653.20 7 hour 1.80 1664.30 10 Hour 1.80 1664.30 10 Hour 1.80 1604.30 10 Hour 1.80 1700.00 10 Hour 1.80 1700.00 10 Hour 1.80 15 years in stand-by float application 10 Hour 1.80 15 years in stand-by float 10 years 15 years in stand-by float 10 years 15 years 10 years 15 years in stand-by float 10 years 15 years	1 hour		
3 hour 4 hour 1.75 1269.90 4 hour 1.76 1346.40 5 hour 1.77 1458.60 6 hour 1.77 1458.60 6 hour 1.77 1523.20 7 hour 1.78 1575.90 8 hour 1.78 1615.00 9 hour 1.80 1664.30 10 Hour 1.80 1664.30 10 Hour 1.80 1700.00  Maximum momentary current for 1 min till 1.60 e.c.v 3060  Expected life of battery under normal operation & maintainence conditions 7 years 15 years in stand-by float application  Internal Resistance of cell (IR) 7 milli ohms 7 0.22  Loss in capacity in 28 days due to self discharge 8 48 88  Recommended Charging rate for a) Float Charging i) Limit current A 255 ii) Voltage V 2.23 vpc b) Boost charging i) Starting Current A 204 ii) Finishing current A 102 iii) Voltage V 2.75  Trickle Charging Rate i) Minimum MA 6800  Equalising charge a) Voltage V 2.3 b) Current A 85 c) Duration Maximum MA 85 co Duration d) Interval between succesive equalising charge Months 3  Recommended Specific gravity at 27 deg C a) for first filling b) at full charge 1.220 +/- 0.005 b) at full charge 1.220 +/- 0.005			
4 hour 5 hour 1.76 1346.40 5 hour 1.77 1458.60 6 hour 1.77 1458.60 6 hour 1.77 1523.20 7 hour 1.78 1575.90 8 hour 1.78 1575.90 8 hour 1.78 1615.00 9 hour 1.80 1664.30 10 Hour 1.80 1664.30 10 Hour 1.80 1700.00 Maximum momentary current for 1 min till 1.60 e.c.v 3060 Expected life of battery under normal operation & maintainence conditions 7 years 15 years in stand-by float application Internal Resistance of cell (IR) 7 milli ohms 15 years in stand-by float application Internal Resistance of cell (IR) 8 milli ohms 15 years in stand-by float application Internal Resistance of cell (IR) 8 milli ohms 15 years in stand-by float application Internal Resistance of cell (IR) 9 milli ohms 15 years in stand-by float application Internal Resistance of cell (IR) 9 milli ohms 15 years in stand-by float application Internal Resistance of cell (IR) 9 milli ohms 15 years in stand-by float application Internal Resistance of cell (IR) 9 milli ohms 15 years in stand-by float application Internal Resistance of cell (IR) 9 milli ohms 15 years in stand-by float application Internal Resistance of cell (IR) 9 milli ohms 15 years in stand-by float application Internal Resistance of cell (IR) 9 milli ohms 15 years in stand-by float application Internal Resistance of cell (IR) 9 years in stand-by float application Internal Resistance of cell (IR) 9 years in stand-by float application Internal Resistance of cell (IR) 9 years in stand-by float application Internal Resistance of cell (IR) 9 years in stand-by float application Internal Proposition Internal Resistance of cell (IR) 9 years in stand-by float application Internal Proposition Internal Prop			
5 hour         1.77         1458.60           6 hour         1.77         1523.20           7 hour         1.78         1575.90           8 hour         1.78         1615.00           9 hour         1.80         1664.30           10 Hour         1.80         1700.00           Maximum momentary current for 1 min till 1.60 e.c.v         3060           Expected life of battery under normal operation & maintainence conditions         Years         15 years in stand-by float application           Internal Resistance of cell (IR)         milli ohms         0.22           Loss in capacity in 28 days due to self discharge         %         <8%			
6 hour 7 hour 1.77 1523.20 7 hour 1.78 1575.90 8 hour 1.78 1615.00 9 hour 1.80 1664.30 10 Hour 1.80 1664.30 11 Hour 1.80 1700.00  Maximum momentary current for 1 min till 1.60 e.c.v 3060  Expected life of battery under normal operation & maintainence conditions 7 years 15 years in stand-by float application 7 milli ohms 7 years 15 years in stand-by float application 8 maintainence of cell (IR) 7 milli ohms 7 years 15 years in stand-by float application 9 years 15 years in stand-by float application 10 years in capacity in 28 days due to self discharge 8 years 15 years in stand-by float application 10 years in capacity in 28 days due to self discharge 9 years in stand-by float application 10 years in stand-by float 3000 years in stand-by float 3			
7 hour         1.78         1575.90           8 hour         1.78         1615.00           9 hour         1.80         1664.30           10 Hour         1.80         1700.00           Maximum momentary current for 1 min till 1.60 e.c.v         3060           Expected life of battery under normal operation & maintainence conditions         Years         15 years in stand-by float application           Internal Resistance of cell (IR)         milli ohms         0.22           Loss in capacity in 28 days due to self discharge         %         <8%			
8 hour 9 hour 1.78 1615.00 9 hour 1.80 1664.30 10 Hour 1.80 1664.30 11 Hour 1.80 1664.30 11 Hour 1.80 1700.00  Maximum momentary current for 1 min till 1.60 e.c.v 3060  Expected life of battery under normal operation & maintainence conditions 7 years 15 years in stand-by float application 7 linternal Resistance of cell (IR) 7 milli ohms 7 linternal Resistance of cell (IR) 8 milli ohms 8 linternal Resistance of cell (IR) 8 milli ohms 10 linternal Resistance of cell (IR) 8 milli ohms 10 linternal Resistance of cell (IR) 8 milli ohms 10 linternal Resistance of cell (IR) 9 milli ohms 10 linter			
9 hour			
Maximum momentary current for 1 min till 1.60 e.c.v  Expected life of battery under normal operation & maintainence conditions  Internal Resistance of cell (IR)  Loss in capacity in 28 days due to self discharge  Recommended Charging rate for a) Float Charging i) Limit current ii) Voltage V 2.23 vpc b) Boost charging i) Starting Current A 204 ii) Finishing current A 102 iii) Voltage V 2.75  Trickle Charging Rate i) Minimum mA 6800  Equalising charge a) Voltage V 2.3 b) Current A 85 c) Duration d) Interval between succesive equalising charge  Recommended Specific gravity at 27 deg C a) for first filling b) at full charge 1.220 +/- 0.005 b) at full charge 1.220 +/- 0.005 b) at full charge			
Expected life of battery under normal operation & maintainence conditions  Internal Resistance of cell (IR)  Loss in capacity in 28 days due to self discharge  Recommended Charging rate for a) Float Charging i) Limit current A 255 ii) Voltage V 2.23 vpc b) Boost charging i) Starting Current A 102 iii) Voltage V 2.75  Trickle Charging Rate i) Minimum mA 6800  Equalising charge a) Voltage V 2.3 b) Current A 85 c) Duration d) Interval between succesive equalising charge  Recommended Specific gravity at 27 deg C a) for first filling b) at Iul charge  1.220 +/- 0.005 b) at full charge  1.220 +/- 0.005 b) at full charge		_	
maintainence conditions    Years   15 years in stand-by float application	Maximum momentary current for 1 min till 1.60 e.c.v		3060
Loss in capacity in 28 days due to self discharge % <8%  Recommended Charging rate for  a) Float Charging  i) Limit current		Years	15 years in stand-by float application
Recommended Charging rate for a) Float Charging i) Limit current A 255 ii) Voltage V 2.23 vpc b) Boost charging i) Starting Current A 204 ii) Finishing current A 102 iii) Voltage V 2.75  Trickle Charging Rate i) Minimum MA 6800  Equalising charge a) Voltage V 2.3 b) Current A 85 c) Duration Hrs. 6 d) Interval between succesive equalising charge Months  Recommended Specific gravity at 27 deg C a) for first filling b) at full charge 1 1.220 +/- 0.005 b) at full charge 1 1.220 +/- 0.005 b) at full charge	Internal Resistance of cell (IR)	milli ohms	0.22
a) Float Charging i) Limit current A 255 ii) Voltage V 2.23 vpc b) Boost charging i) Starting Current A 204 ii) Finishing current A 102 iii) Voltage V 2.75  Trickle Charging Rate i) Minimum mA 1700 ii) Maximum mA 6800  Equalising charge a) Voltage V 2.3 b) Current A 85 c) Duration d) Interval between succesive equalising charge months M	Loss in capacity in 28 days due to self discharge	%	<8%
i) Limit current ii) Voltage V 2.23 vpc b) Boost charging i) Starting Current A 204 ii) Finishing current A 102 iii) Voltage V 2.75  Trickle Charging Rate i) Minimum mA ii) Maximum mA 68800  Equalising charge a) Voltage V 2.3 b) Current A 85 c) Duration Hrs. 6 d) Interval between succesive equalising charge Months  Recommended Specific gravity at 27 deg C a) for first filling b) at full charge 1.220 +/- 0.005 b) at full charge			
ii) Voltage b) Boost charging i) Starting Current A 204 ii) Finishing current A 102 iii) Voltage V 2.75  Trickle Charging Rate i) Minimum mA 6800  Equalising charge a) Voltage V 2.3 b) Current A 85 c) Duration Hrs. 6 d) Interval between succesive equalising charge Months  Recommended Specific gravity at 27 deg C a) for first filling b) at full charge 1 2.23 voltage Months 1.220 +/- 0.005 b) at full charge 1 2.240 +/- 0.005	,	Α	255
b) Boost charging i) Starting Current A 204 ii) Finishing current A 102 iii) Voltage V 2.75  Trickle Charging Rate i) Minimum mA 6800  Equalising charge a) Voltage V 2.3 b) Current A 85 c) Duration Hrs. 6 d) Interval between succesive equalising charge Months  Recommended Specific gravity at 27 deg C a) for first filling b) at full charge 1 1.220 +/- 0.005 b) at full charge 1 1.240 +/- 0.005			
i) Starting Current ii) Finishing current A 102 iii) Voltage V 2.75  Trickle Charging Rate i) Minimum mA 1700 ii) Maximum mA 6800  Equalising charge a) Voltage V 2.3 b) Current A 85 c) Duration Hrs. 6 d) Interval between succesive equalising charge Months  Recommended Specific gravity at 27 deg C a) for first filling b) at full charge 1.220 +/- 0.005 b) at full charge			
ii) Finishing current iii) Voltage  V  2.75  Trickle Charging Rate i) Minimum ii) Maximum  mA feacure  Equalising charge a) Voltage V  2.3 b) Current A A B5 c) Duration Hrs. 6 d) Interval between succesive equalising charge a) for first filling b) at full charge  102 102 103 104 1700 1700 1800 1800 1900 1900 1900 1900 1900 19		Α	204
Trickle Charging Rate  i) Minimum  ii) Maximum  Equalising charge  a) Voltage  V  2.3 b) Current  A  85 c) Duration  d) Interval between succesive equalising charge  Recommended Specific gravity at 27 deg C  a) for first filling  b) at full charge  1700  2.3  85  85  6  Months  3		Α	102
i) Minimum ii) Maximum  Equalising charge a) Voltage V 2.3 b) Current A 85 c) Duration Hrs. 6 d) Interval between succesive equalising charge  Recommended Specific gravity at 27 deg C a) for first filling b) at full charge  1.220 +/- 0.005 b) at full charge	iii) Voltage	V	2.75
ii) Maximum mA 6800  Equalising charge a) Voltage V 2.3 b) Current A 85 c) Duration Hrs. 6 d) Interval between succesive equalising charge Months 3  Recommended Specific gravity at 27 deg C a) for first filling 1.220 +/- 0.005 b) at full charge 1.240 +/- 0.005		mA <b>I</b>	1700
a) Voltage V 2.3 b) Current A 85 c) Duration Hrs. 6 d) Interval between succesive equalising charge Months 3  Recommended Specific gravity at 27 deg C a) for first filling 1.220 +/- 0.005 b) at full charge 1.240 +/- 0.005	,		
a) Voltage V 2.3 b) Current A 85 c) Duration Hrs. 6 d) Interval between succesive equalising charge Months 3  Recommended Specific gravity at 27 deg C a) for first filling 1.220 +/- 0.005 b) at full charge 1.240 +/- 0.005	Equalising charge		
b) Current A 85 c) Duration Hrs. 6 d) Interval between succesive equalising charge Months 3  Recommended Specific gravity at 27 deg C a) for first filling 1.220 +/- 0.005 b) at full charge 1.240 +/- 0.005	, , ,	V	2.3
c) Duration Hrs. 6 d) Interval between succesive equalising charge Months 3  Recommended Specific gravity at 27 deg C a) for first filling 1.220 +/- 0.005 b) at full charge 1.240 +/- 0.005	, •	Α	85
Recommended Specific gravity at 27 deg C a) for first filling b) at full charge 1.220 +/- 0.005 1.240 +/- 0.005		Hrs.	6
a) for first filling 1.220 +/- 0.005 b) at full charge 1.240 +/- 0.005	d) Interval between succesive equalising charge	Months	3
a) for first filling 1.220 +/- 0.005 b) at full charge 1.240 +/- 0.005	Recommended Specific gravity at 27 deg C		
	a) for first filling		
c) when Battery is discharged at 10 hours rate 1.160 - 1.130			
	c) when Battery is discharged at 10 hours rate		1.160 - 1.130



Permissible max. temperature of Electrolyte i) During Initial Charging ii) During Normal Operation	deg C deg C	50 45
Overall dimensions		
Each Cell L x W x H (tolerance of +/- 2 mm in each case) Complete Battery	mm mm	214 X 399 X 847  Depends on the battery layout
Distance between cell centres	mm	220
Quantity of Electrolyte per Cell	litres	42.9
Quantity of Electrolyte for battery (Including 10% extra)	litres	n X electrolyte per cell X 1.1
Weight(+/-5%) Each cell		
without acid	kg	96.0
with acid	kg	148.3
Complete Battery without acid with acid	kg kg	n X each cell weight without acid n X each cell weight with acid
Material and type of Plates i) Positive Plates		
Material		Lead-Antimony alloy spine
Height of Positive Plate	mm	570
Thickness of Positive Plate	mm	9.3
Area of Positive Plate	sqm	0.205
No. of positive plates per cell		13
Whether positive plates of individual cells are interchangeable		Yes, but not recommended
ii) Negative Plates		
Material		Lead - Calcium alloy grid
Height of Negative Plate	mm	564
Thickness of Negative Plate	mm	4.5
Area of Negative Plate	sqm	0.2053
No. of negative plates per cell		14
Whether negative plates of individual cells are interchangeable		Yes, but not recommended
Material and type of Separators		
Material		Synthetic fibre based material
Thickness of separator	mm	1.7
Clearance between bottom of the plate and the bottom of the container	mm	42.5
Clearance between top of the plates and top of container	mm	126
Whether explosion vents are offerred		YES
Type of Vent and Filling Plugs		Explosion proof microporous ceramic made



Thickness of Container mm 10

Material of Container Transparent SAN

Cover

Type of cover Adhesive sealed

Material of Cover Opaque SAN

Connections

Material of Inter-Cell Connectors Insulated Lead Plated Copper

Thickness of Inter-Cell Connectors mm 5

Method of connection Bolted

Inter-row, Inter-tier connectors and end take-offs furnished? Yes

Turnished:

Material of Bolt, Nut and Washer for Inter-Cell and Cable Connections Lead plated MS

Racks

Racks

a) Number of racks per battery
b) Number of cells per rack
c) Type of racks
Depends on the battery layout
Depends on the battery layout
Depends on the battery layout

d) Material of rack Steel / Teak wood
e) Dimensions of the racks Depends on the battery layout

Ventilation requirements

Cubic content of battery rooms m<sup>3</sup> To be provided by customer

Gas generation per single cell per hour Lit 54.4

No. of air exchanges required per hour Depends on the size of battery room

Gasification Voltage per Cell Volt 2.36

Recommended Max. period of cell storage before the first Charge (After Installation and filling of Electrolyte) 12 - 18 hours



General Technical Particulars	مناما	
Type of Cell	Units	14TBS1850
Nominal Voltage per cell	Volts	2
Manufacturer's Name		Exide Industries Ltd.
Standards to which battery is manufactured		IS 1651
IS Nomenclature		
Number of cells in the battery bank		n
Nominal Voltage of Battery	Volts	2 X n
Declared Capacity at 27 degree C upto 1.80 ecv Initial Rated End of Life	AH AH AH	1850 1850 1480
Rated Capacity at mimimum ambient temperature	Ah	As per formula: Ct=C27{1+0.0043(t-27)}
Rated Capacity at maximum ambient temperature	Ah	As per formula: Ct=C27{1+0.0043(t-27)}
Capacity in AH at various end cell voltages and duration of discharge		
1 hour 2 hour 3 hour 4 hour 5 hour 6 hour 7 hour 8 hour 9 hour 10 Hour  Maximum momentary current for 1 min till 1.60 e.c.v  Expected life of battery under normal operation & maintainence conditions  Internal Resistance of cell (IR)  Loss in capacity in 28 days due to self discharge	E.C.V. 1.67 1.70 1.75 1.76 1.77 1.77 1.78 1.78 1.80 1.80  Years milli ohms	Ah output 943.50 1187.70 1381.95 1465.20 1587.30 1657.60 1714.95 1757.50 1811.15 1850.00 3330  15 years in stand-by float application 0.18 <8%
Recommended Charging rate for a) Float Charging i) Limit current ii) Voltage b) Boost charging i) Starting Current ii) Finishing current iii) Voltage	A V A A V	277.5 2.23 vpc 222 111 2.75
Trickle Charging Rate i) Minimum ii) Maximum	mA mA	1850 7400
Equalising charge a) Voltage b) Current c) Duration d) Interval between succesive equalising charge  Recommended Specific gravity at 27 deg C	V A Hrs. Months	2.3 92.5 6 3
a) for first filling     b) at full charge     c) when Battery is discharged at 10 hours rate		1.220 +/- 0.005 1.240 +/- 0.005 1.160 - 1.130



Permissible max. temperature of Electrolyte i) During Initial Charging ii) During Normal Operation	deg C deg C	50 45
Overall dimensions		
Each Cell L x W x H	mm	214 X 399 X 847
(tolerance of +/- 2 mm in each case) Complete Battery	mm	Depends on the battery layout
Distance between cell centres	mm	220
Quantity of Electrolyte per Cell	litres	42.1
Quantity of Electrolyte for battery (Including 10% extra)	litres	n X electrolyte per cell X 1.1
Weight(+/-5%) Each cell		
without acid with acid	kg kg	102.0 153.4
Complete Battery without acid with acid	kg kg	n X each cell weight without acid n X each cell weight with acid
Material and type of Plates i) Positive Plates		
Material		Lead-Antimony alloy spine
Height of Positive Plate	mm	570
Thickness of Positive Plate	mm	9.3
Area of Positive Plate	sqm	0.205
No. of positive plates per cell		14
Whether positive plates of individual cells are interchangeable		Yes, but not recommended
ii) Negative Plates		
Material		Lead - Calcium alloy grid
Height of Negative Plate	mm	564
Thickness of Negative Plate	mm	4.5
Area of Negative Plate	sqm	0.2053
No. of negative plates per cell		15
Whether negative plates of individual cells are interchangeable		Yes, but not recommended
Material and type of Separators		
Material		Synthetic fibre based material
Thickness of separator	mm	1.7
Clearance between bottom of the plate and the bottom of the container	mm	42.5
Clearance between top of the plates and top of container	mm	126
Whether explosion vents are offerred		YES
T ()/ (		

Explosion proof microporous ceramic made

Type of Vent and Filling Plugs



Thickness of Container mm 10

Material of Container Transparent SAN

Cover

Type of cover Adhesive sealed

Material of Cover Opaque SAN

Connections

Material of Inter-Cell Connectors Insulated Lead Plated Copper

Thickness of Inter-Cell Connectors mm 5

Method of connection Bolted

Inter-row, Inter-tier connectors and end take-offs

furnished? Yes

Material of Bolt, Nut and Washer for Inter-Cell and Cable Connections Lead plated MS

Racks

Racks

a) Number of racks per battery
b) Number of cells per rack
c) Type of racks
Depends on the battery layout
c) Type of racks
Depends on the battery layout
Depends on the battery layout

d) Material of rack
e) Dimensions of the racks
Steel / Teak wood
Depends on the battery layout

Ventilation requirements

Cubic content of battery rooms m<sup>3</sup> To be provided by customer

Gas generation per single cell per hour Lit 59.2

No. of air exchanges required per hour Depends on the size of battery room

Gasification Voltage per Cell Volt 2.36

Recommended Max. period of cell storage before the first Charge (After Installation and filling of Electrolyte) 12 - 18 hours



General Technical Particulars	l lada	
Type of Cell	Units	15TBS1975
Nominal Voltage per cell	Volts	2
Manufacturer's Name		Exide Industries Ltd.
Standards to which battery is manufactured		IS 1651
IS Nomenclature		
Number of cells in the battery bank		n
Nominal Voltage of Battery	Volts	2 X n
Declared Capacity at 27 degree C upto 1.80 ecv Initial Rated End of Life	AH AH AH	1975 1975 1580
Rated Capacity at mimimum ambient temperature	Ah	As per formula: Ct=C27{1+0.0043(t-27)}
Rated Capacity at maximum ambient temperature	Ah	As per formula: Ct=C27{1+0.0043(t-27)}
Capacity in AH at various end cell voltages and duratio of discharge	n E.C.V.	Ab output
1 hour 2 hour	1.67 1.70	<b>Ah output</b> 1007.25 1267.95
3 hour 4 hour	1.75 1.76	1475.33 1564.20
5 hour 6 hour	1.77 1.77	1694.55 1769.60
7 hour 8 hour	1.78 1.78	1830.83 1876.25
9 hour 10 Hour	1.80 1.80	1933.53 1975.00
Maximum momentary current for 1 min till 1.60 e.c.v		3555
Expected life of battery under normal operation & maintainence conditions	Years	15 years in stand-by float application
Internal Resistance of cell (IR)	milli ohms	0.36
Loss in capacity in 28 days due to self discharge	%	<8%
Recommended Charging rate for a) Float Charging		
i) Limit current ii) Voltage	A V	296.25 2.23 vpc
b) Boost charging	٨	·
i) Starting Current ii) Finishing current	A A	237 118.5
iii) Voltage	V	2.75
Trickle Charging Rate i) Minimum	mA	1975
ii) Maximum	mA	7900
Equalising charge	.,	0.0
a) Voltage b) Current	V A	2.3 98.75
c) Duration	Hrs.	6
d) Interval between succesive equalising charge	Months	3
Recommended Specific gravity at 27 deg C a) for first filling b) at full charge c) when Battery is discharged at 10 hours rate		1.220 +/- 0.005 1.240 +/- 0.005 1.160 - 1.130
, , , , , , , , , , , , , , , , , , , ,		



Permissible max. temperature of Electrolyte i) During Initial Charging ii) During Normal Operation	deg C deg C	50 45
Overall dimensions		
Each Cell L x W x H	mm	214 X 399 X 847
(tolerance of +/- 2 mm in each case) Complete Battery	mm	Depends on the battery layout
Distance between cell centres	mm	220
Quantity of Electrolyte per Cell	litres	41.2
Quantity of Electrolyte for battery (Including 10% extra)	litres	n X electrolyte per cell X 1.1
Weight(+/-5%) Each cell		
without acid with acid	kg kg	105.5 155.8
Complete Battery without acid with acid	kg kg	n X each cell weight without acid n X each cell weight with acid
Material and type of Plates i) Positive Plates		
Material		Lead-Antimony alloy spine
Height of Positive Plate	mm	570
Thickness of Positive Plate	mm	9.3
Area of Positive Plate	sqm	0.205
No. of positive plates per cell		15
Whether positive plates of individual cells are interchangeable		Yes, but not recommended
ii) Negative Plates		
Material		Lead - Calcium alloy grid
Height of Negative Plate	mm	564
Thickness of Negative Plate	mm	4.5
Area of Negative Plate	sqm	0.2053
No. of negative plates per cell		16
Whether negative plates of individual cells are interchangeable		Yes, but not recommended
Material and type of Separators		
Material		Synthetic fibre based material
Thickness of separator	mm	1.7
Clearance between bottom of the plate and the bottom of the container	mm	42.5
Clearance between top of the plates and top of container	mm	126
Whether explosion vents are offerred		YES
T ()/ :  FIF D		

Explosion proof microporous ceramic made

Type of Vent and Filling Plugs



Depends on the battery layout

#### Container

Thickness of Container mm 10

Material of Container Transparent SAN

Cover

Type of cover Adhesive sealed

Material of Cover Opaque SAN

Connections

Material of Inter-Cell Connectors Insulated Lead Plated Copper

Thickness of Inter-Cell Connectors mm 5

Method of connection Bolted

Inter-row, Inter-tier connectors and end take-offs

furnished? Yes

Material of Bolt, Nut and Washer for Inter-Cell and Cable Connections Lead plated MS

Racks

Racks

a) Number of racks per battery
b) Number of cells per rack
c) Type of racks

Depends on the battery layout
Depends on the battery layout
Depends on the battery layout

d) Material of rack Steel / Teak wood

e) Dimensions of the racks

Ventilation requirements

Cubic content of battery rooms m<sup>3</sup> To be provided by customer

Gas generation per single cell per hour Lit 63.2

No. of air exchanges required per hour Depends on the size of battery room

Gasification Voltage per Cell Volt 2.36

Recommended Max. period of cell storage before the first Charge (After Installation and filling of Electrolyte) 12 - 18 hours



<b>General Technical Particulars</b>		
	Units	
Type of Cell		16TBS2000
Nominal Voltage per cell	Volts	2
Manufacturer's Name		Exide Industries Ltd.
Standards to which battery is manufactured		IS 1651
IS Nomenclature		
Number of cells in the battery bank		n
Nominal Voltage of Battery	Volts	2 X n
Declared Capacity at 27 degree C upto 1.80 ecv		
Initial	AH	2000
Rated	AH	2000
End of Life	AH	1600
Rated Capacity at mimimum ambient temperature	Ah	As per formula: Ct=C27{1+0.0043(t-27)}
Rated Capacity at maximum ambient temperature	Ah	As per formula: Ct=C27{1+0.0043(t-27)}
Capacity in AH at various end cell voltages and duration	ı	
of discharge	E.C.V.	Ab output
1 hour	1.67	Ah output
1 hour		1020.00
2 hour	1.70	1284.00
3 hour	1.75	1494.00
4 hour	1.76	1584.00
5 hour	1.77	1716.00
6 hour	1.77	1792.00
7 hour	1.78	1854.00
8 hour	1.78	1900.00
9 hour	1.80	1958.00
10 Hour	1.80	2000.00
Maximum momentary current for 1 min till 1.60 e.c.v		3600
Expected life of battery under normal operation & maintainence conditions	Years	15 years in stand-by float application
Internal Resistance of cell (IR)	milli ohms	0.15
Loss in capacity in 28 days due to self discharge	%	<8%
Recommended Charging rate for		
a) Float Charging		000
i) Limit current	A	300
ii) Voltage	V	2.23 vpc
b) Boost charging	_	
i) Starting Current	A	240
ii) Finishing current	A	120
iii) Voltage	V	2.75
Trickle Charging Rate		
i) Minimum	mA	2000
ii) Maximum	mA	8000
Equalising charge		
a) Voltage	V	2.3
b) Current	A	100
c) Duration	Hrs.	6
d) Interval between succesive equalising charge	Months	3
,		
Recommended Specific gravity at 27 deg C		
a) for first filling		1.220 +/- 0.005
b) at full charge		1.240 +/- 0.005
c) when Battery is discharged at 10 hours rate		1.160 - 1.130
of mion bandly to alcondiged at 10 mount rate		



Permissible max. temperature of Electrolyte i) During Initial Charging ii) During Normal Operation	deg C deg C	50 45
Overall dimensions		
Each Cell L x W x H (tolerance of +/- 2 mm in each case) Complete Battery	mm mm	214 X 399 X 847  Depends on the battery layout
Distance between cell centres	mm	220
Quantity of Electrolyte per Cell	litres	40.7
Quantity of Electrolyte per Cell	iities	40.7
Quantity of Electrolyte for battery (Including 10% extra)	litres	n X electrolyte per cell X 1.1
Weight(+/-5%) Each cell		
without acid with acid	kg kg	107.4 157.0
Complete Battery without acid with acid	kg kg	n X each cell weight without acid n X each cell weight with acid
Material and type of Plates i) Positive Plates		
Material		Lead-Antimony alloy spine
Height of Positive Plate	mm	570
Thickness of Positive Plate	mm	9.3
Area of Positive Plate	sqm	0.205
No. of positive plates per cell		16
No. of positive plates per cell  Whether positive plates of individual cells are interchangeable		16 Yes, but not recommended
Whether positive plates of individual cells are		
Whether positive plates of individual cells are interchangeable		
Whether positive plates of individual cells are interchangeable  ii) Negative Plates	mm	Yes, but not recommended
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material	mm mm	Yes, but not recommended  Lead - Calcium alloy grid
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate		Yes, but not recommended  Lead - Calcium alloy grid  564
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable  Material and type of Separators	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053  16  Yes, but not recommended
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable  Material and type of Separators  Material	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053  16  Yes, but not recommended  Synthetic fibre based material
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable  Material and type of Separators  Material  Thickness of separator  Clearance between bottom of the plate and the bottom	mm sqm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053  16  Yes, but not recommended  Synthetic fibre based material  1.7
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable  Material and type of Separators  Material  Thickness of separator  Clearance between bottom of the plate and the bottom of the container  Clearance between top of the plates and top of	mm sqm mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053  16  Yes, but not recommended  Synthetic fibre based material  1.7  42.5



Depends on the battery layout

#### Container

Thickness of Container mm 10

Material of Container Transparent SAN

Cover

Type of cover Adhesive sealed

Material of Cover Opaque SAN

Connections

Material of Inter-Cell Connectors Insulated Lead Plated Copper

Thickness of Inter-Cell Connectors mm 5

Method of connection Bolted

Inter-row, Inter-tier connectors and end take-offs furnished? Yes

Material of Bolt, Nut and Washer for Inter-Cell and Cable Connections Lead plated MS

#### Racks

Racks

a) Number of racks per battery
b) Number of cells per rack
c) Type of racks

Depends on the battery layout
Depends on the battery layout
Depends on the battery layout

d) Material of rack
Steel / Teak wood

e) Dimensions of the racks

Ventilation requirements

Cubic content of battery rooms  $$\rm{m}^{3}$$  To be provided by customer

Gas generation per single cell per hour Lit 64

No. of air exchanges required per hour Depends on the size of battery room

Gasification Voltage per Cell Volt 2.36

Recommended Max. period of cell storage before the first Charge (After Installation and filling of Electrolyte) 12 - 18 hours



General Technical Particulars	11.5	
Type of Cell	Units	16TBS2100
Nominal Voltage per cell	Volts	2
Manufacturer's Name		Exide Industries Ltd.
Standards to which battery is manufactured		IS 1651
IS Nomenclature		
Number of cells in the battery bank		n
Nominal Voltage of Battery	Volts	2 X n
Declared Capacity at 27 degree C upto 1.80 ecv Initial Rated End of Life	AH AH AH	2100 2100 1680
Rated Capacity at mimimum ambient temperature	Ah	As per formula: Ct=C27{1+0.0043(t-27)}
Rated Capacity at maximum ambient temperature	Ah	As per formula: Ct=C27{1+0.0043(t-27)}
Capacity in AH at various end cell voltages and duratio of discharge		
1 hour 2 hour 3 hour 4 hour 5 hour 6 hour 7 hour 8 hour 9 hour 10 Hour  Maximum momentary current for 1 min till 1.60 e.c.v	E.C.V. 1.67 1.70 1.75 1.76 1.77 1.77 1.78 1.78 1.80	Ah output 1071.00 1348.20 1568.70 1663.20 1801.80 1881.60 1946.70 1995.00 2055.90 2100.00
Expected life of battery under normal operation & maintainence conditions	Years	15 years in stand-by float application
Internal Resistance of cell (IR)	milli ohms	0.15
Loss in capacity in 28 days due to self discharge	%	<8%
Recommended Charging rate for a) Float Charging i) Limit current ii) Voltage b) Boost charging i) Starting Current ii) Finishing current iii) Voltage	A V A A V	315 2.23 vpc 252 126 2.75
Trickle Charging Rate i) Minimum ii) Maximum	mA mA	2100 8400
Equalising charge a) Voltage b) Current c) Duration d) Interval between succesive equalising charge	V A Hrs. Months	2.3 105 6 3
Recommended Specific gravity at 27 deg C a) for first filling b) at full charge c) when Battery is discharged at 10 hours rate		1.220 +/- 0.005 1.240 +/- 0.005 1.160 - 1.130



Permissible max. temperature of Electrolyte i) During Initial Charging ii) During Normal Operation	deg C deg C	50 45
Overall dimensions		
Each Cell L x W x H (tolerance of +/- 2 mm in each case)	mm	214 X 399 X 847
Complete Battery	mm	Depends on the battery layout
Distance between cell centres	mm	220
Quantity of Electrolyte per Cell	litres	40.4
Quantity of Electrolyte for battery (Including 10% extra)	litres	n X electrolyte per cell X 1.1
Weight(+/-5%) Each cell		
without acid with acid	kg kg	110.7 160.0
Complete Battery without acid with acid	kg kg	n X each cell weight without acid n X each cell weight with acid
Material and type of Plates i) Positive Plates		
Material		Lead-Antimony alloy spine
Height of Positive Plate	mm	570
Thickness of Positive Plate	mm	9.3
Area of Positive Plate	sqm	0.205
No. of positive plates per cell		16
No. of positive plates per cell  Whether positive plates of individual cells are interchangeable		16 Yes, but not recommended
Whether positive plates of individual cells are		
Whether positive plates of individual cells are interchangeable		
Whether positive plates of individual cells are interchangeable  ii) Negative Plates	mm	Yes, but not recommended
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material	mm mm	Yes, but not recommended  Lead - Calcium alloy grid
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate		Yes, but not recommended  Lead - Calcium alloy grid  564
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable  Material and type of Separators	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053  17  Yes, but not recommended
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable  Material and type of Separators  Material	mm sqm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053  17  Yes, but not recommended  Synthetic fibre based material
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable  Material and type of Separators  Material  Thickness of separator  Clearance between bottom of the plate and the bottom	mm sqm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053  17  Yes, but not recommended  Synthetic fibre based material  1.7
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable  Material and type of Separators  Material  Thickness of separator  Clearance between bottom of the plate and the bottom of the container  Clearance between top of the plates and top of	mm sqm mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053  17  Yes, but not recommended  Synthetic fibre based material  1.7  42.5



Lead plated MS

To be provided by customer

#### Container

Thickness of Container mm 10

Material of Container Transparent SAN

Cover

Type of cover Adhesive sealed

Material of Cover Opaque SAN

Connections

Material of Inter-Cell Connectors Insulated Lead Plated Copper

Thickness of Inter-Cell Connectors  $\mathsf{mm}$ 

Method of connection Bolted

Inter-row, Inter-tier connectors and end take-offs furnished? Yes

Material of Bolt, Nut and Washer for Inter-Cell and

Cable Connections

Racks

Racks

a) Number of racks per battery Depends on the battery layout b) Number of cells per rack Depends on the battery layout

c) Type of racks Depends on the battery layout Steel / Teak wood

d) Material of rack Depends on the battery layout

e) Dimensions of the racks

Cubic content of battery rooms

Ventilation requirements

Gas generation per single cell per hour Lit 67.2

No. of air exchanges required per hour Depends on the size of battery room

 $\,m^3\,$ 

Gasification Voltage per Cell 2.36 Volt

Recommended Max. period of cell storage before the first Charge (After Installation and filling of Electrolyte) 12 - 18 hours



### **General Technical Particulars**

General Technical Particulars	Units	
Type of Cell	Office	17TBS2200
Nominal Voltage per cell	Volts	2
Manufacturer's Name		Exide Industries Ltd.
Standards to which battery is manufactured		IS 1651
IS Nomenclature		
Number of cells in the battery bank		n
Nominal Voltage of Battery	Volts	2 X n
Declared Capacity at 27 degree C upto 1.80 ecv Initial Rated End of Life	AH AH AH	2200 2200 1760
Rated Capacity at mimimum ambient temperature	Ah	As per formula: Ct=C27{1+0.0043(t-27)}
Rated Capacity at maximum ambient temperature	Ah	As per formula: Ct=C27{1+0.0043(t-27)}
Capacity in AH at various end cell voltages and duration of discharge		
1 hour 2 hour 3 hour 4 hour 5 hour 6 hour 7 hour 8 hour	1.67 1.70 1.75 1.76 1.77 1.77 1.78 1.78 1.80	Ah output 1122.00 1412.40 1643.40 1742.40 1887.60 1971.20 2039.40 2090.00 2153.80
10 Hour  Maximum momentary current for 1 min till 1.60 e.c.v	1.80	2200.00 3960
Expected life of battery under normal operation & maintainence conditions	Years	15 years in stand-by float application
Internal Resistance of cell (IR)	milli ohms	0.13
Loss in capacity in 28 days due to self discharge	%	<8%
Recommended Charging rate for a) Float Charging i) Limit current ii) Voltage b) Boost charging i) Starting Current ii) Finishing current iii) Voltage	A V A A V	330 2.23 vpc 264 132 2.75
Trickle Charging Rate i) Minimum ii) Maximum	mA mA	2200 8800
Equalising charge a) Voltage b) Current c) Duration d) Interval between succesive equalising charge	V A Hrs. Months	2.3 110 6 3
Recommended Specific gravity at 27 deg C a) for first filling b) at full charge c) when Battery is discharged at 10 hours rate		1.220 +/- 0.005 1.240 +/- 0.005 1.160 - 1.130



Permissible max. temperature of Electrolyte i) During Initial Charging ii) During Normal Operation	deg C deg C	50 45
Overall dimensions		
Each Cell L x W x H (tolerance of +/- 2 mm in each case)	mm	214 X 399 X 847
Complete Battery	mm	Depends on the battery layout
Distance between cell centres	mm	220
Quantity of Electrolyte per Cell	litres	39.5
Quantity of Electrolyte for battery (Including 10% extra)	litres	n X electrolyte per cell X 1.1
Weight(+/-5%) Each cell		
without acid with acid	kg kg	116.8 165.0
Complete Battery without acid with acid	kg kg	n X each cell weight without acid n X each cell weight with acid
Material and type of Plates i) Positive Plates		
Material		Lead-Antimony alloy spine
Height of Positive Plate	mm	570
Thickness of Positive Plate	mm	9.3
Area of Positive Plate	sqm	0.205
No. of positive plates per cell		17
No. of positive plates per cell  Whether positive plates of individual cells are interchangeable		17 Yes, but not recommended
Whether positive plates of individual cells are		
Whether positive plates of individual cells are interchangeable		
Whether positive plates of individual cells are interchangeable  ii) Negative Plates	mm	Yes, but not recommended
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material	mm mm	Yes, but not recommended  Lead - Calcium alloy grid
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate		Yes, but not recommended  Lead - Calcium alloy grid  564
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable  Material and type of Separators	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053  18  Yes, but not recommended
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable  Material and type of Separators  Material	mm sqm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053  18  Yes, but not recommended  Synthetic fibre based material
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable  Material and type of Separators  Material  Thickness of separator  Clearance between bottom of the plate and the bottom	mm sqm mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053  18  Yes, but not recommended  Synthetic fibre based material  1.7
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable  Material and type of Separators  Material  Thickness of separator  Clearance between bottom of the plate and the bottom of the container  Clearance between top of the plates and top of	mm sqm mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053  18  Yes, but not recommended  Synthetic fibre based material  1.7  42.5



Thickness of Container mm 10

Material of Container Transparent SAN

Cover

Type of cover Adhesive sealed

Material of Cover Opaque SAN

Connections

Material of Inter-Cell Connectors Insulated Lead Plated Copper

Thickness of Inter-Cell Connectors mm 5

Method of connection Bolted

Inter-row, Inter-tier connectors and end take-offs

furnished? Yes

Material of Bolt, Nut and Washer for Inter-Cell and Cable Connections

Lead plated MS

### Racks

Racks

a) Number of racks per battery
b) Number of cells per rack
c) Type of racks
Depends on the battery layout
Depends on the battery layout

d) Material of rack Steel / Teak wood
e) Dimensions of the racks Depends on the battery layout

Ventilation requirements

Cubic content of battery rooms  ${\rm m}^3$  To be provided by customer

Gas generation per single cell per hour Lit 70.4

No. of air exchanges required per hour Depends on the size of battery room

Gasification Voltage per Cell Volt 2.36

Recommended Max. period of cell storage before the first Charge (After Installation and filling of Electrolyte) 12 - 18 hours



General Technical Particulars		
Type of Cell	Units	18TBS2400
Nominal Voltage per cell	Volts	2
Manufacturer's Name		Exide Industries Ltd.
Standards to which battery is manufactured		IS 1651
IS Nomenclature		
Number of cells in the battery bank		n
Nominal Voltage of Battery	Volts	2 X n
Declared Capacity at 27 degree C upto 1.80 ecv Initial Rated End of Life	AH AH AH	2400 2400 1920
Rated Capacity at mimimum ambient temperature	Ah	As per formula: Ct=C27{1+0.0043(t-27)}
Rated Capacity at maximum ambient temperature	Ah	As per formula: Ct=C27{1+0.0043(t-27)}
Capacity in AH at various end cell voltages and duration of discharge		
1 hour 2 hour 3 hour 4 hour 5 hour 6 hour 7 hour 8 hour 9 hour 10 Hour  Maximum momentary current for 1 min till 1.60 e.c.v  Expected life of battery under normal operation & maintainence conditions  Internal Resistance of cell (IR)	E.C.V. 1.67 1.70 1.75 1.76 1.77 1.78 1.78 1.80 1.80  Years	Ah output 1224.00 1540.80 1792.80 1900.80 2059.20 2150.40 2224.80 2280.00 2349.60 2400.00  4320  15 years in stand-by float application 0.14
Loss in capacity in 28 days due to self discharge	%	<8%
Recommended Charging rate for a) Float Charging i) Limit current ii) Voltage b) Boost charging i) Starting Current ii) Finishing current iii) Voltage	A V A A V	360 2.23 vpc 288 144 2.75
Trickle Charging Rate i) Minimum ii) Maximum	mA mA	<b>2400</b> 9600
Equalising charge a) Voltage b) Current c) Duration d) Interval between succesive equalising charge	V A Hrs. Months	2.3 120 6 3
Recommended Specific gravity at 27 deg C a) for first filling b) at full charge c) when Battery is discharged at 10 hours rate		1.220 +/- 0.005 1.240 +/- 0.005 1.160 - 1.130



Permissible max. temperature of Electrolyte i) During Initial Charging ii) During Normal Operation	deg C deg C	50 45
Overall dimensions		
Each Cell L x W x H (tolerance of +/- 2 mm in each case)	mm	212 X 487 X 847
Complete Battery	mm	Depends on the battery layout
Distance between cell centres	mm	220
Quantity of Electrolyte per Cell	litres	50.7
Quantity of Electrolyte for battery (Including 10% extra)	litres	n X electrolyte per cell X 1.1
Weight(+/-5%) Each cell		
without acid with acid	kg kg	131.5 193.4
Complete Battery without acid with acid	kg kg	n X each cell weight without acid n X each cell weight with acid
Material and type of Plates i) Positive Plates		
Material		Lead-Antimony alloy spine
Height of Positive Plate	mm	570
Thickness of Positive Plate	mm	9.3
Area of Positive Plate	sqm	0.205
No. of positive plates per cell		18
No. of positive plates per cell  Whether positive plates of individual cells are interchangeable		18 Yes, but not recommended
Whether positive plates of individual cells are		
Whether positive plates of individual cells are interchangeable		
Whether positive plates of individual cells are interchangeable  ii) Negative Plates	mm	Yes, but not recommended
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material	mm mm	Yes, but not recommended  Lead - Calcium alloy grid
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate		Yes, but not recommended  Lead - Calcium alloy grid  564
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable  Material and type of Separators	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053  20  Yes, but not recommended
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable  Material and type of Separators  Material	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053  20  Yes, but not recommended  Synthetic fibre based material
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable  Material and type of Separators  Material  Thickness of separator  Clearance between bottom of the plate and the bottom	mm sqm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053  20  Yes, but not recommended  Synthetic fibre based material  1.7
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable  Material and type of Separators  Material  Thickness of separator  Clearance between bottom of the plate and the bottom of the container  Clearance between top of the plates and top of	mm sqm mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053  20  Yes, but not recommended  Synthetic fibre based material  1.7  43



Thickness of Container mm 10

Material of Container Transparent SAN

Cover

Type of cover Adhesive sealed

Material of Cover Opaque SAN

Connections

Material of Inter-Cell Connectors Insulated Lead Plated Copper

Thickness of Inter-Cell Connectors  $\mathsf{mm}$ 

Method of connection Bolted

Inter-row, Inter-tier connectors and end take-offs furnished? Yes

Material of Bolt, Nut and Washer for Inter-Cell and Lead plated MS Cable Connections

#### Racks

Racks

a) Number of racks per battery Depends on the battery layout b) Number of cells per rack Depends on the battery layout c) Type of racks Depends on the battery layout

d) Material of rack Steel / Teak wood Depends on the battery layout

e) Dimensions of the racks

Ventilation requirements

 $\,m^3\,$ Cubic content of battery rooms To be provided by customer

Gas generation per single cell per hour Lit 76.8

No. of air exchanges required per hour Depends on the size of battery room

Gasification Voltage per Cell 2.36 Volt

Recommended Max. period of cell storage before the first Charge (After Installation and filling of Electrolyte) 12 - 18 hours



General Technical Particulars	l locks	
Type of Cell	Units	20TBS2500
Nominal Voltage per cell	Volts	2
Manufacturer's Name		Exide Industries Ltd.
Standards to which battery is manufactured		IS 1651
IS Nomenclature		
Number of cells in the battery bank		n
Nominal Voltage of Battery	Volts	2 X n
Declared Capacity at 27 degree C upto 1.80 ecv Initial Rated End of Life	AH AH AH	2500 2500 2000
Rated Capacity at mimimum ambient temperature	Ah	As per formula: Ct=C27{1+0.0043(t-27)}
Rated Capacity at maximum ambient temperature	Ah	As per formula: Ct=C27{1+0.0043(t-27)}
Capacity in AH at various end cell voltages and duratio of discharge		
1 hour 2 hour 3 hour 4 hour 5 hour 6 hour 7 hour 8 hour 10 Hour	E.C.V. 1.67 1.70 1.75 1.76 1.77 1.77 1.78 1.78 1.80 1.80	Ah output 1275.00 1605.00 1867.50 1980.00 2145.00 2240.00 2317.50 2375.00 2447.50
Maximum momentary current for 1 min till 1.60 e.c.v	1.60	2500.00 4500
Expected life of battery under normal operation & maintainence conditions	Years	15 years in stand-by float application
Internal Resistance of cell (IR)	milli ohms	0.12
Loss in capacity in 28 days due to self discharge	%	<8%
Recommended Charging rate for a) Float Charging i) Limit current ii) Voltage b) Boost charging i) Starting Current ii) Finishing current iii) Voltage	A V A A V	375 2.23 vpc 300 150 2.75
Trickle Charging Rate i) Minimum ii) Maximum	mA mA	2500 10000
Equalising charge a) Voltage b) Current c) Duration d) Interval between succesive equalising charge	V A Hrs. Months	2.3 125 6 3
Recommended Specific gravity at 27 deg C a) for first filling b) at full charge c) when Battery is discharged at 10 hours rate		1.220 +/- 0.005 1.240 +/- 0.005 1.160 - 1.130



Permissible max. temperature of Electrolyte i) During Initial Charging ii) During Normal Operation	deg C deg C	50 45
Overall dimensions		
Each Cell L x W x H (tolerance of +/- 2 mm in each case)	mm	212 X 487 X 847
Complete Battery	mm	Depends on the battery layout
Distance between cell centres	mm	220
Quantity of Electrolyte per Cell	litres	49.3
Quantity of Electrolyte for battery (Including 10% extra)	litres	n X electrolyte per cell X 1.1
Weight(+/-5%) Each cell		
without acid with acid	kg kg	140.7 200.8
Complete Battery without acid with acid	kg kg	n X each cell weight without acid n X each cell weight with acid
Material and type of Plates i) Positive Plates		
Material		Lead-Antimony alloy spine
Height of Positive Plate	mm	570
Thickness of Positive Plate	mm	9.3
Area of Positive Plate	sqm	0.205
No. of positive plates per cell		20
No. of positive plates per cell  Whether positive plates of individual cells are interchangeable		20 Yes, but not recommended
Whether positive plates of individual cells are		
Whether positive plates of individual cells are interchangeable		
Whether positive plates of individual cells are interchangeable  ii) Negative Plates	mm	Yes, but not recommended
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material	mm mm	Yes, but not recommended  Lead - Calcium alloy grid
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate		Yes, but not recommended  Lead - Calcium alloy grid  564
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable  Material and type of Separators	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053  20  Yes, but not recommended
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable  Material and type of Separators  Material	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053  20  Yes, but not recommended  Synthetic fibre based material
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable  Material and type of Separators  Material  Thickness of separator  Clearance between bottom of the plate and the bottom	mm sqm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053  20  Yes, but not recommended  Synthetic fibre based material  1.7
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable  Material and type of Separators  Material  Thickness of separator  Clearance between bottom of the plate and the bottom of the container  Clearance between top of the plates and top of	mm sqm mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053  20  Yes, but not recommended  Synthetic fibre based material  1.7  43



To be provided by customer

#### Container

Thickness of Container mm 10

Material of Container Transparent SAN

Cover

Type of cover Adhesive sealed

Material of Cover Opaque SAN

Connections

Material of Inter-Cell Connectors Insulated Lead Plated Copper

Thickness of Inter-Cell Connectors  $\mathsf{mm}$ 

Method of connection Bolted

Inter-row, Inter-tier connectors and end take-offs

furnished? Yes

Material of Bolt, Nut and Washer for Inter-Cell and Lead plated MS Cable Connections

Racks

Racks

a) Number of racks per battery Depends on the battery layout b) Number of cells per rack Depends on the battery layout c) Type of racks Depends on the battery layout

d) Material of rack Steel / Teak wood Depends on the battery layout

e) Dimensions of the racks

Cubic content of battery rooms

Ventilation requirements  $\,m^3\,$ 

Gas generation per single cell per hour Lit 80

No. of air exchanges required per hour Depends on the size of battery room

Gasification Voltage per Cell 2.36 Volt

Recommended Max. period of cell storage before the first Charge (After Installation and filling of Electrolyte) 12 - 18 hours



General Technical Particulars	مغنما	
Type of Cell	Units	20TBS2600
Nominal Voltage per cell	Volts	2
Manufacturer's Name		Exide Industries Ltd.
Standards to which battery is manufactured		IS 1651
IS Nomenclature		
Number of cells in the battery bank		n
Nominal Voltage of Battery	Volts	2 X n
Declared Capacity at 27 degree C upto 1.80 ecv Initial Rated End of Life	AH AH AH	2600 2600 2080
Rated Capacity at mimimum ambient temperature	Ah	As per formula: Ct=C27{1+0.0043(t-27)}
Rated Capacity at maximum ambient temperature	Ah	As per formula: Ct=C27{1+0.0043(t-27)}
Capacity in AH at various end cell voltages and duration of discharge		
1 hour 2 hour 3 hour 4 hour 5 hour 6 hour 7 hour 8 hour 10 Hour	E.C.V. 1.67 1.70 1.75 1.76 1.77 1.77 1.78 1.78 1.80 1.80	Ah output 1326.00 1669.20 1942.20 2059.20 2230.80 2329.60 2410.20 2470.00 2545.40 2600.00
Maximum momentary current for 1 min till 1.60 e.c.v		4680
Expected life of battery under normal operation & maintainence conditions	Years	15 years in stand-by float application
Internal Resistance of cell (IR)	milli ohms	0.12
Loss in capacity in 28 days due to self discharge	%	<8%
Recommended Charging rate for a) Float Charging i) Limit current ii) Voltage b) Boost charging i) Starting Current ii) Finishing current iii) Voltage	A V A A V	390 2.23 vpc 312 156 2.75
Trickle Charging Rate i) Minimum ii) Maximum	mA mA	2600 10400
Equalising charge a) Voltage b) Current c) Duration d) Interval between succesive equalising charge	V A Hrs. Months	2.3 130 6 3
Recommended Specific gravity at 27 deg C a) for first filling b) at full charge c) when Battery is discharged at 10 hours rate		1.220 +/- 0.005 1.240 +/- 0.005 1.160 - 1.130



Permissible max. temperature of Electrolyte i) During Initial Charging ii) During Normal Operation	deg C deg C	50 45
Overall dimensions		
Each Cell L x W x H (tolerance of +/- 2 mm in each case) Complete Battery	mm mm	212 X 487 X 847  Depends on the battery layout
Distance between cell centres	mm	220
Quantity of Electrolyte per Cell	litres	49
Quantity of Electrolyte for battery (Including 10% extra)	litres	n X electrolyte per cell X 1.1
Weight(+/-5%) Each cell		
without acid with acid	kg kg	145 204.8
Complete Battery without acid	kg	n X each cell weight without acid
with acid	kg	n X each cell weight with acid
Material and type of Plates i) Positive Plates		
Material		Lead-Antimony alloy spine
Height of Positive Plate	mm	570
Thickness of Positive Plate	mm	9.3
Area of Positive Plate	sqm	0.205
No. of positive plates per cell		20
Whether positive plates of individual cells are interchangeable		Yes, but not recommended
ii) Negative Plates		
Material		Lead - Calcium alloy grid
Height of Negative Plate	mm	564
Thickness of Negative Plate	mm	4.5
Area of Negative Plate	sqm	0.2053
No. of negative plates per cell		22
Whether negative plates of individual cells are interchangeable		Yes, but not recommended
Material and type of Separators		
Material		Synthetic fibre based material
Thickness of separator	mm	1.7
Clearance between bottom of the plate and the bottom of the container	mm	43
Clearance between top of the plates and top of container	mm	125.5
Whether explosion vents are offerred		YES
Type of Vent and Filling Plugs		Explosion proof microporous ceramic made



## Container

Thickness of Container mm 10

Material of Container Transparent SAN

Cover

Type of cover Adhesive sealed

Material of Cover Opaque SAN

Connections

Material of Inter-Cell Connectors Insulated Lead Plated Copper

Thickness of Inter-Cell Connectors  $\mathsf{mm}$ 

Method of connection Bolted

Inter-row, Inter-tier connectors and end take-offs furnished? Yes

Material of Bolt, Nut and Washer for Inter-Cell and Lead plated MS Cable Connections

Racks

Racks

a) Number of racks per battery Depends on the battery layout b) Number of cells per rack Depends on the battery layout c) Type of racks Depends on the battery layout

d) Material of rack Steel / Teak wood

e) Dimensions of the racks Depends on the battery layout

Ventilation requirements

 $\,m^3\,$ Cubic content of battery rooms To be provided by customer

Gas generation per single cell per hour Lit 83.2

No. of air exchanges required per hour Depends on the size of battery room

Gasification Voltage per Cell 2.36 Volt

Recommended Max. period of cell storage before the first Charge (After Installation and filling of Electrolyte) 12 - 18 hours

Recommended Storage life of Battery (Dry shelf life) 12 months



General Technical Particulars	11.5	
Type of Cell	Units	22TBS2900
Nominal Voltage per cell	Volts	2
Manufacturer's Name		Exide Industries Ltd.
Standards to which battery is manufactured		IS 1651
IS Nomenclature		
Number of cells in the battery bank		n
Nominal Voltage of Battery	Volts	2 X n
Declared Capacity at 27 degree C upto 1.80 ecv Initial Rated End of Life	AH AH AH	2900 2900 2320
Rated Capacity at mimimum ambient temperature	Ah	As per formula: Ct=C27{1+0.0043(t-27)}
Rated Capacity at maximum ambient temperature	Ah	As per formula: Ct=C27{1+0.0043(t-27)}
Capacity in AH at various end cell voltages and duratio of discharge		
1 hour 2 hour 3 hour 4 hour 5 hour 6 hour 7 hour 8 hour 9 hour 10 Hour  Maximum momentary current for 1 min till 1.60 e.c.v  Expected life of battery under normal operation & maintainence conditions	E.C.V. 1.67 1.70 1.75 1.76 1.77 1.77 1.78 1.78 1.80 1.80	Ah output 1479.00 1861.80 2166.30 2296.80 2488.20 2598.40 2688.30 2755.00 2839.10 2900.00  5220
Internal Resistance of cell (IR)	milli ohms	0.11
Loss in capacity in 28 days due to self discharge	%	<8%
Recommended Charging rate for a) Float Charging i) Limit current ii) Voltage b) Boost charging i) Starting Current ii) Finishing current iii) Voltage	A V A A V	435 2.23 vpc 348 174 2.75
Trickle Charging Rate i) Minimum ii) Maximum	mA mA	2900 11600
Equalising charge a) Voltage b) Current c) Duration d) Interval between succesive equalising charge	V A Hrs. Months	2.3 145 6 3
Recommended Specific gravity at 27 deg C a) for first filling b) at full charge c) when Battery is discharged at 10 hours rate		1.220 +/- 0.005 1.240 +/- 0.005 1.160 - 1.130



Permissible max. temperature of Electrolyte i) During Initial Charging ii) During Normal Operation	deg C deg C	50 45
Overall dimensions		
Each Cell L x W x H (tolerance of +/- 2 mm in each case)	mm	212 X 576 X 847
Complete Battery	mm	Depends on the battery layout
Distance between cell centres	mm	220
Quantity of Electrolyte per Cell	litres	60.1
Quantity of Electrolyte for battery (Including 10% extra)	litres	n X electrolyte per cell X 1.1
Weight(+/-5%) Each cell		
without acid with acid	kg kg	158.5 231.8
Complete Battery without acid	kg	n X each cell weight without acid
with acid	kg	n X each cell weight with acid
Material and type of Plates i) Positive Plates		
Material		Lead-Antimony alloy spine
Height of Positive Plate	mm	570
Thickness of Positive Plate	mm	9.3
Area of Positive Plate	sqm	0.205
No. of positive plates per cell		22
No. of positive plates per cell  Whether positive plates of individual cells are interchangeable		Yes, but not recommended
Whether positive plates of individual cells are		
Whether positive plates of individual cells are interchangeable		
Whether positive plates of individual cells are interchangeable  ii) Negative Plates	mm	Yes, but not recommended
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material	mm mm	Yes, but not recommended  Lead - Calcium alloy grid
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate		Yes, but not recommended  Lead - Calcium alloy grid  564
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable  Material and type of Separators	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053  24  Yes, but not recommended
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable  Material and type of Separators  Material	mm sqm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053  24  Yes, but not recommended  Synthetic fibre based material
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable  Material and type of Separators  Material  Thickness of separator  Clearance between bottom of the plate and the bottom	mm sqm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053  24  Yes, but not recommended  Synthetic fibre based material  1.7
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable  Material and type of Separators  Material  Thickness of separator  Clearance between bottom of the plate and the bottom of the container  Clearance between top of the plates and top of	mm sqm mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053  24  Yes, but not recommended  Synthetic fibre based material  1.7  43



## Container

Thickness of Container mm 10

Material of Container Transparent SAN

Cover

Type of cover Adhesive sealed

Material of Cover Opaque SAN

Connections

Material of Inter-Cell Connectors Insulated Lead Plated Copper

Thickness of Inter-Cell Connectors mm 5

Method of connection Bolted

Inter-row, Inter-tier connectors and end take-offs furnished? Yes

Material of Bolt, Nut and Washer for Inter-Cell and
Cable Connections

Lead plated MS

Racks

Racks

a) Number of racks per battery
b) Number of cells per rack
c) Type of racks

Depends on the battery layout
Depends on the battery layout
Depends on the battery layout

d) Material of rack

Steel / Teak wood

e) Dimensions of the racks

Depends on the battery layout

Ventilation requirements

Cubic content of battery rooms m<sup>3</sup> To be provided by customer

Gas generation per single cell per hour Lit 92.8

No. of air exchanges required per hour Depends on the size of battery room

Gasification Voltage per Cell Volt 2.36

Recommended Max. period of cell storage before the first Charge (After Installation and filling of Electrolyte) 12 - 18 hours

Recommended Storage life of Battery (Dry shelf life) 12 months



<b>General Technical Particulars</b>		
	Units	
Type of Cell		24TBS3000
Nominal Voltage per cell	Volts	2
Manufacturer's Name		Exide Industries Ltd.
Standards to which battery is manufactured		IS 1651
IS Nomenclature		
Number of cells in the battery bank		n
Nominal Voltage of Battery	Volts	2 X n
Declared Capacity at 27 degree C upto 1.80 ecv		
Initial	AH	3000
Rated	AH	3000
End of Life	AH	2400
Rated Capacity at mimimum ambient temperature	Ah	As per formula: Ct=C27{1+0.0043(t-27)}
Rated Capacity at maximum ambient temperature	Ah	As per formula: Ct=C27{1+0.0043(t-27)}
Capacity in AH at various end cell voltages and duratio of discharge	n	
	E.C.V.	Ah output
1 hour	1.67	1530.00
2 hour	1.70	1926.00
3 hour	1.75	2241.00
4 hour	1.76	2376.00
5 hour	1.77	2574.00
6 hour	1.77	2688.00
7 hour	1.78	2781.00
8 hour	1.78	2850.00
9 hour	1.80	2937.00
10 Hour	1.80	3000.00
Maximum momentary current for 1 min till 1.60 e.c.v		5400
Expected life of battery under normal operation & maintainence conditions	Years	15 years in stand-by float application
Internal Resistance of cell (IR)	milli ohms	0.1
Loss in capacity in 28 days due to self discharge	%	<8%
Recommended Charging rate for a) Float Charging		
i) Limit current	Α	450
ii) Voltage	V	2.23 vpc
b) Boost charging		- F
i) Starting Current	Α	360
ii) Finishing current	Α	180
iii) Voltage	V	2.75
Trickle Charging Rate		
i) Minimum ii) Maximum	mA mA	3000 12000
Equalising charge		
a) Voltage	V	2.3
b) Current	Α	150
c) Duration	Hrs.	6
d) Interval between succesive equalising charge	Months	3
Pacammondad Specific growity of 27 dec C		
Recommended Specific gravity at 27 deg C a) for first filling		1 220 1/ 0 005
a) for first filling b) at full charge		1.220 +/- 0.005 1.240 +/- 0.005
c) when Battery is discharged at 10 hours rate		1.160 - 1.130
o, when pattery is discridingly at 10 flours falls		1.100 - 1.130



Permissible max. temperature of Electrolyte i) During Initial Charging ii) During Normal Operation	deg C deg C	50 45
Overall dimensions		
Each Cell L x W x H (tolerance of +/- 2 mm in each case) Complete Battery	mm mm	212 X 576 X 847  Depends on the battery layout
Distance between cell centres	mm	220
Quantity of Electrolyte per Cell	litres	58.7
Quantity of Electrolyte for battery (Including 10% extra)	litres	n X electrolyte per cell X 1.1
Weight(+/-5%) Each cell		
without acid with acid	kg kg	164.9 236.5
Complete Battery without acid with acid	kg kg	n X each cell weight without acid n X each cell weight with acid
Material and type of Plates i) Positive Plates		
Material		Lead-Antimony alloy spine
Height of Positive Plate	mm	570
Thickness of Positive Plate	mm	9.3
Area of Positive Plate	sqm	0.205
No. of positive plates per cell		24
No. of positive plates per cell  Whether positive plates of individual cells are interchangeable		24 Yes, but not recommended
Whether positive plates of individual cells are		
Whether positive plates of individual cells are interchangeable		
Whether positive plates of individual cells are interchangeable  ii) Negative Plates	mm	Yes, but not recommended
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material	mm mm	Yes, but not recommended  Lead - Calcium alloy grid
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate		Yes, but not recommended  Lead - Calcium alloy grid  564
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable  Material and type of Separators	mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053  24  Yes, but not recommended
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable  Material and type of Separators  Material	mm   sqm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053  24  Yes, but not recommended  Synthetic fibre based material
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable  Material and type of Separators  Material  Thickness of separator  Clearance between bottom of the plate and the bottom	mm sqm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053  24  Yes, but not recommended  Synthetic fibre based material  1.7
Whether positive plates of individual cells are interchangeable  ii) Negative Plates  Material  Height of Negative Plate  Thickness of Negative Plate  Area of Negative Plate  No. of negative plates per cell  Whether negative plates of individual cells are interchangeable  Material and type of Separators  Material  Thickness of separator  Clearance between bottom of the plate and the bottom of the container  Clearance between top of the plates and top of	mm sqm mm	Yes, but not recommended  Lead - Calcium alloy grid  564  4.5  0.2053  24  Yes, but not recommended  Synthetic fibre based material  1.7  43



Depends on the battery layout

To be provided by customer

## Container

Thickness of Container mm 10

Material of Container Transparent SAN

Cover

Type of cover Adhesive sealed

Material of Cover Opaque SAN

Connections

Material of Inter-Cell Connectors Insulated Lead Plated Copper

Thickness of Inter-Cell Connectors  $\mathsf{mm}$ 

Method of connection Bolted

Inter-row, Inter-tier connectors and end take-offs furnished? Yes

Material of Bolt, Nut and Washer for Inter-Cell and Lead plated MS Cable Connections

Racks

Racks

Ventilation requirements

Cubic content of battery rooms

a) Number of racks per battery Depends on the battery layout b) Number of cells per rack Depends on the battery layout c) Type of racks Depends on the battery layout

d) Material of rack Steel / Teak wood

e) Dimensions of the racks

 $\,m^3\,$ 

Gas generation per single cell per hour Lit 96

No. of air exchanges required per hour Depends on the size of battery room

Gasification Voltage per Cell 2.36 Volt

Recommended Max. period of cell storage before the first Charge (After Installation and filling of Electrolyte) 12 - 18 hours

Recommended Storage life of Battery (Dry shelf life) 12 months



General Technical Particulars	l locks	
Type of Cell	Units	24TBS3200
Nominal Voltage per cell	Volts	2
Manufacturer's Name		Exide Industries Ltd.
Standards to which battery is manufactured		IS 1651
IS Nomenclature		
Number of cells in the battery bank		n
Nominal Voltage of Battery	Volts	2 X n
Declared Capacity at 27 degree C upto 1.80 ecv Initial Rated End of Life	AH AH AH	3200 3200 2560
Rated Capacity at mimimum ambient temperature	Ah	As per formula: Ct=C27{1+0.0043(t-27)}
Rated Capacity at maximum ambient temperature	Ah	As per formula: Ct=C27{1+0.0043(t-27)}
Capacity in AH at various end cell voltages and duratio of discharge		
1 hour 2 hour 3 hour 4 hour 5 hour 6 hour 7 hour 8 hour 10 Hour	E.C.V. 1.67 1.70 1.75 1.76 1.77 1.77 1.78 1.78 1.80 1.80	Ah output 1632.00 2054.40 2390.40 2534.40 2745.60 2867.20 2966.40 3040.00 3132.80 3200.00
Maximum momentary current for 1 min till 1.60 e.c.v	1.60	5760
Expected life of battery under normal operation & maintainence conditions	Years	15 years in stand-by float application
Internal Resistance of cell (IR)	milli ohms	0.1
Loss in capacity in 28 days due to self discharge	%	<8%
Recommended Charging rate for a) Float Charging i) Limit current ii) Voltage b) Boost charging i) Starting Current ii) Finishing current iii) Voltage	A V A A V	480 2.23 vpc 384 192 2.75
Trickle Charging Rate i) Minimum ii) Maximum	mA mA	3200 12800
Equalising charge a) Voltage b) Current c) Duration d) Interval between succesive equalising charge	V A Hrs. Months	2.3 160 6 3
Recommended Specific gravity at 27 deg C a) for first filling b) at full charge c) when Battery is discharged at 10 hours rate		1.220 +/- 0.005 1.240 +/- 0.005 1.160 - 1.130



Permissible max. temperature of Electrolyte i) During Initial Charging ii) During Normal Operation	deg C deg C	50 45
Overall dimensions		
Each Cell L x W x H (tolerance of +/- 2 mm in each case) Complete Battery	mm mm	212 X 576 X 847  Depends on the battery layout
Distance between cell centres	mm	220
Quantity of Electrolyte per Cell	litres	58.4
Quantity of Electrolyte for battery (Including 10% extra)	litres	n X electrolyte per cell X 1.1
Weight(+/-5%) Each cell		
without acid with acid	kg	170 241.2
	kg	
Complete Battery without acid with acid	kg kg	n X each cell weight without acid n X each cell weight with acid
Material and type of Plates i) Positive Plates		
Material		Lead-Antimony alloy spine
Height of Positive Plate	mm	570
Thickness of Positive Plate	mm	9.3
Area of Positive Plate	sqm	0.205
No. of positive plates per cell		24
Whether positive plates of individual cells are interchangeable		Yes, but not recommended
ii) Negative Plates		
Material		Lead - Calcium alloy grid
Height of Negative Plate	mm	564
Thickness of Negative Plate	mm	4.5
Area of Negative Plate	sqm	0.2053
No. of negative plates per cell		26
Whether negative plates of individual cells are interchangeable		Yes, but not recommended
Material and type of Separators		
Material		Synthetic fibre based material
Thickness of separator	mm	1.7
Clearance between bottom of the plate and the bottom of the container	mm	43
Clearance between top of the plates and top of container	mm	125.5
Whether explosion vents are offerred		YES
Type of Vent and Filling Plugs		Explosion proof microporous ceramic made



## Container

Thickness of Container mm 10

Material of Container Transparent SAN

Cover

Type of cover Adhesive sealed

Material of Cover Opaque SAN

Connections

Material of Inter-Cell Connectors Insulated Lead Plated Copper

Thickness of Inter-Cell Connectors mm 5

Method of connection Bolted

Inter-row, Inter-tier connectors and end take-offs furnished? Yes

Turnionou.

Material of Bolt, Nut and Washer for Inter-Cell and
Cable Connections

Lead plated MS

Racks

Racks

a) Number of racks per battery
b) Number of cells per rack
c) Type of racks

Depends on the battery layout
Depends on the battery layout
Depends on the battery layout

d) Material of rack
Steel / Teak wood

e) Dimensions of the racks

Depends on the battery layout

Ventilation requirements

Cubic content of battery rooms  $$\rm{m}^{3}$$  To be provided by customer

Gas generation per single cell per hour Lit 102.4

No. of air exchanges required per hour Depends on the size of battery room

Gasification Voltage per Cell Volt 2.36

Recommended Max. period of cell storage before the first Charge (After Installation and filling of Electrolyte) 12 - 18 hours

Recommended Storage life of Battery (Dry shelf life) 12 months